# RECORD OF DECISION
# SUMMARY OF REMEDIAL ALTERNATIVE SELECTION

# CABOT CARBON/KOPPERS SUPERFUND SITE

GAINESVILLE, ALACHUA COUNTY, FLORIDA

PREPARED BY:

U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA, GEORGIA

FEBRUARY 2011

## RECORD OF DECISION

## DECLARATION

### Site Name and Location

This Record of Decision (ROD) is for the Cabot Carbon/Koppers Superfund Site, Gainesville, Alachua County, Florida. The U.S. Environmental Protection Agency (EPA) Site Identification Number is FLD980709356.

### Statement of Basis and Purpose

This decision document presents the selected remedy for the "Site" that was chosen in accordance with the Comprehensive Environmental Response, Compensation, Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), and, to the extent practicable, the National Contingency Plan (NCP). This decision is based on the Administrative Record for the Site. This decision represents the final remedy selected for the Site and following completion of the remedial action (RA), the Site will be ready for reuse. The State of Florida, as represented by the Florida Department of Environmental Protection (FDEP), has been the support agency during the remedial investigation/feasibility study (RI/FS) process. In accordance with 40 Code of Federal Regulations (CFR) Sec 300.430, as the support agency, FDEP has provided input during the process and has actively participated in the decision making process.

### Assessment of Site

The response action selected in this ROD is necessary to protect the public health or welfare or the environment from actual or threatened releases of (1) hazardous substances to the environment; and (2) pollutants or contaminants from this Site which may present an imminent and substantial endangerment to public health or welfare.

### Description of Selected Remedy

The overall cleanup strategy is to treat, contain, and control contamination associated with this Site. Following completion of construction and establishment of institutional controls (ICs), the remedy will be protective of both human and ecological receptors. The selected remedy is compatible with the reasonably anticipated future use of the property.

The selected remedy has three parts that address three distinct media groups: on-Site media, the Upper Floridan Aquifer (UFA), and off-Site media. The major components of the selected remedy for on-Site media include:

- Establishment of an on-Site soil consolidation area that includes:
    - A single, continuous vertical barrier wall (approximately 65 feet deep) encircling all four principal contaminant source areas from land surface to the Hawthorn Group middle clay.
    - Establishment of a low-permeability cap/cover over the consolidation area to protect against rain infiltration and contamination migration.

- In place (in-situ) solidification and stabilization (ISS/S) of contamination from ground surface to the upper Hawthorn Group zone (0 to 65 feet bls) at two of the four principal contaminant source areas (the former North Lagoon and the former Drip Track area). The ISS/S component of this remedy component will be implemented through injection of stabilizing chemicals into the ground surface. This ISS/S treatment is subject to acceptable performance demonstration during pilot tests or treatability studies. Pilot tests/treatability studies are tests conducted with contaminated Site materials and stabilizers to determine if cleanup goals will be met.
- In-situ geochemical stabilization (ISGS) (also referred to as in-situ biogeochemical stabilization (ISBS) of DNAPL from ground surface to the bottom of the upper Hawthorn Group zone (0 to 65 feet bls) at two of the four principal contaminant source areas (former Process area and the former South Lagoon). The ISGS component of this remedy component will be implemented through injection of oxidizing and stabilizing chemicals into the ground surface. This ISGS treatment is subject to acceptable performance demonstration during pilot tests or treatability studies. Pilot tests/treatability studies are tests conducted with contaminated Site materials and stabilizers to determine if cleanup goals will be met. If pilot tests/treatability studies do not demonstrate to EPA acceptable performance of the ISGS treatment for the Surficial Aquifer zone, the Surficial Aquifer zone at the former Process area and at the former South Lagoon will be treated with In-situ solidification (ISS/S).
- In-situ injection of oxidizing chemicals or ISGS treatment in the lower Hawthorn Group in two of the four principal source areas (former Process Area and the former South Lagoon) and along the eastern property boundary through newly installed injection wells.
- Excavation of soil posing a leachability or direct contact concern outside of the consolidation area; placement of excavated soil in soil consolidation area.
- Surface grading and clean soil covers on approximately 83 of 86 acres on the Site property.
- Installation of storm water controls and improvements (e.g., retention/ detention pond).
- Continued operation of the perimeter wells of the Surficial Aquifer extraction and treatment system (outside of the consolidation area) until cleanup goals are attained.
- Continued operation of the horizontal collection drains of the Surficial Aquifer extraction and treatment system as needed to contain potential migration of groundwater contamination (hydraulic control).
- Expansion of the Surficial Aquifer and Hawthorn Group monitoring network.
- Institutional controls such as deed restrictions to prevent future digging that would result in contact with contaminated media.

The major components of the selected remedy for the UFA include:

- Hydraulic containment of contaminated groundwater through extraction and treatment in areas where chemicals of concern (COCs) exceed cleanup goals.
- Construction of additional monitoring/extraction wells for the network, as necessary.
- Monitored natural attenuation (MNA) in areas where there are low-level exceedances of cleanup goals

The major components of the selected remedy for off-Site media include cleanup of soil contamination at private properties surrounding the Site and addressing surface water and sediment contamination in Hogtown and Springstead Creeks.

For soil contamination, a range of options consistent with State of Florida cleanup guidance are proposed for use on individual subparcels with the consent of the private property owners including, in order of preference:

- Excavation and removal of impacted soil that exceeds cleanup goals based on current use of the land. Excavated soil will be transported and placed within the consolidation area on-Site.
- Engineered controls that prevent contact with impacted soil containing contamination that exceeds cleanup goals based on current use of the land use.
- Institutional controls to protect accessibility and use of land/properties.

For surface water and sediment in Hogtown and Springstead Creeks, the selected remedy includes:

- Excavation and removal of impacted sediment in excess of levels shown to likely cause an adverse effect when in direct contact (probable effects concentration). Excavated sediment will be placed in the consolidation area on-Site.
- Monitored natural recovery of remaining impacted sediment until concentrations reach threshold effects concentrations (contaminant concentrations above these levels could adversely affect a plant or animal) or background levels.

**Statutory Determinations**

The selected remedy is protective of human health and the environment, complies with federal and state requirements that are applicable or relevant and appropriate to the RA (unless justified by a waiver), and is cost effective. This remedy utilizes permanent solutions to the maximum extent practicable and satisfies the statutory preference for remedies that employ treatment to reduce toxicity, mobility, or volume as a principal element. The remedy eliminates human and ecological exposure to contaminated groundwater and soil, permanently controls the mobility of the contaminants, and is protective of groundwater resources. Principal threat waste dense non-aqueous phase liquid (DNAPL) in the source areas is treated by both ISS/S and ISGS thus rendering it immobile.

Because this remedy will result in hazardous substances, pollutants, or contaminants remaining on-Site above levels that will allow for unlimited use and unrestricted exposure, a statutory review will be conducted within five years of construction of the remedy to ensure that the on-Site remedy remains protective of human health and the environment, inclusive of the applicable ICs. Five-Year Reviews will continue throughout the life of the Site until hazardous substances, pollutants or contaminants no longer remain on Site at levels that do not allow for unlimited use and unrestricted exposure.

**Data Certification Checklist**

The following information is included in The Decision Summary of this ROD. Additional information may be found in the Administrative Record file for this Site.

- Baseline risk represented by the COCs (Tables 4 and 5, pages 143 and 144)

- Cleanup goals established for COCs and the basis for these levels (Tables 6, 7, and 8, pages 145 through 147)
- How source materials constituting principal threats are addressed (page 111)
- Current and reasonably anticipated future land use assumptions and current and potential future beneficial uses of groundwater used in the Baseline Risk Assessment and ROD (page 39)
- Potential land and groundwater use that will be available at the Site as a result of the selected remedy (page 128)
- Estimated capital, annual operation and maintenance (O&M), and total present worth costs, discount rate, and the number of years over which the remedy cost estimates are projected (Tables 10 and 11, pages 150 and 153)
- Key factor(s) that led to selecting the remedy (i.e. describe how the Selected Remedy provides the best balance of tradeoffs with respect to the balancing and modifying criteria, highlighting criteria key to the decision) (page 113)

**Authorizing Signatures**

Franklin E. Hill                                        2/2/2011

Franklin E. Hill, Director                              Date
Superfund Division
U.S. Environmental Protection Agency, Region 4

# RECORD OF DECISION

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## ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| ACEPD | Alachua County Environmental Protection Division |
| ADD | average daily dose |
| amsl | above mean sea level |
| AOC | Administrative Order of Consent |
| AOC | Area of Contamination |
| ARAR | applicable or relevant and appropriate requirement |
| $As^{+3}$ | arsenite |
| $As^{+5}$ | arsenate |
| BAP-TEQ | benzo(a)pyrene toxic equivalents |
| bls | below land surface |
| BMS | Beazer Materials and Services, Inc. |
| BRA | Baseline Risk Assessment |
| BTEX | benzene, toluene, ethylbenzene and xylene |
| CA | Cooperative Agreement |
| CCA | chromated copper arsenate |
| CERCLA | Comprehensive Environmental Response Compensation Liability Act |
| CFR | Code of Federal Regulations |
| COC | chemical of concern |
| COD | Chemical Oxygen Demand |
| COPC | chemical of potential concern |
| cp | centipoise |
| CSF | cancer slope factor |
| CSM | conceptual site model |
| cy | cubic yards |
| DNAPL | dense non-aqueous phase liquid |
| dynes/cm | dynes per centimeter |
| EE/CA | Engineering Evaluation and Cost Analysis |
| Eh | oxidation-reduction potential |
| EPA | U.S. Environmental Protection Agency |
| EPC | exposure point concentration |
| ESD | Explanation of Significant Differences |
| °F | Degree Fahrenheit |
| F.A.C. | Florida Administrative Code |
| FDEP | Florida Department of Environmental Protection |
| FDER | Florida Department of Environmental Regulation |
| FS | Feasibility Study |
| ft | feet |
| GCTL | groundwater cleanup target level |
| gpm | gallon per minute |
| GRU | Gainesville Regional Utilities |
| HEAST | Health Effects Assessment Summary Tables |
| HG | Hawthorn Group |

## ACRONYMS and ABBREVIATIONS (Continued)

| | |
|---|---|
| HHRA | Human Health Risk Assessment |
| HI | hazard index |
| HQ | hazard quotient |
| IC | institutional control |
| ILCR | incremental lifetime cancer risk |
| IRA | Interim Remedial Action |
| IRIS | Integrated Risk Information System |
| IRM | Interim Remedial Measure |
| ISS/S | *In Situ* solidification and stabilization |
| ISGS | *In Situ* Biogeochemical Stabilization |
| $K_{OC}$ | Organic carbon / water partition coefficients |
| LADD | lifetime average daily dose |
| LDR | land disposal restriction(s) |
| LOAEL | lowest-observed-adverse-effect-level |
| MCL | maximum contaminant level |
| µg/L | micrograms per liter |
| mg/kg | milligrams per kilogram |
| MNA | Monitored Natural Attenuation |
| MW | Monitoring Wells |
| MSW | municipal solid waste |
| M/T/V | Mobility/Toxicity/Volume |
| NCP | National Contingency Plan |
| ncPAH | non-carcinogenic Polynuclear Aromatic Hydrocarbon |
| NOAEL | no-observed-adverse-effect-level |
| NPDES | National Pollutant Discharge Elimination System |
| NPL | National Priorities List |
| NPV | net present value |
| O&M | operation and maintenance |
| OfR | off-Site media remedies |
| OnR | on-Site media remedies |
| OU | Operable Unit |
| PAH | Polynuclear Aromatic Hydrocarbon |
| PCP | Pentachlorophenol |
| POTW | publicly owned treatment works |
| PPOC | permanent point(s) of compliance |
| PRP | Potentially Responsible Party |
| RA | Remedial Action |
| RAO | Remedial Action Objective |
| RCRA | Resource Conservation and Recovery Act |
| RD | Remedial Design |
| RfD | reference dose |

## ACRONYMS and ABBREVIATIONS (Continued)

| | |
|---|---|
| RI | Remedial Investigation |
| ROD | Record of Decision |
| RSFS | Revised Supplemental Feasibility Study |
| SARA | Superfund Amendments and Reauthorization Act of 1986 |
| SCR | Seaboard Coastline Railroad |
| SCTL | Soil Cleanup Target Levels |
| SFS | Supplemental Feasibility Study |
| Site | Cabot Carbon/Koppers Superfund Site |
| S/S | solidification/stabilization |
| SJRWMD | St. Johns River Water Management District |
| TCDD-TEQ | 2,3,7,8-tetrachlorodibenzo-p-dioxin toxic equivalents |
| TOC | total organic carbon |
| TPOC | temporary point(s) of compliance |
| UAO | Unilateral Administrative Order |
| UFA | Upper Floridan Aquifer |

# DECISION SUMMARY

## 1.0 Site Name, Location, and Brief Description

This Record of Decision (ROD) is for the Cabot Carbon/Koppers Superfund Site (Site) located at the northwest corner of North Main Street and NW 23rd Avenue in the northern part of Gainesville, Alachua County, Florida, one mile east of U.S Highway 441. The U.S. Environmental Protection Agency (EPA) is the lead agency for this Site. The EPA Site Identification Number is FLD980709356. Site remediation is to be conducted and financed by the Potentially Responsible Parties (PRPs). The Site was placed on the National Priorities List (NPL) in 1983.

The Site is located within the city limits of Gainesville, Florida, and encompasses approximately 170 acres. See Figure 1 for the Site location map. The Site is bounded by residential and commercial areas in a busy part of Gainesville.

This Site was originally two Sites: Cabot Carbon in the southeast portion of the Site, and Koppers on the western portion of the Site (Figure 1). The Koppers portion of the Site is the only zoned industrial site in the immediate area. As recently as March 2010, the Site was an operating wood-treating facility that also temporarily stored creosote-treated timber. Access is from NW 23rd Avenue. The Koppers portion of the Site covers approximately 90 acres and gently slopes to the north-northeast. Low swampy areas are prevalent in an undeveloped, vegetated area to the northeast. The land immediately west and northwest is residential.

The Cabot Carbon portion of the Site is zoned commercial. It lies immediately to the east of the Koppers portion of the Site. The area is now a shopping center with a large parking lot, a strip mall, and a car dealership. Access is unrestricted. Entrance to the parking lot is from NW 23rd and Main Street. South and east along NW 23rd Avenue and North Main Street are commercial areas.

# 2.0 Site History and Enforcement Activities

## 2.1 Operational History

### 2.1.1 Cabot Portion

Industrial processes at the Site began in 1911. The pine tar and charcoal generation facility operated under various names over the years, including:

- The Williamson Chemical Company
- The Florida Industrial Corporation
- The Retort Chemical Company (built the pine processing plant in 1928)
- Cabot Carbon Company

The Cabot Carbon Company acquired the operation in 1945 and continued to operate the pine tar and charcoal generation facility until 1966. The processing, which consisted of the destructive distillation of pine stumps, resulted in the generation of a large number of liquid products that were marketed collectively as blended solvents.

The Cabot Carbon process generated an estimated 6,000 gallons of crude wood oil and pitch per day. The crude oils and pitch mixtures were stored for refining, with one retort charge producing about 1,100 gallons of crude wood oil. During the Site operations, wastewater containing residual pyroligneous (produced by the destructive distillation of wood) contaminants, and pine tar was discharged to a concrete-lined, pyroligneous acid water (a reddish-brown liquid obtained by destructive distillation of wood and containing chiefly acetic acid, methanol, acetone, furfural, and various tars and oils) pond, where pine tar was allowed to settle for product recovery. During later years of operation, three unlined earthen impoundments were constructed to the north and downstream of the concrete-lined pond to increase settling capacity. In 1967, the Site was sold to Mr. Raymond Tassinari, a local private investor. In October of that year the new owner breached these three lagoons and the contents flowed off-Site through an adjacent 50-acre wetland and into a storm water ditch connecting with Springstead and Hogtown Creeks. The environmental damage to Hogtown Creek following this incident was detectable for five miles downstream.

In 1977, the property was sold to Mr. Harry S. Hamilton who began construction of the shopping center. In 1977, Florida Department of Environmental Regulation (FDER) (now Florida Department of Environmental Protection, [FDEP]) conducted a biological survey in parts of Hogtown Creek and determined it was devoid of life from the point of drainage discharge for 1.1 miles downstream. Cleanup operations were performed in 1979 to remove some contaminated sediments from the ditch, but there is no documented evidence of the extent of source remediation activities.

In 1985, the Department of Transportation (DOT) proposed to widen a portion of North Main Street, adjacent to the site, estimating that 4800 cubic yards of contaminated muck were unsuitable for roadbed material and needed to be removed. The Florida Department of Environmental Regulation (FDER, now DEP) identified feasible alternatives for disposal of the muck in its March 1986 "Assessment of Management Alternatives for North Main Street

Muck – Gainesville, Florida." Environmental concerns prompted the Gainesville Urbanized Area Metropolitan Transportation and Planning Organization (MTPO) to form a task force to review the proposed road-widening project. The EPA advised that waivers of liability for construction in a contaminated area are given only to contractors performing work for EPA. In January 1991, DOT presented a conceptual road-widening plan to EPA and DEP. The agencies reiterated that road widening could be implemented with proper precautions. DOT performed additional soil sampling adjacent to and beneath North Main Street in 1992 to determine the extent of contaminated muck requiring excavation during road construction. Road construction design was completed in March 1993. DOT completed the widening of North Main Street adjacent to the site in September 1994. Excavated soils were transported to an out-of-state facility for treatment and disposal.

Since 1995, EPA has overseen the cleanup of the Cabot portion of the Site through operation of a groundwater interceptor trench system which has pumped and treated in excess of 500 million gallons of contaminated groundwater. In addition, there has been excavation and disposal of contaminated soils of approximately 10,000 tons there followed by Site redevelopment with thriving businesses where the Cabot portion of the Site once was. There have been in excess of 280 million gallons of groundwater captured and treated from the Surficial Aquifer system since 1995. Contaminated sediments have been excavated and treated. Chemical treatment, active and passive DNAPL recovery, soil excavation, and upgrades to existing Surficial Aquifer containment system to pump and treat contaminated Floridan Aquifer groundwater has also been accomplished.

### 2.1.2 Koppers Portion

Industrial processes at the Site began in 1916 with the American Lumber and Treating Company preserving wood utility poles and timbers. This company primarily used creosote in the treatment process. Koppers purchased the plant operations in 1954 while leasing the property from Seaboard Coastline Railroad (SCR). In 1984, Koppers purchased the property from SCR. By June 30, 1988, BNS Acquisitions, Inc., a wholly-owned subsidiary of Beazer PLC, acquired more than 90 percent of the outstanding common stock of Koppers. On October 26, 1988, EPA, the Koppers Company and Cabot Carbon Corporation signed an Administrative Order on Consent (AOC), Docket No. 89-06-C. The AOC provides that the two companies as the potential responsible parties (PRPs) will be responsible for completing a supplemental RI/FS. On November 14, 1988, BNS Acquisitions acquired the balance of the Koppers common shares. On January 26, 1989, the name of Koppers was changed to Beazer Materials and Services, Inc. (BMS) following a merger between BMS and Koppers. On December 28, 1989, Koppers (now BMS) sold the assets of its Tar and Treated Wood Sector, including its Gainesville, Florida facility, to a management buy-out group known as Koppers Industries, Inc.; however, BMS retained responsibility to satisfy the obligations under the AOC in conjunction with the Cabot Carbon Company.

Wood treating over the years was modified to include two additional processes, one using chromated copper arsenate (CCA) salts and the other using pentachlorophenol (PCP). Wolman salts (CCA) were mixed at the Site beginning in 1936. The latest CCA plant was constructed in the late 1960s. It is reported that PCP was used at the Site beginning in 1969. At the time of plant closure (December 2010), only CCA treatment processes were in use.

In the past, two lagoon areas were used to manage wastewater generated by the treating process (Figure 2). The south lagoon was located to the west of the plant access road immediately south of the current office building. The north lagoon was located approximately 1,500 ft to the north. The north lagoon was operated from 1956 until the 1970s. The operating period on the south lagoon is unknown. Both lagoon areas have been closed and graded. The exact year of the lagoon closures is unknown.

### 2.2 Regulatory and Enforcement History

The earliest regulatory action found in available documentation occurred in 1967 when CCC was fined $100 by the City of Gainesville for causing pollution to Hogtown Creek and assessed another charge to cover the city's cost for performing part of the corrective action. Reports indicate that problems and interest in the Site remained dormant until 1977 whenAlachua County and FDER received several complaints about the look and smell of Hogtown Creek. In October 1977, FDER conducted a biological survey of the upper 2.8 miles of Hogtown Creek. EPA and FDER conducted preliminary studies and investigations of the Site in 1979 through 1981. Community interest increased dramatically in 1983 through 1985 and during this time the Cabot Carbon/Koppers Site was placed on the NPL (1983). FDER and EPA entered into a Cooperative Agreement (CA) giving FDER management lead at the Site. During the time period from 1984 through 2010, the following additional investigations and regulatory actions occurred:

- In 1984, EPA granted FDEP, formerly FDER, a CA grant to perform a Remedial Investigation (RI)/Feasibility Study (FS).
- In 1985, Koppers Site investigation further evaluated the groundwater. The analyses performed on the Site investigation groundwater samples included total organic carbon (TOC), chemical oxygen demand (COD), phenols, PCP, copper, chromium, and arsenic.
- In 1986, FDER completed a study that addressed the potential environmental issues associated with the widening of North Main Street in the vicinity of the Site.
- In 1987, the initial RI was completed by IT Corp. This RI was found deficient in many areas.
- In 1988, the PRPs (Cabot and Beazer East) entered into an AOC with EPA to perform a supplemental RI, a risk assessment, and a feasibility study.
- In 1989, a supplemental RI for the Koppers Site was completed by Hunter/ESE to fill in the data gaps from the initial RI.
- In 1990, the Baseline Risk Assessment (BRA) was completed in February and the FS in May.
- In 1990, a ROD was issued in September. The Koppers property was known to be contaminated by creosote-based contaminants including carcinogenic and non-carcinogenic PAHs, phenols such as pentachlorophenol, and metals arsenic and chromium. The 1990 ROD specified: (1) excavation of soils in the Former North Lagoon and Former South Lagoon to an assumed depth of 4 feet; (2) bioremediation

of soils in the Former Process area and Former Drip Track Area by recirculating groundwater with nutrient amendment; (3) installation of a groundwater extraction system in the Surficial Aquifer; and (4) long-term institutional controls on Site use. At the time the ROD was prepared and signed, it was assumed that, based upon then-current information: (1) the Hawthorn Group formation (HG) was a single clay unit that provided an effective hydrologic boundary for vertical groundwater flow and transport and (2) the potential source zones were primarily in the shallow unsaturated zone with groundwater impacts primarily restricted to the Surficial Aquifer.

- In 1991, EPA issued a Unilateral Administrative Order (UAO) to Beazer and Cabot Carbon directing both parties to develop a Remedial Design (RD) for the remedies selected in the ROD, and to implement the RD by performing a Remedial Action (RA). Note: Cabot and Beazer began to pursue remediation independently and started developing separate RDs for the Cabot and Koppers portions of the Cabot Carbon/Koppers Site.
- In 1992, EPA approved a Consent Decree in April for Cabot to develop a RD and implement the RA for the Cabot property.
- In 1994, EPA issued a Resource Conservation and Recovery Act (RCRA) permit (10 years) to Koppers Industries, effective October 30, 1994.
- In 1994, EPA amended the UAO issued to Beazer and Koppers and required them to perform a supplemental FS (SFS) for the Koppers Site. The UAO amendment also directed Beazer to suspend work on the RD for the principal contaminant source areas until further notice.
- In 1995, an Administrative Order on Consent for Removal Action (Removal Order) was signed by EPA and Cabot in January.
- In 1996, Beazer submitted the Quarterly Industrial Wastewater Discharge Monitoring Report to Gainesville Regional Utilities (GRU) in compliance with the GRU discharge permit.
- In 1996, Beazer submitted the Quarterly Comprehensive Groundwater Monitoring Report to EPA.
- In 1997, Beazer completed an Interim Remedial Action (IRA) under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) by removing the former creosote treatment building and performing in place closure of the building's foundation.
- In 1998, Roy F. Weston initiated a field excavation program to locate and close three production wells on the eastern side of the Cabot Site as required in the ROD.
- In 1998, the revised Supplemental Sampling and Analysis Plan was finalized and approved by EPA. Work was initiated on a Revised Supplemental FS (RSFS).
- In 1999, Beazer submitted the RSFS to EPA in September.
- In 2001, EPA completed the first Five-Year Review.
- In 2001, EPA submitted a proposed remedy plan based on the RS/FS; plan is rescinded.
- In 2001, Beazer conducted further studies to characterize the Hawthorn clay and develop a database of local private wells in the vicinity.
- In 2002, Beazer conducted additional field investigations to characterize the Hawthorn Group and aquifer.

- In 2002, Beazer reported on field investigations to further characterize the Hawthorn Group. Significant groundwater contamination by creosote and petroleum hydrocarbons was found up to 90 ft below ground surface, and below several clay layers.
- In 2003, Beazer conducted field investigations to further characterize Hawthorn Group and Floridan aquifer water quality and flow direction. Mail survey of private wells was completed. Floridan aquifer and Hawthorn aquifer groundwater contamination was confirmed.
- In 2003 and 2004, GRU installed and sampled sentinel wells in the UFA between the Koppers Site and the Murphree Well Field. One well had arsenic contamination above maximum contaminant levels (MCL). One possible explanation for the observed arsenic contamination, among others, is that it is the result of naturally occurring minerals in the UFA oxidizing and dissolving when oxygenated water is introduced to the formation during well drilling.
- In 2004, Beazer conducted water quality testing in 80 off-Site shallow private wells, and the one deep Floridan aquifer well. Arsenic was detected in one shallow well, and low levels were detected in the Floridan well.
- In 2004, EPA directed Beazer to develop a Floridan aquifer monitoring plan and to expedite and complete field activities to further characterize source areas.
- In 2004, Beazer worked on developing a new groundwater model for the Koppers Site using GRU, county and recent new data.
- In 2004, a Floridan aquifer monitoring plan was developed by Beazer.
- In 2004, EPA directed Beazer to submit all data from field investigations, and to develop a project plan to address deep contamination in source areas, and submit a project schedule for remediation by August 30, 2004.
- In 2004, Beazer presented results confirming contamination in the Floridan aquifer wells in source areas, and requested an extension of the August 2004 deadline to December 2004.
- In 2004, Beazer submitted a Proposed Interim Measures/Remedy Pilot Approach.
- In 2004, contamination found in onsite Floridan aquifer well FW-6 above drinking water standard.
- In 2005, EPA prepared a Revised Floridan aquifer Monitoring Plan, and Beazer agreed to implement.
- In 2005, Floridan aquifer monitoring well installation began.
- In 2006, preliminary sampling and analysis results indicated contamination in Floridan wells throughout the Floridan Aquifer extending to the deepest zones of the drilled wells (approximate depths of 90 ft below top of Floridan, about 200 ft below ground surface).
- In 2006, second Five-Year Review signed.
- In 2006, Beazer submitted an evaluation of thermal treatment technologies.
- In 2007, Beazer submitted Supplemental Groundwater Monitoring Report.
- In 2007, Beazer submitted Revised Data Summary Report: Results of the Revised Supplemental Sampling Plan –Additional Data for Risk Assessment.

- In 2007, EPA convened first collaborative FS meeting between Beazer, EPA, and other stakeholders.
- In 2008, Beazer submitted Independent Panel Evaluation of Groundwater Issues report.
- In 2008, Beazer submitted Final Field Activity Plan for Field-Scale Testing of In Situ Biogeochemical Stabilization.
- In 2008, Beazer submitted Supplemental Hawthorn Group Investigation and Monitoring Well Installation Report.
- In 2008, Beazer submitted Phase I ISGS - Field Pilot Study Report.
- In 2008, EPA held a public meeting on the status of ongoing investigations and the progress and schedule for developing a remedial plan.
- In 2008, Beazer submitted Comprehensive Groundwater Monitoring Sampling and Analysis Plan.
- In 2008, Beazer submitted Upper Floridan Aquifer Interim Remedial Measure (IRM) Work Plan.
- In 2009, Beazer submitted an Evaluation of Potential On-Site Human Health Risks Associated with Soils and Sediments.
- In 2009, Beazer submitted an Evaluation of Potential Ecological Risks.
- In 2009, FDEP issued notice letters to off-Site property owners with confirmed soil contamination above SCTLs.
- In 2009, Beazer submitted a report titled Summary of Additional On-Site Soil Sampling in Northern Currently Inactive Area and Proposed Additional Sample Locations.
- In 2009, Beazer submitted a Tar Removal Work Plan to address tar deposits in Springstead and Hogtown Creeks.
- In 2009, Koppers Inc. announced that it had reached an agreement for the sale and transfer of the property and buildings at its wood preserving facility in Gainesville, Florida to Beazer East, Inc.
- In 2010, Koppers Inc. decommissioned the operating facilities, completed sale of the property, and transferred property ownership to Beazer East, Inc. (Beazer) in late March.
- In 2010, Koppers and Beazer submitted a Proposed Closure Approach for Gainesville Drip Pad and Ancillary Units (Proposed Closure Approach).
- In 2010, Beazer submitted an update of the on-Site Human Health Risk Assessment.
- In 2010, the collaborative feasibility study group issued the Draft FS.

Since 1995, EPA has overseen the cleanup of the Cabot portion of the Site through operation of a groundwater interceptor trench system which has pumped and treated in excess of 500 million gallons of contaminated groundwater. In addition, there has been excavation and disposal of contaminated soils of approximately 10,000 tons there followed by Site redevelopment with thriving businesses where the Cabot portion of the Site once was. There have been in excess of 280 million gallons of groundwater captured and treated from the Surficial Aquifer system since 1995. Contaminated sediments have been excavated and treated. Chemical treatment, active and passive DNAPL recovery, soil excavation, and upgrades to existing Surficial Aquifer containment system to pump and treat contaminated Floridan Aquifer groundwater has also been accomplished.

## 3.0 Community Participation

EPA satisfied its community involvement obligations stated in the CERCLA legislation as well as the NCP. These included establishment of an administrative record; community interviews; preparation of a community involvement plan (CIP); maintenance of an information repository; notification of the availability of a technical assistance grant (TAG); notification of the Proposed Plan in a major local newspaper; provision of a comment period of at least 30 days on the Proposed Plan (July 15, 2010 to October 15, 2010); a public meeting regarding the Proposed Plan on August 5, 2010; a meeting transcript of the Proposed Plan public meeting; and a response to significant comments and criticisms on the Proposed Plan in a responsiveness summary. Except for the responsiveness summary and meeting transcript that are included as Part 3 of this document, each of the other community involvement requirements is discussed in the following sections.

### 3.1 Community Involvement Plan Update

Community interviews were conducted for the Site during the week of August 1, 2010. Individual interviews, along with a focus group meeting, were held to identify concerns of the community in developing an updated CIP. A draft copy of the CIP was presented to the community for a 30-day comment period to allow additional information, concerns, and/or suggestions to be collected. This was done in response to community demand for intense participation. The 30-day comment period was from August 16, 2010 until September 15, 2010. The CIP was placed in the Information Repository in November 2010. In order to address community outreach and involvement, the EPA has also included in the CIP an opportunity for the document to be revised, upon review, every six months. The current document does address community concerns and comments, and reflects a major revision from the previous version.

Community concerns have been identified and addressed in Table 3.1 of the revised CIP. Table 3.1 lists the concerns and EPA's responses to the concerns. The identified concerns range from community outreach activities to technical and redevelopment issues, many of which are addressed in the Responsiveness Summary in Appendix A. Comments for future CIPs will be reviewed every six months and revised, if necessary. The community will be informed of the next revision of the CIP. Please note that comments have been, and will be, received from a multitude of individuals and interested community groups, which will take time to process, but will be included in future versions of the CIP.

The toll free numbers for EPA representatives have been consistently provided on information that is distributed to the community. These include, but are not limited to, Fact Sheets, Question and Answer Sheets, web-sites for EPA and Protect Gainesville's Citizens, the administrative record, the CIP, and business cards.

The mailing list for the Koppers community is a living document and updating and maintaining it is an on-going activity. The initial mailing list was developed by obtaining residential and/or business addresses within a half mile to one mile radius of the Site. The use of sign-in sheets is another method used to identify addresses of interested citizens for the mailing list. Some residents who attend meetings request that their information not be shared with third parties. Therefore, to respect their wishes and privacy, the residential addresses are used for the mailing list only. Additionally, the EPA is developing a new list of e-mail addresses for the Koppers community to use as another method to provide information as it becomes available to the public.

### 3.2 Public Meetings

As part of the EPA's emphasis on enhanced public participation, EPA provided two public availability sessions in concert with the FDEP and Florida Department of Health. EPA staff participated in seven special Gainesville City and/or Alachua County Special Commission Meetings presenting information related to Koppers Site cleanups and participated in listening sessions for members of the public on May 1, 2008, March 9, 2009, August 31, 2009, January 4, 2010, April 29, 2010, and October 6, 2010. Five fact sheets were produced and distributed to provide information related to offsite soil sampling, and onsite and offsite proposed plan responses to comments received during EPA's August 5, 2010, proposed plan meeting (EPA, 2010a). On June 15, 2010, EPA participated in a Site tour with citizens who had concerns about possible buried drums. PRP Beazer East developed and submitted an October 11, 2010, workplan to investigate possible buried drums onsite. On September 22, 2010, EPA and Beazer East provided a Site tour to answer questions related to upcoming demolition activities. EPA representatives met with the former Gainesville Mayor and GRU staff on January 6, 2010, and November 23, 2009, to discuss technical concerns with the FS.

### 3.3 Collaborative Feasibility Study

On August 31, 2009, EPA released a draft Koppers collaborative feasibility study (FS) authored by EPA, Beazer East, and FDEP to Site stakeholders Gainesville Regional Utility (GRU), Alachua County Environmental Protection Division (ACEPD) and the City of Gainesville (COG) to receive their comment prior to finalizing an FS for the Site. For the previous 3 years (6 meetings), EPA, Beazer East, and FDEP have shared FS work products with the Site stakeholders as part of the collaborative FS process. Both ACEPD and COG chose to public notice the draft FS and their planned comments on the document as well as scheduling two public meetings to discuss their responses. Multiple public interest groups which have not previously been involved in the Koppers Superfund Site chose to provide comments on the draft FS. GRU, ACEPD, and COG had a face-to-face meeting with EPA to discuss their comments on the FS on November 23, 2009. A final FS was issued on May 12, 2010 incorporating relevant changes to incorporate stakeholder concerns. EPA technical representatives met with ACEPD, COG, and ACEPD staff on January 27, 2010, and again on September 23, 2010 to discuss FS updates and concerns and additional concerns with EPA's proposed plan, respectively.

### 3.4 Reuse Planning

With funding from the Superfund Redevelopment Initiative, EPA Contractor E² Inc. is conducting reuse planning to inform the remedial planning process for the Koppers property at the Cabot/Koppers Superfund Site (Site) in Gainesville, Florida. The reuse planning activities have been organized into two phases. The first phase, conducted from March through June, identified a set of future use goals and conducted a preliminary analysis of reuse compatibility with the remedial alternatives under consideration. The second phase of the reuse assessment will commence once the ROD is in place. It will include coordinating with EPA, Beazer East and the City to evaluate site reuse options and considerations based on the selected remedy.

As a first step in the reuse planning process, E² Inc. conducted a series of interviews with the site owner, city staff and community members to outline future use goals for the site and surrounding neighborhood. Future use goals identified include:

- Return the site to productive use consistent with the remedies selected.
- Consider the site as an opportunity for infill development to foster economic development and benefit the community.
- Transition intensity of uses across the site to ensure compatibility with adjacent uses; for example consider a residential buffer zone on the western side of the property as a transition to more intense mixed-use activities to the east.
- Increase publicly accessible open space and maintain existing forested areas.
- Increase pedestrian and vehicular access through the site.
- Consider future trail addition along the rail line to connect to regional trail system.
- Improve stormwater management to enhance conditions in Springstead Creek.

In March 2009, the City planning staff developed a conceptual site plan to inform a potential zoning change to mixed-use medium density zoning. The conceptual plan outlined vertical mixed-use development along 23rd Avenue, residential townhouse and live-work areas along the western portions of the property, and open space located on the northern portion of the site. In spring 2010, future land use recommendations for the Kopper's site were referred to the Community Development Committee (CDC). The CDC recommended that planning staff consider the reuse assessment findings in the upcoming land use petition process. In addition, the City is considering future use options for the adjacent public works property to the north of the site. Coordination with the City during the remedial design phase can ensure compatibility with adjacent land uses and the City's long-term vision for the surrounding neighborhood. On March 26, E² conducted Reuse Assessment meetings with the general public to seek additional input.

The findings of the reuse assessment indicate that the selected remedial components would be compatible with the reuse goals outlined above, including mixed-use and open space. However, the configuration of remedial components could significantly influence the amount of area available for structural development. In particular, the location and configuration of on-site containment areas could influence future use options along 23rd Avenue, as well as the arrangement of contiguous space available for vehicular access, utilities and structural development. Similarly, the approach and configuration of drainage conveyance and stormwater management options could restrict or enhance future use depending on the design.

A meeting was held on June 14, 2010 to present the reuse assessment findings. Participants noted the following observations related to future use considerations:

- Flexibility to Accommodate Future Site Uses: Several meeting participants indicated that remedy components should allow for flexibility to accommodate a range of potential future uses. The on-site soil consolidation area was seen as a constraint to reuse and a component worthy of additional discussion.

- Stormwater: Several meeting participants noted they did not prefer a surface swale along the western boundary of the site, as highlighted in Remedial Zone Scenario 5.

- Forested Areas: While some participants expressed an interest to retain existing forested areas at the Site, several participants indicated that addressing soil contamination would be a primary concern and that soil contamination should not be left in place in order to preserve forested areas.

Once a Record of Decision is in place outlining the selected remedy, $E^2$ Inc. is expected to work with EPA, Beazer East and the City to identify potential site planning options and considerations. This second phase will provide an opportunity for coordination between Beazer East, EPA and the City during the remedial design phase to ensure the remedy is compatible with adjacent land uses and to align the City's rezoning process and the remedial design activities as appropriate.

### 3.5 Grants

The Technical Assistance Grant (TAG) process began when a Letter of Intent (LOI) dated November 17, 2009, was received from Protect Gainesville's Citizens. The Public Notice soliciting other groups interested in applying for a TAG was published in the Gainesville Sun on February 5 - 7, 2010, to provide notice that a TAG was available and a LOI had been received. The Public Notice also invited other groups to contact Protect Gainesville's Citizens to coalesce and work with them, or to provide their own LOI within a particular timeframe. No additional LOI's or applications were received and the TAG was awarded in June 2010 to Cheryl Krauth of Protect Gainesville's Citizens. Other interested groups and individuals have been encouraged to come together to work with the TAG recipient in an effort to reach all interested stakeholders and provide one voice for the community.

EPA awarded Alachua County $108,000 through a cooperative agreement to conduct sediment sampling in Springstead and Hogtown Creek, and a stormwater sampling study to address community concerns related to stormwater runoff and creek contamination from the breaching of Cabot lagoons. Sediment sampling and analysis were submitted in a May 12, 2009, report from Alachua County EPD. Results of this EPA-funded study were used to develop remedial actions addressing contaminants found in both Creeks. Cabot Carbon is moving forward with hot-spot sediment excavations in December 2010.

### 3.6 Administrative Record

Documents in the Administrative Record at the information repository are provided as a hard copy and on compact disks for public review in the Reference area. Additional compact disks have been provided to Cheryl Krauth, who is the administrator of the Technical Assistance Grant (TAG) for Protect Gainesville's Citizens, at the Wild Iris Bookstore, located at 802 W. University Avenue, Gainesville, Florida 32601. The compact disks are provided by EPA and given out to the public as a courtesy and option for an additional location to provide the public with Site information. The Administrative Record provided in the repository is a file of information that reflects the documents EPA relied on in developing the proposed cleanup plan. For a larger index of information that may be publicly provided, the public may contact the Freedom of Information Act (FOIA) office. The website for requesting information via FOIA is http://www.epa.gov/region4/foiapgs/index.htm.

Site-related documents are at the site information repository at the following location:

Alachua County Library
401 E. University Ave.
Gainesville, FL 32601
https://govconnect.alachuacounty.us/sites/doc/epd/Cabot%20Koppers%20Documents/Forms/AllItems.aspx

### 3.7 Proposed Plan

The Proposed Plan (PP) was released on July 15, 2010. The Agency extended the public comment period twice at the request of the public to have more time to review the proposed plan. The public comment period ended on October 15, 2010. The Agency held the PP meeting on August 5, 2010 at the Stephen Foster Elementary School in Gainesville. The Agency also held an October 6, 2010 public availability session with the Florida Department of Health, the Alachua County Health Department, the Florida Department of Environmental Protection, and Beazer East representatives to take questions and comments from the public related to the PP.

### 3.8 Summary of Public Involvement Events

The chart included below details the 22 events in which EPA participated in an effort to learn and address public concerns related to Cabot Carbon/Koppers remedial efforts.

**Public Involvement at Cabot Carbon/Koppers Site**

| Date | Event | Subject |
|---|---|---|
| 8/2007-5/2010 | Collaborative FS | FDEP, Beazer East, EPA begin a series of 6 face-to-face meetings preparing Feasbility Study documents for review and comment by Gainesville Local Implementation Team (LIT) in iterative stakeholder process |
| 11/17/2007 | Koppers Citizen Advisory Meeting | EPA representatives participate in Koppers Site quarterly meeting with interested community who participate in plant meetings |
| 4/2008 | EPA Awards ACEPD Grant | EPA Region 4 awards Alachua County EPD a $108,000 grant to study creek sediments and stormwater runoff at the Koppers facility and former Cabot Carbon lagoons |
| 5/1/2008 | Joint Gainesville City/Alachua County Commission Meeting | Provide updates related to Site remedial investigations/interim remedial measures, redevelopment possibilities, soil cleanup levels. Took questions from Commissioners and general public.<br>See it online at the City of Gainesville website, Commission Meetings Online |
| 3/9/2009 | Gainesville City Commission Special Meeting | Provide information related to land use and soil cleanup standards at Superfund Sites. Took questions/received feedback from Commissioners and general public.<br>See it online at the City of Gainesville website, Commission Meetings Online |
| 6/11/2009 | EPA Public Availability Session | EPA, FDOH, Alachua County DOH, and Beazer East representatives provide face-to-face information to members of the public to discuss soil sampling data results obtained nearby the former Koppers plant |
| 7/2009 | Koppers Site Video | Community Involvement Coordinator and RPM provide a guided tour of the operating Koppers Site and discuss specific operations and cleanup at the Site. A Bob Safay Production.<br>See it at:<br>http://www.epa.gov/region4/waste/npl/nplfln/koppers_video.html |
| 8/31/2009 | Public Release of Draft Collaborative Feasibility Study | Release of Draft Feasibility Study to public, document results of 6 face-to-face meetings with FDEP, Beazer East, and EPA with input from the Local Implementation Team (LIT) |
| 11/23/2009 | Meeting at EPA Region 4 with LIT, Gainesville City/Alachua | Face-to-Face Meeting to discuss LIT concerns with draft FS with EPA and FDEP representatives |

**Public Involvement at Cabot Carbon/Koppers Site**

| Date | Event | Subject |
|---|---|---|
| | County Elected Officials | |
| 1/27/2010 | Gainesville Commission Meeting | EPA personnel address questions related to December 2009 Koppers Site shutdown |
| 1/6/2010 | Administrator Meiburg Meets with Mayor Hanrahan | Senior Management meeting with Mayor to discuss City concerns and path forward for proposed plan |
| 3/26/2010 | Reuse Public Meetings | Pursuant to public request, EPA contractor $E^2$ conducts three meetings without presence of federal, state, local, and city personnel to engage in discussion of possible site reuses. |
| 4/29/2010 | Gainesville City Commission Meeting | EPA personnel provide updates on several interim remedial measure development and takes feedback/questions from the public See it online at the City of Gainesville website. Commission Meetings Online |
| 6/1/2010 | Technical Assistance Grant Award | EPA awards Protect Gainesville Citizens technical assistance grant |
| 6/14/2010 | Reuse Public Meeting | EPA reuse contractor $E^2$ meet with members of the public to discuss their ideas related to possible former Koppers Site reuse |
| 6/15/2010 | Koppers Site Tour | EPA and Beazer East representatives provide Site tour to interested public and take feedback on possible drums buried onsite eyewitnesses. Remedial design workplan for further submitted based on testimonials received |
| 8/1-3/2010 | Community Interviews | Community Interviews in preparation for Community Involvement Plan update |
| 8/5/2010 | Proposed Plan Meeting | EPA representatives present Koppers proposed plan and take public comments/answer questions for 3 hours |
| 8/16/-9/15/2010 | Draft Community Involvement Plan Public Notice | Updated Community Involvement Plan public-noticed in Gainesville Sun |
| 8/17/2010 | Koppers Site Tour | EPA an Beazer East representatives provide a Site tour to discuss Site demolition efforts to remove Site structures, implement an interim remedial measures for stormwater management and dust control measures |
| 9/23/2010 | Meeting with LIT in | EPA, FDEP, and Beazer East representatives meet with LIT members to discuss EPA's proposed plan and local technical |

**Public Involvement at Cabot Carbon/Koppers Site**

| Date | Event | Subject |
|---|---|---|
| | Tallahassee to Discuss EPA Proposed Plan Elements | concerns |
| 10/6/2010 | EPA Public Availability Session | EPA, FDOH, FDEP, Alachua County DOH, and Beazer East representatives provide information related to contents of EPA proposed plan and answer specific questions that members of the public have related to Koppers |

## 4.0 Scope and Role of Operable Unit or Response Action

The initial Record of Decision for the Cabot Carbon/Koppers Site was published in 1990 as Sitewide operable unit 00 which stipulated the groundwater and soil remedy for both the former Cabot Carbon and the then-operating Koppers facilities. Operable Unit 01 was created in 2001 to account for all remedial actions at the former Cabot Carbon Site and Operable Unit 02 was created to account for remedial actions in onsite soils and the Surficial Aquifer at the Koppers facility. A proposed plan was issued for Operable Unit 02 in 2001 and later rescinded.

Since 2001, Operable Unit 03 was created to address remedial actions in the Hawthorn Group. Operable Unit 04 was created to address remedial actions in the Upper Floridan Aquifer and Operable Unit 05 was created to address remedial actions in offsite soils. This action addresses all OUs in a comprehensive sitewide approach designed to address all remaining contamination at the entire Cabot Carbon/Koppers Site. This action amends the Record of Decision for Operable Unit 00 by addressing onsite soils and the Koppers Surficial Aquifer groundwater remedy for the former Koppers facility. This action amends the remedial action for Operable Unit 01 for the former Cabot Carbon Site by requiring sediment remediation in Hogtown/Springstead Creeks. This action adds remedial action in the Hawthorn Group OU3, and the Upper Floridan Aquifer at OU4, and offsite soils/sediments at OU5 for the former Koppers facility.

The selected remedy has three parts that address three distinct media groups: on-Site media (soil and groundwater above the Upper Floridan Aquifer [UFA]), groundwater in the UFA, and off-Site media (soil, sediment, and surface water). The major components of the selected remedy for on-Site media include: Establishment of an on-Site soil consolidation area that includes:

- o A single, continuous vertical barrier wall (approximately 65 feet deep) encircling all four principal contaminant source areas from land surface to the Hawthorn Group middle clay.
- o Establishment of a low-permeability cap/cover over the consolidation area to protect against rain infiltration and contamination migration.

- In place (in-situ) solidification and stabilization (ISS/S) of contamination from ground surface to the upper Hawthorn Group zone (0 to 65 feet bls) at two of the four principal contaminant source areas (the former North Lagoon and the former Drip Track area). The ISS/S component of this remedy component will be implemented through injection of stabilizing chemicals into the ground surface. This ISS/S treatment is subject to acceptable performance demonstration during pilot tests or treatability studies. Pilot tests/treatability studies are tests conducted with contaminated Site materials and stabilizers to determine if cleanup goals will be met.
- In-situ geochemical stabilization (ISGS) (also referred to as in-situ biogeochemical stabilization (ISBS) of DNAPL from ground surface to the bottom of the upper Hawthorn Group zone (0 to 65 feet bls) at two of the four principal contaminant source areas (former Process area and the former South Lagoon). The ISGS component of this remedy component will be implemented through injection of

oxidizing and stabilizing chemicals into the ground surface. This ISGS treatment is subject to acceptable performance demonstration during pilot tests or treatability studies. Pilot tests/treatability studies are tests conducted with contaminated Site materials and stabilizers to determine if cleanup goals will be met. If pilot tests/treatability studies do not demonstrate to EPA acceptable performance of the ISGS treatment for the Surficial Aquifer zone, the Surficial Aquifer zone at the former Process area and at the former South Lagoon will be treated with In-situ solidification (ISS/S).

- In-situ injection of oxidizing chemicals or ISGS treatment in the lower Hawthorn Group in two of the four principal source areas (former Process Area and the former South Lagoon) and along the eastern property boundary (addressing comingled OU1/OU2 groundwater contamination) through newly installed injection wells.
- Excavation of soil posing a leachability or direct contact concern outside of the consolidation area; placement of excavated soil in soil consolidation area.
- Surface grading and clean soil covers on approximately 83 of 86 acres on the Site property.
- Installation of storm water controls and improvements (e.g., retention/ detention pond).
- Continued operation of the perimeter wells of the Surficial Aquifer extraction and treatment system (outside of the consolidation area) until cleanup goals are attained.
- Continued operation of the horizontal collection drains of the Surficial Aquifer extraction and treatment system as needed to contain potential migration of groundwater contamination (hydraulic control).
- Expansion of the Surficial Aquifer and Hawthorn Group monitoring network.
- Institutional controls such as deed restrictions to prevent future digging that would result in contact with contaminated media.

The major components of the selected remedy for the UFA include:

- Hydraulic containment of contaminated groundwater through extraction and treatment in areas where chemicals of concern (COCs) exceed cleanup goals.
- Construction of additional monitoring/extraction wells for the network, as necessary.
- Natural attenuation in areas where there are low-level exceedances of cleanup goals

The major components of the selected remedy for off-Site media include cleanup of soil contamination at private properties surrounding the Site and addressing surface water and sediment contamination in Hogtown and Springstead Creeks.

For soil contamination, a range of options consistent with State of Florida cleanup guidance are proposed for use on individual subparcels with the consent of the private property owners including, in order of preference:

- Excavation and removal of impacted soil that exceeds cleanup goals based on current use of the land. Excavated soil will be transported and placed within the consolidation area on-Site.
- Engineered controls that prevent contact with impacted soil containing contamination that exceeds cleanup goals based on current use of the land use.

- Institutional controls to protect accessibility and use of land/properties.

For surface water and sediment in Hogtown and Springstead Creeks, the selected remedy includes:

- Excavation and removal of impacted sediment in excess of levels shown to likely cause an adverse effect when in direct contact (probable effects concentration). Excavated sediment will be placed in the consolidation area on-Site.
- Monitored natural recovery of remaining impacted sediment until concentrations reach threshold effects concentrations (contaminant concentrations above these levels could adversely affect a plant or animal) or background levels.

The actions summarized above will reduce or eliminate risks to human and ecological receptors from contaminated soil, groundwater, surface water, and sediment and will make the Site property available for reuse. The ROD will be implemented pursuant to the remedial authorities of the CERCLA.

## 5.0 Summary of Site Characteristics

The Cabot Carbon/Koppers Superfund Site encompasses about 170 acres in a commercial and residential area of Gainesville, Florida. This Site was originally two sites, Cabot Carbon in the southeast portion of the Site, and Koppers on the western portion of the Site. Cabot Carbon is inactive, and is now redeveloped commercial property. Koppers continued to operate as an industrial plant until March 2010. Contamination has impacted soil and groundwater, and off-Site surface water and sediment.

### 5.1 Conceptual Site Model

This section presents a unified description of current Site conditions and an understanding of how Site-related contaminants move in the environment and could possibly reach potential environmental receptors. The summary of this information and understanding is called the conceptual Site model (CSM). The CSM provides a concise summary of all pertinent Site knowledge so that key features and their interrelationships can be understood succinctly and in context. A CSM is required in order to identify an effective remedial alternative.

Figure 3 is a conceptual block diagram that summarizes some important aspects of the CSM, especially as related to contaminants in the subsurface and their potential migration. Details of the CSM are presented in the following subsections.

#### 5.1.1 Climate, Topography, and Hydrography

The Site climate is humid subtropical. Average monthly high temperatures range from 66 degrees Fahrenheit (°F) in January to 91°F in July. Average monthly low temperatures range from 42°F in January to 71°F in July. Frost and freezing temperatures typically occur several times a year. Mean annual rainfall is approximately 50 inches, with approximately half of that total attributable to intense thunderstorms during the months of June through September.

Cabot Carbon Portion –The Cabot Carbon portion of the Site is relatively flat with topographic elevations ranging from 165 to 185 feet amsl. Surface water drainage is controlled by a storm water pond located in the northwestern portion of the Cabot portion of the Site overlying the former Cabot lagoons, a storm water pond at North Main Street and 31st Avenue, and a concrete-lined drainage ditch that runs along Main Street. All runoff is directed toward the storm water lagoon or the drainage ditch. The lined drainage ditch overlies the groundwater interceptor trench system (part of the OU1 remedy), and runs north along the eastern boundary of the Site until it intersects an east-west ditch near NE 31st Avenue. This ditch discharges into Springstead Creek approximately 750 feet to the north of the northern Site boundary (Figure 1). Springstead Creek flows in a westerly direction into Hogtown Creek, which flows in a southerly direction, and is located approximately 3,000 feet west of the Site. Hogtown Creek drains southward across a transition zone into the western plains region, where it ultimately discharges directly to the Floridan aquifer by way of Haile sink, approximately 10 miles downstream of the Site.

Koppers Portion – The Koppers portion of the Site is a relatively featureless terrain that slopes gently toward the north-northeast. Elevation ranges from about 165 to 185 feet amsl (Figure 4). Low swampy areas are prevalent in an undeveloped, heavily vegetated area to the northeast of the Site. A drainage ditch bisects the Site roughly from south-southwest to north-northeast. Surface run-off from the Site drains to the northeast into Springstead Creek located approximately 750 feet to the north. The Creek flows in a westerly direction and drains into the southward flowing Hogtown Creek located approximately 3,000 feet west of the Koppers Site.

### 5.1.2 Geology

The conceptual block diagram in Figure 3 depicts the Site geology. In summary, the main geologic units at the Site, from top-to-bottom, are (1) sandy surficial marine-terrace deposits, (2) interbedded sand and clay Hawthorn Group (HG) deposits, (3) the Ocala Limestone, and (4) dolomitized limestone of the Avon Park Formation.

The uppermost geologic unit is a 20- to 30-foot thick unit of Plio-Pleistocene marine terrace deposits consisting primarily of fine- to medium-grained sand with trace amounts of silt and clay.

These surficial marine terrace deposits are underlain by the Miocene-age HG deposits, which are approximately 115 to 125 feet thick. The HG is comprised of interbedded and intermixed clays, silty-clayey sand, sandy clay, and occasional carbonate beds.

Three predominant clay units separated by two clayey-sand units have been identified in the HG deposits under the Site. The upper portion of the HG deposits consists of a green-gray clay unit that is undulating and dips generally toward the northeast. This upper clay unit ranges from 0.5 to 7 feet in thickness. Below this clay is a clayey-sand deposit (34 to 42 feet thick), which is underlain by a second clay unit (2 to 15 feet thick). Below this middle clay unit is another clayey-sand deposit (10 to 35 feet thick), which is underlain by a lower clay unit (20 to 38 feet thick). This lower clay unit consists of two to three discernable clay sub-layers (each 1 to 9 feet thick) separated by thin seams of clayey sand and sandy clay.

Below the HG are Eocene-age dolomitized limestone formations (Ocala Limestone and Avon Park Formation) that are approximately 470 feet in total thickness. In west-central Florida, two distinct dolomite end-members are recognized in the Ocala Formation: (1) a vertically restricted, poorly cemented, friable sucrosic dolomite with high porosity and permeability and (2) a tightly cemented, indurated dolomite with low porosity and permeability (Gaswirth, 2003; Johnson, 1984). Johnson (1984), who has examined logs from throughout Florida, further indicates that the friable portions can be very soft. Poorly to moderately indurated, friable packstone and grainstone units are observed in other portions of the UFA in South Florida (Bennett and Rectenwald, 2003), including the upper boundary of the Ocala Formation (Bennett and Rectenwald, 2002a). Although referring to other portions of the Floridan aquifer, Bennett and Rectenwald (2002b) indicate that these friable zones can appear as washouts on a caliper log. Friable, sandy zones within the Ocala

Formation are found as far north as Georgia (Stewart et al., 1999), including sandy, clayey, friable, chalky weathered limestone at the top of the Ocala Formation (Warner, 1997).

In the Albany, Georgia area, Warner (1997) subdivides the UFA into an upper water-bearing zone and a much higher permeability lower water-bearing zone. The upper water-bearing zone consists of friable, weathered limestone and the lower water-bearing zone consists of harder, fractured limestone. This description of the Ocala Formation is consistent with what is observed at the Site; that is, in the upper portion of the UFA at the Site, core samples demonstrate a soft, poorly-cemented consistency. This material at the top of the Ocala Formation likely behaves more like a porous medium than like a fractured medium. Deeper portions of the Ocala Formation and the Avon Park Formation can be expected to behave as fractured media with areas of cavernous porosity associated with karst processes.

### 5.1.3 Hydrogeology

The three principal hydrostratigraphic units at the Site coincide with the major geologic units. As shown in Figure 3, the main hydrogeologic units are:

- Surficial aquifer
- HG deposits
- UFA.

The UFA is used regionally for water supply, including at the Murphree Well Field (Figure 1). The HG is an effective low-permeability confining unit for the UFA with yields that are generally too low (less than 1 gallon per minute [gpm]) to be viable for water supply. The surficial aquifer is generally not used for water supply due to: (1) low yield (less than 4 gpm); (2) better water source options in the Floridan aquifer; and (3) potential water quality impacts from anthropogenic activities (e.g. sewers, underground storage tanks, dry-cleaning operations, agricultural land uses and industrial land uses).

The three principal hydrostratigraphic units are subdivided into ten distinct hydrogeologic layers (see labels [1] through [10] in Figure 3). These are discussed in more detail in the following sections.

*5.1.3.1 Transmissive Zones.* Layers depicted in Figure 3 as yellow and light blue regions have the highest capacities to transmit water: surficial aquifer [1], Upper Transmissive Unit of the UFA [7], and Lower Transmissive Unit of the UFA [9]. In these units the principal direction of groundwater flow is horizontal to the north-northeast (Figures 5 through 8). Given the predominant horizontal flow, these units create the potential for off-Site migration of Site contaminants. At the Murphree Well Field, production of groundwater comes primarily (approximately 85%) from the Lower Transmissive Unit of the UFA [9] (GeoTrans, 2004b). Importantly, pumping in the UFA has lowered water levels beneath the Site to near the bottom of the lower clay of the HG [6]. This has created large vertical gradients through the impacted media beneath the Site. Water levels in key layers are identified by triangles on the right side of Figure 3 (see [A] through [D]). The water table is in the surficial aquifer and varies spatially and temporally, between approximately 5 and 15 feet below ground surface (bgs) on Site.

*5.1.3.2 Low-Conductivity Clays.* In contrast to the transmissive zones, the three HG clay units depicted in Figure 3 as dark brown regions have very low capacities to transmit water. These are the upper clay unit [2], the middle clay unit [4], and the lower clay unit [6]. Strong empirical evidence for the limited capacities of these HG clay units to transmit water is provided by differences in water levels above and below each clay unit. In each unit the downward head loss across the layer approaches or exceeds the thicknesses of the layer (a hydraulic gradient of 1 or greater). In particular, there is an approximately 90-foot head drop across the 30-foot thick, hard plastic, lower clay unit. This HG lower clay unit is a very effective upper confining unit for the UFA. Given limited surface recharge, the large vertical gradients can only exist if the bulk conductivity of the clay units is very low.

*5.3.3.3 Zones of Moderate Transmissivity.* Lastly, four layers depicted in Figure 3 as light brown and medium blue regions have intermediate capacities to transmit water. These consist of the Upper Hawthorn [3], the Lower Hawthorn [5], and the semi-confining zones of the UFA [8] and [10]. Horizontal flow in these layers is constrained by moderate to low capacities to transmit water, and by preferred horizontal flow paths in adjacent layers with greater transmissivity. Vertical flow in the Upper and Lower Hawthorn is constrained by the low conductivity of the bounding clay layers. As shown in Figure 6, flow in the Upper Hawthorn under the Site is toward the north-northeast, as it is in the surficial aquifer. In the Lower Hawthorn, there is a lateral groundwater flow divide (Figure 7); lateral flow under the western and southern portions of the Site is to the west-northwest while lateral flow under the eastern portions of the Site is to the north-northeast.

### 5.1.4 Principal Contaminant Source Areas

The origin of contamination at the Site is linked directly to Site operations and historical waste management practices. Releases occurred when wood-treatment chemicals dripped onto the soil or were deposited in unlined lagoons. Site investigations have identified four principal contaminant source areas related to former operations and facilities. These are labeled [a] through [d] in Figure 3, and are illustrated in Figure 2 and Figures 4 through 12. Principal contaminant source areas defined in these figures are the areas in the surficial aquifer believed to contain the greatest concentrations of contaminants associated with creosote-based, arsenic-based and/or PCP-based wood treatment materials. It should be noted that DNAPL impacts are documented outside these boundaries in the surficial aquifer and in the HG at some principal contaminant source areas (EPA, 2010c).

The vertical distribution of source area contamination is not known definitively. Analytical data for source area soil borings indicate that DNAPL has migrated down into the Lower Hawthorn, but the extent to which this has occurred (i.e., how homogenous the vertical DNAPL migration patterns are) is uncertain and difficult to determine. This is a common problem at sites with DNAPL that necessitates a conservative approach in defining the area of DNAPL impact. Over an area of several acres, there are clear indications of residual and/or mobile DNAPL in the surficial aquifer, the Upper Hawthorn, and the Lower Hawthorn; however, the extent of DNAPL in the Upper Hawthorn and Lower Hawthorn is not completely defined. GRU cites what they believe is evidence of potentially mobile

DNAPL in all aquifer units and clear evidence of mobile DNAPL in the Upper Hawthorn (GRU, 2008). The selected remedy will actively address all DNAPL, regardless of its location or source origination on the Koppers Site. As part of the remedial design process, additional characterization in these aquifers will be conducted to better characterize and address uncertainties related to DNAPL migration and refine vertical and horizontal boundaries for effective remedy implementation (EPA, 2010c).

Additionally, isolated surface soil areas on the property have high concentrations of various contaminants that are not directly associated with any particular process area on the property. These isolated locations of elevated contaminant concentrations are not identified as significant source areas, rather are locations where contaminants have migrated from source areas (i.e., by surface runoff, spills, or other surface transport mechanism) or from other historic wood treating operations.

### 5.1.5 Nature and Extent of Contamination

*5.1.5.1 DNAPL Presence.* Soil with visual and olfactory evidence of creosote residue (see [e] in Figure 3) was found beneath and adjacent to the historical release areas (locations [a] through [d] in Figure 3). Note that source area boundaries illustrated in Figure 3 are approximate limits in the surficial aquifer. DNAPL distribution is similar, but different in the HG. Estimates of the volumes of soil beneath release areas, and of DNAPL-impacted soils in the surficial aquifer, are provided in Table 1. These estimates are based on a detailed and comprehensive investigation of principal contaminant source areas (GeoTrans, 2004b) that involved: (1) electrical-resistivity surveying to scan for anomalies indicative of DNAPL presence; (2) direct-push borings (a total of 34) in the surficial aquifer with laser-fluorescence screening for creosote; (3) additional direct-push soil borings (a total of 50) in the surficial aquifer for soil sample collection, visual identification of creosote, and field screening for volatile organic compounds; and (4) drilling of twelve boreholes and installation of ten monitoring wells (nine in the HG and one in the UFA) to investigate vertical extent of DNAPL impacts in principal contaminant source areas. Based primarily on direct observations in soil cores, it is estimated that the four principal contaminant source areas cover a total of 5.4 acres and that approximately 100,000 cubic yards of DNAPL-impacted soil is present in the surficial aquifer within these principal contaminant source areas.

DNAPL in the environment may be characterized as mobile or residual; both impact dissolved phase contaminant concentrations in groundwater. While Site data clearly show the presence of DNAPL in the surficial aquifer, the mobility of this DNAPL is uncertain. No measurable DNAPL was recovered in any of the Site surficial aquifer wells that were redeveloped and sampled in 2007 (GeoTrans, 2007c); however, it is not uncommon for monitoring wells installed in DNAPL source zones to produce DNAPL-free water. The active DNAPL recovery pilot test at surficial aquifer well PW-1 in the former process area was unsuccessful (RETEC, GeoTrans, and Key, 2005): the induced hydraulic gradient caused by 158 days of pumping led to only minor DNAPL recovery (0.03% DNAPL in withdrawn water; i.e., 90 gallons of DNAPL recovered from 335,000 gallons of groundwater extracted). Regardless of DNAPL mobility, a large portion of the historical DNAPL release is present in the surficial aquifer based on the results of the comprehensive source area evaluation (GeoTrans, 2004b).

Small volumes of DNAPL have been recovered from the Upper Hawthorn at the Former North Lagoon, Former Drip Track, and Former Process Area. At the Former South Lagoon, DNAPL appeared in an Upper Hawthorn well (HG-9S) immediately after development, but DNAPL has not been detected since. The presence of DNAPL in the Upper Hawthorn indicates that the HG upper clay unit is not a complete barrier to vertical DNAPL migration. Table 1 provides an estimate of the soil volume in the Upper Hawthorn within the surficial aquifer source area footprints (an assumption which may not be accurate based on incomplete delineation of impacts); portions of this volume have been impacted by DNAPL. At the base of the Upper Hawthorn, sparse local areas of mobile DNAPL are present as indicated by the presence of DNAPL in a few HG wells. This mobile DNAPL has been associated with thin (2- to 3-inch) seams of coarse-grained material just above the middle clay unit.

Efforts to recover mobile DNAPL from the suspected larger mass in thin coarse-grained layers at the base of the Upper Hawthorn via active pumping and passive bailing have largely been ineffective. This may be attributed to the limited capacity of the Upper Hawthorn to transmit fluids, the sparse nature of DNAPL zones, limited interconnections between DNAPL zones, and the viscosity difference between DNAPL and groundwater. Currently, DNAPL is being recovered passively from five of the six Upper Hawthorn monitoring wells in the principal contaminant source areas at a total rate of approximately 1.2 gallons per week. A pilot test of active DNAPL recovery near one of the five DNAPL-producing monitoring wells in the former North Lagoon area demonstrated that the volume of recoverable DNAPL is low. An 18-inch recovery well was pumped for long durations at various rates and recovered only a trace of DNAPL.

The Lower Hawthorn has similar characteristics to the Upper Hawthorn with the exception that DNAPL is even less common; however, borings and wells penetrating the Lower Hawthorn are fewer so there are less data upon which to make this conclusion. This conclusion is based on data obtained in a few borings and wells in the Lower Hawthorn that are paired with Upper Hawthorn wells. Pooling of DNAPL above the HG middle clay unit illustrates that the middle clay has been an important impediment to vertical migration of Site contaminants. The presence of trace DNAPL in the Lower Hawthorn shows that the middle clay unit, like the upper clay unit, is an imperfect barrier. Table 1 provides an estimate of the soil volume in the Lower Hawthorn within the surficial aquifer source area footprints (an assumption which may not be accurate based on incomplete delineation of impacts); portions of this volume have been impacted by DNAPL.

No recoverable DNAPL has been observed in the Lower Hawthorn; any DNAPL present there may be at residual saturation and immobile under normal (non-pumped) conditions. The deepest observed penetration of DNAPL is associated with the Former North Lagoon, where DNAPL was found at residual saturation in the upper portion of the HG lower clay unit. Residual DNAPL also was observed in the Lower Hawthorn below the Former Drip Track.

No DNAPL has been observed in the Floridan aquifer during investigation activities or during quarterly sampling of the 72 UFA monitoring well screens/ports on Site. Visual evidence of residual DNAPL has never been observed in over 4,000 feet of cumulative geologic core collected from the Floridan aquifer. The absence of observed DNAPL in the Floridan aquifer does not preclude its existence there. Any DNAPL that may exist at the Site is likely immobile under existing conditions, but potentially could become mobilized if conditions change. Therefore, the remedial action for the Floridan aquifer takes these uncertainties into account.

*5.1.5.2 Soil COC Concentrations.* On-Site surface and subsurface soil was sampled to supplement prior characterization of COC concentrations (AMEC, 2007). Figure 9 presents the average concentrations in surface soil (0- to 6-inch) for arsenic, carcinogenic PAHs (expressed as benzo(a)pyrene toxic equivalents [BAP-TEQ]), and dioxins/furans (expressed as 2,3,7,8-tetrachlorodibenzo-p-dioxin toxic equivalents [TCDD-TEQ]). These COCs drive the evaluation of human-health risk for direct soil exposure under current Site use (AMEC, 2009c). The color coding used in Figure 9 is based on the Florida Soil Cleanup Target Levels (SCTL) for direct exposure at a commercial/industrial Site (concentrations shown in green are below the commercial/industrial SCTL).

The highest arsenic concentrations were detected in the vicinity of the Former South Lagoon; two sample locations had average surface soil concentrations above 1,000 milligrams per kilogram (mg/kg) for arsenic. Elevated PAH concentrations, expressed as BAP-TEQ, were detected in surface soils at all four source areas. Dioxins/furans were detected over a significant portion of the Site at levels above the Florida commercial/industrial SCTL (30 nanograms per kilogram [ng/kg]). However, there was only one of 40 locations (SS058 in the former process area) where the TCDD-TEQ concentration was above EPA's current preliminary remediation goal range for commercial/industrial soils (5 to 20 μg/kg;).

Concentrations of PCP in surface soil were below the Florida SCTL for commercial/industrial direct exposure (28 mg/kg) over most of the Site. There were five exceptions: three sample locations in the former process area, one location at the former drip tracks, and one location at the former north lagoon.

A Site-boundary and off-Site soil sampling and analysis program is presently being conducted by AMEC (2008, 2009a, 2009b, and 2010b). Initial results from this program show that surface soil immediately adjacent to the western Site boundary had elevated concentrations of PAHs, arsenic, and/or dioxins/furans above Florida SCTLs for residential direct exposure. In this area, four of five sampled locations had dioxin/furan concentrations below EPA's current residential preliminary remediation goal for dioxins/furans (1 μg/kg). Additionally, the average concentration of dioxins/furans was below EPA's current residential preliminary remediation goal. This area has been posted and fenced to prevent exposure. For samples taken a distance of approximately 100 feet west of the Site, surface-soil concentrations were markedly lower (more than 10 times less than the EPA's current residential preliminary remediation goal for dioxins/furans), though still above the Florida residential direct exposure SCTL for dioxins/furans. Further off-Site soil characterizations are under way to the north, south, east, and west of the Site and will continue through the remedial design phase of the project.

*5.1.5.3 Surficial Aquifer Groundwater.* The predominant PAH compound detected in groundwater is naphthalene, a non-carcinogenic compound with a relatively low molecular weight. Naphthalene has a relatively high aqueous solubility (compared to other PAHs), is relatively mobile, and degrades relatively easily in the environment. Naphthalene is used as the primary indicator compound that reflects the presence of COCs in Site groundwater.

As part of the effectiveness monitoring for the existing groundwater extraction system, groundwater quality is monitored at the 14 extraction wells and five monitoring wells. The most recent sampling event occurred in December 2008 (Field and Technical Services [FTS], 2009a). A comprehensive round of surficial aquifer sampling was conducted in August 2007 to provide a more complete picture of water quality conditions in the surficial aquifer (GeoTrans, 2007c). Groundwater samples were analyzed for benzene, toluene, ethylbenzene and xylene (BTEX), PAHs, phenols, arsenic, and chromium.

Surficial aquifer naphthalene concentrations measured in August 2007 and December 2008 are shown in Figure 10. Several of the wells near the principal contaminant source areas and near the eastern Site boundary have naphthalene concentrations greater than the Florida groundwater cleanup target level (GCTL) of 14 micrograms per liter (μg/L). In all locations where both a water-table (A-series) well and a deeper surficial aquifer (B-series) well were sampled, the groundwater from the water-table well contained significantly lower naphthalene concentrations than the deeper surficial well. Concentrations of other COCs (e.g., PCP, arsenic, benzene, carbazole, dibenzofuran) also exceeded their GCTLs and/or federal MCLs in select wells (GeoTrans, 2007c; FTS, 2009a; FTS 2009c).

*5.1.5.4 Hawthorn Group Groundwater.* Groundwater quality measurements were collected from HG wells on several occasions since the first wells were installed in 2004. The most recent set of wells were installed off-Site to the east and west (GeoTrans, 2008a, 2008b, and 2009c). The most recent sampling event, conducted in November 2009, included sampling most HG wells. Figure 11 presents the naphthalene concentrations detected in the HG during the November 2009 event, along with some older data for wells that were sampled in prior years. Wells with a label ending in "D" are completed in the Lower Hawthorn; the others (most ending in "S") are completed in the Upper Hawthorn. Note that water samples were not collected in November 2009 from the five Upper Hawthorn source-area wells where DNAPL is routinely recovered (HG-10S, HG-11S, HG-12S, HG-15S, and HG-16S), or from several on-Site Upper Hawthorn wells near the western property boundary where concentrations have historically been low to non-detect.

*5.1.5.5 UFA Groundwater.* Water quality in the UFA beneath and down gradient of the Site is measured on a quarterly basis. The naphthalene concentrations in the UFA are presented on Figure 12.

Monitoring wells FW-1 through FW-9 and MWTP-MW1 were completed within the top 30 feet of the UFA. Only one of these wells (FW-6, a source area monitoring well near the Former North Lagoon) currently has organic contaminant concentrations above GCTLs, and naphthalene concentrations at this well have decreased substantially since July 2004.

Monitoring wells FW-10B through FW-24B are multi-port, telescoped wells completed within the upper 100 feet of the UFA (i.e., the Upper Transmissive Zone). At two of the four principal contaminant source areas (Former Process Area and Former South Lagoon), inorganic and organic contaminants are consistently below MCLs and Florida GCTLs in the UFA monitoring wells. Some organic contaminants are above GCTLs in the UFA wells north of the Former North Lagoon and north-northeast of the Former Drip Track.

The four Lower Transmissive Zone wells at the northern property boundary (FW-4C, FW-22C, FW-23C, and FW-24C) have been non-detect for organic COCs since installation in 2007.

In some sampling events, arsenic concentrations above the Florida GCTL (10 μg/L) were found in groundwater collected from a few of the UFA monitoring wells. These observed concentrations likely result from dissolution of naturally occurring minerals in the UFA that occurs when oxygenated water is introduced to the formation during well drilling (GeoTrans, 2007a; EPA, 2007). The absence of other potentially site-related COCs in these wells supports this determination.

### 5.1.6 Environmental Transport and Fate

Site-specific mechanisms and conditions have acted on contaminants in ways that resulted in the observed patterns of mobility, reactivity and extent. The following sections discuss mechanisms that have acted and may continue to act on Site contaminants, and the general characteristics and behavior of creosote and Site-related contaminants, including solubility, mobility, and ability to biodegrade.

*5.1.6.1 Fate and Transport Properties of Site Contaminants.* The following subsections describe the properties of the prevalent Site-related contaminants that may affect how these contaminants move in the environment.

*5.1.6.1.1 PAHs.* PAHs constitute a class of many semi-volatile organic compounds often associated with the highly viscous creosote preservatives used in wood-treating operations. PAHs are chemical formations of benzene polyring series that range from naphthalene, with two benzene rings, to benzo(g,h,i)perylene, with six benzene rings. Nineteen PAH compounds are analyzed using EPA Method 8270. Eight of these compounds are considered to be carcinogenic (cPAHs): benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, carbazole, chrysene, dibenz(a,h)anthracene, and indeno(1,2,3-

cd)pyrene. It is common to use a toxicity equivalency factor to express the total cPAH concentration, excepting carbazole, in terms of BAP -TEQ.

Excepting carbazole, the cPAHs have aqueous solubility in the range of less than 1 to 20 μg/L (Montgomery and Welkom, 1996). The cPAHs have very low mobility as dissolved species in the subsurface due to their hydrophobic nature (low solubility and high organic carbon partition coefficients, [Koc]). Compared to other PAHs, the cPAHs (excepting carbazole) are more resistant to biodegradation in soil with reported half-lives in soil varying from 80 to 180 days (Cookson, 1995).

The non-carcinogenic PAHs (ncPAHs) and carbazole are less dense, more soluble in water, more mobile in soil/groundwater environments, and more easily biodegraded than the cPAHs. The ncPAHs listed in the 1990 ROD included naphthalene, acenaphthene, acenaphthylene, anthracene, dibenzofuran, fluorene, phenanthrene, and pyrene.

All PAHs tend to degrade to nontoxic byproducts. Toxicity analyses of bioremediated groundwater, which initially contained PAHs and PCP, indicate that the treated water is less toxic than the untreated groundwater (Middaugh et al., 1994). Therefore, the levels of degradation products present in groundwater after biodegradation occurs are less toxic than the parent compounds in the original impacted groundwater.

*5.1.6.1.2 Arsenic.* Arsenic is a naturally occurring element, generally found at higher concentrations in sedimentary rocks than in other rock types. Shales, clays, and sedimentary iron and manganese oxides can be rich in arsenic. The most common forms of arsenic in groundwater are their oxy-anions, arsenite (As+3) and arsenate (As+5). Under moderately reducing conditions, arsenite is the predominant species. In oxygenated water, arsenate is the predominant species. Arsenic cannot be destroyed in the environment; it can only change its form or become attached to or separated from particles. It may change its form by reacting with oxygen or other molecules present in air, water, or soil, or by the metabolic action of plants or animals.

In soil/groundwater systems, the mobility of arsenic is generally controlled either by co-precipitation or adsorption onto the surfaces of solid mineral forms such as ferric oxides/hydroxides, with the arsenate species being more readily adsorbed than the arsenite species, especially at neutral pH. In general, the arsenites tend to be more mobile than arsenates. An increase in the pH to an alkaline condition will cause both arsenite and arsenate to desorb off of particle surfaces and into the water phase. Accordingly, arsenic can be expected to be more mobile in an alkaline environment. The arsenic oxy-anion speciation is also sensitive to oxidation/reduction conditions (Henkel and Polette, 1999).

*5.1.6.1.3 Pentachlorophenol.* PCP is a member of the phenolic group of compounds, and is a polar organic compound used as a preservative in wood-treating operations. PCP is a solid at room temperature and is very soluble in water under high pH (alkaline) conditions. Under acidic conditions, the solubility is lower (approximately 14,000 μg/L at pH 5.0). When dissolved in alkaline solutions, PCP dissociates and forms the pentachlorophenate anion, with an increase in solubility to greater than 100,000 μg/L (Davis et al., 1994).

PCP is biodegradable. Degradation products from the breakdown of PCP include less-chlorinated phenols and less-chlorinated oxidized derivatives (Davis et al., 1994). The less-chlorinated phenol degradation products may include various isomers of tetrachlorophenol (e.g. 2,3,4,5-TeCP; 2,3,4,6-TeCP), trichlorophenol, dichlorophenol, and monochlorophenol. The oxidized derivatives may include chloroanisoles, chlorocatechols, and chlorohydroquinones (Davis et al., 1994; Suzuki, 1977).

Data from other wood-treating sites indicate that PCP degradation products, when present, are detected at concentrations well below the concentration of the parent compound, and do not accumulate in soils or groundwater. This relationship indicates that the degradation products break down faster than PCP. Laboratory studies are consistent with the observation that PCP breakdown products are biodegraded faster than PCP and, thus, do not accumulate in soils or groundwater (Middledorp, Briglia, and Salkinoja-Salonen, 1990).

PCP degradation products also are less toxic than the parent compound. As discussed above, toxicity analyses of impacted groundwater after bioremediation has occurred, which initially contained PAHs and PCP, also indicate that the post-bioremediation groundwater is less toxic than the pre-bioremediation groundwater (Middaugh et al., 1994). Therefore, the levels of degradation products present in groundwater after bioremediation has occurred are less toxic than the parent compounds present in the original groundwater.

*5.1.6.1.4 Dioxins/Furans.* Dioxins/furans constitute a class of 210 structurally related chemical compounds, or congeners, that are often present in complex mixtures and have a variety of environmental sources (EPA, 1989). Dioxins/furans have been associated with wood-treating operations due to impurities in PCP products. Dioxins/furans are considered insoluble in water with solubilities less than 1 μg/L and are considered immobile in soil due to extremely high Koc values that exceed 106 liters per kilogram (L/kg) (Montgomery and Welkom, 1996).

Highly chlorinated dioxin/furan compounds are not susceptible to aerobic (oxidative) biotransformation because they are already highly oxidized. Due to their characteristically low aqueous solubility, dioxin/furan congeners in soil and aquifer sediment are scarcely available for biodegradation by bacteria. This low bioavailability is a primary constraint on their biodegradation. Laboratory studies have determined that the desorbed fraction of dioxin/furan congeners in sediment can be biodegraded under anaerobic conditions via reductive dechlorination (Adriaens, Fu, and Grbic-Galic, 1995). Reductive dechlorination of dioxin/furan presumably occurs preferentially under highly reducing conditions (e.g. methanogenesis), and requires the presence of another more easily degradable electron donor (e.g., natural organic carbon, or BTEX).

*5.1.6.2 Leaching.* Contaminant leaching may occur as rainwater percolates through areas with high concentrations of soluble contaminants in unsaturated soil. The contaminants may be in residual DNAPL in the unsaturated pore space or the contaminants may be adsorbed onto soil particles. Leaching occurs as contaminants are dissolved from residual DNAPL and desorbed from soil. It is important to understand if and where such leaching is occurring because those locations may be a significant source of ongoing groundwater impacts. In areas where leaching is significant, the unsaturated soil is considered to be a "secondary source" of groundwater impacts; the "primary source" is the original release of chemicals to the soil.

At this Site, the primary-source releases occurred several decades ago when process wastewater was directed or pumped to on-Site lagoons that are now closed, and when treated wood was allowed to drip dry without containment or collection of the residual chemicals. Because wood-treatment processes and practices improved over time, and awareness of how operations could adversely impact the environment increased over the years, more recent process activities by Koppers mitigated or prevented gross discharges of chemicals to soil. Due to the approximately 20 years since the primary releases, any significant and ongoing leaching would be clearly manifested in the shallow groundwater concentrations observed at the Site. Thus, leaching is only a potential issue if and where shallow groundwater concentrations of contaminants are relatively high, and where these high concentrations correlate with elevated soil concentrations.

Based on the latest surficial aquifer groundwater-concentration data (GeoTrans, 2007c), the following contaminants are found in multiple shallow water-table (A-series) wells at levels above Florida GCTLs:

- Naphthalene (see Figure 10);
- Acenaphthene;
- 2-Methlynaphthalene;
- Dibenzofuran;
- Carbazole;
- PCP; and
- Arsenic.

For the PAHs listed above (naphthalene, acenaphthene, 2-methylnaphthalene, dibenzofuran, and carbazole), there are several shallow (water-table) monitoring wells that have concentrations exceeding GCTLs: M-16A, M-17, M-20A, M-22A, M-23AR, M-24A, and M-25A. Carbazole alone also exceeds its GCTL at monitoring well M-32AR. Figure 10 shows the pattern of naphthalene concentrations in shallow Surficial aquifer groundwater. However, these shallow surficial aquifer (A-series) wells have measured PAH concentrations that are significantly lower than concentrations in groundwater from the deeper surficial aquifer (B-series) wells, which are screened near the base of the surficial aquifer (GeoTrans, 2007c). This pattern indicates that ongoing leaching is not the most significant source of PAHs in groundwater. The data are consistent with a CSM in which the primary source of PAHs in groundwater is creosote-residual DNAPL that resides primarily below the water table. The shallow wells with GCTL exceedances are near the Former Process Area, Former Drip Track, or southeastern property-boundary extraction wells.

Leachability-based SCTLs have been established by FDEP for many contaminants, including the PAHs discussed above. Out of more than 80 soil locations sampled on Site in 2006 (AMEC, 2007), only seven have concentrations of naphthalene, acenaphthene, 2-methylnaphthalene, and/or dibenzofuran greater than their leachability-based SCTLs. The four soil locations with the highest concentrations are found within the Former North Lagoon (SS094 and SS101) and Former Drip Track (SS077 and SS100). Two locations along the eastern property boundary (SS082 and SS086) also have at least one depth interval exceeding the leachability-based SCTLs for these PAHs. Finally, one depth interval for a location in the western part of the Former Process Area (SS058) has a measured naphthalene concentration above the leachability-based SCTL.

For carbazole, over two-thirds of the 2006 soil sampling locations (AMEC, 2007) have at least one depth interval exceeding the leachability-based SCTL of 0.2 mg/kg. However, the groundwater data do not indicate widespread exceedances of the carbazole GCTL (GeoTrans, 2007). The seven soil sample locations with the highest carbazole concentrations (4.4 mg/kg and higher) correspond with the seven soil sample locations identified above that have concentrations of other PAHs that exceed their leachability SCTLs.

There are only five water-table (A-series) wells with a groundwater PCP concentration that exceeds its 1 µg/L GCTL; all five are located within and northeast of the Former Process Area (GeoTrans, 2007). This is the case, despite the fact that all but one of 91 soil-sample locations (in 2006) have PCP concentrations above the leachability-based SCTL of 0.03 mg/kg (AMEC, 2007). The highest PCP soil concentration was at sample location SS058 at the western edge of the Former Process Area.

Arsenic is different from the organic COCs discussed above in that there is not a general pattern of increased concentration with depth. At several locations with paired surficial aquifer wells, the water-table (A-series) well has a concentration that is similar to or higher than the deeper (B-series) well. The highest measured water-table concentration of arsenic was found in a well on the eastern property boundary (1,140 µg/L arsenic at M-23AR). The two water-table wells with the next highest measured arsenic concentrations are located just north of the Former South Lagoon (796 µg/L at M-32AR and 505 µg/L at M-21A). The remaining water-table wells have arsenic concentrations of 50 µg/L or below, with a total of ten wells above the 10 µg/L GCTL. There is no leachability SCTL for arsenic. Five of the six highest soil-sample concentrations measured in 2006 (see Figure 9) were within or near the northern portion of the Former South Lagoon (SS095, SS096, SS021, SS038, and SS040). Hence, the on-Site soil data coupled with groundwater sample data appear to indicate that there may be a secondary source of arsenic near or within the northern portion of the Former South Lagoon.

In summary, while there is some spatial correlation between measured soil concentrations and measured shallow groundwater concentrations, the groundwater concentrations provide the most direct information regarding the potential for significant secondary-source soil leaching. For the organic COCs, the water-table groundwater concentrations are generally low relative to the concentrations from deeper intervals in the surficial aquifer. This indicates that the main ongoing source of dissolved organic contaminants in the surficial aquifer is DNAPL near the base of the surficial aquifer. Conversely, there appears to be limited ongoing leaching of arsenic from soil within and near the northern half of the Former South Lagoon. There could also be some leaching from shallow soil in other principal contaminant source areas.

*5.1.6.3 Groundwater Migration and Attenuation.* The Site contaminants that are frequently detected in dissolved phase in groundwater are those that readily leach from DNAPL and soil. Conversely, dioxins/furans and cPAHs (excepting carbazole) are practically immobile in groundwater.

*5.1.6.3.1 Migration and Attenuation Process.* Once dissolved into groundwater, contaminants are affected by the processes of advection, dispersion, sorption, and matrix diffusion. The organic contaminants are also affected by natural biodegradation. Arsenic may chemically precipitate from solution under certain geochemical conditions.

Advection is the down gradient movement of contaminants in the direction of groundwater flow, which is sometimes conceptually depicted with "particle" transport paths. The advective rate of groundwater flow in a porous medium depends on the hydraulic conductivity of the medium, the hydraulic gradient, and the effective (interconnected) porosity of the medium.

Dispersion is the spreading of contaminants in groundwater caused by small-scale heterogeneities in flow which leads to contaminants moving from areas of high concentration to areas of low concentration. Dispersion results in the spreading of a small, concentrated source of contaminants into a larger, less-concentrated plume. The plume-spreading effects of dispersion increase with distance from the source.

Sorption occurs when contaminants become chemically or biochemically attached (adsorbed) to the surface of a solid particles of a porous medium. Sorption rates vary by constituent and sorption may or may not be reversible. The main practical effect of sorption is to slow (retard) the down gradient movement (advection) of a constituent in groundwater. In many cases, sorption allows other processes such as dispersion and biodegradation to have greater effect. For most contaminants, sorption is more significant in media with relatively high organic content. For many inorganic contaminants (e.g., arsenic) the degree of sorption depends on the geochemical conditions (oxidation-reduction potential [Eh] and pH) in the subsurface.

Matrix diffusion occurs in fractured media and in porous media that have significant "non-connected" pore space (e.g., clays). While advection occurs primarily in the connected portion of the pore space, contaminants may diffuse into the non-connected pore space. Matrix diffusion retards the movement of solute and can cause a dispersive effect.

The solubility of arsenic in groundwater may change if the groundwater geochemical conditions change. If the solubility becomes much lower (e.g., due to changing mineralogy, pH, and/or Eh encountered by moving groundwater), then some of the arsenic may chemically precipitate into solid form. This process also typically results in constituent retardation, though it may cause some of the arsenic to become permanently mineralized and immobile.

Natural biodegradation refers to the processes wherein native bacteria in the subsurface breakdown the chemical bonds of contaminants as part of metabolism. Such chemical altering results in the formation of degradation byproducts that may, in turn, be further degraded. All of the organic contaminants that are present in Site groundwater have a known propensity for biodegradation and can biodegrade in both aerobic and anaerobic conditions (GeoTrans, 2004b), and in all cases biodegradation results in less toxic and/or more readily degraded byproducts (Middaugh et al., 1994). TRC (1999) conducted a laboratory study to determine naphthalene half-life for Site groundwater samples. Results of this study indicate that the naphthalene half-life for Site groundwater ranged from 627 to 1,119 days. Shorter half-lives are reported in the literature (Howard et al., 1991)

The term "natural attenuation" includes all of the chemical migration and fate processes discussed above that result in decreasing concentrations of contaminants. Thus, the processes of biodegradation, dispersion, sorption, and matrix diffusion all result in natural attenuation of contaminants.

*5.1.6.3.2 Model Analysis of Groundwater Migration and Attenuation.* In 2004, a three-dimensional numerical groundwater model was developed to evaluate groundwater flow and solute transport in the surficial aquifer, HG, and UFA (GeoTrans, 2004a). The groundwater modeling study was carried out in three major steps: (1) development of the groundwater flow model and calibration of the model to observed data, (2) particle-tracking analysis to estimate advective flow paths from principal contaminant source areas to off-Site points of interest (e.g., the Murphree Well Field), and (3) solute transport simulations to estimate potential future concentrations of Site COCs in groundwater. The Site model was constructed to incorporate the major hydrostratigraphic units and hydrologic stresses in the region. The transient model was calibrated to measured groundwater levels. The Site model provides a sophisticated and technically sound analysis tool for estimating COC fate and transport in groundwater.

After calibrating the groundwater flow model, the direction and velocity of groundwater flow from principal contaminant source areas was estimated through particle-tracking simulations. In these simulations, hypothetical particles of a conservative-tracer were "released" within the groundwater flow field near sources, and the predicted down gradient movement of these particles through time was calculated by the model. These model simulations served to establish numerical bounds for the potential advective movement of dissolved contaminants without accounting for attenuation mechanisms that affect Site-related contaminants (e.g., sorption, chemical precipitation, dispersion and biodegradation).

The particle tracking simulations indicate that the vertical groundwater travel time from the surficial aquifer, through the various clay aquitard and water-bearing units, and into the UFA can be more than 85 years. Once groundwater reaches the UFA, the model simulations estimated that an additional 59 to 118 years would be required to reach the Upper Transmissive Zone under the Murphree Well Field. This travel time was predicted using an effective porosity value based on a homogenous aquifer matrix. The model simulations also indicate that groundwater may be delayed from migrating to the Lower Transmissive Zone by the semi-confining unit separating the Upper and Lower Transmissive Zones. The model is a "best estimate" based on current Site understanding and available data.

EPA acknowledges uncertainty in the true value of effective porosity for the area of the Site due to actual subsurface conditions. Site stakeholder GRU believes that using an effective porosity based on a homogeneous aquifer matrix in the model may over-estimate travel time. GRU believes the groundwater travel time from the UFA under the Site to the UFA under the Murphree Well Field may be closer to 4 to 5 years. This appears to be an underestimate because no Site-related COCs have been detected or measured in groundwater from the Murphree Well Field in the years that have past since COCs were detected in groundwater from the UFA.

Solute-transport simulations also were conducted to predict constituent concentrations (GeoTrans, 2004a). These simulations take attenuation mechanisms such as dispersion, sorption, and biodegradation into account. Contaminant transport simulations were made to assess the potential groundwater concentrations of naphthalene and arsenic released at the Site.

Naphthalene was simulated because it is one of the most potentially mobile and widespread COCs at the Site. In the baseline simulation, the model was run assuming a constant dissolved naphthalene concentration of 10,000 μg/L at each DNAPL source area in the surficial aquifer and an additional slug source in the Floridan aquifer near monitoring well FW-6. Biodegradation was simulated as a first-order decay process using a conservative half life estimate (3 years) from relevant literature and Site studies. Due to biodegradation and other natural attenuation processes, the lateral and vertical extent of a naphthalene plume (at its GCTL) was projected by the model results to not extend any farther than potentially a few hundred feet off Site in the surficial aquifer and HG. A worst-case model simulation, assuming a constant injection of naphthalene into the UFA beneath the footprint of the Former North Lagoon, estimated that a 1 μg/L naphthalene concentration contour would not extend any farther than approximately 1,500 feet down gradient of the Site. These model predictions are consistent with current groundwater data from monitoring wells at the Site boundary. The groundwater transport simulations predict no future PAH impacts at the Murphree Well Field.

Groundwater transport simulations for arsenic indicate that lateral and vertical migration of this constituent will be very limited because it is highly adsorptive. The Site model results are consistent with current groundwater monitoring data, with only a few surficial aquifer monitoring wells detecting elevated arsenic concentrations. A model simulation was run assuming a hypothetical "worst-case" constant source of arsenic in the surficial aquifer under the Former Process Area. After a period of 100 years, the model results indicated that the arsenic plume would not migrate beyond 1,000 feet down gradient of the simulated source area. Another model simulation, this time assuming a constant source of arsenic in the UFA at well FW-3, predicted that a 1 μg/L arsenic concentration contour would not extend beyond 1,500 feet down gradient from well FW-3 after 100 years.

*5.1.6.4 Aquifer Cross Contamination.* Drilling in principal contaminant source areas, especially DNAPL source areas, produces risks of cross contamination, potentially spreading source material to previously unimpacted depths and hydrogeologic units. Even when the locations of DNAPL areas and the geology are relatively well known, the installation of wells in or near DNAPL areas using the best available technology has risks (EPA, 1992). EPA (1992) indicates that in order to circumvent these risks, it may be appropriate to avoid drilling directly within areas of known or suspected DNAPL impacts and focus on characterizing dissolved constituent plumes migrating from principal contaminant source areas.

The risks of causing cross contamination when drilling into DNAPL source zones is exacerbated at this Site due to the approximately 120-foot head drop from the surficial aquifer to the UFA. Even though proper precautions are taken during drilling and well construction, there are two possible mechanisms that can lead to cross contamination: (1) a short-term loss of drilling fluids, including drilling mud, and (2) a long-term continuous leakage of impacted groundwater via preferential pathway due to incomplete seals in the annular cement grout. Though the wells on Site were designed and constructed to minimize the potential for cross contamination, the potential risk cannot be totally eliminated. Due to the large vertical hydraulic gradient across the HG clay units (Figure 3), even a very small crack (on the order of microns) in the borehole/well seals can lead to migration of potentially substantial concentrations of contaminants between units (Hinchee, Foster, and Larson, 2008).

There is some Site evidence that cross contamination has led to limited impacts in the UFA. In particular, at the UFA well with highest constituent concentrations, FW-6, drilling mud mixed with Site soil and groundwater was lost during drilling. Measured concentrations of Site contaminants (e.g., naphthalene) at this well were at their highest levels immediately after installation, and declined in subsequent measurements. EPA believes that this is one possible explanation for some, but by no means all, of the constituent concentrations observed in the UFA.

Also, elevated pH measurements at some UFA wells, notably FW-3 (pH over 12 in 2005), likely resulted from high-pH cement grout used in well construction. Because the cement grout was only used above the lower clay unit of the HG at this well, it is likely that groundwater has moved and is moving downward along the borehole.

It is difficult to assess and precisely quantify the degree of aquifer cross contamination or flow via natural discontinuities through the HG clays at the Site. A number of approaches are discussed in the literature, but none allow unambiguous differentiation between drilling-induced cross-contamination and constituent migration via natural-pathways. However, based on the Site conditions and the conclusions of EPA (1992) and Hinchee, Foster, and Larson (2008), care should be taken to minimize or eliminate through the low-permeability HG clay units (particularly the lower clay and middle clay units) in DNAPL-impacted areas. These clay units are presently providing protection to the UFA and maintaining their integrity is very important. It is noted that there will be remedy performance monitoring wells that will most likely have to be installed in or near DNAPL-impacted areas as part of the remedial design/remedial action implementation.

*5.1.6.5 Runoff.* Storm water runoff at the Site flows generally to the northeast. Much of the Site runoff flows in the Site storm water ditch along with storm water from land parcels to the south of the Site. All Site runoff eventually flows into Springstead Creek.

Based on Site topography (Figure 4), there may be some runoff from the Site to the north toward off-Site portions of the Site storm water ditch. There may also be runoff to the east, but the raised ballast of the adjacent railroad spur prevents runoff from moving farther east. There is little or no runoff toward the south. There may be small areas of limited runoff toward the west into a drainage swale along the western property boundary. This area had relatively high concentrations of Site COCs in surface soil, as compared to other off-Site areas, though observations made during the sampling event did not suggest that current topographic features and surface runoff were likely to be responsible for the elevated concentrations (AMEC, 2009a).

Measured concentrations of Site COCs in the surface water of Springstead Creek are low (ACEPD, 2006) and measured concentrations of most Site COCs in Springstead Creek sediment are much lower than on-Site concentrations (ACEPD, 2009; AMEC, 2007). Of all the potentially Site-related COCs measured in Springstead and Hogtown Creek sediments, PAHs have been measured at the highest concentrations; however, the presence of PAHs at high concentrations in these waterways could be the result of other sources not related to activities on the the Koppers property, such as a release from the adjacent Cabot Carbon property that occurred 40 years ago (ACEPD, 2009).

*5.1.6.6 Dust.* Past transport of COCs via dust likely caused the detections of Site COCs in off-Site surface soil west of the Site (AMEC, 2009a, 2009b, and 2010b). Continuing off-Site transport of COCs via dust is less likely due to more limited activity on the Site and to improved dust-control practices. Air dispersion modeling (AMEC, 2009d) suggests that dust at the property boundary is currently well below appropriate EPA ambient air screening levels; therefore, no unacceptable health risks are predicted to be present on the facility, at the fence line of the facility, or beyond the facility boundary. All of the modeling assumes current conditions and does not reflect reduced fugitive dust emissions or reduced constituent concentrations in surface soil that would result if surface soil in portions of the Site were covered.

As of the date this ROD was prepared, dust modeling results have not been accepted by EPA as representative of actual Site conditions. EPA has concerns that the AMEC evaluation described above does not accurately evaluate all variables in such a way as to accurately state that there are no unacceptable health risks. Since the Koppers facility closure, Beazer East has begun interim measures to reduce dust including planting of vegetation over former operations. As part of Site building demolition activities, Beazer East is implementing dust controls in the form of dust suppression through continuous water application. During the remedial design of the Site remedy, Beazer East will design and implement an ambient air monitoring network at the fenceline.

**5.1.7 Potentially Complete Exposure Pathways**
Potential receptors and exposure media were examined in conjunction with the CSM presented above. Figure 13 is a conceptual diagram showing potential routes of human/environmental exposure to Site contaminants. The terminal point of each migration pathway is a potential receptor addressed by the proposed remedies.

*5.1.7.1 Potential Receptors.* The Site has been an industrial facility for over 90 years; the nearest residences are adjacent to the western and northwestern Site boundaries. The use of the Site is anticipated to remain commercial/industrial in the future, though it is possible that portions of the Site could be developed for other purposes (e.g., recreational or mixed-use with a residential component) as well. The EPA acceptable risk range for human health is a potential excess lifetime cancer risk of $1 \times 10^{-4}$ to $1 \times 10^{-6}$ (i.e. between one additional cancer case in a population of ten thousand, to one additional cancer case in a population of one million). Acceptable risks for non-carcinogenic contaminants must result in a hazard index of less than or equal to 1. On-Site trespassers are potential receptors, but their frequent presence on the Site is unlikely because the Site has fences and gates to limit access. Reasonable future receptors include on-Site workers and recreational users.

On-Site residential exposure scenarios are not applicable based on the expected commercial/industrial and/or recreational use of the property. Evaluation of potential risks associated with nonresidential use scenarios is consistent with federal guidance (EPA, 1995), in which EPA proposes to address potential risks consistent with current and plausible future land-use patterns. Note that this assumption does not prevent future Site development from including residential use. However, any future Site development that did include residential uses would need to revisit and address the appropriate potential exposure pathways, at that time, as part of the development design.

There is currently no use of groundwater from the surficial aquifer or HG for drinking water; however, the UFA is a drinking water aquifer. The Floridan aquifer serves as the source of drinking water for over 175,000 people in Alachua County and is the water source for the City of Gainesville Murphree Well Field located 2.5 miles northeast of the Site. This 26 million-gallon-per-day (mgd) well field is operated by GRU.

Off-Site receptors to be protected consist of the residential population located west of the Site property. Surface soil within the residential properties contains detected concentrations of COCs, at least a portion of which is assumed to be Site related.

*5.1.7.2 Exposure Media.* Based on RI data, potential exposure to Site contaminants may be possible via contact with the following media:

- On-Site surface soil (including dust)
- On-Site subsurface soil
- On-Site sediment (within the on-Site drainage ditch)
- On-Site surface water (storm water)
- Off-Site surface soil (residential areas west of facility)
- Off-Site sediment and surface water (north and west of the Site including Springstead Creek)
- Groundwater

Groundwater is further divided by hydrogeologic unit into:

- Surficial aquifer groundwater
- Upper Hawthorn groundwater
- Lower Hawthorn groundwater
- UFA groundwater.

To better organize and evaluate remedies for this complex Site, it was decided to develop and assess remedies for the three defined environmental units separately to facilitate selection of one remedy for each environmental unit:

- On-Site media (except UFA groundwater)
- UFA groundwater, and
- Off-Site media

Therefore the selected remedy consist of the combination of three related remedial alternatives, one for each environmental unit.

*5.1.7.2.1 On-Site Surface Soil.* Potential exposure of current and future trespassers, construction workers and utility workers, and future on-Site workers and recreational users to COCs in surface soil via direct contact is considered a potentially complete pathway. Because surface soil provides a potentially complete exposure pathway and is a potential source of COCs to surface water and sediment, addressing impacted surface soil is a key to controlling other potentially impacted media.

*5.1.7.2.2 On-Site Subsurface soil.* Potential exposure of future on-Site construction workers to contaminants in subsurface soil (deeper than 6 inches) is also considered a potentially complete pathway.

*5.1.7.2.3 On-Site Sediment.* Potential exposure of current and future trespassers and future on-Site workers to COCs in sediments via direct contact is considered a potentially complete pathway.

*5.1.7.2.4 On-Site Surface Water and Storm Water.* The drainage ditch at the Site only flows after heavy storm events; surface runoff is carried northeast off the Site toward Springstead Creek. Also, groundwater in the surficial aquifer may discharge to the Site ditch or down gradient wetlands adjacent to Springstead Creek. There is a potential for surface water to become impacted either by runoff or by shallow groundwater discharge.

*5.1.7.2.5 Off-Site Surface Water and Sediment.* During and after storm events, surface runoff is carried northeast off the Site toward Springstead Creek. There is also a potential that on-Site soil and sediment could be transported downstream during storm events. The potential for ecological risk due to Site-related contaminants in off-Site sediment is currently being evaluated. Potential exposure to Site-related contaminants in off-Site sediments is considered to be a potentially complete exposure pathway.

*5.1.7.2.6 Off-Site Surface Soil.* Another potentially complete exposure pathway consists of off-Site residents (living in areas immediately west of the facility) exposed to COCs in off-Site surface soil in yards and public easements. Exposure can occur through direct contact, ingestion or inhalation. Off-Site surface soil contains concentrations of COCs that exceed SCTLs. Further off-Site soil characterizations to the north, south, east, west of the Site are ongoing and will continue through the remedial design phase of the project.

*5.1.7.2.7 Groundwater.* Concentrations of certain dissolved contaminants exceed GCTLs (FTS, 2009a, 2009c, and 2009c; GeoTrans, 2007c and 2009b) in groundwater in the following hydrogeologic units (Figures 10, 11 and 12):

- Surficial aquifer
- Upper Hawthorn
- Lower Hawthorn
- UFA

Of these units, only the UFA is used as a drinking water source in the vicinity of the Site. This aquifer is the primary source of drinking water in Gainesville via the Murphree Well Field. The UFA is the least impacted of the four hydrogeologic units; however, exposure via groundwater ingestion is considered to be a potentially complete exposure pathway because there is a possibility that groundwater could be withdrawn down gradient of the Site and used as a private drinking water supply.

## 6.0 Current and Future Land Use

The land use for the Koppers property is industrial and surrounding properties are commercial and residential. This area lies in the northern part of Gainesville, within the city limits, in a very busy and heavily trafficked area. As of October 2009, the surrounding population was as follows: within 0.5 mile, 4,274 people; within 2.5 miles, 55,595 people; and within 4 miles, 97,670 people.

EPA makes use of several sources of information when evaluating future land use during CERCLA remedy selection, including the EPA directive "Land Use in the CERCLA Remedy Selection Process" (EPA OSWER Directive No. 9355.7-04). EPA is required to look at reasonably anticipated future land uses in determining what cleanup criteria to apply at a Superfund Site. The initial reasonably anticipated future land use for the Koppers property is industrial/commercial. This is based on current zoning, the stated intention of the property owner, and the determination by the City of Gainesville that rezoning the property to residential will not be feasible. Thus, EPA has determined that unrestricted residential use is not a likely or practical future land use for the Site. However, a remedy that in effect meets Florida residential default cleanup standards has been selected. The remedy calls for clean soil to be placed over almost the entire Site. EPA has made its reasonably anticipated land use determination based on several factors including property owner Beazer East's planned retention of Site ownership and its indicated willingness to include flexibility for future use of the Site as commercial, recreational or mixed use with a residential component. Therefore, the EPA has determined that the reasonably anticipated future land use of the Koppers portion of the Site is likely to be commercial, recreational or mixed-use with a residential component.

This view is consistent with the findings of the City of Gainesville's City Commission which considered and rejected a contingent future rezoning of the former Koppers Site to an exclusively residential use. This option was considered over a two-year time period during which the City planning commission introduced the City's initial vision of the Site as being reused as a mixed use commercial with a residential component similar to Atlantic Station (previously Atlantic Steel Mill) in Atlanta, Georgia. As EPA has communicated to the City in several City Commission meetings and through other formats, there are few, if any, former hazardous waste sites where there is unlimited or unrestricted future use. However, there are many former hazardous waste sites that have "residential" land uses taking place.

The surficial aquifer is contaminated with numerous compounds from previous processing operations at both Sites. Underlying the surficial aquifer is the HG. Underlying the HG is the Floridan aquifer. At the Site, the depth to the top of the Floridan aquifer is 200 to 250 ft below ground surface.

Recent investigations have revealed contamination in the HG and the underlying Floridan aquifer. The Floridan aquifer is the primary source of area drinking water. The city's Murphree Well Field extracts water from the Floridan and supplies the water for the city of

Gainesville. This well field is about 2.5 miles down gradient of the Site. Protection of this sole source aquifer is a key objective of the future land use of the Site.

The potential for environmental damage by off-Site migration of shallow contaminated groundwater into the off-Site down gradient ditch and Springstead Creek is a concern. Springstead Creek flows into Hogtown Creek, which discharges into Haile sink, which discharges into the Floridan aquifer.

# 7.0 Summary of Site Risks

The risk assessment estimates what risks exist at the Site if no action were taken. It provides the basis for taking action and identifies the contaminants and exposure pathways that need to be addressed by the remedial action.

Two risk assessments have been conducted for this Site. The first was a comprehensive effort that was part of the 1989/1990 RI/FS. It examined exposure to soil, groundwater, surface water, sediment and ambient air. Details of this assessment are contained in the 1990 ROD (EPA, 1990) available in the Administrative Record and Information Repository. The applicable portions of the human health risk assessment pertaining to groundwater are summarized in the following subsections.

The second risk assessment was completed in 2010 (ARCADIS, 2010). Its scope was limited to exposure to soil and sediment. For purposes of summarizing the Site risks for this ROD, the findings pertaining to exposure to groundwater reported in 1990 are presented along with the findings pertaining to exposure to soil reported in 2010. Both assessments followed EPA guidance and used a deterministic (i.e., point-estimate) approach to identify those contaminants present in environmental media that could potentially pose adverse health effects to current or future receptors.

## 7.1 Summary of Human Health Risk Assessment

### 7.1.1 Identification of Chemicals of Potential Concern

Chemicals of Potential Concern (COPCs) are chemicals whose data are of sufficient quality for use in the quantitative risk assessment, are potentially Site-related, and represent the most significant contaminants in terms of potential toxicity to humans. In 1990, the analogous term was "indicator chemicals." The selection process followed the one outlined in the Superfund Public Health Evaluation Manual (SPHEM) (EPA, 1986), the predecessor of the Risk Assessment Guidance for Superfund (EPA, 1989). It can be divided into the following four steps:

1. Determination of chemical concentrations and frequency of detection;
2. Identification of toxicity characteristics of detected chemicals;
3. Calculation of chemical toxicity (ct) and indicator score (is) values; and
4. Selection of final indicator chemical.

Selection of COPCs in the 2010 risk assessment was done according to current EPA guidance. The risk assessment evaluated data collected from 1995 to 2010. Maximum concentrations for all contaminants detected at least once in surface soil were compared to the lower of the Florida SCTLs for direct exposure to commercial/industrial worker (FDEP, 2005) and the EPA Industrial Soil Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites (EPA, 2008a). Prior to conducting the screening, the lower of the two screening values (i.e., the lower of the SCTL or RSL) was divided by 10, as requested by FDEP. Table 2 presents the COPC screening results for the 0 to 6 inch soil data.

### 7.1.2 Exposure Assessment

An exposure assessment identifies pathways whereby receptors may be exposed to Site contaminants and estimates the frequency, duration, and magnitude of such exposures. Exposure assessment involves (1) characterization of the environmental setting, (2) identification of exposure pathways, and (3) quantification of exposure (exposure point concentrations and human intakes). The environmental setting is discussed in Section 5. The two remaining elements of an exposure assessment are discussed below.

*7.1.2.1 Identification of Exposure Pathways.* Exposure pathways were determined in a conceptual site models that incorporate information on the potential chemical sources, release mechanisms, affected media, potential exposure pathways, and known receptors to identify complete exposure pathways. A pathway is considered complete if (1) there is a source or chemical release from a source; (2) there is an exposure point where contact can occur; and (3) there is a route of exposure (oral, dermal, or inhalation) through which the chemical may be taken into the body.

In 1990, multiple media/receptor combinations were examined, but the discussion summarized herein is limited to residential exposure to groundwater because cleanup goals are based on this land use. The groundwater exposure assumptions were for the daily consumption of two liters of water by a 70 kilogram (kg) person.

In 2010, the risk assessment examined multiple receptors exposed to various combinations of soil and sediment. For the purposes of this risk assessment summary, the presentation is for the future outdoor worker exposure to surface soil. This medium and the exposure routes associated with it result in the greatest potential risk and justify implementation of the selected remedy. Potentially complete exposure routes included incidental ingestion, dermal contact, and inhalation of soil-derived dust. EPA's default industrial exposure assumptions were used onsite. The risks and hazards associated with the other current and future receptors/media combinations may be found in the risk assessment report (ARCADIS, 2010).

*7.1.2.2 Exposure Point Concentrations.* The concentration term used in the intake equations is a conservative upper bound estimate of the arithmetic average concentration for a COPC based on a set of Site sampling results. Ideally, the exposure point concentration (EPC) should be the true average concentration within an exposure unit.

For the 1990 risk assessment, two hypothetical groundwater wells were selected. Because the indicator chemicals on the northern boundary of the Site are different from the indicator chemicals on the eastern boundary of the Site, a hypothetical well was located at both these points. The general procedure for estimating the potential current and future groundwater exposure concentrations was as follows:

- determination of plume characteristics;
- determination of equilibrium conditions between groundwater and soil at source areas;
- calculation of expected time of travel from source to receptor; and

- calculation of anticipated future exposure concentrations.

In the 2010 risk assessment, EPCs in surface soil were estimated using spatially-weighted averages to account for the varying densities of sampling locations on different parts of the Site. A bootstrapping procedure was used to develop a 95% upper confidence limit (UCL) point estimate of the spatially weighted average. The EPCs for surface soil may be found in Table 3.

*7.1.2.3 Human Intakes.* Human intakes were calculated for each chemical and receptor using the EPCs. Estimates of human intake, expressed in terms of mass of chemical per unit body weight per time (mg/kg-day), were calculated differently depending on whether the COPC is a non-carcinogen or a carcinogen. For non-carcinogens, intake was averaged over the duration of exposure and is referred to as the average daily dose (ADD). For carcinogens, intake was averaged over the average lifespan of a person (70 years) and is referred to as the lifetime average daily dose (LADD). ADDs and LADDs were calculated using standard assumptions and professional judgment.

### 7.1.3 Toxicity Assessment

Toxicity assessment is a two-step process whereby the potential hazards associated with route-specific exposure to a given chemical are: (1) identified by reviewing relevant human and animal studies, and (2) quantified through analysis of dose-response relationships.

Quantitative estimates of toxic response developed by EPA were used to evaluate potential cancer and non-cancer toxicity of contaminants. EPA toxicity values that were used in these assessments include:

- reference dose values (RfDs) for non-carcinogenic effects, and
- cancer slope factors (CSFs) for carcinogenic effects.

The RfDs and CSFs used in these assessments were primarily obtained from EPA's Integrated Risk Information System (IRIS) database. Values that appear in IRIS have been extensively reviewed by EPA work groups and thus represent Agency consensus. For the 2010 risk assessment, toxicity values were obtained from the following sources, in order of priority:

- EPA's IRIS database (EPA, 2008a);
- EPA Region 6 Human Health Medium-Specific Screening Levels, 2008 (EPA, 2008b); and
- Health Effects Assessment Summary Tables (HEAST) values as cited in the EPA Region 6 Human Health Medium-Specific Screening Levels, 2008 (EPA, 2008b).

### 7.1.4 Risk Characterization

The final step is the risk characterization. Human intakes for each exposure pathway are integrated with EPA reference toxicity values to characterize risk. Carcinogenic, non-carcinogenic, and lead effects are estimated separately.

To characterize the overall potential for non-carcinogenic effects associated with exposure to multiple chemicals, the EPA uses a Hazard Index (HI) approach. This approach assumes that simultaneous sub-threshold chronic exposures to multiple chemicals that affect the same target organ are additive and could result in an adverse health effect. The HI is calculated as follows:

HI = ADD1 /RfD1 + ADD2 /RfD2 +...ADDi /RfDi

where:

| | | |
|---|---|---|
| ADDi | = | Average Daily Dose for the ith toxicant |
| RfDi | = | Reference Dose for the ith toxicant |

The term ADDi/RfDi is referred to as the HQ.

Calculation of an HI in excess of unity indicates the potential for adverse health effects. Indices greater than one will be generated anytime intake for any of the COPCs exceeds its RfD. However, given a sufficient number of chemicals under consideration, it is also possible to generate an HI greater than one even if none of the individual chemical intakes exceeds its respective RfD.

Carcinogenic risk is expressed as a probability of developing cancer as a result of lifetime exposure. For a given chemical and route of exposure, excess lifetime cancer risk is calculated as follows:

Risk = LADD × CSF

These risks are probabilities that are generally expressed in scientific notation (e.g., $1 \times 10^{-6}$ or 1E-6). An incremental lifetime cancer risk of $1 \times 10^{-6}$ indicates that, as a plausible upper-bound, an individual has a one-in-one-million chance of developing cancer as a result of Site-related exposure to a carcinogen over a 70-year lifetime under the specific exposure conditions at the Site. For exposures to multiple carcinogens, the EPA assumes that the risk associated with multiple exposures is equivalent to the sum of their individual risks.

*7.1.4.1 1990 Groundwater Findings for Adult Residents.* The cumulative risk for the northern hypothetical well resulting from the representative exposure point concentrations was $9.9 \times 10^{-3}$ for the current scenario and $1.8 \times 10^{-2}$ for the future scenario. The main contributors to the cancer risk levels were arsenic, carcinogenic PAHs and PCP. In addition, the cumulative HI exceeded unity for the representative concentrations, for the northern hypothetical well for both current and future scenarios. The HIs for the current and future scenarios were 1.1 and 1.5 respectively. Chromium and non-carcinogenic PAHs were the main contributors to the HI.

The cancer risk levels for the eastern hypothetical well exceeded the $10^{-4}$ risk level for arsenic and PCP for both the current and future scenarios. The highest risk levels were associated with the future scenario, with a risk level of 4 x $10^{-4}$ for arsenic and 2 x $10^{-3}$ for PCP. The main contributors to the HI were chromium, non-carcinogenic PAHs and phenols.

Groundwater risk exceeds the threshold for action of 1 X $10^{-4}$.

*7.1.4.2 2010 Surface Soil Findings for Outdoor Workers.* The total excess cancer risk for the hypothetical future on-Site outdoor worker was estimated to be 5 x $10^{-4}$ (Table 4) based upon the conservative deterministic risk assessment. This total exceeds both the EPA allowable risk range and FDEP's risk benchmark.

The total HI was less than 1 (Table 5). Therefore, potential non-cancer health effects are not expected to occur as a result of potential exposure to COPCs in on-Site soils.

Lead exposure was evaluated using the Adult Lead Model (EPA, 1999, 2001). The predicted 95th percentile theoretical blood lead level in hypothetical future on-Site outdoor workers was less than the threshold of 10 micrograms per deciliter (μg/dL).

### 7.1.5 Cleanup Goals

Cleanup goals for groundwater COCs are listed in Table 6. The selected goals are based on the MCLs for Drinking Water in Florida contained in Chapter 62-550, Florida Administrative Code (F.A.C.) and GCTLs contained in Chapter 62-777, F.A.C.

Cleanup goals for on-Site soil (0 to 2 feet bls)/sediment COCs are listed in Table 7. The cleanup goals are based on the Florida default SCTLs for leachability based on groundwater criteria unless Site-specific criteria are developed in the RD.

Cleanup goals for off-Site soil/sediment COCs are listed in Table 8. These cleanup goals are based on Florida default SCTLs contained in Chapter 62-777, F.A.C., using the current land use (residential or commercial/ industrial) of the impacted parcel. Florida default leachability SCTLs for protection of ecological organisms in surface water are used for sediment in Springstead and Hogtown Creeks. Note that there are there are no anticipated exceedances of leachability standards based on current contaminant concentrations and types of contaminants encountered in off-Site soils and sediments. Table 7 and Table 8 include both the numeric direct contact and default leachability SCTL criteria. The more stringent of the two criteria apply to vadose zone soils. In cases where background sampling studies show background concentrations of particular contaminants exceed the SCTLs for those particular contaminants, there may be justification for using the background concentrations as clean-up goal concentrations in lieu of the published SCTLs, consistent with FDEP guidance for attainment of SCTLs.

### 7.1.6 Uncertainties

The uncertainty analysis provides decision makers with a summary of those factors that significantly influence risk results and discusses the underlying assumptions that most significantly influence risk estimates. This section discusses the assumptions that may contribute to over- or underestimates of risk.

*7.1.6.1 Uncertainties Related to Environmental Sampling and Analysis.* Uncertainty is always involved in the estimation of chemical concentrations. Uncertainty with respect to data evaluation can arise from many sources, such as the quality and quantity of the data used to characterize the Site, the process used to select data to use in the risk assessment, and the statistical treatment of data. Errors in the analytical data may stem from errors inherent in sampling and/or laboratory procedures. One of the most effective methods of minimizing procedural or systematic error is to subject the data to a strict quality control review. This quality control review procedure helps to eliminate many laboratory errors. However, even with all data vigorously validated, it must be realized that error is inherent in all laboratory procedures.

*7.1.6.2 Uncertainties Related to Exposure Assessment.* The exposure scenarios contribute a considerable degree of uncertainty to the risk assessment because they assume conditions that are unlikely to occur. The exposure assumptions directly influence the calculated doses (daily intakes), and ultimately the risk calculations. For the most part, Site-specific data were not available; therefore, conservative default exposure assumptions were used in calculating exposure doses such as the selection of exposure routes and exposure factors (e.g., contact rate). In most cases, this uncertainty may overestimate the most probable realistic exposures and, therefore, may overestimate risk. This is appropriate when performing risk assessments of this type so that the risk managers can be reasonably assured that the public risks will not be underestimated, and so that risk assessments for different locations and scenarios can be compared.

*7.1.6.3 Uncertainties Related to Toxicity Information.* RfDs and CSFs for the COPCs were derived from EPA sources. RfDs are determined with varying degrees of uncertainty depending on such factors as the basis for the RfD [no-observed-adverse-effect-level (NOAEL)], versus [lowest-observed-adverse-effect-level (LOAEL)], species (animal or human), and professional judgment. The calculated RfD is therefore likely overly protective, and its use may result in an overestimation of non-cancer risk. Similarly, the CSFs developed by EPA are generally conservative and represent the upper-bound limit of the carcinogenic potency of each chemical.

*7.1.6.4 Uncertainties Related to Human Health Risk Characterization.* Ideally, areas of exposure should be defined based on actual exposures or known behaviors of receptors at the Site. Often, however, as in the case of these risk assessments, this information is unavailable.

Each complete exposure pathway concerns more than one contaminant. Uncertainties are associated with summing risks or hazard quotients for multiple substances of concern in the risk characterization step. The assumption ignores the possibility of synergistic or antagonistic activities in the metabolism of the contaminants. This could result in over-or under-estimation of risk.

*7.1.6.5 Uncertainties Summary.* The large number of assumptions made in the risk characterization introduces uncertainty in the results. While this approach could potentially underestimate potential risk, the use of numerous, conservative (i.e., protective of human health) assumptions, in the risk characterization, typically overestimates potential risk. Any one person's potential exposure and subsequent risk are influenced by all the parameters utilized in the assessments and will vary on a case-by-case basis. Despite inevitable uncertainties associated with the steps used to derive potential risks, the use of numerous health-protective assumptions will most likely lead to a very large overestimate of potential risks from the Site even for the most sensitive receptor. Moreover, when evaluating risk assessment results, it is important to put the risks into perspective. For example, the background rate of cancer in the U.S. is approximately 2,500 for a population of 10,000 people (Landis, et al., 1998). The results of the risk assessment must be carefully interpreted considering the uncertainty and conservatism associated with the analysis, especially where site management decisions are made.

### 7.2 Summary of Ecological Risk Assessment

The ecological risk assessment conducted as part of the 1989/1990 RI/FS was summarized in the 1990 ROD (EPA, 1990). That summary is reproduced below.

The environmental exposure pathway of the most potential significance is the exposure of aquatic life in the Springstead Creek and the north Main Street ditch to contaminants in the surface water and sediments. The ecological assessment concluded that in general, although acute responses are unlikely based on ecotoxicity benchmark concentrations and the upper bound exposures point concentrations, the potential exists for adverse chronic effects to individuals inhabiting these locations.

An estimate of the environmental risk to aquatic organisms was obtained by comparing the estimated environmental concentrations with the toxicity of the chemicals using selected ecotoxicity benchmarks. The resulting toxicity quotients can be used to evaluate the potential for an adverse effect. The toxicity quotients indicate that aquatic organisms may be adversely impacted due to arsenic in Springstead Creek, chromium in the north Main Street ditch and PCP and PAHs in both the ditch and the creek.

The environmental assessment predicts that, while temporal changes may occur in the aquatic system, future impacts that may occur at the Site will not be observable for the following reasons:

- The aquatic areas consist of man-made ditches that do not always contain sufficient amounts of water to support aquatic organisms during all developmental stages.
- These areas are small relative to the contiguous aquatic habitat in areas farther from the Site, which suggests that for populations inhabiting these areas, only a small number of individuals within the population would be potentially exposed to any of the Site contaminants.

Therefore, although the risk of potential adverse effects to individuals inhabiting these locations exists, it is unlikely to subsequently produce a potential measurable effect on the population as a whole. This is especially true because the potentially affected areas are not habitat for reproduction.

## 8.0 Remedial Action Objectives

Remedial Action Objectives (RAOs) provide overall goals to guide the selection and implementation of remedial approaches. They were developed after a thorough review of the extensive amount of data that have been collected to date.

The cleanup goals for groundwater presented herein are based on restoration of the aquifer and attainment of drinking water standards outside of waste containment areas. The cleanup goals for on-Site soil/sediment are based on eliminating leachable contaminants to protect groundwater. The cleanup goals for off-Site soil/sediment are land use-dependent (residential or commercial/industrial) to meet the stringent State standard for cancer risk of less than 1 X $10^{-6}$ and a HI less than 1. The cleanup goals for soil for the protection of groundwater presented herein are based on potential residential use. The RAOs include the following:

- Eliminate potential risks to receptors exposed to Site-related contaminants in:
    - Surface soils
    - Groundwater in the Surficial Aquifer, Upper HG, Lower HG, and UFA
    - Subsurface soils
    - Sediment
    - Surface water
- Control and eliminate further migration of impacted groundwater
- Restore quality of groundwater outside of principal contaminant source areas to beneficial use having COC concentrations no greater than Federal MCLs or Florida GCTLs
- Reduce the mobility, volume, and toxicity of DNAPL to the maximum extent practicable.

Based on the Site-specific fate and transport evaluation and an analysis of applicable or relevant and appropriate requirements (ARARs), EPA adopted the Site-specific cleanup goals presented in Tables 6, 7, and 8 to meet these objectives.

# 9.0 Description of Alternatives

Remedial alternatives were defined and evaluated separately for three distinct media groups associated with the Site: on-Site media (soil and groundwater above the UFA), groundwater in the UFA, and off-Site media (soil, sediment, and surface water). The selected remedial alternative consists of a remedy for each of the three media groups. Each is discussed separately below.

## 9.1 Detailed Remedial Alternatives Evaluation: On-Site Alternatives

The on-Site media remedies (OnR) include the No Action remedy (remedy OnR-1) required by the NCP to provide a comparison baseline and a remedy representing continuation of ongoing remedial actions (remedy OnR-2) with addition of surface-soil grading/covers. Also considered are two on-Site alternatives including removal of principal contaminant source areas (OnR-3A and OnR-3B), two alternatives for in situ treatment of principal contaminant source areas (OnR-4A and OnR-4B), and eight alternatives that involve a combination of containment and different levels of source-area treatment (OnR-5A through OnR-5H).

### 9.1.1 Alternative OnR-1: No Action

Capital cost: $0
Annual O&M costs: $0
Total Present Worth: $0

The Superfund program requires the consideration of a No Action alternative to serve as a baseline comparison. Under this alternative, all active and passive Site activities, including groundwater extraction, DNAPL collection and groundwater monitoring, would cease. Furthermore, there would be no deed restrictions or Site security controls to prevent use of Site groundwater, limit exposures to Site soil, or restrict certain kinds of future development.

*Overall Protection of Human Health and the Environment*
The No Action remedy would fail to meet the RAOs. Overall protection of human health and the environment would not be met for the Surficial Aquifer as the groundwater extraction system would be shut down resulting in no controls to the off-Site migration of impacted groundwater at concentrations above applicable groundwater protection standards (e.g. GCTLs). Discontinuation of the groundwater monitoring system would prevent detection of potential off-Site migration of impacted groundwater with concentrations above the standards. Without Site use controls, depending up the nature of that future use, surface and shallow soils could potentially present an unacceptable risk to potential future receptors. Therefore, the No Action remedy does not satisfy this threshold criterion.

*Compliance with ARARs*
The No Action remedy could, depending on future land use, fail to meet allowable risk limits. Groundwater impacts above groundwater protection standards in the Surficial

Aquifer, HG, and Floridan Aquifer would not be addressed. Under such circumstances, the No Action remedy would not be in compliance with the state and federal ARARs; therefore, this remedy would not satisfy this threshold criterion.

*Long-Term Effectiveness and Permanence*
The No Action remedy has no long-term effectiveness toward addressing the RAOs. There would be no reduction in potential risk associated with potential future exposures to Site soil and sediment in the absence of Site use and/or engineering controls. Groundwater with concentrations exceeding GCTLs would remain at the Site, without any controls to address the potential for groundwater to migrate off-Site. No institutional controls would be implemented to prevent potential future exposures. Therefore, the No Action remedy would be ineffective in the long term, and does not meet this primary criterion.

*Reduction of Toxicity, Mobility, or Volume by Treatment*
The No Action remedy does not include any treatment technologies or remedy components. It would not reduce the T/M/V of contaminants in soils or groundwater.

*Short-Term Effectiveness*
The No Action remedy does not include any implementation activities: therefore, there are no additional short-term risks to the community or environment. This remedy is therefore considered to be effective in the short-term.

*Implementability*
There are no constructability, administrative, or availability impediments associated with implementing this remedy.

*Cost*
The costs for implementing this remedy would be minimal. Note that any cost associated with the No Action remedy for on-Site media would be added to the costs of the selected UFA and off-Site surface soil remedies.

### 9.1.2 Alternative OnR-2: Continue Current Actions with Surface Regrading/Covers
Capital cost: $6.2 million
Annual O&M costs: $300,000
Total Present Worth: $11.1 million

This remedial alternative represents a minimal action potentially sufficient to meet RAOs. It includes continuing the current interim remedial measures: Surficial Aquifer groundwater extraction/treatment, groundwater monitoring, and passive DNAPL recovery. Additionally, most of the Site would be regraded and surface covers placed to prevent direct exposure to soil with elevated levels of contaminants. Groundwater monitoring and institutional controls are also part of this remedy.

*Overall Protection of Human Health and the Environment*
The engineering and institutional controls of remedy OnR-2 would protect against potential exposures to surface soils.

Groundwater impacts would continue to be addressed by continuing extraction of groundwater from the Surficial Aquifer. Beyond the property boundary, the primary remedy would be through natural attenuation where there are low-level exceedances of cleanup goals with an ISCO application in the HG as necessary. Monitoring would be used to demonstrate that groundwater concentrations beyond the property boundary are decreasing to below applicable groundwater protection standards (e.g. GCTLs). Institutional controls would prevent potential exposure to impacted groundwater on Site.

These measures would achieve the RAOs of mitigating potentially unacceptable risks to potential on-Site receptors and mitigating potential migration of impacted groundwater. Remedy OnR-2 would likely satisfy this threshold criterion.

*Compliance with ARARs*
The current remedial actions result in meeting groundwater protection standards at temporary points of compliance (TPOC) and would eventually result in meeting standards at the property boundary in the Surficial Aquifer and HG (though the time frame may be extended for the HG). This alternative would not restore groundwater to beneficial use throughout the plume within a reasonable time frame. The potential for future surface water impacts is low.

Current groundwater impacts in the Surficial Aquifer and the HG exist at locations that require remedial action, and this remedy does nothing to aggressively address source material (and therefore potential future migration of contaminants in the Surficial Aquifer or the HG). Future compliance with chemical-specific ARARs is not certain for this remedy.

Treated groundwater is discharged under the conditions of a GRU sanitary-sewer discharge permit. Groundwater treatment residuals are managed, transported, and disposed of in compliance with appropriate regulations. For ISCO application, UIC requirements would be required.

This remedy would not comply with all chemical-specific ARARs within a reasonable timeframe, and therefore would potentially not satisfy this threshold criterion.

*Long-Term Effectiveness and Permanence*
The remedial actions of OnR-2 reduce the long-term likelihood of potential exposure to impacted soil, sediment, or groundwater. The engineering and institutional controls of remedy OnR-2 would protect against potential exposures to surface soils. Groundwater impacts are contained near the Site and will eventually be contained on Site. Institutional controls would be effective at limiting potential contact with impacted groundwater. Potential future impacts to surface water are not expected. All of the technologies used in this remedy are proven and well tested in the field. Their long-term performance has been demonstrated. This primary criterion would be met for remedy OnR-2.

*Reduction of Toxicity, Mobility, or Volume by Treatment*
Groundwater extraction and treatment would result in removal and immobilization of COCs via transfer of mass to treatment residuals. Passive removal of DNAPL (and off-Site incineration) would also reduce the volume of COCs.

If applied as a contingency, ISCO injections into the HG would reduce the volume, mobility, and/or toxicity of COCs in groundwater. Natural attenuation also reduces the toxicity, mobility, and/or volume of Site contaminants. This primary criterion would be met by remedy OnR-2.

*Short-Term Effectiveness*
Implementing OnR-2 would likely result in minimal additional short-term risks. On-Site operations, including the extraction/treatment system, collection of DNAPL from monitoring wells, and groundwater monitoring, would have the potential to create worker safety, accidental releases, and on- and off-Site emission risks. However, overall health and safety risks are low. During on-Site operations ambient air monitoring will be conducted at the fenceline.

Relatively little time would be required to implement this remedy. It may take a few months to complete installation of new monitoring wells, execute institutional controls, and prepare a report. Other components of the remedy are already operational.

Groundwater impacts will be largely contained by the existing Surficial Aquifer hydraulic containment system. Natural attenuation where there are low-level exceedances of cleanup goals, with ISCO if necessary, would be used to attain groundwater protection standards at and downgradient of the property boundary. The length of time required for groundwater to meet the groundwater protection standards at the Property boundary would likely be many years. This primary criterion is met by remedy OnR-2.

*Implementability*
This alternative includes continuing current remedial activities (interim measures), along with (a) grading and covering most of the Site, (b) installing new monitoring wells, (c) developing, implementing, and analyzing an MNA program and additional hydraulic containment as needed, (d) implementing actions in the HG as necessary (see Section 11.2.1.11 for description of trigger criteria for action), and (e) attaching deed restrictions to the Site property. These activities can be readily implemented, thus this primary criterion is met by remedy OnR-2.

*Cost*
The estimated capital cost for remedy OnR-2 is $6.2 million. It assumes that the groundwater treatment system will be operated for 30 years in this remedy. The OM&M costs will be approximately $300,000 annually. The net present value (NPV) cost estimate for this remedy is $11.1 million and is based on a 5 percent discount rate.

### 9.1.3 Alternative OnR-3A: Removal – Surficial Aquifer Excavation

Capital cost: $64.1 million
Annual O&M costs: $165,000
Total Present Worth: $67.8 million

This alternative includes excavating soil in the four principal contaminant source areas to the base of the Surficial Aquifer, approximately 25 feet below surface, treating the excavated soil by ex situ S/S and returning most of this material to the excavations. Some of the solidified material will be incorporated into covers over the excavated areas and much of the Site. Vertical retaining/barrier walls will be installed to the top of the middle clay unit of the HG to provide: (1) shoring for the excavations and (2) physical barriers to horizontal groundwater migration in the Upper Hawthorn. Concurrent dewatering of the excavation pit, and treatment of extracted water, will be required to maintain dewatered conditions during excavation activities. This alternative must be used in conjunction with other alternatives to produce a site wide remedy addressing all media. This alternative must be used in conjunction with other alternatives to produce a site wide remedy addressing all media.

<u>*Overall Protection of Human Health and the Environment*</u>

The combination of soil cover and institutional controls of alternative OnR-3A would be protective against potential exposures to Site-related contaminants in surface soils and would protect surface water from potential impacted runoff.

*Ex situ* S/S of source area soil from the Surficial Aquifer would reduce, but would not eliminate, mass flux of COCs to groundwater in the long term.

Groundwater impacts would be addressed through (1) continuation of extraction in the Surficial Aquifer (eventually to be phased out), (2) natural attenuation where there are low-level exceedances of cleanup goals, and (3) ISCO application in the HG as necessary (see Section 11.2.1.11 for description of trigger criteria for action). Monitoring would be used to demonstrate that groundwater concentrations beyond the property boundary are decreasing to below applicable groundwater protection standards (e.g. GCTLs). Institutional controls would prevent potential exposure to impacted groundwater on Site.

These measures would achieve the RAOs of mitigating potentially unacceptable risks to potential receptors and mitigating potential migration of impacted groundwater. Alternative OnR-3A would satisfy this threshold criterion.

<u>*Compliance with ARARs*</u>

The remedial actions would result in meeting groundwater protection standards at TPOCs and eventually at the property boundary in the Surficial Aquifer and HG. After the soil cover is constructed, potential excess lifetime cancer risks from potential direct exposure to Site-related contaminants in on-Site soil are expected to be well below the Florida limit of $1 \times 10^{-6}$ and the non-cancer HI would be well below 1. The potential for future surface water impacts would be very low.

All excavated soil would be managed and treated within the Site Area of Contamination (AOC), which would avoid certain conditions and restrictions on transportation and disposal of potentially hazardous waste. The National Contingency Plan (NCP) policy (55 FR 8758-8760) allows EPA to designate an AOC as an existing area of continuous contamination of varying amounts and types. Land disposal restrictions (LDR) will not apply if material is moved within an AOC, treated in place, or consolidated within an AOC. Establishment of an AOC facilitates remediation of contaminated sites. Restoration of groundwater to beneficial use within the source containment area would not be a requirement. Treated groundwater would continue to be discharged under the conditions of a GRU sanitary-sewer discharge permit. Groundwater treatment residuals would continue to be managed, transported, and disposed of in compliance with appropriate regulations. Storm water controls would result in compliance with ARARs during and after remedy construction. If ISCO applications were implemented, UIC requirements would be met. This remedy would comply with all ARARs, and therefore would satisfy this threshold criterion.

*Long-Term Effectiveness and Permanence*
The remedial actions of alternative OnR-3A would substantially reduce the long-term likelihood of exposure to impacted soil, sediment, or groundwater. The most contaminated surface soil would be beneath an engineered cover. Groundwater impacts would be contained near the Site and eventually on Site. Institutional controls would be effective at limiting potential contact with impacted soil or impacted groundwater. Potential future impacts to surface water would not be expected.

The principal contaminant source areas would be treated to limit (but not eliminate) ongoing impacts to groundwater and to reduce the need for pump and treatment in the Surficial Aquifer. The vertical barrier wall and caps would provide long-term containment.

All of the technologies used in this remedy are proven and well tested in the field. Their long-term performance has been demonstrated. This primary criterion would be met for remedy OnR-3A.

*Reduction of Toxicity, Mobility, or Volume by Treatment*
Removal (excavation) is not considered a treatment action; although, excavated soil can be treated ex situ. There is some risk that excavation activities could lead to mobilization of DNAPL that is presently immobile at residual saturation. Such mobilized DNAPL should be captured by the dewatering operation.

Treatment of the excavated soil by S/S would significantly decrease the mobility of COCs by binding the contaminants and DNAPL to the soil and reducing hydraulic conductivity of the mass. The source area treatment would also reduce the dissolved-phase plume volume over the long term. Targeted ISCO/ISGS treatment at source area HG wells would also reduce the volume/mobility of deeper COCs.

Graded surface covers, though not a treatment action, would decrease the mobility of contaminants by reducing water infiltration through impacted soils. Likewise, vertical barriers in the Upper Hawthorn would limit groundwater flow through principal contaminant source areas thereby reducing COC mobility.

Groundwater extraction and treatment would result in removal and immobilization of COCs via transfer of mass to treatment residuals. Targeted ISCO in the HG in principal contaminant source areas would also reduce the volume of COCs.

If applied as a contingency, ISCO injections into the HG would reduce the volume, mobility, and/or toxicity of COCs in groundwater. Natural attenuation also reduces the toxicity, mobility, and/or volume of Site contaminants. This primary criterion would be met by remedy OnR-3A.

*Short-Term Effectiveness*
Implementing OnR-3A would create short-term risks requiring mitigation. Implementation of excavation, ex situ solidification, and surface covers will involve substantial use of heavy equipment, large open excavations, and temporary above-ground stockpiling of impacted soil. There will be emissions from machinery, risks of injury to remediation workers, risks of exposure to on-Site personnel, and risks of surface water runoff impacts during construction. The short term risks can be managed through engineering controls, responsible construction management, and safe work practices.

It will take a substantial amount of time to implement this remedy. The most time-consuming component of the remedy is excavation, treatment, and backfilling, which would take approximately 1.5 years to complete. The total time for construction is estimated to be 2 years.

After construction, potential groundwater impacts would be largely contained by the source treatment and hydraulic containment system. Natural attenuation where there are low-level exceedances of cleanup goals, with ISCO if necessary, would be used to attain groundwater protection standards outside the containment system. The length of time required for groundwater to meet the groundwater protection standards at the Property boundary may be several years. This primary criterion is met by remedy OnR-3A.

*Implementability*
Excavation of source area soils containing DNAPL was evaluated in comparison with other options during the FS process. Remedy OnR-3A presents serious implementation challenges. While the practicality of implementing this remedy is questionable, as described below, it is assumed here that implementation challenges can be overcome.

For this remedy, large excavations would be required and large quantities of soil would need to be processed above ground. The amount of space, equipment, and time needed would be correspondingly large. The two source area excavation alternatives considered during the remedy selection process (removal of soil within the Surficial Aquifer or removal of soil to the Hawthorn Group middle clay unit) would present significant challenges due to the excavation depths and the large amounts of soil that would be removed. . The Surficial

Aquifer soil removal would require digging to an approximate depth of 25 feet below ground and removing approximately 280,000 cubic yards (420,000 tons) of soil. Excavating soil to these depths would require shoring to keep the excavation walls from collasping, and dewatering of very large quantities of contaminated groundwater to remove groundwater that would flow into the excavation area during excavation. Groundwater collected from the excavation area would require treatment and disposal. Construction of a staging/temporary storage area may be required. Excavated soil would require management as a hazardous waste. All of these challenges, in turn, result in short-term health and safety risks to remedial workers and the nearby community and significant additional costs for the remedial effort.

Large quantities of cement and other additives would need to be procured and managed. There would be logistical challenges to stockpiling and treating soil on-Site. Precautions would be taken to assure that all storm water was contained. Alternatively, finding one or more disposal facilities that will accept the large quantities of contaminated soil would present a challenge. Land Disposal Restriction (LDR) and Best Demonstrated Available Technology (BDAT) rules establishing treatment standards for land disposal may require that contaminated soils from the Site be sent to one of the few hazardous waste incinerators that accept wood treatment listed waste.

It may also be necessary to treat soils on-site prior to off-Site disposal. Transporting the contaminated soils to an off-Site facility would require either about 15,000 truck loads (Surficial Aquifer excavation). More than 100 dump truck loads per day of contaminated soil could be driven through the areas surrounding the Site resulting in significant transport-related safety and environmental risks, as well as a significant nuisance to the surrounding areas for over 2.5 years. Rail transport presents challenges due to demurrage and relatively low daily volumes. If the material is treated on-site (by any method) and returned to the excavation, the risk reduction and volume treated is very similar to the in-situ treatment options, but with substantially greater short-term risk, engineering challenges, effort, time, and cost.

If the excavated soil is placed in an on-site constructed containment instead of being returned to the excavation or transported off-Site, the resulting mound would be much larger than the mound considered for the gently sloped consolidation area. This would have serious technical and permitting challenges, would limit redevelopment opportunities, and would not be a welcome sight for the community. Actual long-term human health and environmental risk reduction resulting from source area excavation would not be significantly different than in-situ treatment. Short-term risks would be significantly higher for soil excavation. Soil removal will not significantly reduce groundwater concentrations at potential receptors, including the Murphree Well Field. A long-term groundwater remedy would still be required. There is also a risk that residual DNAPL will be mobilized through the groundwater during excavation activities.

<u>*Cost*</u>
The estimated capital cost for remedy OnR-3A is $64.1 million, with most of the cost being for excavation and treatment. It assumes that the groundwater treatment system will be

operated for 10 years in this remedy. After that, OM&M costs will be approximately $165,000 annually. The NPV cost estimate for this remedy is $67.8 million, and is based on a 5 percent discount rate.

Contingent actions are not included in the cost estimate. Note that the cost of this remedy for on-Site media would be added to the costs of the selected UFA and off-Site surface soil remedies.

### 9.1.4 Alternative OnR-3B: Removal – Excavation to Middle Clay

Capital cost: $190 million
Annual O&M costs: $165,000
Total Present Worth: $193.7 million

This remedy includes excavating soil in the four principal contaminant source areas to the middle clay of the HG, approximately 65 feet below surface, treating the excavated soil by ex situ S/S, and returning most of this material to the excavations. Some of the solidified material will be incorporated into covers for the excavated areas and for much of the Site. Vertical retaining/barrier walls will be installed to the top of the middle clay unit of the HG to provide: (1) shoring for the excavations and (2) physical barriers to horizontal migration in the Upper Hawthorn. Concurrent dewatering of the excavation pit, and treatment of extracted water, will be required to maintain dewatered conditions during excavation activities. This alternative must be used in conjunction with other alternatives to produce a site wide remedy addressing all media.

_Overall Protection of Human Health and the Environment_
The combination of soil cover and institutional controls of remedy OnR-3B would be highly protective against potential exposures to Site-related contaminants in surface soils and would protect surface water from potential impacted runoff.

*Ex situ* S/S of source area soil from the Surficial Aquifer and HG would limit potential mass flux of COCs to groundwater in the long term.

Groundwater impacts would be addressed by (1) continuing extraction of Surficial Aquifer groundwater (eventually to be phased out), (2) natural attenuation where there are low-level exceedances of cleanup goals, and (3) ISCO application in the HG if necessary (see Section 11.2.1.11 for description of trigger criteria for action). Monitoring would be used to demonstrate that groundwater concentrations beyond the property boundary are decreasing to below applicable groundwater protection standards (e.g. GCTLs). Institutional controls would prevent potential exposure to impacted groundwater on Site.

These measures would achieve the RAOs of mitigating potentially unacceptable risks to potential receptors and mitigating potential migration of impacted groundwater. Remedy OnR-3B would satisfy this threshold criterion.

*Compliance with ARARs*
The remedial actions would result in meeting groundwater protection standards at TPOCs and eventually throughout the Surficial Aquifer and HG outside the solidified/stabilized area. After the soil cover is constructed, potential excess lifetime cancer risks from direct exposure to Site-related contaminants in on-Site soil are expected to be well below $1 \times 10^{-6}$ and the non-cancer HI would be well below 1. The potential for future surface water impacts would be very low.

All excavated soil would be managed and treated within the Site AOC, which would avoid certain conditions and restrictions on transportation and disposal of potentially hazardous waste. Treated groundwater would continue to be discharged under the conditions of a GRU sanitary-sewer discharge permit. Groundwater treatment residuals would continue to be managed, transported, and disposed of in compliance with appropriate regulations. Storm water controls would result in compliance with ARARs during and after remedy construction. For ISCO application, UIC requirements would be met. This remedy would comply with all ARARs, and therefore would satisfy this threshold criterion.

*Long-Term Effectiveness and Permanence*
The remedial actions of remedy OnR-3B would substantially reduce the long-term likelihood of potential exposure to impacted soil, sediment, or groundwater. The highest-concentration areas of surface soil would be beneath an engineered cover. Groundwater impacts would be contained near the Site and eventually within the solidified/stabilized area. Institutional controls would be effective at limiting potential contact with impacted soil or impacted groundwater. Potential future impacts to surface water would not be expected.

The principal contaminant source areas would also be treated to limit (but not eliminate) ongoing impacts to groundwater and to reduce or eventually eliminate the need for pump and treatment.

All of the technologies used in this remedy are proven and well tested in the field. Their long-term performance has been demonstrated. This primary criterion would be met for remedy OnR-3B.

*Reduction of Toxicity, Mobility, or Volume by Treatment*
Removal (excavation) is not considered a treatment action; however, excavated soil will be treated *ex situ*. There is some risk that excavation activities could lead to mobilization of DNAPL that is presently immobile at residual saturation. Such mobilized DNAPL should be captured by the dewatering operation.

Treatment of the excavated soil by S/S would significantly decrease the mobility of COCs by binding the contaminants and DNAPL to the soil and reducing hydraulic conductivity of the mass. The source area treatment would also reduce the dissolved-phase plume volume over the long term. Targeted ISCO/ISGS treatment at deeper source area HG wells would also reduce the volume/mobility of COCs.

Graded surface covers, would also decrease the potential mobility of contaminants by reducing water infiltration through impacted soils.

Groundwater extraction and treatment would result in removal and immobilization of COCs via transfer of mass to treatment residuals. If applied as a contingency, ISCO injections into the HG would reduce the volume, mobility, and/or toxicity of COCs in groundwater (see Section 11.2.1.11 for description of trigger criteria for action). Natural attenuation also reduces the toxicity, mobility, and/or volume of Site contaminants. This primary criterion would be met by remedy OnR-3B.

*Short-Term Effectiveness*
Implementing OnR-3B would create significant short-term risks that would require mitigation. Implementation of excavation, ex situ solidification, and surface covers will involve substantial use of heavy equipment, large open excavations, and temporary above-ground stockpiling of impacted soil. There will be emissions from machinery, risks of injury to remediation workers, risks of exposure to on-Site personnel, and risks of storm water runoff impacts during construction. The short-term risks can be managed through engineering controls, responsible construction management, and safe work practices.

It will take a substantial amount of time to implement this remedy. The most time-consuming component of the remedy is excavation, treatment, and backfilling, which would take approximately 3 years to complete. The total time for construction is estimated to be 3.5 years.

After construction, groundwater impacts would be largely contained by the source treatment and hydraulic containment system. Natural attenuation where there are low-level exceedances of cleanup goals, with ISCO if necessary, would be used to attain groundwater protection standards at and downgradient of the solidified/stabilized area. The length of time required for groundwater to meet the groundwater protection standards at the property boundary will be several years. This primary criterion is met by remedy OnR-3B.

*Implementability*
Excavation of source area soils containing DNAPL was evaluated in comparison with other options during the FS process. Remedy OnR-3B presents very serious implementation challenges. While the practicality of implementing this remedy is highly questionable, as described below, it is assumed here that implementation challenges can be overcome.

For this remedy, large excavations would be required and large quantities of soil would need to be processed above ground. The amount of space, equipment, and time needed would be corresponding large. The source area excavation within the Surficial Aquiferand removal of soil to the Hawthorn Group middle clay unit would present significant challenges due to the excavation depths and the large amounts of soil that would be removed. . The Surficial Aquifer soil removal would require digging to an approximate depth of 25 feet below ground and removing approximately 280,000 cubic yards (420,000 tons) of soil. The Hawthorn Group middle clay soil is deeper and removal would require digging to an approximate depth of 65 feet below ground and removing approximately 1,800,000 cubic yards (2,700,000 tons) of soil. Excavating soil to these depths would require shoring to keep the excavation walls from collapsing, and large-scale dewatering to remove groundwater that would flow into the excavation area during excavation. Groundwater collected from the excavation area would require treatment and disposal. Construction of a staging/temporary storage area may be required. Excavated soil would require management as a hazardous waste. All of these challenges, in turn, result in significant short-term health and safety risks to remedial workers and the nearby community and significant additional costs to the remedial effort.

Large quantities of cement and other additives would need to be procured and managed. There would be logistical challenges to stockpiling and treating soil on-Site. Precautions would be taken to assure that all storm water was contained. Finding one or more disposal facilities that will accept the large quantities of contaminated soil would present a challenge. Land Disposal Restriction (LDR) and Best Demonstrated Available Technology (BDAT) rules establishing treatment standards for land disposal may require that contaminated soils from the Site be sent to one of the few hazardous waste incinerators that accept wood treatment listed waste.

It may also be necessary to treat soils on-site prior to off-Site disposal. Transporting the contaminated soils to an off-Site facility would require either about 95,000 (Hawthorn Group middle clay excavation) truck loads. More than 100 dump truck loads per day of contaminated soil could be driven through the areas surrounding the Site resulting in significant transport-related safety and environmental risks, as well as a significant nuisance to the surrounding areas for over 2.5 years. Rail transport presents challenges due to demurrage and relatively low daily volumes. If the material is treated on-site (by any method) and returned to the excavation, the risk reduction and volume treated is very similar to the in-situ treatment options, but with substantially greater short-term risk, engineering challenges, effort, time, and cost.

If the excavated soil is placed in an on-site constructed landfill instead of being returned to the excavation or transported off-Site, the resulting mound would be much larger than the mound considered for the gently sloped consolidation area. This would have serious technical and permitting challenges, would limit redevelopment opportunities, and would not be a welcome sight for the community. Actual long-term human health and environmental risk reduction resulting from source area excavation would not be significantly different than in-situ treatment. Short-term risks would be significantly higher for soil excavation. Soil removal will not significantly reduce groundwater concentrations at potential receptors, including the Murphree Well Field. A long-term groundwater remedy would still be required. There is also a risk that residual DNAPL will be mobilized during excavation activities.

*Cost*

The estimated capital cost for remedy OnR-3B is $190 million, with most of the cost being for soil excavation and treatment. It is assumed that the groundwater treatment system will be required for 10 years in this remedy. After that, OM&M costs will be approximately

$165,000 annually. The NPV cost estimate for this remedy is $193 million, and is based on a 5 percent discount rate.

Contingent actions are not included in the cost estimate. Note that the cost of this remedy for on-Site media would be added to the costs of the selected UFA and off-Site surface soil remedies.

### 9.1.5 Alternative OnR-4A: *In situ* Treatment – Solidification/Stabilization to Middle Clay

Capital cost: $75.2 million
Annual O&M costs: $165,000
Total Present Worth: $78.9 million

This alternative includes ISS/S of impacted soil from the ground surface to the top of the middle clay unit of the HG (approximately 65 feet bgs) in the four principal contaminant source areas. Excess soil will be treated by *ex situ* S/S and used as a base layer for surface covers.

*Overall Protection of Human Health and the Environment*

The combination of soil cover and institutional controls of OnR-4A would be highly protective against potential exposures to Site-related contaminants in surface soils and would protect surface water from potential impacted runoff.

ISS/S treatment of principal contaminant source areas in the Surficial Aquifer and Upper Hawthorn would significantly reduce potential mass flux of COCs to groundwater.

Groundwater impacts would be addressed by (1) continuing extraction of Surficial Aquifer groundwater (eventually to be phased out), (2) natural attenuation where there are low-level exceedances of cleanup goals, and (3) ISCO application in the HG if necessary (see Section 11.2.1.11 for description of trigger criteria for action). Monitoring would be used to demonstrate that groundwater concentrations beyond the property boundary are decreasing to below applicable groundwater protection standards (e.g. GCTLs). Institutional controls would prevent potential exposure to impacted groundwater on Site.

These measures would achieve the RAOs of mitigating potentially unacceptable risks to potential receptors and mitigating potential migration of impacted groundwater. Remedy OnR-4A would satisfy this threshold criterion.

*Compliance with ARARs*

The remedial actions would result in meeting groundwater protection standards at TPOCs and eventually throughout the Surficial Aquifer and HG outside the source containment area. After the soil cover is constructed, potential excess lifetime cancer risks from direct exposure to Site-related contaminants in on-Site soil are expected to be well below 1 x 10-6 and the non-cancer HI would be well below 1. The potential for future surface water impacts would be very low.

All excess soil would be managed and treated within the Site AOC, which would avoid certain conditions and restrictions on transportation and disposal of potentially hazardous waste. Treated groundwater would continue to be discharged under the conditions of a GRU sanitary-sewer discharge permit. Groundwater treatment residuals would continue to be managed, transported, and disposed of in compliance with appropriate regulations. Storm water controls would result in compliance with ARARs during and after remedy construction. For ISCO application, UIC requirements would be met. This remedy would comply with all ARARs, and therefore would satisfy this threshold criterion.

*Long-Term Effectiveness and Permanence*

The remedial actions of OnR-4A would substantially reduce the long-term likelihood of potential exposure to impacted soil, sediment, or groundwater. The highest-concentration areas of surface soil would be beneath an engineered cover. Potential groundwater impacts would be treated and contained, and dissolved phase groundwater contamination will be reduced below cleanup goals. Institutional controls would be effective at limiting potential contact with impacted soil or impacted groundwater. Potential future impacts to surface water would not be expected.

The principal contaminant source areas would also be treated to limit (but not eliminate) potential ongoing impacts to groundwater and to reduce or eventually eliminate the need for hydraulic containment.

All of the technologies used in this remedy are proven and well tested in the field. Their long-term performance has been demonstrated. This primary criterion would be met for remedy OnR-4A.

*Reduction of Toxicity, Mobility, or Volume by Treatment*

ISS/S of source area soils would significantly decrease the potential mobility of COCs by binding the contaminants and DNAPL to the soil and reducing hydraulic conductivity of the mass. The source area treatment would also reduce the dissolved-phase plume volume. Targeted ISCO/ISGS treatment at source area HG wells would also reduce the volume/mobility of COCs.

Graded surface covers would also decrease the potential mobility of contaminants by reducing water infiltration through impacted soils.

Groundwater extraction and treatment would result in removal and immobilization of COCs via transfer of mass to treatment residuals.

If applied as a contingency, ISCO injections into the HG would reduce the volume, mobility, and/or toxicity of COCs in groundwater. Natural attenuation also reduces the toxicity, mobility, and/or volume of Site contaminants. This primary criterion would be met by remedy OnR-4A.

*Short-Term Effectiveness*

Implementing OnR-4A would create short-term risks that would require mitigation. Implementation of ISS/S and surface covers will involve substantial use of heavy equipment and temporary above-ground stockpiling of impacted soil. There will be emissions from machinery, risks of injury to remediation workers, risks of exposure to on-Site personnel, and risks of storm water runoff impacts during construction. The short term risks can be managed through engineering controls, responsible construction management, and safe work practices.

It will take a substantial amount of time to implement this remedy. The most time-consuming component of the remedy is ISS/S, which would take approximately 2.5 years to complete. The total time for construction is estimated to be 3 years.

After construction, groundwater impacts would be largely contained by the source treatment and hydraulic containment system. Natural attenuation where there are low-level exceedances of cleanup goals, with ISCO if necessary, would be used to attain groundwater protection standards at and downgradient of the property boundary. The length of time required for groundwater to meet the groundwater protection standards at the Property boundary may be several years. This primary criterion is met by remedy OnR-4A.

*Implementability*

Although OnR-4A presents implementation challenges, the remedy is constructible and this primary criterion is met.

This remedy requires mobilizing and operating large diameter ISS/S rigs. Approximately 5.5 acres of the Site would be subject to ISS/S. Very large quantities of cement and other additives would need to be procured and managed. The design depth of ISS/S treatment is near the practical limit of the technology.

Soil generated from ISS/S implementation would need to be managed and treated for use in the cover system. There may be logistical challenges to stockpiling and treating excess soil on-Site. Precautions would be taken to assure that all storm water was contained.

*Cost*

The estimated capital cost for OnR-4A is $75.2 million, with most of the cost being for ISS/S treatment. It assumes that the groundwater treatment system will be operated for 10 years. After that, OM&M costs will be approximately $165,000 annually. The NPV cost estimate for this remedy is $78.9 million, and is based on a 5 percent discount rate.

Contingent actions are not included in the cost estimate. Note that the cost of this remedy for on-Site media would be added to the costs of the selected UFA and off-Site surface soil remedies.

### 9.1.6 Alternative OnR-4B: *In situ* Treatment – Solidification/Stabilization and Biogeochemical Stabilization

Capital cost: $38.1 million
Annual O&M costs: $165,000
Total Present Worth: $41.8 million

This alternative includes ISS/S of source area impacted soil from the ground surface to the top of the upper clay unit of the HG (approximately 25 feet below ground surface), with ISGS in the Upper Hawthorn below the ISS/S areas. Excess soil will be treated by ex situ solidification/stabilization and used as a base layer for surface covers. This remedy is similar to remedy OnR-4A except that ISGS replaces ISS/S in the Upper Hawthorn.

Overall Protection of Human Health and the Environment

The combination of soil cover and institutional controls of remedy OnR-4B would be highly protective against potential exposures to Site-related contaminants in surface soils and would protect surface water from potential impacted runoff.

ISS/S treatment of principal contaminant source areas in the Surficial Aquifer would limit the potential mass flux of COCs to groundwater. Similarly, ISGS treatment in the Upper Hawthorn would limit the potential mass flux of COCs to groundwater. ISGS would also remove some COC mass through oxidation.

Potential groundwater impacts would be addressed by (1) continuing extraction of Surficial Aquifer groundwater (eventually to be phased out), (2) natural attenuation where there are low-level exceedances of cleanup goals, and (3) ISCO application in the HG if necessary (see Section 11.2.1.11 for description of trigger criteria for action). Monitoring would be used to demonstrate that groundwater concentrations outside the solidified/stabilized area are decreasing to below applicable groundwater protection standards (e.g. GCTLs). Institutional controls would prevent exposure to impacted groundwater on Site.

These measures would achieve the RAOs of mitigating potentially unacceptable risks to potential receptors and mitigating potential migration of impacted groundwater. Remedy OnR-4B would satisfy this threshold criterion.

Compliance with ARARs

The remedial actions would result in meeting groundwater protection standards at TPOCs and eventually throughout the Surficial Aquifer and HG outside the containment area. After the soil cover is constructed, potential excess lifetime cancer risks from direct exposure to Site-related contaminants in on-Site soil are expected to be well below the Florida allowable risk limit of 1x10-6 and the non-cancer HI would be well below 1. The potential for future surface water impacts would be very low.

All excess soil would be managed and treated within the Site AOC, which would avoid certain conditions and restrictions on transportation and disposal of potentially hazardous waste. Treated groundwater would continue to be discharged under the conditions of a GRU sanitary-sewer discharge permit. Groundwater treatment residuals would continue to be managed, transported, and disposed of in compliance with appropriate regulations. Storm water controls would result in compliance with ARARs during and after remedy construction. UIC requirements would be met for application of ISGS and ISCO. This remedy would comply with all ARARs, and therefore would satisfy this threshold criterion.

*Long-Term Effectiveness and Permanence*

The remedial actions of OnR-4B would reduce the long-term likelihood of potential exposure to impacted soil, sediment, or groundwater. The highest-concentration areas of surface soil would be isolated beneath an engineered cover. Potential groundwater impacts would be treated and contained. Institutional controls would be effective at limiting potential contact with impacted soil or impacted groundwater. Potential future impacts to surface water would not be expected.

The principal contaminant source areas would also be treated to limit (but not eliminate) ongoing potential impacts to groundwater and to reduce or eventually eliminate the need for hydraulic containment.

ISGS is an innovative technology that has been tested at this Site and has shown some success at other sites. The ISGS Site study suggested that encrustation of DNAPL likely would be persistent and not be subject to reversibility under likely future geochemical conditions (Adventus, 2009a). However, further Site-specific testing will be mandatory to determine specific parameters and likely effectiveness (such as the radius of influence for effective implementation). In addition, implementing ISGS at this Site will include a requirement for ongoing demonstration of effectiveness over time. Specific criteria for indicating when reinjection or retreatment is needed would be established during remedial design for this Site.

Other technologies used in this remedy are proven and well tested in the field. Their long-term performance has been demonstrated. This primary criterion would be met for remedy OnR-4B.

*Reduction of Toxicity, Mobility, or Volume by Treatment*

ISS/S of Surficial Aquifer soils would significantly decrease the potential mobility of COCs by binding the contaminants and DNAPL to the soil and reducing hydraulic conductivity of the mass. ISGS of Upper Hawthorn soils would decrease the potential mobility of COCs by encapsulating DNAPL in soil. ISGS is expected to reduce hydraulic conductivity and destroy some of the COC mass through oxidation. The source area treatment would also reduce the dissolved-phase plume volume. Targeted ISCO/ISGS treatment at source area HG wells would also reduce the volume/mobility of COCs. As stated previously, EPA would require further Site-specific testing to determine specific parameters and likely effectiveness. Implementing ISGS at this Site would include a requirement for ongoing demonstration of effectiveness over time. Specific criteria for indicating when reinjection or retreatment is needed would be established during remedial design for this Site.

Graded surface covers would also decrease the potential mobility of contaminants by reducing water infiltration through impacted soils.

Groundwater extraction and treatment would result in removal and immobilization of COCs via transfer of mass to treatment residuals.

If applied as a contingency, ISCO injections into the HG would reduce the volume, mobility, and/or toxicity of COCs in groundwater. Natural attenuation also reduces the toxicity, mobility, and/or volume of Site contaminants. This primary criterion would be met by remedy OnR-4B.

*Short-Term Effectiveness*
Implementing OnR-4B would create short-term risks that would require mitigation. Implementation of ISS/S, ISGS, and surface covers will involve substantial use of heavy equipment, handling of potentially harmful chemicals, and temporary above-ground stockpiling of impacted soil. There will be emissions from machinery, risks of injury to remediation workers, risks of exposure to on-Site personnel, and risks of storm water runoff impacts during construction. The short term risks can be managed through engineering controls, responsible construction management, and safe work practices.

It will take a substantial amount of time to implement this remedy. The most time-consuming component of the remedy is ISS/S, which would take approximately 2 years to complete. The total time for construction is estimated to be 2.5 years.

After construction, potential impacts would be largely contained by the source treatment and hydraulic containment system. Natural attenuation where there are low-level exceedances of cleanup goals, with ISCO if necessary, would be used to attain groundwater protection standards outside the containment area. The length of time required for groundwater to meet the groundwater protection standards may be several years. This primary criterion is met by remedy OnR-4B.

*Implementability*
Although OnR-4B presents implementation challenges, the remedy is constructible and this primary criterion is met.

This remedy requires mobilizing and operating large diameter ISS/S rigs. Approximately 5.5 acres of the Site would be subject to ISS/S. Large quantities of cement and other additives would need to be procured and managed. The remedy also requires procurement and handling of large volumes of ISGS (catalyzed sodium permanganate) solution.

Soil generated from ISS/S implementation would need to be managed and treated for use in the cover system. There may be logistical challenges to stockpiling and treating excess soil on-Site. Precautions would be taken to assure that all storm water was contained.

*Cost*
The estimated capital cost for remedy OnR-4B is $38.1 million. ISS/S and ISGS costs are the main contributors. It assumes that the groundwater treatment system will be operated for 10 years. After that, OM&M costs will be approximately $165,000 annually. The NPV cost estimate for this remedy is $48.1 million, and is based on a 5 percent discount rate.

Contingent actions are not included in the cost estimate. Note that the cost of this remedy for on-Site media would be added to the costs of the selected UFA and off-Site surface soil remedies.

**9.1.7 Alternative OnR-5A: Containment/Treatment – Barrier Wall**
Capital cost: $12.8 million
Annual O&M costs: $181,000
Total Present Worth: $16.0 million

This alternative is primarily a containment action that includes installing a vertical barrier wall around the DNAPL source areas to the top of the middle clay unit of the HG. The barrier wall will limit groundwater inflow to (and outflow from) DNAPL-impacted areas. A capped soil-consolidation area will be established inside the barrier-wall for soil excavated during on- or off-Site remedy construction and/or regrading. The cap covering the vertical wall containment zone will also serve to minimize storm water infiltration into the containment zone, thereby minimizing the water recharge into the containment zone. Outside the barrier wall, surface regrading and covers will eliminate potential exposure to soil with constituent concentrations that result in estimated potential risks that exceed applicable risk limits. Passive DNAPL recovery will continue at five source area wells in the Upper Hawthorn and operation of a modified version of the Surficial Aquifer groundwater extraction system will continue until it is no longer needed.

*Overall Protection of Human Health and the Environment*
The combination of soil cover and institutional controls of remedy OnR-5A would be highly protective against potential exposures to Site-related contaminants in surface soils and would protect surface water from potentially impacted runoff.

The barrier-wall system would limit groundwater flow through the principal contaminant source areas. Potential groundwater impacts would largely be contained within the barrier wall. Potential groundwater impacts outside of the barrier wall would be addressed through (1) continuation of extraction in the Surficial Aquifer (eventually to be phased out), (2) natural attenuation where there are low-level exceedances of cleanup goals, and (3) ISCO application in the HG if necessary (see Section 11.2.1.11 for description of trigger criteria for action). Monitoring would be used to demonstrate that groundwater concentrations outside the containment area are decreasing to below applicable groundwater protection standards (e.g. GCTLs). Institutional controls would prevent exposure to impacted groundwater on Site.

These measures would achieve the RAOs of mitigating potentially unacceptable risks to potential receptors and controlling migration of impacted groundwater. Remedy OnR-5A would satisfy this threshold criterion.

*Compliance with ARARs*
The remedial actions would result in meeting groundwater protection standards at TPOCs and eventually throughout the Surficial Aquifer and HG outside the containment area. After the soil cover is constructed, potential excess lifetime cancer risks from direct exposure to Site-related contaminants in on-Site soil are expected to be well below the Florida allowable risk limit of 1 x 10-6 and the non-cancer HI would be well below 1. The potential for future surface water impacts would be very low.

All excess soil would be managed within the Site AOC, which would avoid certain conditions and restrictions on transportation and disposal of potentially hazardous waste. Treated groundwater would continue to be discharged under the conditions of a GRU sanitary-sewer discharge permit. Groundwater treatment residuals would continue to be managed, transported, and disposed of in compliance with appropriate regulations. Storm water controls would result in compliance with ARARs during and after remedy construction. For ISCO application, UIC requirements would be met. This remedy would comply with all ARARs, and therefore would satisfy this threshold criterion.

*Long-Term Effectiveness and Permanence*
The remedial actions of remedy OnR-5A would substantially reduce the long-term likelihood of potential exposure to impacted soil, sediment, or groundwater. The highest-concentration areas of surface soil with elevated concentrations would be isolated beneath an engineered cover. Significant groundwater impacts would be contained, and dissolved phase impacts will be addressed through treatment and natural attenuation. Vertical migration of DNAPL would be mitigated, but not completely controlled or eliminated. Institutional controls would be effective at limiting potential contact with impacted soil or impacted groundwater. Potential future impacts to surface water would not be expected.

All of the technologies used in this remedy are proven and well tested in the field. Their long-term performance has been demonstrated. This primary criterion would be met for remedy OnR-5A.

*Reduction of Toxicity, Mobility, or Volume by Treatment*
Surrounding the principal contaminant source areas with barrier walls, though technically not a treatment action, would reduce the potential mobility of contaminants in groundwater in both the Surficial Aquifer and Upper Hawthorn. Graded surface covers, also not a treatment action, would decrease the potential mobility of contaminants by reducing water infiltration through impacted soils. Targeted ISCO/ISGS treatment at source area HG wells would also reduce the volume/mobility of COCs. As stated previously, EPA would require further Site-specific testing to determine specific parameters and likely effectiveness. Implementing ISGS at this Site would include a requirement for ongoing demonstration of

effectiveness over time. Specific criteria for indicating when reinjection or retreatment is needed would be established during remedial design for this Site.

If applied as a contingency, ISCO injections into the HG would reduce the volume, mobility, and/or toxicity of COCs in groundwater. Natural attenuation also reduces the toxicity, mobility, and/or volume of Site contaminants.

Groundwater extraction and treatment would result in removal and immobilization of COCs via transfer of mass to treatment residuals. Passive removal of DNAPL (and off-Site incineration) would also reduce the volume of COCs. This primary criterion would be met by remedy OnR-5A.

*Short-Term Effectiveness*

Implementing OnR-5A would create short-term risks that would require mitigation. Implementation of barrier walls and surface covers will involve substantial use of heavy equipment, open excavations, and temporary above-ground stockpiling of impacted soil. There will be emissions from machinery, risks of injury to remediation workers, risks of exposure to on-Site personnel, and risks of storm water runoff impacts during construction. The short term risks can be managed through engineering controls, responsible construction management, and safe work practices.

It will take a substantial amount of time to implement this remedy. The total time for construction is estimated to be 12 months.

After construction, the Surficial Aquifer plume and Upper Hawthorn impacts would be largely contained by the slurry walls. Natural attenuation where there are low-level exceedances of cleanup goals, with ISCO if necessary, would be used to attain groundwater protection standards outside the containment area. The length of time required for groundwater to meet the groundwater protection standards at the POCs may be several years. This primary criterion is met by remedy OnR-5A.

*Implementability*

Although OnR-5A presents implementation challenges, the remedy is constructible and this primary criterion is met.

Constructing the barrier wall would require mobilizing large equipment and materials at and around the Site, which may be logistically challenging. The design depth of the vertical barrier is near the practical limit of the technology.

Soil generated from slurry-wall construction would need to be managed. There may be logistical challenges to stockpiling excess soil on-Site. Precautions would be taken to assure that all storm water was contained.

*Cost*
The estimated capital cost for remedy OnR-5A is \$12.8 million, with surface covers and barrier walls being main cost contributors. It assumes that the groundwater treatment system will be operated for 3 years. After that, OM&M costs will be approximately \$181,000 annually. The NPV cost estimate for this remedy is \$16.0 million, and is based on a 5 percent discount rate.

Contingent actions are not included in the cost estimate. Note that the cost of this remedy for on-Site media would be added to the costs of the selected UFA and off-Site surface soil remedies.

### 9.1.8 Alternative OnR-5B: Containment/Treatment – Barrier Wall plus *In Situ* Biogeochemical Stabilization in the Upper Hawthorn

Capital cost: \$18.0 million
Annual O&M costs: \$165,000
Total Present Worth: \$20.9 million

This alternative is a combination of containment and treatment remedies that adds ISGS in the Upper Hawthorn to the prior remedy, OnR-5A. This remedy includes installing a vertical barrier wall around the DNAPL source areas to the top of the middle clay unit of the HG. The barrier wall will limit groundwater inflow to (and outflow from) DNAPL-impacted areas. A capped soil-consolidation area will be established inside the barrier-wall extents for excavated soil. A capped soil-consolidation area will be established inside the barrier-wall for soil excavated during on- or off-Site remedy construction and/or regrading. The cap covering the vertical wall containment zone will also serve to minimize storm water infiltration into the containment zone, thereby minimizing the water recharge into and through the containment zone. Outside the barrier wall, surface regrading and covers will eliminate potential exposure to soil with constituent concentrations that result in estimated potential risks that exceed applicable risk limits. ISGS injections will take place in the Upper Hawthorn to treat DNAPL and reduce COC mobility. Operation of a modified version of the Surficial Aquifer groundwater extraction system will continue until it is no longer needed.

*Overall Protection of Human Health and the Environment*
The combination of soil cover and institutional controls of remedy OnR-5B would be highly protective against potential exposures to Site-related contaminants in surface soils and would protect surface water from potential impacted runoff.

The barrier-wall system would limit groundwater flow through the principal contaminant source areas and ISGS application in the Upper Hawthorn would limit migration in and through that unit. ISGS would also immobilize and remove (through oxidation) some COC mass. As stated previously, EPA will require further Site-specific testing to determine specific parameters and site-specific effectiveness of the technology. Implementing ISGS at this Site will include a requirement for ongoing demonstration of effectiveness over time.

Specific criteria for indicating when reinjection or retreatment is needed would be established during remedial design for this Site.

Potential groundwater impacts would largely be contained within the barrier wall. Potential groundwater impacts outside of the barrier wall would be addressed by (1) continuing extraction of Surficial Aquifer groundwater (eventually to be phased out), (2) natural attenuation where there are low-level exceedances of cleanup goals, and (3) ISCO application in the HG if necessary (see Section 11.2.1.11 for description of trigger criteria for action). Monitoring would be used to demonstrate that groundwater concentrations are decreasing to below applicable groundwater protection standards (e.g. GCTLs). Institutional controls would prevent exposure to impacted groundwater on Site.

These measures would achieve the RAOs of mitigating potentially unacceptable risks to potential receptors and controlling potential migration of impacted groundwater. Remedy OnR-5B would satisfy this threshold criterion.

*Compliance with ARARs*

The remedial actions would result in meeting groundwater protection standards at TPOCs and eventually throughout the Surficial Aquifer and HG outside the containment system. After the soil cover is constructed, potential excess lifetime cancer risks from direct exposure to Site-related contaminants in on-Site soil are expected to be well below the Florida allowable risk limit of $1 \times 10^{-6}$ and the non-cancer HI would be well below 1. The potential for future surface water impacts would be very low.

All excess soil would be managed within the Site AOC, which would avoid certain conditions and restrictions on transportation and disposal of potentially hazardous waste. Treated groundwater would continue to be discharged under the conditions of a GRU sanitary-sewer discharge permit. Groundwater treatment residuals would continue to be managed, transported, and disposed of in compliance with appropriate regulations. Storm water controls would result in compliance with ARARs during and after remedy construction. UIC requirements would be met for application of ISGS and ISCO. This remedy would comply with all ARARs, and therefore would satisfy this threshold criterion.

*Long-Term Effectiveness and Permanence*

The remedial actions of OnR-5B would substantially reduce the long-term likelihood of potential exposure to impacted soil, sediment, or groundwater. The highest-concentration areas of surface soil would be beneath an engineered cover. Potential DNAPL groundwater impacts would be contained and dissolved phase groundwater contamination will be remediated to cleanup goals through ISCO and/or natural attenuation. Institutional controls would be effective at limiting potential contact with impacted soil or impacted groundwater. Potential future impacts to surface water would not be expected.

Principal contaminant source areas in the Upper Hawthorn would also be treated by ISGS to limit (but not eliminate) ongoing impacts to groundwater. ISGS is an innovative technology that has been tested at this Site and has shown some success at other sites. The ISGS Site study suggested that encrustation of DNAPL likely would be persistent and not be subject to reversibility under likely future geochemical conditions (Adventus, 2009a). However, further Site-specific testing will be mandatory to determine specific parameters and likely effectiveness (such as the radius of influence for effective implementation). In addition, implementing ISGS at this Site will include a requirement for ongoing demonstration of effectiveness over time. Specific criteria for indicating when reinjection or retreatment is needed would be established during remedial design for this Site.

Other technologies used in this remedy are proven and well tested in the field. Their long-term performance has been demonstrated. This primary criterion would be met for remedy OnR-4B.

*Reduction of Toxicity, Mobility, or Volume by Treatment*

ISGS of Upper Hawthorn soils would decrease the mobility of COCs by encapsulating DNAPL in soil. ISGS would also reduce the soil hydraulic conductivity and destroy some of the COC mass through oxidation. The source area treatment would also reduce the dissolved-phase plume volume. Targeted ISCO/ISGS treatment at source area HG wells would also reduce the volume/mobility of COCs. As stated previously, EPA will require further Site-specific testing to determine specific parameters and likely effectiveness. Implementing ISGS at this Site will include a requirement for ongoing demonstration of effectiveness over time. Specific criteria for indicating when reinjection or retreatment is needed would be established during remedial design for this Site.

Surrounding the principal contaminant source areas with slurry walls would reduce the potential mobility of contaminants in groundwater in both the Surficial Aquifer and Upper Hawthorn. Graded surface covers would decrease the potential mobility of contaminants by reducing water infiltration through impacted soils.

Groundwater extraction and treatment would result in removal and immobilization of COCs via transfer of mass to treatment residuals.

If applied as a contingency, ISCO injections into the HG would reduce the volume, mobility, and/or toxicity of COCs in groundwater. Natural attenuation also reduces the toxicity, mobility, and/or volume of Site contaminants. This primary criterion would be met by remedy OnR-5B.

*Short-Term Effectiveness*

Implementing OnR-5B would create short-term risks that would require mitigation. Implementation of ISGS, barrier walls, and surface covers will involve substantial use of heavy equipment, open excavations, handling of potentially harmful chemicals, and temporary above-ground stockpiling of impacted soil. There will be emissions from machinery, risks of injury to remediation workers, risks of exposure to on-Site personnel, and risks of storm water runoff impacts during construction. The short term risks can be managed through engineering controls, responsible construction management, and safe work practices.

It will take a substantial amount of time to implement this remedy. The most time-consuming component of the remedy is ISGS, which would take approximately 9 months to complete. The total time for construction is estimated to be 16 months.

After construction, the Surficial Aquifer plume and Upper Hawthorn impacts would be largely contained by the slurry walls. Natural attenuation where there are low-level exceedances of cleanup goals, with ISCO if necessary, would be used to attain groundwater protection standards throughout the groundwater plume outside the containment area. The length of time required for groundwater to meet the groundwater protection standards may be several years. This primary criterion is met by remedy OnR-5B.

*Implementability*

Although OnR-5B presents implementation challenges, the remedy is constructible and this primary criterion is met. Constructing the barrier wall would require mobilizing large equipment and materials at and around the Site, which may be logistically challenging. The design depth of the vertical barrier is near the practical limit of the technology. The remedy also requires procurement and handling of large volumes of ISGS (catalyzed sodium permanganate) solution.

Soil generated from slurry-wall construction would need to be managed. There may be logistical challenges to stockpiling excess soil on-Site. Precautions would be taken to assure that all storm water was contained.

*Cost*

The estimated capital cost for OnR-5B is $18.0 million, with over half of this cost for ISGS treatment. It assumes that the groundwater treatment system will be operated for 3 years. After that, OM&M costs will be approximately $165,000 annually. The NPV cost estimate for this remedy is $20.9 million, and is based on a 5 percent discount rate.
Contingent actions are not included in the cost estimate. Note that the cost of this remedy for on-Site media would be added to the costs of the selected UFA and off-Site surface soil remedies.

### 9.1.9 Alternative OnR-5C: Containment/Treatment – Barrier Wall plus *In Situ* Biogeochemical Stabilization in the Surficial Aquifer

Capital cost: $18.1million
Annual O&M costs: $181,000
Total Present Worth: $21.3 million

Thisalternative is a combination of containment and treatment remedies that is similar to OnR-5B, but it has ISGS in the Surficial Aquifer rather than the Upper Hawthorn. This remedy includes installing a vertical barrier wall around the DNAPL source areas to the top of the middle clay unit of the HG. The barrier wall will limit groundwater inflow to (and outflow from) DNAPL-impacted areas. A capped soil-consolidation area will be established inside the barrier-wall for excavated soil. The cap covering the vertical wall containment zone will also serve to minimize storm water infiltration into the containment zone, thereby minimizing the water recharge into the containment zone. Outside the barrier wall, surface regrading and covers will eliminate potential exposure to soil with constituent concentrations that result in estimated potential risks that exceed applicable risk limits. ISGS injections will take place in the Surficial Aquifer to treat DNAPL and reduce COC mobility. Operation of a modified version of the Surficial Aquifer groundwater extraction system will continue until it is no longer needed.

*Overall Protection of Human Health and the Environment*

The combination of soil cover and institutional controls of remedy OnR-5C would be highly protective against potential exposures to Site-related contaminants in surface soils and would protect surface water from potential impacted runoff.

The principal contaminant source areas of the Surficial Aquifer would be treated by ISGS to significantly reduce potential future impacts to groundwater. ISGS would also remove some COC mass through oxidation. Additionally, the barrier-wall system would limit groundwater flow through principal contaminant source areas.

Potential groundwater impacts would largely be contained within the barrier wall. Potential groundwater impacts outside of the barrier wall would be addressed by (1) continuing extraction of Surficial Aquifer groundwater (eventually to be phased out), (2) natural attenuation where there are low-level exceedances of cleanup goals, and (3) ISCO application in the HG if necessary (see Section 11.2.1.11 for description of trigger criteria for action). Monitoring would be used to demonstrate that groundwater concentrations beyond the POCs are decreasing to below applicable groundwater protection standards (e.g. GCTLs). Institutional controls would prevent potential exposure to impacted groundwater on Site.

These measures would achieve the RAOs of mitigating potentially unacceptable risks to potential receptors and mitigating potential migration of impacted groundwater. Remedy OnR-5C would satisfy this threshold criterion.

*Compliance with ARARs*

The remedial actions would result in meeting groundwater protection standards at TPOCs and eventually throughout the Surficial Aquifer and HG outside the containment area. After the soil cover is constructed, potential excess lifetime cancer risks from direct exposure to Site-related contaminants in on-Site soil are expected to be well below the Florida allowable risk limit of 1 x 10-6 and the non-cancer HI would be well below 1. The potential for future surface water impacts would be very low.

All excess soil would be managed within the Site AOC, which would avoid certain conditions and restrictions on transportation and disposal of potentially hazardous waste. Treated groundwater would continue to be discharged under the conditions of a GRU sanitary-sewer discharge permit. Groundwater treatment residuals would continue to be managed, transported, and disposed of in compliance with appropriate regulations. Storm water controls would result in compliance with ARARs during and after remedy construction. UIC requirements would be met for application of ISGS and ISCO. This remedy would comply with all ARARs, and therefore would satisfy this threshold criterion.

*Long-Term Effectiveness and Permanence*

The remedial actions of OnR-5C would substantially reduce the long-term likelihood of potential exposure to impacted soil, sediment, or groundwater. The highest-concentration areas of surface soil would be beneath an engineered cover. Potential DNAPL groundwater impacts would be contained, and dissolved phase groundwater contamination will be remediated to cleanup goals through ISCO and/or natural attenuation. .Institutional controls would be effective at limiting potential contact with impacted soil or impacted groundwater. Potential future impacts to surface water would not be expected.

The principal contaminant source areas would be treated by ISGS to limit (but not eliminate) ongoing impacts to groundwater and to reduce or eliminate the need for hydraulic containment. ISGS is an innovative technology that has been tested at this Site and has shown some success at other sites. The ISGS Site study suggested that encrustation of DNAPL likely would be persistent and not be subject to reversibility under likely future geochemical conditions (Adventus, 2009a). However, further Site-specific testing will be mandatory to determine specific parameters and site-specific effectiveness (such as the radius of influence for effective implementation). In addition, implementing ISGS at this Site will include a requirement for ongoing demonstration of effectiveness over time. Specific criteria for indicating when reinjection or retreatment is needed would be established during remedial design for this Site.

Other technologies used in this remedy are proven and well tested in the field. Their long-term performance has been demonstrated. This primary criterion would be met for alternative OnR-4B.

*Reduction of Toxicity, Mobility, or Volume by Treatment*

ISGS of Surficial Aquifer soils would significantly decrease the potential mobility of COCs by encapsulating DNAPL in soil. ISGS would also reduce soil hydraulic conductivity and destroy some of the COC mass through oxidation. The source treatment would also reduce the dissolved-phase plume volume. Targeted ISCO/ISGS treatment at source area HG wells would also reduce the volume/mobility of COCs. As stated previously, EPA will require further Site-specific testing to determine specific parameters and likely effectiveness. Implementing ISGS at this Site will include a requirement for ongoing demonstration of effectiveness over time. Specific criteria for indicating when reinjection or retreatment is needed would be established during remedial design for this Site. Passive removal of DNAPL (and off-Site incineration) would also reduce the volume of COCs.

Surrounding the principal contaminant source areas with slurry walls would reduce the potential mobility of contaminants in groundwater in both the Surficial Aquifer and Upper Hawthorn. Graded surface covers would decrease the potential mobility of contaminants by reducing water infiltration through impacted soils.

Groundwater extraction and treatment would result in removal and immobilization of COCs via transfer of mass to treatment residuals.

If applied as a contingency, ISCO injections into the HG would reduce the volume, mobility, and/or toxicity of COCs in groundwater. Natural attenuation also reduces the toxicity, mobility, and/or volume of Site contaminants. This primary criterion would be met by remedy OnR-5C.

*Short-Term Effectiveness*

Implementing remedy OnR-5C would create short-term risks that would require mitigation. Implementation of ISGS, barrier walls, and surface covers will involve substantial use of heavy equipment, open excavations, handling of potentially harmful chemicals, and temporary above-ground stockpiling of impacted soil. There will be emissions from machinery, risks of injury to remediation workers, risks of exposure to on-Site personnel, and risks of storm water runoff impacts during construction. The short term risks can be managed through engineering controls, responsible construction management, and safe work practices.

It will take a substantial amount of time to implement this remedy. The most time-consuming component of the remedy is ISGS, which would take approximately 9 months to complete. The total time for construction is estimated to be 16 months.

After construction, the Surficial Aquifer plume and Upper Hawthorn impacts would be largely contained by the slurry walls. Natural attenuation where there are low-level exceedances of cleanup goals, with ISCO if necessary, would be used to attain groundwater protection standards throughout the plume outside the containment area. The length of time required for groundwater to meet the groundwater protection standards may be several years. This primary criterion is met by remedy OnR-5C.

*Implementability*

Although OnR-5C presents implementation challenges, the remedy is constructible and this primary criterion is met. Constructing the barrier wall would require mobilizing large equipment and materials at and around the Site, which may be logistically challenging. The design depth of the vertical barrier is near the practical limit of the technology. The remedy also requires procurement and handling of large volumes of ISGS (catalyzed sodium permanganate) solution.

Soil generated from slurry-wall construction would need to be managed. There may be logistical challenges to stockpiling excess soil on-Site. Precautions would be taken to assure that all storm water is contained.

*Cost*

The estimated capital cost for alternative OnR-5C is $18.1 million, with ISGS treatment and surface cover construction being the main contributors. It assumes that the groundwater treatment system will be operated for 3 years. After that, OM&M costs will be approximately $181,000 annually. The NPV cost estimate for this remedy is $21.3 million, and is based on a 5 percent discount rate.

Contingent actions are not included in the cost estimate. Note that the cost of this remedy for on-Site media would be added to the costs of the selected UFA and off-Site surface soil remedies.

#### 9.1.10 Alternative OnR-5D: Containment/Treatment – Barrier Wall plus In Situ Solidification/Stabilization in the Surficial Aquifer

Capital cost: $35.7 million
Annual O&M costs: $165,000
Total Present Worth: $38.7 million

This alternative is a combination of containment and treatment remedies that is similar to OnR-5C, but it has ISS/S in the Surficial Aquifer rather than ISGS. This remedy includes installing a vertical barrier wall around the DNAPL source areas to the top of the middle clay unit of the HG. The barrier wall will limit groundwater inflow to (and outflow from) DNAPL-impacted areas. A capped soil-consolidation area will be established inside the barrier-wall for excavated soil and excess soil from ISS/S implementation. The cap covering the vertical wall containment zone will also serve to minimize storm water infiltration into the containment zone, thereby minimizing the water recharge into the containment zone. Outside the barrier wall, surface regrading and covers will eliminate potential exposure to soil with constituent concentrations that result in estimated potential risks that exceed applicable risk limits. ISS/S mixing will take place in the Surficial Aquifer to treat DNAPL and reduce COC mobility. Operation of a modified version of the Surficial Aquifer groundwater extraction system will continue until it is no longer needed.

*Overall Protection of Human Health and the Environment*

The combination of soil cover and institutional controls of remedy OnR-5D would be highly protective against potential exposures to Site-related contaminants in surface soils and would protect surface water from potential impacted runoff.

The principal contaminant source areas of the Surficial Aquifer would be solidified in place to significantly reduce potential future impacts to groundwater. Additionally, the barrier-wall system would limit groundwater flow through the principal contaminant source areas.

Potential groundwater impacts would largely be contained within the barrier wall. Potential groundwater impacts outside of the barrier wall would be addressed by (1) continuing the extraction of Surficial Aquifer groundwater (eventually to be phased out), (2) natural attenuation where there are low-level exceedances of cleanup goals, and (3) ISCO application in the HG if necessary (see Section 11.2.1.11 for description of trigger criteria for action). Monitoring would be used to demonstrate that groundwater concentrations outside the containment area are decreasing to below applicable groundwater protection standards (e.g. GCTLs). Institutional controls would prevent exposure to impacted groundwater on Site.

These measures would achieve the RAOs of mitigating potentially unacceptable risks to potential receptors and mitigating potential migration of impacted groundwater. Remedy OnR-5D would satisfy this threshold criterion.

*Compliance with ARARs*

The remedial actions would result in meeting groundwater protection standards at TPOCs and eventually throughout the Surficial Aquifer and HG outside the containment area. After the soil cover is constructed, potential excess lifetime cancer risks from direct exposure to Site-related contaminants in on-Site soil are expected to be well below the Florida allowable risk limit of $1 \times 10^{-6}$ and the non-cancer HI would be well below 1. The potential for future surface water impacts would be very low.

All excess soil would be managed within the Site AOC, which would avoid certain conditions and restrictions on transportation and disposal of potentially hazardous waste. Treated groundwater would continue to be discharged under the conditions of a GRU sanitary-sewer discharge permit. Groundwater treatment residuals would continue to be managed, transported, and disposed of in compliance with appropriate regulations. Storm water controls would result in compliance with ARARs during and after remedy construction. For ISCO application, UIC requirements would be met. This remedy would comply with all ARARs, and therefore would satisfy this threshold criterion.

*Long-Term Effectiveness and Permanence*

The remedial actions of OnR-5D would substantially reduce the long-term likelihood of potential exposure to impacted soil, sediment, or groundwater. The highest-concentration areas of surface soil would be beneath an engineered cover. Potential DNAPL groundwater impacts would be contained, and dissolved phase groundwater contamination will be remediated to cleanup goals through ISCO and/or natural attenuation. Institutional controls would be effective at limiting potential contact with impacted soil or impacted groundwater. Potential future impacts to surface water would not be expected.

The principal contaminant source areas would also be treated to limit (but not eliminate) ongoing potential impacts to groundwater and to reduce or eliminate the need for hydraulic containment. All of the technologies used in this remedy are proven and well tested in the field. Their long-term performance has been demonstrated. This primary criterion would be met for remedy OnR-5D.

*Reduction of Toxicity, Mobility, or Volume by Treatment*

ISS/S of Surficial Aquifer soils would significantly decrease the potential mobility of COCs by binding the contaminants and DNAPL to the soil and reducing hydraulic conductivity of the mass. This stabilization would result in reducing or eliminating groundwater circulation through the impacted areas, thus reducing the ongoing dissolved-phase plume impacts. Targeted ISCO/ISGS treatment at source area HG wells would also reduce the volume/mobility of COCs. As stated previously, EPA will require further Site-specific testing to determine specific parameters and likely effectiveness of this technology. Implementing ISGS at this Site will include a requirement for ongoing demonstration of effectiveness over time. Specific criteria for indicating when reinjection or retreatment is needed would be established during remedial design for this Site.

Surrounding the principal contaminant source areas with slurry walls would reduce the mobility of contaminants in groundwater in both the Surficial Aquifer and Upper Hawthorn. Graded surface covers would decrease the potential mobility of contaminants by reducing water infiltration through impacted soils.

Groundwater extraction and treatment would result in removal and immobilization of COCs via transfer of mass to treatment residuals.

If applied as a contingency, ISCO injections into the HG would reduce the volume, mobility, and/or toxicity of COCs in groundwater. Natural attenuation also reduces the toxicity, mobility, and/or volume of Site contaminants. This primary criterion would be met by remedy OnR-5D.

*Short-Term Effectiveness*

Implementing OnR-5D would create short-term risks that would require mitigation. Implementation of ISS/S, barrier walls, and surface covers will involve substantial use of heavy equipment, open excavations, and temporary above-ground stockpiling of impacted soil. There will be emissions from machinery, risks of injury to remediation workers, risks of exposure to on-Site personnel, and risks of storm water runoff impacts during construction. The short term risks can be managed through engineering controls, responsible construction management, and safe work practices.

It will take a substantial amount of time to implement this remedy. The most time-consuming component of the remedy is ISS/S, which would take approximately 2 years to complete. The total time for construction is estimated to be 2.5 years.

After construction, the Surficial Aquifer plume and Upper Hawthorn impacts would be largely contained by the slurry walls and ISS/S. Natural attenuation where there are low-level exceedances of cleanup goals, with ISCO if necessary, would be used to attain groundwater protection standards throughout the plume outside of the containment area. The length of time required for groundwater to meet the groundwater protection standards may be several years. This primary criterion is met by remedy OnR-5D.

*Implementability*

While OnR-5D presents implementability challenges, the remedy is constructible, and this primary criterion is met. Constructing the barrier wall would require mobilizing large equipment and materials at and around the Site, which may be logistically challenging. The design depth of the vertical barrier is near the practical limit of the technology.

This remedy also requires mobilizing and operating large diameter ISS/S rigs. Approximately 5.5 acres of the Site would be subject to ISS/S. Demolition of structures would be required, especially in the former process area. Large quantities of cement and other additives would need to be procured and managed.

Excess soil that is generated during ISS/S would need to be managed. There may be logistical challenges to stockpiling excess soil on-Site. Precautions would be taken to assure that all storm water is contained.

*Cost*

The estimated capital cost for remedy OnR-5D is $35.7 million, over half of which is for ISS/S. It assumes that the groundwater treatment system will be operated for 3 years. After that, OM&M costs will be approximately $165,000 annually. The NPV cost estimate for this remedy is $38.7 million, and is based on a 5 percent discount rate.

Contingent actions are not included in the cost estimate. Note that the cost of this alternative for on-Site media would be added to the costs of the selected UFA and off-Site surface soil remedies.

### 9.1.11 Alternative OnR-5E: Containment/Treatment – Barrier Wall plus *In Situ* Biogeochemical Stabilization in the Surficial Aquifer and Upper Hawthorn

Capital cost: $26.1 million
Annual O&M costs: $165,000
Total Present Worth: $29.1 million

This alternative is a combination of containment and treatment technologies that includes ISGS treatment of principal contaminant source areas from the surface to the HG middle clay, in effect combining alternatives OnR-5B and OnR-5C. This remedy includes installing a vertical barrier wall around the DNAPL source areas to the top of the middle clay unit of the HG. The barrier wall will limit groundwater inflow to (and outflow from) DNAPL-impacted areas. A capped soil-consolidation area will be established inside the barrier-wall for excavated soil. The cap covering the vertical wall containment zone will also serve to minimize storm water infiltration into the containment zone, thereby minimizing the water recharge into the containment zone. Outside the barrier wall, surface regrading and covers will eliminate potential exposure to soil with constituent concentrations that result in estimated potential risks that exceed applicable risk limits. ISGS injections will take place in the Surficial Aquifer and Upper Hawthorn to treat DNAPL and reduce COC mobility. Operation of a modified version of the Surficial Aquifer groundwater extraction system will continue until it is no longer needed. Note that the only difference between OnR-5E and remedies OnR-5B and OnR-5C is the depth of the ISGS treatment.

*Overall Protection of Human Health and the Environment*

The combination of soil cover and institutional controls of remedy OnR-5E would be highly protective against potential exposures to Site-related contaminants in surface soils and would protect surface water from potential impacted runoff.

The principal contaminant source areas of the Surficial Aquifer and Upper Hawthorn would be treated by ISGS to significantly reduce potential future impacts to groundwater. ISGS would also remove some COC mass through oxidation. Additionally, the barrier-wall system would limit groundwater flow through the principal contaminant source areas.

Potential groundwater impacts would largely be contained within the barrier wall. Potential groundwater impacts outside of the barrier wall would be addressed by (1) continuing extraction of Surficial Aquifer groundwater (eventually to be phased out), (2) natural attenuation where there are low-level exceedances of cleanup goals, and (3) ISCO application in the HG if necessary (see Section 11.2.1.11 for description of trigger criteria for action). Monitoring would be used to demonstrate that groundwater concentrations outside of the containment area are decreasing to below applicable groundwater protection standards (e.g. GCTLs). Institutional controls would prevent potential exposure to impacted groundwater on Site.

These measures would achieve the RAOs of mitigating potentially unacceptable risks to potential receptors and mitigating potential migration of impacted groundwater. Remedy OnR-5E would satisfy this threshold criterion.

*Compliance with ARARs*

The remedial actions would result in meeting groundwater protection standards at TPOCs and eventually throughout the Surficial Aquifer and HG outside of the containment area. After the soil cover is constructed, potential excess lifetime cancer risks from direct exposure to Site-related contaminants in on-Site soil are expected to be well below 1 x 10-6 and the non-cancer HI would be well below 1. The potential for future surface water impacts would be very low.

All excess soil would be managed within the Site AOC, which would avoid certain conditions and restrictions on transportation and disposal of potentially hazardous waste. Treated groundwater would continue to be discharged under the conditions of a GRU sanitary-sewer discharge permit. Groundwater treatment residuals would continue to be managed, transported, and disposed of in compliance with appropriate regulations. Storm water controls would result in compliance with ARARs during and after remedy construction. UIC requirements would be met for application of ISGS and ISCO. This remedy would comply with all ARARs, and therefore would satisfy this threshold criterion.

*Long-Term Effectiveness and Permanence*

The remedial actions of OnR-5E would substantially reduce the long-term likelihood of potential exposure to impacted soil, sediment, or groundwater. The highest-concentration areas of surface soil would be beneath an engineered cover. Potential DNAPL groundwater impacts would be contained, and dissolved phase groundwater contamination will be remediated to cleanup goals through ISCO and/or natural attenuation. Institutional controls would be effective at limiting potential contact with impacted soil or impacted groundwater. Potential future impacts to surface water would not be expected.

The principal contaminant source areas would also be treated by ISGS to limit (but not eliminate) ongoing impacts to groundwater and to reduce or eliminate the need for hydraulic containment. ISGS is an innovative technology that has been tested at this Site and has shown some success at other sites. The ISGS Site study suggested that encrustation of DNAPL likely would be persistent and not be subject to reversibility under likely future geochemical conditions (Adventus, 2009a). However, further Site-specific testing will be mandatory to determine specific parameters and site-specific effectiveness (such as the radius of influence for effective implementation). In addition, implementing ISGS at this Site will include a requirement for ongoing demonstration of effectiveness over time. Specific criteria for indicating when reinjection or retreatment is needed would be established during remedial design for this Site.

Other technologies used in this remedy are proven and well tested in the field. Their long-term performance has been demonstrated. This primary criterion would be met for remedy OnR-4B.

*Reduction of Toxicity, Mobility, or Volume by Treatment*

ISGS of Surficial Aquifer and Upper Hawthorn soils would significantly decrease the potential mobility of COCs by encapsulating DNAPL in soil. ISGS would also reduce soil hydraulic conductivity and destroy some of the COC mass through oxidation. The source treatment would also reduce the dissolved-phase plume volume. Targeted ISCO/ISGS treatment at source area HG wells would also reduce the volume/mobility of COCs. As stated previously, EPA will require further Site-specific testing to determine specific parameters and likely effectiveness. Implementing ISGS at this Site will include a requirement for ongoing demonstration of effectiveness over time. Specific criteria for indicating when reinjection or retreatment is needed would be established during remedial design for this Site. Passive removal of DNAPL (and off-Site incineration) would also reduce the volume of COCs.

Surrounding the principal contaminant source areas with slurry walls would reduce the potential mobility of contaminants in groundwater in both the Surficial Aquifer and Upper Hawthorn. Graded surface covers would decrease the potential mobility of contaminants by reducing water infiltration through impacted soils.

Groundwater extraction and treatment would result in removal and immobilization of COCs via transfer of mass to treatment residuals.

If applied as a contingency, ISCO injections into the HG would reduce the volume, mobility, and/or toxicity of COCs in groundwater. Natural attenuation also reduces the toxicity, mobility, and/or volume of Site contaminants. This primary criterion would be met by remedy OnR-5E.

*Short-Term Effectiveness*

Implementing remedy OnR-5E would create short-term risks that would require mitigation. Implementation of ISGS, barrier walls, and surface covers will involve substantial use of heavy equipment, open excavations, handling of potentially harmful chemicals, and temporary above-ground stockpiling of impacted soil. There will be emissions from machinery, risks of injury to remediation workers, risks of exposure to on-Site personnel, and risks of storm water runoff impacts during construction. The short term risks can be managed through engineering controls, responsible construction management, and safe work practices.

It will take a substantial amount of time to implement this remedy. The most time-consuming component of the remedy is ISGS, which would take approximately 18 months to complete. The total time for construction is estimated to be 24 months.

After construction, the Surficial Aquifer plume and Upper Hawthorn impacts would be contained by the slurry walls. Natural attenuation where there are low-level exceedances of cleanup goals, with ISCO if necessary, would be used to attain groundwater protection standards at and downgradient of the containment system. The length of time required for groundwater to meet the groundwater protection standards at the POCs may be several years. This primary criterion is met by remedy OnR-5E.

*Implementability*

Although OnR-5E presents implementation challenges, the remedy is constructible and this primary criterion is met. Constructing the barrier wall would require mobilizing large equipment and materials at and around the Site, which may be logistically challenging. The design depth of the vertical barrier is near the practical limit of the technology.

The remedy also requires procurement and handling of large volumes of ISGS (catalyzed sodium permanganate) solution.

Soil generated from slurry-wall construction would need to be managed. There may be logistical challenges to stockpiling excess soil on-Site. Precautions would be taken to assure that all storm water was contained.

*Cost*

The estimated capital cost for remedy OnR-5E is $26.1 million, with ISGS treatment and surface cover construction being the main contributors. It assumes that the groundwater treatment system will be operated for 3 years. After that, OM&M costs will be approximately $165,000 annually. The NPV cost estimate for this remedy is $29.1 million, and is based on a 5 percent discount rate.

Contingent actions are not included in the cost estimate. Note that the cost of this alternative would be added to the costs of the selected UFA and off-Site surface soil remedies.

### 9.1.12 Alternative OnR-5F: Containment/Treatment – Barrier Wall plus *In Situ* Solidification/Stabilization in the Surficial Aquifer and Upper Hawthorn

Capital cost: $71.8 million
Annual O&M costs: $165,000
Total Present Worth: $74.8 million

This alternative is a combination of containment and treatment remedies that is similar to OnR-5E, but it has ISS/S in the Surficial Aquifer and Upper Hawthorn rather than ISGS. This remedy includes installing a vertical barrier wall around the DNAPL source areas to the top of the middle clay unit of the HG. The barrier wall will limit groundwater inflow to (and outflow from) DNAPL-impacted areas. A capped soil-consolidation area will be established inside the barrier-wall for excavated soil and excess soil from ISS/S implementation. The cap covering the vertical wall containment zone will also serve to minimize storm water infiltration into the containment zone, thereby minimizing the water recharge into the containment zone. Outside the barrier wall, surface regrading and covers will eliminate potential exposure to soil with constituent concentrations that result in estimated potential risks that exceed applicable risk limits. ISS/S mixing will take place in the Surficial Aquifer and Upper Hawthorn to treat DNAPL and reduce COC mobility. Operation of a modified version of the Surficial Aquifer groundwater extraction system will continue until it is no longer needed.

*Overall Protection of Human Health and the Environment*

The combination of soil cover and institutional controls of remedy OnR-5F would be highly protective against potential exposures to Site-related contaminants in surface soils and would protect surface water from potential impacted runoff.

The principal contaminant source areas of the Surficial Aquifer and Upper Hawthorn would be solidified in place to significantly reduce future impacts to groundwater. Additionally, the barrier-wall system would limit groundwater flow through the principal contaminant source areas.

Potential DNAPL groundwater impacts would largely be contained within the barrier wall. Potential groundwater impacts outside of the barrier wall would be addressed by (1) continuing the extraction of Surficial Aquifer groundwater (eventually to be phased out), (2) natural attenuation where there are low-level exceedances of cleanup goals, and (3) ISCO application in the HG if necessary (see Section 11.2.1.11 for description of trigger criteria for action). Monitoring would be used to demonstrate that groundwater concentrations outside the containment area are decreasing to below applicable groundwater protection standards (e.g. GCTLs). Institutional controls would prevent potential exposure to impacted groundwater on Site.

These measures would achieve the RAOs of mitigating potentially unacceptable risks to potential receptors and mitigating potential migration of impacted groundwater. Remedy OnR-5F would satisfy this threshold criterion.

*Compliance with ARARs*

The remedial actions would result in meeting groundwater protection standards at TPOCs and eventually throughout the Surficial Aquifer and HG outside of the containment area. After the soil cover is constructed, potential excess lifetime cancer risks from direct exposure to Site-related contaminants in on-Site soil are expected to be well below 1 x $10^{-6}$ and the non-cancer HI would be well below 1. The potential for future surface water impacts would be very low.

All excess soil would be managed within the Site AOC, which would avoid certain conditions and restrictions on transportation and disposal of potentially hazardous waste. Treated groundwater would continue to be discharged under the conditions of a GRU sanitary-sewer discharge permit. Groundwater treatment residuals would continue to be managed, transported, and disposed of in compliance with appropriate regulations. Storm water controls would result in compliance with ARARs during and after remedy construction. For ISCO application, UIC requirements would be met. This remedy would comply with all ARARs, and therefore would satisfy this threshold criterion.

*Long-Term Effectiveness and Permanence*

The remedial actions of OnR-5F would substantially reduce the long-term likelihood of potential exposure to impacted soil, sediment, or groundwater. The highest-concentration areas of surface soil would be beneath an engineered cover. Potential DNAPL groundwater impacts would be contained, and dissolved phase groundwater contamination will be remediated to cleanup goals through ISCO and/or natural attenuation. Institutional controls would be effective at limiting potential contact with impacted soil or impacted groundwater. Potential future impacts to surface water would not be expected.

The principal contaminant source areas would also be treated to limit (but not eliminate) ongoing potential impacts to groundwater and to reduce or eliminate the need for hydraulic containment.

All of the technologies used in this remedy are proven and well tested in the field. Their long-term performance has been demonstrated. This primary criterion would be met for remedy OnR-5F.

*Reduction of Toxicity, Mobility, or Volume by Treatment*

ISS/S of Surficial Aquifer and Upper Hawthorn soils would significantly decrease the potential mobility of COCs by binding the contaminants and DNAPL to the soil and reducing hydraulic conductivity of the treated area. This stabilization would result in reducing or eliminating groundwater circulation through the impacted areas, thus reducing the dissolved-phase plume. Targeted ISCO/ISGS treatment at source area HG wells would also reduce the volume/mobility of COCs. As stated previously, EPA will require further Site-specific testing to determine specific parameters and site-specific effectiveness. Implementing ISGS at this Site will include a requirement for ongoing demonstration of effectiveness over time. Specific criteria for indicating when reinjection or retreatment is needed would be established during remedial design for this Site.

Surrounding the principal contaminant source areas with slurry walls would reduce the potential mobility of contaminants in groundwater in both the Surficial Aquifer and Upper Hawthorn. Graded surface covers would decrease the potential mobility of contaminants by reducing water infiltration through impacted soils.

Groundwater extraction and treatment would result in removal and immobilization of COCs via transfer of mass to treatment residuals.

If applied as a contingency, ISCO injections into the HG would reduce the volume, mobility, and/or toxicity of COCs in groundwater. Natural attenuation also reduces the toxicity, mobility, and/or volume of Site contaminants. This primary criterion would be met by remedy OnR-5F.

*Short-Term Effectiveness*

Implementing OnR-5F would create short-term risks that would require mitigation. Implementation of ISS/S, barrier walls, and surface covers will involve substantial use of heavy equipment, open excavations, and temporary above-ground stockpiling of impacted soil. There will be emissions from machinery, risks of injury to remediation workers, risks of exposure to on-Site personnel, and risks of storm water runoff impacts during construction. The short term risks can be managed through engineering controls, responsible construction management, and safe work practices.

It will take a substantial amount of time to implement this remedy. The most time-consuming component of the remedy is ISS/S, which would take approximately 2.5 years to complete. The total time for construction is estimated to be 3 years.

After construction, the Surficial Aquifer plume and Upper Hawthorn impacts would be largely contained by the solidified/stabilized treatment area and by the slurry walls. Natural attenuation where there are low-level exceedances of cleanup goals, with ISCO if necessary, would be used to attain groundwater protection standards throughout the plume and outside of the containment area. The length of time required for groundwater to meet the groundwater protection standards at the POCs may be several years. This primary criterion is met by remedy OnR-5F.

*Implementability*

While OnR-5F presents implementability challenges, the remedy is constructible, and this primary criterion is met. Constructing the barrier wall would require mobilizing large equipment and materials at and around the Site, which may be logistically challenging. The design depth of the vertical barrier is near the practical limit of the technology.

This remedy also requires mobilizing and operating large diameter ISS/S rigs. Approximately 5.5 acres of the Site would be subject to ISS/S. Very large quantities of cement and other additives would need to be procured and managed. The design depth of ISS/S treatment is near the practical limit of the technology.

Excess soil that is generated during ISS/S would need to be managed. There may be logistical challenges to stockpiling excess soil on-Site. Precautions would be taken to assure that all storm water was contained.

*Cost*

The estimated capital cost for remedy OnR-5F is $71.8 million, over half of which is for ISS/S. It assumes that the groundwater treatment system will be operated for 3 years. After that, OM&M costs will be approximately $165,000 annually. The NPV cost estimate for this remedy is $74.8 million, and is based on a 5 percent discount rate.

Contingent actions are not included in the cost estimate. Note that the cost of this alternative for on-Site media would be added to the costs of the selected UFA and off-Site surface soil remedies.

### 9.1.13 Alternative OnR-5G: Containment/Treatment – Barrier Wall plus *In Situ* Solidification/Stabilization in the Surficial Aquifer and *In Situ* Biogeochemical Stabilization in the Upper Hawthorn

| | |
|---|---|
| Capital cost: | $40.6 million |
| Annual O&M costs: | $165,000 |
| Total Present Worth: | $43.6 million |

This alternative is a combination of containment and treatment remedies that is similar to OnR-5E and OnR-5F, but it has a combination of ISS/S and ISGS treatment for the principal contaminant source areas. This remedy includes installing a vertical barrier wall around the DNAPL source areas to the top of the middle clay unit of the HG. The barrier wall will limit groundwater inflow to (and outflow from) DNAPL-impacted areas. A capped soil-consolidation area will be established inside the barrier-wall for excavated soil and excess soil from ISS/S implementation. The cap covering the vertical wall containment zone will also serve to minimize storm water infiltration into the containment zone, thereby minimizing the water recharge into the containment zone. Outside the barrier wall, surface regrading and covers will eliminate potential exposure to soil with constituent concentrations that result in potential risks that exceed applicable risk limits. ISS/S mixing will take place in the Surficial Aquifer to treat DNAPL and reduce COC mobility. ISGS will be applied to the Upper Hawthorn in principal contaminant source areas to treat mass in that unit and create a barrier to vertical flow. The combination of ISS/S and ISGS is similar to alternative OnR-4B. Operation of a modified version of the Surficial Aquifer groundwater extraction system will continue until it is no longer needed.

*Overall Protection of Human Health and the Environment*

The combination of soil cover and institutional controls of remedy OnR-5G would be highly protective against potential exposures to Site-related contaminants in surface soils and would protect surface water from potentially impacted runoff.

The principal contaminant source areas of the Surficial Aquifer would be solidified in place to significantly reduce potential future impacts to groundwater. ISGS application in the Upper Hawthorn would limit potential migration in and through that unit. ISGS would also immobilize and remove (through oxidation) some COC mass. Additionally, the barrier-wall system would limit groundwater flow through principal contaminant source areas.

Potential groundwater impacts would largely be contained within the barrier wall. Potential groundwater impacts outside of the barrier wall would be addressed by (1) continuing the extraction of Surficial Aquifer groundwater (eventually to be phased out), (2) natural attenuation where there are low-level exceedances of cleanup goals, and (3) ISCO application in the HG as necessary. Monitoring would be used to demonstrate that groundwater concentrations outside the containment area are decreasing to below applicable groundwater protection standards (e.g. GCTLs). Institutional controls would prevent potential exposure to impacted groundwater on Site.

These measures would achieve the RAOs of mitigating potentially unacceptable risks to potential receptors and mitigating potential migration of impacted groundwater. Remedy OnR-5G would satisfy this threshold criterion.

*Compliance with ARARs*

The remedial actions would result in meeting groundwater protection standards at TPOCs and eventually throughout the Surficial Aquifer and HG outside of the containment area. After the soil cover is constructed, potential excess lifetime cancer risks from direct exposure to Site-related contaminants in on-Site soil are expected to be well below $1 \times 10^{-6}$ and the non-cancer HI would be well below 1. The potential for future surface water impacts would be very low.

All excess soil would be managed within the Site AOC, which would avoid certain conditions and restrictions on transportation and disposal of potentially hazardous waste. Treated groundwater would continue to be discharged under the conditions of a GRU sanitary-sewer discharge permit. Groundwater treatment residuals would continue to be managed, transported, and disposed of in compliance with appropriate regulations. Storm water controls would result in compliance with ARARs during and after remedy construction. For ISCO application, UIC requirements would be met. This remedy would comply with all ARARs, and therefore would satisfy this threshold criterion.

*Long-Term Effectiveness and Permanence*

The remedial actions of OnR-5G would substantially reduce the long-term likelihood of potential exposure to impacted soil, sediment, or groundwater. The highest-concentration areas of surface soil would be beneath an engineered cover. Potential DNAPL groundwater impacts would be contained, and dissolved phase groundwater contamination will be remediated to cleanup goals through ISCO and/or natural attenuation. Institutional controls would be effective at limiting potential contact with impacted soil or impacted groundwater. Potential future impacts to surface water would not be expected.

The principal contaminant source areas would also be treated to limit (but not eliminate) ongoing potential impacts to groundwater and to reduce or eliminate the need for hydraulic containment. ISGS is an innovative technology that has been tested at this Site and has shown some success at other sites. The ISGS Site study suggested that encrustation of DNAPL likely would be persistent and not be subject to reversibility under likely future geochemical conditions (Adventus, 2009a). However, further Site-specific testing will be mandatory to determine specific parameters and site-specific effectiveness (such as the radius of influence for effective implementation). In addition, implementing ISGS at this Site will include a requirement for ongoing demonstration of effectiveness over time. Specific criteria for indicating when reinjection or retreatment is needed would be established during remedial design for this Site.

Other technologies used in this alternative are proven and well tested in the field. Their long-term performance has been demonstrated. This primary criterion would be met for remedy OnR-4B.

*Reduction of Toxicity, Mobility, or Volume by Treatment*

ISS/S of Surficial Aquifer and ISGS of Upper Hawthorn soils would significantly decrease the potential mobility of COCs by binding the contaminants and DNAPL to the soil and reducing hydraulic conductivity of the treated area. This stabilization would result in reducing or eliminating potential groundwater circulation through the impacted areas, thus reducing the dissolved-phase plume volume. ISGS treatment would also eliminate some COC mass through oxidation. Targeted ISCO/ISGS treatment at source area HG wells would also reduce the volume/mobility of COCs. As stated previously, EPA will require further Site-specific testing to determine specific parameters and site-specific effectiveness. Implementing ISGS at this Site will include a requirement for ongoing demonstration of effectiveness over time. Specific criteria for indicating when reinjection or retreatment is needed would be established during remedial design for this Site.

Surrounding the principal contaminant source areas with slurry walls and solidification/stabilization of the DNAPL zone would reduce the potential mobility of contaminants in groundwater in both the Surficial Aquifer and Upper Hawthorn. Graded surface covers would decrease the potential mobility of contaminants by reducing water infiltration through impacted soils.

Groundwater extraction and treatment would result in removal and immobilization of COCs via transfer of mass to treatment residuals.

If applied as a contingency, ISCO injections into the HG would reduce the volume, mobility, and/or toxicity of COCs in groundwater. Natural attenuation also reduces the toxicity, mobility, and/or volume of Site contaminants. This primary criterion would be met by alternative OnR-5G.

*Short-Term Effectiveness*

Implementing OnR-5G would create short-term risks that would require mitigation. Implementation of ISS/S, ISGS, barrier walls, and surface covers will involve substantial use of heavy equipment, open excavations, handling of potentially harmful chemicals, and temporary above-ground stockpiling of impacted soil. There will be emissions from machinery, risks of injury to remediation workers, risks of exposure to on-Site personnel, and risks of storm water runoff impacts during construction. The short term risks can be managed through engineering controls, responsible construction management, and safe work practices.

It will take a substantial amount of time to implement this remedy. The most time-consuming component of the remedy is ISS/S, which would take approximately 2 years to complete. The total time for construction is estimated to be 3 years.

After construction, the Surficial Aquifer plume and Upper Hawthorn impacts would be largely contained by the slurry walls and solified/stabilized material. Natural attenuation where there are low-level exceedances of cleanup goals, with ISCO if necessary, would be used to attain groundwater protection standards outside of the containment area. The length of time required for groundwater to meet the groundwater protection standards at the POCs may be several years. This primary criterion is met by remedy OnR-5G.

*Implementability*

While OnR-5G presents implementability challenges, the remedy is constructible, and this primary criterion is met. Constructing the barrier wall would require mobilizing large equipment and materials at and around the Site, which may be logistically challenging. The design depth of the vertical barrier is near the practical limit of the technology.

This alternative also requires mobilizing and operating large diameter ISS/S rigs. Approximately 5.5 acres of the Site would be subject to ISS/S. Large quantities of cement and other additives would need to be procured and managed. The remedy also requires procurement and handling of large volumes of ISGS (catalyzed sodium permanganate) solution.

Excess soil that is generated during ISS/S would need to be managed. There may be logistical challenges to stockpiling excess soil on-Site. Precautions would be taken to assure that all storm water is contained.

*Cost*

The estimated capital cost for remedy OnR-5G is $40.7 million, over half of which is for ISS/S. It assumes that the groundwater treatment system will be operated for 3 years. After that, OM&M costs will be approximately $165,000 annually. The NPV cost estimate for this remedy is $43.6 million, and is based on a 5 percent discount rate.

Contingent actions are not included in the cost estimate. Note that the cost of this remedy for on-Site media would be added to the costs of the selected UFA and off-Site surface soil remedies.

### 9.1.14 Alternative OnR-5H: Containment/Treatment – Barrier Wall plus *In Situ* Biogeochemical Stabilization in the Surficial Aquifer, plus *In Situ* Solidification/ Stabilization in the Upper Hawthorn

Capital cost: $62.4 million
Annual O&M costs: $165,000
Total Present Worth: $65.4 million

This alternative is a combination of the containment and treatment remedies in OnR-5C and the ISS/S treatment in the Upper Hawthorn as described in OnR-5F. This remedy includes installing a vertical barrier wall around the DNAPL source areas to the top of the middle clay unit of the HG. The barrier wall will limit groundwater inflow to (and outflow from) DNAPL-impacted areas. A capped soil-consolidation area for excavated soil will be established inside the barrier-wall area. The cap covering the vertical wall containment zone will also serve to minimize storm water infiltration into the containment zone, thereby minimizing the water recharge into the containment zone. Outside the barrier wall, surface regrading and covers will eliminate potential exposure to impacted soil (soil with constituent concentrations that result in estimated potential risks that exceed applicable risk limits). ISGS injections will take place in the Surficial Aquifer to treat DNAPL and reduce COC mobility. ISS/S mixing will take place in the Upper Hawthorn to treat DNAPL and reduce COC mobility. Operation of a modified version of the Surficial Aquifer groundwater extraction system will continue until it is no longer needed.

*Overall Protection of Human Health and the Environment*
The combination of soil cover and institutional controls of remedy OnR-5H would be highly protective against potential exposures to Site-related contaminants in surface soils and would protect surface water from potential impacted runoff.

The principal contaminant source areas of the Surficial Aquifer would be treated by ISGS to significantly reduce potential future impacts to groundwater. ISGS would also remove some COC mass through oxidation. The principal contaminant source areas of the Upper Hawthorn would be solidified in place to significantly reduce future impacts to groundwater. Additionally, the barrier-wall system would limit groundwater flow through principal contaminant source areas.

Potential groundwater impacts would largely be contained within the barrier wall. Potential groundwater impacts outside of the barrier wall would be addressed by (1) continuing extraction of Surficial Aquifer groundwater (eventually to be phased out), (2) natural attenuation where there are low-level exceedances of cleanup goals, and (3) ISCO application in the HG if necessary. Monitoring would be used to demonstrate that groundwater concentrations outside the containment area are decreasing to below applicable groundwater protection standards (e.g. GCTLs). Institutional controls would prevent potential exposure to impacted groundwater on Site.

These measures would achieve the RAOs of mitigating potentially unacceptable risks to potential receptors and mitigating potential migration of contaminated groundwater. Remedy OnR-5H would satisfy this threshold criterion.

*Compliance with ARARs*
The remedial actions would result in meeting groundwater protection standards at TPOCs and eventually throughout the Surficial Aquifer and HG outside of the containment area. After the soil cover is constructed, potential excess lifetime cancer risks from direct exposure to Site-related contaminants in on-Site soil are expected to be well below 1 x 10-6 and the non-cancer HI would be well below 1. The potential for future surface water impacts would be very low.

All excess soil would be managed within the Site AOC, which would avoid certain conditions and restrictions on transportation and disposal of potentially hazardous waste. Treated groundwater would continue to be discharged under the conditions of a GRU sanitary-sewer discharge permit. Groundwater treatment residuals would continue to be managed, transported, and disposed of in compliance with appropriate regulations. Storm water controls would result in compliance with ARARs during and after remedy construction. UIC requirements would be met for application of ISGS and ISCO. This remedy would comply with all ARARs, and therefore would satisfy this threshold criterion.

*Long-Term Effectiveness and Permanence*
The remedial actions of OnR-5H would substantially reduce the long-term likelihood of potential exposure to impacted soil, sediment, or groundwater. The highest-concentration areas of surface soil would be beneath an engineered cover. Potential DNAPL groundwater impacts would be contained, and dissolved phase groundwater contamination will be remediated to cleanup goals through ISCO and/or natural attenuation. Institutional controls would be effective at limiting potential contact with impacted soil or impacted groundwater. Potential future impacts to surface water would not be expected.

The principal contaminant source areas would also be treated by ISS/S and ISGS to limit (but not eliminate) ongoing impacts to groundwater and to reduce or eliminate the need for hydraulic containment. ISGS is an innovative technology that has been tested at this Site and has shown some success at other sites. The ISGS Site study suggested that encrustation of DNAPL likely would be persistent and not be subject to reversibility under likely future geochemical conditions (Adventus, 2009a). However, further Site-specific testing will be mandatory to determine specific parameters and site-specific effectiveness (such as the radius of influence for effective implementation). In addition, implementing ISGS at this Site will include a requirement for ongoing demonstration of effectiveness over time. Specific criteria for indicating when reinjection or retreatment is needed would be established during remedial design for this Site.

Other technologies used in this remedy are proven and well tested in the field. Their long-term performance has been demonstrated. This primary criterion would be met for remedy OnR-4B.

*Reduction of Toxicity, Mobility, or Volume by Treatment*

ISS/S of Upper Hawthorn soils would significantly decrease the potential mobility of COCs by binding the contaminants and DNAPL to the soil and reducing hydraulic conductivity of the treated area. This stabilization would result in reducing or eliminating groundwater circulation through the impacted areas, thus reducing the dissolved-phase plume volume.

ISGS of Surficial Aquifer soils would significantly decrease the potential mobility of COCs by encapsulating DNAPL in soil. ISGS would also reduce soil hydraulic conductivity and destroy some of the COC mass through oxidation. The source treatment would also reduce the dissolved-phase plume volume. Targeted ISCO/ISGS treatment at source area HG wells would also reduce the volume/mobility of COCs. Passive removal of DNAPL (and off-Site incineration) would also reduce the volume of COCs. As stated previously, EPA will require further Site-specific testing to determine specific parameters and likely effectiveness. Implementing ISGS at this Site will include a requirement for ongoing demonstration of effectiveness over time. Specific criteria for indicating when reinjection or retreatment is needed would be established during remedial design for this Site.

Surrounding the principal contaminant source areas with slurry walls and solidification/stabilization would reduce the potential mobility of contaminants in groundwater in both the Surficial Aquifer and Upper Hawthorn. Graded surface covers would decrease the potential mobility of contaminants by reducing water infiltration through impacted soils.

Groundwater extraction and treatment would result in removal and immobilization of COCs via transfer of mass to treatment residuals.

If applied as a contingency, ISCO injections into the HG would reduce the volume, mobility, and/or toxicity of COCs in groundwater. Natural attenuation also reduces the toxicity, mobility, and/or volume of Site contaminants. This primary criterion would be met by remedy OnR-5H.

*Short-Term Effectiveness*

Implementing remedy OnR-5H would create short-term risks that would require mitigation. Implementation of ISGS, ISS/S, barrier walls, and surface covers will involve substantial use of heavy equipment, open excavations, handling of potentially harmful chemicals, and temporary above-ground stockpiling of impacted soil. There will be emissions from machinery, risks of injury to remediation workers, risks of exposure to on-Site personnel, and risks of storm water runoff impacts during construction. The short term risks can be managed through engineering controls, responsible construction management, and safe work practices.

It will take a substantial amount of time to implement this remedy. The most time-consuming component of the remedy is ISS/S, which would take approximately 2.5 years to complete. The total time for construction is estimated to be 3 years.

After construction, the Surficial Aquifer plume and Upper Hawthorn impacts would be largely contained by the slurry walls and solidification/stabilization. Natural attenuation where there are low-level exceedances of cleanup goals, with ISCO if necessary, would be used to attain groundwater protection throughout the groundwater plume outside the containment area. The length of time required for groundwater to meet the groundwater protection standards at the POCs may be several years. This primary criterion is met by remedy OnR-5H.

*Implementability*

Although OnR-5H presents implementation challenges, the remedy is constructible and this primary criterion is met. Constructing the barrier wall would require mobilizing large equipment and materials at and around the Site, which may be logistically challenging. The design depth of the vertical barrier is near the practical limit of the technology.

The remedy also requires procurement and handling of large volumes of ISGS (catalyzed sodium permanganate) solution.

Soil generated from slurry-wall construction would need to be managed. There may be logistical challenges to stockpiling excess soil on-Site. Precautions would be taken to assure that all storm water was contained.

*Cost*

The estimated capital cost for remedy OnR-5H is $62.4 million, with ISS/S, ISGS treatment, slurry wall and surface cover construction being the main contributors. It assumes that the groundwater treatment system will be operated for 3 years. After that, OM&M costs will be approximately $165,000 annually. The NPV cost estimate for this remedy is $65.4 million, and is based on a 5 percent discount rate.

Contingent actions are not included in the cost estimate. Note that the cost of this alternative for on-Site media would be added to the costs of the selected UFA and off-Site surface soil remedies.

## 9.2 Detailed Remedial Alternatives Evaluation: Upper Floridan Aquifer Alternatives

Remedies for UFA groundwater are evaluated separately from those assembled to address impacted on-Site media and off-Site surface soil. Two remedies considered for the UFA include No Action (UFA-1) and natural attenuation where there are low-levels exceedances of clean-up goals with hydraulic containment (UFA-2).

### 9.2.1 Alternative UFA-1: No Action

Capital cost: $0 million
Annual O&M costs: $0
Total Present Worth: $0

The No Action alternative provides a baseline for comparison, and is required by the NCP. Under the No Action remedy, the existing groundwater monitoring in the UFA would cease. There would be no restrictions on groundwater use, and no monitoring would be performed to evaluate whether Site concentrations above the GCTLs were migrating or concentrations were declining or increasing.

*Overall Protection of Human Health and the Environment*

The No Action alternative for the UFA could fail to meet the RAOs and may, therefore, not protect human health or the environment. Groundwater extraction at FW-6 and FW-21B would be shut down resulting in no controls on the possible migration of potentially impacted UFA groundwater. Potential off-Site migration of impacted groundwater could not be detected if the groundwater monitoring system is decommissioned. Therefore, the UFA No Action alternative does not satisfy this threshold criterion.

*Compliance with ARARs*

UFA-1 would fail to meet chemical-specific ARARs, such as the GCTLs. Contaminant concentrations above the GCTLs in UFA groundwater would remain unaddressed under this alternative. The UFA No Action alternative would not be in compliance with local, state and federal ARARs and it would not satisfy this threshold criterion.

*Long-Term Effectiveness and Permanence*

The No Action alternative does not directly address constituent mass in the environment, and would have only indirect impact on constituent mass through incidental natural attenuation. However, without monitoring, the degree of such reductions would be unknown. Impacted UFA groundwater could potentially continue to migrate. No institutional controls would be implemented to prevent future exposures. Therefore, the No Action alternative may not be effective in the long term.

*Reduction of Toxicity, Mobility, or Volume by Treatment*

The No Action alternative does not include any treatment technology components. It would have only indirect impact on T/M/V of UFA contaminants through natural attenuation. However, without monitoring, the degree of such reductions would be unknown.

*Short-Term Effectiveness*

The UFA No Action alternative includes no implementation activities, and therefore, there are no additional short-term risks to the community or environment. Implementing this alternative creates no additional risk in the short-term.

*Implementability*

There are no impediments to construction, administration, or availability of equipment or services associated with this alternative.

*Cost*

The costs for implementing this alternative would be minimal. Note that any cost associated with the No Action alternative would be added to the base costs of the selected on-Site and off-Site surface soil remedies.

**9.2.2 Alternative UFA-2: Monitored Natural Attenuation with Hydraulic Containment**

Capital cost: $1.34 million
Annual O&M costs: $479,000
Total Present Worth: $8.9 million

This alternative consists of a combination of two technologies: (1) natural attenuation (for relatively low and isolated concentrations exceeding GCTLs); and (2) targeted groundwater extraction for groundwater containing higher and more persistent constituent concentrations.

*Overall Protection of Human Health and the Environment*

The UFA MNA and hydraulic containment alternative would meet the RAOs. Overall human health and the environment would be protected because groundwater extraction would (1) remove contaminant mass from the UFA, and (2) prevent groundwater contaminants from migrating off-Site. Monitoring would be used to document the concentration of the UFA plume. MNA has been demonstrated as a viable ongoing process in the UFA, and, in conjunction with the source control remedy will eliminate dissolved phase contamination in the UFA. The UFA MNA and hydraulic containment remedy satisfies this threshold criterion.

*Compliance with ARARs*

Remedy UFA-2 would meet ARARs identified for the UFA. Potential groundwater impacts in the UFA would be hydraulically contained through implementation of targeted withdrawals, and monitoring would verify plume stability and attenuation. This remedy would comply with ARARs and it would satisfy this threshold criterion.

*Long-Term Effectiveness and Permanence*

Remedy UFA-2 would meet the RAOs through continued extraction of impacted groundwater at selected, locations and through the aquifer's ability to naturally attenuate a decreasing constituent mass. MNA monitoring would document the effectiveness of UFA-2. Therefore, this remedy would meet this primary criterion.

*Reduction of Toxicity, Mobility, or Volume by Treatment*

The mass of Site-related COCs in the UFA is small. Natural attenuation mechanisms are expected to reduce COC T/M/V. Groundwater withdrawals will further reduce COC mass in the aquifer. This primary criterion is met by remedy UFA-2.

*Short-Term Effectiveness*
There would be minimal health and safety risks associated with installing wells, pumps, and conveyance pipes from UFA wells to the groundwater treatment plant. This primary criterion is met by remedy UFA-2.

*Implementability*
The anticipated activities associated with this remedy (groundwater extraction from wells combined with a MNA program) can be readily implemented. This primary criterion is met by the remedy.

*Cost*
Installation of five extraction wells in the UFA with telescoped casings would cost approximately $223,000 each. Assuming that groundwater treatment of the Surficial Aquifer continues, the additional OM&M costs for this remedy would likely be approximately $479,000 annually. Assuming a 5 percent discount rate and 30 years of withdrawal and monitoring, the NPV of this annual OM&M cost is $8.9 million. Note that this cost would be added to the base costs of the selected on-Site and off-Site surface soil remedies.

### 9.3 Detailed Remedial Alternatives Evaluation: Off-Site Surface Soil Remedies

Remedies for surface soil off-Site are evaluated separately from impacted on-Site media and UFA groundwater. Collection of off-Site surface-soil data is still ongoing. Concentrations of Site-related contaminants in off-Site soil are being compared to the Florida SCTLs. SCTLs are conservative and protective of human health for intended uses of the land (i.e., there are different cleanup levels for residential and commercial land uses). The Florida Department of Health (FDOH) is conducting health studies in the vicinity of the former Koppers Site and continues to issue health advisories as soil sampling results are obtained.

Based on the data obtained to date, it is expected that remedial action will be implemented in some areas off-Site to the west of the Site. Surface soil conditions to the north, east, and south of the Site will be determined during ongoing sample collection. The precise area of remedial action, if any, is yet to be determined; however, there is enough information to identify and evaluate potential remedial alternatives.

Four off-Site surface soil remedies (OfR) are considered: No Action (OfR-1), removal (OfR-2), institutional and/or engineering controls (OfR-3), and a hybrid remedy consisting of removal, institutional controls and/or engineered controls (OfR-4).

#### 9.3.1 Alternative OfR-1: No Action
Capital cost: $0 million
Annual O&M costs: $0
Total Present Worth: $0

The No Action alternative provides a baseline for comparison, and is required by the NCP. There would be no restrictions on land use in the residential area west of the facility, and no actions would be implemented to address contaminant concentrations in the soil.

*Overall Protection of Human Health and the Environment*

The No Action alternative would fail to reduce any potentially unacceptable risks posed by contaminants in surface soils at properties that do not meet selected cleanup goals based on guidance for Florida's SCTLs. Human health and the environment would not be protected at such properties. Therefore, the No Action alternative may not satisfy this threshold criterion at some properties.

*Compliance with ARARs*

The No Action alternative for off-Site surface soil would fail to meet ARARs at properties for which potential risks exceed selected cleanup goals based on guidance for Florida's SCTLs. Any potentially unacceptable risk associated with dermal contact, inhalation, or ingestion of soil would remain unaddressed with the No Action alternative.

*Long-Term Effectiveness and Permanence*

At properties that do not meet selected cleanup goals based on guidance for Florida's SCTLs, surface soil posing potentially unacceptable risks would remain in place. No institutional controls would be implemented to prevent potential future exposures. Therefore, the No Action alternative would be ineffective in the long term.

*Reduction of Toxicity, Mobility, or Volume by Treatment*

The No Action alternative does not include any treatment technology component. There would be no decrease in toxicity, mobility, or volume of COCs.

*Short-Term Effectiveness*

The No Action alternative does not include any implementation activities, and therefore, there are no additional short-term risks to the community or environment. By default, this alternative would not create additional risks during implementation because there would be no actions to implement.

*Implementability*

There are no constructability, administrative, or availability impediments associated with implementing this alternative.

*Cost*

The costs for implementing this alternative would be minimal. Note that any cost associated with the No Action alternative would be added to the base costs of the selected on-Site and UFA remedies.

### 9.3.2 Alternative OfR-2: Remove Impacted Soil

Capital cost: $5.66 Million
Annual O&M costs: $15,000
Total Present Worth: $6.1 Million

This approach, although disruptive of residential lives and privacy during implementation, is a one-time action that permanently eliminates the potential risk associated with potential off-Site exposure to the impacted soil and does not require continual long-term maintenance. Soil that is removed would be transported to the former Koppers Inc. property for further action consistent with the onsite alternative selected.

*Overall Protection of Human Health and the Environment*

The removal of impacted soil provides protection of human health within the areas surrounding the Site exceeding selected cleanup goals based on guidance for Florida's SCTLs. After completion of the removal and property restoration, none of the surface soil would present potentially unacceptable risks.

*Compliance with ARARs*

The soil removal action would comply with chemical-specific ARARs. After completion of the removal action, none of the remaining surface soil would present potentially unacceptable risks. ARARs associated with excavation and soil transport would apply to this alternative. Location-specific ARARs also would be met by OfR-2.

*Long-Term Effectiveness and Permanence*

The soil removal action would be permanent and effective in the long-term.

*Reduction of Toxicity, Mobility, or Volume by Treatment*

The soil removal is not a treatment action; however, it would reduce T/M/V of contaminants associated with surface soil in off-Site areas to allowable levels. The soil would be transported to another location where contaminants would be unavailable for exposure to residents. The soil would be managed with soil derived from on-Site remedial activities.

*Short-Term Effectiveness*

The process of excavating off-Site soil and transporting it onto the Site property (if selected as the disposal option) likely will create substantial amounts of dust and other risks associated with operation of large trucks and heavy equipment. The exposure to contaminants in soil may increase while the remedy is implemented. This potential increase in exposure will require short term safety controls, such as temporary relocation, dust control and air monitoring, for the residential population.

*Implementability*

The removal action consists of well established excavation technologies. Contractors and vendors for this remedy exist and are readily available for this type of project. Access between the residential areas and the western portion of the Site can be created. Access to and availability of sufficient volumes of clean fill material is likely.

*Cost*

Actual capital costs for this excavataion remedy are based almost entirely on the actual soil volume that will be addressed. The sampling and assessment program for off-Site surface soil has not been completed at this time. Although, the exact number of parcels requiring specific action is unknown at this time, upper bound assumptions were made to develop an estimate of cost. A total of 35 acres (approximately 100 parcels of residential- or commercial-use lots) were assumed to require excavation down to 2 feet bls, and clean fill equivalent to 2.5 feet was assumed to be needed to restore excavation areas. Based on these assumptions, the total volume of soil is estimated to be 113,000 cubic yards. Under these assumptions, the capital costs for this remedy option is $5.66 million with a minimal annual maintenance cost of $15,000 per year for 30 years. This results in an estimate of $6.1 million for OfR-2. Note that the cost for this remedy will be added to the base costs of the selected on-Site and UFA remedies.

### 9.3.3 Alternative OfR-3: Institutional and Engineering Controls

Capital cost: $9.48 Million
Annual O&M costs: $150,000
Total Present Worth: $11.9 Million

This alternative includes administrative and/or engineering actions intended to control the potentially complete exposure pathways between contaminants in soils and off-Site receptors rather than removing the contaminated soil. Preventing a receptor from contacting contaminants in environmental media is effectively the same as eliminating the potential exposure for that receptor. Both institutional and engineering controls would be applied in a way that reduces or eliminates exposure to surface soil in the affected area. Engineering controls encompass a variety of engineered remedies to contain or reduce contamination, or physical barriers intended to limit access to property. Engineering controls, as they relate to the off-Site properties, include fences, signs, caps or barriers. It can also include purchase of property to eliminate direct exposure of residents to contaminated soil.

*Overall Protection of Human Health and the Environment*

Overall protection of the off-Site human receptors can be accomplished through institutional and/or engineering controls. These actions control exposure to contaminants in off-Site soils; they do not eliminate or move contaminated soil. Overall protection of human health and the environment can be accomplished through appropriate controls that are maintained for the long term.

*Compliance with ARARs*

ARARs are met when off-Site residential or commercial receptors are prevented from contacting surface soil that poses a potentially unacceptable risk.

*Long-Term Effectiveness and Permanence*
Soils containing contaminants will remain in place. Therefore, the controls must be made effective and long lasting. Institutional controls require long-term compliance with land use restrictions to be effective. Engineering controls require long-term maintenance.

*Reduction of Toxicity, Mobility, or Volume by Treatment*
This alternative does not include any treatment technology component. A soil cover would prevent contact with COCs in soil posing a potentially unacceptable risk, but engineering controls would not reduce the inherent toxicity or volume of the contaminants in soils.

*Short-Term Effectiveness*
This remedy is less disruptive than excavation. though some disruption would be required for soil covers. Implementing the administrative actions would not create additional risk to people on the surrounding properties.

*Implementability*
This alternative poses significant implementability challenges for installation of soil covers, but the challenges are less than soil removal. Implementing the engineering and institutional controls will require the consent of the affected property owners.

*Cost*
The sampling and assessment program for off-Site surface soil has not been completed at this time. Although, the exact number of parcels requiring specific action is unknown at this time, upper-bound assumptions were made to develop an estimate of cost. A total of 100 parcels of residential- or commercial-use properties were assumed to require some action. Of those, it was assumed that the owners of 50 properties would agree to sell their properties, with the remaining parcels to be protected through a combination of institutional and engineering controls. Under these assumptions, the capital cost for this remedy option is estimated to be $9.48 million with a minimal annual maintenance of engineering controls of $150,000 per year for 30 years. This results in an estimate of $11.9 million for OfR-3. Note that the cost for this alternative will be added to the base costs of the selected on-Site and UFA remedies.

### 9.3.4 Alternative OfR-4: Removal, Institutional Controls, and/or Engineering Controls (Hybrid)

Capital cost: $7.18 Million
Annual O&M costs: $65,000
Total Present Worth: $8.3 Million

This alternative consists of a combination of removal and institutional and engineering controls. The distinction between soil to be excavated and soil to be addressed by institutional and engineering controls will be based on contaminant concentration(s), parcel land use (present and future), and, most importantly, property-owner preferences. Soil that is removed would be transported to the on-site property for further action consistent with the onsite remedy selected. Engineering controls encompass a variety of engineered remedies to contain or reduce contamination, or physical barriers intended to limit access to property. Engineering controls, as they relate to the off-Site properties, include fences, signs, caps or barriers. In this case, engineering controls also include purchase of properties to eliminate exposure pathways.

*Overall Protection of Human Health and the Environment*

Overall protection of the off-Site human receptors is accomplished through a combination of soil removal and controls to prevent potential exposure.

*Compliance with ARARs*

ARARs are met through a combination of soil removal and controls to prevent potential exposure. This combination of approaches is provided in guidance for Florida SCTLs.

*Long-Term Effectiveness and Permanence*

This remedy would be effective in the long term through a combination of soil removal and permanent controls to prevent potential exposure.

*Reduction of Toxicity, Mobility, or Volume by Treatment*

Same as previous alternatives.

*Short-Term Effectiveness*

There would be disruptions and short-term risks in the off-Site areas that would need to be mitigated as part of this alternative.

*Implementability*

This alternative provides maximum flexibility in implementability by allowing different approaches, as warranted, for different areas.

*Cost*

The sampling and assessment program for off-Site surface soil has not been completed at this time. Although, the exact number of parcels requiring specific action is unknown at this time, upper bound assumptions were made to develop an estimate of cost. A total of 31.5 acres (reflecting approximately 90 parcels of residiential- and commercial-use property) were assumed to require excavation down to 2 feet bls, and clean fill equivalent to 2.5 feet for restoring the excavated areas. Based on these assumptions, the total volume of soil assumed to need excavation is 102,000 cubic yards. Furthermore, it was assumed that the owners of 10 percent of parcels (i.e., 10 properties) would agree to sell their property. Those properties would be addressed through a combination of institutional and engineering controls. Under these assumptions, the capital costs for this remedy option is $7.18 million with a minimal annual maintenance for cover and engineering controls of $65,000 per year for 30 years. This results in an estimate of $8.3 million for OfR-4. Note that the cost for this alternative will be added to the base costs of the selected on-Site and UFA remedies.

## 9.4 Offsite Sediment Alternative

The Agency evaluated the PRP's 2010 ecological screening level risk assessment and its accompanying revisions and does not believe that it provides an adequate basis to select remedial goals for offsite sediment. EPA drew this conclusion because this assessment was based on assumptions used in the screening level risk assessment that have not yet obtained acceptance by EPA and Florida DEP. The Agency gave PRP the opportunity to provide an adequate ecological assessment; however, the product delivered was not adequate for determining risks to ecological receptors. Therefore, EPA is utilizing conservative default ecological endpoints described below in identification and selection of cleanup goals for remedial goal selection with provision for utilizing background concentrations in determining appropriate cleanup goals should background concentrations be found to exceed the threshold effect concentration (TEC) levels.

The selected remedy address citizen concerns with the creeks in two distinct ways. First, to address previous contamination of the sediments in each creek, sediments that have contaminant concentrations associated with either former Cabot Carbon or Koppers that exceed the threshold effects concentrations (i.e. contaminant concentrations in excess of levels that would adversely effect animal life) are required to be excavated and replaced with clean fill material. Assessment of creek sediments is ongoing. To address possible future impacts on sediments, the former Koppers facility is required to construct and operate a detention/retention pond(s) to capture storm water from the former Koppers Site prior to allowing it to be discharged to the tributary to Springstead Creek. The detention/retention pond(s) will be designed, including placement, during the remedial design of the on-site remedy.

Although future migration of contaminated soils due to storm water flow is highly unlikely due to the implementation of Site surface covers and consolidation of contaminated materials beneath a low-permeability cover/cap, storm water capture will allow potentially contaminated sediment to settle so that it will not be released to the creeks.

## 10.0 Comparative Analysis of Alternatives

All of the remedial alternatives were examined with respect to the requirements in the NCP, Code of Federal Regulations (CFR) (40 CFR Part 300.430[e] [9] iii), CERCLA, and factors described in *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA* (EPA, 1988). The nine evaluation criteria include the following:

Threshold Criteria

- Overall protection of human health and the environment; and,
- Compliance with ARARs.

Balancing Criteria

- Short-term effectiveness;
- Long-term effectiveness and permanence;
- Reduction of mobility, toxicity, or volume through treatment;
- Implementability; and,
- Cost.

Modifying Criteria

- State acceptance; and
- Community acceptance.

A comparative analysis of the alternatives based on the threshold and balancing evaluation criteria is presented below. The objective of this section is to compare and contrast the alternatives to support selection of the remedy for the Site.

### 10.1 Overall Protection of Human Health and the Environment

With the exception of the no action alternatives and OnR-2, each alternative satisfies the threshold criterion of overall protection of human health and the environment and compliance with ARARs.

### 10.2 Compliance with ARARs

Section 121(d) of CERCLA and NCP §300.430(f)(1)(ii)(B) require that RAs at Superfund sites at least attain legally applicable or relevant and appropriate Federal and State requirements, standards, criteria, and limitations, which are collectively referred to as "ARARs," unless such ARARs are waived under CERCLA Section 121(d)(4).

Applicable requirements are those cleanup goals, standards of control, and other substantive requirements, criteria, or limitations promulgated under Federal or State environmental laws or facility siting laws that specifically address a hazardous substance, pollutant, contaminant, RA, location, or other circumstance found at a Superfund site. Only those State standards that are identified by a state in a timely manner and that are more stringent than Federal requirements may be applicable. Relevant and appropriate requirements are those cleanup goals, standards of control, and other substantive requirements, criteria, or limitations promulgated under Federal or State environmental laws or facility siting laws that, while not "applicable" to a hazardous substance, pollutant, contaminant, RA, location, or other circumstance at a Superfund site, address problems or situations sufficiently similar to those encountered at the Superfund site that their use is well-suited to the particular site. Only those State standards that are identified in a timely manner, and are more stringent than Federal requirements, may be relevant and appropriate. Compliance with ARARs addresses whether a remedy will meet all of the ARARs of other Federal and State environmental statutes or provides a basis for invoking waiver.

Each remedial alternative is evaluated for its compliance with ARARs as defined in CERCLA Section 121(f). The following items must be considered during the evaluation:

- Compliance with contaminant-specific ARARs (i.e., MCLs). This consideration includes whether contaminant-specific ARARs can be met and whether a waiver may be appropriate if they cannot be met.
- Compliance with location-specific ARARs (i.e., protection of historic sites, regulations regarding activities near wetlands/floodplains). This consideration includes whether location-specific ARARs can be met or waived.
- Compliance with action-specific ARARs (i.e., RCRA treatment technology standards). This consideration includes whether action-specific ARARs can be met or waived.

With the exception of the no action alternatives, each alternative satisfies the threshold criterion of compliance with ARARs. OnR-2 was ranked lower than the other on-Site alternatives because it might not comply with all chemical-specific ARARs, and therefore would potentially not satisfy this threshold criterion.

### 10.3 Long-Term Effectiveness and Permanence

Long-term effectiveness and permanence refers to expected residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time, until all clean-up levels have been met. This criterion includes the consideration of residual risk that will remain following remediation and the adequacy and reliability of controls. Each alternative, except the No Action Alternative 1, provides some degree of long-term protection. Evaluation of the long-term effectiveness and permanence of a remedial alternative addresses the outcome of a remedial alternative in terms of the risk remaining at the site after RAOs are achieved. Long-term effectiveness is evaluated based on the following three factors:

- Magnitude of the remaining risk. This consideration addresses the residual risk remaining from untreated waste or treatment residuals at the end of the remedial activities;
- Adequacy of controls. This consideration addresses the adequacy and suitability of the controls, if necessary, that are used to manage the treatment residuals or untreated wastes that remain at the Site; and
- Reliability of the controls. This consideration addresses the long-term reliability of management controls, if used, for providing continued protection from the treatment residuals or untreated wastes.

### 10.3.1 On-Site Alternatives

The No Action alternative has no long-term effectiveness toward addressing the RAOs, thus it received the lowest score. OnR-2 is less effective and permanent in the long-term because so little active remediation is implemented by that alternative. The two excavation alternatives, OnR-3A and OnR-3B, are ranked higher than other alternatives based on their permanent removal action (excavation and on-Site disposal) of contaminated media. Each of the other alternatives has a high likelihood of long-term effectiveness and permanence. ICs will be necessary for all alternatives to ensure compatible land use is maintained. Similarly, all alternatives would necessitate Five-Year Reviews of remedy protectiveness since unrestricted use/unlimited exposure criteria would not be met. Adequate and reliable controls can be readily established for all of the alternatives.

### 10.3.2 Upper Floridan Aquifer Alternatives

The No Action alternative does not directly address constituent mass in the environment, and would have only indirect impact on constituent mass through incidental natural attenuation. UFA-2 would meet the RAOs through continued extraction of impacted groundwater at selected, adaptable locations and the through aquifer's ability to naturally attenuate a decreasing constituent mass.

### 10.3.3 Off-Site Alternatives

The No Action alternative would be ineffective in the long term at properties that do not meet selected cleanup goals based on guidance for Florida SCTLs. Contaminated soil removal actions outlined in OfR-2 and OfR-4 would be permanent and effective in the long-term. OfR-3 requires the ICs that require long-term compliance with land use restrictions and engineering controls that require long-term maintenance so it was rated lower than OfR-2. The hybrid, OfR-4, requires ICs and engineering controls as well, but it does include excavation, so it was ranked higher than OfR-3 but lower than OfR-2.

## 10.4 Reduction of Mobility, Toxicity, or Volume through Treatment

Reduction of Mobility, Toxicity, or Volume (M/T/V) through treatment refers to the anticipated performance of the treatment technologies that may be included as part of a remedy. This criterion addresses the statutory preference for selecting a RA that employs treatment technologies that are able to permanently and significantly reduce the M/T/V of the COCs as their principal element. The ability of a remedial alternative to reduce the M/T/V of the COCs is evaluated based on the following five factors:

- The treatment processes, the remedies employed and the materials they treat;
- The amount (mass or volume) of hazardous materials that will be destroyed or treated by the remedial alternative, including how the principal threat(s) will be addressed;
- The degree of expected reduction in M/T/V of COCs, measured as a percentage of reduction or order of magnitude;
- The degree to which the treatment is irreversible; and
- The type and quantity of treatment residuals that would remain following the treatment actions.

### 10.4.1 On-Site Alternatives

The No Action alternative does not include any treatment technologies or remedy components. It would not reduce the T/M/V of contaminants in soils or groundwater. OnR-3B was judged the most effective alternative in this regard. It involves excavation to the middle clay and treatment of the excavated soil by S/S. This would significantly decrease the mobility of COCs by binding the contaminants and DNAPL to the soil and reducing hydraulic conductivity of the treated volume. Although the mobility of the contaminants will be reduced by the barrier wall system in both the Surficial Aquifer and Upper Hawthorn and graded surface covers would decrease the potential mobility of contaminants by reducing water infiltration through impacted soils, OnR-5A was judged the least effective alternative with regard to reducing M/T/V. The toxicity and volume of the contaminants would remain unchanged in the containment cell. It is noteworthy that this is a relative scale; in other words, the other alternatives are superior to OnR-5A in this regard, but may not reflect actual effectiveness for site conditions. The barrier wall system is effective but less so in reducing M/T/V than the other alternatives.

### 10.4.2 Upper Floridan Aquifer Alternatives

The No Action alternative does not include any treatment technology components. It would have only indirect impact on T/M/V of UFA contaminants through natural attenuation. The groundwater withdrawals and natural attenuation mechanisms outlined in UFA-2 reduce and eventually eliminate COC mass in the aquifer.

### 10.4.3 Off-Site Alternatives

The No Action alternative (OfR-1) and Institutional and Engineering Controls alternative (OfR-3) do not include any treatment technology component. There would be no decrease in toxicity, mobility, or volume of COCs. For this reason, both received the lowest possible score. The soil removal outlined in OfR-2 and OfR-4 would reduce T/M/V of contaminants associated with surface soil in off-Site areas to allowable levels. However, this is a removal not a treatment action so each alternative was awarded a moderate score.

## 10.5 Short-Term Effectiveness

Short-term effectiveness evaluates the period of time needed to implement the remedy and any adverse impacts that may be posed to workers, the community and the environment during RA until cleanup objectives are achieved. The short-term effectiveness of a remedial alternative is evaluated with respect to its effect on human health and the environment during its implementation. Short-term effectiveness is evaluated based on the following four factors:

- Protection of the community during the RA. This consideration addresses any risk that results from the implementation of the RA (i.e., dust from an excavation) that may affect human health
- Protection of workers during the RA. This consideration addresses threats that may affect workers and the effectiveness and reliability of protective measures that may be taken
- Environmental impacts. This consideration addresses the potential adverse environmental impact that may result from the implementation of the remedial alternative and evaluates how effective available mitigation measures would be to prevent or reduce the impact
- The amount of time required until the RAOs are achieved. This consideration includes an estimate of the time required to achieve protection for the entire Site or for individual elements associated with specific Site areas of threats.

### 10.5.1 On-Site Alternatives

The No Action alternative does not include any implementation activities; therefore, there are no additional short-term risks to the community or environment. This alternative is therefore considered to be effective in the short-term and thus received the maximum score. Similarly, OnR-2 is simply the continuation of the current interim remedial measures with the addition of surface regrading and cover to prevent direct exposure. Short-term risks are low. The excavation options, OnR-3A and OnR-3B, were deemed to have short-term risks that will require mitigation. Excavation, *ex situ* solidification, and surface covers will involve substantial use of heavy equipment, large open excavations, and temporary above-ground stockpiling of impacted soil. There will be emissions from machinery, risks of injury to remediation workers, risks of exposure to on-Site personnel, and risks of surface water runoff impacts during construction. The short term risks can be managed through engineering controls, responsible construction management, and safe work practices.

### 10.5.2 Upper Floridan Aquifer Alternatives

The No Action alternative includes no implementation activities, and therefore, there are no additional short-term risks to the community or environment. There would be minimal health and safety risks associated with installing wells, pumps, and conveyance pipes from UFA wells to the groundwater treatment plant as outlined in UFA-2.

### 10.5.3 Off-Site Alternatives

The No Action alternative does not include any implementation activities, and therefore, there are no additional short-term risks to the community or environment. Excavations outlined in OfR-2 and OfR-4 will create substantial amounts of dust and other risks associated with operation of large trucks and heavy equipment. The exposure to contaminants in soil may increase while the remedy is implemented. This potential increase in exposure will require short term safety controls, such as temporary relocation, dust control and air monitoring, for the residential and business population.

## 10.6 Implementability

Implementability addresses the technical and administrative feasibility of a remedy from design through construction and operation. Factors such as availability of services and materials, administrative feasibility, and coordination with other governmental entities are also considered.

### 10.6.1 On-Site Alternatives

The No Action alternative is implementable because no action is performed. The barrier wall alternatives ("OnR-5" series) present implementation challenges, but these challenges can be overcome. Treatability studies will be required to select the slurry mix design and to determine the long-term compatibility of the backfill. Constructing the barrier wall will require mobilizing large equipment and materials at and around the Site, which may be logistically challenging. The design depth of the vertical barrier is near the practical limit of the technology. Excavation alternatives OnR-3A and OnR-3B present very serious implementation challenges. Extremely large excavations would be required, extremely large quantities of soil would need to be processed, and extremely large volumes of groundwater will require treatment and disposal. The amount of space, equipment, and time needed would be much larger than any other remedy considered and may be infeasible. Institutional controls imposed under all alternatives are considered to be readily implementable.

### 10.6.2 Upper Floridan Aquifer Alternatives

The No Action alternative includes no implementation activities. The anticipated activities associated with UFA-2 (groundwater extraction from wells combined with a MNA program) can be readily implemented.

### 10.6.3 Off-Site Alternatives

There are no constructability, administrative, or availability impediments associated with the No Action alternative. OfR-3 poses some implementability challenges for installation of soil covers, but the challenges are less than soil removal (OfR-2 and OfR-4). Implementing the engineering and institutional controls outlined in OfR-3 and OfR-4 will require the consent of the property owners affected. The soil removal described in OfR-2 and OfR-4 consist of well-developed excavation equipment and technologies. Access between the residential areas and the western portion of the Site can be created. Access to and availability of sufficient volumes of clean fill material is likely.

## 10.7 Cost

For each remedial alternative, a minus 30 to plus 50 percent cost estimate has been developed. Cost estimates for each remedial alternative are based on conceptual engineering and design and are expressed in 2010 dollars. The cost estimate for each remedial alternative consists of the following four general categories:

- Capital Costs. These costs include the expenditures that are required for construction of the remedial alternative (direct costs) and non-construction/overhead costs (indirect costs). Capital costs are exclusive of the costs required to operate and maintain the remedial alternative throughout its use. Direct costs include the labor, equipment and supply costs, including contractor markups for overhead and profit, associated with activities such as mobilization, monitoring, site work, installation of treatment systems, and disposal costs. Indirect costs include items required to support the construction activities, but are not directly associated with a specific item.
- Total Construction Costs. These costs include the capital costs with the addition of the contractor fee (at 10 percent of capital costs), engineering and administrative costs (at 15 percent of capital costs), and a contingency allowance set at 25 percent of the capital costs with contractor fees and engineering and administrative costs.
- Present Worth O&M Costs. These costs include the post-construction cost items required to ensure or verify the continued effectiveness of the remedial alternative. O&M costs typically include long-term power and material costs (i.e., operational cost of a water treatment facility), equipment replacement/repair costs, and long-term monitoring costs (i.e., labor and laboratory costs), including contractor markups for overhead and profit. Present worth analysis is based on a five percent discount rate over a period of 30 years.
- Total Present Worth Costs. This is the sum of the total construction costs and present worth O&M costs and forms the basis for comparison of the various remedial alternatives.

### 10.7.1 On-Site Alternatives

Based on a conceptual-level cost estimate and preliminary assumptions, the estimated costs for the on-site remaining alternatives are summarized in Table 9.

### 10.7.2 Upper Floridan Aquifer Alternatives

Based on a conceptual-level cost estimate and preliminary assumptions, the estimated costs for the on-site remaining alternatives are summarized in Table 9.

### 10.7.3 Off-Site Alternatives

Since soil volume and the specific approach chosen by property owners are unknown at this time, the cost and remediation timeframe for the off-Site alternative are only estimated based on preliminary conceptual-level assumptions. These costs are summarized on Table 9. Each affected private property owner will be contacted by the PRP to discuss the best approaches to address the soil impacts on their private property.

## 10.8 Modifying Criteria

State and community acceptance are modifying criteria that shall be considered in selecting the RA.

### 10.8.1 State/Support Agency Acceptance

The State of Florida, as represented by FDEP, has assisted in the Superfund process through the review of the RI/FS documents and has actively participated in the decision making process. Based on this interaction, it is expected that FDEP will support the selected remedy.

### 10.8.2 Community Acceptance

Approximately 1000 copies of the Proposed Plan were mailed to citizens in neighborhoods adjacent to the Site. The notice of availability of documents pertinent to the proposed remedy was published in the *Gainesville Sun* newspaper on July 15, 2010. EPA Region 4 presented the Proposed Plan to the community on August 5, 2010 and held a public comment period from July 15 through August 15, 2010. Subsequently, the EPA determined that it should provide more details and clarification of the preferred remedy in response to questions and concerns voiced by the community during the public meeting. Two separate fact sheets, one for the preferred remedy and one for off-Site soil cleanup activities, were prepared. A public availability session was held on October 6, 2010 to provide an additional opportunity for the community to address any remaining questions that they may have about Site cleanup. EPA's responses to questions and comments received are included in the Responsiveness Summary which is Appendix A to this ROD.

### 10.9 Principal Threat Wastes

The NCP establishes an expectation that EPA will address the principal threats posed by a site through treatment wherever practicable (NCP §300.430(a)(1)(iii)(A)). Identifying principal threat waste combines concepts of both hazard and risk. In general, principal threat wastes are those source materials considered to be highly toxic or highly mobile, which generally cannot be contained in a reliable manner or would present a significant risk to human health or the environment should exposure occur.

Principal threat wastes (DNAPL and DNAPL-impacted soil) will be dealt with by a combination of containment and two forms of treatment: ISGS and ISS/S. The containment mechanism will be a vertical retaining/barrier wall installed to encircle each source area and to extend vertically to the top of the HG middle clay, approximately 65 feet deep. The total length of the barrier walls will be approximately 4,800 feet and the total vertical square footage will be 314,000 square feet.

The ISGS technology uses a buffered solution of sodium permanganate and catalysts injected into the target zone to reduce the flux of COCs from residual DNAPL into the aqueous phase and to enhance the bioremediation of the aqueous-phase COCs. The ISGS technology involves the beneficial mechanisms described below:

1. Chemical and biological oxidation of DNAPL contaminants, especially relatively low molecular weight contaminants such as naphthalene;

2. Chemical hardening of remaining DNAPL which would be composed of proportionally higher fractions of high molecular weight, relatively insoluble organic contaminants;
3. Precipitation of manganese dioxide complexes at the DNAPL interface to encrust the DNAPL, thereby inhibiting dissolution of contaminants into groundwater.
4. Precipitation of manganese dioxide complexes within the interstitial spaces of the aquifer, effectively reducing the porosity of the aquifer matrix and thereby restricting the water movement through DNAPL-impacted material.

The ISS/S process involves applying additives, such as cement, lime, fly ash, or polymers, to bind with the soil particles to reduce the mobility of the contaminants using large diameter auger drilling/mixing equipment. The desired result is a solidified soil matrix of very low permeability and high strength. The reduced permeability significantly reduces mass flux of all COCs during precipitation infiltration. Chemical fixation of certain COCs to the S/S matrix may also occur. ISS/S of DNAPL-impacted soil will significantly reduce the mobility of DNAPL and Site COCs. The combined use of the ISGS and ISS/S technologies means that the statutory preference for treatment will be satisfied by the selected remedy.

# 11.0 Selected Remedy

## 11.1 Rationale for the Selected Remedy

Based upon consideration of the requirements of CERCLA, the NCP, OSWER Directive 9285.6-08 (Principles for Managing Contaminated Risks at Hazardous Waste Sites), FDEP regulations (as ARAR), the detailed analysis of the alternatives, and public and state comments, EPA has selected the following three-part remedy:

- OnR-5H: An on-Site remedy that focuses primarily on addressing impacted groundwater and sources of contaminants in the surface soil, Surficial Aquifer and Upper and Lower Hawthorn zones, through a combination of treatment and containment.
- UFA-2: A UFA remedy that consists of: (1) targeted groundwater extraction for groundwater containing higher and more persistent contaminant concentrations; and (2) institutional controls and MNA where there are low-level exceedances of cleanup goals.
- OfR-4: An off-Site remedy that includes soil removal and/or institutional and engineering controls.

Together, the selected remedy components meet the threshold criteria of protection to human health and the environment and compliance with ARARs. Further, the selected remedy satisfies the RAOs discussed in Section 8.0. The selected remedy will satisfy the statutory requirements of CERCLA Section 121(b) by being protective of human health and the environment; complying with ARARs; being cost-effective; utilizing permanent solutions and alternative treatment technologies to the maximum extent practicable; and meeting the preference for remedies that employ treatment that permanently and significantly reduces the M/T/V of hazardous wastes as a principal element. This action represents the final remedy selected for the Site, and, as such, is compatible with the intended future use of the Site. A fourth component of the remedy will address offsite

## 11.2 Description of the Selected Remedy

The selected remedy has three parts that address three distinct media groups: on-Site media (soil and groundwater above the Upper Floridan Aquifer [UFA]), groundwater in the UFA, and off-Site media (soil, sediment, and surface water). Each is discussed separately below.

### 11.2.1 On-Site Remedy (OnR-5H)

Implementation details of the relevant components are described in the following subsections.

*11.2.1.1 Soil consolidation area.* This remedy component consists of establishing an on-Site soil consolidation area conceptually shown on Figures 14 and 15. Source area materials treated in place as well as soil removed from other on-Site and off-Site areas will be contained within the consolidation area. The soil consolidation area will be designed to contain the soil contamination, and to prevent human contact and migration to groundwater off-Site. The most contaminated soil (principal threat waste [PTW]) will be treated within the consolidation area. An engineered cap will be constructed over the soil-consolidation area and over the vertical barrier wall (see Section 11.2.1.2). The cap covering the vertical wall containment zone will serve to minimize storm water infiltration into the containment zone, thereby minimizing the water recharge into the containment zone. There will be a gentle slope on the containment area to prevent surface water from accumulating. Other storm water management controls such as rerouting and detention basins will be used to reduce the likelihood of surface water contact with potentially contaminated soil.

*11.2.1.2 Vertical barrier wall.* This remedial component consists of surrounding the entire consolidation area with a continuous vertical subsurface barrier wall. Subsurface barrier walls often are used in environmental remediation where contaminants that move through groundwater may pose a potential threat to a source of drinking water. They have been used for decades as long-term solutions for controlling seepage. Barrier walls are typically constructed of a soil, bentonite (clay), and water mixture. However, a cement/bentonite or other mixture may be used for greater structural strength and to reduce degradation due to chemical interactions. The barrier wall will be joined to the top of the low permeability Hawthorn Group middle clay unit (approximately 65 feet below ground). Because the Hawthorn Group middle clay layer does not readily transmit water due to its low permeability and the surface cover/cap minimizes water from entering from above, the vertical barrier wall creates a subsurface containment area designed to completely surround the contaminated soil and groundwater in the surficial aquifer and Upper Hawthorn aquifer. The cap covering the vertical wall containment zone will minimize storm water infiltration into the containment zone, thereby minimizing the water recharge through the contaminated soil.

*11.2.1.3 Surface grading and covers.* This remedial component mostly applies to on-Site areas outside of the soil consolidation area. The green area on Figure 14 shows the soil outside of the consolidation area. First, soil hot spots in this area which exceed soil leachability target levels will be excavated and placed within the on-Site consolidation area. Then clean surface soil will be applied such that a minimum of two feet of clean surface soil will be in place beneath the final surface. Prior to installation of the surface cover, the Site will be regraded to redirect storm water runoff away from the consolidation area and producing non-erosive drainage across the site. The Site grading activity will involve removal of some surface soils, with placement within the soil consolidation area on-Site. The installation of an additional surface cover atop of the clean soil of materials consistent with future land use will minimize penetration of surface water and protect against direct contact with contaminated soils above residential cleanup levels. Final surface covers may consist of a hard wearing surface such as concrete or asphalt with appropriate supporting base material, or, as appropriate, vegetation.

In summary, the potential components of the final grading and covering plan may include (but will not be limited to) one or more of the following:

- Excavation with a two-foot soil cover;
- Placement of a two-foot soil cover without excavation;
- Placement of a two-foot soil cover and covering with a road and or paved parking area; and
- Placement of a lined pond over exposed soil.

This remedy component likely will result in the removal of trees on Site. It will be desirable to keep existing trees as a buffer along the western and northern property boundaries near existing residences. It will also be desirable to keep many of the existing on-Site monitoring wells (especially in the HG and UFA) intact during this activity; this may require modification of the wells and care during remedy construction.

Dust controls in the form of dust suppression will be implemented through continuous water application. During the remedial design of the Site remedy, an ambient air monitoring network to protect surrounding properties will be designed and implemented.

*11.2.1.4 Storm water rerouting and detention.* This remedy component consists of storm water management controls which: (a) mitigate flash runoff events from the Site, (b) prevent surface water from contacting media with elevated constituent concentrations, and (c) reduce potential soil/sediment transport from the Site. This remedy component will be implemented in concert with the designed surface covers and grading. Storm water controls will consist of: (a) grading and contouring the Site to direct runoff toward collection points, (b) installation of one or more detention/retention basins, and (c) possible replacement of the existing Site storm water ditch with another ditch or with an engineered conveyance such as an underground concrete pipe (culvert). The locations and design of storm water controls will be consistent with the expected future use of the Site property.

High-volume storm water flows will be addressed with one or more constructed detention ponds. These ponds will be constructed by excavating shallow soil in the pond area(s). The ponds detain water in low-lying areas and collect water during peak storm events to slow and reduce the rate of surface water discharge from the Site. The ponds collect sediment and would require some ongoing maintenance to inspect the ponds and clean out the sediment as appropriate. A detention pond with a permeable bottom allows collected water to infiltrate into the subsurface; such a pond would be appropriate where subsurface soil (after excavation of the pond) does not have elevated, leachable concentrations of Site contaminants. A pond that is constructed with a bottom liner to prevent infiltration would be appropriate where elevated, leachable concentrations remain in the subsurface.

*11.2.1.5 Surficial Aquifer hydraulic containment and groundwater monitoring.* This remedy component consists of operating the existing hydraulic containment system including the perimeter wells and the horizontal groundwater collection drains at the base of the Surficial Aquifer near the four principal contaminant source areas. Periodic adjustments to operations will be made as necessary to optimize containment and treatment reliability. This remedy component also includes Surficial Aquifer groundwater monitoring to demonstrate: (a) containment, (b) compliance at selected monitoring points, and (c) natural attenuation.

The southernmost extraction wells (EW-13 through EW-17) will be abandoned and containment in this area will be achieved by the slurry wall. Also, extraction at the perimeter wells will eventually become unnecessary due to source area treatment and containment. Triggers for shutting down perimeter extraction wells will be attainment of groundwater cleanup goals. After shutdown, frequent monitoring will be conducted at the well to determine whether concentrations rebound back to a determined action level, requiring re-initiation of the extraction. Existing and new monitoring wells between principal contaminant source areas and the perimeter extraction wells may also be used to define action levels for perimeter-well withdrawals.

The Surficial Aquifer TPOC wells will be in the immediate vicinity of the eastern and northern Site property boundaries. Initially, 10 Surficial Aquifer wells will be used to monitor groundwater quality in the vicinity of these two propertyboundaries. The majority of the Surficial Aquifer monitoring wells will be nested wells completed in the upper ("A" series monitoring wells) and lower ("B" series monitoring wells) portions of the Surficial Aquifer. In general, monitoring wells completed in the lower portion of the Surficial Aquifer contain higher constituent concentrations. Therefore, Surficial Aquifer monitoring will primarily be performed in monitoring wells completed in the lower portion of the aquifer ("B" series monitoring wells). Locations of additional monitoring points will be identified during remedy design and new wells will be installed during remedy implementation.

There are design options for the groundwater treatment and discharge systems that will be considered during final design, including:

- Modification of the groundwater treatment train for the most reliable and cost-effective COC removal (e.g., ion exchange may be more cost-effective than coagulation/precipitation/filtering for arsenic removal); and
- Discharge of treated groundwater to surface water feeding Springstead Creek. The discharge flow would be approximately 0.1 cubic feet per second (cfs). Surface water discharge concentration criteria would need to be achieved by the groundwater treatment system.

*11.2.1.6 In situ solidification/stabilization (ISS/S) of principal contaminant source areas.* This remedy component consists of using an additive mixture to solidify and stabilize source area soils and aquifer materials in place in both the former North Lagoon and former Drip Track source areas through the Surficial and Upper Hawthorn aquifers. Both of those source areas have shown evidence of impacting the UFA. Application will extend to approximately 65 feet bls. Based on a pilot test of S/S using Site soils, it is anticipated that an additive such as bentonite will be necessary (in addition to cement) to achieve a low hydraulic conductivity matrix. A large diameter auger (6 feet to 12 feet in diameter) will be used to mix source area soil with the solidification agent. The precise mixing formula and rate of addition will be determined by a treatability study. A range of engineering options and approaches may be used. The ISS/S will extend to the HG middle clay, approximately 65 feet deep. Excess material will be removed and transported to the soil consolidation area.

Full treatment of principal contaminant source areas by ISS/S will require demolition/dismantling of foundations, subsurface utilities, and any remaining structures at the Former Drip Tracks. The unknown location, condition, and contents of underground pipes, structures, and foundations significantly complicates application of ISS/S. This action will also necessitate abandonment of existing monitoring wells within the treatment zones.

The final design ISS/S treatment area will be defined through additional field sampling of material within and near delineated principal contaminant source areas. DNAPL source areas would be identified using a combination of indicators potentially including (but not limited to): visual observation of DNAPL in soil cores, photoionization detector readings, odors, and comparison of groundwater concentrations with effective solubility. EPA guidance indicates that groundwater contaminant concentrations approaching 10% solubility (of naphthalene for example) could also be used to infer the likely presence of nearby DNAPL or principal threat waste. Professional judgment will be required in many cases when identifying DNAPL source areas and EPA will evaluate and approve the final ISS/S design.

The stabilized soils must have a minimum unconfined compressive strength greater than or equal to 50 pounds per square inch (psi) as measured in accordance with Compressive Strength of Soil-Cement Mixtures American Society for Testing Materials (ASTM) D1633.2. The stabilized contaminated soils will be tested in accordance with the Synthetic Precipitation Leaching Procedure (SPLP) EPA Method 1312 such that the leachate is below maximum contaminant levels (MCLs) or other remedial goals (RGs) for each constituent. The stabilized soils will have a permeability of not more than $1 \times 10^{-6}$ centimeters per second (cm/sec).

The effectiveness of ISS/S will be monitored by (1) comparing soil samples with and without treatment, and (2) comparing groundwater concentrations taken before and after treatment at wells located near/downgradient of treatment areas.

*11.2.1.7 In situ biogeochemical stabilization (ISGS) of principal contaminant source areas.* This remedy component consists of injecting a catalyzed sodium permanganate solution within the South Lagoon and Former Process Area source areas using a series of borings. Neither of these source areas has shown evidence of impacting the UFA. ISGS is an innovative technology that has been tested at this Site and has shown some success at other sites. The ISGS Site study suggested that encrustation of DNAPL likely would be persistent and not be subject to reversibility under likely future geochemical conditions (Adventus, 2009a). However, further Site-specific testing will be mandatory to determine specific parameters and likely effectiveness (such as the radius of influence for effective implementation). In addition, implementing ISGS at this Site will include a requirement for ongoing demonstration of effectiveness over time. Specific criteria for indicating when reinjection or retreatment is needed would be established during remedial design for this Site.

The ISGS will be applied from ground surface to the bottom of the Surficial Aquifer zone (0 to 65 feet bls) at two of the four principal contaminant source areas (former Process area and the former South Lagoon). The ISGS component of this remedy component will be implemented through injection of oxidizing and stabilizing chemicals into the ground surface. This ISGS treatment is subject to acceptable performance demonstration during pilot tests or treatability studies. Pilot tests/treatability studies are tests conducted with contaminated Site materials and stabilizers to determine if cleanup goals will be met. If pilot tests, treatability studies and or performance monitoring do not demonstrate to EPA acceptable performance of the ISGS treatment for the Surficial Aquifer zone, the Surficial Aquifer zone at the former Process area and at the former South Lagoon will be treated with ISS/S.

The final design of the ISGS treatment area would be determined through additional field sampling of material within and near delineated principal contaminant source areas. DNAPL source areas would be identified using a combination of indicators potentially including (but not limited to): visual observation of DNAPL in soil cores, photoionization detector readings, odors, and comparison of groundwater concentrations with effective solubility. Professional judgment will be required in many cases when identifying DNAPL source areas and EPA will evaluate and approve the final ISGS design.

Important components of implementation of ISGS at the principal contaminant source areas are variables that will be monitored pre-and-post injection to determine if the ISGS technology is effective in reducing the contaminant mass, reducing permeability, and encapsulating DNAPL if DNAPL is encountered. ISGS performance goals will include the following items:

1. Consistent and controlled delivery and distribution of ISGS injectate throughout the designated treatment area with corresponding reduction in permeability and encapsulation of DNAPL.
2. Pronounced reduction in groundwater contaminant concentrations/DNAPL and reduction in mass flux both laterally and vertically.
3. Demonstrated longevity and stability of stabilized matrix, with no rebound.

ISGS performance evaluation will include the following items:

1. Monitoring network of appropriately located wells in the Surficial and Hawthorn to evaluate compliance with UIC and effective control of distribution of ISGS injectate.
2. Soil cores collected pre- and post-injection within treatment area to demonstrate thorough and consistent sweep and reduced permeability /leachability (based on pre- and post-injection lab analysis including modified ANSI 16.1).
3. Pre- and post-treatment slug tests and monitoring of water levels/hydraulic gradients in monitoring wells/piezometers and downgradient recovery wells to document attainment of anticipated changes in hydraulic conductivity /permeability in treatment areas and downgradient.
4. Use of passive flux meters (PFMs) and low pump-induced flow within treatment area to confirm reduction in mass flux. The approach would be to apply the PFM

technology directly within the source area. It would involve initial installation of three monitoring wells in the source area prior to ISGS application and installation of an additional three monitoring wells in the source area subsequent to ISGS application. Slug tests would be conducted on all wells shortly after installation to acquire average pre- and post-treatment hydraulic conductivity values in the source area. Following slug testing, modified versions of the PFMs would be deployed in the monitoring wells and then subjected to low pump-induced flow. In this manner, pre- and post- relative hydraulic conductivity and pre- and post-treatment induced contaminant flux can be compared to determine the relative impact of the ISGS treatment. The PFM monitoring wells can be left in place indefinitely to allow for induced flux measurements over a period of several years. During installation of monitoring wells, cores will also be collected and tested in the lab for leaching potential before and after treatment. In addition, installation of piezometers around the perimeter of the principal contaminant source areas will allow for hydraulic head measurements that can be used to evaluate any predicted changes in the groundwater flow field following treatment. This would provide additional information regarding any changes in permeability that occur within the principal contaminant source areas as a result of ISGS treatment.

5. Pre- and post-injection well sampling to confirm reductions in DNAPL recovery and consistent reductions in groundwater concentrations with no rebound. Further details of the ISGS pilot test and specific short-term and long-term goals will be included in a separate workplan prior to implementation of the pilot during remedial design.

*11.2.1.8 Passive DNAPL recovery.* This remedy component involves continuation of the current program of bi-weekly DNAPL bailing from Upper Hawthorn monitoring wells HG-11S, HG-15S, HG-12S, HG-10S, and HG-16S. This activity will continue as long as DNAPL is recoverable in these wells, or the source area remedy is constructed, which ever occurs first. Removed DNAPL will be temporarily stored on Site for eventual shipment to an appropriate off-Site disposal/recycling facility (e.g., currently off-Site incineration).

*11.2.1.9 ISCO/ISGS Using Existing Hawthorn Group Wells.* This remedy component involves use of existing HG monitoring wells as treatment-injection points. Where groundwater concentrations are elevated but local DNAPL presence is not indicated, the injectate would be an ISCO solution (e.g., peroxide, permanganate, or ozone). If DNAPL is indicated (e.g., where DNAPL has been recovered), the injectate may be either the ISGS (catalyzed sodium permanganate) solution or an ISCO solution. The injected volume will be determined during implementation based on the capacity of the well to receive injectate and based on monitoring of the injection well and nearby wells (if/as feasible) for presence of the injectate and Site contaminants. The three Lower Hawthorn wells in the principal contaminant source areas (HG-10D, HG-16D, and HG-12D) will be used for ISCO or ISGS delivery.

*11.2.1.10 Hawthorn Group groundwater monitoring.* This remedy component includes monitoring of Upper Hawthorn and Lower Hawthorn groundwater using existing monitor wells and installation of new wells as needed. The monitoring will be used to demonstrate MNA, and if necessary, contaminant behavior to define additional treatment wells,

The HG monitoring will primarily focus on ensuring that groundwater impacts remain on Site and that off-Site impacts to groundwater are stable and/or attenuating. As such, the HG monitoring will concentrate on wells located along the eastern and western property boundaries and downgradient of these boundaries. Initially, a total of 22 HG monitoring wells will be included in the monitoring program.

A total of 16 HG monitoring wells will be sampled along the eastern property boundary and six wells will be sampled along the western property boundary. Monitoring along the eastern property boundary will be performed in both Upper and Lower Hawthorn wells and monitoring along the western property boundary will be performed in Lower Hawthorn monitor wells. One exception along the western property boundary is monitoring well HG-24S, which was completed in the Upper Hawthorn and will continue to be monitored under this program.

The Upper Hawthorn wells will be approximately 65 feet deep and may be double cased to limit the potential for downward flow from the Surficial Aquifer. The Lower Hawthorn wells will be approximately 100 feet deep and will be double or triple cased to limit the potential for downward flow from the Surficial Aquifer or Upper Hawthorn.

*11.2.1.11 Contingent Treatment Actions in the Hawthorn Group.* This remedy component includes remedial actions for groundwater in the HG. Because monitoring results indicate that constituent concentrations in Hawthorn Group groundwater are either above GCTLs and increasing or are beginning to be detected above GCTLs (i.e., at previously clean wells where elevated concentrations of contaminants have not been found up to that time), an active remedy will be implemented in the HG where feasible and necessary to meet remedial objectives, as determined through monitoring during the remedial action. Increasing concentrations of contaminants in UFA groundwater could also be considered a trigger for action in the HG.

The expected action for organic contaminants is ISCO using a permanganate solution. The permanganate solution would be delivered to the target treatment zone via low-volume well injection. Existing monitoring wells and/or new delivery wells would be used for this purpose. In order to avoid potential cross contamination, new Lower Hawthorn wells will not be installed where concentrations in the Upper Hawthorn or Surficial Aquifer exceed (or are expected to exceed) certain thresholds (e.g., Florida Natural Attenuation Default Concentrations [NADCs]).

ISCO is the most appropriate action for targeted treatment of concentration hot spots; it may not be suitable for widespread application, particularly in the relatively low-permeability units of the HG.

Should groundwater monitoring data obtained from an upcoming Hawthorn well installation and sampling event east of the former Koppers Site boundary demonstrate former Cabot-attributable groundwater concentrations exceeding Florida GCTLs, Cabot will utilize in-situ injection of oxidizing chemicals (or other appropriate in-situ treatment approaches) to remediate contaminated groundwater.

*11.2.1.12 Monitored Natural Attenuation.* This remedy component includes using monitoring results to evaluate/demonstrate natural attenuation of contaminants in groundwater. Results from monitoring for MNA in the Surficial Aquifer, Upper Hawthorn, and Lower Hawthorn will be used to demonstrate plume stability and decreasing constituent concentrations in groundwater. MNA implementation will include ongoing monitoring of contaminants and other appropriate geochemical parameters, analysis of geochemical and biological conditions to determine the attenuation mechanisms, and analysis of concentration data trends.

*11.2.1.13 Institutional controls.* This on-Site remedy component consists of deed restrictions and other policy/programmatic actions to limit potential exposure to media with elevated constituent concentrations and to ensure the effectiveness of engineering controls.

A Site property deed restriction will specify or limit the types of permissible future Site development and will place health, safety, and materials-management requirements on any future construction activities. Commercial/industrial land use will be permitted on the property and it is possible that portions of the Site could be developed for other purposes (e.g., recreational or mixed-use with a residential component) as well. The deed restriction language will specify certain activities and property uses that are not permitted (e.g., occupied subsurface structures). Certain construction activities or material land-use changes may trigger installation of additional engineering controls to eliminate or reduce potential exposures to levels that are consistent with land use.

Groundwater use will be restricted permanently by a Site-wide property deed restriction (such a restriction does not currently exist). The only permitted withdrawals will be for remediation and sampling. Use of Surficial Aquifer or HG groundwater from the Site for potable use will be explicitly forbidden.

During any period of time when GCTLs are exceeded in off-Site areas, it is also assumed that regulatory groundwater use restrictions and development requirements will remain in place for the Site vicinity via (a) the FDEP/St. Johns River Water Management District (SJRWMD) regulation of the "Delineated Area" of contamination, (b) the local Murphree Well Field Wellhead Protection Area regulations, and (c) the Gainesville regulations that apply to the "Special Area of Environmental Concern."

*11.2.1.14 Five-Year Reviews.* This remedy component consists of remedy-performance reviews to be conducted every five years in compliance with CERCLA and EPA policy. Each review report documents the evaluation of remedy implementation and performance in order to determine if the remedy is or will be protective of human health and the environment. Evaluation of the remedy and the determination of protectiveness will be based on, and supported by, data and observations. The five-year reviews will include an assessment of whether MNA is effective.

*11.2.1.15 Post-Remedy Site Restoration.* This remedy component consists of actions taken after a remedy has been implemented, after active remedial operations have ceased, after remedial goals have been met, and when the only remaining activity associated with the remedy is monitoring to ensure long-term effectiveness. This action may include a final round of comprehensive groundwater sampling, analysis and reporting followed by abandonment of certain groundwater wells and removal of any surface facilities no longer required for OM&M. Final Site grading and surface finishing of areas previously used for remediation/monitoring components would also be part of post-remedy Site restoration. Site restoration activities may be implemented in a step-wise manner wherein certain wells/facilities are abandoned or removed once they are no longer needed for remedy implementation or effectiveness demonstration.

### 11.2.2 Upper Floridan Aquifer Remedy (UFA-2)

This remedy consists of a combination of two technologies: (1) natural attenuation (for relatively low and isolated concentrations exceeding GCTLs); and (2) targeted groundwater extraction for groundwater containing higher and more persistent contaminant concentrations. Its components include:

- Continuation of periodic collection of groundwater samples from monitoring wells, and analysis of samples for potentially Site-related organic contaminants;
- Continuation/expansion of the UFA groundwater extraction/ex situ treatment system, initially using existing wells FW-6 and FW-21B, along with the recently-installed extraction well FW-31BE (near FW-22B);
- As needed, installation of additional high capacity groundwater extraction wells for inclusion in the UFA groundwater extraction/ex situ treatment system; and
- Institutional controls to prevent UFA groundwater extraction for potable use at the Site or offsite where GCTLs are exceeded.

The groundwater will be pumped at a rate that will eliminate migration of dissolved contaminants off-Site (e.g., to the north toward the Murphree Well Field) at concentrations above GCTLs. Collection and (if necessary) ex situ groundwater treatment will be designed to accept and handle this flow rate, at a minimum.

*11.2.2.1 Implementation Details.* Frequent monitoring of on-Site UFA wells will continue in order to demonstrate that: (1) groundwater GCTL exceedances remain limited to a few of the on-Site monitoring ports; and (2) there is an overall reduction in mass and concentration of Site-related contaminants in the UFA. The monitoring will also be used to determine if action levels are reached, triggering additional remedy actions, described below. Monitoring will be conducted at boundary wells and at interior UFA wells. Additional details include:

- Monitoring will initially be quarterly at boundary wells.

- If concentrations effectively remain below GCTLs for 2 years, sampling frequency may be reduced to semi-annual.
- If concentrations effectively remain below GCTLs for 4 years, sampling frequency may be reduced to annual.
- If concentrations exceed GCTLs for any sampling event at a well, monthly confirmatory sampling will be performed for 2 months on that well.
- If monthly sampling demonstrates that concentrations are above GCTLs for two consecutive months, corrective action will be initiated (see below) and monitoring frequency will be quarterly until concentrations remain below GCTLs for four consecutive quarters.
- If corrective action is initiated, sampling frequency will be adjusted to monitor performance of corrective action to contain the plume.

Routine monitoring will also continue at off-Site sentinel wells FW-25B/C, FW-26B/C, and FW-29B/C. In addition to providing early warning for any potential groundwater plume moving downgradient, these wells will remain sentinels until all on-Site boundary wells exhibit concentrations below GCTLs.

*11.2.2.1.1 Trigger Criterion for Groundwater Extraction.* Compliance with defined groundwater quality goals will be determined through groundwater monitoring results. Monitoring results also will be used to define when groundwater quality has fallen out of compliance, and subsequently when groundwater has eturned into compliance. Ideally, an objective trigger criterion for dictating appropriate UFA groundwater remedial action should consist of a pre-defined sequence of actions and events. As an example of potential trigger criteria, if monitor well analytical data indicates that contaminants have reached a well at GCTLs (or near GCTLs and increasing), a potential response would be tp initiate targeted groundwater extraction near the well at that time, and to continue the groundwater extraction until analytical data shows constituent concentrations have returned to an acceptable level. Actual trigger criteria for groundwater extraction in the Upper Floridan Aquifer will be developed and established during remedial design for this Site.

As/where needed, new large-diameter wells will be installed for targeted extraction, and appropriate capacity pumps will be installed. The layout of the extraction system will depend on where action levels are exceeded, but it is expected that all or most of the extraction would be onsite. The goal of such a system will be to contain groundwater exceeding GCTLs within the Site boundary.

*11.2.2.1.2 Groundwater Extraction.* Existing monitoring wells FW-6 and FW-21B are currently being used as low-flow groundwater extraction points, as part of an IRM (GeoTrans, 2008c). A new extraction well, FW-31BE, has recently been installed for higher-flow extraction near FW-22B; extraction from this well is expected to commence soon as part of an interim remedial measure. The withdrawals at FW-6 and FW-21B are designed to capture downward migration along those boreholes or other localized pathways and to remove contaminated groundwater in these two areas. Extraction rates are 1 to 2 gpm at each well, as suggested by an independent panel of experts (Hinchee, Foster, and Larson,

2008) who reviewed Site data and recommended this action. Concentrations of COCs are being measured in the extracted groundwater from each well. The withdrawal at FW-31BE will be designed to hydraulically capture groundwater above GCTLs near and upgradient of FW-22B. If monitoring data show that the extraction rates at FW-6 and FW-21B are inadequate to contain significant source area leakage of contaminants into the Floridan aquifer, additional action will be taken to increase the capture efficiency of the Floridan groundwater extraction system. Such action could consist of, or include, (1) installation of one or more new recovery/extraction wells, (2) initation of groundwater pumping from the new extraction wells, and/or (3) increasing the pump rate at the existing FW-6 and/or FW-21B extraction wells. The pump rates and locations of new extraction wells will be determined based on monitoring data being collected at the present time, and will be selected with the goal of containing leakage and/or eliminating downgradient movement of contaminants in the Floridan Aquifer.

Calculations and modeling analyses have been conducted to estimate the amount of UFA extraction that may necessary to contain groundwater exceeding GCTLs on Site. These preliminary calculations and model simulations indicate that a total withdrawal rate of approximately 80 to 225 gpm will be sufficient to provide adequate capture, depending on the width of the target capture zone (GeoTrans, 2009a). Actual pump rates will be determined based on monitoring data, and will be selected with the goal of containing leakage and/or eliminating downgradient movement of contaminants in the Floridan Aquifer.

Concentrations of COCs will be measured in the groundwater from each UFA extraction well. Initially, and after any significant change in the average extraction rate, measurements will be made monthly; the frequency will then decrease in conformance with the Site-wide comprehensive groundwater monitoring plan. Semiannual OM&M reports will be made to EPA and FDEP.

*11.2.2.1.3 Disposition of Extracted Groundwater.* Extracted groundwater will be collected in holding tanks located near the extraction well and pump system. From there, groundwater can be sent to an on-Site water treatment facility (if necessary) and processed through a treatment train designed to remove contaminants and polish the effluent prior to discharge. Groundwater (treated or untreated) can be discharged to the local wastewater utility under permit. Acceptance criteria for the wastewater utility generally are based on protection of the treatment plant processes and operations and on protection of surface water quality (through criteria such as NPDES permit limits) from impacts by effluent discharge. Water samples will be analyzed to ensure if the pertinent discharge criteria are met.

It is assumed that groundwater extracted from any UFA well would be discharged to the GRU POTW sewer system after any necessary treatment. The current on-Site treatment system, which includes GAC filtering for organic contaminants, is effective at removing Site COCs from groundwater. Expansion and/or optimization of this system to handle higher flows may be required depending on the amount of UFA pumping that is ultimately required for containment.

*11.2.2.2 Institutional controls.* Groundwater use will be restricted permanently by a Site-wide property deed restriction. The only permitted withdrawals will be for remediation and sampling. Use of UFA groundwater from the Site for potable use will be explicitly forbidden.

During remediation, regulatory groundwater use restrictions will remain in place for the vicinity via (a) the FDEP/SJRWMD regulation of the "Delineated Area" of contamination, (b) the local Murphree Well Field Wellhead Protection Area regulations, and (c) the Gainesville regulations that apply to the "Special Area of Environmental Concern."

*11.2.2.3 Substantive permitting requirements.* The SJRWMD consumptive use permit (CUP) requirements may become applicable if: (1) the total extracted flow exceeds 100,000 gallons per day (70 gpm), or (2) if wells with a diameter of 6 inches or greater are used. In either of these cases, the withdrawal plan would need to show that existing groundwater users and natural resources (e.g., wetlands) would not be adversely impacted by the proposed withdrawals. Also, if additional water is to be discharged to the POTW, then a discharge permit modification may be required.

*11.2.2.4 Effectiveness Assumptions.* Implementing a groundwater extraction remedy in the UFA zone can present some challenges, particularly in relation to effectiveness documentation. Finding high constituent concentrations within the UFA is difficult because of the extreme depth of UFA wells and the serious concern over breaching the protective Lower Clay Unit above the UFA. An effective higher-flow pumping remedy will require use of new UFA extraction wells and (potentially) substantial upgrades to the water treatment facility currently used to treat groundwater extracted from the Surficial Aquifer.

Natural attenuation alone is not expected to sufficiently reduce concentrations along the groundwater flow path within the Site boundaries. Natural attenuation processes affecting the COCs in the UFA can include biodegradation, sorption, dispersion, and matrix diffusion. Current measured concentrations in the UFA, almost 100 years after wood-treating operations began, could be interpreted as evidence that attenuation is be occurring. This remedy includes MNA in the UFA, but hydraulic containment will be the primary remedy action (especially in the short-term) and will be expanded if/as necessary, in order to prevent groundwater with elevated concentrations from migrating beyond the current extent. The UFA is a confined, high-transmissivity, lateral-flow aquifer. Hydraulic containment is a proven technology that would be effective in the UFA.

### 11.2.3 Off-Site Remedies

Remedies for surface soil and sediment in Springstead and Hogtown Creeks off-Site are evaluated separately from impacted on-Site media and UFA groundwater. Collection of off-Site surface-soil data is still ongoing. Based on the data obtained to date, it is expected that remedial action will be implemented in some areas off-Site to the west of the Site. Surface soil conditions to the north, east, and south of the Site are to be determined during ongoing sample collection. The extent of contamination in the creeks is based on visual evidence of coal tar residues.

*11.2.3.1 Remedial Strategy for Soil.* At many sampling locations investigated to date, constituent soil concentrations are below cleanup goals. At other sampling locations, one or more contaminants exceed cleanup goals and further delineation is being undertaken.

Once the areas with concentrations exceeding cleanup goals are delineated, each affected private property owner will be contacted to discuss possible approaches to address the soil impacts on the private property. The private property owner may decline to allow remediation of soils. In general, two options exist: removal or institutional and engineering controls.

*11.2.3.2 Remedial Strategy for Sediment.* The approach will be to remove the tar and contaminated sediments to a "visibly clean" endpoint, then backfill the excavated areas with clean sand/sediment material. Sampling will be performed to delineate areas with contamination exceeding cleanup goals indicating the presence of residual tar in sediment. This sediment will be excavated and moved on-site. It is believed that if this work is performed successfully, that this should address the potential contamination issues in the creek regarding the wood tar and associated PAHs. The remedial goal for post-excavation monitoring is the Consensus-Based Probable Effect Concentration (PEC) for PAHs of 22.8 mg/kg sediment as total PAHs (MacDonald et al. 2000). These conclusions are consistent with the 11 principles for managing contaminated sediment risks at hazardous waste sites as enunciated in OSWER Directive 9285.6-08 (EPA, 2002). Contaminated sediments will be transported to the Site and placed among the other excavated material in the consolidation area. Post-excavation, the sediment will be monitored until the cleanup standard in Table 8 has been achieved.

*11.2.3.3 Removal Details for Soil.* If the property owner is willing, then the surface soil requiring remediation would be permanently removed. Removal is disruptive of residential lives and privacy during implementation, but it is a one-time action that permanently eliminates the potential risk associated with potential off-Site exposure to the removed soil and does not require continual long-term maintenance. Such an excavation from residential areas will require a high level of attention to detail and care to minimize spread of impacted soil and to mitigate risks associated with the presence of large trucks and heavy equipment in a residential neighborhood. In addition, stringent dust control will be implemented. The exact soil area and depth to be excavated will depend on the results of the ongoing delineation activities

Excavated soil will be transported to the on-Site consolidation area or may be disposed of off-Site. Access between the facility property and the residential areas immediately west should be easy given the proximity.

Residential yards (and any other properties) will be restored after soil is removed. Excavated areas in residential yards will be backfilled with clean borrow soil, graded for proper surface drainage patterns, and topped with clean top soil. Lawns and small plants will be replaced, and effort will be made to preserve large trees. Transporting clean fill soil back to the residential areas and restoring the excavation zones is likely to cause additional disruption and dust generation and will result in increased risks due to the presence of large trucks and heavy equipment in a residential setting. To the extent practicable, the restoration process will progress with minimal dust generation or disruption to local residents, and will end with reseeding and final grading, as necessary.

*11.2.3.4 Institutional and Engineering Controls.* The components of this remedy are (1) institutional controls designed to prevent people from using or disturbing soil posing potentially unacceptable risk and (2) engineering controls to prevent receptors from potentially contacting affected soil. Institutional controls would be implemented administratively through deed restrictions and other legal processes. Engineering controls envisioned for the affected residential soil would consist of simple technologies (e.g., soil cover, fencing, and/or other simple barriers to exposure).

Engineering controls such as soil covers and fences would require ongoing maintenance. Institutional controls and engineering controls require agreement from the property owner.

## 11.3 Summary of Estimated Remedy Costs

### 11.3.1 On-Site Remedy (OnR-5H)

Based on a conceptual-level cost estimate and preliminary assumptions, the total present value for the selected remedy, Alternative OnR-5H, is $57.2 million for a 30-year project life and assumed equivalent uniform annual interest rate of five percent. The estimated capital cost for this alternative is $54.3 million, and the annual O&M cost is $165,000 for 30 years. Capital costs are summarized in Table 10, and O&M costs are summarized in Table 11. Additional changes in the cost estimate are likely to occur as new information and data are collected during the engineering design of the remedial alternatives. Major changes, if they occur, may be documented in the form of a memorandum in the Administrative Record file, an ESD, or a ROD Amendment. This is an order of magnitude cost estimate that is expected to be within plus 50 percent to minus 30 percent of the actual project costs.

### 11.3.2 Upper Floridan Aquifer Remedy (UFA-2)

Based on a conceptual-level cost estimate and preliminary assumptions, the total present value for the selected remedy, Alternative UFA-2, is $11.7 million for a 30-year project life and assumed equivalent uniform annual interest rate of five percent. The estimated capital cost for this alternative is $4.12 million, and the annual O&M cost is $479,000.

### 11.3.3 Off-Site Remedies

Since soil volume and the specific approach chosen by property owners are unknown at this time, cost and remediation timeframe for the off-Site alternative are only estimated based on preliminary conceptual-level assumptions. Selected off-Site alternative OfR-4 is estimated to be $8.3 million for a 30-year project life and assumed equivalent uniform annual interest rate of five percent. The estimated capital cost for this alternative is $7.18 million and the annual O&M cost is $65,000. Each affected private property owner will be contacted by the PRP to discuss the best approaches to address the soil impacts on their private property.

### 11.3.4 Total Remedy Cost

The total remedy cost is a combination of alternative OnR-5H (On-site remedy), alternative UFA-2 (Upper Floridan Aquifer Remedy), and the off-site remedies (including soil and sediment cleanup). The combined estimated total remedy cost is approximately $63,164,000.

## 11.4 Available Land Use

Groundwater outside the containment area will be suitable for use as a drinking water resource once cleanup goals noted in Table 6 are met. During remedy implementation, engineering and administrative controls will be used to protect the public from environmental exposure or safety hazards associated with the cleanup activities. When this construction is complete, the on-Site property likely will be suitable for a mixed land-use consisting of commercial/industrial and restricted residential development. Off-Site properties will be suitable for either commercial/industrial development or residential land use depending on current use. It is anticipated that reuse of the property can occur prior to meeting the groundwater cleanup goals noted in Table 6. Institutional controls will limit the on- and off-Site land uses and will restrict the use of groundwater in impacted areas.

## 11.5 Final Cleanup Goals

The final cleanup goals and the basis for the cleanup goals are discussed in Section 7.1.5 and included in Tables 6, 7 and 8. In cases where background sampling studies show background concentrations of particular contaminants exceed the cleanup goals for those particular contaminants, there may be justification for using the background concentrations as clean-up goal concentrations in lieu of the cleanup goals established in the ROD. Any such change would be documented and publically available. These cleanup goals are protective of human health and the environment.

# 12.0 Statutory Determinations

Based on information currently available, EPA as the lead agency believes the Preferred Alternatives meet the threshold criteria and provides the best balance of tradeoffs among the other alternatives with respect to the balancing and modifying criteria. The EPA expects the Preferred Alternatives to satisfy the following statutory requirements of CERCLA 121(b): (1) be protective of human health and the environment; (2) comply with ARARs (or justify a waiver); (3) be cost-effective; (4) utilize permanent solutions and alternative treatment technologies or resource recovery technologies, and satisfy the preference for treatment as a principal element, to the extent practicable.

## 12.1 Protection of Human Health and the Environment

The Selected Remedy is comprised of three parts:

- An on-Site component that focuses primarily on addressing impacted groundwater and sources of contaminants in the surface soil, Surficial Aquifer and Upper Hawthorn zones through treatment and containment.
- A UFA component that consists of: (1) targeted groundwater extraction for groundwater containing higher and more persistent contaminant concentrations; and (2) institutional controls and MNA.
- An off-Site component that includes both removal, monitoring, and institutional and engineering controls.

Together, the Selected Remedy components satisfy the statutory requirement for protection of human health and the environment through:

- Treatment and isolation of contaminated groundwater and soil from human receptors
- Treatment of principal threat waste (DNAPL)
- Treatment and MNA of groundwater until exposure levels are reduced to at or below cleanup levels
- Institutional and administrative controls.

The selected remedy uses a multilayered approach to address contaminated media through treatment, containment, and monitoring. The engineering principles and technology for the Selected Remedy are well established and are expected to be reliable over the long-term. Site conditions are conducive to construction of the remedies, and the remedy outcome is compatible with the expected future use of the Site.

## 12.2 Compliance with ARARs

Implementation of the Selected Remedy will comply with all federal and state chemical-specific, action-specific, and location-specific ARARs. Chemical-specific requirements include those laws and regulations governing the release of materials possessing certain chemical or physical characteristics, or containing specified chemical compounds. Chemical-specific requirements set health- or risk-based concentration limits or ranges in various environmental media for specific hazardous substances, contaminants, and pollutants. Table 12 presents the chemical-specific ARARs, criteria and guidance for the Selected Remedy.

Action-specific requirements are technology-based, establishing performance, design, or other similar action-specific controls or regulations for the activities related to the management of hazardous substances or pollutants. Action-specific requirements are triggered by the particular RA selected to accomplish the cleanup. Action specific requirements that will be complied with by the selected remedy primarily include federal and state hazardous waste regulations and discharge requirements. A summary of the requirements to be met through the implementation of the Selected Remedy is provided in Table 13.

Location-specific requirements are design requirements or activity restrictions based on the geographic or physical position of the Site and its surrounding area. Location-specific requirements set restrictions on the types of remedial activities that can be performed based on Site-specific characteristics or location. Location-specific requirements were evaluated and potentially consist of location standards for wetland protection, protection of endangered species, fish and wildlife coordination, and meeting the substantive requirements of a NPDES permit for storm water drainage from the containment cell, construction sites, and industrial activities as shown in Table 14.

### 12.3 Cost Effectiveness

EPA has determined that the Selected Remedy is cost-effective and that the overall protectiveness of the remedy is proportional to the overall cost of the remedy. The cost-effectiveness of the remedy was assessed by comparing the overall effectiveness of the remedy (i.e., long-term effectiveness and permanence; reduction in M/T/V; short-term effectiveness) with the other alternatives considered. More than one remedial alternative may be considered cost-effective, but CERCLA does not mandate that the most cost-effective or least expensive remedy be selected.

### 12.4 Permanent and Alternative Treatment solutions

The Selected Remedy uses permanent solutions and alternative treatment solutions to the maximum extent practicable. The Selected Remedy will provide an acceptable degree of long-term effectiveness and permanence. The Selected Remedy will require Institutional and Administrative Controls over the long-term to remain effective, but these remedy components are neither unusual nor exceptional in degree or cost. The remedy can be reliably considered permanent.

### 12.5 Preference for Treatment as a Principal Element

In addition to the four statutory mandates previously discussed, the NCP includes a preference for treatment for the selected remedies in addressing the principal threat at the Site, and that the selected remedy utilize permanent solutions and alternative treatment technologies to the maximum extent practicable. Both the ISS/S and ISGS stabilization technologies satisfy this criterion.

### 12.6 Five-Year Review Requirement

CERCLA Section 121 and 40 CFR Part 300 require a review of RAs at least every five years if the RA results in hazardous substances, pollutants, or contaminants remaining in place above levels that allow for unlimited use and unrestricted exposure. Because this remedy as well as the previous OU1 remedy result in hazardous substances, pollutants or contaminants remaining on-Site above levels that allow for unlimited use and unrestricted exposure, statutory reviews will be continued to ensure that the remedy is, or will be, protective of human health and the environment.

### 12.7 Documentation of Significant Changes

Pursuant to CERCLA 117(b) and NCP 300.430(f)(3)(ii), the ROD must document any significant changes made to the Preferred Alternative discussed in the Proposed Plan. Two significant changes were made:

Several cleanup goals listed in the Proposed Plan have beed updated. The cleanup goals in Tables 6, 7, and 8 are accurate.

The cost estimate provided for the Preferred Alternative in the Proposed Plan has been updated. The actual costs of the preferred remedy are:

For On-Site Remedy OnR-5H:
- Capital Cost and Contingency: $ 54.3 million
- Annual O&M: $ 165,000
- Total Present Worth: $ 57.2 million

For Upper Floridan Aquifer Remedy UFA-2:
- Capital Cost and Contingency: $ 4.12 million
- Annual O&M: $ 479,000
- Total Present Worth: $ 11.7 million

For Off-Site Remedy OfR-4:
- Capital Cost and Contingency: $ 7.18 million
- Annual O&M: $ 65,000
- Total Present Worth: $ 8.3 million

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# Tables

Table 1

Estimated Volume of Soil Potentially Impacted by DNAPL

| | Former South Lagoon | Former North Lagoon | Former Process Area | Former Drip Track | Total |
|---|---|---|---|---|---|
| Area (acres) | 1.4 | 1.4 | 2.1 | 0.5 | 5.4 |
| Thickness of Surficial Aquifer (vadose + saturated) | 21 | 22 | 23 | 23 | |
| Total soil volume in Surficial Aquifer (cubic yards) | 48,200 | 49,900 | 78,900 | 19,900 | 196,900 |
| Percentage of soil in Surficial Aquifer that is DNAPL impacted | 45% | 65% | 45% | 50% | |
| DNAPL impacted soil volume in Surficial Aquifer (cubic yards) | 21,700 | 32,500 | 35,500 | 10,000 | 99,700 |
| Thickness of Upper Hawthorn (including upper clay unit) (ft) | 43 | 37 | 47 | 35 | |
| Total soil volume in Upper Hawthorn (cubic yards) | 98,700 | 85,500 | 162,000 | 30,400 | 376,600 |
| Thickness of Lower Hawthorn (including middle clay unit) (ft) | 53 | 55 | 47 | 57 | |
| Total soil volume in Lower Hawthorn (cubic yards) | 121,600 | 127,100 | 162,000 | 49,600 | 460,300 |

Source for quantities above Hawthorn Group: GeoTrans, 2004b.

Source for Hawthorn Group thicknesses: Beazer 2006.

Note: Areas and volumes listed above are uncertain estimates.

| Table 2<br>Occurrence, Distribution, and Selection of<br>Chemicals of Concern in Surface Soil (0 to 6 inches bls)<br>(2010 Human Health Risk Assessment) | | | | | | |
|---|---|---|---|---|---|---|
| **Chemical of Concern** | **Min Conc. (ppm)** | **Max Conc. (ppm)** | **Mean Conc. (ppm)** | **95% UCL (ppm)** | **Background Conc. (ppm)** | **Screening Toxicity Value (ppm)** |
| Antimony | 0.37 | 200 | NR | 7.36E+00 | NR | 37 |
| Arsenic | 0.45 | 3,600 | NR | 1.38E+02 | NR | 0.16 |
| Chromium | 1.7 | 3,700 | NR | 1.91E+02 | NR | 47 |
| Lead | 1.85 | 2,200 | NR | 6.87E+01 | NR | 80 |
| Mercury | 0.016 | 26.1 | NR | 1.39E+00 | NR | 1.7 |
| BaP-TEQ | 0.000995 | 138.1 | NR | 1.08E+01 | NR | 0.021 |
| 2-Methylnaphthalene | 0.0014 | 650 | NR | 1.87E+01 | NR | 210 |
| Naphthalene | 0.0027 | 250 | NR | 5.55E+00 | NR | 2 |
| Pentachlorophenol | 0.003 | 630 | NR | 1.24E+01 | NR | 0.9 |
| Dioxins (TCDD-TEQ) | 0.0000024 | 0.17 | NR | 9.20E-03 | NR | 1.80E-06 |

Notes:
bls = below land surface
Min = Minimum detected concentration
Max = Maximum detected concentration
Conc. = Concentration
ppm = parts per million
95% UCL = 95% upper confidence limit on the weighted average
NR = Not reported
BaP-TEQ = Benzo(a)pyrene toxic equivalents
TCDD-TEQ = 2,3,7,8-Tetrachlorodibenzo-p-dioxin toxic equivalents

## Table 3
## Summary of Surface Soil Chemicals of Concern and Medium-Specific Exposure Point Concentrations (2010 Human Health Risk Assessment)

**Scenario Timeframe: Future**
**Medium: Soil**
**Exposure Medium: Surface Soil**

| Exposure Point | Chemical of Concern | Min | Max | Units | Freq of Detect | Exposure Point Conc. | Units | Statistical Measure |
|---|---|---|---|---|---|---|---|---|
| On-Site | Antimony | 0.37 | 200 | mg/kg | 59% | 7.36E+00 | mg/kg | 95% UCL |
| | Arsenic | 0.45 | 3,600 | mg/kg | 98% | 1.38E+02 | mg/kg | 95% UCL |
| | Chromium | 1.7 | 3,700 | mg/kg | 100% | 1.91E+02 | mg/kg | 95% UCL |
| | Lead | 1.85 | 2,200 | mg/kg | 100% | 6.87E+01 | mg/kg | 95% UCL |
| | Mercury | 0.016 | 26.1 | mg/kg | 100% | 1.39E+00 | mg/kg | 95% UCL |
| | BaP-TEQ | 0.000995 | 138.1 | mg/kg | 100% | 1.08E+01 | mg/kg | 95% UCL |
| | 2-Methylnaphthalene | 0.0014 | 650 | mg/kg | 76% | 1.87E+01 | mg/kg | 95% UCL |
| | Naphthalene | 0.0027 | 250 | mg/kg | 84% | 5.55E+00 | mg/kg | 95% UCL |
| | Pentachlorophenol | 0.003 | 630 | mg/kg | 90% | 1.24E+01 | mg/kg | 95% UCL |
| | Dioxins (TCDD-TEQ) | 0.0000024 | 0.17 | mg/kg | 100% | 9.20E-03 | mg/kg | 95% UCL |

Notes:
Min = Minimum detected concentration
Max = Maximum detected concentration
Freq of Detect = Frequency of detection
Conc. = Concentration
mg/kg = milligrams per kilogram
95% UCL = 95% upper confidence limit on the weighted average
BaP-TEQ = Benzo(a)pyrene toxic equivalents
TCDD-TEQ = 2,3,7,8-Tetrachlorodibenzo-p-dioxin toxic equivalents

**Table 4**
**Risk Characterization Summary –Carcinogens**
**(2010 Human Health Risk Assessment)**

**Scenario Timeframe: Future**
**Receptor Population: On-Site Outdoor Worker**
**Receptor Age: Adult**

| Medium | Exposure Medium | Exposure Point | Chemical of Concern | Carcinogenic Risks | | | |
|---|---|---|---|---|---|---|---|
| | | | | Ingestion | Dermal | Inhalation | Exposure Routes Total |
| **Soil** | **Surface Soil** | **On-Site** | Antimony | NA | NA | NA | NA |
| | | | Arsenic | 2.00E-05 | 3.00E-06 | 5.00E-06 | 3.00E-05 |
| | | | Chromium | NA | NA | NA | NA |
| | | | Lead | NA | NA | NA | NA |
| | | | Mercury | NA | NA | NA | NA |
| | | | BaP-TEQ | 1.00E-05 | 4.00E-06 | 8.00E-08 | 2.00E-05 |
| | | | 2-Methylnaphthalene | NA | NA | NA | NA |
| | | | Naphthalene | NA | NA | NA | NA |
| | | | Pentachlorophenol | 5.00E-07 | 1.00E-07 | 4.00E-09 | 6.00E-07 |
| | | | Dioxins (TCDD-TEQ) | 2.00E-04 | 2.00E-04 | 2.00E-06 | 4.00E-04 |
| | | | Total | 3.00E-04 | 2.00E-04 | 7.00E-06 | 5.00E-04 |

Notes:
BaP-TEQ = Benzo(a)pyrene toxic equivalents
TCDD-TEQ = 2,3,7,8-Tetrachlorodibenzo-p-dioxin toxic equivalents
NA = Not applicable

**Table 5**
**Risk Characterization Summary – Non-Carcinogens**
**(2010 Human Health Risk Assessment)**

**Scenario Timeframe: Future**
**Receptor Population: On-Site Outdoor Worker**
**Receptor Age: Adult**

| Medium | Exposure Medium | Exposure Point | Chemical of Concern | Non-Carcinogenic Hazards | | | |
|---|---|---|---|---|---|---|---|
| | | | | Ingestion | Dermal | Inhalation | Exposure Routes Total |
| **Soil** | **Surface Soil** | **On-Site** | Antimony | 2.00E-02 | 6.00E-04 | NA | 2.00E-02 |
| | | | Arsenic | 1.00E-01 | 2.00E-02 | NA | 1.00E-01 |
| | | | Chromium | 1.00E-04 | 5.00E-05 | NA | 2.00E-04 |
| | | | Lead | NA | NA | NA | NA |
| | | | Mercury | NA | NA | 1.00E-04 | 1.00E-04 |
| | | | BaP-TEQ | 3.00E-04 | 3.00E-04 | 2.00E-06 | 6.00E-04 |
| | | | 2-Methylnaphthalene | 3.00E-03 | 4.00E-03 | NA | 7.00E-03 |
| | | | Naphthalene | 2.00E-04 | 2.00E-04 | 4.00E-05 | 5.00E-04 |
| | | | Pentachlorophenol | 4.00E-04 | 9.00E-05 | NA | 4.00E-04 |
| | | | Dioxins (TCDD-TEQ) | NA | NA | NA | NA |
| | | | Total | 1.00E-01 | 3.00E-02 | 2.00E-04 | 2.00E-01 |

Notes:
BaP-TEQ = Benzo(a)pyrene toxic equivalents
TCDD-TEQ = 2,3,7,8-Tetrachlorodibenzo-p-dioxin toxic equivalents
NA = Not applicable

| Table 6<br>Cleanup Goals for<br>Groundwater (µg/L) | |
|---|---|
| 1,1 Biphenyl | 0.5 |
| 2,4-Dimethylphenol | 140 |
| 2-Methylnaphthalene | 28 |
| 2-Methylphenol | 35 |
| 3-/4-Methylphenol | 3.5 |
| Acenaphthalene | 210 |
| Acenaphthene | 20 |
| Arsenic | 10 b |
| Benzene | 1 b |
| Benzo(a)anthracene | 0.05 |
| Benzo(a)pyrene | 0.2 b |
| Benzo(b)fluoranthene | 0.05 |
| Benzo(k)fluoranthene | 0.5 |
| Bis(2-ethylhexyl) phthalate | 6 b |
| Carbazole | 1.8 |
| Chrysene | 4.8 |
| Dibenzofuran | 28 |
| Fluoranthene | 280 |
| Fluorene | 280 |
| Naphthalene | 14 |
| N-Nitrosodiphenylamine | 7.1 |
| Pentachlorophenol | 1 b |
| Phenanthrene | 210 |
| Phenol | 10 |

Notes:

a. Except as noted, all cleanup goals are groundwater cleanup target levels contained in Chapter 62-777, Florida Administrative Code (F.A.C.).

b. Maximum Contaminant Levels (MCLs) for Drinking Water in Florida contained in Chapter 62-550, F.A.C.

| Table 7<br>Cleanup Goals for<br>On-Site Soil/Sediment (mg/kg) | |
|---|---|
| 1.1 Biphenyl | 0.2 |
| 2,4,5-Trichlorophenol | 0.07 |
| 2,4-Dimethylphenol | 1.7 |
| 2-Methylnaphthalene | 8.5 |
| 3-Methylphenol | 0.3 |
| 4-Methylphenol | 0.03 |
| Acenaphthene | 2.1 |
| Antimony | 5.4 |
| Arsenic | c |
| BaP-TEQ d | 8 |
| Benzene | 0.007 |
| Carbazole | 0.2 |
| Chromium (Total) | 38 |
| Copper | c |
| Dibenzofuran | 15 |
| Dioxins (TCDD-TEQ) e | 0.003 |
| Fluoranthene | 1,200 |
| Fluorene | 160 |
| Lead | c |
| Naphthalene | 1.2 |
| Pentachlorophenol | 0.03 |
| Phenanthrene | 250 |

Notes:

a. All cleanup goals are based on Florida default SCTLs for leachability based on groundwater criteria unless Site-specific criteria are developed in the RD

b bls is below land surface

c. Leachability may be derived using the SPLP test to calculate Site-specific SCTLS or may be determined using TCLP in the event oily wastes are present

d. Concentrations for carcinogenic polycyclic aromatic hydrocarbons (cPAHs) are converted to Benzo(a)pyrene equivalents (BaP-TEQ) before comparison with the corresponding SCTL for Benzo(a)pyrene (see the February 2005 "Final Technical Report Development of Cleanup Target Levels (CTLs) for Chapter 62-777 F.A.C."

e. TCDD-TEQ is 2,3,7,8-Tetrachlorodibenzo-p-dioxin toxic equivalent

| Table 8<br>Cleanup Goals for<br>Off-Site Soil/Sediment (mg/kg) | |
|---|---|
| Cleanup Goals for Residential Areas [a] | |
| Arsenic | 2.1 |
| BaP-TEQ [b] | 0.1 |
| Dioxins (TCDD-TEQ) [c] | 0.000007 |
| Pentachlorophenol | 7.2 |
| Cleanup Goals for Commercial/Industrial Areas [d] | |
| Arsenic | 12 |
| Bap-TEQ [b] | 0.7 |
| Dioxins (TCDD-TEQ) [c] | 0.00003 |
| Pentachlorophenol | 28 |
| Cleanup Goal for Protection of Ecological Organisms [e] | |
| Pentachlorophenol | 0.2 |

Notes:

a. Florida default SCTLs residential land-use
b. Concentrations for carcinogenic polycyclic aromatic hydrocarbons (cPAHs) are converted to Benzo(a)pyrene equivalents (BaP-TEQ) before comparison with the corresponding direct exposure Soil Cleanup Target Level (SCTL) for Benzo(a)pyrene (see the February 2005 "Final Technical Report Development of Cleanup Target Levels (CTLs) for Chapter 62-777 F.A.C."
c. TCDD-TEQ is 2,3,7,8-Tetrachlorodibenzo-p-dioxin toxic equivalents
d. Florida default SCTLs for commercial/ industrial land use (depends on specific land-use of off-Site location)
e. Florida default leachability SCTLs for protection of ecological organisms in surface water

**Table 9**
**Cost Comparison of Remedial Alternatives**

| Alternative Description | Capital Cost | Short Term Annual Costs | Duration (years) | Long Term Annual Costs | Duration (years) | Total Present Worth Cost |
|---|---|---|---|---|---|---|
| OnR-1: No Action | $0 | NA | NA | $0 | 30 | $0 |
| OnR-2: Continue Current Actions, Soil Regrading/Cover | $6.2 million | $126,000 | 10 | $300,000 | 30 | $11.1 million |
| OnR-3A: Removal – Surficial Aquifer Excavation | $64.1million | $126,000 | 10 | $165,000 | 30 | $67.8 million |
| OnR-3B: Removal – Excavation to Middle Clay | $190 million | $126,000 | 10 | $165,000 | 30 | $193.7 million |
| OnR-4A: Treatment – ISS/S to Middle Clay | $75.2 million | $126,000 | 10 | $165,000 | 30 | $78.9 million |
| OnR-4B: Treatment – ISS/S in Surficial Aquifer, ISGS in Upper Hawthorn | $38.1 million | $126,000 | 10 | $165,000 | 30 | $41.8 million |
| OnR-5A: Containment/ Treatment – Barrier Wall | $12.8 million | $77,000 | 3 | $181,000 | 30 | $16.0 million |
| OnR-5B: Containment/ Treatment – Barrier Wall, ISGS in Upper Hawthorn | $18.0 million | $77,000 | 3 | $165,000 | 30 | $20.9 million |
| OnR-5C: Containment/ Treatment – Barrier Wall, ISGS in Surficial Aquifer | $18.1 million | $77,000 | 3 | $181,000 | 30 | $21.3 million |
| OnR-5D: Containment/ Treatment – Barrier Wall, ISS/S in Surficial Aquifer | $35.7 million | $77,000 | 3 | $165,000 | 30 | $38.7 million |
| OnR-5E: Containment/ Treatment – Barrier Wall, ISGS to Middle Clay | $26.1 million | $77,000 | 3 | $165,000 | 30 | $29.1 million |
| OnR-5F: Containment/ Treatment – Barrier Wall, ISS/S to Middle Clay | $71.8 million | $77,000 | 3 | $165,000 | 30 | $74.8 million |
| OnR-5G: Containment/ Treatment – Barrier Wall, Surficial Aquifer ISS/S. | $40.6 million | $77,000 | 3 | $165,000 | 30 | $43.6 million |

**Table 9**
**Cost Comparison of Remedial Alternatives**

| Alternative Description | Capital Cost | Short Term Annual Costs | Duration (years) | Long Term Annual Costs | Duration (years) | Total Present Worth Cost |
|---|---|---|---|---|---|---|
| Upper Hawthorn ISGS | | | | | | |
| OnR-5H: Containment/ Treatment – Barrier Wall, ISGS in Surficial Aquifer, ISS/S to Middle Clay | $54.3 million | $77,000 | 3 | $165,000 | 30 | $57.2 million |
| UFA-1: No Action | $0 | NA | NA | $0 | 30 | $0 |
| UFA-2: Monitored Natural Attenuation with Hydraulic Containment | $4.12 million | NA | NA | $479,000 | 30 | $11.7 million |
| OIR-1: No Action | $0 | NA | NA | $0 | 30 | $0 |
| OIR-2: Remove Impacted Soil | $5.66 million | $208,000 | 3 | $15,000 | 30 | $6.1 million |
| OIR-3: Institutional and Engineering Controls | $9.48 million | $158,000 | 3 | $150,000 | 30 | $11.9 million |
| OIR-4: Removal, Institutional Controls, and/or Engineering Controls (Hybrid) | $7.18 million | NA | NA | $65,000 | 30 | $8.3 million |

**Table 10**
**Estimated Remedy Construction Costs**

| Item | | Description | Qty | Units | Unit Rate | Extended Cost | Total |
|---|---|---|---|---|---|---|---|
| **Capital Costs** | | | | | | | **$63,164,000** |
| **1.0** | | **Indirect capital costs** | | | | | **$10,527,000** |
| | 1.1 | Engineering design and Permit/Approval | 10% | LS | $52,637,000 | $5,263,700 | |
| | 1.2 | Contingency | 10% | LS | $52,637,000 | $5,263,700 | |
| **2.0** | | **Direct capital costs** | | | | | **$52,637,000** |
| | 2.1 | Mobilization/demobilization | 1 | LS | $690,000 | $690,000 | $690,000 |
| | Slurry-Wall (extended to 65' bgs) | | | | | | $2,320,000 |
| | 2.20 | Slurry Trench Excavate/Backfill Overburden | 325,000 | vsf | $6.00 | $1,950,000 | |
| | 2.21 | Clay Top on slurry Wall | 5,000 | LF | $60 | $300,000 | |
| | 2.22 | QC Testing / Slurry Wall Report / Submittals | 1 | LS | $70,000 | $70,000 | |
| | Soil Excavation (Onsite) | | | | | | $723,000 |
| | 2.30 | Excavate Soil (Assume 24 Acres; 0-2' below ground surface) | 77,440 | CY | $4.50 | $348,480 | |
| | 2.31 | Confirmation Sampling | 50 | EA | $1,100 | $55,000 | |
| | 2.32 | Transport Soil to the consolidation area & compact | 116,160 | Ton | $2.75 | $319,440 | |
| | Soil Excavation (Offsite) | | | | | | $2,686,500 |
| | 2.40 | Excavate Soil (Assume 90 parcels @ 0.35 acre/parcel; 0-2' below ground surface) | 102,000 | CY | $14.50 | $1,479,000 | |
| | 2.41 | Confirmation Sampling | 45 | EA | $1,100 | $49,500 | |
| | 2.42 | Soil handling to the onsite consolidation area & back (2 trips) | 102,000 | CY | $11.00 | $1,122,000 | |
| | 2.43 | Install and remove silt fencing | 7,200 | LF | $5.00 | $36,000 | |
| | Surface Covers (Onsite) | | | | | | $4,996,000 |
| | 2.50 | Within Slurry Wall Area: Site Prep/Install GCL/Soil Cover | 32 | ACRE | $125,000 | $4,000,000 | |
| | 2.51 | Import Soil Cover (27-Acre; 2.5' avg thickness) | 108,900 | CY | $8.00 | $871,200 | |

**Table 10**
**Estimated Remedy Construction Costs**

| Item | Description | Qty | Units | Unit Rate | Extended Cost | Total |
|---|---|---|---|---|---|---|
| 2.52 | Seed grass for excavation areas and cover areas | 83 | ACRE | $1,500 | $124,500 | |
| | | | | | | |
| Surface Covers (Offsite – Engineering Controls) | | | | | | $1,064,000 |
| 2.53 | Import Soil Cover (31.5 acres; 2.5' avg. thickness) | 127,050 | CY | $8.00 | $1,016,400 | |
| 2.54 | Grass seed for excavation & cover areas | 31.5 | Acre | $1,500 | $47,250 | |
| | | | | | | |
| In-Situ Geochemical Stabilization (ISGS) at the Former South Lagoon + Former Process Area (~65 ft, 3.75 acres) | | | | | | $6,898,000 |
| 2.60 | ISBS Materials 3.75 acres, 65 ft (quote: $27,000 per acre-foot treated volume) | 6,581,250 | LBS | $0.80 | $5,265,000 | |
| 2.61 | Freight Costs | 6,581,250 | LS | $0.10 | $658,125 | |
| 2.62 | Tax | 6.25% | | $5,923,125 | $370,195 | |
| 2.63 | Injection Costs (421 ISGS auger points + Exploratory Borings) | 121 | Day | $5,000 | $605,000 | |
| | | | | | | |
| In-Situ Solidification/Stabilization (ISSS) at the Former North Lagoon + Former Drip Track Area (~65 ft; 2.25 acres) | | | | | | $25,889,000 |
| 2.64 | ISSS Soil Mixing (construction, materials, and labor) with Cement-Reagent | 236,000 | CY | $79.08 | $18,662,880 | |
| 2.65 | Cement (8%) and Freight Charge | 28,400 | Ton | $120 | $3,408,000 | |
| 2.66 | Bentonite (3%) | 10,700 | Ton | $228.88 | $2,449,016 | |
| 2.67 | Tax | 1 | LS | $1,166,430 | $1,166,430 | |
| 2.68 | Excess material from ISSS move to consolidation area | 59,000 | CY | $2.75 | $162,250 | |
| 2.69 | ISSS Bench Scale/Pilot Test | 1 | LS | $40,000 | $40,000 | |
| | | | | | | |
| Extraction Well Installation and Preparation (based on 180 gallons per minute [gpm]) | | | | | | $113,000 |
| 2.70 | Drilling and bore-hole preparation | 1,250 | LF | $15.00 | $18,750 | |
| 2.71 | Well casing installation | 1,250 | LF | $35 | $43,750 | |
| 2.72 | Install Pumps (median capacity 40 gpm) | 5 | EA | $10,000 | $50,000 | |
| | | | | | | |
| Extracted Water Treatment and Disposal | | | | | | $417,000 |
| 2.73 | Install temporary water treatment system | 1 | LS | $200,000 | $200,000 | |
| 2.74 | Install pump-to-treatment piping system | 8,101 | LF | $26.75 | $216,702 | |
| | | | | | | |

**Table 10**
**Estimated Remedy Construction Costs**

| Item | Description | Qty | Units | Unit Rate | Extended Cost | Total |
|---|---|---|---|---|---|---|
| | Detention Pond | | | | | $850,000 |
| 2.80 | Pond Excavation & Transport to Consolidation Area | 58,080 | CY | $7.50 | $435,600 | |
| 2.81 | Inlet and Outlet Structures | 6 | EA | $3,000 | $18,000 | |
| 2.82 | Liner for Detention Pond | 522,720 | SQFT | $0.50 | $261,360 | |
| 2.83 | Side Grading | 1 | LS | $60,000 | $60,000 | |
| 2.84 | Landscaping/Bank Vegetation | 1 | LS | $75,000 | $75,000 | |
| | | | | | | |
| | Storm Water Conveyance (Non-Site Water) | | | | | $750,000 |
| 2.85 | 48" RCP Culvert | 4000 | LF | $150 | $600,000 | |
| 2.86 | Installation | 1 | LS | $150,000 | $150,000 | |
| | | | | | | |
| | ISCO in Existing LHG Wells | | | | | $30,000 |
| 2.87 | Injection and all associated costs | 3 | EA | $10,000 | $30,000 | |
| | | | | | | |
| | Monitor Wells | | | | | $415,000 |
| 2.90 | Install 10 monitoring wells (2-inch) in Surficial Aquifer (25' deep) | 10 | EA | $4,200 | $42,000 | |
| 2.91 | Install 8 monitoring wells (2-inch) in UHG (65' deep), double casings | 8 | EA | $9,500 | $76,000 | |
| 2.92 | Install 4 monitoring wells (2-inch) in LHG (120' deep), triple casings | 4 | EA | $18,000 | $72,000 | |
| 2.93 | Install 10 monitor wells (2-inch) in Floridan Aquifer (225' deep) | 10 | EA | $22,500 | $225,000 | |
| | | | | | | |
| | Institutional Controls | | | | | $100,000 |
| 2.100 | Administrative Orders, Deed Restrictions – Permit Application Process | 1 | LS | $100,000 | $100,000 | |
| | | | | | | |
| | Engineering Controls | | | | | $1,510,000 |
| 2.101 | Fencing, Gates and Physical Barriers | 10 | EA | $10,000 | $100,000 | |
| 2.102 | Install Silt Fencing | 500 | FT | $5 | $2,500 | |
| 2.103 | Property Purchase (assume 10 parcels to be purchased) | 10 | EA | $140,760 | $1,407,600 | |
| | | | | | | |
| | Construction Oversight, Survey, and Reporting (Onsite and Offsite) | | | | | $3,028,000 |
| 2.110 | Oversight Labor | 5.0% | LS | $54,960,000 | $2,748,000 | |
| 2.111 | Survey | 3 | LS | $40,000 | $120,000 | |

**Table 10**

**Estimated Remedy Construction Costs**

| Item | Description | Qty | Units | Unit Rate | Extended Cost | Total |
|---|---|---|---|---|---|---|
| 2.112 | Construction Completion Report | 1 | LS | $160,000 | $160,000 | |
| | | | | | | |
| | Construction Oversight, Survey, and Reporting (Upper Floridan) | | | | | $159,000 |
| 2.113 | Oversight Labor | 2.0% | LS | 955,000 | $19,100 | |
| 2.114 | Survey | 3 | LS | $20,000 | $60,000 | |
| 2.115 | Construction Completion Report | 1 | LS | $80,000 | $80,000 | |

LS = lump sum
vsf = vertical square feet
LF = linear feet
CY = cubic yard
EA = each
lbs = pounds
SQFT = square feet

**Table 11**
**Estimated Operation, Monitoring and Maintenance (OM&M)Costs**

| Item | | Description | Qty | Units | Unit Rate | Extended Cost | Total |
|---|---|---|---|---|---|---|---|
| **1.0** | | **Annual OM&M Costs - 30 Yr** | | | | | **$1, 588,000** |
| | Surface Cover (Onsite and Offsite) | | | | | | |
| | 1.1 | Soil Cover Maintenance | 1 | LS | $300,000 | $300,000 | |
| | Engineering Controls (Offsite) | | | | | | |
| | 1.2 | Engineering Controls – Maintenance | 1 | LS | $150,000 | $150,000 | |
| | Monitoring | | | | | | |
| | 1.30 | Annual Monitoring (Surficial Aquifer) | 1 | LS | $150,000 | $150,000 | |
| | 1.31 | Annual Monitoring (Upper Floridan) | 1 | LS | $250,000 | $250,000 | |
| | 1.32 | Monitored Natural Attenuation (with reporting; Upper Floridan Aquifer) | 1 | LS | $45,000 | $45,000 | |
| | Extraction Pump Operation (Upper Floridan Hydraulic Containment | | | | | | |
| | 1.40 | Operate Pump Extraction System (based on 180 gallons per minute [gpm]) | 93,312 | Kgal | $1.50 | $139,968 | |
| | Treatment Plant Operation and Treated Water Discharge | | | | | | |
| | 1.50 | Labor | 200 | hr | $60 | $12,000 | |
| | 1.51 | POTW Discharge Fees | 93,312 | Kgal | $5.00 | $466,560 | |
| | 1.52 | Chemicals | 1 | LS | $9,000 | $9,000 | |
| | 1.53 | Energy | 68,340 | Kw-hr | $0.12 | $8,201 | |
| | 1.54 | Treatment system repairs & maintenance | 1 | EA | $17,100 | $17,100 | |
| | 1.55 | Pumping system maintenance | 1 | LS | $22,300 | $22,300 | |
| | 1.56 | Effluent monitoring & reporting | 1 | EA | $1,700 | $1,700 | |
| | 1.57 | Lab costs | 1 | EA | $6,000 | $6,000 | |
| | 1.58 | Carbon replacement | 0.5 | EA | $4,700 | $2,350 | |
| | 1.59 | Waste management | 20 | CY | $400 | $8,000 | |
| **2.0** | | **Temporary Annual OM&M Costs - 3 yr** | | | | | **$252,000** |
| | Surficial Aquifer Hydraulic Containment | | | | | | |
| | 2.10 | Labor | 200 | hr | $100 | $20,000 | |
| | 2.11 | POTW Discharge Fees | 93,312 | Kgal | $2.00 | $186,624 | |
| | 2.12 | Chemicals | 1 | LS | $4,750 | $4,750 | |
| | 2.13 | Energy | 31,670 | Kw-hr | $0 | $3,800 | |

**Table 11**
**Estimated Operation, Monitoring and Maintenance (OM&M)Costs**

| Item | | Description | Qty | Units | Unit Rate | Extended Cost | Total |
|---|---|---|---|---|---|---|---|
| | 2.14 | Treatment system repairs & maintenance | 1 | EA | $8,000 | $8,000 | |
| | 2.15 | Pumping system maintenance | 1 | LS | $10,300 | $10,300 | |
| | 2.16 | Effluent monitoring & reporting | 1 | EA | $1,700 | $1,700 | |
| | 2.17 | Lab costs | 1 | EA | $6,000 | $6,000 | |
| | 2.18 | Carbon replacement | 0.5 | EA | $4,700 | $2,350 | |
| | 2.19 | Waste management | 20 | CY | $400 | $8,000 | |
| **FUTURE COSTS** | | | | | | | |
| **3.0** | | **Full Close Out in 30 yr** | | | | | **$1,275,000** |
| | Confirmation Sampling (Onsite / Offsite / Upper Floridan) | | | | | | |
| | 3.10 | Confirmation Sampling (include labor, materials, & lab costs) | 1 | LS | $400,000 | $400,000 | |
| | Site Closing (Onsite / Offsite / Upper Floridan) | | | | | | |
| | 3.20 | Abandon Monitor Wells | 16,250 | FT | $26.91 | $437,288 | |
| | 3.21 | Equipment Removal and Site Restoration | 1 | LS | $300,000 | $300,000 | |
| | 3.22 | Final Close Out Report | 1 | LS | $22,500 | $22,500 | |
| | Well Abandonment and Site Restoration | | | | | | |
| | 4.30 | Abandon Existing Recovery Wells | 1250 | FT | $85.42 | $106,775 | |
| | 4.31 | Equipment Removal and Site Restoration | 1 | LS | $5,000 | $5,000 | |
| | 4.32 | Environmental Report | 1 | LS | $3,000 | $3,000 | |
| **4.0** | | **Close Out of Temporary Facilities - 3 yr** | | | | | **$262,000** |
| | Well Abandonment and Site Restoration | | | | | | |
| | 4.10 | Abandon Existing Recovery Wells | 2,250 | FT | $85.42 | $192,195 | |
| | 4.11 | Equipment Removal and Site Restoration | 1 | LS | $50,000 | $50,000 | |
| | 4.12 | Environmental Report | 1 | LS | $20,000 | $20,000 | |
| **PRESENT VALUE ANALYSIS** | | | | | | | |
| | | Item | | Rate | Cost | Years | **Net Present Value** |
| | Total Annual OM&M Cost (for 30 years) | | | 5% | $1,588,179 | 30 | **$24,414,000** |
| | Annual OM&M Cost (Surficial Aquifer system; for 3 yrs) | | | 5% | $251,524 | 3 | **$685,000** |
| | Future Costs (at end of 3 years; Surficial Aquifer system) | | | 5% | $262,195 | 3 | **$226,000** |
| | Future Costs (at end of 30 years; full close-out) | | | 5% | $1,274,563 | 30 | **$295,000** |

**Table 11**
**Estimated Operation, Monitoring and Maintenance (OM&M)Costs**

| Item | Description | Qty | Units | Unit Rate | Extended Cost | Total |
|---|---|---|---|---|---|---|
| | | | | | | |
| | GRAND TOTAL (OM&M Net Present Value) | | | | | **$25,620,000** |

LS = lump sum
hr = hour
Kgal = 1000 gallons
Kw-hr = kilowatt hour
ft = feet
CY = cubic yard
EA = each

| Table 12<br>Chemical-Specific ARARs, Criteria, and Guidance | | | | |
|---|---|---|---|---|
| **Requirement** | **Citation** | **ARAR Type** | **Description** | **Comment** |
| ***Soil and Groundwater Cleanup Levels/Criteria*** | | | | |
| ***Federal*** | | | | |
| Safe Drinking Water Act-National Primary Drinking Water Standards. Maximum Contaminant Level (MCLs) | 40 CFR Part 141.61 (organics) and 141.62 (inorganics) | Relevant and Appropriate | Legally enforceable federal drinking water standards that establish maximum contaminant levels (MCLs) for specific contaminants that have been determined to adversely affect human health. | These standards are relevant and appropriate to the restoration of groundwater, a potential drinking water source. |
| ***State*** | | | | |
| Florida Surface Water Criteria Rule | Chapter 62-302.530 Florida Administrative Code (FAC) | Relevant and Appropriate | Provides surface water classifications and water quality criteria (numeric and narrative) for protection of State surface water bodies. Numeric ambient water quality criteria (AWQC) are relevant during remedial action of the Site soils that are impacting surface water. | Remedial Action Objectives (RAOs) require protection of surface water by monitoring surface water for some contaminants of concern (COCs) against AWQC. |
| Florida Groundwater Classes, Standards, and | Chapter 62-520.410 and 62-520.420. FAC | Applicable | Designates the groundwater of the State into five classes and establishes minimum criteria. This rule also specifies that Class I and Class II groundwater must meet primary drinking water standards listed in | This rule was used to classify groundwater and establish |

| Table 12<br>Chemical-Specific ARARs, Criteria, and Guidance | | | | |
|---|---|---|---|---|
| **Requirement** | **Citation** | **ARAR Type** | **Description** | **Comment** |
| Exemptions | | | Chapter 62-550.310, FAC. | cleanup goals for groundwater.<br><br>Groundwater at this Site is considered a potential source of drinking water (Class G-II). |
| Florida Drinking Water Standards, Monitoring and Reporting | Chapter 62-550.310, FAC | Relevant and Appropriate | Provides primary drinking water quality standards and maximum contaminant levels (MCLs) for public water supply systems that are applicable at the tap and are relevant and appropriate to the restoration of a Class G-II aquifer. Remedial objectives require restoration of the surficial aquifer to drinking water quality standards. | Cleanup goals for some of the COCs in groundwater are based upon MCLs listed in this rule. RAOs require restoration of surficial aquifer to drinking water quality standards. |
| Florida Contaminant Cleanup Target Levels Rule | Chapter 62-777.170, FAC Tables I & II | Relevant and Appropriate | This rule provides default cleanup criteria, namely cleanup target levels (CTLs) in Tables I and II and an explanation for deriving CTLs for soil, groundwater and surface water that can be used for site rehabilitation (i.e., cleanup). | CTLs for groundwater in Table I of this rule were used to establish cleanup goals for some of the COCs in |

**Table 12**
**Chemical-Specific ARARs, Criteria, and Guidance**

| Requirement | Citation | ARAR Type | Description | Comment |
|---|---|---|---|---|
| | | | | groundwater at this Site.<br><br>Soil CTLs in Table II of this rule were used to establish cleanup goals for some of the soil COCs. |
| Florida Contaminant Site Cleanup Criteria Rule – Risk Assessment | Chapter 62-780.650(1)(d), FAC | Relevant and Appropriate | This section of the rule generally provides elements to be addressed when performing a risk assessment. Requires that a lifetime excess cancer risk level of 1.0E-6 and a hazard index of 1 or less shall be used in establishing alternative CTLs for groundwater or soil. | The 1.0E-6 and a hazard index of 1 or less requirement considered in developing Site-specific or alternative CTLs for certain COCs. |

**Table 13**
**Action-Specific ARARs, Criteria, and Guidance**

| Requirement | Citation | ARAR Type | Description | Comment |
|---|---|---|---|---|
| ***Waste Characterization, Storage, Treatment and Disposal – Primary and Secondary Wastes*** | | | | |
| ***Federal*** | | | | |
| Resource Conservation & Recovery Act (RCRA) Regulations – Identification, Characterization and Listing of Solid and Hazardous Wastes | 40 Code of Federal Regulations (CFR) Part 262.11(a)-(d) (*Solid waste*) and 264.13(a)(1) (*Hazardous waste*) | Applicable | Requires characterization of solid waste and additional characterization of waste determined to be hazardous. Part 261.11(a)-(d) requires determination of whether solid waste is hazardous. Part 263.13(a)(1) requires a detailed chemical and physical analysis of a representative sample of the waste to determine treatment, storage, and disposal requirements. | Response action is expected to generate non-hazardous solid waste (contaminated soil determined not to be hazardous) and RCRA hazardous waste. |
| RCRA – Land Disposal Restrictions (LDR) Treatment Standards for Contaminated Soil | 40 CFR Part 268.7(a) | Applicable | 40 CFR Part 268.7 requires determination of whether waste is restricted from land disposal under 40 CFR 268.40, 268.45, or 268.49 by testing in accordance with prescribed methods or by use of generator knowledge of the waste. 40 CFR 268.49 prohibits land disposal of untreated hazardous wastes and provides treatment standards for contaminated soil considered hazardous waste.<br><br>*Note:* This determination can be made concurrently with the hazardous waste determination required by 40 CFR 262.11. | Excavated soil determined to be hazardous waste will be sent off-Site for treatment and disposal at an appropriate facility. |

**Table 13**
**Action-Specific ARARs, Criteria, and Guidance**

| Requirement | Citation | ARAR Type | Description | Comment |
|---|---|---|---|---|
| RCRA - Temporary on-Site storage of hazardous waste *in containers* | 40 CFR 262.34(a):<br><br>40 CFR 262.34(a)(1)(i); | Applicable | A generator may accumulate hazardous waste at the facility provided that:<br><br>waste is placed in containers that comply with 40 CFR 265.171-173; and | Applies to accumulation of RCRA hazardous waste on-Site as defined in 40 CFR 260.10 |
| | 40 CFR 262.34(a)(2): | | the date upon which accumulation begins is clearly marked and visible for inspection on each container: | |
| | 40 CFR 264.34(a)(3) | | container is marked with the words "hazardous waste"; or | |
| | 40 CFR 262.34(c)(1) | | container may be marked with other words that identify the contents. | Applies to accumulation of 55 gal. or less of RCRA hazardous waste <u>or</u> one quart of acutely hazardous waste listed in 261.33(e) at or near any point of generation |
| Use and Management of Hazardous Waste in *Containers* | 40 CFR Part 265.171 to 173 | Applicable | Establish requirements for use and management of hazardous waste in containers on-Site. | Containers that may be used for temporary storage of hazardous waste (i.e., precipitate, GAC, contaminated soil) on-Site prior to off-Site treatment and disposal will comply with these requirements. |

| Table 13<br>Action-Specific ARARs, Criteria, and Guidance | | | | |
|---|---|---|---|---|
| **Requirement** | **Citation** | **ARAR Type** | **Description** | **Comment** |
| Storage of hazardous waste in container area | 40 CFR 264.175(a) | Applicable | Area must have a containment system designed and operated in accordance with 40 CFR 264.175(b) | Applies to storage of RCRA hazardous waste in containers ***with free liquids*** |
| | 40 CFR 264.175(c) | Applicable | Area must be sloped or otherwise designed and operated to drain liquid from precipitation, or<br><br>Containers must be elevated or otherwise protected from contact with accumulated liquid. | Applies to storage of RCRA-hazardous waste in containers that *do not contain free liquids* (other than F020, F021, F022, F023,F026 and F027) |
| Closure performance standard for RCRA container storage unit | 40 CFR 264.111 | Applicable | Must close the facility (e.g., container storage unit) in a manner that:<br>• Minimizes the need for further maintenance;<br>• Controls minimizes or eliminates to the extent necessary to protect human health and the environment, post-closure escape of hazardous waste, hazardous contaminants, leachate, contaminated run-off, or hazardous waste decomposition products to the ground or surface waters or the atmosphere; and<br><br>Complies with the closure requirements of subpart, but not limited to, the requirements of 40 CFR 264.178 for containers. | Applies to storage of RCRA hazardous waste in containers |
| Closure of RCRA container storage unit | 40 CFR 264.178 | Applicable | At closure, all hazardous waste and hazardous waste residues must be removed from the containment system. .Remaining containers, liners, bases, and soils containing or contaminated with hazardous | Applies to storage of RCRA hazardous waste in containers in a unit with a containment |

| **Table 13**<br>**Action-Specific ARARs, Criteria, and Guidance** | | | | |
|---|---|---|---|---|
| **Requirement** | **Citation** | **ARAR Type** | **Description** | **Comment** |
| | | | waste and hazardous waste residues must be decontaminated or removed.<br>[Comment: At closure, as throughout the operating period, unless the owner or operator can demonstrate in accordance with40 CFR 261.3(d) of this chapter that the solid waste removed from the containment system is not a hazardous waste, the owner or operator becomes a generator of<br>hazardous waste and must manage it in accordance with all applicable requirements of parts 262 through 266 of this chapter]. | system |
| RCRA Regulations – Temporary Storage and Closure of remediation Hazardous Waste in *Staging Piles* | 40 CFR Part 264.554(a)(1)(i)-(iii), 264.554(d)(1)(i)-(iii), 264.554(d)(2)(i)-(vi), 264.554(e)(1)-(2), 264.554(f)(1)-(3) 264.554(h), 264.554(i)(1)(i)-(ii), 264.554(j)(1)-(2), 264.554(k) | Applicable | Provides requirements for temporary storage and closure of *non-flowing hazardous remediation waste* in a staging pile to prevent or minimize releases of hazardous substances or contaminants into the environment. | Storage area for contaminated soil/remediation waste temporarily staged on-Site will consider these requirements. |
| Disposal of RCRA Hazardous waste in a land-based unit | 40 CFR 268.40(a) | Applicable | May be land disposed if it meets the requirements in the table "Treatment Standards for Hazardous Waste" at 40 CFR 268.40 before land disposal. | Applies to land disposal (40 CFR 268.2) of restricted RCRA waste |
| | 40 CFR 268.40(a) | Applicable | All underlying hazardous contaminants [as defined in 40 CFR 268.2(i)] must meet the Universal Treatment Standards, found in 40 CFR | Applies to land disposal of restricted RCRA characteristic wastes (D001- |

**Table 13**
**Action-Specific ARARs, Criteria, and Guidance**

| Requirement | Citation | ARAR Type | Description | Comment |
|---|---|---|---|---|
| | | | 268.48 Table UTS prior to land disposal | D043) that are not managed in a wastewater treatment system that is regulated under the CWA, that is CWA equivalent, or that is injected into a Class I non-hazardous injection well. |
| Treatment of hazardous waste in Miscellaneous Treatment Unit with air emissions | 40 CFR 264.601 | Relevant and Appropriate | Unit must be located, designed, constructed, operated, maintained and closed in a manner that will ensure protection of human health and the environment. | Applies to treatment of RCRA hazardous waste in miscellaneous units, except as provided in 40 CFR 264.1. |
| | 40 CFR 264.601(c) | Relevant and Appropriate | Protection of human health and the environment includes, but is not limited to prevention of any release that may have adverse effects on human health or the environment due to migration of waste contaminants in the air, considering the factors listed in 40 CFR 264.601(c)(1) thru (7). | |
| | 40 CFR 264.1080(a)(5) | Relevant and Appropriate | The requirements of RCRA Subpart CC – Air Emission Standards for Tanks, Surface Impoundments, and Containers do not apply to a | Applies to air pollutant emissions with volatile organics from a hazardous |

| Table 13<br>Action-Specific ARARs, Criteria, and Guidance | | | | |
|---|---|---|---|---|
| **Requirement** | **Citation** | **ARAR Type** | **Description** | **Comment** |
| | | | waste management unit that is solely used for on-Site treatment or storage of hazardous waste that is placed in the unit as a result of implementing remedial activities required under RCRA 3004(u) and (v), RCRA 3008(h), or CERCLA authorities. | waste tank, surface impoundment or container. |
| RCRA Regulations – Disposal of RCRA characteristic wastewaters in a POTW | 40 CFR 268.1(c)(4)(ii) | Applicable | Permits the disposal of such wastewaters if treated pursuant to the pretreatment requirements of Section 307 of the CWA, unless the wastes are subject to a specified method of treatment other than DEACT in 40 CFR 268.40, or are D003 reactive cyanide. | Applies to the land disposal of RCRA hazardous wastewaters that are hazardous only because they exhibit a characteristic and are not otherwise prohibited under 40 CFR 268 |
| RCRA Regulations – Treatment standards for hazardous debris | 40 CFR 268.45(a), (c), (d)(1), and 40 CFR 268.49(c)(1)-(2) | Applicable | Hazardous debris remaining on-Site must comply with 40 CFR 268.45 prior to off-Site disposal as a solid waste. All off-Site disposal must also comply with LDR certification requirements (40 CFR 268.49), which apply to these wastes. If the debris does not fully comply with 40 CFR 268.45, it must be disposed off-Site at a regulated subtitle C facility. | Applies to debris, including treatment residuals, used or generated during remedial activities. |

**Table 13**
**Action-Specific ARARs, Criteria, and Guidance**

| Requirement | Citation | ARAR Type | Description | Comment |
|---|---|---|---|---|
| ***Waste Transportation – Primary and Secondary Wastes*** | | | | |
| RCRA Regulations – Transportation of Hazardous Waste *off-Site* | 40 CFR Part 262.10(h) | Applicable | An owner or operator who initiates a shipment of hazardous waste from a treatment, storage, or disposal facility must comply with the generator standards established in this part, including the requirements of 40 CFR 262.20-23 for manifesting; Section 262.30 for packaging; Section 262.31 for labeling; Section 262.32 for marking; Section 262.33 for placarding; Section 262.41(a) for record-keeping; and Section 262.12 to obtain EPA ID number. | Hazardous waste requiring off-Site disposal will meet these transportation requirements. |
| Federal Hazardous Materials Transportation Act (49 U.S.C. §§ 5101 et seq.) Regulations | 49 CFR Part 171.1(c) | Applicable | This regulation applies to a person, including a person under contract with a department or agency of the federal government, that transports, or causes to be transported or shipped "in commerce", a hazardous material. | Hazardous material requiring off-Site disposal will meet this transportation requirement. |
| RCRA Regulations, Transportation of Hazardous Wastes *on-Site* | 40 CFR 263.10 through 263.31 | Applicable | These regulations establish standards which apply to persons transporting hazardous waste within the United States if the transportation requires a manifest under 40 CFR Part 262 | Hazardous material requiring on-Site disposal will meet this transportation requirement. |
| ***Capping Waste in Place – Landfill Closure and Post Closure*** | | | | |
| ***State*** | | | | |

| Table 13<br>Action-Specific ARARs, Criteria, and Guidance | | | | |
|---|---|---|---|---|
| **Requirement** | **Citation** | **ARAR Type** | **Description** | **Comment** |
| Florida Solid Waste Management Facilities Regulations | Chapter 62-701.300. Florida Administrative Code (FAC) | Relevant and Appropriate | Prohibits storage, processing, or disposal except at a permitted solid waste management facility. | Waste generated on-Site and deemed nonhazardous solid waste will be stored, transported, or disposed of properly. |
| Florida Solid Waste Management Facilities – Landfill Final Closure Rule | Chapter 62-701.600(5)(e),(f),(g), and (h), FAC | Relevant and Appropriate | Provides requirements for final cover design and construction for a solid waste landfill, including control of storm water occurring on the landfill property in order to meet the general performance standard in Chapter 62-701.340(1), FAC. | Capping and closure of the on-Site landfill will meet the relevant provisions of this rule. |
| Federal | | | | |
| RCRA Subtitle C Landfill Cover Standards | 40 C.F.R. § 264.310(a)(1)-(5) | Relevant and Appropriate | Defines the design requirements for a Subtitle C Landfill Cap. Must cover the landfill or cell with a final cover designed and constructed to:<br><br>-provide long-term minimization of migration of liquids through the closed landfill;<br><br>-function with minimum maintenance;<br><br>-promote drainage and minimize erosion or abrasion of the cover; | Construction of a RCRA hazardous waste landfill cover, with the construction of an impermeable cap designed to prevent the migration of hazardous contaminants, using a hydraulic conductivity of no more than 1 x 10-7 cm/sec. |

**Table 13**

**Action-Specific ARARs, Criteria, and Guidance**

| Requirement | Citation | ARAR Type | Description | Comment |
|---|---|---|---|---|
| | | | -accommodate settling and subsidence so that the cover's integrity is maintained; and<br><br>-have a permeability less than or equal to the permeability of any bottom liner system or natural subsurface soils present | |
| RCRA run-on/run-off control systems for landfill cover | 40 CFR § 264.301(g)-(h) | Relevant and Appropriate | Run-on control system must be capable of preventing flow onto the active portion of the landfill during peak discharge from a 25-year storm event. Run-off management system must be able to collect and control the water volume from a runoff resulting from a 24-hour, 25 year storm event. | Construction of a RCRA landfill cover |
| RCRA Closure Performance | 40 CFR §§ 264.111. 264.111(a)-(c) | Relevant and Appropriate | Must close the unit in a manner that :<br><br>Minimizes the need for further maintenance; controls or eliminates releases of hazardous materials to the environment and protects human health; and complies with the closure requirements of 40 C.F.R. § 264.310. | Closure of a RCRA hazardous waste management facility |
| RCRA - General Post Closure Care/Notices for Closed Landfills | 40 CFR 264.310(b)(1), (5), and (6)<br><br>40 CFR 264.117(c) | Relevant and Appropriate | Must maintain the effectiveness and integrity of the final cover, make necessary repairs and prevent erosion. Post | Closure of a RCRA landfill |

| Table 13<br>Action-Specific ARARs, Criteria, and Guidance | | | | |
|---|---|---|---|---|
| **Requirement** | **Citation** | **ARAR Type** | **Description** | **Comment** |
| | 40 CFR 264.119(a)<br><br>40 CFR 264.119 (b)(1)(i)-(iii) | | closure property uses must not be allowed to impact the integrity of the cover, the liner or the containment/monitoring system. Must provide proper notices to the local zoning authority and record deed notices/ICs regarding the contamination that will run with the land. | |
| *General Construction Standards – Land Disturbance Activities – Water Wells -- Monitoring* | | | | |
| Construction of Groundwater Monitoring Wells | 40 CFR 264.97(c) | Relevant and Appropriate | All monitoring wells must be cased in a manner that maintains the integrity of the monitoring well bore hole, this casing must be screened or perforated and packed with gravel or sand, where necessary, to enable collection of groundwater samples, the annular space above the sampling depth must be sealed to prevent contamination of groundwater and samples. | Construction of a RCRA groundwater monitoring well |
| Florida General Pollutant Emission Limitation Standards | Chapter 62-296.320(4)(c), FAC | Applicable | Requires reasonable precautions, such as application of water or other dust suppressants, to control emission of particulate matter from any activity including but not limited to, vehicular movement and construction.. | Precautions will be undertaken to prevent fugitive dust emissions from any land disturbing activities. |
| Florida | Chapter 62- | Relevant | Establishes requirements | Erosion and |

**Table 13**

**Action-Specific ARARs, Criteria, and Guidance**

| Requirement | Citation | ARAR Type | Description | Comment |
|---|---|---|---|---|
| Regulation of Storm water Discharge – Facility Performance Standards | 25.025(7), FAC | and Appropriate | for discharges of untreated storm water from the facility to ensure protection of the surface waters of the state. | storm water control best management practices will be implemented during construction to retain sediment on Site. |
| Florida Generic Permit For Storm water Discharge from Construction Activities | Chapter 62-621.300(4)(a), FAC | Applicable | Requires development and implementation of best management practices (BMPs) and erosion and sedimentation controls for storm water discharges to ensure protection of the surface waters of the state. | Erosion and storm water control BMPs will be implemented during construction activity such as well installation and slurry wall construction to retain sediment on Site. |
| Florida Hazardous Waste Requirements for Remedial Action | Chapter 62-730.225(3) FAC | Applicable | Requires warning signs at sites suspected or confirmed to be contaminated with hazardous wastes. | This requirement will be met. |
| Florida Water Well Construction Standards Rule | Chapter 62-532.500, FAC | Applicable | Establishes minimum standards for the location, construction, repair and abandonment of water wells. | The requirements for the construction, repair and abandonment of monitoring, extraction and injection wells will be met. |
| Florida | Chapter 62-528.600 | Applicable | Establishes standards and | Requirements |

**Table 13**
**Action-Specific ARARs, Criteria, and Guidance**

| Requirement | Citation | ARAR Type | Description | Comment |
|---|---|---|---|---|
| Underground Injection Control Regulations | through 528.645, FAC | | criteria for construction. operation, monitoring, plugging, and abandonment for Class V wells Group 4 injection wells associated with aquifer remediation projects. | pertaining to Class V Group 4 injection wells will be followed. |
| Florida Groundwater Permitting and Monitoring Requirements | Chapter 62-522.300 and 522.300(2)(e), FAC | Applicable | Establishes permitting and monitoring requirements for installations discharging to groundwater to prevent contaminants from causing a violation of water quality standards and criteria of the receiving groundwater | A zone of discharge is allowed for primary standards for groundwater for closed-loop reinjection systems and for the prime contaminants of the reagents used to remediate the contaminants. |
| MNA of Inorganic Contaminants in Groundwater (Volumes 1 and 2) issued in October 2007 | EPA/600/R-07/139 | TBC | Provides a framework for evaluation of monitored natural attenuation as an effective remedy for inorganics in groundwater. | Groundwater performance monitoring criteria will be considered in the development of the MNA Performance Work Plan |

**Table 14**
**Location-Specific ARARs, Criteria, and Guidance**

| Requirement | Citation | ARAR Type | Description | Comment |
|---|---|---|---|---|
| **Federal** | | | | |
| Clean Water Act Regulations – Section 404(b) Guidelines | 40 Code of Federal Regulations (CFR) Part 230.10(a) | Applicable | No discharge of dredged or fill material into an aquatic ecosystem is permitted if there is a practicable alternative that would have less adverse impact. | Remedial work involves location encompassing aquatic ecosystem as defined in 40 CFR 230.3(c). |
| Clean Water Act Regulations – Section 404(b) Guidelines | 40 CFR Part 230.10(d) | Applicable | No discharge of dredged or fill material shall be permitted unless appropriate and practicable steps in accordance with 40 CFR 230.70 et seq. have been taken that will minimize potential adverse impacts of the discharge on the aquatic ecosystem. | Remedial work involves location encompassing aquatic ecosystem as defined in 40 CFR 230.3(c) |
| Clean Water Act – Nation Wide Permit (38) <u>Cleanup of Hazardous and Toxic Waste</u> | 33 CFR Part 323.3(b) | Applicable | Must comply with the substantive requirements of the NWP 38 General Conditions, as appropriate, and any regional or case-specific conditions recommended by the USACE District Engineer, after consultation. | Remedial work involves location encompassing aquatic ecosystem as defined in 40 CFR 230.3(c) |
| Fish and Wildlife Coordination Act – Impounding, diverting or controlling of waters | 16 United States Code §662(a) | Relevant and Appropriate | Requires that the U.S. Fish and Wildlife Service and the related state agency be consulted prior to structural modification of any body of water, including wetlands with a view to the conservation of wildlife resources by preventing loss of and damage to such resources. | The local agencies would be consulted to determine protective measures to prevent loss of wildlife resources. |
| Executive Order 11990 – Protection of Wetlands | Exec. Order 11990 Section 1.(a) | TBC | Requires Federal agencies to evaluate action to minimize the destruction, loss or degradation of wetlands and to preserve and | Sediment excavation in the Peace River Floodplain Area and Oak Creek Area |

**Table 14**

**Location-Specific ARARs, Criteria, and Guidance**

| Requirement | Citation | ARAR Type | Description | Comment |
|---|---|---|---|---|
| | | | enhance beneficial values of wetlands. | involves probable disturbance of jurisdictional wetlands. |
| Executive Order 11988 – Floodplain Management | Exec. Order 11988 Section 2(a)(2) | TBC | Requires Federal agencies to evaluate the potential effects of actions they may take in a floodplain to avoid, to the maximum extent possible, the adverse impacts associated with direct and indirect development of a floodplain. | Oak Creek Area floodplain may need to be restricted from residential development at completion of the excavation and restoration portion of the remedy. |

Figures

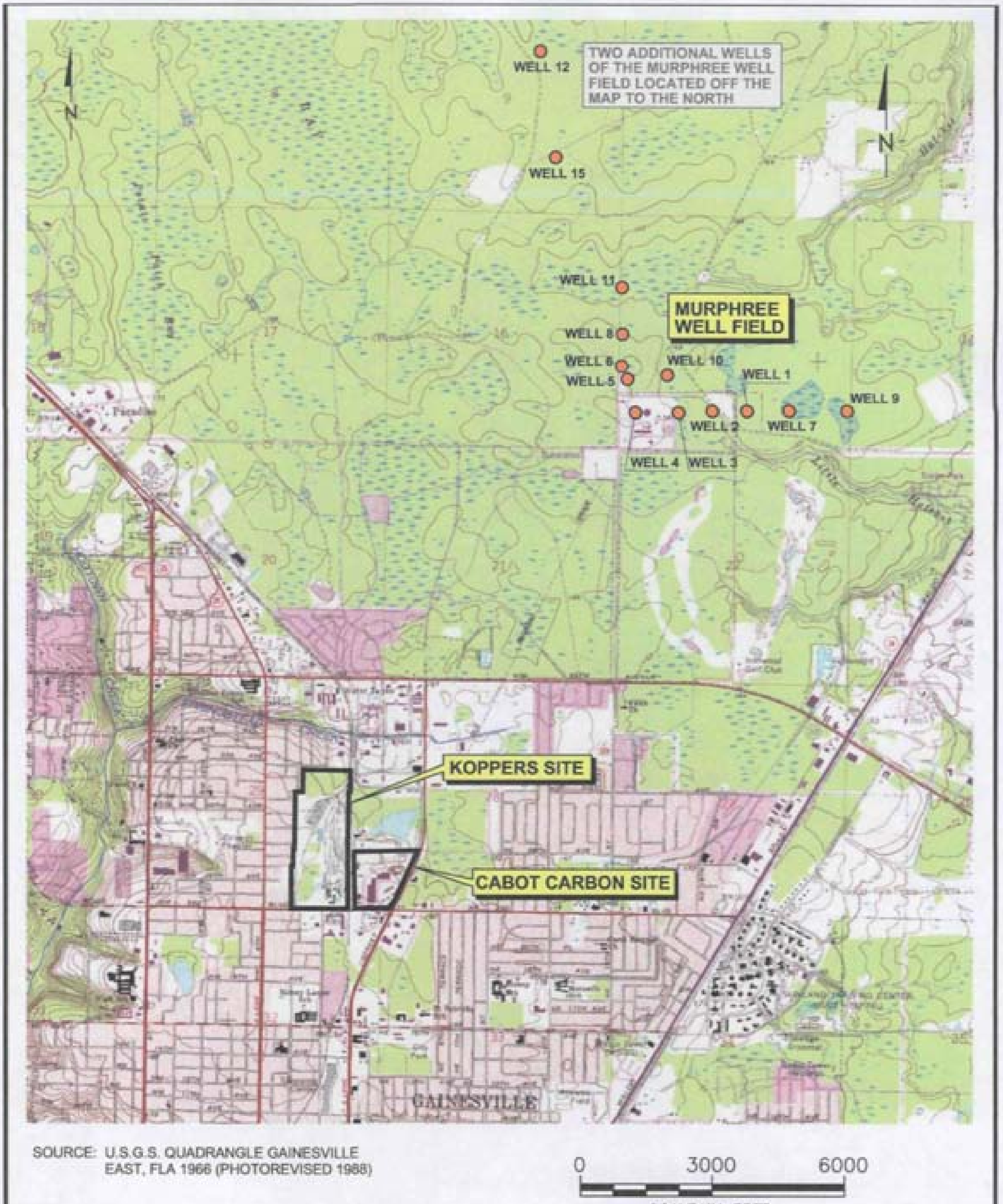


Figure 1
Site Location Map
Cabot Carbon/Koppers Superfund Site, Gainesville, Florida


-N-

LEGEND

- SITE BOUNDARY
- RAILROAD
- EXTRACTION WELL
- MOITORING WELL
- SOURCE AREA
- EXISTING BUILDING STRUCTURE

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Figure 2

Site Map and Aerial Photograph

Cabot Carbon/Koppers Superfund Site, Gainesville, Florida

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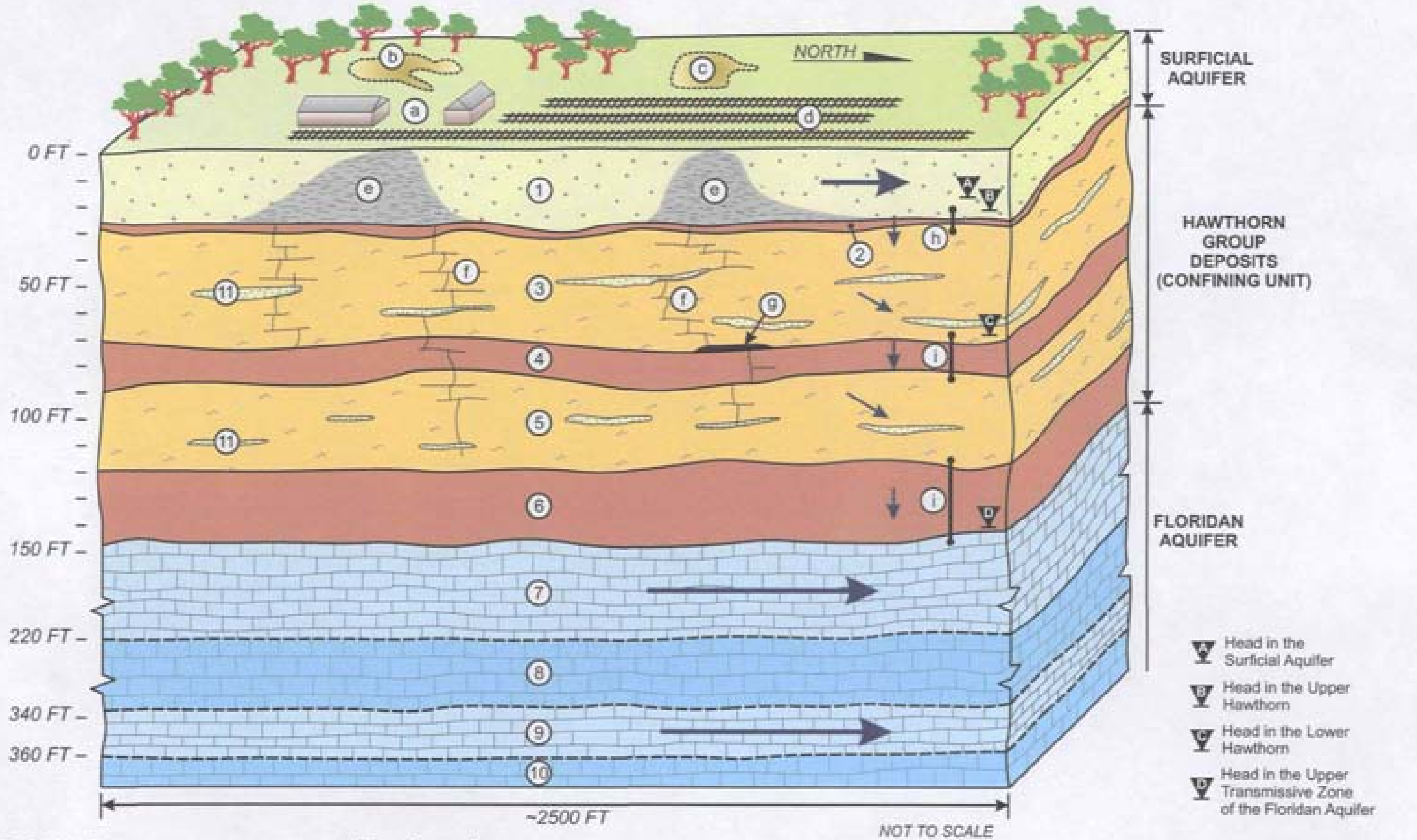


1) Surficial Aquifer
2) Hawthorn Group - Upper Clay
3) Hawthorn Group - Upper Hawthorn
4) Hawthorn Group - Middle Clay
5) Hawthorn Group - Lower Hawthorn
6) Hawthorn Group - Lower Clay
7) Floridan Aquifer - Upper Transmissive Zone
8) Floridan Aquifer - Semi-Confining Zone
9) Floridan Aquifer - Lower Transmissive Zone
10) Floridan Aquifer - Semi-Confining Zone
11) Discontinuous Sandy Interbeds

a) Former Process Area
b) Former South Lagoon
c) Former North Lagoon
d) Former Drip Track
e) Soils with Residual DNAPL
f) Sparse Seams of Residual DNAPL
g) Sparse Seams of Locally Continuous DNAPL
h) Moderate Vertical Hydraulic Gradient (~1 ft/ft)
i) Large Vertcial Hydraulic Gradient (~3 ft/ft)

Note:
There are uncertainties associated with the conceptual understanding presented in this figure.

Figure 3

Conceptual Block Diagram

Cabot Carbon/Koppers Superfund Site, Gainesville, Florida

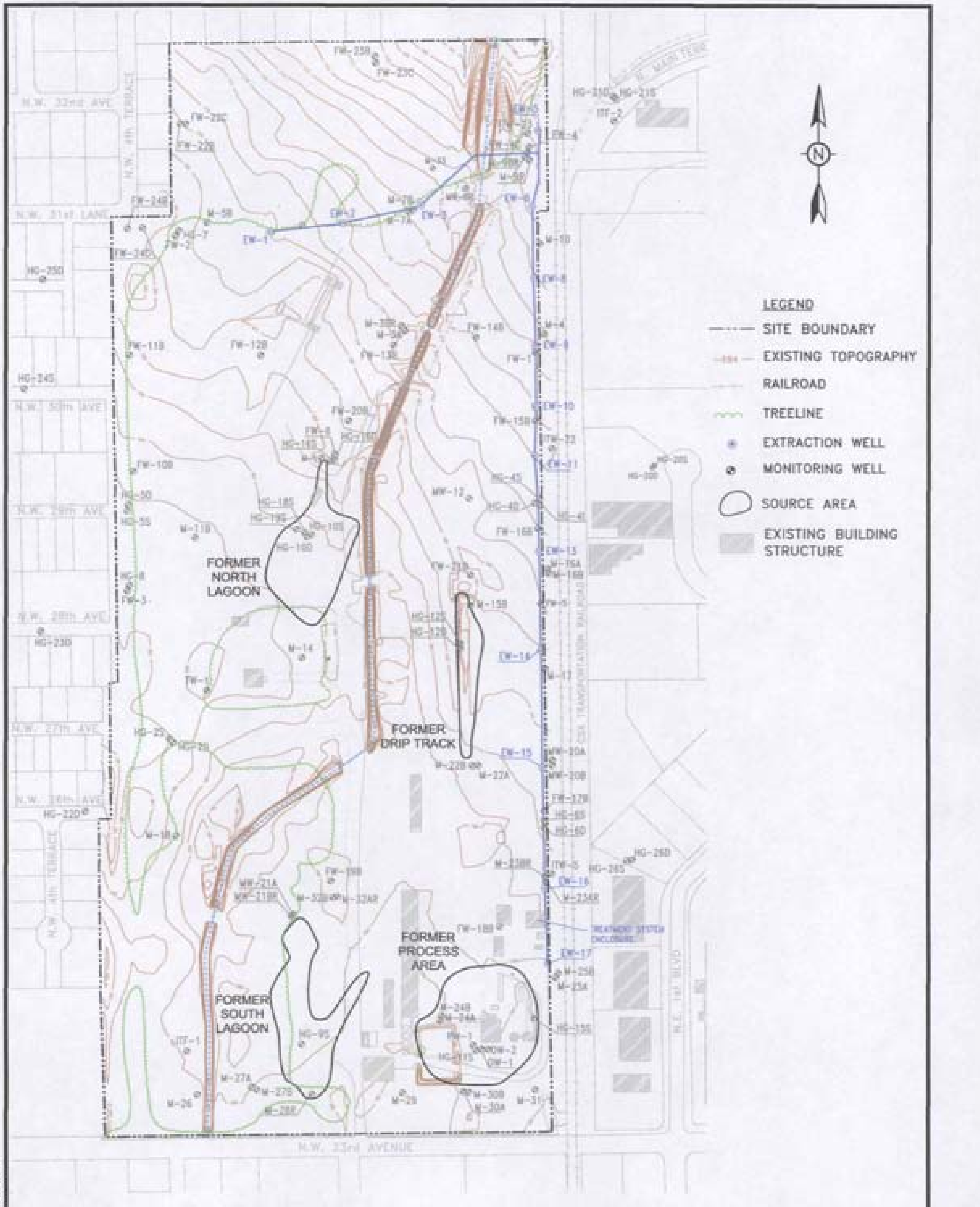


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Figure 4

Site Topography

Cabot Carbon/Koppers Superfund Site, Gainesville, Florida

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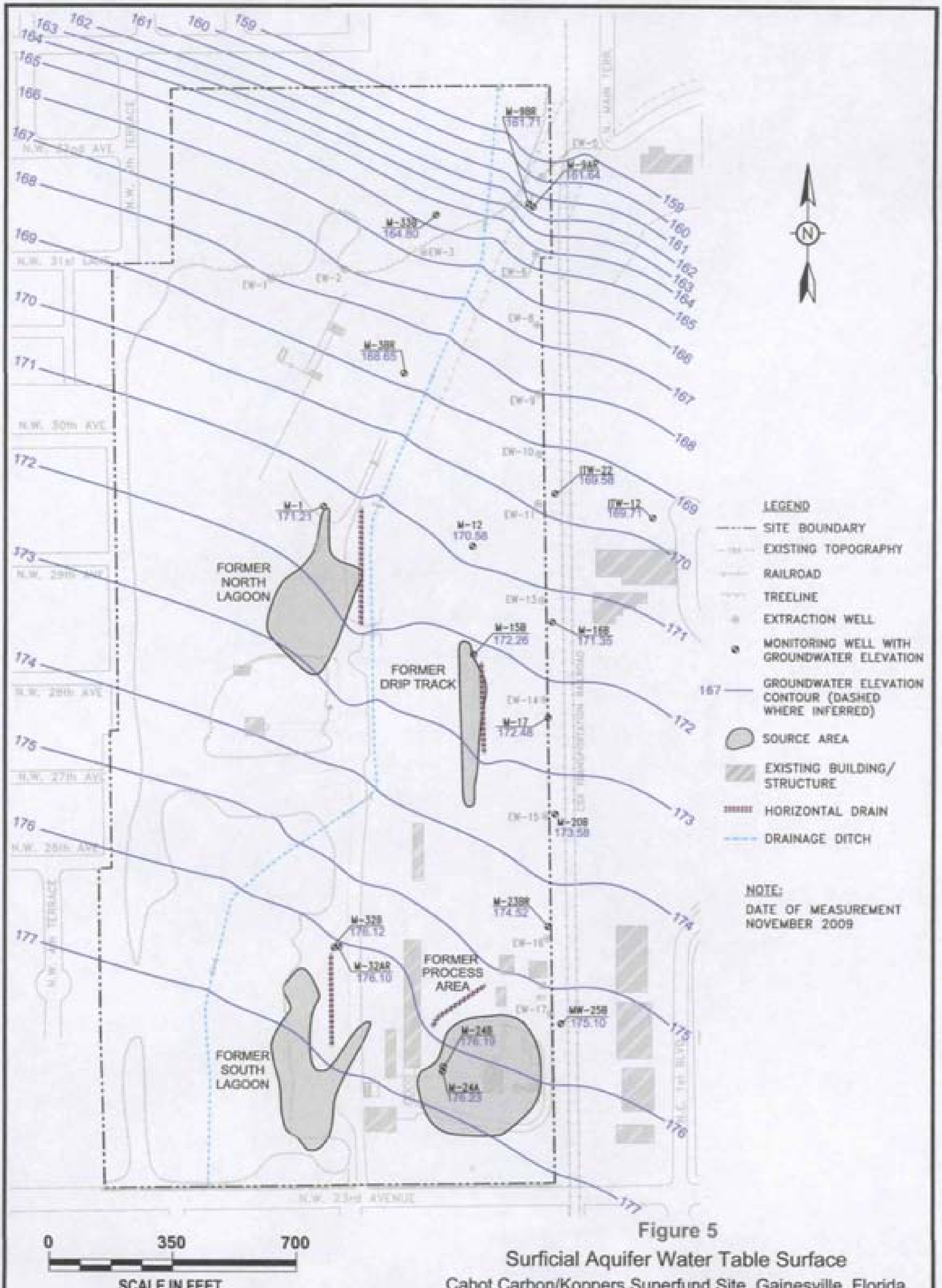


Figure 5
Surficial Aquifer Water Table Surface
Cabot Carbon/Koppers Superfund Site, Gainesville, Florida

22012030004A.DWG

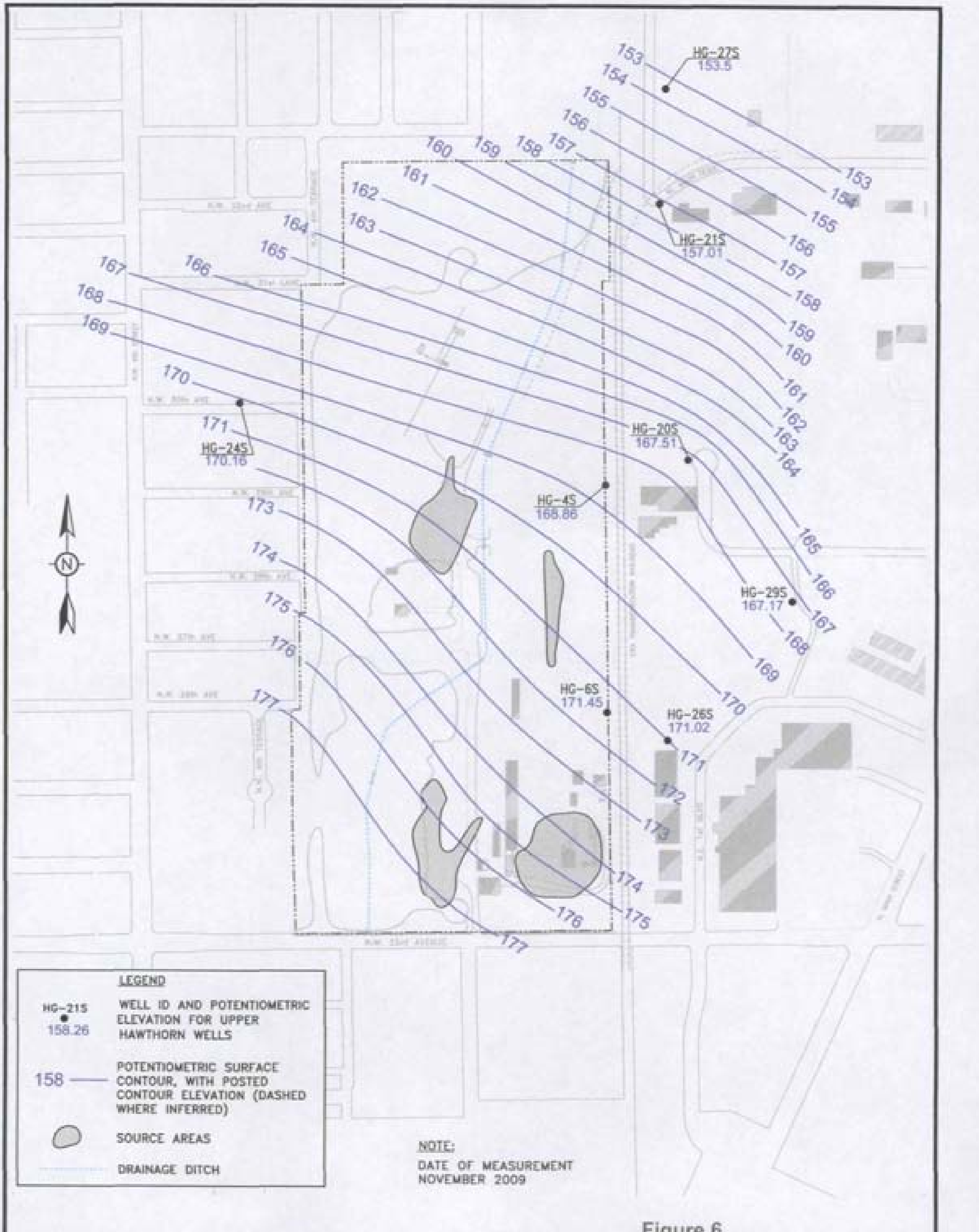


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Figure 6

Upper Hawthorn Potentiometric Surface

Cabot Carbon/Koppers Superfund Site, Gainesville, Florida

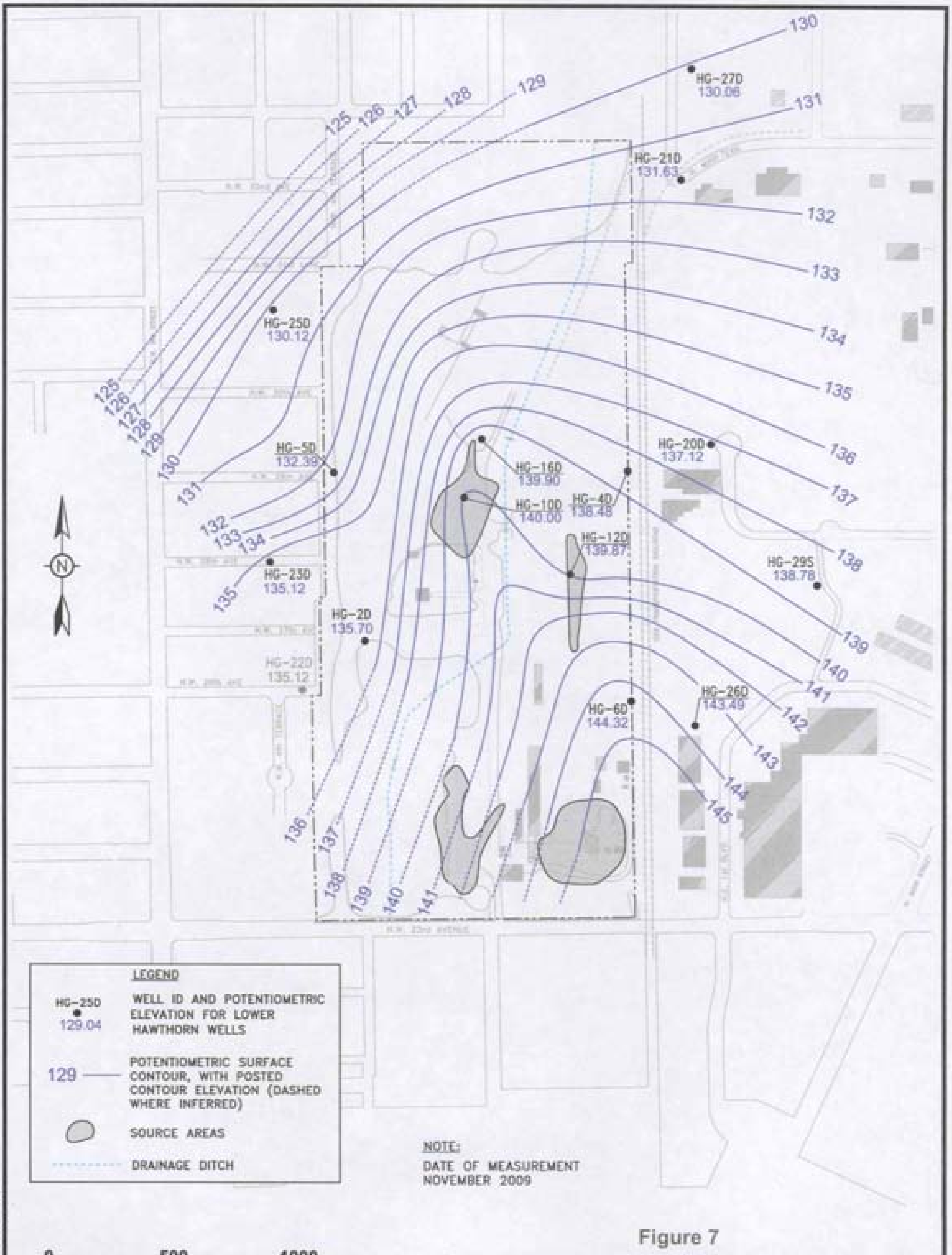


Figure 7

Lower Hawthorn Potentiometric Surface

Cabot Carbon/Koppers Superfund Site, Gainesville, Florida

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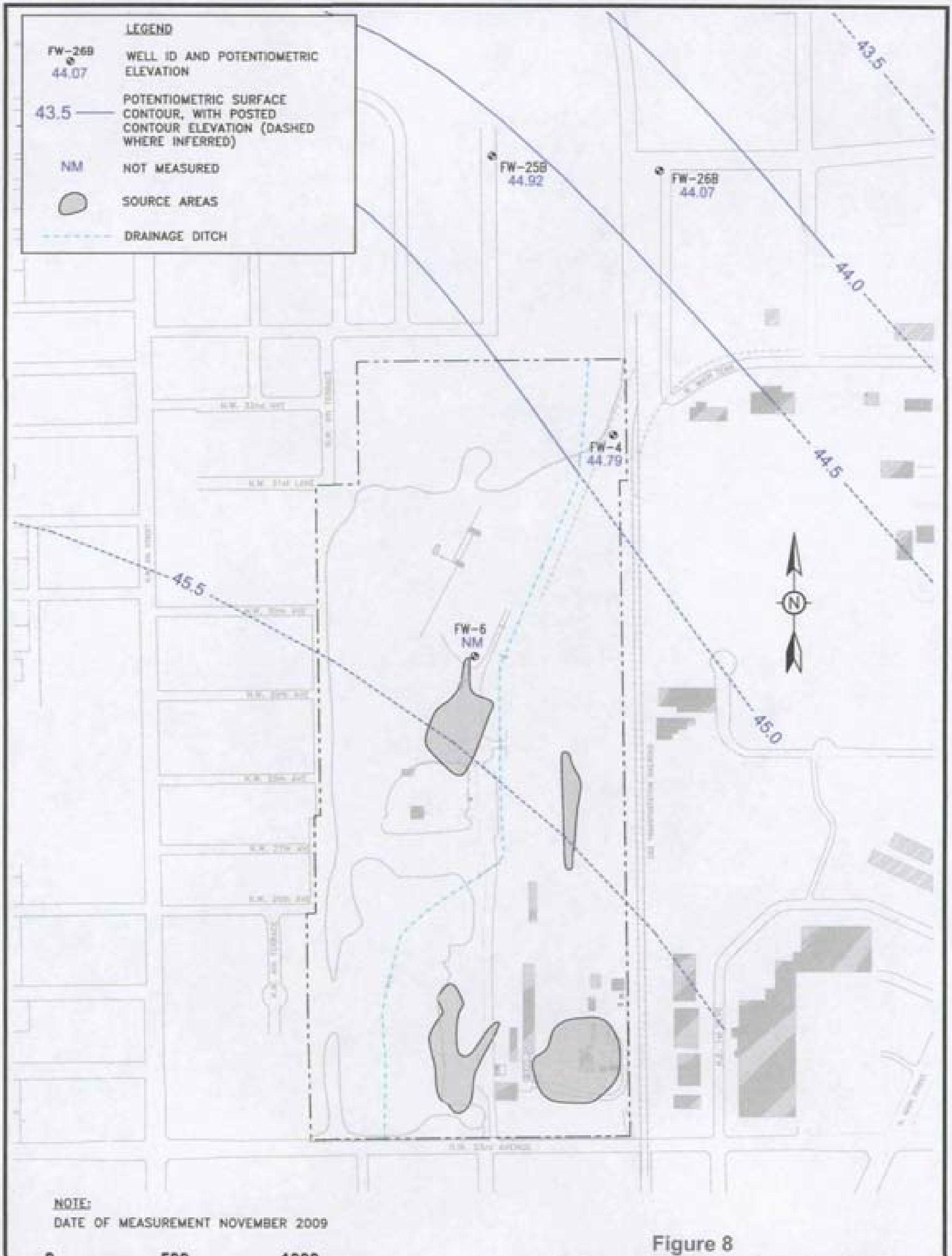


Figure 8
Upper Floridan Aquifer Potentiometric Surface
Cabot Carbon/Koppers Superfund Site, Gainesville, Florida

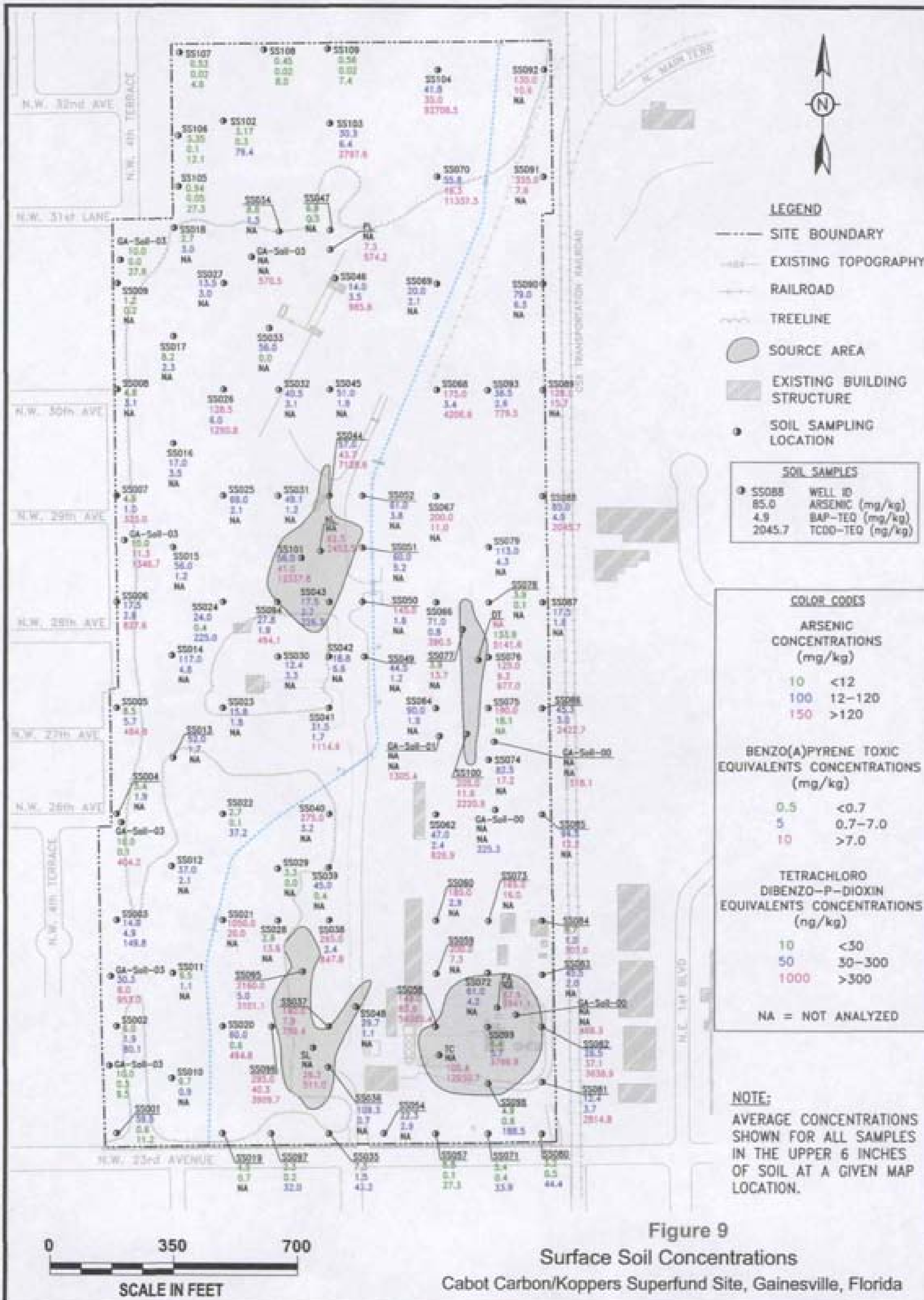


**Figure 9**
Surface Soil Concentrations
Cabot Carbon/Koppers Superfund Site, Gainesville, Florida

220120303A.DWG

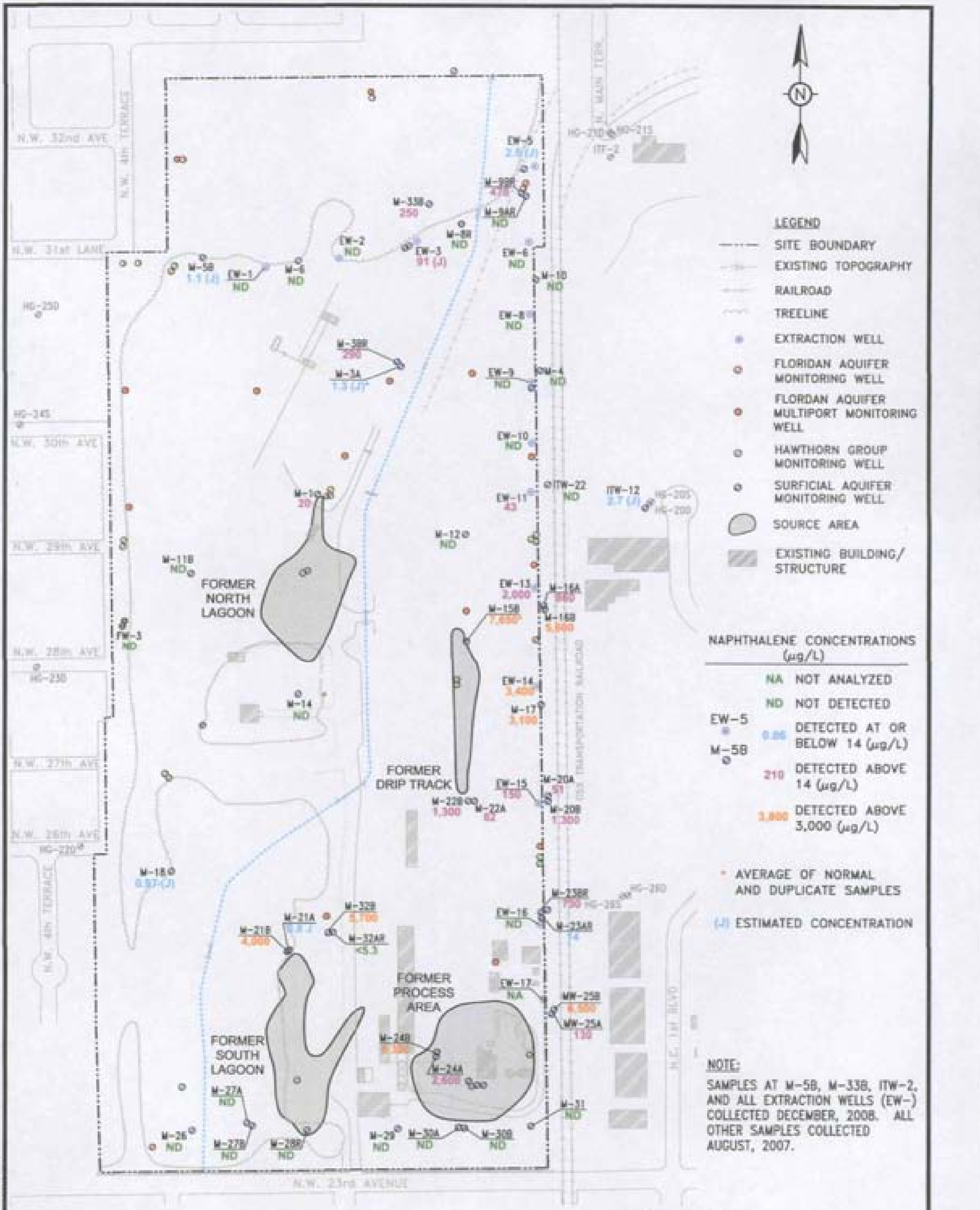


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**Figure 10**

**Surficial Aquifer Naphthalene Concentrations**

Cabot Carbon/Koppers Superfund Site, Gainesville, Florida

22011740154.DWG

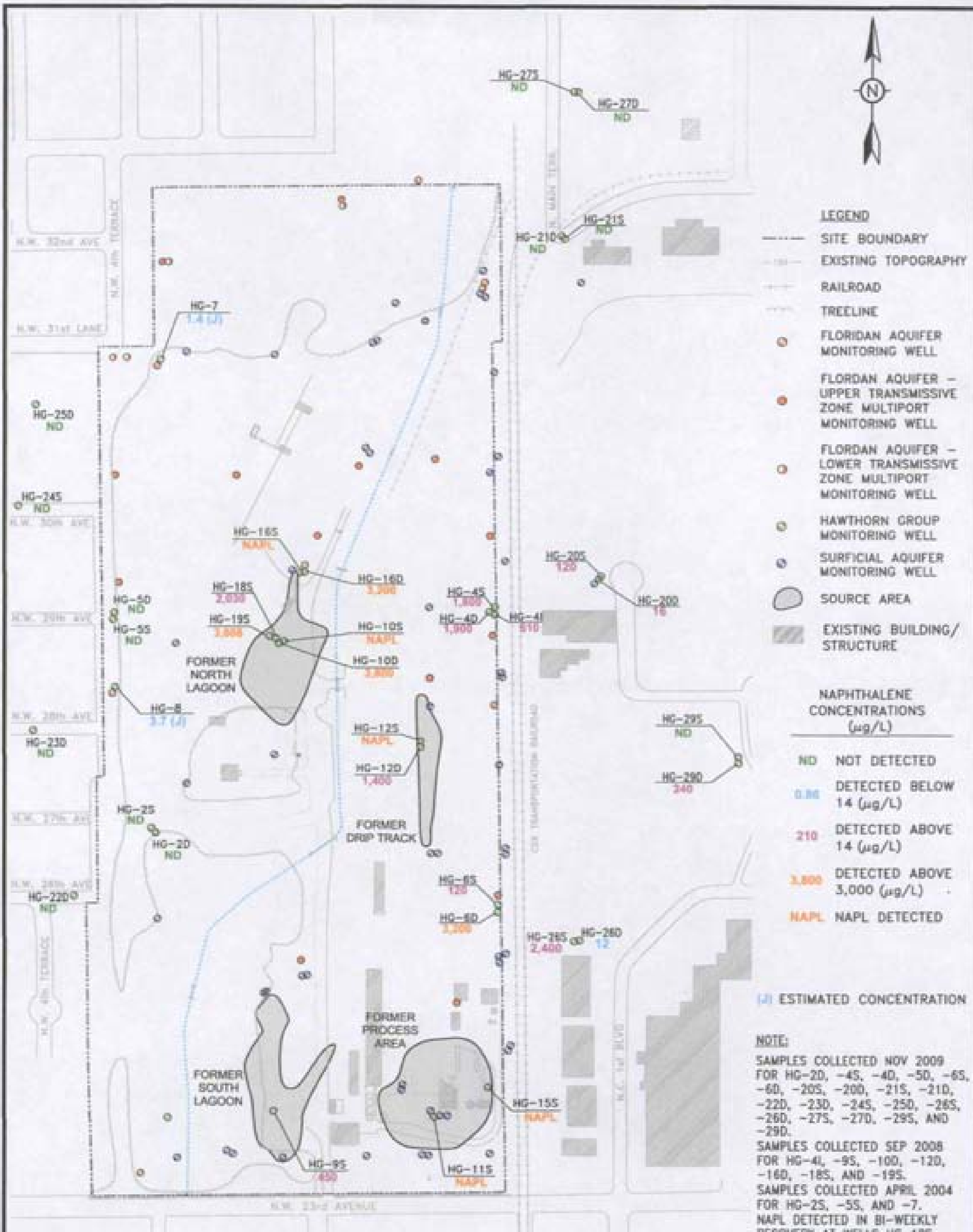


Figure 11
Hawthorn Group Naphthalene Concentrations
Cabot Carbon/Koppers Superfund Site, Gainesville, Florida

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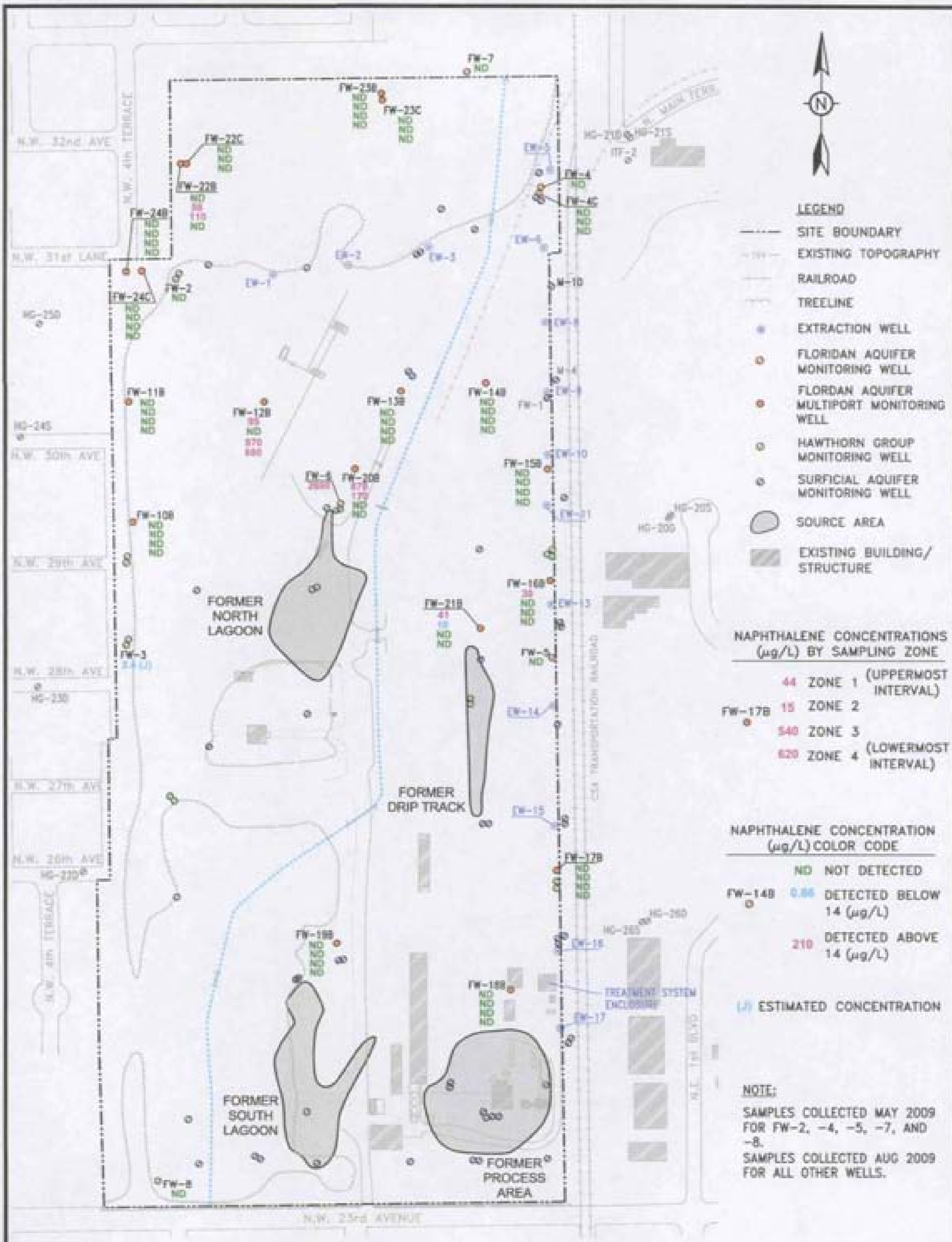


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**Figure 12**
**Upper Floridan Aquifer Naphthalene Concentrations**
Cabot Carbon/Koppers Superfund Site, Gainesville, Florida

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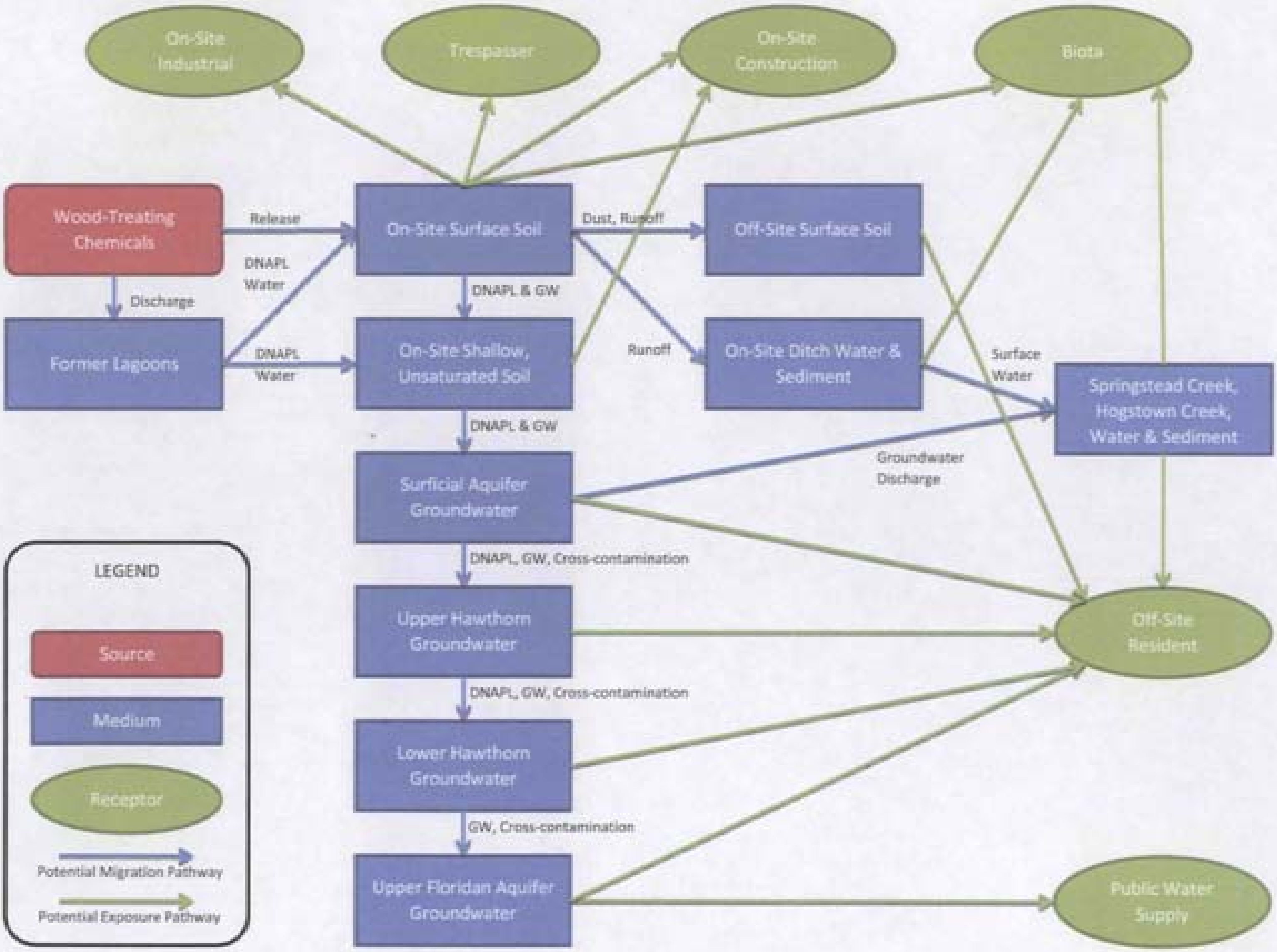
## Figure 13

**Conceptual Diagram of Potential Migration and Exposure Pathways**
**Cabot Carbon/Koppers Superfund Site**
**Gainesville, Alachua County, Florida**



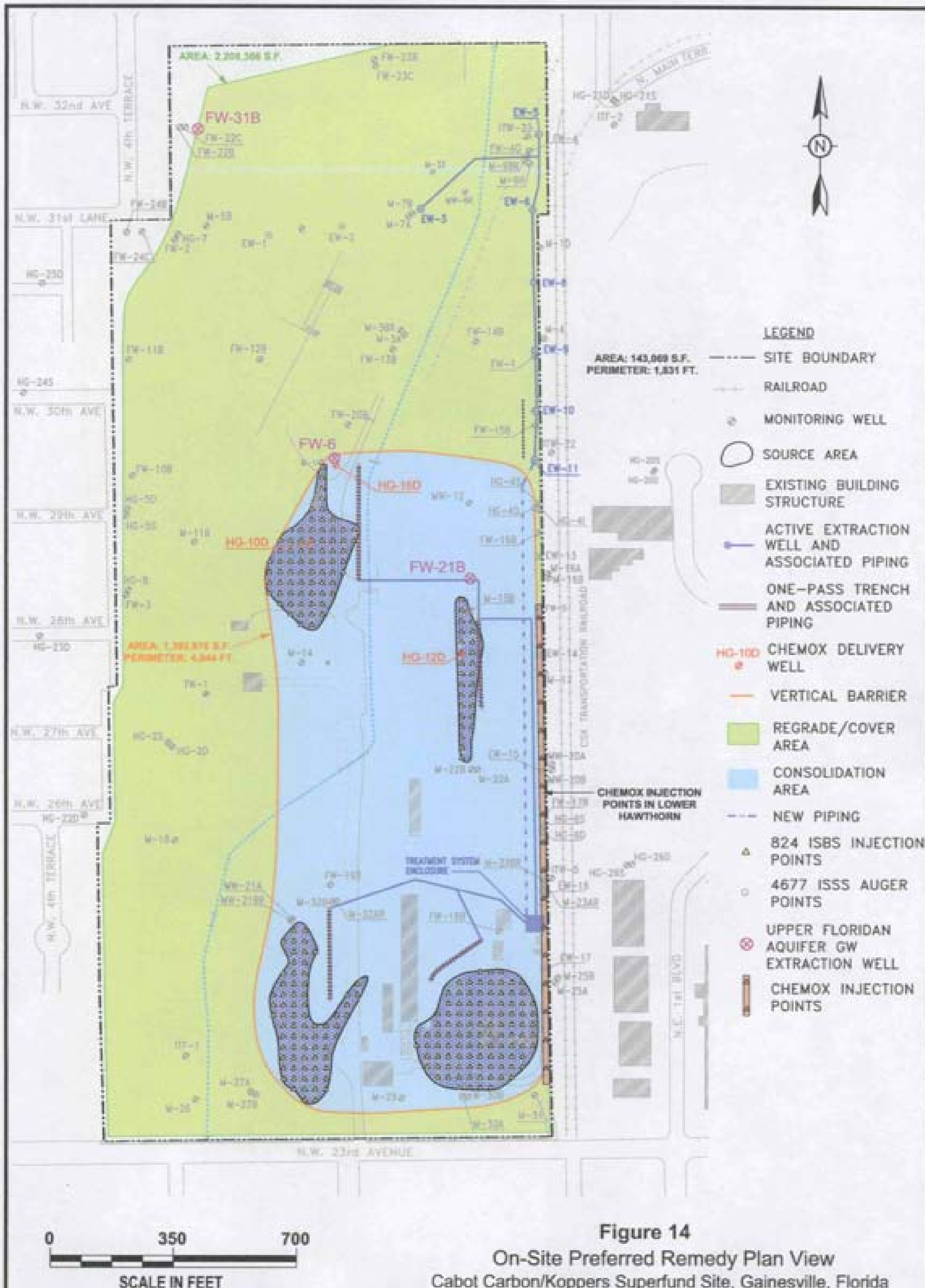



**Figure 14**
On-Site Preferred Remedy Plan View
Cabot Carbon/Koppers Superfund Site, Gainesville, Florida

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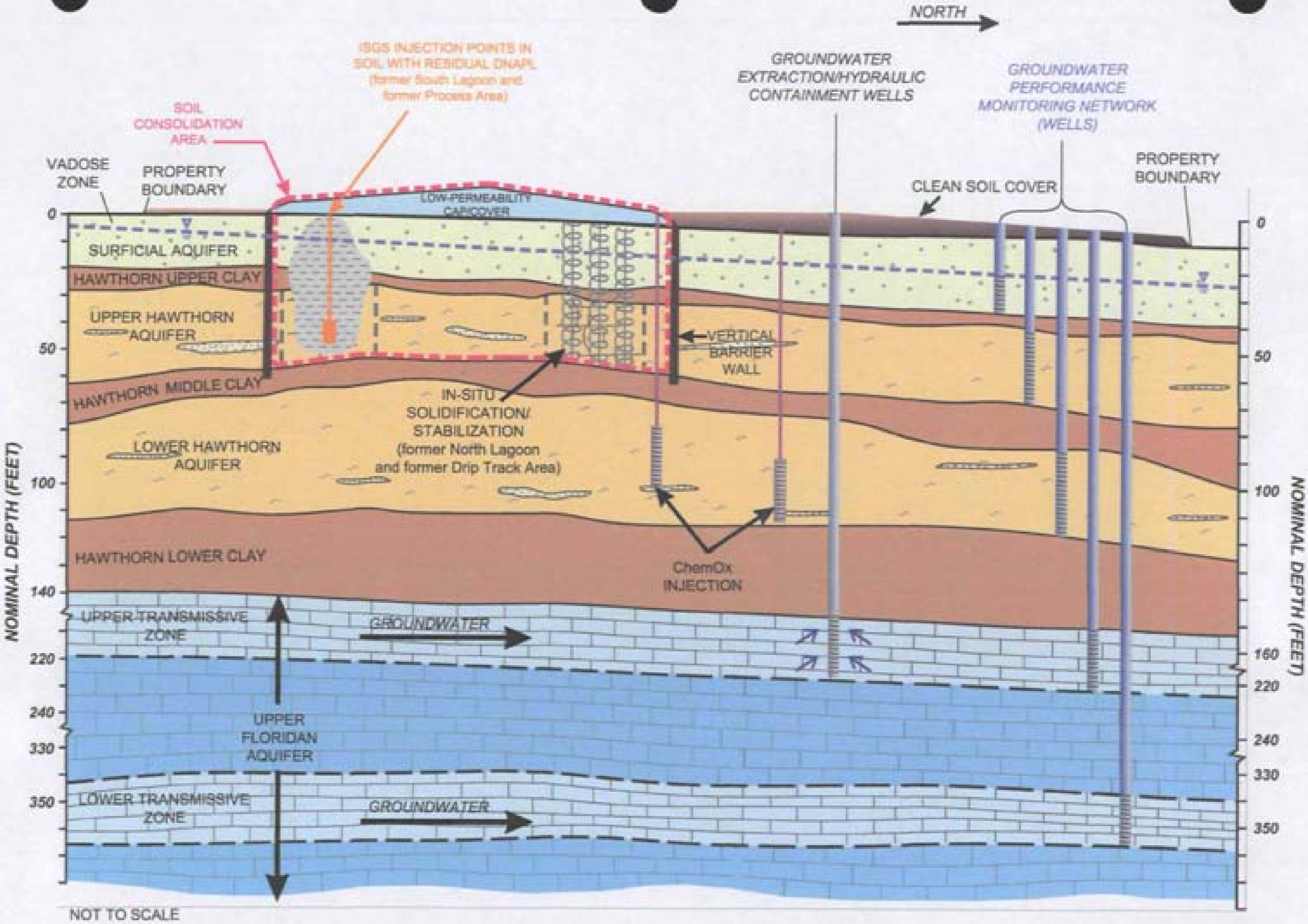



FIGURE 15
ON-SITE PREFERRED REMEDY
CABOT CARBON/KOPPERS SUPERFUND SITE
GAINESVILLE, ALACHUA COUNTY, FLORIDA

# Appendix A
# Responsiveness Summary

# Appendix A: RESPONSIVENESS SUMMARY

## A.1 Overview and Summary

This Responsiveness Summary documents public comments and EPA responses to comments on the proposed plan for remediation of the Koppers portion of the Cabot/Koppers Superfund Site in Gainesville, Alachua County, Florida. EPA Region 4 presented the Proposed Plan to the community on August 5, 2010 and held a public comment period from July 15 through August 15, 2010. EPA held an availability session on October 6, 2010 to provide information and answer questions about upcoming activities at the Site. EPA published the Public Notice for the Proposed Plan and Public Meeting in the *Gainesville Sun* newspaper on July 15, 2010. EPA mailed a meeting notice and a Proposed Plan fact sheet to individuals and groups on the Site mailing list at this same time.

Attachment 1 includes written comments submitted by community groups and other interested parties, including: Alachua County Environmental Protection Advisory Committee, BANCCA.ORG, Beazer East, Inc., City of Gainesville and Alachua County Environmental Protection Advisory Committee, Florida Department of Environmental Protection, Florida Department of Health, Koppers, Inc., Protect Gainesville's Citizens, Stephen Foster Neighborhood Protection Group, Strategic Environmental Analysis Inc., and the University of Florida. These comments are duplicated in Section 3.2 in their entirety with EPA's responses appropriately interspersed. A verbatim transcript of the August 5, 2010 public meeting is provided in Attachment 2. Responses to questions and comments made at the August 5, 2010 public meeting and from email transmittals are provided in Section A.3. Note that while a response is not provided to each comment or question that was received, the gist of the commenter's question or comment was responded to at least once in this Responsiveness Summary.

## A.2 Comments from Organizations and Interested Parties

### A.2.1 Alachua County Environmental Protection Advisory Committee

October 15, 2010

Mr. Scott Miller, Project Manager

US EPA REGION 4
61 Forsyth Street, S.W.
Atlanta, GA 30303-8960
Email: miller.scott@epamail.epa.gov

RE: Cabot-Koppers Superfund Remedial Plan, dated July 15, 2010

Dear Mr. Miller:

In their response to EPA's remedial plan for the Koppers site, both the Gainesville City Commission and the Alachua County Commission have recommended that:

"... USEPA identify and facilitate the mobilization of resources to address adverse health effects of individuals via a door-to-door health study in the neighborhood affected by the Koppers Superfund site contaminants, including but not limited to dioxins. To the extent that adverse health impacts are found to result from the Koppers offsite contamination, the USEPA is requested to enforce financial responsibility requirements on Beazer East."

The Alachua County Environmental Protection Advisory Committee (EPAC) is comprised of 11 citizens appointed by the County Commission to provide advice on protection of natural resources and public health in our community. EPAC strongly supports the joint Commissions' recommendation for a comprehensive health survey (CHS) and is pleased to inform you that a group of Gainesville health professionals has come together to implement such a survey.

Producing a rigorous and defensible CHS is not a simple matter, and in fact some past surveys have been neither scientifically valid nor useful from a public health perspective. But with careful planning and execution, such surveys can be extremely valuable, both in providing concerned residents with critical health information and local health professionals with additional diagnostic and clinical tools. Keys to a successful CHS include a well-designed questionnaire, trained interviewers, careful selection of subjects, and statistically valid analysis.

The Gainesville health professionals interested in conducting the CHS – faculty and graduate students in the University of Florida's College of Public Health and staff from the Suwannee River Area Health Education Center – recognize the pitfalls that have befallen other surveys and are committed to doing the Gainesville survey right. Once Institutional Review Board approval for the CHS has been obtained, I anticipate that representatives from the Florida Department of Health would also actively participate in this study. Discussions are already underway among these partners (along with City and County officials), and preparation of a comprehensive survey questionnaire is nearly complete.

I know that you and your colleagues at EPA have been present at local Commission meetings and other events where residents have expressed their concerns and fears about the incidence of cancers and other health problems in the neighborhoods surrounding the Koppers site. Whatever the results of a CHS of the area might show, providing these citizens with answers is clearly the right thing to do. The cost of a CMH would be very small compared to the cost of the cleanup itself, and EPAC would strongly urge EPA to include a Beazer-funded CHS, to be conducted by the Gainesville professional health team described above, as part of its Record of Decision on the Koppers site.

Should you have any questions regarding the Community Health Survey, please feel free to contact me (352-371-4093 – rpa711@yahoo.com) or Ky Gress of the University of Florida (352-374-0848 – kygress@ufl.edu).

Thank you for your consideration of this request.

Sincerely,
Bob Palmer, Chairman
Alachua County Environmental Protection Advisory Committee

*EPA Response:*
*EPA appreciates the EPAC's offer to conduct a comprehensive health survey (CHS) nearby the former Koppers facility. EPA routinely relies upon the public health expertise of the Agency for Toxic Substances and Disease Registry (ATSDR) along with its State partner the State of Florida Department of Health for assessing Superfund Site health impacts in areas near former hazardous waste sites in Florida. In a letter from Dr. Thomas Friedman, the director of the CDC, Dr. Friedman provided the following excerpted information to Ms. Cynthia Moore Chestnut, Chair Alachua County Board of County Commissioners:*

> *"The Agency for Toxic Substances and Disease Registry (ATSDR) has been actively supporting the Florida Department of Health (FDoH) in evaluating potential community exposures to contaminants at this site. This partnership is part of ATSDR's long-standing cooperative agreement program with the FDOH.*
>
> *At this time, a "door-to-door" health study based on possible dioxin exposures is not recommended. The potentially exposed population near this site is relatively small. Adverse outcomes associated with dioxin exposures have not been reported in populations exposed to dioxin at the levels seen to date in the community surrounding Cabot-Kopper's property. The health problems of the people living in this community are likely to reflect common health problems seen in any similar group of individuals who do not live adjacent to the Cabot-Koppers site. Given these facts, it would not be possible to differentiate the health problems within this group that are the result of their exposures to dioxin.*
>
> *We fully agree with FDOH's plan to evaluate and make recommendations to mitigate any current exposures to protect public health and to also take a broad look at cancer statistics within this community. We will continue to work with our FDOH partners in identifying and reducing Alachua community exposures to environmental contaminants on and near the Cabot-Koppers site and are open to reassessing the need for additional work should further information indicate that it is warranted."*

*At this time, EPA is not planning to conduct or require that a door-to-door CHS be conducted near the former Koppers Site based on the information provided to us from ATSDR. However, should additional data collected in the area indicate a need to conduct a CHS, EPA will contact the EPAC for assistance and coordination in such an effort.*

### A.2.2 BANCCA.ORG

October 12, 2010
Mr. Scott Miller, Project Manager
US EPA REGION 4 61 Forsyth Street, S.W.
Alanta, GA 30303-8960
Email: miller.scott@epamail.epa.gov

RE: Open Letter to EPA Region 4 on the Cabot-Koppers Superfund Remedial Plan (dated July 15, 2010) & EPA Koppers Fact Sheets (dated September 10, 2010)

Dear Mr. Miller:

I am writing to you on behalf of BANCCA.ORG, and many of the citizens of Gainesville, Florida and Alachua County, regarding concerns about the recently released EPA Remedial Plan for the Koppers Superfund site. We intend to publish this same letter online in an open letter format for our worldwide audience, in order to raise awareness of the issues at the Koppers Superfund site in Gainesville.

While we appreciate your efforts with regard to this complex and challenging site, it is our strong belief that the problems that this former wood treatment site presents to our community are not being adequately addressed by the EPA's proposed Remedial Plan, particularly with regard to the protection of human health.

We believe there are serious deficiencies in both the plan itself and the approach taken by the EPA. Also, we are concerned about a number of other problems we have uncovered through our own research during the last few months.

This letter will attempt to detail and explain where the EPA's actions, (or lack thereof), and its proposed Remedial Plan (RP) and Feasibility Study (FS), have failed to meet state and federal requirements, CERCLA requirements, the EPA's own Guidance Documents, as well as the needs of our community with regard to the cleanup of this site, the protection of the health of our local residents, the protection of our environment, and our local water supply.

We hope that this letter will explain our concerns in a clear and concise manner, in order to assist the EPA in tailoring a revised and improved plan that better suits our community's needs, meets our ARARs, and is more protective of human health and the environment.

# TABLE OF CONTENTS

## ISSUES with the EPA's REMEDIAL PLAN for the KOPPERS SUPERFUND SITE

[Note: You can click on any link below to navigate to a particular section of the document.]



### 1. The EPA Issued a Remedial Plan *BEFORE* the Remedial Investigation was Complete

EPA and CERCLA guidelines dictate that the Remedial Investigation (RI) is the first step in the remediation process for a Superfund site, but with regard to the Koppers site, these rules appear to have been turned upside down. Instead, the RI remains incomplete even today, especially with regard to the testing of offsite soils and offsite groundwater contamination. At this time, the extent and boundaries of offsite soil and groundwater contamination remain unclear, which creates a wide array of problems for residents, local government officials, city road crews, utility staff, realtors, and most importantly, for the children, who are the most vulnerable population where toxic dioxin exposure is concerned.

The RI was so poorly done that some onsite source areas were not even identified, tested or included in the Remedial Plan. In fact, it was our website: **BANCCA.ORG**, that revealed to the general public on May 31, 2010 in a Special Report entitled, *"What Lies Beneath - Are There Barrels Buried at the Koppers Superfund Site? Plus What Historical Aerials May Reveal..."* (This report is available online at our website here: http://www.bancca.org/CCA_Editorials/Koppers_Superfund_Site_Special_Report.htm ),

that there were possible overlooked source areas visible in historical aerials from the 60's and 70's, and reports of probable buried drums of toxic waste onsite, which we had learned by interviewing local residents who had lived next to the site for decades. Our review of the historical aerials also revealed 3 possible disturbed areas that had not been investigated by the EPA or Beazer before.

One area in particular consists of what appear to be six (6) long deep parallel trenches, which we now refer to as **"The Trenches Area"**. Fortunately, the EPA has finally recognized this area of the site on its latest plan graphic, where it is referred to euphemistically as a ***"Historically Disturbed Area"***. Yet to date, there has been no explanation of these "trenches" by either Beazer or the EPA, nor testing of this area for contaminants, nor has the EPA committed to doing any cleanup of these potential source area(s) found in the aerials.

Reviewing historical aerials as part of an RI for a Superfund site is nothing new or novel. In fact, the importance of reviewing historical aerial photos for potential source areas during the RI phase is clearly explained in technical reference manuals, such as the textbook, **"Practical Handbook of Environmental Site Characterization and Ground-Water Monitoring, Second Edition"**, edited by David M. Nielsen, pgs. 100-135 (Portions of this book are available online here: http://tinyurl.com/2dp6soz ).

This textbook discusses the importance of site reconnaissance, local interviews, reviewing historical records and aerials, owner records and documents, topographical maps, local and state environmental regulatory agency files, and how this vital information directly relates to the proper characterization of the contaminated environmental site. showed 3 disturbed areas,

In addition, the other disturbed areas in the so-called "Northern Inactive Area" have not been addressed at all in the current EPA Remedial Plan, even though the highest levels of dioxins on the site were found in one of these areas, (*where dioxin levels are 24,377 times higher than Florida residential SCTLs*). We personally reported during the June 16, 2010 Koppers site walk-thru, that based on our own reconnaissance, there is a treated wood disposal area at this spot, where piles of decades-old creosote utility poles lie covered up with vines. Yet, the EPA's proposed plan makes no mention of the remediation of this source area, or its very large pile of debris.

Recently, we learned that the EPA has also known about offsite groundwater contamination west of the Koppers site for at least 4 or more years, **as evidenced by the contamination of the Geiersbach well**, located adjacent to the western easement at 410 NW 26th Avenue in the residential neighborhood. But, the EPA has failed to inform the general public about this offsite groundwater contamination. This 228-foot-deep private water well which tapped into the Floridan aquifer, was purchased by Beazer East from Mr. Geiersbach in 2004, and subsequently plugged, ***because it was found to be contaminated by benzene, naphthalene and other methyl-phenols***

However, until we brought this issue to the forefront last month, this information had been buried in an EPA/USACE Five Year Review Report about the Cabot site, and was never mentioned in any recent EPA documents about offsite contamination from Koppers. *It was as if this contamination had never happened…* Yet, it is clear that there is now offsite groundwater contamination in the residential neighborhood on the western side of the Koppers property that has not been considered in the EPA's RI or proposed plan.

We believe that these facts provide significant proof that Region 4 EPA staff failed to fulfill their obligations to do a proper Remedial Investigation as required by CERCLA for this site.

*EPA Response:*
*As stated in EPA's Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA (EPA/540/G-89/004 OSWER Directive 9355.3-01 October 1988), the objective of the RI/FS process is not the unobtainable goal of removing all uncertainty, but rather to gather information sufficient to support an informed risk management decision regarding which remedy appears to be most appropriate for a given site. The appropriate level of analysis to meet this objective can only be reached through constant strategic thinking and careful planning concerning the essential data needed to reach a remedy selection decision. As hypotheses are tested and either rejected or confirmed, adjustments or choices as to the appropriate course for further investigations and analyses are required. These choices, like the remedy selection itself, involve the balancing of a wide variety of factors and the exercise of best professional judgment. As summarized below, the EPA has met the threshold established in its guidance manual with regard to site characterization:*

- *The remedial investigation (RI) was completed in 1987, and a Supplemental RI was completed in 1989. A Baseline Risk Assessment and FS were completed in 1990. A remediation plan was selected and a ROD for the Cabot Carbon/Koppers Site was signed in1990.*

- *Since the 1990 ROD, investigations have improved the conceptual understanding of the Site. Pilot remedial actions and focused studies have been conducted to assist with the selection and evaluation of a final comprehensive remedial strategy. These activities have included:*

  - *Pilot testing active DNAPL recovery in the Surficial Aquifer at PW-1 in 1994 and 2004*
  - *Studying vertical groundwater circulation at the Former North Lagoon in 1995*
  - *Recovering dense non-aqueous phase liquids (DNAPL) manually by periodic bailing in HG monitor wells since 2004*
  - *Evaluating soil excavation feasibility*
  - *Evaluating in-situ thermal treatment feasibility*
  - *Evaluating surfactant flushing feasibility*
  - *Pilot testing active DNAPL recovery in the HG beneath the Former North Lagoon*

- *Bench testing and pilot field testing in-situ geochemical stabilization (ISGS) of DNAPL using modified permanganate solutions.*

- *More recent investigations (2003, 2004, and 2006) have indicated that DNAPL from former wood-treating substances such as creosote is present in the HG and that Site contaminants are present in groundwater in the Upper Floridan aquifer. Ongoing and planned monitoring is being used to better characterize potential impacts in the Surficial Aquifer, HG, and UFA.*

- *Environmental Investigation Summary*

  - *Over 350 soil borings and 1,000 soil samples have been collected and analyzed across the Site since 1984. Groundwater monitoring has been routinely performed since 1984. Over 150 wells have been installed and sampled in the three main hydrogeologic units (Surficial aquifer, HG, and UFA). Periodic groundwater monitoring reports are prepared for the EPA.*

  - *Potential impacts to off-Site areas have been investigated and continue to be investigated west of the Site. An additional off-Site soil investigation is currently being conducted to completely delineate the extent of impact in other areas surrounding the Site. Some information and analytical data have been generated from sediment and surface water in Hogtown and Springstead Creeks to evaluate impacts to aquatic habitats and species.*

*With regard to other potential source areas, a work plan has been developed to identify if there are buried drums or other primary source areas on the Site. This work plan will be implemented during the remedial design phase of the project. All data obtained as a result of In addition, soil, groundwater, and sediment sampling and analyses will continue as the footprint for installation of all the remedial technologies is refined. After additional sampling and analyses occur and the remedial action is implemented, the proposed on-site actions will ensure exposure at the surface has been mitigated.*

2. The EPA's Remedial Plan for Onsite Contamination Recommends Unproven Remedies (REMOX - ISBS) and Failed Scenarios

a. REMOX is an unproven product that should not be used at this site

The Remedial Plan calls for the use of ISBS for treating DNAPL in the 4 major source areas onsite, and the product that the PRP wishes to use is REMOX EC, supplied by Adventus Americus, and manufactured by Carus Corporation. The plan is to pump thousands of gallons of REMOX into the Koppers site. However, REMOX is a mostly unproven product, which has been promoted heavily by Adventus and Beazer, in spite of numerous questions that remain after the pilot test onsite in 2008. Data from the pilot test indicates that the REMOX was not successful, and one email from Kelsey Helton of FDEP, dated Feb. 25, 2008 expresses concerns about purple colored groundwater detected in a Hawthorne Group well at the Koppers site after the initial pilot test. In that email to Mitch Brourman (see PDF file: "ATTACHMENT A"), Kelsey spells out how this problem violates state and Federal law:

> **"Migration of injectants with constituents exceeding groundwater standards across aquifers is not authorized by the site specific UIC variance issued for this pilot nor is it allowed by state or federal UIC rules.** As such, FDEP requests that Beazer provide a more detailed account of what was observed during the initial ISBS injection activities, any supporting groundwater analysis and a proposed monitoring scope to be initiated in the March 2008 sampling event- if not sooner- to ascertain the extent and magnitude of migration of the permanganate constituents into the Hawthorn."

We noticed similar concerns about "perplexing" purplish-colored groundwater in an email from EPA's William O'Steen to you, Mr. Miller, on the ARI CD, which we mentioned at the August 5th public meeting, which describes how a purple colored groundwater suddenly appeared in Hawthorne Group monitoring well (HG-29D) at the adjacent Cabot site, *after* the REMOX pilot test, which seems to indicate that using REMOX at this site is problematic, if not technological infeasible, and could pose a threat of contamination to offsite groundwater.

We also uncovered two documents that refer to either "cavernous features" or "karsts" possibly being present deep beneath the Koppers site, which would preclude the use of ISBS at this site, since using REMOX could not only have the potential to cause the groundwater contamination to worsen, but could cause it to accelerate and move offsite more rapidly than expected.

Moreover, REMOX EC has been promoted heavily by Beazer, Adventus and their affiliated remediation contractors, while very little peer-reviewed data exists to support its actual efficacy. FDEP and EPD staff have expressed doubts about this product. In addition, our citizens are opposed to having this site become a "beta test site" for an unproven ISBS product, which appears better suited to generating a profit for the firm that supplies the product that it does in immobilizing DNAPL.

If REMOX fails at this site (and some say this already appears to have happened during the 2008 pilot test), our water supply could be impacted in the future, as BTEX contaminants, manganese and other heavy metals move offsite.

Finally, we learned last week that Neale Misquitta, Manager and Principal at both **Key Environmental, Inc** and **Field and Technical Services, LLC** (FTS), who authored several reports related to the pilot test of REMOX at this site, was indicted by the US Department of Justice on fraud charges. (See this for yourself here: http://www.justice.gov/usao/paw/pr/2010_september/2010_09_23_01.html ).

This certainly casts great doubt about the credibility of any reports that Neale or his firm(s) may have authored in support of REMOX and ISBS, and any other reports that he provided in related to the Koppers Superfund site.

*EPA Response:*

*It should be noted that ISGS is only one component of the remedial strategy at the Cabot Koppers Site. Out of an abundance of caution, redundant approaches (containment using slurry walls and caps to isolate the four primary source areas, and* *soil stabilization/treatment to immobilize contaminants) are proposed. EPA acknowledges that ISGS is a developing technology. For this reason, EPA will require stringent performance testing and monitoring during application with an ISS/S contingency in place if performance standards are not achieved. Implementing the remedy in a staged or staggered schedule will provide EPA with more options for meeting cleanup goals. For example, EPA proposes implementing ISGS within a physically contained zone (surrounded by the slurry wall) as a response to subsurface contamination, and to evaluate its effectiveness concurrently in the remedial design phase. EPA will require the PRP to provide engineering design plans for both full-scale implementation of ISGS and a contingent ISS/S remedy along with the other remedial components including but not limited to the vertical barrier wall, the engineered cap, and LHG injection points. If necessary, EPA will be able to quickly respond to ISGS ineffectiveness by requiring the ISGS zone to be revisited and addressed by ISS/S, or additional ISGS injections, without further time-consuming Site-specific rulemakings.*

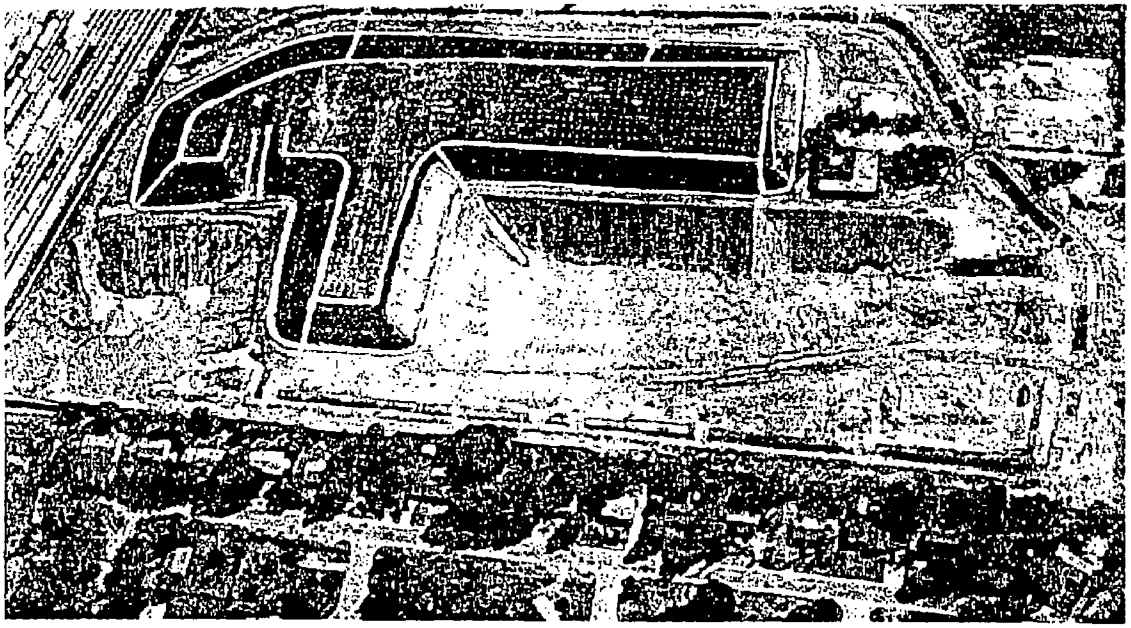
### b. A Larger Mount Dioxin Doomed to Fail?

The remedy selected by the EPA for the onsite contamination involves consolidating thousands of tons of soil and laced with DNAPL and contaminated with dioxins, arsenic, PAHs, BAPs and other COCs into a huge consolidation area that will measure "approximately 32 acres", according to the May 2010 Final FS.

This approach is the same approach used at other Superfund sites, including the **Escambia Treatment Company** (ETC) site in Pensacola, FL, where a similar consolidation area was created and nicknamed **"Mount Dioxin"**. However, the "Mount Dioxin" slated for the Koppers Gainesville site has an area that is 3 times larger than the Pensacola "Mount Dioxin", making it one of the largest onsite hazardous waste consolidation areas at any Superfund site in the nation!

Worse, ***few people are aware of the problems that were encountered in remediating the ETC wood treatment site*** in Pensacola, where residents were exposed to hazardous toxins over a 3 year period while the excavation was taking place, which lead to the relocation of some 420 households, or how the containment and capping of Mount Dioxin was actually a complete failure!

The new book, ***"Sacrifice Zones"*** by Steve Lerner, details how the cap on Mount Dioxin lasted only 8 or 9 years before it was considered failed by the US Army Corps of Engineers. Children were even trespassing on the site and using the cover of the hazardous waste pile as a giant slide for their amusement, he noted, and the entire waste pile had to be uncovered and reburied (at great taxpayer expense) by creating a lined hazardous waste landfill onsite.



[Aerial View of Mount Dioxin, Pensacola, FL - Imagine a mound at the Koppers site 3 times larger than this one.]

Lerner's book describes the issues with Mount Dioxin like this:

> "The EPA's preferred remedy [for dealing with the failure of Mount Dioxin] is to rebury the wastes on site along with contaminated soils from the surrounding communities in an expanded pit....The depth at which engineers plan to rebury the waste is particularly problematic on this site because it is only five feet above the high groundwater elevation, [Wilma] Subra explains. In other words, this large volume of untreated, highly toxic wastes will be separated from the high groundwater mark in the shallow sand and gravel aquifer by only a leaky piece of plastic and five feet of soil...
>
> ...Reburying the wastes without treating them is not only ill advised from a public health standpoint- it is also against Florida law, [Wilma] Subra contends. "The state of Florida has a prohibition on landfills for such waste," she notes. Nevertheless, a deal has been made to go ahead with the re-internment of Mount Dioxin."

According to the Institute for Southern Studies website: ***"On July 8, 2009, the last shovel of soil from the ETC stockpile [Mount Dioxin] was excavated and permanently interred along with approximately 500,000 cubic yards of contaminated soil in an 18-acre on-site containment cell."***

These accounts detail how the EPA is planning to implement a remedial strategy that has already failed at another Superfund site here in Florida, **only on a scale that is 3 times larger!** But unlike the ETC site, the large area needed for containment at the Koppers site means that there will not be enough area left over to rebury the hazardous waste if this first containment effort fails in the future. This is especially true if the site is redeveloped as commercial property.

This is why it is so vital that as much toxic soil and debris as possible be removed, (or treated and removed), from this site. We cannot afford another failed Superfund site cleanup, as has happened in the past. Our water supply will be in jeopardy in the future by any failure of this cap-and-cover strategy.

*EPA Response:*
*It should be noted that the Koppers Site has not yet entered into the design phase when the exact dimensions and design of the cap will be determined; however, estimates as illustrated on Figure 2 of the Onsite Preferred Remedy Fact Sheet are probably closer to 40 acres for the Consolidation area. The area covering most of the site illustrates regrade/cover areas which are not part of the impoundment cell.*

*Many of the points raised by the commenter related to the Escambia Site are factually inaccurate. The HDPE temporary cover alluded to in the comment performed as expected and was replaced by an engineered cap. The Escambia site is currently slated to be developed into a commercial area. The onsite soil consolidation area for the Koppers Site will be covered with an engineered cap and in addition will be covered with 2 feet of clean fill material. This cover/cap will be gently sloped to promote storm water runoff and prevent pooling. The cap will prevent surface exposure to contaminated soil and will limit rainfall from entering the subsurface within the consolidation area. This type of cap/cover has an indefinite life expectancy with minimal maintenance.*

3. EPA is Not being Transparent and is doing a Poor Job of Public Communication

The EPA's "Community Involvement Program (CIP), which is a required under Section 117 of CERCLA law, has bordered on being farcical. Considering that this site has been on the NPL for 26 years, it is only in the past few months that we have had any meetings with the public on this site, and by our count, there have only been 4 meetings with the general public in the last year. Yet, note what the EPA Document *"Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA"* states about timing of community relations activities on page 1-9:

> "Community relations is a useful and important aspect of the RI/FS process. Community relations activities serve to keep communities informed of the activities at the site and help the Agency anticipate and respond to community concerns. **A community relations plan is developed for a site as the work plan for the RI/FS is prepared**. The community relations plan is based on interviews with interested people in the community and will provide the guidelines for future community relations activities at the site. **At a minimum, the plan must provide for a site mailing list**, a conveniently located place for access to all public information about the site, an opportunity for a public meeting **when the RI/FS report and proposed plan are issued**, and a summary of public comments on the RI/FS report and proposed plan and the Agency's response to those comments.
>
> The specific community relations requirements for each phase of the RI/FS are integrated throughout this guidance document since they are parallel to and support the technical activities. Each chapter of this guidance has a section discussing community relations requirements appropriate to that specific phase of the RI/FS. Additional program requirements are described in the draft of Community Relations in Superfund: A Handbook (U.S. EPA, Interim, June 1988)."

For reasons we do not understand, the normal guidelines for CIPs were not followed with regard to the Koppers site, to the detriment of our local community. The EPA meeting which occurred last week, was a shining example of poor public communication. Like most citizens, we received no notification whatsoever from the EPA about this meeting. There seemed to be a total breakdown of communication about this important public meeting. The lack of notification was blamed on an absence of email addresses and on the EPA database; but this excuse fails short given the amount of email communication received by EPA from the community in the past few weeks.

The lack of transparency on the EPA's part is not limited just to the CIP either, as EPA staff have typically displayed an *"ivory tower mentality"* that creates barriers to interpersonal communication and fosters distrust throughout the community. We can cite numerous examples of this, including: 1.) how you yourself suggested in a letter to the City of Gainesville that the EPA did not want to allow a copy of their draft Feasibility Study to be available at our local public library - a violation of the Florida Sunshine Law and Florida Public Records Act statutes, to 2.) a more recent exchange where you told Dr. Pat Cline, the designated Technical Advisor for Protect Gainesville's Citizens (PGC), and PGC staff, that they would have to use the Freedom of Information Act (FOIA) law to obtain copies of important technical reference documents about the Koppers' site for their research. This lack of transparency has been a huge disservice to our community.

*EPA Response:*
*The Community Involvement Plan for the Site has been finalized and operational since 1989. More recently, community interviews were conducted for the Site during the week of August 1, 2010. Individual interviews, along with a focus group meeting, were held to identify concerns of the community for the CIP. A draft copy of the CIP was presented to the community for a 30-day comment period to allow additional information, concerns, and/or suggestions to be collected. This was done in response to community outcry for intense participation. The 30-day comment period was from August 16, 2010 until September 15, 2010. The CIP was placed in the Information Repository in November 2010. In order to address community outreach and involvement, the EPA has also included in the CIP an opportunity for the document to be revised, upon review, every six months. The current document does address community concerns and comments, and reflects a major revision from the previous version.*

*Community concerns have been identified and addressed in Table 3.1 of the revised CIP. Table 3.1 lists the concerns and EPA's responses to the concerns. The identified concerns range from community outreach activities to technical and redevelopment issues. Comments for future CIPs will be reviewed every six months and revised, if necessary. The community will be informed of the next revision of the CIP. Please note that comments have been, and will be, received from a multitude of individuals and interested community groups, which will take time to process, but will be included in future versions of the CIP.*

*The toll free numbers for EPA representatives have been consistently provided on information that is distributed to the community. These include, but are not limited to, Fact Sheets, Question and Answer Sheets, web sites for EPA and Protect Gainesville's Citizens, the administrative record, the CIP, and business cards. The current toll free numbers are 1-877-718-3752 or 1-800-432-3752.*

*The mailing list for the Koppers community is a living document and updating and maintaining it is an ongoing activity. The initial mailing list was developed by obtaining* *residential and/or business addresses within a half mile to one mile radius of the Site. The use of sign-in sheets is another method used to identify addresses of interested citizens for the mailing list. Some residents who attend meetings request that their information not be shared with third parties. Therefore, to respect their wishes and privacy, the residential addresses are used for the mailing list only. Additionally, the EPA is developing a new list of e-mail addresses for the Koppers community to use as another method to provide information as it becomes available to the public.*

*Public Meetings*

*As part of the EPA Administrator's emphasis on enhanced public participation opportunities, EPA staff were involved with two public availability sessions in concert with the FDEP and Florida Department of Health. EPA staff participated in seven special Gainesville City and/or Alachua County Special Commission meetings presenting information related to Koppers Site cleanups and participated in listening sessions for members of the public on May 1, 2008, March 9, 2009, August 17, 2009, August 31, 2009, January 4, 2010, April 29, 2010, and October 6, 2010. Five fact sheets were produced and distributed to provide information related to offsite soil sampling, onsite and offsite proposed plan responses to comments received during EPA's August 5, 2010, proposed plan meeting. On June 15, 2010, EPA participated in a Site walk with citizens who had concerns about possible buried drums. PRP Beazer East developed and submitted an October 11, 2010, workplan to investigate possible buried drums onsite. On September 22, 2010, EPA and Beazer East provided a Site tour to answer questions related to upcoming demolition activities. EPA representatives met with the former Gainesville Mayor and GRU staff on January 6, 2010, and November 23, 2009, to discuss FS concerns.*

**4.** Risks to Human Health from Dioxins, Arsenic and other COCs are Being Downplayed

We spent a great deal of time reviewing both the Draft (Working Copy) and Final versions of the Feasibility Study (FS) and the Human Health Risk Assessment (HHRA) documents.

We are aware of several concerns regarding the HHRA itself, which was prepared by AMEC on behalf of Beazer East. One important example is a letter written today (Oct. 12, 2010) by Dr. Stephen M. Roberts, former EPA FIFRA SAP Chair, to Bob Palmer, Chair of the Alachua County Environmental Protection Advisory Committee about the results from the HHRA. (See answer to question #3 in excerpt from Dr. Robert's letter below.)

3. Did AMEC calculate the risks reasonably? Do you agree with AMEC's assessment of risks on-site?

   We have raised numerous technical issues with the human health risk assessments developed by AMEC. These have been outlined in detail in technical reviews provided to the FDEP for each risk assessment. The bottom line is that we have recommended to FDEP that they should not accept any of the human health risk assessments submitted thus far.

We studied in detail the Feasibility Study, and even ran a line-by-line comparative analysis of the Draft (Working Copy) version of the Feasibility Study vs. the Final version of the FS. We noticed that whoever edited this final FS modified almost every reference to the toxicological and health risk aspects in the FS document. We found numerous changes made that downplay the health risks from exposure to toxins. The effect is that the final version of the FS is weaker, less protective of human health, omits new data, and utilizes vague, euphemistic and misleading terms to replace more specific and concrete phrases from the prior draft FS.

It's as if the new FS sought to *remediate the toxic contamination found at this site via prose, rather than science*. The results are embarrassing, and seem designed to benefit the PRP, not human health or the environment. How the EPA could allow this to happen unchecked is astonishing, especially given that the PRP is supposed to *"conduct the FS under the review and oversight of the EPA"* and *"correct any deficiencies discovered during the conduct of the Agreement"*.

We can state this with great accuracy - we utilized a software program called ***Araxis Merge*** to evaluate the two FS versions side-by-side and line-by-line to see the exact changes that had been made between the versions. As a result, we noticed that many specific key phrases were altered in the final FS version to dilute the content in this version of the report. We found phrase substitutions such as: **"impacted media"** to replace **"contaminated media"**, **"chemicals in the environment"** to replace **"chemical contamination"**, **"constituents at the site"** in lieu of **"site contamination"**, and so on.

In the table below is one example of the kind of "remediation by prose'" that took place when EPA's FS for the Koppers Superfund site was "sanitized" by a Beazer's environmental subcontractor. This excerpt serves as a clear example of why our residents have filed a formal complaint with the Florida Board of Professional Engineers demanding review of these documents, which were not signed and sealed by a professional engineer, as required by Florida law (which is an ARAR you were previously not aware of.)

This particular example, where the text was *adulterated* in the Final version of the Feasibility Study by some unknown author, has a potentially severe and negative impact on the offsite soils remedy for every single resident whose yard is contaminated in the adjacent neighborhood. Notice how the wording about "$1 \times 10^{-6}$ cancer risks" and ARARS were removed from the final FS - this kind of tampering appears to violate the intent of the Adminstrative Order, under which PRPs like Beazer are allowed to write their own FS!

| Draft FS Wording | Final FS Wording |
|---|---|
| Line 345: Off-Site remedy OfR-4 allows for a flexible approach that may include institutional and/or engineering controls on properties that (1) are suitable for such controls and (2) have owners that are amenable to such controls.<br><br>**Where institutional/engineering controls are not possible or beneficial, surface-soil removal *would be applied.* The recommended remedy for areas of off-Site soil determined to pose unacceptable risks is OfR-4.**<br><br>**The area that will require remediation will be determined through the ongoing delineation and risk assessment process. In defining this area of remediation, Applicable or Relevant and Appropriate Requirements (ARARs) will be considered; this includes the Florida statutory provision that excess lifetime cancer risks be no greater than one in one million ($10^{-6}$).** | Line 345: Off-Site remedy OfR-4 allows for a flexible approach that may include institutional and/or engineering controls on properties that (1) are suitable for such controls and (2) have owners that are amenable to such controls.<br><br>**Where institutional/engineering controls are not possible or beneficial, surface-soil removal may be applied, *subject to owner approval.***<br><br>**<< TEXT ADDED IN FINAL VERSION:>>**<br>***If areas exceeding Florida's allowable risk limit or default SCTLs are identified by soil sampling, Beazer East, Inc., will contact each affected private property owner to discuss possible approaches to address the soil impacts on the private property. The private property owner may decline to allow Beazer to remediate soils. Neither the lead environmental agency (in this instance the EPA) nor Beazer is able to require a private property owner to allow access or require remediation to take place if the property owner decides not to do so.*** |

Still, having Beazer-funded subcontractors drastically modify and reword the EPA Feasibility Study to their liking does not remove the requirements upon the EPA to meet ARARs - which in Florida include SCTLs of 7 ppt for dioxins in residential soils and 30 ppt for industrial.

Even so, statements made by EPA staff at last week's EPA public meeting seem to indicate that Beazer East might try to use risk assessment methodologies to reduce or even eliminate the offsite remediation they would be required to do, even though soil samples show that dioxins are as high as 69 ppt in the adjacent neighborhood west of the site. This would clearly violate CERCLA guidelines as well as Florida statutes and Administrative Code, and would quickly lead to a Federal lawsuit. The EPA should use every means necessary to prevent this from happening, because allowing lesser cleanup targets than the Florida SCTLs for offsite soils sets a precedent with wide-ranging deleterious impacts on future site cleanups throughout our state.

In fact, regarding such precedents, the book "Sacrifice Zones" in chapter 2 about the Escambia Treatment Company site in Pensacola, in a section entitled "How Much Dioxin is Too Much", author Steve Lerner makes it clear that the EPA is required to meet the 7 ppt standard, and that EPA's standards were actually much lower than they are now back in the early 1990s! This passage reads:

> **"How Much Dioxin Is Too Much?**
>
> There is also the question of what constitutes an adequate cleanup for soils contaminated with dioxin. <u>When Williams and CATE first began demanding a relocation and cleanup in 1991, the U.S. EPA standards for dioxin in soil were 2 ppt in residential areas, 20 ppt in commercial areas, and 200 ppt in industrial zones.</u> In 1998, however, the EPA issued a policy directive lowering the protection

standard to 1 ppb [1000 ppt]. *This was meant to be an interim standard that would be reset once the EPA's dioxin health risk assessment was concluded. Almost ten years later that report has yet to be issued.*

To further complicate the question of how much dioxin should be permitted in the soil in residential areas, there is another set of federal Superfund rules which require that federal agents clean up the soils to state standards, which in Florida is 7 ppt in residential areas and 30 ppt in commercial/industrial areas. **State and federal lawyers argued over which standard should apply for years finally concluding that the state standard should prevail.** As a result, the area on which a commercial/industrial park will be built will be cleaned up to 30 ppt of dioxin."

Source: *"Pensacola, Florida: Living Next Door to Mount Dioxin And a Chemical Fertilizer Superfund Site"*, by Steve Lerner, from the website for The Collaborative on Health and the Environment: http://www.healthandenvironment.org/articles/homepage/2628

*EPA Response:*
*Concentrations of site-related contaminants in off-site soil are being compared to the Florida SCTLs. SCTLs are conservative and protective of human health for intended uses of the land (i.e., there are different cleanup levels for residential and commercial land uses). The Florida Department of Health (FDOH) is conducting a health survey in the vicinity of the former Koppers Site and continues to issue health advisories as soil sampling results are obtained.*

## The EPA's Plan Does Not Require Epidemiological Studies or Biological Testing of Residents, Homes or Schools.

The EPA's plan fails to address the issue of epidemiological studies and biological testing for residents who live in the neighborhood next to Koppers and have long been exposed to toxins in the dust that blows offsite, as well as the contaminated stormwater that leaves the site and flows into Springstead Creek.

These residents, who are referred to as ***"receptors"*** throughout the FS and other Koppers reports, have been exposed to these toxic, carcinogenic, mutagenic and teratogenic compounds for decades, and **report many accounts of multiple cancers within the same household, cancer "clusters" within the neighborhood, mysterious pet cancers and premature deaths, and other health issues, such as MS, Parkinsons, skin and thyroid problems.** As EPA scientists well know, many of these health problems can be caused by exposure to toxic compounds, such as dioxins, arsenic, pentachlorophenol, benzo(a)pyrenes, hexavalent chromium and mercury, all of which are found on the Koppers site, and many of which can be found in the offsite soils and storm water.

This is why we recommend that the EPA push the CDC and the FDOH to begin epidemiological studies of the neighborhood and biological testing of the residents and their homes.

Yet, in spite of numerous requests by many citizens and our city and county commissioners to test for dioxins in the soil and indoor dust at nearby schools and daycare centers, the EPA has yet to require Beazer to do this, or to do it themselves. Such testing has been done at other Superfund sites, which has even led to the closure of some public schools, due to high dioxin levels.

The EPA, the ATSDR and the FDOH are well aware that exposure to dioxins pose a special risk to small children due to their increased metabolism and sensitivity to environmental contaminants, and that **children are at a greater risk of cancer and non-cancer health hazards from dioxin exposures.** Their failure to protect our children's health is nothing short of reprehensible negligence.

**There is a day care center located directly across the street from the Koppers main entrance,** where to date no soil testing has ever been done. The Stephen Foster Elementary School is located 0.6 miles northwest of the site, and the Sidney Lanier Elementary School is south of the site at about the same distance. Therefore, we recommend that these schools be tested immediately for dioxins, and if the levels are found to be elevated, additional testing should be done at other nearby schools. There are at least a dozen schools and day care centers within a one mile radius of this toxic site.

Worst of all, the ATSDR has delegated its legal duties to perform accurate health assessments to the Florida Department of Health, as it has similarly done in 38 other states, yet when we contacted Jennifer Freed of the ATSDR, whose signature appears on the June 2010 Koppers Health Assessment, she was unable to provide any backup data or calculations for us regarding this particular health assessment, which we believe indicates that the ATSDR is "rubber-stamping" health assessment reports produced by state health departments, without reviewing the data in the reports.

When we finally did receive the actual data and calculations from FDOH for this report, and had other risk assessors review it, they were not in agreement with the conclusions of FDOH, and believed that the report did not take into consideration non-cancer risks for children.

In other words, other risk experts believe that the report by FDOH minimized the real risk posed by the dioxin levels in the soil in the residential neighborhood next to the Koppers site. Such actions by ATSDR and FDOH do not meet the intent or requirements of CERCLA to provide accurate health risk assessments for residents near Superfund sites. These requirements are legal ones, which are spelled out clearly in the aforementioned EPA Guidance document in Section 1.3.4 on page 1-4:

### *1.3.2 Health Assessments*

Under CERCLA §104(i) (Health-Related Authorities),the Agency for Toxic Substances and Disease
Registry (ATSDR) must conduct a health assessment for every site proposed for inclusion on the NPL. The purpose of these health assessments is to assist in determining whether current or potential risk to
human health exists at a site and whether additional information on human exposure and associated health risks is needed. The health assessment is required to be completed "to the maximum extent practicable" before completion of the RI/FS.

The EPA even publishes a detailed guidance document entitled ""CERCLA Baseline Risk Assessment Human Health Evaluation EH-231-012/0692 (June 1992)", that spells out the EPA's and the RPM's responsibilities to ensure that the Health Assessments are conducted properly (see it here: http://homer.ornl.gov/nuclearsafety/env/guidance/cercla/cer-risk.pdf )

Thus, it is our opinion, that the practice of the ATSDR delegating its responsibilities to perform Superfund site health assessments to lesser-qualified and severely-underfunded state health departments is a practice that on its face appears completely illegal under CERCLA Section 104 and 40 CFR 300.430, and should be discontinued. Most importantly, nothing in these statutes eleviate the responsibility of the EPA, and in particular, the EPA RPM, to ensure that the health assessments are accurate and done properly. Thus, it appears that EPA Senior Management needs to get involved in reviewing this vital issue with ATSDR Senior Management to determine whether this practice of delegation health assessments should be allowed to continue.

*EPA Response:*

*EPA has and will continue to follow the Risk Assessment process as outlined in the National Contingency Plan. Although EPA is not tasked to direct nor does it have the authority to direct the State of Florida or ATSDR in conducting such studies the director of the CDC, Dr. Thomas Friedman, provided the following in a November 17, 2010 letter to Ms. Cynthia Moore Chestnut, Chair Alachua County Board of County Commissioners:*

> *"The Agency for Toxic Substances and Disease Registry (ATSDR) has been actively supporting the Florida Department of Health (FDoH) in evaluating potential community exposures to contaminants at this site. This partnership is part of ATSDR's long-standing cooperative agreement program with the FDOH.*
>
> *In a July 2009 report, the FDOH informed the community, the Florida Department of Environmental Protection, and the U.S. Environmental Protection Agency of a possible health concern due to dioxin contamination found in the City of Gainesville easement outside of the Cabot-Koppers' property boundaries. Based on this finding, FDOH recommended restricting public access to this area and collecting more soil samples in the community. The Florida Department of Environmental Protection is in the process of collecting these samples and the FDOH anticipates receiving the results to review in the coming months. FDOH is currently reviewing test results of off-site contaminated creek sediment. FDOH is reviewing cancer statistics for this community. Results of this analysis will determine whether the community surrounding the property has more cancers than expected. While this is not an analytic epidemiologic study meant to evaluate any potential association with dioxin exposure in the community, this assessment is typically the first step in gathering information on the overall cancer burden for a community and can be useful in determining future needs.*
>
> *At this time, a "door-to-door" health study based on possible dioxin exposures is not recommended. The potentially exposed population near this site is relatively small. Adverse outcomes associated with dioxin exposures have not been reported in populations exposed to dioxin at the levels seen to date in the community surrounding Cabot-Kopper's property. The health problems of the people living in this community are likely to reflect common health problems seen in any similar group of individuals who do not live adjacent to the Cabot-Koppers site. Given*

*these facts, it would not be possible to differentiate the health problems within this group that are the result of their exposures to dioxin.*

*We fully agree with FDOH's plan to evaluate and make recommendations to mitigate any current exposures to protect public health and to also take a broad look at cancer statistics within this community. We will continue to work with our FDOH partners in identifying and reducing Alachua community exposures to environmental contaminants on and near the Cabot-Koppers site and are open to reassessing the need for additional work should further information indicate that it is warranted."*

## 5. The EPA's Plan Fails to Address Air Quality Monitoring.

Air quality monitoring is not addressed in the RP, the FS or the HHRA, but should have been an important part of all 3 documents. In fact, the air quality monitoring should have taken place BEFORE the site was closed, and before either the FS or HHRA were written, so that the data could have been incorporated into these reports.

A letter dated July 2, 2009 from Randy Merchant of the Florida DEP to Scott Miller of EPA recommended air monitoring and added the following:

*"One human exposure pathway that has not been fully assessed is inhalation of contaminated dust from the site. Nearby residents, especially those west of the site, report wind-blown dust. Findings of decreasing concentrations of arsenic, benzo(a)pyrene, and dioxins in residential surface soil as you move away from the site support this assertion."*

More to the point - neither AMEC, Beazer, EPA, FDEP, or even ACEPD have done any air quality monitoring to date, and there is no plan to do air quality monitoring in the future that we are aware of. Yet, we know from what took place at the ETC site in Pensacoloa that the nearby residents will likely be exposed to contaminants when the onsite and offsite soils are remediated by excavation or grading.

Author Steve Lerner detailed exactly how bad the air quality became near the ETC site in Pensacola during their two year remediation, in his book "Sacrifice Zones":

> **"Back in 1992, while the excavation was in process, residents in Rosewood Terrace, Oak Park, and Goulding, the communities adjacent to the plant, and in Clarinda Triangle, the community across the highway, began to experience a sharp increase in acute respiratory distress, nosebleeds, headaches, nausea, skin rashes, and a host of other ailments. The air had become so filled with dust from the constant bulldozing that residents decided they had to do something. Contractors doing the excavating were supposed to keep the dust down by spraying it with water during the excavation, but as one commentator on engineering ethics pointed out, the expense of spraying the water was bound to cut into the contractor's profits......But for the residents who lived next door to the source of the problem, the cleanup itself was exacerbating already deplorable environmental conditions. The remedial excavation was creating clouds of contaminated dust in a heavily populated, urban area...**
>
> **...Joel Hirschhorn, a former government employee who worked on superfund issues for years... went through voluminous EPA documents and uncovered data, which demonstrated "that the original removal action had left very high levels of site contamination all over the site including in open pits and the areas not covered by the pile of excavated materials." The remedial work neither removed the threat to shallow groundwater, "given originally by the EPA as the main basis**

**for the action;" nor did it protect residents, he writes. This information provided Williams with a basis to contend that the removal action "had itself caused preventable health threats," he notes."**

**But no one listened to them, and the digging continued, spreading contaminated dust throughout the neighborhood. The poor air quality caused a number of problems. One woman said her daughters would not play outside because "the air would make them itch and burn, and give them headaches." Another woman who works in her garden says she gets so dizzy doing it that she falls against walls. Residents of all ages were affected. "It's not old people [who are dying of cancer]. It is some of the young people in their 40s and 30s, because there is a young man who died right there, he was in his 30s," a resident told a CNN reporter... Some residents even tried to stop the excavation by standing in the way of the bulldozers..."**

Based on this information, we think it is crucial that air quality monitoring devices be installed in several locations west and north of the Koppers site during the remediation. These devices should be monitored frequently by local EPD or EPA staff during remediation, to ensure that the kind of health hazard nightmares that took place in Pensacola don't happen here. This is the real "lesson learned" from the ETC cleanup.

*EPA Response:*

*EPA disputes the Commenter's contention that there were health issues related to remediation at the Escambia Site. As part of that remedial action, EPA designed and implemented a fenceline ambient air monitoring system that provided real-time data to monitor air quality during remedial activities. Environmental exposure from the former Escambia Treating plant has never been linked to dioxin levels in blood. EPA is requiring Beazer East to design and implement an ambient air monitoring network during the remedial design process to be implemented during remedial action at the Site. The air quality monitoring program for the Koppers remedial action will be designed to be equally protective of the public health.*

## 7. EPA Has No Plan to Relocate Residents Out of Harm's Way

The RP fails to consider the need to relocate the residents either temporarily or permanently, and states in the September 2010 fact sheet that, "Based on concentrations of contaminants in surface soil at surrounding residences and the practical remedial alternatives that exist for preventing exposure to these soils, relocation is not warranted." Yet, recent tests of indoor household dust in the local neighborhood using EPA method 4435, as detailed in the Federal class action suit against Beazer and Koppers (see Appendix of this PDF document: http://www.bancca.org/Docs/Koppers%20Superfund%20Federal%20Lawsuit%20Filing.pdf ), ***found indoor dioxin levels ranging from 34 ppt to 1150 ppt!***

How can the EPA ignore this data, when dioxin exposure poses such a clear threat to human health and these results clearly exceed even the EPA's own standards for dioxin level in soils! It is clear to us that Koppers created this widespread contamination now found in these homes and yards, and it is equally clear that Beazer and Koppers should be held responsible by the EPA to clean up this contamination. To do less, is to set a damaging precedent for all future cleanups at other sites throughout the nation.

In our opinion, the precedent for relocation of exposed residents has already been set with the Escambia Treatment Company site in Pensacola, where over 400 households were relocated in the mid 1990s, under nearly identical circumstances. Thus, we believe that several of the households in the area west and north of the Koppers site should qualify for relocation, and that the EPA is dragging its feet and not enforcing its own relocation policies at this site, all the while knowing that the remediation process will last "2.5 years", a length of time sufficient to qualify impacted residents for **permanent relocation** under the EPA's own *"Interim Policy on the Use of Permanent Relocations as Part of Superfund Remedial Actions."*

In fact, our own review of this EPA guidance document leads us to the conclusion that 3 of the 4 criteria needed to initiate permanent relocation apply in the case of the residents living adjacent to the Koppers site.

We refer specifically to these 3 specific criteria:

- **Permanent relocation may be considered in situations where EPA has determined that structures cannot be decontaminated to levels that are protective of human health for their intended use, thus the decontamination alternative may not be implementable.**

- **Permanent relocation may be considered when EPA determines that potential treatment or other response options would require the imposition of unreasonable use restrictions to maintain protectiveness (e.g., typical activities, such as children playing in their yards, would have to be prohibited or severely limited). Such options may not be effective in the long-term, nor is it likely that those options would be acceptable to the community.**

- **Permanent relocation may be considered when an alternative under evaluation includes a temporary relocation expected to last longer than one year. A lengthy temporary relocation may not be acceptable to the community. Further, when viewed in light of the balancing of tradeoffs between alternatives, the temporary relocation remedy may not be practicable, nor meet the statutory requirement to be cost-effective.**

*EPA Response:*
*It is not mandatory for EPA to consider relocation as a remedial option in the feasibility study. EPA is guided in its possible consideration of relocation as a remedy by an EPA guidance document entitled, "Interim Policy on the Use of Permanent Relocations as Part of Superfund Remedial Actions" published on June 30, 1999. A summary of that guidance related to the decision to consider permanent relocation in the feasibility study process is included below:*

> *"EPA's preference is to address the risks posed by the contamination by using well-designed methods of cleanup which allow people to remain safely in their homes and businesses. Having proven EPA's ability to successfully restore contaminated property at many Superfund sites, generally, EPA's preference is to address the risks posed by the contamination by using well-designed methods of cleanup which allow people to remain safely in their homes and businesses. This is consistent with the mandates of CERCLA identified above, and the implementing requirements of the NCP which emphasize selecting remedies that protect human health and the environment, maintain protection over time, and minimize untreated waste. Because of CERCLA's preference for cleanup, it will generally not be necessary to routinely consider permanent relocation as a potential remedy component."*

*There are four situations in which EPA may consider permanent relocations as part of the feasibility study development process. The current situation nearby the former Koppers Site meets none of the criteria listed. The four criteria are as follows:*

1) *Situations where EPA has determined that structures must be destroyed because they physically block or otherwise interfere with a cleanup and methods for lifting or moving the structures safely, or conducting cleanup around the structures are not implementable from an engineering perspective.*
2) *Situations where EPA has determined that structures cannot be decontaminated to levels that are protective of human health for their intended use, thus the decontamination alternative may not be implementable*
3) *Permanent relocation may be considered when EPA determines that potential treatment or other response options would require the imposition of unreasonable use restrictions to maintain protectiveness (e.g., typical activities, such as children playing in their yards, would have to be prohibited or severely limited).*
4) *Permanent relocation may be considered when an alternative under evaluation includes a temporary relocation expected to last longer than one year.*

*EPA and PRPs have routinely conducted cleanups in the State of Florida and throughout the U.S. that are contemplated in the preferred remedial alternative. The remedy is simple from an engineering perspective in that it involves removing up to two feet of top soil from an affected property and replacing it with clean fill, reseeding the yard, and reinstalling any landscaping that had to be removed from the yard to remove the soil. It is unlikely that structures nearby the former Koppers Site are contaminated. After the soil cleanup, there will be no use restrictions required for the yard as there will be clean fill in the yard which would pose no threat or require a use restriction. It is expected that the yard cleanups would take significantly less than one year based on the number of parcels believed to be affected and the simple implementation approach needed to complete the soil remediation.*

*Residents surrounding the Site are not located on a direct source area or a highly contaminated groundwater plume. Based on concentrations of contaminants in surface soil at surrounding residences and the practical remedial alternatives that exist for preventing exposure to these soils, relocation is not warranted.*

### 8. The EPA's Plan Fails to Compensate Residents for Losses in Property Values or Pay for Medical Testing

In addition, the EPA has failed to require that Koppers/Beazer East compensate the residents for the losses in the value of their properties and belongings. Their home values have plummeted dramatically in recent months, especially after the recent announcement of contaminated offsite soils by the Florida DOH and the ATSDR.

Neither is there any plan to provide for medical testing, or compensation for pain and suffering for the affected residents. Thus, many residents have had no choice but to sign on to a Federal $500 million class action suit to get relief for their losses.

The residents have strongly voiced that they want biological testing, including blood tests, to test for the presence of dioxins or other contaminants they have been exposed to over the years. They also want the dust in their homes and nearby schools tested for these same contaminants.Their request for biological testing is not without precedent either, as the same testing was done in Pensacola and showed elevated levels of dioxins in the local resident's blood, as the book "Sacrifice Zones" explains:

**"Blood sampling of former ETC workers and residents who lived near the plant were found to have "elevated levels of dioxin in their blood in excess of the general population" 25 years after the plant closed. [Wilma] Subra observes."**

Still, the EPA, ATSDR and FDOH have turned a deaf ear to the requests of local residents to have these vital tests performed. Some suggest this is part of a larger cover-up; that state and Federal government officials don't want these tests performed because the results might prove too shocking. Others suggest it indicates a failure of the federal and state government bureaucracies to protect the health of those who live in "sacrifice zones".

*EPA Response:*
*EPA's mission is to protect human health and the environment. Compensation to residents for property losses or medical monitoring is beyond EPA's statutory authority.*

## 9. The EPA was Negligent in Allowing the Koppers Site to Remain Open as a Treated Wood Facility for 26 years After the Site was Placed on the National Priorities List (NPL).

The Koppers Superfund site was placed on the NPL in 1984, yet over 20 years passed before any definitive action was taken by the EPA with regard to this site, in spite of reports showing that the groundwater contamination was spreading and leaving the site, and untreated storm water leaving the site violated Florida standards for both arsenic and chromium levels, by 8 and 18 times respectively.

The decades-long inaction by the EPA led to additional exposures of the nearby residents to contaminated dust and other toxic airborne contaminants, including toxic fumes released when treated wood or other waste was burned onsite by Koppers employees (something which the EPA has failed to acknowledge to date, although we have learned of numerous reports from local residents of such activities occurring.) Additionally, had the EPA acted more quickly, it could have prevented much of the toxic storm water pollution that entered Springstead and Hogtown Creeks, which feed directly into our local aquifer.

The EPA has failed in several of its enforcements duties as well, by not issuing any fines or penalties to Koppers or other contractors for environmental violations related to this Superfund site.

Had the EPA acted more quickly to close this toxic site, rather than allowing Koppers to continue to operate for an additional 25 years, this would have resulted in significant reductions of the exposure of local residents to the contaminants from the site- thereby reducing their incidences of cancer, neurological disorders, birth defects, reproductive disorders and premature pet deaths, all of which have been reported at a alarmingly high frequency in the surrounding neighborhood.

Ironically, it was a Letter to the Editor written by this author and published by the Gainesville Sun, which exposed long-term contract between Gainesville Regional Utilities and Koppers for treated wood utility poles, and the subsequent nullification of this contract by the Gainesville City Commissioners, that triggered the final shutdown of the Koppers plant – *not any enforcement action by the EPA.*

But it is clear that the EPA bears a large share of the responsibility for the additional environmental harm caused to the local residents by this additional, yet preventable, exposure to dioxins and other toxins.

For this reason alone, the EPA is obliged to provide the best remedy possible to deal with the offsite contamination in the neighborhood adjacent to the Koppers site, including relocation of affected residents whose property is now contaminated by dioxins, additional soil and indoor testing, testing of the nearby schools, epidemiological screening and biological testing of the residents.
This is the very least that the EPA can do to compensate for the problems your negligence and inaction have caused over the last 3 decades.

*EPA Response:*
*The Koppers facility operated lawfully under environmental and business permits issued by the Florida Department of Environmental Protection, the City of Gainesville, and EPA. EPA is not invested with the authority to close down a facility that is operating in compliance with all of its environmental permits.*

## CONCLUSION

In conclusion, we reject the EPA's poorly crafted Remedial Plan, the companion Fact Sheets, and the May 2010 Final Feasibility Study. These reports don't just simply fall short - they are completely insufficient.

The community of Gainesville, voted ***"No. 1 Place to Live in the US",*** deserves a better Remedial Plan for the Koppers Superfund site- one that protects human health, our environment, and our precious water supply.

We demand a plan that requires that Koppers and Beazer East pay to remediate the toxic legacy they have left behind, and compensate our residents who were unwitting victims of their toxic trespasses.

We deserve a remedial plan that does exactly that, and nothing less.

Sincerely,

**Joseph S. Prager, President**
BANCCA.ORG, LLC
**Email: inbox@bancca.org**

cc: Lisa P. Jackson, EPA Director
Stanley Meiburg, Director, EPA Region 4
Franklin Hill, EPA Region 4 Superfund Division Director
LaTonya Spencer, EPA Community Involvement Coordinator
Craig Lowe, Mayor, City of Gainesville
Fred Murry, Assistant City Manager, City of Gainesville
Sen. Bill Nelson (U.S. Senate)
Rep. Corrine Brown (Florida House of Rep., District 3)
Rep. Charles Chestnut IV (Florida House of Rep., District 23)
Rep. Cliff Stearns (U.S. House of Rep.)
Dr. John Mousa, Alachua Co. Environmental Protection Dept.
Rick Hutton, Gainesville Regional Utilities
Dr. Pat Cline, Technical Advisor, Protect Gainesville's Citizens
Bob Palmer, Chair, Alachua Co. Environmental Protection Advisory Committee
Robert Pearce, Technical Advisory Comm. Chair, Protect Gainesville's Citizens

### A.2.3 Beazer East, Inc

# Beazer

**BEAZER EAST, INC.** C/O THREE RIVERS MANAGEMENT. INC.
ONE OXFORD CENTRE. SUITE 3000. PITTSBURGH. PA 15219-6401

October 15, 2010
Mr. Scott Miller
Remedial Project Manager
Superfund Division
Superfund Remedial Branch
Section C
U.S. EPA Region 4
61 Forsyth Street, SW
Atlanta, GA 30303

Re: Transmittal of Comments
July 15, 2010 USEPA Proposed Plan
Cabot Carbon/Koppers Superfund Site, Gainesville Florida

Dear Mr. Miller:

Beazer East Inc. ("Beazer") appreciates the opportunity to provide its comments on the above referenced document. Beazer requests that its comments be carefully reviewed and considered, and that the comments be placed in the administrative record for the Site.

As you are aware, Beazer has extensive experience in the environmental remediation of former wood treatment sites. For this site, Beazer has retained au extremely well qualified group of technical consultants and experts to work on the various aspects of this site. For reference, I have attached the resumes of the consultants and experts who have been involved in the most recent feasibility studies, risk assessments, and remedy selection discussions. Collectively, this group has hundreds of years of environmental experience, much of which has been related specifically to the remediation of wood treatment sites.

Also, Beazer has developed, in cooperation with and approval by USEPA and FDEP, an extensive amount of site specific data and information upon which the current selection of a remedial action at the site can be based. As an illustrative example of the site specific data developed, I have attached a recent site figure which shows the current array of groundwater monitoring points available at the site. Since 2003, Beazer has invested over $20 million dollars developing this data and information. The development of this site specific data and information allows for an informed and educated decision to be made at the site relative to the prospective remedy.

Furthermore, Beazer believes that this information enables it to understand and appreciate the complex nature of this site. The remedy components selected for the site must fit together synergistically to ensure that true risk reduction is actually effectuated and that future risks are mitigated. As provided in the attached comments, Beazer has some significant reservations about individual aspects of the Proposed Plan, and where appropriate has recommended suitable alternatives. That being said, Beazer remains committed to the implementation of a protective remedy, one which relies upon containment, isolation, treatment and long term monitoring, and is appropriate for the conditions existing at the site.

Finally, Beazer understands the local stakeholders' frustration with the time this process has taken, and their desire to have the site remediation simply be finished. Beazer also wants to get to the end of the project as expeditiously as is reasonably possible. However, there is no simple solution to the puzzle presented by conditions at the site. The data collected from the site documents its complex nature and the need for a sophisticated, long term approach. Beazer, through its efforts, has demonstrated that it is fully committed to resolving environmental matters at this site and that it remains fully committed to a remedial approach that will support its and the community's efforts to restore the site to a position where it may once again, become a positive attribute of the surrounding community.

Again, thank you for your full consideration to our comments, and if I can be of further assistance or answer additional questions, please do not hesitate to contact me.
Sincerely,

Robert Markwell
President, Beazer East, Inc.

Cc: Lisa Jackson, USEPA Administrator
Gwendolyn Keyes Fleming, USEP A Region IV Administrator
Stanley Meiburg, USEPA Region IV Deputy Administrator
Kelsey Helton, FDEP
Senator Bill Nelson
Congressman Cliff Steams
Congresswomen Corrine Brown
Congressman Alan Grayson
Gainesville City Commission
Craig Lowe, Mayor City of Gainesville
Alachua County Board of Commissioners
Cynthia Moore Chestnut, Chair Alachua County Commissioners
Randal Reid, Alachua County Manager
Russ Blackburn Gainesville City Manger
Fred Murray Gainesville Assistant City Manger
Marion Radson Gainesville City Attorney
Dave Wagner Alachua County Attorney
Chris Bird Alachua County Environmental Protection Director
Bob Hunzinger, General Manger GRU

Beazer Comments on EPA Proposed Plan October 15, 2010

Beazer East, Inc. (Beazer) hereby submits its comments to the Superfund Proposed Plan (Proposed Plan) for the former Koppers portion (Site) of the Cabot Carbon/Koppers Superfund Site (Superfund Site)[1] issued on July 15, 2010 by the United States Environmental Protection Agency (EPA). The deadline for comments to the Proposed Plan was extended to October 15, 2010.

1 "Site" as used herein refers to the Koppers portion of the Superfund Site. "Superfund Site" is used to refer to the entire Cabot Carbon/Koppers Superfund Site.

As set forth below, Beazer has both legal and technical concerns with the Proposed Plan. On the technical side, Beazer's primary concerns with the Proposed Plan are in the following areas:

- The implementation of source treatment components (ISS/S and ISGS)
- The proposed remedies for off-Site creek sediments and soils
- EPA's selection of cleanup goals and related criteria

Beazer's legal concerns are primarily with the various off-Site components of the Proposed Plan, and, to a lesser degree, with EPA's communications to the public that may have had the unintended effect of creating the impression that the foreseeable future use of the Site may include an "unrestricted residential" component. In sum, the EPA's selection of remedial alternatives for off-Site sediments is arbitrary and capricious because EPA has not developed the information it is required to evaluate under the Remedial Investigation/Feasibility Study (RI/FS) process set out in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 CFR Part 300, nor has EPA appropriately evaluated such information. EPA should also reconsider its selection of Florida's default residential Soils Cleanup Target Levels (SCTLs) as off-Site cleanup standards in consideration of Beazer's recently-submitted "Derivation Of Off-Site Site-Specific Residential SCTLs" document. Finally, while Beazer continues to cooperate with EPA and the local governments regarding potential future uses of the Site, Beazer has not agreed to conduct a cleanup to "unrestricted residential" standards, and EPA should clarify its recent communications by more explicitly stating that the foreseeable future use of the Site future does not include an unrestricted residential component. Beazer's legal comments are included below in the sections discussing the technical components of the Proposed Plan to which the legal comments pertain.

The details of Beazer's concerns with the Proposed Plan, along with alternative proposals where appropriate, are presented in the following sections.

## 1. Implementation of Source Treatment: ISS/S and ISGS

The prescribed treatment of source areas in the Proposed Plan is flawed. The Proposed Plan calls for in-situ solidification/stabilization (ISS/S) in the Upper Hawthorn (approximately 25 feet to 65 feet belowground surface (bgs)) and in-situ biogeochemical stabilization (ISGS) in the Surficial Aquifer (approximately 0 to 25 feet bgs). This configuration for source treatment is impractical and has important and unnecessary implementation risks. Also, this configuration is not contemplated in any of the FS Alternatives, was not properly evaluated as an alternative source-treatment remedy, and should not have been listed as the preferred source-treatment design.

*EPA Response:*
*As the Commenter is aware, it is EPA's prerogative to consider any combination of individual remedy components that are considered within a feasibility study, such as the May 2010 collaborative FS, in making a preferred remedy selection. While the specific remedy component mix related to the use of in-situ soil solidification/stabilization (ISS/S) in the Upper Hawthorn Group and in-situ biogeochemical stabilization (ISGS) also known and hereafter referred to as in-situ geochemical stabilization (ISGS) in the Surficial aquifer for the four primary source areas were not paired in the FS for consideration, ISS/S and ISGS were considered respectively for use in the Surficial Aquifer and in the Upper Hawthorn Group. There is no technical nor legal justification for rejecting each technology's application in each aquifer as EPA has included in the preferred remedial alternative.*

*The Commenter appears concerned with EPA's conclusion that this approach is an optimal remedy approach for the Surficial and Upper Hawthorn Aquifers at the four primary source areas that will be located within a vertical barrier wall keyed into the middle Hawthorn Clay Layer, and paired with enhanced hydraulic containment in the Surficial Aquifer. EPA acknowledges that remedy implementation will require a carefully planned and phased implementation to achieve optimal results. All technologies considered for use at the Site have been successfully applied at other sites.*

*EPA has adjusted its preferred remedial alternative to require ISS/S be implemented in the Surficial Aquifer and the Upper Hawthorn Aquifer at the former North Lagoon and former Drip Track Area. EPA's rationale for this change to its preferred remedial alternative is based on its preference to use the more proven technology in areas below which there have been observed impacts in the Upper Floridan Aquifer. EPA acknowledges the Commenter's concerns related to implementation but notes that there have been other deep soil mixing uses of ISS/S of up to 110 feet below ground surface without negative unintended effects. EPA will provide real-time oversight and pre-construction planning from the U.S. Army Corps of Engineers personnel who have extensive experience in use of this technology for use in hazardous waste treatment and solidification in other contexts such as strengthening dam configurations, etc.*

As detailed below, the Proposed Plan's application of ISGS *above* ISS/S is impractical and it appears that EPA did not fully understand the implications or likely cost of such an application. Implementation risks associated with ISS/S in the Upper Hawthorn, and the availability of a more practical treatment technology, should lead EPA to reconsider the source treatment approach. Beazer proposes an alternative source treatment approach that is consistent with the overall remedial strategy and includes effectiveness demonstration for ISGS with an ISS/S implementation component as a contingency.

In considering the appropriate source treatment approach, it is important to recognize that in this instance (1) source treatment is applied primarily for the purpose of reducing potential dense non-aqueous phase liquid (DNAPL) mobility and (2) source treatment is applied within a robust containment system. The robust groundwater containment system described in the Proposed Plan effectuates protection of human health and the environment by eliminating migration pathways from the sources. The engineered containment system includes (1) a subsurface vertical barrier wall around the primary source areas to a depth of approximately 65 ft, (2) a low-permeability surface cover to limit water infiltration into the containment area, and (3) additional hydraulic containment specified for the UFA and for the Surficial Aquifer outside the containment area that provides an added measure of protection. In addition, the existing clay layers of the Hawthorn Group are significant hydraulic barriers, as evidenced by the 125-foot hydraulic head difference between the Upper Hawthorn and Upper Floridan Aquifer (UFA).

**a. Application of ISS/S in the Upper Hawthorn Has Serious Implementation Risks**

In order to implement ISS/S in the Upper Hawthorn in primary source areas, a large-diameter auger (LDA) would be used to make thousands of 6- to 10-ft diameter mixing holes approximately 65 ft deep. Each LDA borehole would be required to pass through the upper clay layer of the Hawthorn Group. This application has the potential to drag down any mobile DNAPL that is presently trapped in the Surficial Aquifer or within and on top of the upper clay layer of the Hawthorn Group. In addition, each LDA borehole could also cause vertical pathways or conduits for the downward migration of any mobile DNAPL, especially along the outer perimeter of the borehole.

While the upper clay of the Hawthorn Group is not a perfect impermeable barrier, it does provide some natural protection against DNAPL mobility in two important ways. First, this layer provides hydraulic resistance, as evidenced by the approximately 1- to 2-foot groundwater head difference measured between the Surficial Aquifer and the Upper Hawthorn in the primary source areas. Second, DNAPL collects on top of low-permeability materials and can become trapped within the pore spaces of fine-grained materials such as clays. The protective qualities of the upper clay would be significantly compromised, and likely eliminated, by application of LDA mixing into the Upper Hawthorn.

*EPA Response:*

*EPA disagrees that contaminant carry-down poses a significant limitation to effective implementation of ISS/S. A more likely scenario during implementation of the ISS/S component of the proposed remedy is that DNAPL-rich aquifer material would be homogenized with DNAPL-lean or DNAPL-free aquifer material within each auger-advancement zone. A new, temporary equilibrium could be established with (1) overall lower DNAPL concentrations (i.e., dispersion of the existing potentially-mobile DNAPL mass throughout a larger volume of subsurface material) and (2) temporarily changing potentially mobile "free-phase" DNAPL into a more residual DNAPL state (as potentially free-phase DNAPL is diluted with DNAPL-free material, away from the critical DNAPL concentration required to induce DNAPL mobility). This scenario envisioned by EPA is consistent with the Commenter's long-standing assumption that DNAPL exists in the subsurface under the source area footprints as primarily residual DNAPL and not free-flowing DNAPL. EPA believes that effective implementation of the proposed source area remedy would involve a phased approach beginning with injection of solidification agents at the deepest depths (approximately 65 feet* *below ground surface) prior to its use at shallower depths. EPA expects that the time-frame in which the new, temporary residual-DNAPL equilibrium to devolve into a condition where DNAPL mass might again coalesce into potentially mobile free-phase DNAPL is sufficiently long to allow implementation of the ISS/S under the Surficial Aquifer before there is any substantial danger of vertical DNAPL mobility. EPA will provide U.S. Army Corps of Engineers real-time oversight of this installation and pre-planning to address Commenter concerns and direct the implementation so that it is effective.*

**b. ISGS Has Technical Advantages over ISS/S**

On-Site pilot testing has demonstrated that ISGS is an effective technology for treatment of Site-related constituents. ISGS treatment results in (1) immobilization of DNAPL, (2) prevention of dissolution into groundwater, and (3) some removal of contaminant mass via chemical oxidation. This innovative technology has been successfully deployed at other sites and has resulted in demonstrable reduction in the mobility of DNAPL and DNAPL constituents. In the FS, all alternatives that involve the application of ISGS as a treatment technology include a redundant barrier-wall containment system and hydraulic containment in the UFA. ISGS provides source-area treatment, but is not critical to the elimination of groundwater-migration pathways. Rather, ISGS is a good fit in an overall containment/treatment remedial strategy and compliments the other selected technologies.

Other advantages of ISGS, as compared to ISS/S include:

- ISGS is more easily implemented and achieves greater volumetric coverage with fewer and smaller borings (2- to 4-inch diameter).
- With ISGS, there is a much lower risk of moving significant quantities of DNAPL downward during implementation.
- ISGS can be reapplied if necessary, or ISS/S can be applied later if ISGS is not effective.
- The ISGS reagent will follow preferential pathways, in effect "chasing" DNAPL to provide targeted treatment where the DNAPL resides.
- Unlike ISS/S, ISGS results in some removal of constituent mass through chemical oxidation.
- ISGS generates relatively little waste soil that must be treated and/or disposed of.
- ISGS can be applied in a targeted fashion (areas and depths where impacts are observed) resulting in less wasted effort in horizons that are not impacted (e.g. impacted horizons within the Upper Hawthorn).
- ISGS is more easily applied through former building foundations and subsurface obstructions (e.g. in Former Process Area) than is ISS/S, and will achieve better coverage in such areas.
- ISGS is much more cost effective than ISS/S (cost per cubic yard treated).
- ISGS is much less resource intensive than ISS/S in terms of energy use, carbon footprint, and water use (consistent with EPA's Superfund Green Remediation Strategy).

Both ISGS and ISS/S are active (aggressive) technologies rather than passive technologies. Challenges with effectiveness demonstration (e.g., measurement of mass flux) are not substantially different between ISS/S and ISGS.

Sufficient testing has been performed with ISGS to show that it will likely be effective at the Site. Beazer proposes to further demonstrate ISGS effectiveness at the Site through a full-scale demonstration.

*EPA Response:*
*EPA does recognize that ISGS (also identified as in situ geochemical stabilization or ISGS) has some advantages over ISS/S; however, EPA also is concerned about some of the disadvantages it has over ISS/S.*

*The innovative ISGS technology is much less disruptive to the site at ground level, making it easier to implement in terms of equipment mobilization and use, and smaller equipment footprint during implementation. Compared to the high-torque requirements of ISS/S, the ISGS technology is no more energy-intensive than well drilling, making it somewhat more of a "green remediation" technology than ISS/S. All of these factors have the added benefit of making ISGS less expensive to implement than ISS/S. One of the components in the ISGS fluid material is the strong oxidant permanganate. In addition to the geochemical encapsulation process, implementing ISGS also attacks some creosote DNAPL components by partial chemical degradation (destructive oxidation). This added "mass reduction" benefit does not occur to any substantial degree with the purely containment ISS/S technology.*

*For a given individual entry point, ISGS covers a smaller subsurface volume or zone than does ISS/S. The radius of influence of a single ISS/S entry point is on the order of 3-5 feet (equivalent to 28-80 square feet), whereas the radius of influence of the ISGS technology is rather variable and dependent on subsurface geology. In three dimensions, the ISS/S is a more coarse technology that addresses a larger volume of subsurface material as the auger advances vertically. This has the advantage of "treating" a larger volume of subsurface material per entry point, or per pass, but it has the disadvantage of being a less precise technology. The ISGS technology can (in theory) be used to target specific subsurface zones that are impacted, if those zones are well-characterized and identified. Identifying the location of DNAPL in the subsurface still is one of the most elusive aspects of DNAPL remediation, and thus the "targeted precision" advantage of ISGS is only theoretical at this time.*

*Further, the innovative nature of ISGS means that there is less field application history for this technology, and therefore less information with which to evaluate its effectiveness. ISGS effectiveness is open to debate in regards to the following factors:*

1. *Applicability within a broad range of geologic conditions and locations*
2. *Repeatability and consistency of effectiveness within a given set of geologic conditions and geographic locations*
3. *Accuracy and efficiency of locating DNAPL within the impacted subsurface*

4. *Efficiency of the ISGS reagent distribution within the impacted subsurface*
5. *Availability and accuracy of monitoring method(s) for confirming adequate reagent distribution*
6. *Relative degree of mass reduction (via permanganate oxidation) versus mass immobilization (via manganese dioxide precipitation/ encrustation/coating)*
7. *Degree of aquifer porosity/permeability reduction through general soil-pore clogging with precipitated manganese oxide*
8. *Efficiency of encrustation/coverage of DNAPL residual fluid/droplets*
9. *Efficiency of ISGS reagent to "find" DNAPL and DNAPL-components in the subsurface, after injection. One claim by the vendor is ISGS reagent's ability to follow the same porous pathways taken by the DNAPL material. This claim is debatable, based on differences in viscosity and fluid density between hydrophobic organic DNAPL material and aqueous-based ISGS reagent, and the highly variable surface characteristics likely created throughout the impacted subsurface zone from hydrophobic DNAPL-coated soil solids interacting with hydrophilic ISGS reagent which likely will thermodynamically follow the path of least resistance (i.e., hydrophilic pore spaces and pathways) when injected into the subsurface under positive pressure.*
10. *Longevity and mechanical strength of surface encrustation on DNAPL residual fluid/droplets*
11. *Longevity of unreacted ISGS reagent within subsurface aquifer zones*
12. *Secondary environmental impact from injected ISGS reagent (e.g., groundwater or subsurface soil quality)*
13. *Availability and accuracy of monitoring method(s) for determining parameters 6 through 12 over time in the subsurface, with a high degree of confidence.*

*EPA recognizes that the ISGS treatment will be implemented within the confines of the source area containment zone (isolated within slurry walls, and a low-permeability cap). However, the uncertainty associated with the 13 factors identified above (and perhaps others not identified here) is not lost on stakeholders and citizens in the community.*

**c. The EPA's Selected Source-Treatment Remedy in the Proposed Plan Is Not Practical**

When creating the 65-feet deep LDA boreholes specified in the Proposed Plan, and effectuating the column mixing (homogenization with a reagent), it is not feasible to mix only the lower portion of the columns. It is also not practical or advantageous to use two different stabilizing reagents (which also act as auger lubricants) for every column. Beazer has discussed this with two experienced LDA contractors and is convinced that such a deployment is infeasible or at least highly impractical. Based on the discussions at a technical meeting in Tallahassee on September 23, 2010, EPA's consulting contractor agrees.

Simply stated, it is not practical to apply ISGS (which is designed for injection, not LDA mixing) *above* ISS/S.

*EPA Response:*
*See comment response to comment 1.*

**d. The EPA Has Severely Underestimated the Costs of Its Proposed ISS/S-Based Remedy**

The driving cost in ISS/S source treatment is the LDA mixing cost which is roughly proportional to the volume of soil mixed. The volume of soil that would be mixed by LDA into the Upper Hawthorn (per the Proposed Plan) can be calculated as the total area of the primary source areas (approximately 5 acres) times the mixing depth (approximately 65 ft): the result is over half a million cubic yards.

Though details are not provided, it is obvious that the Proposed Plan dramatically underestimates the volume of soil that would be mixed and, therefore, dramatically underestimates the overall net-present value (NPV) cost of the full remedy. Apparently, the cost estimate in the Proposed Plan did not consider the soil in the Surficial Aquifer (from 0 to 25 ft) as soil to be mixed but, rather, used only the thickness of the Upper Hawthorn (or a part of that thickness) in deriving the volume to be mixed. However, as described above, and as acknowledged by EPA's own consulting contractor, it is impossible to mix a deep interval of soil using LDA without also mixing the soil above it.

The July 15, 2010, Proposed Plan estimates that the on-Site remedy will cost $43.7 million (NPV). Less than one month later, at a public meeting on August 5, 2010, EPA inexplicably presented a revised NPV cost estimate for the on-Site remedy that was nearly 50% greater: $65 million for the same remedy. In neither case were details of these cost estimates provided. The FS presents an NPV cost estimate of $75 million for Alternative OnR-5F, which – although not the same – is most similar to the Proposed Plan on- Site remedy. One of the appendices to the FS details this cost estimate. Based on subsequent conversations with potential contractors, Beazer contends that the Proposed Plan's on-Site remedy is likely to cost at least $75 million (NPV).

It is also important to note that over 78% of the construction costs for the Proposed Plan on-Site remedy are for application of the ISS/S with LDA soil mixing (based on the estimate worksheet in the FS). In Beazer's view it is not sensible to spend over three-quarters of the direct capital cost on an imperfect source-treatment component that is deployed within a robust containment system. It is the containment system (barrier wall, low-permeability cover, natural Hawthorn Group clay layers, and hydraulic containment) that reduces potential risks to human and ecological receptors. While source treatment is important for any CERCLA cleanup, putting the vast majority of the remediation dollars toward ISS/S at this Site does not make sense, particularly when there would be no measurable reduction in risk as a result of the significant increased expenditure on ISS/S application relative to the simpler ISGS technology which also achieves DNAPL stabilization.

*EPA Response:*
*EPA acknowledges that some costs were underestimated in the proposed plan. The updated remedial action included in this Record of Decision has an estimated cost for onsite remedial actions of $57 million dollars.*

*EPA disagrees with the Commenter's view related to the characterization of the natural Hawthorn Group clay layers as part of a "robust containment system." Clearly, the natural Lower Hawthorn Group has been and continues to provide protection at the Site from the transport of Site contaminants. However, data obtained at other portions in the Hawthorn clay layer indicate a much less effective barrier to contaminant migration exists in other portions of the Hawthorn clays. That data suggests that additional protection inside of the containment system is in order to account for uncertain Site-specific geologic conditions.*

*EPA also disagrees with the statement that there would be "no measurable reduction in risk as a result of the significant increased expenditure on ISS/S application relative to the simpler ISGS technology which achieves DNAPL stabilization." EPA views this statement as professional opinion in lieu of data that would substantiate this claim. EPA believes that while ISGS has promise to reduce principal threat waste mass, unlike in-situ solidification/stabilization, and also to reduce aquifer permeability/transmissivity, there are significant uncertainties related to field implementation that would prevent this conclusion from being made at this time.*

**e. Beazer Proposes an Effective ISGS Approach with ISS/S as a Contingency**

For the reasons identified above, the selected remedy in the ROD should specify ISGS source treatment after additional effectiveness demonstration. Beazer proposes to conduct a full-scale demonstration of ISGS in one of the source areas early in the remedial design period. If ISGS proves to be ineffective, ISS/S would be implemented at all source areas.

Logistically, it would make sense to apply ISGS in the Surficial Aquifer and Upper Hawthorn (like FS Alternative OnR-5E) at the Former Process Area as a full-scale demonstration of the technology. This could be done during the remedial design time period while other components of the remedy are designed. Because the Former Process Area has many underground obstructions (former foundations, pipes, etc.), ISS/S – with its large diameter boreholes – would be very difficult to apply in this area. Also, DNAPL has been collected (in small amounts) from both the Surficial Aquifer and Upper Hawthorn in the Former Process Area, meaning that DNAPL mobility reduction could be observed and documented in a full-scale demonstration. Impacts are not observed in the UFA near the Former Process Area. ISGS treatment in the Former Process Area will likely result in decreased flow of DNAPL to DNAPL collection wells and the formation of stable-mineral crusts on DNAPL globules. The results of an ISGS demonstration in the Former Process Area could be monitored over a period of many months to determine likelihood of long-term effectiveness and suitability of use in the other source areas.

For the Former North Lagoon and Former Drip Track, the source treatment should also be ISGS in the Surficial Aquifer and in the Upper Hawthorn (like FS Alternative OnR-5E). ISGS should be applied in the Surficial Aquifer only at the Former South Lagoon (like FS Alternative OnR-5C) because this area has less observed DNAPL impacts than the other three source areas and there are no nearby impacts in the UFA.

In sum, ISGS should be the primary source-treatment component and ISS/S should be a contingent action to be applied if ISGS proves to be ineffective.

*EPA Response:*
*EPA agrees that ISGS shows promise in treating DNAPL and reducing aquifer permeability/transmissivity. EPA also agrees that the former Process Area would be an optimal location for a full-scale pilot implementation of this technology during the remedial design process in both the Surficial and Upper Hawthorn aquifers. EPA also believes that this technology could be used to address the Surficial and Upper Hawthorn aquifers in the former South Lagoon. EPA believes that a full-scale implementation during the remedial design phase will provide the information and data necessary to determine preliminary technology effectiveness.*

*Therefore, EPA is updating the preferred remedial alternative to provide for full-scale implementation of ISGS in the former Process Area and former South Lagoon in both the Surficial and Upper Hawthorn aquifers during the remedial design. Should ISGS prove to be ineffective, it will be necessary to use ISS/S in lieu of ISGS.*

## 2. EPA's Selection of Off-Site Remedies Was Not Consistent with the NCP

The selected remedies for off-Site sediments in Springstead Creek and Hogtown Creek (the "Creeks") should not have been part of the Proposed Plan and should not be part of the forthcoming ROD amendment. The proposed remedies for the Creeks in the Proposed Plan are not based on any evaluation of alternatives, as required by CERCLA and the NCP. Moreover, most of the impacts in the Creeks are not solely or even primarily attributable to Beazer or to activities at or on the Koppers portion of the Superfund Site. In addition, the cleanup criteria that are identified in the Proposed Plan are inappropriate. Further discussion regarding each of these shortcomings is provided below.

### a. Selection of the Off-Site Sediment Remedy Was Not Vetted Through the NCP's RI/FS Process and Was Arbitrary and Capricious

In its proposed selection of off-Site sediment remedies for the Creeks, EPA failed to comply with the requirements of the NCP that require EPA to first identify and evaluate alternatives before proposing one of those alternatives as the preferred remedy. Indeed, with respect to EPA's proposed off-Site sediment remedies in the Creeks, EPA neglected identify or evaluate the selected remedies prior to issuance of the Proposed Plan.

For the first time in the Proposed Plan, EPA proposed remedies for off-site sediment remediation that were never evaluated in the FS ("Excavation and removal of impacted sediment in excess of the probable effects concentrations") as well as remedies for which costs were never considered ("Accurate cost estimation of the removal component of OfR-2 and OfR-4 depends on . . . significant unknowns."). These flaws are not overcome by the issuance of "clarification and additional information about off-Site soil activities" in the Follow-up Off-Site Soil Remedy Fact Sheet. That document still neglects to provide cost estimates for the proposed off-Site sediment remedy and still fails to provide detailed analyses of off- Site sediment alternatives, both of which are necessary for remedy selection, as required by the NCP.

Neither the Feasibility Study nor the Proposed Plan can form a legitimate basis for a ROD amendment for the proposed off-Site sediment remedy. Until these deficiencies are remedied through the RI/FS process, the forthcoming ROD Amendment should not include any off-Site sediment remedy.

CERCLA requires EPA to select remedial actions in accordance with the NCP and to provide for a cost effective remedy. *See* 42 U.S.C. §§ 9604(a)(1), 9604(a)(4), 9621(a), and 9622(a). CERCLA § 113(j)(2) provides that courts shall uphold [EPA's] decision unless the objecting party can demonstrate, on the administrative record, that the decision was arbitrary and capricious." 42 U.S.C. §9613(j)(2).

Where EPA action is not consistent with the NCP, courts have held that such action is arbitrary and capricious. *United States v. Burlington Northern Railroad Co.*, 200 F.3d 679, 694 (10th Cir. 1999) (holding that EPA acted arbitrarily and capriciously when it fundamentally altered a remedy with respect to scope and cost without following the NCP's required procedures for proposed amendments regarding cost, and noting that the "failure resulted in excluding the public and Potentially Responsible Parties . . . from the decision-making process, in violation of the [NCP]."); *Washington State Department of Transportation v. Washington Natural Gas Co.*, 59 F.3d 793, 802 (9th Cir. 1995) (noting that the NCP guides federal and state response activities and that such parties must follow the "detailed process set forth in the NCP" to recover their costs.)

Here, the Proposed Plan improperly selected a remedy for off-site remediation of sediments that was entirely missing from the Feasibility Study: excavation and removal of impacted sediment in excess of the probable effects concentrations. This remedy selection is inconsistent with the NCP because EPA did not "evaluate alternatives to the extent necessary to select a remedy," which is the very purpose of the RI/FS process. 40 C.F.R. §300.430(a)(2). According to the NCP, such an evaluation includes project scoping, data collection, risk assessment, treatability studies, and analysis of alternatives. *Id.* EPA's selection of sediment excavation and replacement in Hogtown and Springstead Creeks failed to consider, implement or incorporate any of these NCP requirements. And EPA's selection process was equally deficient in its failure to adhere to the NCP's required levels of public involvement in the decision making process. 40 C.F.R. §300.430(c).

EPA's own guidance undermines the approach followed here. In 2005, EPA issued guidance documents that explained the investigation issues unique to sediment environments and the importance of developing clearly defined remediation goals based on site-specific data. *Contaminated Sediment Remediation Guidance for Hazardous Waste Sites* (2005) (Sediment Remediation Guidance). In particular, an excavation alternative "should include an evaluation of all phases of the project, including removal, staging, dewatering, water treatment, sediment transport, and sediment treatment, reuse, or disposal." Sediment Remediation Guidance (p. iv).

None of these project phases were detailed, analyzed or evaluated by EPA in connection with the Proposed Plan.

Chapter 7 of EPA's Sediment Remediation Guidance discusses the risk management decision-making process and the NCP's remedy selection framework. The Guidance states that "it may be appropriate to postpone a final decision if there is significant doubt about the proposed action's ability to reduce site risks substantially in light of the *potential magnitude of costs* associated with addressing certain sediment sites." Sediment Guidance 7-1 (emphasis added). Here, neither EPA, the public, nor Beazer properly can evaluate sediment remediation alternatives because no alternative has been presented for review and no costs have been estimated. A review of the administrative record indicates that EPA has not recognized the potential need for specialized equipment, the increased truck traffic for transport of dredged material, the impact of dredging and replacement to workers and the community, or the disruption to local residents and businesses that would occur during excavation and replacement of sediments in the off-site Creeks.

EPA's Proposed Plan is deficient because the off-site remedy selections do not reflect that the NCP's nine criteria formed the basis for the remedy selection decisions. In the complete absence of any evaluation of sediment remediation in the FS or Proposed Plan, EPA's off-site remedy selection is not consistent with the NCP, is arbitrary and capricious, and cannot form the basis for a Record of Decision.

*EPA Response:*
*Data from the Creeks have been part of the RI/FS process from the late 1980s to today. The 2009 Alachua County EPD data are simply the latest creek sediment data obtained to date. Neither ACEPD nor EPA have represented that the data obtained in 2009 were exhaustive in nature but were related to determining baseline conditions in creek sediments and investigating tar deposits that were visible in both creeks. The 1990 Record of Decision contained extensive information related to sediment contaminant concentrations in the creeks.*

*EPA's preferred remedial alternative decision addressing offsite sediment contamination was not arbitrary and capricious. In a letter dated September 24, 2009 from Scott Miller, USEPA Region 4 to Mr. Paul Anderson, Beazer East Consultant (AMEC), EPA provided comments on the Beazer East "Evaluation of Potential Ecological Risks Cabot Carbon Koppers Superfund Site, Gainesville, Florida (Report)" which included a request to provide a letter from Region 3 EPA approving the approach Beazer East used in the assessment. The submittal did not address dioxin TEQ and sediment sampling done by Alachua County EPD through an EPA grant that demonstrated dioxin TEQ concentrations in excess of upstream dioxin TEQ levels in sediment. In addition, the proposed plan allows remediation to background as well as the probable effect concentration (PEC)/ threshold effect concentration (TEC) paradigm. The TEC is the concentration below which adverse effects are not expected to occur. The PEC is the concentration above which adverse effects are likely to occur more often than not.*

*The Agency has evaluated the 2010 ecological screening level risk assessment and its accompanying revisions and does not believe that it provides an adequate basis to select remedial goals for offsite sediment. EPA drew this conclusion because this assessment was based on assumptions used in the screening level risk assessment that have not yet obtained acceptance by EPA and Florida DEP. The Agency gave Beazer East the opportunity to provide an adequate ecological assessment; however, the product delivered was not adequate for determining risks to ecological receptors. Therefore, EPA is utilizing conservative default ecological endpoints in identification and selection of cleanup goals for remedial goal selection with provision for utilizing background concentrations in determining appropriate cleanup goals should background concentrations be found to exceed the TEC levels.*

**b. Impacts in the Creeks Are Not Attributable Solely to Beazer or the Koppers Portion of the Superfund Site**

As evidenced by the work in the Creeks being performed by Cabot Corporation (Cabot) pursuant to, *inter alia*, Cabot's EPA-approved "TAR REMOVAL WORK PLAN" dated October 19, 2009, and "POLLUTION PREVENTION PLAN FOR TAR REMOVAL, SPRINGSTEAD & HOGTOWN CREEKS, GAINESVILLE, FLORIDA" dated July 2010, neither Beazer nor operations at the former Koppers portion of the Superfund Site are primarily responsible for the Creek conditions that may require remediation under the approach presented in the Proposed Plan. According to these two Cabot Plans, the Springstead and Hogtown Creek conditions are believed to have been created by historical discharges from the former Cabot Carbon property, including a massive release resulting from a historic breach of Cabot's former pine tar products lagoon.

In contrast to the above-referenced Cabot Plans, the Proposed Plan recommends off-Site sediment remedies in the Creeks but states that the Proposed Plan is only proffering these off-Site remedial options for impacts allegedly caused by the Koppers portion of the Superfund Site. There is no reasonable or rational basis for EPA to simultaneously approve Cabot Plans that acknowledge the Cabot portion of the Superfund Site is the source of Creek contamination, and then issue a Proposed Plan that suggests – without any supporting documentation – that an off-Site sediment remedy in the Creeks is connected or related to the Koppers portion of the Superfund Site.

Because most or all of any remediation-driving impacts identified in Springstead Creek and Hogtown Creek sediment resulted from releases at and from the former Cabot Carbon property, it seems inappropriate and arbitrary for EPA to direct Beazer to implement a remedy for off-Site sediments in the Creeks. And, it is even more confusing for EPA to use a ROD Amendment that purportedly pertains solely to the Koppers portion of the Superfund Site to implement this directive. Moreover, there is no indication in the Proposed Plan or any supporting documentation that EPA will use the forthcoming ROD Amendment to impose obligations upon Cabot requiring it – as a party primarily responsible for Creek contamination – to comply with, participate in, or even cooperate with Beazer, with respect to implementing the proposed off-Site Creek remedy.

While Beazer is not at this time refusing to participate on a limited basis in the investigation and potential remediation of the Creeks, it is arbitrary and capricious, as well as without any reasonable or rational basis, for EPA to use a ROD Amendment purportedly limited to the

Koppers portion of the Superfund Site to mandate a remedy associated with releases and contamination that even EPA has acknowledged are sourced from the Cabot Carbon portion of the Superfund Site.

*EPA Response:*
*The Commenter has made a determination that EPA has concluded that it is solely responsible for contaminant concentrations in Springstead and Hogtown Creeks. EPA has made no such conclusion and the proposed plan explicitly states that both Cabot Carbon and Beazer East both contributed to contamination in these creeks. On page 10 of EPA's July 15, 2010, proposed plan the following language appears:*

> *"Since inputs to both Springstead and Hogtown Creeks are attributable to releases from both the Koppers facility and the Cabot Carbon facility, cleanup will be performed jointly."*

*EPA expects Cabot and Beazer East to work together to determine which entity is responsible for remediation of contaminated sediments in the creeks.*

**c. The Cleanup Criteria for the Creeks Are Inappropriate**

**i. Available Data**

As noted above, the Creeks have not been part of the RI/FS process. The nature and extent of contamination in the Creeks has not yet been fully investigated. In January and February 2009, Alachua County Environmental Protection Department (ACEPD) collected samples from the Creeks at locations where there was evidence of tar and/or visually impacted areas, which were selected after regular probing found relatively isolated visibly affected areas. This method of sample selection led to a highly biased data set in that constituent concentration data are only available from visibly impacted areas and not from all areas of the Creeks. It is likely that if sediments without visible impacts had been sampled, substantially lower constituent concentrations than reported by ACEPD would have been found in the majority of Creek sediments. Thus, representative concentrations of all Creek sediments would be much lower than reported by the ACEPD and concentrations have not been established for the length of the Creeks, nor has there been an established pattern of tar or other constituents. In sum, EPA has not reviewed an unbiased and objective data set for the Creeks, such as would have been developed had the Creeks been part of a CERCLA and NCP compliant RI/FS process.

*EPA Response:*
*Data from the Creeks have been part of the RI/FS process from the late 1980s to today. The 2009 Alachua County EPD data are simply the latest creek sediment data obtained to date. Neither ACEPD nor EPA have represented that the data obtained in 2009 were exhaustive in nature but were related to determining baseline conditions in creek sediments and investigating tar deposits that were visible in both creeks. The 1990 Record of Decision contained extensive information related to sediment contaminant concentrations in the creeks.*

*The Agency has evaluated the Beazer East 2010 ecological screening level risk assessment and its accompanying revisions. EPA is not satisfied that it provides an adequate basis to select remedial goals for offsite sediment because this assessment was based on assumptions used in the screening level risk assessment that have not yet obtained acceptance by EPA and Florida DEP. The Agency gave Beazer East the opportunity to provide an adequate ecological assessment; however, the product delivered was not adequate for the site needs. Therefore, the Agency will utilize conservative default ecological endpoints in identification and selection of cleanup goals for remedial goal selection and include provisions to determine background concentrations in creek sediments to be used in place of the TEC, where appropriate. The Commenter will be obtaining additional sediment data to further characterize the creek sediments.*

**ii. Sources of Contamination**

The samples that have been collected demonstrate higher total PAH concentrations upstream of the Koppers Site, indicating sources other than the Koppers property are contributing the PAH concentrations measured in Creek sediments. Fingerprinting of the tar-like material identified by ACEPD is needed to determine the historic sources of this material and the potentially responsible parties (PRPs) associated with these sources. Once the PRPs have been established, both human health and ecological risk assessments may need to be completed to determine whether the environmental conditions warrant remediation, and to what extent.

*EPA Response:*
*The Agency provided comments on the 2009 document and the resulting document was deemed inadequate; therefore, the Agency will utilize conservative default ecological endpoints in identification and selection of cleanup goals for remedial goal selection in an effort to move the cleanup forward.*

**iii. Exposure Assumptions**

The comparison of sediment concentrations to FDEP residential SCTLs, as suggested by Table 1, to determine areas to be remediated is not appropriate and represents an incorrect and unrealistic application of those SCTLs. The surface soil CTLs make numerous highly conservative assumptions about potential exposures to constituents in soils. Many, if not all, of those assumptions do not apply to sediments. For example, the frequency of exposure to soil in residential yards is not the same as the frequency of exposure to the sediment in the creeks surrounded by dense growth, which makes access difficult. More appropriate exposure assumptions are warranted to first determine if potential risk above regulatory levels of concern exists to people possibly recreating in the creeks. If potential risk above regulatory criteria does exist, these same appropriate exposure assumptions could be used to develop reasonable cleanup levels to determine the extent of remediation.

Moreover, the Proposed Plan should not include any SCTLs for off-Site sediments as no evaluation of potential human health risks associated with off-Site sediment has been conducted. Until a risk assessment is completed that evaluates potential risk associated with hypothetical exposures to Site-related constituents in sediments, no basis exists to determine whether such hypothetical exposures may result in potential risks that exceed Florida's administrative target risk limits. Indeed, if a human health risk assessment were to be conducted, given the generally low concentrations of Site-related constituents reported by ACEPD in their notably biased sampling, it is very likely that any potential risks that may be associated with such constituents in sediments will not exceed Florida's target risk limits and, therefore, that no remediation of creek sediments will be required for protection of human health.

Although no formal human health risk assessment has been done, the Department of Health at the University of Florida indicated that risks are not expected given the remoteness of the creeks. Remediation may be needed to remove visible tar, but not because of the residual concentrations of wood treating related constituents.

*EPA Response:*
*The Commenter draws conclusions for which it has little, if any, data to support and as such constitutes professional opinion. EPA agrees that additional sampling data will be necessary to conclusively address contaminated sediments in the creeks.*

**iv. Ecological Risk**

The Proposed Plan (Page 11, column 2, paragraph 4 and Page 12, column 1, first paragraph) indicates that EPA will defer to conservative default ecological endpoints because the screening level risk assessment previously submitted by Beazer has not yet obtained acceptance by EPA and FDEP. Not having completed a review of the screening level risk assessment represents an inadequate basis to use "conservative default endpoints" as a basis to establish cleanup goals. EPA similarly needs to review the screening assessment and provide technical justification why the conclusions of the screening risk assessment are not valid. That screening risk assessment concludes that concentrations of wood treating-derived PAHs in Springstead and Hogtown Creek sediments do not pose an unacceptable risk and that no remediation is necessary.

As described in Beazer's screening assessment, whole sediment toxicity tests conducted at eight wood treating sites demonstrate that the concentration of total PAH in sediments needs to exceed at least 250 mg/kg before substantial (i.e., statistically significant) mortality of either *Hyalella* or *Chironomus*, two commonly used sensitive laboratory test species, is observed. The maximum total PAH concentration detected in sediment samples collected by ACEPD was 146 mg/kg, which was collected from a location upstream of the former Koppers facility. The highest total PAH concentration reported by ACEPD downstream of the former Koppers facility was 82 mg/kg. At no other wood treating site where such concentrations have been tested has Beazer found significant toxicity. Therefore, significant ecological risk to the benthic community attributable to releases from the former Koppers property is not expected in either Springstead or Hogtown Creeks.

If after its review of the screening level risk assessment, EPA were to disagree with the conclusion of an absence of an ecological risk, the Proposed Plan's indication that remediation of creek sediments is needed based upon "conservative default endpoints" is inconsistent with typical EPA practice, particularly in light of the information available at this Site. In most cases after a screening ecological evaluation is completed, those results lead either to the conclusion that potential ecological risk is not present and that further study and evaluation is not warranted or that a potential risk may exist and that more study and evaluation is needed to determine whether any potential risks are acceptable or not. Almost never does the agency reach the conclusion that remediation is necessary based only on the results of a screening evaluation. Exceedance of screening benchmarks, the only "ecological evaluation" presented in the Proposed Plan, does not connote that a risk exceeding regulatory action levels is present in Springstead and Hogtown Creek sediments. Thus, if after completing its review of the ecological screening evaluation provided by Beazer, EPA still believes that wood treating-related constituents in Springstead and Hogtown Creeks may pose an unacceptable ecological risk, the next step in the ecological risk assessment process would be to conduct a more refined evaluation of potential ecological risk. Such an evaluation may, but does not have to, entail the collection and toxicity testing of sediment from the creeks in which locations potentially affected by the Site will be compared to upstream reference locations. Given that the highest total PAH concentration was found upstream of the former Koppers facility, if the highest upstream locations also demonstrate the highest toxicity to test species, results of such site-specific toxicity testing would demonstrate the absence of a significant impact from the former Koppers facility and, thus, remediation would not be warranted. Regardless, until more refined, ecological evaluations are completed, no determination about the need to remediate creek sediments can be made. Consequently, any reference to remediation of Springstead and Hogtown Creek sediment needs to be removed from the Proposed Plan.

Additionally, cleanup goals discussed in the screening assessment have, in fact, undergone extensive review by EPA Region III. Region III accepted those data as the basis for a 100 ppm total PAH sediment cleanup goal that is protective of aquatic receptors. Therefore, the Proposed Plan is in error when it implies that the evaluation presented in the screening evaluation has not obtained acceptance by EPA. Those assumptions and clean up goals have been accepted by another EPA Region.

In summary, since submitting updated sediment toxicity information to Region IV, Beazer has received no information indicating why those findings are not applicable to PAHs that may have originated from the former Koppers property. All sediment samples downstream of the confluence with the drainage ditch from the Koppers facility which were collected by ACEPD during the past two years showed total PAH concentrations less than 100 ppm. Notably, those samples represent a biased data set, as the samples were collected from the most impacted areas

ACEPD identified in the Creeks following extensive probing and observation programs. Therefore, no reason currently exists to believe wood treating-related PAH concentrations in the creeks exceed the 100 ppm cleanup goal already deemed acceptable by EPA in another Region. In sum, there was no need to include cleanup of Springstead or Hogstown Creek Sediments in the Proposed Plan downstream of the Koppers portion of the Superfund Site. And, if a cleanup of sediments is ever required in the Creeks, any such cleanup is not related to wood-treating constituents and therefore should not be included in the forthcoming ROD Amendment.

*EPA Response:*

*EPA engaged Beazer East in trying to provide ecological endpoints. In a September 24, 2009 letter from Scott Miller (EPA Region 4) to Dr. Paul Anderson (AMEC), EPA extended the opportunity to work with Beazer in trying to establish acceptable resolution of ecological risk concerns. Subsequent responses have not been adequate for the Agency to provide approval; therefore, EPA will use* *conservative default ecological endpoints in identification and selection of cleanup goals for remedial goal selection or background concentrations.*

## 3. The EPA's Selected Cleanup Goals and Related Criteria Are Unclear and/or Inappropriate

#### a. Groundwater Cleanup Goals Apply at the Limit of Institutional Control

The Proposed Plan is unclear on the location where groundwater cleanup goals would be applied and enforced. Per Florida regulations, the appropriate location for application of the groundwater goals should be at the limit of institutional control (e.g., the Beazer property boundary) or the edge of the present plume if the plume is within the property boundary. Remedial Action Objective (RAO) bullet #3 in the Proposed Plan (p. 12) states that cleanup goals apply "outside source areas." This RAO was not included in the FS and conflicts with Florida's policy regarding points of compliance.

*EPA Response:*
*Florida GCTLs are applied and enforced at either the Site boundary or at the limit of institutional controls pursuant to Florida Administrative Code (FAC) regulation 62-780. The Commenter incorrectly assumes that the remedial action objective (RAO) #3 on page 12 of the proposed plan is a cleanup standard. Any Federal drinking water standards are also ARARs and are appropriately applied as per Federal regulations and guidance, which would be outside the area where waste is managed in place. The area where federal MCLs should be met includes part of the area where there are institutional controls to prevent exposure to groundwater.*

#### b. The Basis for Listing Constituents of Concern Is Unclear

It is unclear how the list of constituents of concern (COCs) presented in Table 1 of the Proposed Plan was determined. Several of the groundwater COCs listed (1,1-biphenyl, 2-phenol, bis(2-ethylhexyl) phthalate, and n-nitrosodiphenylamine) are not commonly analyzed for and are not part of the present list of analytes for groundwater monitoring. Also, while benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, and chrysene are soil COCs, they are not generally considered to be a groundwater threat because of their low water solubility and are not part of the current Site groundwater monitoring plan.

*EPA Response:*
*These COCs were included as a result of comments by FDEP on the Revised FS dated May, 2010 in a letter to EPA June 9, 2010. In this letter FDEP requested all contaminants exceeding Florida groundwater GCTL criteria be included in the proposed plan, even if those compounds have not shown exceedances at the Koppers property boundary.*

#### c. The Tables Listing Default GCTLs and SCTLs Are Inaccurate

Several of the GCTLs listed in Table 1 are incorrect. Of particular note, the GCTL for acenaphthene is 20 μg/L, not 210 μg/L. Also GCTLs should be corrected and listed separately for 3-methylphenol (35 μg/L) and 4-methylphenol (3.5 μg/L). The default Commercial/Industrial (C/I) SCTL for antimony is 370 mg/kg. The C/I SCTL for arsenic is 12 mg/kg. The C/I SCTL for acenaphthene is 20,000 mg/kg. The C/I SCTL for benzene is 1.7 mg/kg. The C/I SCTL for 3-methylphenol is 33,000 and the C/I SCTL for 4-methylphenol is 3,400 mg/kg. Additionally, fluorene is misspelled in the table.

*EPA Response:*
*EPA acknowledges these issues are present in the Proposed Plan and will be corrected in the Record of Decision.*

**d. Development of Leachability-Based Cleanup Criteria**

The Proposed Plan should have included language stating that any vadose-zone soil with the potential to create groundwater impacts above cleanup targets should be managed by either:

- Removal of the soil and placement within the capped consolidation area, or
- Placement of a low-permeability cap over the soil.

However, if such actions are required for any area where any constituent concentration exceeds a Florida *default* leachability-based cleanup target, then nearly the entire Site would require vadose-zone soil removal or capping. This action would not be necessary or reasonable because we know from groundwater concentration data that groundwater impacts are limited in areal extent. For example, the measured concentrations of pentachlorophenol in vadose-zone soil exceed the default leachability target of 0.03 mg/kg at locations throughout the entire Site; but pentachlorophenol is not detected in groundwater samples north and west of the area that will be within the vertical barrier wall.

As stated in the FS (and implied by language in Table 1 of the Proposed Plan), the definition of what soil concentrations pose a potential leachability concern, therefore requiring removal or capping, should be finalized during the remedial design phase. The pertinent cleanup target for the Proposed Plan is the groundwater-concentration cleanup target.

Beazer does not take issue with the application of "Florida leachability criteria" as presented in the Proposed Plan. However, Beazer requests that EPA clarify that the application of Florida leachability criteria does not mean that *default* leachability-based SCTLs apply.

*EPA Response:*
*EPA supports the use of groundwater quality data from the surficial aquifer as an indication of where there may be vadose soil contamination that is contributing to unacceptable groundwater impacts. Note that while EPA supports Beazer's performing detailed site-specific soil contaminant leaching tests, there will need to be a sufficient number of such tests run on a range of soil types, soil depths, and concentrations in order to have a sufficient understanding of the relationship between soil concentrations and leachate concentrations. Site-specific testing will*

*likely be needed for arsenic, because there is no default leachability-based SCTL for this metal.*

**e. The EPA Has Inappropriately Rejected the On-Site Risk Assessment in Favor of Strict Application of Florida's Default Direct-Contact SCTLs as Cleanup Levels**

The on-Site human health risk assessment was developed with the goal of being used as an adaptive management tool to determine whether proposed on-Site remedial alternatives meet Florida's statutory risk limit of $1 \times 10^{-6}$ (one in one million) for cancer effects and a Hazard Index of 1.0 for non-cancer effects. The May 26, 2010 Human Health Risk Assessment (HHRA) takes into account changes in land use and incorporates comments received on an earlier version. EPA has not provided Beazer additional technical comments beyond those already addressed by the current HHRA. To the best of Beazer's knowledge, both the probabilistic and deterministic evaluations of potential risk presented in the HHRA are consistent with EPA risk assessment guidance and, thus, represent evaluations of potential risk that, contrary to the assertion in the Proposed Plan (Page 11, column 2, paragraph 3), do provide an adequate basis to define the required cleanup goals. In fact, the probabilistic evaluation presented in the HHRA should be preferred for establishing cleanup goals because the probabilistic evaluation provides a more realistic estimate of potential risk. Use of more realistic, but still conservative and health protective clean up goals derived from the probabilistic evaluation, will assure that limited resources are spent wisely and that the community is not exposed to undue risk by unnecessary remediation.

Beazer continues to believe that the most comprehensive and practical evaluation of the protectiveness of various on-Site remedial alternatives is through the direct use of the probabilistic on-Site risk assessment. Nevertheless, Beazer also recognizes that USEPA often uses the deterministic, site-specific risk assessment to "back-calculate" clean-up goals (referred to as SCTLs in Florida) based upon the site-specific assumptions presented in such a risk assessment. On-Site Site-specific SCTLs have been developed for all receptors that exceeded FDEP risk limit of one in one million estimated lifetime cancer risk in the HHRA. Two sets of on-Site soil SCTLs were developed: one based on the deterministic risk assessment presented in the on-Site risk assessment; and, the other set based on the probabilistic risk assessment presented in the on-Site risk assessment.

Deterministic SCTLs were developed for the trespasser, outdoor worker, indoor worker, utility worker, construction worker, and the recreational user potentially exposed to constituents in on-Site soils using the same exposure assumptions presented in the May 26, 2010 HHRA. A deterministic SCTL was also developed for the trespasser potentially contacting ditch sediments.

Deterministic SCTLs, calculated using standard, simple equations, are shown in Table 1.
Probabilistic SCTLs were developed for the outdoor worker and indoor worker using the same methodology presented for the development of off-Site SCTLs (submitted October 14, 2010), but with the exposure assumptions used in the May 26, 2010 HHRA for the outdoor and indoor worker. The probabilistic SCTLs are based on Florida's statutory allowable cancer risk limit of one in one million ($1 \times 10^{-6}$). Only the hypothetical future outdoor worker SCTLs are presented in Table 2 because these were more stringent than those for hypothetical future indoor worker. Two sets of Site-specific SCTLs were developed for hypothetical future on-Site workers. One set of SCTLs is protective of hypothetical future on-Site workers who have typical (median) potential

exposures to COPCs in soil. The other set of SCTLs is protective of hypothetical future on-Site workers who have high-end (95% upper percentile) potential exposures to COPCs in soil.

TABLE 1
SUMMARY OF ON-SITE SITE-SPECIFIC SOIL AND SEDIMENT CLEANUP TARGET LEVELS - DETERMINISTIC RISK ASSESSMENT
FORMER KOPPERS, INC. WOOD-TREATING FACILITY
GAINESVILLE, FLORIDA

| | SCTLs (mg/kg) | | | |
|---|---|---|---|---|
| Receptor/Area | Arsenic | BaPTE | Pentachlorophenol | TCDDTEQ |
| Hypothetical Current and Future On-Site Trespasser | 170 | 25 | 880 | 0.0013 |
| Hypothetical Current and Future On-Site Trespasser in Drainage Ditch | 200 | 25 | 880 | 0.0013 |
| Hypothetical Future On-Site Outdoor Worker | 5.3 | 0.75 | 27 | 0.000038 |
| Hypothetical Future On-Site Indoor Worker | 8.1 | 1.5 | 53 | 0.000075 |
| Hypothetical Future On-Site Utility Worker | 100 | 11 | 410 | 0.00059 |
| Hypothetical Future On-Site Construction Worker | 230 | 31 | 1100 | 0.0018 |
| Hypothetical Future On-Site Recreational User | 44 | 5.4 | 200 | 0.00028 |

TABLE 2
SUMMARY OF MEE ON-SITE SITE-SPECIFIC SOIL/SEDIMENT CLEANUP TARGET LEVELS
FORMER KOPPERS, INC. WOOD-TREATING FACILITY
GAINESVILLE, FLORIDA

| MEE SCTLs (mg/kg) | | |
|---|---|---|
| Hypothetical Future On-Site Outdoor Worker | | |
| COPC | Typical (Median) | Upper Bound (95%ile) |
| Arsenic | 120 | 23 |
| BaP-TE | 18 | 2.0 |
| TCDD-TEQ | 0.00069 | 0.00015 |

Note that even though the probabilistic SCTLs are referred to as being protective of median and upper percentile potential exposures, respectively, at Florida's statutory target cancer risk of one in one million, they are actually more protective than required by Florida statute. Both the residential SCTLs and the on- Site worker SCTLs are derived using an upper bound estimate of the cancer slope factor for dioxin as well as other conservative exposure assumptions more fully described in the off-Site SCTL document (October 14, 2010). Use of a single upper bound slope factor as well as the other conservative exposure assumptions, to develop Site-specific probabilistic SCTLs, instead of a distribution of cancer slope factors, means that potential risks are overestimated and the resulting SCTLs are lower (more protective) than necessary to meet Florida's statutory target risk limit.

*EPA Response:*
*EPA reviewed the onsite probabilistic risk assessment for sediments and soils and has concluded that exposure assumptions, cancer slope factors and the probabilistic approach in utilizing distributions of these separate variables does not comport with EPA and FDEP's currently accepted approach to risk assessment calculations. EPA views the State of Florida's Cleanup target levels provided in Chapter 62-777.170, FAC and Tables I & II as relevant and appropriate. This rule provides default cleanup criteria, namely cleanup target levels (CTLs) and an explanation for deriving CTLs for soil, groundwater and surface water that can be used for site rehabilitation (i.e., cleanup). CTLs for groundwater in Table I of this rule were used to establish cleanup goals for some of the COCs in groundwater at this Site. Soil CTLs in Table II of this rule were used to establish cleanup goals for some of the soil COCs.*

**f. Use of Overly Conservative Clean Up Goals Such As SCTLs May Create Greater Risk Than They Are Intended to Prevent**

As discussed above, Florida's default SCTLs are inappropriate to use as cleanup goals at this site. They do not account for Site-specific factors that mitigate potential risks presented in the HHRA and the derivation of off-Site Site-specific residential SCTLs. Additionally, the deterministic risk assessment process used to derive the default SCTLs is exceptionally conservative. The end result is unrealistic estimates of potential risk that greatly overstate any actual risk that may be present. By using such default SCTLs as clean up goals without taking into consideration the ramifications of their conservative nature, far more extensive remediation may be undertaken than is necessary to protect public health to the level required by Florida statue. While implementing more extensive remediation than required by law seems like it should provide additional benefit to public health, doing so may actually cause more risk than it eliminates because the process of remediation creates risk. As the risks being remediated get smaller and smaller (because more and more conservative cleanup goals are being used), the extent of remediation increases and the risks associated with that more extensive remediation can begin to outweigh the risks that are being reduced. Basing remediation on realistic but protective cleanup goals derived from using probabilistic risk assessments that use reasonable combinations of assumptions leads to protective remedies that minimize the potential for risks associated with remediation to be greater than the risks that the remedy is being implemented to mitigate.

*EPA Response:*
*EPA disagrees with this view. See above response to comment for 3e.*

**g. The EPA Has Selected an Off-Site Cleanup Goal Without Any Consideration Of Site-Specific Off-Site SCTLs**

An off-Site Site-specific SCTL for TCDD-TEQ has been developed using probabilistic risk assessment methods for properties that are assumed to have potential exposures associated with residential use. As with the on-Site SCTLs, the residential SCTLs are based on Florida's statutory allowable cancer risk limitof one in one million ($1 \times 10^{-6}$). Two Site-specific residential SCTLs were developed. One SCTL is protective of hypothetical residents who have typical (median) potential exposures to TCDD-TEQ in soil. That SCTL is 95 ng/kg. The other SCTL is protective of hypothetical residents who have high-end (90% upper percentile) potential exposures to TCDD-TEQ in soil. Beazer submitted the derivation off-Site SCTLs to EPA on October 14, 2010.

The Proposed Plan, issued on July 15, 2010, conclusively states that the off-Site residential soil cleanup level for dioxins will be Florida's default residential SCTL of 7 parts per trillion (ppt) as 2,3,7,8- tetrachlorodibenzo-p-dioxin toxic equivalents (TCDD-TEQ). Florida law permits the calculation of site-specific SCTLs, and Beazer has calculated and proposed site-specific SCTLs in the off-Site SCTL report. EPA was fully aware of the schedule for off-Site soil sampling, and the results of that sampling were integral to determining whether Site-specific off-Site SCTLs would need to be derived. Beazer requests that the EPA reconsider its decision of the selected off-Site cleanup level following its review of the off- Site SCTL report. In addition, contemporaneously with these comments, Beazer has submitted a formal request for waiver of application of the Florida SCTLs as ARARs.

The SCTL for dioxins and furans is not consistent with current and proposed Federal guidance that governs cleanup of soils containing dioxins and furans nationwide. The EPA's current Federal guidance lists 1,000 ppt as the Preliminary Remediation Goal (PRG) for dioxins and furans. This PRG was issued in 1998 in *Approach for Addressing Dioxin in Soil at CERCLA and RCRA Sites*, OSWER Directive 9200.4-26 (EPA 1998). The PRG was issued as "a starting point for setting cleanup levels" at sites with soils affected by dioxins and furans. On January 7, 2010, in accordance with its Dioxin Science Plan, EPA issued *Draft Recommended Interim Preliminary Remediation Goals for Dioxin in Soil at CERCLA and RCRA Sites* (EPA 2009). The Draft Interim PRG document proposed a new interim PRG of 72 ppt TCDD-TEQ for residential soils. This proposed PRG, which has been through review at the Office of Management and Budget and is expected to be issued as final Federal guidance this year, is ten times higher than the SCTL proposed by EPA for use at the Cabot Carbon/Koppers Superfund Site. EPA is, thus, being inconsistent in its management of dioxin and furan soil sites.

In addition to the SCTL being inconsistent with pending Federal guidance, the cancer slope factor used in FDEP's calculation of the generic statewide SCTL for dioxins and furans is based on an outdated and scientifically discredited TCDD cancer slope factor (CSF) derived from toxicity study in rats (Kociba et al., 1978). The cancer slope factor was cited from a 1997 Environmental Protection Agency (EPA) document entitled *Health Effects Assessment Summary Tables*. This 1997 document presented a cancer slope factor published earlier in 1985 by EPA in a document entitled *Health Assessment Document for Polychlorinated Dibenzo-p-Dioxins* (Office of Health and Environmental Assessment, Environmental Criteria and Assessment Office. Cincinnati, Ohio. EPA 600/8-84-014F.) The 1985 cancer slope factor used by FDEP is outdated and scientifically discredited as noted in detail in Arcadis' April 2010 document entitled *Comments on: Draft Recommended Interim Preliminary Remediation Goals for Dioxin in Soil at CERCLA and RCRA Sites (OSWER 9200.3-56), December 30, 2009* (submitted on behalf of Beazer and others; previously provided).

The cancer slope factor was already outdated in 2005 when FDEP derived its SCTL for dioxins and furans, but it is even more outdated in 2010 when EPA proposed the use of the generic statewide SCTL as a residential cleanup level for the Cabot Carbon/Koppers Superfund Site. Specifically, FDEP's 2005 document lists the following sources of toxicity values in order of preference: (1) EPA's Integrated Risk Information System (IRIS); (2) EPA's Provisional Peer-

Reviewed Toxicity Values (PPRTVs); and (3) EPA's Health Effects Assessment Summary Tables (HEAST). Finding no values in sources 1 or 2, FDEP relied on the cancer slope factor listed in EPA's 1997 HEAST document to derive the generic statewide SCTL.

This protocol for selection of toxicity values is not consistent with EPA's 2003 document entitled *Human Health Toxicity Values in Superfund Risk Assessments* (Office of Solid Waste and Emergency Response, Washington, DC. OSWER Directive 9285.7-53. December 5, 2003.) The EPA's current Superfund protocol for choosing toxicity values lists IRIS and PPTRV sources as Tier 1 and Tier 2 sources, respectively, but it lists Tier 3 sources as "additional EPA and non-EPA sources of toxicity information. Priority should be given to those sources of information that are the most current, the basis for which is transparent and publicly available, and which have been peer reviewed." While HEAST is one Tier 3 source, other "EPA and non-EPA" sources are also Tier 3 sources of toxicity values. The CSF used by FDEP is not a scientifically sound cancer-based toxicity benchmark for TCDD for numerous reasons:

1. It was selected without following EPA's (2003) OSWER Directive for selecting toxicity values and did not consider its scientific basis or other CSFs published in the peer-reviewed scientific literature.
2. It is based on an outdated classification of rat liver lesions from the Kociba et al. (1978) cancer bioassay.
3. It does not take into account changes in EPA's methods for cross-species scaling.
4. Its derivation using a linear dose-response model is inconsistent with TCDD's mode of action.

The Off-Site HHRA and the comments on EPA's proposed interim PRG for dioxins and furans both provide detailed scientific reasons why the CSF used by FDEP is not a scientifically sound. By selecting the default CSF from 1985, derived from incorrect tumor response data using a non-threshold linear model and an outdated species scaling methodology the FDEP and EPA have ignored the current state of the science regarding the carcinogenic dose-response of TCDD. These very same views were provided to the EPA by the National Academy of Sciences in 2006 and have been expounded for over two decades by the scientific community, yet FDEP and EPA continue to ignore the scientific evidence.

*EPA Response:*
*EPA views the State of Florida's Cleanup target levels provided in Chapter 62-777.170, FAC and Tables I & II as relevant and appropriate. This rule provides default cleanup criteria, namely cleanup target levels (CTLs) and an explanation for deriving CTLs for soil, groundwater and surface water that can be used for site rehabilitation (i.e., cleanup). CTLs for groundwater in Table I of this rule were used to establish cleanup goals for some of the COCs in groundwater at this Site. Soil CTLs in Table II of this rule were used to establish cleanup goals for some of the soil COCs.*

*Considerable uncertainty surrounds the derivation of clean-up goals for dioxins and furans, including the development of site-specific risk-based goals, and Florida's default residential SCTL of 0.007 µg/kg. At present there is significant ongoing debate between and among researchers, different regulatory agencies,* *and the regulated community regarding the toxicity of dioxins/furans and whether meaningful human-health risks are posed by low concentrations of these contaminants, particularly with respect to concentrations in soils. Evidence of this ongoing debate can be observed in the numerous comments submitted to EPA in response to publication of the agency's Dioxin Science Plan, the proposed interim preliminary remediation goals (PRG) for dioxins, and the draft response to the National Academy of Science's review of the Dioxin Reassessment. Cleanup goals for dioxins/furans used by various state regulatory agencies and EPA vary over several orders of magnitude, with Florida's default SCTL being at the low end of the range. Florida's SCTLs will be used as the cleanup goal for dioxin-contaminated soil at the Site.*

**h. The Proposed Plan Does Not Include Provision for Use of Background Concentrations in Lieu of SCTLs.**

Beyond the changes discussed above regarding the derivation of Site-specific clean up goals, the Proposed Plan should also be modified to allow for the use of background concentrations as cleanup goals. Florida's rules specifically allow for use of background concentrations. Depending upon the results of the continued off-Site sampling, it is possible that off-Site soils in the vicinity of the Site may be identified that are below background levels but exceed Site-specific (or generic default) SCTLs. Such soils would not need remediation. The discussion of clean up levels in the Proposed Plan should be modified to acknowledge that potential.

*EPA Response:*
*Soil sampling up through September 2010 and a specific background study conducted by the Commenter indicate that there are no background soil samples that exceed the SCTLs and, therefore, it is unnecessary to make provision for potential soil background levels in excess of SCTLs as such do not exist nearby the former Koppers facility. However, the Commenter is correct and there is a chance in the near future that soil sampling data may be obtained which constitutes background and exceeds the default SCTLs. Therefore, the ROD will include language to address this possibility.*

## 4. EPA Must Clarify That The Foreseeable Future Use of the Site Does Not Include an "Unrestricted" Residential Component

During the RI/FS process, the EPA appropriately evaluated the Site as commercial/industrial property, including projections of potential future use for recreational purposes. The May 2010 FS states that:

> On-Site residential exposure scenarios are not applicable based on the expected commercial/industrial and/or recreational use of the property. Evaluation of potential risks associated with nonresidential future uses of the property is consistent with federal guidance (EPA, 1995), in which EPA proposes to address potential risks consistent with current and plausible future land-use patterns.

FS at p. 1-37 (emphasis added). However, the Proposed Plan noted that, because the wood treating operations at the Site had terminated, both Beazer and EPA were evaluating alternative future uses of the property:

> **Site Risk Assessment**
>
> Risk assessments were conducted to determine the current and future effects of contaminants on human health and the environment. . . . A human-health risk assessment (HHRA) for on-Site soils and sediment was submitted in 2009 and updated in May 2010 to take into account a change in land use and to incorporate comments received on the earlier version. The estimates of potential risk presented in the August 2009 HHRA assume that the use of the Site is for wood treatment in the foreseeable future because wood-treatment operations have ceased, this assumption is no longer valid. The HHRA was updated to take into account a change in land use not previously contemplated under the 2009 submittal.

Proposed Plan at p. 11, (emphasis added).

Recently, EPA has issued clarifying "Fact Sheets" distributed at the public meeting conducted on October 6, 2010, in which EPA stated:

> EPA has made its reasonably anticipated land use determination based on several factors including property owner Beazer East's planned retention of Site ownership and its indicated future use of the Site as commercial, recreational or mixed use with a residential component.

September 2010 Proposed Remedy Fact Sheet at p. 9 (emphasis added). The language of the Proposed Plan in conjunction with the "residential component" language in the Fact Sheets has, apparently, caused confusion in the community with respect to the nature of the foreseeable future use of the Site, despite the fact that EPA also stated in the Fact Sheet that "EPA has determined that unrestricted residential use is not a likely or practical future land use for the Site." *Id.*, underlined emphasis added. Beazer is also aware that members of the local community have communicated to EPA their strong desire for the site to be remediated to unrestricted residential standards.

Beazer is voluntarily and in good faith cooperating with the EPA and the Local Inter-Governmental Team ("LIT"), among others, with respect to planning for potential redevelopment of the Site, and will continue such cooperation. However, it should be stated clearly and definitively in the ROD Amendment that Beazer has not committed to bearing any financial or other consequences of including "unrestricted residential" components in such re-use. Beazer has agreed to conduct an industrial/commercial site-specific cleanup that, with appropriate institutional and/or engineering controls, *may* result in a *restricted* residential use sometime in the future, such as condominiums or apartments on the upper floors of an otherwise commercial facility. Remediation of all or portions of the Site to "unrestricted residential" cleanup standards would obviously have a significant impact on the work required, as well as the corresponding costs, none of which have been evaluated through the RI/FS process and none of which Beazer believes is appropriate.

In addition, the local governments cannot unilaterally require Beazer to actually use the Site for residential purposes, or to prepare the Site for future residential use. The Site has been exclusively and lawfully used for industrial purposes since 1916. According to the City's Comprehensive Plan, the Comprehensive Plan category for the Property is "IND" (Industrial). This category is the most intensive land use category in Gainesville's Comprehensive Plan. The Industrial land use category is assigned to areas appropriate for manufacturing, fabricating, distribution, extraction, wholesaling, warehousing, recycling and other ancillary uses. The Industrial category permits uses such as the wood treating facility previously operated on the Site. In addition, the City's Zoning Map lists the zoning district for the Property as "I-2" (General Industrial). The permitted uses, by right, in the I-2 category include "lumber and wood product," which allows uses such as the wood treating facility that previously operated on the Site. At present, there have been no effective legal measures taken by the City or any other individual or entity to change, alter or amend these zoning classifications.

Under these circumstances, attempts by any party to use the ROD Amendment process to reclassify the legal zoning for the Site property in the attempt to force Beazer into a future residential use could conceivably amount to a "taking" without just compensation in violation of the Fifth Amendment of the Constitution of the United States. Moreover, even if such reclassification was permitted to move forward, Beazer cannot be forced to use the property for any newly permitted purposes. As the owner of real property, Beazer has a fundamental and legally-protected right to make whatever use of the property it deems appropriate within the confines of lawful zoning and land use restrictions, including no use at all. In the event that Beazer does not reach agreement with the local government and others on a mutually acceptable future use plan, Beazer can lawfully elect to simply leave the Site idle with appropriate controls to prevent Site access (fencing, guards, etc.). Accordingly, the idle scenario is also a foreseeable future use of the Site.

For all the reasons set forth above, the forthcoming ROD Amendment should specifically state that Beazer is conducting a commercial/industrial cleanup on the Site, and that "unrestricted residential" cleanup standards are inappropriate for the Site.

*EPA Response:*
*EPA agrees with the Commenter's point and will update the ROD to include the requested language. It is not EPA's intent to dictate the specific future land use at the Site. The "residential component" referred to in the Proposed Plan Fact Sheet is not intended to include unrestricted use, but rather to allow for restricted residential uses constructed such that soil exposures would be eliminated or controlled as has been done at a multitude of former hazardous waste sites where soils were remediated to commercial/industrial soil standards and exposure barriers were used to provide for restricted residential uses. A partial list of these sites includes the Atlantic Station redevelopment in Atlanta, Georgia; the Newberry Site in Fayette, Pennsylvania Site; the and the Magnolia Site in Charleston, South Carolina.*

## 5. Off-Site Remedy for a Property will be Selected by Property Owner from a Short List of Potential Alternatives

The Proposed Plan incorrectly describes the remedy selection process for off-Site properties. EPA will contact property owners needing to be included in remedial activities for their properties and describe the remedial alternatives available for that property. Property owners will, in consultation with EPA, select a remedial solution from those originally offered by EPA and Beazer. That short list of alternatives will comprise a subset of all possible alternatives that could be used to remediate residential surface soils.

*EPA Response:*
*EPA concurs with this comment and will update the description of this approach in the Record of Decision.*

### A.2.4 City of Gainesville and Alachua County Environmental Protection Advisory Committee

Mr. Scott Miller, Remedial Project Manager
United States Environmental Protection Agency
Region IV, Superfund North Florida Section
61 Forsyth Street, SW
Atlanta, GA 30303

RE:
City of Gainesville and Alachua County Comments and Recommendations on
*USEPA Superfund Proposed Plan Cabot Carbon/Koppers Superfund Site*
*Gainesville, Alachua County, Florida*

Dear Mr. Miller:

The attached report includes comments from the City of Gainesville and Alachua County, on the *USEPA Superfund Proposed Plan Cabot Carbon/Koppers Superfund Site, Gainesville, Alachua County, Florida (Proposed Plan).* These comments were developed by our local intergovernmental team consisting of staff from the City of Gainesville, Gainesville Regional Utilities, Alachua County Environmental Protection Department, and the Alachua County Health Department and their technical consultants. These recommendations reflect the input and concerns of the technical team, our local citizens, the Gainesville City Commission and the Alachua County Board of County Commissioners.

The Cabot Carbon/Koppers site has been a Superfund site since 1983, and has been a significant concern to our community since well before that time. The site is located in the heart of our community directly adjacent to residential areas and only two miles from the City's well field. Proper cleanup of the site is a critical priority for our community, and is necessary in order to ensure the safety of our drinking water supply, protect the health of our citizens and the environment, and protect the economic vitality of our community. In addition to countless hours of staff time, the City has invested over $2 million in hiring its own team of internationally recognized consultants to assist us in ensuring that appropriate actions are taken at the site.

We appreciate EPA's recent efforts in moving forward with development of plans for cleaning up the site, and recognize that cleanup of the site will be challenging. However, the current Proposed Plan is not adequately protective of human or environmental health and is not acceptable to the City of Gainesville and our local community. We request that EPA implement the attached recommendations in the Record of Decision for the Koppers Site.

Thank you for your on-going effort in addressing the Cabot/Koppers Superfund Site. If you have questions about our technical comments you may contact Mr. Fred Murry, Assistant City Manager at City of Gainesville ((352) 334-5000 ext 5674), Mr. Rick Hutton, P.E. at Gainesville Regional Utilities ((352) 393-1218) and/or Dr. John Mousa at the Alachua County Environmental Protection Department ((352) 264-6805).

**Sincerely,**
**Craig Lowe**
**Mayor**

**City of Gainesville and Alachua County**
**Comments and Recommendations**
**On**
**USEPA Superfund Proposed Plan**
**Cabot Carbon/Koppers Superfund Site,**
**Gainesville, Alachua County, Florida (July 2010)**
**Final**
**October 2010**

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**Local Intergovernmental Team**
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1GRU "DNAPL Team" members.

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# 1.0 GROUNDWATER & SUBSURFACE REMEDY

**INTRODUCTION**

The nature and extent of contamination and the geology of the Koppers site will make successful remediation of the site challenging. Creosote Dense Non- Aqueous Phase Liquid (DNAPL) has been recovered from wells in the Surficial Aquifer (SA) and Upper Hawthorn Group (UHG) and, based on multiple lines of evidence, has penetrated the Lower Hawthorn Group (LHG) and the Upper Floridan Aquifer (UFA). Given the high polynuclear aromatic hydrocarbon (PAH) concentrations in groundwater offsite to the east in the UHG it appears that DNAPL has migrated laterally to the east of the Koppers property. Much of this DNAPL likely continues to be mobile, and unless removed or immobilized, will continue slowly migrating vertically and horizontally, ultimately causing increased groundwater contamination in the UFA. Of particular concern is that further contamination of the UFA will pose a material threat to the Murphree wellfield.

***EPA General Response No.1:***

*Addressing the threat to the Murphree well field from contaminants related to wood-treating operations has been, and continues to be, a major goal of the EPA. However, the data available to EPA at this time indicate that any potential threat is not imminent. The proposed remedy addresses the potential threat to the Murphree well field at a level of response that is appropriate relative to the level of threat indicated by current data. Furthermore, EPA will require the PRP to continue monitoring operations and effectiveness of the proposed remedy. In the event that the remedy is shown, with definitive data, to not be achieving the specified objectives, contingency plans will be enacted well before the potential threat to the Murphree well field becomes imminent.*

Dissolved-phase plumes of PAHs exist in the Surficial, UHG and LHG strata and in the UFA, and likely extend off-site in all formations. Beazer has constructed a relatively extensive UFA monitoring network at the site, although the extent of the UFA plumes has not yet been fully delineated. Most of the UFA monitoring wells indicate PAH concentrations below cleanup standards. However, there are regions in the interior of the site (i.e., identified by FW-6, FW20B, FW-12B, FW- 21B and recently FW-27B, see Figure 1) where PAH concentrations are well above cleanup standards. These plumes will likely continue to expand without appropriate treatment. Of particular concern are the plume(s) in the interior of the site where contamination extends to an as-yet undefined depth (as indicated by wells FW-12B and FW-27B), and two locations (FW-22B and FW-16B) at the periphery of the site. The fact that PAH contamination in the UFA has reached these boundary wells is a clear indication that off-site migration of contaminants is occurring in the UFA – and in the case of FW-16B - has been occurring for some time. Hydraulic containment has been initiated as an interim action in the area of FW-22B (pumping approximately 28 gpm). However, actions have not yet been undertaken at the eastern site boundary (i.e. FW-16B), or in the interior of the site, other than the low rate pumping test (i.e. 2 gpm or less) at FW-6 and FW-21B. The southern part of the site remains without any LHG or UFA monitoring at all despite the large amounts of mobile DNAPL recovered from PW-1.

***EPA General Response No. 2:***
*It is critical for all stakeholders to understand two assumptions being made by EPA. First, the extent of subsurface contamination at this Site can never be perfectly and completely known because of the technical impracticality of reaching every parcel or unit of subsurface soil and ground water associated with this Site. However, the EPA is satisfied that the amount of data and information available at this time is sufficient to complete remedy selection. Acceptance of this remedy, or minor variations of it, does not mean that EPA believes the Site is perfectly understood or that it believes the remedy will achieve all objectives perfectly.*

*Second, the EPA does not intend to release the PRP from further involvement at the Site once the proposed remedy, or minor variations of it, are implemented. The complexity of the Site and the level of impact is not amenable to a quick or simple remedy. Thus, remedial action at this Site is anticipated to be a phased effort over time with data collection and engineering application occurring in phased cycles. EPA will require the PRP to continue monitoring operations and effectiveness of the proposed remedy. In the event that the remedy is shown, with definitive data, to not be achieving the specified objectives, contingency plans will be enacted well before the potential threat to the Murphree well field becomes imminent.*

*To this end, it is imperative that the ROD language be sufficiently inclusive to allow variations and contingencies to be implemented under the domain of the ROD, as new information is obtained in the future. Such an approach may appear vague, but it is not. Limiting the ROD language to a single set of narrow, prescriptive recipe steps is inappropriate for such a complex and challenging Site, and would be counter-productive in the long-run. Such an approach merely gives EPA more tools for requiring the PRP to take additional actions without the need for a time-consuming Site-specific rulemaking. Doing so will result in cleanup goals being attained more rapidly.*

*The EPA is satisfied that the amount of data collected to date allows reasonable inference of the likely extent of contamination within subsurface soil and ground water. More importantly, the EPA is satisfied that the amount of data collected to date (while not perfect or complete) allows a reasonable course of action to be implemented at this Site in the form of the proposed remedy. The proposed remedy, or minor variations of it, will achieve the following goals: (1) prevent further migration of contamination which would make the overall situation more serious, (2) begin to destroy, remove, or isolate contaminant mass within the various impacted surface and subsurface media, and (3) collect additional data on potential threats at the Site. These three objectives are important to EPA* *because it believes that postponing action at the "periphery" of the Site (both at the surface and in the subsurface) while waiting for additional data on interior extent of contamination is not a prudent course of action. Additional data on interior extent of contamination will not change the limited number of remedial options available to EPA because those remedy options are constrained primarily by the limits of what technology can achieve, not by availability of information or data.*

Treatment or removal of contaminants to reduce downward migration of DNAPL and mass loading of dissolved contamination are important in reducing the amount of contamination reaching the UFA. However, it will not be possible to treat all of the DNAPL, particularly within the LHG. Therefore, hydraulic containment in the UFA is essential in order to protect the Floridan Aquifer and community's water supply.

***EPA General Response No. 3:***
*The EPA is in agreement that treatment or removal is preferable in instances where such action can be technically implemented and taken without incurring adverse impacts on health or environment (i.e., making the situation worse). In fact, such is required to be EPA's preference, by law.*

*At this Site, all possible technologies for treatment or removal of contaminant mass have been identified and evaluated over the course of several years with the input of numerous technical experts, both associated with EPA and independent of EPA. Consideration of all relevant data, information and possible consequences of implementation has led the EPA to develop the remedy it has proposed. For the rationale behind EPA's support of the proposed remedy, see General Response No. 2.*

Although Remedial Action Objectives are described generally in the USEPA Proposed Plan (p. 12), we strongly believe that specific priority goals (related to groundwater) can, and should, be stated in the remedial plan in the upcoming ROD (Record of Decision) and should include the following:

**A. Contain the contamination in the UFA on-site using hydraulic containment**

(1) Reduce interior contaminant plumes by groundwater extraction within the UFA at rates sufficient to contain them (our preliminary estimates based on simulations using the GeoTrans model of the site indicate extraction rates of at least 100 gpm will be required to do this); and
(2) Prevent off-site migration of contaminants at all locations including FW-22B and FW-16B.

**B. Remove or immobilize creosote to the fullest extent possible in the UHG, LHG and Surficial Aquifer in order to:**

(1) reduce vertical and horizontal migration of creosote DNAPL, and
(2) reduce dissolution and mass loading of contaminants into LHG and UFA groundwaters.

**C. Contain SA and UHG contamination by using hydraulic containment and slurry walls to minimize migration of contaminants; and**

**D. Provide long-term monitoring (in the SA, UHG, LHG and UFA) to allow assessment of the performance of the remedy, verify compliance with cleanup criteria and assure no off-site migration of contaminants in the Floridan Aquifer.**

*EPA Response:*
*EPA shares these goals. Hydraulic containment of the Upper Floridan Aquifer (UFA) ground water (and concurrent monitoring of effectiveness) currently is being implemented by the PRP in UFA zones shown to be impacted. The points of discussion (specific pump rate and well pump locations) are design specifications that can be updated at any time in the future as data indicate its necessity. Hydraulic containment of the UFA is being implemented currently, independently of the ROD and proposed remedy. It is also included in the proposed remedy. In addition, the ROD will include conditions under which additional UFA recovery wells will be installed and EPA's general approach to require their installation. EPA does not concur with the flow rate calculations as listed above as being definitive to achieve the remedial goals which are specified by the State of Florida law regarding compliance with GCTLs at Site boundaries or the limit of institutional controls and compliance with federal MCLs outside of waste management areas.*

*Aspects of the proposed remedy that address containment and monitoring include: (1) a slurry wall and cap to isolate the suspected source areas (and any other source material excavated and brought back into that source area zone to be contained); (2) both physical stabilization (ISS/S) and chemical immobilization (in situ geochemical stabilization [ISGS] formerly termed in situ biogeochemical stabilization, or ISBS) of source contamination, and (3) expanding the monitoring network during and after construction of the physical containment elements of the remedy. Implementing the remedy in a staged or staggered schedule will provide EPA with more options for meeting clean-up goals. For example, EPA proposes implementing ISGS within a physically contained zone as a response to subsurface contamination, and to evaluate its effectiveness concurrently with the remedial design. EPA will require the PRP to provide engineering design plans for both full-scale implementation of ISGS and a contingent ISSS remedy along with the other remedial components including but not limited to the vertical barrier wall, the engineered cap, and LHG injection points. Should the ISGS* *prove to be ineffective or technically unimplementable, EPA will be able to quickly respond by requiring the ISGS zone to be revisited and addressed, without further time-consuming Site-specific rulemakings.*

**COMMENTS AND RECOMMENDATIONS**

The Proposed Plan does include, generally, elements intended to address each of the priority goals summarized above. We request that the upcoming ROD explicitly include these elements in relation to the Koppers site. We have the following comments and recommendations regarding the groundwater related elements of the Proposed Plan:

1. Hydraulic containment in the Floridan Aquifer must be more robust and extensive than is currently underway. The ROD must include hydraulic containment with the goal of capturing the plume in the interior of the site. Additionally, the ROD should contain specific criteria or principles (triggers) to determine when and where additional remedial actions will be required in the Floridan Aquifer.

*EPA Response:*
*Hydraulic containment of the Upper Floridan Aquifer (UFA) ground water (and concurrent monitoring of effectiveness) is being implemented by the PRP in UFA zones shown to be impacted. The points of discussion (specific pump rate and well pump locations) are design specifications that can be updated at any time in the future as data indicate its necessity. Hydraulic containment of the UFA is being implemented currently, independently of the ROD and proposed remedy. It is included in the proposed remedy. To this end, it is imperative that the ROD language be sufficiently generic to allow variations and contingencies to be implemented under the domain of the ROD, as new information is obtained in the future. Limiting the ROD language to a narrow, prescriptive recipe of steps will be counter-productive in the long-run. Such an approach may appear vague or disregarding of public opinion, but it is not. Such an approach merely gives EPA more tools to attain long-term goals for this Site.*

The plan appropriately requires hydraulic containment in areas where contaminants exceed federal MCLs and Florida GCTLs outside of source areas. It also requires construction of additional extraction wells as necessary. The plan includes on-going monitoring in areas where constituents do not exceed cleanup goals. We support these provisions.

As we understand it, based on these provisions, hydraulic containment should be initiated to address UFA contamination in the interior of the site (as indicated by FW-12B and now FW-27B), as well as at the eastern site boundary (as indicated by FW-16B). The goal of the interior pumping should be to capture and contain the interior plume(s). EPA should not wait for the plume(s) to reach the property boundary before these actions are taken. The low rate pumping described in the Proposed Plan and currently implemented at FW-6 and FW-21B is not adequate to achieve this goal. Additional pumping at much higher rates in the interior of the site will be required to achieve this goal.

In addition to these provisions, we request that the ROD require a contingency plan that will be implemented if there is a definable increasing trend in constituents of concern (COCs) at a well indicating that contamination is spreading, even if cleanup goals have not yet been exceeded.

***EPA General Response No. 4:***

*It is important for all stakeholders to understand that the Proposed Plan is not a Feasibility Study or a design document. All possible variants and scenarios requiring contingency actions can not be included in a Proposed Plan document. Similarly, the language in the ROD will be sufficiently inclusive to allow reasonable variations and contingency adjustments to be made quickly during remediation within the context of the ROD. Failure to do so, by making the ROD language too prescriptive and narrow-in-scope, creates a potential situation for additional administrative and legal delay in implementing simple remedial adjustments at the Site. We have included a flow-chart that includes decision points upon which EPA will require additional monitoring and/or hydraulic containment in the UFA when contaminant concentrations exceed historic concentrations by a statistically-significant amount.*

The installation of extraction well FW-31BE is an essential element in containing the Floridan contamination because migration off site in this area has been (and may still be) occurring. This extraction well is intended to address contamination leaving the site in the northwest region of the site near well FW-22B. However, additional monitoring wells are needed off-site to characterize the extent of offsite contamination at that location, and to ensure FW-31BE is adequately containing it.

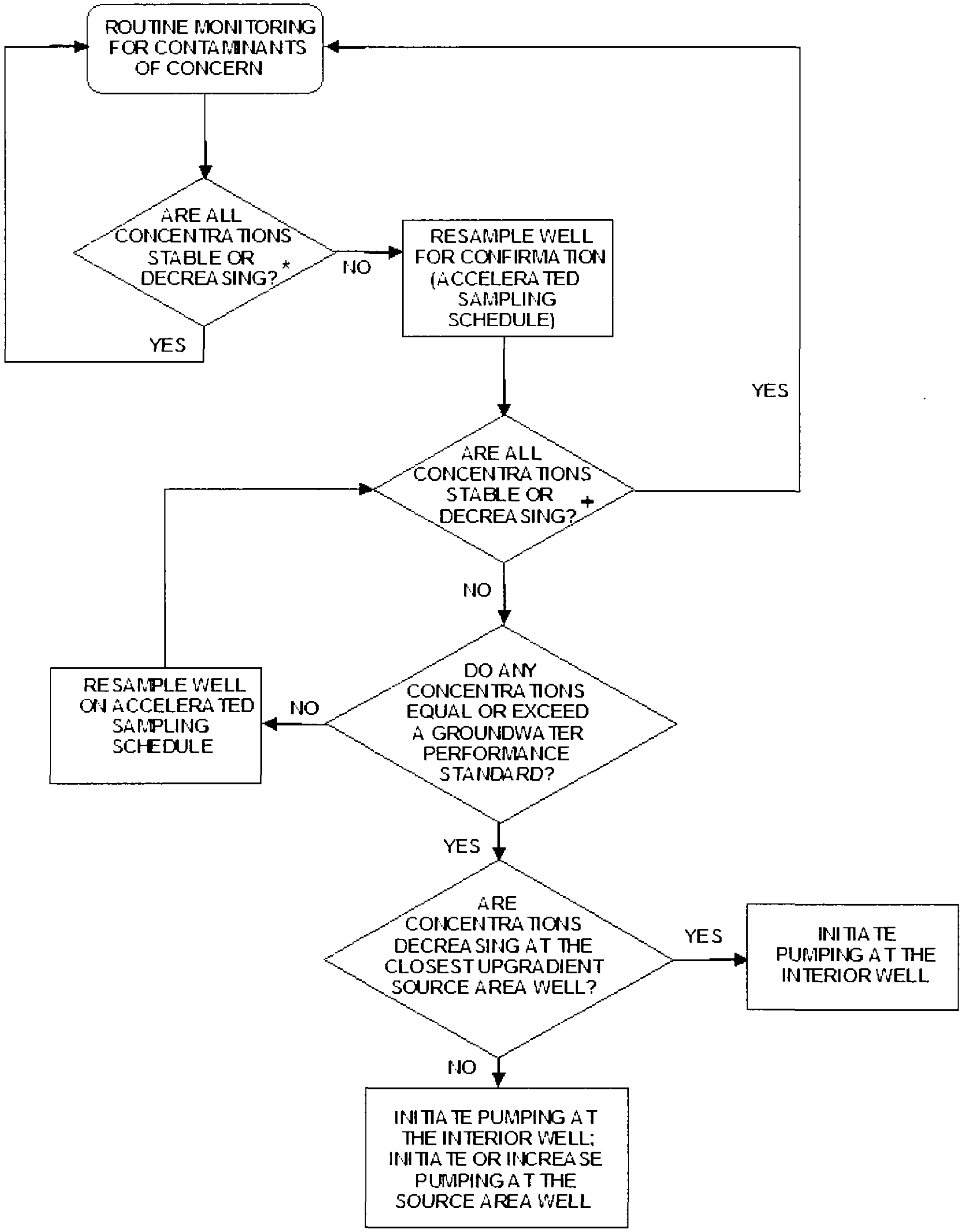
Additional hydraulic containment will also be necessary to address Floridan Aquifer contamination at other locations on the site. This conclusion is based on:

A. The results of the low rate pumping Interim Remedial Measure (IRM) at FW-6 and FW-21B (received August 3, 2010) indicate no significant improvement from the low rate pumping since it began in October 2009, and no evidence has been generated to support Beazer's claim that annular casing seepage is actually the cause of UFA contamination at these locations;
B. Very high concentrations of naphthalene persist at several interior wells. Of particular concern is FW-12B and FW-27B which show high concentrations at an as-yet undefined depth in the UFA; and
C. Concentrations persist above GCTLs at boundary well FW-16B.

The future analytical results from the most recently installed on-site Floridan monitoring wells (FW-27B, FW-28B and FW-30B) should provide further information on the extent of contamination in the UFA.

*EPA Response:*
*The following flow-charts are offered as a means to logically direct monitoring or expansion of the monitoring well network.*

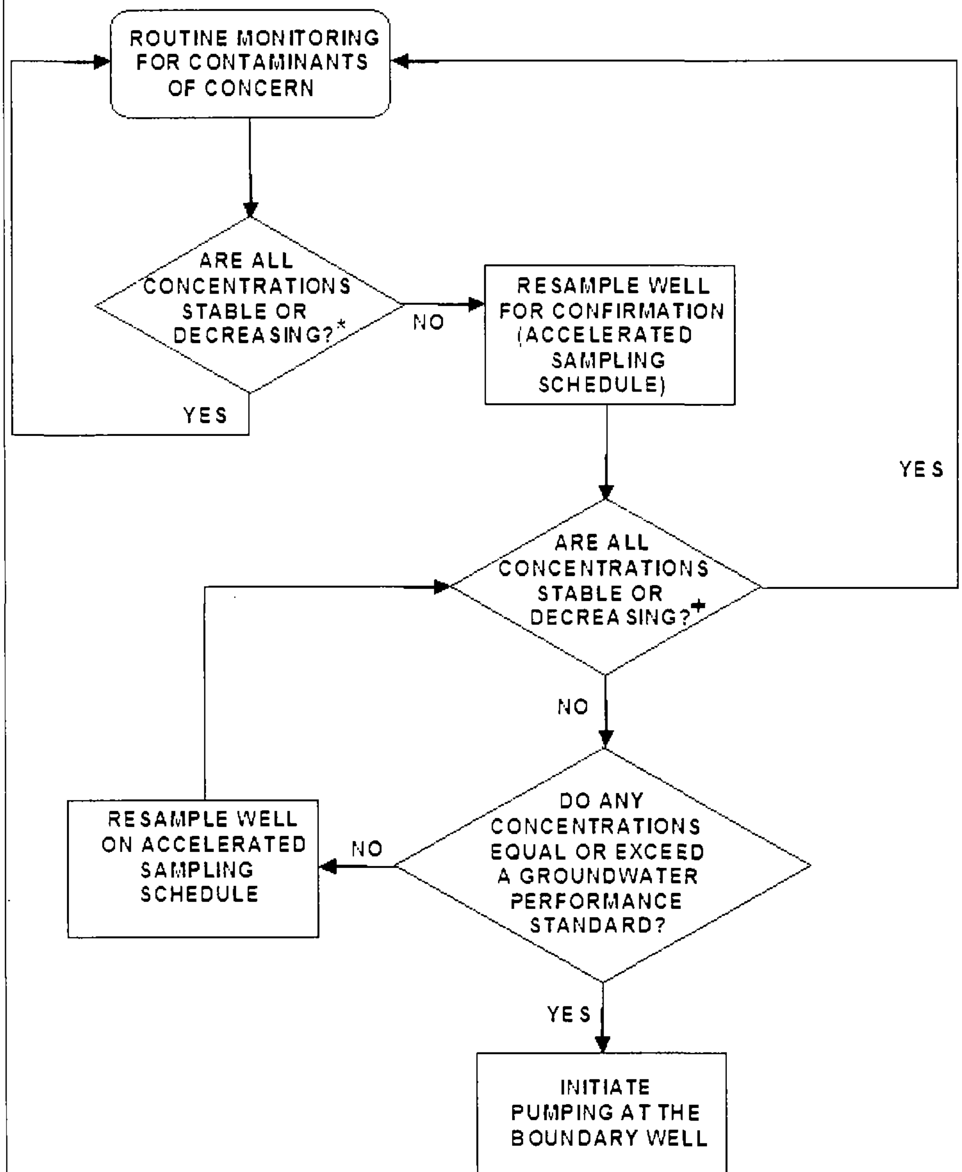
## INTERIOR FLORIDAN AQUIFER MONITORING WELL FLOW CHART




* STATISTICALLY-BASED COMPARISON

+ RELATIVE TO THE SAMPLE OBTAINED BEFORE THE FIRST SAMPLE SUBJECTED TO FLOW CHART ANALYSIS

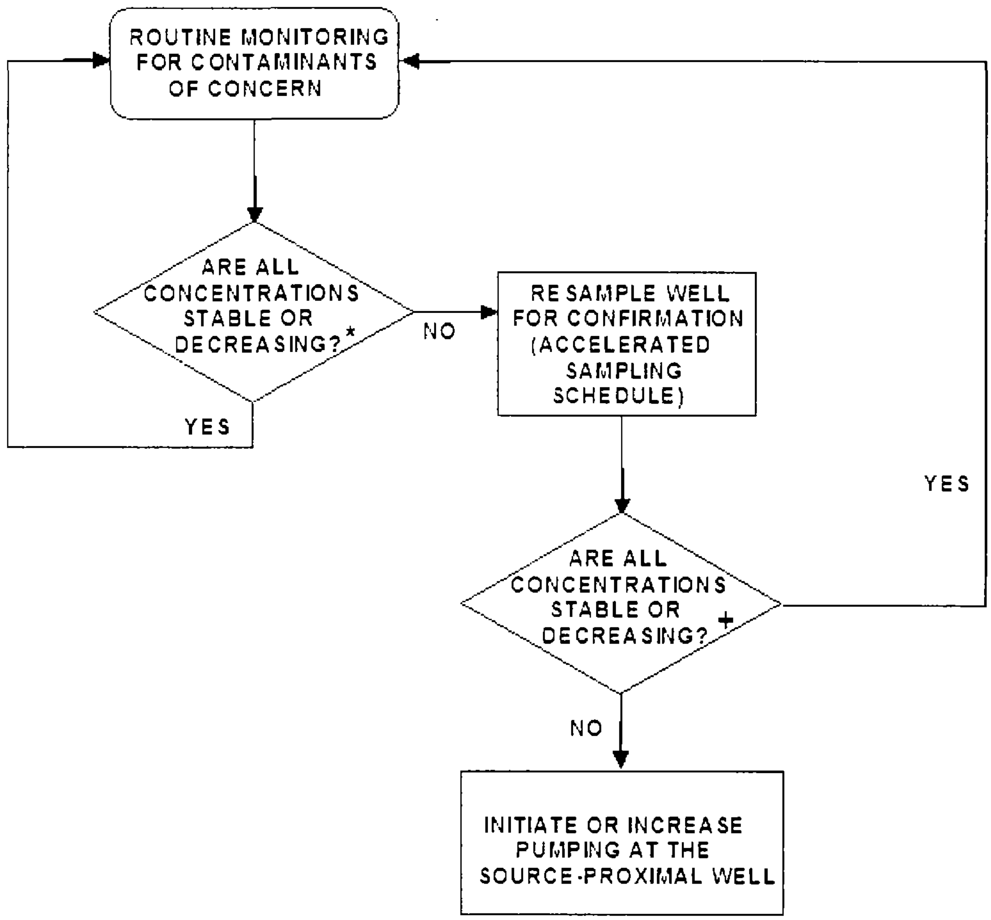
## BOUNDARY FLORIDAN AQUIFER MONITORING WELL FLOW CHART




* STATISTICALLY-BASED COMPARISON

\+ RELATIVE TO THE SAMPLE OBTAINED BEFORE THE FIRST SAMPLE SUBJECTED TO FLOW CHART ANALYSIS

## SOURCE-PROXIMAL FLORIDAN AQUIFER MONITORING WELL FLOW CHART




* STATISTICALLY-BASED COMPARISON

+ RELATIVE TO THE SAMPLE OBTAINED BEFORE THE FIRST SAMPLE SUBJECTED TO FLOW CHART ANALYSIS

**2. The Groundwater Contamination section of the Proposed Plan misstates the degree of contamination in the Floridan Aquifer. The ROD should accurately describe known site conditions.**

*EPA Response:*
*See General Response No.2*

The most important objective of the groundwater/subsurface remedy is to contain and clean up contamination in the UFA. However, the Groundwater Contamination section of the Proposed Plan makes several incorrect statements, and vastly understates the magnitude and extent of contamination in the UFA. For example, it makes no mention of the off-site contamination identified by monitoring locations FW-22B and FW-16B at the site boundary. The Conceptual Site Model (Figure 3, p. 9) shows no contamination in the UFA or contaminant migration pathways through the LHG.

The Proposed Plan (p. 11) refers to a single monitoring well near the former north lagoon which exceeded GCTLs but in which naphthalene concentrations "have decreased substantially since July 2004". This is incorrect; the statement can only refer to FW-6 because only that well existed near the former north lagoon in the UFA on the July 2004 date mentioned. Naphthalene concentrations in the well (FW-6) did decline between July 2004 and January 2008. However, since that time concentrations have fluctuated dramatically. August 2009 data were the highest yet measured (i.e., 2600 ppb naphthalene). More recent data, collected after initiation of the pumping at FW-6, have reported naphthalene concentrations between 580 and 1,100 ppb. At a minimum, the Conceptual Site Model and Groundwater Contamination descriptions in the ROD should acknowledge:

A. Likely off-site migration of COCs to the east in the SA;

*EPA Response:*
*Minimal migration of COCs to the east was believed to be present during operation of the boundary-line recovery wells. This is being addressed through the addition of several groundwater collection trenches and the redevelopment of boundary-line extraction wells.*

B. Apparent off-site migration of DNAPL to the east in the UHG;

*EPA Response:*
*Limited off-property DNAPL migration has apparently occurred. A 2009 investigation to evaluate potential off-property migration of DNAPL found no evidence of extensive DNAPL migration to the east of the property.*

C. Naphthalene concentrations in the LHG, which exceed 1,000 ppb across the width of the site, that result in continuing contamination of the UFA;

*EPA Response:*
*It is incorrect to state LHG naphthalene concentrations exceed 1,000 ppb across the width of the Site. Such concentrations exceed 1,000 ug/L beneath and immediately downgradient of the principal contaminant source areas where lower Hawthorn Group wells are located.*

D. PAH concentrations at FW-6 have fluctuated, but not shown a decreasing trend in FW-6 since its installation in 2004;

*EPA Response:*
*PAH concentrations at FW-6 have generally decreased since the well was installed in 2004 but as a generalization, after some initial concentration decreases over the first few monitoring events in 2004, most PAH concentrations have remained relatively steady or shown fluctuations that do not demonstrate a decreasing trend.*

E. PAH Concentrations in other interior wells (i.e. FW-21B & FW-12B) in excess of GCTLs, with FW-12B showing increasing PAH levels with depth;

*EPA Response:*
*FW-12B shows increasing levels of contaminants from zone 2 to zone 3. Zone 3 PAH concentrations are sometimes higher than zone 4 PAH concentrations and sometimes lower. For example, the zone 3 naphthalene, 2-methylnaphthalene, and dibenzofuran concentrations exceed the zone 4 concentrations (based on mean and median of 2004-2010 data), whereas the zone 4 carbazole concentrations exceed the zone 3 concentrations.*

F. PAH concentrations exceeding GCTLs at boundary wells FW-22B and FW-16B; and

*EPA Response:*
*EPA acknowledges this fact.*

G. COC's have been detected at levels below COCs at several other boundary wells (FW-2, FW-3, FW-11B and FW-24B).

*EPA Response:*
*EPA acknowledges this fact.*

EPA's statement in the Proposed Plan gives the impression that contamination in the UFA at the former north lagoon is of minimal concern, and that minimal or no action is needed to contain it. We request that EPA review this section of the Proposed Plan closely and ensure that the description of the Groundwater Contamination contained in the ROD better reflect actual known site conditions. Also, we are submitting comments to Beazer's draft report on the Floridan IRM that EPA should consider when evaluating contamination in the UFA.

*EPA Response:*
*EPA does not believe that contamination at the former North Lagoon is of minimal concern. Furthermore, EPA has required the PRP to evaluate this contamination and may in the near future require a dedicated Floridan recovery well beyond the one found at FW-31B to recover contaminated groundwater should the Floridan IRM in operation there currently prove to be ineffective. We will update the ROD to include language to that effect.*

*Also see General Responses No. 1 and No. 2*

**3. Financial assurance should be provided for the final remedy selected, including on-going operation of Floridan Aquifer containment.**

The site will likely require containment of the Floridan Aquifer plumes via pump and treat for an extended period of time (i.e. decades). Beazer should be required to provide a form of financial assurance (such as a bond) to ensure that sufficient funds will be dedicated to completion of the final remedy, including the continued operation of the Floridan Aquifer Containment system and monitoring of the UFA.

*EPA Response:*
*Comment noted. EPA agrees with this comment and that is why in all consent decrees that are signed between EPA and a potentially-responsible party (PRP) such as Beazer East, there is a requirement for a PRP to provide financial assurance on a yearly basis to EPA to demonstrate its ongoing ability to meet its financial obligations at a Site. The consent decree between EPA and Beazer East will include this requirement.*

**4. The ROD should stipulate expansion of the Floridan Aquifer monitoring network to fully delineate the horizontal and vertical extent of off-site and on-site plumes.**

*EPA Response:*
*See General Response No. 4*

Beazer has installed a relatively extensive UFA monitoring well network at the Koppers site. However, additional wells are needed at the following locations:

A. off-site adjacent to FW-22B (and FW-31BE) to ensure that FW-31BE is indeed capturing the plume that had been leaving the site in the northwest (at FW-22B);

   *EPA Response:*
   *Results of aquifer test data and monitoring of newly installed well FW-28B indicate that the contamination detected at FW-22B is not migrating toward*

*FW-28B. Contamination may be migrating past FW-22B in a northwestward direction. It is reasonable to add another Floridan aquifer well to the northwest of FW-22B, at a location approximately on a line (east-west direction) with the northern Koppers property line. This well would be approximately 250 feet northwest of FW-22B and approximately 208 feet west (and very slightly north) of FW-28B.*

B. off-site adjacent to FW-16B to delineate the off-site extent of this plume and to verify that future hydraulic containment efforts are successful in stopping this off-site migration:

*EPA Response:*
*EPA agreed to defer adding a well off-property to the east of FW-16B pending the outcome of the groundwater recovery at FW-21B. FW-16B naphthalene and benzene concentrations are highest in monitoring zone 1 and have shown no obvious increases over time and are slightly in excess of their groundwater cleanup target level (GCTL) or Florida MCL (benzene). FW-21B and FW-16B results during the FW-21B pumping period are insufficient to evaluate whether or not pumping at FW-21B has had the effect of sufficiently cutting off the possible source of contamination for FW-16B. Both wells will continue to be monitored and as appropriate, given specified triggering criteria, an additional Floridan aquifer well will be drilled northeast of FW-16B.*

C. interior of the site to fully delineate the horizontal and vertical extent of the on-site plume or plumes being detected by FW-6, FW-12B, FW- 21B and FW-27B;

*EPA Response:*
*Groundwater monitoring begun at FW-27B has demonstrated that significant contamination by multiple contaminants of potential concern extends into the semi-confining unit in the upper Floridan aquifer. Clearly, there is a need for further monitoring deeper into this zone and into the underlying lower transmissive zone of the upper Floridan aquifer (LTZ), to define the vertical extent of significant groundwater contamination in the Floridan. Note that low-level contamination has been detected in the lower transmissive zone at downgradient monitoring wells FW-22C (zone 1, August 2009) and FW-24C (zone 2, May 2009), so there is already some indication of contaminant migration into the LTZ. The distance between FW-27B and FW-22B/FW-22C is approximately 475 feet, and an appropriate location for a new Floridan aquifer well pair (UTZ and LTZ, with monitoring through the semi-confining layer) is approximately 200 feet northwest of FW-27B and on a line between that well and FW-22B.*

D. on the western property boundary at 26th Ave (the need for this is based on historical elevated COC levels in an offsite private UFA well (Geiersbach well) in this area, and on detections of COCs in FW-3); and

*EPA Response:*
*The rationale for including a new Floridan well on the western property boundary at 26th Avenue in the monitoring program is the detection of elevated contaminant concentrations in a former private well in the area and detections of contaminants in upper Floridan aquifer monitoring well FW-3. Contamination in the private well was possibly due to leakage into the upper Floridan aquifer from contamination in the lower Hawthorn group that entered the underlying aquifer at the well, due to deteriorated well construction materials or an incomplete seal between the lower Hawthorn and the upper Floridan. A similar process has been surmised as the cause of the low-level groundwater contamination that has been observed in FW-3. Water-level data and contaminant distribution patterns across the Koppers property do not indicate that contamination at FW-3 or the private well originated through advective contaminant transport in the Floridan aquifer from upgradient identified contaminant entry points. There is insufficient rationale at this time to add another Floridan well at the suggested location.*

E. Beneath (or immediately adjacent to) the former process area and south lagoon (both of these areas lack LHG wells so the depth of contamination is not known; the process area is of particular concern due to the mobile DNAPL being collected in the UHG, and the fact that the existing UFA well (FW-18B) is roughly 200 ft north of the process area).

*EPA Response:*
*These source areas are already being adequately monitored by multilevel monitoring wells and drilling additional wells through highly contaminated zones in the immediate vicinity of the source areas is inadvisable.*

The interior plume(s) are of great concern because of their high concentration and depth, which is as-yet undefined. Analytical results from FW-27B indicate that creosote contamination extends to at least the deepest sample-port in that well, 289 ft below ground surface. It is critical that Beazer install additional wells to fully delineate the horizontal and vertical extent of this plume, and to assure that it is not expanding and does not migrate off-site undetected.

*EPA Response:*
*See General Response No. 2*

**5. The City and County request excavation and off-site disposal of the SA source areas. This remedy would provide the highest degree of confidence from the community, and provide the highest level of permanence for the site remediation.**

*EPA Response:*

*Excavation of source area soils containing DNAPL was evaluated in comparison with other options during the FS process. The preferred onsite remedy was determined to be the optimal alternative based on the nine CERCLA criteria used in developing and evaluating remedial options, including risk reduction and protectiveness. Specific challenges to soil excavation and off-site disposal at the Site are:*

***Excavation depths and large soil volume***

*The two source area excavation alternatives considered during the remedy selection process (removal of soil within the Surficial Aquifer or removal of soil to the Hawthorn Group middle clay unit) would present significant challenges due to the excavation depths and the large amounts of soil that would be removed. The Surficial Aquifer soil removal would require digging to an approximate depth of 25 feet below ground and removing approximately 280,000 cubic yards (420,000 tons) of soil. The Hawthorn Group middle clay soil is deeper and removal would require digging to an approximate depth of 65 feet below ground and removing approximately 1,800,000 cubic yards (2,700,000 tons) of soil. Excavating soil to these depths would require shoring to keep the excavation walls from falling in on workers, and dewatering to remove groundwater that would flow into the excavation area during excavation. Groundwater collected from the excavation area would require treatment and disposal. Construction of a staging/temporary storage area may be required. Excavated soil would require management as listed hazardous waste. All of these challenges, in turn, result in short-term health and safety risks to remedial workers and the nearby community and significant additional costs to the remedial effort.*

***Off-Site disposal challenges***

*Finding one or more disposal facilities that will accept the large quantities of contaminated soil would present a challenge. Land Disposal Restriction (LDR) and Best Demonstrated Available Technology (BDAT) rules establishing treatment standards for land disposal may require that contaminated soils from the Site be sent to one of the few hazardous waste incinerators that accept wood treatment listed waste. It may also be necessary to treat soils on-site prior to off-Site disposal. Transporting the contaminated soils to an off-Site facility would require either about 15,000 (Surficial Aquifer excavation) or 95,000 (Hawthorn Group middle clay excavation) truck loads. More than 100 dump truck loads per day of contaminated soil could be driven through the areas surrounding the Site resulting in significant transport-related safety and environmental risks, as well as a significant nuisance to the surrounding areas for over 2.5 years. The same logistical difficulties are associated with rail transport.*

***On-site treatment challenges***

*If the material is treated on-site (by any method) and returned to the excavation, the risk reduction and volume treated is very similar to the in-situ treatment* *options, but with substantially greater short-term risk, engineering challenges, effort, time, and cost.*

***On-site construction of above ground landfill challenges***
*If the excavated soil is placed in an on-site constructed landfill instead of being returned to the excavation or transported off-Site, the resulting mound would be much larger than the mound considered for the gently sloped consolidation area. This would have serious technical and permitting challenges, would limit redevelopment opportunities, and would not be a welcome sight for the community.*

***Risk reduction not significantly different with excavation***
*Actual long-term human health and environmental risk reduction resulting from source area excavation would not be significantly different than in-situ treatment. Short-term risks would be significantly higher for soil excavation. Soil removal will not significantly reduce groundwater concentrations at potential receptors, including the Murphree Well Field. A long-term groundwater remedy would still be required. There is also a risk that residual DNAPL will move through the groundwater during excavation activities.*

**6. We do not support In Situ Bio Geo Chemical Stabilization (ISBS) in the SA or UHG source areas. To the extent excavation cannot be applied in the SA, In-Situ Solidification/Stabilization (ISS/S) should be used. We do support the use of ISS/S for UHG source areas.**

*EPA Response:*
*It should be noted that ISGS is only one component of the containment strategy at the Cabot Koppers Site. EPA has a regulatory imperative to utilize treatment over containment whenever practical. Out of an abundance of caution, redundant approaches (slurry walls, and a cap to isolate the four primary source areas, and soil stabilization/treatment) are proposed with additional contingencies to insure project success. Specific performance requirements will be engineered during the design phase of the project. EPA acknowledges that ISGS is a developing technology; however, EPA will require stringent performance testing and monitoring during application with an ISSS contingency in place if performance standards are not achieved. Implementing the remedy in a staged or staggered schedule will provide EPA with more options for meeting clean-up goals. For example, EPA proposes implementing ISGS within a physically contained zone (surrounded by the slurry wall) as a response to subsurface contamination, and to evaluate its effectiveness concurrently with the remedial design. EPA will require the PRP to provide engineering design plans for both full-scale implementation of ISGS and a contingent ISSS remedy along with the other remedial components including but not limited to the vertical barrier wall, the engineered cap, and LHG injection points. EPA will be able to quickly respond to ISGS ineffectiveness by requiring the ISGS zone to be revisited and*

*addressed by ISS/S, or additional ISGS injections, without further time-consuming Site-specific rulemakings.*

The need to remove or immobilize DNAPL to the fullest extent possible in the UHG and LHG (in addition to the surficial aquifer) is a primary concern to the City and County, and was emphasized in our responses to the August 2009 Draft Feasibility Study. The goal of this treatment is to reduce vertical and horizontal mass loading of DNAPL and dissolved phase constituents, with vertical mass loading being the most critical component. The proposed plan includes treatment of source areas using ISS/S in the UHG, and ISBS (alternatively referred to as In Situ Geo Chemical Stabilization (ISGS)) in the SA.

As we understand it Beazer has proposed an approach utilizing ISBS in the UHG in combination with ISS/S or ISBS in the SA. We believe that EPA's proposal to use ISS/S for the UHG is appropriate. ISS/S is a comparatively well-proven technology, although the depths and the clay layers present in the UHG at the site are likely to make implementation of any technology challenging. ISS/S provides the best technical approach for effectively treating the UHG source areas.

For the SA source areas, our first preference would be to remove and dispose off-site all of the DNAPL impacted sediments from the SA, with ISS/S in the UHG. If EPA does not select excavation as the remedy for DNAPL impacted sediments from the SA, it is the opinion of our technical team that the use of ISS/S in the SA, concurrently with ISS/S in the UHG, would provide the most appropriate remedy to achieve an acceptable level of groundwater protection.

We do not support the use of ISBS to treat SA or UHG source areas. In our previous correspondence (*GRU & ACEPD Proposed Performance Metrics for ISGS, May 10, 2010*) we expressed concern about the effectiveness of ISBS. Upon further review we feel that ISBS is not appropriate for application in the SA or UHG source areas at the Koppers Gainesville site for the following reasons:

A. **ISBS is not a proven technology (in contrast to ISS/S which is well-proven).** There is very little information in the peer-reviewed literature to indicate that ISBS has been successfully applied at any site, and certainly not on the scale proposed at the Koppers Site. The application of ISBS technology reported for the Denver Koppers site used soil boring data to make conclusive statements about the treatability of a heterogeneous NAPL impacted zone. Results from these data were mixed and no attempt was made to quantify changes in mass loading. Comments from Dr. Neil Thomson on the Denver ISBS Treatment report are attached in Attachment A.

   The pilot test of ISBS at the Koppers Gainesville site was similarly inconclusive in that the sweep of injected fluid in the SA was very uneven, leading to untreated zones close to the injection wells. The high injection pressures resulted in surface discharges ("day lighting") of the permanganate solution, apparently through inadequately sealed borings that are likely to also exist elsewhere on site with similar consequences. Comments from Dr. Neil Thomson on the ISBS pilot study at Koppers Gainesville are in Attachment B. Furthermore, using a similar technology, Thomson et al., (2008) reported a material decrease in mass discharge and/or total plume mass during monitoring performed 1 and 2 years post-treatment; however, 4 years after treatment, mass discharge and total plume mass for all monitored compounds rebounded to pre-treatment values (Thomson et al., 2008, *Rebound of a coal tar creosote plume following partial source zone treatment with permanganate*. Journal of Contaminant Hydrology, v. 102, p. 154-171). This article is in Attachment C.

*EPA Response:*
*The proposed remedy includes phased implementation which provides EPA with more opportunity for evaluation and adaptation of remedy implementation details. Source area contamination in the surficial aquifer FIRST will be contained vertically by ISS/S in the underlying UHG. Lateral movement of DNAPL in the surficial aquifer beyond the footprint of the principal contaminant source areas has been minimal, as indicated in the "Data Report for Additional Investigation of Hawthorn Group DNAPL Source Evaluation for the Koppers Industries Property" (GeoTrans, Inc., 2004).*

*Because of some issues raised in Recommendation 6, ISGS needs to be further field tested before full-scale implementation. If ISGS is not reasonably believed to effectively contain and/or treat the potentially mobile nonaqueous-phase contamination, then the remedy construction would default to ISS/S to treat principal threat wastes in the surficial aquifer. Note that ISS/S could be implemented around the perimeter of any NAPL-contaminated areas treated by ISGS if the ISGS treatment was found to be inefficient or incomplete. This two-zone, phased treatment approach would assure that contaminant mass flux outside of the core area would be virtually eliminated.*

*Dr. Thompson acknowledged in a recent conference call that the study cited above by the Commenter was based on a potassium permanganate solution without the aid of a catalyst. ISGS is a sodium permanganate solution which includes a catalyst and so the study results may or may not accurately reflect performance of the ISGS treatment.*

B. **Delivery of the ISBS reagent to contaminants under the conditions at the Koppers Gainesville site will be very uncertain.** Delivery of the ISBS reagent to the surface of the creosote mass is critical. Beazer's hypothesis is that the ISBS will follow the same high conductivity features as the creosote DNAPL did. However, this phenomenon is likely to be limited by factors including: *(1) DNAPL itself is likely blocking at least some of the pathways through which the DNAPL migrated (ISBS solution will not displace creosote DNAPL); (2) ISBS will preferentially flow to highest conductivity pathways that are not blocked by DNAPL, and will have limited* *contact with creosote that has migrated into more moderate conductivity pathways or pathways which are blocked or partially blocked by DNAPL.* Creosote DNAPL likely has migrated into moderate conductivity as well as high conductivity features because it has had 50 or more years under varying hydrologic conditions to do so. The ISBS pilot test showed clearly that the dense ISBS solution sank to the bottom of the SA causing poor sweep of the aquifer; and *(3) Much of the DNAPL mass is likely interconnected, which provides the mechanism by which DNAPL can continue to migrate.* Even if the ISBS reagent is successful in contacting the outside surface of the DNAPL mass, this may not prevent DNAPL from continuing to migrate within the interior of the interconnected DNAPL mass. As you are aware, we disagree with Beazer's conclusion that DNAPL within the UHG and LHG exists primarily as disconnected ganglia. Adequate distribution of the ISBS reagent was not obtained in the field pilot study at the Koppers,Gainesville site.

*EPA Response:*
*EPA acknowledges this is a developing technology with significant challenges; however, engineered performance monitoring and alternative action will be designed into the remedy.*

C. **At this time there is no reliable way to determine if treatment goals are being achieved with ISBS.** The treatment goals are to reduce the vertical and horizontal mass loading of DNAPL and dissolved phase constituents. Determination of the effectiveness of ISBS treatment in meeting these goals will require comparison of pre- and post-treatment contaminant mass loading measurements. It will also require measurement of the reduction in DNAPL vertical mobility. Methods which have been discussed for doing this include:

*(1) Use of Core Data.* The ability of core data to assess performance of ISBS is limited because cores represent a limited snapshot of subsurface conditions, which are likely to vary substantially over very short distances due to heterogeneities in the geology, DNAPL architecture and ISBS solution distribution.

*(2) Measurement of Dissolved-Phase Mass Loading Using Flux Monitoring Devices.* Technologies exist to measure horizontal dissolved phase mass flux. However, to date no method has been proposed to measure vertical mass flux, which is the most critical parameter for this site, as protection of the UFA is the ultimate objective of the treatment system. Horizontal mass flux is not an adequate indicator of vertical mass flux since the transport pathways are different.

*(3) Use of UFA Extraction System Data to Measure Dissolved-Phase Mass Loading.* In order to use UFA extraction system data to estimate mass load, it will be necessary to expand the UFA extraction system so that it captures the entire UFA plume(s). This will require installing pumping wells in the vicinity of the source areas and expanding the treatment plant capacity to process the *additional* extracted groundwater, i.e., >100 gpm. (FW-31BE is capturing a portion of one plume as it is

leaving the site. It is not capturing the entirety of the interior plume(s) such that a mass loading of contamination into the UFA could be assessed). Before the mass load reduction resulting from ISBS treatment could be assessed, data from this capture system would have to be collected and evaluated for a minimum of 1-2 years prior to ISBS treatment and several years (likely 5-10 years or more) post-treatment. The likely long lag time between treatment and UFA response makes this method impractical for determining the success of ISBS treatment in a timely manner. It would be unlikely that EPA could assess the ISBS success in the first 5-year review cycle.

*(4) Measurement of Reduction in DNAPL Vertical Mobility.* One method which has been proposed to assess the impacts of ISBS on DNAPL mobility is to observe changes in the volume of DNAPL collected in UHG monitoring wells. Five out of 6 of the monitoring wells installed in the UHG consistently yield DNAPL, but there are only 1 or 2 such wells within the footprint of each SA source area. Cessation of DNAPL collection in one of these wells immediately after treatment by ISBS may indicate that lateral DNAPL mobility was reduced in the vicinity of that well. However, this conclusion could not be applied across the entire source area. More UHG wells could be installed prior to ISBS treatment in an attempt to provide a better assessment across the source area. However, an apparent reduction in DNAPL recovery in a well that was recently installed prior to ISBS treatment does not conclusively indicate that the ISBS treatment was successful. An apparent reduction of DNAPL recovery in a recently installed monitoring well could be due to natural variation in DNAPL recovery rates (as observed in existing UHG monitor wells), or alternatively it could be because there was not enough DNAPL volume at that location to maintain a consistent collection rate. Several years of monitoring would be required to demonstrate consistent DNAPL recovery rates at the new wells, in order to conclude with any certainty that reductions in recovery after ISBS were, in fact, due to ISBS treatment. Additionally, even if a reduction in lateral mobility could be demonstrated, this may, or may not, reflect a reduction in vertical mobility.

We do not believe that any of the above proposed metrics will be effective at measuring ISBS performance at the site. There are inherent difficulties with each suggested method, which are described in detail above.

In contrast to ISBS, ISS/S is not plagued with such issues. ISS/S is a well proven technology which has been used at multiple sites. Since it involves mechanical mixing of soils, distribution of the solidification agents is much less of an issue. To confirm treatment, soil cores of the solidified material can be collected to confirm the spatial extent of treatment. Changes to hydraulic conductivity, compression strength, and leachability in these cores can be easily measured using standardized methods to establish the degree of success of the treatment. Implementation of ISS/S in the SA and UHG will not require the otherwise difficult measurements of mass loadings described above for ISBS in order to assess the effectiveness of the selected remedy.

As we understand it EPA's basis for proposing ISBS in the SA in conjunction with ISS/S in the UHG is that the ISS/S in the UHG will provide a "floor", so that even if the ISBS in the SA is only partially successful, downward mass loading through the UHG will be limited. To be effective, the ISS/S floor will have to be implemented over an area extending well beyond the lateral boundaries of the UHG source zones to ensure that DNAPL from the SA does not migrate downward. In addition, the disturbance of the SA soils due to the augering during ISS/S will change the characteristics of the SA soils. Therefore, a pilot study would have to be carried out demonstrating the proposed ISS/S and ISBS treatment combination. Given the need for a minimum of 4 years (perhaps longer) to evaluate the performance of the ISBS portion of the pilot study, the final remedy for the site would be further delayed. Any further delay in the implementation of a remedy for this site is unacceptable to the City/County and local community.

Since ISS/S in the UHG will require auguring through the SA source area to reach the UHG, we believe it makes the most sense to apply ISS/S in the SA at the same time that it is applied in the UHG (per Alternative OnR-5F). Although EPA's cost estimate for the proposed plan ($65 million) indicates a cost savings as compared to Alternative OnR-5F, in reality we feel there would be little if any cost advantage of the proposed remedy compared to use of ISS/S in both the SA & UHG (Alternative OnR-5F), particularly in light of the considerable risk that ISBS will not be successful, the likelihood of unforeseen complications with this remedy, and the delays that a combined ISS/S/ISBS pilot study would create. Given the length of time the community has waited for a final remedy for the site, it is important that the final remedy be as robust as possible, provide for the greatest opportunity for achieving the remedial objectives, and be implemented as quickly as possible.

*EPA Response:*
*In the interest of addressing concerns regarding the implementation of ISGS, the remedy has been modified somewhat since the issuance of the Proposed Plan. The remedy consists of the following:*

- *In place (in-situ) solidification and stabilization (ISS/S) of contamination from ground surface to the upper Hawthorn Group zone (0 to 65 feet bls) at two of the four principal contaminant source areas (the former North Lagoon and the former Drip Track area). The ISS/S component of this remedy component will be implemented through injection of stabilizing chemicals into the ground surface. This ISS/S treatment is subject to acceptable performance demonstration during pilot tests or treatability studies. Pilot tests/treatability studies are tests conducted with contaminated Site materials and stabilizers to determine if cleanup goals will be met.*
- *n-situ geochemical stabilization (ISGS) (also referred to as in-situ biogeochemical stabilization (ISBS) of DNAPL from ground surface to the bottom of the upper Hawthorn Group zone (0 to 65 feet bls) at two of the four principal contaminant source areas (former Process area*

> *and the former South Lagoon). The ISGS component of this remedy component will be implemented through injection of oxidizing and stabilizing chemicals into the ground surface. This ISGS treatment is subject to acceptable performance demonstration during pilot tests or treatability studies. Pilot tests/treatability studies are tests conducted with contaminated Site materials and stabilizers to determine if cleanup goals will be met. If pilot tests/treatability studies do not demonstrate to EPA acceptable performance of the ISGS treatment for the Surficial Aquifer zone, the Surficial Aquifer zone at the former Process area and at the former South Lagoon will be treated with In-situ solidification (ISS/S).*

*The described challenges to implementing ISGS technology are partially the basis for the proposed staged or phased remedy implementation strategy at the Site. At each time stage during remedy implementation, new assessment of success or effectiveness can be made. Based on results of such assessments, EPA is prepared to require the PRP to implement additional remedial technologies. These redundancies in protectiveness are possible in part because of the phased implementation strategy. Furthermore, the required Five-Year Review cycle provides additional periods of remedy evaluation over the long-term and additional feedback information for EPA to determine if PRP needs to implement additional remedial actions.*

***Proposed ISBS Pilot Study***

It is our understanding that EPA is considering a plan in which Beazer would implement a full-scale ISBS pilot study in the former process area. The study would be initiated immediately and would be conducted concurrently with remedial design and implementation of the other remedy components (i.e. the slurry wall and other components excluding DNAPL source zone treatment). The stated intention is that the study would not delay the overall remedy implementation, since it would be started immediately, would be conducted during remedial design, and be completed by the time DNAPL source area treatment would be initiated.

Our concerns with this pilot study approach are that: (1) the results of the study and success of the ISBS treatment will be uncertain and subject to much debate (for the reasons described above), and (2) the pilot test will result in a significant delay in remedy implementation. As described above, in research performed by Thomson et al (2008) at the Borden site, which was under much more controlled conditions with much more homogeneous and transmissive geology (in a sandy aquifer) than the Koppers Gainesville site, it took 4 years for the system to reestablish equilibrium after treatment. Given lower transmissivity and the more complex geology at Koppers Gainesville, it is likely to take even more time for the groundwater system to re-equilibrate post-treatment at this site. For these reasons we object to moving forward with the pilot study, and recommend selection and implementation of ISS/S and/or excavation as the remedy for treating SA and UHG source areas.

However, if EPA chooses to move forward with the ISBS pilot study, the study would need to be rigorously designed, implemented, and evaluated and the burden of proving the success of the technology should be on Beazer. The study would need to include the following at a minimum to provide defensible results:

A. Development of metrics and criteria that can adequately measure ISBS performance within the required timeframe (i.e. the limitations of available performance metrics described above would have to be overcome);
B. Characterization of DNAPL extent & architecture (the present characterization is not adequate for remedial or pilot study design or performance assessment);
C. Concurrent pilot testing of ISS/S to provide side-by-side comparison of the technologies, and assist in providing performance criteria for comparison with ISBS;
D. Pre-treatment monitoring (to establish baseline conditions); and
E. Post-treatment monitoring, data analysis, and reporting.

Concurrent pilot testing of ISS/S at another source area would provide a side-by- side comparison of the two technologies, and would help to provide an indication of the relative success of the ISBS. For example, assuming a methodology can be developed to measure downward mass loading, data from the ISS/S pilot would provide a relative reference point for comparison.

*EPA Response:*
*In the interest of addressing concerns regarding the implementation of ISGS, the remedy has been modified somewhat since the issuance of the Proposed Plan. The remedy consists of the following:*

- *In place (in-situ) solidification and stabilization (ISS/S) of contamination from ground surface to the upper Hawthorn Group zone (0 to 65 feet bls) at two of the four principal contaminant source areas (the former North Lagoon and the former Drip Track area). The ISS/S component of this remedy component will be implemented through injection of stabilizing chemicals into the ground surface. This ISS/S treatment is subject to acceptable performance demonstration during pilot tests or treatability studies. Pilot tests/treatability studies are tests conducted with contaminated Site materials and stabilizers to determine if cleanup goals will be met.*
- *n-situ geochemical stabilization (ISGS) (also referred to as in-situ biogeochemical stabilization (ISBS) of DNAPL from ground surface to the bottom of the upper Hawthorn Group zone (0 to 65 feet bls) at two of the four principal contaminant source areas (former Process area and the former South Lagoon). The ISGS component of this remedy component will be implemented through injection of oxidizing and stabilizing chemicals into the ground surface. This ISGS treatment is subject to acceptable performance demonstration during pilot tests or treatability studies. Pilot tests/treatability studies are tests conducted*

> *with contaminated Site materials and stabilizers to determine if cleanup goals will be met. If pilot tests/treatability studies do not demonstrate to EPA acceptable performance of the ISGS treatment for the Surficial Aquifer zone, the Surficial Aquifer zone at the former Process area and at the former South Lagoon will be treated with In-situ solidification (ISS/S).*

*The described challenges to implementing ISGS technology are partially the basis for the proposed staged or phased remedy implementation strategy at the Site. At each time stage during remedy implementation, new assessment of success or effectiveness can be made. Based on results of such assessments, EPA is prepared to require the PRP to implement more stringent or costly remedy technologies. These redundancies in protectiveness are possible in part because of the phased implementation strategy. Furthermore, the required Five-Year Review cycle provides additional periods of remedy evaluation over the long-term and additional feedback information for EPA to determine if PRP needs to implement additional remedial actions.*

**7. We support the Slurry Wall and cap components of the Proposed Remedy. We also support EPA's designation of all DNAPL as a principal threat waste. However, the ROD should also address UHG source areas east of the property boundary that are outside the slurry wall shown in the Feasibility Study.**

Slurry walls are a well demonstrated technology for the purposes they are designed for. We believe the slurry wall will minimize lateral movement of contaminants within the SA and UHG. It will not (and is not intended to) affect vertical movement of contaminants in any aquifer unit, or lateral movement of contaminants in the LHG or UFA. Even with the most effective treatment of the DNAPL in the SA and UHG, there will continue to be a dissolved phase plume (or plumes) outside the source zones that will need to be contained. Therefore, the slurry wall will be an important component of any remedy.

We support EPA's designation of all DNAPL as a principle threat waste, and that "remedial actions proposed as a part of this Plan are intended to address DNAPL (i.e. principle threat waste) impacts, regardless of its location or source origination on the Koppers site."

There is evidence of DNAPL within the UHG to the east of the Koppers site which is outside of the footprint of the slurry wall as depicted in the Feasibility Study. Based on borings along the eastern boundary of the site and dissolved phase contamination in UHG wells, it is evident that DNAPL has migrated off-site within the UHG to the vicinity of the HG-26 well cluster on the Cabot Carbon Site. It is not clear from the Proposed Plan if or how these off-site source areas will be addressed. Treatment of DNAPL in these areas should be included in any final remedy since it is a principle threat waste and is an ongoing source of groundwater contamination. The fact that the area to the east of the

Koppers site is not owned by Beazer does not preclude them from employing appropriate remedies in this area.

The CSX rail line on the eastern property boundary is unused to the south and terminates at 23rd Avenue. It is our understanding that to the north the closest user is Harwood Brick Distributors, Inc. (northeast of the Koppers site) at 3302 NE 2nd Street. It is important to consider the potential of this unused segment of railroad bed to be incorporated into the Koppers site and used to expand the area of the slurry wall to the east. Although this is a small area, it would provide additional area for containment of contamination in the surficial and UHG.

*EPA Response:*
*EPA will consider treatment of UHG soil/groundwater east of Koppers where available data indicate Principal Threat Waste (NAPL) is or is likely present in close proximity. Treatment needs to be capable of reducing contaminant mass/concentration of all contaminants of concern. The inclusion of the railroad area into the slurry wall, as will many pertinent issues, will be evaluated and addressed as part of the Remedial Design document. During remedial design the precise alignment of the vertical barrier wall will be data driven as determined by additional sampling and lithologic logging, it may or may not follow the alignment shown in figures presented in the proposed plan and FS.*

**8. We support use of Chemox or ISBS in the LHG. However, existing LHG monitoring wells should either be retained or replaced.**

Treatment of creosote DNAPL to reduce mobility and migration of contaminants into groundwater in the Hawthorn Group to the maximum extent possible is a high priority. We support the concept of injecting Chemox or ISBS into the LHG
to immobilize DNAPL to the extent practicable. Although we have concerns about the performance of ISBS, the ability to deliver the reagent to adequately contact all the DNAPL, and the ability to measure the performance of ISBS (described above), we recognize that it is not possible to deploy ISS/S, excavation or other more robust remedies at the depth of the LHG with current technology. The depth, limited permeability and heterogeneity of the geological strata also make injection of Chemox, ISBS or other chemicals difficult. *Limitations of the ability to treat the LHG DNAPL make it all the more critical to employ effective monitoring and hydraulic containment in the UFA.*

The existing LHG monitoring wells are important for monitoring the status of the site and effectiveness of the site remedies. They will be particularly useful in long term monitoring of any remedies employed in the LHG. It would be preferable to retain the existing LHG wells, however, if they cannot be retained when ISS/S is implemented, they should be replaced after ISS/S is implemented. It is important to note that at the present time there are no LHG monitoring wells in the Process Area or South Lagoon – and we believe wells in the LHG are required at both of those source areas.

We do not object to injecting ISBS into a LHG well that must be removed before ISS/S treatment and replaced anyway, although their small diameter is likely to make them poorly suitable as injection wells. However, where possible, existing LHG wells should be retained and used, in conjunction with additional new LHG monitoring wells for long-term monitoring (ISBS or Chemox cannot be injected into wells that will be retained). ISBS or Chemox injection should be performed using new dedicated injection wells.

We propose that the ROD include a provision that Chemox or ISBS will be employed in the LHG using dedicated injection wells with existing, and new monitoring wells (as appropriate) being used to monitor the success of this action. We recommend that implementation of LHG remedies be staged to occur after implementation of the other site remedies to allow time for observing effects of remediation in the UHG and to permit installation of additional monitoring wells after the SA and UHG are stabilized. The exception to this would be that Chemox or ISBS will be deployed to the existing DNAPL impacted LHG monitoring wells that must be removed as part of the SA and UHG remedies.

*EPA Response:*
*New lower Hawthorn Group (LHG) wells will be needed, for both injection of chemicals to treat highly contaminated groundwater and as replacements for existing monitoring wells that would be destroyed as a result of source area remedial actions. The advantage of replacing LHG wells in source areas (e.g. HG-10D) is that before and after data can be obtained to evaluate the effects of remedial actions on groundwater quality.*

*On the other hand, if replacement wells are constructed exactly where older LHG wells have been removed after being used as points of injection of an oxidant, the groundwater results may be mostly indicative of how the point injections have influenced groundwater quality, rather than being indicative of how the overall source area remedy has affected groundwater quality. Additionally, LHG wells within the area of source treatment/containment would not function as effective compliance monitoring wells.*

*A preferred option would be to construct new LHG monitoring wells outside of the treatment/ containment area to act as both indicators of the overall effectiveness of the source area remedial actions and as compliance point monitoring wells (for at least the 5 µg/L Federal MCL for benzene). These wells probably need to be installed and monitored more than once prior to source area remedial action in order to provide a baseline water quality profile. EPA agrees with the proposal here and in Recommendation 9 that LHG wells need to be added to specifically monitor the Former Process Area and South Lagoon. There may be some advantage to completing new LHG wells for chemical injection within the source containment zone (probably not within the actual footprint of the principal source areas or identified DNAPL zones).*

*The last paragraph of Recommendation 8 recommends that the LHG remedies be staged to occur after implementation of other remedies to allow time for observing effects of remediation in the upper Hawthorn Group (UHG) and to permit installation of additional monitoring wells after the surficial aquifer and UHG have stabilized. It may require years to be able to evaluate the effects of remediation in the UHG on a broad scale, therefore, delaying the LHG remedial action until this time occurs does not make sense. The idea that remedial actions in the LHG may have to occur after source area remedial actions in shallower zones occurs does make sense, if new LHG wells are drilled into areas where shallower source area remedial actions are implemented.*

**9. Additional characterization is needed to delineate DNAPL source areas and dissolved phase plumes.**

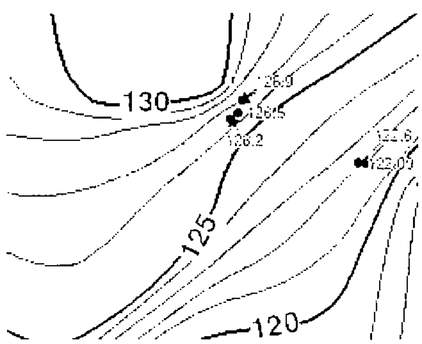
The Proposed Plan appropriately includes: "Expansion of surficial aquifer and HG monitoring network for: (1) establishment of sentinel locations; (2) demonstration of active natural attenuation processes; and (3) establishment of trigger locations for contingency actions." We request a fourth objective be added to "further delineate DNAPL source areas to define the lateral limits of source zone treatment in the Surficial Aquifer and Hawthorn Group". Source areas should be defined on the basis of visual evidence of NAPL or staining in continuous soil cores or naphthalene concentrations in groundwater in excess of 1,000 μg/L (ppb). Note that the "source area" boundaries presented on plan view figures in the FS and other documents are based on estimated footprints of the lagoons and other areas that existed at the site at one time and the results of investigations of Surficial Aquifer contamination conducted in 2004; they likely underestimate the area over which DNAPL has spread in the SA and in the underlying UHG or LHG. The areas contaminated by residual and mobile DNAPL need to be fully characterized in all aquifers units as part of the remedial design so that remedies will be implemented as effectively as possible.

Additional HG well(s) are needed at the northern boundary to evaluate potential off-site migration in that area. Low levels of Koppers-related organics were detected in a private irrigation well in proximity to the northern boundary of the Koppers site.

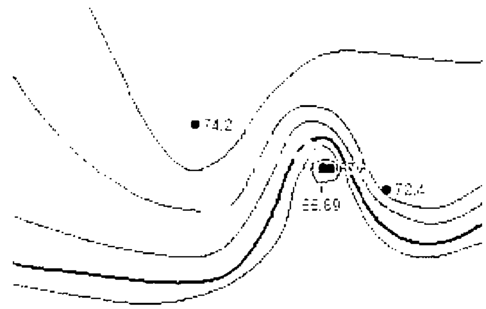
The expansion of the surficial aquifer and Hawthorn Group monitoring network should include additional LHG wells near the source areas. At the present time there are no LHG monitoring wells in the Process Area or South Lagoon – we request that the ROD require specifically that such wells be installed.

Finally, the ROD should require characterization to locate potential, but as-yet unidentified, source areas. This includes investigations to determine if buried drums exist at the site, and to determine if there is contamination from other process or waste treatment areas that might have existed outside of the identified source areas.

*EPA Response:*
*Some additional characterization of the potential extent of source areas is needed, especially in the area to the northeast of the north lagoon, where there is the potential for DNAPL to be migrating (or to have migrated) to the northeast on top of both the middle Hawthorn clay and the lower Hawthorn clay (see illustrations below).*




Elevation Contours for Top of Hawthorn Group Deposits -- Middle Clay Unit



Elevation Contours for Top of Hawthorn Group Deposits -- Lower Clay Unit

*Recommendation 9 states that additional Hawthorn wells are needed at the northern property boundary to evaluate potential off-site migration in this area. While on-property Hawthorn monitoring wells are needed north of the North Lagoon and Drip Track areas, there does not appear to be a current need for more wells beyond the northern property boundary, based on data from existing wells HG27S/ HG27D. Wells as far north as the northern property boundary may or may not be needed.*

**10. The soil consolidation (if implemented) and cap, and any future development of the site should be configured so as not to significantly obstruct the ability to further treat source zones in the future.**

Due to the uncertainties associated with the DNAPL treatments, particularly in the LHG, there may be a future need to further treat source areas and/or to add additional monitoring wells. In addition, there may be advances in technology which will allow more effective treatment. Therefore, the cap and soil consolidation, and any future development should be configured so as to not significantly obstruct the ability to access and treat source areas.

*EPA Response:*
*EPA agrees with this comment. Five-year reviews are required by law to provide feedback information on remedy effectiveness and on the ability for future remedial activities to be implemented. With EPA and FDEP involved in future land-use agreements, access points would be included in any future land-use development to allow for additional remedial action to be implemented (e.g.,*

*additional Chemox injections, additional monitor well installation, etc.), if necessary.*

# 2.0 ON-SITE / OFF-SITE SURFACE SOILS REMEDY

**COMMENTS AND RECOMMENDATIONS**

**11. The USEPA Proposed Plan remedy for the surface soils and the future land use assumptions made by USEPA have not been sufficiently coordinated with the City of Gainesville and local stakeholders. Additional coordination with the City of Gainesville and local stakeholders is needed regarding the future land use vision. The final remedy for the Koppers site must meet the following minimum criteria:**

- **A. It should be based on an explicit redevelopment vision;**
- **B. It should be compatible with a redevelopment scenario that includes a step down in land use types from east to west on the site;**
- **C. Clean-up of soils to the west and north of proposed containment area to allow redevelopment with all residential land use categories;**
- **D. Industrial re-use should not be considered appropriate land use for the site; and**
- **E. Remedy should be compatible with eventual reuse of City of Gainesville Public Works property north of site.**

The USEPA's efforts to solicit input from the City of Gainesville and the local community on the final site remedy and especially surface soil remediation and future land use issues has not been timely nor adequate and has not allowed sufficient time to solicit appropriate community input on impacts of the EPA proposed soil remedy. The reuse vision for the site discussed by USEPA's Reuse contractor, $E^2$, in presentations to the community has assumed a preselected remedy for soils that is not compatible with the City of Gainesville future redevelopment vision for the site. Insufficient time has been allowed to provide adequate and appropriate involvement from the City and local stakeholders in the remedy selection process.

*EPA Response:*
*EPA makes use of several sources of information when evaluating future land use during CERCLA remedy selection, including the EPA directive "Land Use in the CERCLA Remedy Selection Process" (EPA OSWER Directive No. 9355.7-04). It is important to note a distinction between the use of the term "residential" in the world of zoning and use and the term "residential" as that term is used in describing soil cleanup standards at hazardous waste sites. In the second case, the use of the word "residential" cleanup standards at a hazardous waste sites means a soil cleanup that would allow for unrestricted and unlimited use at a site. EPA contractor $E^2$ presented a conceptual document that did not accurately depict such details as the footprint of the onsite soil containment areas.*

*The concept of converting a long-standing industrial property, one used for highly-invasive industrial operations for nearly a century, into a pristine unrestricted-use property must be considered within the context of reason and technical feasibility. EPA is required to look at reasonably anticipated future land uses in determining what cleanup criteria to apply at a Superfund Site. EPA has determined that unrestricted residential use is not a likely or practical future land use for the Site. However, a remedy that in effect meets Florida residential default cleanup standards has been selected. The remedy calls for clean soil to be placed over almost the entire Site. EPA has made its reasonably anticipated land use determination based on several factors including property owner Beazer East's planned retention of Site ownership and its indicated future use of the Site as commercial, recreational or mixed use with a residential component. Therefore, the EPA has determined that the reasonably anticipated future land use of the Koppers portion of the Site is likely to be commercial, recreational or mixed-use with a residential component.*

*Even if unrestricted land-use were a reasonable goal for this particular Site, the time element required to achieve it would extend for several decades and involve numerous iterations of remedial action at the Site. One ROD (with one set of remedial technologies) may not cover all the elements required to achieve such a goal. The only way to achieve the comment's stated goal is to remove tens to hundreds of millions of cubic yards of contaminated surface and subsurface material (soil and water down to depths of several hundred feet below ground level) over time. Even if this were technically feasible and financially viable, the disturbance to the surrounding community during its implementation would generate substantial risk and disruption to the community over a longer period of time.*

*As stated previously, EPA is in agreement that treatment or removal is preferable in instances where such action can be technically implemented and taken without incurring adverse impacts on health or environment (i.e., making the situation worse). In fact, such is required to be EPA's preference, by law. At this Site, all possible technologies for treatment or removal of contaminant mass have been identified and evaluated over the course of several years with the input of numerous technical experts, both associated with EPA and independent of EPA. Consideration of all relevant information, data and potential consequences of implementation of alternate remedy options has led the EPA to develop the remedy it has proposed.*

*The City of Gainesville City Commission considered and rejected a contingent future rezoning of the former Koppers Site to an exclusively residential use. This option was considered over a two-year time period during which the City planning commission introduced the City's initial vision of the Site as being reused as a mixed use commercial with a residential component similar to Atlantic Station* *(previously Atlantic Steel Mill) in Atlanta, Georgia. As EPA has communicated to the City in several City Commission meetings and through other formats, there are few, if any, former hazardous waste sites where there is unlimited or unrestricted future use. However, there are many former hazardous waste sites where there are "residential" land uses taking place.*

The Code of Federal Regulation (CFR) Chapter 40, Section 300.430 prescribes clear requirements for EPA's obligations for community involvement prior to and during the RI/FS process and through ROD development. EPA has met few of these obligations. For example, the required Community Involvement Plan was ignored for over 20 years and was only recently updated. The 1989 Community Involvement Plan (CIP) was required to be updated every 3 years (7 times during the past 21 years) to solicit comment from the community throughout the multiple RI, FS and RAO development process. Instead, the first CIP draft since 1989 was produced *after* EPA released its Proposed Plan. Additionally, the required local information repository at the Alachua County public library was not kept up to date for many years. These inactions on EPA's part denied local Gainesville residents the right to review key documents in the administrative record and provide crucial input to EPA throughout the RI, FS and remedy selection process. These inactions denied the community its rightful role in the selection of appropriate remedies for the site and in determining the types of future uses the site will accommodate following the remedial actions.

*EPA Response:*
*This comment/response process is involving the community and stakeholders in the process. Additionally, representative stakeholders were involved in the FS development and evaluation process. EPA has provided all reasonable means of involving the interested public.*

The City of Gainesville has previously provided input to EPA regarding its vision for future redevelopment of the site. It is not clear and it has not been communicated to the local community how the USEPA's proposed remediation scenario for the site will impact or limit future redevelopment of the site and how it may comply with the City's redevelopment vision. In particular, USEPA's proposal to meet FDEP commercial soil clean-up target levels (SCTLs) and not residential SCTLs for surface soils in the areas outside of the containment area as well as the construction of a large soil consolidation area will significantly impact future land use and adversely impact the financial health and vitality of surrounding properties and neighborhoods. Additional coordination with the City of Gainesville and local stakeholders is needed regarding the future land use vision. It is critically important to the local acceptance of any final remedy for the Koppers site that it meet the following minimum criteria described above.

*EPA Response:*
*It is important to note a distinction between the use of the term "residential" in the world of zoning and use and the term "residential" as that term is used in describing soil cleanup standards at hazardous waste sites. In the second case,*

*the use of the word "residential" cleanup standards at a hazardous waste sites means a soil cleanup that would allow for unrestricted and unlimited use at a site.*

*The City of Gainesville City Commission considered and rejected a contingent future rezoning of the former Koppers Site to an exclusively residential use. This option was considered over a two-year time period during which the City planning commission introduced the City's initial vision of the Site as being reused as a mixed use commercial with a residential component similar to Atlantic Station (previously Atlantic Steel Mill) in Atlanta, Georgia.*

*EPA makes use of several sources of information when evaluating future land use during CERCLA remedy selection, including the EPA directive "Land Use in the CERCLA Remedy Selection Process" (EPA OSWER Directive No. 9355.7-04). In this instance, the PRP is the property owner and does have input into the future use. As EPA has communicated to the City in several City Commission meetings and through other formats, there are few, if any, former hazardous waste sites where there is unlimited or unrestricted future use. However, there are many former hazardous waste sites where there are "residential" land uses taking place.*

The City Commission on June 23, 2008 adopted Resolution No. 071173 that authorized the City Manager to study the present and future land use of the Site including, but not limited to, those areas within the site with the highest levels of contamination, and to recommend any appropriate changes to the future land use and zoning maps that may include residential or mixed residential and commercial uses. The City Plan Board met on September 23, 2010, after receiving public comments and developed a land use policy recommendation for the Koppers site that recommends residential type development outside of the slurry wall area. Such a policy would also amend the City's Comprehensive Plan by adding a policy that will guide the future development of the Site for reuse that does not consider industrial use as an appropriate use for the Site. City staff presented the Plan Board general recommendation to the City Commission on September 27, 2010 and it was well received by the Community and the City Commission. The Comprehensive Plan amendment will be formally presented to the City Commission in the next few months and the amendments to the City's Comprehensive Plan are anticipated to be adopted by the end of summer 2011.

The City of Gainesville is currently developing reuse plans for the 10 acre City Public Works parcel north of the former Koppers Site. It is critical that the reuse plan for the Koppers site be coordinated with and be compatible with the reuse plans developed for the City's property.

**11. Landfilling of contaminated on-site and off-site soils and sediments in a large on-site consolidation area is unacceptable to the community. USEPA did not evaluate off-site disposal of excavated surface soils and sediments despite statements in the FS that evaluation of offsite soil disposal would be completed.**

**The massive soil consolidation area should be eliminated as part of the final remedy and offsite disposal of excavated contaminated soils should be evaluated in an amended FS and considered as part of the final remedy.**

**USEPA should implement offsite disposal of excavated soils that originate from the area outside of the containment area as well as soils and sediments removed from adjacent residential and commercial properties, rights of way and creeks.**

*EPA Response:*
*It is not accurate to state that "USEPA did not evaluate off-site disposal of excavated surface soils." The feasibility study process for this Site did assess several variations of the excavation remedy option. Excavation with onsite soil management was evaluated in the FS as onsite alternatives OnR-3A and OnR-3B. Excavation with offsite soil management was considered and discussed during the several meetings of the Joint FS Workgroup. Details of the offsite soil management options were considered through a TRC report (2005) entitled Source Removal Assessment Report. In that report, offsite soil management was evaluated as Alternative 1 (excavation and offsite incineration) and Alternative 4 (excavation and offsite landfill) assuming that excavation was limited to the Surficial Aquifer soil (0 to ~23 feet below ground) and that only DNAPL-impacted soils were removed (i.e., attaining soil remediation goals was not a basis for that particular report). The analysis presented in the TRC (2005) report was determined by EPA to be sufficiently satisfactory to conclude that an offsite soil management option was not feasible for the Site. Under more stringent assumptions (e.g., deeper subsurface soil excavation, broader soil excavation criteria such as meeting soil cleanup standards (not just DNAPL removal), etc.), the offsite soil management option of the excavation alternative would be even less viable for this site. Based on this decision to screen out the offsite soil management option, it was not carried into the remedy FS document except by reference (e.g., Section 2.3.1.1 in the May 2010 Cabot Carbon/Koppers Feasibility Study). With a sufficiently inclusive ROD, it is possible that sub-volumes of soil with specific characteristics (i.e., non-hazardous or not containing listed wastes) can be addressed through remedy options other than containment.*

The City and County and the local community strongly object to the creation of a large, thirty-two acre soil consolidation area on top of the source area containment cap which could contain from 190,000 to 240,000 cu yds of soils contaminated with dioxins, arsenic, polynuclear aromatic compounds (PAHs) and other toxic soil contaminants. According to the presentation given to the local community on June 14, 2010 by E2, the land reuse consultant hired by USEPA, the height of this soil consolidation area may be as high as 8 to 10 feet above current land surface with a 3:1 slope on the sides. The community finds the magnitude of this soil consolidation area filled with toxic soils to be highly objectionable. The City and County request that this massive soil consolidation area be eliminated as part of the final remedy and that offsite disposal of excavated contaminated soils be evaluated in an amended FS and considered as part of the final remedy. Should soil cover be required as part of the low permeability cap over the source areas it should be constructed with the minimum height necessary for proper cover and drainage and the soils used should be uncontaminated clean soils.

*EPA Response:*
*The analysis presented in EPA's land-use contractor's document regarding possible land reuse options for the former Koppers Industries site was conceptual in nature, and was not an EPA policy or an engineering basis of design. Engineering design will require further investigation to provide sufficient precision for construction and monitoring of remedy technologies, within the context of other site-specific requirements and agreements.*

The City and County believe that the creation of a significant soil consolidation area will significantly limit the types and amount of redevelopment possible for the property in the future. It will create a permanent mound of contaminated soils in the middle of the City of Gainesville that is incompatible with the adjacent urban residential and commercial areas.

In the Feasibility Study report, Section 2.6 presents "the technologies that will be carried forward in the evaluations based on the screening evaluations presented in Sections 2.4 and 2.5." (See page 2-44 of the FS report). Specifically included in Section 2.6.6 in the list of technologies to be evaluated in detail in the FS for untreated soils is "offsite landfill disposal". (See page 2-46 of the Koppers site FS report).

In spite of making a commitment in Section 2.6.6 to evaluate offsite soil disposal in detail, not a single remedial alternative in the FS report included an evaluation of offsite soil disposal, even for minimally contaminated soils. In fact the complete set of alternatives evaluated is consistent in that none of them considered the removal of any contamination from the site.

It appears that USEPA made a pre-determined decision during the FS to not evaluate any off-site disposal alternatives and to, in effect, turn the Koppers site into a permanent waste disposal facility for all on-site and off-site contamination. This decision was made without any effort to assess the benefits that removal of contaminated soil would have on the redevelopment potential of the site or other factors and with disregard to its statements in the FS report that offsite disposal would, in fact, be evaluated.

The City and County request that USEPA complete the evaluation of remedial alternatives that include offsite soil disposal as stated in the FS. The City and County request that USEPA implement offsite disposal of excavated soils that originate from the area outside of the containment area as well as soils and sediments removed from adjacent residential and commercial properties, rights of way and creeks.

The City's Wellfield Protection Code (section 30-200 through 30-204) would require a Wellfield Protection Special Use Permit for the landfilling of offsite hazardous waste materials on the Koppers site. Section 30-70 treats processes involving inorganic and organic chemicals as a specially regulated industry and is only allowed by special use permit. City staff is not likely to recommend the relocation of off-site soils and sediments because this area is within the wellfield protection zone. The City's own practice is to remove onsite contaminated soils and sediments, as performed on the Depot Park Site on South Main Street, and to transport such soils and sediments to a proper treatment facility.

*EPA Response:*
*Excavation and off-site disposal as technology options were evaluated in the FS and screened out early in the process. The FS did assess several variations of the excavation remedy option. Excavation with onsite soil management was evaluated in the FS as onsite alternatives OnR-3A and OnR-3B. Excavation with offsite soil management was considered and discussed during the several meetings of the Joint FS Workgroup. Details of the offsite soil management options were considered through a TRC report (2005) entitled Source Removal Assessment Report. In that report, offsite soil management was evaluated as Alternative 1 (excavation and offsite incineration) and Alternative 4 (excavation and offsite landfill) assuming that excavation was limited to the Surficial Aquifer soil (0 to ~23 feet below ground) and that only DNAPL-impacted soils were removed (i.e., attaining soil remediation goals was not a basis for that particular report). The analysis presented in the TRC (2005) report was determined by EPA to be sufficiently satisfactory to conclude that an offsite soil management option was not feasible for the Site. Under more stringent assumptions (e.g., deeper subsurface soil excavation, broader soil excavation criteria such as meeting soil cleanup standards [not just DNAPL removal], etc.), the offsite soil management option of the excavation alternative would be even less viable for this site. Based on this decision to screen out the offsite soil management option, it was not carried into the remedy FS document except by reference (e.g., Section 2.3.1.1 in the May 2010 Cabot Carbon/Koppers Feasibility Study). Also, it should be noted that in accordance to the EPA RI/FS Guidance document (OSWER Directive 9355.3-01, October 1988) "Offsite transport and disposal without treatment is the least favored alternative where practicable treatment technologies are available."*

**12. The USEPA Proposed Plan remedy for surface soils for the area outside of the containment area is excessively vague about the specific actions that will be taken to meet FDEP SCTLs in this area. It is not clear if FDEP SCTLs will be met by covering contaminated soils or by removal of contamination followed by appropriate clean fill cover. There is also no detailed discussion of how FDEP Leaching Criteria will be met.**

**USEPA should provide more detail in an amended FS and commitment regarding specific actions to be taken to remediate soils in the western and northern areas outside of the proposed containment area.**

**Specific actions to be taken to remediate or address the elevated "hot spots" needs to be specified in the plan or ROD.**

*EPA Response:*
*For offsite soil contamination, three options are being considered for maximum implementability. The options include:*

- *Excavation and removal of soil containing concentrations of contaminants that exceed specified cleanup goals associated with present use of the land.*
- *Engineered controls that prevent contact with impacted soil that exceeds cleanup goals based on present land use.*
- *Institutional controls that protect access and use of land/properties.*

*Concentrations of site-related contaminants in off-site soil are being compared to the Florida SCTLs. SCTLs are conservative and protective of human health for intended uses of the land (i.e., there are different cleanup levels for residential and commercial land uses). The Florida Department of Health (FDOH) is conducting a health survey in the vicinity of the former Koppers Site and continues to issue health advisories as soil sampling results are obtained.*

The proposed remedy for on-site non-source area surface soils is extremely vague regarding specific remedial actions to be implemented at specific areas of surface soil at the site. According to the proposed plan, some surface soil could be excavated and consolidated under caps in the source zones (the Consolidation Area), some surface soil could be graded, and some surface soil could be graded and placed beneath a cap of unspecified composition outside of the source zones. The Feasibility Study (FS) report includes an even longer list of potential actions that might be implemented at any particular location for onsite surface soil, including:

A. Excavation only
B. Excavation with a 2 ft cover
C. Placement of a two-foot soil cover without excavation
D. Placement of a two-foot thick impermeable cover/cap
E. Covering with a road and or paved parking area
F. Covering with structures (e.g., buildings) that prevent soil exposure
G. Placement of a lined treatment pond over exposed soil

The Proposed Plan does not specify at what locations any of these potential remedial actions will be applied. There are costs presented in the FS for excavation of 24 acres of surface soils, however it is not clear the source of this estimated amount of excavated soils and the locations from which it is to be excavated. This vagueness makes it impossible to understand what the site will look like after remediation, and most importantly, to understand the impacts of the remedial action on the potential for future site redevelopment.

The City and County object to this vagueness and believe that USEPA should be much more specific about remedial actions proposed for each area of surface soil at the site. The City and County are concerned that the potential surface soil remedies listed above will be applied in a hodgepodge manner that will seriously reduce the ease of and could in fact hinder redevelopment of the site. The City and County are also concerned that the remedial approach will be to simply cover contaminated soil with clean fill in an attempt to minimize the need to remove contaminated soils.

USEPA should especially provide more detail and commitment regarding specific actions to be taken to remediate soils in the western and northern areas outside of the proposed containment area. In particular, specific actions to be taken to remediate or address the elevated "hot spots" where contamination at levels significantly above FDEP SCTLs exists in the surface soils such as in the central western boundary of the site and in the northern wooded area (See Figures 3, 4 and 5) should be described in detail (that is, whether this area will be excavated, if so, to what depth, or whether two feet of clean soil will simply be dumped on it). Greater specificity will enable all parties to understand the degree to which the selected remedial approach will facilitate or hinder future site development and provide details on how much contamination will remain on site.

*EPA Response:*
*The FS and Proposed Plan were done in accordance with applicable guidance. As stated in the EPA RI/FS Guidance document ( OSWER Directive 9355.3-01, October 1988) "The objective of the RI/FS process is not the unobtainable goal of removing all uncertainty, but rather to gather information sufficient to support an informed risk management decision regarding which remedy appears to be most appropriate for a given site. The appropriate level of analysis to meet this objective can only be reached through constant strategic thinking and careful planning concerning the essential data needed to reach a remedy selection decision. As hypotheses are tested and either rejected or confirmed, adjustments or choices as to the appropriate course for further investigations and analyses are required. These choices, like the remedy selection itself, involve the balancing of a wide variety of factors and the exercise of best professional judgment."*

*Nine criteria are used to evaluate each remedy, in accordance with CERCLA RI/FS Guidance (EPA, 1988). The nine CERCLA criteria used to evaluate remedies in the FS process are:*

1. *Overall protection of human health and the environment*
2. *Compliance with ARARs*
3. *Long-term effectiveness and permanence*

4. *Reduction in mobility/toxicity/volume through treatment*
5. *Short-term effectiveness*
6. *Implementability*
7. *Cost*
8. *State Acceptance*
9. *Community Acceptance*

*The first two criteria (the threshold criteria) evaluate how candidate remedies satisfy regulatory and administrative aspects of remediation.*

*Criteria three through seven (the balancing criteria) evaluate the candidate remedies' (1) effectiveness within the constraints presented by engineering and administrative limitations, (2) efficiency at meeting clean-up goals, and (3) economic impact based on cost to implement.*

*The last two criteria (the modifying criteria) are reserved for stakeholders, affected public and regulatory/administrative agencies to give input to the remedy evaluation process.*

*The CERCLA criteria encompass statutory requirements and technical, cost, and institutional considerations, and are grouped into three categories (threshold, primary, and modifying criteria) based on their function in the remedy evaluation process. Furthermore, these primary CERCLA criteria are expanded into sub-criteria that clarify the intent of the primary criterion and that provide additional discriminatory power to the remedy evaluation process.*

**13. Covering of contaminated soils outside of the containment area leaves permanent soil contamination and limits options for future redevelopment. Removal of contaminated soils in areas outside of the containment area should be prioritized before any soil covers are applied.**

**Achieving FDEP Residential soil clean-up criteria for the entire area outside of the containment area but especially the areas near the western and northern boundary of the site should be targeted by the plan as the preferred alternative. This is a strong preference of the local community.**

*EPA Response:*
*Future onsite land-use envisioned for the Site under the proposed remedy is a mixed-use comprised of combinations of possible commercial and residential land-use. As stated previously, EPA is in agreement that treatment or removal is preferable in instances where such action can be technically implemented and taken without incurring adverse impacts on health or environment (i.e., making the situation worse). In fact, such is required to be EPA's preference, by law. At this Site, all possible technologies for treatment or removal of contaminant mass*

*have been identified and evaluated over the course of several years with the input of numerous technical experts, both associated with EPA and independent of EPA. Consideration of all relevant information, data and potential consequences of implementation has led the EPA to develop the remedy it has proposed.*

**USEPA should amend the FS and provide separate cost calculations for the alternatives of removal of all contaminated surface soils outside of the containment area that are above FDEP residential or commercial SCTLs and leaching criteria.**

*EPA Response:*
*See Response to comment 13 regarding the FS requirements.*

The Koppers site is located in the heart of the City of Gainesville amidst an area of long established residential communities.

The City of Gainesville has promoted "infill development," as opposed to urban sprawl, for many years. Maximizing the potential for redevelopment of the site is a crucial concern for the City and community. For these reasons, the selected remedy should:

A. Maximize <u>removal</u> and <u>not covering</u> of soils in areas outside the containment area and.
B. Require removal of all contaminated surface soils outside of the containment area that exceed FDEP Residential SCTLs or FDEP Leachability SCTLs down to the water table.

USEPA should amend the FS and provide separate cost calculations for the alternatives of removal of contaminated surface soils outside of the containment area that are above FDEP residential and commercial SCTLs and Leaching criteria. By doing so, a decision can be made as to the feasibility of cleaning up these surface soils to meet commercial or the more stringent residential SCTLs by excavation. For example, review of the surface soil data from the site appears to indicate that removal of up to 2 feet of soils in several areas of the approximately 300 foot wide area near the western and northern boundary and in several additional locations in the areas outside of the consolidation area may allow reaching of FDEP residential SCTLs for dioxin and benzo-a-pyrene toxicity equivalents (TEQ) and potentially for arsenic impacts as well (See Figures 3, 4 and 5). Such a removal of surface soils along with a commitment to remove soils from "hot spots" in this boundary area and in the northern area will provide more flexibility for future redevelopment of this property and minimize concerns about contamination from adjacent residential areas. This approach is a strong preference of the community. The City and County would like to see serious commitment to approaches that maximize removal of contamination in the area outside of the containment area.

*EPA Response:*

*Comment noted; however, the FS has been completed and will not be amended. Cost estimations for remedy components will be included in the ROD. The FS is designed for remedy evaluation and feasibility, not for investigation of every conceivable technology and implementation.*

**14. Other unknown, potential source areas outside of the containment area may exist and may be covered or not identified in the soil remedy. These potential additional source areas need to identified and remediated in the final remedy.**

.Inspection of historic aerial photographs for the site indicates the potential presence of disposal trenches in the northern portion of the site. In addition, former site workers and local residents have indicated that some portions of the site may have been used for buried drum disposal or other waste disposal activities. Considering that the site was used as a heavy industrial facility for nearly 100 years, there is a significant possibility that areas of the site in addition to those currently being considered for remediation to have been used for waste disposal practices. USEPA should implement a site-wide screening and investigation to evaluate the presence of additional disposal or source areas at the site and conduct appropriate removal or treatment any additional source areas identified.

*EPA Response:*
*EPA shares the goal of identification of any additional sources and intends to include additional investigations of other contaminated areas before and during remedial design and implementation. Soils outside the containment area with concentrations high enough to pose a concern due to leaching to groundwater will be removed and placed within the containment/consolidation area. During the remedial design additional leachability studies will be done to assess areas for soil removal*

*A work plan has been developed for the remedial design phase of the project to identify if there are possible buried drums or other primary source areas on the Site. This work plan describes the approach to the investigation of former disturbed areas and the "eyewitness" account of buried-drum disposal at the Cabot Carbon/Koppers Superfund Site (the Site) in Gainesville, Florida. It includes a description of the proposed remote sensing electromagnetic (EM) and ground-penetrating radar (GPR) surveys and confirmation trenching. In addition, soil, groundwater, and sediment sampling and analyses will continue as the footprint for installation of all the remedial technologies is refined. After additional sampling and analyses occur and the remedial action is implemented, the proposed on-site actions will ensure exposure at the surface has been mitigated.*

**15. The off-site delineation of soil contamination is incomplete and must be expedited, in particular in the adjacent residential neighborhood in which residents continue to be exposed to Koppers contamination.**

*EPA Response:*

*Off-site soil sampling and analyses have been conducted in the Gainesville area. Results to date indicate that the top six inches of soil obtained from right-ofway samples up to 300 feet west of the Site contain dioxin, and to a much lesser degree arsenic and PAHs at concentrations above the Florida cleanup target levels for unrestricted residential use. The highest contaminant concentrations were observed just outside the western Site fenceline. Soil samples collected to the north of the Site were below Florida cleanup target levels for unrestricted residential use. Further off-site soil sampling is currently being completed in residential yards in the Stephen Foster neighborhood and in City right-of-ways to the south, northeast, and east of the former Koppers facility. Results of these samples were provided to property owners.*

**The City and County strongly support the proposed USEPA plan to complete the delineation of dioxin and other offsite contaminants to the State of Florida residential SCTLs for residential properties and FDEP commercial SCTLs for commercial properties. The City and County are against any effort to develop alternate clean-up standards for these offsite properties that will provide a lesser degree of protection of our citizens. State of Florida Residential SCTLs should also be met on all properties currently associated with residential uses. Additional offsite soil sampling needs to be performed sufficiently beyond the point where the FDEP SCTLs are initially achieved to confirm that soil concentrations remain at or below the FDEP SCTL levels.**

*EPA Response:*
*Cleanup of off-site soil will address contaminant levels that pose unacceptable risk at residences, as well as commercial properties surrounding the Site. For soil contamination, a range of options are proposed for use on individual subparcels after obtaining the consent of private property owners. The options include: (1) Excavation and removal of soil containing concentrations of contaminants that exceed specified cleanup goals associated with present use of the land; (2) Engineered controls that prevent contact with impacted soil that exceeds cleanup goals based on present land use; and (3) Institutional controls that protect access and use of land/properties.*

**Additional offsite sampling should also be performed on and west of NW 6th Street west of the Koppers site to assure that commercial and residential areas on and west of NW 6th Street have not been impacted.**

*EPA Response:*
*EPA will require sampling where previous sample data dictates additional sampling is warranted. Currently there is no data indicating additional sampling is warranted in this area. EPA will require additional sampling where Florida SCTLs are not achieved.*

**Additional offsite soil sampling should be performed on nearby school properties to confirm that these soils do not pose a risk to children's health.**

**Irrigation wells on nearby contamination impacted properties that are proposed for remediation in the offsite soil remedy should be identified by USEPA, sampled and tested for Koppers chemicals of concern and properly abandoned if determined to be contaminated or pose a threat to water quality.**

*EPA Response:*
*See General Response No. 2. In addition, delineation of offsite contamination within residential areas is ongoing, and data associated with those samples are being collected for use in the implementation of the off-site portion of the remedy. Soil requiring remedial action will be identified and mapped, and one or more remedial actions that are protective of human health and the environment. Based on September 2010 data, additional soil sampling is proposed for late December into January.*

The investigation into the extent of contamination at this site has been ongoing for several decades and is still incomplete. Based on recently obtained offsite soils data, it appears that residents adjacent to the site have been exposed to contamination from the Koppers site that has migrated onto their property.

The City and County are concerned about the length of time it has taken USEPA to complete the offsite delineation of contaminated properties and reduce the exposure potential to offsite residents. The City and County urgently request that USEPA expedite the delineation and remediation of off-site contaminated areas. The City and County are concerned that planned USEPA delineation of contamination on residential and commercial property in the neighborhood west of the Koppers site may cease when FDEP Residential SCTLs are reached on residential properties or FDEP commercial SCTLs are reached on commercial properties near the east side of NW 6th Street. Since commercial standards are higher than residential standards and the potential that windborne contaminants may have historically impacted a wider area, the achievement of commercial standards on the properties east of NW 6th Street may not provide assurance that either commercial or residential SCTLs are achieved on commercial and residential properties west of NW 6th Street. There are residential properties immediately west of NW 6th Street that should be investigated to assure residents that there are no impacts from Koppers contamination. The City and County are requesting that delineating the extent of soil contamination must include soil sampling on and west of NW 6th Street.

*EPA Response:*
*EPA will initiate additional sample collection and analysis when results for previous soil sampling rounds indicate additional data are needed. Once concentrations of contaminants in soil samples are shown to be consistently below State of Florida STCLs, data collection will be assumed to be complete.*

*Currently there are no data indicating additional sampling is warranted in this area.*

In addition, offsite sampling needs to be performed sufficiently beyond the point where the FDEP SCTLs are initially achieved to confirm that soil concentrations remain at or below the FDEP SCTL levels. In particular, the City and County and the local citizens are requesting that USEPA collect and analyze additional soil samples in the residential areas to the north of NW 33rd Ave north of the Koppers site. Although several soil samples along the southern right of way along NW 33rd Avenue were found not to contain contamination above the FDEP residential SCTL, considering the statistical variability and imprecision associated with sampling and testing for very low levels of dioxins in soils, the long term nature of historical discharges from the Koppers site, the shifting wind patterns, variable tree cover and storm water flows which may have created pathways for the spread of contamination, it is important to confirm that areas north of the 33rd Ave and other such assumed limits of contamination are in fact free from impacts.

*EPA Response:*
*Delineation of offsite contamination within residential areas is ongoing, and data associated with those samples are being collected for use in the implementation of the off-site portion of the remedy. Soil requiring remedial action will be identified and mapped, and one or more remedial actions that are protective of human health and the environment. EPA will initiate additional sample collection and analysis when results for previous soil sampling rounds indicate additional data are needed. Once concentrations of contaminants in soil samples are shown to be consistently below State of Florida STCLs, data collection will be assumed to be complete. Currently there are no data indicating additional sampling is warranted in this area.*

This is especially important due to the increased citizen concern and apprehension about impacts to their health and property values from being perceived to be close to a contaminated zone.

Due to the presence of offsite soil contamination in nearby neighborhood rights of-way, concern has been raised by the community about the impact of Koppers related contaminants on the soils at nearby public and private schools. USEPA is requested to sample and test the surface soils of school properties within a 2 mile radius of the Koppers site to determine whether the soil concentration of contaminants poses any risks to human health.

Irrigation wells are known to exist on offsite residential properties adjacent to the Koppers site. These wells may have been impacted by Koppers contamination. USEPA is requested to locate, sample and test these wells during any remediation of offsite properties and to require the proper abandonment of those wells that are contaminated or pose a threat to aquifer water quality.

*EPA Response:*
*Comment noted. A well survey did not identify any operating irrigation wells in the area. The need for additional data collection or surveys is driven by results of previous data collection or surveys.*

**16. The City and County and nearby residents are concerned about long term safety of USEPA proposed remedial plan for offsite contaminated soils which will allow property owners to select either excavation or engineering controls or institutional controls as the remedy for offsite properties. USEPA should restrict the use of engineering or institutional controls for offsite properties, especially those that will remain in separate individual resident ownership where it will be difficult to enforce institutional controls. USEPA should require that offsite residential properties are cleaned using removal and restoration as a preferred remedy rather than engineering or institutional controls.**

Allowing engineering or institutional controls to be an option for offsite properties at the discretion of the property owner instead of requiring excavation of contamination and restoration raises significant concerns if the current property owner or future property owner does not abide by the engineering or institutional restrictions. This could cause the contamination in the soils to be exposed and cause a health risk to the new property owner and adjacent neighbors. This would be of particular concern with residential properties, although it is also a concern for commercial properties. The City and County want to avoid the possibility of creating a "hodgepodge" scattered pattern of cleaned and not cleaned properties in the neighborhood which will cause environmental concerns for future human exposure to toxic contaminants to remain in the neighborhood as well as impact property values. The City and County request that USEPA restrict the use of engineering or institutional controls on offsite properties that will remain in separate individual property ownership where engineering or institutional controls cannot be practically enforced or monitored.

*EPA Response:*
*EPA expects that residents/homeowners within the impacted areas will have the most accurate information about their own properties with which to make decisions regarding which remedial option to request for their particular property. Furthermore, property transfer transactions to new ownership will require full disclosure regarding the current status of the property as it relates to institutional or engineering controls, and the required actions necessary to maintain protectiveness. EPA expects that any prospective purchaser of impacted properties will take this into consideration when making the decision to purchase or not purchase the property(-ies). The use of engineering and institutional controls to prevent exposure to soils with contaminant concentrations in excess of SCTLs is an approach created by the State of Florida risk-based corrective action regulations found in Florida Administrative Code 62-780. Its use would likely be only where an assemblage of parcels is considered as part of a*

*redevelopment of the former Koppers Site and in combination with redevelopment of the City of Gainesville public works Site. Pursuant to earlier comments by the City, its inclusion would help to facilitate Site redevelopment to more preferable uses such as mixed-use.*

# 3.0 OTHER OFFSITE IMPACTS

## COMMENTS AND RECOMMENDATIONS

**17. Neighboring residents to the Koppers site have expressed concern about the potential for indoor contamination of their homes. The Florida Department of Health has requested that USEPA require Beazer East investigate and clean-up nearby structures that have dust with site related contaminants that pose an unacceptable risk to human health. The City and County request that USEPA conduct appropriate investigations including sampling and take necessary remedial actions to address this issue.**

*EPA Response:*
*EPA has formed a work group with the Florida Department of Health, the Center for Disease Control, and FDEP to assess the need for indoor air quality studies. It has been EPA's experience that there have been no indoor air contamination issues at other wood treating sites.*

Residents living west of the Koppers site have communicated to local government officials their concerns about potential indoor contamination of their residences based on independent testing using a USEPA screening analytical method for dioxin-like chemicals. The reliability of these test data have not been evaluated by the City, County or the local Health Department. However, because much of the migration of contamination from the Koppers site to offsite residential property likely occurred via air-borne transport of small particulates (i.e., contaminated dirt and dust) it is reasonable to expect that offsite properties with soil contamination may also have experienced deposition of these same particulates inside the homes.

*EPA Response:*
*Comment noted; however, it is important for all stakeholders to understand that, within the context of a highly urbanized community, as samples are collected for analysis from locations farther away from the potential source(s), the ability to definitively correlate the analytical results from those samples to the potential source(s) diminishes significantly. Also, it is imperative for all stakeholders to consider that highly-disruptive remediation activities such as excavation and transport of contaminated soil have the potential to be highly invasive and to generate additional movement of contaminated dust.*

The Florida Department of Health (FDOH) in a September 24, 2010 letter to Mr. Scott Miller of USEPA stated that "EPA should require the responsible party to investigate site related contaminants in the dust of nearby homes, schools, and businesses." The FDOH letter stated that "the 2009 AMEC Earth and Environmental, Inc. report is inadequate to assess this issue since it only addresses on site dust deposition under current conditions and does not address past off-site dust deposition. The report further states that the "EPA should require the responsible party to remediate nearby buildings found to have dust with site related contaminants at levels that pose an unacceptable health risk". Because of the reasonable assumption that nearby homes and structures, structures may be contaminated, the recommendation of FDOH and the increasing anxiety of local residents concerning this issue, the City and County request that USEPA expeditiously take whatever actions are necessary to investigate and address this issue including sampling within nearby homes, businesses and schools (with the property owners consent) in the area to determine the degree to which the interiors of these structures may have been impacted by contamination from the Koppers site and take appropriate remedial actions.

*EPA Response:*
*EPA has convened a workgroup consisting of EPA, Centers for Disease Control (CDC), FDOH, and FDEP members to determine what, if any, indoor air quality sampling will be conducted nearby the former Koppers facility. Once this workgroup has determined definitively that indoor dust sampling will occur and under what circumstances, EPA will either conduct or require the responsible party to conduct indoor dust sampling. EPA is not aware of other instances at former wood-treatment sites where indoor dust has posed an unacceptable health risk to residents.*

*FDEP has confirmed that its risk-based corrective action soil cleanup target level (SCTL) standards found at 62-780 do not apply to indoor dust. Therefore, EPA will utilize its risk criteria in determining if an unacceptable risk to health is present. It is important to note that dioxin TEQ has multiple potential sources in the context of household dust. Prior to requiring the responsible party to remediate indoor living environments, it would be necessary to determine with reasonable certainty that the contamination is associated with the former Koppers Site.*

**18. The City and County recommend that USEPA identify and facilitate the mobilization of resources to address adverse health effects of individuals via a door-to-door health study in the neighborhood affected by the Koppers Superfund site contaminants, including but not limited to dioxins. To the extent that adverse health impacts are found to result from the Koppers offsite contamination, the USEPA is requested to enforce financial responsibility requirements on Beazer East.**

Neighboring residents to the Koppers Superfund site have expressed to the local City and County officials and the Alachua County Health Department/Florida Department of Health their concern about what they believe to be adverse health impacts to residents in the neighborhood west of the Koppers site that they believe may be linked to Koppers site contaminants. The City and County believe it is important to investigate these concerns and request that USEPA identify and facilitate the mobilization of resources to address adverse health effects of individuals via a door-to-door health survey in the neighborhood affected by Koppers site contaminants, including but not limited to dioxins. To the extent that adverse health impacts are found to result from the Koppers offsite contamination, the USEPA is requested to enforce financial responsibility requirements on Beazer East.

*EPA Response:*
*ATSDR and the State of Florida Department of Health have been coordinating efforts to address the offsite contamination concerns. In a letter from Dr. Thomas Friedman, the Director of the CDC, Dr. Friedman provided the following excerpted information in a letter to Ms. Cynthia Moore Chestnut, Chair Alachua County Board of County Commissioners:*

> *"The Agency for Toxic Substances and Disease Registry (ATSDR) has been actively supporting the Florida Department of Health (FDoH) in evaluating potential community exposures to contaminants at this site. This partnership is part of ATSDR's long-standing cooperative agreement program with the FDOH.*
>
> *At this time, a "door-to-door" health study based on possible dioxin exposures is not recommended. The potentially exposed population near this site is relatively small. Adverse outcomes associated with dioxin exposures have not been reported in populations exposed to dioxin at the levels seen to date in the community surrounding Cabot-Kopper's property. The health problems of the people living in this community are likely to reflect common health problems seen in any similar group of individuals who do not live adjacent to the Cabot-Koppers site. Given these facts, it would not be possible to differentiate the health problems within this group that are the result of their exposures to dioxin.*
>
> *We fully agree with FDOH's plan to evaluate and make recommendations to mitigate any current exposures to protect public health and to also take a broad look at cancer statistics within this community. We will continue to work with our FDOH partners in identifying and reducing Alachua community exposures to environmental contaminants on and near the Cabot-Koppers site and are open to reassessing the need for additional work should further information indicate that it is warranted."*

**19. USEPA should provide for permanent relocation assistance for residents near the Koppers site. Temporary relocation assistance should also be provided for residents if desired by the residents during offsite and on-site remediation activities.**

**The USEPA should also calculate the lost property value of homes**

**impacted by contamination from the Koppers site and address the issue of providing compensation for property owners.**

Relocation assistance for temporary and permanent relocation of residents adjacent to Superfund sites has been provided or required by USEPA at other Superfund site with similar contamination as the Koppers site and with similar proximity to residential property and receptors. Such relocation assistance is appropriate during remediation activities involving a large degree of soil disturbance such as is contemplated in the proposed plan. Such actions have a significant potential for creating further offsite impacts.

For these reasons, USEPA should provide for temporary relocation assistance to residents adjacent to or near the site during soil remediation activities. This relocation assistance is especially important for residents that are most vulnerable to potential health impacts, such as the elderly, very young or pregnant residents, or those with existing respiratory or related health problems. USEPA should also offer the option for permanent relocation of residents living on properties that are within the delineated area impacted by contaminants from the site as a means to reduce their ongoing exposure.

Neighboring residents to the west of the Koppers site have reported to local government that their property values have been significantly negatively impacted by the recent discovery of contamination above FDEP SCTLs in the rights of ways in their neighborhood. Planned residential property sampling in the neighborhood may confirm that the contamination is widespread in the neighborhood. While USEPA's proposed plan calls for the clean-up of contaminated offsite soils, there is a contamination stigma now attached to these properties. The City and County request that USEPA address this situation by calculating the lost property value of the homes impacted by the contamination inthe neighborhood and providing compensation to impacted property owners.

*EPA Response:*
*EPA has limited authorization under the NCP. EPA is neither structured nor authorized to reimburse property owners for perceived loss of property value. CERCLA was enacted to provide a program for identifying and responding to releases of hazardous substances into the environment. SARA was enacted to strengthen CERCLA by requiring that site cleanups be, to the fullest practicable and technically feasible extent, permanent and that they use treatments that significantly reduce the volume, toxicity, or mobility of hazardous pollutants. CERCLA authorizes the EPA to protect the public health and welfare and the environment from the release or potential release of hazardous substances, pollutants, or contaminants.*

# 4.0 STORMWATER REMEDY

### COMMENTS AND RECOMMENDATIONS

**20. The Proposed Plan is overly brief in storm water strategy and controls that are integral elements of the remedial action plan for the Site. The Plan does not include strategy, design criteria, essential site data and final cover landscaping descriptions. Additionally, the storm water remedy should include the use of an underground pipe to replace the open storm water ditch on the site.**

**The City and County requests that USEPA acknowledge these critical issues in the ROD and that USEPA commit to addressing them in the Remedial Design document.**

*EPA Response:*
*As is the case for offsite contamination delineation and UFA hydraulic containment actions, storm water controls are being implemented and managed at the Site currently, independent of the ROD and Proposed Plan. Additional storm water management activities are included in the proposed remedy, to the extent that they are directly related to the former Koppers property.*

The Proposed Plan does not include strategy, design criteria, essential site data and final cover landscaping descriptions. This information is essential to the City of Gainesville and the public to assess the quality of the plan in addressing pertinent stormwater issues and assessing the consistency of the associated redevelopment benefits/barriers of the Plan with the City's 'Vision' for this piece of Gainesville. Critical stormwater design and control issues that should be acknowledged and addressed in the ROD and Remedial Design documents include options for: 1) management of westerly neighborhood stormwater flows; 2) major ditch flows in conflict with the containment area; and 3) east side site stormwater flows where the containment area is very close to the property line. Conceptual level descriptions of these will aid in the review and understanding more fully the consequences of the choices posed in the proposed plan. Control issues should include development of: 1) design criteria for storm water; 2) soils data for the remaining former work area of the Site, and; 3) landscaping descriptions. The storm water design criteria should include local industry standards as well as City of Gainesville requirements for the Hogtown Creek basin. These criteria should also include an analysis that determines the likely soil particle size to provide transport to site pollutants during storm flows. This analysis can then be used to determine the appropriate detention time for the basin(s) needed to capture the majority of those particles. Soil data is needed on the remainder of the former work area to determine thickness and extent of the compacted soil. This data will lead to an action plan to return the parent soil infiltration rate. Finally, outline work descriptions and specifications are needed for landscaping. This information is essential to evaluating elements of the stormwater design criteria and making judgments on how 'finished' the Site will be for future use.

The City and County request that Remedial Design and Proposed Plan include a commitment to implement a piped conveyance instead of an open stormwater ditch for the stormwater leaving NW 23rd Avenue and crossing the site. This will minimize potential transport of contaminated sediments from the site.

*EPA Response:*
*The issues raised in the comment are specific design issues that will be addressed during remedial design. The storm water ditch traversing the Site property currently acts as a storm water control feature for the site, allowing some portion of storm water to be diverted away from identified source areas. This reduces the amount of precipitation volume percolating through the source material and thereby generating less potential for further contaminant leaching into the shallow ground water. Once storm water management features onsite are reconfigured, it may be possible to convert the open storm water drainage ditch into a subsurface pipe conveyance. All of these storm water activities require coordination.*

# 5.0 CREEK SEDIMENT REMEDY

**COMMENTS AND RECOMMENDATIONS**

**21. Cleanup of the sediments in Hogtown and Springstead Creeks is proposed only for those areas where contaminants exceed benthic Probable Effects Concentrations (PECs). However, FDEP has determined that exposed creek sediments potentially pose human health risks.**

**Contaminated sediments in both Hogtown and Springstead Creeks and the on-site and offsite stormwater ditches that lead to Springstead Creek must be excavated to the more stringent of the FDEP residential SCTL or the PEC for each chemical of concern. Excavated sediments should not be consolidated on-site.**

*EPA Response:*
*EPA is requiring the PRP for the former Koppers site to work with the PRP for the adjacent Cabot Carbon portion of the Site to develop a joint plan for addressing contamination in the surface water ways (Springstead and Hogtown Creeks).*

In the Proposed Plan, USEPA has indicated that it plans to remediate creek sediments only where contamination exceeds the benthic Probable Effects Concentrations (PEC). This is inadequate.

FDEP has concluded that the exposed contaminated soils in the streambed and in other exposed sediments in these creeks pose a potential human health risk. Additionally, cleanup of the on-site and off-site storm water ditches that lead to Springstead Creek is not addressed in the Proposed Plan.

For these reasons, contaminated sediments in both Hogtown and Springstead Creeks and the onsite and offsite ditches must be excavated to the more stringent of the FDEP residential SCTL or the PEC for each chemical of concern. Appropriate sediment confirmation sampling must be done after remediation to confirm that the excavation of these sediments is adequate.

*EPA Response:*
*The selected remedy addresses citizen concerns with the creeks in two distinct ways. First, to address previous contamination of the sediments in each creek, sediments that have contaminant concentrations associated with either former Cabot Carbon or Koppers that exceed the threshold effects concentrations (i.e. contaminant concentrations in excess of levels that would adversely affect animal life) are required to be excavated and replaced with clean fill material. Assessment of creek sediments for impacts to benthic invertebrate organisms is ongoing.To address possible future impacts on sediments, the former Koppers facility is required to construct and operate a detention/retention pond(s) to capture storm water from the former Koppers Site prior to allowing it to be discharged to the tributary to Springstead Creek. The detention/retention pond(s) will be designed during the remedial design of the on-site remedy.*

The USEPA proposed plan states that contaminated sediments above FDEP criteria will be excavated from the creeks. Since the creek contamination may be linked to historical discharges from the former Cabot site as well as from the Koppers site, it is not clear which responsible party will be responsible for the remediation. The City and County understand that the Cabot Corporation has proposed a plan to remove tarry contamination from several locations in Springstead and Hogtown Creek. Review of this plan indicates that contaminated sediments will be disposed of off-site at an approved landfill. Therefore the USEPA proposal to move sediments on site is confusing and contradictory. USEPA should require that excavated, contaminated creek and ditch sediments be disposed of properly in an approve landfill and not stockpiled on site.

*EPA Response:*
*EPA is requiring the PRP for the former Koppers site to work with the PRP for the adjacent Cabot Carbon portion of the Site to develop a joint plan for addressing contamination in the surface water ways (Springstead and Hogtown Creeks).*

# 6.0 ADDITIONAL COMMENTS

**22. The USEPA should make available in the local repository a complete Site file containing all project documents, correspondence and data related to the remedial investigation, risk assessment, feasibility study and remedial technology evaluation for the Koppers Superfund site.**

**Additionally, the City and County request that additional relevant documents be added to the Administrative Record File. The documents requested to be added to the Administrative Record file are contained in the attached electronic files (CD attached).**

The City and County support and acknowledge that certain requests have been made to USEPA from the local community, including the group Protect Gainesville's Citizen's, Inc. (PGCI), seeking local access to the complete Site File documents and requesting that additional relevant documents be added to the Administrative Record. On June 1, 2010, the Mayor of Gainesville sent a letter to USEPA requesting that the information requested by PCGI be provide as soon as possible. A complete Site File has not been made readily available by USEPA to the community in the local repository. USEPA has provided a CD containing the Administrative Record to the local repository. However, there are many documents that we and/or local citizens believe are relevant to the site which are not part of the AR and are not in the local repository. Therefore, the City and County request the following:

1) The USEPA make available in the local repository a complete Site file containing all project documents, correspondence and data related to the remedial investigation, risk assessment, feasibility study and remedial technology evaluation for the Koppers Superfund site, and

2) Additional relevant documents identified by our citizens and City and County staff should be added to the Administrative Record File. The documents requested to be added to the Administrative Record file are provided as electronic files in the CD attached to this document and should be considered part of this document.

*EPA Response:*
*EPA has evaluated and discussed the request to include certain documents in the Administrative Record (AR), but ultimately has decided not to include the requested documents in the AR. The AR is the specific body of documents that "forms the basis" for the selection of a particular response at a Site. Consequently, only documents which were considered or relied upon in EPA's decision-making belong in the AR.*

### A.2.5 Florida Department of Environmental Protection

Bob Martinez Center
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

October 14, 2010
Mr. Scott Miller
Remedial Project Manager
United States Environmental Protection Agency
Region IV, Superfund North Florida Section
61 Forsyth Street, SW
Atlanta, Georgia 30303

RE: DEP review of the July 2010 Superfund Proposed Plan for the Cabot Carbon/Koppers Superfund site, Gainesville, Alachua County, Florida

Dear Scott:
This correspondence provides DEP comments on the final July 2010 proposed plan for the Cabot Carbon/Koppers Superfund site. This serves to supplement DEP's June 9, 2010 comments on the revised May 2010 Koppers site Feasibility Study (FS) and EPA's likely proposed amended remedy for the Cabot Carbon/Koppers Superfund site, Gainesville. We appreciate EPA's responsiveness and efforts to address DEP's previous comments. We take this opportunity to reiterate previous DEP recommendations which we believe are critical to the effectiveness of the remedy and will ensure compliance with State ARARs. We also provide recommendations that we hope will clarify what we understand are the remedial components and remedial goals of the proposed site remedy.

We are pleased to see that the revised FS has 1) incorporated additional remedial alternatives with combined technologies recommended by DEP and local stakeholders for improved source mitigation alternatives; 2) provided further discussion and clarification regarding storm water management prior to and as a component of the Superfund remedy; 3) more appropriately recognized the potential and likelihood of continued vertical DNAPL migration in its revised conceptual model; 4) acknowledged the need for further delineation of the offsite Hawthorn Group groundwater contamination; and 5) continues to acknowledge the application of Chapters 62-780 and 62-777 in the development of site remedial cleanup criteria. the establishment of temporary and permanent points of compliance for groundwater remedies in the Surficial aquifer, Hawthorn Group and Floridan aquifer, and the use of a risk management option (RMO) III approach including engineering controls and defined institutional control boundaries at the Koppers site.

*EPA Response:*
*Comment noted.*

We are also pleased that the FS emphasized ongoing dust suppression following closure of the Koppers facility and indicated that design of an air monitoring network at the fence line would be implemented during the Superfund remedial design phase. The revised FS also includes alternatives for remediation of offsite soil contamination.

*EPA Response:*
*Comment noted*

As noted previously, all documents containing geologic or engineering information must be signed and sealed by a registered PE or PG licensed in the State of Florida, pursuant to Rule 62-780.400, F.A.C. and Chapters 471 and 492, Florida Statues.

*EPA Response:*
*The NCP regulations found at 40 Code of Federal Regulations Part 300, contain the EPA regulations for implementing CERCLA, as well as governance on documents to be submitted to the Agency. Per EPA FS guidance, the FS is a conceptual document that supports the design of selected remedies. The NCP requires certification of engineering design documents; therefore, design documents for the Koppers Site generated during the remedial design phase of the project, will be signed and sealed by a professional engineer registered in the State of Florida. The remedial design of the selected remedy will occur after the ROD is issued.*

Based on the revised final FS and final proposed plan, we understand that EPA is proposing a combination containment and source treatment remedy to address onsite contaminated soils, DNAPL and groundwater, including Surficial, Hawthorn and Floridan aquifer groundwater. Containment would be accomplished by a slurry wall to the middle clay that surrounds all 4 source areas and includes other leachable materials. Source areas are to be treated insitu. Groundwater extraction and treatment would continue in the Surficial aquifer; focused hydraulic containment through groundwater recovery and treatment would also be conducted in the Floridan and expanded as necessary in response to monitoring results and "triggers" established to address plume migration and promote plume stability; insitu groundwater treatment would be implemented in the Hawthorn. Monitored natural attenuation (MNA) is included as a remedial component for all groundwater. Groundwater remediation in all aquifers and the Hawthorn would be considered complete when groundwater contaminant plumes are stable and/or shrinking, and when contaminants do not exceed federal MCLs beyond the edge of the source control boundary and do not exceed State groundwater cleanup target levels (GCTLs) beyond the points of compliance at or within the institutional control (IC) boundary (equivalent in this case to Koppers property boundary). Monitoring will be ongoing to document the progress and effectiveness of the site remedy, trigger initiation or expansion of active remedies in the Hawthorn and/ or Floridan, support evaluation of MNA in the lesser contaminated portions of the plumes, and confirm that groundwater contaminant plumes are stable or shrinking.

*EPA Response:*
*Comment noted. EPA recognizes and appreciates FDEP's understanding of the ongoing nature of delineating contamination at the Koppers Site.*

Overall, this approach is consistent with Chapter 62-780, Risk Management Option **III** which allows for alternative cleanup goals with appropriate institutional/ engineering controls, such that soils and groundwater beyond the institutional control boundary meet cleanup criteria for unrestricted use. Where offsite land use is commercial, soil may be remediated to commercial SCTLs with appropriate institutional controls. Offsite sediment (off the Koppers facility property) exceeding applicable criteria are proposed to be remediated by a combination of excavation and contaminant monitored natural recovery.

*EPA Response:*
*Comment noted.*

**DEP offers the following proposed plan comments.**

**Description of site contamination**
Although delineation of the extent of contamination is still ongoing (particularly for the offsite soils as well as for groundwater contamination with the establishment of temporary points of compliance (TPOC) for the Surficial and Hawthorn Group groundwater plumes and Floridan Aquifer contamination east of the property boundary), it is important to ***provide a clear description of what is currently known*** about the magnitude and extent of contamination both on and off the Koppers facility property. In particular, we found that the proposed plan was not clear in the following areas and request improved specificity in the Amended Record of Decision (AROD):

• *Magnitude and extent of Floridan Aquifer groundwater contamination.* Groundwater contamination above GCTLs has been observed in Floridan wells other than just FW-6, primarily in the northern and eastern portions of the site. It should be noted that increasing groundwater contaminant levels in FW- 22B (a POC well) resulted in the installation of FW-31BE and ongoing pump and treat to prevent further plume migration and pull any offsite contamination back within the IC/property boundary. In addition, it appears that offsite plume migration has occurred east of Koppers based on FW-16B. Groundwater recovery is ongoing at FW-6 and FW-21B to evaluate possible vertical migration due to well construction at FW-6 and to evaluate the effectiveness of groundwater recovery using an existing well, FW-21B, to address migration and GCTL exceedances observed in FW-16B. Pumping of FW-6 and 21B was initiated in October 2009. Based on more recent discussions, DEP anticipates that decisions regarding the effectiveness of FW-21B and the need for downgradient TPOC wells east of Koppers along with a determination of the integrity of FW-6 will be forthcoming within the next few months. If cross-contamination is occurring at FW-6, the monitoring well should be abandoned and replaced with an appropriately constructed multiport well.

• *Magnitude and extent of Hawthorn Group groundwater contamination.* In particular, it should be clearly acknowledged in the AROD that groundwater contamination has been observed in the Upper and Lower Hawthorn east and northeast of the Koppers facility above GCTLs at a distance of up to 800 feet east of the Koppers property boundary, not just immediately east of the property. The AROD should also speak more directly to groundwater contaminants east of Koppers that may be attributable to former Cabot facility operations and indicate that these contaminants will be delineated and also addressed by a combination of insitu treatment and MNA, if that is the intent. It should also be acknowledged that the magnitude of contamination in the Lower Hawthorn is not *known* in the Process and South Lagoon source areas on the Koppers site because no Lower Hawthorn monitoring wells have been installed in those source areas.

• DEP does not agree with the proposed plan interpretation that observed arsenic in Floridan Aquifer monitoring wells is ***solely*** due to oxygenated water introduced during well drillings. We do agree that vertical migration of arsenic from the Surficial or Hawthorn into the Floridan is not supported by site data and not likely occurring. As previously noted, however, the persistent presence of arsenic above GCTL in Floridan wells located primarily outside of the organic contaminant plume area indicates to us that naturally occurring arsenic in the Floridan aquifer is going into solution in response to a redox front, downgradient of the Floridan plume. As such, monitoring of arsenic levels in these wells should continue as part of the comprehensive groundwater monitoring program for site cleanup. We request that this alternative interpretation be noted in the AROD.

*EPA Response:*
*EPA agrees that monitoring of arsenic concentrations in Surficial and Hawthorn wells should and will continue as part of the comprehensive groundwater monitoring program for Site cleanup. As the preface to these comments notes, delineation of the extent of contamination is ongoing. The discussion regarding the extent of contamination in the Proposed Plan was derived from the FS that all interested parties reviewed and provided commentary on. It is EPA's position that this discussion is adequate for the purposes of the Proposed Plan and ROD and proposes no changes.*

**RAOs and Cleanup goals**
• We recommend that the AROD reflect that a critical remedial action objective is to create *a stable and shrinking plume such that cleanup target levels for groundwater are ultimately met at Points of Compliance at the source control or institutional control boundary consistent with federal and state regulations and requirements, respectively* (not simply to prevent further plume migration, particularly where the groundwater contaminant plume has migrated off the Koppers facility property)

*EPA Response:*
*Although EPA may share this goal, the RAOs were established in the FS that was produced as a collaborative effort among many stakeholders, including the FDEP. EPA has no intention of revisiting the FS. For this reason, no change in the RAOs is proposed.*

• We are pleased to see that the proposed plan reflects use of Chapter 62-777 default SCTLs both on the Koppers facility where commercial default SCTLs are proposed and offsite where either residential or commercial default SCTLs may be applied based on corresponding land use and the willingness of the property owner to implement an institutional control (restrictive covenant).

*EPA Response:*
*Comment noted.*

• We also support the proposed plan's use of default SCTL leachability criteria to address leachable vadose zone soils located outside of the proposed containment area. As previous stated by DEP, site specific leachability criteria may be developed during design if desired and consistent with Chapter 62-780.

*EPA Response:*
*Comment noted.*

• DEP recommends that the AROD identify both the numeric direct contact and default leachability SCTL criteria and state that the more stringent of the two criteria apply to vadose zone soils. It will be easier to ascertain the basis for the cleanup goals and will allow more obvious adjustments to those goals if site specific leachability criteria are developed.

*EPA Response:*
*EPA agrees with this approach and will include it in the ROD.*

• EPA recently issued caveat approval for the May 26, 2010 Human Health Risk Assessment (HHRA) for onsite soils and sediments noting that the probabilistic components of the risk assessment and specific tables or figures were not approved. It appears that the proposed plan may allow the use of a risk assessment on offsite properties based on more property-specific land uses. As discussed in 28, 2010 correspondence, it is unlikely that an appropriately constructed probabilistic risk assessment to evaluate the *offsite* soil contaminant levels would result in offsite soil cleanup goals significantly different from Chapter 62-777 default SCTLs for unrestricted, residential use. DEP does not support the use of assumptions or variables inconsistent with State or federal regulations or guidelines outside of accepted industry practices. Use of such assumptions/variables in a probabilistic risk assessment for the development of cleanup goals and/ or the re-assessment of risk under a future proposed land use/

redevelopment plan would also not be supported by DEP, as discussed in DEP's previous HHRA review comments.

*EPA Response:*
*As noted above, cleanup goals for off-Site soil/sediment COCs are Florida default SCTLs contained in Chapter 62-777, F.A.C.; however, the goals are based on the current land use (residential or commercial/ industrial) of the impacted parcel. Risk assessment is not relevant to this process.*

• Our review of the proposed plan indicates that Table 1 has incorporated the list of groundwater and onsite/ offsite soil contaminants previously identified by DEP as contaminants of concern (COCs). As noted in previous comments, groundwater COCs should include all constituents where GCTL exceedances have been observed, even if those compounds have not shown a violation at the Koppers property boundary. Acknowledging the difference between the federal MCL and State GCTL for benzene, the Amended ROD should be clear how each of these will be applied. We understand that EPA will apply the federal MCLs immediately outside the source containment area whereas the State GCTLs will apply at points of compliance at the institutional control boundary consistent with Chapter 62-780, risk management option III. We will be happy to review the final list of COCs in the AROD prior to EPA signature to confirm that the COCs are comprehensive and corresponding numeric criteria are consistent with Chapter 62-777.

*EPA Response:*
*EPA appreciates FDEP's review of this list of COCs and has added the additional COCs (those exceeding GCTLs) to the Proposed Plan based on previous FDEP comment. Cleanup goals for groundwater are the Florida MCLs unless no Florida MCL has been established. In those cases, the GCTL will be used. The selected goals are the MCLs for Drinking Water in Florida contained in Chapter 62-550, Florida Administrative Code (F.A.C.) and GCTLs contained in Chapter 62-777, F.A.C. The ROD will clearly state the specific standards and their point of compliance.*

• Table 1 cleanup goals for offsite soils and sediments is confusing, however, particularly for sediments and appears to have omitted contaminants that were observed in creek sediments as reported in the ACEPD Sediment Quality Study Report on Springstead and Hogtown Creeks (August 2009). Sediment COCs and corresponding cleanup criteria should include both Chapter 62-777 default SCTLs for direct contact and Sediment Quality Assessment Guidelines (SQAGs) for cPAHs (BaP-TEQ), PAHs and dioxin, for protection of both public health and the environment. Leaching of sediment contamination to surface water may also be an issue based on the comparison of PAH concentrations in sediments to Chapter 62- 777 default SCTL leachability criteria for the protection of surface water. Default leaching criteria should also be reflected in the table. Site specific sediment leachability criteria may also be developed during design. As commented previously, we recommend use of the EPA Region 4 Hazmat Ecological Screening Value of 2.5 ng/kg for dioxin.

*EPA Response:*
*The cleanup goals for off-Site soil/sediment will be the Florida default SCTLs residential or commercial/ industrial land use (depending on the specific land use of the off-Site location. The cleanup goal for sediment in the creeks will be the Florida default leachability SCTL for pentachlorophenol for protection of ecological organisms in surface water.*

• EPA has proposed a sediment removal based on the Probable Effect Concentration (PEC) criteria followed by monitored natural recovery to address remaining impacted sediments above threshold effects concentrations (TEC) criteria. Dioxin exceeding the recommended EPA screening value above should be addressed by the removal action. Superfund Five Year Reviews should include evaluation of the progress and effectiveness of monitored natural recovery in reducing PAH concentrations to the TEC and SCTL remedial goals.

*EPA Response:*
*EPA's preferred remedy proposed a sediment removal based on the PEC criteria followed by monitored natural recovery for sediments above TEC or background contaminant concentrations. Cleanup of sediments in the creeks to the PEC criteria is highly protective. EPA agrees with FDEP that Superfund Five-Year Reviews should include evaluation of the effectiveness of monitored natural recovery in reducing PAH concentrations cleanup goals.*

• Please see enclosed comments from University of Florida including summary tables of Chapter 62-777 numeric cleanup goals for site related contaminants for groundwater, soils and sediments.

*EPA Response:*
*Comment noted.*

• Containment and treatment of DNAPL (including residual DNAPL) and other leachable source areas is a critical component of this site remedy and the goal to mitigate continued contamination of the underlying Floridan Aquifer as well as address offsite contaminant migration in the Hawthorn and future compliance with property boundary POCs in all aquifers. Based on previous discussions amongst EPA, DEP and stakeholders regarding criteria that could be used to delineate the lateral extent of the these DNAPL source areas, we understand that delineation will be based on a combination of visual DNAPL confirmation, olfactory evidence and groundwater concentration data obtained from borings into the Surficial and upper Hawthorn formations. EPA guidance indicates that groundwater contaminant concentrations approaching 10% solubility (of naphthalene for example) could also be used to infer the likely presence of nearby DNAPL or principal threat waste requiring remediation. **We recommend that the AROD identify the**

**criteria by which DNAPL and DNAPL sources will be identified for treatment and/ or containment, so that this does not continue to be a point of debate during design and construction.**

*EPA Response:*
*EPA acknowledges that this may be a point of debate during the remedial design and will include this point in the ROD. EPA will utilize a multiple lines of evidence approach in assessing the likely presence of DNAPL including but not limited to visual observation, PID readings, and effective solubility.*

**EPA's Preferred remedy**

• The proposed plan refers to a "low permeability cover" over the containment area. DEP supports the proposed slurry (barrier) wall around all 4 source areas extending to the Hawthorn middle clay (approx 65' bls), with an *impermeable cover* (vertical hydraulic conductivity of 10E-06 cm/ sec) over the entire slurry wall enclosure including DNAPL source areas and other consolidated leachable materials, along with treatment of the DNAPL source areas. This impermeable cover will require less rigorous water level control due to less percolation and further discourage vertical migration of contaminants in response to hydraulic head differences.

*EPA Response:*
*Comment noted. The comment touches on an issue of semantics and terminology, rather than a critical remedial design issue. The use of the term "low-permeability cover" is used purposefully to convey the technically correct message that no engineered cover is entirely "impermeable." EPA will require that the engineered cover constructed over the containment zone have a design-required hydraulic conductivity of 10E-06 cm/sec, or less.*

• DEP is pleased to see that EPA has proposed the use of *Insitu Solidification/Stabilization (ISSS)* treatment to address Upper Hawthorn DNAPL source areas, along with the slurry wall (to the middle clay) to contain the more highly contaminated onsite groundwater and source material. ISSS has a proven track record at similar sites with this magnitude and type of contamination; and would not be hampered by the potential issues of chemical deliverability, consistent distribution, long term performance and reliability (rebound) that have been experienced by the insitu biogeochemical stabilization technology being considered for the site. (see discussion below). ISSS has been shown to effectively reduce permeability of the contaminated zone, immobilize contaminants and mitigate leachability of the source material. While acknowledging the higher cost associated with this technology, we believe the confidence that it affords makes it appropriate for this large and hydro-geologically challenging site. **We recommend that the AROD include ISSS performance criteria including permeability (10e-07), unconfined compressive strength (50 psi), and short term and long term leachability (SPLP and modified ANS 16.1) and require performance testing during design to ensure the ISSS formulation will meet these criteria.**

*EPA Response:*
*Comment noted. EPA will clarify this issue/topic in the amended ROD.*

• EPA's preferred remedy also includes *Insitu Biogeochemical Stabilization (ISBS)* to address DNAPL source areas in the Surficial aquifer, with a contingent ISSS remedy if ISBS performance criteria cannot be met during design phase pilot testing. DEP remains concerned about the use of the ISBS technology at this site and recommends that ISSS be utilized in the Surficial aquifer to address DNAPL source areas, not ISBS. It is essential that the selected remedy include effective treatment technology(s) to address the 4 DNAPL source areas in the Surficial and Upper Hawthorn, to mitigate ongoing sources of groundwater contamination and to minimize vertical mass flux and migration of DNAPL through the Surficial and Hawthorn that is contributing to the observed Floridan Aquifer contamination.

*EPA Response:*
*It should be noted that ISGS is only one component of the remedial strategy at the Cabot Koppers Site. Out of an abundance of caution, redundant approaches (containment using slurry walls and caps to isolate the four primary source areas, and soil stabilization/treatment to immobilize the contamination) are proposed. Specific performance requirements, with contingencies to insure project success, will be engineered during the design phase of the project.*

*That said, EPA acknowledges that ISGS is a developing technology. As such, EPA will require stringent performance testing and monitoring during its application with an ISS/S contingency in place if performance standards are not achieved. Implementing the remedy in a staged or staggered schedule will provide EPA with more options for meeting cleanup goals. For example, EPA proposes implementing ISGS within a physically contained zone (surrounded by the vertical barrier wall and a Surficial hydraulic containment system) as a response to subsurface contamination, and to evaluate its effectiveness concurrently with the remedial design.*

*Pursuant to concerns raised by FDEP and other site stakeholders, EPA is updating the preferred remedial alternative to require ISS/S in both the former North Lagoon and former Drip Track source areas in both the Surficial and Upper Hawthorn aquifers. EPA's rationale for updating its preferred remedial alternative is that below these two former source areas, there have been demonstrated 'Floridan groundwater impacts exceeding groundwater cleanup goals.*

*In addition, EPA is updating its preferred remedial alternative to allow ISBS treatments in both the Surficial and Upper Hawthorn aquifers at both the former Process Area and the former South Lagoon during the period of the remedial design. Should these injections prove ineffective, EPA will require ISS/S to be implemented in these areas as well.*

*EPA will require the PRP to provide engineering design plans for both full-scale implementation of ISGS and a contingent ISS/S remedy along with the other remedial components including but not limited to the vertical barrier wall, the engineered cap, and LHG injection points. If necessary, EPA will be able to quickly respond to ISGS ineffectiveness by requiring the ISGS zone to be revisited and addressed by ISS/S, or additional ISGS injections, without further time-consuming Site-specific rulemakings.*

DEP concerns regarding results of the previous Koppers pilot and use of ISBS were discussed in the June 2010 FS comments. More recent discussions with EPA, ACEPD, GRU and their DNAPL team along with consultation with EPA- Ada, Oklahoma have illustrated the difficulty in designing a pilot study including corresponding short term and long term performance criteria that would provide representative and definitive results to support conclusions regarding its use and long term effectiveness at this particular site. Even with improved delivery and distribution within the source zone, the observed rebound of groundwater contaminant concentrations at the Borden site after 4 years underscores the issue of long term effectiveness and the likely need for re-treatment. Confirmation of effective mitigation of vertical flux/ contaminant migration into the Hawthorn could not likely be demonstrated in the short term. In fact, recent discussions have indicated that to obtain reliable and conclusive data regarding long term performance, the Koppers ISBS pilot study should be conducted over a period of at least 4 years. Implementation of a reliable site remedy should be accomplished as timely as possible. Use of ISSS in both the Surficial and Upper Hawthorn would allow a more timely and reliable remedy to be implemented. As previously communicated by DEP, however, if EPA elects to continue with the ISBS pilot/ remedy as proposed, additional more rigorous pilot testing and evaluation based on specific performance criteria should be required to demonstrate that this technology could successfully be applied with reliable short and long term results.

*EPA Response:*
*Aspects of the proposed remedy that address the SA and UHG include physical (ISS/S) and chemical (ISGS) immobilization of source contamination, and expanding the monitoring network. Implementing the remedy in a staged or staggered schedule will provide EPA with more options for meeting cleanup goals. For example, EPA proposes implementing ISGS within a physically contained zone (surrounded by the slurry wall) as a response to subsurface contamination, and to evaluate its effectiveness concurrently with the remedial design. EPA will require the PRP to provide engineering design plans for both full-scale implementation of ISGS and a contingent ISSS remedy along with the other remedial components including but not limited to the vertical barrier wall, the engineered cap, and LHG injection points. If necessary, EPA will be able to respond quickly to ISGS ineffectiveness by requiring the ISGS zone to be revisited and addressed by ISS/S, or additional ISGS injections, without further time-consuming Site-specific rulemakings. The described challenges to*

*implementing ISGS technology are partially the basis for the proposed staged or phased remedy implementation strategy at the Site. At each stage during remedy implementation, a new assessment of success or effectiveness can be made. Based on results of such assessments, EPA is prepared to require the PRP to implement ISS/S. These redundancies in protectiveness are possible in part because of the phased implementation strategy. Furthermore, the required Five-Year Review cycle provides additional periods of remedy evaluation over the long-term and additional feedback for EPA to determine if the PRP needs to implement additional remedial measures.*

These short and long term performance criteria for the design pilot along with associated testing should be specified in the AROD. We recommend that they generally reflect the following:

**ISBS Performance goals-**
1) Consistent and controlled delivery and distribution of ISBS throughout the designated treatment area in the Surficial aquifer source zone with corresponding reduction in permeability and encapsulation of DNAPL.

2) Pronounced reduction in groundwater contaminant concentrations/DNAPL and reduction in mass flux both laterally and vertically.

3) Demonstrated longevity and stability of stabilized matrix, with no rebound.

4) Compliance with UIC requirements in Chapter 62-524 and applicable variance.

**Basis for ISBS performance evaluation-**
1) Monitoring network of appropriately located wells in the Surficial and Hawthorn to evaluate compliance with UIC and effective control of distribution of ISBS injectate.

2) Soil cores collected pre and post injection within treatment area to demonstrate thorough and consistent sweep and reduced permeability /leachability (based on pre and post injection lab analysis including modified ANSI 16.1).

3) Pre and post treatment slug tests and monitoring of water levels/hydraulic gradients in monitoring wells/piezometers and downgradient recovery wells to document attainment of anticipated changes in hydraulic conductivity /permeability in treatment areas and downgradient.

4) Use of PFMs (flux meters) and low pump-induced flow within treatment area to confirm reduction in mass flux, as recommended by EPA-Ada, OK.

5) Appropriately located monitoring wells in Surficial, UHG and LHG, and Floridan. Pre and post-injection well sampling to confirm reductions in DNAPL recovery and consistent reductions in groundwater concentrations with no rebound. Further details

of the ISBS pilot test and specific short term and long term goals should be fleshed out prior to implementation of the pilot during remedial design. We agree that if EPA elects to move ahead with the pilot, a larger test area in one or more source areas should be utilized to better represent the performance of ISBS. We are reluctant to support a large or full scale pilot in the process area. There is only limited assessment and understanding of contaminant distribution in that area, it is close to the property boundary, and there are inadequate deeper monitoring wells in the Hawthorn to support performance evaluation. We recommend that pilot studies be conducted in the North Lagoon and/or South Lagoon. Also, please note that as EPA has proposed delivery of ISBS through the large diameter augers during full scale implementation of ISSS, the ISBS pilot should simulate similar delivery conditions.

*EPA Response:*
*Suggested ISBS performance criteria and evaluation criteria are noted and many of these elements will be included as performance criteria in the ROD. EPA will continue to consult with FDEP on these effectiveness measures.*

• *Hawthorn groundwater contamination.* We understand that the proposed remedy will include 1) continued bailing of onsite Upper Hawthorn wells within the containment area that do not require P&A (due to their proximity to the insitu ISSS DNAPL source remedy), 2) insitu chemox (ISCO) or ISBS treatment using existing onsite Lower Hawthorn wells in all 4 source areas and along the eastern property boundary, and 3) *contingent* insitu treatment of contaminated groundwater in existing Hawthorn wells if monitoring indicates that concentrations are above GCTLs and increasing or begin to be detected above GCTLs in previously clean sentinel wells. We believe that the #3 *contingent* insitu treatment, above, refers to the area immediately east of the Koppers property site and outside the slurry wall / containment area. Offsite Hawthorn wells located east and northeast of the Koppers property and outside of the proposed slurry wall have shown concentrations significantly above GCTLs and at levels that infer DNAPL (principal threat wastes) in the area, particularly in the Upper Hawthorn.

MNA is the primary proposed offsite groundwater remedy for remediation of groundwater outside of the IC boundary to GCTLs. It is unlikely that MNA will be successful without treatment in the more highly contaminated offsite areas. **DEP recommends that the AROD require insitu treatment in the Upper or Lower Hawthorn offsite where concentrations indicate principal threat wastes or are above Chapter 62- 777 Natural Attenuation Default Criteria (NADCs) rather than waiting for increases in current concentrations to trigger treatment as proposed.** Chapter 62-780 allows the evaluation and development of triggers with higher concentrations than NADCs if an MNA evaluation indicates that those higher action levels are also effective in supporting MNA. We understand that active remedial technologies are limited for this low permeability formation and that use of ISCO or ISBS is the most feasible approach to address the less accessible DNAPL or elevated groundwater concentrations. **DEP recommends the use of ISCO to reduce groundwater contaminant concentrations in these areas.** It may be appropriate to consider other oxidants besides permanganate if clogging of the aquifer and injection well is a concern. Please note that UIC requires dedicated wells for insitu injection and (separate wells) for performance monitoring and compliance. **We are concerned that Lower Hawthorn impacts in the area of the North Lagoon may be more extensive than are now known and that the above approach may not be adequate to mitigate vertical migration into the Floridan in this area. We have no suggestions at this time but urge EPA to require adequate assessment and evaluation of DNAPL contamination in this area during design.**

*EPA Response:*
*EPA will consider treatment of UHG soil/groundwater east of Koppers where available data indicate Principal Threat Waste (NAPL) is or is likely present in close proximity. Treatment needs to be capable of reducing contaminant mass/concentration of all contaminants of concern. During remedial design the precise alignment of the vertical barrier wall will be data driven as determined by additional sampling and lithologic logging, it may or may not follow the alignment shown in figures presented in the proposed plan and FS.*

• We remain concerned that there are inadequately assessed areas northwest of the North Lagoon source area and in the northern area of the site which may require expansion of the slurry wall area, more extensive DNAPL source treatment or more extensive vadose zone source removal not contemplated in the current FS. Assessment and delineation of these potential source areas must be conducted during remedial design to ensure the comprehensiveness, effectiveness and protectiveness of the containment/ source treatment remedy in these areas.

*EPA Response:*
*As noted above, the alignment of vertical barrier wall will be data-driven. Data obtained during remedial design will inform the precise footprint of the vertical barrier wall installation*

• *Floridan Plume containment-* As discussed in the revised FS, Floridan aquifer groundwater recovery has been initiated FW-6 and FW-21B as an interim measure to address groundwater exceedances near and upgradient of POC well FW-16B and to mitigate any leakage along the well bore(s). FW-31B was also recently installed as a recovery well to capture groundwater contamination exceeding GCTLs observed in point of compliance (POC) well FW-22B. Monitoring and triggers for initiation of groundwater recovery to address observed or pending POC exceedances in the Floridan have been outlined in the FS. We understand they will be reflected in the Amended ROD and remedial design. DEP anticipates that once the AROD is signed, these formal triggers will go into effect, including evaluation of the effectiveness of FW-21B in pulling back contaminated groundwater in order for POC FW-16B to meet groundwater cleanup target levels.

*EPA Response:*
*Comment noted. EPA continues to recognize and appreciate FDEP's understanding of the ongoing nature of delineating contamination at the Koppers Site. EPA anticipates that the response to exceedances of the GCTLs at property boundary wells located in the UFA will be as was specified in the May 2010 Final Feasibility Study. Specifically, in the case of property boundary wells this means that any exceedance of the GCTL will be followed up with up to two calendar quarters of sampling and confirmed exceedances will be addressed by hydraulic containment will be implemented.*

**Off site soil remedy**
Delineation of contaminated soils is ongoing west of Koppers. Soil sampling has also been initiated south and east of Koppers to determine if site related contamination exists in those areas. Regardless of the current land use offsite, lateral and vertical *delineation* should be to unrestricted use SCTLs. We strongly request that EPA and Beazer proceed as expeditiously as possible in delineation and remediation of offsite soils.

*EPA Response:*
*EPA shares this goal. EPA continues to collect information and data related to areas offsite to the west of the property, and this information can be made available to the public at the appropriate time.*

**Sediment remedy**
We understand that Cabot will be conducting a removal to address visually tarry sediments as an interim action. The proposal does not include all areas where dioxin contamination has been observed above recommended criteria. Confirmatory sampling will be necessary subsequent to this removal to determine what additional action is necessary to address remaining sediments exceeding final cleanup goals.

*EPA Response:*
*FDEP correctly notes that Cabot will be conducting an interim remedial action to remove visually tarry sediments. FDEP also correctly notes that there will need to be confirmatory sampling to determine to what extent the interim action has addressed all Cabot Site-related contamination and reduced concentrations of remaining sediments below cleanup goals. Based on data obtained, Cabot may be required to conduct additional remedial actions.*

**Additional Design Activities-**
DEP recommends that the AROD clearly identify additional assessment or treatability testing that will be required during remedial design to support design and implementation of a protective and effective remedy. We support the proposed monitoring well locations recommended by the City and County in their recent Proposed Plan review comments. We recommend that remedial design activities include the following:

1) Delineation of offsite Hawthorn groundwater contamination and installation of temporary point of compliance wells at the leading edge of the plume where GCTLs are met.

2) Installation of offsite TPOC wells to delineate and monitor effectiveness of Surficial aquifer groundwater remedy.

3) Installation of onsite Lower Hawthorn well(s) at or immediately downgradient of the South Lagoon and Process area source areas.

4) If selected, pilot testing to determine the ability of ISBS to meet performance criteria and its long term effectiveness in mitigating Surficial aquifer DNAPL sources and vertical contaminant migration.

5) Treatability testing for development of the ISSS formulation for insitu treatment of DNAPL source areas.

6) Compatibility testing and formulation of the slurry wall composition for compatibility with onsite contaminated groundwater.

7) Development and implementation of a dust monitoring program to ensure that dust leaving the Koppers property does not contain contaminants at concentrations that would pose a health risk.

8) Evaluation of effectiveness of Floridan IRM groundwater recovery at FW 21-B and the need for a dedicated recovery well to ensure GCTL compliance at FW 16B.

9) Installation of additional Floridan monitoring wells to monitor onsite plume behavior, compliance at the IC boundary and/ or provide offsite delineation. This includes a) an onsite upper Floridan "transect" well b) an offsite well downgradient of FW-16B; c) Floridan well east of the process area.

10) Additional assessment and source delineation in the areas northwest of the North Lagoon source area and in the northern area of the site which may require expansion of the slurry wall area, more extensive DNAPL source treatment or more extensive vadose zone source removal not contemplated in the current FS. This is evidenced by the increasing groundwater contaminant concentrations with depth in North Lagoon area; Floridan aquifer groundwater contamination in FW-22B near the NW property boundary; significant soil contaminant levels more recently identified in the Northern Inactive Area along with aerial photo information suggesting drums, dumping or waste disposal in that area; and detections of site related phenolics and PCP daughter products in Hawthorn monitoring wells located offsite to the northeast.

11) Delineation of DNAPL source areas and identification of bounds for insitu treatment and slurry wall.

*EPA Response:*
*EPA acknowledges the necessity of addressing the above items in the remedial design phase of the project. However, EPA does not believe that these items belong in the ROD but that each of these points will be addressed in individual workplans required to be submitted during the remedial design process to carry out specific data collection activities.*

We appreciate the opportunity to comment on the proposed plan. We are available to discuss these comments or other areas of proposed remedy prior to finalization of the Amended ROD at your convenience.

Sincerely,
Kelsey A. Helton, Bureau of Waste Cleanup, Hazardous Waste Cleanup Section

### A.2.6 Florida Department of Health

Scott Miller
Remedial Project Manager
Superfund Division
Superfund Remedial Branch, Section C
U.S. EPA Region 4
61 Forsyth Street, SW
Atlanta, GA 30303

September 24, 2010

Re: EPA's Cabot/Koppers Proposed Plan

Dear Mr. Miller:

Thank you for the chance to comment on EPA's July 2010 proposed plan for the Cabot Carbon/Koppers Superfund site in Gainesville, Florida.

*On-Site Soil*

In a June 2010 letter, the Florida Department of Health (DOH) concluded that transport of contaminated dust from the Koppers site to the nearby Stephen Foster neighborhood is a public health concern [DOH 2010a]. The responsible party proposes to root rake and disk 26 acres of hardened lime rock on the site. Some of this area is within 100 feet of the Stephen Foster neighborhood. Root raking and disking have the potential to create contaminated dust that can drift into the nearby neighborhood. This potential continues until the establishment of a vegetative cover.

In the Cabot Carbon/Koppers plan, EPA should require the responsible party to water the site to suppress dust formation prior to root raking and disking. While they root rake and disk, EPA should require the responsible party to continue to water daily or as necessary for dust suppression. After completion of root raking and disking, EPA should require a daily soil moisture check and water as necessary to prevent dust formation until a vegetative cover is fully established. After a vegetative cover is fully established, EPA should require a weekly check of soil moisture and water as necessary until implementation of a permanent remedy.

*EPA Response:*
*EPA shares this goal. Note that the responsible party has submitted a workplan which includes operation of a water truck to wet soil, as well as air and dust monitoring to take place during subsequent demolition of the former Koppers facility site buildings. In addition, EPA has required the responsible party to design and implement an ambient air quality monitoring network during the remedial design phase for use during Site remediation.*

In the Cabot Carbon/Koppers plan, EPA should also require the responsible party to assess the health risk for future use of the Koppers hazardous waste site including commercial and residential.

*EPA Response:*
*It is unnecessary for EPA to require the responsible party to assess the health risk for future use of the former Koppers Site without a Site-specific plan for redevelopment available for it to do so. In fact, without benefit of a specific proposal it would be a nearly impossible task. EPA's preferred remedial alternative requires Beazer East to remediate the Site to the FDEP default commercial/industrial soil cleanup standards found in the State of Florida's risk-based corrective action program. The Site cleanup will be protective of all commercial, industrial, and recreational uses for which the property owner and the community may desire to undertake there. In addition, utilizing elements of intelligent design, possible soil exposures may be eliminated or modified in a way to allow restricted residential use on the Site. Because this remedy will result in hazardous substances, pollutants, or contaminants remaining on-Site above levels that will allow for unlimited use and unrestricted exposure, a statutory review will be conducted within five years of construction of the remedy to ensure that the on-Site remedy remains protective of human health and the environment, inclusive of the applicable institutional controls (ICs). Five-Year Reviews will continue throughout the life of the Site until hazardous substances, pollutants or contaminants no longer remain on Site at levels that do not allow for unlimited use and unrestricted exposure.*

*Off-Site Soil*
In a 2009 report, Florida DOH and the Agency for Toxic Substances and Disease Registry (ATSDR) concluded that incidental ingestion (swallowing) for more than a year of very small amounts of surface soil from the City of Gainesville easement adjacent to the western Koppers boundary between NW 26th and NW 30th Avenues ***could possibly harm children's health*** [ATSDR 2009]. In June 2010, the Florida DOH found the ***temporary fence and warning signs were not effective in preventing trespass*** on this easement. Florida DOH recommended the City of Gainesville or responsible party replace the temporary fence and signs with a more effective barrier to trespass [DOH 2010b]. In the Cabot Carbon/Koppers plan, EPA should require the City of Gainesville or the responsible party to post warning signs and erect an effective barrier to trespass until soil in this easement is remediated.

*EPA Response:*
*Beazer East has completed permanent fencing in the City of Gainesville right-of-way along with posted signage which was the subject of FDOH's concern in the June 2010 FDOH publication.*

In two reports, Florida DOH and ATSDR concluded that ***surface soil testing*** in the Stephen Foster neighborhood adjacent to the Koppers site ***had not extended far enough and recommended additional testing*** [ATSDR 2009, 2010a]. In the Cabot Carbon/Koppers plan, EPA should continue to require the responsible party to test surface soil until they define the extent of contamination.

*EPA Response:*
*Response: EPA shares this goal. Sampling offsite soil in the areas nearby the former Koppers facility is ongoing and will continue until the complete extent of soil contamination is determined.*

Florida DOH supports the plan to remove off-site surface soil exceeding Florida's soil cleanup target levels and replace it with clean fill.

*Off-Site Indoor Dust*

In the Cabot Carbon/Koppers plan, EPA should require the responsible party to investigate site related contaminants in the dust of nearby homes, schools, and businesses. The ***2009 AMEC Earth & Environmental, Inc. report is inadequate*** to assess this issue since it only addresses onsite dust deposition under current conditions and does not address past off-site dust deposition [AMEC 2009]. In the Cabot Carbon/Koppers plan, EPA should also require the responsible party to remediate nearby buildings found to have dust with site-related contaminants at levels that pose an unacceptable risk to health.

*EPA Response:*
*EPA has convened a workgroup consisting of EPA, Centers for Disease Control (CDC), FDOH, and FDEP members to determine what, if any, indoor air quality sampling will be conducted nearby the former Koppers facility. Once this workgroup has determined definitively that indoor dust sampling will occur and under what circumstances, EPA will either conduct or require the responsible party to conduct indoor dust sampling. EPA is not aware of other instances at former wood-treatment sites where indoor dust has posed an unacceptable health risk to residents.*

*FDEP has confirmed that its risk-based corrective action soil cleanup target level (SCTL) standards found at 62-780 do not apply to indoor dust. Therefore,*
*EPA will utilize its risk criteria in determining if an unacceptable risk to health is present. It is important to note that dioxin TEQ has multiple potential sources in the context of household dust. Prior to requiring the responsible party to remediate indoor living environments, it would be necessary to determine with reasonable certainty that the contamination is associated with the former Koppers Site.*

*Off-Site Creek Sediments*

In a 2010 draft report, Florida DOH and ATSDR concluded that although incidental ingestion (swallowing) of very small amounts of contaminated sediments in the Springstead and Hogtown Creeks is not likely to harm people's health, contaminant concentrations are still above state standards and should be cleaned up [ATSDR 2010b]. In the Cabot Carbon/Koppers plan, EPA should require the responsible parties to cleanup contaminated sediments in Springstead and Hogtown Creeks.

*EPA Response:*
*The selected remedy address citizen concerns with the creeks in two distinct ways. First, to address previous contamination of the sediments in each creek, sediments that have contaminant concentrations associated with either former Cabot Carbon or Koppers that exceed the threshold effects concentrations (i.e. contaminant concentrations in excess of levels that would adversely effect animal life) are required to be excavated and replaced with clean fill material.*

*Assessment of creek sediments is ongoing. To address possible future impacts on sediments, the former Koppers facility is required to construct and operate a detention/retention pond(s) to capture storm water from the former Koppers Site prior to allowing it to be discharged to the tributary to Springstead Creek. The detention/retention pond(s) will be designed, including placement, during the remedial design of the on-site remedy.*

*Although future migration of contaminated soils due to storm water flow is highly unlikely due to the implementation of Site surface covers and consolidation of contaminated materials beneath a low-permeability cover/cap, storm water capture will allow potentially contaminated sediment to settle so that it will not be released to the creeks.*

*References*

[AMEC 2009] AMEC Earth & Environmental. Potential Fugitive Dust Impacts Predicted from Air Dispersion Modeling. Koppers, Inc. Wood-Treating Facility. Gainesville, Florida. Westford, Massachusetts. August 17, 2009.

[ATSDR 2009] Agency for Toxic Substances and Disease Registry. Health Consultation. OffSite Surface Soil, Koppers Hazardous Waste Site, Gainesville, Alachua County, Florida. U.S. Department of Health and Human Services. Atlanta, GA 30333. July 17, 2009.

[ATSDR 2010a] Agency for Toxic Substances and Disease Registry. Health Consultation. Additional Off-Site Surface Soil, Koppers Hazardous Waste Site. Gainesville, Alachua County, Florida. U.S. Department of Health and Human Services. Atlanta, GA 30333. June 17, 2010.

[ATSDR 2010b] Agency for Toxic Substances and Disease Registry. Health Consultation. Public Comment Version. Springstead and Hogtown Creek Sediments, Cabot Carbon-Koppers Hazardous Waste Site, Gainesville, Alachua County, Florida. U.S. Department of Health and Human Services. Atlanta, GA 30333. June 23, 2010.

[DOH 2010a] Letter from E. Randall Merchant, Florida Department of Health to Anthony Dennis, Alachua County Health Department. June 15, 2010.

[DOH 2010b] Electronic mail from Randy Merchant, Florida Department of Health to Anthony Dennis, Alachua County Health Department. July 1, 2010.

Thanks again for a chance to comment on EPA's proposed plan for the Cabot Carbon/Koppers site.

Sincerely,
E. Randall Merchant
Environmental Administrator
850 245-4299

cc: Anthony Dennis - Alachua CHD
Kelsey Helton - Florida DEP
John Mousa - Alachua CEPD

### A.2.7 Koppers, Inc.

October 12, 2010
Mr. Scott Miller
Remedial Project Manager
Superfund Division
Superfund Remedial Branch, Section C
U.S.EPA Region 4
61 Forsyth Street, SW

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**SUBJECT: COMMENTS TO JULY 2010 PROPOSED PLAN
CABOT CARBON/KOPPERS SUPERFUND SITE**

Dear Mr: Miller
Koppers Inc., a former owner/operator of the wood treating facility located at NW 23rd Street in Gainesville, FL, submits these comments to the Superfund Proposed Plan for the Cabot Carbon/Koppers Superfund Site. Koppers Inc. (formerly Koppers Industries, Inc.) owned and operated the wood treating facility at NW 23rd Street for a limited period of time.

Koppers Industries, Inc. purchased the site in late December 1988 from Koppers Company, Inc., now known as Beazer East, Inc. Upon closure of its manufacturing operations in December 2009, Koppers Inc. sold the facility back to Beazer East. Inc. in March 2010. Throughout the Proposed Plan there are numerous references to the "Koppers" portion of the Cabot Carbon/Koppers Superfund Site, to "Koppers", and to the "Koppers Site". Since several entities with the word "Koppers" in their name have owned the site and the term "Koppers" is not defined, the generic use of the word in the document can be confusing and, at times, inaccurate. For example, the last sentence in the 151 paragraph on page 3 under Site History states .... "On *March* 31, *2010, Beazer East, Inc. purchased the property from Koppers in order to facilitate remediation.* "The "Koppers" referred to in this sentence is Koppers Inc. The document further states that wood treating processes began at the site in 1916 and describes the various units used to manage wastes or wastewaters at the site. Without further explanation or definition of the term "Koppers", an obvious conclusion could be that Koppers Inc. operated the site and the units that are now subject to remediation since 1916. As stated above, Koppers Inc. only owned and/or operated the wood treating site from late 1988 until March 2010. This

Superfund site was included on the National Priorities List (NPL) prior to Koppers Inc.'s ownership and Koppers Inc. did not use units subject to remediation.

Therefore, Koppers Inc. requests that some clarification be included in the Proposed Plan regarding the ownership and activity history at the site as noted below.

The end of the 1 st paragraph under Site History on page 3 is suggested to be revised to:
" ....... *The Koppers portion* of *the site* was *an active facility until December 2009 when Koppers Inc. ceased its manufacturing operations. Koppers Inc. (then known* as *Koppers Industries, Inc.) purchased the site from Beazer East, Inc., (then known* as *Koppers Company, Inc., the former owner/operator* of *the site) in December* 1988. *On March* 31, *2010, Beazer East, Inc. purchased the property back from Koppers Inc. in order to facilitate remediation.*

The 5th paragraph under Site History on page 3 states ...
*"Former wood-treatment facilities are located within the southeastern portion* of *the Koppers Site (Figure* 2). *This includes* a *recently-active process building and adjacent drip tracks where chromated copper arsenate (CCA)* was *used to preserve wood. The central and northern portions* of *the Site were recently used for wood storage, staging, and debarking':*

Koppers Inc. believes these statements also lead to a misunderstanding of the site ownership history and issues being addressed. First, the reference to the recently active process building and drip track implies this is the only activity that occurred in the southeastern portion of the site. Treatment activities and practices have been conducted in that area for many years preceding Koppers Inc. ownership. Secondly, wood storage and staging has been conducted at the site for many years throughout its ownership, not just recently. Koppers Inc. requests that these additional activities also be mentioned in the Site History section of the document to more accurately reflect the historic operations.

*EPA Response:*
*The ROD will include a change to the first paragraph under Site History as was requested. The comment related to the fifth paragraph is noted but EPA will not make this requested change as the current language does not in and of itself even attempt to provide the universe of previous uses in the southeastern portion of the Site.*

Koppers Inc. appreciates your consideration of these comments and trust they will be addressed as we believe they clarify the ownership and activity history at the site.

Sincerely,
Linda S. Paul
Environmental Manager
cc: Mitchell Brourman, Beazer East, Inc.

### A.2.8 Protect Gainesville's Citizens

October 14, 2010
Scott Miller
Site Manager
Cabot / Koppers Superfund Site
Region 4, Environmental Protection Agency
Atlanta Federal Center
81 Forsyth Street
Atlanta, GA 30303-8960

RE: Comments to EPA regarding vapor intrusion at the Koppers Site

In September 2010, the US EPA developed fact sheets to address questions that were raised during the proposed plan meeting at the Stephen Foster Elementary School on August 15th 2010. One of the fact sheet states that vapor intrusion is not a concern because of the presence of volatile compounds at low concentrations. Contrary to this statement, the *OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance* (US EPA, 2002) suggests that low levels of volatile compounds in groundwater may present a vapor intrusion hazard.

I am making this comment to encourage the US EPA to perform thorough studies on vapor intrusion in order to determine if vapor intrusion represents a risk for future uses.

The current data do not appear sufficient for performing a thorough vapor intrusion study. The second-five year review for the Koppers site states that numerous monitoring wells present at the site were not regularly monitored "over the years". This review recommends that: *"All of the Surficial Aquifer wells installed in investigations between* 1984 *to* 1995 *should be cleaned out and redeveloped Re-surveying of the wells should be performed as necessary. Regular monitoring of all the wells and sample analysis for all site cac's should be performed"* (Second five year review for the Cabot / Koppers Superfund site, 2006).

By going over the documents in the administrative record, I found out that the latest and most relevant samples regarding the surficial aquifer COCs were performed on August 2007. In December 2007, Geotrans submitted a document to the US EPA entitled "Surficial Aquifer Well Redevelopment and Sampling Report, in Response to Five-Year Review Report, April 2006 - Recommendation #9 Cabot Carbon/Koppers Superfund Site in Gainesville, Florida" showing the results of August 2007 sampling. These samples were performed more than three year~ago and therefore I am asking US EPA if:

- the 2nd five year review recommendation was followed?
- the statement regarding vapor intrusion made by the US EP A was based on relevant and appropriate studies?

In the above cited report, the monitoring wells detected 11 contaminants that are sufficiently toxic and volatile (based on the User's Guide for Evaluating Subsurface Vapor Intrusion into

Buildings, prepared by the Environmental Quality Inc to the US EPA, 2004). Among these contaminants, two are characterized as carcinogenic by inhalation: benzene and naphthalene.

By looking at the RCRA Draft Supplemental Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway, the groundwater screening level for naphthalene is 15 f.lg/L. This target groundwater concentration corresponds to a target indoor air concentration where the soil gas to indoor air attenuation factor is 0.01 and the partitioning across the water table obeys Henry's law. The screening level for naphthalene should be lower because naphthalene has been recently characterized as a carcinogen by inhalation and this value hasn't been updated yet.

Figure 3 of the 2007 Surficial Aquifer Well Redevelopment and Sampling Report shows the presence of naphthalene in three main areas. The first one is next to the former South Lagoon, the former Drip Track area and the former Process area. The second zone is located in the vicinity of and downgradient of the former North Lagoon. Finally, the last impacted area is in the northeastern section of the Site. The concentrations in these areas are well above the US EPA screening level for vapor intrusion with concentrations reaching 8300 f.lg/L. Naphthalene is only one contaminant among eleven others that may pose a risk to future indoor workers. By examining these numbers it is impractical for the US EPA to state that vapor intrusion is not a concern without conducting further studies. Based on the Administrative record, the US EPA hasn't conducted any studies to support their statement.

The Johnson and Ettinger model is recommended by the US Environmental Protection Agency to determine whether vapor intrusion may result in a potential unacceptable inhalation risk. The US EP A should have used this model to find out if vapor intrusion is an issue.

By using the Johnson and Ettinger model and the maximum concentrations found throughout the site for contaminants that are sufficiently toxic and volatile, the values for the total cancer risk and the hazard index are:

| Contaminant | Cw | Risk | HQ |
|---|---|---|---|
| | µlg/L | | |
| Benzene | 250 | 1.00E-04 | 1.198204 |
| Ethylbenzene | 140 | | 0.024272 |
| Toluene | 420 | | 0.17561 |
| m-p xylene | 320 | | 0.518601 |
| o xylene | 150 | | 0.192458 |
| 2Methylnaphthalene | 1500 | | 0.171483 |
| Acenaphthene (Ace) | 730 | | 0.007893 |
| Dibenzofuran | 400 | | 0.001865 |
| Fluorene | 360 | | 0.002547 |
| Naphthalene | 8300 | 8.76E-04 | 24.03867 |
| Pyrene | 13 | | 2.22E-05 |

| | | | |
|---|---|---|---|
| **Total** | | **9.76E-04** | **26.33163** |

To calculate the cancer risk and the hazard quotient, different site-specific assumptions were made:

- groundwater temperature is 22 degrees Celsius
- the capillary zone and the unsaturated zone soil type is assumed to be sand based on the 2010 Feasibility Study
- the slab-on-grade scenario was selected (most common in Florida) and default values for parameters related to this foundation were selected
- a water table depth of 9 feet (average value of seasonal variations at the Koppers Site) commercial/industrial specific exposure factors were used

Based on this table, naphthalene is the contaminant that represents the greatest concern. The Hazard Index is 26 and therefore is greater than 1, which suggests that noncancer adverse human health effects are likely.
The total cancer risk is 9.76 E-04. This value is between but at the higher end of the USEPA's allowable risk range of 1x10-6 to 1xl0-4. However, the cancer risk exceeds FDEP's risk benchmark of one in a million.

This value exceeds the US EPA's allowable risk range of lxlO-6 to 1xlO-4 and FDEP's risk benchmark of one in a million. I strongly encourage the US EPA to investigate this pathway further and to obtain current surficial aquifer concentrations at the site. Without further study, it appears that future commercial/industrial workers at the Koppers site may be at risk from vapor intrusion.

Please feel free to contact me if you would like to review the spreadsheet supporting my conclusions.

Sincerely,
Beata Urbaniak
Dr. Patricia V. Cline [Technical Advisor]

*EPA Response:*
*The Commenter refers to a 2006 Five-Year review item that required Beazer East to redevelop and sample Surficial Aquifer wells. The document entitled "Surficial Aquifer Well Redevelopment and Sampling Report, in Response to Five-Year Review Report, April 2006 - Recommendation #9 Cabot Carbon/Koppers Superfund Site in Gainesville, Florida" showing the results of August 2007 sampling is the follow-up report that was completed to address Recommendation #9 of the 2006 Five-Year review.*

*EPA acknowledges there is a potential threat concerning vapor intrusion; however, there are currently no structures above the groundwater plume except for some onsite buildings that have been demolished. Post remediation, the areas of significant contamination will have been stabilized, covered with an impermeable barrier (the* *cap) that will prevent vapor intrusion from the source areas and physically/chemically treated in such a way as to either bind contaminants to a stabilization/solidification agent rendering them unable to be vaporized or chemically altered in such a way as to create either an insoluble precipitate within a vertical barrier wall (which will prevent lateral migration) to prevent lateral migration.*

*EPA acknowledges that there could be a potential concern with vapor intrusion. However, absent a Site-specific redevelopment plan which will unlikely to be forthcoming prior to Site remediation, it would be unlikely to be able to ascertain what future impact may occur. As there are no Site buildings remaining for which vapor may intrude, the Commenter's calculations are simply a theoretical risk based on outdated data. Once there is a specific Site redevelopment plan which may be evaluated for vapor intrusion and other possible potential risks of redevelopment, EPA and FDEP will either evaluate or have the responsible party evaluate these risks. The responsible party is required to continue to monitor the Surficial Aquifer wells.*

October 10, 2010
Mimi A. Drew
Secretary of the Florida Department of Environmental Protection (FDEP)
3900 Commonwealth Boulevard M.S. 49
Tallahassee, Florida 32399

RE: Koppers Superfund Site. Failure to follow Professional Engineer/Geologist Requirements

The public health of citizens of Gainesville Florida is at risk from Koppers Superfund Site contamination, including groundwater impacts that threaten our well field. The Environmental Protection Agency (EPA) recently provided the Administrative Record, the documents which form the basis for their proposed remedy. These documents do not comply with Florida Statutes and Laws that require applicable portions of technical documents be signed and sealed by a professional engineer (PE) registered pursuant to Chapter 471, F.S., or a professional geologist (PG) registered pursuant to Chapter 492, F.S., certifying that the applicable portions of the technical document and associated work comply with standard professional practices.

EPA has stated that federal regulations do not require the Feasibility Study (FS) or other documents to be certified by licensed professionals. We feel the state statutes are clear, and provide no exemption for Superfund sites. For example, Chapter 492, F.S. outlining requirements for PG signatures (applicable to numerous Koppers groundwater reports) begins with a clear statement of Purpose:

> *It is hereby declared to be the public policy of the state that, in order to* ***safeguard the life, health, property, and public well-being of its citizens, any person practicing or offering to practice geology in this state shall meet the requirements of this chapter.***

FDEP staff appeared unsure of whether these statutes apply to the work performed at the Koppers' Site. To get clarification, complaints have been filed to have example documents reviewed by the state licensing boards1. In addition, we have contacted two states in EPA Region 4 regarding PG signatures and received the following responses:

> *While EPA may or may not require the signature, the Alabama PG statute requires documents to be signed that are within the public practice of geology. Public documents should be signed by an AL PG if they contain geological information/interpretation.*
> Dorothy Malaier, PG Board Chair
>
> *The State of South Carolina requires that a geologist hold a license to practice in this state whenever s/he engages in practice and there is no general exception for work on Superfund sites.* Lenora Addison-Miles [milesl@scdllr.com]

We expect a similar clear and definitive response for engineers and geologists practicing in Florida.

[ 1 Florida Board of Professional Engineers, regarding the May 2010 Feasibility Study (FS), filed June 27, 2010.
Florida Board of Professional Geologists, regarding the Hawthorn Group Investigation, filed September 22, 2010 ]

We raise this issue for two reasons:

- The state laws that are designed for protection of human health must be followed. Not following these licensing requirement means that no one is accepting responsibility for the accuracy of the statements, calculations, conclusions, or impacts to human health or the environment that will result from decisions based on these documents
- Critical documents are incomplete and technically deficient. This should be addressed before finalizing a remedy that puts our citizens at risk. It is unacceptable that EPA can consider the FS document "Final" if the critical problems have not been addressed.

As the agency that reviews these documents, we look to FDEP to protect our citizens and:

1. Be clear on the requirements for professional certifications for Superfund Sites, convey these to FDEP staff and EPA, and enforce these licensing requirements on **all** sites.
2. Reject the FS and relevant documents associated with the Koppers site that are not signed and sealed by the appropriate Professional Engineer or Professional Geologist licensed to practice in the State of Florida.
3. Recognize this is not a formality. The Koppers FS fails to provide criteria and critical performance metrics on which to base a remedy. We request you consult with Florida Board of Professional Engineers (FBPE) on the FS; and demand that EPA cannot consider the FS final until these issues have been addressed.
4. Give official support to community requests for an addendum to the FS evaluating alternatives consistent with professional practices so that the implications of the remedy are transparent.

We would be happy to supply our technical comments on the deficiencies of the relevant documents (particularly the FS). The deficiencies of the proposed plan and the lack of transparency / accuracy of the supporting documents have also been highlighted in comments to the EPA prepared by the Local Intergovernmental Team (*City of Gainesville, the Alachua County Environmental Protection Department, the Alachua County Department of Health, and Gainesville Regional Utilities*), along with the City and County Commissions.

The public comment period on the proposed remedy is nearing an end, and the Record of Decision for the remedy at this site may be issued soon. We look to the support of FDEP, our licensing boards, and our representatives to address the concerns of the community and resolve this issue quickly. Please contact me (352 234-3732) if you would like further clarification on these concerns. We appreciate your assistance in resolving these issues.

Sincerely,
Dr. Pat Cline
Technical Advisor
6322 SW 37th Way
Gainesville, Fl 32608
ta@protectgainesville.org

*EPA Response:*
*The NCP regulations found at 40 Code of Federal Regulations (CFR) Part 300, contain the EPA regulations for implementing CERCLA, as well as governance on documents to be submitted to the agency. Per EPA FS guidance, the FS is a conceptual document that supports the design of selected remedies. The NCP requires certification of engineering design documents; therefore, design documents for the Koppers Site generated during the remedial design phase of the project, will be signed and sealed by a professional engineer registered in the State of Florida. In an October 14, 2010, letter from Mary Jean Yon, FDEP Director of the Division of Waste Management in response to Dr. Cline's, October 10, 2010, letter, FDEP clarified that Superfund law dictates what requirements there are for the design and certification of a Feasibility Study. The remedial design of the selected remedy will occur after the Record of Decision (ROD) is issued.*

October 15, 2010
Scott Miller
Site Manager
Cabot / Koppers Superfund Site
Region 4, Environmental Protection Agency
Atlanta Federal Center
81 Forsyth Street
Atlanta, GA 30303-8960

**RE: Protect Gainesville's Citizens (PGC) Comments**

PGC has been active over the past few months providing information and opportunities for the community to become better informed and provide comments on the proposed remedy for the Koppers Superfund Site. This letter is submitted to highlight key issues that have been raised and of concern to the PGC and a large segment of the community.

Comment 1. An effective Community Involvement Plan responsive to the needs of the citizens in Gainesville is important. Some of the responses to the community concerns do not seem adequate. We would like to work with L'Tonya Spencer to update the CIP and to maintain commitments to the community regarding availability of information and opportunities to participate in the process. Because the recent CIP update process occurred simultaneously with the process of hiring a technical advisor and preparing for the public comment period, we do not feel the community was able to adequately participate as needed. We ask that in the future adequate time be allocated for all stages of the Superfund Clean up Process.

*EPA Response:*
*The current CIP does address community concerns and comments, and reflects a major revision from the previous version. Comments for future CIPs will be reviewed every six months and revised, if necessary. The community will be informed of the next revision of the CIP. Please note that comments have been, and will be, received from a multitude of individuals and interested community groups, which will take time to process, but will be included in future versions of the CIP.*

Comment 2. PGC requested the Administrative Record File and update to the repository in April 2010, and Dr. Cline provided additional requests. No complete site index has been received and many documents remain missing in the repository. This has hampered detailed evaluation of the Plan and the primary supporting document, the Feasibility Study (FS). A complete file is essential to maintain the critical evaluations that have been completed over the past 10 years and provide the basis for the summary statements made in the FS.

*EPA Response:*
*In a response to a request from Dr. Cline dated August 18, 2010, EPA stated that it has decided not to include the requested documents in the AR. Each of the documents cited are, and will remain, a part of the Site file, where they are available to the public via FOIA. The AR, however, is the body of documents that "forms the basis" for the selection of a particular response at a Site. Consequently, only documents which were considered or relied upon in our decision-making belong in the AR.*

Comment 3. An aggressive remedy to protect the groundwater is needed. We concur with comments expressed by LIT and TA on ISBS and think its potential use at this site should be reconsidered.

*EPA Response:*
*EPA agrees that an aggressive remedy is warranted and believes that the proposed remedy is a comprehensive and aggressive remedy. EPA is given a regulatory imperative to utilize innovative technologies where appropriate. As such, EPA believes that a pilot test of the ISBS is appropriate and in the best interest of the site remedy. It should be noted that ISS/S is incorporated into the ROD so that if the ISGS aspect of the remedy does not meet performance criteria, the remedy may be altered or changed as appropriate.*

Comment 4. For the past year, there have been presentations about potential redevelopment of the Site, yet it appears that a remedy will be in place that may discourage development, and could leave the city with an undevelopable piece of property.

*EPA Response:*
*EPA is required to look at reasonably anticipated future land uses in determining what cleanup criteria to apply at a Superfund Site. EPA has determined that unrestricted residential use is not a likely or practical future land use for the Site. However, a remedy that in effect meets Florida residential default cleanup standards has been selected. The remedy calls for clean soil to be placed over almost the entire Site. EPA has made its reasonably anticipated land use determination based on several factors including property owner Beazer East's planned retention of Site ownership and its indicated future use of the Site as commercial, recreational or mixed use with a residential component. Therefore, the EPA has determined that the reasonably anticipated future land use of the Koppers portion of the Site is likely to be commercial, recreational or mixed-use with a residential component.*

Comment 5. Although the Proposed plan identifies the SCTLs as the cleanup numbers for soil, the AR appears to bias support for the risk assessment documents and inference of the use of the target risk value rather than the Florida SCTLs. We just received a document that alters assumptions. This is unacceptable.

*EPA Response:*
*EPA is not clear as to what document is being referred to; however, it is EPA's intent to use SCTL values for commercial/Industrial for onsite soils. For offsite soils it is EPA's intent to utilize SCTLs appropriate for the land use.*

Comment 7. Residents have persistently raised questions about potential offsite groundwater contamination west of the site into the residential neighborhood. These have been generally dismissed, and site documents appear to infer that this area is not impacted. Recent review of data in the southwest area of the site suggests there is contamination in that area that requires additional investigation and potentially impacts the remedy.

*EPA Response:*
*Presumably this comment is referring to the historical detection of elevated COCs in an offsite private UFA well (Geiersbach well) in this area. Contamination in the private well was possibly due to leakage into the upper Floridan aquifer from contamination in the lower Hawthorn group that entered the underlying aquifer at the well, due to deteriorated well construction materials or an incomplete seal between the lower Hawthorn and the upper Floridan. A similar process has been surmised as the cause of the low-level groundwater contamination that has been observed in FW-3. Water-level data and contaminant distribution patterns across the Koppers property do not indicate that contamination at FW-3 or the private well originated through advective contaminant transport in the Floridan aquifer from upgradient identified contaminant entry points.*

Comment 8: The proposed plan recommends excavating contaminated soils and piling them up in the southeast corner of the property. This is unacceptable. We understand there are some soils which are too contaminated to be removed from the site. For those areas that can be either removed or remediated a plan should be proposed for consideration that would either move them to a lined land fill or remediate them in place to the SCTL's.

*EPA Response:*
*The soil consolidation alternative is an efficient means of minimizing potential for exposure at the Koppers site. The soil consolidation area will be designed to contain the soil contamination and prevent human contact and migration in groundwater off-Site. The consolidation area at the Koppers Site will be covered with a low-permeability cap/cover constructed of clean material that will be a minimum of two feet thick. This cover/cap will be gently sloped to promote storm water runoff and prevent pooling. The intent of the cap will be to prevent surface exposure to contaminated soil and limit rainfall from entering the subsurface within the consolidation area. This type of cap/cover is designed to perform into*

*perpetuity with minimal maintenance requirements. The exact dimensions and design of the cap will be determined in the design phase.*

Sincerely,
Cheryl Krauth Chair, Protect Gainesville's Citizens, Inc.

October 15, 2010
Scott Miller, Remedial Project Manager
Superfund Division, Superfund Remedial Branch
U.S. EPA Region 4
61 Forsyth Street, SW
Atlanta, GA 30303

Re: Comments on U.S. EPA's Proposed Plan for the Koppers Superfund Site in Gainesville, Florida

Dear Mr. Miller:

As you are aware, there is pervasive, strong objection within the community to EPA's Proposed Plan for the clean-up of the Koppers Superfund Site in Gainesville, Florida. Many of these complaints are well-deserved, ranging from deficiencies on the part of EPA to properly involve the community in its remedy selection process, to inadequate and inappropriate on-site and off-site remediation.

As you are also aware, the City of Gainesville and Alachua County have submitted their Comments and Recommendations on EPA's Proposed Plan, developed by the Local Intergovernmental Team, the City and County governments, and members of the community. Untold thousands of hours on the part of many dedicated, intelligent, and thoughtful individuals went into preparing these response comments. I endorse them wholeheartedly, almost without exception, and I implore EPA to take them to heart.

I am keenly aware of the difficult relationships between EPA, the Responsible Parties, and the local community. Neither am I under any illusion as to the limitations associated with remedying a very large, heavily contaminated, complex site. Limitations notwithstanding, there are many elements in EPA's Proposed Plan that are seriously inadequate and unacceptable.

**Community Involvement**
Community input is supposed to play a crucial role throughout the decision-making process on superfund sites. EPA is required to vigorously engage and integrate the community as soon as a site is placed on the National Priorities List. EPA is required to place heavy emphasis on community input in selecting the remedies and in providing a site that will accommodate the community's desired future uses. EPA has been severely deficient in following both federal law and its own policy directives in this regard. Superfund Community Involvement Handbook (EPA):

> "In CERCLA, Congress was clear about its intent for the Agency to provide every opportunity for residents of affected communities to become active participants in the process and to have a say in the decisions that affect their community. Congress, in

> establishing the Superfund program, wanted the Agency to be guided by the people whose lives are impacted by Superfund sites. The intent of the law is restated in the NCP at 40 CFR 300.430(c)(2)(ii): —(A) Ensure the public appropriate opportunities for involvement in a wide variety of site-related decisions, including site analysis and characterization, alternatives analysis, and selection of remedy."

A substantial amount of the current dysfunction and antagonism between the community and EPA could have been avoided if proper emphasis had been placed on developing an integrative dialogue with the community throughout the remedy selection process, i.e., an active Community Involvement Plan (CIP).

It is through the CIP that the community is to be kept informed of the various aspects and considerations associated with the entire remedial process, from "discovery" of the site to deletion from the NPL. And it is through the CIP that EPA is made aware of the types of remedies and future uses the community desires on the site--so that EPA can provide the corresponding remedies, wherever practicable.
Superfund Land Use Directive (EPA):

> "Discussions with local land use planning authorities, appropriate officials, and the public, as appropriate, should be conducted as early as possible in the scoping phase of the Remedial Investigation/Feasibility Study (RI/FS). This will assist EPA in understanding the reasonably anticipated future uses of the land on which the Superfund site is located; Remedial action objectives developed during the RI/FS should reflect the reasonably anticipated future land use or uses."

The only known Community Involvement Plan for the Koppers Superfund Site in Gainesville was established in 1989 (it was then called the Community Relations Plan). According to that Plan, quarterly updates were to be issued to the community and the Plan was to be revised if there were indications of significant changes in community interest at any time during the Remedial Investigation, the Feasibility Study, the Draft FS report, or during development of the Proposed Plan.

Beginning in 1993, CIPs were required to be updated every 3 years. The CIP for the Koppers site should have been updated 6 times since 1989. Astoundingly, it wasn't until August 2010 that EPA drafted a new CIP--3 weeks *after* release the Proposed Plan.

I do not know what resources may or may not have been available to EPA throughout the past 20 years to fulfill its responsibility to incorporate community input into the remedy selection process. But there is no doubt whatsoever that in this instance, EPA's deficiency in this regard is largely responsible for the current level of anger and hostility towards EPA, and the inadequate and inappropriate remedies in the Proposed Plan.

*EPA Response:*
*The Community Involvement Plan has been in place and operational since 1989. Community interviews were conducted for the Site during the week of August 1, 2010. Individual interviews, along with a focus group meeting, were held to identify concerns of the community for the CIP. A draft copy of the CIP was presented to the community for a 30-day comment period to allow additional information, concerns, and/or suggestions to be collected. This was done in*

*response to community outcry for intense participation. The 30-day comment period was from August 16, 2010 until September 15, 2010. The CIP was placed in the Information Repository in November 2010. In order to address community outreach and involvement, the EPA has also included in the CIP an opportunity for the document to be revised, upon review, every six months. The current document does address community concerns and comments, and reflects a major revision from the previous version.*

*Community concerns have been identified and addressed in Table 3.1 of the revised CIP. Table 3.1 lists the concerns and EPA's responses to the concerns. The identified concerns range from community outreach activities to technical and redevelopment issues. Comments for future CIPs will be reviewed every six months and revised, if necessary. The community will be informed of the next revision of the CIP. Please note that comments have been, and will be, received from a multitude of individuals and interested community groups, which will take time to process, but will be included in future versions of the CIP.*

*The toll free numbers for EPA representatives have been consistently provided on information that is distributed to the community. These include, but are not limited to, Fact Sheets, Question and Answer Sheets, web sites for EPA and Protect Gainesville's Citizens, the administrative record, the CIP, and business cards. The current toll free numbers are 1-877-718-3752 or 1-800-432-3752.*

*The mailing list for the Koppers community is a living document and updating and maintaining it is an ongoing activity. The initial mailing list was developed by obtaining residential and/or business addresses within a half mile to one mile radius of the Site. The use of sign-in sheets is another method used to identify addresses of interested citizens for the mailing list. Some residents who attend meetings request that their information not be shared with third parties. Therefore, to respect their wishes and privacy, the residential addresses are used for the mailing list only. Additionally, the EPA is developing a new list of e-mail addresses for the Koppers community to use as another method to provide information as it becomes available to the public.*

*Public Meetings*

*As part of the EPA Administrator's emphasis on enhanced public participation opportunities, EPA staff were involved with two public availability sessions in concert with the FDEP and Florida Department of Health. EPA staff participated in seven special Gainesville City and/or Alachua County Special Commission meetings presenting information related to Koppers Site cleanups and participated in listening sessions for members of the public on May 1, 2008, March 9, 2009, April 29, 2010, August 31, 2009, January 4, 2010, March 9, 2009, August 17, 2009. Five fact sheets were produced and distributed to provide information related to offsite soil sampling, onsite and offsite proposed plan* *responses to comments received during EPA's August 5, 2010, proposed plan meeting. On June 15, 2010, EPA participated in a Site walk with citizens who had concerns about possible buried drums. PRP Beazer East developed and submitted an October 11, 2010, workplan to investigate possible buried drums onsite. On September 22, 2010, EPA and Beazer East provided a Site tour to answer questions related to upcoming demolition activities. EPA representatives met with the former Gainesville Mayor and GRU staff on January 6, 2010, and November 23, 2009, to discuss FS concerns.*

**Rightful Expectations**

The land and our creeks have suffered unconscionable environmental abuse for almost 100 years. The community justifiably feels that the Responsible Parties should be held accountable and that EPA should require the RP's to clean up every last bit of contamination from the site, i.e., return the land to the condition it was in before they got their dirty hands on it. This is a well-deserved, well-grounded expectation for environmental and social justice. Even after the horrendous activities were "discovered" in 1983 and the site was placed on the NPL, the abuses continued for an additional 26 years. We really are NOT interested in hearing excuses.

Realistically speaking, most of the reasonable elements of the community understand that the magnitude and nature of the contamination on the site impose limitations that make total clean-up a near impossibility. Nonetheless, EPA's Proposed Plan falls *far* short of what is appropriate, necessary, and practicable. That is why the proposed remedies to simply cover up the contamination feel like such an insult.

Because evaluation and cost analysis of so many potential remedial alternatives appear to be missing from the FS, it is impossible for the community to accept the rationale behind EPA's chosen remedies in the Proposed Plan.

*EPA Response:*

*The FS and Proposed Plan were done in accordance with applicable guidance. As stated in the EPA RI/FS Guidance document ( OSWER Directive 9355.3-01, October 1988) "The objective of the RI/FS process is not the unobtainable goal of removing all uncertainty, but rather to gather information sufficient to support an informed risk management decision regarding which remedy appears to be most appropriate for a given site. The appropriate level of analysis to meet this objective can only be reached through constant strategic thinking and careful planning concerning the essential data needed to reach a remedy selection decision. As hypotheses are tested and either rejected or confirmed, adjustments or choices as to the appropriate course for further investigations and analyses are required. These choices, like the remedy selection itself, involve the balancing of a wide variety of factors and the exercise of best professional judgment."*

*Nine criteria are used to evaluate each remedy, in accordance with CERCLA RI/FS Guidance (EPA, 1988). The nine CERCLA criteria used to evaluate remedies in the FS process are:*

1. *Overall protection of human health and the environment*
2. *Compliance with ARARs*
3. *Long-term effectiveness and permanence*
4. *Reduction in mobility/toxicity/volume through treatment*
5. *Short-term effectiveness*
6. *Implementability*
7. *Cost*
8. *State Acceptance*
9. *Community Acceptance*

*The first two criteria (the threshold criteria) evaluate how candidate remedies satisfy regulatory and administrative aspects of remediation.*

*Criteria three through seven (the balancing criteria) evaluate the candidate remedies' (1) effectiveness within the constraints presented by engineering and administrative limitations, (2) efficiency at meeting clean-up goals, and (3) economic impact based on cost to implement.*

*The last two criteria (the modifying criteria) are reserved for stakeholders, affected public and regulatory/administrative agencies to give input to the remedy evaluation process.*

*The CERCLA criteria encompass statutory requirements and technical, cost, and institutional considerations, and are grouped into three categories (threshold, primary, and modifying criteria) based on their function in the remedy evaluation process. Furthermore, these primary CERCLA criteria are expanded into sub-criteria that clarify the intent of the primary criterion and that provide additional discriminatory power to the remedy evaluation process.*

**Primary Source Areas**

Being directly upstream in the Floridan Aquifer from the Murphree Wellfield, the groundwater remedy must, without question, be protective of the regional drinking water supply. EPA's proposed remedies are not sufficient to accomplish that.

The community's preferred remedy within the 4 primary source areas is excavation and off-site disposal of contaminated soils down to the 2nd clay layer. However desirable, this is likely not a practicable alternative due both to the expense of the excavation process itself and to the disposal restrictions and transport requirements of the DNAPL material involved. Nonetheless, the community deserves to see a detailed evaluation of this alternative, which should be included in an amended FS.

Excavation and off-site disposal of soils from within the source areas down to the 1st clay would, of course, be significantly more practicable. An evaluation of this alternative should be provided in an amended FS, as should an evaluation for on-site treatment. The community needs to understand the practicability, or lack thereof, of all remedial options.

If excavation and off-site disposal of the primary source area soils proves to be completely impracticable, thorough solidification and stabilization of these soils (i.e., ISSS) from surface to the 2nd clay, with supplemental ISBS and hydraulic containment at deeper levels, appears to be the optimal and justifiable fall-back solution. ISBS should not be relied upon as an effective remedy in the surficial aquifer, as is being proposed by EPA.

ISSS from the surface to the 2nd clay in the primary source areas is a remedial alternative that warrants evaluation and cost analysis. This should be provided in an amended FS.
In addition to the LIT recommendation to expand the proposed slurry wall eastward to address off-site migration of contaminants there, evidence suggests there is off-site migration of DNAPL contamination to the west, as well. Further testing appears to be necessary to determine whether the slurry wall perimeter would need to be adjusted accordingly to prevent additional off-site migration of contaminants. The slurry wall configuration (subsurface containment remedy) need not dictate the surface soils remedy, discussed further below.

*EPA Response:*
*Excavation of source area soils containing DNAPL was evaluated in comparison with other options during the FS process. The preferred onsite remedy was determined to be the optimal alternative based on the nine CERCLA criteria used in developing and evaluating remedial options, including risk reduction and protectiveness. Specific challenges to soil excavation and off-site disposal at the Site are:*

> ***Excavation depths and large soil volume***
> *The two source area excavation alternatives considered during the remedy selection process (removal of soil within the Surficial Aquifer or removal of soil to the Hawthorn Group middle clay unit) would present significant challenges due to the excavation depths and the large amounts of soil that would be removed. The Surficial Aquifer soil removal would require digging to an approximate depth of 25 feet below ground and removing approximately 280,000 cubic yards (420,000 tons) of soil. The Hawthorn Group middle clay soil is deeper and removal would require digging to an approximate depth of 65 feet below ground and removing approximately 1,800,000 cubic yards (2,700,000 tons) of soil. Excavating soil to these depths would require shoring to keep the excavation walls from falling in on workers, and dewatering to remove groundwater that would flow into the excavation area during excavation. Groundwater collected from the excavation area would require treatment and disposal. Construction of a staging/temporary storage area may be required. Excavated soil would require management as listed hazardous waste. All of these challenges, in turn, result in short-term health and safety risks to remedial workers and the nearby community and significant additional costs to the remedial effort.*

***Off-Site disposal challenges***
*Finding one or more disposal facilities that will accept the large quantities of contaminated soil would present a challenge. Land Disposal Restriction (LDR) and Best Demonstrated Available Technology (BDAT) rules establishing treatment standards for land disposal may require that contaminated soils from the Site be sent to one of the few hazardous waste incinerators that accept wood treatment listed waste. It may also be necessary to treat soils on-site prior to off-Site disposal. Transporting the contaminated soils to an off-Site facility would require either about 15,000 (Surficial Aquifer excavation) or 95,000 (Hawthorn Group middle clay excavation) truck loads. More than 100 dump truck loads per day of contaminated soil could be driven through the areas surrounding the Site resulting in significant transport-related safety and environmental risks, as well as a significant nuisance to the surrounding areas for over 2.5 years. The same logistical difficulties are associated with rail transport.*

***On-site treatment challenges***
*If the material is treated on-site (by any method) and returned to the excavation, the risk reduction and volume treated is very similar to the in-situ treatment options, but with substantially greater short-term risk, engineering challenges, effort, time, and cost.*

***On-site construction of above ground landfill challenges***
*If the excavated soil is placed in an on-site constructed landfill instead of being returned to the excavation or transported off-Site, the resulting mound would be much larger than the mound considered for the gently sloped consolidation area. This would have serious technical and permitting challenges, would limit redevelopment opportunities, and would not be a welcome sight for the community.*

***Risk reduction not significantly different with excavation***
*Actual long-term human health and environmental risk reduction resulting from source area excavation would not be significantly different than in-situ treatment. Short-term risks would be significantly higher for soil excavation. Soil removal will not significantly reduce groundwater concentrations at potential receptors, including the Murphree Well Field. A long-term groundwater remedy would still be required. There is also a risk that residual DNAPL will move through the groundwater during excavation activities.*

*Finally, it should be noted that ISGS is only one component of the remedial strategy at the Cabot Koppers Site. Out of an abundance of caution, redundant approaches (containment using slurry walls and caps to isolate the four primary source areas, and soil stabilization/treatment to immobilize the contamination)* *are proposed. Specific performance requirements, with contingencies to insure project success, will be engineered during the design phase of the project.*

*That said, EPA acknowledges that ISGS is a developing technology. As such, EPA will require stringent performance testing and monitoring during its application with an ISS/S contingency in place if performance standards are not achieved. Implementing the remedy in a staged or staggered schedule will provide EPA with more options for meeting cleanup goals. For example, EPA proposes implementing ISGS within a physically contained zone (surrounded by the slurry wall) as a response to subsurface contamination, and to evaluate its effectiveness concurrently with the remedial design.*

*EPA will require the PRP to provide engineering design plans for both full-scale implementation of ISGS and a contingent ISS/S remedy along with the other remedial components including but not limited to the vertical barrier wall, the engineered cap, and LHG injection points. If necessary, EPA will be able to quickly respond to ISGS ineffectiveness by requiring the ISGS zone to be revisited and addressed by ISS/S, or additional ISGS injections, without further time-consuming Site-specific rulemakings.*

**Non-Source Area Soils**

EPA's proposed surface soils remedy is to surficially scrape the non-source area to a non-specified depth (leaving an indeterminate amount of contamination behind), pile the scrapings on top of the source areas, put a cap on top of the mound, and throw some clean dirt on top of the scraped area. Adding insult to injury, those surficial soils would only have to meet commercial/ industrial SCTLs. Future development would require engineering and institutional controls over almost the entire site--significantly impairing (and dictating) the types of future uses the site could accommodate.

This type of remedy might be appropriate if the site was in an isolated location, but it is not. The site is integrated well within the developed area of the city and shares a 3/4 mile-long boundary with a single family neighborhood. Attaining a site that is genuinely clean should be one of EPA's primary objectives for this site. A remedy that does not actually clean the majority of the contaminants from the site will not remove the stigma associated with the site and will adversely impact the economic health and vitality of adjacent neighborhoods for generations to come. EPA has completely neglected the psychological impact of the chosen remedy on the community. This, in my opinion, is where the Proposed Plan is most deficient.

In 2008 the Gainesville City Commission passed a Resolution requesting EPA to require the responsible parties to clean the Site to Florida residential SCTLs. And yet EPA's Proposed Plan states:

> "The selected cleanup goals are the Florida commercial/ industrial SCTLs for on-Site soils/ sediments."

AMEC's on-site surface soil tests indicate that it may in fact be practicable to attain a thorough clean-up over the majority of the area outside the primary source areas. With additional testing, a fine-grained work plan could be generated to determine the various depths to which contaminated soils would need to be excavated to reach relatively clean earth. A legitimate expectation would be to thoroughly clean as great an area as possible by excavation of these soils. An evaluation and cost analysis for excavating the non-source area portions of the site to the various depths necessary to reach the different soil contact and leachability standards is missing from the FS. This information is crucial, and should be included in an amended FS.

In association with the excavation of on-site surface soils (whether to indiscriminate depths as is being proposed, or to the depths necessary to reach target criteria) are the alternatives for off-site disposal or on-site treatment of these soils. These alternatives warrant evaluation and cost analysis, and need to be provided in an amended FS.

The mounding of contaminants on-site is highly objectionable to the community--and for good reason. It will adversely impact and stigmatize adjacent neighborhoods forever.
If evaluation proves that off-site disposal or on-site treatment of the non-source area soils is in fact impracticable, the excavated soils should be confined to as small an area as possible, so as to maximize the area on the Site where surface soils could potentially be cleaned. I think a thoroughly clean area over as much of the site as possible (with a higher mound) would be preferable to continued widespread contamination over the entire site under 2 feet of "clean" dirt (with a lower mound).
As mentioned before, it is important to recognize that the slurry wall configuration (subsurface remedy) does not necessarily dictate the surface soils remedy (outside the primary source areas themselves). Surface soil tests indicate that the western/central area within the proposed slurry wall could conceivably be cleaned similarly to the area outside the slurry wall. And if tests determine that the slurry wall actually needed to be expanded to the west, that would not necessarily dictate the surface soils remedy within the slurry wall there either.

*EPA Response:*
*Because of the issues described above regarding excavation, containing soils on-site is the optimal solution for the community's needs. The soil consolidation area will be designed to contain the soil contamination and prevent human contact and migration in groundwater off-Site.*

*The most contaminated soil (principal threat waste) will be treated within the consolidation area. There will be a gentle slope on the containment area to prevent surface water from accumulating. Other storm water management controls such as rerouting and detention basins will be used to reduce the likelihood of surface water contact with potentially contaminated soil.*

*With regard to cleanup goals, EPA is required to look at reasonably anticipated future land uses in determining what cleanup criteria to apply at a Superfund Site. EPA has determined that unrestricted residential use is not a likely or practical future land use for the Site. However, a remedy that in effect meets Florida residential default cleanup standards has been selected. The remedy calls for clean soil to be placed over almost the entire Site. EPA has made its reasonably anticipated land use determination based on several factors including property owner Beazer East's planned retention of Site ownership and its indicated future use of the Site as commercial, recreational or mixed use with a* *residential component. Therefore, the EPA has determined that the reasonably anticipated future land use of the Koppers portion of the Site is likely to be commercial, recreational or mixed-use with a residential component.*

**Future Uses and Re-Use of the Site**

EPA's proposed remedies are based upon erroneously presumed future land uses and do not provide protection for the future uses the community has expressly made known to EPA as being desirable. EPA has consistently ignored community input regarding this primary goal of the Superfund program. EPA directive and guidance documents go to great lengths to emphasize the importance of providing a site capable of accommodating the future land uses deemed desirable by the community.

Reuse Assessments: A Tool to Implement the Superfund Land Use Directive (EPA):

> "As reflected in the Superfund Land Use Directive, the reuse assessment process should include soliciting community input on future land use considerations for sites. Community input can be particularly useful for sites where the future land use is uncertain and should be directed toward understanding the types or categories of future land use that the community believes would be appropriate for the site, and categories of land use that the community believes inappropriate."

Superfund Reuse Directive (EPA):

> "When this document states that EPA "identifies" or "determines" the reasonably anticipated future land use of a site, it should be understood to mean that, based on the input of site's stakeholders (local governments, community groups, individuals, states, tribes, etc.) and other remedy selection factors described in the CERCLA statute, the NCP and EPA guidance, the Agency makes a decision on what the future land uses are likely to be, so that remedies can, wherever practicable, support those future uses."

Risk Assessment Guidance for Superfund (EPA):

> "Assume future residential land use if it seems possible based on the evaluation of the available information. For example, if the site is currently industrial but is located near residential areas in an urban area, future residential land use may be a reasonable possibility."

The City of Gainesville and the local community have made it crystal clear to EPA that as much of the site as possible should be sufficiently cleaned to be able to accommodate *all* types of residential uses; and sufficiently cleaned to eliminate the need for engineering and institutional controls over as much of the site as possible. And yet, the Feasibility Study upon which EPA is grounding its remedy selection states: "On-Site residential exposure scenarios are not applicable based on the expected commercial/industrial and/or recreational use of the property."

It was the responsibility of EPA to develop, ***at minimum***, a range of remedial alternatives that would achieve the different land use potentials for the Site.

Superfund Land Use Directive (EPA):

> "Remedial action objectives provide the foundation upon which remedial cleanup alternatives are developed. In general, remedial action objectives should be developed in order to develop alternatives that would achieve cleanup levels associated with the reasonably anticipated future land use over as much of the site as possible. In cases where

> the reasonably anticipated future land use is highly uncertain, a range of the reasonably likely future land uses should be considered in developing remedial action objectives. These likely future land uses can be reflected by developing a range of remedial alternatives that will achieve different land use potentials."

Instead, it appears that EPA chose only to provide a set of predetermined alternatives that place the interests of the Responsible Parties above the interests of the community.

The Site Re-Use Meeting with EPA's "consultant," E2, Inc., was a complete sham. The main question posed to the community was "Where on the Site do you want the biggest pile of contaminants?"

*EPA Response:*
*As noted above, EPA is required to look at reasonably anticipated future land uses in determining what cleanup criteria to apply at a Superfund Site. EPA has determined that unrestricted residential use is not a likely or practical future land use for the Site. However, a remedy that in effect meets Florida residential default cleanup standards has been selected. The remedy calls for clean soil to be placed over almost the entire Site. EPA has made its reasonably anticipated land use determination based on several factors including property owner Beazer East's planned retention of Site ownership and its indicated future use of the Site as commercial, recreational or mixed use with a residential component. Therefore, the EPA has determined that the reasonably anticipated future land use of the Koppers portion of the Site is likely to be commercial, recreational or mixed-use with a residential component.*

**Off-Site Soils and Sediments**
Off-site soil testing is ongoing and the area of contamination has yet to be delineated. Testing must continue until such delineation is clarified; and off-site soils must be cleaned to Florida default residential soil cleanup target levels. At a 2009 joint City and County Commission meeting, as EPA's Regional Project Manager for the Site, you specifically stated, in response to a specific question, that off-site soils would, unequivocally, be cleaned to 7 PPT for dioxin. We expect this declaration to be honored.

The proposed plan does not address in-home remediation; nor does it address temporary relocation of residents during remediation of their properties. These are issues that should be appropriately addressed.

The delineation of contaminants in creek sediments is not comprehensive. This is essential to providing a thorough remedy necessary to protect the creek ecosystem from continued adverse impact from these contaminants.

Contaminated off-site soils and creek sediments should not be brought onto the Site, adding to the contamination there. Off-site disposal alternatives for these soils were not evaluated in the Feasibility Study. They should be provided in an amended Feasibility Study.

*EPA Response:*
*With regard to off-Site soils, concentrations of site-related contaminants will be compared to the Florida SCTLs. SCTLs are conservative and protective of human health for intended uses of the land (i.e., there are different cleanup levels for residential and commercial land uses). Once the comparison has been made, a range of options are proposed for use on individual subparcels after obtaining the consent of private property owners. The options include:*

- *Excavation and removal of soil containing concentrations of contaminants that exceed specified cleanup goals associated with present use of the land.*
- *Engineered controls that prevent contact with impacted soil that exceeds cleanup goals based on present land use.*
- *Institutional controls that protect access and use of land/properties.*

*With regard to in-home remediation, EPA has formed a work group with the Florida Department of Health, the Center for Disease Control, and FDEP to assess the need for indoor air quality studies. It has been EPA's experience that there have been no indoor air contamination issues at other wood treating sites. The findings of this work group will influence any decisions regarding possible in-home remediation.*

*With regard to temporary relocation, the PRP has offered to temporarily relocate residents during remedial action implementation.*

*With regard to creek sediments, the selected remedy addresses the creeks in two distinct ways. First, to address previous contamination of the sediments in each creek, sediments that have contaminant concentrations associated with either former Cabot Carbon or Koppers that exceed the threshold effects concentrations (i.e. contaminant concentrations in excess of levels that would adversely effect animal life) are required to be excavated and replaced with clean fill material. Placement of these sediments in the containment cell onsite is the most efficient management option.*

*Assessment of creek sediments is ongoing. To address possible future impacts on sediments, the former Koppers facility will be required to construct and operate a detention/retention pond(s) to capture storm water from the former Koppers Site prior to allowing it to be discharged to the tributary to Springstead Creek. The detention/retention pond(s) will be designed, including placement, during the remedial design of the on-site remedy.*

**Stormwater Management**
Significant video evidence has been provided demonstrating the huge volume of untreated, contaminated stormwater runoff that flows off the Koppers site into Springstead Creek. Beazer has submitted an application for a new discharge permit. According to the diagram submitted with that application, there are serious deficiencies with Beazer's stormwater management plan,

with most of the runoff actually bypassing the proposed collection areas entirely, including runoff from the 4 primary source areas. Considering contaminant concentrations in runoff will likely be even worse during the remediation process where soils will be severely disturbed, effective, functional management is critical. These deficiencies must be addressed. Longer berms and larger retention areas must be provided in association with issuance of any interim stormwater permit.

*EPA Response:*
*As noted above, to address possible future impacts on sediments, the former Koppers facility will be required to construct and operate a detention/retention pond(s) to capture storm water from the former Koppers Site prior to allowing it to be discharged to the tributary to Springstead Creek. The detention/retention pond(s) will be designed, including placement, during the remedial design of the on-site remedy.*

**Conclusions**
EPA's disregard for the community has led to a Proposed Plan that makes a mockery out of what Congress intended to be a community guided remedial endeavor. Although everyone is anxious to begin the remedial process, the remedies must be suited to the location and actually clean the site.

The Record of Decision should be put on hold. EPA needs to provide an amended Feasibility Study addressing the numerous deficiencies enumerated above; and provide the community with a new Proposed Plan for its consideration. Thank you.

Sincerely,
Robert Pearce

714 NW 36th Avenue
Gainesville, FL 32609
robertpearce2000@gmail.com
Chair, Technical Advisory Committee for Protect Gainesville's Citizens
Former President, Stephen Foster Neighborhood Association

September 22, 2010
Scott Miller
Site Manager
Cabot / Koppers Superfund Site
Region 4, Environmental Protection Agency
Atlanta Federal Center
81 Forsyth Street
Atlanta, GA 30303-8960

RE: Risk Assessment Comment
The Administrative Record (AR) contains a letter you sent to Dr. Paul Anderson on June 18, 2010, with your comments on what portions of the May 26, 2010 Human Health Risk Assessment are approved or not approved. A copy of this letter is attached.

It appears the use of the probabilistic model is being rejected. However, can you clarify what exactly is referred to by wording like "some text", "some portions", and "several subsections"?

The proposed plan states remedial goals for soil will be the default Florida soil cleanup target levels (SCTLs), although the exact application of these is not clearly stated. Since the plan was developed after this letter, does this mean that the entire risk assessment is no longer approved? If so, why is this included in the AR? If you are going on record as approving portions of this assessment, can you explicitly state what this includes? Specifically:

- Calculation of site-wide average concentrations using Thiessen Polygons as inferred in figures from Section 3?
- Use of relative absorption factors (Appendix C and G)?

We disagree with approval of these sections. In addition, there are numerous technical errors in this risk assessment (for example, not calculating the non-cancer hazard associated with dioxins). Therefore, including the attached letter and the risk assessment in the AR is misleading as to the reliability of this analysis, and the implications of this approval are not transparent. As a side note, the May 26, 2010, risk assessment is not in the AR, but rather the earlier May 10, 2010, draft.
Sincerely,
Dr. Patricia V. Cline
Principal

*EPA Response:*
*EPA has no further comments on the referenced Human Health Risk Assessment, the findings from which support the planned remedial actions. EPA's position on cleanup goals is summarized below:*

- *On-Site soil/sediment COCs: Florida default SCTLs contained in Chapter 62-777, F.A.C. for commercial/industrial land use.*

- *Off-Site soil/sediment COCs: Florida default SCTLs contained in Chapter 62-777, F.A.C.; however, the goals are based on the current land use (residential or commercial/ industrial) of the impacted off-Site parcel.*

- *Sediment in the creeks: Florida default leachability SCTL for pentachlorophenol for protection of ecological organisms in surface water.*

- *Groundwater: Florida MCLs unless no Florida MCL has been established. In those cases, the GCTL will be used. The selected goals are the MCLs for Drinking Water in Florida contained in Chapter 62-550, Florida Administrative Code (F.A.C.) and GCTLs contained in Chapter 62-777, F.A.C. The ROD will clearly state the specific standards and their point of compliance.*

### A.2.9 Stephen Foster Neighborhood Protection Group

October 15, 2010
Re: Community Comments Proposed Plan (July 2010)
Gwendolyn Keyes Fleming, Region 4 Administrator
US EPA Region 4
61 Forsyth Street, SW
Atlanta, GA 30303-8960

Dear Ms. Fleming:

These comments are submitted on behalf of the Stephen Foster Neighborhood Protection Group (SFNPG), a community organization located in Alachua County, Gainesville, Florida. The SFNPG is a neighborhood community organization charged with representing and protecting the health and well-being of the residents living in the Stephen Foster neighborhood bordering the Cabot-Koppers Superfund and industrial site, and which is dedicated to making the Stephen Foster neighborhood a safer and healthier place to live, work, and play. The SFNPG works to improve environmental, housing, and other living conditions within the Stephen Foster Neighborhood. It is with those purposes in mind, SFNPG submitted comments on November 3, 2009 to the original August 2009 Feasibility Study, submitted comments on August 6, 2010 to the May 2010 Revised Feasibility Study, submitted comments on September 15, 2010 on the August 9, 2010 Community Involvement Plan, and are now submitting comments on the July 2010 Proposed Plan (PP).

The PP fails to adequately address the contamination on the Cabot-Koppers site in a multitude of ways. According to 40 CFR § 300.430(f)(2), the EPA, as the lead agency, must create a proposed plan, at a minimum, that "briefly describes the remedial alternatives analyzed by the lead agency, proposes a preferred remedial action alternative, and summarizes the information relied upon to select the preferred alternative." The proposed plan is created to provide the public with an opportunity to comment on the preferred remedial action alternative and to participate in the selection of the remedial action at the site.

These comments are meant to explain community concerns regarding the PP and implore the EPA to reconsider their chosen remediation options as they are not protective of human health and the environment and will lead to catastrophic impacts in the future.

**The EPA is grossly premature in its selection of a remedial alternative as delineation of contamination remains incomplete**

As we have continued to reiterate in our comments on the feasibility studies, a remedial plan cannot be chosen without a complete site characterization and delineation of all contamination, on-site and off-site. The PP states:

> "As part of the remedial design process which follows remedy selection, additional characterization of Site aquifers will be conducted to address remaining uncertainties related to DNAPL migration, and, more importantly refine its vertical and horizontal boundaries for effective remedy implementation. Off-site soil characterization

continues to the north, south, east and west of the Site to completely delineate Site-related impacts and to expedite cleanup of off-Site areas." (PP at pg. 14).

This clearly indicates that the contamination has not been fully delineated in all media in all areas. The PP purports to pick a remedial alternative that will be protective of human health, implementable, and effective, among other things, without an appropriate grasp of the entire scope of contamination. The purpose of the remedial investigation found in 40 CFR § 300.430(d)(1) is to compile data that will allow for the adequate characterization of a site for the ***ultimate purpose of crafting an effective remedial alternative***. The EPA is completely remiss to push forward on selection of a remedy without collection and analysis of all requisite data.

Further, despite protests from the city, county, and local residents, the EPA has yet to initiate a testing regime at local schools. Stephen Foster Elementary is .6 miles from the site. The smallest and most vulnerable among us must not be ignored. The EPA must test the schools to ensure that Stephen Foster's children are not risking additional exposure by attending their schools.

*EPA Response:*
*As stated in EPA's Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA (EPA/540/G-89/004 OSWER Directive 9355.3-01 October 1988), the objective of the RI/FS process is not the unobtainable goal of removing all uncertainty, but rather to gather information sufficient to support an informed risk management decision regarding which remedy appears to be most appropriate for a given site. The appropriate level of analysis to meet this objective can only be reached through constant strategic thinking and careful planning concerning the essential data needed to reach a remedy selection decision. As hypotheses are tested and either rejected or confirmed, adjustments or choices as to the appropriate course for further investigations and analyses are required. These choices, like the remedy selection itself, involve the balancing of a wide variety of factors and the exercise of best professional judgment. EPA has met the threshold established in its guidance manual with regard to site characterization.*

*With regard to the comment regarding testing near local schools, soil sampling results indicate that contaminant concentrations in soil exceed State standards at a distance of up to 400 feet from the Site. At this time there is no soil sampling data available that would suggest that Site contamination has made its way six-tenths of a mile to the Stephen Foster Neighborhood Elementary School. Evaluation of soil sampling data by the Florida Department of Health in a June 2010 Health Consultation for offsite soils indicate that the Florida DOH believes that incidental ingestion of soils along Stephen Foster neighborhood roadsides "is not expected to harm people's health."*

**The EPA fails to adequately analyze the various remedial alternatives under the applicable 40 CFR § 300.430(e)(9) criteria**

The first requirement under 40 CFR § 300.430(f)(2)(i) is to "provide a brief summary description of the remedial alternatives evaluated in the detailed analysis established under (e)(9) of this section." (e)(9) contains nine evaluation criteria that a proposed plan is required to analyze.[1] Although the PP mentions each of the nine criteria, it is severely lacking in any sort of meaningful analysis. The purpose of the proposed plan is so that the public can be adequately informed on all available remedial alternatives, including the EPA's preferred remedial alternative, so that they can intelligently comment and participate in the remedial alternative selection process. The EPA completely eviscerates this requirement by providing virtually no analysis of the available alternatives. The reader is left to wonder whether the EPA engaged in any evaluation at all or whether they already had their preferred alternative in mind and set up the analysis to lend support to that alternative. A look back at the Feasibility Study (May 2010) shows a lack of any sort of meaningful analysis of all the criteria as well. Effectiveness and implementability are given some discussion, yet the mandated "threshold criteria" – overall protection of human health and the environment and compliance with ARARs is markedly absent or surficially treated. *See* 40 CFR § 300.430(f)(1)(i)(A).

The threshold criteria in evaluating the remedial alternatives are overall protection of human health and the environment and compliance with ARARs. 40 CFR § 300.430(f)(1)(i)(A). The PP's cursory glance at these first two criteria is insufficient to "reflect the scope and complexity of site problems and alternatives being evaluated." 40 CFR §300.430(a)(1)(ii)(C). There is little to no explanation as to the unique hazards to human health that this site may pose to the community. The PP's conclusory language in regards to these requirements does not reflect any detailed analysis by the EPA in regards to the "unacceptable risks" to human health and the environment and how each alternative would specifically address such risks. Such conclusory language includes "nine of the ten on-Site alternatives are expected to meet the two threshold CERCLA criteria" (PP pg.28); "UFA-1 … would fail to meet the mandatory criteria" (PP pg. 30); and "[a]lternatives OfR-2, OfR-3, and OfR-4 are all protective and would effectively eliminate any potentially unacceptable risks …" These statements do not provide any information on why the EPA deems one alternative more protective of human health or in compliance with ARARs over any other alternative.

The assessment of the alternatives' long-term effectiveness under 40 CFR § 300.430(e)(9)(iii)(C) is incomplete. There is no discussion as to the degree of certainty that each alternative would provide in regards to the probability of success. There is no mention of the "magnitude of residual risk remaining from untreated waste water or treatment residuals remaining at the conclusion of the remedial activities." 40 CFR § 300.430(e)(9)(iii)(C)(1). Also, there is no discussion as to the "adequacy and reliability of controls such as containment systems…that are necessary to manage treatment residuals and untreated waste." 40 CFR § 300.430(e)(9)(iii)(C)(2). The PP provides a brief conclusion as to which alternatives may be more effective in the long-term time frame, but provides no information to support such claims. Conclusory statements, similar to those used to describe protection of human health and the environment and compliance with ARARs, are once again used.[2] While the statute states that a "brief summary" should be provided, it would do a disservice to the purpose of the statute, keeping the community adequately informed, to provide such a limited scope of information as is presented in the PP.

It is difficult to determine whether any or all of the statutorily prescribed factors have been employed in determining, "the degree to which alternatives employ recycling or treatment that reduces toxicity, mobility, or volume." 40 CFR § 300.430(e)(9)(iii)(D). The factors are listed in the PP and there is also a list providing for which alternatives would be used the most to the alternatives that would be used the least to address the "reduction of toxicity, mobility or volume." 40 CFR § 300.430(e)(9)(iii)(D). No mention, however, is made in how or if these factors were applied to reach such conclusions. Some of the factors are indirectly discussed in the description, not the evaluation, of the remedial alternatives. Even in that section of the PP, however, there are no specifics or estimations as to the "amount of hazardous substances, pollutants, or contaminants that will be destroyed, treated, or recycled." 40 CFR § 300.430(e)(9)(iii)(D)(2). There are also no specifics or estimations as to the "degree of expected reduction, "degree to which treatment is irreversible," and the "degree to which treatment reduces inherent hazards posed by principal threats at the site." 40 CFR § 300.430(e)(9)(iii)(D)(3)-(6).

The PP fails to adequately discuss short-term effectiveness as required by 40 CFR § 300.430(e)(9)(iii)(E). The PP simply states which alternatives would provide the greatest short-term effectiveness and which would provide the least short term effectiveness. It does not address in which ways the methods would be effective in relation to the amount of time necessary to complete the remedial objective. It appears as if every alternative is just as effective as the next, but some with a longer or shorter amount of time to actually realize its effectiveness. The statute lists four considerations when evaluating short-term effectiveness.[3] Based on the PP, it appears as if only the "time until protection is achieved" factor was considered. No other details are provided.

40 CFR § 300.430(e)(9)(iii)(F) mandates that the EPA consider implementability in their analysis of the remedial alternatives. The PP merely states the factors to be considered in evaluating implementability of the alternatives and lists the alternatives in order from most implementable to least implementable in EPA's estimation. There is only one line justifying these conclusions. Whatever analysis was conducted in order to reach these conclusions is omitted in full from this section. Being conclusory in the "spirit" of brevity denies the community any sort of valuable information to use in their evaluation of the preferred remedial alternative.

Further, the statute states additional requirements when assessing the implentability of off-site remedial action. "Administrative feasibility, including activities needed to coordinate with other offices and agencies and the ability and time required to obtain any necessary approvals and permits from other agencies (for off-site actions)" must be considered in determining implementability. 40 CFR § 300.430(e)(9)(III)(F)(2). Also, "availability of services and materials, including the availability of adequate off-site treatment, storage capacity, and disposal capacity and services; the availability of necessary equipment and specialists, and provisions to ensure any necessary additional resources; the availability of services and materials; and availability of prospective technologies," should also be considered. §300.430(e)(9)(iii)(F)(3). If any of these requirements were considered, they are not reflected in the PP.

According to 40 CFR 300.430(e)(9)(iii)(G), cost must be considered. The projected cost for each remedial alternative is presented in the PP. The PP also states that the alternative with the highest cost is the most effective alternative and the remaining alternatives differ in cost and effectiveness. The PP says that costs will vary based on the amount of technology implemented, the degree of difficulty in implementation, and time to meet RAOs. The range in cost variation is not provided and the estimated cost of each alternative does not include any detail on how that amount was calculated. Cost estimates are only valuable if they are explained in conjunction with time frames, degree of difficulty in implementation, and the amount of technology used (all of these being stated as variables of costs associated with the alternatives) in order to reach the projected expense.

40 CFR § 300.430(e)(9)(iii)(H) mandates that the EPA consider any State concerns. If the State had any concerns or comments regarding the preferred alternative, they are not in the PP. By "State" we assume the PP is referring to the Florida Department of Protection (FDEP). The PP speaks of the State's acceptance of the preferred alternative and how it has been "closely involved in the development and evaluation of these alternatives." This suggests that the State did not have any concerns or comments and if this is not the case, the language of the PP is misleading. The community has requested the comments from the FDEP many times and has not been provided with those comments. Without any sense of where the FDEP stands on this issue, it is impossible to evaluate any other possible weaknesses of the PP. It should be noted that the City of Gainesville is not satisfied with the PP and has provided its own comments on the document.

40 CFR § 300.430(e)(9)(iii)(I) requires a determination of "which components of the alternatives interested persons in the community support, have reservations about, or oppose." This portion of the PP is omitted as it cannot be completed until comments concerning the PP are received. It should be noted by the EPA that the community has not accepted the PP or any part of its proposed remedial actions. The cleanup plan is completely inadequate to the community because it does not include excavation on-site, includes only limited excavation off-site, and proposes to store the contamination onsite under a large "Mt. Dixon"-type cover. Also, the PP proposes experimental methods in the 30 acre source area and does not provide costs on excavation and removal or incineration. In addition, it leaves treatment of the non-source 60 acres vague, and does not address searching for additional sources such as trenches and drum burial areas. In addition to the above mentioned weaknesses, the plan also fails to mention testing inside nearby residents' homes, any relocation assistance, or compensation for affected residents.

*EPA Response:*
*EPA disagrees with this characterization of the remedy development process. Instead, EPA has provided all reasonable means of involving the interested public in a multiyear, multi-party collaborative effort. This effort combined the contributions of the following stakeholders who were involved in identifying, evaluating and critiquing remedial options for this Site:*

- *City of Gainesville representatives*
- *Gainesville Regional Utilities (GRU) and consultants (Jones Edmunds)*
- *Alachua County Environmental Protection Department*

- *Beazer East and contractor (GeoTrans)*
- *PRP support consultants (Adventus, SES, AMEC, Key Environmental, GeoHazards)*
- *University of Colorado*
- *Florida Department of Environmental Protection*
- *US EPA (site manager and technical support personnel)*
- *EPA consultant (Black & Veatch)*

*A 15-member Joint FS Group convened for seven meetings and numerous teleconferences over the course of approximately 2.5 years. The Joint FS Group encouraged and welcomed any and all technical and community view points pertinent to remedy development.*

*Seven iterations of a draft FS report were produced by the Joint FS Group and submitted to stakeholders for review and comment. The public reviewed and commented on a version of the draft FS. EPA has been involved in eight public meetings to discuss the Koppers Site remedy. All review comments were considered and evaluated; responses to relevant comments were provided at meetings (in person) or by correspondence (letter and/or email). Additional pilot studies and field investigations, recommended by stakeholders and technical experts via the review/comment process, were conducted during the Joint FS Group tenure.*

*Numerous field investigations, pilot studies, and environmental monitoring reports have been generated through the process:*
- *technology applicability and implementability tests*
- *proof-of-concept studies*
- *contaminant monitoring progress reports*
- *source material capture/recovery trials*

*In sum, EPA has more than satisfied its obligations with regard to remedy selection and is confident that the selected remedy will achieve its intended goal to protect human health and the environment.*

**The EPA does not adequately discuss the rationale that supports their preferred alternative**

According to 40 CFR § 300.430(f)(2)(ii), the EPA is required to "identify and provide a discussion of the rationale that supports the preferred alternative." The PP addresses and describes the alternative preferred by the EPA. However, there is no discussion as to the reasoning behind the selection of the preferred alternative. No justification is given for what was included in the preferred alternative, for what was omitted from the preferred alternative, or even why the preferred alternative was selected. This is a weakness that permeates the entire PP as no proper evaluation was undertaken concerning any of the remedial alternatives using the statutorily mandated (e)(9) criteria. Such a discussion is required by statute and of utmost importance in conveying to the community the reasons for preferring that specific alternative.

*EPA Response:*
*Based upon consideration of the requirements of CERCLA, the NCP, FDEP applicable regulations, the detailed analysis of the alternatives and public and state comments, EPA has selected a three-part remedy. Together, the selected remedy components meet the threshold criteria of protection to human health and the environment and compliance with ARARs. Further, the selected remedy satisfies the RAOs. The selected remedy will satisfy the statutory requirements of CERCLA Section 121(b) by being protective of human health and the environment; complying with ARARs; being cost-effective; utilizing permanent solutions and alternative treatment technologies to the maximum extent practicable; and meeting the preference for remedies that employ treatment that permanently and significantly reduces the M/T/V of hazardous wastes as a principal element. This action represents the final remedy selected for the Site, and, as such, is compatible with the intended future use of the Site.*

**Once again, relocation is not considered as an option in the PP**

The residential population on the west side of the Koppers site may potentially be a part of an exposure pathway. (May 2010 Feasibility Study at 1-40). As seen from the limited indoor testing done for dioxins in fine particulates, this is no longer a potential exposure pathway; ***an actual pathway exists***. Because of this, relocation must be included as an alternative. The exclusion of the relocation alternative necessarily means the ultimate decision-maker is not taking into consideration all appropriate and viable remedial alternatives. Relocation is an approved alternative under federal guidelines and policies and must be considered as a part of this clean up strategy due to the off-site impacts (*see generally* 1999 Interim Policy on the Use of Permanent Relocations as Part of Superfund Remedial Actions). Further, governing policy dictates that relocation should be considered where unreasonable use restrictions may exist during or after clean up, noting restrictions on such activities as children playing in yards. The Florida Department of Health has already recommended restrictions on children playing in easements adjacent to residential property in the Stephen Foster neighborhood and further risk assessment is ongoing. (Health Consultation, July 17, 2009, Florida DOH). Finally, failure to acknowledge the adequacy of relocation precludes perhaps the best mode of protecting human health and the environment. This option is the only option that would account for those "yet to be determined" unacceptable risks. It would eliminate limitations caused by current use of off-site areas as residential property and control future exposure associated with active clean up of the Koppers site and its continued use as an industrial facility.

Relocation is briefly mentioned in the May 2010 Feasibility Study. The Feasibility Study recognizes that in order to achieve the remedial goals, the following may be done to disrupt the potential exposure pathway: (May 2010 Feasibility Study at 3-52).

....

3. ***"Current receptors could be removed from the area and future receptors could be prevented from becoming residents of [the] area. This would achieve the goal of***

> ***disrupting the potential exposure pathway and eliminating the potential risk/hazard to public health and/or the environment.*** " (emphasis added).

This is the ***only*** mention of relocation as an option in any of the feasibility studies or in the PP. It cannot be viewed as an alternative considered by the EPA since it does not meet the evaluation requirements of 40 CFR § 300.430. By failing to develop relocation as an option, the EPA precludes further consideration of relocation as an alternative unless there is a significant change in available information for off-site characterization. 40 CFR § 300.430(f).

Relocation must be considered as an alternative for community acceptance. The EPA's evaluation cannot be considered adequate without a discussion of relocation in light of the rules and governing policy. Dioxins have been found inside homes. The rest of the off-site contamination is still to be determined. The absence of relocation as an option is illogical and exemplifies a lack of diligence on the part of the EPA.

*EPA Response:*
*It is not mandatory for EPA to consider relocation as a remedial option in the feasibility study. EPA is guided in its possible consideration of relocation as a remedy by an EPA guidance document entitled, "Interim Policy on the Use of Permanent Relocations as Part of Superfund Remedial Actions" published on June 30, 1999. A summary of that guidance related to the decision to consider permanent relocation in the feasibility study process is included below:*

> *"EPA's preference is to address the risks posed by the contamination by using well-designed methods of cleanup which allow people to remain safely in their homes and businesses. Having proven EPA's ability to successfully restore contaminated property at many Superfund sites, generally, EPA's preference is to address the risks posed by the contamination by using well-designed methods of cleanup which allow people to remain safely in their homes and businesses. This is consistent with the mandates of CERCLA identified above, and the implementing requirements of the NCP which emphasize selecting remedies that protect human health and the environment, maintain protection over time, and minimize untreated waste. Because of CERCLA's preference for cleanup, it will generally not be necessary to routinely consider permanent relocation as a potential remedy component."*

*There are four situations in which EPA may consider permanent relocations as part of the feasibility study development process. The current situation nearby the former Koppers Site meets none of the criteria listed. The four criteria are as follows:*

- *Situations where EPA has determined that structures must be destroyed because they physically block or otherwise interfere with a cleanup and methods for lifting or moving the structures safely, or conducting cleanup around the structures are not implementable from an engineering perspective.*

- *Situations where EPA has determined that structures cannot be decontaminated to levels that are protective of human health for their intended use, thus the decontamination alternative may not be implementable*
- *Permanent relocation may be considered when EPA determines that potential treatment or other response options would require the imposition of unreasonable use restrictions to maintain protectiveness (e.g., typical activities, such as children playing in their yards, would have to be prohibited or severely limited).*
- *Permanent relocation may be considered when an alternative under evaluation includes a temporary relocation expected to last longer than one year.*

*EPA and PRPs have routinely conducted cleanups in the State of Florida and throughout the U.S. that are contemplated in the preferred remedial alternative. The remedy is simple from an engineering perspective in that involves removing up to two feet of top soil from an affected property and replacing it with clean fill, reseeding the yard, and reinstalling any landscaping that had to be removed from the yard to remove the soil. It is unlikely that structures nearby the former Koppers Site are contaminated. After the soil cleanup, there are no use restrictions required for the yard as there is now clean fill in the yard which would pose no threat or require a use restriction there. It is expected that the yard cleanups would take significantly less than one year based on the number of parcels believed to be effected and the simple implementation approach needed to complete the soil remediation.*

*Residents surrounding the Site are not located on a direct source area or a highly contaminated groundwater plume. Based on concentrations of contaminants in surface soil at surrounding residences and the practical remedial alternatives that exist for preventing exposure to these soils, relocation is not warranted.*

**The plan to scrape soil from residents' yards to be stored on the site is absolutely unacceptable to the community**

As stated above, the residents of the Stephen Foster neighborhood remain adamantly opposed to the plan to scrape contaminated soil from their yards and store it on the site. The institutional controls to accompany such a remedy are also completely unacceptable. As an alternative the EPA offers up a combination of engineering and institutional controls which would effectively cap the property owner's land and then prohibit such owner from doing much of anything with that land in the future. The residents demand that a proper cleanup be initiated which would include relocation to remove citizens from their toxic community.

The removal of impacted soils from the neighborhood will result in a severe disruption of the lives and privacy of the residents of the Stephen Foster neighborhood. The May 2010 Feasibility Study dismissed this concern, calling the soil removal a "one-time event." (p. 3-53). Yet, full data collection to characterize off-site contamination has not been completed. Without that data, there is no way to predict whether this removal will be the aforesaid "one-time event" or a series of events to ensure the contamination is fully eradicated. Further, the removal of soil will destroy landscaping and damage or destroy all of the massive oaks, pines, maples, cherry, and other native trees in the area. Only the pines have a deep enough tap root to avoid damage by excavation. The majority of other trees have extremely superficial root systems which run a little more than a foot beneath the ultra sandy, nutrient-poor topsoil. A simple drive through the surrounding community reveals the natural beauty of the area, a beauty the residents highly value. Once the soil is scraped, institutional controls will be needed, although likely ineffectual, after the excavation is completed. Animals are likely to dig farther than two feet, trees planted by residents may have a root system that extends farther than two feet, and such trees may bear fruit contaminated by the unexcavated soil underneath. Even an industrious child may dig past that two foot mark. How does the EPA propose to prevent these events? Although these issues have been brought to the attention of the EPA time and time again, including in our comments to both versions of the feasibility study, they are ***still*** not being addressed in the PP.

The storing of contaminated soil onsite is completely abhorrent to the residents of the Stephen Foster neighborhood. They do not want a Mt. Dixon in their midst. Capping the soil does not make it disappear. The contamination remains on the property and will threaten the adjacent neighborhoods with recontamination in the future. In addition, it limits future options for the site and the residents are hopeful that if the site is properly cleaned it can be created into something the community can be proud of instead of a reminder of Gainesville's dirty past.

The PP does not evaluate disposing of soils off-site. They should provide cost estimates and a plan for disposing of soil off-site as one of the remedial alternatives. This discrepancy ignores a valid and effective means for cleaning up the site, as well as the neighboring community. Further, only part of the area on site is proposed to be capped. As for the rest of the area, the EPA remains vague and makes references to either providing more caps for the that area or excavating the soil. The EPA must be clear and straightforward concerning everything they plan to do onsite. If they plan to excavate, they must say so clearly and indicate which areas they intend to excavate. They must also state what they plan to do with that contaminated soil once excavation is complete. If they plan to cap or utilize other engineering controls, they similarly must say so clearly and indicate which areas on which they intend to use the controls.

Additionally, the PP does not fully consider the impacts from on-site activities that may impact the surrounding community during the implementation of the remedial alternative such as dust, noise, and other exposure mechanisms.[4] The PP explains that Beazer has "begun interim measures to reduce dust including planting of vegetation over former operation areas." (PP pg. 14). The PP goes on to state that "Beazer East is implementing dust control of continuous water application to suppress dust." The PP does not elaborate on precisely what this continuous water application entails, how often the water is being applied, whether this is a recognized and safe method of suppressing dust, when the water application is needed, or the level of protection this provides to the adjacent community.

All of the above commentary proves that the EPA's PP is not protective of human health and the environment. As this is a threshold criterion under 40 CFR § 300.430(f)(1)(i)(A), this remedial alternative should have been discarded early on by the EPA.

*EPA Response:*
*Removal of soil and providing clean cover to mitigate exposure is an effective and accepted method to reduce risk in areas with contaminated surface soils. EPA understands there will be a disruption of the local community during removal; however, unfortunately any remedy, including relocation, would also involve inconvenience to the local community.*

*It should be noted that the Koppers Site has not yet entered into the design phase. Dimensions of the remedy and post-remedial land use have not been determined. The consolidation area at the Koppers Site will be covered with a low-permeability cap/cover constructed of clean material that will be a minimum of two feet thick. This cover/cap will be gently sloped to promote storm water runoff and prevent pooling. The cap will prevent surface exposure to contaminated soil and will limit rainfall from entering the subsurface within the consolidation area. This type of cap/cover is designed to perform into perpetuity with minimal maintenance. The exact dimensions and design of the cover/cap will be determined in the design phase; however, estimates as illustrated on Figure 2 of the Onsite Preferred Remedy Fact Sheet are closer to 40 acres for the Consolidation area and are not anticipated to alter the topography as mentioned. The area covering most of the site illustrates regrade/cover areas which are not part of the impoundment cell.*

**Storm water runoff control has not been adequately explained**

To control storm water the EPA proposes the following:

> "Storm water controls will consist of: (a) grading and contouring the Site to direct runoff toward collection points; (b) installation of one or more detention/retention ponds; and (c) possible replacement of the existing Site storm water ditch with another ditch or with an engineering conveyance such as an underground concrete pipe (culvert)." (PP pg.14).

This remedy does not fully explain how it will be adequate to control storm water runoff. There is no elaboration on how the grading and contouring will direct runoff toward collection points or how the detention/retention ponds will contain the water in such a way to prevent contamination of the soil and groundwater beneath it. Without this information, there is no way for the community to analyze the alternative under the criteria in (e)(9), especially protection of human health and the environment and effectiveness in the short and long term.

*EPA Response:*
*As previously mentioned, the Koppers Site has yet to reach the design phase. The RI/FS through the ROD distills down potential remedies with no real design components other than those lessons learned from other similar sites. Details as site specific as storm water runoff are not typically evaluated to the extent anticipated in the comment. Also, future migration of contaminated soils due to*

*storm water flow is highly unlikely due to the implementation of Site surface covers and consolidation of contaminated materials beneath a low-permeability cover/cap. Storm water capture will allow potentially contaminated sediment to settle so that it will not be released to the creeks.*

**The proposed remediation of the Hogtown and Springstead Creeks is not adequate**

The PP states the following for remediation of the creeks: "Ongoing detention basin to mitigate ongoing impacts. Excavation and removal of impacted sediment in excess of the probable effects concentration (transport and consolidate on-site). Monitored natural recovery of remaining impacted sediment until concentrations reach threshold effects concentration or background levels." (PP pg. 33). What exactly the detention basis will be or how it will mitigate ongoing impacts is unclear. In addition, this remedial action is vague on exactly what standard the EPA is using to clean the creeks. In a letter from Dr. Stephen M. Roberts and Dr. Leah D. Stuchal of the University of Florida to Liga Mora-Applegate of the FDEP, the Drs. recommend Florida Residential CTLs for sediment in the creeks given the proximity of the creeks to residential yards. *Letter from Dr. Roberts and Dr. Stuchal to Ms. Mora-Applegate dated February 10, 2010 pg. 1 attached to these comments.* In addition, the Drs. also state that "[g]iven that PAHs and dioxin contamination in creeks are not consistently co-located, this remedial effort cannot be assumed to address the issue of dioxin contamination." *Id.* at 3. The community agrees with the Drs. assertions and insists that the EPA clean up the creeks to Florida Residential CTLs and address the issue of dioxin contamination.

*EPA Response:*
*EPA disagrees. The commenter states "In addition, this remedial action is vague on exactly what standard the EPA is using to clean the creeks" when in fact the criteria being proposed to address creek contamination are clearly stated as being the Probable Effects Concentrations (PEC) for sediment-bound contaminants. PEC are sediment quality guidelines that were established as concentrations of individual chemicals above which adverse effects in sediments are expected to frequently occur. Concentrations below the PEC level are not expected to frequently cause an adverse effect to the exposed sediment species. These are the proposed cleanup levels for sediment-bound contaminants in the creeks impacted by Cabot Carbon and Koppers contamination (USEPA, 2000, Prediction of sediment toxicity using consensus-based freshwater sediment quality guidelines: EPA 905/R-00/007, Great Lakes Program Office, Chicago, Illinois).*

**An adequate explanation of various former trenches as well as possible drum burials or dumping sites is not included nor is any suggested remedy for these possible contamination areas**

Aerial photos taken in 1965 and 1971 of the site reveal trenches in the woods north of the site which are no longer in existence. What happened to these trenches? What were these trenches used for? How does the EPA plan on investigating these trenches?

Anecdotal evidence points to locations of possible drum burial and other dumping sites. These would constitute additional contamination areas outside of the documented source areas. The EPA gives no indication in their investigation of the site that they have looked for the possible additional areas of concern. Scott Miller, EPA project manager stated that there will be a "work plan coming forth" to address buried drums. (August 5, 2010 EPA Meeting Official Transcript pg. 112 lines 7-9). This vague language is simply not acceptable to the community. Simple ground penetrating radar in the areas of concern would be sufficient to begin investigation of these sites. The community expects a commitment by the EPA to search for and analyze these areas and incorporate them into their PP.

40 CFR § 300.430(d)(1) states that the purpose of the remedial investigation (which supports all of the plans the EPA subsequently issues) "is to collect data necessary to adequately characterize the site for the purposes of developing and evaluating effective remedial alternatives." § 300.430(d)(2) goes to on require that the EPA "characterize the nature of and threat posed by the hazardous substances and hazardous materials and gather data necessary to assess the extent to which the release poses a threat to human health..." Without fully analyzing any possible dumping sites, drum burials, and former trenches, the EPA cannot be certain they have gathered all of the requisite data to create a full contamination characterization. Without this data, the EPA cannot assure the community their chosen remedial alternative will be effective.

*EPA Response:*
*A June 5, 2010, Site walk with members of the community was organized at the former Koppers Site to gather information. Approximately 50 members of the community showed up for this Site walk. The primary concern raised by the participants was the possibility of drums having been buried on the Site as was related to them by third parties not present who purportedly witnessed drums being buried onsite. Members of the public also raised concerns about former Koppers Sites, notably none that were wood-treaters but were chemical production facilities, where buried drums had been found. In an abundance of caution, EPA required Beazer East submitted a workplan for a further remedial investigation beyond the three previously completed at the Site. On October 13, 2010, the work plan was submitted for the remedial design phase of the project to determine if there are buried drums or other primary source areas on the Site. In addition, soil, groundwater, and sediment sampling and analyses will continue as the footprint for installation of all the remedial technologies is refined. After additional sampling and analyses occur and the remedial action is implemented, the proposed on-site actions will ensure exposure at the surface has been mitigated.*

**The PP completely ignores contamination known to exist inside residences**

Tests on fine particulates have been performed on the inside of several homes within two miles from the site. The results were shocking to the residents and their attorneys. The dioxin levels, thought to be some of the most dangerous contaminants on the planet, range from 400PPT to 1100PPT – ***over 1000 times*** higher than the levels deemed safe by the EPA for outside soil contamination. TCDD, a dioxin found inside homes, is a known carcinogen. In addition, exposure to this chemical can cause a host of other illnesses, including reproductive issues, development problems, immune system suppression, heart disease, diabetes, hormonal changes, liver damage, pancreatic abnormalities, problems with the circulatory and respiratory systems, etc. Children, who are particularly susceptible, are coming into contact with these dangerous contaminants inside their own homes and the schools they attend (twelve of which are located within two miles of the site).

According to 40 CFR § 300.430(d) the remedial investigation should perform field investigations sufficient to assess the following: physical characteristics of the site; characteristics or classification of air, surface water, and groundwater; general characteristics of the waste; extent to which the source can be adequately identified and characterized; ***actual and potential exposure pathways through environmental media***; and ***actual and potential exposure routes, such as inhalation or ingestion***. Obviously, finding fine particulates inside residences shows an actual exposure route, more specifically ***actual exposure***. The testing performed thus far was limited in scope and further testing is warranted. One of the major aims of the remedial investigation is to determine risks to ***human health***. Human health is surely affected by dioxins inhaled and ingested inside the homes of residents. It is illogical for the EPA to solely conduct soil and groundwater sampling when confirmed contamination exists within residences. This poses an ***immediate threat*** to the residents of the area. Mr. Scott Miller of the EPA has been asked directly whether or not additional testing will be done on the homes. He has refused to answer. Those residents with means, a/k/a "Koppers Refugees," have been fleeing the area, abandoning their homes, in order to escape this harmful contamination. Those without means to do so are consumed with constant worry and stress about how these deadly chemicals may be affecting their health and the health of their families. These residents are not accessing the site or purposefully exposing themselves to harmful contaminants. They are simply attempting to live their lives in what is supposed to be a safe haven: their homes.

*EPA Response:*
*The Commenter incorrectly states that there is known evidence of indoor contamination inside residents' homes nearby the former Koppers Site. This allegation is a mischaracterization of sampling data that was purportedly obtained from residents near the former Koppers Site. The attorneys representing nearby residents in what was previously a class action suit, which was subsequently not certified as a class, refused to release this data (lab reports with important items related to dioxin TEQ detections) to the Florida Department of Health (FDOH) per its request so that FDOH, EPA, and others could review the sampling and analysis approaches that were used. The Centers for Disease Control (CDC) and FDOH evaluated the EPA sampling approach utilized to generate this data and came to the conclusion that this technique overestimated dioxin TEQ concentrations by including compounds that are not part of the dioxin congener list such as bromated compounds, etc. As EPA, FDOH, and CDC were not party to or invited to participate in the sampling, EPA, FDOH, and ATSDR have no firsthand knowledge of the claimed dioxin TEQ concentrations inside of residences.*

*In an abundance of caution, EPA has convened a workgroup consisting of EPA, CDC, FDOH, and FDEP members to determine what, if any, indoor air quality* *sampling will be conducted nearby the former Koppers facility. Once this workgroup has determined definitively that indoor dust sampling will occur and under what circumstances, EPA will either conduct or require the responsible party to conduct indoor dust sampling. It is noteworthy that EPA is not aware of other instances at former wood-treatment sites where indoor dust has posed an unacceptable health risk to residents.*

*FDEP has confirmed that its risk-based corrective action soil cleanup target level (SCTL) standards found at 62-780 do not apply to indoor dust. Therefore, EPA will utilize its risk criteria in determining if an unacceptable risk to health is present. It is important to note that dioxin TEQ has multiple potential sources in the context of household dust. Prior to requiring the responsible party to remediate indoor living environments, it would be necessary to determine with reasonable certainty that the contamination is associated with the former Koppers Site.*

*ATSDR and the FDOH have been coordinating efforts to address the offsite contamination concerns. In a letter from Dr. Thomas Friedman, the director of the CDC, Dr. Friedman provided the following excerpted information to Ms. Cynthia Moore Chestnut, Chair Alachua County Board of County Commissioners:*

> *"The Agency for Toxic Substances and Disease Registry (ATSDR) has been actively supporting the Florida Department of Health (FDoH) in evaluating potential community exposures to contaminants at this site. This partnership is part of ATSDR's long-standing cooperative agreement program with the FDOH.*
>
> *At this time, a "door-to-door" health study based on possible dioxin exposures is not recommended. The potentially exposed population near this site is relatively small. Adverse outcomes associated with dioxin exposures have not been reported in populations exposed to dioxin at the levels seen to date in the community surrounding Cabot-Kopper's property. The health problems of the people living in this community are likely to reflect common health problems seen in any similar group of individuals who do not live adjacent to the Cabot-Koppers site. Given these facts, it would not be possible to differentiate the health problems within this group that are the result of their exposures to dioxin.*
>
> *We fully agree with FDOH's plan to evaluate and make recommendations to mitigate any current exposures to protect public health and to also take a broad look at cancer statistics within this community. We will continue to work with our FDOH partners in identifying and reducing Alachua community exposures to environmental contaminants on and near the*

*Cabot-Koppers site and are open to reassessing the need for additional work should further information indicate that it is warranted."*

**It is not clear that the EPA is going to follow mandated Florida CTLs**

In the second to last Remedial Action Objective (RAO), the EPA states that they plan to "restore quality of groundwater outside of source areas to beneficial use having COC concentrations no greater than Federal MCLs ***or*** Florida GCTLs." (PP p. 12). The EPA is required to clean up the site according to ***Florida*** GCTLs which are much more protective than Federal MCLs.

In addition, the EPA states that they will clean up the site according to commercial/industrial CTLs. Which will it be? In a recent EPA meeting, Scott Miller, project manager for the site, stated that the future land use at the site may possibly be a mixed use with a residential component. (August 5, 2010 EPA Meeting Official Transcript pg. 10 lines 19-21). Later he states "...there are many sites that have been cleaned up to commercial/industrial standards, where there's been exposure barriers deployed at the site, and there's now residential use ... People live there. Townhomes. That would also be appropriate for this site." (Transcript pg. 38 line 25 – pg. 39 lines 1-6). We assume he deems commercial CTLs appropriate for the site since Florida land use codes typically group mixed use and multi-family housing under its commercial sections. It is ludicrous to think it is appropriate to have commercial CTLs (even more outrageous to consider industrial CTLs) on land that will be supporting residences simply because the Florida zoning code considers mixed use and multi-family housing commercial. CTL levels are based on frequency of exposure. If an individual lives on a site in a townhome, he will be frequenting the site as often as someone that lived on the site in a single family home. His cancer risk will increase in the same fashion as a resident of a single family home. In addition, the Gainesville City Commission passed a resolution in 2008 which stated the site should be cleaned up to Florida Residential CTLs. This resolution was completely disregarded by the EPA.

The Table 1 in the PP states the clean up goals for COCs. (PP pg. 13). Under the groundwater table, benzene is listed twice, once using the Florida CTL (1 ug/L) and again using the Federal MCL (5 ug/L). It is not clear which one the EPA will be using on this site. The EPA must use the most protective clean up level, which is the Florida level of 1 ug/L. This should be corrected in the PP so that the correct clean up level is clearly stated.

Further, the EPA appears to criticize the Florida CTLs for dioxins and furans stating "[a]t present there is significant ongoing debate between and among researchers, different regulatory agencies, and the regulated community regarding the toxicity of dioxins/furans and whether meaningful human-health risks are posed by low concentrations of these contaminants..." (PP pg. 13). They go on to mention that Florida's default SCTL is "at the low end of the range." While the final sentence indicates the EPA intends to use Florida's CTLs, the entire diatribe is troublesome and leads the reader to believe that if the EPA can find a way around it, they will attempt to use a level higher than the mandated Florida level. The EPA is cleaning up a site in Florida and is required to use Florida CTLs.

The community insists that residential CTLs be used if any sort of residential housing is contemplated in the future for the site. These discrepancies should be fixed to make it clear that the EPA will use the applicable Florida CTLs.

*EPA Response:*
*Cleanup goals for groundwater are the more stringent of the Florida groundwater cleanup target levels (GCTLs) or the Florida maximum contaminant levels (MCL) as measured at property boundaries or the limit of institutional controls. Federal maximum contaminant levels (MCL) are applied outside of the waste containment area in all aquifers. The compliance point in this case is outside of the vertical barrier wall that is anticipated to be constructed. The selected goals are the MCLs for Drinking Water in Florida contained in Chapter 62-550, Florida Administrative Code (F.A.C.) and GCTLs contained in Chapter 62-777, F.A.C.*

*Cleanup goals for on-Site soil (0 to 2 feet bls)/sediment COCs are the Florida default SCTLs for leachability based on groundwater criteria unless Site-specific criteria are developed in the RD.*

*Cleanup goals for off-Site soil/sediment COCs are Florida default SCTLs contained in Chapter 62-777, F.A.C.; however, the goals are based on the current land use (residential or commercial/ industrial) of the impacted parcel.*

*Florida default leachability SCTLs for protection of ecological organisms in surface water are used for sediment in Springstead and Hogtown Creeks. Note that there are there are no anticipated exceedances of leachability standards based on current contaminant concentrations and types of contaminants encountered in offSite soils and sediments.*

**Conclusion**

After ***twenty-seven years*** in the making, the PP fails to follow the mandates of 40 CFR § 300.430 in numerous ways. The PP relies on incomplete data, the remedies selected fail to take into account effects to the residents of the Stephen Foster neighborhood, the remedies are not appropriately analyzed under the nine criteria, and a discussion of the most beneficial option, relocation, is not included in the PP. The community has serious concerns about many of the proposed remedial actions including storing contaminated soil on-site, clean up of the local creeks, and storm water runoff. The community wants a work plan ***now*** that addresses what the EPA will do to investigate possible drum burials, storage sites, and locations of former trenches. The EPA must make it clear in the PP that they intend to use the most stringent clean up target goals, which are Florida's CTLs. Most importantly, the EPA is ignoring data confirming actual contamination inside of residences. All of the EPA reports to date are silent on what the EPA intends to do to remedy this deadly contamination. All of these issues should be addressed ***before*** a final remedial option is selected so that all potential hazards and concerns of the Stephen Foster neighborhood can be given appropriate weight in the selection process.

SFNPG would like to point out that many minority and people of lower socio-economic status reside in the area surrounding the site. In light of the EPA's mandate for environmental justice, the community hopes the EPA would be more sensitive about their approach to community involvement. In a recent July 22, 2010 memorandum from the EPA, the EPA states that ***achieving environmental justice is an agency priority and should be***

***factored into every decision.***[5] The memorandum defines environmental justice as the "fair treatment and meaningful involvement" of all people regardless of race, national origin, or income in the formulation of rules and the implementation of cleanup processes. This cleanup process has taken ***in excess of twenty-seven years***. In response to learning of this fact during an investigation by CNN into the Gainesville Superfund site, Mathy Stanislaus, EPA's new Superfund Program Director, admitted that ***"community residents should be angry for how long this is going on and how long they have waited for their cleanup."*** That is unfair treatment. As stated before, the community was not consulted while the EPA performed their investigations and research. That shows a complete lack of involvement, much less meaningful involvement. The EPA is not only failing to follow its own directive on environmental justice, it is acting in a way that completely contravenes the spirit of the mandate.

Once again, SFNPG would like to remind the EPA that neighboring residents had no part in contributing to, endorsing, or encouraging the hazardous pollution that now lies within their yards and inside their homes adjacent to the site. The EPA has failed time and again to recognize the degree to which the residents have been impacted by this contamination. SFNPG implores the EPA to take the concerns of the community seriously and factor them into their remedial alternative selection. SFNPG expects the EPA to use its full authority under the law to protect the health and environment of the citizens most impacted by this ongoing tragedy.

Please feel free to contact me directly with any questions or concerns you may have. Please direct all correspondence regarding these comments to the undersigned counsel.

Sincerely,
Sarah Schwemin
Attorney for the Stephen Foster Neighborhood
Protection Group

### A.2.10 Strategic Environmental Analysis Inc

September 24, 2010
Scott Miller
Site Manager
Cabot / Koppers Superfund Site
Region 4, Environmental Protection Agency
Atlanta Federal Center
81 Forsyth Street
Atlanta, GA 30303-8960

RE: Data Requests

The underlying assumption for many of the Superfund Guidance documents is that a Remedial Investigation and Feasibility Study (RI/FS) report will be prepared that integrates and interprets the data gathered during the investigations and studies so that previous draft preliminary information would not be needed. The Koppers studies that are being cited as supporting the proposed remedy are more complex, and are lacking in a final comprehensive summary of the:

- Nature and extent of contamination (soil, groundwater and DNAPL).
- Fate and Transport (leachability and groundwater evaluation are not finalized)
- Chemicals of Concern / Cleanup Criteria
    - No clear basis for selection of the COCs in the proposed plan
    - No maps of the distribution/concentrations of many of the COCs
- Whether/where selected criteria could be met based on existing data

These factors contribute to the lack of transparency in understanding the site conditions and implications of the proposed remedy. We consider this a serious flaw in the FS and fail to understand how EPA and FDEP and can support decisions based on the information in that document, and not require the responsible party to provide the information in a format that meets typical standards of practice.

*EPA Response:*
*EPA does not concur with the Commenter's concern related to the adequacy of the RI/FS. The PRP has prepared three remedial investigations and feasibility studies over a several year time period. In addition, the PRP routinely monitors groundwater in all aquifers at the Site. These documents are part of the Site file and are available on request.*

We are interested in expediting the overall process, and would prefer to avoid lengthy revisions to the FS. To that end, we request critical information summaries and data so that the community's questions can be answered. This will also provide current and future reviewers of the Site information with a synthesis of information better documenting the basis for decisions. For the EPA meeting proposed for October 6, we request the following information/maps be provided and that EPA be prepared address questions on these issues:

- A comprehensive overview of groundwater issues that integrates results of the various reports. This is necessary to understand the implications of the proposed source and soil remedy. The groundwater information is scattered in many documents generated over the past 20 years. Rather than a lengthy analysis, we request at a minimum the following information be provided:
    - o How the proposed plan groundwater chemicals of concern were identified (screening tables? Data compilation?)
    - o Maps showing of the nature and extent of groundwater contamination
    - o Compilation of well locations and boring logs
    - o Geologic profiles

• The source area DNAPL delineation investigation (GeoTrans, 2004) was not included in the AR, and the community has raised many questions on this issue that are not detailed in the FS or proposed plan. Therefore, this is an additional topic to be expanded upon in the informational meeting. This should include maps and waste characterization information.

• Maps should be prepared that show where soil criteria (residential/commercial direct contact and leachability) are exceeded in both surface and subsurface soil.

Many questions have been raised by the community that are not in the supporting documents but could be quickly addressed with access to the data. Providing an electronic version (Access or Excel) of the soil and groundwater data that are considered relevant for interpretation of spatial and/or temporal trends would provide the information necessary without multiple iterations of supplemental data analysis reports to address these questions. We request that the database include the following:
• Analytical results used for on-site and off-site soil characterization
• Sample coordinates, depths and sample dates
• Locations of current and abandoned wells
• Groundwater analytical results for the several years. This is flexible because of differences in well installation/abandonment, etc.

These electronic data were requested previously (April 29, 2010 letter from PGC and the proposed plan meeting, and the FOIA request from Cheryl Krauth dated August 1, 2010). A database would have been necessary to prepare maps and statistical analyses presented in reports, so we feel it would be readily available. Again, these data will allow us to more quickly focus and prioritize, particularly where the existing data summaries/evaluation has not been provided and we can quickly verify the findings and data interpretation.

*EPA Response:*

*In a response to a request from you dated August 18, 2010, EPA has decided not to include the requested documents in the AR. Each of the documents he cited are, and will remain, a part of the Site file, where they are available to the public via FOIA.*

This focused synthesis of information can help expedite the decision process without prolonged challenges as to the adequacy of the underlying documents. Please contact me if you have questions regarding this request.

Sincerely,
Dr. Patricia V. Cline
Principal

September 22, 2010
Scott Miller
Site Manager
Cabot / Koppers Superfund Site
Region 4, Environmental Protection Agency
Atlanta Federal Center
81 Forsyth Street
Atlanta, GA 30303-8960

RE: Risk Assessment Comment

The Administrative Record (AR) contains a letter you sent to Dr. Paul Anderson on June 18, 2010, with your comments on what portions of the May 26, 2010 Human Health Risk Assessment are approved or not approved. A copy of this letter is attached.

It appears the use of the probabilistic model is being rejected. However, can you clarify what exactly is referred to by wording like "some text", "some portions", and "several subsections"? The proposed plan states remedial goals for soil will be the default Florida soil cleanup target levels (SCTLs), although the exact application of these is not clearly stated. Since the plan was developed after this letter, does this mean that the entire risk assessment is no longer approved? If so, why is this included in the AR? If you are going on record as approving portions of this assessment, can you explicitly state what this includes? Specifically:

- Calculation of site-wide average concentrations using Thiessen Polygons as inferred in figures from Section 3?
- Use of relative absorption factors (Appendix C and G)?

We disagree with approval of these sections. In addition, there are numerous technical errors in this risk assessment (for example, not calculating the non-cancer hazard associated with dioxins). Therefore, including the attached letter and the risk assessment in the AR is misleading as to the reliability of this analysis, and the implications of this approval are not transparent. As a side note, the May 26, 2010, risk assessment is not in the AR, but rather the earlier May 10, 2010, draft.

*EPA Response:*
*EPA has not approved the risk assessments provided by the PRP to date. It intends to proceed with use of State Cleanup Target Levels as the basis for remedial action. The use of generic risk goals (e.g., cancer risk goal of within the 10-4 to 10-6 incremental cancer incidence; the non-cancer risk goal of a hazard quotient of less than 1] will be applied as necessary, as well.*

Sincerely,
Dr. Patricia V. Cline
Principal

**A.2.11 University of Florida**

October 14, 2010

Ligia Mora-Applegate
Bureau of Waste Cleanup
Florida Department of Environmental Protection
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Re: Koppers Proposed Plan

Dear Ms. Mora-Applegate:

At your request we have reviewed the *U. S. Environmental Protection Agency, Superfund Proposed Plan, Cabot Carbon/Koppers Superfund Site, Gainesville, Alachua County, Florida.* This document was prepared by the US EPA and is dated July 2010.

The plan summarizes remedial action objectives and cleanup levels for groundwater, onsite soil, and off-site soil. It reviews remedial alternatives and proposes surface grading and covering for most of the site with containment and treatment of impacted groundwater. Our review focuses on the proposed cleanup levels. **We have the following comments on the document:**

1. Off-site soil remediation goals were selected based on current land use. However, future land use may not be identical to current use. Therefore, off-site cleanup levels should be based on unrestricted land use regardless of the current use unless individual property owners implement institutional controls preventing future residential use.

*EPA Response:*
*EPA disagrees. Cleanup goals are Florida default SCTLs contained in Chapter 62-777, F.A.C.; however, the goals are based on the current land use (residential or commercial/ industrial) of the impacted parcel.*

2. It is unclear why two groundwater cleanup levels are listed for benzene in Table 1. The correct cleanup level should be 1 μg/L benzene based on the promulgated FDEP GCTLc (Chapter 62-777, F.A.C.).

*EPA Response:*
*We agree that the cleanup level will be 1 ug/L for benzene. This will be reflected in the ROD.*

3. Remediation goals for the protection of ecological receptors are not included in the document. The Alachua County Environmental Protection Department assessed chemical concentrations in submerged and dry sediment along Springstead and Hogtown Creeks. The study showed concentrations of dioxin and BaP-TEQs in excess of both human health and ecological criteria. The ecological screening levels applicable to this site are 2.5 ng/kg dioxin and 1.1 mg/kg BaP-TEQs for the protection of piscivorous mammals. The presence of these Chemicals of Potential Ecological Concern above screening levels indicates that further assessment of ecological risk is needed. In Springstead and Hogtown Creek sediment where both human health and ecological criteria apply, cleanup should be based on the lower of goals developed for protection from human health and ecological effects.

*EPA Response:*
*The selected remedy address citizen concerns with the creeks in two distinct ways. First, to address previous contamination of the sediments in each creek, sediments that have contaminant concentrations associated with either former Cabot Carbon or Koppers that exceed the threshold effects concentrations (i.e. contaminant concentrations in excess of levels that would adversely effect animal life) are required to be excavated and replaced with clean fill material. Assessment of creek sediments is ongoing. To address possible future impacts on sediments, the former Koppers facility is required to construct and operate a detention/retention pond(s) to capture storm water from the former Koppers Site prior to allowing it to be discharged to the tributary to Springstead Creek. The detention/retention pond(s) will be designed, including placement, during the remedial design of the on-site remedy.*

4. The groundwater CTL for acenaphthene of 210 μg/L is incorrect. It should be 20 μg/L.
*EPA Response:*
*We agree that the cleanup level will be 20 ug/L for acenaphthene. This will be reflected in the ROD.*

5. The groundwater CTL for bis(2-ethylhexyl)phthalate is missing. The correct value is 6 μg/L.
*EPA Response:*
*We agree that the cleanup level will be 6 ug/L for bis(2-ethylhexyl)phthalate. This will be reflected in the ROD.*

6. The groundwater CTL for 3-/4-methylphenol of 7 μg/L is incorrect. When two chemicals are combined into a single detection group the toxicity values can not be apportioned. Because they are grouped together, it is unclear how much of the detected concentration is due to each individual chemical. Therefore, a conservative approach

should be taken and the chemicals should be screened at the lower of the two criteria. In this case, the CTL is 3.5 µg/L.

*EPA Response:*
*We agree that the cleanup level will be 3.5 ug/L for 3-/4-methylphenol. This will be reflected in the ROD.*

7. As stated above, the industrial soil CTL for 3-/4-methylphenol should be the lower of the two criteria. The applicable industrial SCTL is 3,400 mg/kg. Additionally, the leachability SCTL for 4-methylphenol (0.03 mg/kg) is the lowest applicable criterion and should be met throughout the vadose zone.

*EPA Response:*
*We agree that the cleanup level will be 0.03 mg/kg for 3-/4-methylphenol. This will be reflected in the ROD.*

8. The proposed plan assumes that future land use will be restricted to commercial/industrial purposes, yet in on-site soil clean-up goals, the residential SCTLs are listed for antimony, arsenic, acenaphthene and benzene.

*EPA Response:*
*Commercial/Industrial numbers should have been used. This will be reflected in the ROD.*

9. Page 3 states that the drainage ditch on the Koppers site discharges into Hogtown Creek, which flows into Springstead Creek. The opposite is true. Koppers' drainage ditch discharges into Springstead Creek, which flows into Hogtown creek.

*EPA Response:*
*This will be verified and corrected as appropriate in the ROD.*

10. The document does not indicate which areas will be covered by the proposed remedy. No maps for are included detailing the areas affected by the proposed plan. Therefore, it is not clear if all areas of concern will be addressed. Specifically, we are concerned with recently detected areas of high dioxin concentrations in the Northern Inactive Area. These areas were not fully investigated and anecdotal evidence indicates that they may represent a former waste pit. Any remedies should address this area and possible further migration of contamination off-site to the Northeast.

*EPA Response:*
*Follow up Proposed Plan fact sheets included maps showing areas covered by the proposed remedy. It is acknowledged that offsite areas show little detail and will be modified as more information becomes available.*

11. The correct chemicals of concern and remedial goal options for this site are listed in the following tables: [See master copy for these tables]

*EPA Response:*
*Tables 6, 7, and 8 in the ROD will have a complete listing of the correct COCs and remedial goals.*

Please let us know if you have any questions regarding this review.

Sincerely,
Leah D. Stuchal, Ph.D.
Stephen M. Roberts, Ph.D.

## A.3 Summary of Public Comments Received at the Proposed Plan Public Meeting and via Email and EPA Responses

Several common themes were apparent from the comments heard at the meetings and expressed in writing by individual community members. Excerpts from some of the oral and written comments are presented below. The comments are shown in no particular order.

1. The FS did not include a table summarizing the cleanup goals as is required. The Feasibility Study (FS) should include a side-by-side comparison of residential and commercial/industrial cleanup standards.

   *EPA Response:*

   *The May 10, 2010 Koppers Feasibility Study includes cleanup goals for the Koppers Site in Table 2-4 and in Chapter 2.1.1 (Table 2.1.1), 2.1.2 (Table 2.1.2), and 2.1.3 (Table 2.1.3). The FS is designed to evaluate a subset of likely response scenarios and potentially applicable technologies and operable units that may address site problems (40 CFR 300.430(b)(3)). It is unclear how a side-by-side comparison of residential and commercial/industrial cleanup standards and their impact on soil volume treated assists the Agency in creating likely response scenarios at the Site. Rather, it appears that the Commenter desires additional information unrelated to the central task of the FS. Therefore, there will be no amendment to the FS to undertake such an effort.*

2. How will EPA demonstrate that the chosen cleanup levels will be met?

   *EPA Response:*

   *In the instance of determining that soil/sediment cleanup standards are met, EPA will require post-remedy construction soil sampling to verify that the soil/sediment cleanup standards are met. EPA currently requires continuous monitoring of groundwater contaminant concentrations in the aquifers. EPA will have the responsible party monitor the groundwater and surface water at points of compliance in the monitoring network. Once the groundwater sampling and analysis demonstrate that the cleanup goals have been met, ongoing monitoring is required to ensure that cleanup goals continue to be met. Every five years, there is a requirement for EPA to conduct a Five-Year review to evaluate and ensure that the remedy remains protective.*

3. It is not clear whether or not all of the soils in the Surficial Aquifer will meet Site ARARs throughout the Site. Are there engineering calculations of soils not meeting the ARARs?

   Did not see soil volume and remedial cost calculations in the FS.

   *EPA Response:*

   *All soils in the top two feet are required to meet the State of Florida risk-based corrective action default commercial/industrial standards. In addition, all soils are required to meet the default leachability criteria in soil standard. There are engineering calculations of soils affected by DNAPL by area, aquifer and* *volume included in Table 1 of the May 2010, Koppers Site Feasibility Study. Cost estimate calculations for remedial options considered in the Feasibility Study are included in Appendix B.*

4. Are the soil leachability criteria applied as separate cleanup standards if it results in the lowest soil allowable contaminant concentration limit?

   *EPA Response:*

   *Yes, the soil leachability criteria are applied as a separate set of standards that must be met in addition to the direct contact soil standards.*

5. What is the difference in the treatment for soils in the blue versus the green area of the FS charts?

   *EPA Response:*

   *Both sets of soils (blue and green) are required by EPA's preferred alternative to be remediated to meet the State of Florida risk-based corrective action default commercial/industrial cleanup standards in the top two feet of soil. For the soils in green, the technique used to complete this effort would be to remove soils that exceed leachability standards and place in an onsite soil containment area that has a low-permeability engineered cap along with clean soil cover to prevent infiltration. These soils along with the already existing soils in the onsite containment area will also be chemically or physically treated prior to placement below the low-permeability engineered cap. There are multiple approaches that address contamination in the green area for soils that do not exceed leachability criteria related to the protection of groundwater. One approach is for the responsible party to place two feet of clean fill over the existing soil. There are other approaches as well so that the soil cleanup standards are met.*

6. The clays on the accompanying Proposed Plan document figures indicate that they are continuous, we do not believe that these clays are continuous.

   *EPA Response:*

   *Clay thicknesses vary based on where they are located vertically and in what aquifer unit in which they appear. EPA's preferred remedial alternative assumes that clay thicknesses do vary and that they are not continuous. The figure depiction is simply meant as a convenient approach to put a cross-sectional diagram in place to explain remedial alternatives considered in the proposed plan.*

7. How much money does Beazer have to implement a cleanup at this Site?

   *EPA Response:*

   *EPA is not privy to the amount of money that Beazer East has planned to spend on the former Koppers Site remediation. EPA requires as part of the consent decree with Beazer East that it provide financial assurance each year demonstrating that it has the resources necessary to carry out its remedial responsibilities at the former Koppers Site.*

8. The proposed vertical barrier wall is keyed to the middle Hawthorn Clay layer, there is concern that this layer will not sufficiently create a bottom to stop contamination from being carried down. How does the proposed plan account for this? How will

EPA monitor barrier wall effectiveness and what trigger would make the EPA require additional actions?

*EPA Response:*

*EPA takes into account the Site-specific geologic concerns related to discontinuous clays in its preferred remedial alternative by requiring a barrier wall to be keyed into the middle Hawthorn clay where we know that there is reasonable clay thickness of two to ten feet. In addition, EPA is requiring the responsible party to treat chemically (through in-situ geochemical stabilization) and physically (through in-situ solidification/stabilization) as well as requiring a low-permeability engineered cap over the entirety of the four principal source areas to prevent infiltration of rain water into the vertical barrier wall containment area. Should contamination appear at Floridan monitoring well locations that exceeds the groundwater cleanup target levels (GCTLs) or the maximum contaminant levels (MCL), EPA may require the responsible party to install and operate additional dedicated groundwater recovery wells which would be used to extract and remediate groundwater.*

9. How much of the Floridan aquifer is being monitored?

   *EPA Response:*

   *There are currently 39 groundwater monitoring wells installed and operational on all portions of the Site with a handful constructed between the Site and the Gainesville Regional Utility Murphee Wellfield to ensure that contamination does not leave the Site in the Upper Floridan Aquifer. There are approximately 89 monitoring points.*

10. EPA originally had a list of 33 chemicals of concern that were being monitored at the Site and now we understand that there are only 5, is EPA still looking to see if the other 28 chemicals are present?

    *EPA Response:*

    *There are well in excess of 33 COCs being monitored for Site groundwater, surface water, sediments, and soils. EPA is unaware of where the Commenter received information that EPA was currently monitoring only 5 contaminants on the Site.*

11. What are the criteria used to determine what soils are removed from outside of the soil consolidation area and placed inside the onsite soil consolidation area?

    *EPA Response:*

    *EPA's position on cleanup goals is summarized below:*

    - *On-Site soil/sediment COCs: Florida default SCTLs contained in Chapter 62-777, F.A.C. for commercial/industrial land use.*

    - *Off-Site soil/sediment COCs: Florida default SCTLs contained in Chapter 62-777, F.A.C.; however, the goals are based on the current land use (residential or commercial/ industrial) of the impacted off-Site parcel.*

- *Sediment in the creeks: Florida default leachability SCTL for pentachlorophenol for protection of ecological organisms in surface water.*

12. Soil sampling in the offsite areas included from zero to six inches below ground surface, what about the soil below that level?

    *EPA Response:*

    *The answer goes to the means by which the contaminants migrated from the source. For off-Site areas, our assumption is that contaminants were transported by air and were deposited on the surface in relatively low concentrations. The contaminants associated with wood treating sites are very insoluble and for this reason typically bind to the upper few inches of soil rather than being washed into lower zones. For this reason, our investigations focus on the upper few inches of soil.*

13. There has been no proper health or epidemiological study done at the Site since it became a Superfund Site.

    *EPA Response:*

    *The comment is not accurate. EPA has repeatedly relied upon the public health expertise of the federal Agency for Toxic Substances and Disease Registry (ATSDR) in Atlanta, Georgia along with its State partner the State of Florida Department of Health (DOH) to assess health impacts at the Koppers Site. In 1989, the Florida DOH, through a cooperative agreement with the ATSDR, reviewed the environmental data, found the Koppers site a potential health risk, recommended warning signs, and recommended additional environmental testing (ATSDR 1989).*

    *In 1993, the Florida DOH found most of its 1989 recommendations had been followed but recommended a more complete public health assessment and again recommended warning signs (ATSDR 1993). In 1995, the Florida DOH reviewed new environmental data and recommended restricted site access, additional environmental testing, and warning signs (ATSDR 1995).*

    *The Florida DOH reviewed February 2009 soil test results from the Stephen Foster neighborhood west of the Koppers site. In a July 2009 report on the February 2009 soil testing, the Florida DOH found dioxin contamination in the 30-foot wide City of Gainesville easement between NW 26th and NW 30th Avenues just west of Koppers could possibly harm children's health. The Florida DOH recommended parents keep children from playing in this easement. The Florida DOH also recommended more soil testing in the Stephen Foster neighborhood (ATSDR 2009).*

    *In the summer of 2009, the responsible party erected a temporary fence restricting access to the City easement to prevent children from playing in this area. The responsible party has not, however, cleaned up the soil in this easement.*

*In June and December 2009, consultants for the responsible party tested more surface soil samples along the roads in the Stephen Foster neighborhood. In June 2010, the Florida DOH reported on the findings of the soil sampling conducted in 2009 (ATSDR 2010). The Florida DOH concluded that incidental ingestion (swallowing) of very small amounts of dioxin-contaminated surface soil tested along Stephen Foster roadsides in June and December 2009 is not expected to harm people's health. However, they also concluded that surface soil testing has been inadequate to determine the full extent of contamination from the Koppers site (ATSDR 2010).*

*Further, in a letter from Dr. Thomas Friedman, the director of the CDC, Dr. Friedman provided the following excerpted information to Ms. Cynthia Moore Chestnut, Chair Alachua County Board of County Commissioners:*

> *"The Agency for Toxic Substances and Disease Registry (ATSDR) has been actively supporting the Florida Department of Health (FDoH) in evaluating potential community exposures to contaminants at this site. This partnership is part of ATSDR's long-standing cooperative agreement program with the FDOH.*
>
> *At this time, a "door-to-door" health study based on possible dioxin exposures is not recommended. The potentially exposed population near this site is relatively small. Adverse outcomes associated with dioxin exposures have not been reported in populations exposed to dioxin at the levels seen to date in the community surrounding Cabot-Kopper's property. The health problems of the people living in this community are likely to reflect common health problems seen in any similar group of individuals who do not live adjacent to the Cabot-Koppers site. Given these facts, it would not be possible to differentiate the health problems within this group that are the result of their exposures to dioxin.*
>
> *We fully agree with FDOH's plan to evaluate and make recommendations to mitigate any current exposures to protect public health and to also take a broad look at cancer statistics within this community. We will continue to work with our FDOH partners in identifying and reducing Alachua community exposures to environmental contaminants on and near the Cabot-Koppers site and are open to reassessing the need for additional work should further information indicate that it is warranted."*

*ATSDR 1989. Agency for Toxic Substances and Disease Registry. Health Assessment for Cabot Carbon/Koppers Site. U.S. Department of Health and Human Services. Atlanta, GA. April 24, 1989.*

*ATSDR 1993. Agency for Toxic Substances and Disease Registry. Site Review and Update for Cabot Carbon/Koppers Site. U.S. Department of Health and Human Services. Atlanta, GA. September 24, 1993.*

*ATSDR 1995. Agency for Toxic Substances and Disease Registry. Health Consultation for Cabot Carbon/Koppers Superfund Site. U.S. Department of Health and Human Services. Atlanta, GA. November 15, 1995.*

*ATSDR 2009. Agency for Toxic Substances and Disease Registry. Health Consultation Off-Site Surface Soil, Koppers Hazardous Waste Site. Gainesville, Alachua County, Florida. U.S. Department of Health and Human Services. Atlanta, GA. July 17, 2009.*

*ATSDR 2010. Agency for Toxic Substances and Disease Registry. Health Consultation Off-Site Surface Soil, Koppers Hazardous Waste Site. Gainesville, Alachua County, Florida. U.S. Department of Health and Human Services. Atlanta, GA. June 17, 2010.*

14. There should be an update to the FS to look at how much soil would need to be removed to get from the commercial/residential soil cleanup standards to residential standards on the Site and provide a cost to do so. There is a belief that in areas of the Site, simple removal of the top two feet of soil would allow the Site to attain residential soil standards.

    *EPA Response:*
    *There is no portion of the Site that would attain cleanup goals for all Site chemicals of concern (COC) by removing the top two feet of soil from a location. There is a small area on the northern and western side of the Site that would attain cleanup goals for dioxin TEQ by the simple removal of the top two feet of soils.*
15. When may we expect a cleanup to be finalized for the former Koppers Site?

    *EPA Response:*
    *EPA is finalizing the record of decision (ROD) today. EPA expects that the remedial design will take approximately one year to eighteen months. EPA believes that it will take approximately two years after remedial design completion to complete the entire on- and off-Site cleanup of groundwater, surface water, sediments, and soils.*
16. What are the plans to protect citizens during cleanup of the offsite soil areas where there is contamination present?

    *EPA Response:*
    *Beazer East has indicated that it will offer residents the option of temporary relocation while soil removal and clean fill replacement are taking place in the residential neighborhoods. In addition, there will be ongoing ambient air monitoring taking place during remediation to ensure that there are no unacceptable soil/dust exposures taking place.*

17. Previously, there were signs by the creeks warning of excessive phenol levels, what has happened to those signs and should they not be reposted?

    *EPA Response:*

    *FDEP and Alachua County have reposted these warning signs.*

18. Are you going to test the water or soil to the south of the former Koppers property?

    *EPA Response:*

    *Yes, there has been one round of sampling of soil south of the Site that took place in September 2010. We expect additional soil sampling to take place to the south of the Site in the March 2011 timeframe.*

19. Why do you emphasize the soil cleanup standards meeting required standards in the top two feet in the proposed plan?

    *EPA Response:*

    *The State of Florida default soil cleanup target levels (SCTLs) require that standards be met in the top two feet of soil.*

20. What do the stabilization compounds contain that were mentioned in the proposed plan and are there dangers associated with these compounds?

    *EPA Response: In Situ Geochemical Stabilization (ISGS) entails the use of modified permanganate solutions. Permanganate is an inorganic chemical compound and is a strong oxidizing agent. As a strong oxidizing agent, care must be exercised when handling it. Skin irritation is a possible consequence of exposure. In Situ Solidification/Stabilization (ISS/S) entails the use of Portland cement. Portland cement can be a skin irritant as well. Extreme care will be taken when implementing these and all parts of the remedy. The public will not be at risk.*

21. There were previous problems at the existing Winn-Dixie store with the buckling of floor tile which it was believed were caused by polyaromatic hydrocarbons. Winn-Dixie and the authorities simply made them fix the tiles and there was no further follow-up.

    *EPA Response:*

    *Prior to the 1990 Record of Decision being finalized, there were concerns raised by the public about floor tiles in the Winn-Dixie store having been adversely effected by Cabot-related contaminants that made these floor tiles no longer adhere to the floor. Winn-Dixie and Florida Department of Environmental Protection personnel began an investigation of the this problem and concluded that the failure of the floor tiles to remain adhered to the Winn-Dixie floor was unrelated to Cabot Site contamination. Since that time, EPA is not aware of additional floor tile adhesion problems at the Winn-Dixie. The Cabot Corporation monitors its Site wells on at least a semiannual basis. In addition, Cabot Corporation is installing Upper Hawthorn wells nearby the Winn-Dixie to continue to sample groundwater that may have contaminants that are associated with the Site. The fact that EPA has received no further complaints would suggest that this problem no longer exists. The Superfund law requires EPA to evaluate remedy effectiveness at*

*Superfund sites on a once/five-year basis to ensure that remedial actions remain effective. Should Winn-Dixie has further issues related to the adhesion of floor tiles at its store, EPA may require additional remedial investigation and remedial actions if the situation warrants it.*

22. Why does it matter if offsite soil/sediment contamination is attributable to Koppers or Cabot?

    *EPA Response:*

    *From the citizen's perspective, the Commenter correctly points out that it is unimportant. From EPA's perspective, it is required by law to determine which entity is responsible for specific contaminants present in the environment and require that entity to clean up those contaminants for which it is responsible.*

23. What institutional controls will be required across the Site and what restrictions would have to be overcome to develop outside of the four principal source areas?

    *EPA Response:*

    *Institutional controls that would be required at the Site would include a prohibition on use of the groundwater from the Site, redevelopment to take place in conformance with a Site soil management plan, and a prohibition on unrestricted use.*

24. Who is liable if the institutional controls are violated after redevelopment occurs?

    *EPA Response:*

    *Typically, the party violating the institutional control is liable for violations of institutional controls.*

25. In which court will the consent decree between Beazer East and EPA be signed? How will the community be notified?

    *EPA Response:*

    *The Federal Court for the Northern District of Florida is where the consent decree between Beazer East and EPA will be filed. The community will be notified through a Federal Register notice announcing the consent decree and through a legal notice in the Gainesville Sun.*

26. It is mandatory for EPA to evaluate relocation as a remedial option in its feasibility study, why was this not done?

    *EPA Response:*

    *The commenter is mistaken. It is not mandatory for EPA to consider relocation as a remedial option in the feasibility study. EPA is guided in its possible consideration of relocation as a remedy by an EPA guidance document entitled, "Interim Policy on the Use of Permanent Relocations as Part of Superfund Remedial Actions" published on June 30, 1999. A summary of that guidance related to the decision to consider permanent relocation in the feasibility study process is included below:*

> *"EPA's preference is to address the risks posed by the contamination by using well-designed methods of cleanup which allow people to remain safely in their homes and businesses. Having proven EPA's ability to successfully restore contaminated property at many Superfund sites, generally, EPA's preference is to address the risks posed by the contamination by using well-designed methods of cleanup which allow people to remain safely in their homes and businesses. This is consistent with the mandates of CERCLA identified above, and the implementing requirements of the NCP which emphasize selecting remedies that protect human health and the environment, maintain protection over time, and minimize untreated waste. Because of CERCLA's preference for cleanup, it will generally not be necessary to routinely consider permanent relocation as a potential remedy component."*

*There are four situations in which EPA may consider permanent relocations as part of the feasibility study development process. The current situation nearby the former Koppers Site meets none of the criteria listed. The four criteria are as follows:*

1. *Situations where EPA has determined that structures must be destroyed because they physically block or otherwise interfere with a cleanup and methods for lifting or moving the structures safely, or conducting cleanup around the structures are not implementable from an engineering perspective.*
2. *Situations where EPA has determined that structures cannot be decontaminated to levels that are protective of human health for their intended use, thus the decontamination alternative may not be implementable*
3. *Permanent relocation may be considered when EPA determines that potential treatment or other response options would require the imposition of unreasonable use restrictions to maintain protectiveness (e.g., typical activities, such as children playing in their yards, would have to be prohibited or severely limited).*
4. *Permanent relocation may be considered when an alternative under evaluation includes a temporary relocation expected to last longer than one year.*

*EPA and PRPs have routinely conducted cleanups in the state of Florida and throughout the U.S. that are contemplated in the preferred remedial alternative. The remedy is simple from an engineering perspective in that it involves removing up to two feet of top soil from an affected property and replacing it with clean fill, reseeding the yard, and reinstalling any landscaping that had to be removed from the yard to remove the soil. It is unlikely that structures nearby the former Koppers Site are contaminated. After the soil* *cleanup, there will be no use restrictions required for the yard as there will be clean fill in the yard which would pose no threat or require a use restriction. It is expected that the yard cleanups would take significantly less than one year based on the number of parcels believed to be affected and the simple implementation approach needed to complete the soil remediation.*

27. The failure to effect a cleanup at the Site in over twenty-six years is a violation of EPA directives on environmental justice as was specified as a requirement in a July 22, 2010 guidance memorandum on implementing environmental justice at the EPA.

    *EPA Response:*

    *EPA has overseen the cleanup of the Cabot portion of the Site through operation of a groundwater interceptor trench system which has pumped and treated in excess of 500 million gallons of contaminated groundwater at the Site since 1995. In addition, there has been excavation and disposal of contaminated soils of approximately 10,000 tons there followed by Site redevelopment with thriving businesses where the Cabot portion of the Site once was. While progress at the Koppers portion of the Site has not gone as quickly as EPA would have liked, there has been in excess of 280 million gallons of groundwater captured and treated from the Surficial Aquifer system since 1995. Contaminated sediments have been excavated and treated. Chemical treatment, active and passive DNAPL recovery, soil excavation, and upgrades to existing Surficial Aquifer containment system to pump and treat contaminated Floridan Aquifer groundwater has also been accomplished. The Agency is dedicated to ensuring that environmental justice takes place in all EPA activities. The Agency has included an enhanced public participation process at this Site to make sure that the public is involved through the remedial decision process from the collaborative FS process with Gainesville stakeholders to an enhanced site reuse effort from $E^2$ contractors. EPA believes that significant progress has been made in enacting Site cleanups and that extra work completed to ensure robust community participation has ensured that environmental justice is addressed.*

28. I am writing to express my disapproval of EPA's proposed plan regarding the Koppers Superfund Site in Gainesville, Florida. Please adopt the changes recommended by the joint City's/County's LIT team and enforce a proper clean-up of this horribly polluted site.

    *EPA Response:*

    *EPA disagrees. After much deliberation and based upon consideration of the requirements of CERCLA, the NCP, FDEP applicable regulations, the detailed analysis of the alternatives and public and state comments, EPA has selected a remedy that will satisfy the statutory requirements of CERCLA by* *being protective of human health and the environment; complying with ARARs; being cost-effective; utilizing permanent solutions and alternative treatment technologies to the maximum extent practicable; and meeting the preference for remedies that employ treatment that permanently and significantly reduces the M/T/V of hazardous wastes as a principal element. This action represents the final remedy selected for the Site, and, as such, is compatible with the intended future use of the Site.*

29. It is very important that the cleanup plan for the Koppers Superfund site protect Gainesville's citizen's health and our drinking water source from contamination. Gainesville's drinking water needs more protection than the creation of an unlined toxic waste landfill in its aquifer protection zone.

*EPA Response:*

*As noted in response to others expressing a similar sentiment, EPA fully agrees. Out of an abundance of caution, redundant approaches (containment using slurry walls and caps to isolate the four primary source areas, and soil stabilization/treatment to immobilize contaminants) are proposed. These measures will ensure that the region's drinking water source is protected.*

30. The USEPA's efforts to solicit input from the City of Gainesville and the local community on the final site remedy and especially surface soil remediation and future land use issues has not been timely nor adequate and has not allowed sufficient time to solicit appropriate community input on impacts of the EPA proposed soil remedy.

*EPA Response:*

*EPA disagrees with this characterization of its Community Involvement efforts. In particular, EPA points to the fact that EPA staff participated in seven special Gainesville City and/or Alachua County Special Commission meetings presenting information related to Koppers Site cleanups and participated in listening sessions for members of the public on May 1, 2008, March 9, 2009, August 17, 2009, August 31, 2009, January 4, 2010, April 29, 2010, and October 6, 2010. Also, to reiterate a response provided previously, EPA points out that the remedy selection process combined the contributions of the following stakeholders who were involved in identifying, evaluating and critiquing remedial options for this Site:*

- *City of Gainesville representatives*
- *Gainesville Regional Utilities (GRU) and consultants (Jones Edmunds)*
- *Alachua County Environmental Protection Department*
- *Beazer East and contractor (GeoTrans)*
- *PRP support consultants (Adventus, SES, AMEC, Key Environmental, GeoHazards)*

- *University of Colorado*
- *Florida Department of Environmental Protection*
- *US EPA (site manager and technical support personnel)*
- *EPA consultant (Black & Veatch)*

*A 15-member Joint FS Group convened for seven meetings and numerous teleconferences over the course of approximately 2.5 years. The Joint FS Group encouraged and welcomed any and all technical and community view points pertinent to remedy development.*

31. The USEPA's efforts to solicit input from the City of Gainesville and the local community on the final site remedy and especially surface soil remediation and future land use issues has not been timely nor adequate and has not allowed sufficient time to solicit appropriate community input on impacts of the EPA proposed soil remedy.

*EPA Response:*

*As noted previously, EPA is required to look at reasonably anticipated future land uses in determining what cleanup criteria to apply at a Superfund Site. EPA has determined that unrestricted residential use is not a likely or practical future land use for the Site.*

*EPA has made its reasonably anticipated land use determination based on several factors including property owner Beazer East's planned retention of Site ownership and its indicated future use of the Site as commercial, recreational or mixed use with a residential component. Therefore, the EPA has determined that the reasonably anticipated future land use of the Koppers portion of the Site is likely to be commercial, recreational or mixed-use with a residential component.*

32. Let Beazer go broke paying for this. They willingly bought this property and all its assets and liabilities.

*EPA Response:*

*It is not in the best interest of the community or the tax payers for a PRP to go broke. In a PRP-led site such as this, the PRP is responsible for paying for the remedy. Fortunately, Beazer is a relatively financially solvent company and they will be funding the remediation instead of the tax payers.*

33. Many citizens expressed a concern regarding the unknown effectiveness of innovative technologies, and on the containment/isolation strategy proposed. Several comments exhibit specific opposition to the innovative ISBS (also known as in-situ geochemical stabilization, ISGS) technology.

*EPA Response:*

*Please see previous responses to others who expressed similar sentiments.*

34. Regarding the creeks, you affirm, "To address possible future impacts on sediments, the former Koppers facility is required to construct and operate a detention/retention pond(s) to capture storm water from the former Koppers Site prior to allowing it to be

discharged...," but you do not mention that the Proposed Plan only calls for the retention pond to capture 15% of the storm water. Are we expecting all the contaminants we wish to settle in the retention pond to be contained in the 15% of storm water that is captured?

*EPA Response:*

*To address possible future impacts on sediments, the former Koppers facility will be required to construct and operate a detention/retention pond(s) to capture storm water from the former Koppers Site prior to allowing it to be discharged to the tributary to Springstead Creek. The detention/retention pond(s) will be designed, including placement, during the remedial design of the on-site remedy. A guiding principle of storm water design is that post-construction runoff cannot exceed current conditions. Thus, the detention pond(s) will be designed accordingly.*

35. We want to make sure that while the ROD may include a summary and may group comments, that all comments and their attachments will become part of the final administrative record. I believe this is consistent with what LaTonya stated recently, but wanted to confirm.

*EPA Response:*

*The commenter correctly notes that comments of a similar nature may be paraphrased, abbreviated, or grouped in the main body of the Responsiveness Summary of the ROD. However, all comments will be included in an unabridged form in an appendix to the Responsiveness Summary of the ROD.*

**Attachment 1**

# City of Gainesville

Craig Lowe, Mayor

October 7, 2010

Mr. Scott Miller, Remedial Project Manager
United States Environmental Protection Agency
Region IV, Superfund North Florida Section
61 Forsyth Street, SW
Atlanta, GA 30303

RE: City of Gainesville and Alachua County Comments and Recommendations on *USEPA Superfund Proposed Plan Cabot Carbon/Koppers Superfund Site Gainesville, Alachua County, Florida*

Dear Mr. Miller:

The attached report includes comments from the City of Gainesville and Alachua County on the *USEPA Superfund Proposed Plan Cabot Carbon/Koppers Superfund Site Gainesville, Alachua County, Florida (Proposed Plan)*. These comments were developed by our local intergovernmental team consisting of staff from the City of Gainesville, Gainesville Regional Utilities, Alachua County Environmental Protection Department, and the Alachua County Health Department and their technical consultants. These recommendations reflect the input and concerns of the technical team, our local citizens, the Gainesville City Commission and the Alachua County Board of County Commissioners.

The Cabot Carbon/Koppers site has been a Superfund site since 1983, and has been a significant concern to our community since well before that time. The site is located in the heart of our community directly adjacent to residential areas and only two miles from the City's wellfield. Proper cleanup of the site is a critical priority for our community, and is necessary in order to ensure the safety of our drinking water supply, protect the health of our citizens and the environment, and protect the economic vitality of our community. In addition to countless hours of staff time, the City has invested over $2 million in hiring its own team of internationally recognized consultants to assist us in ensuring that appropriate actions are taken at the site.

We appreciate EPA's recent efforts in moving forward with development of plans for cleaning up the site, and recognize that cleanup of the site will be challenging. However, the current Proposed Plan is not adequately protective of human or environmental health and is not acceptable to the City of Gainesville and our local community. We request that EPA implement the attached recommendations in the Record of Decision for the Koppers Site.

Thank you for your on-going effort in addressing the Cabot/Koppers Superfund Site. If you have questions about our technical comments you may contact Mr. Fred Murry, Assistant City Manager at City of Gainesville ((352) 334-5000 ext 5674), Mr. Rick Hutton, P.E. at Gainesville Regional Utilities ((352) 393-1218) and/or Dr. John Mousa at the Alachua County Environmental Protection Department ((352) 264-6805).

Sincerely,

Craig Lowe

Craig Lowe
Mayor

xc: Lisa P. Jackson, EPA Administrator
Gwendolyn Keyes Fleming, EPA Region 4 Administrator
Stanley Meiburg, EPA Region 4 Deputy Administrator
Senator Bill Nelson
Congressman Cliff Stearns
Congresswoman Corrine Brown
Congressman Alan Grayson
Gainesville City Commission
Alachua County Board of County Commissioners
Robert Hunzinger, Gainesville Regional Utilities General Manager
Russell Blackburn, Gainesville City Manager
Randall Reid, Alachua County Manager
David Wagner, Alachua County Attorney
Marion Radson, Gainesville City Attorney
Kelsey Helton (FDEP)
Correspondence

# City of Gainesville and Alachua County

## Comments and Recommendations

## On

## USEPA Superfund Proposed Plan
## Cabot Carbon/Koppers Superfund Site,
## Gainesville, Alachua County, Florida (July 2010)

**Final**

**October 2010**

More than Energy

**Local Intergovernmental Team**

Fred Murry, Asst. City Manager, City of Gainesville
Rick Hutton, ME, P.E., GRU
John Mousa, PhD, Alachua County EPD
Stewart Pearson, P.E., City of Gainesville
Ralph Hilliard, Planning Manager, City of Gainesville
Anthony Dennis, Env. Health Director, Alachua County Health Department
Robin Hallbourg, P.G., Alachua County EPD

Stanley Feenstra, PhD, P.Geo. Applied Groundwater Research Ltd.[1]
Richard Jackson, PhD, P.E. Intera Engineering, Ltd[1]
Neil Thomson, PhD, P.E., Univ. of Waterloo[1]
John Herbert, MS, P.G.[1]
Dean Williamson, P.E., CH2M-Hill

[1]GRU "DNAPL Team" members.

# Table of Contents



## ATTACHMENTS

# 1.0 GROUNDWATER & SUBSURFACE REMEDY

## INTRODUCTION

The nature and extent of contamination and the geology of the Koppers site will make successful remediation of the site challenging. Creosote Dense Non-Aqueous Phase Liquid (DNAPL) has been recovered from wells in the Surficial Aquifer (SA) and Upper Hawthorn Group (UHG) and, based on multiple lines of evidence, has penetrated the Lower Hawthorn Group (LHG) and the Upper Floridan Aquifer (UFA). Given the high polynuclear aromatic hydrocarbon (PAH) concentrations in groundwater offsite to the east in the UHG it appears that DNAPL has migrated laterally to the east of the Koppers property. Much of this DNAPL likely continues to be mobile, and unless removed or immobilized, will continue slowly migrating vertically and horizontally, ultimately causing increased groundwater contamination in the UFA. Of particular concern is that further contamination of the UFA will pose a material threat to the Murphree wellfield.

Dissolved-phase plumes of PAHs exist in the Surficial, UHG and LHG strata and in the UFA, and likely extend off-site in all formations. Beazer has constructed a relatively extensive UFA monitoring network at the site, although the extent of the UFA plumes has not yet been fully delineated. Most of the UFA monitoring wells indicate PAH concentrations below cleanup standards. However, there are regions in the interior of the site (i.e., identified by FW-6, FW20B, FW-12B, FW-21B and recently FW-27B, see Figure 1) where PAH concentrations are well above cleanup standards. These plumes will likely continue to expand without appropriate treatment. Of particular concern are the plume(s) in the interior of the site where contamination extends to an as-yet undefined depth (as indicated by wells FW-12B and FW-27B), and two locations (FW-22B and FW-16B) at the periphery of the site. The fact that PAH contamination in the UFA has reached these boundary wells is a clear indication that off-site migration of contaminants is occurring in the UFA – and in the case of FW-16B - has been occurring for some time. Hydraulic containment has been initiated as an interim action in the area of FW-22B (pumping approximately 28 gpm). However, actions have not yet been undertaken at the eastern site boundary (i.e. FW-16B), or in the interior of the site, other than the low rate pumping test (i.e. 2 gpm or less) at FW-6 and FW-21B. The southern part of the site remains without any LHG or UFA monitoring at all despite the large amounts of mobile DNAPL recovered from PW-1.

Treatment or removal of contaminants to reduce downward migration of DNAPL and mass loading of dissolved contamination are important in reducing the amount of contamination reaching the UFA. However, it will not be possible to treat all of the DNAPL, particularly within the LHG. Therefore, <u>hydraulic containment in the UFA is essential</u> in order to protect the Floridan Aquifer and community's water supply.

Although Remedial Action Objectives are described generally in the USEPA Proposed Plan (p. 12), we strongly believe that specific priority goals (related to groundwater) can, and should, be stated in the remedial plan in the upcoming ROD (Record of Decision) and should include the following:

A. **Contain the contamination in the UFA on-site using hydraulic containment**
   (1) Reduce interior contaminant plumes by groundwater extraction within the UFA at rates sufficient to contain them (our preliminary estimates based on simulations using the GeoTrans model of the site indicate extraction rates of at least 100 gpm will be required to do this); and
   (2) Prevent off-site migration of contaminants at all locations including FW-22B and FW-16B.

B. **Remove or immobilize creosote to the fullest extent possible in the UHG, LHG and Surficial Aquifer in order to:**
   (1) reduce vertical and horizontal migration of creosote DNAPL, and
   (2) reduce dissolution and mass loading of contaminants into LHG and UFA groundwaters.

C. **Contain SA and UHG contamination by using hydraulic containment and slurry walls to minimize migration of contaminants; and**

D. **Provide long-term monitoring (in the SA, UHG, LHG and UFA) to allow assessment of the performance of the remedy, verify compliance with cleanup criteria and assure no off-site migration of contaminants in the Floridan Aquifer.**

## COMMENTS AND RECOMMENDATIONS

The Proposed Plan does include, generally, elements intended to address each of the priority goals summarized above. We request that the upcoming ROD explicitly include these elements in relation to the Koppers site. We have the following comments and recommendations regarding the groundwater related elements of the Proposed Plan:

1. **Hydraulic containment in the Floridan Aquifer must be more robust and extensive than is currently underway. The ROD must include hydraulic containment with the goal of capturing the plume in the interior of the site. Additionally, the ROD should contain specific criteria or principles (triggers) to determine when and where additional remedial actions will be required in the Floridan Aquifer.**

The plan appropriately requires hydraulic containment in areas where contaminants exceed federal MCLs and Florida GCTLs outside of source areas. It also requires construction of additional extraction wells as necessary. The plan includes on-going monitoring in areas where constituents do not exceed cleanup goals. We support these provisions.

As we understand it, based on these provisions, hydraulic containment should be initiated to address UFA contamination in the interior of the site (as indicated by FW-12B and now FW-27B), as well as at the eastern site boundary (as indicated by FW-16B). The goal of the interior pumping should be to capture and contain the interior plume(s). EPA should not wait for the plume(s) to reach the property boundary before these actions are taken. The low rate pumping described in the Proposed Plan and currently implemented at FW-6 and FW-21B is not adequate to achieve this goal. Additional pumping at much higher rates in the interior of the site will be required to achieve this goal.

In addition to these provisions, we request that the ROD require a contingency plan that will be implemented if there is a definable increasing trend in constituents of concern (COCs) at a well indicating that contamination is spreading, even if cleanup goals have not yet been exceeded.

The installation of extraction well FW-31BE is an essential element in containing the Floridan contamination because migration off site in this area has been (and may still be) occurring. This extraction well is intended to address contamination leaving the site in the northwest region of the site near well FW-22B. However, additional monitoring wells are needed off-site to characterize the extent of off-site contamination at that location, and to ensure FW-31BE is adequately containing it.

Additional hydraulic containment will also be necessary to address Floridan Aquifer contamination at other locations on the site. This conclusion is based on:

A. The results of the low rate pumping Interim Remedial Measure (IRM) at FW-6 and FW-21B (received August 3, 2010) indicate no significant improvement from the low rate pumping since it began in October 2009, and no evidence has been generated to support Beazer's claim that annular casing seepage is actually the cause of UFA contamination at these locations;

B. Very high concentrations of naphthalene persist at several interior wells. Of particular concern is FW-12B and FW-27B which show high concentrations at an as-yet undefined depth in the UFA; and

C. Concentrations persist above GCTLs at boundary well FW-16B.

The future analytical results from the most recently installed on-site Floridan monitoring wells (FW-27B, FW-28B and FW-30B) should provide further information on the extent of contamination in the UFA.

2. **The Groundwater Contamination section of the Proposed Plan misstates the degree of contamination in the Floridan Aquifer. The ROD should accurately describe known site conditions.**

The most important objective of the groundwater/subsurface remedy is to contain and clean up contamination in the UFA. However, the Groundwater Contamination section of the Proposed Plan makes several incorrect statements, and vastly understates the magnitude and extent of contamination in the UFA. For example, it makes no mention of the off-site contamination identified by monitoring locations FW-22B and FW-16B at the site boundary. The Conceptual Site Model (Figure 3, p. 9) shows no contamination in the UFA or contaminant migration pathways through the LHG.

The Proposed Plan (p. 11) refers to a single monitoring well near the former north lagoon which exceeded GCTLs but in which naphthalene concentrations "have decreased substantially since July 2004". This is incorrect; the statement can only refer to FW-6 because only that well existed near the former north lagoon in the UFA on the July 2004 date mentioned. Naphthalene concentrations in the well (FW-6) did decline between July 2004 and January 2008. However, since that time concentrations have fluctuated dramatically. August 2009 data were the highest yet measured (i.e., 2600 ppb naphthalene). More recent data, collected after initiation of the pumping at FW-6, have reported naphthalene concentrations between 580 and 1,100 ppb. At a minimum, the Conceptual Site Model and Groundwater Contamination descriptions in the ROD should acknowledge:

A. Likely off-site migration of COCs to the east in the SA;

B. Apparent off-site migration of DNAPL to the east in the UHG;

C. Naphthalene concentrations in the LHG, which exceed 1,000 ppb across the width of the site, that result in continuing contamination of the UFA;

D. PAH concentrations at FW-6 have fluctuated, but not shown a decreasing trend in FW-6 since its installation in 2004;

E. PAH Concentrations in other interior wells (i.e. FW-21B & FW-12B) in excess of GCTLs, with FW-12B showing increasing PAH levels with depth;

F. PAH concentrations exceeding GCTLs at boundary wells FW-22B and FW-16B; and

G. COC's have been detected at levels below COCs at several other boundary wells (FW-2, FW-3, FW-11B and FW-24B).

EPA's statement in the Proposed Plan gives the impression that contamination in the UFA at the former north lagoon is of minimal concern, and that minimal or no action is needed to contain it. We request that EPA review this section of the Proposed Plan closely and ensure that the description of the Groundwater Contamination contained in the ROD better reflect actual known site conditions. Also, we are submitting comments to Beazer's draft report on the Floridan IRM that EPA should consider when evaluating contamination in the UFA.

**3. Financial assurance should be provided for the final remedy selected, including on-going operation of Floridan Aquifer containment.**

The site will likely require containment of the Floridan Aquifer plumes via pump and treat for an extended period of time (i.e. decades). Beazer should be required to provide a form of financial assurance (such as a bond) to ensure that sufficient funds will be dedicated to completion of the final remedy, including the continued operation of the Floridan Aquifer Containment system and monitoring of the UFA.

**4. The ROD should stipulate expansion of the Floridan Aquifer monitoring network to fully delineate the horizontal and vertical extent of off-site and on-site plumes.**

Beazer has installed a relatively extensive UFA monitoring well network at the Koppers site. However, additional wells are needed at the following locations:

A. off-site adjacent to FW-22B (and FW-31BE) to ensure that FW-31BE is indeed capturing the plume that had been leaving the site in the northwest (at FW-22B);
B. off-site adjacent to FW-16B to delineate the off-site extent of this plume and to verify that future hydraulic containment efforts are successful in stopping this off-site migration;
C. interior of the site to fully delineate the horizontal and vertical extent of the on-site plume or plumes being detected by FW-6, FW-12B, FW-21B and FW-27B;
D. on the western property boundary at 26$^{th}$ Ave (the need for this is based on historical elevated COC levels in an offsite private UFA well (Geiersbach well) in this area, and on detections of COCs in FW-3); and
E. Beneath (or immediately adjacent to) the former process area and south lagoon (both of these areas lack LHG wells so the depth of contamination is not known; the process area is of particular concern due to the mobile DNAPL being collected in the UHG, and the fact that the existing UFA well (FW-18B) is roughly 200 ft north of the process area).

The interior plume(s) are of great concern because of their high concentration and depth, which is as-yet undefined. Analytical results from FW-27B indicate that creosote contamination extends to at least the deepest sample-port in that well, 289 ft below ground surface. It is critical that Beazer install additional wells to fully delineate the horizontal and vertical extent of this plume, and to assure that it is not expanding and does not migrate off-site undetected.

5. **The City and County request excavation and off-site disposal of the SA source areas. This remedy would provide the highest degree of confidence from the community, and provide the highest level of permanence for the site remediation.**

6. **We do not support In Situ Bio Geo Chemical Stabilization (ISBS) in the SA or UHG source areas. To the extent excavation cannot be applied in the SA, In-Situ Solidification/Stabilization (ISS/S) should be used. We do support the use of ISS/S for UHG source areas.**

The need to remove or immobilize DNAPL to the fullest extent possible in the UHG and LHG (in addition to the surficial aquifer) is a primary concern to the City and County, and was emphasized in our responses to the August 2009 Draft Feasibility Study. The goal of this treatment is to reduce vertical and horizontal mass loading of DNAPL and dissolved phase constituents, with vertical mass loading being the most critical component. The proposed plan includes treatment of source areas using ISS/S in the UHG, and ISBS (alternatively referred to as In Situ Geo Chemical Stabilization (ISGS)) in the SA. As we understand it Beazer has proposed an approach utilizing ISBS in the UHG in combination with ISS/S or ISBS in the SA.

We believe that EPA's proposal to use ISS/S for the UHG is appropriate. ISS/S is a comparatively well-proven technology, although the depths and the clay layers present in the UHG at the site are likely to make implementation of any technology challenging. ISS/S provides the best technical approach for effectively treating the UHG source areas.

For the SA source areas, our first preference would be to remove and dispose off-site all of the DNAPL impacted sediments from the SA, with ISS/S in the UHG. If EPA does not select excavation as the remedy for DNAPL impacted sediments from the SA, it is the opinion of our technical team that the use of ISS/S in the SA, concurrently with ISS/S in the UHG, would provide the most appropriate remedy to achieve an acceptable level of groundwater protection.

We do not support the use of ISBS to treat SA or UHG source areas. In our previous correspondence (*GRU & ACEPD Proposed Performance Metrics for ISGS, May 10, 2010*) we expressed concern about the effectiveness of ISBS.

Upon further review we feel that ISBS is not appropriate for application in the SA or UHG source areas at the Koppers Gainesville site for the following reasons:

A. **ISBS is not a proven technology (in contrast to ISS/S which is well-proven).** There is very little information in the peer-reviewed literature to indicate that ISBS has been successfully applied at any site, and certainly not on the scale proposed at the Koppers Site. The application of ISBS technology reported for the Denver Koppers site used soil boring data to make conclusive statements about the treatability of a heterogeneous NAPL impacted zone. Results from these data were mixed and no attempt was made to quantify changes in mass loading. Comments from Dr. Neil Thomson on the Denver ISBS Treatment report are attached in Attachment A.

   The pilot test of ISBS at the Koppers Gainesville site was similarly inconclusive in that the sweep of injected fluid in the SA was very uneven, leading to untreated zones close to the injection wells. The high injection pressures resulted in surface discharges ("day lighting") of the permanganate solution, apparently through inadequately sealed borings that are likely to also exist elsewhere on site with similar consequences. Comments from Dr. Neil Thomson on the ISBS pilot study at Koppers Gainesville are in Attachment B. Furthermore, using a similar technology, Thomson et al., (2008) reported a material decrease in mass discharge and/or total plume mass during monitoring performed 1 and 2 years post-treatment; however, 4 years after treatment, mass discharge and total plume mass for all monitored compounds rebounded to pre-treatment values (Thomson et al., 2008, *Rebound of a coal tar creosote plume following partial source zone treatment with permanganate*. Journal of Contaminant Hydrology, v. 102, p. 154-171). This article is in Attachment C

B. **Delivery of the ISBS reagent to contaminants under the conditions at the Koppers Gainesville site will be very uncertain.** Delivery of the ISBS reagent to the surface of the creosote mass is critical. Beazer's hypothesis is that the ISBS will follow the same high conductivity features as the creosote DNAPL did. However, this phenomenon is likely to be limited by factors including:

   (1) *DNAPL itself is likely blocking at least some of the pathways through which the DNAPL migrated (ISBS solution will not displace creosote DNAPL);*

   (2) *ISBS will preferentially flow to highest conductivity pathways that are not blocked by DNAPL, and will have limited contact with creosote that has migrated into more moderate conductivity pathways or pathways which are blocked or partially blocked by*

*DNAPL.* Creosote DNAPL likely has migrated into moderate conductivity as well as high conductivity features because it has had 50 or more years under varying hydrologic conditions to do so. The ISBS pilot test showed clearly that the dense ISBS solution sank to the bottom of the SA causing poor sweep of the aquifer; and

(3) *Much of the DNAPL mass is likely interconnected, which provides the mechanism by which DNAPL can continue to migrate.* Even if the ISBS reagent is successful in contacting the outside surface of the DNAPL mass, this may not prevent DNAPL from continuing to migrate within the interior of the interconnected DNAPL mass. As you are aware, we disagree with Beazer's conclusion that DNAPL within the UHG and LHG exists primarily as disconnected ganglia.

Adequate distribution of the ISBS reagent was not obtained in the field pilot study at the Koppers Gainesville site.

C. **At this time there is no reliable way to determine if treatment goals are being achieved with ISBS.** The treatment goals are to reduce the vertical and horizontal mass loading of DNAPL and dissolved phase constituents. Determination of the effectiveness of ISBS treatment in meeting these goals will require comparison of pre- and post-treatment contaminant mass loading measurements. It will <u>also</u> require measurement of the reduction in DNAPL vertical mobility. Methods which have been discussed for doing this include:

(1) *Use of Core Data.* The ability of core data to assess performance of ISBS is limited because cores represent a limited snapshot of subsurface conditions, which are likely to vary substantially over very short distances due to heterogeneities in the geology, DNAPL architecture and ISBS solution distribution.

(2) *Measurement of Dissolved-Phase Mass Loading Using Flux Monitoring Devices.* Technologies exist to measure <u>horizontal</u> dissolved phase mass flux. However, to date no method has been proposed to measure <u>vertical</u> mass flux, which is the most critical parameter for this site, as protection of the UFA is the ultimate objective of the treatment system. Horizontal mass flux is not an adequate indicator of vertical mass flux since the transport pathways are different.

(3) *Use of UFA Extraction System Data to Measure Dissolved-Phase Mass Loading.* In order to use UFA extraction system data to estimate mass load, it will be necessary to expand the UFA extraction system so that it captures the entire UFA plume(s). This will require installing pumping wells in the vicinity of the source

areas and expanding the treatment plant capacity to process the *additional* extracted groundwater, i.e., >100 gpm. (FW-31BE is capturing a portion of one plume as it is leaving the site. It is not capturing the entirety of the interior plume(s) such that a mass loading of contamination into the UFA could be assessed). Before the mass load reduction resulting from ISBS treatment could be assessed, data from this capture system would have to be collected and evaluated for a minimum of 1-2 years prior to ISBS treatment and several years (likely 5-10 years or more) post-treatment. The likely long lag time between treatment and UFA response makes this method impractical for determining the success of ISBS treatment in a timely manner. It would be unlikely that EPA could assess the ISBS success in the first 5-year review cycle.

(4) *Measurement of Reduction in DNAPL Vertical Mobility.* One method which has been proposed to assess the impacts of ISBS on DNAPL mobility is to observe changes in the volume of DNAPL collected in UHG monitoring wells. Five out of 6 of the monitoring wells installed in the UHG consistently yield DNAPL, but there are only 1 or 2 such wells within the footprint of each SA source area. Cessation of DNAPL collection in one of these wells immediately after treatment by ISBS may indicate that lateral DNAPL mobility was reduced in the vicinity of that well. However, this conclusion could not be applied across the entire source area. More UHG wells could be installed prior to ISBS treatment in an attempt to provide a better assessment across the source area. However, an apparent reduction in DNAPL recovery in a well that was recently installed prior to ISBS treatment does not conclusively indicate that the ISBS treatment was successful. An apparent reduction of DNAPL recovery in a recently installed monitoring well could be due to natural variation in DNAPL recovery rates (as observed in existing UHG monitor wells), or alternatively it could be because there was not enough DNAPL volume at that location to maintain a consistent collection rate. Several years of monitoring would be required to demonstrate consistent DNAPL recovery rates at the new wells, in order to conclude with any certainty that reductions in recovery after ISBS were, in fact, due to ISBS treatment. Additionally, even if a reduction in lateral mobility could be demonstrated, this may, or may not, reflect a reduction in vertical mobility.

We do not believe that any of the above proposed metrics will be effective at measuring ISBS performance at the site. There are inherent difficulties with each suggested method, which are described in detail above.

In contrast to ISBS, ISS/S is not plagued with such issues. ISS/S is a well-proven technology which has been used at multiple sites. Since it involves mechanical mixing of soils, distribution of the solidification agents is much less of an issue. To confirm treatment, soil cores of the solidified material can be collected to confirm the spatial extent of treatment. Changes to hydraulic conductivity, compression strength, and leachability in these cores can be easily measured using standardized methods to establish the degree of success of the treatment. Implementation of ISS/S in the SA and UHG will not require the otherwise difficult measurements of mass loadings described above for ISBS in order to assess the effectiveness of the selected remedy.

As we understand it EPA's basis for proposing ISBS in the SA in conjunction with ISS/S in the UHG is that the ISS/S in the UHG will provide a "floor", so that even if the ISBS in the SA is only partially successful, downward mass loading through the UHG will be limited. To be effective, the ISS/S floor will have to be implemented over an area extending well beyond the lateral boundaries of the UHG source zones to ensure that DNAPL from the SA does not migrate downward. In addition, the disturbance of the SA soils due to the augering during ISS/S will change the characteristics of the SA soils. Therefore, a pilot study would have to be carried out demonstrating the proposed ISS/S and ISBS treatment combination. Given the need for a minimum of 4 years (perhaps longer) to evaluate the performance of the ISBS portion of the pilot study, the final remedy for the site would be further delayed. Any further delay in the implementation of a remedy for this site is unacceptable to the City/County and local community.

Since ISS/S in the UHG will require auguring through the SA source area to reach the UHG, we believe it makes the most sense to apply ISS/S in the SA at the same time that it is applied in the UHG (per Alternative OnR-5F). Although EPA's cost estimate for the proposed plan ($65 million) indicates a cost savings as compared to Alternative OnR-5F, in reality we feel there would be little if any cost advantage of the proposed remedy compared to use of ISS/S in both the SA & UHG (Alternative OnR-5F), particularly in light of the considerable risk that ISBS will not be successful, the likelihood of unforeseen complications with this remedy, and the delays that a combined ISS/S/ISBS pilot study would create. Given the length of time the community has waited for a final remedy for the site, it is important that the final remedy be as robust as possible, provide for the greatest opportunity for achieving the remedial objectives, and be implemented as quickly as possible.

***Proposed ISBS Pilot Study***

It is our understanding that EPA is considering a plan in which Beazer would implement a full-scale ISBS pilot study in the former process area. The study would be initiated immediately and would be conducted concurrently with remedial design and implementation of the other remedy components (i.e. the slurry wall and other components excluding DNAPL source zone treatment). The stated intention is that the study would not delay the overall remedy implementation, since it would be started immediately, would be conducted during remedial design, and be completed by the time DNAPL source area treatment would be initiated.

Our concerns with this pilot study approach are that: (1) the results of the study and success of the ISBS treatment will be uncertain and subject to much debate (for the reasons described above), and (2) the pilot test will result in a significant delay in remedy implementation. As described above, in research performed by Thomson et al (2008) at the Borden site, which was under much more controlled conditions with much more homogeneous and transmissive geology (in a sandy aquifer) than the Koppers Gainesville site, it took 4 years for the system to re-establish equilibrium after treatment. Given lower transmissivity and the more complex geology at Koppers Gainesville, it is likely to take even more time for the groundwater system to re-equilibrate post-treatment at this site. For these reasons we object to moving forward with the pilot study, and recommend selection and implementation of ISS/S and/or excavation as the remedy for treating SA and UHG source areas.

However, if EPA chooses to move forward with the ISBS pilot study, the study would need to be rigorously designed, implemented, and evaluated and the burden of proving the success of the technology should be on Beazer. The study would need to include the following at a minimum to provide defensible results:

A. Development of metrics and criteria that can adequately measure ISBS performance within the required timeframe (i.e. the limitations of available performance metrics described above would have to be overcome);

B. Characterization of DNAPL extent & architecture (the present characterization is not adequate for remedial or pilot study design or performance assessment);

C. Concurrent pilot testing of ISS/S to provide side-by-side comparison of the technologies, and assist in providing performance criteria for comparison with ISBS;

D. Pre-treatment monitoring (to establish baseline conditions); and

E. Post-treatment monitoring, data analysis, and reporting.

Concurrent pilot testing of ISS/S at another source area would provide a side-by-side comparison of the two technologies, and would help to provide an indication of the relative success of the ISBS. For example, assuming a methodology can be developed to measure downward mass loading, data from the ISS/S pilot would provide a relative reference point for comparison.

7. **We support the Slurry Wall and cap components of the Proposed Remedy. We also support EPA's designation of all DNAPL as a principle threat waste. However, the ROD should also address UHG source areas east of the property boundary that are outside the slurry wall shown in the Feasibility Study.**

Slurry walls are a well demonstrated technology for the purposes they are designed for. We believe the slurry wall will minimize lateral movement of contaminants within the SA and UHG. It will not (and is not intended to) affect vertical movement of contaminants in any aquifer unit, or lateral movement of contaminants in the LHG or UFA. Even with the most effective treatment of the DNAPL in the SA and UHG, there will continue to be a dissolved phase plume (or plumes) outside the source zones that will need to be contained. Therefore, the slurry wall will be an important component of any remedy.

We support EPA's designation of all DNAPL as a principle threat waste, and that "remedial actions proposed as a part of this Plan are intended to address DNAPL (i.e. principle threat waste) impacts, regardless of its location or source origination on the Koppers site."

There is evidence of DNAPL within the UHG to the east of the Koppers site which is outside of the footprint of the slurry wall as depicted in the Feasibility Study. Based on borings along the eastern boundary of the site and dissolved phase contamination in UHG wells, it is evident that DNAPL has migrated off-site within the UHG to the vicinity of the HG-26 well cluster on the Cabot Carbon Site. It is not clear from the Proposed Plan if or how these off-site source areas will be addressed. Treatment of DNAPL in these areas should be included in any final remedy since it is a principle threat waste and is an ongoing source of groundwater contamination. The fact that the area to the east of the Koppers site is not owned by Beazer does not preclude them from employing appropriate remedies in this area.

The CSX rail line on the eastern property boundary is unused to the south and terminates at 23rd Avenue. It is our understanding that to the north the closest user is Harwood Brick Distributors, Inc. (northeast of the Koppers site) at 3302 NE 2$^{nd}$ Street. It is important to consider the potential of this unused segment of railroad bed to be incorporated into the Koppers site and used to expand the area of the slurry wall to the east. Although this is a small area, it would provide additional area for containment of contamination in the surficial and UHG.

8. **We support use of Chemox or ISBS in the LHG. However, existing LHG monitoring wells should either be retained or replaced.**

Treatment of creosote DNAPL to reduce mobility and migration of contaminants into groundwater in the Hawthorn Group to the maximum extent possible is a high priority. We support the concept of injecting Chemox or ISBS into the LHG to immobilize DNAPL to the extent practicable. Although we have concerns about the performance of ISBS, the ability to deliver the reagent to adequately contact all the DNAPL, and the ability to measure the performance of ISBS (described above), we recognize that it is not possible to deploy ISS/S, excavation or other more robust remedies at the depth of the LHG with current technology. The depth, limited permeability and heterogeneity of the geological strata also make injection of Chemox, ISBS or other chemicals difficult. _Limitations of the ability to treat the LHG DNAPL make it all the more critical to employ effective monitoring and hydraulic containment in the UFA_.

The existing LHG monitoring wells are important for monitoring the status of the site and effectiveness of the site remedies. They will be particularly useful in long term monitoring of any remedies employed in the LHG. It would be preferable to retain the existing LHG wells, however, if they cannot be retained when ISS/S is implemented, they should be replaced after ISS/S is implemented. It is important to note that at the present time there are no LHG monitoring wells in the Process Area or South Lagoon – and we believe wells in the LHG are required at both of those source areas.

We do not object to injecting ISBS into a LHG well that must be removed before ISS/S treatment and replaced anyway, although their small diameter is likely to make them poorly suitable as injection wells. However, where possible, existing LHG wells should be retained and used, in conjunction with additional new LHG monitoring wells for long-term monitoring (ISBS or Chemox cannot be injected into wells that will be retained). ISBS or Chemox injection should be performed using new dedicated injection wells.

We propose that the ROD include a provision that Chemox or ISBS will be employed in the LHG using dedicated injection wells with existing, and new monitoring wells (as appropriate) being used to monitor the success of this action. We recommend that implementation of LHG remedies be staged to occur after implementation of the other site remedies to allow time for observing effects of remediation in the UHG and to permit installation of additional monitoring wells after the SA and UHG are stabilized. The exception to this would be that Chemox or ISBS will be deployed to the existing DNAPL impacted LHG monitoring wells that must be removed as part of the SA and UHG remedies.

**9. Additional characterization is needed to delineate DNAPL source areas and dissolved phase plumes.**

The Proposed Plan appropriately includes: "Expansion of surficial aquifer and HG monitoring network for: (1) establishment of sentinel locations; (2) demonstration of active natural attenuation processes; and (3) establishment of trigger locations for contingency actions." We request a fourth objective be added to "further delineate DNAPL source areas to define the lateral limits of source zone treatment in the Surficial Aquifer and Hawthorn Group". Source areas should be defined on the basis of visual evidence of NAPL or staining in continuous soil cores or naphthalene concentrations in groundwater in excess of 1,000 ug/L (ppb). Note that the "source area" boundaries presented on plan view figures in the FS and other documents are based on estimated footprints of the lagoons and other areas that existed at the site at one time and the results of investigations of Surficial Aquifer contamination conducted in 2004; they likely underestimate the area over which DNAPL has spread in the SA and in the underlying UHG or LHG. The areas contaminated by residual and mobile DNAPL need to be fully characterized in all aquifers units as part of the remedial design so that remedies will be implemented as effectively as possible.

Additional HG well(s) are needed at the northern boundary to evaluate potential off-site migration in that area. Low levels of Koppers-related organics were detected in a private irrigation well in proximity to the northern boundary of the Koppers site.

The expansion of the surficial aquifer and Hawthorn Group monitoring network should include additional LHG wells near the source areas. At the present time there are no LHG monitoring wells in the Process Area or South Lagoon – we request that the ROD require specifically that such wells be installed.

Finally, the ROD should require characterization to locate potential, but as-yet unidentified, source areas. This includes investigations to determine if buried drums exist at the site, and to determine if there is contamination from other process or waste treatment areas that might have existed outside of the identified source areas.

**10. The soil consolidation (if implemented) and cap, and any future development of the site should be configured so as not to significantly obstruct the ability to further treat source zones in the future.**

Due to the uncertainties associated with the DNAPL treatments, particularly in the LHG, there may be a future need to further treat source areas and/or to add additional monitoring wells. In addition, there may be advances in technology which will allow more effective treatment. Therefore, the cap and soil consolidation, and any future development should be configured so as to not significantly obstruct the ability to access and treat source areas.

# 2.0 ON-SITE / OFF-SITE SURFACE SOILS REMEDY

## COMMENTS AND RECOMMENDATIONS

**11. The USEPA Proposed Plan remedy for the surface soils and the future land use assumptions made by USEPA have not been sufficiently coordinated with the City of Gainesville and local stakeholders. Additional coordination with the City of Gainesville and local stakeholders is needed regarding the future land use vision. The final remedy for the Koppers site must meet the following minimum criteria:**

**A. It should be based on an explicit redevelopment vision;**

**B. It should be compatible with a redevelopment scenario that includes a step down in land use types from east to west on the site;**

**C. Clean-up of soils to the west and north of proposed containment area to allow redevelopment with all residential land use categories;**

**D. Industrial re-use should not be considered appropriate land use for the site; and**

**E. Remedy should be compatible with eventual reuse of City of Gainesville Public Works property north of site.**

The USEPA's efforts to solicit input from the City of Gainesville and the local community on the final site remedy and especially surface soil remediation and future land use issues has not been timely nor adequate and has not allowed sufficient time to solicit appropriate community input on impacts of the EPA proposed soil remedy. The reuse vision for the site discussed by USEPA's Reuse contractor, $E^2$, in presentations to the community has assumed a pre-selected remedy for soils that is not compatible with the City of Gainesville future redevelopment vision for the site. Insufficient time has been allowed to provide adequate and appropriate involvement from the City and local stakeholders in the remedy selection process.

The Code of Federal Regulation (CFR) Chapter 40, Section 300.430 prescribes clear requirements for EPA's obligations for community involvement prior to and during the RI/FS process and through ROD development. EPA has met few of these obligations. For example, the required Community Involvement Plan was ignored for over 20 years and was only recently updated. The 1989 Community Involvement Plan (CIP) was required to be updated every 3 years (7 times during the past 21 years) to solicit comment from the community throughout the multiple

RI, FS and RAO development process. Instead, the first CIP draft since 1989 was produced *after* EPA released its Proposed Plan. Additionally, the required local information repository at the Alachua County public library was not kept up to date for many years. These inactions on EPA's part denied local Gainesville residents the right to review key documents in the administrative record and provide crucial input to EPA throughout the RI, FS and remedy selection process. These inactions denied the community its rightful role in the selection of appropriate remedies for the site and in determining the types of future uses the site will accommodate following the remedial actions.

The City of Gainesville has previously provided input to EPA regarding its vision for future redevelopment of the site. It is not clear and it has not been communicated to the local community how the USEPA's proposed remediation scenario for the site will impact or limit future redevelopment of the site and how it may comply with the City's redevelopment vision. In particular, USEPA's proposal to meet FDEP commercial soil clean-up target levels (SCTLs) and not residential SCTLs for surface soils in the areas outside of the containment area as well as the construction of a large soil consolidation area will significantly impact future land use and adversely impact the financial health and vitality of surrounding properties and neighborhoods. Additional coordination with the City of Gainesville and local stakeholders is needed regarding the future land use vision. It is critically important to the local acceptance of any final remedy for the Koppers site that it meet the following minimum criteria described above.

The City Commission on June 23, 2008 adopted Resolution No. 071173 that authorized the City Manager to study the present and future land use of the Site including, but not limited to, those areas within the site with the highest levels of contamination, and to recommend any appropriate changes to the future land use and zoning maps that may include residential or mixed residential and commercial uses. The City Plan Board met on September 23, 2010, after receiving public comments and developed a land use policy recommendation for the Koppers site that recommends residential type development outside of the slurry wall area. Such a policy would also amend the City's Comprehensive Plan by adding a policy that will guide the future development of the Site for reuse that does not consider industrial use as an appropriate use for the Site. City staff presented the Plan Board general recommendation to the City Commission on September 27, 2010 and it was well received by the Community and the City Commission. The Comprehensive Plan amendment will be formally presented to the City Commission in the next few months and the amendments to the City's Comprehensive Plan are anticipated to be adopted by the end of summer 2011.

The City of Gainesville is currently developing reuse plans for the 10 acre City Public Works parcel north of the former Koppers Site. It is critical that the reuse plan for the Koppers site be coordinated with and be compatible with the reuse plans developed for the City's property.

11. **Landfilling of contaminated on-site and off-site soils and sediments in a large on-site consolidation area is unacceptable to the community. USEPA did not evaluate off-site disposal of excavated surface soils and sediments despite statements in the FS that evaluation of offsite soil disposal would be completed.**

    **The massive soil consolidation area should be eliminated as part of the final remedy and offsite disposal of excavated contaminated soils should be evaluated in an amended FS and considered as part of the final remedy.**

    **USEPA should implement offsite disposal of excavated soils that originate from the area outside of the containment area as well as soils and sediments removed from adjacent residential and commercial properties, rights of way and creeks.**

The City and County and the local community strongly object to the creation of a large, thirty-two acre soil consolidation area on top of the source area containment cap which could contain from 190,000 to 240,000 cu yds of soils contaminated with dioxins, arsenic, polynuclear aromatic compounds (PAHs) and other toxic soil contaminants. According to the presentation given to the local community on June 14, 2010 by $E^2$, the land reuse consultant hired by USEPA, the height of this soil consolidation area may be as high as 8 to 10 feet above current land surface with a 3:1 slope on the sides. The community finds the magnitude of this soil consolidation area filled with toxic soils to be highly objectionable. The City and County request that this massive soil consolidation area be eliminated as part of the final remedy and that offsite disposal of excavated contaminated soils be evaluated in an amended FS and considered as part of the final remedy. Should soil cover be required as part of the low permeability cap over the source areas it should be constructed with the minimum height necessary for proper cover and drainage and the soils used should be uncontaminated clean soils.

The City and County believe that the creation of a significant soil consolidation area will significantly limit the types and amount of redevelopment possible for the property in the future. It will create a permanent mound of contaminated soils in the middle of the City of Gainesville that is incompatible with the adjacent urban residential and commercial areas.

In the Feasibility Study report, Section 2.6 presents "the technologies that will be carried forward in the evaluations based on the screening evaluations presented in Sections 2.4 and 2.5." (See page 2-44 of the FS report). Specifically included in Section 2.6.6 in the list of technologies to be evaluated in detail in the FS for untreated soils is "offsite landfill disposal". (See page 2-46 of the Koppers site FS report).

In spite of making a commitment in Section 2.6.6 to evaluate offsite soil disposal in detail, not a single remedial alternative in the FS report included an evaluation of offsite soil disposal, even for minimally contaminated soils. In fact the complete set of alternatives evaluated is consistent in that none of them considered the removal of any contamination from the site.

It appears that USEPA made a pre-determined decision during the FS to not evaluate any off-site disposal alternatives and to, in effect, turn the Koppers site into a permanent waste disposal facility for all on-site and off-site contamination. This decision was made without any effort to assess the benefits that removal of contaminated soil would have on the redevelopment potential of the site or other factors and with disregard to its statements in the FS report that offsite disposal would, in fact, be evaluated.

The City and County request that USEPA complete the evaluation of remedial alternatives that include offsite soil disposal as stated in the FS. The City and County request that USEPA implement offsite disposal of excavated soils that originate from the area outside of the containment area as well as soils and sediments removed from adjacent residential and commercial properties, rights of way and creeks.

The City's Wellfield Protection Code (section 30-200 through 30-204) would require a Wellfield Protection Special Use Permit for the landfilling of offsite hazardous waste materials on the Koppers site. Section 30-70 treats processes involving inorganic and organic chemicals as a specially regulated industry and is only allowed by special use permit. City staff is not likely to recommend the relocation of off-site soils and sediments because this area is within the wellfield protection zone. The City's own practice is to remove onsite contaminated soils and sediments, as performed on the Depot Park Site on South Main Street, and to transport such soils and sediments to a proper treatment facility.

12. **The USEPA Proposed Plan remedy for surface soils for the area outside of the containment area is excessively vague about the specific actions that will be taken to meet FDEP SCTLs in this area. It is not clear if FDEP SCTLs will be met by covering contaminated soils or by removal of contamination followed by appropriate clean fill cover. There is also no detailed discussion of how FDEP Leaching Criteria will be met.**

    **USEPA should provide more detail in an amended FS and commitment regarding specific actions to be taken to remediate soils in the western and northern areas outside of the proposed containment area.**

    **Specific actions to be taken to remediate or address the elevated "hot spots" needs to be specified in the plan or ROD.**

The proposed remedy for on-site non-source area surface soils is extremely vague regarding specific remedial actions to be implemented at specific areas of surface soil at the site. According to the proposed plan, some surface soil could be excavated and consolidated under caps in the source zones (the Consolidation Area), some surface soil could be graded, and some surface soil could be graded and placed beneath a cap of unspecified composition outside of the source zones. The Feasibility Study (FS) report includes an even longer list of potential actions that might be implemented at any particular location for on-site surface soil, including:

A. Excavation only

B. Excavation with a 2 ft cover

C. Placement of a two-foot soil cover without excavation

D. Placement of a two-foot thick impermeable cover/cap

E. Covering with a road and or paved parking area

F. Covering with structures (e.g., buildings) that prevent soil exposure

G. Placement of a lined treatment pond over exposed soil

The Proposed Plan does not specify at what locations any of these potential remedial actions will be applied. There are costs presented in the FS for excavation of 24 acres of surface soils, however it is not clear the source of this estimated amount of excavated soils and the locations from which it is to be excavated. This vagueness makes it impossible to understand what the site will look like after remediation, and most importantly, to understand the impacts of the remedial action on the potential for future site redevelopment.

The City and County object to this vagueness and believe that USEPA should be much more specific about remedial actions proposed for each area of surface soil at the site. The City and County are concerned that the potential surface soil remedies listed above will be applied in a hodgepodge manner that will seriously reduce the ease of and could in fact hinder redevelopment of the site. The City and County are also concerned that the remedial approach will be to simply cover contaminated soil with clean fill in an attempt to minimize the need to remove contaminated soils.

USEPA should especially provide more detail and commitment regarding specific actions to be taken to remediate soils in the western and northern areas outside of the proposed containment area. In particular, specific actions to be taken to remediate or address the elevated "hot spots" where contamination at levels significantly above FDEP SCTLs exists in the surface soils such as in the central western boundary of the site and in the northern wooded area (See Figures 3, 4 and 5) should be described in detail (that is, whether this area will be excavated, if so, to what depth, or whether two feet of clean soil will simply be dumped on it). Greater specificity will enable all parties to understand the degree to which the selected remedial approach will facilitate or hinder future site development and provide details on how much contamination will remain on site.

13. **Covering of contaminated soils outside of the containment area leaves permanent soil contamination and limits options for future redevelopment. Removal of contaminated soils in areas outside of the containment area should be prioritized before any soil covers are applied.**

    **Achieving FDEP Residential soil clean-up criteria for the entire area outside of the containment area but especially the areas near the western and northern boundary of the site should be targeted by the plan as the preferred alternative. This is a strong preference of the local community.**

    **USEPA should amend the FS and provide separate cost calculations for the alternatives of removal of all contaminated surface soils outside of the containment area that are above FDEP residential or commercial SCTLs and leaching criteria.**

The Koppers site is located in the heart of the City of Gainesville amidst an area of long established residential communities. The City of Gainesville has promoted "infill development," as opposed to urban sprawl, for many years. Maximizing the potential for redevelopment of the site is a crucial concern for the City and community.

For these reasons, the selected remedy should:

A. Maximize removal and not covering of soils in areas outside the containment area and,

B. Require removal of all contaminated surface soils outside of the containment area that exceed FDEP Residential SCTLs or FDEP Leachability SCTLs down to the water table.

USEPA should amend the FS and provide separate cost calculations for the alternatives of removal of contaminated surface soils outside of the containment area that are above FDEP residential and commercial SCTLs and Leaching criteria. By doing so, a decision can be made as to the feasibility of cleaning up these surface soils to meet commercial or the more stringent residential SCTLs by excavation. For example, review of the surface soil data from the site appears to indicate that removal of up to 2 feet of soils in several areas of the approximately 300 foot wide area near the western and northern boundary and in several additional locations in the areas outside of the consolidation area may allow reaching of FDEP residential SCTLs for dioxin and benzo-a-pyrene toxicity equivalents (TEQ) and potentially for arsenic impacts as well (See Figures 3, 4 and 5). Such a removal of surface soils along with a commitment to remove soils from "hot spots" in this boundary area and in the northern area will provide more flexibility for future redevelopment of this property and minimize concerns about contamination from adjacent residential areas. This approach is a strong preference of the community. The City and County would like to see serious commitment to approaches that maximize removal of contamination in the area outside of the containment area.

**14. Other unknown, potential source areas outside of the containment area may exist and may be covered or not identified in the soil remedy. These potential additional source areas need to identified and remediated in the final remedy.**

Inspection of historic aerial photographs for the site indicates the potential presence of disposal trenches in the northern portion of the site. In addition, former site workers and local residents have indicated that some portions of the site may have been used for buried drum disposal or other waste disposal activities. Considering that the site was used as a heavy industrial facility for nearly 100 years, there is a significant possibility that areas of the site in addition to those currently being considered for remediation to have been used for waste disposal practices. USEPA should implement a site-wide screening and investigation to evaluate the presence of additional disposal or source areas at the site and conduct appropriate removal or treatment any additional source areas identified.

**15. The off-site delineation of soil contamination is incomplete and must be expedited, in particular in the adjacent residential neighborhood in which residents continue to be exposed to Koppers contamination.**

**The City and County strongly support the proposed USEPA plan to complete the delineation of dioxin and other offsite contaminants to the State of Florida residential SCTLs for residential properties and FDEP commercial SCTLs for commercial properties. The City and County are against any effort to develop alternate clean-up standards for these offsite properties that will provide a lesser degree of protection of our citizens. State of Florida Residential SCTLs should also be met on all properties currently associated with residential uses.**

**Additional offsite soil sampling needs to be performed sufficiently beyond the point where the FDEP SCTLs are initially achieved to confirm that soil concentrations remain at or below the FDEP SCTL levels.**

**Additional offsite sampling should also be performed on and west of NW 6th Street west of the Koppers site to assure that commercial and residential areas on and west of NW 6th Street have not been impacted.**

**Additional offsite soil sampling should be performed on nearby school properties to confirm that these soils do not pose a risk to children's health.**

**Irrigation wells on nearby contamination impacted properties that are proposed for remediation in the offsite soil remedy should be identified by USEPA, sampled and tested for Koppers chemicals of concern and properly abandoned if determined to be contaminated or pose a threat to water quality.**

The investigation into the extent of contamination at this site has been ongoing for several decades and is still incomplete. Based on recently obtained offsite soils data, it appears that residents adjacent to the site have been exposed to contamination from the Koppers site that has migrated onto their property. The City and County are concerned about the length of time it has taken USEPA to complete the offsite delineation of contaminated properties and reduce the exposure potential to offsite residents. The City and County urgently request that USEPA expedite the delineation and remediation of off-site contaminated areas.

The City and County are concerned that planned USEPA delineation of contamination on residential and commercial property in the neighborhood west of the Koppers site may cease when FDEP Residential SCTLs are reached on residential properties or FDEP commercial SCTLs are reached on commercial properties near the east side of NW 6$^{th}$ Street. Since commercial standards are higher than residential standards and the potential that windborne contaminants may have historically impacted a wider area, the achievement of commercial standards on the properties east of NW 6$^{th}$ Street may not provide assurance that either commercial or residential SCTLs are achieved on commercial and residential properties west of NW 6$^{th}$ Street. There are residential properties immediately west of NW 6$^{th}$ Street that should be investigated to assure residents that there are no impacts from Koppers contamination. The City and County are requesting that delineating the extent of soil contamination must include soil sampling on and west of NW 6$^{th}$ Street.

In addition, offsite sampling needs to be performed sufficiently beyond the point where the FDEP SCTLs are initially achieved to confirm that soil concentrations remain at or below the FDEP SCTL levels. In particular, the City and County and the local citizens are requesting that USEPA collect and analyze additional soil samples in the residential areas to the north of NW 33$^{rd}$ Ave north of the Koppers site. Although several soil samples along the southern right of way along NW 33$^{rd}$ Avenue were found not to contain contamination above the FDEP residential SCTL, considering the statistical variability and imprecision associated with sampling and testing for very low levels of dioxins in soils, the long term nature of historical discharges from the Koppers site, the shifting wind patterns, variable tree cover and stormwater flows which may have created pathways for the spread of contamination, it is important to confirm that areas north of the 33$^{rd}$ Ave and other such assumed limits of contamination are in fact free from impacts.

This is especially important due to the increased citizen concern and apprehension about impacts to their health and property values from being perceived to be close to a contaminated zone.

Due to the presence of offsite soil contamination in nearby neighborhood rights-of-ways, concern has been raised by the community about the impact of Koppers related contaminants on the soils at nearby public and private schools. USEPA is requested to sample and test the surface soils of school properties within a 2 mile radius of the Koppers site to determine whether the soil concentration of contaminants poses any risks to human health.

Irrigation wells are known to exist on offsite residential properties adjacent to the Koppers site. These wells may have been impacted by Koppers contamination. USEPA is requested to locate, sample and test these wells during any remediation of offsite properties and to require the proper abandonment of those wells that are contaminated or pose a threat to aquifer water quality.

16. **The City and County and nearby residents are concerned about long term safety of USEPA proposed remedial plan for offsite contaminated soils which will allow property owners to select either excavation or engineering controls or institutional controls as the remedy for offsite properties. USEPA should restrict the use of engineering or institutional controls for offsite properties, especially those that will remain in separate individual resident ownership where it will be difficult to enforce institutional controls. USEPA should require that offsite residential properties are cleaned using removal and restoration as a preferred remedy rather than engineering or institutional controls.**

Allowing engineering or institutional controls to be an option for offsite properties at the discretion of the property owner instead of requiring excavation of contamination and restoration raises significant concerns if the current property owner or future property owner does not abide by the engineering or institutional restrictions. This could cause the contamination in the soils to be exposed and cause a health risk to the new property owner and adjacent neighbors. This would be of particular concern with residential properties, although it is also a concern for commercial properties. The City and County want to avoid the possibility of creating a "hodgepodge" scattered pattern of cleaned and not cleaned properties in the neighborhood which will cause environmental concerns for future human exposure to toxic contaminants to remain in the neighborhood as well as impact property values. The City and County request that USEPA restrict the use of engineering or institutional controls on offsite properties that will remain in separate individual property ownership where engineering or institutional controls cannot be practically enforced or monitored.

# 3.0 OTHER OFFSITE IMPACTS

## COMMENTS AND RECOMMENDATIONS

**17. Neighboring residents to the Koppers site have expressed concern about the potential for indoor contamination of their homes. The Florida Department of Health has requested that USEPA require Beazer East investigate and clean-up nearby structures that have dust with site related contaminants that pose an unacceptable risk to human health. The City and County request that USEPA conduct appropriate investigations including sampling and take necessary remedial actions to address this issue.**

Residents living west of the Koppers site have communicated to local government officials their concerns about potential indoor contamination of their residences based on independent testing using a USEPA screening analytical method for dioxin-like chemicals. The reliability of these test data have not been evaluated by the City, County or the local Health Department. However, because much of the migration of contamination from the Koppers site to offsite residential property likely occurred via air-borne transport of small particulates (i.e., contaminated dirt and dust) it is reasonable to expect that offsite properties with soil contamination may also have experienced deposition of these same particulates inside the homes.

The Florida Department of Health (FDOH) in a September 24, 2010 letter to Mr. Scott Miller of USEPA stated that "EPA should require the responsible party to investigate site related contaminants in the dust of nearby homes, schools, and businesses." The FDOH letter stated that "the 2009 AMEC Earth and Environmental, Inc. report is inadequate to assess this issue since it only addresses on site dust deposition under current conditions and does not address past off-site dust deposition. The report further states that the "EPA should require the responsible party to remediate nearby buildings found to have dust with site related contaminants at levels that pose an unacceptable health risk".

Because of the reasonable assumption that nearby homes and structures, structures may be contaminated, the recommendation of FDOH and the increasing anxiety of local residents concerning this issue, the City and County request that USEPA expeditiously take whatever actions are necessary to investigate and address this issue including sampling within nearby homes, businesses and schools (with the property owners consent) in the area to determine the degree to which the interiors of these structures may have been impacted by contamination from the Koppers site and take appropriate remedial actions.

**18. The City and County recommend that USEPA identify and facilitate the mobilization of resources to address adverse health effects of individuals via a door-to-door health study in the neighborhood affected by the Koppers Superfund site contaminants, including but not limited to dioxins. To the extent that adverse health impacts are found to result from the Koppers offsite contamination, the USEPA is requested to enforce financial responsibility requirements on Beazer East.**

Neighboring residents to the Koppers Superfund site have expressed to the local City and County officials and the Alachua County Health Department/Florida Department of Health their concern about what they believe to be adverse health impacts to residents in the neighborhood west of the Koppers site that they believe may be linked to Koppers site contaminants. The City and County believe it is important to investigate these concerns and request that USEPA identify and facilitate the mobilization of resources to address adverse health effects of individuals via a door-to-door health survey in the neighborhood affected by Koppers site contaminants, including but not limited to dioxins. To the extent that adverse health impacts are found to result from the Koppers offsite contamination, the USEPA is requested to enforce financial responsibility requirements on Beazer East.

**19. USEPA should provide for permanent relocation assistance for residents near the Koppers site. Temporary relocation assistance should also be provided for residents if desired by the residents during offsite and on-site remediation activities.**

**The USEPA should also calculate the lost property value of homes impacted by contamination from the Koppers site and address the issue of providing compensation for property owners.**

Relocation assistance for temporary and permanent relocation of residents adjacent to Superfund sites has been provided or required by USEPA at other Superfund site with similar contamination as the Koppers site and with similar proximity to residential property and receptors. Such relocation assistance is appropriate during remediation activities involving a large degree of soil disturbance such as is contemplated in the proposed plan. Such actions have a significant potential for creating further offsite impacts.

For these reasons, USEPA should provide for temporary relocation assistance to residents adjacent to or near the site during soil remediation activities. This relocation assistance is especially important for residents that are most vulnerable to potential health impacts, such as the elderly, very young or pregnant residents, or those with existing respiratory or related health problems. USEPA should also offer the option for permanent relocation of residents living on properties that are within the delineated area impacted by contaminants from the site as a means to reduce their ongoing exposure.

Neighboring residents to the west of the Koppers site have reported to local government that their property values have been significantly negatively impacted by the recent discovery of contamination above FDEP SCTLs in the rights of ways in their neighborhood. Planned residential property sampling in the neighborhood may confirm that the contamination is widespread in the neighborhood. While USEPA's proposed plan calls for the clean-up of contaminated offsite soils, there is a contamination stigma now attached to these properties. The City and County request that USEPA address this situation by calculating the lost property value of the homes impacted by the contamination in the neighborhood and providing compensation to impacted property owners.

# 4.0 STORMWATER REMEDY

## COMMENTS AND RECOMMENDATIONS

**20. The Proposed Plan is overly brief in stormwater strategy and controls that are integral elements of the remedial action plan for the Site. The Plan does not include strategy, design criteria, essential site data and final cover landscaping descriptions. Additionally, the stormwater remedy should include the use of an underground pipe to replace the open stormwater ditch on the site.**

**The City and County requests that USEPA acknowledge these critical issues in the ROD and that USEPA commit to addressing them in the Remedial Design document.**

The Proposed Plan does not include strategy, design criteria, essential site data and final cover landscaping descriptions. This information is essential to the City of Gainesville and the public to assess the quality of the plan in addressing pertinent stormwater issues and assessing the consistency of the associated redevelopment benefits/barriers of the Plan with the City's 'Vision' for this piece of Gainesville. Critical stormwater design and control issues that should be acknowledged and addressed in the ROD and Remedial Design documents include options for: 1) management of westerly neighborhood stormwater flows; 2) major ditch flows in conflict with the containment area; and 3) east side site stormwater flows where the containment area is very close to the property line. Conceptual level descriptions of these will aid in the review and understanding more fully the consequences of the choices posed in the proposed plan.

Control issues should include development of: 1) design criteria for stormwater; 2) soils data for the remaining former work area of the Site, and; 3) landscaping descriptions. The stormwater design criteria should include local industry standards as well as City of Gainesville requirements for the Hogtown Creek basin. These criteria should also include an analysis that determines the likely soil particle size to provide transport to site pollutants during storm flows. This analysis can then be used to determine the appropriate detention time for the basin(s) needed to capture the majority of those particles. Soil data is needed on the remainder of the former work area to determine thickness and extent of the compacted soil. This data will lead to an action plan to return the parent soil infiltration rate. Finally, outline work descriptions and specifications are needed for landscaping. This information is essential to evaluating elements of the stormwater design criteria and making judgments on how 'finished' the Site will be for future use.

The City and County request that Remedial Design and Proposed Plan include a commitment to implement a piped conveyance instead of an open stormwater ditch for the stormwater leaving NW 23$^{rd}$ Avenue and crossing the site. This will minimize potential transport of contaminated sediments from the site.

# 5.0 CREEK SEDIMENT REMEDY

## COMMENTS AND RECOMMENDATIONS

**21. Cleanup of the sediments in Hogtown and Springstead Creeks is proposed only for those areas where contaminants exceed benthic Probable Effects Concentrations (PECs). However, FDEP has determined that exposed creek sediments potentially pose human health risks.**

**Contaminated sediments in both Hogtown and Springstead Creeks and the on-site and offsite stormwater ditches that lead to Springstead Creek must be excavated to the more stringent of the FDEP residential SCTL or the PEC for each chemical of concern. Excavated sediments should not be consolidated on-site.**

In the Proposed Plan, USEPA has indicated that it plans to remediate creek sediments only where contamination exceeds the benthic Probable Effects Concentrations (PEC). This is inadequate.

FDEP has concluded that the exposed contaminated soils in the streambed and in other exposed sediments in these creeks pose a potential human health risk. Additionally, cleanup of the on-site and off-site stromwater ditches that lead to Springstead Creek is not addressed in the Proposed Plan.

For these reasons, contaminated sediments in both Hogtown and Springstead Creeks and the onsite and offsite ditches must be excavated to the more stringent of the FDEP residential SCTL or the PEC for each chemical of concern. Appropriate sediment confirmation sampling must be done after remediation to confirm that the excavation of these sediments is adequate.

The USEPA proposed plan states that contaminated sediments above FDEP criteria will be excavated from the creeks. Since the creek contamination may be linked to historical discharges from the former Cabot site as well as from the Koppers site, it is not clear which responsible party will be responsible for the remediation. The City and County understand that the Cabot Corporation has proposed a plan to remove tarry contamination from several locations in Springstead and Hogtown Creek. Review of this plan indicates that contaminated sediments will be disposed of off-site at an approved landfill. Therefore the USEPA proposal to move sediments on site is confusing and contradictory. USEPA should require that excavated, contaminated creek and ditch sediments be disposed of properly in an approve landfill and not stockpiled on site.

# 6.0 ADDITIONAL COMMENTS

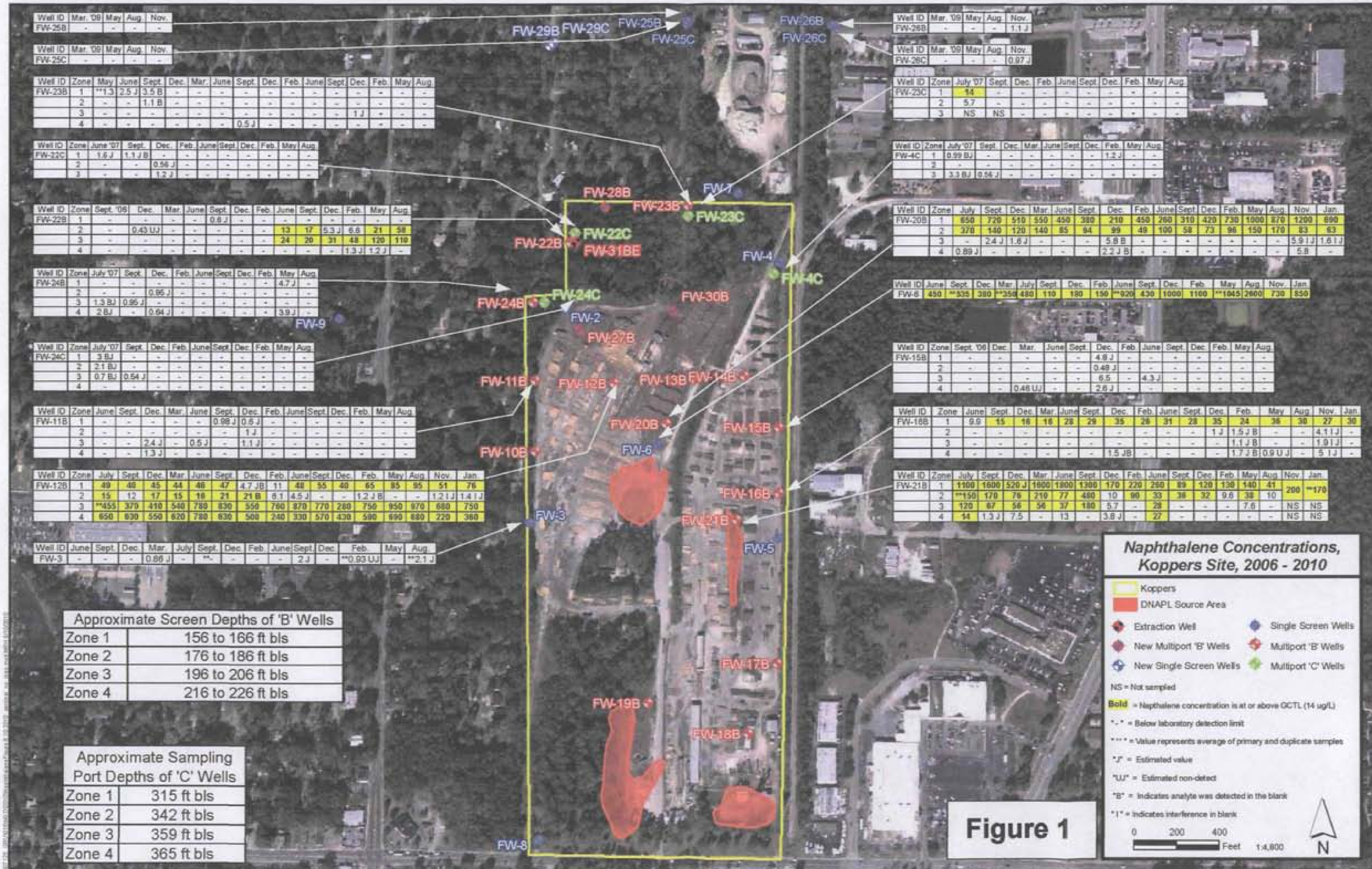
22. **The USEPA should make available in the local repository a complete Site file containing all project documents, correspondence and data related to the remedial investigation, risk assessment, feasibility study and remedial technology evaluation for the Koppers Superfund site.**

    **Additionally, the City and County request that additional relevant documents be added to the Administrative Record File. The documents requested to be added to the Administrative Record file are contained in the attached electronic files (CD attached).**

    The City and County support and acknowledge that certain requests have been made to USEPA from the local community, including the group Protect Gainesville's Citizen's, Inc. (PGCI), seeking local access to the complete Site File documents and requesting that additional relevant documents be added to the Administrative Record. On June 1, 2010, the Mayor of Gainesville sent a letter to USEPA requesting that the information requested by PCGI be provide as soon as possible. A complete Site File has not been made readily available by USEPA to the community in the local repository. USEPA has provided a CD containing the Administrative Record to the local repository. However, there are many documents that we and/or local citizens believe are relevant to the site which are not part of the AR and are not in the local repository. Therefore, the City and County request the following:

    1) The USEPA make available in the local repository a complete Site file containing all project documents, correspondence and data related to the remedial investigation, risk assessment, feasibility study and remedial technology evaluation for the Koppers Superfund site, and

    2) Additional relevant documents identified by our citizens and City and County staff should be added to the Administrative Record File. The documents requested to be added to the Administrative Record file are provided as electronic files in the CD attached to this document and should be considered part of this document.




| Well ID | Mar. '09 | May | Aug. | Nov. |
|---|---|---|---|---|
| FW-25B | - | - | - | - |

| Well ID | Mar. '09 | May | Aug. | Nov. |
|---|---|---|---|---|
| FW-25C | - | - | - | - |

| Well ID | Zone | May | June | Sept. | Dec. | Mar. | June | Sept. | Dec. | Feb. | June | Sept. | Dec. | Feb. | May | Aug. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FW-23B | 1 | **1.3 | 2.5 J | 3.5 B | - | - | - | - | - | - | - | - | - | - | - | - |
| | 2 | - | - | 1.1 B | - | - | - | - | - | - | - | - | - | - | - | - |
| | 3 | - | - | - | - | - | - | - | - | - | - | - | 1 J | - | - | - |
| | 4 | - | - | - | - | - | - | 0.5 J | - | - | - | - | - | - | - | - |

| Well ID | Zone | June '07 | Sept. | Dec. | Feb. | June | Sept. | Dec. | Feb. | May | Aug. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| FW-22C | 1 | 1.6 J | 1.1 J B | - | - | - | - | - | - | - | - |
| | 2 | - | - | 0.56 J | - | - | - | - | - | - | - |
| | 3 | - | - | 1.2 J | - | - | - | - | - | - | - |

| Well ID | Zone | Sept. '06 | Dec. | Mar. | June | Sept. | Dec. | Feb. | June | Sept. | Dec. | Feb. | May | Aug. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FW-22B | 1 | - | - | - | - | 0.8 J | - | - | - | - | - | - | - | - |
| | 2 | - | 0.43 UJ | - | - | - | - | - | **13** | **17** | 5.3 J | 6.6 | **21** | **58** |
| | 3 | - | - | - | - | - | - | - | **24** | **20** | **31** | **48** | **120** | **110** |
| | 4 | - | - | - | - | - | - | - | - | - | - | 1.3 J | 1.2 J | - |

| Well ID | Zone | July '07 | Sept. | Dec. | Feb. | June | Sept. | Dec. | Feb. | May | Aug. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| FW-24B | 1 | - | - | - | - | - | - | - | - | 4.7 J | - |
| | 2 | - | - | 0.86 J | - | - | - | - | - | - | - |
| | 3 | 1.3 BJ | 0.95 J | - | - | - | - | - | - | - | - |
| | 4 | 2 BJ | - | 0.64 J | - | - | - | - | - | 3.9 J | - |

| Well ID | Zone | July '07 | Sept. | Dec. | Feb. | June | Sept. | Dec. | Feb. | May | Aug. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| FW-24C | 1 | 3 BJ | - | - | - | - | - | - | - | - | - |
| | 2 | 2.1 BJ | - | - | - | - | - | - | - | - | - |
| | 3 | 0.7 BJ | 0.54 J | - | - | - | - | - | - | - | - |
| | 4 | - | - | - | - | - | - | - | - | - | - |

| Well ID | Zone | June | Sept. | Dec. | Mar. | June | Sept. | Dec. | Feb. | June | Sept. | Dec. | Feb. | May | Aug. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FW-11B | 1 | - | - | - | - | - | 0.98 J | 0.5 J | - | - | - | - | - | - | - |
| | 2 | - | - | - | - | - | - | 1 J | - | - | - | - | - | - | - |
| | 3 | - | - | 2.4 J | - | 0.5 J | - | 1.1 J | - | - | - | - | - | - | - |
| | 4 | - | - | 1.3 J | - | - | - | - | - | - | - | - | - | - | - |

| Well ID | Zone | July | Sept. | Dec. | Mar. | June | Sept. | Dec. | Feb. | June | Sept. | Dec. | Feb. | May | Aug. | Nov. | Jan. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FW-12B | 1 | **49** | **40** | **45** | **44** | **46** | **47** | 4.7 JB | 11 | **48** | **55** | **40** | **65** | **85** | **95** | **51** | **76** |
| | 2 | **15** | 12 | **17** | **15** | **16** | **21** | **21 B** | 8.1 | 4.5 J | - | - | 1.2 J B | - | - | 1.2 I J | 1.4 I J |
| | 3 | ****455** | **370** | **410** | **540** | **780** | **830** | **550** | **760** | **870** | **770** | **280** | **750** | **950** | **970** | **680** | **750** |
| | 4 | **650** | **830** | **550** | **620** | **780** | **830** | **500** | **240** | **330** | **570** | **430** | **590** | **690** | **680** | **220** | **360** |

| Well ID | June | Sept. | Dec. | Mar. | July | Sept. | Dec. | Feb. | June | Sept. | Dec. | Feb. | May | Aug. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FW-3 | - | - | - | 0.86 J | - | **- | - | - | - | 2 J | - | **0.93 UJ | - | **2.1 J |

| Well ID | Mar. '09 | May | Aug. | Nov. |
|---|---|---|---|---|
| FW-26B | - | - | - | 1.1 J |

| Well ID | Mar. '09 | May | Aug. | Nov. |
|---|---|---|---|---|
| FW-26C | - | - | - | 0.97 J |

| Well ID | Zone | July '07 | Sept. | Dec. | Feb. | June | Sept. | Dec. | Feb. | May | Aug. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| FW-23C | 1 | **14** | - | - | - | - | - | - | - | - | - |
| | 2 | 5.7 | - | - | - | - | - | - | - | - | - |
| | 3 | NS | NS | - | - | - | - | - | - | - | - |

| Well ID | Zone | July '07 | Sept. | Dec. | Mar. | June | Sept. | Dec. | Feb. | May | Aug. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| FW-4C | 1 | 0.99 BJ | - | - | - | - | - | - | 1.2 J | - | - |
| | 2 | - | - | - | - | - | - | - | - | - | - |
| | 3 | 3.3 BJ | 0.56 J | - | - | - | - | - | - | - | - |

| Well ID | Zone | July | Sept. | Dec. | Mar. | June | Sept. | Dec. | Feb. | June | Sept. | Dec. | Feb. | May | Aug. | Nov. | Jan. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FW-20B | 1 | **650** | **720** | **510** | **550** | **450** | **380** | **210** | **450** | **260** | **310** | **420** | **730** | **1000** | **870** | **1200** | **690** |
| | 2 | **370** | **140** | **120** | **140** | **85** | **94** | **99** | **49** | **100** | **58** | **73** | **96** | **150** | **170** | **83** | **63** |
| | 3 | - | 2.4 J | 1.6 J | - | - | - | 5.8 B | - | - | - | - | - | - | - | 5.9 I J | 1.6 I J |
| | 4 | 0.89 J | - | - | - | - | - | 2.2 J B | - | - | - | - | - | - | - | 5.8 | - |

| Well ID | June | Sept. | Dec. | Mar. | July | Sept. | Dec. | Feb. | June | Sept. | Dec. | Feb. | May | Aug. | Nov. | Jan. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FW-6 | **450** | ****535** | **380** | ****350** | **480** | **110** | **180** | **150** | ****920** | **430** | **1000** | **1100** | ****1045** | **2600** | **730** | **850** |

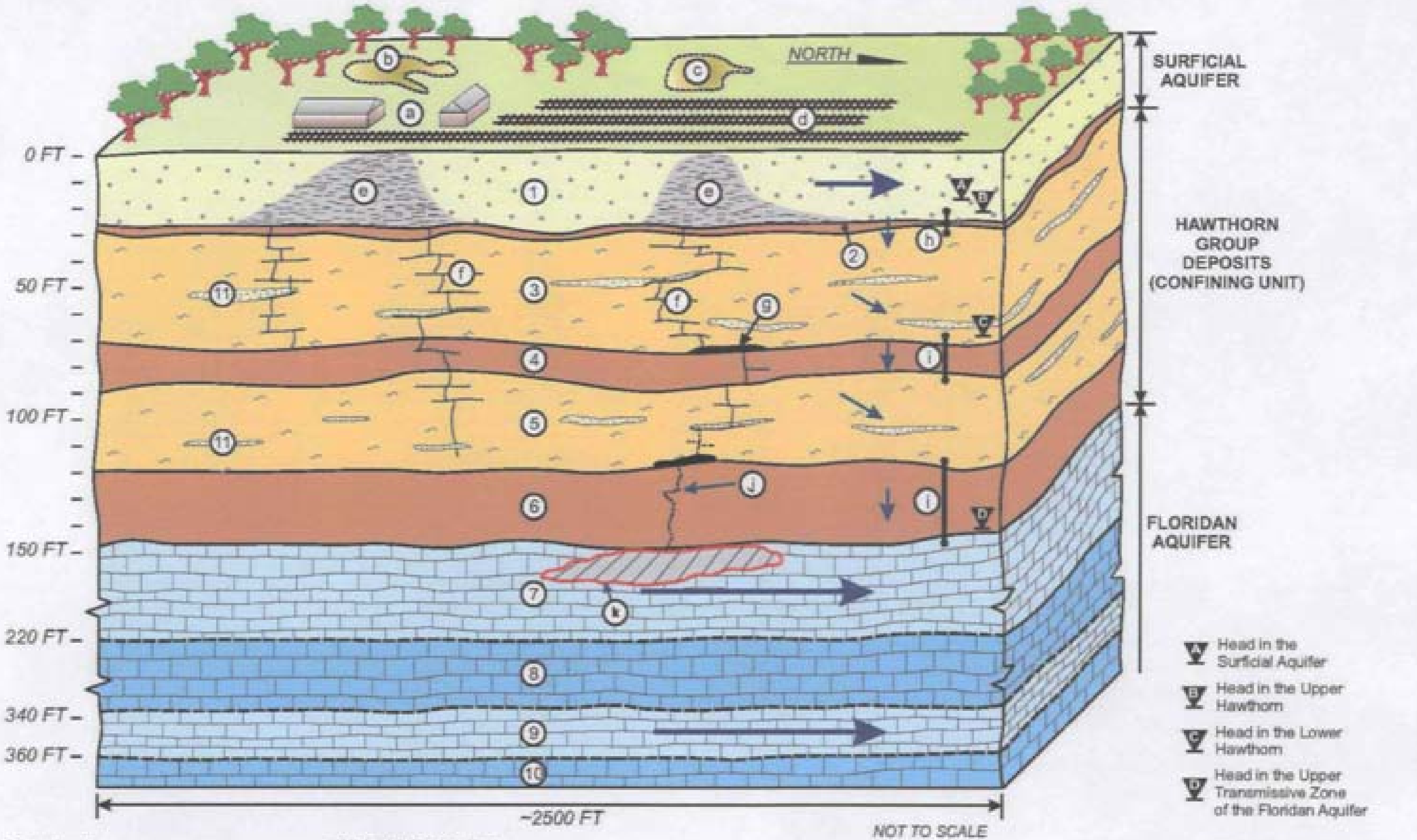
| Well ID | Zone | Sept. '06 | Dec. | Mar. | June | Sept. | Dec. | Feb. | June | Sept. | Dec. | Feb. | May | Aug. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FW-15B | 1 | - | - | - | - | - | 4.8 J | - | - | - | - | - | - | - |
| | 2 | - | - | - | - | - | 0.48 J | - | - | - | - | - | - | - |
| | 3 | - | - | - | - | - | 6.5 | - | 4.3 J | - | - | - | - | - |
| | 4 | - | - | 0.46 UJ | - | - | 2.6 J | - | - | - | - | - | - | - |

| Well ID | Zone | June | Sept. | Dec. | Mar. | June | Sept. | Dec. | Feb. | June | Sept. | Dec. | Feb. | May | Aug. | Nov. | Jan. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FW-16B | 1 | 9.9 | **15** | **16** | **16** | **28** | **29** | **35** | **26** | **31** | **28** | **35** | **24** | **36** | **30** | **27** | **30** |
| | 2 | - | - | - | - | - | - | - | - | - | - | 1 J | 1.5 J B | - | - | 4.1 I J | - |
| | 3 | - | - | - | - | - | - | - | - | - | - | - | 1.1 J B | - | - | 1.9 I J | - |
| | 4 | - | - | - | - | - | - | 1.5 JB | - | - | - | - | 1.7 J B | 0.9 U J | - | 5 I J | - |

| Well ID | Zone | July | Sept. | Dec. | Mar. | June | Sept. | Dec. | Feb. | June | Sept. | Dec. | Feb. | May | Aug. | Nov. | Jan. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FW-21B | 1 | **1100** | **1600** | **520 J** | **1600** | **1800** | **1300** | **170** | **220** | **250** | **89** | **120** | **130** | **140** | **41** | **200** | ****170** |
| | 2 | ****150** | **170** | **76** | **210** | **77** | **480** | 10 | **90** | **33** | **36** | **32** | 9.6 | **38** | 10 | | |
| | 3 | **120** | **67** | **56** | **56** | **37** | **180** | 5.7 | - | **28** | - | - | - | 7.6 | - | NS | NS |
| | 4 | **14** | 1.3 J | 7.5 | - | 13 | - | 3.8 J | - | **27** | - | - | - | - | - | NS | NS |

| Approximate Screen Depths of 'B' Wells | |
|---|---|
| Zone 1 | 156 to 166 ft bls |
| Zone 2 | 176 to 186 ft bls |
| Zone 3 | 196 to 206 ft bls |
| Zone 4 | 216 to 226 ft bls |

| Approximate Sampling Port Depths of 'C' Wells | |
|---|---|
| Zone 1 | 315 ft bls |
| Zone 2 | 342 ft bls |
| Zone 3 | 359 ft bls |
| Zone 4 | 365 ft bls |



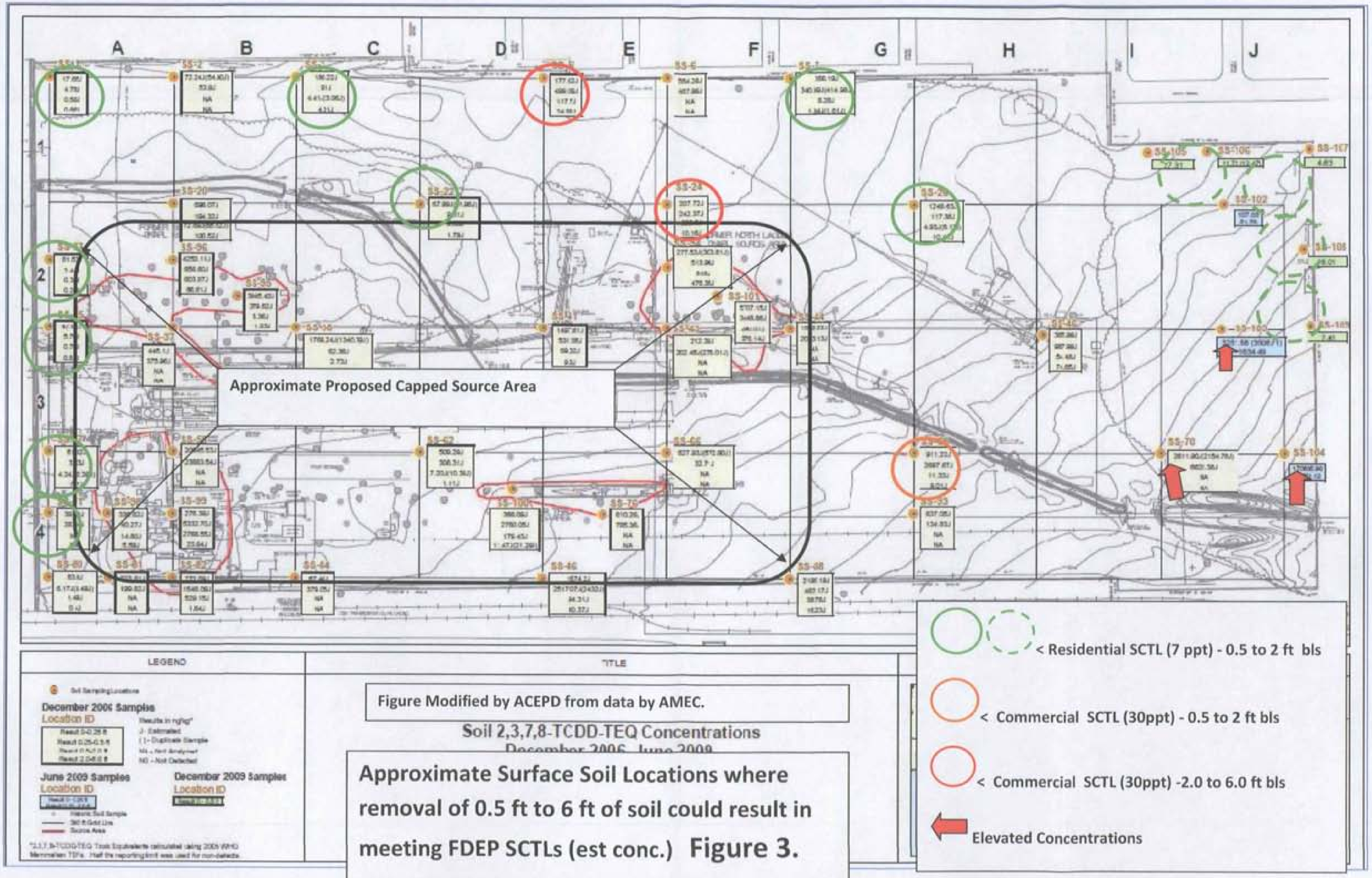

1) Surficial Aquifer
2) Hawthorn Group - Upper Clay
3) Hawthorn Group - Upper Hawthorn
4) Hawthorn Group - Middle Clay
5) Hawthorn Group - Lower Hawthorn
6) Hawthorn Group - Lower Clay
7) Floridan Aquifer - Upper Transmissive Zone
8) Floridan Aquifer - Semi-Confining Zone
9) Floridan Aquifer - Lower Transmissive Zone
10) Floridan Aquifer - Semi-Confining Zone
11) Discontinuous Sandy Interbeds

a) Former Process Area
b) Former South Lagoon
c) Former North Lagoon
d) Former Drip Track
e) Soils with Residual DNAPL
f) Sparse Seams of Residual DNAPL
g) Sparse Seams of Locally Continuous DNAPL
h) Moderate Vertical Hydraulic Gradient (~1 ft/ft)
i) Large Vertcial Hydraulic Gradient (~3 ft/ft)
**j) Migration of dissolved and/or DNAPL Phase contamination through LHG clay**
**k) Floridan Aquifer dissolved phase plume**

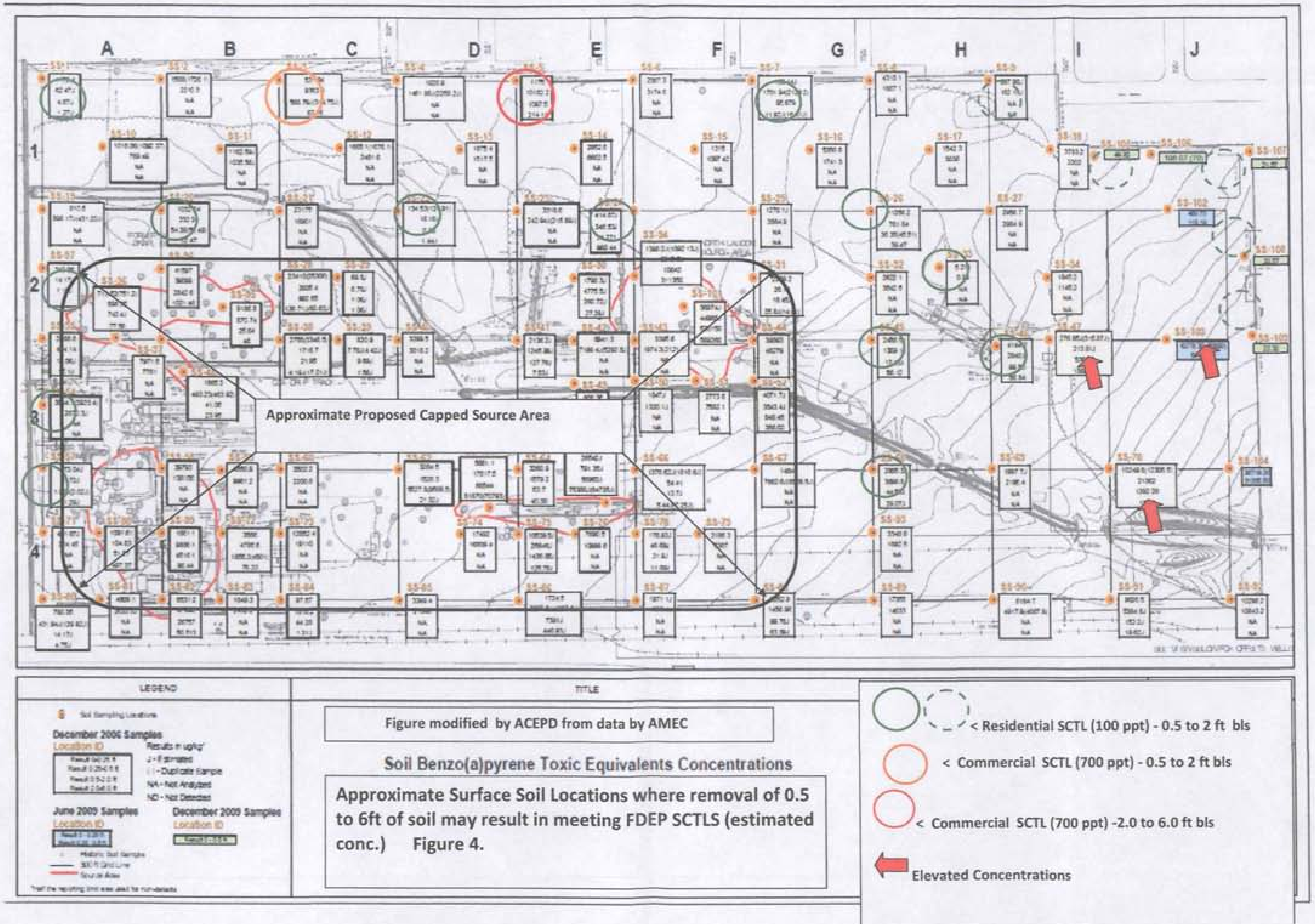
Note:
There are uncertainties associated with the conceptual understanding presented in this figure.

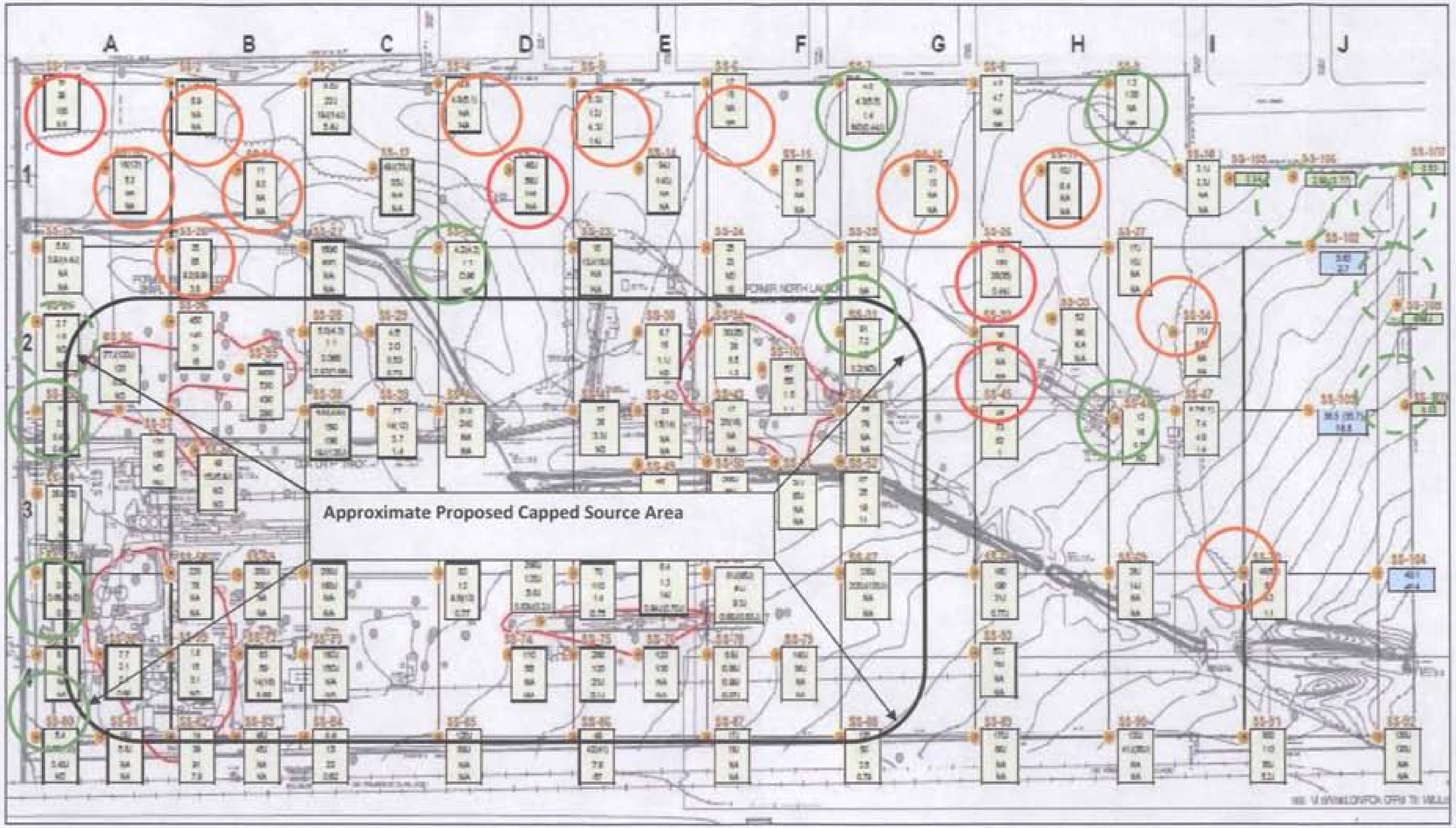
GROUNDWATER FLOW (SIZE INDICATIVE OF APPROXIMATE RELATIVE MAGNITUDE)

Figure 2
Conceptual Block Diagram **with Proposed Modifications**
Cabot Carbon/Koppers Superfund Site, Gainesville, Florida



A
B
C
D
E
F
G
H
I
J
1
2
3
4
Approximate Proposed Capped Source Area
LEGEND
TITLE
December 2006 Samples
Location ID
June 2009 Samples
Location ID
December 2009 Samples
Location ID
Figure Modified by ACEPD from data by AMEC.
Soil 2,3,7,8-TCDD-TEQ Concentrations
Approximate Surface Soil Locations where removal of 0.5 ft to 6 ft of soil could result in meeting FDEP SCTLs (est conc.)
Figure 3.
< Residential SCTL (7 ppt) - 0.5 to 2 ft bls
< Commercial SCTL (30ppt) - 0.5 to 2 ft bls
< Commercial SCTL (30ppt) -2.0 to 6.0 ft bls
Elevated Concentrations


A
B
C
D
E
F
G
H
I
J
1
2
3
4
Approximate Proposed Capped Source Area
LEGEND
TITLE
December 2006 Samples
June 2009 Samples
December 2005 Samples
Figure modified by ACEPD from data by AMEC
Soil Benzo(a)pyrene Toxic Equivalents Concentrations
Approximate Surface Soil Locations where removal of 0.5 to 6ft of soil may result in meeting FDEP SCTLS (estimated conc.) Figure 4.
< Residential SCTL (100 ppt) - 0.5 to 2 ft bls
< Commercial SCTL (700 ppt) - 0.5 to 2 ft bls
< Commercial SCTL (700 ppt) -2.0 to 6.0 ft bls
Elevated Concentrations




LEGEND

Soil Sampling Locations

December 2006 Samples

Location ID

June 2009 Samples

December 2009 Samples

Historic Soil Sample

300 ft Grid Line

Source Area

TITLE

Figure modified by ACEPD from data by AMEC

Soil Arsenic Concentrations

**Approximate Surface Soil Locations where removal of 0.5 to 6ft of soil may result in meeting FDEP SCTLS (estimated conc.)**

**Figure 5**

< Residential SCTL (2.1 ppm) - .5 to 2 ft bls

< Commercial SCTL (12 ppm) - 0.5 to 2.0 ft bls

< Commercial SCTL (12 ppm) - 2.0 to 6.0 ft bls

Elevated Concentrations

# Attachment A
# Comments on ISBS Treatment at Koppers, Denver, Neil R. Thomson, August 24, 2010

# Comments on ISBS Treatment at Koppers, Denver

Neil R. Thomson
August 24, 2010

## Phase 1 (2003)

### Background

**Treatment Target**

- LNAPL in Zone A (alluvial deposits/cobbly sand)
- 8% saturation
- creosote/pentachlorophenol NAPLs (LNAPL in Zone A and DNAPL in Zone B)
- 2 foot thick saturated zone
- "Data indicate that most NAPL accumulations at the site are at or below residual saturation, and are therefore immobile" (pg 3)
- "results of laboratory analysis support in-situ pilot tests that demonstrate significant LNAPL and DNAPL recovery is technically impracticable at the site" (pg 3)
- pilot scale area 75 ft x 95 ft in off-site area
- 13 injection points (5 ft screen) installed to top of Zone B (bedrock)
- 1,850 gallons (7000 L) of 30 g/L $KMnO_4$ per well in 2 episodes at low pressure

**Relevant Treatment Objectives**

- "reduce the free-phase NAPL thickness and recovery volumes in wells within the defined test area" (pg 3)
- "evaluate the ability of the ISBS processes to stabilize creosote/penta NAPL residuals" (pg 4)

**Performance Monitoring**

- monitoring of 17 wells (field parameters only)
- water level and NAPL thickness
- soil borings (5 in treatment area and 2 (controls) in up-gradient on-site area) to top of Zone B
- samples from borings analysed for total PAHs/penta and leachable PAHs/penta

**Results**

R1. "discernible" decrease in LNAPL thickness in wells in treatment area and no "discernible" LNAPL thickness in wells outside treatment area (pg 15)

R2. following treatment NAPL recovery decreased by greater than 40% in 4 of 5 wells (pg 16)

R3. comparisons between the treated and background soil boring samples
- "indicate a 19% decrease in the total PAH residual mass" (pg 16)
- "indicate a 76% decrease in the total PAH leachable from the treated soils" (pg 17)
- indicate "a 53% reduction in the residual mass of total chlorinated phenols" (pg 17)
- indicate "no differences in the amounts of leachable chlorinated phenols between the treated and un-treated soils" (pg 17)

**Issues**

1. If the NAPL was truly non-mobile then why was if being collected in wells? Seems like a site characterization problem and a flaw in the CSM.

2. It is well known that hydraulic fluctuations can alter LNAPL distribution and the observed thicknesses in wells. The injection of 91,000 L of 30 g/L permanganate solution into the treatment zone would have caused substantial changes in the hydraulic regime in this area clearly impacting the LNAPL distribution. The non-treatment area did not receive an equivalent hydraulic perturbation and hence this is not a fair comparison. Results R1 and R2, which are jointly connected, are not supported by the site data collected. Moreover, NAPL flow into wells can be a highly transient and sporadic process. Little pre-treatment NAPL thickness time series data were collected and no attempt at a trend analysis (aside from visual) was reported.

3. Use of soil boring data to make conclusive statements about the treatability of a heterogeneous NAPL impacted zone is plagued with numerous problems related to "representativeness". To have any confidence in the results an appropriate statistical sample population is required.

   The statements listed under R3 are based on 2 background (control) samples and 4 treatment samples. Two samples are insufficient to calculate a sample variance. Data in Tables 4 to 7 indicate other sample data were available but excluded from the calculations with no justification.

   The control samples are not really controls since they were not subjected to the same hydraulic conditions as the treatment samples – again an unfair comparison.

   No statistical significance testing was preformed clearly ignoring the high degree of concentration variability in both the control and treatment samples. Table A (below) provides an example analysis for the total PAH soil residuals (data extracted from Table 4). The results indicate that the mean total PAH residual mass for the control and treatment cores are not statistically different (assuming that the standard assumptions hold for a *t*-test).

   In conclusion this sparse and highly variable data set does not appear to support the statements listed under R3 (note a comprehensive analysis of the all data would need to be undertake before a definitive conclusion could be supported).

Table A. Example statistical analysis.

| Statistic | Control | Treatment |
|---|---|---|
| | 13274 | 2515 |
| | 5916 | 10402 |
| | 11478 | 7207 |
| | 3587 | 10961 |
| n | 4 | 4 |
| mean | 8564 | 7771 |
| variance | 20819310 | 15013964 |
| STDEV | 4563 | 3875 |
| t stat | 0.265 | |
| t crit | 2.45 | (5% LOS) |
| accept null hypothesis / no difference between means | | |

## Phase 2 (2004)

### Background

### Treatment Target

- NAPLs on Dewy Lake Property (off site)
- area of 22,667 $ft^2$
- injection 350,000 L of 30 g/L $KMnO_4$ solution
- 44 injection points and 3 trenches (3 to 6 feet to top of bedrock)

### Relevant Treatment Objectives

- Not provided

### Performance Monitoring

- Not provided (some baseline soil samples were collected from 6 borings)

### Results

- Not provided

# Attachment B
# Comments on ISBS Pilot Scale Study Report,
# Neil R. Thomson,
# September 7, 2010

# Comments on ISBS Pilot Scale Study Report

Neil R. Thomson
September 07, 2010

I have reviewed the following documents associated with the ISBS Pilot Scale Test:

ISBS Pilot Test Final Report (dated January, 2009)
Appendix A - Phase I Field Report (dated March 31, 2008)
Appendix E - Drilling and Well Installation (dated April 2, 2008)
GRU Comments to Phase1-ISBS-Field Pilot Study Report (undated)
GRU Comments on the ISBS Pilot Study Report (dated February 27, 2009)
Beazer Response to ACEPD Comments on ISBS Report (dated June 1, 1009)
Beazer Response to GRU Comments on ISBS Report (dated June 1, 2009)
Mueller et al., Battelle ppt Presentation (May, 2010)

I will not repeat many of the comments made by both the GRU Team and the ACEPD, but will identify them at the appropriate location. Also, I will restrict this review to ISBS and not provide comments on the groundwater variance sampling issue.

For appropriate background and context for this review, I prepared a summary of permanganate oxidation of creosote NAPLs (Appendix A) that contains relevant discussion of permanganate chemistry, oxidation induced weathering, enhanced mass removal, precipitate formation, and the *in situ* bio-chemical stabilization (ISBS) concept. I have also provided a summary of the limited information I have been able to gather on the Carus RemOx EC Stabilisation Reagent which was used in this pilot test.

**Background Summary**

As stated on pg 9 of the ISBS Pilot Test Final Report, the specific objectives of this pilot study were to:

1. "Validate the ability of the ISBS reagent to stabilize NAPL residuals (defined herein as phase separated but non-mobile hydrocarbons)";
2. "Confirm the effectiveness of the selected construction methods to properly introduce the ISBS reagents into the subsurface";
3. "Identify the composition of the developed "crusts", degree of encapsulation, and reduction in permeability produced by ISBS"; and
4. "Estimate the longevity of the stabilized matrix under in situ conditions."

The approach was to apply the stabilization reagent (SR) in the surficial aquifer (SA) at the former North Lagoon Area. Groundwater flow is to the northeast at ~21 ft/day. The water table was ~12 ft bgs and the top of the HG upper clay is at ~ 20 ft bgs. Two different SR delivery methods were used in two areas: temporary injection points (TIPs) and direct injection points

(DIPs). Only 2 TIP (TIP-3 and TIP-4) were installed (screened between 9 and 19 ft bgs) to the bottom of the SA), and 16 DIP (using GeoProbe tools) were used.

TIP-3 received ~540 gallons and TIP-4 received ~40 gallons of 100 g/L (10%; SG of 1.12) SR at a pressure of 200 psi. At each DIP location a bottom up approach was used (18-20, 14-16, 9-11 ft bgs) to delivery 525 gallons of 45 g/L (4.5%; SG of 1.05 to 1.10) SR at a pressure between 25-75 psi. Some shallow intervals were skipped due to day-lighting of the SR.

**Performance Monitoring and Methods**

Unfortunately, the only form of performance monitoring was soil cores. According to the ISBS Pilot Test Final Report "mobile NAPL does not exist in the monitoring area".

Pre-injection cores (various names; 3 in each area), SR verification cores (VB-1 to VB-7) and post-injection cores (DVB-1 to DVB-3, and TVB-1 to TVB-3) were collected.

Pre-injection cores were collected with Rotosonic drilling (does not yield intact cores). Each 2 ft long core was split into 3 sections. Each section was homogenized and sampled. A 200 g sample was leached (at 150 mL/day to generate 2 L over 14 days) and the leachate and leached soil were sampled.

SR verification cores were collected to estimate zone of influence and SR distribution.

Post-injection cores were collected 60 days after injection using a GeoProbe macro-core direct push sampler. Attempts were made to sample the same depth interval as the pre-injection cores. Only one homogenized sample over the 2 ft core length was available for use (sampled and leaching). The leachate generation procedure used for the pre-injection cores was not possible due to slow flow so an alternative method was used (soil sample added to jars for 1 week).

**Comments**

1. The test objectives seem reasonable; however, the methods used and data gathered do not provide sufficient evidence to satisfy <u>all</u> these objectives. For example the term stabilize has many meanings and in the context of this study a clear definition of the behaviour of the post stabilized system should be stated and then carefully addressed.
2. In the details provided in these documents there is no mention of design loading targets and pore volume sweep. These estimates are critical to this technology. What was the total oxidant demand estimate? How was this calculated? What was the expected consumption/interaction with the SA material (other reduced aquifer species)? What was the target objective for field application? How successful was this? What data were collected to demonstrate this? What lab-to-field scale-up relationships were used? The Battelle ppt slides indicate that some spatial coverage was expected for both the DIP and TIP injection areas, and details on application rate are provided. It is unclear how the specified oxidant loading (permanganate to soil mass) values were determined. It is surprising that the application rate for the DIP area was 10% of the pore volume and the application rate for the

TIP area was 4% of the pore volume. Given these low pore volume numbers and expected coverage areas I would have expected that the integrated system response would have been used as a performance metric rather that strategic soil cores. Slide 3 in the Battelle ppt presentation clearly recognizes that flux (mass load) reduction was expected, but yet this test was executed without collecting the information required to estimate this critical response.

3. The statement that the SR will "tend to migrate throughout the targeted treatment zone reacting preferentially with residual NAPL" is simply not correct. The SR will react with all reduced species present in a competitive manner.
4. High solution density will result in density induced flow and SR migration to at least the top of the Upper HG clay unit and deeper if possible. The data collected from the SR verification borings are not included nor is a comprehensive summary provided of the collected data– in my estimation there was not sufficient data collected in the critical areas (deep) to make a defendable conclusion.
5. The statements that the ISBS technology has an "inherent ability to "seek" vertical migration pathways and seal or entomb them in situ", and "preferential flow paths - both vertical and horizontal - should be treated and hydraulically sealed as a result of the ISBS precipitation reactions and COI encrustation" are not founded. NAPL presence will reduce the relative permeability and result in a bypassing of the SR around the zones most heavily impacted by DNAPL. The migration of the SR is controlled by the injection pressure and the formation permeability distribution (with the mobile and immobile NAPL in place). Once the injection phase is over, SR migration is controlled by ambient groundwater flow and - in this study large density effects too.
6. The solution density difference between TIP and DIP, and limited data on SR distribution does not allow for comparison between injection methods; therefore, Objective 2 was not achieved. There is also limited data to support the stated radius of influence. Moreover these delivery approaches resulted in much of the SR sinking to the bottom of the SA. While complete contact with all the NAPL is not a requirement of this technology a more complete "sweep" will provide a higher probability of the important SR/NAPL contact that is required (*GRU Team Comment 4*). In addition, the high injection pressures used for both the TIP and DIP locations are excessive – these pressures appear to exceed the total effective vertical stress and most likely resulted in liquefaction of the formation.
7. Appearance of the SR in the UH extraction well (UHG-EW-01) suggests that there exists a hydraulic connection between the SA and the Upper HG. Perhaps a well seal/construction problem or window/discontinuity in the Upper HG Clay.
8. Use of soil cores to make conclusive statements about the treatability of an impacted zone is problematic due to heterogeneities in both the NAPL distribution and lithology. Attempts at "core paring", while a step in the right direction, is plagued with the same issues. All conclusions based on the soil core data should be statistically based. This then calls for a sufficient number of representative samples for statistical analysis testing – the number collected in this study is limited and insufficient for a statistical based comparison. (*ACEPD Comment 2*)
9. Difference in leachate generation methods does not allow for an unbiased comparison. Bias is introduced and there is not enough information to sort out which direction (*GRU Team Comment 5*, and *ACEPD Comment 1*). The connection between slow leachate flow rate for the post-injection soils and the precipitate presence was not established – some concerns

related to differences in soil texture (*ACEPD Comment 8*). Again a problem comparing pre and post injection cores.

10. A mass balance should have been performed on the soil coil samples (soil concentration = leached concentration + remaining soil concentration). This would provide a check on the closure and quality of these data. Not enough data is provided to make these calculations independently. (*ACEPD Comments 3 and 4*)
11. The seven petrographic thin sections prepared from 5 individual core sections clearly support the local scale interaction between the SR and NAPL – precipitate formation at the NAPL interface and reduction in porosity (*GRU Team Comment 6*, and *ACEPD Comment 7*).
12. The mineralogy of the precipitates as stated are "aluminum silicate hydroxides" – where is the aluminum from and what happened to the mass of injected manganese? Perhaps some potential reactions could be provided to support this observation. Also more information related to the longevity of these fresh precipitates is warranted.
13. The translation of this local scale observation to a macro-scale phenomenon with an ensuing reduction in mass loading from the SA is not evident from this study (*GRU Team Comment 8*). No attempt was made to capture data to estimate this impact.

**Summary Comments related to the Pilot Scale Study Objectives**:

Since there are issues related to using soil cores and subsequent experimental methods there is insufficient evidence to show, at the scale of these injections, that the SR was able to stabilize NAPL residuals (Objective 1).

The concentration (which impacts the reactivity and density) of the injected SR at the TIP and DIP locations was different. As well some DIP locations received less SR volume. SR distribution data is limited. Hence little can be concluded on the two delivery methods used (Objective 2).

The petrographic thin sections provide conclusive evidence that precipitation occurred at the NAPL interface and reduced porosity was present at this observation scale. The connection to a permeability reduction is speculation, but at the scale of these observations can be justified (Objective 3). There is no indication on the spatial extent of these reductions.

There is no data in this study to support an estimate of the longevity of the stabilized matrix under *in situ* conditions (Objective 4). Speculation is provided based on the mineralogy of the observed precipitates.

**Some Issues Related to the EPA Proposed Plan**

The results from this pilot test do not demonstrate unequivocal success. Thus if ISBS (or ISGS) will be used to treat the vadose-zone and SA, and perhaps the Lower HG then additional pilot scale tests and treatability studies must be performed if this technology is to be employed at this site.

1. To optimize implementation, DNAPL impacts will need to be better characterized in all potential application areas and specifically in the Lower HG. Is the assumption that all the creosote NAPL is at or below residual saturation in the porous medium (immobile)?
2. Confirmation of SR delivery to target DNAPL zones will need to be developed. Note that the porous medium must be suitable for flushing SR (have sufficient K). The influence of heterogeneities on delivery performance will need to be established.
3. A high SR concentration is required to maximize the reaction – a balance needs to be made with respect to density effects.
4. Delivery to the NAPL must occur for the required precipitate formation to occur at a reaction interface close to the water/NAPL interface.
5. The role of NOD (reaction with other reduced aquifer species) must be understood to optimize delivery by avoiding unproductive SR consumption.
6. Performance metrics related to a quantifiable reduction in mass loading need to be established and then demonstrated at the pilot scale. For the SA this relates to a vertical mass loading into the Upper HG, and for the Lower HG this relates to both horizontal and vertical mass loadings. These metrics will have to be established and demonstrated both short (months) and long term (years).
7. Additional support for the expected longevity of the fresh precipitates is required.
8. Metals mobilization? It remains a concern.
9. Creosote is a complex mixture of 100's of compounds including polycyclic aromatic hydrocarbons (PAHs) and alkylated PAHs; phenolic compounds including cresols; and nitrogen-, sulfur-, and oxygen-heterocyclics including dibenzofurans, and hence *in situ* by-product generation and fate must be established. Will stable toxic by-products be generated?
10. Has permanganate reactivity with all COCs been established? Here is what I know (to be completed):

| COC | Permanganate Reactivity | Source |
|---|---|---|
| Naphthalene | yes | Forsey et al. (2010) |
| Acenaphthalene | ? | |
| 2-methylnaphthalene | yes | Forsey et al. (2010) |
| pentachlorophenol | ? | |
| arsenic | - | |
| carbazole | yes | Forsey et al. (2010) |
| dibenzofuran | not reactive | Forsey et al. (2010) |
| 1,1 biphenyl | not reactive | Forsey et al. (2010) |
| Phenol | ? | |
| 2-phenol | ? | |
| 2-methylphenol | ? | |
| 2,4-dimethylphenol | ? | |
| 3/4-methylphenol | ? | |
| Acenaphthene | yes | Forsey et al. (2010) |
| benzo(a)anthracene | ? | |

| | | |
|---|---|---|
| benzo(a)pyrene | ? | |
| benzo(b)fluoranthene | ? | |
| benzo(k)fluoranthene | ? | |
| chrysene | yes | Forsey et al. (2010) |
| bis(2-ethylhexyl) phthalate | ? | |
| fluoranthene | yes | Forsey et al. (2010) |
| fluorine | yes | Forsey et al. (2010) |
| n-nitrosodiphenylamine | ? | |
| phenanthrene | yes | Forsey et al. (2010) |
| benzene | no | Forsey et al. (2010) |

## APPENDIX A. Permanganate Oxidation of Creosote NAPLs

*Working Document* *N.R. Thomson*

**Relevant Permanganate Chemistry**

Little research has been directed at the treatment of creosote contamination and specifically the oxidation of arenes (i.e., compounds based on benzene rings such as benzene and toluene) by permanganate. Rudakov and Lobachev (1994), and Rudakov et al. (1996) proposed two parallel oxidation mechanisms for the permanganate oxidation of an alkylbenzene: (1) attack at the carbon hydrogen bond in the alkyl substituent, and (2) attack at the benzene ring.

Compounds comprising an alkyl substituent were found to be attacked predominately at the C-H bond in the alkyl group. For example the reaction of toluene with permanganate can be written as (Rudakov and Lobachev, 1994)

$$\begin{aligned} &C_6H_5CH_3 + OMnO_3^- \rightarrow \{C_6H_5H_2C\cdots H\cdots OMn(IV)O_3^-\} \\ &\rightarrow C_6H_5H_2COMn(V)O_2(OH^-) \rightarrow C_6H_5H_2COH + Mn(V)O_3^- \end{aligned} \tag{1}$$

where the final oxidation product is benzoic acid, and the manganese (V) is reduced to manganese dioxide ($Mn(IV)O_2$). The reactivity of the alkylbenzenes studied was determined to follow the energy required for homolysis of the C-H bond; that is the stronger the benzylic C-H bond the more resistant the compound was to oxidation. For example, in terms of benzylic C-H bond strength in the alkyl group

$$C_6H_5CH_3 > C_6H_5CH_2CH_3 > C_6H_5CH(CH_3)_2 \tag{2}$$

and therefore the relative reactivity order for these compounds is reversed. As bond strength decreases from a compound with a primary hydrogen (toluene) to the compound with a tertiary hydrogen (iso-propylbenzene), reactivity increases. Rudakov and Lobachev (1994) noted that this trend is similar to that exhibited by hydrogen atom abstraction by radicals and concluded that permanganate reacts in a similar fashion to an oxygen radical in the cleavage of the alkyl C-H bond despite the fact that permanganate itself has no radical character. If the reaction were a free radical reaction, the relative reactivity of the compounds could be inferred by examining the stability of the radical intermediate; however, the oxidation of these compounds by permanganate is not a free radical reaction but the relative reactivity trends are similar. By analogy, it is expected that intermediate compounds formed during permanganate oxidation exhibit similar stabilities. Therefore, compounds yielding reaction intermediates with high stability (low potential energy) will be less readily oxidized than those that yield intermediate compounds with lower stability (high potential energy).

The second mechanism proposed by Rudakov and Lobachev (1994) involves an attack by the permanganate anion on the aromatic ring and it proceeds via electrophilic aromatic substitution. In their examination of the relative contributions of the two oxidation pathways (i.e., C-H bond attack or electrophilic substitution), Rudakov and Lobachev (1994) suggested structural properties that would determine the dominant pathway. While attack at the C-H bond in the alkyl group was determined to be preferential, the contribution of this attack decreased with deactivation of the C-H bond and activation of the benzene ring with methyl groups.

Creosote contains a wide variety of alkylbenzenes, and alkyl substituted and non-substituted polycyclic aromatic hydrocarbons that are susceptible to oxidation by the two mechanisms stated.

Forsey et al. (2010) determined the permanganate second-order rate coefficients for some creosote constituents including:

biphenyl,
naphthalene,
anthracene,
phenanthrene ,
fluoranthene,
chrysene,
pyrene,
darbazole
dibenzofuran
1 -methylnaphthalene
2-methylnaphthalene
fluorene
acenaphthene
benzene
methylbenzene
ethylbenzene
Isopropylbenzene ,
tert-butylbenzene

The compounds investigated exhibit a wide range of reactivities that follow the two different suspected reaction mechanisms. Compounds such as pyrene that do not have benzylic hydrogens, but are observed to be reactive to permanganate, are likely oxidized by electrophilic aromatic substitution. Polycyclic aromatic hydrocarbons that have a benzylic hydrogen (e.g., 1-methylnapthalene) are susceptible to oxidation via an abstraction of a benzylic hydrogen and/or electrophilic aromatic substitution. For these compounds a strong correlation between the second-order rate coefficient and C-H bond dissociation energies implies that abstraction of the benzylic hydrogen is the dominant oxidation pathway. The susceptibility of a compound to electrophilic aromatic substitution generally increases with the number of arene rings, thus the reactivity increases in the series: naphthalene < phenanthrene < pyrene. The reactivity of PAHs can be predicted by considering likely intermediate compounds in the oxidation process. Aromatic compounds with intermediates that retain some degree of aromaticity are more thermodynamically likely to undergo oxidation than those whose intermediates lose their aromaticity.

***Since not all of the creosote compounds are susceptible to permanganate oxidization some residual NAPL will remain following treatment.***

**Dissolution and NAPL Weathering**

For oxidation to occur the compound must be in the aqueous phase; therefore mass transfer must occur from the NAPL to the aqueous phase. A typical mass transfer expression for this process is given by

$$\frac{dC_w^m}{dt} = k(C_{sat}^m - C_w^m) \tag{3}$$

where $C_w^m$ is the aqueous phase concentration of compound $m$, $C_{sat}^m$ is the aqueous solubility of compound $m$, and $k$ is the bulk mass transfer coefficient. Essentially Eq (3) shows that mass transfer depends on a mass transfer coefficient, and driving force (i.e., the difference in concentrations). The mass transfer coefficient depends on a number of factors including the Reynold's number, NAPL saturation, interfacial area, and mean or median grain size. For creosote NAPL, the aqueous phase solubility of each NAPL constituent may be estimated from the solubility analog of Raoult's Law

$$C_{sat}^m = x^m C_{sat,m}^o \tag{4}$$

where $x^m$ is the mole fraction of component $m$ in the NAPL mixture, and $C^o_{sat,m}$ is the solubility of the pure compound. Eq (4) assumes an activity coefficient equal to unity and is usually valid for mixtures of lower alkane and aromatic hydrocarbons. For PAHs that exist as solids in their pure phase, the super-cooled liquid solubility is used for $C^o_{sat,m}$ and can be calculated according to

$$C_{sat,m}^o = C_{sat,m}^{solid} \exp[6.8 T_m / (T-1)] \tag{5}$$

where $C^{solid}_{sat,m}$ is the solid phase solubility, $T_m$ is the melting temperature, and $T$ is the system temperature. Laboratory studies conducted by Lee et al. (1992) indicated that Raoult's Law provided a reasonable approximation between predicted and measured solubilities of PAHs.

If permanganate is able to be delivered in close proximity to the NAPL where the dissolved phase concentration of all the NAPL constituents is controlled by Eq (3), then a competitive oxidation process occurs with the most reactive (largest reaction rate coefficient) dissolved constituents being degraded first. This will result in an increase in the mass transfer of these constituents from the NAPL and an associated reduction in their mole fraction. Eventually, the aqueous phase concentration of the most reactive constituents will decrease according to Eq (4), and the aqueous phase concentration of the less soluble or less reactive constituents will increase. This preferential change the NAPL composition is known as ***oxidation induced weathering*** and may result in changes in the NAPL physical properties (increase in density and viscosity).

***Enhanced NAPL mass removal*** (relative to an equivalent treatment with water) results from (1) direct oxidation of the most reactive compounds, and (2) an increased solubility of the remaining NAPL constituents. In an ideal system the degree of enhanced NAPL mass removal depends on constituent reactivity, solubility and mole faction.

**Precipitate Formation**

The half-cell reaction for the reduction of $MnO_4^-$ between pH 3.5 and 12 is

$$MnO_4^- + 3e^- + 4H^+ \rightarrow MnO_{2(s)} + 2H_2O \tag{6}$$

According Eq (6) and manganese speciation, permanganate will be reduced to manganese dioxide under pH and Eh conditions commonly present during ISCO (i.e., low pH and high Eh).

Manganese dioxide is a dark brown, water-insoluble solid. It is highly polar and has a high tendency to coagulate by aggregation and form hydrated colloids with high water contents (Morgan and Stumm 1963; Perez-Benito and Arias, 1991). The degree to which the colloids will aggregate depends on the experimental conditions, and it is possible that the colloids can be stabilized for long periods. For example, the presence of phosphate ions can slow down the coagulation of $MnO_2$ because the colloidal particles obtain a negative electrostatic charge after phosphate ions are adsorbed onto their surface (Perez-Benito and Arias, 1991). Alternatively, the presence of polyvalent cations (e.g., $Mg^{2+}$, $Ca^{2+}$) can increase the rate of formation and aggregation of the colloids (Morgan and Stumm, 1963). $MnO_2$ production is visually confirmed by a dark brown to black area within the subsurface (Schroth et al., 2001; Conrad et al., 2002; MacKinnon and Thomson, 2002). Upon initial production, the $MnO_2$ solids are colloidal in size though they can agglomerate into larger size particles. $MnO_2$ solids produced during permanganate ISCO have been observed using scanning electron microscopy (SEM) demonstrating their colloidal nature.

The fact that $MnO_2$ aggregates into colloids is important with respect to its ability to form a barrier between the aqueous phase and the NAPL, and its ability to plug the pore spaces in the vicinity of the NAPL. The formation and subsequent accumulation near the NAPL is the required ***precipitate formation and plugging*** to facilitate ISGS. Although the volume occupied by the $MnO_2$ alone may be small, there is some evidence that bound water can account for 90% of the weight of a colloid (Siegrist et al., 2002). This dramatically increases the volume occupied by the $MnO_2$ colloids. This precipitate accumulation results in a reduction in permeability and a decrease in mass transfer (water/NAPL).

In many cases, the manganese dioxide present on the surface of the colloids is further reduced according to:

$$MnO_{2(s)} + 2H^+ + 2e^- \rightarrow MnO_{(s)} + H_2O \tag{7}$$

The manganese oxide will then remain at the colloid surface, or under very acidic conditions, may be reduced even further to $Mn^{2+}$, which would dissolve into solution according to

$$MnO_{(s)} + 2H^+ \rightarrow Mn^{2+}_{(s)} + H_2O \tag{8}$$

The degree to which $MnO_2$ is further reduced depends on the experimental conditions (Perez-Benito and Arias, 1991), and is increasingly likely as the acidity of the system increases.

**Stabilizing NAPL with Permanganate**

The underlying mechanisms required for NAPL stabilization with permanganate (ISBS or ISGS) are:

- *enhanced mass removal*
- *oxidation induced weathering*
- *precipitate formation and plugging*

These three mechanisms in concert will give rise to a macro-scale reduction in mass loading from the treated system. However, for this to be effective, delivery of the permanganate solution to most of the hydraulically accessible NAPL is required. The resulting impact or system response depends on the NAPL architecture – not all systems will respond the same.

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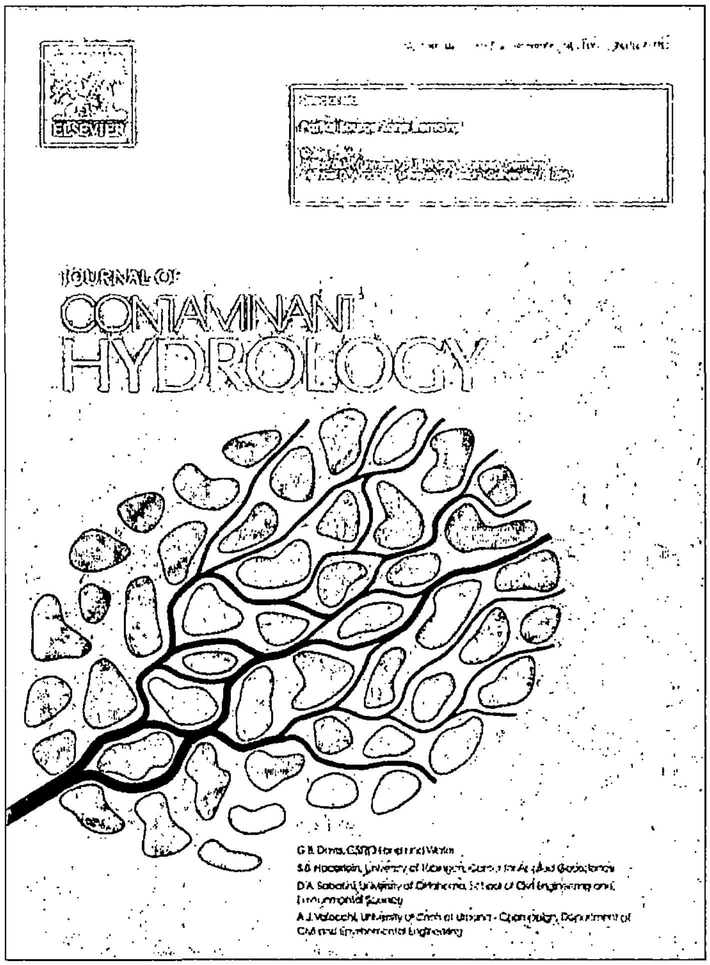
## **Carus RemOx EC Stabilization Reagent** (incomplete)

*Information has been difficult to track down...*

ISBS solutions contain $NaMnO_4$, and additives: concretizing agents ($Ca^{+2}$, $Mg^{+2}$, silicate oxides), and Fe to develop more structurally sound crusts), and buffers (perhaps carbonates to maintain an elevated pH). Carus manufactures the ISBS reagents but ADVENTUS owns the technology.

**Attachment C**
**Thomson et al., 2008**
**Rebound of a Coal Tar Creosote Plume Following Partial Source Zone Treatment with Permanganate.**
**Journal of Contaminant Hydrology, v. 102, p. 154-171.**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# Rebound of a coal tar creosote plume following partial source zone treatment with permanganate

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ABSTRACT

The long-term management of dissolved plumes originating from a coal tar creosote source is a technical challenge. For some sites stabilization of the source may be the best practical solution to decrease the contaminant mass loading to the plume and associated off-site migration. At the bench-scale, the deposition of manganese oxides, a permanganate reaction byproduct, has been shown to cause pore plugging and the formation of a manganese oxide layer adjacent to the non-aqueous phase liquid creosote which reduces post-treatment mass transfer and hence mass loading from the source. The objective of this study was to investigate the potential of partial permanganate treatment to reduce the ability of a coal tar creosote source zone to generate a multi-component plume at the pilot-scale over both the short-term (weeks to months) and the long-term (years) at a site where there is > 10 years of comprehensive synoptic plume baseline data available. A series of preliminary bench-scale experiments were conducted to support this pilot-scale investigation.

The results from the bench-scale experiments indicated that if sufficient mass removal of the reactive compounds is achieved then the effective solubility, aqueous concentration and rate of mass removal of the more abundant non-reactive coal tar creosote compounds such as bipbenyl and dibenzofuran can be increased. Manganese oxide formation and deposition caused an order-of-magnitude decrease in hydraulic conductivity.

Approximately 125 kg of permanganate were delivered into the pilot-scale source zone over 35 days, and based on mass balance estimates < 10% of the initial reactive coal tar creosote mass in the source zone was oxidized. Mass discharge estimated at a down-gradient fence line indicated > 35% reduction for all monitored compounds except for biphenyl, dibenzofuran and fluoranthene 150 days after treatment, whicb is consistent with the bench-scale experimental results. Pre- and post-treatment soil core data indicated a highly variahle and random spatial distribution of mass within the source zone and provided no insight into the mass removed of any of the monitored species.

The down-gradient plume was monitored approximately 1, 2 and 4 years following treatment. The data collected at 1 and 2 years post-treatment showed a decrease in mass discharge (10 to 60%) and/or total plume mass (0 to 55%); however, by 4 years post-treatment there was a rebound in both mass discharge and total plume mass for all monitored compounds to pre-treatment values or higher. The variability of the data collected was too large to resolve subtle changes in plume morphology, particularly near the source zone, that would provide insight into the impact of the formation and deposition of manganese oxides that occurred during treatment on mass transfer and/or flow by-passing.

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Overall, the results from this pilot-scale investigation indicate that there was a significant but short-term (months) reduction of mass emanating from the source zone as a result of permanganate treatment but there was no long-term (years) impact on the ability of this coal tar creosote source zone to generate a multi-component plume.


## 1. Introduction

Coal tar creosote that is produced from the fractional distillation of crude coal tars is a brownish-black/yellowish dark green non-aqueous phase liquid (NAPL) with a density between 1.01 and 1.20 g/cm$^3$ (Wu et al., 2000). Creosote is a complex mixture and may contain more than several hundred different chemical compounds; however, the chemical composition is influenced by the origin of the coal and by the nature of the distilling process and thus creosote components are rarely consistent in their type and concentration. Mueller et al. (1989) reported that the approximate mass fractions are 85% aromatic hydrocarbons, including polycyclic aromatic hydrocarbons (PAHs) and alkylated PAHs; 10% phenolic compounds including cresols; and 5% nitrogen-, sulfur-, and oxygen-heterocyclics including dibenzofurans. Groundwater and soil impacted by creosote-contaminated sites may potentially contain a number of these chemical compounds depending on the NAPL composition and the aqueous solubility, vapour pressure, and subsurface attenuation processes (e.g., dispersion, reactions, sorption) of the individual compounds (Priddle and MacQuarrie, 1994; King and Barker, 1999). Characteristic of NAPL contaminated sites where low solubility compounds are present, dissolution of the organic solutes is slow and hence the presence of coal tar creosote poses a long-term source of groundwater contamination. Due to the potential toxicity, carcinogenicity and mutagenicity of many of these compounds at low concentrations (IARC, 1998), these sites pose a threat to groundwater resources and other biosphere receptors.

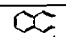
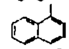
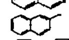
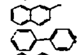
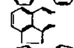
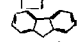
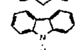
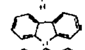
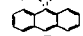
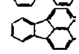
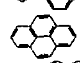
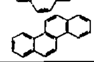
Over the last 15 years, *in situ* chemical oxidation (ISCO) using permanganate has received considerable attention as a technique with the potential to destroy various chlorinated ethenes in the subsurface (Schnarr et al., 1998; Siegrist et al., 2001, Mackinnon and Thomson, 2002; ITRC, 2005; USEPA, 2006; Thomson et al., 2007). While field scale and laboratory studies have focused on the application of permanganate for the oxidation of chlorinated ethenes and certain PAH compounds (Gates-Anderson et al., 2001; Brown et al., 2003), little effort has been directed at treatment of coal tar creosote contamination and specifically the oxidation of arenes by permanganate.

Rudakov and Lobachev (1994), and Rudakov et al. (1996) proposed two parallel oxidation mechanisms for the permanganate oxidation of an alkylbenzene: (1) attack at the carbon hydrogen bond in the alkyl substituent and (2) an attack on the aromatic ring that proceeds via electrophilic aromatic substitution. In their examination of the relative contributions of the two oxidation pathways, Rudakov and Lobachev (1994) suggested structural properties that would determine the dominant pathway. Coal tar creosote contains a wide variety of alkylbenzenes, and alkyl substituted and non-substituted polycyclic aromatic hydrocarbons that are susceptible to oxidation by these two mechanisms. Forsey (2004) determined the permanganate second-order rate coefficients for some coal tar creosote constituents including pyrene, fluoranthene, phenanthrene, chyrsene, naphthalene, carbazole, fluorene, and biphenyl (Table 1). The compounds investigated exhibit a wide range of reactivities that follow the two different suspected reaction mechanisms. The second-order rate coefficients in Table 1 are similar in magnitude to those reported in the literature for chloroethenes, except for naphthalene which has a second-order rate coefficient similar to toluene (Waldemer and Tratnyek, 2006).

While the oxidation of some creosote compounds is likely to occur during ISCO treatment of a coal tar creosote source, not all of the compounds of concern will be susceptible to permanganate oxidization and hence a source will remain following treatment which will require long-term site management. For sites where contaminant mass removal is not the primary remedial goal, technologies that isolate or stabilize the NAPL source may be the best practical solution, since they can reduce the contaminant mass loading to the plume and associated off-site migration. An important product of the reduction of permanganate is manganese oxide, which forms at the point of reaction and is a water insoluble solid that is highly polar and tends to coagulate by aggregation to form hydrated colloids with high water contents (Perez-Benito and Arias, 1991). The degree to which the colloids will aggregate depends on the presence of other ions as well as the system Eh and pH (Morgan and Stumm, 1963). Laboratory research has demonstrated that the precipitation of manganese oxides and the formation of $CO_2$, another reaction product, decreased the hydraulic conductivity between 50 and 90% (Schroth et al., 2001) in sand-packed columns, caused flow divergence around regions of higher NAPL saturations in a two-dimensional physical model (Li and Schwartz, 2004), and resulted in pore plugging and the formation of a distinct manganese oxide layer in the vicinity of the NAPL that reduced the post-treatment mass transfer (Mackinnon and Thomson, 2002; Conrad et al., 2002; Urynowicz and Siegrist, 2005). The longevity of the trapped $CO_2$ is temporary, but the manganese oxide deposition is believed to be stable as long as the geochemical conditions are conducive (e.g., pH>3; Appelo and Postma, 1999). As a result, it is hypothesized that treatment of a coal tar creosote source zone by permanganate will initially result in some degree of mass destruction until manganese oxide deposition has reached a level to impact hydraulic conductivity and mass transfer. When this point is reached either the manganese oxides will adversely affect the performance of the treatment system and/or the rate of mass destruction will decrease.

The objective of this study was to investigate the potential of partial permanganate treatment to reduce the ability of a

**Table 1**
Second-order reaction rate coefficients and suspected oxidation mechanism of selected coal tar creosote compounds

| Compound | Formula | Structure | Oxidation mechanism | Rate coefficient[a] [$M^{-1}$ $s^{-1}$] |
|---|---|---|---|---|
| Naphthalene | $C_{10}H_8$ |  | EAS[b] | $1.1\times10^{-2}\pm2\times10^{-3}$ |
| 1-methylnaphthalene | $C_{11}H_{10}$ |  | ABH[c] | $1.4\times10^{-2}\pm2\times10^{-3}$ |
| 2-methylnaphthalene | $C_{11}H_{10}$ |  | ABH | $1.8\times10^{-2}\pm3\times10^{-3}$ |
| Biphenyl | $C_{12}H_{10}$ |  | – | NR[d] |
| Acenaphthene | $C_{12}H_{10}$ |  | ABH | $2.1\times10^{-1}\pm3\times10^{-2}$ |
| Fluorene | $C_{13}H_{10}$ |  | ABH | $4.3\times10^{-1}\pm3\times10^{-2}$ |
| Carbazole | $C_{12}H_9N$ |  | ABH | $4.4\times10^{-1}\pm8\times10^{-2}$ |
| Dibenzofuran | $C_{12}H_8O$ |  | – | NR |
| Anthracene | $C_{14}H_{10}$ |  | EAS | >6.8[e] |
| Phenanthrene | $C_{14}H_{10}$ |  | EAS | $4.2\times10^{-1}\pm3\times10^{-2}$ |
| Fluoranthene[f] | $C_{16}H_{10}$ |  | EAS | $9.0\times10^{-1}\pm3\times10^{-1}$ |
| Pyrene[g] | $C_{16}H_{10}$ |  | EAS | $1.7\times10^{0}\pm6\times10^{-1}$ |
| Chrysene[h] | $C_{18}H_{12}$ |  | EAS | $1.2\times10^{-2}\pm1\times10^{-2}$ |

Notes:
[a] Second-order reaction rate coefficient and 95% confidence interval from Forsey (2004).
[b] Oxidation by permanganate is suspected to be initiated by electrophilic aromatic substitution.
[c] Oxidation by permanganate is suspected to be initiated by abstraction of a benzylic hydrogen.
[d] No reaction observed over the 2 day reaction period.
[e] Reaction rate was too fast to measure; estimate based on initial rate.
[f] Rate coefficient based on initial data; reaction does not go to completion.
[g] Rate coefficient based on pseudo first-order portion following initial decrease.
[h] Rate coefficient tentatively assigned due to solubility issues.

coal tar creosote source zone to generate a multi-component plume at the pilot-scale over both the short-term (weeks to months) and the long-term (years). It was not our intent to deliver ample permanganate mass to the source zone to satisfy the stoichiometric requirements of all the reactive coal tar creosote compounds and the permanganate natural oxidant demand (NOD), but rather to provide enough permanganate mass so that sufficient manganese oxide deposition occurred to impact hydraulic conductivity and mass transfer. Hence, we have termed this approach partial permanganate treatment in contrast to a situation where the remedial goal would be to completely "clean-up" the source zone. The site used to explore this partial source zone treatment is located at the Canadian Forces Base (CFB) Borden near Alliston, Ontario, Canada and has ~10 years of synoptic plume data that was used to develop a comprehensive baseline of the plume morphology and trends. To support the pilot-scale experimentation, a series of preliminary bench-scale experiments were conducted to evaluate the potential for permanganate to oxidize a coal tar creosote residual NAPL source and to provide specific information on mass removal, changes in post-treatment effluent concentrations, hydraulic conductivity and manganese oxide deposition.

## 2. Preliminary bench-scale investigations

A series of column experiments was conducted to assess the reactivity of specific coal tar creosote compounds to permanganate, and to provide representative information on potential or expected reductions in mass discharge and hydraulic conductivity due to byproduct formation and deposition within a coal tar creosote residual source. Each experimental series consisted of a control and a treatment column. Stop-flow column experiments with a creosote saturation of 8% were intermittently flushed with either Milli-Q water (control) or a permanganate solution (8 g $KMnO_4$/L) (treatment) for 172 days. This intermittent or pulsed flushing allows for a prolonged residence time to maximize the oxidation reaction and hence mass removed. The mass distribution of selected compounds and manganese oxide deposition following permanganate treatment were determined at 1 cm intervals. Flow-through column experiments with a creosote saturation of 3% were used to investigate hydraulic conductivity impacts, and the relationship between mass removal and associated changes in mass discharge. This series of experiments was flushed with Milli-Q water (control) and permanganate solution (15 g $KMnO_4$/L) at a flow rate of ~3.3 mL/h (velocity of ~2.0 cm/h) for ~7 days to mimic the physical and NAPL conditions of the pilot-scale site at CFB Borden. All column experiments were performed with the same sand and the raw coal tar creosote used to construct the CFB Borden source (King and Barker, 1999).

### *2.1. Methods*

The stop-flow columns (diameter 5 cm, length 12 cm) were constructed of thick walled glass tubing fitted with stainless steel end plates. As required, a 50 mL syringe was used to inject either Milli-Q water or permanganate solution into the column from the bottom, and the effluent was allowed to exit freely from the top of the column into a 60 mL sample vial. Periodically a 13 mL aliquot from the sample vial was analyzed for selected compounds (Table 2) following the addition of 1 mL of a saturated bisulfite solution to quench any residual permanganate.

The continuous-flow columns were constructed of nominal 2.54-cm Schedule 40 PVC pipe (length 12.5 cm) modified to accommodate inlet and outlet tubing, and contained glass beads (0.59 to 0.84 mm diameter) to act as flow distributors at either end. The columns were operated under up-flow conditions where the inlet was maintained at a constant flow rate and the outlet was maintained at a constant hydraulic head. A piezometer was attached to the column influent tubing to monitor hydraulic head.

The chemical composition of the creosote (Carbochem Ltd. Mississauga ON) used in this experimentation is listed in Table 2. The selected compounds represent 56.5% of the total creosote mass assuming the molecular weight of the unknown fraction was 200 g/mol based on a qualitative comparison of the gas chromatograph (GC) retention times for identified and unidentified compounds. The mass spectrum of a sample of this creosote indicated that the unknown mass fraction was predominately made up of heavy molecular weight PAHs with a smaller percentage of unknown phenol and heterocyclic compounds. The density of the creosote was measured to be 1.10 g/mL at 21 °C.

To generate a homogeneous mixture of creosote and sand, 30 mL of Milli-Q water and 300 mL of sand were well-mixed and then the required volume of creosote was added to the wet sand and stirred thoroughly. Each column was packed with material from the middle of the mixture and gently packed in ~1 cm lifts. To estimate the initial mass of individual creosote compounds added to each column, a 20 g sample of the mixture was taken as each column was being packed and analyzed for the bulk soil concentration of selected creosote compounds. After packing, each column was flushed with $CO_2$ for 1 h and then slowly flushed with Milli-Q water from the bottom to minimize trapped air.

The bulk soil concentration of selected creosote compounds was determined by soxhlet extraction using a modified version of the EPA Method 3540C (extracting with a 200 mL mixture of $CH_2Cl_2$ and acetone (1:1) for 24 h). The analytical determination of the concentration of all creosote compounds reported in this paper was performed on a GC (HP5890A) equipped with a splitless injection port, a 0.25 mm×30 m glass DB5 capillary column with a film thickness of 0.25 μm and a flame ionization detector (FID). The oven temperature was held at 40 °C for

**Table 2**
Coal tar creosote chemical composition, variability of bulk soil concentration quantification, and the results from the stop-flow and continuous-flow column experiments

| Compound | MW [g/mol] | Aqueous solubility[a] [mg/L] | Mass fraction [%] | MDL [μg/L] | Standard deviation[b] [g/kg] | Stop-flow experiments | | | | | Continuous-flow experiments | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Initial [g/kg] | Control | | Treatment | | Control discharge [mg/day] | Treatment discharge [mg/day] | Percent change |
| | | | | | | | Final [g/kg] | Percent change | Final [g/kg] | Percent change | | | |
| Phenol | 94.1 | 82,000 | 0.07 | 32 | – | 13 | <MDL | −100 | <MDL | −100 | – | – | – |
| *m*-xylene | 106.2 | 196 | 0.01 | 5.8 | – | 2.4 | <MDL | −100 | <MDL | −100 | – | – | – |
| *o*-cresol | 108.1 | 25,920 | 0.04 | 8.7 | – | 7.2 | <MDL | −100 | <MDL | −100 | – | – | – |
| *p* and *m*-cresol | 108.1 | 24,000 | 0.12 | 8.7 | – | 21 | <MDL | −100 | <MDL | −100 | – | – | – |
| 2,6-dimethylphenol | 122.2 | 6150 | 0.02 | 4.3 | – | 4.1 | <MDL | −100 | <MDL | −100 | – | – | – |
| 2,4 and 2,5-dimethylphenol | 122.2 | – | 0.05 | 4.3 | – | 7.9 | <MDL | −100 | <MDL | −100 | – | – | – |
| 2,3-dimethylphenol | 122.2 | 14,000 | 0.08 | 4.3 | – | 10 | <MDL | −100 | <MDL | −100 | – | – | – |
| 3,5-dimethylphenol | 122.2 | 12,000 | 0.01 | 4.3 | – | 4.1 | <MDL | −100 | <MDL | −100 | – | – | – |
| Naphthalene | 128.2 | 31.7 | 8.1 | 4.3 | ±18 | 2400 | 2400 | 0 | 1000 | −58 | 0.29 | 0.25 | −14 |
| Indole+2-Methylnaphthalene[c] | 142.2 | 24.4 | 3.9 | 4.7 | ±13 | 480 | 420 | 0 | 260 | −46 | 0.035 | 0.026 | −26 |
| 1-methylnaphthalene | 142.2 | 28.5 | 1.8 | 2.7 | ±6.2 | 610 | 610 | 0 | 600 | −2 | 0.017 | 0.012 | −29 |
| Acenaphthylene | 152.2 | – | 0.2 | 2.7 | ±0.81 | 42 | 40 | 0 | 35 | −17 | 0.0086 | 0.0021 | −76 |
| Biphenyl | 154.2 | 7.5 | 1.5 | 4.8 | ±7.5 | 280 | 240 | −14 | 65 | −77 | 0.013 | 0.025 | 92 |
| Acenapthene | 154.2 | 3.9 | 6.0 | 2.3 | ±94 | 1350 | 1350 | 0 | 370 | −73 | 0.047 | 0.021 | −55 |
| Fluorene | 166.2 | 2 | 4.7 | 2.7 | ±19 | 1100 | 1100 | 0 | 280 | −75 | 0.028 | 0.0098 | −65 |
| Carbazole | 167.2 | 1 | 0.87 | 4.7 | ±3.8 | 94 | 83 | −12 | 27 | −71 | 0.043 | 0.0013 | −97 |
| Dibenzofuran | 168.2 | 10 | 4.0 | 2.7 | ±20 | 720 | 720 | 0 | 640 | −11 | 0.032 | 0.046 | 44 |
| Phenanthrene | 178.2 | 1.3 | 10.4 | 6.5 | ±110 | 2900 | 2900 | 0 | 2400 | −17 | 0.025 | 0.012 | −52 |
| Anthracene | 178.2 | 0.07 | 1.1 | 3.6 | ±3.7 | 220 | 220 | 0 | 2.1 | −99 | 0.0097 | 0.0039 | −60 |
| Fluoranthene | 202.3 | 0.26 | 5.2 | 5.2 | ±22 | 2200 | 2200 | 0 | 2000 | −9 | 0.0029 | 0.0041 | 41 |
| Pyrene | 202.3 | 0.14 | 4.0 | 4.3 | ±17 | 810 | 830 | 0 | 560 | −31 | 0.0015 | 0.00029 | −81 |
| Benzo(a)anthracene | 228.2 | 0.3 | 1.2 | 3.3 | ±4.6 | 250 | 250 | 0 | 170 | −32 | <MDL | <MDL | – |
| Chrysene | 228.2 | 0.002 | 1.1 | 6.3 | ±4.1 | 230 | 230 | 0 | 220 | −4 | <MDL | <MDL | – |
| Benzo(b)fluoranthene | 252.3 | – | 0.64 | 20 | ±1.7 | 140 | 140 | 0 | 170 | 21 | <MDL | <MDL | – |
| Benzo(k)fluoranthene | 252.3 | – | 0.3 | 20 | ±1.4 | 37 | 39 | 5 | 19 | −49 | <MDL | <MDL | – |
| Benzo(a)pyrene | 252.3 | 0.003 | 0.44 | 24 | ±1.4 | 54 | 56 | 0 | 4 | −93 | <MDL | <MDL | – |
| Benzo(g,h,i)perylene | 276.3 | 0.084 | 0.14 | <32 | ±0.28 | 11 | 12 | 0 | <MDL | <MDL | <MDL | <MDL | – |
| Indeno(1,2,3,c,b) pyrene+ Dibenzo(a,h) Anthracene[d] | 278.4 | – | 0.48 | <62 | ±1.1 | 22 | 21 | 0 | 4 | −82 | <MDL | <MDL | – |
| Total: | | | 56.0 | | | 14,100 | 13,900 | −1 | 8830 | −37 | 0.55 | 0.41 | −25 |

Notes:

[a] From Mueller et al. (1989), MacKay et al. (1992), and Forsey (2004).

[b] Bulk soil concentration standard deviation as estimated from the extraction and analysis of 4 samples.

[c] Since indole and 2-methylnaphthalene elute at the same time they are combined. The MW and solubility shown are for 2-methylnaphthalene.

[d] Since indeno(1,2,3,c,b) pyrene and dibenzo(a,h)anthracene elute at the same time they are combined. The MW shown is for dibenzo(a,h)anthracene.

0.5 min and then ramped to 300 °C at 15 °C/min where it was held for 10 min. The FID was maintained at 325 °C and the helium carrier gas flow rate was 25 mL/min. Quantification was by external and internal standards. The method detection limit (MDL) for the monitored creosote compounds are provided in Table 2. To assess the degree of variability inherent in the soxhlet extraction procedure and subsequent analysis procedure, creosote, sand and water were mixed similar to the method used prior to packing the columns and four subsamples were removed and the bulk soil concentrations were estimated. The results of this assessment (Table 2) indicate that for some compounds there is considerable variability; for example the standard deviation of the dibenzofuran bulk soil concentration was estimated to be ±20 g/kg.

For the stop-flow columns the permanganate solution or Milli-Q water was added, on average, every 2 days at room temperature (21 ± 2 °C) at rate of ~13 mL/min using the syringe. The permanganate solution was added to the treatment column first and the injection episode was terminated when the permanganate concentration in the effluent was approximately the same as the injection concentration. An equivalent volume of Milli-Q water was injected into the control column. After 172 days the stop-flow column experiment was terminated and each column was sectioned into 1-cm thick increments and the bulk soil concentration of the monitored creosote compounds and manganese oxides was determined from ~30 g subsamples. Manganese oxides were removed with an acidified solution of hydroxylamine hydrochloride (Chao, 1972). To each sample 70 mL of hydroxylamine hydrochloride (0.025 M in 0.01 M $HNO_3$) and 10 mL of 6 M $HNO_3$ was added and mixed for 5 min. The concentration of manganese removed by the extraction was determined by atomic adsorption (Varian Model 1475 Atomic Absorption Spectrophotometer) with a MDL of 0.02 mg/L.

For the continuous-flow column experiments the treatment column was flushed with Milli-Q water for ~1 day before the influent was switched to the 15 g $KMnO_4$/L permanganate solution. After ~7 days of flushing, the influent on the treatment column was switched back to water and the treatment column was flushed for another day. The control column was flushed exclusively with Milli-Q water for ~7 days. Aqueous samples were collected from the effluent of the control and treatment columns during the pre and post-treatment water flushes.

Following the termination of the continuous-flow column experiment, the bulk soil concentration of the monitored creosote compounds and total manganese was determined for the material in both the control and treatment columns. From each column, three ~5 g samples were analyzed for bulk soil manganese concentration using inductively coupled plasma emission spectroscopy (Spectro Analytical, Fitchburg, MA). Soil samples were dried (85 °C), reweighed, and then digested using 2 mL of 50% $HNO_3$ and 10 mL of 50% HCl for 1 h at 100 °C (Method 3030F, APHA, 1998). In this method, all the manganese species present are converted to $Mn^{+2}$ and the MDL was 0.07 mg/L Mn. The bulk soil concentration of selected creosote compounds for the remainder of the soil in the treatment and control columns were determined as described above for the stop-flow columns.

Permanganate solutions were made by dissolving solid $KMnO_4$ (BDH, Toronto, CA) into Milli-Q water. Permanganate concentration was quantified on filtered samples (0.45-μm glass fibre, Pall Corporation) by spectrophotometry at 525 nm with a MDL of 1.3 mg/L. The spectrophotometer was calibrated prior to each sampling event using a standard stock solution (APHA, 1998).

### *2.2. Results and discussion*

#### *2.2.1. Stop-flow column experiments*

A total of 96 injection episodes were performed over the 172 day duration of the stop-flow column experiments resulting in ~29 g of $KMnO_4$ injected into the treatment column. At the end of the first injection the characteristic dark purple colour rapidly faded as it was reduced to manganese oxides by easily oxidizable creosote compounds. As additional permanganate was added in subsequent injections the dark purple colour persisted and, through the glass column walls, preferential flow pathways were clearly distinguished by the dark purple permanganate solution, and diffusion into pore spaces that were initially bypassed were visible. After the injection of 16 pore volumes (PVs) the bottom screen in the treatment column became plugged, presumably due to manganese oxide deposition, and an 18 gauge needle was used to make small holes in the screen so additional permanganate solution could be added. Magnesium oxides deposition on the screen did not become a problem again until 41 PVs had been injected into the column and the experiment was terminated. The effluent sample from the treatment column frequently contained visibly flocculent brown particles, presumably mobile manganese oxides. No gas phase (e.g., $CO_2$) was observed in the treatment column during the stop-flow column experiment.

Effluent concentrations from both the control and treatment columns showed a rapid decrease in the aqueous concentrations for the more soluble compounds such as phenol, *o*-cresol and *m*-xylene (not shown). The less soluble compounds such as biphenyl, carbazole, dibenzofuran and anthracene were continually dissolved from NAPL as shown in Fig. 1. Interpretation of these effluent data is complicated by the stop-flow nature of this column experiment. After each injection episode the aqueous concentration of an individual compound would be significantly decreased in both the control and treatment columns and then gradually increase to reach its effective aqueous solubility; however, in the treatment column the rate of mass transfer is affected by the presence of permanganate. Specifically, in the treatment column the aqueous concentration of oxidizable compounds will remain depressed for a longer period of time resulting in increased dissolution of each oxidizable compound and hence the more readily oxidizable compounds will be removed to a greater extent than the less reactive or non-reactive compounds. Since the permanganate concentration was observed to decrease to approximately zero between injection episodes, the effective aqueous solubility in the treatment column was most likely reached before the next injection episode. If a sufficient mass of reactive compounds were removed, then the NAPL mole fraction would decrease along with the effective aqueous solubility consistent with the solubility analog of Raoult's Law (King and Barker, 1999). Studies examining mass transfer rates have shown that equilibrium concentrations can be reached quickly (minutes

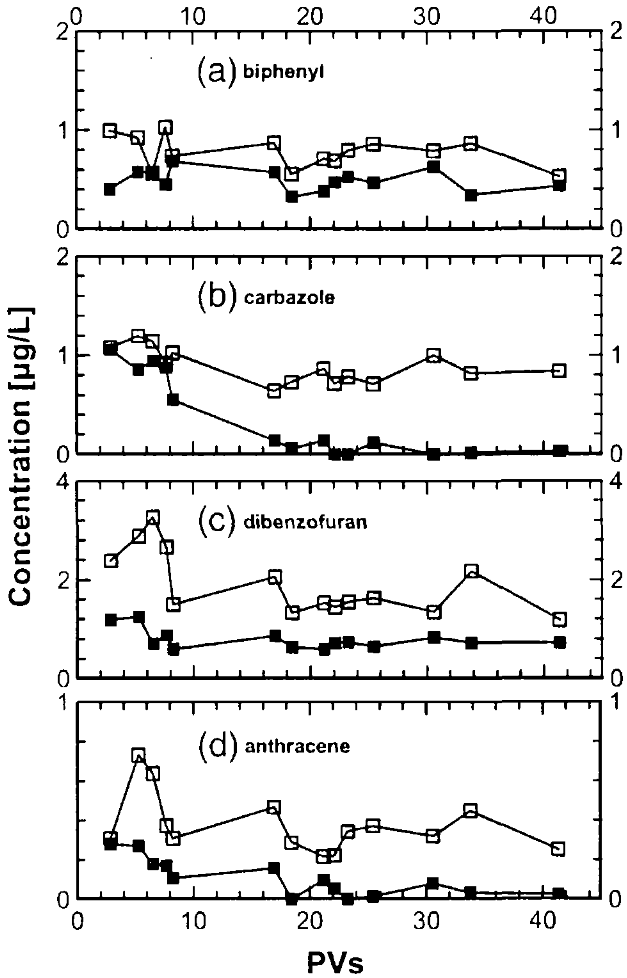



**Fig. 1.** Effluent concentrations for (a) biphenyl, (b) carbazole, (c) dibenzofuran, and (d) anthracene from the stop-flow column experiments (open square—control column; filled square—treatment column).

to hours) for chlorinated organics (Anderson et al., 1992), but for slow-stirring batch experiments with diesel fuel and column experiments with creosote it took 40 to 60 h for all of the components to reach aqueous phase equilibrium (Priddle and MacQuarrie, 1994; Schluep et al., 2001). Since the residence time between injection episodes was ~48 h we believe that this was sufficient to allow the more abundant and soluble creosote components to reach equilibrium concentrations in both the control and treatment columns. For the non-reactive compounds (e.g., biphenyl, dibenzofuran) the effluent concentrations in both the control and treatment column remained relatively constant while more than 42 PVs of solution was flushed through each column. Considering the initial high mass fraction of these compounds in the NAPL this suggests that the effective solubility of at least these two compounds remained relatively unchanged. The differences in effluent concentration between the control and treatment columns were presumed to be due to slight variations in column packing and NAPL heterogeneity. For the reactive compounds such as carbazole and anthracene, the effluent concentration from the treatment column was substantially lower relative to the control column indicating that enhanced mass removal of these compounds occurred. Given the residence time between injection episodes, there seems to be little difference between the carbazole and anthracene effluent concentrations despite the order-of-magnitude difference in their second-order reaction rate coefficient.

Table 2 lists the initial and final bulk soil concentration of each monitored compound in the control and treatment columns. The overall bulk soil concentration of the monitored creosote compounds in the treatment column was reduced by 37% compared to only 1% for the control column, clearly indicative that oxidation of selected compounds occurred in the treatment column. For compounds that are readily oxidized by permanganate (e.g., carbazole, fluorene, anthracene) the percent mass removed was much higher in the treatment column compared to the control column. Surprisingly, compounds that are resistant to permanganate, such as dibenzofuran and biphenyl, were also removed to a greater extent in the treatment column relative to the control column, presumably due to an increase in their NAPL mole fraction values. For example the data indicated that 77% of the biphenyl mass was removed from the treatment column compared to 14% from the control column despite the fact that biphenyl is resistant to permanganate oxidation.

For the soil samples evaluated in this investigation, it was assumed that the predominant manganese species was $MnO_2$ and hence the manganese results are reported in terms of $MnO_2$ per mass of dry soil. The average bulk soil manganese concentration precipitated in the treatment column after 172 days was 20.8 g $MnO_2$/kg, and varied from 14.5 g $MnO_2$/kg at the top of the column to 26.0 g $MnO_2$/kg at the bottom of the column. This variation is consistent with the orange/brown precipitate observed near the top of the column that gradually became blacker further down the column and at the very bottom a hard manganese oxide deposition was present. The average bulk soil manganese concentration of the sand used in these bench-scale experiments was ~0.4 g $MnO_2$/kg.

*2.2.2. Continuous-flow column experiments*

Approximately 8.5 g of $KMnO_4$ was injected into the treatment column over the 7 day treatment period or about 1/3 of the permanganate mass injected into the stop-flow treatment column. The mass discharge of the monitored creosote compounds, as estimated from the product of the measured aqueous concentration and flow rate, for the post-treatment water flush are listed in Table 2. With the exception of biphenyl, fluoranthene and dibenzofuran, the listed mass discharge estimates were lower for the treatment column by 14 to 97% relative to the control column. Based on the kinetic data in Table 1, it was expected that biphenyl and dibenzofuran, being resistant to permanganate oxidation, would increase in mole fraction in the NAPL and hence mass discharge. This increase results in a higher mass removal which is consistent with observations from the stop-flow experiments. Fluoranthene, while susceptible to oxidation by permanganate, displayed similar trends to biphenyl and dibenzofuran. The reason for the increase in the fluoranthene mass discharge is unclear but in kinetic studies it was observed that fluoranthene was not completely oxidized by permanganate and the reaction stopped within the first 3 min following the addition of permanganate (Forsey, 2004). Thus the rate coefficient given in Table 1 is for the initial reaction and not for the complete oxidation of fluoranthene. This apparent increase in fluoranthene mass discharge may be due to either incomplete oxidation of fluoranthene or production of an oxidation byproduct with a gas chromatograph retention time similar to that of fluoranthene. Considering that the initial NAPL saturation in the continuous-flow experiments was considerably lower than in the stop-flow experiments (3% compared to 8%) it was not surprising that the percent mass removal of the monitored creosote compounds in the control column (not shown) was much higher (15 to 40%) than those observed in the stop-flow column experiments. However, the mass removal trends between the treatment and control column for the continuous-flow experiment are consistent with the observations from the stop-flow column experiment.

Following the introduction of permanganate to the treatment column, there was a marked increase in the hydraulic gradient across the column, resulting in a decrease in hydraulic conductivity from $1.3\times10^{-3}$ to $1.6\times10^{-4}$ cm/s over 1 day. The hydraulic gradient continued to increase and, at the completion of the permanganate flush, the hydraulic conductivity was estimated to be $9.3\times10^{-5}$ cm/s. The hydraulic gradient across the control column was relatively constant compared to the treatment column. The evolution of the increased hydraulic gradient and corresponding decrease in hydraulic conductivity is a result of the formation and subsequent deposition of manganese solids within the treatment column presumably obstructing flow pathways. At the termination of the continuous-flow experiment the average bulk manganese concentration in the treatment column was 5.5 g $MnO_2$/kg which was significantly ($\alpha$=5%) larger than the average bulk manganese concentration in the control column of 0.4 g $MnO_2$/kg, confirming that manganese oxides had been deposited within the treatment column. The bulk manganese concentrations reported for the stop-flow experiment were considerably larger than for the continuous-flow experiment due to a higher permanganate dosing. While hydraulic conductivity reduction due to the production of $CO_2$ gas has been observed by others (e.g., Schroth et al., 2001), no $CO_2$ production was observed over the course of this continuous-flow experiment.

### 2.3. Conclusions

The results from these preliminary column experiments indicate that sufficient mass removal of reactive compounds can be achieved during permanganate treatment so that an increase in the NAPL mole fraction of non-reactive compounds is realized. This increase in mole fraction results in an increased effective solubility and aqueous concentration for the more abundant non-reactive compounds. Consequently, the rate of mass removal of these compounds also increased. For the continuous-flow column experiments the 25% decrease in the mass discharge was associated with a 33% decrease in compound mass; however, there was no relationship between the percent mass of reactive compounds removed and the corresponding percent reduction in discharge for individual compounds. Both column experiments demonstrated the physical impact of manganese oxide formation and deposition; continual clogging of the inlet screen in the stop-flow experiment giving rise to injection problems, and an order-of-magnitude decrease in the hydraulic conductivity of the continuous-flow column. The manganese concentration in the treatment column is within the range (2 to 24 g $MnO_2$/kg) reported in the literature (Mackinnon and Thomson, 2002; Siegrist et al., 2002; Li and Schwartz, 2004) and suggests that mass transfer impacts may have occurred.

## 3. Pilot-scale field investigation

### 3.1. Site description and history

The pilot-scale field investigation component of this study was conducted on a creosote source zone installed on August 28, 1991 in the ~10 m thick unconfined aquifer at the CFB Borden (Fig. 2). The detailed monitoring network depicted in Fig. 2(a) was originally installed by Mackay et al. (1986) as part of a previous plume study. The timeline used to monitor events associated with this source zone are denoted by the number of days since source zone installation which is Day 0.

The creosote used to construct this source zone comprised ~70 kg of raw creosote (Carbochem Ltd. Mississauga ON) augmented with 0.45 kg carbazole, 0.50 kg *p*-cresol, 1 kg phenol and 3 kg *m*-xylene. This modified creosote was mixed with ~5800 kg of sand with a hydraulic conductivity of $3.6\times10^{-4}$ m/s to reach a NAPL saturation of 7% (v/v). The hydraulic conductivity of this sand is approximately a factor of four higher than the native Borden aquifer material ($8.5\times10^{-5}$ m/s) and was used to ensure that groundwater flow though the source zone would not be inhibited by the NAPL presence. The creosote and sand mixture was then installed in two adjacent zones (denoted as the east and west source areas. For additional details on the source zone emplacement see Malcolmson (1992), and King and Barker (1999).

Prior to permanganate treatment, a detailed plume monitoring program was undertaken on Day 278, 626, 1357 and 3619 (King and Barker 1999; King et al., 1999). This monitoring program involved sampling of 63 to 179 multilevel wells and required the analysis of 717 to 2415 samples for each sampling episode. Mass entering the plume from the source was estimated at an up-gradient boundary coincident with the row of multilevel samplers located ~2.7 m from the source (denoted here as the 3-m fence line shown on Fig. 2). King and Barker (1999) developed a model based on the solubility analog of Raoult's Law to simulate the dissolution of compounds from the source zone using a constant groundwater flux of 0.03 m/day and a cross-sectional flow area of 6 $m^2$. Results from this model were within a factor of 2 of observed dissolved concentrations in the source. Using this model, it was estimated that there was ~350 mol of creosote compounds remaining in the source zone at the start of permanganate treatment (Day 3675) and that ~150 mol are associated with the known reactive compounds listed in Table 1.

### 3.2. Source zone treatment

#### 3.2.1. Methods

Based on the findings from the column experiments, and to meet the objective of this pilot-scale field investigation, a

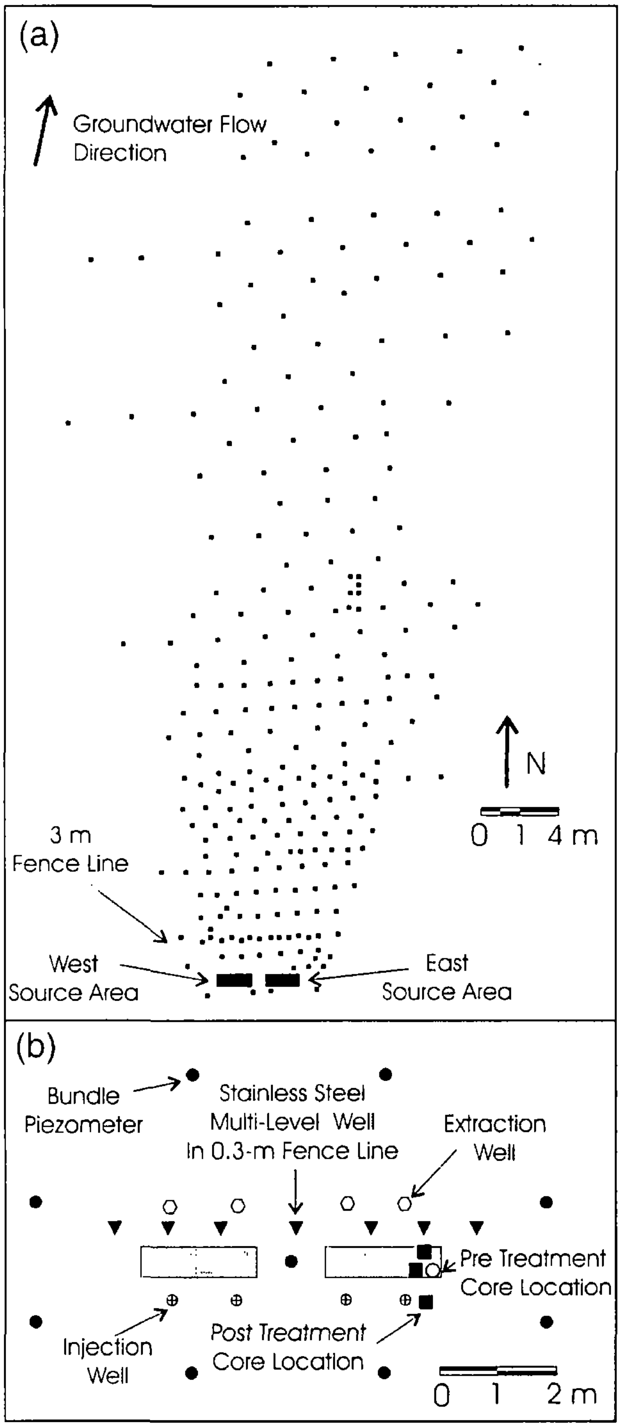



**Fig. 2.** Creosote source zone and plume monitoring network: (a) plan view of source zone and plume monitoring network (each plume monitoring location represents a multilevel sampler); (b) plan view of the source zone with permanganate injection/extraction wells, piezometers, core locations, and 0.3-m sampling fence line shown.

semi-passive pulse injection system was employed to deliver permanganate to the source zone using the 4 up-gradient injection wells shown on Fig. 2(b). A delivery system of this type is possible in this investigation due to the hydraulic conductivity of the source zone which, by design, is equal to or greater than the native aquifer material. Injection wells were constructed from 5 cm diameter PVC stock well material and installed by a direct push technique to a nominal depth of 3.5 m below ground surface (bgs) and screened (10-slot) over the 2.2 m depth of the source zone. A pulse injection system can sustain permanganate concentrations in the source zone to maximize the oxidation reaction rates and diffusion related concentration gradients (e.g., Schnarr et al., 1998; Lowe et al., 2002; Thomson et al., 2007). Each injection episode was designed to deliver a total of 3200 L of permanganate solution (800 L/well) up-gradient of the source zone. To generate a uniform permanganate treatment to each source area, injection into one well up-gradient of each source area was followed by injection into the other well, thus creating overlapping injection zones. With the aid of results from groundwater flow simulations using MODFLOW-2000 (Harbaugh et al., 2000) an injection rate of 5 L/min was selected for delivery of the design volume in ~10 h, resulting in minimal disturbance to the ambient flow field. Based on an estimated average linear groundwater velocity of 10 cm/day, the tail of each permanganate pulse was expected to migrate sufficiently down-gradient of the injection wells in ~7 days to necessitate another injection episode to maintain the presence of permanganate within the source zone. To limit density effects and maximize permanganate concentration, a design concentration of 15 g $KMnO_4$/L was selected which has a specific gravity of 1.01 at 20 °C (Carus Corporation, 2007). Prior to each injection episode, the required permanganate solution was mixed on site by adding a sufficient mass of solid $KMnO_4$ (CAIROX® Technical Grade Potassium Permanganate, Carus Chemical) to uncontaminated groundwater to achieve the target concentration. The permanganate solution was filtered (<5 μm) and then injected using a centrifugal pump with a throttled outlet to control the flow rate.

The permanganate NOD represents the consumption of permanganate by the naturally occurring reduced species (organic carbon, and reduced minerals containing Fe(II), Mn (II, III) and S(-I, -II)) associated with the aquifer material (Siegrist et al., 2001; Mumford et al., 2005; Honning et al., 2007), and for native Borden aquifer material has been estimated to range from 0.4 to 3.5 g-$KMnO_4$/kg (Thomson et al. 2007). This permanganate NOD is consistent with the low TOC and mineralogy of the Borden aquifer material (calcite, quartz, plagioclase, and feldspar minerals with surface coatings of iron and manganese oxyhydroxides) (Ball et al., 1990). The NOD of the sand material used to construct the source area is not known but it is expected to be less than the Borden aquifer material NOD. Permanganate consumption by groundwater was expected to be minimal.

One week after each permanganate injection episode, permanganate breakthrough was monitored at a sampling fence line located ~0.3 m down-gradient from the source (identified here as the 0.3-m fence line). The 0.3-m fence line comprised 7 multilevel bundles with 13, 3 mm inside diameter stainless steel points per bundle. Samples were collected into 40 mL sample vials using a single-tube vacuum system (King and Barker, 1999). Quantification of permanganate concentration was completed at the University of Waterloo following the procedure described in Section 2.1.

To monitor hydraulic conditions during permanganate treatment, 9 multilevel piezometers were installed using a direct push technique around the source zone (Fig. 2(b)). Each piezometer was constructed from 1.25 cm diameter high density polyethylene tubing notched, screened with Nitex®, and arranged in bundles of 4 tubes extending to nominal depths of 1, 2, 3 and 4 m bgs.

Sixty days prior to initiating permanganate treatment and 150 days after the termination of treatment, a performance assessment comprised of ambient mass discharge (King et al., 1999; Einarson and MacKay, 2001; ITRC, 2004) and forced mass discharge measurements was performed. Under ambient gradient conditions a round of samples (~80) from the 0.3-m fence line were collected and analyzed for representative coal tar creosote compounds. Samples were collected into 40 mL sample vials using a single-tube vacuum system (King and Barker, 1999). At least 40 mL of groundwater was pumped through the system prior to sample collection. Samples were preserved with 0.4 mL of 10% sodium azide solution, placed in coolers and transported to the University of Waterloo for analysis. These data were used to establish an estimate of the mass loading from the source zone to the plume under ambient gradient conditions. This mass loading or dissolution rate (i.e., the rate at which the mass of a specific coal tar creosote compound crosses the plane defined by the 0.3-m fence line) was calculated by integrating the spatial distribution of the aqueous mass flux over the 0.3-m fence line (King et al., 1999; Einarson and MacKay, 2001; ITRC, 2004; Kubert and Finkel, 2006).

In contrast to the ambient mass discharge estimate which is subject to variable hydraulic conditions and spatial integration errors, the forced mass discharge estimate allows for a large degree of control between assessment measurements since a similar pumping and hence flow field can be established through the source zone. The forced mass discharge measurement is similar to the integral pumping test used to quantify mass fluxes (Bockelmann et al., 2001; Béland-Pelletier et al., submitted for publication). Four extraction wells located ~0.5 m down-gradient of the source zone were installed, identical to the permanganate injection wells described above, to facilitate the forced mass discharge estimate. During the forced mass discharge assessment, uncontaminated site groundwater water was injected into the 4 injection wells, while groundwater was pumped from the 4 extraction wells. Extracted groundwater was blended prior to a groundwater sample collection port and then passed through a carbon filter (Calgon Corporation, model F300) and released to the ground surface >50 m down-gradient. Periodic groundwater samples were collected in 40 mL vials with no head space, preserved with 0.4 mL of 10% sodium azide solution, placed in coolers and transported to the University of Waterloo for analysis. The forced mass discharge estimate to the extraction wells from the source zone was calculated as the product of the total extraction flow rate times the concentration of coal tar creosote compound (Ptak and Teutsch, 2000; Bockelmann et al., 2001; ITRC, 2004).

Two intact soil cores were extracted from the source zone 110 days prior to permanganate treatment using a piston core barrel technique similar to that described in Starr and Ingleton (1992). The core tube consisted of 5-cm ID aluminum pipe and brass core catcher, and was driven to depth with a jackhammer. Each core tube was capped and placed in a cooler for transport to the University of Waterloo where they were stored in a walk-in refrigerator prior to opening. In order to develop an understanding of the bulk soil concentration vertical distribution for a number of compounds, the entire length of one core was sub-sampled in 1 or 2 cm lengths (see Fig. 2(b) for location). Sample extraction and analysis were as described in Section 2.1.

Approximately 180 days following permanganate treatment 3 intact soil cores were collected from in and up-gradient of the source zone. One core was taken immediately

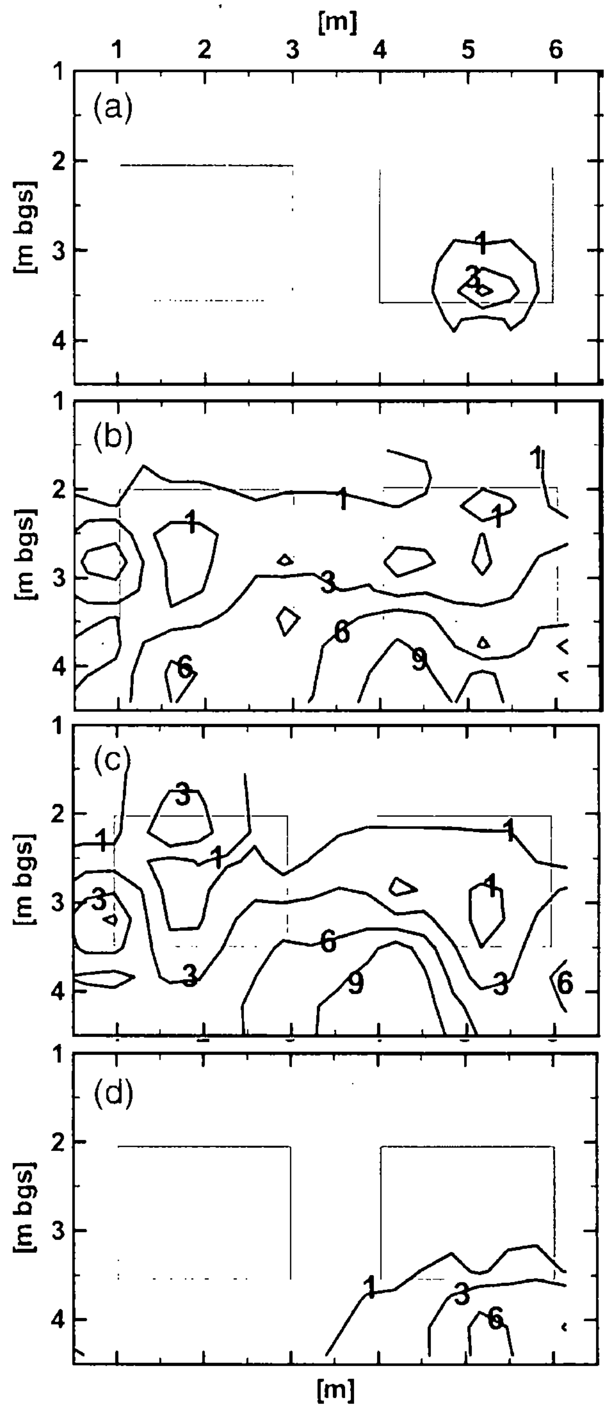



**Fig. 3.** Spatial distribution of permanganate (g $KMnO_4$/L) at the 0.3-m fence line (a) 7 days after the first injection episode, (b) 7 days after the 3rd injection episode (c) 7 days after the 5th injection episode, and (d) 35 days after the 6th injection episode. The east and west source area is on the left and right respectively.

down-gradient of an injection well but outside the source zone, and the other 2 cores were taken from the up-gradient and down-gradient edges of the east source area (see Fig. 2 (b) for locations). Each of the post-treatment soil cores were sub-sampled (1 mL) using a pre-cleaned micro-sampling tool on a 1 cm grid and mixed to produce 3 composite samples for each core. A sub-sample from each composite was analyzed for the bulk soil creosote compound concentrations identical to the pre-treatment analysis. A second sub-sample was analyzed for total manganese by ASTM method D 3974-81.

### 3.2.2. Results and discussion

*3.2.2.1. Permanganate delivery system.* A total of 6 pulsing episodes were preformed with an average permanganate concentration of ~13 g $KMnO_4$/L for a total of ~125 kg of $KMnO_4$. The injections were completed up-gradient of the source zone from Day 3675 to Day 3710. The volume of permanganate solution injected during each pulsing episode varied from 1700 to 2300 L; well short of the design injection volume of 3200 L. The design injection rate of 1 L/min was not able to be sustained during any of the pulsing episodes. Even though the permanganate solution was filtered prior to injection, the injection rate had to be reduced on each successive injection episode in response to a presumed decrease in the surrounding hydraulic conductivity since there was no evidence of screen clogging and no solid precipitate was observed in any of the injection wells. The difficulty in delivering the permanganate was attributed to the formation and deposition of manganese oxides and a subsequent reduction in hydraulic conductivity in the source zone which affected the ability of the injection wells to function as expected. Given the proximity of the injection wells to the source zone, this observation is similar to the continuous-flow column experiments where a continual reduction in hydraulic conductivity was observed during permanganate treatment. The apparent reduction in hydraulic conductivity manifested itself in the localized mounding of the groundwater table.

Permanganate concentration contours at the 0.3-m fence line 7 days after the 1st, 3rd and 5th pulsed injection episodes, and 35 days after the 6th pulsed injection episode are presented in Fig. 3. The spatial distribution of permanganate at the 0.3-m fence line 7 days after the 1st delivery episode indicates that much of the injected permanganate mass had been consumed between the injection wells and the fence line due to oxidation of selected creosote compounds and satisfaction of the NOD. The permanganate spatial distribution at the 0.3-m fence line 7 days after the 3rd and 5th pulsed injection episodes are consistent with the other distributions (not shown) and illustrates the heterogeneity of the permanganate distribution down-gradient of the source zone. It appears that the delivered permanganate was able to migrate through much of the source zone; however, there were areas where lower down-gradient permanganate concentrations were observed (e.g., the right edge of the east source area, and the upper portion of the west source area). The maximum permanganate concentration observed in the 0.3-m fence line was typically located coincident to the bottom of the west source area and, for some sampling rounds, was close to the average injected concentration of ~13 g $KMnO_4$/L indicative of little permanganate consumption. These data suggest that the pulsed injection system was able to deliver permanganate to the source zone as designed. Permanganate was detected at the 0.3-m fence line at a concentration of ~6 g $KMnO_4$/L 35 days following the final injection episode (Fig. 3(d)) presumably due to the slow depletion of permanganate mass trapped in lower hydraulic conductivity regions in the source zone. Monitoring conducted ~5 months following the final injection episode indicated that no detectable permanganate was present in any of the samples collected from the 0.3-m fence line.

**Table 3**
Pre- and post-treatment ambient and forced gradient discharge estimates for selected coal tar creosote compounds

| Compound | Ambient gradient discharge | | | | | Forced gradient discharge | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Pre-treatment | | Post-treatment | | Percent change | Pre-treatment | | Post-treatment | | Percent change |
| | [μg/L] [a] | [mg/day] | [μg/L] [a] | [mg/day] | | [μg/L] [b] | [mg/day] | [μg/L] [b] | [mg/day] | |
| Naphthalene | 12,000 | 750 | 12,600 | 310 | −59 | 910 | 2900 | 470 | 2200 | −24 |
| 1-methylnaphthalene | 850 | 200 | 780 | 120 | −40 | 250 | 810 | 150 | 710 | −12 |
| Acenaphthylene | 60 | 15 | 80 | 6 | −58 | 19 | 60 | 8 | 35 | −42 |
| Biphenyl | 300 | 84 | 380 | 71 | −15 | 110 | 360 | 83 | 400 | 11 |
| Acenaphthene | 1500 | 430 | 1500 | 200 | −53 | 600 | 1900 | 280 | 1200 | −37 |
| Fluorene | 430 | 110 | 340 | 51 | −54 | 190 | 630 | 85 | 400 | −37 |
| Carbazole | 270 | 61 | 200 | 18 | −70 | 130 | 400 | 35 | 170 | −58 |
| Dibenzofuran | 860 | 250 | 1100 | 210 | −16 | 260 | 1200 | 250 | 1200 | 0 |
| Phenanthrene | 300 | 96 | 280 | 60 | −37 | 160 | 520 | 110 | 520 | 0 |
| Anthracene | 150 | 31 | 170 | 14 | −55 | 41 | 130 | 24 | 110 | −15 |
| Fluoranthene | 60 | 13 | 77 | 11 | −11 | 19 | 61 | 18 | 86 | 41 |
| Pyrene | 46 | 9 | 27 | 3 | −63 | 14 | 45 | 7 | 35 | −22 |
| Benz(a)anthracene | <MDL | – | <MDL | – | – | <MDL | – | <MDL | – | – |
| Chrysene | <MDL | – | <MDL | – | – | <MDL | – | <MDL | – | – |
| Benzo(a)pyrene | <MDL | – | <MDL | – | – | <MDL | – | <MDL | – | – |
| Total | | 2048 | | 1075 | −47 | | 9016 | | 7066 | −22 |

Notes:
[a] Peak concentration in the 0.3-m fence line.
[b] Average concentration in blended effluent.

*3.2.2.2. Ambient mass discharge.* Pre- and post-treatment ambient mass discharge estimates were determined by spatial integration of the 0.3-m fence line data. The spatial area associated with each individual concentration measurement was determined by the Theissen polygon method (Thiessen, 1911). Since the monitoring network used was of insufficient spatial extent to capture the entire plume, no attempt was undertaken to extrapolate beyond the spatial extents of the monitoring fence line. A uniform Darcy flux of 5.4 and 4.4 cm/day were estimated for the pre- and post-treatment spatial distribution, respectively, based on observed hydraulic gradients estimated from the surrounding piezometers on the day of sampling, and an assumed constant hydraulic conductivity of $8.5\times10^{-5}$ m/s (Mackay et al., 1986). Both laboratory and field evidence strongly suggests that permanganate application to the source zone results in a decrease in hydraulic conductivity, but no *in situ* measurements of hydraulic conductivity were obtained. However, given that the hydraulic conductivity of the source zone following permanganate application was expected to be lower, the assumption of an unchanged hydraulic conductivity value will result in a conservative estimate of the mass discharge. Table 3 presents the results of the ambient discharge calculations based on data obtained pre- and post-treatment.

The results of the ambient discharge calculations indicate that the mass discharge for all the compounds examined decreased between pre- and post-treatment. The total load decreased from 2048 to 1075 mg/day. All compounds indicated a >35% reduction in mass discharge except for biphenyl, dibenzofuran and fluoranthene which is consistent with the findings from the continuous-flow column experiments. There was a general trend toward higher reductions in compound concentrations at the 0.3-m fence line in areas associated with observed higher permanganate concentration during treatment. Fig. 4 presents the pre- and post-treatment carbazole concentration spatial distribution at the 0.3-m fence line. The general trends are consistent with the ambient mass discharge calculations and clearly show that the extent of detectable concentrations of carbazole was substantially decreased following permanganate treatment. In particular, the pre-treatment distribution for the east source area indicates two distinct zones of relatively high carbazole concentration, while the post-treatment distribution indicates that both zones remain but with decreased peak concentrations.

*3.2.2.3. Forced gradient discharge.* About 100 days prior to permanganate treatment a quasi-steady state flow field was established across the source zone by injecting uncontaminated site groundwater into the 4 injection wells at a cumulative rate of ~4 L/min while simultaneously extracting groundwater from the 4 extraction wells at a cumulative rate of 2.2 L/min. The combined effluent from the 4 wells was blended and sampled daily for ~9 days. It was not possible to re-create the identical hydraulic conditions ~215 days following permanganate treatment due to the well efficiency issues discussed above and thus only the 4 extraction wells were used but were operated at a slightly higher cumulative flow rate of ~3.3 L/min. During the pre-treatment assessment the hydraulic gradient across the source zone between corre-

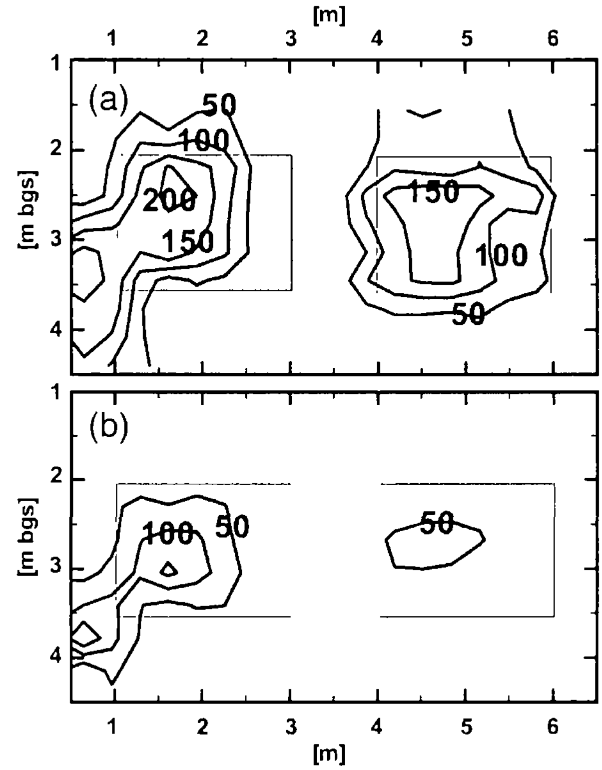



**Fig. 4.** (a) Pre-treatment and (b) post-treatment carbazole concentration contours (μg/L) at the 0.3-m fence line. The east and west source area is on the left and right respectively.

sponding pairs of injection/extraction wells was relatively uniform at ~0.35 m/m, while during the post-treatment assessment the hydraulic gradient across the source zone varied from ~0.25 m/m for the outermost pairs of injection/extraction wells to ~0.10 m/m for the innermost pairs of injection/extraction wells. In spite of this difference in hydraulic gradient, the spatial extent of the capture zone for each assessment is comparable, suggesting that extracted groundwater was drawn from similar areas. The hydraulic head contours for the post-treatment assessment indicate a deflection between the two source areas, suggestive of a lower conductivity in the source zone relative to the native aquifer material.

The time series concentration data for the various monitored coal tar creosote species in the blended effluent during both the pre- and post-treatment assessment showed some initial variability (a coefficient of variation of <0.1 for the pre-treatment assessment and <0.3 for the post-treatment assessment) over the initial 2 to 5 days of extraction and then stabilized. The higher variability observed for the post-treatment assessment was assumed to be a result of the reduced control over the flow field compared to the pre-treatment assessment. The average concentration of the last 2 days of the time series data were used to estimate the mass discharge for each species under forced gradient conditions (Table 3). The results indicate that the mass discharge for all compounds, except biphenyl, dibenzofuran, phenanathrene and fluoranthene, decreased following permanganate treatment. There was essentially no change in the mass discharge of dibenzofuran and phenanathrene, and the increase in post-treatment mass discharge for biphenyl and fluoranthene is consistent with the finding from the preliminary bench-scale experiments.

*3.2.2.4. Soil cores.* The bulk soil concentration data for the pre-treatment soil core for 4 compounds are presented in Fig. 5. These data are typical of the other monitored compounds and illustrate that the bulk soil concentration is quite variable throughout the depth of the source zone. Based on a geostatistical analysis, these spatial distributions where determined to be highly variable and randomly distributed. This randomly distributed bulk soil concentration distribution highlights the inherent difficulty with the extrapolation of a point bulk soil concentration measurement to a larger volume even for this carefully emplaced source zone. As a result of this highly variable and random spatial distribution of mass within the source zone, no statistically significant change ($\alpha$=5%) in mass for any of the monitored species was evident between the pre-treatment soil core and either of the post-treatment soil cores extracted from the source zone. Furthermore, there is no statistical difference in the mean bulk soil concentrations for the core taken from the up-gradient edge of the source zone and the core taken from the down-gradient edge of the source zone.

The analysis of pre- and post-treatment core material also included an evaluation of total manganese. While the precise composition of the manganese solid that forms during permanganate oxidation of various creosote species is unknown, it is expected to be of the form $MnO_x$. The average bulk soil manganese concentration in the post-treatment source zone cores (~6.0 g $MnO_2$/kg) was statistically higher than the average bulk soil manganese concentration in the pre-treatment soil core (~0.8 g $MnO_2$/kg). There is no statistically significant difference in the mean bulk soil manganese concentrations between the post-treatment soil core taken from the up-gradient edge and down-gradient edge of the source zone. The elevated manganese concentration in the post-treatment source cores was similar to the manganese concentration in the continuous-flow treatment column. Given that the hydraulic conductivity reduction observed in the treatment column was attributed to the formation of manganese oxide deposition it is possible that a similar hydraulic conductivity reduction occurred within the source zone.

*3.2.2.5. Permanganate mass balance.* Monitoring data indicated that permanganate was consistently detected at the 0.3-m fence line. These data were used to estimate the total mass of permanganate that crossed this fence line using the same approach as employed to determine the ambient mass discharge, and assuming a linear temporal variation in discharge between monitoring episodes. The results from these calculations indicate that ~90 kg or ~570 mol of permanganate migrated across the 0.3-m fence line. Since ~790 mol of permanganate were delivered up-gradient of the source zone during the 35 day treatment period, ~200 mol of permanganate were assumed to be consumed through oxidation of coal tar creosote compounds within source zone, if the NOD of the source zone material is assumed to be insignificant. If the average stoichiometric mole ratio between permanganate and selected coal tar creosote compounds is 18 to 1, assuming complete mineralization of the selected coal tar creosote compounds, then ~11 mol of the 150 mol or ~7% of reactive coal tar creosote compounds that were estimated to be present in the source zone at the start of treatment were oxidized by permanganate.

### 3.3. Long-term post-treatment plume monitoring

Long-term post-treatment monitoring focused only on the down-gradient plume which was comprehensively sampled on Day 4315 and Day 5140, or approximately 2 and 4 years following treatment. On Day 4065 only the 3-m fence line was sampled. Fig. 6 shows dissolved concentration contours created using the maximum observed concentration of each compound at each multilevel sampler for two pre-treatment (Day 1357 and Day 3619) and the two post-treatment (Day 4315 and Day 5140) sampling episodes. For comparison purposes 4 plume metrics were used: mass discharge crossing the 3-m sampling fence line (see Fig. 2(a) for location), total plume mass, the down-gradient plume mass profile, and the plume spatial extent. The mass discharge (mg/day) of each compound (Table 4 and Fig. 7) crossing the 3-m fence line was estimated as described for the 0.3-m fence line in Section

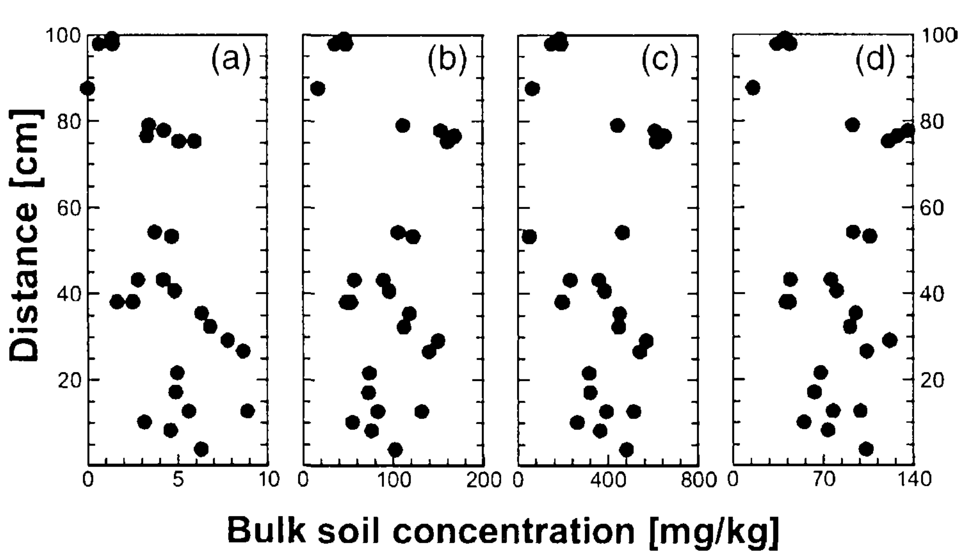



**Fig. 5.** Bulk soil concentrations from a pre-treatment source zone soil core for (a) naphthalene, (b) biphenyl, (c) dibenzofuran, and (d) chrysene.

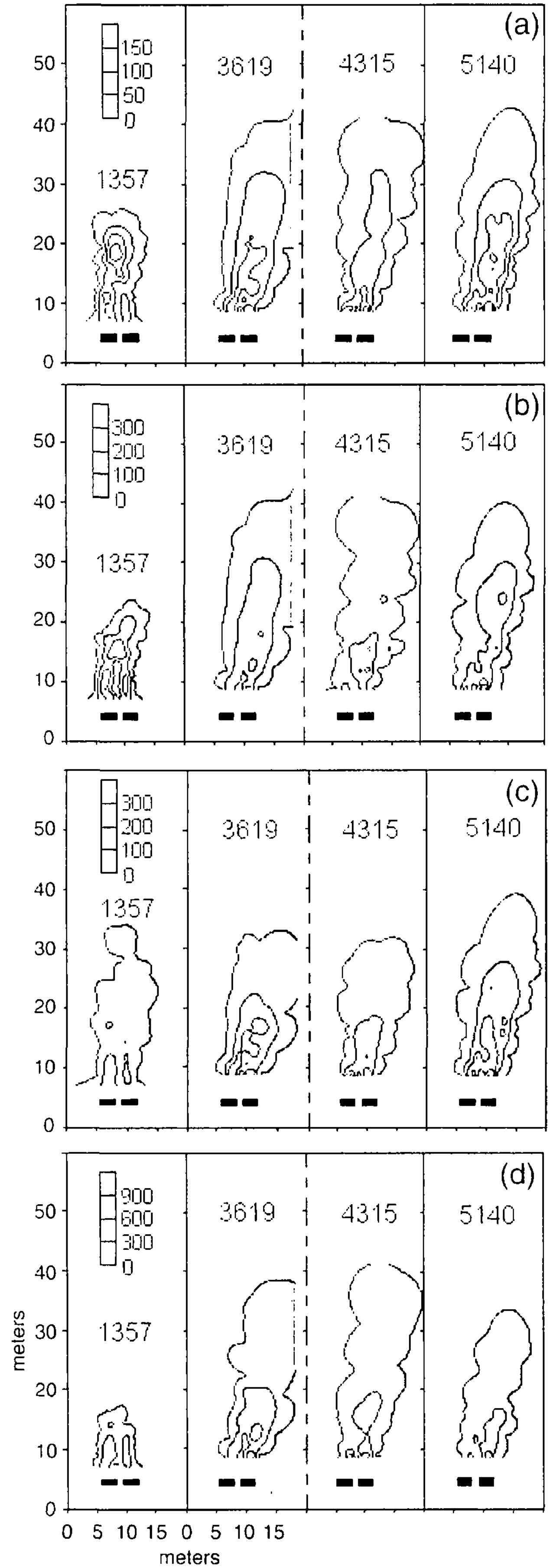



Fig. 6. Dissolved plume concentration contours of (a) biphenyl, (b) carbazole, (c) dibenzofuran, and (d) anthracene. Permanganate treatment occurred between Day 3675 to Day 3710 (dashed line).

3.2.2; however, a constant and uniform groundwater flux (0.03 m/day) was used. The initial sampling fence line used on Day 278, Day 626 and Day 1357 consisted of 8 multilevels with 14 vertical sampling points and was expanded to 15 multilevels with 14 vertical sampling points for the remaining sampling episodes. The 3-m fence line instead of the 0.3-m fence line was used in this long-term plume monitoring to be consistent with the previous historical data collected (King and Barker, 1999). In general the mass discharge crossing the 0.3-m fence line is ~2.5 times larger than the mass discharge crossing the 3-m fence line due to the significant level of biotransformation that occurs between these two fence lines (King et al., 1999). The uncertainty in the reported mass discharge estimates was determined by considering analytical error associated with the quantification of the concentration of each compound, variation of groundwater velocity, and data density (Béland-Pelletier et al., submitted for publication). The error bars in Fig. 7 represent ±1 standard deviation as estimated from a coefficient of variation of 0.28 for Day 278, Day 626 and Day 1357, and 0.12 for the remaining sampling days. For each sampling episode the total plume mass for each compound (Table 4 and Fig. 8) was estimated as the sum of the mass in the dissolved and sorbed phases using $R\,M_d$ where $M_d$ is the dissolved mass estimated using a three-dimensional integration of the multilevel sampler concentrations (King et al., 1999), and $R=(1+\rho_b K_d/\theta)$ is the compound specific retardation factor. Retardation values (Table 4) were calculated using a porosity ($\theta$) of 0.33, a bulk density ($\rho_b$) of 1810 kg/m$^3$ (Mackay et al., 1986), and distribution coefficients ($K_d$) from laboratory data (King et al., 1999) or estimated from literature correlations (Karickhoff et al., 1979) and octonal-water partition data. The uncertainty in the total plume mass estimate was determined by considering the mass balance errors reported from previous natural gradient conservative tracer experiments conducted within the same densely monitored area of the Borden aquifer (Freyberg, 1986; Mackay et al. 1986; Hubbard, 1992) and the uncertainty associated with the estimate of sorbed mass. Thus, the uncertainty estimates vary between compounds; however, in Fig. 8 a coefficient of variation of 0.36 was used for all compounds to capture the highest uncertainty. To provide an indication of the down-gradient dissolved plume mass profile the three-dimensional integration of the sampling network was used to assign plume mass into ~1 m intervals or slices (Fig. 9) for Day 3619, Day 4315 and Day 5140. Note that the mass in a pseudo-steady state plume typically decreases with increasing distance from the source due to biotransformation processes (King et al., 1999).

### 3.3.1. Discussion

Naphthalene and $m$-xylene were undergoing significant attenuation at the time of treatment and it was not possible to separate the effects of the source zone treatment from that of the ongoing plume shrinkage. Following treatment all of the remaining monitored compounds, except for anthracene, followed a similar trend that was characterized by an initial decrease in mass discharge on Day 4065 and/or total plume

**Table 4**
Estimated mass discharge ($J_D$) at the 3-m fence line, and total plume mass ($M_T$) at the given sampling day

| Compound | Retardation value [a] | | Sample day | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | 278 | 626 | 1357 | 3619 | 4065 | 4315 | 5140 |
| *m*-xylene | 2.2 [b] | $J_D$ (mg/day) | 3000 | 1000 | 280 | 4.0 | 3.3 | 0 | 0 |
| | | $M_T$ (g) | 580 | 230 | 92 | 4.4 | – | 0.86 | 0 |
| Naphthalene | 2.2 [c] | $J_D$ (mg/day) | 2800 | 2200 | 1100 | 340 | 220 | 230 | 160 |
| | | $M_T$ (g) | 410 | 750 | 1300 | 220 | – | 110 | 110 |
| 1-methyl naphthalene | 2.3 [c] | $J_D$ (mg/day) | 93 | 130 | 99 | 82 | 49 | 80 | 68 |
| | | $M_T$ (g) | 11 | 22 | 42 | 75 | – | 45 | 57 |
| Biphenyl | 7.5 [b] | $J_D$ (mg/day) | 25 | 63 | 17 | 34 | 24 | 39 | 38 |
| | | $M_T$ (g) | 3.5 | 13 | 14 | 37 | – | 29 | 50 |
| Acenaphthene | 6.6 [b] | $J_D$ (mg/day) | 130 | 220 | 190 | 170 | 75 | 140 | 140 |
| | | $M_T$ (g) | 18 | 31 | 64 | 170 | – | 130 | 180 |
| Fluorene | 11.2 [b] | $J_D$ (mg/day) | 19 | 58 | – | 43 | 21 | 33 | 39 |
| | | $M_T$ (g) | 2.4 | 7.1 | – | 40 | – | 31 | 59 |
| Carbazole | 5.6 [c] | $J_D$ (mg/day) | 24 | 43 | 16 | 22 | 9.7 | 14 | 25 |
| | | $M_T$ (g) | 4.5 | 11 | 18 | 48 | – | 21 | 41 |
| Dibenzofuran | 4.7 [c] | $J_D$ (mg/day) | 66 | 79 | 78 | 95 | 78 | 110 | 120 |
| | | $M_T$ (g) | 14 | 28 | 24 | 88 | – | 73 | 180 |
| Phenanthrene | 10.9 [c] | $J_D$ (mg/day) | 0.70 | 3 | 21 | 31 | 28 | 28 | 41 |
| | | $M_T$ (g) | 0.31 | 1.1 | 8.0 | 35 | – | 40 | 81 |
| Anthracene | 20.1 [b] | $J_D$ (mg/day) | 2.0 | 9 | 10 | 11 | 9.2 | 8 | 7.0 |
| | | $M_T$ (g) | 0.5 | 2.4 | 3.5 | 14 | – | 14 | 8.8 |

The dashed vertical line represents the permanganate treatment interval (Day 3675 to 3710).
Notes:
[a]Associated estimates of $R$ according to $R = 1 + (\rho_b/\theta)K_d$.
[b]value of $K_d$ from literature values of log $K_{ow}$ using log $K_{oc}$ = 1.00 log $K_{ow}$ − 0.21 and $K_d = f_{oc}K_{oc}$.
[c]value of $K_d$ determined from laboratory batch testing by King et al. (1999).

mass on Day 4315, and then a rebound in both mass discharge and total plume mass to pre-treatment values or higher by Day 5140 (see Table 4). Mass discharge on Day 4065 was 10 to 60% lower relative to Day 3619 values, and total plume mass on Day 4315 was 0 to 55% lower relative to Day 3619 values. This overall trend was observed for both reactive and non-reactive compounds.

Pre-treatment plume trends of reactive compounds (e.g., carbazole) indicate an increasing plume size (Fig. 6 (b)) and total plume mass (Fig. 8 (b)). The pre-treatment mass discharge of carbazole peaked on Day 626 and then remained relatively constant. Following treatment the maximum concentrations within the carbazole plume, total plume mass and mass discharge decreased on Day 4315; however, the plume spatial extent remained the same. By Day 5140 the dissolved plume concentrations, total plume mass and mass discharge values had returned to pre-treatment values. The approximate location of compounds that emanated from the source zone during the 35 day treatment period was calculated considering only advective transport, estimated from retarded velocity values using a groundwater velocity of 9 cm/day and retardation factors (Table 4) assuming that there was no change to the organic content of the aquifer solids due to exposure to permanganate. On Day 4315 carbazole would have traveled ~10 m post-treatment (Fig. 9(b)) and while the mass within this region of the carbazole plume is at its greatest, just up-gradient (<10 m) there is a distinct decrease in mass. By Day 5140 the portion of the carbazole plume that emanated from the source zone during treatment was estimated to be at ~23 m, which is near the leading edge of the carbazole plume where concentrations significantly decrease and become <MDL by ~28 m. All reactive compounds showed some degree of decrease in mass discharge on Day 4065 since the location of the treated region of each plume was within ±2 m of the 3-m monitoring fence line.

Prior to treatment, compounds that were non-reactive to permanganate (e.g., biphenyl and dibenzofuran) showed increasing plume size and total plume mass. Biphenyl mass discharge at the 3-m fence line peaked on Day 626 then remained relatively constant while the dibenzofuran mass discharge continued to increase. Following treatment on Day 4315 there appears to be a general concentration depression within the core of the biphenyl and dibenzofuran plumes (Fig. 6(a) and (c))) which is captured by the total plume mass estimate (Fig. 8(a) and (c)); however, this decrease in total plume mass is within the data uncertainty and therefore is not statistically significant. Mass discharge estimated on Day 4065 shows a decline for both biphenyl and dibenzofuran, but by Day 5140 the mass discharge and the total plume mass had rebounded to pre-treatment estimates. By Day 4315 biphenyl and dibenzofuran that emanated from the source zone during treatment would have migrated ~7.5 m and ~11 m down-gradient. The biphenyl location is coincident with a depression in the dissolved mass profile (Fig. 9(a)), while the dibenzofuran location corresponds to a mass peak within the plume with the depression in dissolved plume mass located <11 m suggesting that the assumed dibenzofuran retardation factor was too low. By Day 5140 dibenzofuran that emanated

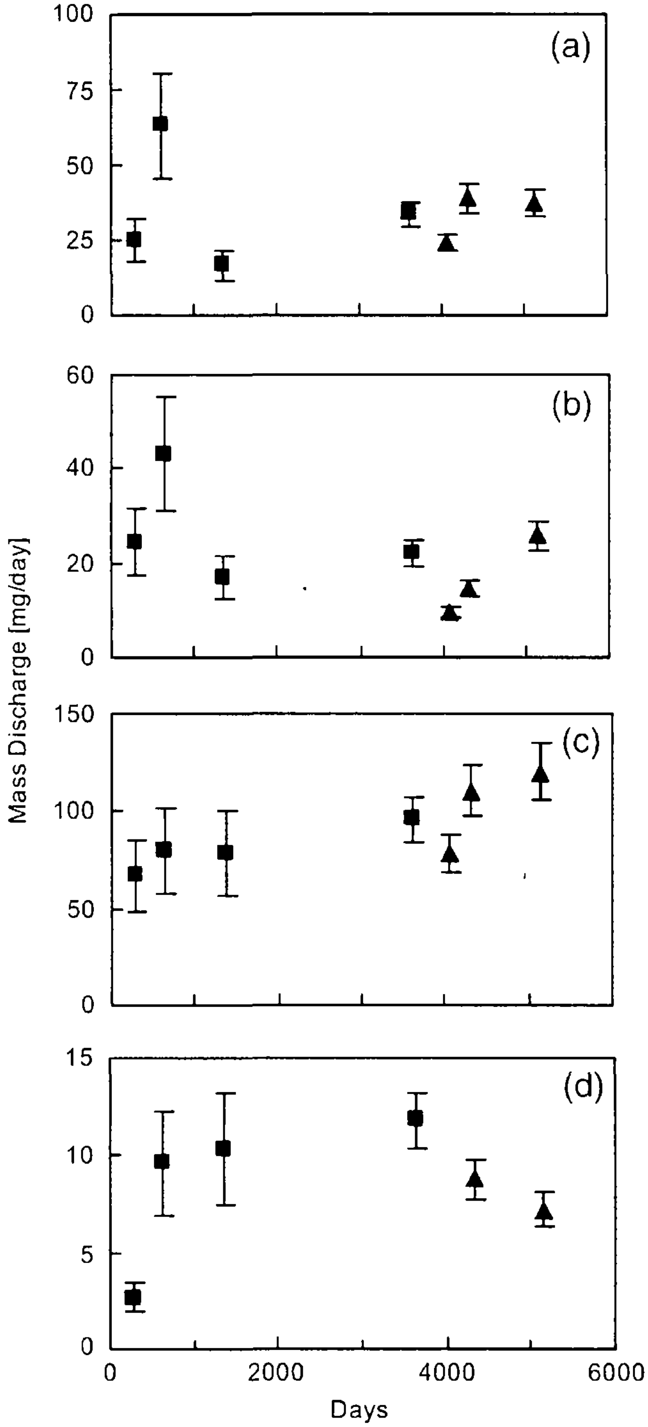



**Fig. 7.** Estimated mass discharge at the 3-m fence line for (a) biphenyl, (b) carbazole, (c) dibenzofuran, and (d) anthracene. Squares represent pre-treatment and triangles represent post-treatment data. The error bars represent ± 1 standard deviation as estimated from a coefficient of variation of 0.28 for Day 278, Day 626 and Day 1357, and 0.12 for the remaining sampling days.

from the source zone during treatment would have migrated ~28 m which is beyond the extent of the detected dibenzofuran plume. The temporary decrease in mass discharge and plume mass for the non-reactive compounds was not expected; however, it is clearly associated with the source zone treatment.

Anthracene was the only compound that showed a continued decrease in plume spatial extent, total plume mass and mass discharge following treatment. The trend in the anthracene plume prior to treatment was an increasing plume size (Fig. 6(d)), total plume mass (Fig. 8(d)), and mass discharge (Fig. 7(d)). Anthracene is strongly sorbed (Table 4) and thus the region of the anthracene plume that emanated from the source zone during treatment was just beginning to enter the monitoring network (~3.0 m from the source) by Day 4315, and was ~6.5 m down-gradient of the source by Day 5140 which is within the network. Unlike the other monitored compounds, this slowly migrating treated region of the anthracene plume was captured in all post-treatment sampling episodes giving rise to decreased plume metrics. It is hypothesized that, in future sampling episodes, the treated region of the anthracene plume will have migrated sufficiently down-gradient that the anthracene total plume mass and mass discharge will have rebounded to post-treatment levels.

Based on the findings from the laboratory experiments it was expected that if the NAPL was significantly impacted by permanganate treatment that the biphenyl and dibenzofuran plume mass would increase, due to enhanced dissolution of reactive compounds, which would increase their mole

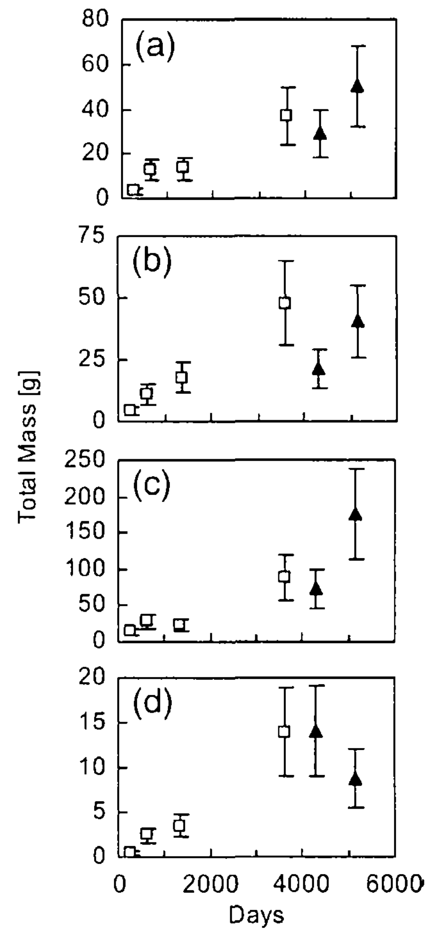



**Fig. 8.** Estimated total plume mass (dissolved and sorbed) for (a) biphenyl, (b) carbazole, (c) dibenzofuran, and (d) anthracene. Squares represent pre-treatment and triangles represent post-treatment data. The error bars represent ± 1 standard deviation as estimated from a coefficient of variation of 0.36 which captures the greatest uncertainty.

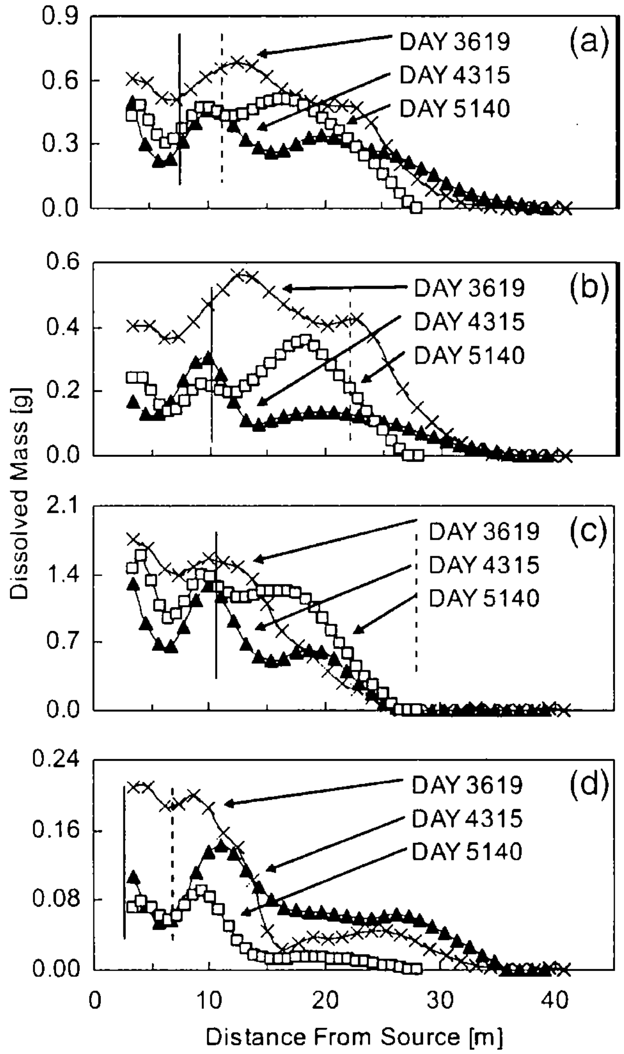



**Fig. 9.** Dissolved plume mass profile for (a) biphenyl, (b) carbazole, (c) dibenzofuran, and (d) anthracene for pre-treatment Day 3619, and post-treatment Day 4315 and Day 5140. The vertical line represents the estimated advective distance each compound migrated based on retarded velocity values for Day 4315 (solid line) and Day 5140 (dashed line).

fractions. Both biphenyl and dibenzofuran show an increase in plume mass on Day 5140 compared to Day 4315. While the increase in the biphenyl total plume mass is perhaps consistent with the pre-treatment trends, the increase in dibenzofuran total plume mass of more than 100% is suggestive of some NAPL impact.

The ~90 kg of residual permanganate that was not utilized in the source zone may have migrated through the monitoring network prior to the first post-oxidation sampling event (Day 4315). This migrating permanganate plume, if not depleted by NOD, would cause a reduction in sorbed mass and therefore affect the plume shape or mass of reactive compounds. There is no evidence of extensive oxidation of sorbed compounds such as anthracene or fluorene in the plume. Selected groundwater samples collected up-gradient of the source zone (background), from within the source zone, from the 3-m fence line and from within the plume on Day 5140 were analyzed for dissolved manganese. These data indicate that manganese concentrations at the 3-m fence line (1.1 mg/L) was about twice the background and source zone concentration (0.5 mg/L) and slightly higher than the manganese concentrations in the plume. This suggests that there is slightly elevated manganese concentrations emanating from the source zone presumably associated with the presence of manganese oxides deposited in the source during permanganate treatment.

It was surprising that both reactive and non-reactive compounds showed similar post-treatment plume metric trends. On Day 5140 it appears that the decrease in mass between 5 to 10 m down-gradient of the source persists after rebound of the plume metrics has occurred. We believe that the entire plume has been encapsulated by the monitoring network and so essentially all chemical mass discharge was likely considered, although the sample density (4 to 8 points/m$^2$) suggests a relative mass estimate uncertainty of < 10% (Béland-Pelletier et al., submitted for publication). This long-term change in the plume mass profiles near the source zone may be related to a decrease in the hydraulic conductivity and mass transfer rate within the source zone due to manganese oxide deposition. These alterations to the source zone may have caused a shift in the plume behavior just down-gradient of the source zone that manifests as a marked depression in the dissolved mass profiles but does not affect the mass discharge estimate at the 3-m fence line.

## 4. Summary

Remediation techniques that are limited by NAPL/groundwater mass transfer (e.g., pump-and-treat) are often deemed unpractical for the long-term management of the multi-component plume generated from coal tar creosote-contaminated sites. One possible solution is to stabilize the source zone by creating a rind of manganese oxide precipitates in close proximity to the NAPL by flushing the source zone with a concentrated permanganate solution. Previous laboratory observations have indicated that the formation and deposition of manganese oxides can give rise to flow by-passing and decrease NAPL/groundwater mass transfer following treatment. The focus of this study was to investigate the impact of partial permanganate treatment of a coal tar creosote source zone to reduce its ability to generate a multi-component plume at the pilot-scale.

The results from the series of preliminary column experiments, using the same raw coal tar creosote and sand material as the pilot-scale investigation, indicated that a mass removal of 33% resulted in a 25% decrease in mass discharge or loading of the monitored compounds relative to the control column. Sufficient mass reduction of the reactive compounds was achieved to cause the effective solubility, aqueous concentration and therefore rate of mass removal of the more abundant non-reactive coal tar creosote compounds such as biphenyl and dibenzofuran to increase. Manganese oxide formation and deposition was visually observed and resulted in an order-of-magnitude decrease in hydraulic conductivity.

Approximately 125 kg of permanganate was delivered into the pilot-scale source zone over 35 days using a pulsed well delivery system. As the injection episodes progressed, the injection rate had to be reduced in response to a presumed decrease in the source zone hydraulic conductivity. Monitoring data indicated that permanganate was able to migrate through the source zone with ~70% of the injected 125 kg of permanganate estimated to cross the 0.3-m sampling fence line. Based on a permanganate mass balance estimate, and using an average stoichiometric mole ratio between permanganate and selected coal tar creosote compounds, <10% of the initial reactive coal tar creosote mass in the source zone was oxidized. In spite of this, mass discharge estimated at the 0.3-m fence line indicated a >35% reduction for all monitored compounds 150 days after treatment, except for biphenyl, dibenzofuran and fluoranthene, which is consistent with the bench-scale experimental results. This decrease was supported by forced gradient discharge measurements which, although not showing the same magnitude of decrease, displayed similar trends for each compound. Pre- and post-treatment soil core data indicated a highly variable and random spatial distribution of mass within the source zone and hence provided no insight into the mass removed of any of the monitored species. Finally, bulk soil manganese concentration data obtained from subsampling source zone cores indicated elevated levels consistent with the preliminary bench-scale experiments. Although no direct source zone hydraulic conductivity measurements were performed, a localized mounding of the water table around the source zone suggested a reduction in hydraulic conductivity had occurred following treatment.

The down-gradient plume was monitored approximately 1, 2 and 4 years following treatment to assess the long-term impact of this partial permanganate treatment. The data collected at 1 and 2 years post-treatment showed a decrease in mass discharge and/or total plume mass; however, by 4 years post-treatment there was a rebound in both mass discharge and total plume mass for all monitored compounds to pre-treatment values or higher. This overall trend was observed for both reactive and non-reactive compounds. The observed decrease in mass discharge and total plume mass at 1 to 2 years post-treatment was attributed to the presence of the portion of the plume for each compound that emanated from the source zone during treatment in the monitoring network. Rebound occurred once this treated portion of the plume passed through the monitoring network.

The long-term data indicate that the observed decrease in mass discharge at the 0.3-m fence line 150 days following treatment was temporary, and, once the system had recovered from treatment, rebound to pre-treatment behavior occurred. For highly sorbing compounds, like anthracene, the time required for this plume monitoring system to show rebound was >4 years following treatment. The timeframe associated with this rebound is especially important for the development of post-remediation monitoring strategies. Due to the rather large variability of the plume metrics used in this investigation, we are unable to resolve subtle changes in plume morphology, particularly near the source zone, that would provide insight into the impact of the formation and deposition of manganese oxides that occurred during treatment on mass transfer and/or flow by-passing. Nevertheless, for this pilot-scale study ~10% of the coal tar creosote mass in the source zone was oxidized and increases in bulk manganese soil concentrations were observed but no significant long-term effect on the dissolved plumes emanating from the source resulted. We acknowledge that perhaps additional permanganate treatment may have produced different results and support this method as a potentially viable approach to stabilize NAPL source zones.

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**Attachment D**
**CD of Documents Requested by**
**City and County for**
**Inclusion in Administrative Record**

***Note: CD of Documents is not included with electronic copies of this report. CD is included with paper copies of this report, or can be provided separately upon request.***

WildLaw
A Non-profit Environmental Law Firm

**October 15, 2010**

**Re: Community Comments Proposed Plan (July 2010)**

Gwendolyn Keyes Fleming, Region 4 Administrator
US EPA Region 4
61 Forsyth Street, SW
Atlanta, GA 30303-8960

Dear Ms. Fleming:

These comments are submitted on behalf of the Stephen Foster Neighborhood Protection Group (SFNPG), a community organization located in Alachua County, Gainesville, Florida. The SFNPG is a neighborhood community organization charged with representing and protecting the health and well-being of the residents living in the Stephen Foster neighborhood bordering the Cabot-Koppers Superfund and industrial site, and which is dedicated to making the Stephen Foster neighborhood a safer and healthier place to live, work, and play. The SFNPG works to improve environmental, housing, and other living conditions within the Stephen Foster Neighborhood. It is with those purposes in mind, SFNPG submitted comments on November 3, 2009 to the original August 2009 Feasibility Study, submitted comments on August 6, 2010 to the May 2010 Revised Feasibility Study, submitted comments on September 15, 2010 on the August 9, 2010 Community Involvement Plan, and are now submitting comments on the July 2010 Proposed Plan (PP).

The PP fails to adequately address the contamination on the Cabot-Koppers site in a multitude of ways. According to 40 CFR § 300.430(f)(2), the EPA, as the lead agency, must create a proposed plan, at a minimum, that "briefly describes the remedial alternatives analyzed by the lead agency, proposes a preferred remedial action alternative, and summarizes the information relied upon to select the preferred alternative." The proposed plan is created to provide the public with an opportunity to comment on the preferred remedial action alternative and to participate in the selection of the remedial action at the site.

These comments are meant to explain community concerns regarding the PP and implore the EPA to reconsider their chosen remediation options as they are not protective of human health and the environment and will lead to catastrophic impacts in the future.

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**The EPA is grossly premature in its selection of a remedial alternative as delineation of contamination remains incomplete**

As we have continued to reiterate in our comments on the feasibility studies, a remedial plan cannot be chosen without a complete site characterization and delineation of all contamination, on-site and off-site. The PP states:

> "As part of the remedial design process which follows remedy selection, additional characterization of Site aquifers will be conducted to address remaining uncertainties related to DNAPL migration, and, more importantly refine its vertical and horizontal boundaries for effective remedy implementation. Off-site soil characterization continues to the north, south, east and west of the Site to completely delineate Site-related impacts and to expedite cleanup of off-Site areas." (PP at pg. 14).

This clearly indicates that the contamination has not been fully delineated in all media in all areas. The PP purports to pick a remedial alternative that will be protective of human health, implementable, and effective, among other things, without an appropriate grasp of the entire scope of contamination. The purpose of the remedial investigation found in 40 CFR § 300.430(d)(1) is to compile data that will allow for the adequate characterization of a site for the ***ultimate purpose of crafting an effective remedial alternative***. The EPA is completely remiss to push forward on selection of a remedy without collection and analysis of all requisite data.

Further, despite protests from the city, county, and local residents, the EPA has yet to initiate a testing regime at local schools. Stephen Foster Elementary is .6 miles from the site. The smallest and most vulnerable among us must not be ignored. The EPA must test the schools to ensure that Stephen Foster's children are not risking additional exposure by attending their schools.

**The EPA fails to adequately analyze the various remedial alternatives under the applicable 40 CFR § 300.430(e)(9) criteria**

The first requirement under 40 CFR § 300.430(f)(2)(i) is to "provide a brief summary description of the remedial alternatives evaluated in the detailed analysis established under (e)(9) of this section." (e)(9) contains nine evaluation criteria that a proposed plan is required to analyze.[1] Although the PP mentions each of the nine criteria, it is severely lacking in any sort of meaningful analysis. The purpose of the proposed plan is so that the public can be adequately informed on all available remedial alternatives, including the EPA's preferred remedial alternative, so that they can intelligently comment and participate in the remedial alternative selection process. The EPA completely eviscerates this requirement by providing virtually no analysis of the available alternatives. The reader is left to wonder whether the EPA engaged in any evaluation at all or whether they already had their preferred alternative in mind and set up the analysis to lend support to that alternative. A look back at the Feasibility Study (May 2010)

[1] These criteria include overall protection of human health and the environment; compliance with ARARs; long-term effectiveness and permanence; reduction of toxicity, mobility, or volume through treatment; short-term effectiveness; implementability; cost; state acceptance; and community acceptance.

shows a lack of any sort of meaningful analysis of all the criteria as well. Effectiveness and implementability are given some discussion, yet the mandated "threshold criteria" – overall protection of human health and the environment and compliance with ARARs is markedly absent or surficially treated. *See* 40 CFR § 300.430(f)(1)(i)(A).

The threshold criteria in evaluating the remedial alternatives are overall protection of human health and the environment and compliance with ARARs. 40 CFR § 300.430(f)(1)(i)(A). The PP's cursory glance at these first two criteria is insufficient to "reflect the scope and complexity of site problems and alternatives being evaluated." 40 CFR §300.430(a)(1)(ii)(C). There is little to no explanation as to the unique hazards to human health that this site may pose to the community. The PP's conclusory language in regards to these requirements does not reflect any detailed analysis by the EPA in regards to the "unacceptable risks" to human health and the environment and how each alternative would specifically address such risks. Such conclusory language includes "nine of the ten on-Site alternatives are expected to meet the two threshold CERCLA criteria" (PP pg.28); "UFA-1 ... would fail to meet the mandatory criteria" (PP pg. 30); and "[a]lternatives OfR-2, OfR-3, and OfR-4 are all protective and would effectively eliminate any potentially unacceptable risks ..." These statements do not provide any information on why the EPA deems one alternative more protective of human health or in compliance with ARARs over any other alternative.

The assessment of the alternatives' long-term effectiveness under 40 CFR § 300.430(e)(9)(iii)(C) is incomplete. There is no discussion as to the degree of certainty that each alternative would provide in regards to the probability of success. There is no mention of the "magnitude of residual risk remaining from untreated waste water or treatment residuals remaining at the conclusion of the remedial activities." 40 CFR § 300.430(e)(9)(iii)(C)(1). Also, there is no discussion as to the "adequacy and reliability of controls such as containment systems...that are necessary to manage treatment residuals and untreated waste." 40 CFR § 300.430(e)(9)(iii)(C)(2). The PP provides a brief conclusion as to which alternatives may be more effective in the long-term time frame, but provides no information to support such claims. Conclusory statements, similar to those used to describe protection of human health and the environment and compliance with ARARs, are once again used.[2] While the statute states that a "brief summary" should be provided, it would do a disservice to the purpose of the statute, keeping the community adequately informed, to provide such a limited scope of information as is presented in the PP.

It is difficult to determine whether any or all of the statutorily prescribed factors have been employed in determining, "the degree to which alternatives employ recycling or treatment that reduces toxicity, mobility, or volume." 40 CFR § 300.430(e)(9)(iii)(D). The factors are listed in the PP and there is also a list providing for which alternatives would be used the most to the alternatives that would be used the least to address the "reduction of toxicity, mobility or volume." 40 CFR § 300.430(e)(9)(iii)(D). No mention, however, is made in how or if these factors were applied to reach such conclusions. Some of the factors are indirectly discussed in the description, not the evaluation, of the remedial alternatives. Even in that section of the PP,

[2] These statements include such things as "[a]lternative OnR-2 is protective with limitations, and the No Action alternative is not effective" (PP pg.28); "The more effective of the two UF alternatives ... is the UFA-2" (PP pg.30); and "OfR-1 is not effective at addressing contaminated soil." (PP pg. 31).

however, there are no specifics or estimations as to the "amount of hazardous substances, pollutants, or contaminants that will be destroyed, treated, or recycled." 40 CFR § 300.430(e)(9)(iii)(D)(2). There are also no specifics or estimations as to the "degree of expected reduction, "degree to which treatment is irreversible," and the "degree to which treatment reduces inherent hazards posed by principal threats at the site." 40 CFR § 300.430(e)(9)(iii)(D)(3)-(6).

The PP fails to adequately discuss short-term effectiveness as required by 40 CFR § 300.430(e)(9)(iii)(E). The PP simply states which alternatives would provide the greatest short-term effectiveness and which would provide the least short term effectiveness. It does not address in which ways the methods would be effective in relation to the amount of time necessary to complete the remedial objective. It appears as if every alternative is just as effective as the next, but some with a longer or shorter amount of time to actually realize its effectiveness. The statute lists four considerations when evaluating short-term effectiveness.[3] Based on the PP, it appears as if only the "time until protection is achieved" factor was considered. No other details are provided.

40 CFR § 300.430(e)(9)(iii)(F) mandates that the EPA consider implementability in their analysis of the remedial alternatives. The PP merely states the factors to be considered in evaluating implementability of the alternatives and lists the alternatives in order from most implementable to least implementable in EPA's estimation. There is only one line justifying these conclusions. Whatever analysis was conducted in order to reach these conclusions is omitted in full from this section. Being conclusory in the "spirit" of brevity denies the community any sort of valuable information to use in their evaluation of the preferred remedial alternative.

Further, the statute states additional requirements when assessing the implentability of off-site remedial action. "Administrative feasibility, including activities needed to coordinate with other offices and agencies and the ability and time required to obtain any necessary approvals and permits from other agencies (for off-site actions)" must be considered in determining implementability. 40 CFR § 300.430(e)(9)(III)(F)(2). Also, "availability of services and materials, including the availability of adequate off-site treatment, storage capacity, and disposal capacity and services; the availability of necessary equipment and specialists, and provisions to ensure any necessary additional resources; the availability of services and materials; and availability of prospective technologies," should also be considered. §300.430(e)(9)(iii)(F)(3). If any of these requirements were considered, they are not reflected in the PP.

According to 40 CFR 300.430(e)(9)(iii)(G), cost must be considered. The projected cost for each remedial alternative is presented in the PP. The PP also states that the alternative with the highest cost is the most effective alternative and the remaining alternatives differ in cost and

[3] These factors include (1) short-term risks that might be posed to the community during implementation of an alternative; (2) potential impacts on workers during remedial action and the effectiveness and reliability of protective measures; (3) potential environmental impacts of the remedial action and the effectiveness and reliability of mitigative measures during implementation; and (4) time until protection is achieved. 40 CFR § 300.430(e)(9)(iii)(E)

effectiveness. The PP says that costs will vary based on the amount of technology implemented, the degree of difficulty in implementation, and time to meet RAOs. The range in cost variation is not provided and the estimated cost of each alternative does not include any detail on how that amount was calculated. Cost estimates are only valuable if they are explained in conjunction with time frames, degree of difficulty in implementation, and the amount of technology used (all of these being stated as variables of costs associated with the alternatives) in order to reach the projected expense.

40 CFR § 300.430(e)(9)(iii)(H) mandates that the EPA consider any State concerns. If the State had any concerns or comments regarding the preferred alternative, they are not in the PP. By "State" we assume the PP is referring to the Florida Department of Protection (FDEP). The PP speaks of the State's acceptance of the preferred alternative and how it has been "closely involved in the development and evaluation of these alternatives." This suggests that the State did not have any concerns or comments and if this is not the case, the language of the PP is misleading. The community has requested the comments from the FDEP many times and has not been provided with those comments. Without any sense of where the FDEP stands on this issue, it is impossible to evaluate any other possible weaknesses of the PP. It should be noted that the City of Gainesville is not satisfied with the PP and has provided its own comments on the document.

40 CFR § 300.430(e)(9)(iii)(I) requires a determination of "which components of the alternatives interested persons in the community support, have reservations about, or oppose." This portion of the PP is omitted as it cannot be completed until comments concerning the PP are received. It should be noted by the EPA that the community has not accepted the PP or any part of its proposed remedial actions. The cleanup plan is completely inadequate to the community because it does not include excavation on-site, includes only limited excavation off-site, and proposes to store the contamination onsite under a large "Mt. Dixon"-type cover. Also, the PP proposes experimental methods in the 30 acre source area and does not provide costs on excavation and removal or incineration. In addition, it leaves treatment of the non-source 60 acres vague, and does not address searching for additional sources such as trenches and drum burial areas. In addition to the above mentioned weaknesses, the plan also fails to mention testing inside nearby residents' homes, any relocation assistance, or compensation for affected residents.

**The EPA does not adequately discuss the rationale that supports their preferred alternative**

According to 40 CFR § 300.430(f)(2)(ii), the EPA is required to "identify and provide a discussion of the rationale that supports the preferred alternative." The PP addresses and describes the alternative preferred by the EPA. However, there is no discussion as to the reasoning behind the selection of the preferred alternative. No justification is given for what was included in the preferred alternative, for what was omitted from the preferred alternative, or even why the preferred alternative was selected. This is a weakness that permeates the entire PP as no proper evaluation was undertaken concerning any of the remedial alternatives using the statutorily mandated (e)(9) criteria. Such a discussion is required by statute and of utmost importance in conveying to the community the reasons for preferring that specific alternative.

**Once again, relocation is not considered as an option in the PP**

The residential population on the west side of the Koppers site may potentially be a part of an exposure pathway. (May 2010 Feasibility Study at 1-40). As seen from the limited indoor testing done for dioxins in fine particulates, this is no longer a potential exposure pathway; ***an actual pathway exists***. Because of this, relocation must be included as an alternative. The exclusion of the relocation alternative necessarily means the ultimate decision-maker is not taking into consideration all appropriate and viable remedial alternatives. Relocation is an approved alternative under federal guidelines and policies and must be considered as a part of this clean up strategy due to the off-site impacts (*see generally* 1999 Interim Policy on the Use of Permanent Relocations as Part of Superfund Remedial Actions). Further, governing policy dictates that relocation should be considered where unreasonable use restrictions may exist during or after clean up, noting restrictions on such activities as children playing in yards. The Florida Department of Health has already recommended restrictions on children playing in easements adjacent to residential property in the Stephen Foster neighborhood and further risk assessment is ongoing. (Health Consultation, July 17, 2009, Florida DOH). Finally, failure to acknowledge the adequacy of relocation precludes perhaps the best mode of protecting human health and the environment. This option is the only option that would account for those "yet to be determined" unacceptable risks. It would eliminate limitations caused by current use of off-site areas as residential property and control future exposure associated with active clean up of the Koppers site and its continued use as an industrial facility.

Relocation is briefly mentioned in the May 2010 Feasibility Study. The Feasibility Study recognizes that in order to achieve the remedial goals, the following may be done to disrupt the potential exposure pathway: (May 2010 Feasibility Study at 3-52).

> ....
>
> 3. ***"Current receptors could be removed from the area and future receptors could be prevented from becoming residents of [the] area. This would achieve the goal of disrupting the potential exposure pathway and eliminating the potential risk/hazard to public health and/or the environment."*** (emphasis added).

This is the ***only*** mention of relocation as an option in any of the feasibility studies or in the PP. It cannot be viewed as an alternative considered by the EPA since it does not meet the evaluation requirements of 40 CFR § 300.430. By failing to develop relocation as an option, the EPA precludes further consideration of relocation as an alternative unless there is a significant change in available information for off-site characterization. 40 CFR § 300.430(f).

Relocation must be considered as an alternative for community acceptance. The EPA's evaluation cannot be considered adequate without a discussion of relocation in light of the rules and governing policy. Dioxins have been found inside homes. The rest of the off-site contamination is still to be determined. The absence of relocation as an option is illogical and exemplifies a lack of diligence on the part of the EPA.

**The plan to scrape soil from residents' yards to be stored on the site is absolutely unacceptable to the community**

As stated above, the residents of the Stephen Foster neighborhood remain adamantly opposed to the plan to scrape contaminated soil from their yards and store it on the site. The institutional controls to accompany such a remedy are also completely unacceptable. As an alternative the EPA offers up a combination of engineering and institutional controls which would effectively cap the property owner's land and then prohibit such owner from doing much of anything with that land in the future. The residents demand that a proper cleanup be initiated which would include relocation to remove citizens from their toxic community.

The removal of impacted soils from the neighborhood will result in a severe disruption of the lives and privacy of the residents of the Stephen Foster neighborhood. The May 2010 Feasibility Study dismissed this concern, calling the soil removal a "one-time event." (p. 3-53). Yet, full data collection to characterize off-site contamination has not been completed. Without that data, there is no way to predict whether this removal will be the aforesaid "one-time event" or a series of events to ensure the contamination is fully eradicated. Further, the removal of soil will destroy landscaping and damage or destroy all of the massive oaks, pines, maples, cherry, and other native trees in the area. Only the pines have a deep enough tap root to avoid damage by excavation. The majority of other trees have extremely superficial root systems which run a little more than a foot beneath the ultra sandy, nutrient-poor topsoil. A simple drive through the surrounding community reveals the natural beauty of the area, a beauty the residents highly value. Once the soil is scraped, institutional controls will be needed, although likely ineffectual, after the excavation is completed. Animals are likely to dig farther than two feet, trees planted by residents may have a root system that extends farther than two feet, and such trees may bear fruit contaminated by the unexcavated soil underneath. Even an industrious child may dig past that two foot mark. How does the EPA propose to prevent these events? Although these issues have been brought to the attention of the EPA time and time again, including in our comments to both versions of the feasibility study, they are ***still*** not being addressed in the PP.

The storing of contaminated soil onsite is completely abhorrent to the residents of the Stephen Foster neighborhood. They do not want a Mt. Dixon in their midst. Capping the soil does not make it disappear. The contamination remains on the property and will threaten the adjacent neighborhoods with recontamination in the future. In addition, it limits future options for the site and the residents are hopeful that if the site is properly cleaned it can be created into something the community can be proud of instead of a reminder of Gainesville's dirty past.

The PP does not evaluate disposing of soils off-site. They should provide cost estimates and a plan for disposing of soil off-site as one of the remedial alternatives. This discrepancy ignores a valid and effective means for cleaning up the site, as well as the neighboring community. Further, only part of the area on site is proposed to be capped. As for the rest of the area, the EPA remains vague and makes references to either providing more caps for the that area or excavating the soil. The EPA must be clear and straightforward concerning everything they plan to do onsite. If they plan to excavate, they must say so clearly and indicate which areas they intend to excavate. They must also state what they plan to do with that contaminated soil once excavation is complete. If they plan to cap or utilize other engineering controls, they similarly must say so clearly and indicate which areas on which they intend to use the controls.

Additionally, the PP does not fully consider the impacts from on-site activities that may impact the surrounding community during the implementation of the remedial alternative such as dust, noise, and other exposure mechanisms.[4] The PP explains that Beazer has "begun interim measures to reduce dust including planting of vegetation over former operation areas." (PP pg. 14). The PP goes on to state that "Beazer East is implementing dust control of continuous water application to suppress dust." The PP does not elaborate on precisely what this continuous water application entails, how often the water is being applied, whether this is a recognized and safe method of suppressing dust, when the water application is needed, or the level of protection this provides to the adjacent community.

All of the above commentary proves that the EPA's PP is not protective of human health and the environment. As this is a threshold criterion under 40 CFR § 300.430(f)(1)(i)(A), this remedial alternative should have been discarded early on by the EPA.

**Storm water runoff control has not been adequately explained**

To control storm water the EPA proposes the following:

> "Storm water controls will consist of: (a) grading and contouring the Site to direct runoff toward collection points; (b) installation of one or more detention/retention ponds; and (c) possible replacement of the existing Site storm water ditch with another ditch or with an engineering conveyance such as an underground concrete pipe (culvert)." (PP pg. 14).

This remedy does not fully explain how it will be adequate to control storm water runoff. There is no elaboration on how the grading and contouring will direct runoff toward collection points or how the detention/retention ponds will contain the water in such a way to prevent contamination of the soil and groundwater beneath it. Without this information, there is no way for the community to analyze the alternative under the criteria in (e)(9), especially protection of human health and the environment and effectiveness in the short and long term.

**The proposed remediation of the Hogtown and Springstead Creeks is not adequate**

The PP states the following for remediation of the creeks: "Ongoing detention basin to mitigate ongoing impacts. Excavation and removal of impacted sediment in excess of the probable effects concentration (transport and consolidate on-site). Monitored natural recovery of remaining impacted sediment until concentrations reach threshold effects concentration or background levels." (PP pg. 33). What exactly the detention basis will be or how it will mitigate ongoing impacts is unclear. In addition, this remedial action is vague on exactly what standard

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[4] *See* William Barnard & Brad Uhlmann, MACTEC, *Preliminary review comments on AMEC report entitled "Potential Fugitive Dust Impacts Predicated from Air Dispersion Modeling Koppers, Inc. Wood-Treating Facility Gainesville, Florida"* at 3 (Oct. 7, 2009) (explaining that build-up of toxic materials could continue to occur at the air/plant boundary and in soils when removal via the precipitation run-off occurs).

the EPA is using to clean the creeks. In a letter from Dr. Stephen M. Roberts and Dr. Leah D. Stuchal of the University of Florida to Liga Mora-Applegate of the FDEP, the Drs. recommend Florida Residential CTLs for sediment in the creeks given the proximity of the creeks to residential yards. *Letter from Dr. Roberts and Dr. Stuchal to Ms. Mora-Applegate dated February 10, 2010 pg. 1 attached to these comments.* In addition, the Drs. also state that "[g]iven that PAHs and dioxin contamination in creeks are not consistently co-located, this remedial effort cannot be assumed to address the issue of dioxin contamination." *Id.* at 3. The community agrees with the Drs. assertions and insists that the EPA clean up the creeks to Florida Residential CTLs and address the issue of dioxin contamination.

**An adequate explanation of various former trenches as well as possible drum burials or dumping sites is not included nor is any suggested remedy for these possible contamination areas**

Aerial photos taken in 1965 and 1971 of the site reveal trenches in the woods north of the site which are no longer in existence. What happened to these trenches? What were these trenches used for? How does the EPA plan on investigating these trenches?

Anecdotal evidence points to locations of possible drum burial and other dumping sites. These would constitute additional contamination areas outside of the documented source areas. The EPA gives no indication in their investigation of the site that they have looked for the possible additional areas of concern. Scott Miller, EPA project manager stated that there will be a "work plan coming forth" to address buried drums. (August 5, 2010 EPA Meeting Official Transcript pg. 112 lines 7-9). This vague language is simply not acceptable to the community. Simple ground penetrating radar in the areas of concern would be sufficient to begin investigation of these sites. The community expects a commitment by the EPA to search for and analyze these areas and incorporate them into their PP.

40 CFR § 300.430(d)(1) states that the purpose of the remedial investigation (which supports all of the plans the EPA subsequently issues) "is to collect data necessary to adequately characterize the site for the purposes of developing and evaluating effective remedial alternatives." § 300.430(d)(2) goes to on require that the EPA "characterize the nature of and threat posed by the hazardous substances and hazardous materials and gather data necessary to assess the extent to which the release poses a threat to human health…" Without fully analyzing any possible dumping sites, drum burials, and former trenches, the EPA cannot be certain they have gathered all of the requisite data to create a full contamination characterization. Without this data, the EPA cannot assure the community their chosen remedial alternative will be effective.

**The PP completely ignores contamination known to exist inside residences**

Tests on fine particulates have been performed on the inside of several homes within two miles from the site. The results were shocking to the residents and their attorneys. The dioxin levels, thought to be some of the most dangerous contaminants on the planet, range from 400PPT to 1100PPT – ***over 1000 times*** higher than the levels deemed safe by the EPA for outside soil contamination. TCDD, a dioxin found inside homes, is a known carcinogen. In addition, exposure to this chemical can cause a host of other illnesses, including reproductive issues, development problems, immune system suppression, heart disease, diabetes, hormonal changes, liver damage, pancreatic abnormalities, problems with the circulatory and respiratory systems, etc. Children, who are particularly susceptible, are coming into contact with these dangerous contaminants inside their own homes and the schools they attend (twelve of which are located within two miles of the site).

According to 40 CFR § 300.430(d) the remedial investigation should perform field investigations sufficient to assess the following: physical characteristics of the site; characteristics or classification of air, surface water, and groundwater; general characteristics of the waste; extent to which the source can be adequately identified and characterized; ***actual and potential exposure pathways through environmental media***; and ***actual and potential exposure routes, such as inhalation or ingestion***. Obviously, finding fine particulates inside residences shows an actual exposure route, more specifically ***actual exposure***. The testing performed thus far was limited in scope and further testing is warranted. One of the major aims of the remedial investigation is to determine risks to ***human health***. Human health is surely affected by dioxins inhaled and ingested inside the homes of residents. It is illogical for the EPA to solely conduct soil and groundwater sampling when confirmed contamination exists within residences. This poses an ***immediate threat*** to the residents of the area. Mr. Scott Miller of the EPA has been asked directly whether or not additional testing will be done on the homes. He has refused to answer. Those residents with means, a/k/a "Koppers Refugees," have been fleeing the area, abandoning their homes, in order to escape this harmful contamination. Those without means to do so are consumed with constant worry and stress about how these deadly chemicals may be affecting their health and the health of their families. These residents are not accessing the site or purposefully exposing themselves to harmful contaminants. They are simply attempting to live their lives in what is supposed to be a safe haven: their homes.

**It is not clear that the EPA is going to follow mandated Florida CTLs**

In the second to last Remedial Action Objective (RAO), the EPA states that they plan to "restore quality of groundwater outside of source areas to beneficial use having COC concentrations no greater than Federal MCLs ***or*** Florida GCTLs." (PP p. 12). The EPA is required to clean up the site according to ***Florida*** GCTLs which are much more protective than Federal MCLs.

In addition, the EPA states that they will clean up the site according to commercial/industrial CTLs. Which will it be? In a recent EPA meeting, Scott Miller, project manager for the site, stated that the future land use at the site may possibly be a mixed use with a residential component. (August 5, 2010 EPA Meeting Official Transcript pg. 10 lines 19-21). Later he states "...there are many sites that have been cleaned up to commercial/industrial standards, where there's been exposure barriers deployed at the site, and there's now residential use ... People live there. Townhomes. That would also be appropriate for this site." (Transcript pg. 38 line 25 – pg. 39 lines 1-6). We assume he deems commercial CTLs appropriate for the site since Florida land use codes typically group mixed use and multi-family housing under its commercial sections. It is ludicrous to think it is appropriate to have commercial CTLs (even more outrageous to consider industrial CTLs) on land that will be supporting residences simply because the Florida zoning code considers mixed use and multi-family housing commercial. CTL levels are based on frequency of exposure. If an individual lives on a site in a townhome, he will be frequenting the site as often as someone that lived on the site in a single family home. His cancer risk will increase in the same fashion as a resident of a single family home. In addition, the Gainesville City Commission passed a resolution in 2008 which stated the site should be cleaned up to Florida Residential CTLs. This resolution was completely disregarded by the EPA.

The Table 1 in the PP states the clean up goals for COCs. (PP pg. 13). Under the groundwater table, benzene is listed twice, once using the Florida CTL (1 ug/L) and again using the Federal MCL (5 ug/L). It is not clear which one the EPA will be using on this site. The EPA must use the most protective clean up level, which is the Florida level of 1 ug/L. This should be corrected in the PP so that the correct clean up level is clearly stated.

Further, the EPA appears to criticize the Florida CTLs for dioxins and furans stating "[a]t present there is significant ongoing debate between and among researchers, different regulatory agencies, and the regulated community regarding the toxicity of dioxins/furans and whether meaningful human-health risks are posed by low concentrations of these contaminants..." (PP pg. 13). They go on to mention that Florida's default SCTL is "at the low end of the range." While the final sentence indicates the EPA intends to use Florida's CTLs, the entire diatribe is troublesome and leads the reader to believe that if the EPA can find a way around it, they will attempt to use a level higher than the mandated Florida level. The EPA is cleaning up a site in Florida and is required to use Florida CTLs.

The community insists that residential CTLs be used if any sort of residential housing is contemplated in the future for the site. These discrepancies should be fixed to make it clear that the EPA will use the applicable Florida CTLs.

**Conclusion**

After ***twenty-seven years*** in the making, the PP fails to follow the mandates of 40 CFR § 300.430 in numerous ways. The PP relies on incomplete data, the remedies selected fail to take into account effects to the residents of the Stephen Foster neighborhood, the remedies are not appropriately analyzed under the nine criteria, and a discussion of the most beneficial option, relocation, is not included in the PP. The community has serious concerns about many of the proposed remedial actions including storing contaminated soil on-site, clean up of the local creeks, and storm water runoff. The community wants a work plan ***now*** that addresses what the EPA will do to investigate possible drum burials, storage sites, and locations of former trenches. The EPA must make it clear in the PP that they intend to use the most stringent clean up target goals, which are Florida's CTLs. Most importantly, the EPA is ignoring data confirming actual contamination inside of residences. All of the EPA reports to date are silent on what the EPA intends to do to remedy this deadly contamination. All of these issues should be addressed ***before*** a final remedial option is selected so that all potential hazards and concerns of the Stephen Foster neighborhood can be given appropriate weight in the selection process.

SFNPG would like to point out that many minority and people of lower socio-economic status reside in the area surrounding the site. In light of the EPA's mandate for environmental justice, the community hopes the EPA would be more sensitive about their approach to community involvement. In a recent July 22, 2010 memorandum from the EPA, the EPA states that ***achieving environmental justice is an agency priority and should be factored into every decision***.[5] The memorandum defines environmental justice as the "fair treatment and meaningful involvement" of all people regardless of race, national origin, or income in the formulation of rules and the implementation of cleanup processes. This cleanup process has taken ***in excess of twenty-seven years***. In response to learning of this fact during an investigation by CNN into the Gainesville Superfund site, Mathy Stanislaus, EPA's new Superfund Program Director, admitted that ***"community residents should be angry for how long this is going on and how long they have waited for their cleanup."*** That is unfair treatment. As stated before, the community was not consulted while the EPA performed their investigations and research. That shows a complete lack of involvement, much less meaningful involvement. The EPA is not only failing to follow its own directive on environmental justice, it is acting in a way that completely contravenes the spirit of the mandate.

Once again, SFNPG would like to remind the EPA that neighboring residents had no part in contributing to, endorsing, or encouraging the hazardous pollution that now lies within their yards and inside their homes adjacent to the site. The EPA has failed time and again to recognize the degree to which the residents have been impacted by this contamination. SFNPG implores the EPA to take the concerns of the community seriously and factor them into their remedial alternative selection. SFNPG expects the EPA to use its full authority under the law to protect the health and environment of the citizens most impacted by this ongoing tragedy.

Please feel free to contact me directly with any questions or concerns you may have. Please direct all correspondence regarding these comments to the undersigned counsel.

Sincerely,

Sarah Schwemin
Attorney for the Stephen Foster Neighborhood
Protection Group

[5] EPA, *Interim Guidance on Considering Environmental Justice During the Development of an Action*, July 22, 2010.

**BANCCA.ORG, LLC**
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October 12, 2010

Mr. Scott Miller, Project Manager
US EPA REGION 4
61 Forsyth Street, S.W.
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Email: miller.scott@epamail.epa.gov

**RE: Open Letter to EPA Region 4 on the Cabot-Koppers Superfund Remedial Plan (dated July 15, 2010) & EPA Koppers Fact Sheets (dated September 10, 2010)**

Dear Mr. Miller:

I am writing to you on behalf of BANCCA.ORG, and many of the citizens of Gainesville, Florida and Alachua County, regarding concerns about the recently released EPA Remedial Plan for the Koppers Superfund site. We intend to publish this same letter online in an open letter format for our worldwide audience, in order to raise awareness of the issues at the Koppers Superfund site in Gainesville.

While we appreciate your efforts with regard to this complex and challenging site, it is our strong belief that the problems that this former wood treatment site presents to our community are not being adequately addressed by the EPA's proposed Remedial Plan, particularly with regard to the protection of human health.

We believe there are serious deficiencies in both the plan itself and the approach taken by the EPA. Also, we are concerned about a number of other problems we have uncovered through our own research during the last few months.

This letter will attempt to detail and explain where the EPA's actions, (or lack thereof), and its proposed Remedial Plan (RP) and Feasibility Study (FS), have failed to meet state and federal requirements, CERCLA requirements, the EPA's own Guidance Documents, as well as the needs of our community with regard to the cleanup of this site, the protection of the health of our local residents, the protection of our environment, and our local water supply.

We hope that this letter will explain our concerns in a clear and concise manner, in order to assist the EPA in tailoring a revised and improved plan that better suits our community's needs, meets our ARARs, and is more protective of human health and the environment.

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## ISSUES with the EPA's REMEDIAL PLAN for the KOPPERS SUPERFUND SITE

[Note: You can click on any link below to navigate to a particular section of the document.]

## 1. The EPA Issued a Remedial Plan *BEFORE* the Remedial Investigation was Complete

EPA and CERCLA guidelines dictate that the Remedial Investigation (RI) is the first step in the remediation process for a Superfund site, but with regard to the Koppers site, these rules appear to have been turned upside down. Instead, the RI remains incomplete even today, especially with regard to the testing of offsite soils and offsite groundwater contamination.

**2.**

**3.**

At this time, the extent and boundaries of offsite soil and groundwater contamination remain unclear, which creates a wide array of problems for residents, local government officials, city road crews, utility staff, realtors, and most importantly, for the children, who are the most vulnerable population where toxic dioxin exposure is concerned.

The RI was so poorly done that some onsite source areas were not even identified, tested or included in the Remedial Plan. In fact, it was our website: **BANCCA.ORG**, that revealed to the general public on May 31, 2010 in a Special Report entitled, ***"What Lies Beneath - Are There Barrels Buried at the Koppers Superfund Site? Plus What Historical Aerials May Reveal..."*** (This report is available online at our website here: http://www.bancca.org/CCA_Editorials/Koppers_Superfund_Site_Special_Report.htm ), that there were possible overlooked source areas visible in historical aerials from the 60's and 70's, and reports of probable buried drums of toxic waste onsite, which we had learned by interviewing local residents who had lived next to the site for decades. Our review of the historical aerials also revealed 3 possible disturbed areas that had not been investigated by the EPA or Beazer before.

One area in particular consists of what appear to be six (6) long deep parallel trenches, which we now refer to as **"The Trenches Area"**. Fortunately, the EPA has finally recognized this area of the site on its latest plan graphic, where it is referred to euphemistically as a ***"Historically Disturbed Area"***. Yet to date, there has been no explanation of these "trenches" by either Beazer or the EPA, nor testing of this area for contaminants, nor has the EPA committed to doing any cleanup of these potential source area(s) found in the aerials.

Reviewing historical aerials as part of an RI for a Superfund site is nothing new or novel. In fact, the importance of reviewing historical aerial photos for potential source areas during the RI phase is clearly explained in technical reference manuals, such as the textbook, **"Practical Handbook of Environmental Site Characterization and Ground-Water Monitoring, Second Edition"**, edited by David M. Nielsen, pgs. 100-135 (Portions of this book are available online here: http://tinyurl.com/2dp6soz ).

This textbook discusses the importance of site reconnaissance, local interviews, reviewing historical records and aerials, owner records and documents, topographical maps, local and state environmental regulatory agency files, and how this vital information directly relates to the proper characterization of the contaminated environmental site. showed 3 disturbed areas,

In addition, the other disturbed areas in the so-called "Northern Inactive Area" have not been addressed at all in the current EPA Remedial Plan, even though the highest levels of dioxins on the site were found in one of these areas, (*where dioxin levels are 24,377 times higher than Florida residential SCTLs*). We personally reported during the June 16, 2010 Koppers site walk-thru, that based on our own reconnaissance, there is a treated wood disposal area at this spot, where piles of decades-old creosote utility poles lie covered up with vines. Yet, the EPA's proposed plan makes no mention of the remediation of this source area, or its very large pile of debris.

Recently, we learned that the EPA has also known about offsite groundwater contamination west of the Koppers site for at least 4 or more years, **as evidenced by the contamination of the Geiersbach well**, located adjacent to the western easement at 410 NW 26th Avenue in the residential neighborhood. But, the EPA has failed to inform the general public about this offsite groundwater contamination. This 228-foot-deep private water well which tapped into the Floridan aquifer, was purchased by Beazer East from Mr. Geiersbach in 2004, and subsequently plugged, ***because it was found to be contaminated by benzene, naphthalene and other methyl-phenols.***

However, until we brought this issue to the forefront last month, this information had been buried in an EPA/USACE Five Year Review Report about the Cabot site, and was never mentioned in any recent EPA documents about offsite contamination from Koppers. *It was as if this contamination had never happened...* Yet, it is clear that there is now offsite groundwater contamination in the residential neighborhood on the western side of the Koppers property that has not been considered in the EPA's RI or proposed plan.

We believe that these facts provide significant proof that Region 4 EPA staff failed to fulfill their obligations to do a proper Remedial Investigation as required by CERCLA for this site.

The intent of an RI is to collect the minimum data necessary to complete a Feasibility Study. The Feasibility Study is intended to distill the number of possible alternatives into a manageable subset of alternatives that can be effectively evaluated. It is acknowledged that there are data gaps that will need to be closed; however, it should be noted that it is common to continue to gather data as needed throughout the Remedial Design and in some cases the Remedial Action.

Note: Have Adrian look at the RI and see if he can address some of the historical aerial concerns.

## 4. The EPA's Remedial Plan for Onsite Contamination Recommends Unproven Remedies (REMOX - ISBS) and Failed Scenarios

### a. REMOX is an unproven product that should not be used at this site

The Remedial Plan calls for the use of ISBS for treating DNAPL in the 4 major source areas onsite, and the product that the PRP wishes to use is REMOX EC, supplied by Adventus Americus, and manufactured by Carus Corporation. The plan is to pump thousands of gallons of REMOX into the Koppers site. However, REMOX is a mostly unproven product, which has been promoted heavily by Adventus and Beazer, in spite of numerous questions that remain after the pilot test onsite in 2008. Data from the pilot test indicates that the REMOX was not successful, and one email from Kelsey Helton of FDEP, dated Feb. 25, 2008 expresses concerns about purple colored groundwater detected in a Hawthorne Group well at the Koppers site after the initial pilot test. In that email to Mitch Brourman (see PDF file: "ATTACHMENT A"), Kelsey spells out how this problem violates state and Federal law:

> **"Migration of injectants with constituents exceeding groundwater standards across aquifers is not authorized by the site specific UIC variance issued for this pilot nor is it allowed by state or federal UIC rules.** As such, FDEP requests that Beazer provide a more detailed account of what was observed during the initial ISBS injection activities, any supporting groundwater analysis and a proposed monitoring scope to be initiated in the March 2008 sampling event- if not sooner- to ascertain the extent and magnitude of migration of the permanganate constituents into the Hawthorn."

We noticed similar concerns about "perplexing" purplish-colored groundwater in an email from EPA's William O'Steen to you, Mr. Miller, on the ARI CD, which we mentioned at the August 5th public meeting, which describes how a purple colored groundwater suddenly appeared in Hawthorne Group monitoring well (HG-29D) at the adjacent Cabot site, ***after*** the REMOX pilot test, which seems to indicate that using REMOX at this site is problematic, if not technological infeasible, and could pose a threat of contamination to offsite groundwater.

We also uncovered two documents that refer to either "cavernous features" or "karsts" possibly being present deep beneath the Koppers site, which would preclude the use of ISBS at this site, since using REMOX could not only have the potential to cause the groundwater contamination to worsen, but could cause it to accelerate and move offsite more rapidly than expected.

Moreover, REMOX EC has been promoted heavily by Beazer, Adventus and their affiliated remediation contractors, while very little peer-reviewed data exists to support its actual efficacy. FDEP and EPD staff have expressed doubts about this product. In addition, our citizens are opposed to having this site become a "beta test site" for an unproven ISBS product, which appears better suited to generating a profit for the firm that supplies the product that it does in immobilizing DNAPL.

If REMOX fails at this site (and some say this already appears to have happened during the 2008 pilot test), our water supply could be impacted in the future, as BTEX contaminants, manganese and other heavy metals move offsite.

Finally, we learned last week that Neale Misquitta, Manager and Principal at both **Key Environmental, Inc** and **Field and Technical Services, LLC** (FTS), who authored several reports related to the pilot test of REMOX at this site, was indicted by the US Department of Justice on fraud charges. (See this for yourself here: http://www.justice.gov/usao/paw/pr/2010_september/2010_09_23_01.html ).

This certainly casts great doubt about the credibility of any reports that Neale or his firm(s) may have authored in support of REMOX and ISBS, and any other reports that he provided in related to the Koppers Superfund site.

### b. A Larger Mount Dioxin Doomed to Fail?

The remedy selected by the EPA for the onsite contamination involves consolidating thousands of tons of soil and laced with DNAPL and contaminated with dioxins, arsenic, PAHs, BAPs and other COCs into a huge consoli-dation area that will measure "approximately 32 acres", according to the May 2010 Final FS.

This approach is the same approach used at other Superfund sites, including the **Escambia Treatment Company** (ETC) site in Pensacola, FL, where a similar consolidation area was created and nicknamed **"Mount Dioxin"**. However, the "Mount Dioxin" slated for the Koppers Gainesville site has an area that is 3 times larger than the Pensacola "Mount Dioxin", making it one of the largest onsite hazardous waste consolidation areas at any Superfund site in the nation!

Worse, *few people are aware of the problems that were encountered in remediating the ETC wood treatment site* in Pensacola, where residents were exposed to hazardous toxins over a 3 year period while the excavation was taking place, which lead to the relocation of some 420 households, or how the containment and capping of Mount Dioxin was actually a complete failure!

The new book, *"Sacrifice Zones"* by Steve Lerner, details how the cap on Mount Dioxin lasted only 8 or 9 years before it was considered failed by the US Army Corps of Engineers. Children were even trespassing on the site and using the cover of the hazardous waste pile as a giant slide for their amusement, he noted, and the entire waste pile had to be uncovered and reburied (at great taxpayer expense) by creating a lined hazardous waste landfill onsite.

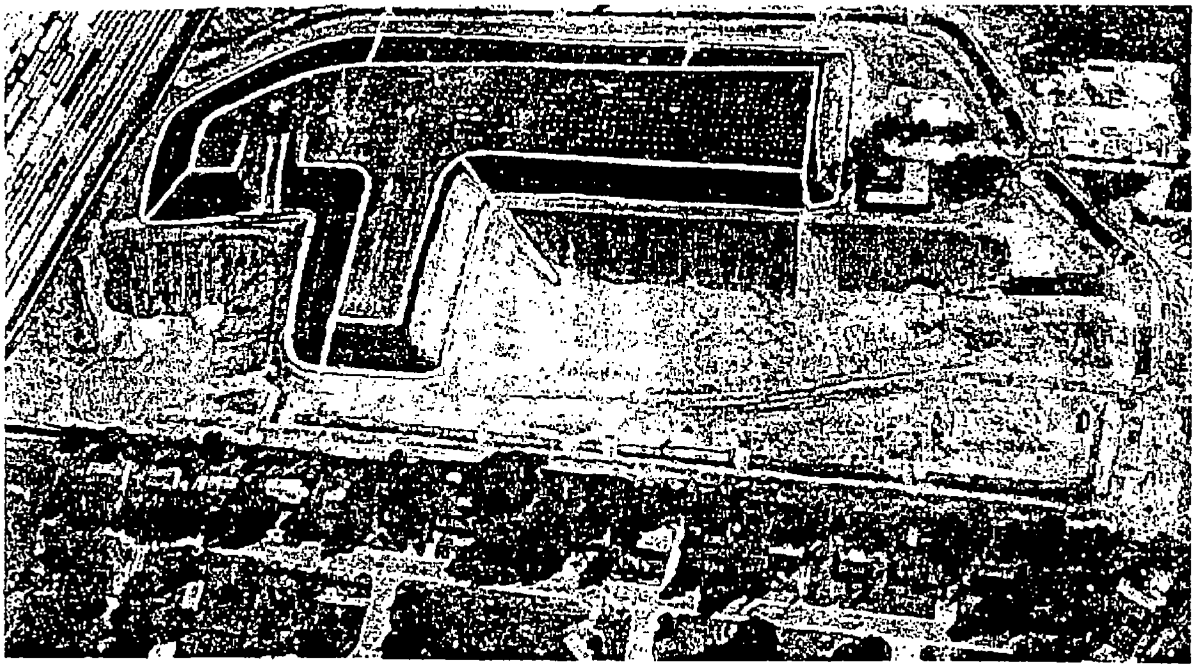

*Figure 2 "Mt. Dioxin." Rosewood Terrace, an African American residential community, can be seen at bottom of photo*

[Aerial View of Mount Dioxin, Pensacola, FL – Imagine a mound at the Koppers site 3 times larger than this one.]

Lerner's book describes the issues with Mount Dioxin like this:

> "The EPA's preferred remedy [for dealing with the failure of Mount Dioxin] is to rebury the wastes on site along with contaminated soils from the surrounding communities in an expanded pit....The depth at which engineers plan to rebury the waste is particularly problematic on this site because it is only five feet above the high groundwater elevation, [Wilma] Subra explains. In other words, this large volume of untreated, highly toxic wastes will be separated from the high groundwater mark in the shallow sand and gravel aquifer by only a leaky piece of plastic and five feet of soil...
>
> ...Reburying the wastes without treating them is not only ill advised from a public health standpoint- it is also against Florida law, [Wilma] Subra contends. "The state of Florida has a prohibition on landfills for such waste," she notes. Nevertheless, a deal has been made to go ahead with the re-internment of Mount Dioxin."

According to the Institute for Southern Studies website: ***"On July 8, 2009, the last shovel of soil from the ETC stockpile [Mount Dioxin] was excavated and permanently interred along with approximately 500,000 cubic yards of contaminated soil in an 18-acre on-site containment cell."***

These accounts detail how the EPA is planning to implement a remedial strategy that has already failed at another Superfund site here in Florida, **only on a scale that is 3 times larger!** But unlike the ETC site, the large area needed for containment at the Koppers site means that there will not be enough area left over to rebury the hazardous waste if this first containment effort fails in the future. This is especially true if the site is redeveloped as commercial property.

This is why it is so vital that as much toxic soil and debris as possible be removed, (or treated and removed), from this site. We cannot afford another failed Superfund site cleanup, as has happened in the past. Our water supply will be in jeopardy in the future by any failure of this cap-and-cover strategy.

## 5. EPA is Not being Transparent and is doing a Poor Job of Public Communication

The EPA's "Community Involvement Program (CIP), which is a required under Section 117 of CERCLA law, has bordered on being farcical. Considering that this site has been on the NPL for 26 years, it is only in the past few months that we have had any meetings with the public on this site, and by our count, there have only been 4 meetings with the general public in the last year. Yet, note what the EPA Document *"Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA"* states about timing of community relations activities on page 1-9:

> "Community relations is a useful and important aspect of the RI/FS process. Community relations activities serve to keep communities informed of the activities at the site and help the Agency anticipate and respond to community concerns. **A community relations plan is developed for a site as the work plan for the RI/FS is prepared**. The community relations plan is based on interviews with interested people in the community and will provide the guidelines for future community relations activities at the site. **At a minimum, the plan must provide for a site mailing list**, a conveniently located place for access to all public information about the site, an opportunity for a public meeting **when the RI/FS report and proposed plan are issued**, and a summary of public comments on the RI/FS report and proposed plan and the Agency's response to those comments.
>
> The specific community relations requirements for each phase of the RI/FS are integrated throughout this guidance document since they are parallel to and support the technical activities. Each chapter of this guidance has a section discussing community relations requirements appropriate to that specific phase of the RI/FS. Additional program requirements are described in the draft of Community Relations in Superfund: A Handbook (U.S. EPA, Interim, June 1988)."

For reasons we do not understand, the normal guidelines for CIPs were not followed with regard to the Koppers site, to the detriment of our local community. The EPA meeting which occurred last week, was a shining example of poor public communication. Like most citizens, we received no notification whatsoever from the EPA about this meeting. There seemed to be a total breakdown of communication about this important public meeting. The lack of notification was blamed on an absence of email addresses and on the EPA database; but this excuse fails short given the amount of email communication received by EPA from the community in the past few weeks.

The lack of transparency on the EPA's part is not limited just to the CIP either, as EPA staff have typically displayed an ***"ivory tower mentality"*** that creates barriers to interpersonal communication and fosters distrust throughout the community. We can cite numerous examples of this, including: 1.) how you yourself suggested in a letter to the City of Gainesville that the EPA did not want to allow a copy of their draft Feasibility Study to be available at our local public library - a violation of the Florida Sunshine Law and Florida Public Records Act statutes, to 2.) a more recent exchange where you told Dr. Pat Cline, the designated Technical Advisor for Protect Gainesville's Citizens (PGC), and PGC staff, that they would have to use the Freedom of Information Act (FOIA) law to obtain copies of important technical reference documents about the Koppers' site for their research. This lack of transparency has been a huge disservice to our community.

## 4. Risks to Human Health from Dioxins, Arsenic and other COCs are Being Downplayed

We spent a great deal of time reviewing both the Draft (Working Copy) and Final versions of the Feasibility Study (FS) and the Human Health Risk Assessment (HHRA) documents.

We are aware of several concerns regarding the HHRA itself, which was prepared by AMEC on behalf of Beazer East. One important example is a letter written today (Oct. 12, 2010) by Dr. Stephen M. Roberts, former EPA FIFRA SAP Chair, to Bob Palmer, Chair of the Alachua County Environmental Protection Advisory Committee about the results from the HHRA. (See answer to question #3 in excerpt from Dr. Robert's letter below.)

3. Did AMEC calculate the risks reasonably? Do you agree with AMEC's assessment of risks on-site?

   We have raised numerous technical issues with the human health risk assessments developed by AMEC. These have been outlined in detail in technical reviews provided to the FDEP for each risk assessment. The bottom line is that we have recommended to FDEP that they should not accept any of the human health risk assessments submitted thus far.

We studied in detail the Feasibility Study, and even ran a line-by-line comparative analysis of the Draft (Working Copy) version of the Feasibility Study vs. the Final version of the FS. We noticed that whoever edited this final FS modified almost every reference to the toxicological and health risk aspects in the FS document. We found numerous changes made that downplay the health risks from exposure to toxins. The effect is that the final version of the FS is weaker, less protective of human health, omits new data, and utilizes vague, euphemistic and misleading terms to replace more specific and concrete phrases from the prior draft FS.

It's as if the new FS sought to *remediate the toxic contamination found at this site via prose, rather than science*. The results are embarrassing, and seem designed to benefit the PRP, not human health or the environment. How the EPA could allow this to happen unchecked is astonishing, especially given that the PRP is supposed to *"conduct the FS under the review and oversight of the EPA"* and *"correct any deficiencies discovered during the conduct of the Agreement"*.

We can state this with great accuracy - we utilized a software program called ***Araxis Merge*** to evaluate the two FS versions side-by-side and line-by-line to see the exact changes that had been made between the versions. As a result, we noticed that many specific key phrases were altered in the final FS version to dilute the content in this version of the report. We found phrase substitutions such as: **"impacted media"** to replace **"contaminated media"**, **"chemicals in the environment"** to replace **"chemical contamination"**, **"constituents at the site"** in lieu of **"site contamination"**, and so on.

In the table below is one example of the kind of "remediation by prose'" that took place when EPA's FS for the Koppers Superfund site was "sanitized" by a Beazer's environmental subcontractor. This excerpt serves as a clear example of why our residents have filed a formal complaint with the Florida Board of Professional Engineers demanding review of these documents, which were not signed and sealed by a professional engineer, as required by Florida law (which is an ARAR you were previously not aware of.)

This particular example, where the text was *adulterated* in the Final version of the Feasibility Study by some unknown author, has a potentially severe and negative impact on the offsite soils remedy for every single resident whose yard is contaminated in the adjacent neighborhood. Notice how the wording about "1 x $10^{-6}$ cancer risks" and ARARS were removed from the final FS – this kind of tampering appears to violate the intent of the Adminstrative Order, under which PRPs like Beazer are allowed to write their own FS!

| Draft FS Wording | Final FS Wording |
|---|---|
| Line 345: Off-Site remedy OfR-4 allows for a flexible approach that may include institutional and/or engineering controls on properties that (1) are suitable for such controls and (2) have owners that are amenable to such controls.<br><br>**Where institutional/engineering controls are not possible or beneficial, surface-soil removal *would be applied.* The recommended** | Line 345: Off-Site remedy OfR-4 allows for a flexible approach that may include institutional and/or engineering controls on properties that (1) are suitable for such controls and (2) have owners that are amenable to such controls.<br><br>**Where institutional/engineering controls are not possible or beneficial, surface-soil removal may be applied, *subject to owner*** |

| | |
|---|---|
| **remedy for areas of off-Site soil determined to pose unacceptable risks is OfR-4.**<br><br>**The area that will require remediation will be determined through the ongoing delineation and risk assessment process. In defining this area of remediation, Applicable or Relevant and Appropriate Requirements (ARARs) will be considered; this includes the Florida statutory provision that excess lifetime cancer risks be no greater than one in one million ($10^{-6}$).** | ***approval.***<br><br>**<< TEXT ADDED IN FINAL VERSION:>>**<br>***If areas exceeding Florida's allowable risk limit or default SCTLs are identified by soil sampling, Beazer East, Inc., will contact each affected private property owner to discuss possible approaches to address the soil impacts on the private property. The private property owner may decline to allow Beazer to remediate soils. Neither the lead environmental agency (in this instance the EPA) nor Beazer is able to require a private property owner to allow access or require remediation to take place if the property owner decides not to do so.*** |

Still, having Beazer-funded subcontractors drastically modify and reword the EPA Feasibility Study to their liking does not remove the requirements upon the EPA to meet ARARs - which in Florida include SCTLs of 7 ppt for dioxins in residential soils and 30 ppt for industrial.

Even so, statements made by EPA staff at last week's EPA public meeting seem to indicate that Beazer East might try to use risk assessment methodologies to reduce or even eliminate the offsite remediation they would be required to do, even though soil samples show that dioxins are as high as 69 ppt in the adjacent neighborhood west of the site. This would clearly violate CERCLA guidelines as well as Florida statutes and Administrative Code, and would quickly lead to a Federal lawsuit. The EPA should use every means necessary to prevent this from happening, because allowing lesser cleanup targets than the Florida SCTLs for offsite soils sets a precedent with wide-ranging deleterious impacts on future site cleanups throughout our state.

In fact, regarding such precedents, the book "Sacrifice Zones" in chapter 2 about the Escambia Treatment Company site in Pensacola, in a section entitled "How Much Dioxin is Too Much", author Steve Lerner makes it clear that the EPA is required to meet the 7 ppt standard, and that EPA's standards were actually much lower than they are now back in the early 1990s! This passage reads:

> **"How Much Dioxin Is Too Much?**
>
> There is also the question of what constitutes an adequate cleanup for soils contaminated with dioxin. <u>When Williams and CATE first began demanding a relocation and cleanup in 1991, the U.S. EPA standards for dioxin in soil were 2 ppt in residential areas, 20 ppt in commercial areas, and 200 ppt in industrial zones.</u> In 1998, however, the EPA issued a policy directive lowering the protection standard to 1 ppb [1000 ppt]. *This was meant to be an interim standard that would be reset once the EPA's dioxin health risk assessment was concluded. Almost ten years later that report has yet to be issued.*
>
> To further complicate the question of how much dioxin should be permitted in the soil in residential areas, there is another set of federal Superfund rules which require that federal agents clean up the soils to state standards, which in Florida is 7 ppt in residential areas and 30 ppt in commercial/industrial areas. <u>State and federal lawyers argued over which standard should apply for years finally concluding that the state standard should prevail.</u> As a result, the area on which a commercial/industrial park will be built will be cleaned up to 30 ppt of dioxin."
>
> Source: *"Pensacola, Florida: Living Next Door to Mount Dioxin And a Chemical Fertilizer Superfund Site"*, by Steve Lerner, from the website for The Collaborative on Health and the Environment: <u>http://www.healthandenvironment.org/articles/homepage/2628</u>

## 5. The EPA's Plan Does Not Require Epidemiological Studies or Biological Testing of Residents, Homes or Schools

The EPA's plan fails to address the issue of epidemiological studies and biological testing for residents who live in the neighborhood next to Koppers and have long been exposed to toxins in the dust that blows offsite, as well as the contaminated stormwater that leaves the site and flows into Springstead Creek.

These residents, who are referred to as ***"receptors"*** throughout the FS and other Koppers reports, have been exposed to these toxic, carcinogenic, mutagenic and teratogenic compounds for decades, and **report many accounts of multiple cancers within the same household, cancer "clusters" within the neighborhood, mysterious pet cancers and premature deaths, and other health issues, such as MS, Parkinsons, skin and thyroid problems.** As EPA scientists well know, many of these health problems can be caused by exposure to toxic compounds, such as dioxins, arsenic, pentachlorophenol, benzo(a)pyrenes, hexavalent chromium and mercury, all of which are found on the Koppers site, and many of which can be found in the offsite soils and storm water.

This is why we recommend that the EPA push the CDC and the FDOH to begin epidemiological studies of the neighborhood and biological testing of the residents and their homes.

Yet, in spite of numerous requests by many citizens and our city and county commissioners to test for dioxins in the soil and indoor dust at nearby schools and daycare centers, the EPA has yet to require Beazer to do this, or to do it themselves. Such testing has been done at other Superfund sites, which has even led to the closure of some public schools, due to high dioxin levels.

The EPA, the ATSDR and the FDOH are well aware that exposure to dioxins pose a special risk to small children due to their increased metabolism and sensitivity to environmental contaminants, and that **children are at a greater risk of cancer and non-cancer health hazards from dioxin exposures**. Their failure to protect our children's health is nothing short of reprehensible negligence.

**There is a day care center located directly across the street from the Koppers main entrance,** where to date no soil testing has ever been done. The Stephen Foster Elementary School is located 0.6 miles northwest of the site, and the Sidney Lanier Elementary School is south of the site at about the same distance. Therefore, we recommend that these schools be tested immediately for dioxins, and if the levels are found to be elevated, additional testing should be done at other nearby schools. There are at least a dozen schools and day care centers within a one mile radius of this toxic site.

Worst of all, the ATSDR has delegated its legal duties to perform accurate health assessments to the Florida Department of Health, as it has similarly done in 38 other states, yet when we contacted Jennifer Freed of the ATSDR, whose signature appears on the June 2010 Koppers Health Assessment, she was unable to provide any backup data or calculations for us regarding this particular health assessment, which we believe indicates that the ATSDR is "rubber-stamping" health assessment reports produced by state health departments, without reviewing the data in the reports.

When we finally did receive the actual data and calculations from FDOH for this report, and had other risk assessors review it, they were not in agreement with the conclusions of FDOH, and believed that the report did not take into consideration non-cancer risks for children.

In other words, other risk experts believe that the report by FDOH minimized the real risk posed by the dioxin levels in the soil in the residential neighborhood next to the Koppers site. Such actions by ATSDR and FDOH do not meet the intent or requirements of CERCLA to provide accurate health risk assessments for residents near Superfund sites. These requirements are legal ones, which are spelled out clearly in the aforementioned EPA Guidance document in Section 1.3.4 on page 1-4:

### *1.3.2 Health Assessments*

Under CERCLA §104(i) (Health-Related Authorities),<u>the Agency for Toxic Substances and Disease</u>

Registry (ATSDR) must conduct a health assessment for every site proposed for inclusion on the NPL. The purpose of these health assessments is to assist in determining whether current or potential risk to human health exists at a site and whether additional information on human exposure and associated health risks is needed. The health assessment is required to be completed "to the maximum extent practicable" before completion of the RI/FS.

The EPA even publishes a detailed guidance document entitled ""CERCLA Baseline Risk Assessment Human Health Evaluation EH-231-012/0692 (June 1992)", that spells out the EPA's and the RPM's responsibilities to ensure that the Health Assessments are conducted properly (see it here: http://homer.ornl.gov/nuclearsafety/env/guidance/cercla/cer-risk.pdf )

Thus, it is our opinion, that the practice of the ATSDR delegating its responsibilities to perform Superfund site health assessments to lesser-qualified and severely-underfunded state health departments is a practice that on its face appears completely illegal under CERCLA Section 104 and 40 CFR 300.430, and should be discontinued. Most importantly, nothing in these statutes eleviate the responsibility of the EPA, and in particular, the EPA RPM, to ensure that the health assessments are accurate and done properly. Thus, it appears that EPA Senior Management needs to get involved in reviewing this vital issue with ATSDR Senior Management to determine whether this practice of delegation health assessments should be allowed to continue.

## 6. The EPA's Plan Fails to Address Air Quality Monitoring.

Air quality monitoring is not addressed in the RP, the FS or the HHRA, but should have been an important part of all 3 documents. In fact, the air quality monitoring should have taken place BEFORE the site was closed, and before either the FS or HHRA were written, so that the data could have been incorporated into these reports.

A letter dated July 2, 2009 from Randy Merchant of the Florida DEP to Scott Miller of EPA recommended air monitoring and added the following:

*"One human exposure pathway that has not been fully assessed is inhalation of contaminated dust from the site. Nearby residents, especially those west of the site, report wind-blown dust. Findings of decreasing concentrations of arsenic, benzo(a)pyrene, and dioxins in residential surface soil as you move away from the site support this assertion."*

More to the point - neither AMEC, Beazer, EPA, FDEP, or even ACEPD have done any air quality monitoring to date, and there is no plan to do air quality monitoring in the future that we are aware of. Yet, we know from what took place at the ETC site in Pensacoloa that the nearby residents will likely be exposed to contaminants when the onsite and offsite soils are remediated by excavation or grading.

Author Steve Lerner detailed exactly how bad the air quality became near the ETC site in Pensacola during their two year remediation, in his book "Sacrifice Zones":

> "Back in 1992, while the excavation was in process, residents in Rosewood Terrace, Oak Park, and Goulding, the communities adjacent to the plant, and in Clarinda Triangle, the community across the highway, began to experience a sharp increase in acute respiratory distress, nosebleeds, headaches, nausea, skin rashes, and a host of other ailments. The air had become so filled with dust from the constant bulldozing that residents decided they had to do something. Contractors doing the excavating were supposed to keep the dust down by spraying it with water during the excavation, but as one commentator on engineering ethics pointed out, the expense of spraying the water was bound to cut into the contractor's profits......But for the residents who lived next door to the source of the problem, the cleanup itself was exacerbating already deplorable environmental conditions. The remedial excavation was creating clouds of contaminated dust in a heavily populated, urban area...
>
> ...Joel Hirschhorn, a former government employee who worked on superfund issues for years... went through voluminous EPA documents and uncovered data, which demonstrated "that the original removal action had left very high levels of site contamination all over the site including in open pits and the areas not covered by the pile of excavated materials." The remedial work neither removed the threat to shallow groundwater, "given originally by the EPA as the main basis for the action;" nor did it protect residents, he writes. This information provided Williams with a basis to contend that the removal action "had itself caused preventable health threats," he notes."

But no one listened to them, and the digging continued, spreading contaminated dust throughout the neighborhood. The poor air quality caused a number of problems. One woman said her daughters would not play outside because "the air would make them itch and burn, and give them headaches." Another woman who works in her garden says she gets so dizzy doing it that she falls against walls. Residents of all ages were affected. "It's not old people [who are dying of cancer]. It is some of the young people in their 40s and 30s, because there is a young man who died right there, he was in his 30s," a resident told a CNN reporter...
Some residents even tried to stop the excavation by standing in the way of the bulldozers..."

Based on this information, we think it is crucial that air quality monitoring devices be installed in several locations west and north of the Koppers site during the remediation. These devices should be monitored frequently by local EPD or EPA staff during remediation, to ensure that the kind of health hazard nightmares that took place in Pensacola don't happen here. This is the real "lesson learned" from the ETC cleanup.

## 7. EPA Has No Plan to Relocate Residents Out of Harm's Way

The RP fails to consider the need to relocate the residents either temporarily or permanently, and states in the September 2010 fact sheet that, "Based on concentrations of contaminants in surface soil at surrounding residences and the practical remedial alternatives that exist for preventing exposure to these soils, relocation is not warranted." Yet, recent tests of indoor household dust in the local neighborhood using EPA method 4435, as detailed in the Federal class action suit against Beazer and Koppers (see Appendix of this PDF document: http://www.bancca.org/Docs/Koppers%20Superfund%20Federal%20Lawsuit%20Filing.pdf), *found indoor dioxin levels ranging from 34 ppt to 1150 ppt!*

How can the EPA ignore this data, when dioxin exposure poses such a clear threat to human health and these results clearly exceed even the EPA's own standards for dioxin level in soils! It is clear to us that Koppers created this widespread contamination now found in these homes and yards, and it is equally clear that Beazer and Koppers should be held responsible by the EPA to clean up this contamination. To do less, is to set a damaging precedent for all future cleanups at other sites throughout the nation.

In our opinion, the precedent for relocation of exposed residents has already been set with the Escambia Treatment Company site in Pensacola, where over 400 households were relocated in the mid 1990s, under nearly identical circumstances. Thus, we believe that several of the households in the area west and north of the Koppers site should qualify for relocation, and that the EPA is dragging its feet and not enforcing its own relocation policies at this site, all the while knowing that the remediation process will last "2.5 years", a length of time sufficient to qualify impacted residents for permanent relocation under the EPA's own *"Interim Policy on the Use of Permanent Relocations as Part of Superfund Remedial Actions."*

In fact, our own review of this EPA guidance document leads us to the conclusion that 3 of the 4 criteria needed to initiate permanent relocation apply in the case of the residents living adjacent to the Koppers site.

We refer specifically to these 3 specific criteria:

- Permanent relocation may be considered in situations where EPA has determined that structures cannot be decontaminated to levels that are protective of human health for their intended use, thus the decontamination alternative may not be implementable.
- Permanent relocation may be considered when EPA determines that potential treatment or other response options would require the imposition of unreasonable use restrictions to maintain protectiveness (e.g., typical activities, such as children playing in their yards, would have to be prohibited or severely limited). Such options may not be effective in the long-term, nor is it likely that those options would be acceptable to the community.
- Permanent relocation may be considered when an alternative under evaluation includes a temporary relocation expected to last longer than one year. A lengthy temporary relocation may not be acceptable to the community.

Further, when viewed in light of the balancing of tradeoffs between alternatives, the temporary relocation remedy may not be practicable, nor meet the statutory requirement to be cost-effective.

## 8. The EPA's Plan Fails to Compensate Residents for Losses in Property Values or Pay for Medical Testing

In addition, the EPA has failed to require that Koppers/Beazer East compensate the residents for the losses in the value of their properties and belongings. Their home values have plummeted dramatically in recent months, especially after the recent announcement of contaminated offsite soils by the Florida DOH and the ATSDR. Neither is there any plan to provide for medical testing, or compensation for pain and suffering for the affected residents. Thus, many residents have had no choice but to sign on to a Federal $500 million class action suit to get relief for their losses.

The residents have strongly voiced that they want biological testing, including blood tests, to test for the presence of dioxins or other contaminants they have been exposed to over the years. They also want the dust in their homes and nearby schools tested for these same contaminants.Their request for biological testing is not without precedent either, as the same testing was done in Pensacola and showed elevated levels of dioxins in the local resident's blood, as the book "Sacrifice Zones" explains:

"Blood sampling of former ETC workers and residents who lived near the plant were found to have "elevated levels of dioxin in their blood in excess of the general population" 25 years after the plant closed, [Wilma] Subra observes."

Still, the EPA, ATSDR and FDOH have turned a deaf ear to the requests of local residents to have these vital tests performed. Some suggest this is part of a larger cover-up; that state and Federal government officials don't want these tests performed because the results might prove too shocking. Others suggest it indicates a failure of the federal and state government bureaucracies to protect the health of those who live in "sacrifice zones".

**9. The EPA was Negligent in Allowing the Koppers Site to Remain Open as a Treated Wood Facility for 26 years After the Site was Placed on the National Priorities List (NPL).**

The Koppers Superfund site was placed on the NPL in 1984, yet over 20 years passed before any definitive action was taken by the EPA with regard to this site, in spite of reports showing that the groundwater contamination was spreading and leaving the site, and untreated storm water leaving the site violated Florida standards for both arsenic and chromium levels, by 8 and 18 times respectively.

The decades-long inaction by the EPA led to additional exposures of the nearby residents to contaminated dust and other toxic airborne contaminants, including toxic fumes released when treated wood or other waste was burned onsite by Koppers employees (something which the EPA has failed to acknowledge to date, although we have learned of numerous reports from local residents of such activities occurring.) Additionally, had the EPA acted more quickly, it could have prevented much of the toxic storm water pollution that entered Springstead and Hogtown Creeks, which feed directly into our local aquifer.

The EPA has failed in several of its enforcements duties as well, by not issuing any fines or penalties to Koppers or other contractors for environmental violations related to this Superfund site.

Had the EPA acted more quickly to close this toxic site, rather than allowing Koppers to continue to operate for an additional 25 years, this would have resulted in significant reductions of the exposure of local residents to the contaminants from the site- thereby reducing their incidences of cancer, neurological disorders, birth defects, reproductive disorders and premature pet deaths, all of which have been reported at a alarmingly high frequency in the surrounding neighborhood.

Ironically, it was a Letter to the Editor written by this author and published by the Gainesville Sun, which exposed long-term contract between Gainesville Regional Utilities and Koppers for treated wood utility poles, and the subsequent nullification of this contract by the Gainesville City Commissioners, that triggered the final shutdown of the Koppers plant – *not any enforcement action by the EPA.*

But it is clear that the EPA bears a large share of the responsibility for the additional environmental harm caused to the local residents by this additional, yet preventable, exposure to dioxins and other toxins.

For this reason alone, the EPA is obliged to provide the best remedy possible to deal with the offsite contamination in the neighborhood adjacent to the Koppers site, including relocation of affected residents whose property is now contaminated by dioxins, additional soil and indoor testing, testing of the nearby schools, epidemiological screening and biological testing of the residents.

This is the very least that the EPA can do to compensate for the problems your negligence and inaction have caused over the last 3 decades. .

## CONCLUSION

In conclusion, we reject the EPA's poorly crafted Remedial Plan, the companion Fact Sheets, and the May 2010 Final Feasibility Study. These reports don't just simply fall short - they are completely insufficient.

The community of Gainesville, voted *"No. 1 Place to Live in the US"*, deserves a better Remedial Plan for the Koppers Superfund site- one that protects human health, our environment, and our precious water supply.

We demand a plan that requires that Koppers and Beazer East pay to remediate the toxic legacy they have left behind, and compensate our residents who were unwitting victims of their toxic trespasses.

We deserve a remedial plan that does exactly that, and nothing less.

Sincerely,

**Joseph S. Prager, President**
**BANCCA.ORG, LLC**
**Email: inbox@bancca.org**

cc: Lisa P. Jackson, EPA Director
Stanley Meiburg, Director, EPA Region 4
Franklin Hill, EPA Region 4 Superfund Division Director
LaTonya Spencer, EPA Community Involvement Coordinator
Craig Lowe, Mayor, City of Gainesville
Fred Murry, Assistant City Manager, City of Gainesville
Sen. Bill Nelson (U.S. Senate)
Rep. Corrine Brown (Florida House of Rep., District 3)
Rep. Charles Chestnut IV (Florida House of Rep., District 23)
Rep. Cliff Stearns (U.S. House of Rep.)
Dr. John Mousa, Alachua Co. Environmental Protection Dept.
Rick Hutton, Gainesville Regional Utilities
Dr. Pat Cline, Technical Advisor, Protect Gainesville's Citizens
Bob Palmer, Chair, Alachua Co. Environmental Protection Advisory Committee
Robert Pearce, Technical Advisory Comm. Chair, Protect Gainesville's Citizens

**Florida Department of Health**

Scott Miller
Remedial Project Manager
Superfund Division
Superfund Remedial Branch, Section C
U.S. EPA Region 4
61 Forsyth Street, SW
Atlanta, GA 30303

September 24,2010

Re: EPA's Cabot/Koppers Proposed Plan

Dear Mr. Miller:

Thank you for the chance to comment on EPA's July 2010 proposed plan for the Cabot Carbon/Koppers Superfund site in Gainesville, Florida.

*On-Site Soil*

In a June 2010 letter, the Florida Department of Health (DOH) concluded that transport of contaminated dust from the Koppers site to the nearby Stephen Foster neighborhood is a public health concern [DOH 2010a]. The responsible party proposes to root rake and disk 26 acres of hardened lime rock on the site. Some of this area is within 100 feet of the Stephen Foster neighborhood. Root raking and disking have the potential to create contaminated dust that can drift into the nearby neighborhood. This potential continues until the establishment of a vegetative cover.

In the Cabot Carbon/Koppers plan, EPA should require the responsible party to water the site to suppress dust formation prior to root raking and disking. While they root rake and disk, EPA should require the responsible party to continue to water daily or as necessary for dust suppression. After completion of root raking and disking, EPA should require a daily soil moisture check and water as necessary to prevent dust formation until a vegetative cover is fully established. After a vegetative cover is fully established, EPA should require a weekly check of soil moisture and water as necessary until implementation of a permanent remedy.

In the Cabot Carbon/Koppers plan, EPA should also require the responsible party to assess the health risk for future use of the Koppers hazardous waste site including commercial and residential.

*Off-Site Soil*

In a 2009 report, Florida DOH and the Agency for Toxic Substances and Disease Registry (ATSDR) concluded that incidental ingestion (swallowing) for more than a year of very small amounts of surface soil from the City of Gainesville easement adjacent to the western Koppers boundary between NW 26th and NW 30th Avenues could possibly harm children's health [ATSDR 2009]. In June 2010, the Florida DOH found the temporary fence and warning signs were not effective in preventing trespass on this easement. Florida DOH recommended the City of Gainesville or responsible party replace the temporary fence and signs with a more effective barrier to trespass [DOH 2010b]. In the Cabot Carbon/Koppers plan, EPA should require the City of Gainesville or the responsible party to post warning signs and erect an effective barrier to trespass until soil in this easement is remediated.

In two reports, Florida DOH and ATSDR concluded that surface soil testing in the Stephen Foster neighborhood adjacent to the Koppers site had not extended far enough and recommended additional testing [ATSDR 2009, 2010a]. In the Cabot Carbon/Koppers plan, EPA should continue to require the responsible party to test surface soil until they define the extent of contamination.

Florida DOH supports the plan to remove off-site surface soil exceeding Florida's soil cleanup target levels and replace it with clean fill.

*Off-Site Indoor Dust*

In the Cabot Carbon/Koppers plan, EPA should require the responsible party to investigate site related contaminants in the dust of nearby homes, schools, and businesses. The 2009 AMEC Earth & Environmental, Inc. report is inadequate to assess this issue since it only addresses onsite dust deposition under current conditions and does not address past off-site dust deposition [AMEC 2009]. In the Cabot Carbon/Koppers plan, EPA should also require the responsible party to remediate nearby buildings found to have dust with site-related contaminants at levels that pose an unacceptable risk to health.

*Off-Site Creek Sediments*

In a 2010 draft report, Florida DOH and ATSDR concluded that although incidental ingestion (swallowing) of very small amounts of contaminated sediments in the Springstead and Hogtown Creeks is not likely to harm people's health, contaminant concentrations are still above state standards and should be cleaned up [ATSDR 2010b]. In the Cabot Carbon/Koppers plan, EPA should require the responsible parties to cleanup contaminated sediments in Springstead and Hogtown Creeks.

*References*

[AMEC 2009] AMEC Earth & Environmental. Potential Fugitive Dust Impacts Predicted from
Air Dispersion Modeling. Koppers, Inc. Wood-Treating Facility. Gainesville, Florida. Westford, Massachusetts. August 17, 2009.

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Dennis, Alachua County Health Department. June 15, 2010.

[DOH 2010b] Electronic mail from Randy Merchant, Florida Department of Health to Anthony
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Thanks again for a chance to comment on EPA's proposed plan for the Cabot Carbon/Koppers site.

Sincerely,
E. Randall Merchant
Environmental Administrator
850 245-4299

cc: Anthony Dennis - Alachua CHD
Kelsey Helton - Florida DEP
John Mousa - Alachua CEPD

FLORIDA DEPARTMENT OF HEALTH

Charlie Crist
Governor

Ana M. Viamonte Ros, M.D., M.P.H.
State Surgeon General

September 24, 2010

Scott Miller
Remedial Project Manager
Superfund Division
Superfund Remedial Branch, Section C
U.S. EPA Region 4
61 Forsyth Street, SW
Atlanta, GA 30303

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Sincerely,

Randy Merchant

E. Randall Merchant
Environmental Administrator
850 245-4299

cc: Anthony Dennis – Alachua CHD
Kelsey Helton – Florida DEP
John Mousa – Alachua CEPD

**Koppers Incorporated**

October 12, 2010
Mr. Scott Miller
Remedial Project Manager
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**SUBJECT: COMMENTS TO JULY 2010 PROPOSED PLAN CABOT CARBON/KOPPERS SUPERFUND SITE**

Dear Mr: Miller

Koppers Inc., a former owner/operator of the wood treating facility located at NW 23rd Street in Gainesville, FL, submits these comments to the Superfund Proposed Plan for the Cabot Carbon/Koppers Superfund Site. Koppers Inc. (formerly Koppers Industries, Inc.) owned and operated the wood treating facility at NW 23rd Street for a limited period of time. Koppers Industries, Inc. purchased the site in late December 1988 from Koppers Company, Inc., now known as Beazer East, Inc. Upon closure of its manufacturing operations in December 2009, Koppers Inc. sold the facility back to Beazer East. Inc. in March 2010.

Throughout the Proposed Plan there are numerous references to the "Koppers" portion of the Cabot Carbon/Koppers Superfund Site, to "Koppers", and to the "Koppers Site". Since several entities with the word "Koppers" in their name have owned the site and the term "Koppers" is not defined, the generic use of the word in the document can be confusing and, at times, inaccurate. For example, the last sentence in the 151 paragraph on page 3 under Site History states .... "On *March* 31, *2010, Beazer East, Inc. purchased the property from Koppers in order to facilitate remediation.* "The "Koppers" referred to in this sentence is Koppers Inc. The document further states that wood treating processes began at the site in 1916 and describes the various units used to manage wastes or wastewaters at the site.

Without further explanation or definition of the term "Koppers", an obvious conclusion could be that Koppers Inc. operated the site and the units that are now subject to remediation since 1916. As stated above, Koppers Inc. only owned and/or operated the wood treating site from late 1988 until March 2010. This Superfund site was included on the National Priorities List (NPL) prior to Koppers Inc.'s ownership and Koppers Inc. did not use units subject to remediation. Therefore, Koppers Inc. requests that some clarification be included in the Proposed Plan regarding the ownership and activity history at the site as noted below.

The end of the 1 st paragraph under Site History on page 3 is suggested to be revised to: " ....... *The Koppers portion* of *the site* was *an active facility until December 2009 when Koppers Inc. ceased its manufacturing operations. Koppers Inc. (then known* as *Koppers*

*Industries, Inc.) purchased the site from Beazer East, Inc., (then known* as *Koppers Company, Inc., the former owner/operator* of *the site) in December* 1988. *On March* 31, *2010, Beazer East, Inc. purchased the property back from Koppers Inc. in order to facilitate remediation.*

The 5th paragraph under Site History on page 3 states ...

*"Former wood-treatment facilities are located within the southeastern portion* of *the Koppers Site (Figure* 2). *This includes* a *recently-active process building and adjacent drip tracks where chromated copper arsenate (CCA)* was *used to preserve wood. The central and northern portions* of *the Site were recently used for wood storage, staging, and debarking':*

Koppers Inc. believes these statements also lead to a misunderstanding of the site ownership history and issues being addressed. First, the reference to the recently active process building and drip track implies this is the only activity that occurred in the southeastern portion of the site. Treatment activities and practices have been conducted in that area for many years preceding Koppers Inc. ownership. Secondly, wood storage and staging has been conducted at the site for many years throughout its ownership, not just recently. Koppers Inc. requests that these additional activities also be mentioned in the Site History section of the document to more accurately reflect the historic operations.

Koppers Inc. appreciates your consideration of these comments and trust they will be addressed as we believe they clarify the ownership and activity history at the site.

Sincerely,
Linda S. Paul
Environmental Manager
cc: Mitchell Brourman, Beazer East, Inc.

**Protect Gainesville's Citizens**

October 14,2010
Scott Miller
Site Manager
Cabot / Koppers Superfund Site
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Atlanta Federal Center
81 Forsyth Street
Atlanta, GA 30303-8960

RE: Comments to EPA regarding vapor intrusion at the Koppers Site

In September 2010, the US EPA developed fact sheets to address questions that were raised during the proposed plan meeting at the Stephen Foster Elementary School on August 15th 2010. One of the fact sheet states that vapor intrusion is not a concern because of the presence of volatile compounds at low concentrations. Contrary to this statement, the *OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance* (US EPA, 2002) suggests that low levels of volatile compounds in groundwater may present a vapor intrusion hazard.

I am making this comment to encourage the US EPA to perform thorough studies on vapor intrusion in order to determine if vapor intrusion represents a risk for future uses.

The current data do not appear sufficient for performing a thorough vapor intrusion study. The second-five year review for the Koppers site states that numerous monitoring wells present at the site were not regularly monitored "over the years". This review recommends that: *"All of the Surficial Aquifer wells installed in investigations between* 1984 *to* 1995 *should be cleaned out and redeveloped Re-surveying of the wells should be performed as necessary. Regular monitoring of all the wells and sample analysis for all site cac's should be performed"* (Second five year review for the Cabot / Koppers Superfund site, 2006).

By going over the documents in the administrative record, I found out that the latest and most relevant samples regarding the surficial aquifer COCs were performed on August 2007. In December 2007, Geotrans submitted a document to the US EPA entitled "Surficial Aquifer Well Redevelopment and Sampling Report, in Response to Five-Year Review Report, April 2006 - Recommendation #9 Cabot Carbon/Koppers Superfund Site in Gainesville, Florida" showing the results of August 2007 sampling. These samples were performed more than three year~ago and therefore I am asking US EPA if:

- the 2nd five year review recommendation was followed?
- the statement regarding vapor intrusion made by the US EP A was based on relevant and appropriate studies?

In the above cited report, the monitoring wells detected 11 contaminants that are sufficiently toxic and volatile (based on the User's Guide for Evaluating Subsurface Vapor Intrusion into

Buildings, prepared by the Environmental Quality Inc to the US EPA, 2004). Among these contaminants, two are characterized as carcinogenic by inhalation: benzene and naphthalene.

By looking at the RCRA Draft Supplemental Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway, the groundwater screening level for naphthalene is 15 f.lg/L. This target groundwater concentration corresponds to a target indoor air concentration where the soil gas to indoor air attenuation factor is 0.01 and the partitioning across the water table obeys Henry's law. The screening level for naphthalene should be lower because naphthalene has been recently characterized as a carcinogen by inhalation and this value hasn't been updated yet.

Figure 3 of the 2007 Surficial Aquifer Well Redevelopment and Sampling Report shows the presence of naphthalene in three main areas. The first one is next to the former South Lagoon, the former Drip Track area and the former Process area. The second zone is located in the vicinity of and downgradient of the former North Lagoon. Finally, the last impacted area is in the northeastern section of the Site. The concentrations in these areas are well above the US EPA screening level for vapor intrusion with concentrations reaching 8300 f.lg/L. Naphthalene is only one contaminant among eleven others that may pose a risk to future indoor workers. By examining these numbers it is impractical for the US EPA to state that vapor intrusion is not a concern without conducting further studies. Based on the Administrative record, the US EPA hasn't conducted any studies to support their statement.

The Johnson and Ettinger model is recommended by the US Environmental Protection Agency to determine whether vapor intrusion may result in a potential unacceptable inhalation risk. The US EP A should have used this model to find out if vapor intrusion is an issue.

By using the Johnson and Ettinger model and the maximum concentrations found throughout the site for contaminants that are sufficiently toxic and volatile, the values for the total cancer risk and the hazard index are:

| Contaminant | Cw | Risk | HQ |
|---|---|---|---|
| | µg/L | | |
| Benzene | 250 | 1.00E-04 | 1.198204 |
| Ethylbenzene | 140 | | 0.024272 |
| Toluene | 420 | | 0.17561 |
| m-p xylene | 320 | | 0.518601 |
| o xylene | 150 | | 0.192458 |
| 2Methylnaphthalene | 1500 | | 0.171483 |
| Acenaphthene (Ace) | 730 | | 0.007893 |
| Dibenzofuran | 400 | | 0.001865 |
| Fluorene | 360 | | 0.002547 |
| Naphthalene | 8300 | 8.76E-04 | 24.03867 |
| Pyrene | 13 | | 2.22E-05 |
| **Total** | | **9.76E-04** | **26.33163** |

To calculate the cancer risk and the hazard quotient, different site-specific assumptions were made:

- groundwater temperature is 22 degrees Celsius
- the capillary zone and the unsaturated zone soil type is assumed to be sand based on the 2010 Feasibility Study
- the slab-on-grade scenario was selected (most common in Florida) and default values for parameters related to this foundation were selected
- a water table depth of 9 feet (average value of seasonal variations at the Koppers Site) commercial/industrial specific exposure factors were used

Based on this table, naphthalene is the contaminant that represents the greatest concern. The Hazard Index is 26 and therefore is greater than 1, which suggests that noncancer adverse human health effects are likely.
The total cancer risk is 9.76 E-04. This value is between but at the higher end of the USEPA's allowable risk range of 1x10-6 to 1xl0-4. However, the cancer risk exceeds FDEP's risk benchmark of one in a million.

This value exceeds the US EPA's allowable risk range of lxlO-6 to 1xlO-4 and FDEP's risk benchmark of one in a million. I strongly encourage the US EPA to investigate this pathway further and to obtain current surficial aquifer concentrations at the site. Without further study, it appears that future commercial/industrial workers at the Koppers site may be at risk from vapor intrusion.

Please feel free to contact me if you would like to review the spreadsheet supporting my conclusions.

Sincerely,
Beata Urbaniak
Dr. Patricia V. Cline [Technical Advisor]

October 10, 2010
Mimi A. Drew
Secretary of the Florida Department of Environmental Protection (FDEP)
3900 Commonwealth Boulevard M.S. 49
Tallahassee, Florida 32399

RE: Koppers Superfund Site. Failure to follow Professional Engineer/Geologist Requirements

The public health of citizens of Gainesville Florida is at risk from Koppers Superfund Site contamination, including groundwater impacts that threaten our well field. The Environmental Protection Agency (EPA) recently provided the Administrative Record, the documents which form the basis for their proposed remedy. These documents do not comply with Florida Statutes and Laws that require applicable portions of technical documents be signed and sealed by a professional engineer (PE) registered pursuant to Chapter 471, F.S., or a professional geologist (PG) registered pursuant to Chapter 492, F.S., certifying that the applicable portions of the technical document and associated work comply with standard professional practices.

EPA has stated that federal regulations do not require the Feasibility Study (FS) or other documents to be certified by licensed professionals. We feel the state statutes are clear, and provide no exemption for Superfund sites. For example, Chapter 492, F.S. outlining requirements for PG signatures (applicable to numerous Koppers groundwater reports) begins with a clear statement of Purpose:

> *It is hereby declared to be the public policy of the state that, in order to* ***safeguard the life, health, property, and public well-being of its citizens, any person practicing or offering to practice geology in this state shall meet the requirements of this chapter.***

FDEP staff appeared unsure of whether these statutes apply to the work performed at the Koppers' Site. To get clarification, complaints have been filed to have example documents reviewed by the state licensing boards[1]. In addition, we have contacted two states in EPA Region 4 regarding PG signatures and received the following responses:

> *While EPA may or may not require the signature, the Alabama PG statute requires documents to be signed that are within the public practice of geology. Public documents should be signed by an AL PG if they contain geological information/interpretation.*
> Dorothy Malaier, PG Board Chair
>
> *The State of South Carolina requires that a geologist hold a license to practice in this state whenever s/he engages in practice and there is no general exception for work on Superfund sites.* Lenora Addison-Miles [milesl@scdllr.com]

We expect a similar clear and definitive response for engineers and geologists practicing in Florida.

[ 1 Florida Board of Professional Engineers, regarding the May 2010 Feasibility Study (FS), filed June 27, 2010.

Florida Board of Professional Geologists, regarding the Hawthorn Group Investigation, filed September 22, 2010 ]

We raise this issue for two reasons:

- The state laws that are designed for protection of human health must be followed. Not following these licensing requirement means that no one is accepting responsibility for the accuracy of the statements, calculations, conclusions, or impacts to human health or the environment that will result from decisions based on these documents
- Critical documents are incomplete and technically deficient. This should be addressed before finalizing a remedy that puts our citizens at risk. It is unacceptable that EPA can consider the FS document "Final" if the critical problems have not been addressed.

As the agency that reviews these documents, we look to FDEP to protect our citizens and:

1. Be clear on the requirements for professional certifications for Superfund Sites, convey these to FDEP staff and EPA, and enforce these licensing requirements on **all** sites.
2. Reject the FS and relevant documents associated with the Koppers site that are not signed and sealed by the appropriate Professional Engineer or Professional Geologist licensed to practice in the State of Florida.
3. Recognize this is not a formality. The Koppers FS fails to provide criteria and critical performance metrics on which to base a remedy. We request you consult with Florida Board of Professional Engineers (FBPE) on the FS; and demand that EPA cannot consider the FS final until these issues have been addressed.
4. Give official support to community requests for an addendum to the FS evaluating alternatives consistent with professional practices so that the implications of the remedy are transparent.

We would be happy to supply our technical comments on the deficiencies of the relevant documents (particularly the FS). The deficiencies of the proposed plan and the lack of transparency / accuracy of the supporting documents have also been highlighted in comments to the EPA prepared by the Local Intergovernmental Team (*City of Gainesville, the Alachua County Environmental Protection Department, the Alachua County Department of Health, and Gainesville Regional Utilities*), along with the City and County Commissions.

The public comment period on the proposed remedy is nearing an end, and the Record of Decision for the remedy at this site may be issued soon. We look to the support of FDEP, our licensing boards, and our representatives to address the concerns of the community and resolve this issue quickly. Please contact me (352 234-3732) if you would like further clarification on these concerns. We appreciate your assistance in resolving these issues.

Sincerely,
Dr. Pat Cline
Technical Advisor
6322 SW 37th Way
Gainesville, Fl 32608
ta@protectgainesville.org

October 15, 2010
Scott Miller
Site Manager
Cabot / Koppers Superfund Site
Region 4, Environmental Protection Agency
Atlanta Federal Center
81 Forsyth Street
Atlanta, GA 30303-8960

**RE: Protect Gainesville's Citizens (PGC) Comments**

PGC has been active over the past few months providing information and opportunities for the community to become better informed and provide comments on the proposed remedy for the Koppers Superfund Site. This letter is submitted to highlight key issues that have been raised and of concern to the PGC and a large segment of the community.

Comment 1. An effective Community Involvement Plan responsive to the needs of the citizens in Gainesville is important. Some of the responses to the community concerns do not seem adequate. We would like to work with L'Tonya Spencer to update the CIP and to maintain commitments to the community regarding availability of information and opportunities to participate in the process. Because the recent CIP update process occurred simultaneously with the process of hiring a technical advisor and preparing for the public comment period, we do not feel the community was able to adequately participate as needed. We ask that in the future adequate time be allocated for all stages of the Superfund Clean up Process.

Comment 2. PGC requested the Administrative Record File and update to the repository in April 2010, and Dr. Cline provided additional requests. No complete site index has been received and many documents remain missing in the repository. This has hampered detailed evaluation of the Plan and the primary supporting document, the Feasibility Study (FS). A complete file is essential to maintain the critical evaluations that have been completed over the past 10 years and provide the basis for the summary statements made in the FS.

Comment 3. An aggressive remedy to protect the groundwater is needed. We concur with comments expressed by LIT and TA on ISBS and think its potential use at this site should be reconsidered.

Comment 4. For the past year, there have been presentations about potential redevelopment of the Site, yet it appears that a remedy will be in place that may discourage development, and could leave the city with an undevelopable piece of property.

Comment 5. Although the Proposed plan identifies the SCTLs as the cleanup numbers for soil, the AR appears to bias support for the risk assessment documents and inference of the use of the target risk value rather than the Florida SCTLs. We just received a document that alters assumptions. This is unacceptable.

Comment 7. Residents have persistently raised questions about potential offsite groundwater contamination west of the site into the residential neighborhood. These have been generally dismissed, and site documents appear to infer that this area is not impacted. Recent review of data in the southwest area of the site suggests there is contamination in that area that requires additional investigation and potentially impacts the remedy.

Comment 8: The proposed plan recommends excavating contaminated soils and piling them up in the southeast corner of the property. This is unacceptable. We understand there are some soils which are too contaminated to be removed from the site. For those areas that can be either removed or remediated a plan should be proposed for consideration that would either move them to a lined land fill or remediate them in place to the SCTL's.

Sincerely,
Cheryl Krauth Chair, Protect Gainesville's Citizens, Inc.

October 15, 2010
Scott Miller, Remedial Project Manager
Superfund Division, Superfund Remedial Branch
U.S. EPA Region 4
61 Forsyth Street, SW
Atlanta, GA 30303

Re: Comments on U.S. EPA's Proposed Plan for the Koppers Superfund Site in Gainesville, Florida

Dear Mr. Miller:

As you are aware, there is pervasive, strong objection within the community to EPA's Proposed Plan for the clean-up of the Koppers Superfund Site in Gainesville, Florida. Many of these complaints are well-deserved, ranging from deficiencies on the part of EPA to properly involve the community in its remedy selection process, to inadequate and inappropriate on-site and off-site remediation.

As you are also aware, the City of Gainesville and Alachua County have submitted their Comments and Recommendations on EPA's Proposed Plan, developed by the Local Intergovernmental Team, the City and County governments, and members of the community. Untold thousands of hours on the part of many dedicated, intelligent, and thoughtful individuals went into preparing these response comments. I endorse them wholeheartedly, almost without exception, and I implore EPA to take them to heart.

I am keenly aware of the difficult relationships between EPA, the Responsible Parties, and the local community. Neither am I under any illusion as to the limitations associated with remedying a very large, heavily contaminated, complex site. Limitations notwithstanding, there are many elements in EPA's Proposed Plan that are seriously inadequate and unacceptable.

**Community Involvement**
Community input is supposed to play a crucial role throughout the decision-making process on superfund sites. EPA is required to vigorously engage and integrate the community as soon as a site is placed on the National Priorities List. EPA is required to place heavy emphasis on community input in selecting the remedies and in providing a site that will accommodate the community's desired future uses. EPA has been severely deficient in following both federal law and its own policy directives in this regard.
Superfund Community Involvement Handbook (EPA):

> "In CERCLA, Congress was clear about its intent for the Agency to provide every opportunity for residents of affected communities to become active participants in the process and to have a say in the decisions that affect their community. Congress, in establishing the Superfund program, wanted the Agency to be guided by the people whose lives are impacted by Superfund sites. The intent of the law is restated in the NCP at 40 CFR 300.430(c)(2)(ii): —(A) Ensure the public appropriate opportunities for involvement in a wide variety of site-related decisions, including site analysis and characterization, alternatives analysis, and selection of remedy."

A substantial amount of the current dysfunction and antagonism between the community and EPA could have been avoided if proper emphasis had been placed on developing an integrative dialogue with the community throughout the remedy selection process, i.e., an active Community Involvement Plan (CIP).

It is through the CIP that the community is to be kept informed of the various aspects and considerations associated with the entire remedial process, from "discovery" of the site to deletion from the NPL. And it is through the CIP that EPA is made aware of the types of remedies and future uses the community desires on the site--so that EPA can provide the corresponding remedies, wherever practicable.
Superfund Land Use Directive (EPA):

> "Discussions with local land use planning authorities, appropriate officials, and the public, as appropriate, should be conducted as early as possible in the scoping phase of the Remedial Investigation/Feasibility Study (RI/FS). This will assist EPA in understanding the reasonably anticipated future uses of the land on which the Superfund site is located; Remedial action objectives developed during the RI/FS should reflect the reasonably anticipated future land use or uses."

The only known Community Involvement Plan for the Koppers Superfund Site in Gainesville was established in 1989 (it was then called the Community Relations Plan). According to that Plan, quarterly updates were to be issued to the community and the Plan was to be revised if there were indications of significant changes in community interest at any time during the Remedial Investigation, the Feasibility Study, the Draft FS report, or during development of the Proposed Plan.

Beginning in 1993, CIPs were required to be updated every 3 years. The CIP for the Koppers site should have been updated 6 times since 1989. Astoundingly, it wasn't until August 2010 that EPA drafted a new CIP--3 weeks *after* release the Proposed Plan.

I do not know what resources may or may not have been available to EPA throughout the past 20 years to fulfill its responsibility to incorporate community input into the remedy selection process. But there is no doubt whatsoever that in this instance, EPA's deficiency in this regard is largely responsible for the current level of anger and hostility towards EPA, and the inadequate and inappropriate remedies in the Proposed Plan.

**Rightful Expectations**
The land and our creeks have suffered unconscionable environmental abuse for almost 100 years. The community justifiably feels that the Responsible Parties should be held accountable and that EPA should require the RP's to clean up every last bit of contamination from the site, i.e., return the land to the condition it was in before they got their dirty hands on it. This is a well-deserved, well-grounded expectation for environmental and social justice. Even after the horrendous activities were "discovered" in 1983 and the site was placed on the NPL, the abuses continued for an additional 26 years. We really are NOT interested in hearing excuses.

Realistically speaking, most of the reasonable elements of the community understand that the magnitude and nature of the contamination on the site impose limitations that make total clean-up a near impossibility. Nonetheless, EPA's Proposed Plan falls *far* short of what is appropriate, necessary, and practicable. That is why the proposed remedies to simply cover up the contamination feel like such an insult.

Because evaluation and cost analysis of so many potential remedial alternatives appear to be missing from the FS, it is impossible for the community to accept the rationale behind EPA's chosen remedies in the Proposed Plan.

**Primary Source Areas**

Being directly upstream in the Floridan Aquifer from the Murphree Wellfield, the groundwater remedy must, without question, be protective of the regional drinking water supply. EPA's proposed remedies are not sufficient to accomplish that.

The community's preferred remedy within the 4 primary source areas is excavation and off-site disposal of contaminated soils down to the 2nd clay layer. However desirable, this is likely not a practicable alternative due both to the expense of the excavation process itself and to the disposal restrictions and transport requirements of the DNAPL material involved. Nonetheless, the community deserves to see a detailed evaluation of this alternative, which should be included in an amended FS.

Excavation and off-site disposal of soils from within the source areas down to the 1st clay would, of course, be significantly more practicable. An evaluation of this alternative should be provided in an amended FS, as should an evaluation for on-site treatment. The community needs to understand the practicability, or lack thereof, of all remedial options.

If excavation and off-site disposal of the primary source area soils proves to be completely impracticable, thorough solidification and stabilization of these soils (i.e., ISSS) from surface to the 2nd clay, with supplemental ISBS and hydraulic containment at deeper levels, appears to be the optimal and justifiable fall-back solution. ISBS should not be relied upon as an effective remedy in the surficial aquifer, as is being proposed by EPA.

ISSS from the surface to the 2nd clay in the primary source areas is a remedial alternative that warrants evaluation and cost analysis. This should be provided in an amended FS.
In addition to the LIT recommendation to expand the proposed slurry wall eastward to address off-site migration of contaminants there, evidence suggests there is off-site migration of DNAPL contamination to the west, as well. Further testing appears to be necessary to determine whether the slurry wall perimeter would need to be adjusted accordingly to prevent additional off-site migration of contaminants.
The slurry wall configuration (subsurface containment remedy) need not dictate the surface soils remedy, discussed further below.

**Non-Source Area Soils**

EPA's proposed surface soils remedy is to surficially scrape the non-source area to a non-specified depth (leaving an indeterminate amount of contamination behind), pile the scrapings on top of the source areas, put a cap on top of the mound, and throw some clean dirt on top of the scraped area. Adding insult to injury, those surficial soils would only have to meet commercial/ industrial SCTLs. Future development would require engineering and institutional controls over almost the entire site--significantly impairing (and dictating) the types of future uses the site could accommodate.

This type of remedy might be appropriate if the site was in an isolated location, but it is not. The site is integrated well within the developed area of the city and shares a 3/4 mile-long boundary with a single family neighborhood. Attaining a site that is genuinely clean should be one of EPA's primary objectives for this site. A remedy that does not actually clean the majority of the contaminants from the site will not remove the stigma associated with the site and will adversely impact the economic health and vitality of adjacent neighborhoods for generations to come. EPA has completely neglected the psychological impact of the chosen remedy on the community. This, in my opinion, is where the Proposed Plan is most deficient.

In 2008 the Gainesville City Commission passed a Resolution requesting EPA to require the responsible parties to clean the Site to Florida residential SCTLs. And yet EPA's Proposed Plan states:

> "The selected cleanup goals are the Florida commercial/ industrial SCTLs for on-Site soils/ sediments."

AMEC's on-site surface soil tests indicate that it may in fact be practicable to attain a thorough clean-up over the majority of the area outside the primary source areas. With additional testing, a fine-grained work plan could be generated to determine the various depths to which contaminated soils would need to be excavated to reach relatively clean earth. A legitimate expectation would be to thoroughly clean as great an area as possible by excavation of these soils. An evaluation and cost analysis for excavating the non-source area portions of the site to the various depths necessary to reach the different soil contact and leachability standards is missing from the FS. This information is crucial, and should be included in an amended FS.

In association with the excavation of on-site surface soils (whether to indiscriminate depths as is being proposed, or to the depths necessary to reach target criteria) are the alternatives for off-site disposal or on-site treatment of these soils. These alternatives warrant evaluation and cost analysis, and need to be provided in an amended FS.

The mounding of contaminants on-site is highly objectionable to the community--and for good reason. It will adversely impact and stigmatize adjacent neighborhoods forever.
If evaluation proves that off-site disposal or on-site treatment of the non-source area soils is in fact impracticable, the excavated soils should be confined to as small an area as possible, so as to maximize the area on the Site where surface soils could potentially be cleaned. I think a thoroughly clean area over as much of the site as possible (with a higher mound) would be preferable to continued widespread contamination over the entire site under 2 feet of "clean" dirt (with a lower mound).

As mentioned before, it is important to recognize that the slurry wall configuration (subsurface remedy) does not necessarily dictate the surface soils remedy (outside the primary source areas themselves). Surface soil tests indicate that the western/central area within the proposed slurry wall could conceivably be cleaned similarly to the area outside the slurry wall. And if tests determine that the slurry wall actually needed to be expanded to the west, that would not necessarily dictate the surface soils remedy within the slurry wall there either.

**Future Uses and Re-Use of the Site**
EPA's proposed remedies are based upon erroneously presumed future land uses and do not provide protection for the future uses the community has expressly made known to EPA as being desirable. EPA has consistently ignored community input regarding this primary goal of the Superfund program. EPA directive and guidance documents go to great lengths to emphasize the importance of providing a site capable of accommodating the future land uses deemed desirable by the community.

Reuse Assessments: A Tool to Implement the Superfund Land Use Directive (EPA):

> "As reflected in the Superfund Land Use Directive, the reuse assessment process should include soliciting community input on future land use considerations for sites.

Community input can be particularly useful for sites where the future land use is uncertain and should be directed toward understanding the types or categories of future land use that the community believes would be appropriate for the site, and categories of land use that the community believes inappropriate."

Superfund Reuse Directive (EPA):

"When this document states that EPA "identifies" or "determines" the reasonably anticipated future land use of a site, it should be understood to mean that, based on the input of site's stakeholders (local governments, community groups, individuals, states, tribes, etc.) and other remedy selection factors described in the CERCLA statute, the NCP and EPA guidance, the Agency makes a decision on what the future land uses are likely to be, so that remedies can, wherever practicable, support those future uses."

Risk Assessment Guidance for Superfund (EPA):

"Assume future residential land use if it seems possible based on the evaluation of the available information. For example, if the site is currently industrial but is located near residential areas in an urban area, future residential land use may be a reasonable possibility."

The City of Gainesville and the local community have made it crystal clear to EPA that as much of the site as possihle should be sufficiently cleaned to be able to accommodate *all* types of residential uses; and sufficiently cleaned to eliminate the need for engineering and institutional controls over as much of the site as possible. And yet, the Feasibility Study upon which EPA is grounding its remedy selection states: "On-Site residential exposure scenarios are not applicable based on the expected commercial/industrial and/or recreational use of the property."

It was the responsibility of EPA to develop, ***at minimum***, a range of remedial alternatives that would achieve the different land use potentials for the Site.

Superfund Land Use Directive (EPA):

"Remedial action objectives provide the foundation upon which remedial cleanup alternatives are developed. In general, remedial action objectives should be developed in order to develop alternatives that would achieve cleanup levels associated with the reasonably anticipated future land use over as much of the site as possible. In cases where the reasonably anticipated future land use is highly uncertain, a range of the reasonably likely future land uses should be considered in developing remedial action objectives. These likely future land uses can be reflected by developing a range of remedial alternatives that will achieve different land use potentials."

Instead, it appears that EPA chose only to provide a set of predetermined alternatives that place the interests of the Responsible Parties above the interests of the community.

The Site Re-Use Meeting with EPA's "consultant," $E_2$, Inc., was a complete sham. The main question posed to the community was "Where on the Site do you want the biggest pile of contaminants?"

**Off-Site Soils and Sediments**

Off-site soil testing is ongoing and the area of contamination has yet to be delineated. Testing must continue until such delineation is clarified; and off-site soils must be cleaned to Florida default residential soil cleanup target levels. At a 2009 joint City and County Commission meeting, as EPA's Regional Project Manager for the Site, you specifically stated, in response to a specific question, that off-site soils would, unequivocally, be cleaned to 7 PPT for dioxin. We expect this declaration to be honored.

The proposed plan does not address in-home remediation; nor does it address temporary relocation of residents during remediation of their properties. These are issues that should be appropriately addressed.

The delineation of contaminants in creek sediments is not comprehensive. This is essential to providing a thorough remedy necessary to protect the creek ecosystem from continued adverse impact from these contaminants.

Contaminated off-site soils and creek sediments should not be brought onto the Site, adding to the contamination there. Off-site disposal alternatives for these soils were not evaluated in the Feasibility Study. They should be provided in an amended Feasibility Study.

**Stormwater Management**
Significant video evidence has been provided demonstrating the huge volume of untreated, contaminated stormwater runoff that flows off the Koppers site into Springstead Creek. Beazer has submitted an application for a new discharge permit. According to the diagram submitted with that application, there are serious deficiencies with Beazer's stormwater management plan, with most of the runoff actually bypassing the proposed collection areas entirely, including runoff from the 4 primary source areas. Considering contaminant concentrations in runoff will likely be even worse during the remediation process where soils will be severely disturbed, effective, functional management is critical. These deficiencies must be addressed. Longer berms and larger retention areas must be provided in association with issuance of any interim stormwater permit.

**Conclusions**
EPA's disregard for the community has led to a Proposed Plan that makes a mockery out of what Congress intended to be a community guided remedial endeavor. Although everyone is anxious to begin the remedial process, the remedies must be suited to the location and actually clean the site.

The Record of Decision should be put on hold. EPA needs to provide an amended Feasibility Study addressing the numerous deficiencies enumerated above; and provide the community with a new Proposed Plan for its consideration. Thank you.

Sincerely,
Robert Pearce

714 NW 36th Avenue
Gainesville, FL 32609
robertpearce2000@gmail.com
Chair, Technical Advisory Committee for Protect Gainesville's Citizens
Former President, Stephen Foster Neighborhood Association

**Stephen Foster Neighborhood Protection Group**

**October 15, 2010**
**Re: Community Comments Proposed Plan (July 2010)**
Gwendolyn Keyes Fleming, Region 4 Administrator
US EPA Region 4
61 Forsyth Street, SW
Atlanta, GA 30303-8960

Dear Ms. Fleming:

These comments are submitted on behalf of the Stephen Foster Neighborhood Protection Group (SFNPG), a community organization located in Alachua County, Gainesville, Florida. The SFNPG is a neighborhood community organization charged with representing and protecting the health and well-being of the residents living in the Stephen Foster neighborhood bordering the Cabot-Koppers Superfund and industrial site, and which is dedicated to making the Stephen Foster neighborhood a safer and healthier place to live, work, and play. The SFNPG works to improve environmental, housing, and other living conditions within the Stephen Foster Neighborhood. It is with those purposes in mind, SFNPG submitted comments on November 3, 2009 to the original August 2009 Feasibility Study, submitted comments on August 6, 2010 to the May 2010 Revised Feasibility Study, submitted comments on September 15, 2010 on the August 9, 2010 Community Involvement Plan, and are now submitting comments on the July 2010 Proposed Plan (PP).

The PP fails to adequately address the contamination on the Cabot-Koppers site in a multitude of ways. According to 40 CFR § 300.430(f)(2), the EPA, as the lead agency, must create a proposed plan, at a minimum, that "briefly describes the remedial alternatives analyzed by the lead agency, proposes a preferred remedial action alternative, and summarizes the information relied upon to select the preferred alternative." The proposed plan is created to provide the public with an opportunity to comment on the preferred remedial action alternative and to participate in the selection of the remedial action at the site.

These comments are meant to explain community concerns regarding the PP and implore the EPA to reconsider their chosen remediation options as they are not protective of human health and the environment and will lead to catastrophic impacts in the future.

**The EPA is grossly premature in its selection of a remedial alternative as delineation of contamination remains incomplete**

As we have continued to reiterate in our comments on the feasibility studies, a remedial plan cannot be chosen without a complete site characterization and delineation of all contamination, on-site and off-site. The PP states:

> "As part of the remedial design process which follows remedy selection, additional characterization of Site aquifers will be conducted to address remaining uncertainties related to DNAPL migration, and, more importantly refine its vertical and horizontal boundaries for effective remedy implementation. Off-site soil characterization continues to the north, south, east and west of the Site to completely delineate Site-related impacts and to expedite cleanup of off-Site areas." (PP at pg. 14).

This clearly indicates that the contamination has not been fully delineated in all media in all areas. The PP purports to pick a remedial alternative that will be protective of human health, implementable, and effective, among other things, without an appropriate grasp of the entire scope of contamination. The purpose of the remedial investigation found in 40 CFR § 300.430(d)(1) is to compile data that will allow for the adequate characterization of a site for the ***ultimate purpose of crafting an effective remedial alternative***. The EPA is completely remiss to push forward on selection of a remedy without collection and analysis of all requisite data.

Further, despite protests from the city, county, and local residents, the EPA has yet to initiate a testing regime at local schools. Stephen Foster Elementary is .6 miles from the site. The smallest and most vulnerable among us must not be ignored. The EPA must test the schools to ensure that Stephen Foster's children are not risking additional exposure by attending their schools.

**The EPA fails to adequately analyze the various remedial alternatives under the applicable 40 CFR § 300.430(e)(9) criteria**

The first requirement under 40 CFR § 300.430(f)(2)(i) is to "provide a brief summary description of the remedial alternatives evaluated in the detailed analysis established under (e)(9) of this section." (e)(9) contains nine evaluation criteria that a proposed plan is required to analyze.[1] Although the PP mentions each of the nine criteria, it is severely lacking in any sort of meaningful analysis. The purpose of the proposed plan is so that the public can be adequately informed on all available remedial alternatives, including the EPA's preferred remedial alternative, so that they can intelligently comment and participate in the remedial alternative selection process. The EPA completely eviscerates this requirement by providing virtually no analysis of the available alternatives. The reader is left to wonder whether the EPA engaged in any evaluation at all or whether they already had their preferred alternative in mind and set up the analysis to lend support to that alternative. A look back at the Feasibility Study (May 2010) shows a lack of any sort of meaningful analysis of all the criteria as well. Effectiveness and implementability are given some discussion, yet the mandated "threshold criteria" – overall protection of human health and the environment and compliance with ARARs is markedly absent or surficially treated. *See* 40 CFR § 300.430(f)(1)(i)(A).

The threshold criteria in evaluating the remedial alternatives are overall protection of human health and the environment and compliance with ARARs. 40 CFR § 300.430(f)(1)(i)(A). The PP's cursory glance at these first two criteria is insufficient to "reflect the scope and complexity of site problems and alternatives being evaluated." 40 CFR §300.430(a)(1)(ii)(C). There is little to no explanation as to the unique hazards to human health that this site may pose to the community. The PP's conclusory language in regards to these requirements does not reflect any detailed analysis by the EPA in regards to the "unacceptable risks" to human health and the environment and how each alternative would specifically address such risks. Such conclusory language includes "nine of the ten on-Site alternatives are expected to meet the two threshold CERCLA criteria" (PP pg.28); "UFA-1 … would fail to meet the mandatory criteria" (PP pg. 30); and "[a]lternatives OfR-2, OfR-3, and OfR-4 are all protective and would effectively eliminate any potentially unacceptable risks …" These statements do not provide any information on why the EPA deems one alternative more protective of human health or in compliance with ARARs over any other alternative.

The assessment of the alternatives' long-term effectiveness under 40 CFR § 300.430(e)(9)(iii)(C) is incomplete. There is no discussion as to the degree of certainty that each alternative would provide in regards to the probability of success. There is no mention of the "magnitude of residual risk remaining from untreated waste water or treatment residuals remaining at the conclusion of the remedial activities." 40 CFR § 300.430(e)(9)(iii)(C)(1). Also, there is no discussion as to the "adequacy and reliability of controls such as containment systems...that are necessary to manage treatment residuals and untreated waste." 40 CFR § 300.430(e)(9)(iii)(C)(2). The PP provides a brief conclusion as to which alternatives may be more effective in the long-term time frame, but provides no information to support such claims. Conclusory statements, similar to those used to describe protection of human health and the environment and compliance with ARARs, are once again used.[2] While the statute states that a "brief summary" should be provided, it would do a disservice to the purpose of the statute, keeping the community adequately informed, to provide such a limited scope of information as is presented in the PP.

It is difficult to determine whether any or all of the statutorily prescribed factors have been employed in determining, "the degree to which alternatives employ recycling or treatment that reduces toxicity, mobility, or volume." 40 CFR § 300.430(e)(9)(iii)(D). The factors are listed in the PP and there is also a list providing for which alternatives would be used the most to the alternatives that would be used the least to address the "reduction of toxicity, mobility or volume." 40 CFR § 300.430(e)(9)(iii)(D). No mention, however, is made in how or if these factors were applied to reach such conclusions. Some of the factors are indirectly discussed in the description, not the evaluation, of the remedial alternatives. Even in that section of the PP, however, there are no specifics or estimations as to the "amount of hazardous substances, pollutants, or contaminants that will be destroyed, treated, or recycled." 40 CFR § 300.430(e)(9)(iii)(D)(2). There are also no specifics or estimations as to the "degree of expected reduction, "degree to which treatment is irreversible," and the "degree to which treatment reduces inherent hazards posed by principal threats at the site." 40 CFR § 300.430(e)(9)(iii)(D)(3)-(6).

The PP fails to adequately discuss short-term effectiveness as required by 40 CFR § 300.430(e)(9)(iii)(E). The PP simply states which alternatives would provide the greatest short-term effectiveness and which would provide the least short term effectiveness. It does not address in which ways the methods would be effective in relation to the amount of time necessary to complete the remedial objective. It appears as if every alternative is just as effective as the next, but some with a longer or shorter amount of time to actually realize its effectiveness. The statute lists four considerations when evaluating short-term effectiveness.[3] Based on the PP, it appears as if only the "time until protection is achieved" factor was considered. No other details are provided.

40 CFR § 300.430(e)(9)(iii)(F) mandates that the EPA consider implementability in their analysis of the remedial alternatives. The PP merely states the factors to be considered in evaluating implementability of the alternatives and lists the alternatives in order from most implementable to least implementable in EPA's estimation. There is only one line justifying these conclusions. Whatever analysis was conducted in order to reach these conclusions is omitted in full from this section. Being conclusory in the "spirit" of brevity denies the

community any sort of valuable information to use in their evaluation of the preferred remedial alternative.

Further, the statute states additional requirements when assessing the implentability of off-site remedial action. "Administrative feasibility, including activities needed to coordinate with other offices and agencies and the ability and time required to obtain any necessary approvals and permits from other agencies (for off-site actions)" must be considered in determining implementability. 40 CFR § 300.430(e)(9)(III)(F)(2). Also, "availability of services and materials, including the availability of adequate off-site treatment, storage capacity, and disposal capacity and services; the availability of necessary equipment and specialists, and provisions to ensure any necessary additional resources; the availability of services and materials; and availability of prospective technologies," should also be considered. §300.430(e)(9)(iii)(F)(3). If any of these requirements were considered, they are not reflected in the PP.

According to 40 CFR 300.430(e)(9)(iii)(G), cost must be considered. The projected cost for each remedial alternative is presented in the PP. The PP also states that the alternative with the highest cost is the most effective alternative and the remaining alternatives differ in cost and effectiveness. The PP says that costs will vary based on the amount of technology implemented, the degree of difficulty in implementation, and time to meet RAOs. The range in cost variation is not provided and the estimated cost of each alternative does not include any detail on how that amount was calculated. Cost estimates are only valuable if they are explained in conjunction with time frames, degree of difficulty in implementation, and the amount of technology used (all of these being stated as variables of costs associated with the alternatives) in order to reach the projected expense.

40 CFR § 300.430(e)(9)(iii)(H) mandates that the EPA consider any State concerns. If the State had any concerns or comments regarding the preferred alternative, they are not in the PP. By "State" we assume the PP is referring to the Florida Department of Protection (FDEP). The PP speaks of the State's acceptance of the preferred alternative and how it has been "closely involved in the development and evaluation of these alternatives." This suggests that the State did not have any concerns or comments and if this is not the case, the language of the PP is misleading. The community has requested the comments from the FDEP many times and has not been provided with those comments. Without any sense of where the FDEP stands on this issue, it is impossible to evaluate any other possible weaknesses of the PP. It should be noted that the City of Gainesville is not satisfied with the PP and has provided its own comments on the document.

40 CFR § 300.430(e)(9)(iii)(I) requires a determination of "which components of the alternatives interested persons in the community support, have reservations about, or oppose." This portion of the PP is omitted as it cannot be completed until comments concerning the PP are received. It should be noted by the EPA that the community has not accepted the PP or any part of its proposed remedial actions. The cleanup plan is completely inadequate to the community because it does not include excavation on-site, includes only limited excavation off-site, and proposes to store the contamination onsite under a large "Mt. Dixon"-type cover. Also, the PP proposes experimental methods in the 30 acre source area and does not provide costs on excavation and removal or incineration. In addition, it leaves treatment of the non-source 60 acres vague, and does not address searching for additional sources such as trenches and drum burial areas. In addition to the above mentioned

weaknesses, the plan also fails to mention testing inside nearby residents' homes, any relocation assistance, or compensation for affected residents.

**The EPA does not adequately discuss the rationale that supports their preferred alternative**

According to 40 CFR § 300.430(f)(2)(ii), the EPA is required to "identify and provide a discussion of the rationale that supports the preferred alternative." The PP addresses and describes the alternative preferred by the EPA. However, there is no discussion as to the reasoning behind the selection of the preferred alternative. No justification is given for what was included in the preferred alternative, for what was omitted from the preferred alternative, or even why the preferred alternative was selected. This is a weakness that permeates the entire PP as no proper evaluation was undertaken concerning any of the remedial alternatives using the statutorily mandated (e)(9) criteria. Such a discussion is required by statute and of utmost importance in conveying to the community the reasons for preferring that specific alternative.

**Once again, relocation is not considered as an option in the PP**

The residential population on the west side of the Koppers site may potentially be a part of an exposure pathway. (May 2010 Feasibility Study at 1-40). As seen from the limited indoor testing done for dioxins in fine particulates, this is no longer a potential exposure pathway; ***an actual pathway exists***. Because of this, relocation must be included as an alternative. The exclusion of the relocation alternative necessarily means the ultimate decision-maker is not taking into consideration all appropriate and viable remedial alternatives. Relocation is an approved alternative under federal guidelines and policies and must be considered as a part of this clean up strategy due to the off-site impacts (*see generally* 1999 Interim Policy on the Use of Permanent Relocations as Part of Superfund Remedial Actions). Further, governing policy dictates that relocation should be considered where unreasonable use restrictions may exist during or after clean up, noting restrictions on such activities as children playing in yards. The Florida Department of Health has already recommended restrictions on children playing in easements adjacent to residential property in the Stephen Foster neighborhood and further risk assessment is ongoing. (Health Consultation, July 17, 2009, Florida DOH). Finally, failure to acknowledge the adequacy of relocation precludes perhaps the best mode of protecting human health and the environment. This option is the only option that would account for those "yet to be determined" unacceptable risks. It would eliminate limitations caused by current use of off-site areas as residential property and control future exposure associated with active clean up of the Koppers site and its continued use as an industrial facility.

Relocation is briefly mentioned in the May 2010 Feasibility Study. The Feasibility Study recognizes that in order to achieve the remedial goals, the following may be done to disrupt the potential exposure pathway: (May 2010 Feasibility Study at 3-52).

....

> 3. ***"Current receptors could be removed from the area and future receptors could be prevented from becoming residents of [the] area. This would achieve the goal of disrupting the potential exposure pathway and eliminating the potential risk/hazard to public health and/or the environment."*** (emphasis added).

This is the ***only*** mention of relocation as an option in any of the feasibility studies or in the PP. It cannot be viewed as an alternative considered by the EPA since it does not meet the evaluation requirements of 40 CFR § 300.430. By failing to develop relocation as an option, the EPA precludes further consideration of relocation as an alternative unless there is a significant change in available information for off-site characterization. 40 CFR § 300.430(f).

Relocation must be considered as an alternative for community acceptance. The EPA's evaluation cannot be considered adequate without a discussion of relocation in light of the rules and governing policy. Dioxins have been found inside homes. The rest of the off-site contamination is still to be determined. The absence of relocation as an option is illogical and exemplifies a lack of diligence on the part of the EPA.

**The plan to scrape soil from residents' yards to be stored on the site is absolutely unacceptable to the community**

As stated above, the residents of the Stephen Foster neighborhood remain adamantly opposed to the plan to scrape contaminated soil from their yards and store it on the site. The institutional controls to accompany such a remedy are also completely unacceptable. As an alternative the EPA offers up a combination of engineering and institutional controls which would effectively cap the property owner's land and then prohibit such owner from doing much of anything with that land in the future. The residents demand that a proper cleanup be initiated which would include relocation to remove citizens from their toxic community.

The removal of impacted soils from the neighborhood will result in a severe disruption of the lives and privacy of the residents of the Stephen Foster neighborhood. The May 2010 Feasibility Study dismissed this concern, calling the soil removal a "one-time event." (p. 3-53). Yet, full data collection to characterize off-site contamination has not been completed. Without that data, there is no way to predict whether this removal will be the aforesaid "one-time event" or a series of events to ensure the contamination is fully eradicated. Further, the removal of soil will destroy landscaping and damage or destroy all of the massive oaks, pines, maples, cherry, and other native trees in the area. Only the pines have a deep enough tap root to avoid damage by excavation. The majority of other trees have extremely superficial root systems which run a little more than a foot beneath the ultra sandy, nutrient-poor topsoil. A simple drive through the surrounding community reveals the natural beauty of the area, a beauty the residents highly value. Once the soil is scraped, institutional controls will be needed, although likely ineffectual, after the excavation is completed. Animals are likely to dig farther than two feet, trees planted by residents may have a root system that extends farther than two feet, and such trees may bear fruit contaminated by the unexcavated soil underneath. Even an industrious child may dig past that two foot mark. How does the EPA propose to prevent these events? Although these issues have been brought to the attention of the EPA time and time again, including in our comments to both versions of the feasibility study, they are ***still*** not being addressed in the PP.

The storing of contaminated soil onsite is completely abhorrent to the residents of the Stephen Foster neighborhood. They do not want a Mt. Dixon in their midst. Capping the soil does not make it disappear. The contamination remains on the property and will threaten the adjacent neighborhoods with recontamination in the future. In addition, it limits future options for the site and the residents are hopeful that if the site is properly cleaned it can be created into something the community can be proud of instead of a reminder of Gainesville's dirty past.

The PP does not evaluate disposing of soils off-site. They should provide cost estimates and a plan for disposing of soil off-site as one of the remedial alternatives. This discrepancy ignores a valid and effective means for cleaning up the site, as well as the neighboring community. Further, only part of the area on site is proposed to be capped. As for the rest of the area, the EPA remains vague and makes references to either providing more caps for the that area or excavating the soil. The EPA must be clear and straightforward concerning everything they plan to do onsite. If they plan to excavate, they must say so clearly and indicate which areas they intend to excavate. They must also state what they plan to do with that contaminated soil once excavation is complete. If they plan to cap or utilize other engineering controls, they similarly must say so clearly and indicate which areas on which they intend to use the controls.

Additionally, the PP does not fully consider the impacts from on-site activities that may impact the surrounding community during the implementation of the remedial alternative such as dust, noise, and other exposure mechanisms.[4] The PP explains that Beazer has "begun interim measures to reduce dust including planting of vegetation over former operation areas." (PP pg. 14). The PP goes on to state that "Beazer East is implementing dust control of continuous water application to suppress dust." The PP does not elaborate on precisely what this continuous water application entails, how often the water is being applied, whether this is a recognized and safe method of suppressing dust, when the water application is needed, or the level of protection this provides to the adjacent community.

All of the above commentary proves that the EPA's PP is not protective of human health and the environment. As this is a threshold criterion under 40 CFR § 300.430(f)(1)(i)(A), this remedial alternative should have been discarded early on by the EPA.

**Storm water runoff control has not been adequately explained**

To control storm water the EPA proposes the following:

> "Storm water controls will consist of: (a) grading and contouring the Site to direct runoff toward collection points; (b) installation of one or more detention/retention ponds; and (c) possible replacement of the existing Site storm water ditch with another ditch or with an engineering conveyance such as an underground concrete pipe (culvert)." (PP pg.14).

This remedy does not fully explain how it will be adequate to control storm water runoff. There is no elaboration on how the grading and contouring will direct runoff toward collection points or how the detention/retention ponds will contain the water in such a way to prevent contamination of the soil and groundwater beneath it. Without this information, there is no way for the community to analyze the alternative under the criteria in (e)(9), especially protection of human health and the environment and effectiveness in the short and long term.

**The proposed remediation of the Hogtown and Springstead Creeks is not adequate**

The PP states the following for remediation of the creeks: "Ongoing detention basin to mitigate ongoing impacts. Excavation and removal of impacted sediment in excess of the probable effects concentration (transport and consolidate on-site). Monitored natural recovery of remaining impacted sediment until concentrations reach threshold effects concentration or background levels." (PP pg. 33). What exactly the detention basis will be or how it will mitigate ongoing impacts is unclear. In addition, this remedial action is vague on exactly what standard the EPA is using to clean the creeks. In a letter from Dr. Stephen M. Roberts and Dr. Leah D. Stuchal of the University of Florida to Liga Mora-Applegate of the FDEP, the Drs. recommend Florida Residential CTLs for sediment in the creeks given the proximity of the creeks to residential yards. *Letter from Dr. Roberts and Dr. Stuchal to Ms. Mora-*

*Applegate dated February 10, 2010 pg. 1 attached to these comments.* In addition, the Drs. also state that "[g]iven that PAHs and dioxin contamination in creeks are not consistently co-located, this remedial effort cannot be assumed to address the issue of dioxin contamination." *Id.* at 3. The community agrees with the Drs. assertions and insists that the EPA clean up the creeks to Florida Residential CTLs and address the issue of dioxin contamination.

**An adequate explanation of various former trenches as well as possible drum burials or dumping sites is not included nor is any suggested remedy for these possible contamination areas**

Aerial photos taken in 1965 and 1971 of the site reveal trenches in the woods north of the site which are no longer in existence. What happened to these trenches? What were these trenches used for? How does the EPA plan on investigating these trenches?

Anecdotal evidence points to locations of possible drum burial and other dumping sites. These would constitute additional contamination areas outside of the documented source areas. The EPA gives no indication in their investigation of the site that they have looked for the possible additional areas of concern. Scott Miller, EPA project manager stated that there will be a "work plan coming forth" to address buried drums. (August 5, 2010 EPA Meeting Official Transcript pg. 112 lines 7-9). This vague language is simply not acceptable to the community. Simple ground penetrating radar in the areas of concern would be sufficient to begin investigation of these sites. The community expects a commitment by the EPA to search for and analyze these areas and incorporate them into their PP.

40 CFR § 300.430(d)(1) states that the purpose of the remedial investigation (which supports all of the plans the EPA subsequently issues) "is to collect data necessary to adequately characterize the site for the purposes of developing and evaluating effective remedial alternatives." § 300.430(d)(2) goes to on require that the EPA "characterize the nature of and threat posed by the hazardous substances and hazardous materials and gather data necessary to assess the extent to which the release poses a threat to human health..." Without fully analyzing any possible dumping sites, drum burials, and former trenches, the EPA cannot be certain they have gathered all of the requisite data to create a full contamination characterization. Without this data, the EPA cannot assure the community their chosen remedial alternative will be effective.

**The PP completely ignores contamination known to exist inside residences**

Tests on fine particulates have been performed on the inside of several homes within two miles from the site. The results were shocking to the residents and their attorneys. The dioxin levels, thought to be some of the most dangerous contaminants on the planet, range from 400PPT to 1100PPT – ***over 1000 times*** higher than the levels deemed safe by the EPA for outside soil contamination. TCDD, a dioxin found inside homes, is a known carcinogen. In addition, exposure to this chemical can cause a host of other illnesses, including reproductive issues, development problems, immune system suppression, heart disease, diabetes, hormonal changes, liver damage, pancreatic abnormalities, problems with the circulatory and respiratory systems, etc. Children, who are particularly susceptible, are coming into contact with these dangerous contaminants inside their own homes and the schools they attend (twelve of which are located within two miles of the site).

According to 40 CFR § 300.430(d) the remedial investigation should perform field investigations sufficient to assess the following: physical characteristics of the site;

characteristics or classification of air, surface water, and groundwater; general characteristics of the waste; extent to which the source can be adequately identified and characterized; ***actual and potential exposure pathways through environmental media***; and ***actual and potential exposure routes, such as inhalation or ingestion***. Obviously, finding fine particulates inside residences shows an actual exposure route, more specifically ***actual exposure***. The testing performed thus far was limited in scope and further testing is warranted. One of the major aims of the remedial investigation is to determine risks to ***human health***. Human health is surely affected by dioxins inhaled and ingested inside the homes of residents. It is illogical for the EPA to solely conduct soil and groundwater sampling when confirmed contamination exists within residences. This poses an ***immediate threat*** to the residents of the area. Mr. Scott Miller of the EPA has been asked directly whether or not additional testing will be done on the homes. He has refused to answer. Those residents with means, a/k/a "Koppers Refugees," have been fleeing the area, abandoning their homes, in order to escape this harmful contamination. Those without means to do so are consumed with constant worry and stress about how these deadly chemicals may be affecting their health and the health of their families. These residents are not accessing the site or purposefully exposing themselves to harmful contaminants. They are simply attempting to live their lives in what is supposed to be a safe haven: their homes.

**It is not clear that the EPA is going to follow mandated Florida CTLs**

In the second to last Remedial Action Objective (RAO), the EPA states that they plan to "restore quality of groundwater outside of source areas to beneficial use having COC concentrations no greater than Federal MCLs ***or*** Florida GCTLs." (PP p. 12). The EPA is required to clean up the site according to ***Florida*** GCTLs which are much more protective than Federal MCLs.

In addition, the EPA states that they will clean up the site according to commercial/industrial CTLs. Which will it be? In a recent EPA meeting, Scott Miller, project manager for the site, stated that the future land use at the site may possibly be a mixed use with a residential component. (August 5, 2010 EPA Meeting Official Transcript pg. 10 lines 19-21). Later he states "...there are many sites that have been cleaned up to commercial/industrial standards, where there's been exposure barriers deployed at the site, and there's now residential use ... People live there. Townhomes. That would also be appropriate for this site." (Transcript pg. 38 line 25 – pg. 39 lines 1-6). We assume he deems commercial CTLs appropriate for the site since Florida land use codes typically group mixed use and multi-family housing under its commercial sections. It is ludicrous to think it is appropriate to have commercial CTLs (even more outrageous to consider industrial CTLs) on land that will be supporting residences simply because the Florida zoning code considers mixed use and multi-family housing commercial. CTL levels are based on frequency of exposure. If an individual lives on a site in a townhome, he will be frequenting the site as often as someone that lived on the site in a single family home. His cancer risk will increase in the same fashion as a resident of a single family home. In addition, the Gainesville City Commission passed a resolution in 2008 which stated the site should be cleaned up to Florida Residential CTLs. This resolution was completely disregarded by the EPA.

The Table 1 in the PP states the clean up goals for COCs. (PP pg. 13). Under the groundwater table, benzene is listed twice, once using the Florida CTL (1 ug/L) and again using the Federal MCL (5 ug/L). It is not clear which one the EPA will be using on this site. The EPA must use the most protective clean up level, which is the Florida level of 1 ug/L. This should be corrected in the PP so that the correct clean up level is clearly stated.

Further, the EPA appears to criticize the Florida CTLs for dioxins and furans stating "[a]t present there is significant ongoing debate between and among researchers, different regulatory agencies, and the regulated community regarding the toxicity of dioxins/furans and whether meaningful human-health risks are posed by low concentrations of these contaminants..." (PP pg. 13). They go on to mention that Florida's default SCTL is "at the low end of the range." While the final sentence indicates the EPA intends to use Florida's CTLs, the entire diatribe is troublesome and leads the reader to believe that if the EPA can find a way around it, they will attempt to use a level higher than the mandated Florida level. The EPA is cleaning up a site in Florida and is required to use Florida CTLs.

The community insists that residential CTLs be used if any sort of residential housing is contemplated in the future for the site. These discrepancies should be fixed to make it clear that the EPA will use the applicable Florida CTLs.

**Conclusion**

After ***twenty-seven years*** in the making, the PP fails to follow the mandates of 40 CFR § 300.430 in numerous ways. The PP relies on incomplete data, the remedies selected fail to take into account effects to the residents of the Stephen Foster neighborhood, the remedies are not appropriately analyzed under the nine criteria, and a discussion of the most beneficial option, relocation, is not included in the PP. The community has serious concerns about many of the proposed remedial actions including storing contaminated soil on-site, clean up of the local creeks, and storm water runoff. The community wants a work plan ***now*** that addresses what the EPA will do to investigate possible drum burials, storage sites, and locations of former trenches. The EPA must make it clear in the PP that they intend to use the most stringent clean up target goals, which are Florida's CTLs. Most importantly, the EPA is ignoring data confirming actual contamination inside of residences. All of the EPA reports to date are silent on what the EPA intends to do to remedy this deadly contamination. All of these issues should be addressed ***before*** a final remedial option is selected so that all potential hazards and concerns of the Stephen Foster neighborhood can be given appropriate weight in the selection process.

SFNPG would like to point out that many minority and people of lower socio-economic status reside in the area surrounding the site. In light of the EPA's mandate for environmental justice, the community hopes the EPA would be more sensitive about their approach to community involvement. In a recent July 22, 2010 memorandum from the EPA, the EPA states that ***achieving environmental justice is an agency priority and should be factored into every decision***.[5] The memorandum defines environmental justice as the "fair treatment and meaningful involvement" of all people regardless of race, national origin, or income in the formulation of rules and the implementation of cleanup processes. This cleanup process has taken ***in excess of twenty-seven years***. In response to learning of this fact during an investigation by CNN into the Gainesville Superfund site, Mathy Stanislaus, EPA's new Superfund Program Director, admitted that ***"community residents should be angry for how long this is going on and how long they have waited for their cleanup."*** That is unfair treatment. As stated before, the community was not consulted while the EPA performed their investigations and research. That shows a complete lack of involvement, much less meaningful involvement. The EPA is not only failing to follow its own directive on environmental justice, it is acting in a way that completely contravenes the spirit of the mandate.

Once again, SFNPG would like to remind the EPA that neighboring residents had no part in contributing to, endorsing, or encouraging the hazardous pollution that now lies within their yards and inside their homes adjacent to the site. The EPA has failed time and again to recognize the degree to which the residents have been impacted by this contamination. SFNPG implores the EPA to take the concerns of the community seriously and factor them into their remedial alternative selection. SFNPG expects the EPA to use its full authority under the law to protect the health and environment of the citizens most impacted by this ongoing tragedy.

Please feel free to contact me directly with any questions or concerns you may have. Please direct all correspondence regarding these comments to the undersigned counsel.

Sincerely,
Sarah Schwemin
Attorney for the Stephen Foster Neighborhood
Protection Group

**Strategic Environmental Analysis, Inc**

September 24, 2010
Scott Miller
Site Manager
Cabot / Koppers Superfund Site
Region 4, Environmental Protection Agency
Atlanta Federal Center
81 Forsyth Street
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RE: Data Requests

The underlying assumption for many of the Superfund Guidance documents is that a Remedial Investigation and Feasibility Study (RI/FS) report will be prepared that integrates and interprets the data gathered during the investigations and studies so that previous draft preliminary information would not be needed. The Koppers studies that are being cited as supporting the proposed remedy are more complex, and are lacking in a final comprehensive summary of the:

- Nature and extent of contamination (soil, groundwater and DNAPL).
- Fate and Transport (leachability and groundwater evaluation are not finalized)
- Chemicals of Concern / Cleanup Criteria
    - o No clear basis for selection of the COCs in the proposed plan
    - o No maps of the distribution/concentrations of many of the COCs
- Whether/where selected criteria could be met based on existing data

These factors contribute to the lack of transparency in understanding the site conditions and implications of the proposed remedy. We consider this a serious flaw in the FS and fail to understand how EPA and FDEP and can support decisions based on the information in that document, and not require the responsible party to provide the information in a format that meets typical standards of practice.

We are interested in expediting the overall process, and would prefer to avoid lengthy revisions to the FS. To that end, we request critical information summaries and data so that the community's questions can be answered. This will also provide current and future reviewers of the Site information with a synthesis of information better documenting the basis for decisions.
For the EPA meeting proposed for October 6, we request the following information/maps be provided and that EPA be prepared address questions on these issues:

- A comprehensive overview of groundwater issues that integrates results of the various reports. This is necessary to understand the implications of the proposed source and soil remedy. The groundwater information is scattered in many documents generated over the past 20 years. Rather than a lengthy analysis, we request at a minimum the following information be provided:

o How the proposed plan groundwater chemicals of concern were identified (screening tables? Data compilation?)
o Maps showing of the nature and extent of groundwater contamination
o Compilation of well locations and boring logs
o Geologic profiles

• The source area DNAPL delineation investigation (GeoTrans, 2004) was not included in the AR, and the community has raised many questions on this issue that are not detailed in the FS or proposed plan. Therefore, this is an additional topic to be expanded upon in the informational meeting. This should include maps and waste characterization information.

• Maps should be prepared that show where soil criteria (residential/commercial direct contact and leachability) are exceeded in both surface and subsurface soil.

Many questions have been raised by the community that are not in the supporting documents but could be quickly addressed with access to the data. Providing an electronic version (Access or Excel) of the soil and groundwater data that are considered relevant for interpretation of spatial and/or temporal trends would provide the information necessary without multiple iterations of supplemental data analysis reports to address these questions. We request that the database include the following:
• Analytical results used for on-site and off-site soil characterization
• Sample coordinates, depths and sample dates
• Locations of current and abandoned wells
• Groundwater analytical results for the several years. This is flexible because of differences in well installation/abandonment, etc.

These electronic data were requested previously (April 29, 2010 letter from PGC and the proposed plan meeting, and the FOIA request from Cheryl Krauth dated August 1, 2010). A database would have been necessary to prepare maps and statistical analyses presented in reports, so we feel it would be readily available. Again, these data will allow us to more quickly focus and prioritize, particularly where the existing data summaries/evaluation has not been provided and we can quickly verify the findings and data interpretation.

This focused synthesis of information can help expedite the decision process without prolonged challenges as to the adequacy of the underlying documents. Please contact me if you have questions regarding this request.

Sincerely,
Dr. Patricia V. Cline
Principal

September 22, 2010
Scott Miller
Site Manager
Cabot / Koppers Superfund Site
Region 4, Environmental Protection Agency
Atlanta Federal Center
81 Forsyth Street
Atlanta, GA 30303-8960

RE: Risk Assessment Comment

The Administrative Record (AR) contains a letter you sent to Dr. Paul Anderson on June 18, 2010, with your comments on what portions of the May 26, 2010 Human Health Risk Assessment are approved or not approved. A copy of this letter is attached.
It appears the use of the probabilistic model is being rejected. However, can you clarify what exactly is referred to by wording like "some text", "some portions", and "several subsections"?

The proposed plan states remedial goals for soil will be the default Florida soil cleanup target levels (SCTLs), although the exact application of these is not clearly stated. Since the plan was developed after this letter, does this mean that the entire risk assessment is no longer approved? If so, why is this included in the AR? If you are going on record as approving portions of this assessment, can you explicitly state what this includes? Specifically:

- Calculation of site-wide average concentrations using Thiessen Polygons as inferred in figures from Section 3?
- Use of relative absorption factors (Appendix C and G)?

We disagree with approval of these sections. In addition, there are numerous technical errors in this risk assessment (for example, not calculating the non-cancer hazard associated with dioxins). Therefore, including the attached letter and the risk assessment in the AR is misleading as to the reliability of this analysis, and the implications of this approval are not transparent. As a side note, the May 26, 2010, risk assessment is not in the AR, but rather the earlier May 10, 2010, draft.
Sincerely,
Dr. Patricia V. Cline
Principal

**<u>University of Florida</u>**

October 14,2010

Ligia Mora-Applegate
Bureau of Waste Cleanup
Florida Department of Environmental Protection
2600 Blair Stone Road
Tallahassee, FL 32399-2400

University of FLorida
Center for Environment and Human Toxicology
PO Box 110885
Gainesville, FL 32611-0885
352-392-2243 Tel
352-392-4707 Fax

Re: Koppers Proposed Plan

Dear Ms. Mora-Applegate:

At your request we have reviewed the *U.* S. *Environmental Protection Agency, Superfund Proposed Plan, Cabot Carbon/Koppers Superfund Site, Gainesville, Alachua County, Florida.* This document was prepared by the US EPA and is dated July 2010. The plan summarizes remedial action objectives and cleanup levels for groundwater, onsite soil, and off-site soil. It reviews remedial alternatives and proposes surface grading and covering for most of the site with containment and treatment of impacted groundwater. Our review focuses on the proposed cleanup levels. **We have the following comments on the document:**

1. Off-site soil remediation goals were selected based on current land use. However, future land use may not be identical to current use. Therefore, off-site cleanup levels should be based on unrestricted land use regardless of the current use unless individual property owners implement institutional controls preventing future residential use.
2. It is unclear why two groundwater cleanup levels are listed for benzene in Table 1. The correct cleanup level should be 1 /Ag/L benzene based on the promulgated FDEP GCTLc (Chapter 62-777, F.A.C.).
3. Remediation goals for the protection of ecological receptors are not included in the document. The Alachua County Environmental Protection Department assessed chemical concentrations in submerged and dry sediment along Springstead and Hogtown Creeks. The study showed concentrations of dioxin and BaP-TEQs in excess of both human health and ecological criteria. The ecological screening levels applicable to this site are 2.5 ng/kg dioxin and 1.1 mg/kg BaP-TEQs for the protection of piscivorous mammals. The presence of these Chemicals of Potential Ecological Concern above screening levels indicates that further assessment of ecological risk is needed. In Springstead and Hogtown Creek sediment where both human health and ecological criteria apply, cleanup should be based on the lower of goals developed for protection from human health and ecological effects.
4. The groundwater CTL for acenaphthene of 210 *""gIL* is incorrect. **It** should be 20 *""gIL.*
5. The groundwater CTL for bis(2-ethylhexyl)phthalate is missing. The correct value is 6 *""gIL.*

6. The groundwater CTL for 3-/4-methylphenol of 7 ug/L is incorrect. When two chemicals are combined into a single detection group the toxicity values can not be apportioned. Because they are grouped together, it is unclear how much of the detected concentration is due to each individual chemical. Therefore, a conservative approach should be taken and the chemicals should be screened at the lower of the two criteria. In this case, the CTL is 3.5 *""gIL.*
7. As stated above, the industrial soil CTL for 3-/4-methylphenol should be the lower of the two criteria. The applicable industrial SCTL is 3,400 *mg/kg.* Additionally, the leachability SCTL for 4-methylphenol (0.03 *mg/kg)* is the lowest applicable criterion and should be met throughout the vadose zone.
8. The proposed plan assumes that future land use will be restricted to commercial/industrial purposes, yet in on-site soil clean-up goals, the residential SCTLs are listed for antimony, arsenic, acenaphthene and benzene.
9. Page 3 states that the drainage ditch on the Koppers site discharges into Hogtown Creek, which flows into Springstead Creek. The opposite is true. Koppers' drainage ditch discharges into Springstead Creek, which flows into Hogtown creek.
10. The document does not indicate which areas will be covered by the proposed remedy. No maps for are included detailing the areas affected by the proposed plan. Therefore, it is not clear if all areas of concern will be addressed. Specifically, we are concerned with recently detected areas of high dioxin concentrations in the Northern Inactive Area. These areas were not fully investigated and anecdotal evidence indicates that they may represent a former waste pit. Any remedies should address this area and possible further migration of contamination off-site to the Northeast.
11. The correct chemicals of concern and remedial goal options for this site are listed in the following tables: [See master copy for these tables]

Please let us know if you have any questions regarding this review.

Sincerely,
Leah D. Stuchal, Ph.D.
Stephen M. Roberts, Ph.D.

**Florida Department of Environmental Protection**

Bob Martinez Center
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

October 14, 2010
Mr. Scott Miller
Remedial Project Manager
United States Environmental Protection
Agency
Region IV, Superfund North Florida
Section
61 Forsyth Street, SW
Atlanta, Georgia 30303

RE: DEP review of the July 2010 Superfund Proposed Plan for the Cabot Carbon/Koppers Superfund site, Gainesville, Alachua County, Florida

Dear Scott:
This correspondence provides DEP comments on the final July 2010 proposed plan for the Cabot Carbon/Koppers Superfund site. This serves to supplement DEP's June 9, 2010 comments on the revised May 2010 Koppers site Feasibility Study (FS) and EPA's likely proposed amended remedy for the Cabot Carbon/Koppers Superfund site, Gainesville. We appreciate EPA's responsiveness and efforts to address DEP's previous comments. We take this opportunity to reiterate previous DEP recommendations which we believe are critical to the effectiveness of the remedy and will ensure compliance with State ARARs. We also provide recommendations that we hope will clarify what we understand are the remedial components and remedial goals of the proposed site remedy.

We are pleased to see that the revised FS has 1) incorporated additional remedial alternatives with combined technologies recommended by DEP and local stakeholders for improved source mitigation alternatives; 2) provided further discussion and clarification regarding stormwater management prior to and as a component of the Superfund remedy; 3) more appropriately recognized the potential and likelihood of continued vertical DNAPL migration in its revised conceptual model; 4) acknowledged the need for further delineation of the offsite Hawthorn Group groundwater contamination; and 5) continues to acknowledge the application of Chapters 62-780 and 62-777 in the development of site remedial cleanup criteria, the establishment of temporary and permanent points of compliance for groundwater remedies in the surficial aquifer, Hawthorn Group and Floridan aquifer, and the use of a risk management option (RMO) **III** approach including engineering controls and defined institutional control boundaries at the Koppers site. We are also pleased that the FS emphasized ongoing dust suppression following closure of the Koppers facility and indicated that design of an air monitoring network at the fence line would be implemented during the Superfund remedial design phase. The revised FS also includes alternatives for remediation of offsite soil contamination.

As noted previously, all documents containing geologic or engineering information must be signed and sealed by a registered PE or PG licensed in the State of Florida, pursuant to Rule 62-780.400, F.A.C. and Chapters 471 and 492, Florida Statues.

Based on the revised final FS and final proposed plan, we understand that EPA is proposing a combination containment and source treatment remedy to address onsite contaminated soils, DNAPL and groundwater, including surficial, Hawthorn and Floridan aquifer groundwaters. Containment would be accomplished by a slurry wall to the middle clay that surrounds all 4 source areas and includes other leachable materials. Source areas are to be treated insitu. Groundwater extraction and treatment would continue in the surficial aquifer; focused hydraulic containment through groundwater recovery and treatment would also be conducted in the Floridan and expanded as necessary in response to monitoring results and "triggers" established to address plume migration and promote plume stability; insitu groundwater treatment would be implemented in the Hawthorn.

Monitored natural attenuation (MNA) is included as a remedial component for all groundwater. Groundwater remediation in all aquifers and the Hawthorn would be considered complete when groundwater contaminant plumes are stable and/ or shrinking, and when contaminants do not exceed federal MCLs beyond the edge of the source control boundary and do not exceed State groundwater cleanup target levels (GCTLs) beyond the points of compliance at or within the institutional control (IC) boundary (equivalent in this case to Koppers property boundary). Monitoring will be ongoing to document the progress and effectiveness of the site remedy, trigger initiation or expansion of active remedies in the Hawthorn and/ or Floridan, support evaluation of MNA in the lesser contaminated portions of the plumes, and confirm that groundwater contaminant plumes are stable or shrinking. Overall, this approach is consistent with Chapter 62-780, Risk Management Option **III** which allows for alternative cleanup goals with appropriate institutional/ engineering controls, such that soils and groundwater beyond the institutional control boundary meet cleanup criteria for unrestricted use. Where offsite land use is commercial, soil may be remediated to commercial SCTLs with appropriate institutional controls. Offsite sediments (off the Koppers facility property) exceeding applicable criteria are proposed to be remediated by a combination of excavation and contaminant monitored natural recovery. DEP offers the following proposed plan comments.

**Description of site contamination**

Although delineation of the extent of contamination is still ongoing (particularly for the offsite soils as well as for groundwater contamination with the establishment of temporary points of compliance (TPOC) for the surficial and Hawthorn Group groundwater plumes and Floridan Aquifer contamination east of the property boundary) it is important to provide a clear description of what is currently known about the magnitude and extent of contamination both on and off the Koppers facility property. In particular, we found that the proposed plan was not clear in the following areas and request improved specificity in the Amended Record of Decision (AROD):

• *Magnitude and extent of Floridan Aquifer groundwater contamination.*_*Groundwater* contamination above GCTLs has been observed in Floridan wells other than just FW-6, primarily in the northern and eastern portions of the site. It should be noted that increasing groundwater contaminant levels in FW- 22B (a POC well) resulted in the installation of FW-31BE and ongoing pump and treat to prevent further plume migration and pull any offsite contamination back within the IC/property boundary. In addition, it appears that offsite plume migration has occurred east of Koppers based on FW-16B. Groundwater recovery is ongoing at FW-6 and FW-21B to evaluate possible vertical migration due to well construction at FW-6 and to evaluate the effectiveness of groundwater recovery using an existing well, FW-21B, to address migration and GCTL exceedances observed in FW-16B. Pumping of FW-6 and 21B was initiated in October 2009. Based on more recent discussions, DEP anticipates that decisions regarding the effectiveness of FW-21B and the need for downgradient TPOC wells east of Koppers along with a determination of the integrity of FW-6 will be forthcoming within the next few months. If cross contamination is occurring at FW-6, the monitoring well should be abandoned and replaced with an appropriately constructed multiport well.

• *Magnitude and extent of Hawthorn Group groundwater contamination.* In particular, it should be clearly acknowledged in the AROD that groundwater contamination has been observed in the Upper and Lower Hawthorn east and northeast of the Koppers facility above GCTLs at a distance of up to 800 feet east of the Koppers property boundary, not just immediately east of the property. The AROD should also speak more directly to groundwater contaminants east of Koppers that may be attributable to former Cabot facility operations and indicate that these contaminants will be delineated and also addressed by a combination of insitu treatment and MNA, if that is the intent. It should also be acknowledged that the magnitude of contamination in the Lower Hawthorn is not *known* in the Process and South Lagoon source areas on the Koppers site because no Lower Hawthorn monitoring wells have been installed in those source areas.

• DEP does not agree with the proposed plan interpretation that observed arsenic in Floridan Aquifer monitoring wells is solely due to oxygenated water introduced during well drillings. We do agree that vertical migration of arsenic from the surficial or Hawthorn into the Floridan is not supported by site data and not likely occurring. As previously noted, however, the persistent presence of arsenic above GCTL in Floridan wells located primarily outside of the organic contaminant plume area indicates to us that naturally occurring arsenic in the Floridan aquifer is going into solution in response to a redox front downgradient of the Floridan plume. As such, monitoring of arsenic levels in these wells should continue as part of the comprehensive groundwater monitoring program for site cleanup. We request that this alternative interpretation be noted in the AROD.

**RAOs and Cleanup goals**

• We recommend that the AROD reflect that a critical remedial action objective is to create *a stable and shrinking plume such that cleanup target levels for groundwater are ultimately met at Points of Compliance at the source control or institutional control boundary consistent with federal and state regulations and requirements, respectively.* (not simply to prevent further plume migration, particularly where the groundwater contaminant plume has migrated off the Koppers facility property)

• We are pleased to see that the proposed plan reflects use of Chapter 62-777 default SCTLs both on the Koppers facility where commercial default SCTLs are proposed and offsite where either residential or commercial default SCTLs may be applied based on corresponding land use and the willingness of the property owner to implement an institutional control (restrictive covenant).

• We also support the proposed plan's use of default SCTL leachability criteria to address leachable vadose zone soils located outside of the proposed containment area. As previous stated by DEP, site specific leachability criteria may be developed during design if desired and consistent with Chapter 62-780.

• DEP recommends that the AROD identify both the numeric direct contact and default leachability SCTL criteria and state that the more stringent of the two criteria apply to vadose zone soils. It will be easier to ascertain the basis for the cleanup goals and will allow more obvious adjustments to those goals if site specific leachability criteria are developed.

• EPA recently issued caveat approval for the May 26, 2010 Human Health Risk Assessment (HHRA) for onsite soils and sediments noting that the probabilistic components of the risk assessment and specific tables or figures were not approved. It appears that the proposed plan may allow the use of a risk assessment on offsite properties based on more property-specific land uses. As discussed in 28, 2010 correspondence, it is unlikely that an appropriately constructed probabilistic risk assessment to evaluate the *offsite* soil contaminant levels would result in offsite soil cleanup goals significantly different from Chapter 62-777 default SCTLs for unrestricted, residential use. DEP does not support the use of assumptions or variables inconsistent with State or federal regulations or guidelines outside of accepted industry practices. Use of such assumptions/variables in a probabilistic risk assessment for the development of cleanup goals and/ or the re-assessment of risk under a future proposed land use/ redevelopment plan would also not be supported by DEP, as discussed in DEP's previous HHRA review comments.
• Our review of the proposed plan indicates that Table 1 has incorporated the list of groundwater and onsite/ offsite soil contaminants previously identified by DEP as contaminants of concern (COCs). As noted in previous comments, groundwater COCs should include all constituents where GCTL exceedances have been observed, even if those compounds have not shown a violation at the Koppers property boundary. Acknowledging the difference between the federal MCL and State GCTL for benzene, the Amended ROD should be clear how each of these will be applied. We understand that EPA will apply the federal MCLs immediately outside the source containment area whereas the State GCTLs will apply at points of compliance at the institutional control boundary consistent with Chapter 62-780, risk management option III. We will be happy to review the final list of COCs in the AROD prior to EPA signature to confirm that the COCs are comprehensive and corresponding numeric criteria are consistent with Chapter 62-777.
• Table 1 cleanup goals for offsite soils and sediments is confusing, however, particularly for sediments and appears to have omitted contaminants that were observed in creek sediments as reported in the ACEPD Sediment Quality Study Report on Springstead and Hogtown Creeks (August 2009). Sediment COCs and corresponding cleanup criteria should include both Chapter 62-777 default SCTLs for direct contact and Sediment Quality Assessment Guidelines (SQAGs) for cPAHs (BaP-TEQ), P AHs and dioxin, for protection of both public health and the environment. Leaching of sediment contamination to surface water may also be an issue based on the comparison of P AH concentrations in sediments to Chapter 62- 777default SCTL leachability criteria for the protection of surface water. Default leaching criteria should also be reflected in the table. Site specific sediment leachability criteria may also be developed during design. As commented previously, we recommend use of the EPA Region 4 Hazmat Ecological Screening Value of 2.5 ng/kg for dioxin.
• EP A has proposed a sediment removal based on the Probable Effect Concentration (PEC) criteria followed by monitored natural recovery to address remaining impacted sediments above threshold effects concentrations (TEC) criteria. Dioxin exceeding the recommended EPA screening value above should be addressed by the removal action. Superfund Five Year Reviews should include evaluation of the progress and effectiveness

of monitored natural recovery in reducing PAH concentrations to the TEC and SCTL remedial goals.

• Please see enclosed comments from University of Florida including summary tables of Chapter 62-777 numeric cleanup goals for site related contaminants for groundwater, soils and sediments.

• Containment and treatment of DNAPL (including residual DNAPL) and other leachable source areas is a critical component of this site remedy and the goal to mitigate continued contamination of the underlying Floridan Aquifer as well as address offsite contaminant migration in the Hawthorn and future compliance with property boundary POCs in all aquifers. Based on previous discussions amongst EPA, DEP and stakeholders regarding criteria that could be used to delineate the lateral extent of the these DNAPL source areas, we understand that delineation will be based on a combination of visual DNAPL confirmation, olfactory evidence and groundwater concentration data obtained from borings into the surficial and upper Hawthorn formations. EPA guidance indicates that groundwater contaminant concentrations approaching 10% solubility (of naphthalene for example) could also be used to infer the likely presence of nearby DNAPL or principal threat waste requiring remediation. We recommend that the AROD identify the criteria by which DNAPL and DNAPL sources will be identified for treatment and/ or containment, so that this does not continue to be a point of debate during design and construction.

**EPA's Preferred remedy**

• The proposed plan refers to a "low permeability cover" over the containment area. DEP supports the proposed slurry (barrier) wall around all 4 source areas extending to the Hawthorn middle clay (approx 65' bls), with an *impermeable cover* (vertical hydraulic conductivity of 10E-06 cm/ sec) over the entire slurry wall enclosure including DNAPL source areas and other consolidated leachable materials, along with treatment of the DNAPL source areas. This impermeable cover will require less rigorous water level control due to less percolation and further discourage vertical migration of contaminants in response to hydraulic head differences.

• DEP is pleased to see that EPA has proposed the use of *Insitu Solidification/Stabilization (ISSS)* treatment to address Upper Hawthorn DNAPL source areas, along with the slurry wall (to the middle clay) to contain the more highly contaminated onsite groundwater and source material. ISSS has a proven track record at similar sites with this magnitude and type of contamination; and would not be hampered by the potential issues of chemical deliverability, consistent distribution, long term performance and reliability (rebound) that have been experienced by the insitu biogeochemical stabilization technology being considered for the site. (see discussion below). ISSS has been shown to effectively reduce permeability of the contaminated zone, immobilize contaminants and mitigate leachability of the source material. While acknowledging the higher cost associated with this technology, we believe the confidence that it affords makes it appropriate for this large and hydro-geologically challenging site. We recommend that the AROD include ISSS performance criteria including permeability ($10^{-7}$), unconfined compressive strength (50 psi), and short term and long term leachability (SPLP and modified ANS 16.1) and require performance testing during design to ensure the ISSS formulation will meet these criteria.

• EPA's preferred remedy also includes *Insitu Biogeochemical Stabilization (ISBS)* to address DNAPL source areas in the surficial aquifer, with a contingent ISSS remedy if ISBS performance criteria cannot be met during design phase pilot testing. DEP remains concerned about the use of the ISBS technology at this site and recommends that ISSS be utilized in the surficial aquifer to address DNAPL source areas, not ISBS. It is essential that the selected remedy include effective treatment technology(s) to address the 4 DNAPL source areas in the surficial and Upper Hawthorn, to mitigate ongoing sources of groundwater contamination and to minimize vertical mass flux and migration of DNAPL through the surficial and Hawthorn that is contributing to the observed Floridan Aquifer contamination. DEP concerns regarding results of the previous Koppers pilot and use of ISBS were discussed in the June 2010 FS comments. More recent discussions with EPA, ACEPD, GRU and their DNAPL team along with consultation with EP A- Ada, Oklahoma have illustrated the difficulty in designing a pilot study including corresponding short term and long term performance criteria that would provide representative and definitive results to support conclusions regarding its use and long term effectiveness at this particular site. Even with improved delivery and distribution within the source zone, the observed rebound of groundwater contaminant concentrations at the Borden site after 4 years underscores the issue of long term effectiveness and the likely need for re-treatment. Confirmation of effective mitigation of vertical flux/ contaminant migration into the Hawthorn could not likely be demonstrated in the short term. In fact, recent discussions have indicated that to obtain reliable and conclusive data regarding long term performance, the Koppers ISBS pilot study should be conducted over a period of at least 4 years. Implementation of a reliable site remedy should be accomplished as timely as possible. Use of ISSS in both the surficial and Upper Hawthorn would allow a more timely and reliable remedy to be implemented. As previously communicated by DEP, however, if EP A elects to continue with the ISBS pilot/ remedy as proposed, additional more rigorous pilot testing and evaluation based on specific performance criteria should be required to demonstrate that this technology could successfully be applied with reliable short and long term results. These short and long term performance criteria for the design pilot along with associated testing should be specified in the AROD.

**We recommend that they generally reflect the following: ISBS Performance goals-**

1) Consistent and controlled delivery and distribution of ISBS throughout the designated treatment area in the surficial aquifer source zone with corresponding reduction in permeability and encapsulation of DNAPL.
2) Pronounced reduction in groundwater contaminant concentrations/DNAPL and reduction in mass flux both laterally and vertically.
3) Demonstrated longevity and stability of stabilized matrix, with no rebound.
4) Compliance with UIC requirements in Chapter 62-524 and applicable variance.

Basis for ISBS performance evaluation-

1) Monitoring network of appropriately located wells in the surficial and Hawthorn to evaluate compliance with UIC and effective control of distribution of ISBS injectate.

2) Soil cores collected pre and post injection within treatment area to demonstrate thorough and consistent sweep and reduced permeability /leachability (based on pre and post injection lab analysis including modified ANSI 16.1).
3) Pre and post treatment slug tests and monitoring of water levels/hydraulic gradients in monitoring wells/piezometers and downgradient recovery wells to document attainment of anticipated changes in hydraulic conductivity /permeability in treatment areas and downgradient.
4) Use of PFMs (flux meters) and low pump-induced flow within treatment area to confirm reduction in mass flux, as recommended by EPA-Ada, OK.
5) Appropriately located monitoring wells in surficial, UHG and LHG, and Floridan. Pre and post-injection well sampling to confirm reductions in DNAPL recovery and consistent reductions in groundwater concentrations with no rebound. Further details of the ISBS pilot test and specific short term and long term goals should be fleshed out prior to implementation of the pilot during remedial design. We agree that if EPA elects to move ahead with the pilot, a larger test area in one or more source areas should be utilized to better represent the performance of ISBS. We are reluctant to support a large or full scale pilot in the process area. There is only limited assessment and understanding of contaminant distribution in that area, it is close to the property boundary, and there are inadequate deeper monitoring wells in the Hawthorn to support performance evaluation. We recommend that pilot studies be conducted in the North Lagoon and */or* South Lagoon. Also, please note that as EPA has proposed delivery of ISBS through the large diameter augers during full scale implementation of
ISSS, the ISBS pilot should simulate similar delivery conditions.

• *Hawthorn groundwater contamination.* We understand that the proposed remedy will include 1) continued bailing of onsite Upper Hawthorn wells within the containment area that do not require P&A (due to their proximity to the insitu ISSS DNAPL source remedy), 2) insitu chemox (ISCO) or ISBS treatment using existing onsite Lower Hawthorn wells in all 4 source areas and along the eastern property boundary, and 3) *contingent* insitu treatment of contaminated groundwater in existing Hawthorn wells if monitoring indicates that concentrations are above GCTLs and increasing or begin to be detected above GCTLs in previously clean sentinel wells.

We believe that the #3 *contingent* insitu treatment above refers to the area immediately east of the Koppers property site and outside the slurry wall / containment area. Offsite Hawthorn wells located east and northeast of the Koppers property and outside of the proposed slurry wall have shown concentrations significantly above GCTLs and at levels that infer DNAPL (principal threat wastes) in the area, particularly in the Upper Hawthorn. MNA is the primary proposed offsite groundwater remedy for remediation of groundwater outside of the IC boundary to GCTLs. It is unlikely that MNA will be successful without treatment in the more highly contaminated offsite areas. DEP recommends that the AROD require insitu treatment in the Upper or Lower Hawthorn offsite where concentrations indicate principal threat wastes or are above Chapter 62-777 Natural Attenuation Default Criteria (NADCs) rather than waiting for increases in current concentrations to trigger treatment as proposed. Chapter 62-780 allows the evaluation and development of triggers with higher concentrations than NADCs if an MNA evaluation indicates that those higher action levels are also effective in supporting MNA. We understand that active remedial technologies are limited for this low permeability formation and that use of ISCO or ISBS is the most feasible approach to address the less accessible DNAPL or elevated groundwater concentrations. DEP recommends the use of ISCO to reduce groundwater contaminant concentrations in these areas. It may be appropriate to consider other oxidants besides permanganate if clogging of the aquifer and injection well is a concern. Please note that UIC requires dedicated wells for insitu injection and (separate wells) for performance monitoring and compliance. We are concerned that Lower Hawthorn impacts in the area of the North Lagoon may be more extensive than are now known and that the above approach may not be adequate to mitigate vertical migration into the Floridan in this area. We have no suggestions at this time but urge EPA to require adequate assessment and evaluation of DNAPL contamination in this area during design.

• We remain concerned that there are inadequately assessed areas northwest of the North Lagoon source area and in the northern area of the site which may require expansion of the slurry wall area, more extensive DNAPL source treatment or more extensive vadose zone source removal not contemplated in the current FS. Assessment and delineation of these potential source areas must be conducted during remedial design to ensure the comprehensiveness, effectiveness and protectiveness of the containment/ source treatment remedy in these areas.

• *Floridan Plume containment-* As discussed in the revised FS, Floridan aquifer groundwater recovery has been initiated FW-6 and FW-21B as an interim measure to address groundwater exceedances near and upgradient of POC well FW-16B and to mitigate any leakage along the well bore(s). FW-31B was also recently installed as a recovery well to capture groundwater contamination exceeding GCTLs observed in point of compliance (POC) well FW-22B. Monitoring and triggers for initiation of groundwater recovery to address observed or pending POC exceedances in the Floridan have been outlined in the FS. We understand they will be reflected in the Amended ROD and remedial design. DEP anticipates that once the AROD is signed, these formal triggers will go into effect, including evaluation of the effectiveness of FW-21B in pulling back contaminated groundwater in order for POC FW-16B to meet groundwater cleanup target levels.

**Off site soil remedy**

Delineation of contaminated soils is ongoing west of Koppers. Soil sampling has also been initiated south and east of Koppers to determine if site related contamination exists in those areas. Regardless of the current land use offsite, lateral and vertical *delineation* should be to unrestricted use SCTLs. We strongly request that EPA and Beazer proceed as expeditiously as possible in delineation and remediation of offsite soils.

**Sediment remedy**

We understand that Cabot will be conducting a removal to address visually tarry sediments as an interim action. The proposal does not include all areas where dioxin contamination has been observed above recommended criteria. Confirmatory sampling will be necessary subsequent to this removal to determine what additional action is necessary to address remaining sediments exceeding final cleanup goals.

Additional Design Activities-

DEP recommends that the AROD clearly identify additional assessment or treatability testing that will be required during remedial design to support design and implementation of a protective and effective remedy. We support the proposed monitoring well locations recommended by the City and County in their recent Proposed Plan review comments. We recommend that remedial design activities include the following:

1) Delineation of offsite Hawthorn groundwater contamination and installation of temporary point of compliance wells at the leading edge of the plume where GCTLs are met.

2) Installation of offsite TPOC wells to delineate and monitor effectiveness of surficial aquifer groundwater remedy.

3) Installation of onsite Lower Hawthorn well(s) at or immediately downgradient of the South Lagoon and Process area source areas.

4) If selected, pilot testing to determine the ability of ISBS to meet performance criteria and its long term effectiveness in mitigating surficial aquifer DNAPL sources and vertical contaminant migration.

5) Treatability testing for development of the ISSS formulation for insitu treatment of DNAPL source areas.

6) Compatibility testing and formulation of the slurry wall composition for compatibility with onsite contaminated groundwater.

7) Development and implementation of a dust monitoring program to ensure that dust leaving the Koppers property does not contain contaminants at concentrations that would pose a health risk.

8) Evaluation of effectiveness of Floridan IRM groundwater recovery at FW 21-B and the need for a dedicated recovery well to ensure GCTL compliance at FW 16B.

9) Installation of additional Floridan monitoring wells to monitor onsite plume behavior, compliance at the IC boundary and/ or provide offsite delineation. This includes a) an onsite upper Floridan "transect" well b) an offsite well downgradient of FW-16B; c) Floridan well east of the process area.

10) Additional assessment and source delineation in the areas northwest of the North Lagoon source area and in the northern area of the site which may require expansion of the slurry wall area, more extensive DNAPL source treatment or more extensive vadose zone source removal not contemplated in the current FS. This is evidenced by the increasing groundwater contaminant concentrations with depth in North Lagoon area; Floridan aquifer groundwater contamination in FW-22B near the NW property boundary; significant soil contaminant levels more recently identified in the Northern Inactive Area along with aerial photo information suggesting drums, dumping or waste disposal in that area; and detections of site related phenolics and PCP daughter products in Hawthorn monitoring wells located offsite to the northeast.

11) Delineation of DNAPL source areas and identification of bounds for insitu treatment and slurry wall.

We appreciate the opportunity to comment on the proposed plan. We are available to discuss these comments or other areas of proposed remedy prior to finalization of the Amended ROD at your convenience.

Sincerely,

Kelsey A. Helton
Bureau of Waste Cleanup
Hazardous Waste Cleanup Section

# Beazer

**BEAZER EAST, INC.** C/O THREE RIVERS MANAGEMENT, INC.
ONE OXFORD CENTRE, SUITE 3000, PITTSBURGH, PA 15219-6401

October 15, 2010

Mr. Scott Miller
Remedial Project Manager
Superfund Division
Superfund Remedial Branch
Section C
U.S. EPA Region 4
61 Forsyth Street, SW
Atlanta, GA 30303

**Re: Transmittal of Comments**
**July 15, 2010 USEPA Proposed Plan**
**Cabot Carbon/Koppers Superfund Site, Gainesville Florida**

Dear Mr. Miller:

Beazer East Inc. ("Beazer") appreciates the opportunity to provide its comments on the above referenced document. Beazer requests that its comments be carefully reviewed and considered, and that the comments be placed in the administrative record for the Site.

As you are aware, Beazer has extensive experience in the environmental remediation of former wood treatment sites. For this site, Beazer has retained an extremely well qualified group of technical consultants and experts to work on the various aspects of this site. For reference, I have attached the resumes of the consultants and experts who have been involved in the most recent feasibility studies, risk assessments, and remedy selection discussions. Collectively, this group has hundreds of years of environmental experience, much of which has been related specifically to the remediation of wood treatment sites.

Also, Beazer has developed, in cooperation with and approval by USEPA and FDEP, an extensive amount of site specific data and information upon which the current selection of a remedial action at the site can be based. As an illustrative example of the site specific data developed, I have attached a recent site figure which shows the current array of groundwater monitoring points available at the site. Since 2003, Beazer has invested over $20 million dollars developing this data and information. The development of this site specific data and information allows for an informed and educated decision to be made at the site relative to the prospective remedy.

Furthermore, Beazer believes that this information enables it to understand and appreciate the complex nature of this site. The remedy components selected for the site must fit together synergistically to ensure that true risk reduction is actually effectuated and that future risks are mitigated. As provided in the attached comments, Beazer has some significant reservations about individual aspects of the Proposed Plan, and where appropriate has recommended suitable alternatives. That being said, Beazer remains committed to the implementation of a protective remedy, one which relies upon containment, isolation, treatment and long term monitoring, and is appropriate for the conditions existing at the site.

Finally, Beazer understands the local stakeholders' frustration with the time this process has taken, and their desire to have the site remediation simply be finished. Beazer also wants to get to the end of the project as expeditiously as is reasonably possible. However, there is no simple solution to the puzzle presented by conditions at the site. The data collected from the site documents its complex nature and the need for a sophisticated, long term approach. Beazer, through its efforts, has demonstrated that it is fully committed to resolving environmental matters at this site and that it remains fully committed to a remedial approach that will support its and the community's efforts to restore the site to a position where it may once again, become a positive attribute of the surrounding community.

Again, thank you for your full consideration to our comments, and if I can be of further assistance or answer additional questions, please do not hesitate to contact me.

Sincerely,

Robert Markwell
President, Beazer East, Inc.

Cc: Lisa Jackson, USEPA Administrator
Gwendolyn Keyes Fleming, USEPA Region IV Administrator
Stanley Meiburg, USEPA Region IV Deputy Administrator
Kelsey Helton, FDEP
Senator Bill Nelson
Congressman Cliff Stearns
Congresswomen Corrine Brown
Congressman Alan Grayson
Gainesville City Commission
Craig Lowe, Mayor City of Gainesville
Alachua County Board of Commissioners
Cynthia Moore Chestnut, Chair Alachua County Commissioners
Randal Reid, Alachua County Manager
Russ Blackburn Gainesville City Manger
Fred Murray Gainesville Assistant City Manger
Marion Radson Gainesville City Attorney
Dave Wagner Alachua County Attorney
Chris Bird Alachua County Environmental Protection Director
Bob Hunzinger, General Manger GRU

Beazer East, Inc. (Beazer) hereby submits its comments to the Superfund Proposed Plan (Proposed Plan) for the former Koppers portion (Site) of the Cabot Carbon/Koppers Superfund Site (Superfund Site)[1] issued on July 15, 2010 by the United States Environmental Protection Agency (EPA). The deadline for comments to the Proposed Plan was extended to October 15, 2010.

As set forth below, Beazer has both legal and technical concerns with the Proposed Plan. On the technical side, Beazer's primary concerns with the Proposed Plan are in the following areas:

- The implementation of source treatment components (ISS/S and ISBS)
- The proposed remedies for off-Site creek sediments and soils
- EPA's selection of cleanup goals and related criteria

Beazer's legal concerns are primarily with the various off-Site components of the Proposed Plan, and, to a lesser degree, with EPA's communications to the public that may have had the unintended effect of creating the impression that the foreseeable future use of the Site may include an "unrestricted residential" component. In sum, the EPA's selection of remedial alternatives for off-Site sediments is arbitrary and capricious because EPA has not developed the information it is required to evaluate under the Remedial Investigation/Feasibility Study (RI/FS) process set out in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 CFR Part 300, nor has EPA appropriately evaluated such information. EPA should also reconsider its selection of Florida's default residential Soils Cleanup Target Levels (SCTLs) as off-Site cleanup standards in consideration of Beazer's recently-submitted "Derivation Of Off-Site Site-Specific Residential SCTLs" document. Finally, while Beazer continues to cooperate with EPA and the local governments regarding potential future uses of the Site, Beazer has not agreed to conduct a cleanup to "unrestricted residential" standards, and EPA should clarify its recent communications by more explicitly stating that the foreseeable future use of the Site future does not include an unrestricted residential component. Beazer's legal comments are included below in the sections discussing the technical components of the Proposed Plan to which the legal comments pertain.

The details of Beazer's concerns with the Proposed Plan, along with alternative proposals where appropriate, are presented in the following sections.

# 1. Implementation of Source Treatment: ISS/S and ISBS

The prescribed treatment of source areas in the Proposed Plan is flawed. The Proposed Plan calls for in-situ solidification/stabilization (ISS/S) in the Upper Hawthorn (approximately 25 feet to 65 feet below ground surface (bgs)) and in-situ biogeochemical stabilization (ISBS) in the Surficial Aquifer (approximately 0 to 25 feet bgs). This configuration for source treatment is impractical and has important and unnecessary implementation risks. Also, this configuration is not contemplated in any of the FS Alternatives, was not properly evaluated as an alternative source-treatment remedy, and should not have been listed as the preferred source-treatment design.

[1] "Site" as used herein refers to the Koppers portion of the Superfund Site. "Superfund Site" is used to refer to the entire Cabot Carbon/Koppers Superfund Site.

As detailed below, the Proposed Plan's application of ISBS *above* ISS/S is impractical and it appears that EPA did not fully understand the implications or likely cost of such an application. Implementation risks associated with ISS/S in the Upper Hawthorn, and the availability of a more practical treatment technology, should lead EPA to reconsider the source treatment approach. Beazer proposes an alternative source treatment approach that is consistent with the overall remedial strategy and includes effectiveness demonstration for ISBS with an ISS/S implementation component as a contingency.

In considering the appropriate source treatment approach, it is important to recognize that in this instance (1) source treatment is applied primarily for the purpose of reducing potential dense non-aqueous phase liquid (DNAPL) mobility and (2) source treatment is applied within a robust containment system. The robust groundwater containment system described in the Proposed Plan effectuates protection of human health and the environment by eliminating migration pathways from the sources. The engineered containment system includes (1) a subsurface vertical barrier wall around the primary source areas to a depth of approximately 65 ft, (2) a low-permeability surface cover to limit water infiltration into the containment area, and (3) additional hydraulic containment specified for the UFA and for the Surficial Aquifer outside the containment area that provides an added measure of protection. In addition, the existing clay layers of the Hawthorn Group are significant hydraulic barriers, as evidenced by the 125-foot hydraulic head difference between the Upper Hawthorn and Upper Floridan Aquifer (UFA).

### a. Application of ISS/S in the Upper Hawthorn Has Serious Implementation Risks

In order to implement ISS/S in the Upper Hawthorn in primary source areas, a large-diameter auger (LDA) would be used to make <u>thousands</u> of 6- to 10-ft diameter mixing holes approximately 65 ft deep. Each LDA borehole would be required to pass through the upper clay layer of the Hawthorn Group. This application has the potential to drag down any mobile DNAPL that is presently trapped in the Surficial Aquifer or within and on top of the upper clay layer of the Hawthorn Group. In addition, each LDA borehole could also cause vertical pathways or conduits for the downward migration of any mobile DNAPL, especially along the outer perimeter of the borehole.

While the upper clay of the Hawthorn Group is not a perfect impermeable barrier, it does provide some natural protection against DNAPL mobility in two important ways. First, this layer provides hydraulic resistance, as evidenced by the approximately 1- to 2-foot groundwater head difference measured between the Surficial Aquifer and the Upper Hawthorn in the primary source areas. Second, DNAPL collects on top of low-permeability materials and can become trapped within the pore spaces of fine-grained materials such as clays. The protective qualities of the upper clay would be significantly compromised, and likely eliminated, by application of LDA mixing into the Upper Hawthorn.

### b. ISBS Has Technical Advantages over ISS/S

On-Site pilot testing has demonstrated that ISBS is an effective technology for treatment of Site-related constituents. ISBS treatment results in (1) immobilization of DNAPL, (2) prevention of dissolution into groundwater, and (3) some removal of contaminant mass via chemical oxidation. This innovative technology has been successfully deployed at other sites and has resulted in demonstrable reduction in the mobility of DNAPL and DNAPL constituents. In the FS, all alternatives that involve the application of ISBS as a treatment technology include a redundant barrier-wall containment system and hydraulic containment in the UFA. ISBS provides source-area treatment, but is not critical to the elimination of groundwater-migration pathways. Rather, ISBS is a good fit in an overall containment/treatment remedial strategy and compliments the other selected technologies.

Other advantages of ISBS, as compared to ISS/S include:

- ISBS is more easily implemented and achieves greater volumetric coverage with fewer and smaller borings (2- to 4-inch diameter).
- With ISBS, there is a much lower risk of moving significant quantities of DNAPL downward during implementation.
- ISBS can be reapplied if necessary, or ISS/S can be applied later if ISBS is not effective.
- The ISBS reagent will follow preferential pathways, in effect "chasing" DNAPL to provide targeted treatment where the DNAPL resides.
- Unlike ISS/S, ISBS results in some removal of constituent mass through chemical oxidation.
- ISBS generates relatively little waste soil that must be treated and/or disposed of.
- ISBS can be applied in a targeted fashion (areas and depths where impacts are observed) resulting in less wasted effort in horizons that are not impacted (e.g. impacted horizons within the Upper Hawthorn).
- ISBS is more easily applied through former building foundations and subsurface obstructions (e.g. in Former Process Area) than is ISS/S, and will achieve better coverage in such areas.
- ISBS is much more cost effective than ISS/S (cost per cubic yard treated).
- ISBS is much less resource intensive than ISS/S in terms of energy use, carbon footprint, and water use (consistent with EPA's Superfund Green Remediation Strategy).

Both ISBS and ISS/S are active (aggressive) technologies rather than passive technologies. Challenges with effectiveness demonstration (e.g., measurement of mass flux) are not substantially different between ISS/S and ISBS.

Sufficient testing has been performed with ISBS to show that it will likely be effective at the Site. Beazer proposes to further demonstrate ISBS effectiveness at the Site through a full-scale demonstration.

**c. The EPA's Selected Source-Treatment Remedy in the Proposed Plan Is Not Practical**

When creating the 65-feet deep LDA boreholes specified in the Proposed Plan, and effectuating the column mixing (homogenization with a reagent), it is not feasible to mix only the lower portion of the columns. It is also not practical or advantageous to use two different stabilizing reagents (which also act as auger lubricants) for every column. Beazer has discussed this with two experienced LDA contractors and is convinced that such a deployment is infeasible or at least highly impractical. Based on the discussions at a technical meeting in Tallahassee on September 23, 2010, EPA's consulting contractor agrees.

Simply stated, it is not practical to apply ISBS (which is designed for injection, not LDA mixing) *above* ISS/S.

### d. The EPA Has Severely Underestimated the Costs of Its Proposed ISS/S-Based Remedy

The driving cost in ISS/S source treatment is the LDA mixing cost which is roughly proportional to the volume of soil mixed. The volume of soil that would be mixed by LDA into the Upper Hawthorn (per the Proposed Plan) can be calculated as the total area of the primary source areas (approximately 5 acres) times the mixing depth (approximately 65 ft): the result is over half a million cubic yards.

Though details are not provided, it is obvious that the Proposed Plan dramatically underestimates the volume of soil that would be mixed and, therefore, dramatically underestimates the overall net-present-value (NPV) cost of the full remedy. Apparently, the cost estimate in the Proposed Plan did not consider the soil in the Surficial Aquifer (from 0 to 25 ft) as soil to be mixed but, rather, used only the thickness of the Upper Hawthorn (or a part of that thickness) in deriving the volume to be mixed. However, as described above, and as acknowledged by EPA's own consulting contractor, it is impossible to mix a deep interval of soil using LDA without also mixing the soil above it.

The July 15, 2010, Proposed Plan estimates that the on-Site remedy will cost $43.7 million (NPV). Less than one month later, at a public meeting on August 5, 2010, EPA inexplicably presented a revised NPV cost estimate for the on-Site remedy that was nearly 50% greater: $65 million for the same remedy. In neither case were details of these cost estimates provided. The FS presents an NPV cost estimate of $75 million for Alternative OnR-5F, which – although not the same – is most similar to the Proposed Plan on-Site remedy. One of the appendices to the FS details this cost estimate. Based on subsequent conversations with potential contractors, Beazer contends that the Proposed Plan's on-Site remedy is likely to cost at least $75 million (NPV).

It is also important to note that over 78% of the construction costs for the Proposed Plan on-Site remedy are for application of the ISS/S with LDA soil mixing (based on the estimate worksheet in the FS). In Beazer's view it is not sensible to spend over three-quarters of the direct capital cost on an imperfect source-treatment component that is deployed within a robust containment system. It is the containment system (barrier wall, low-permeability cover, natural Hawthorn Group clay layers, and hydraulic containment) that reduces potential risks to human and ecological receptors. While source treatment is important for any CERCLA cleanup, putting the vast majority of the remediation dollars toward ISS/S at this Site does not make sense, particularly when there would be no measurable reduction in risk as a result of the significant increased expenditure on ISS/S application relative to the simpler ISBS technology which also achieves DNAPL stabilization.

### e. Beazer Proposes an Effective ISBS Approach with ISS/S as a Contingency

For the reasons identified above, the selected remedy in the ROD should specify ISBS source treatment after additional effectiveness demonstration. Beazer proposes to conduct a full-scale demonstration of ISBS in one of the source areas early in the remedial design period. If ISBS proves to be ineffective, ISS/S would be implemented at all source areas.

Logistically, it would make sense to apply ISBS in the Surficial Aquifer and Upper Hawthorn (like FS Alternative OnR-5E) at the Former Process Area as a full-scale demonstration of the technology. This could be done during the remedial design time period while other components of the remedy are designed. Because the Former Process Area has many underground obstructions (former foundations, pipes, etc.), ISS/S – with its large diameter boreholes – would be very difficult to apply in this area. Also, DNAPL has been collected (in small amounts) from both the Surficial Aquifer and Upper Hawthorn in the Former Process Area, meaning that DNAPL mobility reduction could be observed and documented in a full-scale demonstration. Impacts are not observed in the UFA near the Former Process Area. ISBS treatment in the Former Process Area will likely result in decreased flow of DNAPL to DNAPL-collection wells and the formation of stable-mineral crusts on DNAPL globules. The results of an ISBS demonstration in the Former Process Area could be monitored over a period of many months to determine likelihood of long-term effectiveness and suitability of use in the other source areas.

For the Former North Lagoon and Former Drip Track, the source treatment should also be ISBS in the Surficial Aquifer and in the Upper Hawthorn (like FS Alternative OnR-5E). ISBS should be applied in the Surficial Aquifer only at the Former South Lagoon (like FS Alternative OnR-5C) because this area has less observed DNAPL impacts than the other three source areas and there are no nearby impacts in the UFA.

In sum, ISBS should be the primary source-treatment component and ISS/S should be a contingent action to be applied if ISBS proves to be ineffective.

## 2. EPA's Selection of Off-Site Remedies Was Not Consistent with the NCP

The selected remedies for off-Site sediments in Springstead Creek and Hogtown Creek (the "Creeks') should not have been part of the Proposed Plan and should not be part of the forthcoming ROD amendment. The proposed remedies for the Creeks in the Proposed Plan are not based on any evaluation of alternatives, as required by CERCLA and the NCP. Moreover, most of the impacts in the Creeks are not solely or even primarily attributable to Beazer or to activities at or on the Koppers portion of the Superfund Site. In addition, the cleanup criteria that are identified in the Proposed Plan are inappropriate. Further discussion regarding each of these shortcomings is provided below.

### a. Selection of the Off-Site Sediment Remedy Was Not Vetted Through the NCP's RI/FS Process and Was Arbitrary and Capricious

In its proposed selection of off-Site sediment remedies for the Creeks, EPA failed to comply with the requirements of the NCP that require EPA to first identify and evaluate alternatives before proposing one of those alternatives as the preferred remedy. Indeed, with respect to EPA's proposed off-Site sediment remedies in the Creeks, EPA neglected identify or evaluate the selected remedies prior to issuance of the Proposed Plan.

For the first time in the Proposed Plan, EPA proposed remedies for off-site sediment remediation that were never evaluated in the FS ("Excavation and removal of impacted sediment in excess of the probable effects concentrations") as well as remedies for which costs were never considered ("Accurate cost estimation of the removal component of OfR-2 and OfR-4 depends on . . . significant unknowns."). These flaws are not overcome by the issuance of "clarification and additional information about off-Site soil activities" in the Follow-up Off-Site Soil Remedy Fact Sheet. That document still neglects to provide cost estimates for the proposed off-Site sediment remedy and still fails to provide detailed analyses of off-Site sediment alternatives, both of which are necessary for remedy selection, as required by the NCP. Neither the Feasibility Study nor the Proposed Plan can form a legitimate basis for a ROD amendment for the proposed off-Site sediment remedy. Until these deficiencies are remedied through the RI/FS process, the forthcoming ROD Amendment should not include any off-Site sediment remedy.

CERCLA requires EPA to select remedial actions in accordance with the NCP and to provide for a cost-effective remedy. *See* 42 U.S.C. §§ 9604(a)(1), 9604(a)(4), 9621(a), and 9622(a). CERCLA § 113(j)(2) provides that courts shall uphold [EPA's] decision unless the objecting party can demonstrate, on the administrative record, that the decision was arbitrary and capricious." 42 U.S.C. §9613(j)(2).

Where EPA action is not consistent with the NCP, courts have held that such action is arbitrary and capricious. *United States v. Burlington Northern Railroad Co.*, 200 F.3d 679, 694 (10th Cir. 1999) (holding that EPA acted arbitrarily and capriciously when it fundamentally altered a remedy with respect to scope and cost without following the NCP's required procedures for proposed amendments regarding cost, and noting that the "failure resulted in excluding the public and Potentially Responsible Parties . . . from the decision-making process, in violation of the [NCP]."); *Washington State Department of Transportation v. Washington Natural Gas Co.*, 59 F.3d 793, 802 (9th Cir. 1995) (noting that the NCP guides federal and state response activities and that such parties must follow the "detailed process set forth in the NCP" to recover their costs.)

Here, the Proposed Plan improperly selected a remedy for off-site remediation of sediments that was entirely missing from the Feasibility Study: excavation and removal of impacted sediment in excess of the probable effects concentrations. This remedy selection is inconsistent with the NCP because EPA did not "evaluate alternatives to the extent necessary to select a remedy," which is the very purpose of the RI/FS process. 40 C.F.R. §300.430(a)(2). According to the NCP, such an evaluation includes project scoping, data collection, risk assessment, treatability studies, and analysis of alternatives. *Id.* EPA's selection of sediment excavation and replacement in Hogtown and Springstead Creeks failed to consider, implement or incorporate any of these NCP requirements. And EPA's selection process was equally deficient in its failure to adhere to the NCP's required levels of public involvement in the decision-making process. 40 C.F.R. §300.430(c).

EPA's own guidance undermines the approach followed here. In 2005, EPA issued guidance documents that explained the investigation issues unique to sediment environments and the importance of developing clearly defined remediation goals based on site-specific data. *Contaminated Sediment Remediation Guidance for Hazardous Waste Sites* (2005) (Sediment Remediation Guidance). In particular, an excavation alternative "should include an evaluation of all phases of the project, including removal, staging, dewatering, water treatment, sediment transport, and sediment treatment, reuse, or disposal." Sediment Remediation Guidance (p. iv). None of these project phases were detailed, analyzed or evaluated by EPA in connection with the Proposed Plan.

Chapter 7 of EPA's Sediment Remediation Guidance discusses the risk management decision-making process and the NCP's remedy selection framework. The Guidance states that "it may be appropriate to postpone a final decision if there is significant doubt about the proposed action's ability to reduce site risks substantially in light of the *potential magnitude of costs* associated with addressing certain sediment sites." Sediment Guidance 7-1 (emphasis added). Here, neither EPA, the public, nor Beazer properly can evaluate sediment remediation alternatives because no alternative has been presented for review and no costs have been estimated. A review of the administrative record indicates that EPA has not recognized the potential need for specialized equipment, the increased truck traffic for transport of dredged material, the impact of dredging and replacement to workers and the community, or the disruption to local residents and businesses that would occur during excavation and replacement of sediments in the off-site Creeks.

EPA's Proposed Plan is deficient because the off-site remedy selections do not reflect that the NCP's nine criteria formed the basis for the remedy selection decisions. In the complete absence of any evaluation of sediment remediation in the FS or Proposed Plan, EPA's off-site remedy selection is not consistent with the NCP, is arbitrary and capricious, and cannot form the basis for a Record of Decision.

**b. Impacts in the Creeks Are Not Attributable Solely to Beazer or the Koppers Portion of the Superfund Site**

As evidenced by the work in the Creeks being performed by Cabot Corporation (Cabot) pursuant to, *inter alia*, Cabot's EPA-approved "TAR REMOVAL WORK PLAN" dated October 19, 2009, and "POLLUTION PREVENTION PLAN FOR TAR REMOVAL, SPRINGSTEAD & HOGTOWN CREEKS, GAINESVILLE, FLORIDA" dated July 2010, neither Beazer nor operations at the former Koppers portion of the Superfund Site are primarily responsible for the Creek conditions that may require remediation under the approach presented in the Proposed Plan. According to these two Cabot Plans, the Springstead and Hogtown Creek conditions are believed to have been created by historical discharges from the former Cabot Carbon property, including a massive release resulting from a historic breach of Cabot's former pine tar products lagoon.

In contrast to the above-referenced Cabot Plans, the Proposed Plan recommends off-Site sediment remedies in the Creeks but states that the Proposed Plan is only proffering these off-Site remedial options for impacts allegedly caused by the Koppers portion of the Superfund Site. There is no reasonable or rational basis for EPA to simultaneously approve Cabot Plans that acknowledge the Cabot portion of the Superfund Site is the source of Creek contamination, and then issue a Proposed Plan that suggests – without any supporting documentation – that an off-Site sediment remedy in the Creeks is connected or related to the Koppers portion of the Superfund Site.

Because most or all of any remediation-driving impacts identified in Springstead Creek and Hogtown Creek sediment resulted from releases at and from the former Cabot Carbon property, it seems inappropriate and arbitrary for EPA to direct Beazer to implement a remedy for off-Site sediments in the Creeks. And, it is even more confusing for EPA to use a ROD Amendment that purportedly pertains solely to the Koppers portion of the Superfund Site to implement this directive. Moreover, there is no indication in the Proposed Plan or any supporting documentation that EPA will use the forthcoming ROD Amendment to impose obligations upon Cabot requiring it – as a party primarily responsible for Creek contamination – to comply with, participate in, or even cooperate with Beazer, with respect to implementing the proposed off-Site Creek remedy.

While Beazer is not at this time refusing to participate on a limited basis in the investigation and potential remediation of the Creeks, it is arbitrary and capricious, as well as without any reasonable or rational basis, for EPA to use a ROD Amendment purportedly limited to the Koppers portion of the Superfund Site to mandate a remedy associated with releases and contamination that even EPA has acknowledged are sourced from the Cabot Carbon portion of the Superfund Site.

### c. The Cleanup Criteria for the Creeks Are Inappropriate

#### i. Available Data

As noted above, the Creeks have not been part of the RI/FS process. The nature and extent of contamination in the Creeks has not yet been fully investigated. In January and February 2009, Alachua County Environmental Protection Department (ACEPD) collected samples from the Creeks at locations where there was evidence of tar and/or visually impacted areas, which were selected after regular probing found relatively isolated visibly affected areas. This method of sample selection led to a highly biased data set in that constituent concentration data are only available from visibly impacted areas and not from all areas of the Creeks. It is likely that if sediments without visible impacts had been sampled, substantially lower constituent concentrations than reported by ACEPD would have been found in the majority of Creek sediments. Thus, representative concentrations of all Creek sediments would be much lower than reported by the ACEPD and concentrations have not been established for the length of the Creeks, nor has there been an established pattern of tar or other constituents. In sum, EPA has not reviewed an unbiased and objective data set for the Creeks, such as would have been developed had the Creeks been part of a CERCLA and NCP compliant RI/FS process.

#### ii. Sources of Contamination

The samples that have been collected demonstrate higher total PAH concentrations upstream of the Koppers Site, indicating sources other than the Koppers property are contributing the PAH concentrations measured in Creek sediments. Fingerprinting of the tar-like material identified by ACEPD is needed to determine the historic sources of this material and the potentially responsible parties (PRPs) associated with these sources. Once the PRPs have been established, both human health and ecological risk assessments may need to be completed to determine whether the environmental conditions warrant remediation, and to what extent.

#### iii. Exposure Assumptions

The comparison of sediment concentrations to FDEP residential SCTLs, as suggested by Table 1, to determine areas to be remediated is not appropriate and represents an incorrect and unrealistic application of those SCTLs. The surface soil CTLs make numerous highly conservative assumptions about potential exposures to constituents in soils. Many, if not all, of those assumptions do not apply to sediments. For example, the frequency of exposure to soil in residential yards is not the same as the frequency of exposure to the sediment in the creeks surrounded by dense growth, which makes access difficult. More appropriate exposure assumptions are warranted to first determine if potential risk above regulatory levels of concern exists to people possibly recreating in the creeks. If potential risk above regulatory criteria does exist, these same appropriate exposure assumptions could be used to develop reasonable cleanup levels to determine the extent of remediation.

Moreover, the Proposed Plan should not include any SCTLs for off-Site sediments as no evaluation of potential human health risks associated with off-Site sediment has been conducted. Until a risk assessment is completed that evaluates potential risk associated with hypothetical exposures to Site-related constituents in sediments, no basis exists to determine whether such hypothetical exposures may result in potential risks that exceed Florida's administrative target risk limits. Indeed, if a human health risk assessment were to be conducted, given the generally low concentrations of Site-related constituents reported by ACEPD in their notably biased sampling, it is very likely that any potential risks that may be associated with such constituents in sediments will not exceed Florida's target risk limits and, therefore, that no remediation of creek sediments will be required for protection of human health.

Although no formal human health risk assessment has been done, the Department of Health at the University of Florida indicated that risks are not expected given the remoteness of the creeks. Remediation may be needed to remove visible tar, but not because of the residual concentrations of wood-treating related constituents.

### iv. Ecological Risk

The Proposed Plan (Page 11, column 2, paragraph 4 and Page 12, column 1, first paragraph) indicates that EPA will defer to conservative default ecological endpoints because the screening level risk assessment previously submitted by Beazer has not yet obtained acceptance by EPA and FDEP. Not having completed a review of the screening level risk assessment represents an inadequate basis to use "conservative default endpoints" as a basis to establish cleanup goals. EPA similarly needs to review the screening assessment and provide technical justification why the conclusions of the screening risk assessment are not valid. That screening risk assessment concludes that concentrations of wood treating-derived PAHs in Springstead and Hogtown Creek sediments do not pose an unacceptable risk and that no remediation is necessary.

As described in Beazer's screening assessment, whole sediment toxicity tests conducted at eight wood-treating sites demonstrate that the concentration of total PAH in sediments needs to exceed at least 250 mg/kg before substantial (i.e., statistically significant) mortality of either *Hyalella* or *Chironomus*, two commonly used sensitive laboratory test species, is observed. The maximum total PAH concentration detected in sediment samples collected by ACEPD was 146 mg/kg, which was collected from a location upstream of the former Koppers facility. The highest total PAH concentration reported by ACEPD downstream of the former Koppers facility was 82 mg/kg. At no other wood treating site where such concentrations have been tested has Beazer found significant toxicity. Therefore, significant ecological risk to the benthic community attributable to releases from the former Koppers property is not expected in either Springstead or Hogtown Creeks.

If after its review of the screening level risk assessment, EPA were to disagree with the conclusion of an absence of an ecological risk, the Proposed Plan's indication that remediation of creek sediments is needed based upon "conservative default endpoints" is inconsistent with typical EPA practice, particularly in light of the information available at this Site. In most cases after a screening ecological evaluation is completed, those results lead either to the conclusion that potential ecological risk is not present and that further study and evaluation is not warranted or that a potential risk may exist and that more study and evaluation is needed to determine whether any potential risks are acceptable or not. Almost never does the agency reach the conclusion that remediation is necessary based only on the results of a screening evaluation. Exceedance of screening benchmarks, the only "ecological evaluation" presented in the Proposed Plan, does not connote that a risk exceeding regulatory action levels is present in Springstead and Hogtown Creek sediments. Thus, if after completing its review of the ecological screening evaluation provided by Beazer, EPA still believes that wood treating-related constituents in Springstead and Hogtown Creeks may pose an unacceptable ecological risk, the next step in the ecological risk assessment process would be to conduct a more refined evaluation of potential ecological risk. Such an evaluation may, but does not have to, entail the collection and toxicity testing of sediment from the creeks in which locations potentially affected by the Site will be compared to upstream reference locations. Given that the highest total PAH concentration was found upstream of the former Koppers facility, if the highest upstream locations also demonstrate the highest toxicity to test species, results of such site-specific toxicity testing would demonstrate the absence of a significant impact from the former Koppers facility and, thus, remediation would not be warranted. Regardless, until more refined, ecological evaluations are completed, no determination about the need to remediate creek sediments can be made. Consequently, any reference to remediation of Springstead and Hogtown Creek sediment needs to be removed from the Proposed Plan.

Additionally, cleanup goals discussed in the screening assessment have, in fact, undergone extensive review by EPA Region III. Region III accepted those data as the basis for a 100 ppm total PAH sediment cleanup goal that is protective of aquatic receptors. Therefore, the Proposed Plan is in error when it implies that the evaluation presented in the screening evaluation has not obtained acceptance by EPA. Those assumptions and clean up goals have been accepted by another EPA Region.

In summary, since submitting updated sediment toxicity information to Region IV, Beazer has received no information indicating why those findings are not applicable to PAHs that may have originated from the former Koppers property. All sediment samples downstream of the confluence with the drainage ditch from the Koppers facility which were collected by ACEPD during the past two years showed total PAH concentrations less than 100 ppm. Notably, those samples represent a biased data set, as the samples were collected from the most impacted areas ACEPD identified in the Creeks following extensive probing and observation programs. Therefore, no reason currently exists to believe wood treating-related PAH concentrations in the creeks exceed the 100 ppm cleanup goal already deemed acceptable by EPA in another Region. In sum, there was no need to include cleanup of Springstead or Hogstown Creek Sediments in the Proposed Plan downstream of the Koppers portion of the Superfund Site. And, if a cleanup of sediments is ever required in the Creeks, any such cleanup is not related to wood-treating constituents and therefore should not be included in the forthcoming ROD Amendment.

## 3. The EPA's Selected Cleanup Goals and Related Criteria Are Unclear and/or Inappropriate

### a. Groundwater Cleanup Goals Apply at the Limit of Institutional Control

The Proposed Plan is unclear on the location where groundwater cleanup goals would be applied and enforced. Per Florida regulations, the appropriate location for application of the groundwater goals should be at the limit of institutional control (e.g., the Beazer property boundary) or the edge of the present plume if the plume is within the property boundary. Remedial Action Objective (RAO) bullet #3 in the Proposed Plan (p. 12) states that cleanup goals apply "outside source areas." This RAO was not included in the FS and conflicts with Florida's policy regarding points of compliance.

### b. The Basis for Listing Constituents of Concern Is Unclear

It is unclear how the list of constituents of concern (COCs) presented in Table 1 of the Proposed Plan was determined. Several of the groundwater COCs listed (1,1-biphenyl, 2-phenol, bis(2-ethylhexyl) phthalate, and n-nitrosodiphenylamine) are not commonly analyzed for and are not part of the present list of analytes for groundwater monitoring. Also, while benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, and chrysene are soil COCs, they are not generally considered to be a groundwater threat because of their low water solubility and are not part of the current Site groundwater monitoring plan.

### c. The Tables Listing Default GCTLs and SCTLs Are Inaccurate

Several of the GCTLs listed in Table 1 are incorrect. Of particular note, the GCTL for acenaphthene is 20 μg/L, not 210 μg/L. Also GCTLs should be corrected and listed separately for 3-methylphenol (35 μg/L) and 4-methylphenol (3.5 μg/L).

The default Commercial/Industrial (C/I) SCTL for antimony is 370 mg/kg. The C/I SCTL for arsenic is 12 mg/kg. The C/I SCTL for acenaphthene is 20,000 mg/kg. The C/I SCTL for benzene is 1.7 mg/kg. The C/I SCTL for 3-methylphenol is 33,000 and the C/I SCTL for 4-methylphenol is 3,400 mg/kg. Additionally, fluorene is misspelled in the table.

### d. Development of Leachability-Based Cleanup Criteria

The Proposed Plan should have included language stating that any vadose-zone soil with the potential to create groundwater impacts above cleanup targets should be managed by either:

- Removal of the soil and placement within the capped consolidation area, or
- Placement of a low-permeability cap over the soil.

However, if such actions are required for any area where any constituent concentration exceeds a Florida *default* leachability-based cleanup target, then nearly the entire Site would require vadose-zone soil removal or capping. This action would not be necessary or reasonable because we know from groundwater concentration data that groundwater impacts are limited in areal extent. For example, the measured concentrations of pentachlorophenol in vadose-zone soil exceed the default leachability target of 0.03 mg/kg at locations throughout the entire Site; but pentachlorophenol is not detected in groundwater samples north and west of the area that will be within the vertical barrier wall.

As stated in the FS (and implied by language in Table 1 of the Proposed Plan), the definition of what soil concentrations pose a potential leachability concern, therefore requiring removal or capping, should be finalized during the remedial design phase. The pertinent cleanup target for the Proposed Plan is the groundwater-concentration cleanup target.

Beazer does not take issue with the application of "Florida leachability criteria" as presented in the Proposed Plan. However, Beazer requests that EPA clarify that the application of Florida leachability criteria does not mean that *default* leachability-based SCTLs apply.

### e. The EPA Has Inappropriately Rejected the On-Site Risk Assessment in Favor of Strict Application of Florida's Default Direct-Contact SCTLs as Cleanup Levels

The on-Site human health risk assessment was developed with the goal of being used as an adaptive management tool to determine whether proposed on-Site remedial alternatives meet Florida's statutory risk limit of $1x10^{-6}$ (one in one million) for cancer effects and a Hazard Index of 1.0 for non-cancer effects. The May 26, 2010 Human Health Risk Assessment (HHRA) takes into account changes in land use and incorporates comments received on an earlier version. EPA has not provided Beazer additional technical comments beyond those already addressed by the current HHRA. To the best of Beazer's knowledge, both the probabilistic and deterministic evaluations of potential risk presented in the HHRA are consistent with EPA risk assessment guidance and, thus, represent evaluations of potential risk that, contrary to the assertion in the Proposed Plan (Page 11, column 2, paragraph 3), do provide an adequate basis to define the required cleanup goals. In fact, the probabilistic evaluation presented in the HHRA should be preferred for establishing cleanup goals because the probabilistic evaluation provides a more realistic estimate of potential risk. Use of more realistic, but still conservative and health protective clean up goals derived from the probabilistic evaluation, will assure that limited resources are spent wisely and that the community is not exposed to undue risk by unnecessary remediation.

Beazer continues to believe that the most comprehensive and practical evaluation of the protectiveness of various on-Site remedial alternatives is through the direct use of the probabilistic on-Site risk assessment. Nevertheless, Beazer also recognizes that USEPA often uses the deterministic, site-specific risk assessment to "back-calculate" clean-up goals (referred to as SCTLs in Florida) based upon the site-specific assumptions presented in such a risk assessment. On-Site Site-specific SCTLs have been developed for all receptors that exceeded FDEP risk limit of one in one million estimated lifetime cancer risk in the HHRA. Two sets of on-Site soil SCTLs were developed: one based on the deterministic risk assessment presented in the on-Site risk assessment; and, the other set based on the probabilistic risk assessment presented in the on-Site risk assessment.

Deterministic SCTLs were developed for the trespasser, outdoor worker, indoor worker, utility worker, construction worker, and the recreational user potentially exposed to constituents in on-Site soils using the same exposure assumptions presented in the May 26, 2010 HHRA. A deterministic SCTL was also developed for the trespasser potentially contacting ditch sediments. Deterministic SCTLs, calculated using standard, simple equations, are shown in Table 1.

Probabilistic SCTLs were developed for the outdoor worker and indoor worker using the same methodology presented for the development of off-Site SCTLs (submitted October 14, 2010), but with the exposure assumptions used in the May 26, 2010 HHRA for the outdoor and indoor worker. The probabilistic SCTLs are based on Florida's statutory allowable cancer risk limit of one in one million ($1x10^{-6}$). Only the hypothetical future outdoor worker SCTLs are presented in Table 2 because these were more stringent than those for hypothetical future indoor worker. Two sets of Site-specific SCTLs were developed for hypothetical future on-Site workers. One set of SCTLs is protective of hypothetical future on-Site workers who have typical (median) potential exposures to COPCs in soil. The other set of SCTLs is protective of hypothetical future on-Site workers who have high-end (95% upper percentile) potential exposures to COPCs in soil..

TABLE 1

SUMMARY OF ON-SITE SITE-SPECIFIC SOIL AND SEDIMENT CLEANUP TARGET LEVELS - DETERMINISTIC RISK ASSESSMENT

FORMER KOPPERS, INC. WOOD-TREATING FACILITY

GAINESVILLE, FLORIDA

| | SCTLs (mg/kg) | | | |
|---|---|---|---|---|
| Receptor/Area | Arsenic | BaP-TE | Pentachlorophenol | TCDD-TEQ |
| Hypothetical Current and Future On-Site Trespasser | 170 | 25 | 880 | 0.0013 |
| Hypothetical Current and Future On-Site Trespasser in Drainage Ditch | 200 | 25 | 880 | 0.0013 |
| Hypothetical Future On-Site Outdoor Worker | 5.3 | 0.75 | 27 | 0.000038 |
| Hypothetical Future On-Site Indoor Worker | 8.1 | 1.5 | 53 | 0.000075 |
| Hypothetical Future On-Site Utility Worker | 100 | 11 | 410 | 0.00059 |
| Hypothetical Future On-Site Construction Worker | 230 | 31 | 1100 | 0.0018 |
| Hypothetical Future On-Site Recreational User | 44 | 5.4 | 200 | 0.00028 |

TABLE 2

SUMMARY OF MEE ON-SITE SITE-SPECIFIC SOIL/SEDIMENT CLEANUP TARGET LEVELS

FORMER KOPPERS, INC. WOOD-TREATING FACILITY

GAINESVILLE, FLORIDA

| MEE SCTLs (mg/kg) | | |
|---|---|---|
| Hypothetical Future On-Site Outdoor Worker | | |
| COPC | Typical (Median) | Upper Bound (95%ile) |
| Arsenic | 120 | 23 |
| BaP-TE | 18 | 2.0 |
| TCDD-TEQ | 0.00069 | 0.00015 |

Note that even though the probabilistic SCTLs are referred to as being protective of median and upper percentile potential exposures, respectively, at Florida's statutory target cancer risk of one in one million, they are actually more protective than required by Florida statute. Both the residential SCTLs and the on-Site worker SCTLs are derived using an upper bound estimate of the cancer slope factor for dioxin as well as other conservative exposure assumptions more fully described in the off-Site SCTL document (October 14, 2010). Use of a single upper bound slope factor as well as the other conservative exposure assumptions, to develop Site-specific probabilistic SCTLs, instead of a distribution of cancer slope factors, means that potential risks are overestimated and the resulting SCTLs are lower (more protective) than necessary to meet Florida's statutory target risk limit.

**f. Use of Overly Conservative Clean Up Goals Such As SCTLs May Create Greater Risk Than They Are Intended to Prevent**

As discussed above, Florida's default SCTLs are inappropriate to use as cleanup goals at this site. They do not account for Site-specific factors that mitigate potential risks presented in the HHRA and the derivation of off-Site Site-specific residential SCTLs. Additionally, the deterministic risk assessment process used to derive the default SCTLs is exceptionally conservative. The end result is unrealistic estimates of potential risk that greatly overstate any actual risk that may be present. By using such default SCTLs as clean up goals without taking into consideration the ramifications of their conservative nature, far more extensive remediation may be undertaken than is necessary to protect public health to the level required by Florida statue. While implementing more extensive remediation than required by law seems like it should provide additional benefit to public health, doing so may actually cause more risk than it eliminates because the process of remediation creates risk. As the risks being remediated get smaller and smaller (because more and more conservative cleanup goals are being used), the extent of remediation increases and the risks associated with that more extensive remediation can begin to outweigh the risks that are being reduced. Basing remediation on realistic but protective cleanup goals derived from using probabilistic risk assessments that use reasonable combinations of assumptions leads to protective remedies that minimize the potential for risks associated with remediation to be greater than the risks that the remedy is being implemented to mitigate.

**g. The EPA Has Selected an Off-Site Cleanup Goal Without Any Consideration Of Site-Specific Off-Site SCTLs**

An off-Site Site-specific SCTL for TCDD-TEQ has been developed using probabilistic risk assessment methods for properties that are assumed to have potential exposures associated with residential use. As with the on-Site SCTLs, the residential SCTLs are based on Florida's statutory allowable cancer risk limit of one in one million ($1 \times 10^{-6}$). Two Site-specific residential SCTLs were developed. One SCTL is protective of hypothetical residents who have typical (median) potential exposures to TCDD-TEQ in soil. That SCTL is 95 ng/kg. The other SCTL is protective of hypothetical residents who have high-end (90% upper percentile) potential exposures to TCDD-TEQ in soil. Beazer submitted the derivation off-Site SCTLs to EPA on October 14, 2010.

The Proposed Plan, issued on July 15, 2010, conclusively states that the off-Site residential soil cleanup level for dioxins will be Florida's default residential SCTL of 7 parts per trillion (ppt) as 2,3,7,8-tetrachlorodibenzo-p-dioxin toxic equivalents (TCDD-TEQ). Florida law permits the calculation of site-specific SCTLs, and Beazer has calculated and proposed site-specific SCTLs in the off-Site SCTL report. EPA was fully aware of the schedule for off-Site soil sampling, and the results of that sampling were integral to determining whether Site-specific off-Site SCTLs would need to be derived. Beazer requests that the EPA reconsider its decision of the selected off-Site cleanup level following its review of the off-Site SCTL report. In addition, contemporaneously with these Comments, Beazer has submitted a formal request for waiver of application of the Florida SCTLs as ARARs.

The SCTL for dioxins and furans is not consistent with current and proposed Federal guidance that governs cleanup of soils containing dioxins and furans nationwide. The EPA's current Federal guidance lists 1,000 ppt as the Preliminary Remediation Goal (PRG) for dioxins and furans. This PRG was issued in 1998 in *Approach for Addressing Dioxin in Soil at CERCLA and RCRA Sites*, OSWER Directive 9200.4-26 (EPA 1998). The PRG was issued as "a starting point for setting cleanup levels" at sites with soils affected by dioxins and furans. On January 7, 2010, in accordance with its Dioxin Science Plan, EPA issued *Draft Recommended Interim Preliminary Remediation Goals for Dioxin in Soil at CERCLA and RCRA Sites* (EPA 2009). The Draft Interim PRG document proposed a new interim PRG of 72 ppt TCDD-TEQ for residential soils. This proposed PRG, which has been through review at the Office of Management and Budget and is expected to be issued as final Federal guidance this year, is ten times higher than the SCTL proposed by EPA for use at the Cabot Carbon/Koppers Superfund Site. EPA is, thus, being inconsistent in its management of dioxin and furan soil sites.

In addition to the SCTL being inconsistent with pending Federal guidance, the cancer slope factor used in FDEP's calculation of the generic statewide SCTL for dioxins and furans is based on an outdated and scientifically discredited TCDD cancer slope factor (CSF) derived from toxicity study in rats (Kociba et al., 1978). The cancer slope factor was cited from a 1997 Environmental Protection Agency (EPA) document entitled *Health Effects Assessment Summary Tables*. This 1997 document presented a cancer slope factor published earlier in 1985 by EPA in a document entitled *Health Assessment Document for Polychlorinated Dibenzo-p-Dioxins* (Office of Health and Environmental Assessment, Environmental Criteria and Assessment Office. Cincinnati, Ohio. EPA 600/8-84-014F.) The 1985 cancer slope factor used by FDEP is outdated and scientifically discredited as noted in detail in Arcadis' April 2010 document entitled *Comments on: Draft Recommended Interim Preliminary Remediation Goals for Dioxin in Soil at CERCLA and RCRA Sites (OSWER 9200.3-56), December 30, 2009* (submitted on behalf of Beazer and others; previously provided).

The cancer slope factor was already outdated in 2005 when FDEP derived its SCTL for dioxins and furans, but it is even more outdated in 2010 when EPA proposed the use of the generic statewide SCTL as a residential cleanup level for the Cabot Carbon/Koppers Superfund Site. Specifically, FDEP's 2005 document lists the following sources of toxicity values in order of preference: (1) EPA's Integrated Risk Information System (IRIS); (2) EPA's Provisional Peer-Reviewed Toxicity Values (PPRTVs); and (3) EPA's Health Effects Assessment Summary Tables (HEAST). Finding no values in sources 1 or 2, FDEP relied on the cancer slope factor listed in EPA's 1997 HEAST document to derive the generic statewide SCTL.

This protocol for selection of toxicity values is not consistent with EPA's 2003 document entitled *Human Health Toxicity Values in Superfund Risk Assessments* (Office of Solid Waste and Emergency Response, Washington, DC. OSWER Directive 9285.7-53. December 5, 2003.) The EPA's current Superfund protocol for choosing toxicity values lists IRIS and PPTRV sources as Tier 1 and Tier 2 sources, respectively, but it lists Tier 3 sources as "additional EPA and non-EPA sources of toxicity information. Priority should be given to those sources of information that are the most current, the basis for which is transparent and publicly available, and which have been peer reviewed." While HEAST is one Tier 3 source, other "EPA and non-EPA" sources are also Tier 3 sources of toxicity values.

The CSF used by FDEP is not a scientifically sound cancer-based toxicity benchmark for TCDD for numerous reasons:

1. It was selected without following EPA's (2003) OSWER Directive for selecting toxicity values and did not consider its scientific basis or other CSFs published in the peer-reviewed scientific literature.

2. It is based on an outdated classification of rat liver lesions from the Kociba et al. (1978) cancer bioassay.

3. It does not take into account changes in EPA's methods for cross-species scaling.

4. Its derivation using a linear dose-response model is inconsistent with TCDD's mode of action.

The Off-Site HHRA and the comments on EPA's proposed interim PRG for dioxins and furans both provide detailed scientific reasons why the CSF used by FDEP is not a scientifically sound. By selecting the default CSF from 1985, derived from incorrect tumor response data using a non-threshold linear model and an outdated species scaling methodology the FDEP and EPA have ignored the current state of the science regarding the carcinogenic dose-response of TCDD. These very same views were provided to the EPA by the National Academy of Sciences in 2006 and have been expounded for over two decades by the scientific community, yet FDEP and EPA continue to ignore the scientific evidence.

**h. The Proposed Plan Does Not Include Provision for Use of Background Concentrations in Lieu of SCTLs.**

Beyond the changes discussed above regarding the derivation of Site-specific clean up goals, the Proposed Plan should also be modified to allow for the use of background concentrations as cleanup goals. Florida's rules specifically allow for use of background concentrations. Depending upon the results of the continued off-Site sampling, it is possible that off-Site soils in the vicinity of the Site may be identified that are below background levels but exceed Site-specific (or generic default) SCTLs. Such soils would not need remediation. The discussion of clean up levels in the Proposed Plan should be modified to acknowledge that potential.

## 4. EPA Must Clarify That The Foreseeable Future Use of the Site Does Not Include an "Unrestricted" Residential Component

During the RI/FS process, the EPA appropriately evaluated the Site as commercial/industrial property, including projections of potential future use for recreational purposes. The May 2010 FS states that:

> On-Site residential exposure scenarios are not applicable based on the expected commercial/industrial and/or recreational use of the property. Evaluation of potential risks associated with nonresidential use scenarios is consistent with federal guidance (EPA, 1995), in which EPA proposes to address potential risks consistent with current and plausible future land-use patterns.

FS at p. 1-37 (emphasis added). However, the Proposed Plan noted that, because the wood treating operations at the Site had terminated, both Beazer and EPA were evaluating alternative future uses of the property:

> **Site Risk Assessment**
>
> Risk assessments were conducted to determine the current and future effects of contaminants on human health and the environment. . . . A human-health risk assessment (HHRA) for on-Site soils and sediment was submitted in 2009 and updated in May 2010 to take into account a change in land use and to incorporate comments received on the earlier version. The estimates of potential risk presented in the August 2009 HHRA assume that the use of the Site is for wood treatment in the foreseeable future because wood-treatment operations have ceased, this assumption is no longer valid. The HHRA was updated to take into account a change in land use not previously contemplated under the 2009 submittal.

Proposed Plan at p. 11, (emphasis added).

Recently, EPA has issued clarifying "Fact Sheets" distributed at the public meeting conducted on October 6, 2010, in which EPA stated:

> EPA has made its reasonably anticipated land use determination based on several factors including property owner Beazer East's planned retention of Site ownership and its indicated future use of the Site as commercial, recreational or mixed use <u>with a residential component</u>.

September 2010 Proposed Remedy Fact Sheet at p. 9 (emphasis added). The language of the Proposed Plan in conjunction with the "residential component" language in the Fact Sheets has, apparently, caused confusion in the community with respect to the nature of the foreseeable future use of the Site, despite the fact that EPA also stated in the Fact Sheet that "<u>EPA has determined that unrestricted residential use is not a likely or practical future land use for the Site.</u>" *Id.*, underlined emphasis added. Beazer is also aware that members of the local community have communicated to EPA their strong desire for the site to be remediated to unrestricted residential standards.

Beazer is voluntarily and in good faith cooperating with the EPA and the Local Inter-Governmental Team ("LIT"), among others, with respect to planning for potential redevelopment of the Site, and will continue such cooperation. However, it should be stated clearly and definitively in the ROD Amendment that Beazer has not committed to bearing any financial or other consequences of including "unrestricted residential" components in such re-use. Beazer has agreed to conduct an industrial/commercial site-specific cleanup that, with appropriate institutional and/or engineering controls, *may* result in a *restricted* residential use sometime in the future, such as condominiums or apartments on the upper floors of an otherwise commercial facility. Remediation of all or portions of the Site to "unrestricted residential" cleanup standards would obviously have a significant impact on the work required, as well as the corresponding costs, none of which have been evaluated through the RI/FS process and none of which Beazer believes is appropriate.

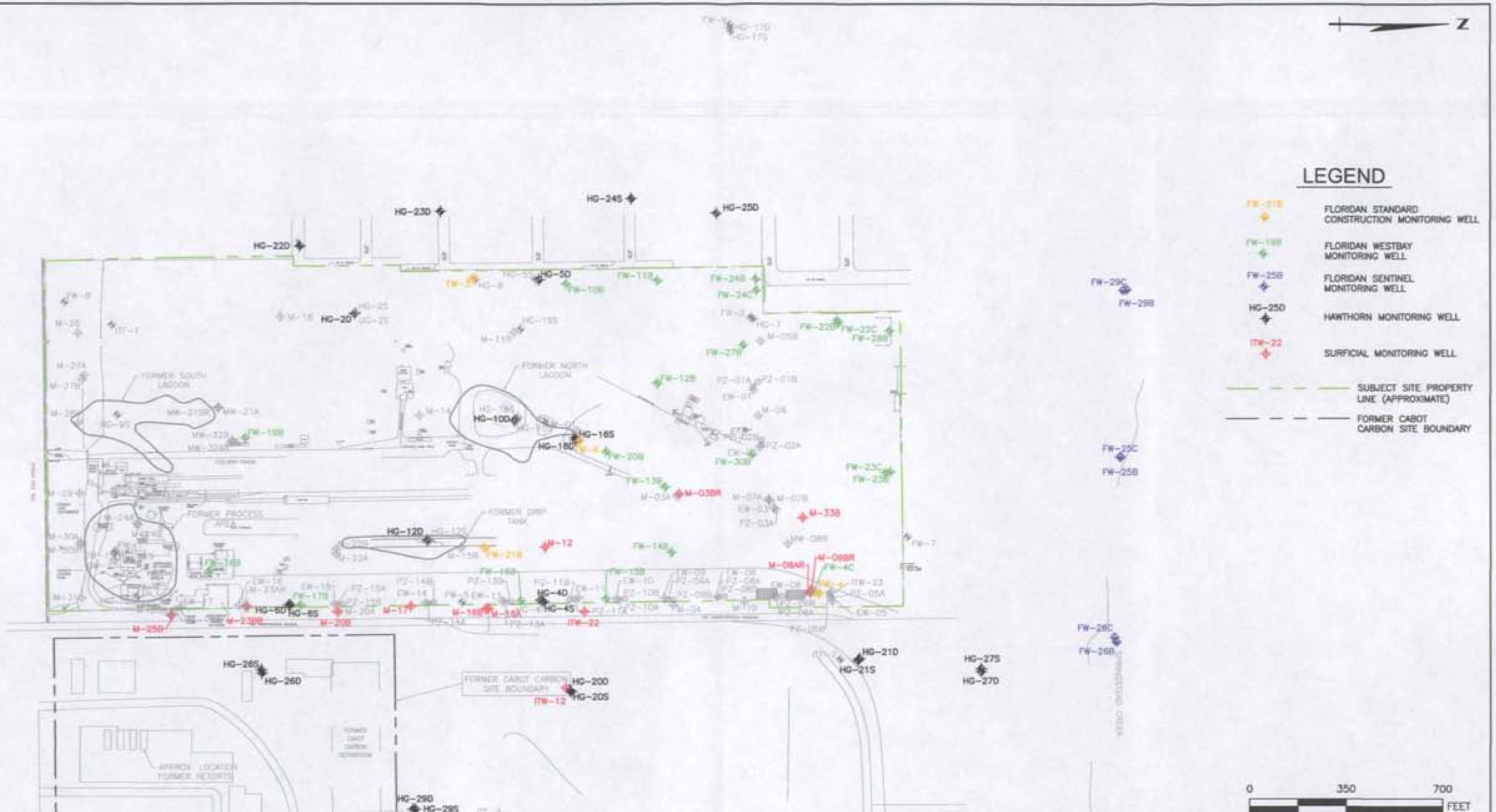
In addition, the local governments cannot unilaterally require Beazer to actually use the Site for residential purposes, or to prepare the Site for future residential use. The Site has been exclusively and lawfully used for industrial purposes since 1916. According to the City's Comprehensive Plan, the Comprehensive Plan category for the Property is "IND" (Industrial). This category is the most intensive land use category in Gainesville's Comprehensive Plan. The Industrial land use category is assigned to areas appropriate for manufacturing, fabricating, distribution, extraction, wholesaling, warehousing, recycling and other ancillary uses. The Industrial category permits uses such as the wood treating facility previously operated on the Site. In addition, the City's Zoning Map lists the zoning district for the Property as "I-2" (General Industrial). The permitted uses, by right, in the I-2 category include "lumber and wood product," which allows uses such as the wood treating facility that previously operated on the Site. At present, there have been no effective legal measures taken by the City or any other individual or entity to change, alter or amend these zoning classifications.

Under these circumstances, attempts by any party to use the ROD Amendment process to reclassify the legal zoning for the Site property in the attempt to force Beazer into a future residential use could conceivably amount to a "taking" without just compensation in violation of the Fifth Amendment of the Constitution of the United States. Moreover, even if such reclassification was permitted to move forward, Beazer cannot be forced to use the property for any newly permitted purposes. As the owner of real property, Beazer has a fundamental and legally-protected right to make whatever use of the property it deems appropriate within the confines of lawful zoning and land use restrictions, including no use at all. In the event that Beazer does not reach agreement with the local government and others on a mutually-acceptable future use plan, Beazer can lawfully elect to simply leave the Site idle with appropriate controls to prevent Site access (fencing, guards, etc.). Accordingly, the idle scenario is also a foreseeable future use of the Site.

For all the reasons set forth above, the forthcoming ROD Amendment should specifically state that Beazer is conducting a commercial/industrial cleanup on the Site, and that "unrestricted residential" cleanup standards are inappropriate for the Site.

## 5. Off-Site Remedy for a Property will be Selected by Property Owner from a Short List of Potential Alternatives

The Proposed Plan incorrectly describes the remedy selection process for off-Site properties. EPA will contact property owners needing to be included in remedial activities for their properties and describe the remedial alternatives available for that property. Property owners will, in consultation with EPA, select a remedial solution from those originally offered by EPA and Beazer. That short list of alternatives will comprise a subset of all possible alternatives that could be used to remediate residential surface soils.




REFERENCE: GEOTRANS 2010 FIGURES COMPREHENSIVE GROUNDWATER MONITORING AND SAMPLING PLAN; AUGUST 4, 2010.

| REV # | DATE | DESCRIPTION | APPD |
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BEAZER EAST, INC.
PITTSBURGH, PENNSYLVANIA

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|---|---|
| DRWN: KC | DATE: 08/18/10 |
| CHKD: RMB | DATE: 08/18/10 |
| APPD: AMG | DATE: 08/18/10 |
| SCALE: AS SHOWN | |
| ISSUE DATE: | |

FTS

FIELD & TECHNICAL SERVICES, LLC
200 THIRD AVENUE
CARNEGIE, PA 15106

2010 FIRST SEMIANNUAL
COMPREHENSIVE GROUNDWATER MONITORING REPORT
CABOT CARBON/KOPPERS SUPERFUND SITE
GAINESVILLE, FLORIDA

WELL LOCATION PLAN

PROJECT NO: GM040010
DRAWING NUMBER
FIGURE 2

**Attachment 2**

US ENVIRONMENTAL PROTECTION AGENCY - REGION 4
PROPOSED CLEANUP PLAN AND PUBLIC COMMENT PERIOD
CABOT CARBON/KOPPERS SUPERFUND SITE
GAINESVILLE, FLORIDA

This Public Information Meeting came to be heard on

DATE: August 5, 2010
TIME: 6:00 p.m. - 9:00 p.m.
LOCATION: 3800 Northwest 6th Street
Gainesville, Florida

As stenographically reported by:

Cynthia F. Leverett, Court Reporter

CERTIFIED COPY

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PRESENT ON BEHALF OF USEPA:

L'Tonya Spencer, Community Involvement Coordinator

Scott Miller, Remedial Project Manager

David Keefer, Superfund Remedial Section Chief

Bill Osteen

Kevin P. Koporec

MS. SPENCER: My name is L'Tonya Spencer. I'm the public affairs specialist/community coordinator for the Koppers site. And I'm with the United States Environmental Protection Agency.

The meeting tonight is to talk the proposed plan for the Koppers site. Basically, to talk about how we're proposing a remedy.

A few housekeeping rules. I understand that you have some people that agree to disagree with us tonight, but we want to be as respectful as possible.

And we want to let you know that we do have law enforcement here. And, if someone is asked to be removed, please go silently. Okay?

Second of all, protocol for this, as well, if you did not sign in, please make sure you sign in, so that, if you're not on our mailing list, we can add you to the mailing list for future mailings.

The third thing is, there are people who are audio and visually recording this meeting. So, if there's anyone that has an objection to that, which we don't. As USEPA, we're civil service. So, we just want to make you aware that the meeting is being taped.

And, also, for the comments, the questions, we do have a court reporter here. So, when we get to the question-and-answer portion of the meeting, if you would please state your name and ask the question clearly, so that we can make sure we get it on record, we would greatly appreciate it.

Last but not least, this is a part of our comment period. This is not the only opportunity that you have to give a comment or to ask a question. The comment period is continuing after this meeting. So, our information is in the proposed plan document. You can send it to myself, L'Tonya Spencer, or to Scott Miller. Our email address and mailing address is in the information.

So, if you don't have an opportunity tonight, please know that there are opportunities available to you.

I'm going to ask that, while Scott is doing his presentation, if you have a question during the presentation, Anna Cornelius in the back will have cards that you can write your question on. We'd like to be sure that he gets through his whole presentation before we open up question and answer.

So, if you have questions during his presentation, Anna can give you an index card to write your question on, so that we can come back to that.

Scott is going to do introductions of representatives that are here. He's going to give his presentation, and then we're going to open it up for question and answer.

MR. MILLER: Good evening, and welcome to the proposed plan meeting for the Koppers portion of the Cabot Carbon/Koppers superfund site.

Latonya's asked me to identify some local elected representatives. And I notice that Mayor Lowe is here. I see Commissioner Donavan, Commissioner Hodgekins. Anyone else present?

I know the entire commission is here. I'm sorry. Those folks in the back, thank you for coming out this evening.

We've got a presentation here that's brief that allows us to -- it's about 30 minutes, or maybe less, allows us to take a good bit of time to hear your comments and views on the proposed plan.

The Koppers portion of the Cabot/Koppers superfund site is approximately 86 acres in size and encompasses several operable units.

Operable unit one was the Cabot Carbon property, where remediation was done in 1995 with respect to excavations. And now there's a groundwater treatment system actively operating.

And there also was a time when the surficial aquifer system for the Koppers site was installed and has processed 260 million gallons of ground water since that time.

Koppers, Inc., and its predecessors treated utility poles at this site from 1969 -- excuse me, from 1960 to 2009. In March 2010, the property was purchased by the responsible party, that's Beazer East, and they contacted us for the purpose of remediation and for working together with folks on getting the site readings necessary out there once the remediation has taken place.

Here's the site now. On the left-hand side of the screen you see where the former Koppers operation was located, approximately 86 acres in size. On the right-hand side is the Cabot Carbon portion, which has since been re-developed.

Wood treating processes began in 1960, with the use of creosote to treat utility poles. They began using pentachlorophenol during the time period of 1969 until 1990. Copper chromate arsenate was used from 1990 through 2009.

The former north and south lagoons were used to process waste water. The former north lagoon was active from 1956 to the 1970's. And the former south lagoon was active from 1943 through 1976.

There's been a number of remedial investigations at the site, beginning in 1983 and moving forward. A supplemental remedial investigation was completed 1989, along with a base line risk assessment and final feasibility study to support the 1990 record of decision.

Recent ground water investigations from 2003 to 2010 indicated that dense non-aqueous phase liquids were present in the Hawthorn group, and that site contaminants are present in groundwater in the upper Floridan aquifer.

EPA participated in the collaborative feasibility study process with local stakeholders; the Florida Department of Environmental Protection; and the responsible party, Beazer East, from 2007 to 2010. The final feasibility study was issued in May of 2010.

There's been significant on-site and off-site soil and groundwater sampling to characterize the nature and extent of contamination at the site. We've done over 350 soil borings, and 1000 soil samples have been collected and analyzed since 1984.

Off-site surface soil sampling is ongoing, and will continue through the remedial design process to support the remedial footprint.

Groundwater monitoring has been routinely done since 1984. And there's been over 3100 wells installed and sampled on site.

The risk assessment that's been done for the site, the human health risk assessment, indicates there are unacceptable risks to on-site workers, future recreational uses, or current or future trespassers. So, the site will require remediation.

The ecological risk assessment showed that there's unacceptable risks of organisms in the sediments.

Contaminants of concern. We define contaminants of concern to be those things, those contaminants that exceed safe drinking water, Florida groundwater cleanup target levels, preliminary remediation goals, which are soils allowing concentration level for contaminants to Florida groundwater clean up target levels.

The contaminants of concern in the soil are arsenic, dioxins, polycyclic aromatic hydrocarbons, pentachlorophenol are above the soil cleanup target levels of Florida DEP in the source area and off-site soils.

Groundwater contamination of concern in the surficial aquifer are primarily naptholene. Organics are of concern in the Hawthorne group and the upper Floridan aquifer.

Some of the contaminants of concern include PAH's and dioxin TEQ. Dioxin TEQ is a look at dioxins -- or a family of contaminants, growing that up and expressing that as a number in terms of most toxic dioxin, which is 2378 TCDD dioxin. So, it's an equivalence factor that's used as opposed to listing 189 separate contaminants of the dioxin family.

The conceptual site model shows how conditions and site-related constituents move in the environment.

Primarily, at this site, we have wood

treating chemicals that have gotten into the environment from the former process area, the former south lagoon, the former north lagoon, and the former drip track.

From the slide, you can see that these areas were the former -- that's the former north lagoon, the former south lagoon, the former process area, and the former drip track.

What you've got with respect to groundwater aquifer to surficial aquifer is a little over 25 feet. The Hawthorne aquifer is down to approximately 150 feet, and below is the Floridan aquifer.

Site contaminants have come down from approximately around the source areas, down into the surficial aquifer, down into the Hawthorne. And we've got these dissolved phase contaminants in the Hawthorne, as well as the Floridan. Groundwater flows from the southwest to the northeast predominantly.

The nature and extent of contamination. The surface soils on site -- the surficial MCL, maximum contaminant level, and groundwater cleanup target levels are exceeding for certain organisms.

There's been PAH hot spots identified in the five miles of the creek. And in surface water drainage, there's been exceedances of certain metals that are associated with wood treating.

EPA has been involved in several community involvement and outreach things, including three fact sheets.

We've been involved in nine public meetings since 2008. We've worked with the collaborative FS group; the Florida Department of Environmental Protection; the Alachua County EPA; the Gainesville Regional Utilities and their consultants; and the responsible party, Beaver East.

The feasibility study is a document that evaluates alternatives to address remediation of impacted media, and it's based on reasonably anticipated future land use at the site.

What we believe is the expected future land use at the site is a commercial, recreational, or mixed use with a residential use component.

The FS evaluated ten on-site remedial alternatives, four off-site remedial soil alternatives, and three alternatives for the upper Floridan aquifer.

Remedial action objectives drives what we're trying to accomplish out at the site with respect to addressing risks that may be present. Those are the mitigated risks to human health and the environment proposed by site-related contaminants in surface soils, groundwater in the surficial aquifer, the upper Hawthorn group, and the upper Floridan aquifer, subsurface soils, sediments, and surface water to prevent further migration of impacted groundwater, restore groundwater outside the source area for beneficial use, and reduce the mobility, volume and toxicity to the extent it's practical.

Key remedial technologies that were examined as part of the feasibility study for soil sediment were excavation, capping, barrier wall, monitoring actual recovery.

With respect to groundwater, we identified in-situ solidification and stabilization, in-situ biogeochemical stabilization, hydraulic containment, pump and treatment.

In-situ solidification and stabilization is a use of a solidification agent to mix with soil to freeze, in effect, contaminants from getting into groundwater.

In-situ biogeochemical stabilization is the use of inserting a manganate solution with catalysts to react and to -- when it comes into contact with organics -- actually, the organics, it changes them into an insoluable precipitate.

Hydraulic containment is the use of pumping, to take groundwater that's contaminated, and treat it.

Chemical oxidation is the use of chemicals, such as manganate, to change the nature of the chemical that's there, and make it something that is not toxic.

DNAPL recovery is the recovery of dense non-aqueous phase liquids from the environment through manual or through pumping techniques.

Monitored natural attenuation is the use of -- or the environment's natural processes that remove or reduce site-wide contaminants.

As part of the FS, we did evaluate 10 different options, 10 comprehensive remedies to address soils on site, off-site, groundwater, sediment, and surface water.

For on-site remedial alternatives, we looked at several options, ten options in total, of which nine meet the -- several were based on removal, and that is the concept of removing soil and treating it on-site and returning it to its place. That was evaluated in the surficial aquifer, as well as to the middle clay, which is the middle Hawthorne clay. That's something that is distinct and separate.

In addition, these alternatives include the use of surface covers and capping on site to prevent contact with soils that are in excess of the soil cleanup target levels.

In-situ treatment, solidification and stabilization to the middle clay was evaluated. In-situ treatment, solidification and stabilization, and biogeochemical stabilization was also evaluated.

Containment and treatment with a barrier wall were also included in several of these on-site options above.

And, as you go down the line, what you get is something that is more and more treatment-based, in that, in every aquifer, there is a treatment technology that's evaluated for application. That's in the surficial, upper Hawthorne, lower Hawthorne, and upper Floridan aquifer, as well as off-site.

We split out the upper Floridan remedial alternatives. The upper Floridan is a very important resource. It is the resource for drinking water for this area of Gainesville.

We evaluated the no-action alternative, as required by the statute. We also evaluated hydraulic containment, and coupled that with monitored natural attenuation, which is the use of natural processes to reduce site contamination.

For off-site remedial alternatives, we evaluated no action, removal of impacted soil, institutional and engineering controls, being that use of engineering controls such as a cap, driveway, et cetera, in a voluntary process between a property owner and a responsible party that's available under the State of Florida regulations.

And then we also evaluated a hybrid concept, including removal, institutional controls, and engineering controlled hybrids in combination.

When EPA looks at evaluating remedial alternatives, we have nine different criteria under the national contingency plan regulations that we look at.

We have two that we call threshold criteria. And if these alternatives are not -- if they don't meet these two, then we don't further consider them for evaluation.

And those two threshold criteria are, it has to protect human health and the environment, number one. And, number two, it has to meet all applicable laws and regulations.

Balancing criteria are what we look to when we're looking at evaluating one set of remedial alternatives against another. Long-term effectiveness, implementability, the reduction of toxicity, mobility or volume, short-term effectiveness, and cost are part of the evaluation.

With respect to modifying criteria, which is the other two, we look to the support of the state agencies and community acceptance to possibly vary what may be a preferred alternative as we move forward.

We looked at long-term effectiveness. And that's the ability of the real option that's chosen to, over the long haul, to continue to meet the requirements with respect to not having to come back and revisit a site.

We look at implementability, and that's simply how quickly and how thoroughly something can be done.

We look at the reduction of mobility, toxicity and volume. You can see how we evaluated those for the on-site alternatives, the short-term effectiveness. And cost also plays a role.

EPA's preferred remedial alternative is on-site remedial option 5C, with elements of 5F. And what that means is a vertical barrier wall encompassing all four source areas, drilled to the Hawthorn clay layer, on-site soil that exceeds the commercial and industrial SCTL's.

(Inaudible comments made by audience members.)

MR. MILLER: Okay. It's the vertical barrier wall encompassing all four source areas to the Hawthorn clay layer; on-site soil that exceeds the commercial and industrial SCTL's.

It will be addressed by both soil- consolidation cap inside the vertical barrier wall and a soil cover outside of the vertical barrier wall. It would be an on-site surface cap that covers approximately 83 of 86 acres.

In-situ biogeochemical stabilization treatment in the surficial aquifer zone at the four source areas, surficial groundwater extraction at the four source areas, and an eastern boundary until the ground water cleanup target levels of Floridan are met.

It also requires solidification, stabilization in the upper Hawthorn at the four source areas. Targeted chemical oxidation injections to existing wells in the lower Hawthorn group, remove the source area footprint, chemical oxidation wells installed and dedicated at the eastern boundary, as well as an on-site surface water retention base.

For the upper Floridan, we chose the hydraulic containment and monitored natural attenuation to address areas of the upper Floridan that are on the site that have constituents in excess of cleanup target levels.

We chose off-site remedial option 4, which is to remediate the most stringent standard consistent with current land uses. So, if there's currently a residence there, it would be remediated to residential Florida SCTL's, soil cleanup target levels. If there's a commercial venture there, then it will remediated to those levels.

Off-site in the creek sediments, we'll remediate to the probable effect concentration level. That will be hot spot removals of sediments in Hogtown and Springstead Creeks, with modern natural recovery to where there's no threshold effects until we reach the threshold effect concentration or background.

In addition, we'll also have institutional controls on the sites that will dictate what to be done with respect to groundwater and site use over time. This is a pictorial of that.

The surficial aquifer here, we're proposing to institute biogeochemical re-stabilization injected here to 25 feet. Site consolidation, with surface cover areas throughout the site.

A slurry wall that runs from the site surface to the middle Hawthorn clay layer, treatment inside the four source areas, stabilization and solidification in these areas.

In the lower Hawthorn, chemical oxidation injections in the lower Hawthorn.

And in the Floridan, extraction of groundwater with contaminate levels greater than the Florida groundwater cleanup target levels.

There's an over-fly view of the same thing I just went over. It's coming over the surface. And with that, I'll open up for questions.

MS. SPENCER: We're going to start the question-and-answer period. And, Robert, you can do your presentation. I'm sorry I don't have the visual opportunity for you to show it, but you can feel free to come to the mike and discuss your comments.

Just so you'll know, after Robert finishes his comments and presentation, we have a list of people that I'm going to call.

I'd ask that you keep your comments short so that we can open it up to other people in the audience that would like to make a comment or ask a question.

So, as soon as Robert finishes, I'll call down the list, and then we'll open it up for people in the audience to listen to your comments and to ask questions.

ROBERT PEARCE: My name is Robert Pearce. I'm speaking only for myself. I've been working with Protect Gainesville Citizens. As I had to interrupt, I apologize, some of you have a four-sheet set of diagrams that were part of the Power Point presentation that I had asked to be able to present, but I was told no. So, at the last minute we printed some copies, we printed a hundred copies. Thank you, Diedre. But I wish we'd printed, maybe, like 200.

I'm going to try to give a little bit of an overview. I live in the Stephen Foster neighborhood. And Springstead Creek runs through my back yard.

The remedy in the proposed plan is not the type of remedy the community wants, which is a cleanup, rather than a cover-up. I'm sorry that wasn't illustrated a little bit better. This diagram does illustrate it a little bit better. I'll get into that.

It will adversely impact the long-term economic health and vitality of surrounding neighborhoods. It will continue to threaten the regional drinking water supply, and it will not accommodate the future uses desired by the community.

If the site was far removed from civilization and the wellfield, using covers and caps might be an appropriate remedy. But the site is integrated well within the developed area of the city. It shares a three-quarter mile long boundary with a residential neighborhood, and it is directly upgrade from the Murphy wellfield.

The contaminated soils throughout the site should, therefore, be excavated and appropriately disposed and/or excavated and cleaned, on or off site, and be replaced. But the site, itself, should not be used as a hazardous waste landfill.

The Beazer-Koppers alliance is responsible for contaminating the land and the Springstead and Hogtown Creek ecosystems for almost 100 years with impunity. They are guilty of unconscionable environmental disrespect and abuse, which continued almost for 30 years, even after being placed on the national priorities list as a superfund site. And they are responsible for stigmatizing the surrounding neighborhoods for decades.

It's time the responsible parties are held accountable. And EPA should require a proper cleanup, not just a cover-up, which is what this plan is.

The groundwater is most threatened by the heavily contaminated soils deep within the four primary source areas. The remedy should, therefore, significantly reduce toxicity and volume of the contaminants.

Much of the contamination is believed to lie within the surficial aquifer above the Hawthorn group clay layer. At minimum, the source areas should be excavated at least down to the upper clay in conjunction with a slurry wall and demonstrated proven in-situ remediation at lower levels.

If discovery warrants, the source areas should be excavated to the middle clay. Excavation to the upper clay could be accomplished within a moderate time frame, and it will eliminate a great majority of the threat to the wellfield.

The surface soils both inside and outside the source areas are also severely contaminated, and also to unknown depths and quantities. Contaminants have been dripping and leaking onto these soils unrestrained and with no containment.

Soil testing has shown dioxin levels up to 13,000 times higher than Florida residential soil standards even well away from the four primary source areas. And, yet, EPA's proposed surface soil remedy is to surficially scape an un specified amount of soil to a non-specific depth outside the primary source areas, that's the green area. We produced these diagrams, too, by the way, not EPA. I lost my place here.

All right. Dump those scrapings into a 30-acre corral sitting on top of the even more contaminated source areas -- that's this area -- capping the pile, and covering the scraped area with some top soil.

EPA's soil cleanup at the surface would be to commercial/industrial target levels, and the contaminated soil below the covering would remain unremediated. This is not an appropriate cleanup remedy for a 90-acre piece of land setting in the middle of the city.

A proper surface soil remedy would be to Florida default residential soil cleanup target levels over as much of the site as possible, rather than the proposed commercial/industrial target levels, which are four to twelve times higher, and which would restrict residential uses. And soil should be cleaned thoroughly and as deeply as necessary to remove contaminants, not just a surficial scrape and a cover-up.

A proper remedy will result in a clean site, will eliminate the long-standing stigma associated with the site, and will correspond with the types of future uses desired by the city and community, which the proposed remedy does not.

The community's input is supposed to play a crucial role in the decision-making process on superfund sites. EPA is required to vigorously engage and integrate the community throughout the remedial process, and is required to place heavy emphasis on community input in the selection of the cleanup remedy.

EPA has been severely deficient in following both federal law and its policy directives in this regard.

EPA is required to establish a community involvement plan as soon as possible after a site is placed on the national priorities list. And EPA is required to update and revise that plan every three years, which never happened.

The community involvement plan process identifies the community's desired remedies and desired future uses for the site.

EPA is charged to protect human health and the environment. Together, with guidance from the community, are intended to drive the remedy selection, but that did not happen. Instead, EPA made its remedy selection in a virtual vacuum.

MS. SPENCER: One minute, Robert.

ROBERT PEARCE: Koppers was placed on the national priorities list in 1984. According to the administrative record, EPA drafted one community involvement plan in 1989. The community involvement plan is intended to be an integrated and active program throughout the process from the actual placement on the NPL to its deletion.

According to the administrative record, EPA has not updated or revised the community involvement plan since 1989, 21 years ago. And it wasn't until last month that EPA initiated a new community involvement plan, just one week prior to the announcement of the selected remedy.

EPA's policy directives emphasize the community's desired future uses and remedy selection. Re-use is inexplicably tied to the cleanup remedy, which must be protective of future uses.

In 2008 the Gainesville City Commission passed a resolution stating the site should be cleaned to Florida residential soil cleanup target levels. And, yet, EPA's proposed plan states, quote, the selected cleanup goals are for the commercial/industrial soil cleanup target levels for on-site soil sediments.

In early 2010, the Gainesville City Commission initiated a land use change petition with strong emphasis on desired future residential uses on the site. And, yet, EPA's feasibility study states, quote, on-site residential exposure scenarios are not applicable based on the expanded commercial/industrial and/or recreational use of the property.

MS. SPENCER: Robert, your time's up.

(Inaudible comments made by audience members.)

MS. SPENCER: Okay. I just want you to know that we're on a time constraint. He can finish by your suggestion.

All right. Finish, Robert.

ROBERT PEARCE: And so that there is no

misunderstanding, when EPA mentions future recreational uses, recreational uses are associated with commercial/industrial cleanup target levels because risk of exposure to contaminants is theoretically less than residential uses.

All of this has lead to a proposed plan with an inappropriate remedy. And it makes a sham out of what Congress intended to be an integrated community-guided remedial endeavor.

Although everyone is anxious to begin the remedial process, the remedial actions that are taken need to prove an actual cleanup.

The record of decision should put on hold and EPA should provide a proposed plan that actually corresponds with the type of cleanup the community wants and with the types of uses the community wants.

Thank you for your time.

MS. SPENCER: The next person to give comment will be Claire Marcussen.

UNIDENTIFIED AUDIENCE MEMBER: I'd like to point out that Mr. Pearce spoke for more than ten minutes.

MS. SPENCER: It's noted. But it was at the request of more than one person.

UNIDENTIFIED AUDIENCE MEMBER: I request everyone get more than ten minutes. Anyone second that?

CLAIRE Marcussen: I'll get started, so everybody has a chance.

My name's Claire Marcussen. I've lived in Gainesville since 1988. I'm an environmental consultant, and I have 20 years of superfund experience. And I'm assisting the technical team and the citizens group to understand some of the issues at the site.

Specifically, I have concerns regarding the target cleanup levels supplied to the site. The preferred remedy is supposed to be supported by evaluations completed previously in the FS.

Although it is deemed final, the FS does not provide summary tables of cleanup goals in soil sediment and groundwater. This is required, according to EPA guidance.

The soils, the FS only states that, upon completion of the remedy, post cleanup risks will be estimated to see if they meet the Florida target risk level of 10 to -6.

For groundwater, the FS references a summary table of cleanup levels. However, this table, 2-4, is not included in our administrative file.

As a result of these inconsistencies, it's very unclear how the various remedies could even be screened and evaluated properly. So, the cleanup levels were not identified as a basis for estimating the amount of cleanup at the site.

It appears that the proposed plan attempted to address these deficiencies by including a table of cleanup levels. For on-site soils and sediment, this table indicates that there's three possible cleanup levels for each chemical, to include the Florida default industrial/commercial cleanup levels, default leachability levels, or the possible application of site specific leaching data. However, the table has only one column of numbers, without specifying which of the three cleanup levels these numbers correspond.

Upon a more detailed review of this table, several errors were noted. None of these levels for on-site soil represent leachability levels. Some of the levels are residential levels for some of the chemicals, but the remaining chemicals having only industrial levels.

As a result, it's very unclear of the applicability of these values to each remedy, since they have never been discussed with respect to the documentation of the remedies to date.

Let me give you an example of our confusion. As Robert was pointing out, in the green area on this figure, it's unclear how much of the green area soils will be removed, if any, as a figure has not been included in the FS to illustrate how deep or wide the soil contamination is relative to the cleanup goals.

The only figure presented in the FS is Figure 1-9, which is right here. This figure shows average soil concentrations for three compounds in only shallow surface soil, and does not address subsurface soil.

Based on this figure, it appears that a vast majority of the surface soils exceed cleanup goals for commercial and industrial use across the entire site.

Since Florida's residential cleanup goals are far more stringent, the current planned cleanup will not be protective of future residential use of the property, thus, you need to restrict the property. This limits the use of the property.

Finally, EPA has classified nationally one of the main chemicals that was used at the site as a carcinogenic via breathing, inhalation, back in September of 2008. This was not considered in the risk assessment or in the selection of cleanup goals. This oversight results in less protective cleanup levels in soil and groundwater for this chemical.

In addition, this issue may have implications for areas where currently you may focus only on the leaching, when, in fact, maybe vapors are a problem.

Due to the lack of clarity in the FS with respect to the different types of cleanup levels, the basis for each remedy and the preferred remedy are unsupported.

To be fully transparent, an evaluation of soil sediment remedies using all three cleanup levels, as well as residential levels, should be conducted to demonstrated that they are protective of human health and the environment under the different land use scenarios. Note, this is also required to ensure the maximum beneficial use of the site.

So, in conclusion, the public requires

answers to the following questions with respect to the proposed plan. And I will hand you this, so you have it.

How does EPA intend to correct the errors noted and clearly communicate in the public documents what cleanup levels were used for each medium; how these cleanup criteria were used to estimate the amount of contamination that needs to be cleaned up; how and where each remedy will achieve the various cleanup levels, as this has not been presented in the FS or the proposed plan. And, finally, how will you demonstrate that, once you do clean up, that the cleanup has actually achieved those cleanup levels?

Thank you.

MS. SPENCER: At this time we're going to ask the mayor of Gainesville, Craig Lowe, to come and speak.

CRAIG LOWE: Thank you. I'd like to thank everyone for being here. I would like to point out that, actually, tonight is a regularly scheduled city commission meeting on a schedule that we set up over two years ago. We did actually take a long recess in order to be here tonight.

Unfortunately, we do have to return to city hall in not too long, because we do have items that we cannot put off on our agenda.

We did actually notify EPA of our regular meeting scheduled, and did request a rescheduling of this particular meeting, but that was not granted.

The City of Gainesville is in the process of reviewing the proposed remediation plan, and staff does have serious concerns, and we will be filing the detailed objections, and we are listening to the community's concerns.

We have filed for all 60-day extension for the public comment period. We have received a 30-day extension. And we will be seeking another 30-day extension of the public comment period.

I will be asking for a continuation of tonight's meeting, because, as you see, we have a large number of citizens here who would like to voice their concerns. And I'm sure that the allotted time will not be able to accommodate all of those comments. And we would hope that the continuation would be at a time when elected officials can hear the concerns of their citizens.

Again, I would like to thank everyone for being here. And, hopefully, we can work together in letting the Environmental Protection Agency know about our concerns with the plan and work constructively to resolving these issues.

Again, thank you so much for being here.

MS. SPENCER: The next person will be David Pace.

DAVID PACE: My name is David Pace. I've been a resident of the Steven Foster neighborhood for over 15 years. I've been attending these meetings for over a decade. It is not at all clear to the public or to myself how the proposed remedy will actually reduce the mobility, toxicity or volume of the contamination at the site. Those are EPA's words in your mission.

More specifically, the two technologies that are indicated for the source areas, the most heavily contaminated areas with the DNAPL, which is this goo of creosote and all this other toxic junk, the two technologies, ISBS and ISS -- and note, the "BS" is appropriate in both contexts.

I want to know how the EPA can demonstrate to the community that these are proven technologies. How they will provide safe, long-lasting, and permanent remedies? How will they actually reduce the amount and the mobility of the toxicity of the contaminants on the site?

I've done a brief review of the literature. And, from what I can tell, these are new technologies without any proven track record. Actually, during the joint city/county commission meeting in April, an expert witness testified that there's no scientific evidence that these are proven to reduce the downward mobility of the DNAPL compounds, and shook his head when he looked at one of the proposed remedies on the feasibility study.

So, it's my contention that we really need to re-examine these two technologies and demonstrate scientifically that they will protect the citizens from the downward migration of DNAPL compounds into the Hawthorn layers, which are like a big sponge. They're not exactly a clay layer. They're like a sponge, which is setting right above the Floridan aquifer.

So that is my contention, and I would like a response.

MS. SPENCER: You want a response today?

DAVID PACE: Yes.

MR. MILLER: Well, with respect to -- you went through a lot, Mr. Pace.

With respect to in-situ solidification, it's been a demonstrated technology. It's been in use for over 20 years on sites that have not only been cleaned by other parties other than EPA, but also by EPA. It's in use.

In-situ biogeochemical stabilization is a relatively new technology that's been piloted at this site, as well as other sites. It's been used at one site, a Denver Koppers plant, former Koppers plant in Denver, Colorado, where it has been shown to reduce, scientifically to reduce those contaminate concentrations.

But, Mr. Pace, that brings up a good point. We don't simply install or have installed these technologies. We require that they be demonstrated prior to their installation.

That proposed plan document is a large piece of work. And if you go and look in that, you will see in the plan, itself, for both of those, there's a required performance test prior to both of those being implemented at the site.

In addition, there will be continual groundwater monitoring nearby these technologies. And we will see over time if, indeed, it does reduce the contamination there. In the past, it most certainly has through in-situ solidification, and that has been demonstrated over time.

UNIDENTIFIED AUDIENCE MEMBER: Has it been demonstrated where the aquifer is setting right below a contaminated clay layer and contaminants are seeping down? That's my question.

MR. MILLER: It has been demonstrated in that exact situation in the southeast.

UNIDENTIFIED AUDIENCE MEMBER: What particular site?

MR. MILLER: Brunswick Wood is one. I tell you what. We can provide you specific sites. That's a reasonable question.

MS. SPENCER: The next person to speak is Diedre Bryan.

DIEDRE BRYAN: I have a question. It's about that land use thing. It's my understanding that citizens and the city commission have repeatedly expressed their preference for residential land use soil cleanup levels. And you've got, in your proposal, commercial/industrial.

So, why did you choose that one, when you're supposed to get all this community input, and you seem to ignore it?

So, if you could explain how you chose that commercial/industrial use.

MR. MILLER: Okay. Ms. Bryan, let's address that. For starters, there are terminologies used that are different in the environmental field versus the zoning field, or the land use field.

Okay. Residential use means unrestricted use in the environmental world. So, when you say unrestricted use, this is virtually no hazardous waste site around that has unrestricted use. And that's what that terminology means in the environmental world. Okay?

So, if you're speaking to the standard, what we look at in the standard, when we make this determination, is we look at anticipated future land use based on what's happened there, and some other criteria with guidance that I'll be more than happy to provide you when we look at making those types of decisions.

But what we're not saying with respect to that is that that site cannot be used in some form or fashion for residential use in the future. And, in fact, there are many sites that have been cleaned up to commercial/industrial standards, where there's been exposure barriers deployed at the site, and there's now residential use. Okay? People live there. Townhomes. That would be also appropriate for this site.

DIEDRE BRYAN: But why did you use industrial, when we know that's not what anyone wants?

MR. MILLER: What we do is look at a set of criteria based on, among other things, what the folks who own the land say they're going to look to use it for in the future. We also look at other criteria.

But one of the things that has not been thought of and is not being planned for in the future by the current site owner is unrestricted residential use, three-bedroom, two-bath houses with no restrictions whatsoever. And I think the reality of it is, is there's not a big demand for unrestricted residential use on a former industrial site. And --

DIEDRE BRYAN: (Inaudible.)

MR. MILLER: I think what she asked was could you do residential with limited restrictions.

DIEDRE BRYAN: Minimal. I'm sorry.

Minimal.

MS. SPENCER: Do you have another question before I go on? Okay.

I'm going to call one more person off of this list, and then I'm going to open it up to everyone else, and then I'm going to come back to the list so that it can be fair and equitable for everyone to respond.

The next person is Jerry Steinberg.

JERRY STEINBERG: My name is Jerry Steinberg. I'm an environmental engineer with Water and Air Research, a local environmental consulting firm. And, as a matter of fact, there's about four environmental people from Water and Air Research here tonight.

I'm a licensed professional engineer in Florida, and have worked at superfund and regular sites over much of my 30 years as an environmental engineer consultant.

I'm a member of the technical team that is assisting the citizens group. And I've been involved with the group only since last week. So, recognizing, folks from the EPA, that I really haven't had a lot of time, I am going to throw a few comments and questions at you.

The time is limited. I want to give other people time to speak. But I'm trusting that the answers to these questions will be coming forth during the comment period.

The next comments that I'm going to make address the soils above the Hawthorn. Basically, in the surficial aquifer. It is not clear whether or not all soils at the site will be required to meet ARAR's.

I'm going to use a lot of acronyms to get through this. And I apologize if I lose a few people. But the folks up front should understand the questions.

Does the plan require that all soils not contained within the blue area here, in other words, in the green area, are going to meet ARAR's? Or might there be soils above ARAR's left without any active remedial action?

There seems to be more information provided by soil cleanup in the blue area than in the green area.

While I've only been working on this matter for a few days, I looked briefly in the feasibility study for a clear depiction or picture of soil contamination in the green area and I did not find much information.

For example, I would've expected sketches of contaminant concentration, isopleths at several depths.

So, having reviewed the proposed plan and briefly looking at the feasibility studies, I can't tell how the soils in the green area will be cleaned up.

Is there a description or depiction of soils above ARAR's in three dimensions for the green area in the feasibility study?

Are there engineering calculations of volume of soil not meeting ARAR's? What is the remedial strategy for these soils?

Again, addressing soils at the site. I cannot tell how much attention was given to on-site treatment of soils above ARAR's. While I saw mention of this remedial approach in the feasibility study, where it was identified as a viable option, I did not find any engineering calculations of soil volumes and costs that could be treated on site, that soils could be treated on site and replaced there. Were such calculations and costs derived? Were they derived respectfully for the green areas and again for the blue areas? Were they based on testing results showing soils above ARAR's? And, if so, can you provide these calculations and costs?

The preceding question specifically addressed on-site treatment of soils. We have not had sufficient time to fully review the evaluation of other technologies that may have been excluded. In other words, I've sort of tried to look at what might not have been considered in the feasibility study, but time has been a limitation.

It is important that those technologies that may more aggressively treat the waste or actually reduce the volume or mass of contamination be fully considered with respect to all feasibility criteria.

Technologies that achieve the most reliable and permanent solution, especially with respect to future land use objectives, must be thoroughly evaluated prior to the plan acceptance.

The criteria in the plan for what will guide cleanup of soil is not easy for me to understand. At one place I believe I read that soil ARAR's will be no less stringent than State of Florida soil cleanup target levels.

So, the question is: Is that correct? Are the leachability SCTL's applied as a cleanup criteria to all soil contamination at the site if it is the lowest ARAR?

There is a recognition that certain types of contamination, if taken off site, must be managed at a hazardous waste facility. The plan is not clear whether all the contaminated soil taken off site must be managed as hazardous waste.

What does the feasibility study specify as the requirement for soils in the blue area versus the contaminated soils in the green area? How did or would different requirements affect the engineering cost estimates?

Now, quickly switching over to deeper groundwater soils. Deeper soils in the groundwater contamination above the Floridan aquifer, it appears that the preferred remedy includes the use of stabilization and ISBS. I'd like to more comment, and hopefully we'll get a little bit more comment, on the effectiveness and performance of the ISBS. We've just had some of that.

But, more importantly, what I did not hear in the response to the lady's comment earlier was how do you plan to monitor to determine its effectiveness, and what data will be gathered to enable the final remedial action implementation?

The plan states that the Florida Department of Environmental Protection supports the preferred alternative. I believe we have some FDEP representatives here. So, I'll be addressing you for just a minute.

The citizens group would like to learn more about the FDEP technical review, and specifically the FDEP environmental engineer's and hydrogeologist's comments on the feasibility study. Where can the details of the FDEP engineer's and geologist's reviews and comments be found?

And my last comment is, the proposed plan document seems vague, or at best uncertain, with respect to how soils and groundwater will be cleaned up to meet all the ARAR's.

A record of decision must be a more detailed decision document and much less a list of things that might be done. And that record of decision really must be based on evaluations completed in prior studies like the feasibility study.

It's really not possible for the affected parties and the stakeholders to effectively comment on the acceptability of the remedies without this additional detail.

Thank you.

MS. SPENCER: Before we move forward, Scott, I don't know whether or not you want to address at least one or two of those questions. I'm not sure you can address all of them tonight.

(Inaudible comments from the audience members.)

MS. SPENCER: Okay. Well, what we're going to do is, I have a list for the Protect Gainesville's Citizens Group. And I promise that I'm going to allow each of you an opportunity to speak. But I do realize that there are people here who are not a part of Protect Gainesville's Citizens that may want the opportunity to speak. So, I'm going to call a couple that have given me cards, and then I'm going to get back to the list. And then I'm going to go back to those people that are not on this list. Is that fair enough?

Stephen Boyes.

STEPHEN BOYES: I'm Stephen Boyes,

Geosolutions. I'm a hydrogeologist. I've worked in the Gainesville area for a long time.

A few questions I have, or concerns I have, is cut straight to the model. The clays are indicated to be continuous on the models. They've consistently indicated that, yet they're not.

I've raised this concern at numerous meetings, and they still continue to be represented in the documents, in the designs, as being continuous across the site. These are lenses that are discontinuous, they're not connected.

GRU in its excavation on South Main Street has gone through the top of that first clay, and it's not there in some of the places on site. It's discontinuous. These are lenses that are not connected. That applies also to the second clay bed.

In Florida we have licensure requirements for engineers and geologists. Geologists are required, when they present something like this, to put their seal on it. And, in order to submit plans to the State of Florida, an assessment requires sealing by professionals, as well as design plans for environmental cleanups that require professional engineers. I've seen no professional seals on any documents developed for work on this site.

That pretty well covers it, other than the one question I have. How much money is available from Beazer to clean up this site?

MS. SPENCER: Okay. Jeanette Hinsdale.

UNIDENTIFIED AUDIENCE MEMBER: Do we get an answer?

MS. SPENCER: Scott, do you have an answer at this time for the last question?

MR. MILLER: You asked me how much money that Beazer East has for the cleanup? I don't know that. We don't address that. We just specify cleanup.

JEANETTE HINSDALE: Good evening. My name is a Jeanette Hinsdale. I'm a lover of Alachua County. And I thank everyone for being here tonight.

There's no heavier burden than the great potential. And I don't think this plan is heavy enough to deal with the potential that we have to offer.

This plan is addressing the Koppers, not the

Cabot site. And there's 1989 CIP, Community Involvement Program, the Citizen Involvement Program, that state citizens' concerns relating to the creek. They're also talking about the shopping center parking lot, the auto dealership, as well as the impact on the creeks that goes beyond this site. And we're 20 years later. There's actually documentation of this CIP. And I'm wondering what are your plans to address those concerns? What happened to those previous concerns?

We understand -- well, Steve said this, but I want to say it again. We understand it's the state statute that remedial investigations and feasibility studies need to be signed by a Florida registered professional so that someone takes responsibility for the contents of these documents. And I want to know a why has this not been done? Who's responsible for the technical accuracy and the quality of these documents? Who's to be held responsible for these documents? Like the geologist who came up with the plan is a professional who signed off on the design.

From what I've heard from Steve, it's an illegitimate proposal, presentation, it's bogus, because of the continuous clay, it's not there, it's discontinuous. There's no seals.

I'm suspicious of the bath tub, the slurry wall. It's not really a bath tub, because it doesn't have a bottom. The bottom is the clay, Hawthorn clay formation.

I'm really suspicious of this not having a bottom. I'm afraid it won't prevent the contaminants from seeping further, because the ideal is that you're going to have this bath tub with the Hawthorn clay formation for the bottom and a cap on top. And the idea is that the rain water's going to come down, and it's not going to through the cap, so it's not going to go through the contaminated soil area and it's not going to reach out to the groundwater.

But, in reality, what really happens is the rainwater falls on the cap and it also runs off and falls where the rest of the rainwater's falling, on the ground. And us here in Florida know the groundwater levels rise and fall. And sometimes during hurricane season, they're right there, you know, beneath the surface or above the surface. And, so, it's like steeping tea. When the water rises up, it's steeping the contaminated soil, and then the level goes down, falls down, and the contaminated water goes with it.

So, you know, it's just, like, what professional came up with that plan was my question. How are you going to monitor the bottom, the water quality, the water level?

You know, also, if you do put that in place and it works, what type of an event would cause you to come back and have to do more? Do you have a plan in place for that?

Also, I'm not a professional, but I was wondering about the Floridan aquifer. Because you say that you're monitoring the superficial aquifer and the upper aquifer. So, I'm just wondering how much of the Floridan aquifer you're really monitoring.

Thank you very much. That's my comments for the evening.

UNIDENTIFIED AUDIENCE MEMBER: Where can we find answers to these questions?

MS. SPENCER: The answers to these questions will be in a summary that will be made public.

DAVID KEEFER: Good evening, I'm David

Keefer. I work with Scott Miller. I'm also in the superfund program. And I'm here tonight to listen to the community. Obviously, there's great community interest in this site and the cleanup plan. So, one of the things your mayor has asked for was an additional opportunity to make sure everybody's voice can be heard. And that's something that we're considering.

When this meeting is over, we're going to sit down and look at something to put together to ensure that everybody has a chance to speak.

Several people have asked for information that we can provide in short order, and can do that through our website.

Overall, the public comments are addressed through a document called responsiveness summary, which is part of the record of decision. And, you know, we need to work on -- yes, ma'am.

UNIDENTIFIED AUDIENCE MEMBER: (Inaudible.)

DAVID KEEFER: That's what I was trying to address earlier, is we clearly need to have a longer dialogue with this community about this cleanup plan. We may also have lots of legitimate questions that we need to do a good job answering and clarifying.

And I don't have an answer for you to tonight as to when we can get together again and talk. That's -- we're going to have to figure out when we can get that scheduled and coordinated with the mayor and city commission's office. But we will get back to everybody on the mailing list, make sure your name's on the mailing list, and let you know how we're going to continue this conversation

UNIDENTIFIED AUDIENCE MEMBER: (Inaudible.)

MS. SPENCER: Her question is whether or not there's going to be a place that the public will be able to read the questions and the answers to the questions.

UNIDENTIFIED AUDIENCE MEMBER: Or challenge your answers.

MS. SPENCER: Or challenge the answers.

UNIDENTIFIED AUDIENCE MEMBER: (Inaudible.)

MS. SPENCER: Again, I think David mentioned we're going to have to get back together, not just with EPA, but also the city to determine how we can further this conversation. So, I don't think there's an answer to that, but it should be forthcoming is what I'm hearing.

Okay. I'm going to go back to the list.

Kayla Sosnow.

KAYLA SOSNOW: I want to make a suggestion, L'Tonya, that you call two or three people at a time, so we don't have to waste all this time with people getting up out of their chairs and coming down here.

I have two comments. One is that the EPA originally had a list of 33 chemicals of concern at this site. And I've heard that you're now only concerned about remediating five chemicals.

So, my question is: Does that mean that you're not looking for the other 28 chemicals? So, if they're present, they're just going to be left there?

And my second question is: You state that some soils would be removed during re-grading and placed in the consolidation area. Is there a process determining which soils, what areas they're in, and how deep you'll be going, so that most of the site outside the source area would have few restrictions for redevelopment, and was that evaluated in the feasibility study?

MS. SPENCER: Okay. The next person is going to be Sharon Sheets. And after Sharon, we'll have Sharon Woodruff.

SHARON SHEETS: Hi, folks. For a long time we've lived right next to Koppers, three doors away. Been to a lots of these meetings since '83 exactly. And I'm glad that we're all here tonight. And I hope that EPA can see how concerned we are and that maybe we need a little bit more time and EPA needs a little bit more work on this plan.

Being a resident -- and I have signed to have my soil studied. I've had fugitive dust sampling done. I've got CCCA's in the yard. So, I've got a toxic yard. Supposedly, not hugely toxic, but I don't trust to eat out of my yard, have my hens in the yard. I keep my windows closed. Breathing the dust, just fugitive dust is toxic. So, I signed on to have deeper soil testing going on.

And I didn't see anything in this document that we have that addresses what's going on with off-site soil testing. How many of us are -- or what's the extent of the off-site soil testing? When can we expect it to be completed? How does this fit in with what offer that we've already been given to treat the site? What about off-site and how all of us are being affected?

How long do you expect for it to take? And will we, as residents, immediately, or pretty immediately, get the results of whatever's going on, so that we can effectively take care of ourselves? Because we've been trying to do this without very much cooperation. I've been asking for years.

Second -- and I flyered the neighborhood up and down the Koppers line for years and years and years for all the meetings that we've ever had. There are people that live right on the line who swear to me that there are lagoons and barrels that are still planted and have not been identified on the perimeter of the property. And I really do believe that we have the technology that some of this could be looked into. I don't know that anybody has actually done any, I want to say -- and I know it can be done, I mean, it's possible. If there's any more in-depth study having been done, particularly along the perimeter of Koppers, where many of the people who have been affected health-wise with various forms of cancers, and what have you, swear that they have witnessed lagoons being plowed under and barrels being buried. So, I'm still curious about that and whether or not there has been any effort to identify those. It seems that they could very easily be found. So, my question is mostly for us property owners.

And then, really, what kind of remediation can we expect, given that -- seems like the plan is just to bury the worse of it, leave the green area pretty much as is. And those of us that are right on the periphery, we're SOL, you know, can't sell our houses, can't rent our houses, and where do we go, what do we do? And we're not in good health. Thanks.

MS. SPENCER: Sharon Woodruff.

SHARON WOODRUFF: I'm Sharon Woodruff. I have lived four to nine blocks from the property line of Koppers for most of the last 40 years. So far, only one of my family has died of cancer, and two of our blessed dogs. I hope that's going to be the end. But tonight I want to address something that no one else has addressed. The potential land use.

The premises of the feasibility study are so flawed, so imaginary, so erroneous, so negligent, so inadequate, and totally false in so many way. It does not take a scientist to look at it and say: Whoa, let's start over here. Who is going to say that?

Since the imaginary tenants for future land use were composed by persons totally unfamiliar with the neighborhood and its processes, major changes have made even the stupid original postulates even more unrealistic.

First, the railroad is now a recreational trail south of the site. And the only natural use of the railroad space to the east of Koppers is to extend the recreational trail now that the captive use by Koppers is now a moot point.

Second, the feasibility study states that recreational access is present in the neighborhood at Stephen Foster School and at Sidney Lanier School. Go look again. That's been purely imaginary for years.

In truth, chain link fences and "keep out or be arrested" signs greet all who attempt to enter the school grounds.

Third, the Walmart store on Northwest 13th Street will close forever in two years. The potential for commercial use in the Northwest 23rd Avenue strip is purely imaginary by someone who does not live in Gainesville, and probably has spent very little time here.

There are so many more things that are just totally wrong in the beginning. Studies that test the top one to six inches of soil? What about below that?

What about the combinations of poisons? Somebody's mentioned that already.

What about capillary action? We have such intense dry spells, and then such heavy wet spells.

What about the runoff? That has still not been adequately dealt with. You've killed two creeks already, Springstead and Hogtown. That has not been properly addressed. We want our creeks back and healthy.

In the 1970's I learned a computer term which basically describes this whole process. I can tell there's some other programers here. GIGO. Garbage in equals garbage out. That is what this feasibility study is. And it needs to be started over and done right.

MS. SPENCER: Okay. I'm going to do a quick time check. It is now 7:30. I'm going to call two people from the list, and I'll check the time at that point. Because, before the meeting ends, I want to introduce the technical advisor for the Protect Gainesville's Citizens, Dr. Pat Kline. And I also want to introduce to you the person who applied for the grant and received the grant for Protect Gainesville's Citizens, Cheryl Crowe.

UNIDENTIFIED AUDIENCE MEMBER: (Inaudible.)

MS. SPENCER: The meeting can be extended, but it will not go on public record, because we will not at that time have a person to record it.

UNIDENTIFIED AUDIENCE MEMBER: (Inaudible.)

MS. SPENCER: By law, we have to our own person, court reporter. And before you get started, we are going to talk -- okay. Hold on. Wait.

Before we get started, we are going to discuss possibly having another meeting or other ways to get your comments. So, the comment period is not over. So, please, don't expect this to just be the last time that you have an opportunity to give a comment. Please be reminded this is not the only way and it's not the last way.

I'm going to call Kim Popejoy and Gina Hawkins.

KIM POPEJOY: I'm Kim Popejoy, and I'm chair of the Superfund Art Project.

Scott, I also own a piece of property that's stuck right in this little corner. You have this large green area here in which the surface soil concentrations, particularly of dioxin, are way above the target levels.

As I read the proposed plan, one of the ways that you could deal with this is by leaving the contaminants on-site, and then covering it with two feet of soil. What would that do to potential future uses? And does that mean that you don't really have to refine and further characterize the other possible sources in this area?

So, those are a couple of questions. And the other things are more broad and general questions.

And I ask all of you to take a look around yourself and look at each other, and realize that you being here tonight do have an impact on this process.

So, Scott, how can we change the record of decision? How can we affect the proposed plan? And, as far as this proposed plan is concerned, how can we change your mind?

GINA HAWKINS: Some of you may remember me as Director of the Cleanwater Action Project back in 1983 that began work on this site. Others of you know me as your neighbor in the Stephen Foster neighborhood since 1986.

And I want to say, in 28 years of experience working on solid and hazardous waste management issues, I've never seen the State of Florida ever allow the construction of a permanent storage facility for PAH's, copper, chromium, arsenate, let alone an uncontained mound covered with a tarp. No municipality would ever be permitted to store waste in this manner. Therefore, I find it reprehensible that you're proposing this as a permanent storage site of these materials under a tarp.

Finally, my last question. The regulations require that the extent of contamination be defined typically during the remedial investigation. Why, 20 years after the initial ROD, is this not complete?

I've been involved for a quarter of a century. I'm going to be living there another quarter century. So, I can wait you out.

When will you consider your identification of the extent of the contamination complete? And I want to know a date, and at least include a year, if you will.

MS. SPENCER: Okay. We're going to have Dwayne Mundy and then Joe Prager.

DWAYNE MUNDY: Thank you. And my question is kind of along the line of Gina's. Are there any other communities in Florida that have an unlined toxic waste landfill in the aquifer protection zone of their primary source of drinking water?

Thank you.

JOE PRAGER: You. I'm Joe Prager. I publish a website called Ban CCA dot org about CCA treated wood. Many of you have seen me speak on this issue before and about the superfund site. I'm going to try to be brief.

The plan should be rejected, marked "return to sender," and mailed back to Scott.

I am glad to see Mr. Keefer's here, and also Mr. Osteen's here. I've read some of Mr. Osteen's letters, and I'm going to mention them tonight. So, I'm glad he's here, so I'm not talking about him without his being present.

I'm very concerned about the fast track process that this has undergone, where Beazer is treated with kid gloves. I asked the question the other day if they were being given de minimus status. Apparently, that's not quite true. But I can't really tell the difference. That's a legal term for when you get out of paying for things or pay the least possible cost.

So, I think removal of the contaminated source area, the blue there, would be a better option. If we can dig down to 40 feet at Depot Avenue, we can dig down to 40 feet here and get rid of the bulk of the contaminants.

I'm concerned that we've picked one of the bottom three cheapest options. Again, who is paying for this? Beazer. Are you guys getting stock options? Because we may want to get in some of that action ourselves.

The Cabot site is an example of what can go wrong when you use the method that's used on this site plan. And I'm going to mention your letter, Mr. Osteen.

There's a letter on the administrative record that talks about how Well HG29 on the Cabot site, about right there, has perplexingly purple water. We may be drinking that someday. And Mr. Osteen was smart enough to realize that

that's not just chemicals, you know, that water's actually purple for some reason. So, we need to study it more.

And when you read letter after letter, whether it's something from Kelsey Helton that was written in November about testing the schools that are south of this site, or whether they're letters from our own county officials, city officials, toxicologists, they all say we need to study this more.

So, my question is: Why are we coming to a plan when the remedial investigation is incomplete?

Why haven't the yards been tested?

I'm also concerned that we got something called the administrative record index, it's on a CD. Now, you guys know how big CD's are. There are 220 PDF files on that. This site has been on the NPO list for 26 years. I think there should be more than 220 PDF files. Where are the rest of the documents?

Contaminants are already leaving the site, folks. There's a naphthalene plume that heads north already now. So, it's about right here. Okay? It's underground, and there are residential lots there, like Mr. McGee's, if he's here, and other people.

And, so, Mr. McGee here has naphthalene underneath his yard. Now, if I had naphthalene under my yard, I'd want somebody to come clean it up because of vapor infiltration.

Homes in Florida are built on a slab. And naphthalene rises up through sand and soil and limestone, rises right through concrete slabs, and you breathe minute amounts of it. That is why the floor tiles in the back of the Kmart peeled off on the Cabot site.

So, we also have possible surficial aquifer contamination on the western side that Roy was going to talk about, if he got the opportunity, including residential wells that were bought by Beazer and Top Kill. We know what means now; right?

So, if the wells that are close to the site in the residential area are contaminated, I think that's a concern, because the horse is out of the barn.

We know that the soil on the streets in that western area are contaminated. How do we know that? We know that because the city is concerned about it, and they generate this map with these little yellow stars. It's on the administrative record I just mentioned. You see all the those little stars? That's where dioxin is above seven parts per trillion, the Florida SDTL. That means the dioxin levels are going to give you cancer eventually. And it's a concern for the city that got mentioned to Mr. Miller, because they're concerned about their workers' health. So, if they're going to re-pave these streets, they're worried about the dioxin levels that are underneath the street.

I'm worried the dioxin levels that are in those people's front yards. Okay. If it's too toxic on the workers, it's too toxic for our residents.

And with regard to that toxic dust, we are now in the Stephen Foster Elementary School, we are point .6 miles, as the crow flies, from the site. We've tested some of the homes in this area as part of the 500-million-dollar lawsuit. We know that the dioxin dust levels are really, really high. Some are 1100 parts per trillion compared to 7. You guys know how much that is.

So, what are the dust levels in this school, or the one that's directly south of the site, or any of them within three quarters of a mile? And why aren't we checking that? I would think that would be the responsibility of the EPA.

On-site sources are not being addressed either, folks. And it's not like they haven't been informed. And like somebody brought up, we've had 26 years.

Here's an aerial photo. Here's the aerial photo of the Koppers site, circa 1965. This is the northern most area. So, it's the area at the top of the rectangle area. See all the woods? Here's the same area in 1971. Notice the trenches. You see the six parallel trenches? They're a couple hundred feet long. See them? They don't exist, folks. Forget about it. We don't know what they were used for. I've been asking those questions.

I've been asking about buried drums, because there are people saying that they saw that, and those issues have not been addressed in this work plan.

So, why is the EPA tone deaf? You guys can hear me, but I guess they can't. I'm sorry. It's just a fact.

With regard to the possible buried drums, there's a multi-level well, number FW-12B, and it's on some diagrams you have. Now, a multi-level well has four sensors. So, there's a sensor here, one here, one here, one here. That well is real close to where the eye witness said the drums are buried, and it detects contaminants at the first, third, and fourth levels, which is highly unusual. Okay. So, why aren't we doing ground penetrating radar, like Ms. Sheets suggested? It's real inexpensive to do that.

Two more points, and I'm going to wrap.

There's been no proper health study done. People have had 10 cancer victims in a single household. Pets are dying. Birds are dying. Why did the ATSDR rubber stamp the FDOH's report and say there's no problem? I don't understand that.

But I do understand the Pottery Barn rule. You go in the Pottery Barn, you break a vase, you pay for it. So, I think Beazer should follow the Pottery Barn rule. They broke it. They should pay for it.

Thank you very much.

MS. SPENCER: Okay. At this time I'm going to ask the technical advisor for Protect Gainesville's Citizens to come forward.

UNIDENTIFIED AUDIENCE MEMBER: (Inaudible.)

MS. SPENCER: Okay. I'm going to repeat her question, because in absolutely 10 minutes I am going to close the meeting.

She wants to know, for the record, why there has been no indoor sampling.

UNIDENTIFIED AUDIENCE MEMBER: (Inaudible.)

MS. SPENCER: Okay. But we have two other people that have the right to speak, as well. And I have used your whole list.

UNIDENTIFIED AUDIENCE MEMBER: (Inaudible.)

MS. SPENCER: I'm not going to argue with you. Excuse me, please. Don't argue with me.

Dr. Kline, would you please come forward for your comments, please?

PAT KLINE: This is a hard group to follow. And I'm Pat Kline. And I have been -- recently the Protect Gainesville's Citizen selected team to help clarify some of the technical issues and help communicate your issues to EPA to the extent I can, or clarify things to you.

And, you know, this is a really impassioned community and engaged community. And I want everybody to recognize, from EPA, that the people who are brave enough to come up and say these things reflect only a few of the people that have these kinds of feelings. Obviously, there's a number of people that want to talk.

Some of you know me because I've been involved in this because of the city. And I've been reviewing some documents, and you probably already know what I'm going to say, because I'm typically consistent, at least, whether or not that's good.

And I appreciate the City of Gainesville also allowing a continued collaboration with our group. Because, to address some of these issues, takes a lot of depth and breadth of technical expertise. And I need to work with you on that.

Now, one thing, I'm personally --

UNIDENTIFIED AUDIENCE MEMBER: (Inaudible.)

PAT KLINE: Pardon?

UNIDENTIFIED AUDIENCE MEMBER: (Inaudible.)

PAT KLINE: Oh, well, we'll see. For myself, personally, and most people I talk to, we want something to move forward. We want the site cleaned quickly. We don't want to go another five years doing a bunch of studies. So, to the extent we could do things that makes sense, that are acceptable and adequate and transparent, we want to go there.

So, some of the purpose of my comments right now are to make sure that we fill these gaps the extent we can --

UNIDENTIFIED AUDIENCE MEMBER: (Inaudible.)

MS. SPENCER: Okay. I have asked that you all be respectful. And I'm trying to give people, who have requested the opportunity to speak, to speak to the extent possible.

Again, this meeting will end at 8:00. And I know some of y'all are angry about that. But there are other opportunities to send in comments.

So, if you're going to continue to be disrespectful, we can end the meeting now.

Thank you.

PAT KLINE: I'm going to shorten my comments, because many people were very effective at making these, but I want to draw your attention to a couple things.

One, the green area. The green area, because of the fact we have Dr. Elmer Acorn. And if you want to know exactly how to do an FS and look at areas and volumes, please talk to him also. We'll bring him in. But the idea is you can't take some vague, well, we'll re-grade, we'll do some covering, we'll do something else.

You've never done a document with leachability comparisons or with leachability criteria. You've never done a map with data saying where the exceedences are.

We have no idea if and where any place on that site you could actually remove dirt and have no cover and have it protective from the standpoint of soils. And I think we deserve to know that.

And I personally sat at a meeting and asked that, in the subsequent FS, you look at risk assessment, but I asked to look at looking at the volume of soil you'd have to remove to get to commercial/industrial and residential. And the reason for that is, we have had a lot of language barriers here, but sometimes those may be the exact same volumes. And at least we have the right to know what it would cost.

Now, I have previously looked at the consolidation thing. But after talking to so many people, I realize that we would also like a cost estimate for off-site disposal of these contaminated soils.

Now, I want to be clear that there's a distinction here between what you guys can evaluate quickly. I know other people here that can evaluate the cost to 22 acres off site. We can do those. But you guys have the data.

You never presented the subsurface data in the FS, and you never estimated the volumes and did the comparison. And I think that's a deficiency in the document. And when you go to the ROD, you need to be able to say that in the ROD. So, some place you have to present it.

So, give us an addendum that shows us these numbers. It's not rocket science. It will not take you that long. You can probably do it in a couple weeks. Then we would at least understand what we're arguing about.

The other thing, as a technical advisor, I would say, in addition to the vagueness -- and I do -- oh, two things. One is, Scott, thank you for very much for giving us SDTL's, particularly off-site. But, you know, I think this whole green thing is kind of a camouflage, making us feel it's all going to be clean. And that's not at all the case.

That entire 90 acres of that site could be covered with contamination every place across that whole site, and that's pretty unacceptable.

As the technical advisory team, we come in, and I'm going through the record and I'm trying to figure out things that I have not worked on very much before, like groundwater. And what I'm finding is,

Here's a report with some Floridan wells, and here's a report with some Hawthorn wells. It is a big disconnected mess of things. I have not seen any comprehensive groundwater data summary that lets us know what is where in groundwater.

I would really appreciate, since the data's there, I know you have it, I know you know the wells, I know you've got the coordinates for these things and the data and databases, I think you need a data summary report. In fact, I think that should have been in the FS also.

But I think having all these segmented reports that I've seen makes it very difficult for anybody -- I don't know if it's intentional or what, for anybody to really have a good understanding of what's going on.

And when you say something like you can do leachability, we'll either use the numbers or we will maybe make up our own. How do we sign off on a plan we have no idea what that means?

Do the evaluation now. Let us know what it is. And if we want to fight that fight, at least we know what we're fighting.

I will be more formal with my request. But I'm telling you that some of the data isn't there. It's not in the FS. I think you can do it in the next few weeks, allow us a chance to review, then we can give you more meaningful input and support your ROD when you get there so we can go through that process.

And I want to think the rest of the team members for getting out, and the community. Great job. Thanks.

CHERYL: Hi, I'm Cheryl. I'm from Protect Gainesville's Citizens. I know you've heard this request a couple times tonight, but we're all here to meet and come to the table with you guys and discuss this thing. I'd like to ask you to maybe take five minutes to 8:00 and talk among yourselves. Even if the court reporter goes home, we have a videotape, even if it doesn't get on the official record, roll up your sleeves, sit here, and listen to this community. Give everyone in this room that want an opportunity to speak an opportunity to speak. Just show us that you care, that you want to hear, and it really makes a difference to you what we have to say.

In addition to that, we'd like to ask for a second 30-day extension, giving us from September to October for public comment. Of course, I put out there the caveat, if you decide when you go home that you need to re-write this proposed plan, you can just postpone the public comment period and let us know when the new proposed plan is ready.

If we're going to continue forward, we'd also like to reiterate, we want a second public meeting held further towards the end of the public comment period so that we have more time to have this discussion.

We would like the transcript and responsiveness summary for us to review at least 30 days prior to the end of the public comment period.

We've asked a lot of questions tonight. There's no way that we can actually respond effectively to this proposed plan without the answers to those questions. Giving us the answer to those questions along with the record of decision is not acceptable. We need the questions now, so that we can actually work with the information that you give us.

I think you've heard this already. We're in the process of reviewing the administrative record. At this time it does appear that some of the documents that are referenced in this, the documents that are there are missing. Our technical advisors are working at preparing a list of those documents. So, again we need those documents before we can prepare our complete response to this proposed plan.

And I think that's probably about it. Oh, here we go. The last one I wanted to ask for.

There's a lot of technical data that's referred in these documents. It's very scattered. We'd asked for this before. We would like a complete set of the data and the data summaries that this document that the proposed plan and the feasibility study are based on. Every one that did some piece of this has their data. We'd like it in some kind of database format. Whatever format you want to give to us is fine, but we'd like the data so that we can review it.

SANDRA WATTS KENNEDY: Test the inside of our homes that have been tested already that show (inaudible). We have children. Hello. There are -- I don't want to talk about all the miscarriages, the birth defects that go on. When you start going door-to-door in our neighborhood and getting these anecdotes, it's horrifying. Almost anybody here will testify to that.

I can't believe you're even human, when you won't even look at us when we've asked for this before very politely. Please, I'm begging, come confirm. Or, better yet, if it turns out that there's something wrong with the data, let us know. People live inside their houses.

This is a human factor, and it is your mandate. It is the EPA's mission statement, after all, to protect human health and safeguard the natural environment upon which life depends to ensure that all Americans are protected from significant risks to human health and environment, where they live, where they learn, and where they work.

I'm Sandra Watts Kennedy. I represent Stephen Foster Neighborhood Association, Incorporated. Thank you.

MS. SPENCER: Okay. What we are doing, we're checking with the school to see if it's okay, that they have someone that will lock the school until we're done. And we will proceed until 9:00.

UNIDENTIFIED AUDIENCE MEMBER: I have a key, and I will stay until the meeting is over.

MS. SPENCER: So, we will proceed until 9:00, for those people who would like to stay. I still have a list of names here for people who want to give comments, as well as a list from Protect Gainesville's Citizens. I'm going to start with the list that -- for those people that are leaving, can you leave quietly so that we can continue with the meeting, please.

I have an Armondo that had a comment. Is Armondo back here?

UNIDENTIFIED AUDIENCE MEMBER: Mr. Miller, I'm going to address this question to you. Although, I don't see you. My question is going to be -- it's unfortunate that we don't have Beazer's representative here. I'm sorry.

Hopefully, I'm loud enough.

Two things, we don't have the Beazer's representative and we don't have the administrator or the Obama appointee from Jacksonville here.

But my question would be: Is there any way that we can get some clarification, once we have clarification, about how much Beazer will actually contribute to the infrastructure? Because if this has gone on for approximately 30 years, there's going to be a possibility that we need to build new infrastructure for water to actually treat a lot of these chemicals.

And being in the economic downturn that we all know we're in, and where our city and county governments are, how much is Beazer going to give the City of Gainesville, GRU, or what have you, to help build water infrastructure to treat? Not to mention how much the federal government and the superfund will also contribute. That's one question.

Second question is: There was a CNN report, I don't remember when approximately it was, I remember seeing it on television, that talked about dioxin and how long it takes to break down, not just in the soil, but also in the air. That is probably -- I don't want my child looking like a regular child, and then looking like the Ukrainian president or the president that blew up with dioxin poisoning. It is scary. It is frightening.

It's not just a City of Gainesville issue, it is public enemy number one, it is an Alachua County issue. And, if it gets to the Floridan aquifer, I'm sorry, dilution is not the solution to pollution.

I don't want any claps, please. I'm being real serious.

I would like a real answer from that, if you could. I think those are pretty significant, easy-to-follow questions. And if you could answer -- I believe, Scott Miller, if you could answer that, I'd appreciate it. Thank you.

MR. MILLER: In brief, with respect to infrastructure concerns, I think it's important to note that there's been no detection of site contaminants at the Murphy wellfield or at the sentinel wells that have been installed between the site and the Murphy wellfield. And that's why we're implementing a remedy to make sure that never happens.

So, with respect to that, that's the answer to your question.

And, I'm sorry, I can't talk to you about the Ukrainian president, other than he got a dose that's 50 thousand times the level --

MS. SPENCER: Is Lee Norris still here? Next I'm going to call from the card. It will be Cindy Harrington.

LEE NORRIS: My name's Lee Norris. I moved to Stephen Foster in 1971. My question's very simple.

If it's 26 years before we get it cleaned up, it won't matter to about half of this crowd. We'll be gone. Can you give us some time line? We're at 26 years, and we're at the proposed cleanup. When can we expect a cleanup? You know, if it's 26 years, look at the white haired people in here, it won't matter to us. We'll be gone. Please give us some kind of answer of what can we expect in a time frame.

MS. SPENCER: Cindy.

CINDY HARRINGTON: I'm Cindy Harrington. I'm a resident of the Stephen Foster neighborhood. And until the feasibility study holds those responsible for polluting our city truly accountable and requires them to fully clean it up, I will never agree with its findings.

Anyone with a middle school education can see the injustice of allowing a polluting party a proverbial pass by capping a portion of the site, and then throwing a couple of feet of topsoil on some other affected areas.

We have the culprit. We know who the culprit is. This is not an abandoned site. We know who the culprit is; correct? They know who the culprit is. They are morally responsible, they are legally responsible, and they are financially capable of cleaning up the site and cleaning up the residential area around the site.

And it is the duty of the EPA to hold them to task, not to find the path of least resistance, not to find the cheapest way out. It is their duty to find the right path and the right remedy. The EPA should not be their advocates, but, rather, their worse nightmare. Which leads me to question number one.

It concerns us that agencies who are supposed to protect the community are not doing what is required by law. For example, why was it the citizens who had to bring up the signage issue or the lack thereof around the Koppers neighborhood?

And, more recently, I don't know if this was required by law, but I did receive a feasibility study in the mail. But I understand that many citizens closer to Koppers than me never received this in the mail.

So, how can we trust what you say you're going to do you're going to do, when we can't even get mailings straight? It really concerns me.

And what are the plans to protect residents in the neighborhood during remediation activities, either on or off site? Are they going to be trucking contaminants through our neighborhoods? How are we going to be protected and not be further polluted?

And once this cleanup is complete, what will be the responsibility Beazer East to provide remediation if any of the institutional controls are violated and contamination is exposed?

Now, am I hearing this right? Are you going to tell me that I'm not allowed to plant a garden in my yard or I'm not allowed to excavate in my backyard to build a pool or to put in a decking, where I might have footings beyond two feet in depth? And if I do put in a pool, and all of a sudden this pollution comes up, am I now going to be held liable while Beazer walks away? Are you going to tell me that I'm going to be liable if these dioxins come up in my yard and expose my neighbors to pollution?

And, last, but not least, people are abandoning properties left and right in our community. Our values -- and I'm also, by the way, a local realtor. Our values are -- I have a little sign that says: My house is worthless. It is worthless. Who is going to buy a house in a neighborhood that's polluted? And who, I ask, is going to make us whole? Who is going to make us whole? It better be Beazer.

Thank you.

MS. SPENCER: Okay. We have Sally Shatner. And after Sally, we have Tia Mall.

SALLY SHATNER: Hi. I'm Sally Shatner. I've lived in the Stephen Foster neighborhood and right off the creek for 18 years. I was actually diagnosed with an autoimmune thyroid disease. My cat was diagnosed two years after me with the same disease.

I received a certified letter from Florida EPA stating that my property is contaminated. Now, it's a certified letter, so it's on file. I won't ever be able to sell my house, even though I'm within about 12 years of paying it off. So, great. Now I'm stuck with contaminated property and health problems.

The other thing is, too, on the creek, back in 1980 I have an article from The Alligator, stating that there were signs all through the creek, saying there was excessive phenol concentrations, do not go in the creek. Those signs have all been removed. They have not been up since my husband moved in the neighborhood in '89. They were not there in '92, when I first started going through the creek. So, where were these signs and why haven't we known that there are phenols in the creek? Now we're just finding out that they are in the creek?

The dioxins that they found on our property were 33 percent higher than what the state levels are.

Thank you.

MS. SPENCER: Karen Eppel. And after Karen, we'll have Christy Smith.

KAREN EPPEL: Hi. I'm part of Protect Gainesville's Citizens, and I'm also a resident within about a mile of the site.

Actually, I have three questions. Some of us do not want the high concentration of toxic materials heaped into a pile that leaves us with toxins here forever. We don't feel this is an adequate solution.

What other technologies are available that would be more aggressive in removing the contamination from the site? Can you get it out of there and take it someplace else?

Also, have you done testing far enough into the surrounding neighborhoods to determine where contamination returns to ground levels? Have you figured out the boundaries of the contamination? And, if not, why? If you haven't, why not? Has that been done?

MR. MILLER: There's ongoing testing planning to take place in mid-September to begin -- to get towards the end of answering your question, to outline the footprints as we go.

KAREN EPPEL: And I have another question in somewhat the same vein. What about groundwater levels in other directions besides towards the wellfields? Will you be going in a circular way? Because, believe me, water here just doesn't flow in one direction. When the rain comes down, it goes everywhere.

MR. MILLER: Yes, ma'am. We have extensive wells on site. There's over 300 wells. There's 86 monitoring points in the Floridan aquifer around the site, in the northern and western and eastern side, and wells on site below the former source areas.

So, we are collecting a lot of data as we move forward.

KAREN EPPEL: All directions?

MR. MILLER: Yes, ma'am.

KAREN EPPEL: Okay. One more. The remedy supposedly supports commercial land uses. Wouldn't digging down below the tops of the covers into the contamination conflict with the institutional controls?

If the remedy supposedly supports commercial land uses, wouldn't digging down below the specified levels into the contamination to build foundations conflict with the institutional controls? If so, how would this area be developed?

MR. MILLER: It could conflict with the institutional controls. But the institutional control, when people come and develop a site, they work with the environmental agencies to look at how -- what effects will take place there, and then soils are managed in accordance with that site soil management plan that will be part of an institutional control.

So, it can be re-developed, it's just re-developed in a way that's consistent with protecting human health and the environment.

KAREN EPPEL: Okay. What about my first question, that we would really rather that the materials were removed from the site. We really don't want a toxic waste dump in our city.

MR. MILLER: Removal has been part of the evaluation. We'll continue to take a look at that.

KAREN EPPEL: Thank you.

MS. SPENCER: David Gold. Is David Gold here?

Did I call Christy Smith?

David Gold, is he here?

Okay. Darryl Beach.

DARRYL BEACH: How far away is the testing in September going to be from the site?

MR. MILLER: Right now the testing is -- the testing has been done on a progressive basis as we go away from the site. And what we're looking to do is to find out where the soils are in compliance with the state residential standards on that side of the site, the western side of the site. Or, if it's a commercial piece of property, if it's in compliance with the commercial standards that the State of Florida has. We're doing that on a phased basis.

We're doing that to the city right-of-ways. And then, once we do that, we come back and request access to people's yards, because we can't simply just walk in their yard and take a soil sample.

Once they give us their written permission, then we go into their yard at 0 to 6 and 6 to 24, and sample it. It's going to be done on all areas, all sides. And that's also part of what we hope to do in September. But that is somewhat controlled by how quickly we get access agreements back, because we do have to get written permission from folks to do that to their property.

MS. SPENCER: The next two names are Barbara Ruth and Kate Ellison.

KATE ELLISON: My name is Kate Ellison. I'm a resident of Gainesville. And these questions have sort of been asked before, but I want to just state for the record the amount of concern in the neighborhood for so many of these questions that we don't have answers for yet.

Why do you assume that the creosote was limited to this blue area? We believe that there are source areas not identified that remain outside the area. Will the proposed remedy require that these be remediated, if identified, and not simply covered up?

We've given you maps that show the source areas outside of this blue area. Do you have a plan for these?

Why do you emphasize the two feet in places in your proposed plan? What if taking a little more of the soil would leave no contamination in some areas above the levels protected for commercial or residential criteria?

And are you going to test the soil or the water to the south side of the Koppers site?

Thank you.

MS. SPENCER: Okay. Off of the list we have Mia Garna. And, after Mia, we have Renee Pinault.

MIA GARNA: My name Mia Garna. I'm an Alachua County resident and business owner. I just wanted to say it was sort of unclassy to open this community meeting by alerting us to police presence. That was really unwelcoming and sort of set the tone a little bit off and not in our favor.

Basically, a lot of my questions have been answered. But with the recent dispersant discoveries, if this, which it should not, but if your plan passes, what do the stabilization compounds contain? What are they composed of? And what are the safety of these compounds that are intended to remove these chemicals? Will they just leave more chemicals? Will they cause a hazard during groundscaping? Will there be a dust impact? These are the questions that I have.

MS. SPENCER: Renee.

RENEE PINAULT: Some of the proposed plans that were sent to my home included some off-site soil remediation, but the plan that you've chosen doesn't address this.

Can you please address why this decision was made? What's going to be done with the soil in the neighborhoods that lie on the perimeter of the site? And what are the health risks during the cleanup?

My home is located right here. If the soil here is contaminated, what leaves me to believe that my soil here is fine?

Thank you.

MS. SPENCER: Okay. We're going to have Ken Kay and Kia.

UNIDENTIFIED AUDIENCE MEMBER: (Inaudible.)

MR. MILLER: Okay. With respect to the question with off-site soil cleanup, that is part of the proposed plan. And there are three options in there. But, presumptively, what would happen is, soils would be removed from residential yards and taken away from residential yards in the zero to two foot range.

And the way that would work is, before that would happen, we'd have to, naturally, get the people's permission. We'd sit down and talk to them about their specific yard. And there may be certain areas or trees that they don't want us to get near. And, so, we'll take that, take that soil, basically, away from the property, and then replace it with clean fill.

That's the essence of that, unless there's a voluntary agreement reached between property owners and Beazer East to something different.

KEN KOPCZYNSKI: Good evening. For the record, my name is Ken Kopczynski. I'm a resident of Tallahassee, Florida. I first became involved in this site in 1984, was not happy with the way things were going there in regard to the research that is being done.

We did finally get the EPA to acknowledge the fact that there was a lagoon under North Main Street. There's some issues with that.

I spent six years of my life prior to moving to Tallahassee to try to get in the record the history and the extent of the contamination of this site. And I'm sorry to say, we're still in that position 26 years later, including this document that was handed out tonight.

I will use an example. Page three: The site was originally two sites, Cabot Carbon in the southeast portion of the site, and Koppers on the western portion of the site.

Ladies and gentlemen, this site was originally three parcels. The Cabot, the Koppers, and the area north of the Cabot site. And, in fact, if you go to the property records of Alachua County and look at the property records for the two parcels just north, you will find that it says, specifically, superfund site.

Okay. So, anyway, the question becomes what is the superfund site? And I'm tired of hearing on-site and off-site. If it's polluted off-site, it's part of the superfund. I mean, the map in here shows the property lines of Cabot and Koppers.

We know that northeast lagoon, which is now in contention in terms of who's responsible for it, is highly polluted. Guess what, folks? It ain't on the superfund site. It's on these two pieces of property to the north.

Process wastewater contain -- this is still on page three: Process waste water containing residual pine tar was discharged to three unlined lagoons as early as 1937.

Folks, if you look at the aerial photographs in 1937, there is one lagoon, and it's under

North Main Street. Those three unlined lagoons were not built until between 1949 and 1956. You look at the aerials.

The Koppers site -- again, on page three: The Koppers operated as a wood treating facility from 1916. Folks, I've got an article from the Gainesville Sun that this site was built in 1911. I've got a sand born map of the site from 1913. Yet, here's a document today saying that it was in operation in 1916.

Still on page three: Wood treating processes at the Koppers site began with the creosote impregnation process in 1916. Well, we've already decided that's not true. Well, it could be true. It could be true that in 1916 is when they actually started this creosote impregnation. I wonder what the children looked like.

The treatment processes -- and I apologize to you all, and I apologize to you all. And I know that you guys are targets and everything. Don't take this personally.

The treatment processes were modified over the years to include two additional processes: One, using CCA, beginning in 1960's; and the another using pentachlorophenol, beginning in 1969.

Folks, I've got an article from the Gainesville Sun that they started using what are called Wilson salts in 1936. 1936, they were treating the lumber with -- it's not quite CCA, it's another chemical composition. I can tell you what it is.

The other problem I have is on page 11, it says: The proposed remedy is intended to be the final cleanup for the Cabot Carbon/Koppers site.

Folks, if you don't have the history, you don't know what the extent of the pollution is, how can you have a final site?

One of my pet peeves has been the Winn Dixie floor. Back in 1980-something or another, 1984, Winn Dixie was experiencing floor tiles buckling. Okay. And they had a consultant come in, bore six holes in the floor. And guess what they discovered? Polyaromatic hydrocarbons coming, plasticizing the floor tiles, and eroding the vapor barrier, eating the damn concrete.

So, what did Winn Dixie do? And what did our authorities do? Well, you know, we're having other problems in Winn Dixie stores. And, well, we don't really trust the results. Now, did they go back out and test? Hell no.

Now, this map right here is a blueprint, which I don't know exists anymore. I was lucky enough to make a copy of it, probably, before it disappeared, of the Cabot site.

What I've done is I've superimposed on top of this map the location of the roads, the location of the building. And guess what, folks? Winn Dixie is setting on top of a pine tar pit.

Now, do you think that pine tar pit had anything to do with those floor tiles buckling? No. They had problems elsewhere.

I would like to give this to you all to put it in the damned record that you have it. And, tell me, have you all looked around and tested these retorts?

Did you see all the tanks that they have? Have you all looked at these tanks here? Have you looked for them? What about this irrigation pond?

Now, I know y'all went out and tried to find this deep water well. Well, folks, they had a deep water well at Cabot, and they had a deep water well at Koppers, which is a direct conduit to the Floridan aquifer. Find those. I asked y'all in 1984 to find these goddamned wells.

So, anyway, thanks a lot.

UNIDENTIFIED AUDIENCE MEMBER: (Inaudible.)

KIA IDEKER: For the record, my name is Kia Ideker. I have a lot of questions that didn't get asked. I'm going to read them really quickly. We'd like these in the response summary.

The feasibility does not address an alternative for off-site sediment at all. In fact, it states that, generally, they believe risk is low or attributed to Cabot. We just had a little Cabot education.

Why does it matter whether it is attributed to Koppers or Cabot? Do we have multiple operational units that need investigation?

Please clarify -- and I'd like an answer to this now. Please clarify what institutional controls will be required across the site following the implication of this remedial design and plan? Specifically, what would be done to the source areas? And what restrictions would be needed to develop outside the source areas in the future?

If development occurs on the green area, which is deceiving, because that's not going to be green in this plan, who holds the liability if those institutional controls are broken?

If Beazer sells the land or allows development, and somebody comes in and digs beyond that 22 feet of top clean fill, who holds that liability? Is the small business owner or the Winn Dixie or somebody that goes there going to have to pay for those source areas that you didn't find, that they find? Because we know that's what's going on at Carbon.

Everyone keeps telling us that's an example of a good cleanup. We do not believe that to be an example of a good cleanup. I'd like to invite you to stay tomorrow until the temperature hits 86 to 96 degrees, and drive over by that site and smell the creosote coming out of the earth.

We have vapor intrusion in this town and in those buildings and off that site. You can smell it. We know where it's coming from. So, who pays for the liability? Who holds that liability? You can't put a foundation in without penetrating through the soil.

We'd like that removed. And we'd like

confirmatory testing done once the top two feet is removed. Whether you remove it and clean it on site, which I think is a good idea, because we can just use the clean dirt that's already there. It's just less money to haul it away.

We want confirmatory testing underneath there. We believe there are source areas all over that place. Thank you.

As currently summarized, it is possible that the contaminants across the entire site will remain and be entombed. A layer of clean soil on the top will be brought in. Is it possible that that will limit future land use and lead to a big fence with a guard and no development?

That's it. Thanks.

MS. SPENCER: Jan Ambrose Carter.

UNIDENTIFIED AUDIENCE MEMBER: We need to state for the record that our mayor and city commissioners have had to leave and will not be here to hear all of the rest of the citizen comments.

MS. SPENCER: It's supposed to be recorded that the city commissioners have left the building. Is there anybody else?

The camera is gone, so there's no video

recording at this time. The court reporter is still here, taking comments for EPA.

JAN AMBROSE CARTER: And that will be just fine for this comment, if somebody could write down at the end a question that I have.

My name is Jan Ambrose Carter. And I spent the early part of this year working with Protect Gainesville's Citizens to write the proposal for the EPA's technical assistance grant. And I'm grateful that our community has been awarded that 50 thousand dollars to hire our technical advisor.

Since the funds were only received a few weeks ago, I'm concerned that we haven't had sufficient time to use the money as it needs to be used, to educate the community about the technical details of the current proposed plan.

Foreseeing that this might happen, I contacted our county DEP last February and explained the situation. And, with their blessing, on March 3rd of this year, I wrote a formal request to Scott Miller and his supervisor, requesting an extension of the period of public comment that we're in now to allow time for grant funds to be issued and utilized before a record of decision was issued for the site. That request was denied. But I understand that more requests have been made. And I appreciate you considering those.

In the meantime, I started educating myself on the process that occurs before a cleanup plan becomes final. I spoke with other communities who have been dealing with superfund sites, including the one in Brunswick, Georgia.

The proposed plan that we're discussing tonight will, with or without changes made to accommodate our concerns, eventually become a record of decision, or ROD.

And, while that sounds like the final word, my understanding is that ROD will not actually be legal and binding until a consent decree is issued by a court of law.

We expect that EPA will respond to our community comments on the proposed plan and on the record of decision before filing for a consent decree. And we expect that the EPA's responses to our comments will be made part of the site's administrative record before the consent decree is filed with the court. We expect the EPA will notify our community when the consent decree is filed.

So, my questions tonight are these. In which court will the consent decree be filed? And I would like the address, if you have it, or the city and state.

CAROLINE HINSON: Good evening. My name's Caroline Hinson. It's the Federal Court for the Northern District of Florida, which I believe is here in Gainesville. I don't have the address with me, but I can get that to you. It will be filed there after several months of negotiation. Of course, that comes out quite a number of months after the ROD, so that all the comments responding to ROD are incorporated into the record.

JAN AMBROSE CARTER: My second question. How will the community be notified? I'm sorry. Will the EPA notify our community when the consent decree is filed?

CAROLINE HINSON: The consent decision also has a public comment period. So, that will -- we'll have more public comments between the filing of the consent decree and between when the court enters it.

Quite often the court also has a hearing, so

that it's open, and people can come and comment
at that time.
JAN AMBROSE CARTER: And then my last question is, for the people here tonight, by show of hands, who are willing to go to court where the consent decree is filed and represent our concerns of the community that are not addressed in the record of decision? Thank you.
CAROLINE HINSON: I'm sorry. Just one more comment. When we say you'll be notified, it will be published in a local newspaper. So, it won't be -- it will also be published in the federal register. So, it won't be hidden away somewhere. It will be in your local newspaper.
MS. SPENCER: And, if Caroline lets me know, I'll let Cheryl know.
One thing that I need to clarify. I don't have a list of groups. Cheryl is the person that I contact, because she has the technical assistance grant. And I have asked on several occasions, if there are other, quote, unquote, groups, if you will give me your name and your address, you can be notified as well.
JOHN KING: Thank you. I'm John King. I'm president of Water and Air Research,

environmental engineering consulting firm here in town. We're part of the team supporting Dr. Kline and the neighborhood association through the grant.

One, I'd like to thank EPA for the funding that you provided the neighborhood association to buy the technical advisors, particularly the quality of Dr. Kline.

However, the grant did come through in late June, or whatever. They went through a selection process. And, as you heard tonight, the teams have just come on board in trying to analyze 228 PDF's in the last 10 days. And some of my team has only had the opportunity in the last two or three days to engage on some of these issues.

Again, we respect and appreciate that you've already said that you will provide a fairly extended review period here. I think we need that. The train's moving fast right now. We need to kind of step back and make sure that what we're doing is right.

It's been 30 years. It's good to be here now, but we need to make sure the decisions are right.

I really only have one question I want to pose to you and put in the record. Region 4 EPA, as recently as 2009, dealt with a site in south Florida, DeSoto County. It was a creosote plant started in 1911. It was closed, supposedly, in 1952. It has many of the same problems that we have here. Actually, if you read the EPA record and go through it, you'll find tremendous similarity.

You've heard a lot tonight about vapor intrusion. The vapors do not know that that's where Beazer's property line ends.

And, so, to that point, in your documents, your responsive summary, which is effectively the same document we will get from this meeting, and all of the questions that are turned in to this group will be published in this summary, in the summary that you did for that site, you reference that there are -- and I'm going to just quote a very small piece here -- that the surrounding properties or certain properties in that area were required by a responsible party, the residents have been relocated, and all of the potential for exposure eliminated. Those are your words.

Now, I would hold out to you in question, will you please respond to this community what your plan is to force the responsible party to procure the properties that will have the level of contamination or the vapor intrusions of these contaminants that we're talking about, and/or deal with the relocation issues? Thank you.

MS. SPENCER: Okay. I have two cards here. If the people are not here, I want to read their statements, so it can go on record.

Ann Lowry.

ANN LOWRY: My name is Ann Lowry. And I've lived in the Stephen Foster neighborhood for 16 years. I was a director of nursing in a hospital and participated within the community and contributed to the community. However, five years after I moved, I got MS.

Well, my neurologist, when she found out I lived in the Koppers neighborhood and saw what the pollutants were, she said: Oh, well, you know, oh, my God, you know, no wonder, no wonder.

I am not the only one that has MS that lives in the Stephen Foster neighborhood. Other people have gone and civilly sued Beazer and won a judgment against them for their pollution causing the MS.

Ten years ago I was started on interferon, a 32-hundred-dollar-a-month drug, one of 23 medications I take every day. Interferon is also used to treat malignant melanoma. It's a pretty strong treatment. Well, five years ago, I got malignant melanoma and had to have surgery two times.

How many times have we asked to have the insides of our homes checked? How many times have we gone door-to-door and noticed that there's been at least one person on two blocks in every household that has cancer or has died of cancer?

Now, we need to do epidemiological studies. Maybe the next time, in five years, when y'all decide what you're going to do to fix this, I hope you're all not standing, like I am, with my dog and my braces, waiting to go home to my wheelchair.

I hope that the EPA will clean this up, will take all the carcinogens out, move it away. Don't cap it over, waiting for it to vaporize back into your homes, because I don't want you to look like me.

MS. SPENCER: Okay. Phyllis Tanner and Mike Turturro.

MIKE TURTURRO: I'm Mike Turturro. I'm a citizen in Gainesville. Somebody already thanked you for acknowledging that we need more of a dialogue here. So, I thank you for letting the meeting run late. I'll try not to make it run much later.

It seems part of that, while I hope you can find some modification to the so-called normal processes, since the processes have already been modified, and the way the community involvement plan, for lack of a better, word has been botched because there was this plan, and it's old, and now there's this new thing, then we're -- after 25 years, it's a little ironic, now we're in a hurry and only have a certain number of days.

It seems like things have changed in the past year or so. So, maybe it's a time to take it -- not slow it way down, but, basically, find just the right speed for this thing.

And I got to say, I don't think I've heard anything tonight that I've disagreed with. Seems like everybody had really good questions, and it goes on and on.

I have two specific questions, one of them about the on-site. Several people have mentioned the possibility of hidden drums and various contamination. Have you guys considered any plans to do any search for buried treasure, so to speak, penetrating radar, something like that?

MR. MILLER: Yes, we have. And there's going to be a work plan coming forth that we'll share to address concerns with buried drums on-site

MIKE TURTURRO: Thank you. The other thing is this issue about institutional controls is a little confusing. I think I get the picture for the on-site. But, if it's dealing with somebody's residential property, are you going to be putting institutional controls on residential property?

MR. MILLER: That is included as a voluntary option between two private parties, the person who owns the house, for instance, and Beazer East.

If, for some reason, instead of having soil removed from the yard, you prefer or reach an agreement, for instance, to sell the home or to come up with another approach that works, such as, you know, installing a driveway and keeping it up, or anything like that that keeps the situation in such a way that people don't come into contact with these soils that are in excess of these levels that are the state levels, it allows you to work together to make that happen.

It's strictly voluntary between two parties.

MIKE TURTURRO: I'm not a property owner. It just seems like it keeps coming up. It seems obvious, if something like that happens, there would have to be some kind of an addendum to the deed or something that would carry through. And, in that case, wouldn't there have to be some sort of compensation to the property owners?

MR. MILLER: Yes

MIKE TURTURRO: The third thing I have to say isn't really a question so much, but you might want to tackle it.

When I looked at this plan, and in particular the off-site part of it, it's a bunch of: We don't really know yet, so we're going to consider these options. And the plan itself -- like the FS was a consideration of a whole bunch of options, and then, even for on-site was a combination of options, which is sort of another option -- and I'm not trying to be too pedantic here, but it seems like, you know, what's the plan?

And for the off-site, it seems like this plan is to make a plan. And I don't know how we can actually comment on a plan to make a plan. Thanks.

MR. MILLER: The answer to your question is this. What we do in the next phase here, once we get a record of decision, we have the data available to come up with a plan of how to address the contamination.

As part of that plan, and what you see ongoing, is we're collecting data so we know what the footprint of the remediation will be off-site.

We do not know the specific entirety of the footprint of what the remediation will be off-site. We do not believe that will prevent us from making a decision with how we go with that. So, that's why we're pushing forward with off-site soil sampling, regardless of how we go forward with the proposed plan, because we think it needs to be an expedited approach.

MR. KEEFER: Just to clarify, too, the footprint of the off-site or off-property cleanup will be to the most stringent Florida DEP cleanup target levels that is applicable to whatever land use. If it's residential, it's residential. If it's commercial, it's commercial.

So, they're going to continue sampling until they find the edge of the impact. And then all the those properties will be remediated, or, as Scott tried to explain before, if the landowner and Beazer reach some other arrangement, such as Beazer wanting to buy them out, there's provisions for that, as well.

The point is that we want to be in a position to move forward with the off-property cleanup as quickly as possible. It's pretty simple. It's a binary decision. If contamination is in your yard, it needs to be removed. Okay. That's done by excavation.

So, we don't want to wait for a long design period or any other delays that might occur, because we know how that's going to work. So, that's the point of that of the approach, is to get your properties cleaned up first.

UNIDENTIFIED AUDIENCE MEMBER: What about the contamination in the house?

MR. KOPOREC: I've heard you bring it up

tonight. I don't have an answer to that. We'll discuss it, and I'll get back to you.

MS. SPENCER: I'm going to call three names. George Papatti. Susan Fairforest, and Roy Hale.

GEORGE PAPATTI: My name is George Papatti. And I live in the duck pond neighborhood, right next to one of the county commissioners, Cynthia Chestnut.

Most people are not aware that, years ago, when Koppers was using creosote, that the odors occasionally wafted into our neighborhood. And after several times experiencing this, I called the plant up at midnight and intentionally tried to catch the employees off guard. And I said: Why did you turn off your scrubbers? And the gentleman who answered, apparently, was one of the workers. Well, apparently wasn't paid very well, judging from the way he was speaking. He said that he was told to turn the scrubbers off.

So, for the record, I'd like to remind people that industries that are heavy polluters generally play hardball and are very much in denial of things that in public they make statements: Well, we're responsible citizens, we care about the community that we operate in.

That is apparently not true.

There are companies that are progressive, and then there are companies that know full well that it's going to be a huge, costly, uphill battle to operate responsibly, and they play dirty. And Koppers was like that.

Regarding one of the residents who just talked about multiple sclerosis. In looking at adverse health impact data, I unmasked a lot the of materials. And one of the papers that I found identified the high incidents of neurological disorders associated with EPA superfund sites.

It's easy to find this now. Back when I got this information, I had to spend until the wee hours of the morning at the university library, when I could stay there, and gather this information. Now, with the Internet, it's open for everyone to get. So, be aware about MS and neurological issues.

My question -- one of my questions about capping the toxic source area on the property with soil and concrete seems -- I find it impossible to imagine that the EPA would want to do this, knowing now, with recent information that there are fissures in the Hawthorn groove.

There's no tub. It's just a barrier wall has been mentioned. I'd like to voice that concern.

I also want to remind them, before they proceed any further, that they need to devote an equal amount of time to the concept of relocation of residents. Because, if they don't, it's a violation of the law regarding feasibility studies.

And my last comment regards a memorandum submitted or circulated July 22nd of 2010 by the EPA. It was an EPA form, and it stated that achieving environmental justice is an agency priority and should be factored into every decision.

The memorandum defines environmental justice as the fair treatment and meaningful involvement of all people, regardless of race, national origin, or income, in the formulation of rules and implementation of cleanup processes.

This cleanup process, of course, has taken well over 20 years. In response to learning of this fact, the director of EPA's superfund, when asked by (inaudible) commented, and I quote: Community residents should be angry for how long this is going on and how long they have waited for their cleanup, end of quote.

That failure is unfair treatment, I might add. That shows a complete lack of meaningful involvement, and our Region 4 EPA administrators are not only failing to follow their own directives on environmental justice, they're not acting in a way that -- they're acting in a way that contradicts the spirit of that mandate.

Final question. I ask the Region 4 EPA administrators to request from Mr. Stancil an in-service workshop to remind them about their obligations.

SUSAN FAIRFOREST: Hello. My name is Susan Fairforest. And I'm a board member with the Stephen Foster Neighborhood Protection Group.

The Stephen Foster Neighborhood Protection Group would like to remind the EPA that neighboring residents, you refer to us as recipients, I guess we're the recipients of the poison, that neighboring residents had no part in contributing to, endorsing or encouraging the hazardous pollution that now lies within our yards and inside our homes adjacent to the site.

The feasibility study and all tasks leading to its creation failed to recognize the degree to which residents have been impacted by this contamination.

Mr. Miller, I wish you'd look at me when I talk to you. Thank you.

Stephen Foster Neighborhood Protection Group implores the EPA to take the concerns of the community seriously and factor them into their remedial alternative selection.

The Stephen Foster Neighborhood Protection Group expects the EPA to use its full authority under the law to protect the environment and the health of the citizens most impacted by this ongoing tragedy.

The responsible party should be required to step up to the plate and return some of the profits made at the expense of a wounded community, and pay for the cost to clean up our contaminated homes, the insides, as well as the outsides. This must be a priority over the pondering of soil cleanup methods that are inherently deficient, such as an approach that will not address the immediate issue of protecting our health and welfare.

We want our way overdue environmental justice now. Enough is enough. Gainesville residents deserve better from our environmental protection agency.

No dioxins or permanent hazardous waste site for Gainesville. Relocate affected residents.

And this part is my personal comments. Digging up my gardens and trees, destablizing my house on the creek bank and letting it slide into the creek by removing two feet of soil, and leaving the inside of my home with toxic levels is not a satisfactory remedy.

I want to be compensated for the value of my property so that my family can be relocated. And I don't think leaving it up to Beazer to cut a deal with me over relocation is going to work in my benefit. Relocate affected residents. You make sure it gets done.

Dig it up, clean it up, and haul it away. Thank you.

MS. SPENCER: Our court reporter is out of tape. We also have no audio/visual. So, the additional comments, if there are more additional comments, please note that you can email Scott or you can email me. You can mail them into the environmental protection agency. Their address and information is in the proposed plan.

And, please, remember that the end of the comment period is not over. So, you still have a opportunity to comment.

Thank you guys for being respectful tonight. Thank you for coming.

(Whereupon the meeting concluded.)

STATE OF FLORIDA
COUNTY OF ALACHUA

I, Cynthia F. Leverett, Court Reporter, do hereby certify that I was requested to and did attend the public information meeting on the aforementioned date for the purpose of stenographically recording the proceedings.

I further certify that the foregoing pages, numbered 1 through 122, are a true and accurate record of the meeting as derived from my stenographic notes taken at the time and place indicated herein.

Dated this 28th of September, 1020.

Cynthia F. Leverett, Court R