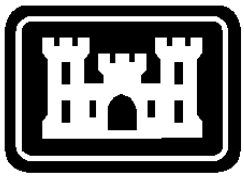

US Army Corps
of Engineers®
Buffalo District

RECORD OF DECISION

FOR THE LINDE SITE

TONAWANDA, NEW YORK

MARCH 2000

APPENDIX B

NYSEC CORRESPONDENCE, 1999

- **NYSDEC Letter of August 23, 1999**
- **NYSDEC Letter of November 8, 1999**
- **USACE Responses and Consideration of NYSDEC Letter of August 23, 1999**

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NYSDEC LETTER OF AUGUST 23, 1999

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New York State Department of Environmental Conservation
Division of Solid & Hazardous Materials
50 Wolf Road, Albany, New York 12233-7250
518-457-6934 FAX 518-457-0629

John P. Cahill
Commissioner

AUG 2 3 1999

Mr. George B. Brooks
Deputy District Engineer for Project Management
U.S. Army Engineering District, Buffalo District
1776 Niagara Street
Buffalo, NY 14207-3199

Dear Mr. Brooks:

Re: Record of Decision and Appendix A Responsiveness Summary for the Linde site, Tonawanda, New York (August 12, 1999)

This responds to the July 22, 1999 and August 12, 1999 letters from Mr. Raymond Pilon, of your staff, to Dr. Paul J. Merges, of this Department, requesting a position statement on the United States Army Corps of Engineers' (USACE) Review Draft of the Record of Decision (ROD) and Appendix A Responsiveness Summary for the Linde site, Tonawanda, New York.

It is our goal to work with the USACE throughout the remediation of the Linde site to achieve a successful cleanup. However, at this time our position is that, pursuant to CERCLA and the New York State Environmental Conservation Law, we cannot concur with the draft ROD as written. We believe the Technical Memorandum and Proposed Plan need to be revised because of the recently identified applicable or relevant and appropriate requirement (ARAR), 10 CFR 40, Appendix A, Criterion 6(6). Other primary issues that prevent our concurrence are: (1) the proposed uranium cleanup criterion of 600 picocuries per gram (pCi/g) for total uranium; (2) the unsupported use of averaging over a 2000 m^2 by three-meter-thick area to meet the stated goal that the remaining soils will not exceed an average of 60 pCi/g of total uranium; (3) the inconsistency of the proposed 600 pCi/g cleanup level with that of other USACE cleanup levels at FUSRAP sites in New York State; and (4) the assumption that the long-term use of the property will be industrial or commercial. These and other issues are described briefly in this letter, and in detail in the enclosed comments.

Newly Identified ARAR

Title 10 CFR 40, Appendix A, Criterion 6(6) as an ARAR includes the "as low as is reasonably achievable" (ALARA) concept. This new ARAR puts the 600 pCi/g cleanup criteria as developed by the USACE at odds with the cleanup criteria developed with ALARA considerations by the United States Department of Energy (DOE) in 1993. The draft ROD states that the decontamination criterion for the Linde site will include removing all soil containing a concentration of total uranium greater than 600 pCi/g, and is only meeting the DOE's criteria of 60 pCi/g by averaging over an unacceptable large area and depth.

Decontamination Criterion

In addition, this proposed decontamination criterion is inconsistent with the New York State regulations that apply to uranium. Under New York State laws and regulations, uranium in any chemical form or compound in concentrations greater than 0.05 percent by weight is subject to radioactive materials regulations. The 0.05 wt percent translates to approximately 12.5 Bq/g (339 pCi/g) for natural uranium (including U-238, 235, and 234, and omitting consideration of decay products). As such, we cannot support the value proposed by the USACE.

Average Concentration

In the draft ROD, the cleanup criterion for total uranium includes a requirement that the concentration of uranium in the remediated soils will not exceed 60 pCi/g when averaged over an area of 2,000 square meters and to a depth of three meters. This cleanup guideline was not presented in the proposed plan; therefore, the USACE should issue a revised proposed plan if it intends to apply this guideline. As the draft ROD is currently written, it is not apparent why the concentration of uranium should be averaged over 2,000 square meters by three meters deep. This area contrasts with the 100 m^2 area specified in 10 CFR 40 as well as the six-inch depth as discussed in the United States Nuclear Regulatory Commission's Draft *Guidance on the Benchmark Dose Modeling For the Radiological Criteria For License Termination of Uranium Recovery Facilities*. According to the 1993 Remedial Investigation Report, the maximum depth of contamination is 1.2 meters, except for one small portion of Area 4, where the maximum depth is nearly three meters. It is not this Department's practice, when calculating the average concentration of residual contaminants, to include large volumes of uncontaminated soil.

Inconsistency with Other USACE Cleanup Levels at FUSRAP Sites in New York State

The USACE is currently remediating the Colonie FUSRAP site. At that site, the USACE has agreed to remove U-238 contamination to a 35 pCi/g level, which could translate to a total uranium cleanup level of 69 pCi/g. Thus, the USACE total uranium cleanup level of 600 pCi/g for the Linde site is over eight times higher than the criterion applied in Colonie, New York. Indeed, the USACE will require institutional control by the Federal Government for all Colonie wastes in eastern New York State, between 35 pCi/g and 100 pCi/g. Yet, the USACE proposes to remediate the Linde site in western New York State to only 600 pCi/g total uranium. Why is the USACE proposing such different cleanup levels in New York for sites with similar residential/industrial environs?

Industrial/Commercial vs. Residential Uses

The USACE's position is that for purposes of planning the remediation, the future use of the Linde site should be assumed to be industrial or commercial. This Department's position is that given the current zoning of the property and its proximity to residential neighborhoods, there exists the possibility of residential future uses of this property during the hundreds of years when the

residual radioactive material will be present. Therefore, the goal of any remedial effort should be, from the start, to meet the requirements for residential use. This is particularly justified given the assertion in the draft ROD that the remediated site will be suitable for residential use. If that is truly the expected outcome, we believe it should be the stated goal.

For the above reasons, we urge the USACE to reconsider this draft ROD. If you have any questions or need further information, please contact me at (518) 457-6934.

Sincerely,

Stephen Hammond, P.E.
Director
Division of Solid & Hazardous Materials

Enclosure

cc: w/encl. - Lt. Col. M. Feierstein, USACE
R. Pylon, USACE
D. White, NRC
S. Page, EPA
R. Aldrich, NYSDOL
K. Rimawi, NYSDOH
D. Conroy, Praxair, Inc.
P. Kranz, Erie County

New York State Department of Environmental Conservation
Division of Solid & Hazardous Materials
Bureau of Radiation & Hazardous Site Management

Comments on the
USACE Review Draft Record of Decision for the Linde Site, Tonawanda, New York
(August 12, 1999)

August 20, 1999

1. We believe the USACE should refrain from issuing a Record of Decision (ROD) for the Linde site until it complies with 40 CFR 300.430(f)(3)(ii)(B), which requires the USACE to

> Seek additional public comment on a revised proposed plan, when the lead agency determines the change could not have been reasonably anticipated by the public based on the information available in the proposed plan or the supporting analysis and information in the administrative record. The lead agency shall, prior to adoption of the selected remedy in the ROD, issue a revised proposed plan, which shall include a discussion of the significant changes and the reasons for such changes, in accordance with the public participation requirements described in paragraph (f)(3)(i) of this section.

A revised proposed plan (and a revised technical memorandum supporting it) is called for in this case because the USACE has identified a new applicable or relevant and appropriate requirement (ARAR), 10 CFR 40, Appendix A, Criterion 6(6). This ARAR contains several items which directly conflict with the draft ROD, specifically the averaging over 100 m^2 (6 inches deep) and the application of the as low as reasonably achievable (ALARA) principle.

2. The draft ROD refers to the new ARAR in 10 CFR 40, Appendix A, criterion 6(6). This criterion requires the calculation of a benchmark radiation dose from radium, which must then be used to set a decontamination criterion in terms of picocuries per gram of uranium and thorium. It is a new requirement and not yet a common approach to deriving cleanup criteria. The United States Nuclear Regulatory Commission has only recently issued some guidance on applying this guidance, in the form of a draft standard review plan, posted for public review on that agency's website. It is not by any means a simple process, nor is there yet an agreed upon standard approach.

The draft ROD acknowledges that following the requirements of 10 CFR 40, Appendix A, criterion 6(6) may result in a decontamination criterion different from the 600 pCi/g the USACE has chosen to use for total uranium at the Linde site. In several places (including pages 13, 17, and 19) the draft ROD states,

> USACE then used the information contained in [the USACE's March 1999 technical memorandum for the Linde site] to determine whether the cleanup criterion for radium contained in 40 CFR 192 along with a total uranium cleanup guideline of 600 pCi/g maximum and 60 pCi/g average, when averaged over a soil volume of 2,000 m^2 by 3 m thick, would be more or less stringent than cleanup of 40 CFR 192 and the newly promulgated standards (underlining added)

This implies that the USACE has gone through the process of developing a benchmark dose for the Linde site and has derived from that a cleanup criterion for uranium and thorium. The reader expects the sentence quoted above to be followed by the results of the determination the USACE states it has made, for example, "The USACE found that the total uranium criterion derived under 10 CFR 40 would be ___ pCi/g, which is less/greater than the 600 pCi/g presented in the proposed plan." This is essential information. If the USACE's application of 10 CFR 40 results in a uranium cleanup criterion less than 600 pCi/g, the latter criterion should be dropped from the draft ROD, and the rest of the ROD revised accordingly. For example, a lower uranium cleanup criterion may result in higher costs for the remediation.

Developing a the benchmark dose and the uranium cleanup criterion involves making some assumptions about the site, determining site-specific characteristics, deciding on the parameters to be used in the dose assessment, performing pathway analyses and dose assessments, and completing an ALARA analysis. This process should be documented, with the details discussed and agreed upon by the landowner, the State, local governments, and other interested parties. We recommend that the NRC also be consulted, inasmuch as this will be one of the first applications of this new provision in the NRC's regulations.

3. As noted in the August 26, 1999, USACE Demolition Work Plan for Linde Building 30, "the radiological component of the contamination at the site has been classified as 11(e)2 waste as defined by the Atomic Energy Act (AEC) of 1954, as amended." As such, the radioactive wastes at the Linde site should be disposed of in a facility licensed to accept 11(e)2 material. In addition, the disposal facility should not have any constraints on its permit relative to acceptance of radioactive wastes from the United States Department of Energy, which originally took possession of the MED wastes at the Linde site.

4. Section 5.2.1 should discuss the applicability of "DOE Guidelines for Residual Radioactive Materials at FUSRAP and Remote SFMP Sites," Revision 2, March 1987 (CCN 046176).

5. Section 5.7.1 proposes a background level for U-238 of 3.1 pCi/g. This level is very high. (See Eisenbud, "Natural Radioactivity," Table 7-6, which states the highest U-238 concentration was in Igneous rock at 1.3 pCi/g.)

6. Section 5.7.2 should be revised to note that the DOE identified FUSRAP material in the Town of Tonawanda Landfill which was placed there as a result of dredging the sediments in the Two Mile Creek downstream of the Linde site. The Department of Energy added this landfill to the list of Linde associated vicinity properties in December 1992 (see letter W. Alexander Williams, DOE, to Cal Chaplin, Town Clerk Tonawanda).

7. Section 6.4 states that USACE believes the use of the 5/15/600/60(ave.) criteria "should satisfy the standards in 10 CFR 40, Appendix A, Criterion 6(6). Yet that criterion requires an ALARA analysis, averaging over 100 square meters, a benchmark dose, and use of the "unity" rule. The ROD must explain how USACE will meet Criterion 6(6) in light of the fact that

   USACE proposed 600 pCi/g total uranium cannot be considered ALARA when another federal agency (DOE) agreed to clean up the Linde site to 60 pCi/g. ALARA should not be considered an agency dependent analytical tool, but the application of good health physics practices.

   No benchmark dose analyses was presented.

   Criterion 6(6) requires an averaging over a maximum of 100 square meters. Yet the USACE proposes averaging over 2000 square meters by 3 meters deep.

   The ROD cleanup criteria has not proposed to use the "unity" rule.

8. The estimated cost on page iii should be consistent with that presented in Table 8-1 of $28,217,000 in 1999 dollars, not the $27,700.00 presented. Likewise, the estimated cost in the last sentence on page 37 should be consistent with that in Table 8-1.

9. The bottom paragraph on page 1 discusses a subsurface storage vault which may contain radioactive wastes. What special precautions is USACE planning to take in order to assess this potential unknown radiological hazard?

10. On page 25, Section 6.4, it is stated that the USACE Linde Site assessment "the most likely future land use at Linde will be commercial/industrial." While this land use may well be the "most likely," the use of the site for residential uses is not precluded as noted in Section 1.2.3. Thus, the USACE should use a residential use scenario as the basis for their dose modeling. Please see additional comments supplied in our enclosed responses to the USACE's *Review Draft for Appendix A - Responsiveness Summary.*

New York State Department of Environmental Conservation
Division of Solid & Hazardous Materials
Bureau of Radiation & Hazardous Site Management

Comments on the
USACE Review Draft for Appendix A - Responsiveness Summary
for the
Record of Decision for the Linde Site, Tonawanda, New York
(August 12, 1999)

August 20, 1999

The form of our comments will be first, New York State Department of Environmental Conservation's (DEC) original comment in bold, followed by USACE's response, and then DEC's comments on the USACE's response.

Cleanup Criteria

1. **This Department's *Cleanup Guideline for Soils Contaminated with Radioactive Materials*, Division of Solid & Hazardous Materials Technical Administrative Guidance Memorandum 4003 ("TAGM 4003") should be in the category of "To Be Considered" when setting cleanup criteria for sites in New York State. It is one of the documents by which this Department judges the adequacy of proposed cleanup criteria.**

   The USACE responded that,

   It is USACE's position that the adequacy of the remedy selected and applied will be measured by evaluating compliance with the ARAR's and the risk based uranium cleanup criteria, not TAGM 4003. However, USACE understands what NYSDEC must do to address the NYS administrative guidelines and believes that implementation of the preferred remedy will result in a level of protectiveness at the Linde Site is acceptable to the State.

   DEC Comment on USACE Response

   DEC will evaluate the effectiveness of the remediation based on TAGM-4003.

2. **One principle of TAGM 4003 is that radiation doses are to be assessed under, "reasonable scenarios for current and plausible future uses of the land." We agree with the Corps that the reasonable scenario for <u>current</u> use of the Linde site is industrial or commercial, but we cannot agree that industrial is the only plausible use of the land in the <u>future</u>. As we stated in our March 10, 1999 letter to**

Mr. Raymond Pylon on the *Draft Technical Memorandum Linde Site Radiological Assessment, Tonawanda, New York*, **we do not agree with the proposed future use of the Linde site as discussed in that document, or in the proposed plan. The fact that the site has been industrial for the past 60 years does not assure that it will not be put to residential use sometime in the future. Pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), a reasonable maximum exposure scenario should be assumed and cleanup goals set accordingly to ensure protectiveness, using best professional judgement. We believe that future uses of this property over the next 1,000 years could easily be of the residential nature (DOE had conservatively assumed a resident subsistent farmer scenario). Therefore, the USACE should model and discuss this scenario. Otherwise, it is difficult to conclude that the proposed alternative will meet the long-term effectiveness criterion of 40 CFR 300.430(e)(()(iii)(C).**

The USACE responded that,

It is the USACE's position that the implementation of a remedial action in compliance with 40 CFR 192 and 10 CFR Part 40, Appendix A, Criterion 6(6) will allow for future unrestricted use, including residential, at the Linde Site. In addition, USACE believes that when NYSDEC completes their assessment, NYSDEC will come to the same conclusion.

DEC Comment on USACE Response

Our comment pertained to the selection of the likely future use of the site, not the outcome of the remediation. We agree that the remediation *may* result in a site suitable for residential use. However, we do not agree that the remediation plan should be based on an assumption that the land will only be used for industrial or commercial purposes. This assumption cannot be relied upon for the time span in which the residual radionuclides will be present on the site. Such an approach is inconsistent with the Department's guidelines for cleanup of radioactive sites.

In the USACE's draft ROD for the Linde site document, section 1.2.3 states,

> The Linde property is located in a Performance Standards Zoning District. The purpose of the Performance Standards District is to encourage and allow the most appropriate use of the land available now as well as approaching future commercial and industrial uses unhampered by restrictive categorizing, thus extending the desirability of flexible zoning, subject to change with changing conditions. Restrictions in this district permit an institution for human care or treatment or a dwelling unit only if the development abuts a residential zoning district . . . Zoning in the Linde property

> vicinity includes a business district to the north, a low-density residential area to the west, and the Performance Standard District to the south and east . . . Because the west boundary of the site abuts a residential zone, construction of an institution for human care or treatment or a dwelling unit are not strictly prohibited under the Performance Standard zoning category.

These statements support a conclusion that residential uses are possible for this land. Examples of industrial property being put to residential use are increasingly common. In fact, the day after the June 3, 1999 public hearing on the Linde site, on the front page of the local section of the *Buffalo News* was an article about a developer turning the Trico complex into apartments. Therefore, this Department concludes that residential uses of the property are strongly possible and that the USACE should use a residential use scenario as the basis for their dose modeling.

3. **This Department questions why the USACE decided to perform another radiological risk assessment at all, since the United States Department of Energy (DOE) had already performed one, which established a uranium cleanup level of 60 picocuries per gram (pCi/g). That criterion met two important objectives, doses calculated under the residential scenario (conservatively modeled as the resident farmer scenario) and the application of the ALARA (As Low As Reasonably Achievable) principle. All of the soil remedial efforts at the Linde site performed to date have been undertaken to meet this cleanup criterion. The Corps has not provided a justification for decontaminating the rest of the site to a less protective standard.**

The USACE responded that,

> The cleanup criteria proposed by USACE was developed to provide for an acceptable level of protection in accordance with CERCLA and was based on an industrial exposure scenario, which is the most likely future land use. The proposed criteria were the standards in 40 CFR 192 for radium, which includes consideration of thorium, and 600 pCi/g total uranium. Based on modeling results, remediation of the site to the 40 CFR 192 criteria and the cleanup level of 600 pCi/g for total uranium should result in a residual total uranium concentration of 60 pCi/g, or less, when averaged over a soil volume of 2,000 square meters by 3 meters thick. The expected residual total uranium concentration in the soils is equal to or less than the earlier DOE recommended guideline of 60 pCi/g for total uranium in residual soils that would allow for release for residential use and no further radiological restrictions. After consideration of these concerns and the modeling results, USACE has agreed to commit to a post-remedial total uranium concentration in the soils of 60 pCi/g when averaged over a soil volume of 2,000 square meters by three (3) meters

thick. Based on this commitment, the cleanup criteria for the soils at the Linde site will be (1) the removal of all soils exceeding the total uranium cleanup criteria of 600 pCi/g; (2) the removal of soils exceeding the 40 CFR 192 standards for radium, which includes consideration of thorium, when averaged over 100 square meters; and (3) ensuring that the total uranium concentration remaining in the soils after remediation to the first two standards is equal to or less than 60 pCi/g when averaged over a soil volume of 2,000 square meters by 3 meters thick.

On June 11, 1999, subsequent to the release of the PP, an amendment to 10 CFR 40, Appendix A, Criterion 6(6) became effective. That regulation requires that remaining byproduct material containing concentrations of radionuclides other than radium, such as uranium in the soil, and surface activity on remaining structures, do not result in a total effective dose equivalent exceeding the benchmark dose, which is the dose associated with cleanup to the radium standards and must be as low as reasonably achievable. While the regulation is not applicable, it is considered relevant and appropriate. USACE believes that the application of the site specific concentration guidelines should effect compliance with that ARAR. Regardless, USACE will comply with 10 CFR 40. Appendix A, Criterion 6(6).

DEC Comment on USACE Response

At this time, the only proposed plan on record is the one issued for public review in March 1999, which set a decontamination criterion ten times the level previously proposed by the USDOE for this site. As a result of public protest, the USACE changed its cleanup criterion to add a goal of 60 pCi/g total uranium when averaged over a 2,000 square meter area, to a depth of three meters. USACE has never presented any supporting documentation for this proposal or any modeling results for it, to the DEC.

The draft ROD should explain the derivation of this criterion. As the ROD is currently written, it is not apparent why the concentration of uranium should be averaged over 2,000 square meters. This area contrasts with the cleanup criterion for both radium-226 in 10 CFR 192 and uranium in 10 CFR 40, which calls for averaging over an area of only 100 square meters and a depth of six inches. According to the 1993 Remedial Investigation Report, the maximum depth of contamination is 1.2 meters, except for one small portion of Area 4, where the maximum depth is nearly 3 meters. It is not this Department's practice, when calculating the average concentration of residual contaminants, to include large volumes of uncontaminated soil. This approach to establishing a cleanup criteria is unfounded in radiological remediation projects that we are aware of for the following reasons:

a. A volume three meters thick by 2,000 square meters will result in obtaining credit for the clean soils, most of which can be expected to exist for most of a three-meter depth.

It would of necessity, on a site such as Linde, result in receiving credit for many clean areas since most remedial areas of the Linde site do not entail a 2,000 square meter area.

b. New York State radiation control regulations requires that exposures to radiation be kept ALARA. The USACE cleanup criteria do not provide for any consideration of ALARA.

c. Even if a 6,000 cubic meter volume of soils met a 60 pCi/g level, areas where the total uranium concentration exceeded 339 pCi/g would be subject to the need to be regulated as source materials.

4. **The proposed plan includes a cleanup criterion for total uranium (natural uranium) of 600 pCi/g, which is about 286 pCi/g of U-238, 301 pCi/g of U-234, and 13 pCi/g of U-235. Uranium and thorium in concentrations greater than 0.05% by weight are subject to licensing under the federal Atomic Energy Act, 10 CFR 40, and Agreement State laws and regulations. For U-238, a concentration of 0.05% by weight is approximately equal to an activity concentration of 167 pCi/g. We cannot agree to a cleanup criterion that could theoretically result in leaving on site radioactive material that would require a radioactive materials license. Such a cleanup criterion is not consistent with the goals of FUSRAP, nor is it acceptable to this Department. While the U.S. Nuclear Regulatory Commission is currently declining to regulate the 11(e)2 by-product material on this site, to our knowledge, it has not yet exempted any source material that the Corps may leave behind for the landowner to possess.**

5. **This Department would like to point out to the USACE that a cleanup criterion is not a below regulatory concern level. Licensed radioactive material is always licensed material unless it is disposed of under the radioactive materials laws and regulations. We are unaware of any USACE regulation authorizing licensed radioactive material to be disposed of without consideration of its licensed status. While the Linde wastes are not under a radioactive material license, the "substantive requirements" provision of CERCLA would impose similar constraints. For example, this Department might not approve soils contaminated with hazardous components and containing radionuclides below a cleanup criterion being disposed of at a RCRA-C disposal facility in New York State. This fact is important to all parties involved in cleanups which result in higher than background levels of residual radioactive materials remaining on site.**

The USACE provided one response to these two comments,

All material present at the Linde site is considered pre-1978 byproduct material that is not subject to NRC jurisdiction. It is, therefore, by definition, not source material and, in accordance with a March 2, 1998 letter from the NRC specifically addressing the Linde site, not subject [to] license requirements to remain at the

site or be handled. In addition there are no NRC rules or regulations that would preclude disposal of the materials in a RCRA disposal facility. However, acceptance at such a facility would be subject to its operating permit and the agreement of state agency that regulates the facility's permit compliance.

DEC Comment on USACE Response

With respect to the USACE response to our comment number 4, we recognize that the NRC has determined that the uranium extraction wastes on the Linde property are not subject to regulation under the federal Atomic Energy Act. However, this proposed decontamination criterion is inconsistent with the New York State regulations that apply to uranium. Under New York State laws and regulations, uranium in any chemical form or compound in concentrations greater than 0.05 percent by weight (or 339 pCi/g of total uranium) is subject to radioactive materials regulations. As such, we cannot support the 600 pCi/g value proposed by the Corps.

With respect to the USACE response to our comment number 5, this Department does not support a federal remediation plan that transfers to the property owner the obligation for controlling the future use of the soils on this site. If the State considers this material licensable, these soils would not be allowed to be removed from the site nor moved about the site without adequate controls. This would be unfair to the property owner.

6. **The preferred alternative presented in the proposed plan includes meeting the radium-226 standards in Subpart B of 40 CFR Part 192 (i.e., 5 pCi/g in the top 15 cm of soil and 15 pCi/g in any 15-cm layer below the top 15 cm). However, the proposed plan does not demonstrate that the 15 pCi/g criterion is appropriate. On February 12, 1998, the US Environmental Protection Agency issued directive No. 9200.4-25, *Use of Soil Cleanup Criteria in 40 CFR Part 192 as Remediation Goals for CERCLA sites*. In that document, the EPA states,**

> **If the contaminants at a site are the same (i.e., radium-226, radium-228, and/or thorium) and the distribution of contamination is similar to that existing at Title I sites as described in 40 CFR Part 192 (i.e., little subsurface contamination from 5 to 30 pCi/g), then the 15 pCi/g standard is a potentially relevant and appropriate requirement for the site. . . . If the radioactive contamination at the site is unlike that at the uranium mill tailings sites regulated under 40 CFR 192, in that significant subsurface contamination exists at a level between 5 pCi/g to 30 pCi/g, the use of the 15 pCi/g standard is not generally appropriate.**

Before the Corps concludes that the 15 pCi/g criterion is appropriate at the Linde site, it should revise the proposed plan to address the EPA directive and to demonstrate that the conditions described in the directive are met at that site.

The USACE responded,

"The circumstances and history of the site have been carefully reviewed and it has been determined that 40 CFR Part 192 and 10 CFR 40, Appendix A, Criterion 6(6) are relevant and appropriate for the site."

DEC Comment on USACE Response

Our original comment suggested that the USACE review the directive issued by the USEPA and include a discussion of it in a revised proposed plan. The response from USACE does not refer to the directive. We found the document to be pertinent and informative and we encourage the USACE to review it.

Groundwater Impacts

7. **In our March 10, 1999 letter to Mr. Pylon, we informed the USACE that we would like additional time to review the information presented on the impacts of the deep well injections. In the interim, our geologist has reviewed the data. At this time we do not agree with the conclusion that " . . . groundwater at the Linde site does not require remediation," as expressed in the last paragraph of section 2.1, *Description of the Impacted Property,* on page 6. We recommend that a limited extension of the monitoring within the contact zone aquifer be performed which would be designed (1) to provide a reasonable definition on the extent of the zone of disposal and the zone of contamination and (2) to characterize the nature of contamination within these two zones. Despite the statements made in the reports that the levels of contamination seen to date, and the levels of activity in the injected wastewater itself, were consistently below regulatory standards, given the tremendous volume of material injected we need to be vigilant to insure that there are not some areas that contain unexpectedly high levels of activity.**

The USACE responded that,

The original RI, FS and PP for the Linde (Tonawanda) site(s), proposed that no action was warranted to address on-site groundwater. USACE further investigated existing available information relating to the groundwater at the Linde site and presented findings in a document entitled "Synopsis of Historical Information on Linde Effluent Injection Wells" (USACE 1999b). The result of that assessment was also a conclusion that no remediation of the groundwater is warranted. This conclusion was re-stated in the 1999 Linde PP (USACE 1999d). However, based

on the comments received during the comment period. USACE has decided to not make a final decision regarding groundwater in this ROD. USACE will further assess the groundwater conditions at the site and address the need for any remediation in a future ROD.

DEC Comment on USACE Response

The USACE has excluded from consideration in this ROD the groundwater contamination issues and the remediation of Building 14 and MED contaminated soils under this building. It has also given no time frame when these ROD(s) will be issued. Segmentation of a project such as this is inappropriate pursuant to the CEQ regulations implementing NEPA.

Institutional Control

8. **This Department would like to see documentation that the United States Department of Energy (DOE) has concurred with the proposed cleanup level and the use of institutional control for this site. Since the USACE turns over to the DOE the responsibility for long-term monitoring two years after the completion of brown fielded sites cleanup, we would like to make sure DOE agrees with this approach and recognizes its future obligation. When exposure controls are used, restrictions by USACE, and later DOE, should be employed to ensure that the controls remain in place, that they remain protective, and that they are effective in preventing exposure for as long as the radionuclides present at the site remain hazardous. Since the Linde site radionuclides have very long half-lives, DOE's acceptance of this role and potential liability should be obtained and documentation of it provided to us.**

9. **In addition, the plan should state how institutional controls will be applied. Specifically, will the USACE require Praxair, Inc. to place a deed notation or deed restriction on their deed in order to assure institutional control? If so, USACE should identify what law and regulation authorizes them to do so. The USACE should state whether it is prepared to address issues regarding the taking of property, which could result from requiring institutional control and thereby reducing the value of the property and limiting the landowner's ability to use it.**

The USACE provided one response to these two comments,

The two action alternatives presented in the PP for remediating the Linde site (Alternatives 2 and 4) differed only in the way Building 14 (and soils remaining under the building slabs and footings that contain contaminants exceeding the cleanup guidelines) would be addressed during the remediation process. The preferred alternative presented in the PP, Alternative 4, proposed that the building

would remain on the site and that institutional controls would be implemented to protect workers in the building, and future site users from inadvertent exposures to residual contaminants remaining within and under the building. Alternative 2 included the demolition and disposal of the building and residual contaminated soils currently remaining under the building. Comments received during the public comment period, including the public meetings, indicated that the community is concerned about leaving residual contamination on the site, even if institutional controls would prevent exposure to the contaminants. USACE has decided that additional assessment of the possible remedies for Building 14 (and residual soils under the building) is warranted. Therefore, the building and soils under the building are being excluded from this ROD and will be addressed separately, allowing for the initiation of remedial actions to proceed on the remainder of the site. A future ROD will be developed to address Building 14 and any residual contaminated soils under the building.

DEC Comment on USACE Response

DEC acknowledges this response.

Vicinity Properties

10. **Also, since the Town of Tonawanda landfill is a vicinity property to this site, it should be added to the listing on page 4, the first paragraph of section 2, *Site Background,* and some discussion to the fact that this site will be addressed under a separate record of decision at a later date should be added.**

The USACE responded that,

This ROD only addresses specific media and areas of the Linde site and its immediately adjacent properties. Issues raised regarding health problems, Building 14, the groundwater at the site or other properties off the current Praxair property are not within the scope of this decision document. Those issues will be addressed separately, if appropriate, at a future time.

DEC Comment on USACE Response

The Federal Government added the Town of Tonawanda landfill to the FUSRAP program in 1992. We encourage the USACE to address that site as soon as possible.

Independent Verification Contractor

11. **The use of independent verification contractors is a routine practice by other federal radiological agencies, such as the Department of Energy and the Nuclear Regulatory Commission. As such, New York State expects the USACE to do likewise at the Linde site. It is very disappointing that a federal agency remediating radiological contamination in New York State's environment is unwilling to subject its cleanup efforts to peer review, as would occur if the USACE employed an independent verification contractor. It is especially unfortunate when other federal radiological agencies are willing to do so when they are involved in similar cleanups in this State.**

The USACE responded that

All remediation efforts conducted at the Linde site will be monitored and verified by government personnel in accordance with the USACE Quality Assurance Program. In addition, NYSDEC will be conducting independent assessments of the remedial work. USACE believes that with adherence to the Quality Assurance Program and the independent assessment by the state, the use of an Independent Verification Contractor is unnecessary.

DEC Comment on USACE Response

This Department acknowledges this response.

Application of Cleanup Criteria

12. **This document does not discuss what mechanism will be used to determine compliance with the cleanup level. While the averaging over 100 m^2 areas is discussed, more recently, at site cleanups the Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM) techniques are being applied. The document needs to address how a successful site cleanup will be determined.**

The USACE responded that, "USACE will apply MARSSIM techniques."

DEC Comment on USACE Response

MARSSIM is not being applied if the USACE intends to average residual uranium soil contamination over a depth of three meters. MARSSIM only applies to surface (0 to 6 inches) contamination of soil. The USACE needs to better explain their methods, especially in view of the application of 10 CFR 40.

Generic Comments and Generic Responses

4.7 Comment Response ID-G - State and Community Acceptance

This section of the Responsiveness Summary should be re-titled "Community Acceptance," as it does not describe the USACE's contacts with the State, nor does it describe the State's position on the proposed plan. If not retitled, the section should be rewritten to accurately report that the State notified the USACE by letter dated April 30, 1999, that it could not concur with the proposed plan as written, that the USACE provided no additional written information to the State, and that State representatives were not among the speakers at the second public meeting who spoke in favor of the revised criteria.

NYSDEC LETTER OF NOVEMBER 8, 1999

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New York State Department of Environmental Conservation
Division of Solid & Hazardous Materials
50 Wolf Road, Albany, New York 12233-7250
Phone: (518) 457-6934 Fax: (518) 457-0629
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John P. Cahill
Commissioner

NOV 08 1999

Mr. George B. Brooks
Deputy District Engineer for Project Management
U.S. Army Engineering District, Buffalo District
1776 Niagara Street
Buffalo, NY 14207-3199

Dear Mr. Brooks:

Re: Linde FUSRAP Site, September 1999 Draft Record of Decision

This letter responds to the most recent proposed Linde Record of Decision, which was sent to this Department on September 16, 1999 by Raymond Pilon. His letter transmitted a third draft of the Record of Decision (ROD) for the Linde FUSRAP site in Tonawanda, New York. In his letter, the Corps asked that we review the revised draft ROD and consider if there is cause for modification to the Department's position, which was presented in our August 23, 1999 letter to you. Mr. Pilon provided additional information (a one-page fax) to John Mitchell of this Department on September 29, 1999.

Our August 23, 1999 letter listed several issues that prevented our concurrence with the August 12, 1999 draft ROD. In particular, we could not concur with the proposed averaging over 6,000 cubic meters in assessing the remediation, the future use of the site as only industrial/commercial, and the 600 pCi/g decontamination criterion for uranium.

The September 1999 draft ROD proposes to average residual radionuclide concentrations over 100 square meters, in layers of 15 centimeters. This proposed averaging would be acceptable to this Department and would resolve the averaging issue.

Our concerns regarding the future use of the land remain. The proposed ROD sets a goal of meeting a benchmark dose of 8.8 mrem/y for surfaces, under a commercial/

industrial worker scenario. We believe that the scenarios the Corps adopts for such a dose should be consistent with those used by other federal radiological agencies (DOE, NRC, and EPA). Applying their subsistence farmer scenario, including the drinking water pathway, would result in a cleanup criterion of about 60 pCi/g, which we could support. This Department will evaluate the completed remediation, based on a residential scenario, to determine whether radiation doses will be below the 10 mrem/y level set in our *Cleanup Guideline for Soils Contaminated with Radioactive Materials,* Division of Solid & Hazardous Materials Technical Administrative Guidance Memorandum 4003 ("TAGM 4003"). If we find that the site does not meet our TAGM-4003, we will not be able to agree that the site can be released for unrestricted use.

The September 1999 draft ROD proposes new uranium criteria based on the recently adopted 10 CFR 40, Appendix A, Criterion 6(6). In the specific comments enclosed in our August 23, 1999 letter, we stated that the process of developing those criteria should be documented, with the details discussed and agreed upon by the landowner, the State, local governments, and other interested parties. To date, this has not occurred. We appreciate the explanations provided by telephone to our staff on September 27, 1999, and the RESRAD input data your staff provided. However, our concern was that the process of applying this regulation for the first time in the country was being done without the public's being informed or allowed to comment. Absent a public review of the derivation of the uranium criteria, our comment stands.

The comments we presented in our August 23, 1999 letter regarding the 600 pCi/g criterion for uranium also apply to the newly derived uranium criteria presented in the September 1999 draft ROD, which are 554 pCi/g surface, and 774 pCi/g, subsurface. As we have informed the Corps in recent meetings and conversations, these criteria are so high as to be unacceptable. This Department has overseen a number of decontaminations at radioactively contaminated sites in New York State. We have also worked closely with several federal agencies in their cleanups of such sites. We have never seen proposed, nor have we agreed to, decontamination criteria of such magnitude. Doing so, we believe, would set a very dangerous precedent and would be in conflict with the mission established for this Department in State Law.

In addition, we are unaware of any federal remediation which "free released" a site at such high levels. We requested the Corps to provide us documentation where it has been used, and the information from Mr. Pilon confirms that cleanup levels of this magnitude have not been applied at any other site in the country. Indeed, the USEPA's September 23, 1999 letter to the Corps regarding the draft ROD lists several sites across the country where significantly lower uranium decontamination criteria apply.

This Department has an obligation to protect not only the environment, but also the economic health of New York State. We are deeply concerned about the effect that an incomplete cleanup could have on Praxair, an important employer in the Town of Tonawanda, and on future uses of the property.

We understand you are confident that the residual levels of uranium at the site will be far below the 554 pCi/g and 774 pCi/g criteria presented in the draft ROD. In light of that expectation, we suggest that the Corps revisit its application of the ARAR found in 10 CFR 40.

As you know, that ARAR contains two parts: the benchmark dose derivation and the application of ALARA. The benchmark dose calculation produced the 554 and 774 pCi/g criteria. The next step is to adjust those figures, based on consideration of ALARA.

ALARA is defined in state and federal regulation as,

> "ALARA" (as low as reasonably achievable) means making every reasonable effort to maintain exposures to radiation as far below the dose limits in this part as is practical consistent with the purpose for which the licensed activity is undertaken, taking into account the state of technology, the economics of improvements in relation to state of technology, the economics of improvements in relation to benefits to the public health and safety, and other societal and socioeconomic considerations, and in relation to utilization of licensed radioactive materials in the public interest. [6 NYCRR 380-2.1(a)(5)]

As stated in the NRC's *Draft Guidance on the Benchmark Dose Modeling for the Radiological Criteria for License Termination of Uranium Recovery Facilities*, "In conjunction with the activity limit [derived from the radium benchmark dose], the ALARA principle is considered in setting cleanup levels."

According to the supplemental information provided to us by Mr. Pilon on September 29, 1999, after the remediation of the Linde site, "the 95% upper confidence level (UCL_{95}) concentration for the residual total uranium would be less than 60 pCi/g." If this is true, then decontaminating the site to 60 pCi/g is clearly achievable and, hence, it is ALARA. Therefore, we could only concur with a ROD that unequivocally stated that the uranium decontamination criterion would be at least as low as 60 pCi/g.

We support the Federal Government's mission to remediate the Linde Site. This support is based on the success of the Ashland 2 remediation and the August 1999 draft work plans for the Linde site, which you have provided to our staff for review. As stated in staff's comments to the Corps, we concur with the intent of those draft work plans to remove from the site all soils containing uranium at concentrations greater than 60 picocuries per gram. We encourage the Corps to move ahead with remediation of the Linde site as proposed in the August 1999 work plans.

Thank you for the opportunity to review this draft ROD. We look forward to working with the Corps to resolve the remaining issues.

Sincerely,

Stephen Hammond, P.E.
Director
Division of Solid & Hazardous Materials

cc: P. Giardina, USEPA
D. Conroy, Praxair

USACE RESPONSES TO AND CONSIDERATION OF NYSDEC LETTER OF AUGUST 23, 1999

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RESPONSES AND CONSIDERATION OF NYSDEC LETTER OF 8/23/99

The following are the responses to the general issues raised in the cover letter. The title only is repeated to reference back to the letter.

Newly Identified ARAR

The provisions of 10 CFR Part 40 Appendix A, Criterion 6(6) are the same as those found in 40 CFR Part 192 Subparts D and E, which in turn are the same as the requirements found in 40 CFR part 192 Subparts A and B. However, 10 CFR Part 40 Appendix A, Criterion 6(6) contains an additional provision, added to it by an amendment effective June 11, 1999. This amendment provides a methodology for addressing radionuclides other than radium that may be present in the soil and on the surface of remaining structures. This methodology is based on meeting a benchmark dose, the dose that would result from exposure to radium alone after cleanup to the radium standards stated in 10 CFR 40, Appendix A, Criterion 6(6). The new amendment to 10 CFR 40, Appendix A, Criterion 6(6) only provides a method of calculating the cleanup level for a portion of the site contamination and results in a cleanup level that is not significantly different from that included in the PP and does not change the expected future land use assumed and discussed in the PP. As discussed in the revised Section 11 of the ROD, the NRC benchmark dose will result in a soil cleanup level for all radioactive contaminants that is as protective as that applicable to radium, which was included in the PP. A discussion of the sum-of-the-ratios method for ensuring the overall level of protection will be obtained is provided in response to comment #2, below. Based on the evaluations provided in Section 11 of the ROD, there were no significant changes justifying a new public comment period.

Decontamination Criteria

The definition of source material in 6 NYCRR § 383-2.1 is as stated: "(46) Source material means: (i) uranium or thorium, or any combination thereof, in any physical or chemical form; or (ii) ores which contain by weight one-twentieth of one percent (0.05 percent) or more of (a) uranium; (b) thorium; or (c) any combination thereof.". This definition follows the definition of source material included in the AEA. The AEA specifies that there are two different source materials. One is the ores which contain 0.05% by weight uranium or thorium or a combination thereof. The other is that designated by the NRC pursuant to the provisions of 42 USC Section 2901. USACE is not aware of any such designations by NRC that would make the residual materials at Linde source material. The remediation at Linde does not involve uranium ores, only residual radioactive materials as defined in 40 CFR 192, § 192.01(a)(1) and (2), which state that residual radioactive material is "(1) Waste … in the form of tailings resulting from the processing of ores for the extraction of uranium…; and (2) Other wastes … at a processing site which relate to such processing, …" or byproduct material as defined in 42 USC § 2014(e)(2) and 10 CFR Part 40.1. 6 NYCRR § 383 further states that the regulations of Part 383 do not apply to "disposal of the tailings or wastes produced by the extraction or concentration of uranium … from any ore processed primarily for its source material content…" (6 NYCRR § 383-1.1(b)(3)).

Average Concentration

The goal of the site cleanup is to meet the standards of the ARARs, not the previously proposed site specific uranium criteria. The averaging method to be used to demonstrate compliance with the ARARs will be averaging to $100m^2$ over a 15 cm thickness in accordance with the ARARs. Remediation to that standard will result in a residual concentration of uranium that is lower than was originally presented in the PP.

Inconsistency with Other USACE Cleanup Levels at FUSRAP Sites in New York State

As NYSDEC is aware, cleanup levels are dependent on a number of factors such as the radiological and non-radiological contaminants of concern (COCs) present, the site characteristics, likely exposure scenarios, and relevant risk and health based standards. The COCs at the Colonie Site (e.g., uranium, Th-232, lead, TCE, etc.) are very different than those at the Linde Site (e.g., uranium, Th-230, Ra-226). The ARARs are also different as well as the site characteristics. Comparing specific cleanup levels for specific radionuclides at various sites could be misleading. Instead, the cleanup levels at a particular site should be based on the COCs at the site, the site characteristics, the appropriate ARARs, and likely land uses.

Industrial/Commercial vs. Residential Uses

USACE believes that the most likely land use is commercial/industrial. USACE has, however, also evaluated the residential scenario for general reference. USACE estimated the benchmark dose and associated uranium concentration limit for surface and subsurface cleanups conservatively considering the critical group to be a resident gardener eating 5% of his produce from a garden on the site. The results of that assessment are presented in our response to comment #10.

The following are responses to the detailed comments attached to the subject letter regarding the ROD. These also address their continued concerns expressed in comments on the Responsiveness Summary, where appropriate.

Response to Comment #1: The provisions of 10 CFR Part 40 Appendix A, Criterion 6(6) are the same as those found in 40 CFR Part 192 Subparts D and E, which in turn are the same as the requirements found in 40 CFR part 192 Subparts A and B. However, 10 CFR Part 40 Appendix A, Criterion 6(6) contains an additional provision, added to it by an amendment effective June 11, 1999. This amendment provides a methodology for addressing radionuclides other than radium that may be present in the soil and on the surface of remaining structures. This methodology is based on meeting a benchmark dose, the dose that would result from exposure to radium alone after cleanup to the radium standards stated in 10 CFR 40, Appendix A, Criterion 6(6). The new amendment to 10 CFR 40, Appendix A, Criterion 6(6) only provides a method of calculating the cleanup level for a portion of the site contamination and results in a cleanup level that is not significantly different from that included in the PP and does not change the expected future land use assumed and discussed in the PP. As discussed in the revised Section 11 of the ROD, the NRC benchmark dose will result in a soil cleanup level for all radioactive contaminants that is as protective as that applicable to radium, which was included in the PP. A discussion of the sum-of-the-ratios method for ensuring the overall level of protection will be obtained is provided in response to comment #2, below. Based on the evaluations provided in Section 11 of the ROD, there were no significant changes justifying a new public comment period.

Response to Comment #2: New regulations amending 10 CFR 40, Appendix A, Criterion 6(6) were promulgated and became effective on June 11, 1999. This new amendment addresses areas contaminated with radionuclides other than radium, while the radium criteria remains to the 5 pCi/g and 15 pCi/g radium above background standards included in the first paragraph of Criterion 6(6) as well as 40 CFR 192, Subpart B. 10 CFR 40, Appendix A, Criterion 6(6) defines the benchmark dose as the total effective dose equivalent (TEDE) to the average member of the critical group when exposed to radium at the 5 pCi/g (surface) or 15 pCi/g (subsurface) concentrations. Each radionuclide contaminant, including radium, is limited to the concentration that would individually produce the benchmark dose. Criterion 6(6) also states if more than one residual radionuclide is present in the same 100-square-meter area, the sum of the ratios for each radionuclide of concentration present to the concentration limit will not exceed "1" (unity).

USACE evaluated the new standard, the draft NRC guidance included in the Federal Register (Vol. 64, N0. 69, dated April 12, 1999, pp. 17690–17695), and the Linde Radiological Assessment (USACE 1999a), which has been provided to NYSDEC for review and includes all of the site assumptions used for RESRAD modeling. Based on the current understanding by USACE of the new standard and associated guidance, USACE was able to use the data and information contained in the Linde Radiological Assessment (USACE 1999a) to establish the benchmark doses and associated radionuclide concentration limits for surface cleanups as well as subsurface cleanups. The results in the Linde Radiological Assessment were based on RESRAD runs modeling the conditions at the Linde site. The

document also included what the allowable concentrations would be for various radionuclides to meet dose objectives both with and without cover materials for the most likely scenario at the site, the industrial/commercial scenario. These results are contained in Table 3-3 of the Linde Radiological Assessment. Using those results, USACE was able to derive the benchmark dose for surface cleanup by dividing the 10 mrem/y (no cover) by the 5.7 pCi/g of Ra-226 associated with that dose and then multiplying the result by 5 pCi/g of Ra-226, which results in a benchmark dose of 8.8 mrem/y for surface cleanups. Table 3-3 data was then used to derive the allowable concentrations for total uranium, Th-230 and Th-232. The same methodology was used in deriving the same information for subsurface cleanups. The data used were the results in Table 3-3 based on a cover depth of 6 inches. The resulting benchmark dose for subsurface cleanups was calculated to be 4.1 mrem/y. The following tabulates the results of the assessment and what the radionuclide limits are for surface and subsurface cleanups:

	Allowable Residual Concentration Limit for Indicated Benchmark Dose (Commercial/Industrial Use) (pCi/g)	
Radionuclide	**Surface: 8.8 mrem/yr**	**Subsurface: 4.1 mrem/yr**
Ra-226	5.0	15
Th-230	14	44
U-total	554	774

During remediation, the actual radionuclide concentrations within a 100 square meter area will be divided by their corresponding concentration limit from the table above. These ratios are then added and must be equal to or less than "1" (unity). If the sum of these ratios exceeds unity, additional soil removal is necessary.

The allowable residual radionuclide concentrations on structure surfaces would be computed for specific structures and the associated exposure scenarios and would be based on meeting the benchmark dose of 8.8 mrem/y for surface cleanups.

Response to Comment #3:

(1) 11(e)(2) byproduct material that is regulated by the NRC or held under a license by the NRC must be disposed in a facility that is licensed by the NRC, per NRC rules. NRC has expressly declined to assert jurisdiction over the radioactive materials at Linde because it was created prior to 1978 when Congress provided the agency authority to regulate the material. This material is therefore not subject to NRC requirements, including the requirement to dispose of the waste at an NRC-licensed facility.

(2) The USACE has been granted authority to manage and execute the FUSRAP program by the U.S. Congress. In the Memorandum of Understanding entered into between the USACE and the DOE, the USACE has complete control over FUSRAP cleanup activities, including disposal of the waste. Constraints regarding DOE-owned wastes do not extend to the USACE.

Response to Comment #4: USACE assumes that the comment meant for USACE to consider, possibly as a TBC, the referenced DOE document. First, since this cleanup activity is governed by applicable or relevant and appropriate regulations, it is not necessary to rely on TBCs for additional standards, criteria, requirements or limitations.

Secondly, DOE guidelines do not apply to USACE activities and this section has been deleted

Response to Comment #5: The background value used is that established by the DOE when they characterized the Tonawanda Sites and obtained background values for the various radionuclides. This information is documented in the RI for the Tonawanda Sites.

Response to Comment #6: In December 1992, DOE designated the Tonawanda Landfill as a FUSRAP vicinity property for Linde, but did not include it in the 1993 Proposed Plan. As indicated in earlier response to a similar comment by NYSDEC, the Town of Tonawanda Landfill is not within the scope of this ROD since it was not within the scope of the PP. USACE will address the Town of Tonawanda Landfill FUSRAP site separately.

Response to Comment #7: USACE has included a discussion within the ROD regarding what the benchmark dose and associated cleanup concentration limits are for uranium and thorium associated with surface and subsurface cleanup using the industrial/commercial use scenario. The response to comment #2 above includes a discussion of how the calculations were done and the results.

As for an ALARA evaluation, USACE has evaluated the benefit and cost associated with reducing the total allowable residual uranium concentration from levels expected through application of the ARAR benchmark dose concentration limits, considered to be approximately 600 pCi/g or less, to 60 pCi/g. The evaluation considered both commercial/industrial and residential use scenarios. The results were documented in a document entitled "COMPARISON OF UNITED STATES ARMY CORPS OF ENGINEERS AND DEPARTMENT OF ENERGY LINDE CLEANUP CRITERIA, LINDE FUSRAP SITE, TONAWANDA, NEW YORK", dated July 29, 1999. A copy of this evaluation has been included in the Administrative Record. Based on these results using 3-D modeling of impacted areas, the reduction in dose for the commercial/industrial worker scenario in using 60 pCi/g total uranium was less than 1 mrem/year at an increase in costs of over $15M. For the residential scenario, the dose reduction was approximately 3 mrem/year at an increase cost of over $15M. Based on these results, USACE does not believe it is reasonable to reduce the uranium cleanup criteria to anything less than limits associated with the appropriate benchmark dose. Another ALARA practice used by USACE is the actual over-excavation of materials as materials exceeding criteria are removed thus resulting in the residual concentrations being much lower than the criteria. The practice of removing an additional 2 inches of soil as an ALARA practice was recognized by NRC in their draft guidance included in the Federal Register (Vol. 64, N0. 69, dated April 12, 1999, pp. 17690–17695), as an ALARA approach used is some past mill site cleanups.

Response to Comment #8: The cost stated in the Declaration is the estimated cost associated with the selected remedy. The costs originally presented in Section 8 referred to the estimated costs associated with the alternatives as they were discussed in the 1999 PP. Section 8 has been revised and Table 8-1 deleted to reflect only those alternatives being considered within the scope of the ROD, which excludes Building 14 and the groundwater system.

Response to Comment #9: The specific precautions will be prepared and included in the site remediation work plan, which would include detailed radiation protection and health and safety plans. Location and investigation of the subsurface vault is best done when the properly trained personnel and equipment are available using procedures written specifically for addressing radiological materials. For this reason, USACE felt that this effort would be best done using the remediation contractor to provide for minimal impact on the public health and safety as well as the environment.

Response to Comment #10: USACE believes that the most likely land use is commercial/industrial. USACE has, however, also evaluated the residential, as discussed in response to comment #7 above. USACE estimated the benchmark dose and associated uranium concentration limits for surface and subsurface cleanups considering the critical group to be a resident gardener eating 5% of his produce from a garden on the site. The methodology used is the same as discussed in response to comment #2, only using preliminary Dose-to-Source ratios (DSRs) for the residential scenario. The results of that assessment are as follow:

	Allowable Residual Concentration Limit for Indicated Benchmark Dose (Residential Use) (pCi/g)	
Radionuclide	**Surface: 30 mrem/yr**	**Subsurface: 79 mrem/yr**
Ra-226	5.0	15
Th-230	14	38
U-total	577	1490

As shown in the table, the results for the uranium are considerably greater than the results using the commercial/industrial use scenario. USACE believes that the concentration limits now contained in the ROD will be protective and will meet the ARARs for all reasonable land uses.

In addition to the NYSDEC comments on the ROD, there was attached to the NYSDEC letter their responses to USACE responses to previous State comments on the Responsiveness Summary. All of their remaining concerns have been addressed in the responses above, except for the following comment:

Generic Comments and Generic Responses (Page 11 of 11)

Response to Comment: 4.7 Comment Response ID-G – State and Community Acceptance

A statement has been added to the Declaration in the ROD, as well as the Responsiveness Summary, that the State of New York does not concur with the selected remedy.

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