UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

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September 30, 1998

Peter B. Bloch, Esq.
Presiding Officer
Atomic Safety and Licensing Board
U.S. Nuclear Regulatory Commission
Washington, DC 20555

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Special Assistant
Atomic Safety and Licensing Board
U.S. Nuclear Regulatory Commission
Washington, DC 20555

In the Matter of
INTERNATIONAL URANIUM (USA) CORPORATION
(Receipt of Material from Tonawanda, New York)
Docket No. 40-8681-MLA-4

Dear Administrative Judges:

Pursuant to LBP-98-21, 48 NRC ___ (September 1, 1998) and 10 C.F.R. § 2.1231(a), enclosed the hearing file (and an index listing each document) for the above-captioned proceeding. Copies are being provided to the parties in this proceeding by means of this letter.

Sincerely,

Mitzi A. Young
Counsel for NRC Staff

Enclosures: As stated

cc w/ encls: Fred Nelson, Esq.
Anthony Thompson, Esq,
Jill Pohlman, Esq.
SECY
OCAA
ASLB Panel
Adjudicatory File
PDR

DS03

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HEARING FILE
INTERNATIONAL URANIUM (USA) CORPORATION (IUSA)
Docket No. 40-8681-MLA-4

Accession No.

1. 9805190096 Letter from M. Rehmann, IUSA, to J. Holonich, NRC, dated 5/8/98, forwarding Amendment application dated 5/8/98

    9805190105 Request to Amend Source Material License SUA-1358, White Mesa Mill Docket No.40-8681, dated 5/8/98 (Amendment application with 3 Attachments)

    9805190111 USACE/OR/21950-1029, Proposed Plan for Ashland 1 and 2 Sites: Tonawanda, New York," dated 11/87

2. 9806090245 Facsimile from M. Rehmann, IUSA, to J. Park, NRC, dated 5/27/98, forwarding supplemental information (radioactive waste profile record); (Docketed per 6/4/98 Memo from Park, NRC (9806090244))

3. 9806090139 Letter from M. Rehmann, IUSA, to J. Holonich, NRC, dated 5/29/98, transmitting Record of Decision for Ashland 1 and 2 Sites, US Army Corps of Engineers (USACE), 4/98

    9806260176 USACE, "Final Record of Decision for Ashland 1 (Including Seaway Area D) and Ashland 2 Sites, dated 4/98

4. 9806080244 Letter from J. Holonich to M. Rehmann, IUSA, dated 6/1/98, forwarding Request for Additional Information (RAI)

5. 9806120329 Letter from M. Rehmann, IUSA, dated 6/3/98, Response to Request for Additional Information dated June 1, 1998

    9806290122 Site Operations Plan: FUSRAP Ashland 2 Remedial Action, Tonawanda, New York, dated 5/22/98 (docketed by 6/24/98 Park Memo: 9806290108)

    9806290126 Excavation & Restoration Plan (E&RP): FUSRAP Ashland 2 Remedial Action, Tonawanda, New York, dated 5/22/98

    9807100060 Figure from E&RP (aperature card) [attachment to 6/3/98 IUSA letter]

    9806290117 Sampling and Analysis Plan (SAP): FUSRAP Ashland 2 Remedial Action, Tonowanda, New York, dated 5/29/98

    9807100061 Figure from SAP (aperature card) [attachment to 6/3/98 IUC letter]

6. 9806260198 Letter from M. Rehmann, IUSA, to J. Holonich, NRC, dated 6/11/98, providing supplemental information (confirmatory sampling frequencies)

7. 9806260153 Facsimile from D.Kim, Shaw, Pittman, to J. Park, NRC, dated 6/11/98, submitting background information on FUSRAP program and sites (FUSRAP: Introduction to Formerly Utilized Sites: Remedial Action Program (FUSRAP), dated 10/30/97)

8. 9806260150 Facsimile from L. Edward, Shaw, Pittman, J. Park, NRC, dated 6/12/98, submitting excerpt of US Department of Energy, DOE/EM-0233, dated 4/95 (regarding FUSRAP program and sites)

9. 9806260185 Letter from M. Conrad, USACE, to NRC, dated 6/16/98 (Subject: "Description of Material to be Disposed from Ashland 1 (including Seaway D) and Ashland 2 Sites"

10. "Uranium Mill Facilities, Notice of Two Guidance Documents: Final Revised Guidance on Disposal of Non-Atomic Energy Act of 1954, Section 11e.(2) Byproduct Material in Tailings Impoundments; Final Position and Guidance on the Use of Uranium Mill Feed Materials Other Than Natural Ores," 60 Fed. Reg 49296 (September 22, 1995)

11. USDOE "1996 BEMR: Ashland 2" (posted 8/14/98) (discussion of site and planned remediation activities [http://eagle.emweb.icx.net/bemr96/asho.html]

12. 9806250152 Letter from J. Holonich, NRC, to M. Rehmann, IUSA, forwarding Amendment 6 to Source Material License SUA-1358, dated 6/23/98 (enclosing Technical Evaluation Report and License Amendment)

    9806250154 Amendment 6 to SUA-1358, dated 6/23/98.

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REHMANN,M.R. Affiliation Not Assigned
RECIP.NAME RECIPIENT AFFILIATION
HOLONICH,J.J. High-Level Waste & Uranium Recovery Projects Branch (NMS

SUBJECT: Forwards application for amend to license SUA-1358 to authorize receipt & processing of U-bearing matl resulting from processing of natural ore for extraction of U.

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IUC INTERNATIONAL URANIUM (USA) CORPORATION

Independence Plaza, Suite 950 • 1050 Seventeenth Street • Denver, CO 80265 • 303 628 7798 (main) • 303 389 4125 (fax)

May 8, 1998

Via Overnight Mail

Mr. Joseph J. Holonich, Branch Chief
High Level Waste and Uranium Recovery
Projects Branch
Division of Waste Management
Office of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
2 White Flint North, Mail Stop T-7J9
11545 Rockville Pike
Rockville, MD 20852

Re: Amendment Request to Process an Alternate Feed at White Mesa Uranium Mill
Source Material License SUA-1358

Dear Mr. Holonich:

International Uranium (USA) Corporation ("IUSA") hereby submits the enclosed request to amend Source Material License SUA-1358 to authorize receipt and processing of a uranium-bearing material resulting from the processing of natural ore for the extraction of uranium. For ease of reference, this material is referred to herein as the "Uranium Material". The Uranium Material is being removed by ICF Kaiser, under a contract with the U.S. Army Corps of Engineers ("USACE", or the "Corps") from a site being managed under the Formerly Utilized Sites Remedial Action Program ("FUSRAP") in Tonawanda, New York, known as Ashland 2.

The volume of the Uranium Material to be removed and shipped from Ashland 2 will range from approximately 24,000 to approximately 25,000 dry tons. Average uranium content is difficult to estimate, although site history and available data suggest that recoverable uranium is present. Analytical data provided to IUSA indicate uranium content ranging from nondetectable to approximately 1.0 percent, or greater. IUSA analysis of three surface samples indicated concentrations ranging from <0.001 to 0.06 percent. Eighteen core samples showed uranium contents above 0.05 percent.

In addition to recovery of the uranium content of the Uranium Material, vanadium may also be recovered using the secondary vanadium recovery circuit of the Mill that is used when vanadium/uranium feedstock is processed. However, insufficient ore grade data are available to estimate the potential recovery of vanadium or other metal materials. This Uranium Material will be processed either together with or separately from, and in the same manner as our

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conventional ores, and will contribute significant economic benefits to IUSA, as detailed in Section 1.3 of the application. Because we have asked that this application be expedited, in order to facilitate NRC's review, we have decided to include in the regulatory considerations section of our application more detail than in past submissions.

The processing of the Uranium Material will not increase the mill's production to exceed the License Condition No. 10.1 limit of 4,380 tons of U_3O_8 per calendar year. As production will remain within the limits assessed in the original Environmental Assessment, and as the process will be essentially unchanged, this amendment will result in no significant environmental impacts beyond those originally evaluated.

The disposal of the 11e.(2) byproducts resulting from processing the Ashland 2 material will not change the characteristics of the Mill tailings from the characteristics associated with normal milling operations. In fact, processing of the Ashland 2 material, which is an 11e.(2) byproduct material, to recover the uranium it still contains, is expected to make the resulting 11e.(2) tailings less contaminated, as radioactive uranium will be removed from the Uranium Material.

Complete details are provided in the attached request to amend, which includes the following sections:

Attachment 3 U.S. Army Corps of Engineers Value Engineering Proposal for Ashland 1 and Ashland 2

To ensure that all pertinent information is included in this submittal, the following guidelines were used in preparing this request to amend:

- U.S. Nuclear Regulatory Commission ("NRC") *Final Position and Guidance on the Use of Uranium Mill Feed Material Other Than Natural Ores* (Federal Register Volume 60, No. 184, September 22, 1995).
- Energy Fuels Nuclear ("EFN") request to the NRC for the amendment to process uranium-bearing potassium diurinate ($K_2U_2O_7$) in a solution of potassium hydroxide/potassium fluoride in water ("KOH Amendment").
- NRC and State of Utah comments and requests for information relative to the KOH Amendment.
- EFN request to NRC for the Rhone-Poulenc alternate feed amendment.
- NRC and State of Utah comments and requests for information relative to the EFN request for the Rhone-Poulenc alternate feed amendment.
- EFN request to the NRC for the amendment to process uranium-bearing material owned by the Cabot Corporation.
- EFN request to the NRC for the amendment to process uranium-bearing material owned by the U.S. Department of Energy.

We believe that use of these guidance materials, supported by our discussions with the NRC concerning these amendment requests, has allowed us to prepare a complete, concise submittal. Therefore, IUSA requests that the NRC please attempt to reply to this request within 30 days of this transmittal date. The established schedule calls for removal actions for Ashland 2 to take place during the summer of 1998. The contractor, ICF Kaiser, will begin excavation in early June, 1998; start shipping the Material; and be completed by September 30, 1998. Removal actions at the two other FUSRAP locations near Ashland 2, Ashland 1 and Seaway, will follow in early 1999. Early review will allow material from the Ashland 2 site to be transported to IUSA in lieu of other locations. I can be reached at (303) 389.4131

Sincerely,

Michelle R. Rehmann
Environmental Manager

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MRR/tay
Attachments

cc James Park
Earl E. Hoellen
Harold R. Roberts
David C. Frydenlund
William N. Deal

Request to Amend Source Material License SUA-1358 White Mesa Mill Docket No. 40-8681

May 8, 1998

Prepared by:
International Uranium (USA) Corporation
1050 17th Street, Suite 950
Denver, CO 80265

Contact: Michelle R. Rehmann, Environmental Manager
Phone: (303) 389.4131

Submitted to:
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11545 Rockville Pike
Rockville, MD 20852

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INTRODUCTION

International Uranium (USA) Corporation ("IUSA") operates an NRC-licensed uranium mill located approximately six miles south of Blanding, Utah. The mill processes natural (native, raw) uranium ores and feed materials other than natural ores. These alternate feed materials are generally processing products from other extraction procedures, which IUSA processes at IUSA's licensed uranium mill, primarily for the source material content. All waste associated with this processing is, therefore, 11e.(2) byproduct material; or, as stated in the alternate feed analysis noticed in Federal Register Volume 57, No. 93:

> "The fact that the term 'any ore' rather than 'unrefined and unprocessed ore' is used in the definition of 11e.(2) byproduct material implies that a broader range of feed materials could be processed in a mill, with the wastes still being considered as 11e.(2) byproduct material".

This application to amend NRC Source Material License SUA-1358 requests an amendment to allow IUSA to process a specific alternate feed, and to dispose of the associated 11e.(2) byproduct material in accordance with the Mill operating procedures.

Yellowcake produced from the processing of this material will not cause the currently-approved yellowcake production limit of 4,380 tons per year to be exceeded. In addition, and as a result, radiological doses to members of the public in the vicinity of the mill will not be elevated above levels previously assessed and approved.

1.0 MATERIAL COMPOSITION AND VOLUME

IUSA is requesting an amendment to Source Material License SUA-1358 to authorize receipt and processing of certain uranium-containing byproducts resulting from the processing of natural ore for the extraction of uranium. For ease of reference, this byproduct material is referred to herein as the "Uranium Material". The Uranium Material is located at a site being managed under the Formerly Utilized Sites Remedial Action ("FUSRAP") Program in Tonawanda, New York, known as Ashland 2. The Uranium Material is not a residue from a water treatment process.

The Uranium Material will be transported by ICF Kaiser, under contract to the U.S. Army Corps of Engineers ("USACE", or the "Corps"), as part of the FUSRAP Program, from Ashland 2 to the White Mesa Mill.

Ashland 2 is one of three sites located on the Linde Property near one another in Tonawanda, New York: Ashland 1, Ashland 2, and Seaway. The regional setting of Linde, Ashland 1, Ashland 2, and Seaway is shown in Figure 1-2 of Attachment 1. Figure 1-3 shows the locations of Linde, Ashland 1, Ashland 2, and Seaway.

From 1942 to 1946, portions of the Linde Property in Tonawanda, New York were used to separate uranium from imported pitchblende and domestic ore, under contract with the Manhattan Engineering District ("MED").

Figure 1-8 shows the process used for domestic ores; the process was modified somewhat for African ores, as is footnoted on Figure 1-8.

Residues from uranium ore processing at the Linde facility were disposed of (in trenches) and/or stored at the Ashland 2 property. Uranium ores processed at Linde included domestic ores and African ores, containing uranium in equilibrium with all of the daughter products in the decay chain.

In addition to these maps, Attachment 1 includes the following items describing Ashland 2 materials, process history, flow diagrams, and analytical data:

1. A complete history of uranium processing at the Linde property is provided on page 2 of the Proposed Plan for the Ashland 1 Ashland 2 Sites-Tonawanda, New York (U.S. Army Corps of Engineers, November 1997).

2. Portions of the Radiological Survey of the Ashland Oil Company (Former Haist Property), Tonawanda, New York (U.S. Department of Energy, May 1978) describe uranium concentrations in core samples and approximate distributions of tailings stored on the Linde property.

3. A portion of the Preliminary Assessment Site Investigation and HRS Scoring for Ashland 2 Tonawanda, NY (U.S. DOE, June 1987), which describes the content of the residues, including 8,000 tons of residues containing approximately 0.54% uranium, that were deposited on the Linde property between 1944-1946.

4. A Portion of the Preliminary Assessment and Site Investigation for Linde Air Products (U.S. DOE, September 1987) describes Linde operations and processes.

Over the years, leaching has spread contamination from the Uranium Material to adjacent soils, increasing the volume to be removed. The Corps estimates that the volume of the Uranium Material is approximately 24,000 to 25,000 tons (dry basis). Physically, the Uranium Material is a moist material consisting of byproducts from uranium processing operations (ie., "tailings"), mixed with site soils.

1.1 Radiochemical Data

Process history demonstrates that the Uranium Material results from the processing of natural, mined uranium-bearing ores. It is currently being managed, and would be disposed of (if not reprocessed) as 11e.(2) byproduct material.

Average uranium content is difficult to estimate, although site history and available data suggest that recoverable uranium is present. Analytical data provided to IUSA indicate uranium content ranging from nondetectable to approximately 1.0 percent, or greater. IUSA analysis of three surface samples indicated concentrations ranging from <0.001 to 0.06 percent.

1.2 Hazardous Constituent Data

NRC guidance suggests that if a proposed feed material consists of hazardous waste, listed under subpart D Section 261.30-33 of 40 CFR (or comparable RCRA authorized State regulations), it would be subject to EPA (or State) regulation under RCRA. To avoid the complexities of NRC/EPA dual regulation, such feed material may not be approved for processing at a licensed mill. If the licensee can show that the proposed feed material does not consist of a listed hazardous waste, this issue is resolved. NRC guidance further states that feed material exhibiting only a characteristic of hazardous waste (ignitable, corrosive, reactive, toxic) would not be regulated as hazardous waste and could therefore be approved for recycling and extraction of source material. The NRC Alternate Feed Guidance also states that NRC staff may consult with EPA (or the State) before making a determination on whether the feed material contains hazardous waste.

The Corps, based on its analysis of the Uranium Material and process knowledge, believes that the Uranium Material contains no RCRA listed wastes. Process history and analytical data are described in Attachment 1.

ICF Kaiser, the contractor for the Corps, has indicated that to date, no listed hazardous wastes have been discovered at Ashland 2. Upon excavation, additional chemical testing will be accomplished to verify existing data, prior to any shipment. Any material that such testing would indicate contains listed hazardous waste constituents will not be included in the Uranium Material. ICF Kaiser has prepared a draft Sampling and Analysis Plan ("SAP") for this confirmatory sampling program. The SAP is currently under review by the Corps. ICF Kaiser will at NRC's request provide NRC with a copy of the final SAP.

The Uranium Material contains metals and other parameters which already are present in the mill tailings disposed of in the Cell 3 impoundments. Generally, the composition of the Uranium Material is very similar to the composition of the materials currently present in the White Mesa Mill's tailings impoundments, because the Uranium Material resulted from the processing of uranium-bearing ores for the extraction of uranium, and should not have an adverse impact on the overall Cell 3 tailings composition. Furthermore, the amount of tailings (a maximum of approximately 25,000 tons) produced by processing the material is not significant in comparison to the total amount of tailings currently in the cell (approximately 1.4 million tons). Additionally IUSA is required to conduct regular monitoring of the impoundment leak detection systems and of the groundwater in the vicinity of the impoundments to detect leakage if it should occur.

1.3 **Regulatory Considerations**

Uranium Material Qualifies as "Ore"

According to NRC guidance, for the tailings and wastes from the proposed processing to qualify as 11e.(2) byproduct material, the feed material must qualify as "ore." NRC has established the following definition of ore:

> "Ore is a natural or native matter that may be mined and treated for the extraction of any of its constituents or any other matter from which source material is extracted in a licensed uranium or thorium mill."

The Uranium Material is a matter from which source material will be extracted in a licensed uranium mill, and therefore qualifies as "ore" under this definition.

Uranium Material Not Subject to RCRA

As described under 1.2 above, the Uranium Material is not subject to regulation as a listed hazardous waste as defined in the Resource Conservation and Recovery Act, as amended, 42 U.S.C. Section 6901-6991 and its implementing regulations, or comparable State laws or regulations governing the regulation of listed hazardous wastes. In fact, the Department of Energy, as predecessor to the Corps in managing the FUSRAP sites, has consistently classified the FUSRAP materials, including the Uranium Material at Ashland 2, as 11e.(2) byproduct material. If Ashland 2 material were to be shipped to a waste disposal facility, IUSA understands that it would be accepted and disposed of as 11e.(2) byproduct material.

Justification of Certification Under Certification Test

In the Licensee Certification and Justification test set out in the NRC's *Final Position and Guidance on the Use of Uranium Mill Feed Material Other Than Natural Ores*, the licensee must certify under oath or affirmation that the feed material is to be processed primarily for the recovery of uranium and for no other primary purpose. IUSA makes this certification below.

Under this *Guidance*, the licensee must also justify, with reasonable documentation, the certification. The justification can be based on financial considerations, the high uranium content of the feed material, or other grounds.

Uranium Content

As stated above, average uranium content is difficult to estimate, although site history and available data suggest that recoverable uranium is present. For example, analytical data provided to IUSA indicate uranium content ranging from nondetectable to approximately 1.0 percent, or greater. IUSA analysis of three surface samples indicated concentrations ranging from <0.001 to

0.06 percent. Historic reports indicate that residues were both spread over and buried at the property. One report containing core data listed eighteen core samples that contained uranium above 0.05 percent.

The site history indicates that 8,000 tons of process residues containing on average approximately 0.54 percent U_3O_8 from processing at the Ashland 1 property, were spread out over roughly two thirds of that property. Some of these residues contained as much as 5.57 percent vanadium (V_2O_5). The majority of the residues, and associated contaminated soils, were transferred to Ashland 2 and Seaway. It is not clear how much of these residues remain on the Ashland 2 property; however all that do remain will be included in the Uranium Materials. Additional radioactive residues were removed from Ashland 1 and were also deposited in an area of the Ashland 2 Property.

Based on the information available, IUSA estimates that the average grade of U_3O_8 contained in the Uranium Material could be approximately 0.05 percent, but that this number could be increased or decreased depending on the extent to which pockets of higher grade materials exist on the site. However, IUSA believes that, based on the history of the site, there is significant potential that the average grade of the materials could be substantially greater than 0.05 percent U_3O_8. For example, if one half of the Ashland 1 residues described above remain on the Ashland 2 site, the average grade of the total Uranium Materials could be in the range of 0.10 to 0.12 percent U_3O_8.

These grades of 0.05 percent to 0.12 percent U_3O_8 are on the low end of the scale to justify hardrock mining and conventional milling today, although these grades of ore have been mined under conventional methods in the past and are currently being mined by *in situ* methods today. However, there are no mining or transportation costs payable by IUSA in connection with these ores, and therefore, these grades can justify conventional milling on their own merits in certain circumstances. When the additional *Financial Considerations* referred to below are taken into account, IUSA has concluded that milling the Uranium Material for its source material content provides a net benefit to IUSA, without taking into consideration the recycling fee referred to below under *Other Considerations.*

Financial Considerations

For a number of reasons, IUSA believes that the ability to process the Uranium Materials in the same fashion as conventional uranium ores either alone or commingled with such ores during the same mill run provides a number of production and production scheduling benefits to IUSA that have the effect of significantly reducing the incremental cost to IUSA of processing the Uranium Materials.

The White Mesa Mill has a nominal capacity of 2,000 dry tons of conventional ore per day. The mill cannot operate at less than its nominal capacity, without making certain capital modifications to the mill. This equates to approximately 680,000 tons per operating year, or 57,000 tons per month. This far exceeds the mine production from IUSA's currently operating mines, which is approximately 10,000 tons per month, and significantly exceeds the historic daily production available for processing at the mill from all sources. As a result, the mill has almost always been run in campaigns, where sufficient ores are stockpiled to justify a minimum length mill run (which should generally be at least eight months of continuous operations); the mill is run until the stockpile together with ores that have been delivered to the mill during the mill run have been milled; and then the mill is put on standby until a sufficient amount of ores are again stockpiled to justify the next mill run, and so on.

There are several economic costs associated with this type of operation. First, several millions of dollars of valuable ore can be stockpiled for months, before offsetting revenues are realized. This has the effect of increasing the real cost of mining, as the cost to mine this ore must be financed during the period. Secondly, the longer the period of time that ore is sitting on the pad waiting to be milled, the higher is the risk that commodity prices will decrease during that time period, with the result that the yellowcake or vanadium will have to be sold at a lower price than expected. This risk can be partially offset to the extent that the resulting commodities are sold forward at or prior to the time that the ore is mined. However, IUSA, like most producers, does not sell all of its production forward in this manner. Thirdly, it is difficult to maintain a trained workforce at the mill during the downtime. As a result, there is a cost, both direct, in the form of training, and indirect, in the form of decreased operating efficiencies and recovery percentages over the initial months of each mill run, associated with training new operators for each mill run. This is one reason why it is important that each mill run be at least eight months or so, to minimize this type of start up inefficiency during each mill run. And of course, the longer the continuous mill run the better.

By making certain capital modifications to the mill, IUSA has the ability to decrease the nominal capacity of the mill, to allow for a lower throughput per day. This has the benefit of reducing the amount of time necessary to stockpile ore, as the number of tons required to be stockpiled between each mill run would be less. However, reducing the nominal throughput of the mill has the unfortunate effect of increasing the milling cost per ton, as certain cost components such as labor and utilities cannot be reduced proportionately. Therefore there are economic limits inherent in reducing the nominal capacity of the mill. As a result, the more ore that can be fed to the mill the better. A greater, faster, supply of ore will result in longer mill runs at higher nominal capacities and lower milling costs.

The ability to process the Uranium Materials along with conventional ores, or separately, in the same mill run, will provide IUSA with the ability to commence its mill run earlier in 1998 than otherwise would be the case. IUSA currently expects that, depending on various circumstances, the mill run could commence approximately two and one half months earlier as a result of processing the Uranium Material. IUSA views the Uranium Material the same as if it were low-grade conventional ore. The resulting ability to thereby increase IUSA's stockpile of ore by the addition of the Uranium Material and the ability to process such ores during the same mill run and in the same manner as conventional ores, is expected to provide the following benefits to IUSA:

(a) the financial cost of stockpiling ore (i.e., the interest cost of the ore on the pad) is expected to be reduced by approximately two and one-half months;

(b) IUSA would expect to be able to produce more U_3O_8 and V_2O_5 in 1998, which can be applied to reduce advance royalties payable in 1998, which advance royalties cannot be recouped from production in subsequent years;

(c) By reducing the time between the mining of ore and the production and sale of U_3O_8 and V_2O_5, IUSA is able to reduce the risk that the prices at which the commodities are sold will have fallen, thereby reducing the resulting resulting risk of the possibility of production at a loss. Only a portion of IUSA's U_3O_8 is sold forward; the remainder must be sold on the spot market. At this time most of IUSA's V_2O_5 must be sold on the spot market;

(d) An earlier conventional ore mill run should make it easier for IUSA to attract purchased conventional ore from independent third party miners, because the interest cost to such miners of having mined the ore without having received full payment for the value of the ore should be less, and hence the cost of mining would be less. IUSA's purchased ore program is an important part of its business;

(e) The price of V_2O_5 is currently close to a seven-year high, and the ability to produce vanadium earlier reduces the risk that IUSA will miss this high in the market;

(f) Having the ability to commingle Uranium Materials with, or to process the Uranium Material during the same mill run as, conventional ores should provide some ability to use Uranium Materials to smooth out variability in the production and delivery of conventional ores to the mill; and

(g) The ability to start a conventional mill run earlier this year may reduce the risk of losing trained mill operators due to the possibilities of downtime between IUSA's current alternate feed run and its next conventional ore run. Or, alternatively, an earlier mill run may reduce the cost of retaining qualified personnel on staff during downtime, due to the possible shortening of the downtime period.

Finally, if circumstances at the Mill change such that ore supplies from IUSA's mines and other sources increases over the amounts currently expected, and the conventional mill run can therefore be started earlier than currently expected, then the ability to process the Uranium Material during the same mill run will either allow the Mill to be run at a higher nominal throughput than otherwise would be the case, resulting in lower costs of processing each ton of ore during the mill run and a more accelerated output of yellowcake and vanadium, or allowing for a longer mill run than would otherwise be the case, thereby allowing for lower average operating costs per ton due to the spreading out of startup and shutdown costs over a larger number of tons of ore milled during the mill run.

For these reasons, IUSA has determined that the ability to process the Uranium Material for uranium in the same manner and during the same mill run as our conventional ores has significant financial and commercial benefits to our uranium milling business, even at low grades of uranium contained in the Uranium Materials. And of course, these benefits have the effect of reducing the incremental cost of processing the Uranium Material. To the extent that the Uranium Material contains higher grades of uranium, this added uranium recovery will add to the financial benefits to IUSA of processing the Uranium Material.

In addition to the foregoing, the Uranium Materials may contain some vanadium. If the Uranium Material is processed in separate batches during the mill run, it may be possible to recover this vanadium if it can be isolated in batches of 1.0 percent or higher. Historic data suggest that vanadium-bearing residues of over 5.0 percent may still be included in the Uranium Material. If these pockets of vanadium can be identified, then they can be run through the mill on a batch basis geared toward maximizing the co-product recovery of vanadium along with the uranium. If, however, these vanadium grades are commingled within the Uranium Material, they may still add to the recovery of vanadium at the mill if commingled with other vanadium-bearing ores. It is difficult to quantify what if any recovery of vanadium is possible, but there is definitely the potential for the recovery of some valuable vanadium at little incremental processing cost.

Other Considerations

In addition to the fact that IUSA will retain all uranium and vanadium produced from the Uranium Materials, and will realize the financial and commercial benefits described above, IUSA will receive a recycling fee for recycling the Uranium Materials to remove uranium and thereby reduce the radioactive component of the materials. However, recycling of the Uranium Materials for uranium and the disposal of the resulting tailings in the mill's tailings impoundments as 11e.(2) byproduct material is not the primary purpose of processing the Uranium Materials. The primary purpose of processing the Uranium Materials is for the recovery of source material in a manner that is economic to the operation of the mill in its processing of ores for their uranium content. By processing the Uranium Materials for uranium in the same fashion and during the same mill run as other conventional ores, the mill is able to enjoy significant financial economies and commercial benefits. The ability to also collect a recycling fee is merely good business practice, in light of market and commercial considerations.

2.0 TRANSPORTATION CONSIDERATIONS

The Uranium Material will be shipped by train and exclusive-use trucks from the Ashland 2 site to the White Mesa Mill in intermodal containers. The sealed containers will be loaded on railcars and transported cross-country to the final rail destination (expected to be either near Grand Junction, Colorado; Cisco, Utah; or Green River, Utah), where they will be transferred to trucks for the final leg of the journey to the White Mesa Mill. It is expected that four containers will be shipped per rail car, for a total of approximately 290 to 300 cars. ICF Kaiser expects that 60 truck loads per week will be used to transport from the rail transfer site to White Mesa Mill.

The Uranium Material will be shipped as LSA (low specific activity) Radioactive Hazard Class 7 Hazardous Material as defined by DOT regulations. ICF Kaiser will arrange with a materials handling contractor for the proper labeling, placarding, manifesting and transport of each shipment of the Uranium Material. Each shipment will be "exclusive use" (i.e., the only material in each container will be the Uranium Material).

For the following reasons, it is not expected that transportation impacts associated with the movement of the Uranium Material by train and truck from New York to the White Mesa Mill will be significant:

- The material will be shipped as "low specific activity" material in exclusive-use containers (i.e., no other material will be in the containers with the Uranium Material). The containers will be appropriately labeled, placarded, and manifested, and shipments will be tracked by the shipping company from the Ashland 2 site until they reach the White Mesa Mill.
- On average during 1996, 370 trucks per day traveled the stretch of State Road 191 between Monticello, UT and Blanding, UT (1997 NRC personal communication with the State of Utah Department of Transportation). An additional 60 trucks per week traveling this route to the mill represents an increased traffic load of only 2 percent. Shipments are expected to take place over the course of a limited time period (three to four months).
- The containers and trucks involved in transporting the material to the mill site will be surveyed and decontaminated, as necessary, prior to leaving the Ashland 2 site for the White Mesa Mill and again prior to leaving the mill site for the return trip.

3.0 PROCESS

The Uranium Material will be added to the mill circuit in a manner similar to that used for the normal processing of conventional ore either alone, or commingled with conventional ores. The Uranium Material will be dumped into the ore receiving hopper and fed to the SAG mill before being pumped to Pulp Storage. The leaching process will begin in Pulp Storage with the addition of sulfuric acid.

The solution will be advanced through the remainder of the mill circuitry with no anticipated modifications to either the circuit or recovery process. Since no physical changes to the mill circuit of any significance will be necessary to process this Material, no construction impacts of any significance beyond those previously assessed will be involved.

Tailings produced by the processing of this material will be disposed of on-site in an existing lined tailings impoundment (Cell 3). The addition of these tailings (a maximum of approximately 25,000 dry tons) to Cell 3 will increase the total amount of tailings in the cell by approximately one to two percent, raising Cell 3 to a total of approximately 69 percent of cell capacity; therefore, no new impoundments are necessary. The design of the existing impoundments previously has been approved by the NRC, and IUSA is required by its NRC license to conduct regular monitoring of the impoundment liners and of the groundwater around the impoundments to detect leakage if it should occur.

4.0 SAFETY MEASURES

Mill employees involved in handling the material will be provided with personal protective equipment, including respiratory protection, as required. Airborne particulate and breathing zone sampling results will be used to establish health and safety guidelines to be implemented throughout the processing operations.

The Uranium Material will be delivered to the mill in closed containers via truck. The Uranium Material will be introduced into the mill circuit in the same manner as conventional ore. The material will proceed through the leach circuit, CCD circuit, and into the solvent extraction circuit in normal process fashion as detailed in Section 3.0 above. Since there are no major process changes to the mill circuit, and since the extraction process sequence is very similar to processing conventional uranium solutions, it is anticipated that no extraordinary safety hazards will be encountered.

Employee exposure potential during initial material handling operations is expected to be no more significant than what is normally encountered during conventional milling operations. Employees will be provided with personal protective equipment including full-face respirators, if required. Airborne particulate samples will be collected and analyzed for gross alpha concentrations. If uranium airborne concentrations exceed 25 percent of the DAC, full-face respiratory protection will be implemented during the entire sequence of material dumping operations. Spills and splashed material that may be encountered during this initial material processing shall be wetted and collected during routine work activity. Sample material of the Uranium Material indicates it is a neutral material. Therefore, it is anticipated that no unusual PPE apparel will be required other than coveralls and rubber gloves during material handling activities. Respiratory protection will be implemented as determined.

4.1 Control of Airborne Contamination

IUSA does not anticipate unusual or extraordinary airborne contamination dispersion when processing the Uranium Material. The contamination potential is expected to be less than what is normally encountered when processing conventional uranium ore. The successive extraction process circuitry from grinding, leaching, and CCD through solvent extraction and into precipitation are all liquid processes, and the potential for airborne contamination dispersion is minimal. Uranium extraction proceeds through the mill circuit as if the Uranium Material were uranium ore. The material is a moist solid or in a slurry form once it has been introduced into the SAG mill. Normal dust control measures will be utilized prior to the SAG mill.

The efficiency of airborne contamination control measures during the material handling operations will be assessed while the ore is in stockpile. Airborne particulate samples and breathing zone samples will be collected in those areas during initial material processing activities and analyzed for gross alpha. The results will establish health and safety guidelines which will be implemented throughout the material processing operations.

Personal protective equipment, including respiratory protection as required, will be provided to those individuals engaged in material processing. Additional environmental air samples will be taken at nearby locations in the vicinity of material processing activities to ensure adequate contamination control measures are effective and that the spread of uranium airborne particulates have been prevented.

4.2 Radiation Safety

The radiation safety program which exists at the White Mesa Mill, pursuant to the conditions and provisions of NRC License Number SUA-1358, and applicable Regulations of the Code of Federal Regulations, Title 10, is adequate to ensure the maximum protection of the worker and environment, and is consistent with the principle of maintaining exposures of radiation to individual workers and to the general public to levels As Low As Reasonably Achievable (ALARA).

4.3 Vehicle Scan

After the cargo has been offloaded at the mill site, a radiation survey of the vehicle and intermodal bin will be performed consistent with standard mill procedures (Attachment 2). In general, radiation levels are in accordance with applicable values contained in the NRC Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct, Source, or Special Nuclear Material, U.S. NRC, May, 1987. If radiation levels indicate values in excess of the above limits, appropriate decontamination procedures would be implemented. However, these limits are appropriate for materials and equipment released for unrestricted use only, and do not apply to restricted exclusive use shipments. As stated in Section 2.0 above, the shipments of uranium material to and from the White Mesa Mill will be dedicated, exclusive loads; therefore, radiation surveys and radiation levels consistent with DOT requirements will be applied to returning vehicles and cargo.

5.0 OTHER INFORMATION

5.1 Added Advantage of Recycling

The Value Engineering Study Team of the U.S. Army Corps of Engineers has proposed that the Corps use recycling and mineral recovery technologies at a uranium mill to reduce radioactive material disposal costs (See Attachment 3). The Corps notes that the White Mesa Mill has the technology necessary to recycle materials for extraction of uranium, vanadium, rare earth minerals, and other metals, and to provide for disposal of treated waste in the Mill's fully lined and NRC-compliant existing tailings impoundments.

The Corps has found that recycling will add value to the FUSRAP program, and lists the following advantages of recycling, over disposal:

1. Conforms to Congressional and regulatory mandates which encourage use of recycling.
2. Reduces radioactivity of the material to be disposed of.
3. Recycles uranium and other minerals.
4. Reduces cost of disposal of byproduct from recycling operation.
5. Treatment and disposal are performed at one location, and by-product from recycling is disposed of in an NRC-compliant disposal system, meeting 10 CFR 40 design criteria.
6. 11e.(2) by-product is disposed of in existing tailings impoundment which is consistent with 10 CFR 40 Appendix B intent for nonproliferation of small sites.
7. Actual cost savings for treatment and disposal versus cost of direct disposal only could be greater than projected, depending upon quantities of recoverable uranium or other minerals.
8. This technology has been demonstrated on multiple waste streams, and has potential applicability to other FUSRAP sites.

5.2 Reprocessing of 11e.(2) Byproduct Materials Under UMTRCA

From a legal point of view, there is no reason why IUSA should not be able to accept and process the Uranium Materials as alternate feeds since UMTRCA itself allows such remilling of 11e.(2) byproduct material:

> "[T]he Secretary [of Energy] shall request expressions of interest from private parties regarding the remilling of the residual radioactive materials at the [inactive] site and upon, receipt of any expression of interest, the Secretary shall evaluate among other things the mineral concentration of the residual radioactive materials at each designated site to determine whether . . . recovery of such minerals is practicable. The Secretary, with the concurrence of the Commission, may permit the recovery of such minerals. . . ."

While this provision applies only to inactive (Title I) sites, 11e.(2) byproduct material present at active (Title II) sites may be reprocessed under section 83 of the Atomic Energy Act. That section regulates transfer of custody of mill tailings and lands necessary for their disposal to DOE or states upon termination of licenses and provides in part:

> "If the Commission determines by order that use of the surface or subsurface estates, or both, of the land transferred to the United States or to a State under subparagraph (A) would not endanger the public health, safety, welfare, or environment, the Commission . . . shall permit the use of the surface or subsurface estates . . ."

Certification of International Uranium (USA) Corporation (the "Licensee")

I, David C. Frydenlund, the undersigned, for and on behalf of the Licensee, do hereby certify as follows:

1. The Licensee intends to enter into a contract with ICF Kaiser Engineers, Inc., 9300 Lee Highway, Fairfax, VA 22031-1207, on behalf of the United States Corps. Of Engineers (the "Material Supplier") under which the Licensee will process certain alternate feed material (the "Material") at the White Mesa Uranium Mill for the recovery of uranium. As demonstrated in the foregoing amendment application, based on the uranium content and financial considerations surrounding the Material and the processing transaction, the Licensee hereby certifies and affirms that the Material is being processed primarily for the recovery of uranium and for no other primary purpose.

2. The Licensee further certifies and affirms that the Material, as alternate feed to a licensed uranium mill, is not subject to regulation as a listed hazardous waste as defined in the Resource Conservation and Recovery Act, as amended, 42 U.S.C. Section 6901-6991 and its implementing regulations, or comparable State laws or regulations governing the regulation of listed hazardous wastes. The Licensee is obtaining the Material as an alternate feed, consistent with NRC guidance, for the uranium recovery process being conducted at the White Mesa Mill.

Signature	May 9, 1998 Date

David C. Frydenlund
Vice President and General Counsel
International Uranium (USA) Corporation

ATTACHMENT 1

Ashland 2 Material Description, Process History,
Flow Diagram, and Analytical Data

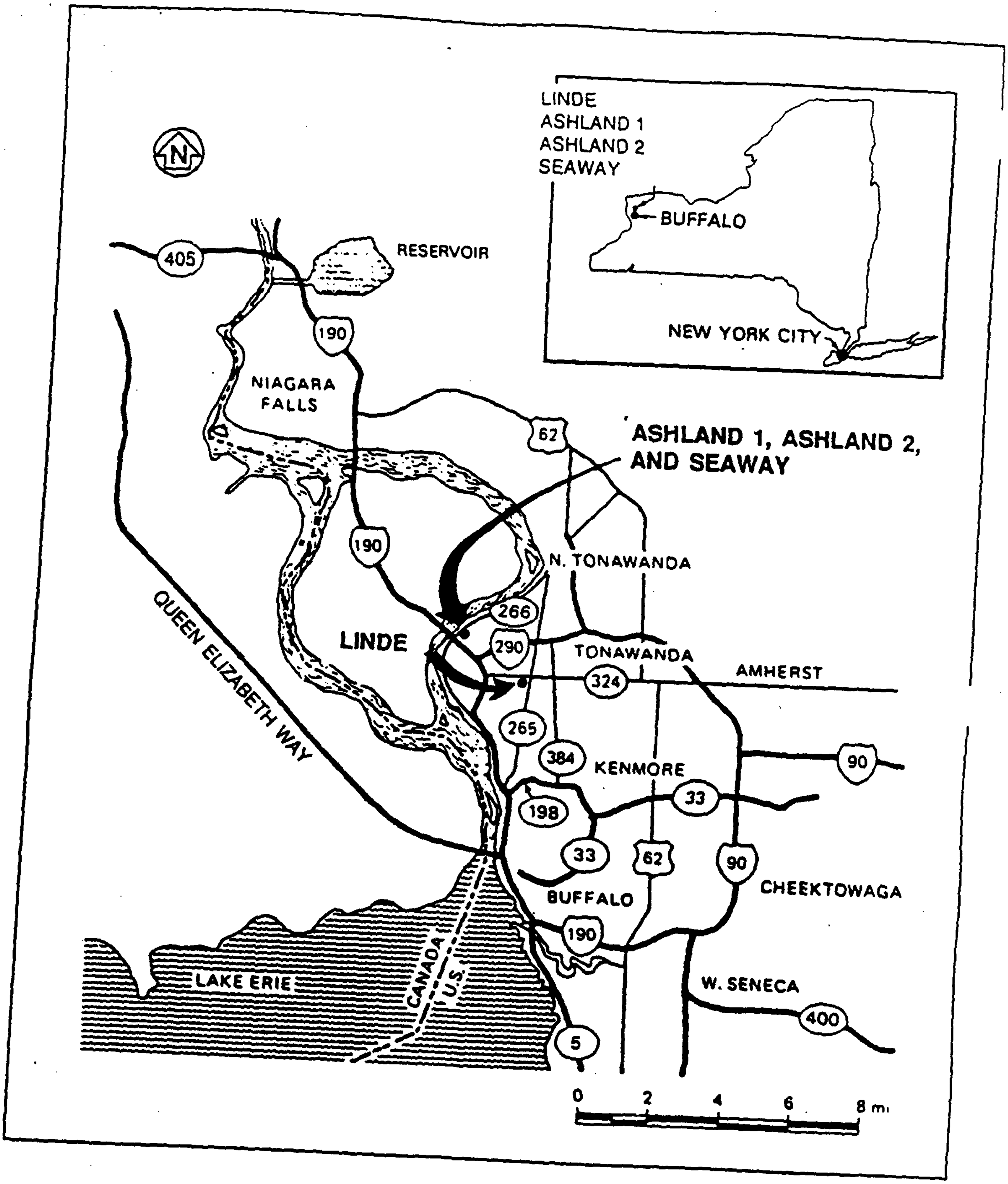

Figure 1-2
Regional Setting of Linde, Ashland 1, Ashland 2, and Seaway

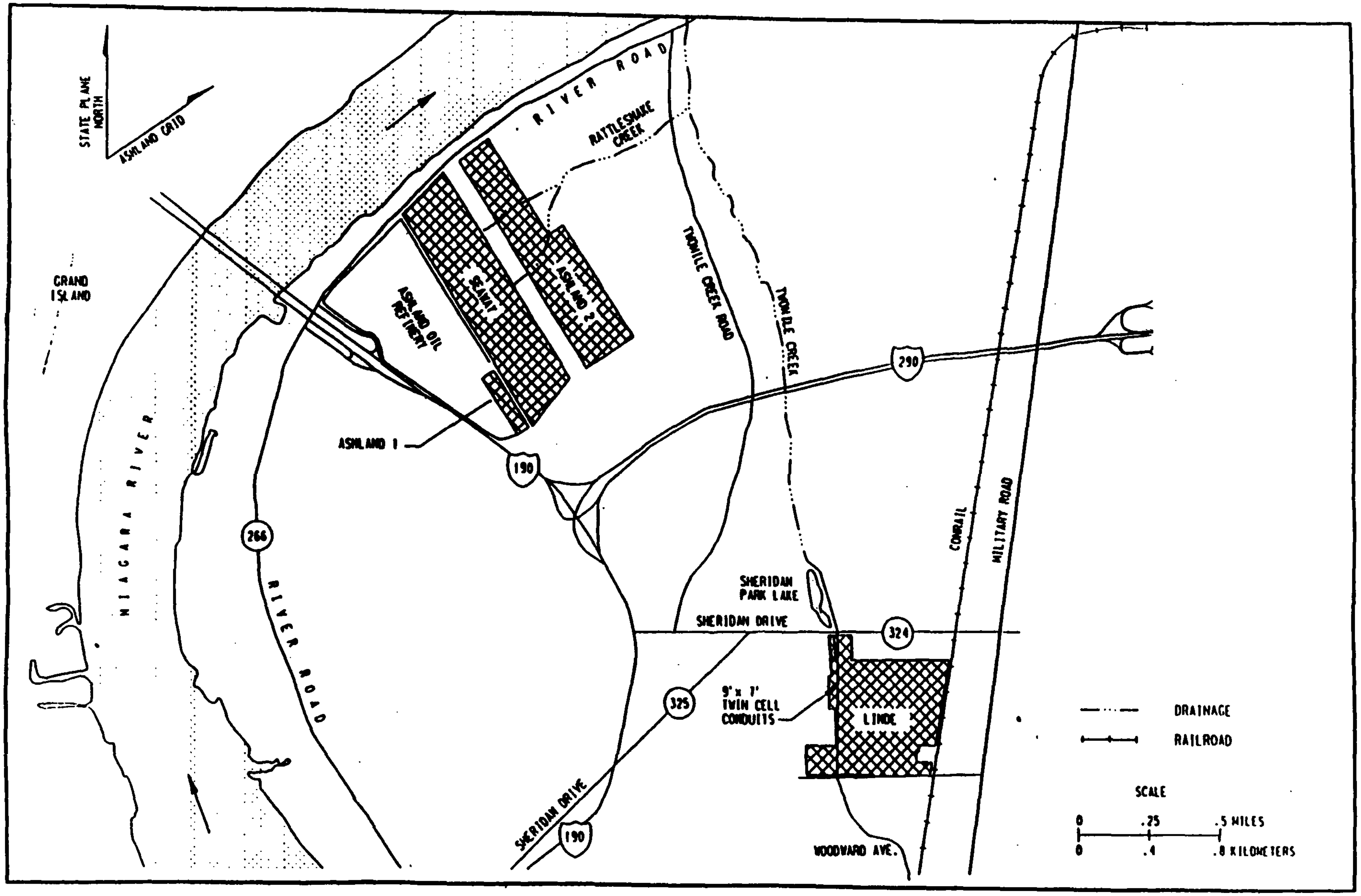

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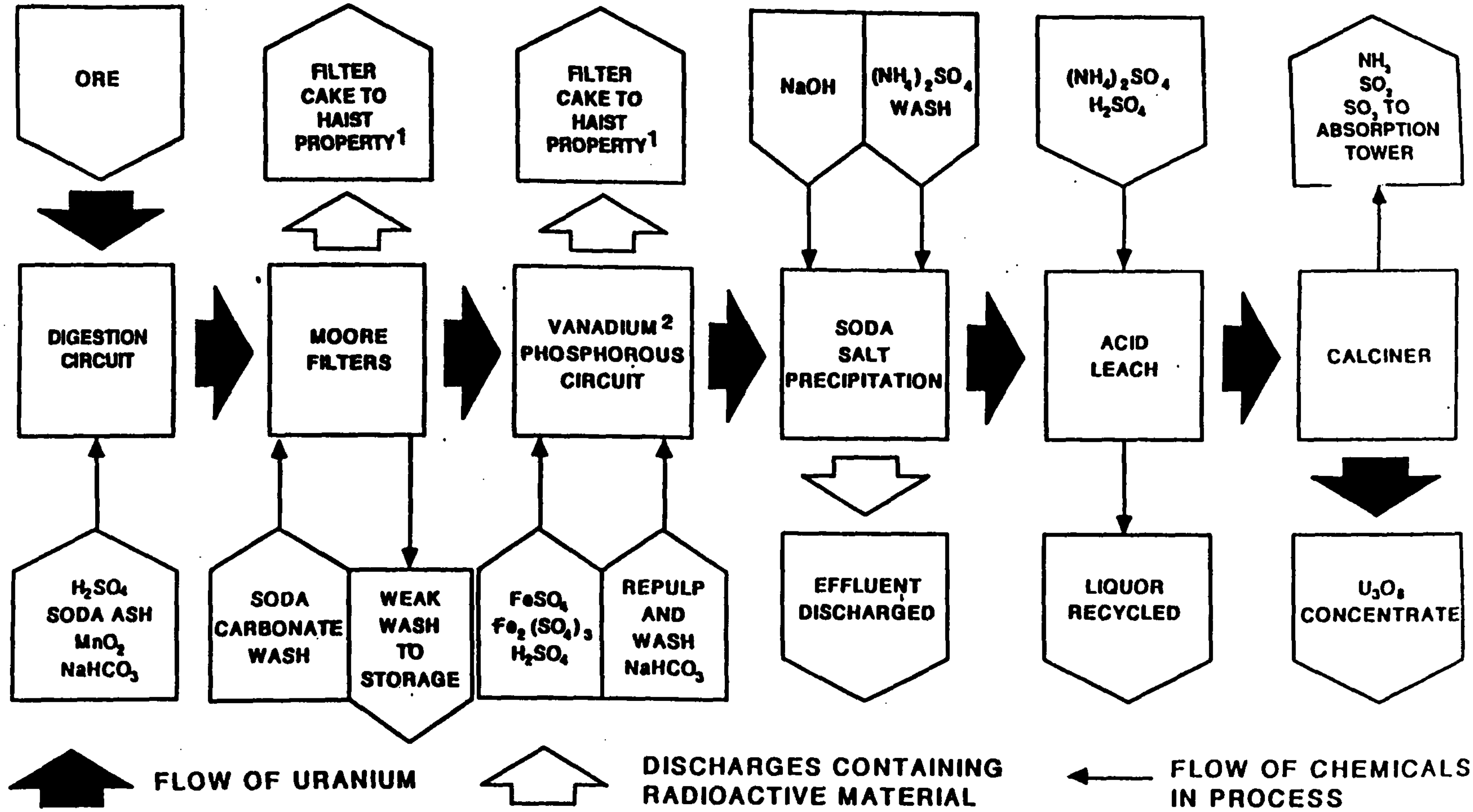
Figure 1-3
Locations of Linde, Ashland 1, Ashland 2, and Seaway



1. For the African ores, filter cake was taken to Lake Ontario Ordnance Works.
2. Initially, vanadium was removed by adding lead sulfate, and the soda salt precipitation was performed using an acid - caustic method that involved the addition of H_2SO_4 before the caustic was added. Later, the direct caustic method was used. For the African ores, a lead circuit was used instead of a vanadium/phosphorus circuit.

Source: The Aerospace Corporation. *Evaluation of the 1943-to-1946 Liquid Effluent Discharge from the Linde Air Products Company Ceramics Plant*, ATR-82(7963-04)-2, Germantown, Md. December 1981.

LMF - 1150.1

Figure 1-8
Processing of Domestic Uran' ` Ores at the Linde Ceramics Plant

160070

FINAL
USACE/OR/21950-1029

PROPOSED PLAN FOR THE ASHLAND 1 AND ASHLAND 2 SITES

TONAWANDA, NEW YORK

NOVEMBER 1997

prepared by
U.S. Army Corps of Engineers, Buffalo District Office, Formerly Utilized Sites Remedial Action Program

with technical assistance from
Science Applications International Corporation ESC-FUSRAP
under Contract No. DE-AC05-91OR21950

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UNITED STATES ARMY CORPS OF ENGINEERS
ADDENDUM TO PROPOSED PLAN
FOR ASHLAND 1 AND ASHLAND 2 SITES
TONAWANDA, NEW YORK

A revised Proposed Plan for the Ashland 1 and Ashland 2 properties and Area D of the Seaway property in Tonawanda, New York was prepared by the United States Department of Energy (DOE) in September 1997 under its authority to conduct the Formerly Utilized Sites Remedial Action Program (FUSRAP) at certain sites including these sites. On October 13, 1997, the Energy and Water Development Appropriations Act, 1998 was signed into law as Public Law 105-62. Pursuant to this law, the FUSRAP was transferred from the DOE to the United States Army Corps of Engineers (USACE). As a result of this transfer the revised Proposed Plan was not issued by the DOE and the responsibility for this project was transferred to USACE.

USACE officials recognize the need for a timely and efficient transition of this project and the need for necessary and appropriate response actions to proceed at these sites in accordance with the Comprehensive Environmental Response, Compensation and Liability Act, 42 United States Code 9601 et seq. (CERCLA). Therefore, USACE has decided to proceed to propose the response action recommended in the September 1997 revised Proposed Plan prepared by the DOE.

USACE does hereby propose that the final remedial action for the Ashland 1 and Ashland 2 and Seaway Area D sites be the alternative designated as Alternative 2A and described on page 10 of the revised proposed plan. This alternative is considered by the USACE to be adequately cost effective while meeting the nine criteria prescribed by CERCLA and the National Contingency Plan, 40 Code of Federal Regulations Part 300 (NCP), and is protective of human health and welfare and the environment. In particular, giving consideration to the community acceptance criteria, alternative 2A appears likely to be more acceptable to the community than the other alternatives considered for this site, based on extensive communications between DOE and representative members of the local community, although this criteria will not be finally determined until after receipt of comments from the public.

USACE notes that the revised proposed plan prepared by DOE relies in its analysis in part upon certain DOE guidelines which are not promulgated regulations and which are not applicable to USACE. These are generic guidelines developed within DOE to provide guidance within that agency. They are known as "DOE Order 5400.5." In addition, the revised proposed plan prepared by DOE relies in its analysis upon a New York State Department of Environmental Conservation (NYSDEC) guideline known as "Technical Administrative Guidance Memorandum" (TAGM) Number 4003 (1993) which is not a promulgated regulation and is not applicable to USACE. By adopting and proposing the selection of this alternative as the final remedial action for these sites, USACE takes no positions and makes no representation, for purposes of this remedy selection or any other, regarding the appropriateness of consideration of these DOE or NYSDEC guidelines in evaluating or deciding upon the selection of a final remedial action.

USACE invites members of the public to review the proposed plan and the supporting documents which further describe the conditions at the sites and the bases for this proposal. Those documents may be found in the Administrative Record for these sites at the Tonawanda Public Information Center, 70 Pearce Avenue, Tonawanda, NY 14150, or the Tonawanda Public Library, in Tonawanda, NY. Members of the public who wish to comment upon this proposed plan may submit their comments to USACE at the following address:

U.S. Army Corps of Engineers
Buffalo District
FUSRAP Information Center
70 Pearce Avenue
Buffalo, NY 14150

Please refer to this proposed plan or to the Ashland 1 and Ashland 2 sites in the comments. All comments will be reviewed and considered by USACE in making its final decision upon the remedial action to be conducted at these sites. Comments should be submitted no later than 60 days after the date of this addendum.

After the close of the public comment period, USACE will review all public comments, as well as the information contained in the Administrative Record for these sites, and any new information developed or received during the course of this public comment period, in light of the requirements of CERCLA and the NCP. An authorized official of USACE will then make a final selection of the remedial action to be conducted at these sites. This decision will be documented in a Record of Decision, which will be issued to the public, along with a response to all comments submitted regarding this proposed plan.

If there are any questions regarding the comment process, or the proposed plan, please direct them to the address noted above, or telephone (716) 871-9660 or 1-800-253-9759.

Michael J. Conrad
Lieutenant Colonel
Commanding
U.S. Army Engineer District, Buffalo

November 10, 1997

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REVISED PROPOSED PLAN

This revised Proposed Plan describes the preferred alternative resulting from the United States Department of Energy's (DOE's) discussions with the community representatives for Ashland 1 (which includes Seaway Area D) and Ashland 2. A Proposed Plan for the Tonawanda Site was issued in November 1993 (DOE 1993a) for public comment which described the DOE's preferred alternative for cleaning up elevated levels of radionuclides at the Tonawanda Site in the Town of Tonawanda, New York. Numerous concerns and comments were raised by the community and their representatives regarding the preferred alternative in that Proposed Plan and the onsite disposal of any remedial action waste.

DOE has listened to these concerns and has had numerous interactions with the community's representatives in Congress (Congressman LaFalce and his staff), representatives locally [Coalition Against Nuclear Materials in Tonawanda (CANiT) and their consultants], and the New York State Department of Environmental Conservation (NYSDEC) over the past year. The primary objective of these meetings was to work together to reach an agreement on a cleanup approach that would be protective of human health and the environment, allow the Town of Tonawanda to move forward with planned property developments without restrictions, and be economically feasible for DOE.

This revised Proposed Plan (PP) addresses only the Ashland 1 and Ashland 2 properties and Area D of the Seaway property. The Seaway (Areas A, B, and C), Linde (currently Praxair), and Linde Vicinity Properties will be addressed separately. With the exception of buildings located at the Linde property, these will be addressed in a separate Proposed Plan and Record of Decision (ROD). Remediation of the Linde buildings has been addressed separately using Engineering Evaluations/Cost Analysis (EE/CA) documentation and public reviews.

This plan provides background information on the Tonawanda site, describes the alternatives considered in the original November 1993 Proposed Plan to clean up the site, presents the rationale for the selection of the preferred alternative, and outlines the public's role in helping DOE make a decision on a cleanup approach.

DOE is conducting this evaluation of the Tonawanda Site under its Formerly Utilized Sites Remedial Action Program (FUSRAP). Congress has authorized DOE to remediate areas with elevated levels of radionuclides that are a result of activities at the former Linde property associated with the separation of uranium ores from 1942 to 1946 under contract to the Manhattan Engineer District (MED).

The 1993 preferred alternative has been revised based on the following: input from the community after issuance of the previous draft Proposed Plan; discussions with the community's representatives; a new cleanup guideline derivation specific to Ashland 1 and Ashland 2; and three key documents associated with the original Proposed Plan. The three key documents were the Remedial Investigation (RI) report (BNI 1993) which describes the nature and extent of areas with elevated levels of radionuclides; the Baseline Risk Assessment (BRA) (DOE 1993b) which assesses the risks to public health and the environment posed by the site; and the Feasibility Study (FS) (DOE 1993c) which describes how the cleanup options discussed in the original Proposed Plan were developed and evaluated. In developing the alternatives for this Proposed Plan, DOE has taken into consideration the following additional information: 1) the dose objectives stated in TAGM 4003 (10 mrem/year) based on intended land use; and, 2) the 1992 Town of Tonawanda Waterfront Development Master Plan which describes the intended future land uses for the Ashland 1 and Ashland 2 sites. These considerations are known under Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) as "To Be Considered (TBCs)".

It is DOE policy to incorporate the values of the National Environmental Policy Act (NEPA) into the requirements of CERCLA for remedial action at sites for which it has authority. The RI/FS conducted under CERCLA is the primary process for environmental compliance associated with DOE remedial actions. Under an integrated CERCLA and NEPA policy, the CERCLA process is supplemented, as appropriate, to incorporate NEPA values.

This plan summarizes information that can be found in greater detail in the reports named above and in other documents contained in the administrative record file for the site which can be found at the Public Information Center and the Tonawanda Public Library. DOE and the U. S. Environmental Protection Agency (EPA) encourage the public to review these documents for a more comprehensive discussion of the alternatives that were considered in the original Proposed Plan.

The final decision on the remedy to be implemented will be documented in the Record of Decision, ROD, only after consideration of all comments received and any new information presented. DOE may modify the preferred alternative presented here or select another option from this Proposed Plan based on new information or public and/or agency comments. Therefore, the public is encouraged to review and comment on all of the alternatives identified.

SITE BACKGROUND

From 1942 to 1946, portions of the Linde site (currently Praxair) and a few select buildings located at Linde in the Town of Tonawanda, New York, were used for separation of uranium ores. These processing activities, conducted under a MED contract, resulted in elevated levels of radionuclides in portions of the property and buildings. Subsequent disposal and relocation of processing wastes from the Linde property resulted in elevated levels of radionuclides at three nearby properties in the Town of Tonawanda: the Ashland 1 property, the Seaway property, and the Ashland 2 property. Together these four properties are referred to as the Tonawanda Site. The location of Ashland 1 and Ashland 2 with respect to these four properties is shown in Figure 1. A more detailed view of the Ashland 1 and Ashland 2 areas is provided in Figure 2. As shown in Figure 2, a small area of Seaway, known as Seaway Area D, has elevated levels of radionuclides at or near the surface. This area is included in the scope of Ashland 1 due to the close proximity and relative ease to remediate while remediating Ashland 1. Within this Proposed Plan, any reference to Ashland 1 with respect to cleanup scope, cost, and/or volumes includes the material located at Seaway Area D.

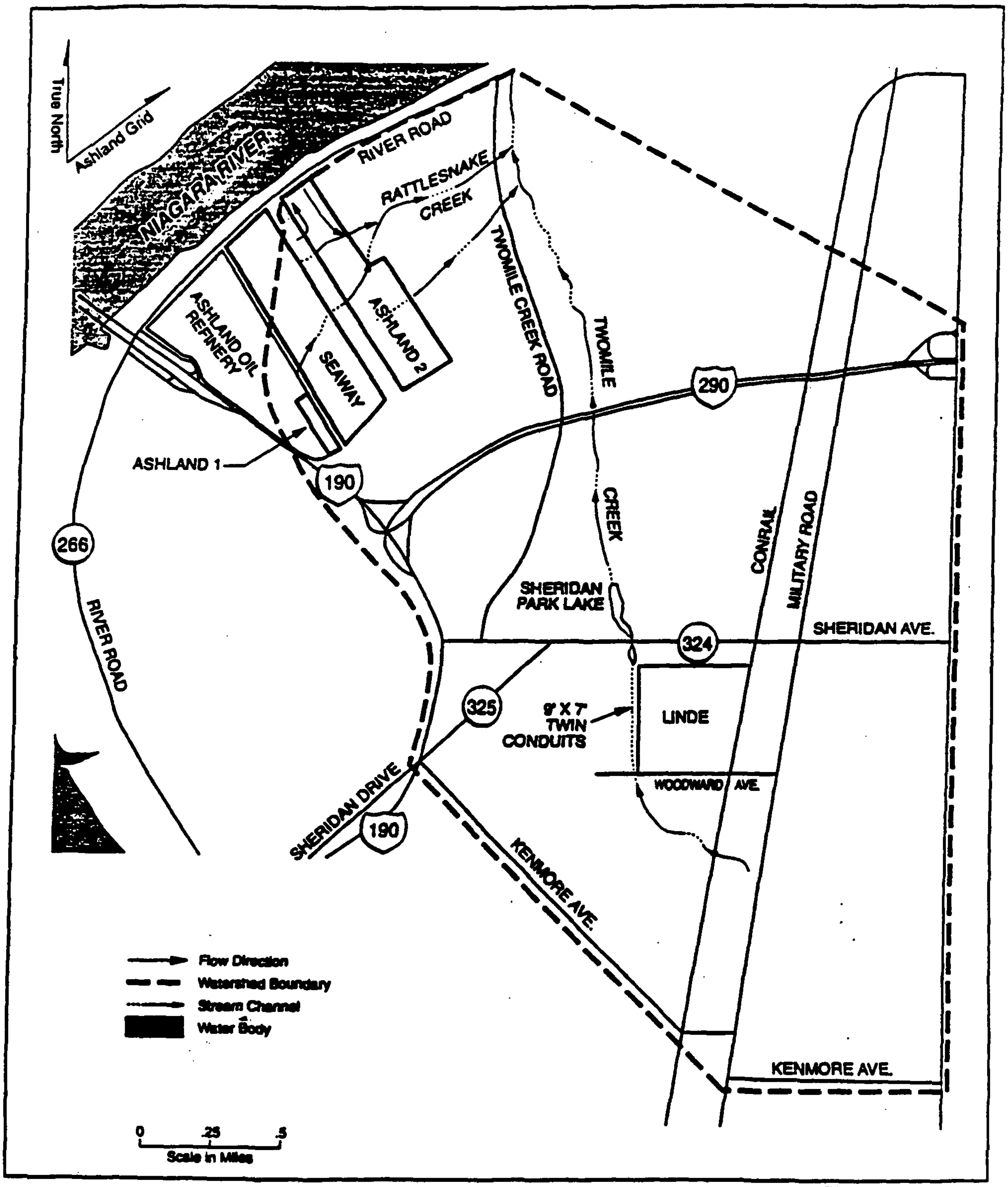
Description of the Impacted Properties

MED leased a 4 hectare (10-acre) tract known as the Haist property, now called Ashland 1, to serve as a disposal site for wastes from the uranium ore separation process. Wastes were deposited at Ashland 1 from 1944 to 1946 and consisted primarily of low-grade uranium ore tailings. Records indicate that approximately 7,300 metric tons (8,000 tons) of residues were spread over roughly two-thirds of the property. In 1960, the property was transferred to Ashland Oil and has been used as part of this company's oil refinery activities since that time.

In 1974, Ashland Oil constructed a bermed area for two petroleum product storage tanks and a drainage ditch on the Ashland 1 property. Approximately 4,600 m^3 (6,000 yds^3) of soil, containing radioactive residues and commingled MED-related inorganic constituents, were removed during construction activities. The majority of the excavated soil was transported to Ashland 2 and Seaway for disposal. The storage tanks were removed by Ashland Oil in 1989.

A portion of the Ashland 2 property was used by Ashland Oil as a landfill for disposal of general plant refuse and industrial and chemical by-products. The radioactive residues and commingled inorganic constituents removed from Ashland 1 were deposited in an area of Ashland 2 adjoining the Ashland Oil landfill area. The industrial landfill portion of Ashland 2 was closed and covered with clay soil in 1982 by Ashland Oil. Currently, the Ashland 2 property is vacant and is covered by a vegetative growth (e.g., grass, bushes, and weeds); no commercial operations are currently being conducted.

Historical investigations of Ashland 1 and Ashland 2 discussed in the RI indicate two sources of elevated levels of radionuclides at each of these properties: surface and subsurface soils. The primary radionuclides in the soils are U-238, Ra-226, Th-230, and their respective decay products, and the associated MED-related chemical constituents (e.g., copper, lead, vanadium). These materials are the principal Constituents of Concern (COCs) for Ashland 1 and Ashland 2. There were other constituents identified and considered for various media when performing the risk assessments (DOE 1993b).



FUS/Tonawanda BRA 051593

Figure 1. Tonawanda Site Showing Locations of Ashland 1 and Ashland 2

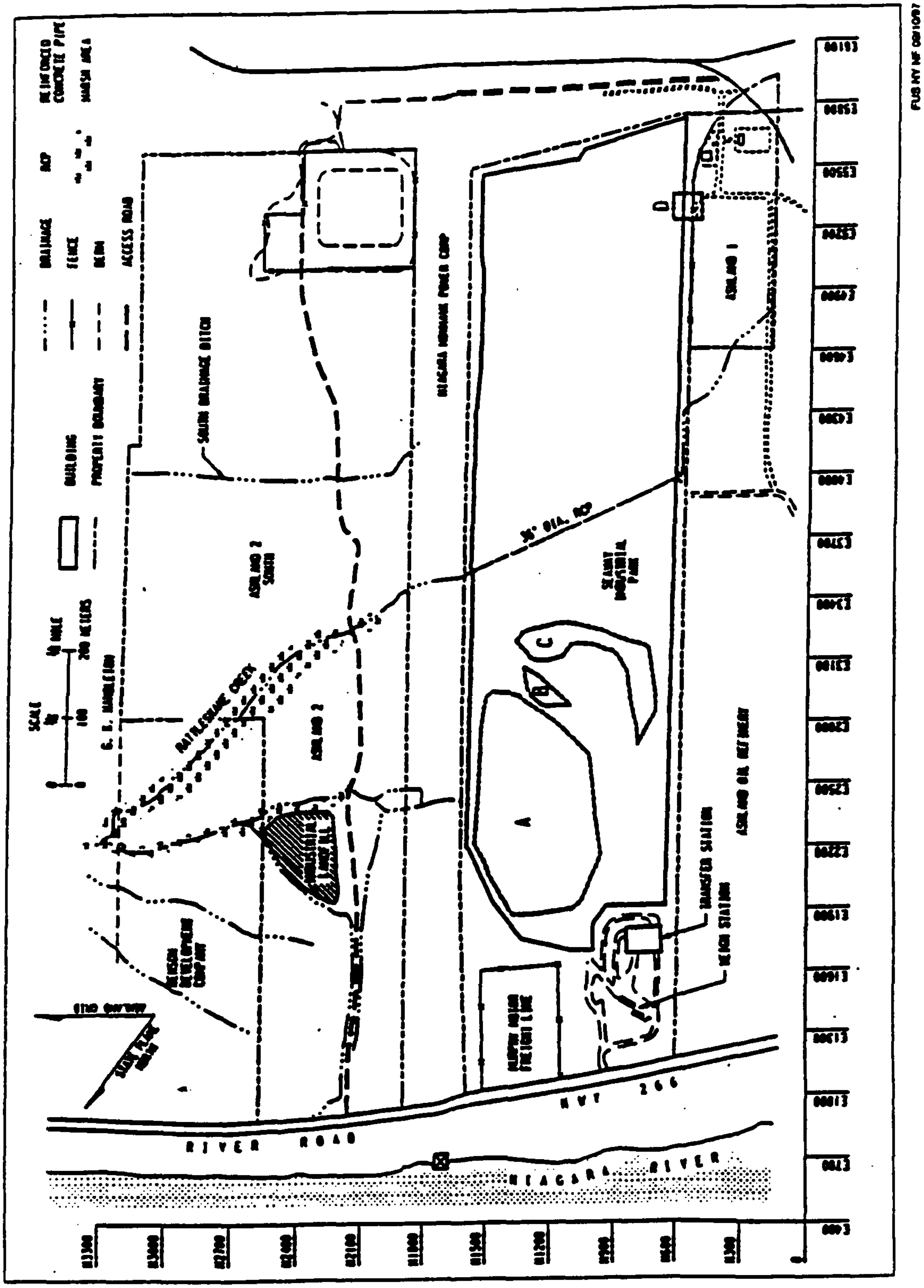


Figure 2. Detailed View of Ashland 1 (including Seaway Area D) and Ashland 2

SUMMARY OF SITE RISKS

The BRA was prepared to evaluate the risk to human health and the environment from the radioactive and chemical constituents at the site. In accordance with EPA guidance, the primary health risks investigated were cancer and other chemical-related illnesses as well as the ecological risks. This assessment evaluated the potential risks that could develop in the absence of cleanup and assumes that no controls (e.g., fencing, maintenance, protective clothing, etc.) are, or will be, in place. The purpose of the BRA was to determine the need for cleanup and provide a baseline against which the remedial action alternatives were compared. The complete report is in the administrative record file and a brief summary of the radiological and chemical health risks as well as the ecological risks is provided herein.

The BRA identified the means by which people and the environment may be exposed to constituents present at the Tonawanda site. Mathematical models were used to predict the possible effects on human health and the environment from exposure to elevated levels of radionuclides and chemicals for both present and future uses at the site. The modeled risk estimates were then compared to an EPA-established "target risk range" for cancer incidence (i.e., the excess probability that an individual would develop cancer over a lifetime as a result of being exposed to the contaminants at the site). EPA has established the generally acceptable target risk range for excess cancer incidence from a few in 10,000 to 1 in 1 million.

Radiological Health Risk

The BRA provides risk estimates for average (mean) exposure conditions under hypothetical scenarios for current and projected future land use. These estimated risks are calculated using the average radionuclide concentrations present at the properties. The results predicted that, for the current land uses, no one would be exposed to unacceptable risks. For assumed future land uses, the mean radiological risk, as was reported in the original 1993 Proposed Plan, was predicted to be within the EPA range of acceptability at all properties.

EPA requires that the modeling also include what is called a Reasonable Maximum Exposure (RME) scenario. These calculations assume that an individual would be exposed to the constituents on the properties for prolonged periods. For current land uses, the model predicted that exposure would not exceed the EPA range of acceptability for the Ashland properties. For some future land use scenarios, calculated RME risks exceeded the target risk range at both Ashland 1 and Ashland 2 properties which served to support the need for a remedial action.

Chemical Health Risk

The BRA evaluated cancer and chemical toxicity risks. The risk of developing cancer over a 70-year lifetime from chemical carcinogens at the site was evaluated for both average (mean) exposure and for RME. None of the estimated cancer risks exceeded the EPA risk range of acceptability for current or future land uses. In addition, no unacceptable effects would be expected for non-cancer chemical illnesses under current land uses.

The potential for chemical noncarcinogenic health effects is expressed as chemical-specific hazard quotients (HQs). HQs were tabulated for all chemicals of concern where reference doses or reference concentrations are currently available. HQs are summed for each pathway to provide a total hazard index (HI) for the pathway. The calculated HIs for all exposure pathways for all scenarios evaluated at Ashland 1 and Ashland 2 are much less than 1 thus indicating that no unacceptable effects would be expected.

Ecological Risk

The Ecological Risk Assessment for the Tonawanda BRA follows EPA's general procedures for ecological assessments in the Superfund program. The characterization of habitats and biota at risk are semiqualitative, and screening of COCs and assessment of potential impacts to biota are based on measured environmental concentrations of the constituents and toxicological effects reported in the literature.

The Tonawanda Site is located in a highly modified urban, industrial area. Linde, Ashland 1 and Seaway provide minimal urban wildlife habitat supporting only cosmopolitan species of birds and small mammals such as crows, gulls, and rats. Ashland 2 supports a more diverse animal community because it contains a mosaic of vegetated habitat types including wetlands hydrologically connected to Rattlesnake and Twomile Creeks and the Niagara River.

Based on published aquatic and oral toxicity data and their mobility and persistence properties, 33 ecological COCs were identified: 3 radionuclides, 21 metals, 7 volatile and 2 semivolatile organics. The heavy metals, especially copper, lead, selenium, silver, vanadium, and zinc in Tonawanda properties' soils and surface waters were the greatest source of ecological risk to terrestrial and aquatic populations' exposure by ingestion of soils and direct contact with surface waters. Although no threatened or endangered species were identified, in the absence of remediation, both onsite and offsite organisms and populations at Tonawanda properties will continue to be at risk, particularly at Ashland 2, where wildlife and natural habitats are more extensive.

SUMMARY OF REMEDIAL ALTERNATIVES

Detailed descriptions of the remedial alternatives for the Tonawanda site, including the Ashland 1 and Ashland 2 properties, can be found in the FS which is available in the administrative record. In the 1993 Feasibility Study and Proposed Plan, reference is made to DOE guidelines for cleanup. These guidelines were the generic guidelines in DOE Order 5400.5 (which limits the Ra-226 and Th-230 concentrations to 15 pCi/g, each, in the subsurface) and can be used without further evaluations. Site-specific guidelines are also allowed if additional analyses are performed to demonstrate that the dose objectives stated in the DOE Order are met. The site-specific guideline established for the Ashland 1 and Ashland 2 sites pursuant to the DOE Order met the dose objectives of the DOE Order for release with no radiological restrictions and the dose objectives of the NYSDEC TAGM 4003 for the intended future land use as defined in the 1992 Town of Tonawanda Waterfront Development Master Plan. Both the generic and site-specific guidelines will meet the applicable or relevant and appropriate requirements (ARARs). As a point of clarification, where the DOE Order generic guidelines were used for an alternative, they are referred to as "generic" guidelines. Where the site-specific guideline is used for an alternative, it will be referred to as the "Site-specific" guideline. The following are summaries of those alternatives considered.

Alternative 1: No Action. The no-action alternative is required under CERCLA and NEPA regulation to provide a baseline for comparison with other alternatives. Under this alternative, no action is taken to implement remedial activities. Periodic monitoring of the levels of the COCs in appropriate media is continued.

Alternative 2: Complete Excavation with Offsite Disposal. Complete excavation of MED-related soils containing radionuclides above guidelines (generic guidelines) and offsite disposal would remove the source of elevated levels of radionuclides from the site. Removal of material containing radionuclides above guidelines in or near wetland areas would be performed during the dry season to minimize the need for dikes and berms; compensatory wetlands would be created for those wetlands destroyed, if any, under this alternative. This alternative would protect human health and the environment and would meet applicable standards regarding acceptable levels of residual radionuclides.

Alternative 3: Complete Excavation with Onsite Disposal. Similar to Alternative 2 regarding excavation of soils, however, all excavated soils would be placed in an on-site disposal cell. Institutional controls would be imposed to control access to the onsite engineered disposal cell and the cell would be designed to minimize future exposures or releases to the environment. Applicable standards regarding acceptable levels of residual radionuclides would be met.

Alternative 4: Partial Excavation with Offsite Disposal. Similar to Alternative 2, except excavation of MED-impacted soils would involve only those soils containing radionuclides above guidelines (generic guidelines) that are accessible (i.e., not under landfill material, buildings, or permanent structures). This alternative does not meet existing applicable standards for levels of residual radionuclides acceptable for unrestricted use. Therefore, restrictions would be required on the continued use of areas of these properties, or alternate concentrations would have to be justified for soils left in place containing radionuclides above guidelines in areas to be released for unrestricted use. For the Ashland 1 and Ashland 2 properties, it appears that all impacted soils are accessible thus making this alternative the same as Alternative 2.

Alternative 5: Partial Excavation with Onsite Disposal. Same as Alternative 4, except all excavated soils would be placed in an on-site engineered disposal cell, as discussed in Alternative 3. This alternative does not meet existing applicable standards for acceptable levels of residual radionuclides for unrestricted use at the on-site disposal cell. Therefore, restrictions would be required on the future use of areas of these properties, or alternate concentrations would have to be justified for soils left in place containing levels of radionuclides above guidelines in areas to be released for unrestricted use. For the Ashland 1 and Ashland 2 properties, it appears that all impacted soils are accessible thus making this alternative the same as Alternative 3.

Alternative 6: Containment with Institutional Controls. Containment would involve capping all accessible soils. Removal of any material containing radionuclides above guidelines (generic guidelines) from wetland areas would be performed during the dry season to minimize the need for dikes and berms; compensatory wetlands would be created for those wetlands destroyed, if any, under this alternative. This alternative would protect human health and the environment by eliminating exposure pathways. Institutional controls would be required to prevent future access to and disturbance of the contained waste. Applicable standards regarding residual levels of radionuclides would not be met. Therefore, restrictions would be required on the future use of areas of these properties, or alternate concentrations would have to be justified for inaccessible soils left in place.

Alternative 2A: Complete Excavation with Offsite Disposal (using site-specific guidelines). This alternative, although not specifically discussed in the 1993 Proposed Plan, is the same as Alternative 2, except the guideline used was developed specifically for the Ashland 1 and Ashland 2 sites, versus the generic guidelines used in Alternative 2. The site-specific guideline was developed to satisfy the 10 mrem/year dose objective stated in NYSDEC Technical Administrative Guidance Memorandum (TAGM) 4003 for the intended land use as delineated in the 1992 Town of Tonawanda Waterfront Development Master Plan. Soils exceeding the site-specific derived guideline of 40 pCi/g Th-230 (DOE 1997) would be excavated and shipped offsite for commercial disposal and the site restored with backfill, loam, and seed to conditions which achieve the NYSDEC TAGM 4003 dose objective of 10 mrem/year for the intended future land use as defined in the 1992 Town of Tonawanda Waterfront Development Master Plan.

ANALYSIS OF ALTERNATIVES FOR ASHLAND 1 AND ASHLAND 2

The alternatives described in the previous section were evaluated using CERCLA criteria and NEPA values to determine the most favorable actions for cleanup of the Tonawanda site. These criteria are described below. They were established to ensure that the remedy is protective of human health and the environment, meets regulatory requirements, is cost effective, and utilizes permanent solutions and treatment to the maximum extent practicable. The results of the detailed evaluation of alternatives to remediate the Tonawanda site are summarized in the following section. Key elements of the evaluation are discussed.

Glossary of Evaluation Criteria

- ***Overall Protection of Human Health and the Environment*** - addresses whether an alternative provides adequate protection and describes how risks are eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.
- ***Compliance with Federal and State Environmental Regulations*** - addresses if a remedy would meet all of the ARARs of other Federal and State environmental laws.
- ***Long-Term Effectiveness and Permanence*** - addresses the remaining risk and the ability of an alternative to protect human health and the environment over time, once cleanup goals have been met.
- ***Short-Term Effectiveness and Environmental Impacts*** - addresses the impacts to the community and site workers

during cleanup including the amount of time it takes to complete the action.

- ***Reduction in Toxicity, Mobility, or Volume through Treatment*** - addresses the anticipated performance of treatment that permanently and significantly reduces toxicity, mobility, or volume of waste.
- ***Implementability*** - addresses the technical and administrative feasibility of an alternative, including the availability of materials and services required for cleanup.
- ***Cost*** - compares the differences in cost, including capital, operation, and maintenance costs.
- ***State Acceptance*** - evaluates whether the State agrees with, opposes, or has no comment on the preferred alternative.
- ***Community Acceptance*** - addresses the issues and concerns the public may have regarding each of the alternatives.

ALTERNATIVE COMPARISON

The purpose of the following analysis is to weigh the advantages and disadvantages of the alternatives, when compared with each other, based on the evaluation criteria. This information is used to select a preferred alternative. The Feasibility Study Alternatives 4 and 5 are not included since they are the same as Alternatives 2 and 3, respectively, for the Ashland 1 and Ashland 2 properties.

Overall Protection of Human Health and the Environment. The alternatives providing complete excavation of soils containing radionuclides above guidelines, specifically Alternatives 2, 2A and 3, provide the greatest degree of protection to human health and the environment, including the ecological system, because the materials containing radionuclides above guidelines are removed from the site and permanently isolated in a disposal facility. A degree of risk to workers is involved with implementing these alternatives, as well as the other remedial action alternatives, because the associated work involves intrusive activities for handling and moving all materials containing radionuclides above guidelines at the Tonawanda site. These risks can be minimized by using safety procedures and equipment. Alternative 6 provides protection by reducing or eliminating certain exposure pathways. It relies on institutional controls to provide protection of human health and the environment. Alternative 1 provides no increased protection over the current site conditions and will not be protective of human health and the environment over the long-term for foreseeable land uses.

Compliance with ARARs. Alternatives 2, 2A and 3 meet ARARs because all soil containing radionuclides exceeding the guidelines (generic and site-specific) would be excavated and permanently isolated in a disposal cell or facility. The other alternatives, all of which involve leaving some soil containing radionuclides above guidelines in place, would not comply with restrictions on residual concentrations in soils unless criteria set forth in 40 CFR 192 for establishing different standards are met. Alternative 6 would also rely on establishing different standards using the criteria set forth in 40 CFR 192. Alternative 1 is noncompliant with ARARs because all waste containing radionuclides above guidelines remains onsite with no additional protection provided.

Long-term Effectiveness and Permanence. A primary measure of the long-term effectiveness of an alternative is the magnitude of residual risk to human health after remediation. The adequacy and reliability of engineering and/or institutional controls used to manage residual materials that remain onsite must also be considered.

Alternatives 2, 2A and 3 have the highest degree of long-term effectiveness and permanence because all soils containing radionuclides above generic guidelines, or the site-specific guideline, are excavated and removed from the site, or placed in an engineered disposal cell.

Alternative 6, containment, has a high degree of effectiveness, but relies on long-term management to ensure that exposure pathways remain blocked. The magnitude of residual risk and exposures to human health and the environment is directly related to the adequacy and reliability of the clay cap and institutional controls.

For Alternatives 2, 2A, 3 and 6, risk calculated for a worker involved in maintenance activities at any disposal cell or capped areas for a period of 25 years is similar to the general public's health risk during remediation and is within acceptable levels.

Alternative 1, no action, has low long-term *effectiveness* because the post-implementation remedial risks equal those now at the site.

Short-term Effectiveness and Environmental Impacts. Short-term effectiveness is measured with respect to protection of community and workers as well as short-term environmental impacts during remedial actions and time until remedial action objectives are achieved. An increase in the complexity of an alternative typically results in a decrease in short-term effectiveness because of increased handling and processing. Also, alternatives involving offsite disposal of wastes would result in a decrease in short-term effectiveness because of the increased time required and transportation-related risks.

Alternative 1, no action, is the most effective in protecting the community and workers and controlling impacts during implementation since no actions that could create impacts are undertaken. Alternative 1 requires the shortest time to implement. The short-term effectiveness of the other alternatives rank in the following order: Alternative 6 (containment), Alternative 3 (complete excavation and on-site disposal), Alternative 2A (complete excavation and offsite disposal using site-specific guideline), and Alternative 2 (complete excavation and offsite disposal using generic guidelines).

Reduction in Toxicity, Mobility, or Volume through Treatment. None of the alternatives provides treatment on site for the materials to be removed. Alternatives 2, 2A and 4, which provide for some degree of offsite disposal, will include containment at the final disposal location and any treatment which is required to meet the standards of the offsite facility. These alternatives thus will achieve reduction in mobility, although no treatment is planned which will reduce the toxicity or volume of the disposed materials. The remaining alternatives would provide either no removal of materials, or disposal onsite, which would also limit mobility through design of the disposal facility. The Feasibility Study evaluated currently available treatment technologies for treatment in the course of removal and found none are economically and technologically feasible at this time. Thus the preferred alternative achieves the best possible result in regard to this criteria.

Implementability. In regards to implementability, the alternatives were evaluated with respect to the following:

- ability to construct and operate the technology,
- reliability of the technology,
- ease of undertaking additional remedial actions,
- ability to monitor effectiveness,
- ability to obtain approvals and coordinate with regulatory agencies,
- availability of offsite disposal services and capacity, and
- availability of necessary equipment and specialists.

The degree of difficulty in implementing an alternative increases with the complexity of the remediation activity. The design, engineering, and administrative requirements of Alternative 1, no action, are essentially negligible. The remaining alternatives are all technically and administratively feasible. The engineering, design, and administrative requirements increase with the complexity of the alternatives in the following order: Alternative 6, containment with institutional controls; Alternative 2A, complete excavation and offsite disposal (using site-specific guideline); Alternative 2, complete excavation and offsite disposal; and Alternative 3, complete excavation and onsite disposal. Materials and services for the various alternatives are readily available. The degree of difficulty in implementing these alternatives increases with the amount and type of soils to be excavated, the level of permitting required to construct new disposal facilities, and the distance to the selected disposal facility.

Cost. The comparative analysis of costs compares the differences in capital, operations and maintenance (O&M), and present worth values. Costs for each of the alternatives presented in the original plan have been provided in detail in Appendix G of the Feasibility Study. These costs were for the entire Tonawanda Site, not just Ashland 1 and Ashland 2. Since the completion of the original Proposed Plan, the costing methodology has changed, primarily in the area of assessing program management costs. Additionally, a more detailed analysis of volumes of soils containing radionuclides above generic and site-specific guidelines has been conducted using three-dimensional modeling. These new estimates, based on 1997 dollars, have been made for the Ashland 1 and Ashland 2 properties only. Table 1 presents the current cost estimates for the Ashland 1 and Ashland 2 alternatives.

State Acceptance and *Community Acceptance* These criterion are not evaluated formally until comments on the Proposed Plan are reviewed.

Table 1. Implementation Costs for Ashland 1 and Ashland 2

Alternative	Description	Cost (in 1997$)
1	No Action	$7,000,000
2	Complete Excavation and Offsite Disposal (Generic Guideline)	$72,000,000
2A	Complete Excavation and Offsite Disposal (using site-specific guideline of 40 pCi/g Th-230 Guideline)	$38,000,000
3	Complete Excavation with Onsite Disposal (Generic Guideline)	$46,000,000
6	Containment with Institutional Controls	$26,000,000

ASHLAND 1 AND ASHLAND 2 PREFERRED ALTERNATIVE

DOE prefers Alternative 2A, *Complete Excavation with Offsite Disposal (using site-specific guidelines)*. This alternative meets the commitments made to the community representatives and is believed to provide the best balance among the considered alternatives with respect to the evaluation criteria, will protect human health and the environment, and will comply with ARARs while providing for the release of property for future use without any radiological restrictions. Specific components of the preferred alternative are listed below:

- Excavate soils containing in excess of the 40 pCi/g Th-230 guideline at Ashland 1 (including Seaway Area D) and Ashland 2, as described in the site specific document entitled "Radionuclide Cleanup Guideline Derivation for Asland 1, Ashland 2, and Seaway".
- Ship offsite for commercial disposal excavated soils exceeding 40 pCi/g Th-230.
- Restore the sites with backfill, loam, and seed to conditions which will achieve the NYSDEC TAGM 4003 dose objective of 10 mrem/year for the intended future land use as defined in the 1992 Town of Tonawanda Waterfront Development Master Plan.

Although not the least expensive alternative (no action, and containment were estimated to be lower cost alternatives), it is the least expensive of the options which are protective of human health and the environment and meet DOE's commitments of using offsite disposal and allowing for the development and future use of the remediated properties.

DOE/EV-0005/4

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Formerly Utilized MED/AEC Sites Remedial Action Program

Radiological Survey of the Ashland Oil Company (Former Haist Property), Tonawanda, New York

May 1978

Final Report

Prepared for

U.S. Department of Energy
Assistant Secretary for Environment
Division of Environmental Control Technology
Washington, D.C. 20545

Under
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was 8.3 pCi/g, in a sampl(: Fig. 7), which also contains drainage from the residues on Seaway. All other samples taken from drainage paths leading from the former Haist property (and crossing the Seaway property) showed less than 4 pCi/g radium, and the radium concentration in samples collected within 800 ft of the boundary of the site averaged about 2 pCi/g. Since most of the drainage from the former Haist property is carried northward toward the Niagara River, it appears that only small quantities of radium are carried from the site in surface run-off.

A concentration of natural uranium of approximately 25 pCi/g was found in a mud sample taken near the Haist property (M9) and in a sample taken in a drainage path (M8) over 2000 m from the center of the Haist site (see Table 1 and Fig. 6). The highest uranium concentration found in the mud samples (32.5 pCi/g) was from a sample (M5) taken near the residues toward the east boundary of the Industrial Park.

The concentration of uranium, radium, and thorium in water samples from Ashland and Seaway and from drainage paths leading to the Niagara River is given in Table 2, which also shows the concentration guide for each isotope considered. Locations at which the samples were collected are shown in Fig. 6. In every water sample, the concentration of each isotope considered was at least an order of magnitude below the CG_w.[4]

Concentrations of Radionuclides in the Soil

Concentrations of radionuclides in soil samples from core holes collected on the site are listed in Table 3; locations are shown in Fig. 5. In Table 3, the part of the sample number preceding the dash gives the location; for example, sample 15-C is from core hole 15. Gamma radiation

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levels in core holes are listed as a function of depth in Table 4 for core-hole locations at which no soil samples were taken. These scintillation probe readings are used only to give an approximation of the depth of contamination in the soil.

The average concentration of radium in soil samples taken from section NW was approximately 13 pCi/g. Highest radium concentrations in section NW were found near the surface at location 66 (137 pCi/g) and in a region including locations 47, 48, and 49, where there appears to be tailings extending from the surface to a depth of 4 or 5 ft. The concentration of uranium at location 49 is 0.24% by weight between 3 and 4 ft deep. At location 66, the uranium content near the surface was 0.08% by weight or 2.57 pCi/g. The average concentration of radium in samples taken at depths of 0-4 ft at locations 47, 48, and 49 was about 37 pCi/g.

It appears that most of the residues have been removed from Section M. Radium concentrations in the 50 samples collected from this section averaged approximately 18 pCi/g; however, in hole 42, the soil between a depth of 4 and 5 ft contains 1.2% uranium. Most of these samples were taken from dike 1 which was built using soil from the site. The remaining samples were taken from locations 40, 42, and 43. Some samples from several feet below the surface at locations 40 and 42 showed radium concentrations of 50 to 160 pCi/g.

Radium concentrations in soil samples from section SE averaged approximately 35 pCi/g and were as high as 508 pCi/g. Highest concentrations were in a nearly rectangular area estimated to be about 200 ft

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by 50 ft and including locations 1, 2, 3, 4, 6, 18, 19, and 37 (see Figs. 4 and 5). In this same area, the concentration of uranium was found to range from normal terrestrial concentrations to 2900 pCi/g or 0.83% by weight. The depth of contamination ranged to approximately 7 ft. Records indicate that sludges from uranium ore processing were dumped in this area (see Fig. 1). According to soil sample analyses (Table 3) and core-hole loggings (Table 4), at least part of the sludge remains; it is covered by 2 or 3 ft of relatively uncontaminated soil and extends to a depth of 6 to 7 ft in most places. Samples from several other parts of section SE contained over 100 pCi/g radium; these samples were usually taken from depths of 4 to 8 ft. The NFG building is near the edge of a tailings or sludge pile which has been covered with clean fill dirt.

Radium concentrations as high as 259 pCi/g (at location 27 at a depth of 2 to 3 ft) were found near the building.

Radon Emanation

The average radon emanation at the surface near locations at which soil samples were taken can be estimated from data in Tables 3 and 5 and Fig. 13. As an illustration, the radon emanation from a tailings pile containing locations 47, 48, and 49 was estimated. In this area, the contamination is, for the most part, from the surface to a depth of 4 or 5 ft. The average concentration of radium found at locations 47, 48, and 49 at depths of 0 to 4 ft was about 37 pCi/g. Assuming that the tailings are moist for most of the year, it may be seen from Fig. 13 that a 4-ft layer of these tailings would release radon at the rate of

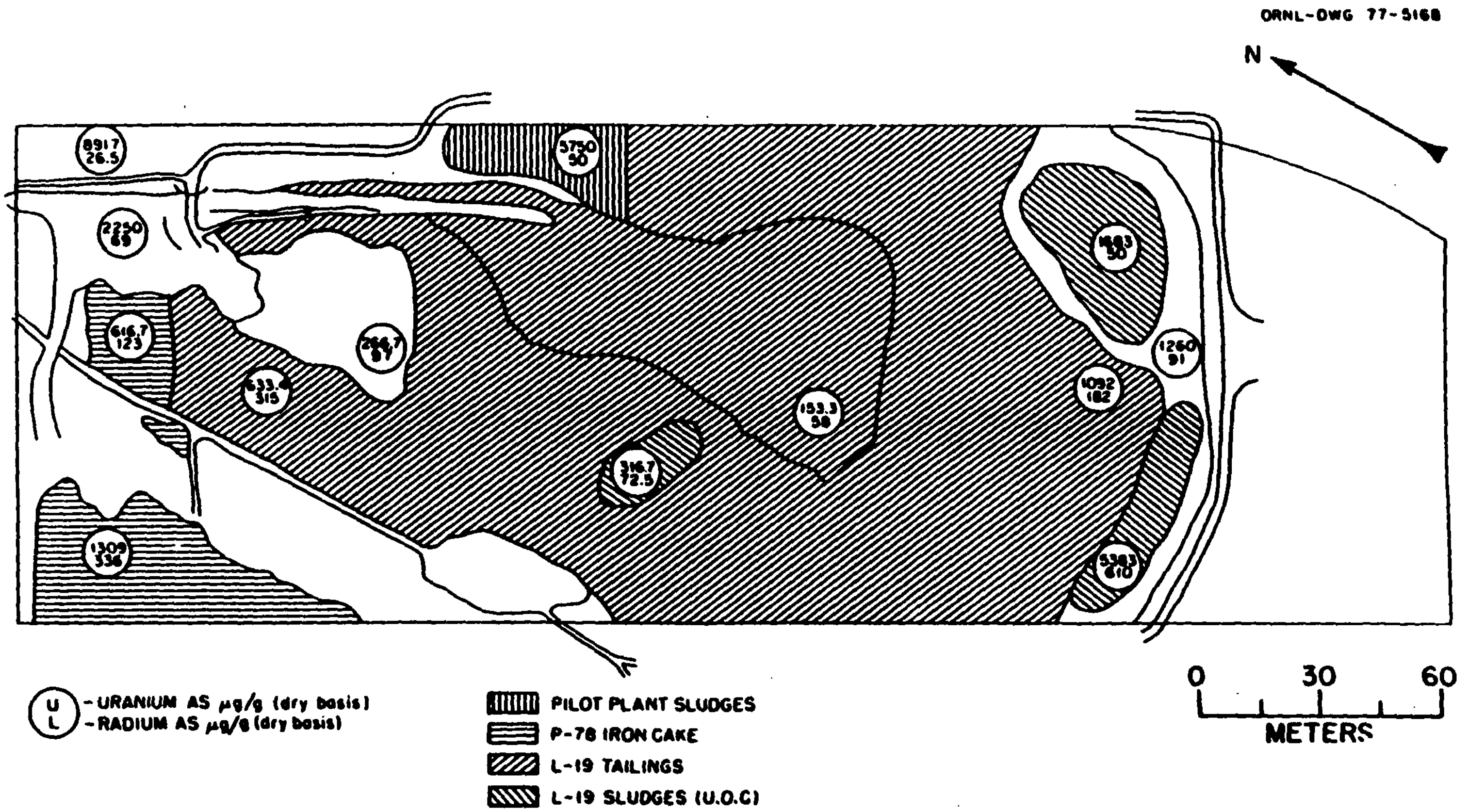

Fig. 1. Approximate distribution of tailings on Haist property in 1958. Source: Health and Safety Laboratory Report on Haist Property to General Services Administration, 1958.

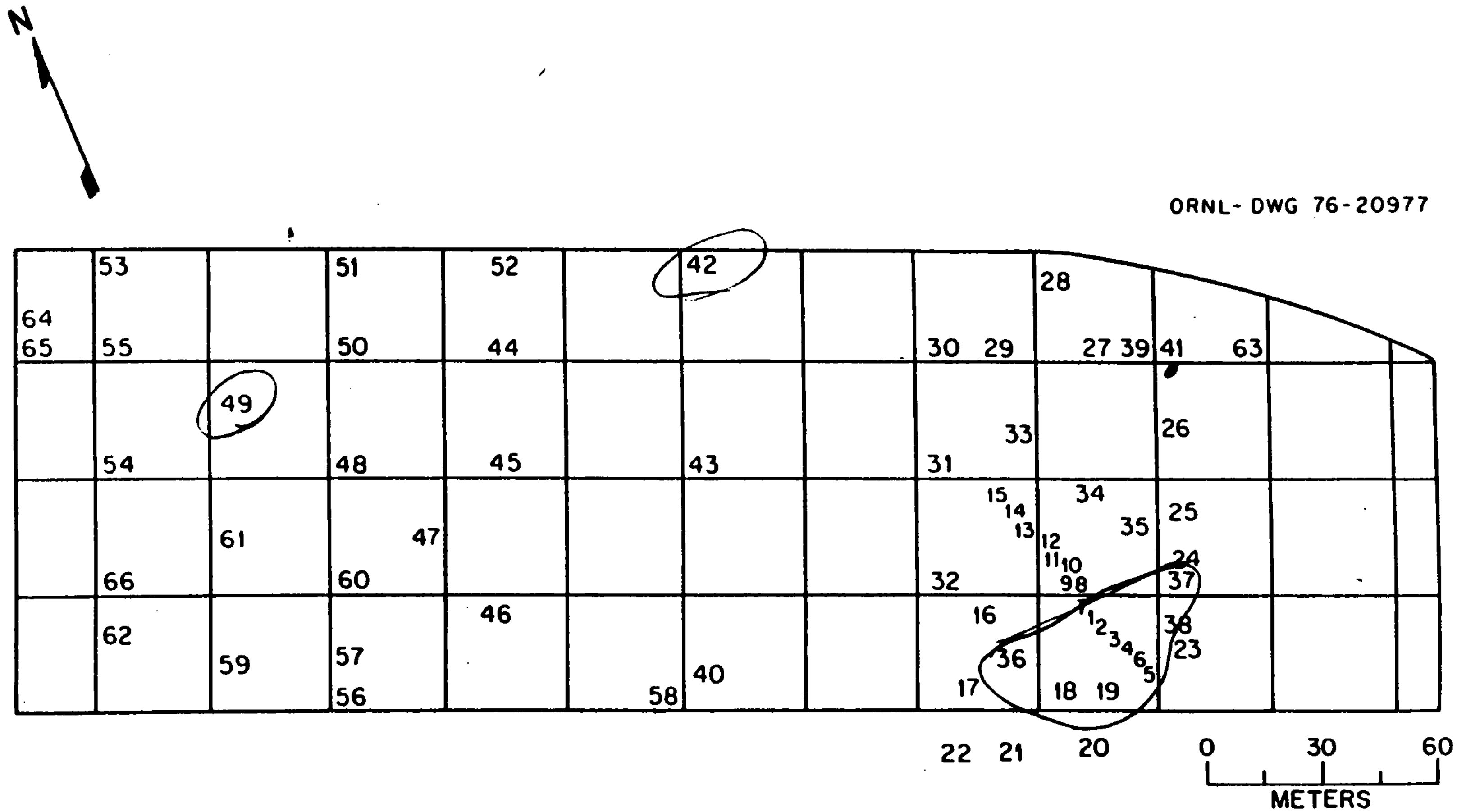

Fig. 4. Locations of core holes.

Table 3. Concentration of ^{226}Ra, ^{232}Th, ^{238}U, ^{227}Ac, and ^{40}K in core hole samples

Sample	Depth (ft)	^{226}Ra (pCi/g)	^{232}Th (pCi/g)	^{238}U (pCi/g)	^{227}Ac (pCi/g)	^{40}K (pCi/g)
1A	0 - 0.5	1.3	ND[a]	ND	ND	ND
1B	0.5 - 1.5	1.0	1.0	2.5	ND	12
1C	1.5 - 2.5	1.4	ND	ND	ND	ND
1D	2.5 - 3.5	15	ND	ND	ND	ND
1E	3.5 - 5.0	55	6.6	890	130	ND
1F	5.0 - 6.0	130	ND	ND	ND	ND
1G	6.0 - 7.0	82	ND	ND	ND	ND
2A	0 - 1.0	1.2	0.8	2.9	0.5	11
2B	1.0 - 2.0	1.3	0.9	ND	1.5	16
2C	2.0 - 3.0	140	ND	ND	ND	ND
2D	3.0 - 4.0	280	6.8	2,100	120	ND
2E	4.0 - 5.0	100	ND	ND	ND	ND
2F	5.0 - 6.0	130	ND	ND	ND	ND
2G	6.0 - 7.0	81	ND	ND	ND	ND
3A	0 - 1.0	3.2	0.9	ND	<0.1	11
3B	1.0 - 2.0	1.5	0.7	ND	ND	15
3C	2.0 - 3.0	16	1.2	44	ND	18
3D	3.0 - 4.0	100	5.8	710	120	ND
3E	4.0 - 5.0	21	ND	130	ND	23
3F	5.0 - 6.0	50	ND	150	0.5	19
3G	6.0 - 7.0	5.0	1.0	20	1.7	21
3H	7.0 - 8.0	1.0	ND	ND	ND	ND
4A	0 - 1.0	1.7	0.8	ND	ND	44
4B	1.0 - 2.0	1.7	0.9	3.3	ND	ND
4C	2.0 - 3.0	210	ND	ND	0.1	ND
4D	3.0 - 4.0	210	ND	230	ND	ND
4E	4.0 - 5.0	180	ND	1,200	ND	ND
4F	5.0 - 6.0	530	55	2,900	1,500	ND
4G	6.0 - 7.0	3.6	1.5	40	3.5	21
4H	7.0 - 8.0	1.0	1.1	26	0.4	19
5A	0 - 1.0	1.5	0.7	2.6	0.6	4.0
5B	1.0 - 2.0	1.4	1.0	2.4	ND	17
5C	2.0 - 3.0	1.5	0.9	ND	ND	20
5D	3.0 - 4.0	1.9	ND	ND	2.3	21
5E	4.0 - 5.0	1.7	1.1	4.4	ND	21
5F	5.0 - 6.0	1.3	1.0	ND	ND	23
5G	6.0 - 7.0	1.7	0.9	ND	ND	20
6A	0 - 1.0	1.7	0.8	ND	ND	ND
6B	1.0 - 2.0	6.5	0.8	28	11	16
6C	2.0 - 3.0	9.2	1.2	21	ND	20
6D	3.0 - 4.0	86	ND	ND	ND	ND
6E	4.0 - 5.0	220	12	1,100	390	ND
6F	5.0 - 6.0	160	10	820	260	ND
6G	6.0 - 7.0	13	ND	ND	0.2	ND
6H	7.0 - 8.0	1.2	1.0	13	0.6	21

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Table 3. (cont'd.) Concentration of ^{226}Ra, ^{232}Th, ^{238}U, ^{227}Ac, and ^{40}K in core hole samples

Sample	Depth (ft)	^{226}Ra (pCi/g)	^{232}Th (pCi/g)	^{238}U (pCi/g)	^{227}Ac (pCi/g)	^{40}K (pCi/g)
7A	0 - 1.0	1.6	0.3	6.8	ND	17
7B	1.0 - 2.0	--	--	--	--	--
7C	2.0 - 3.0	1.5	0.9	4.4	2.3	11
7D	3.0 - 4.0	4.5	0.9	ND	0.1	17
7E	4.0 - 5.0	13	ND	ND	ND	ND
7F	5.0 - 6.0	19	1.2	58	30	18
7G	6.0 - 7.0	23	ND	85	33	16
7H	7.0 - 8.0	1.2	1.0	11	ND	23
8A	0 - 1.0	3.9	1.6	6.5	4.2	ND
8B	1.0 - 2.0	1.8	0.9	ND	ND	16
8C	2.0 - 3.0	1.5	1.1	ND	ND	16
8D	3.0 - 4.0	30	2.9	170	45	ND
8E	4.0 - 5.0	90	4.4	370	160	ND
8F	5.0 - 6.0	29	ND	170	52	14
8G	6.0 - 7.0	0.9	ND	ND	ND	ND
11A	0 - 1.0	2.0	ND	ND	ND	ND
11B	1.0 - 2.0	2.2	ND	ND	ND	ND
11C	2.0 - 3.0	1.4	1.0	2.3	ND	16
11D	3.0 - 4.0	2.3	0.7	ND	ND	14
11E	4.0 - 5.0	23	1.2	7.3	31	15
11F	5.0 - 6.0	25	4.7	38	ND	16
11G	6.0 - 7.0	3.7	ND	ND	ND	ND
11H	7.0 - 8.0	1.2	ND	13	ND	19
11I	8.0 - 9.0	6.4	0.9	27	ND	18
11J	9.0 - 10.0	1.0	0.9	ND	ND	21
13A	0 - 1.0	1.3	ND	ND	ND	ND
13B	1.0 - 2.0	1.6	1.1	3.1	ND	15
13C	2.0 - 3.0	0.8	0.9	1.5	ND	17
13D	3.0 - 4.0	2.4	ND	ND	ND	ND
13E	4.0 - 5.0	83	5.5	210	ND	ND
13F	5.0 - 6.0	64	ND	ND	ND	ND
13G	6.0 - 7.0	45	3.7	150	87	ND
13H	7.0 - 8.0	2.2	ND	ND	ND	ND
13I	8.0 - 9.0	1.7	ND	ND	ND	ND
13J	9.0 - 10.0	0.9	0.9	25	ND	18
15A	0 - 1.0	1.2	1.1	2.8	ND	18
15B	1.0 - 2.0	1.1	0.7	ND	ND	14
15C	2.0 - 3.0	2.1	1.1	ND	ND	17
15D	3.0 - 4.0	150	7.9	370	120	ND
15E	4.0 - 5.0	72	ND	ND	ND	ND
15F	5.0 - 6.0	25	ND	ND	ND	ND
15G	6.0 - 7.0	72	ND	ND	ND	ND
15H	7.0 - 8.0	3.5	ND	ND	ND	20
15I	8.0 - 9.0	1.0	ND	ND	ND	ND
15J	9.0 - 10.0	1.1	ND	ND	ND	ND

Table 3. (cont'd.) Concentration of ^{226}Ra, ^{232}Th, ^{238}U, ^{227}Ac, and ^{40}K in core hole samples

Sample	Depth (ft)	^{226}Ra (pCi/g)	^{232}Th (pCi/g)	^{238}U (pCi/g)	^{227}Ac (pCi/g)	^{40}K (pCi/g)
27A	0 - 1.0	1.7	1.1	20	ND	17
27B	1.0 - 2.0	2.6	1.0	6.5	2.4	21
27C	2.0 - 3.0	79	ND	ND	ND	ND
27D	3.0 - 4.0	260	ND	ND	ND	ND
27E	4.0 - 5.0	73	ND	510	66	17
27F	5.0 - 6.0	120	ND	ND	ND	ND
27G	6.0 - 7.0	100	ND	550	91	13
27H	7.0 - 8.0	1.4	1.0	14	ND	21
27I	8.0 - 9.0	1.3	1.0	ND	ND	21
27J	9.0 - 10.0	1.0	1.0	2.4	ND	21
28A	0 - 1.0	2.2	1.0	ND	ND	ND
28B	1.0 - 2.0	1.6	1.0	5.4	ND	19
28C	2.0 - 3.0	1.0	1.1	ND	ND	20
28D	3.0 - 4.0	1.0	1.0	ND	ND	20
28E	4.0 - 5.0	1.0	ND	ND	ND	ND
28F	5.0 - 6.0	29.0	ND	68	49	18
28G	6.0 - 7.0	42	1.2	89	ND	ND
28H	7.0 - 8.0	4.6	ND	ND	ND	ND
28I	8.0 - 9.0	1.6	1.1	10	ND	22
28J	9.0 - 10.0	1.0	1.0	ND	ND	20
29A	0 - 1.0	2.1	0.9	7.4	ND	19
29B	1.0 - 2.0	1.2	0.7	ND	ND	16
29C	2.0 - 3.0	2.0	ND	ND	ND	ND
29D	3.0 - 4.0	37	ND	70	50	17
29E	4.0 - 5.0	40	ND	ND	ND	ND
29F	5.0 - 6.0	1.0	1.1	5.4	ND	19
29G	6.0 - 7.0	1.4	ND	ND	ND	ND
29H	7.0 - 8.0	1.2	1.0	ND	ND	20
30A	0 - 1.0	1.8	ND	ND	ND	ND
30B	1.0 - 2.0	2.2	ND	ND	ND	ND
30C	2.0 - 3.0	9.0	1.0	21	3.4	19
30D	3.0 - 4.0	1.4	ND	ND	ND	ND
30E	4.0 - 5.0	71	3.9	210	92	ND
30F	5.0 - 6.0	143	8.2	230	190	ND
30G	6.0 - 7.0	42	ND	100	ND	17
30H	7.0 - 8.0	2.0	1.0	11	1.3	19
31A	0 - 1.0	1.9	1.0	3.6	ND	17
31B	1.0 - 2.0	2.3	0.8	ND	4.5	16
31C	2.0 - 3.0	1.3	1.0	ND	ND	16
31D	3.0 - 4.0	1.3	ND	ND	ND	ND
31E	4.0 - 5.0	24	1.1	32	20	13
31F	5.0 - 6.0	160	5.4	200	122	ND
31G	6.0 - 7.0	31	2.4	81	31	16
31H	7.0 - 8.0	3.0	ND	ND	ND	ND
31I	8.0 - 9.0	1.1	1.0	2.6	ND	20
31J	9.0 - 10.0	1.0	0.9	1.4	ND	21

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Table 3. (cont'd.) Concentration of ^{226}Ra, ^{232}Th, ^{238}U, ^{227}Ac, and ^{40}K in core hole samples

Sample	Depth (ft)	^{226}Ra (pCi/g)	^{232}Th (pCi/g)	^{238}U (pCi/g)	^{227}Ac (pCi/g)	^{40}K (pCi/g)
32A	0 - 1.0	1.4	0.9	ND	ND	20
32B	1.0 - 2.0	1.0	0.9	2.4	ND	ND
32C	2.0 - 3.0	1.7	0.9	ND	ND	ND
32D	3.0 - 4.0	1.5	ND	ND	ND	ND
32E	4.0 - 5.0	1.5	1.1	ND	ND	18
32F	5.0 - 6.0	2.7	0.9	1.5	ND	11
32G	6.0 - 7.0	20	ND	ND	ND	ND
32H	7.0 - 8.0	160	5.7	200	100	ND
32I	8.0 - 9.0	130	ND	210	81	ND
32J	9.0 - 10.0	2.7	1.1	ND	ND	21
32K	10.0 - 11.0	11	ND	ND	ND	ND
32L	11.0 - 12.0	1.6	ND	ND	ND	ND
33A	0 - 1.0	1.0	0.9	2.0	ND	16
33C	2.0 - 3.0	76	ND	ND	ND	ND
33D	3.0 - 4.0	58	5.0	290	100	ND
33E	4.0 - 5.0	39	ND	ND	ND	ND
33F	5.0 - 6.0	5.7	ND	ND	ND	ND
33G	6.0 - 7.0	1.3	1.0	6.7	0.7	ND
33H	7.0 - 8.0	1.1	ND	ND	ND	ND
34A	0 - 1.0	1.4	1.2	8.1	0.5	15
34B	1.0 - 2.0	1.4	ND	ND	ND	ND
34C	2.0 - 3.0	1.6	0.9	4.3	ND	20
34D	3.0 - 4.0	52	ND	120	94	14
34E	4.0 - 5.0	110	ND	ND	ND	ND
34F	5.0 - 6.0	21	0.6	ND	31	ND
34G	6.0 - 7.0	7.0	ND	32	11	21
34H	7.0 - 8.0	1.0	ND	ND	ND	ND
35A	0 - 1.0	1.5	ND	ND	ND	ND
35C	2.0 - 3.0	9.3	ND	ND	ND	ND
35D	3.0 - 4.0	1.5	ND	ND	ND	ND
35E	4.0 - 5.0	11	ND	ND	ND	ND
35F	5.0 - 6.0	92	7.6	330	160	ND
35G	6.0 - 7.0	1.2	1.0	ND	ND	21
35H	7.0 - 8.0	9.1	ND	ND	ND	ND
36A	0 - 1.0	1.1	1.0	ND	ND	19
36B	1.0 - 2.0	1.2	1.0	ND	ND	17
36C	2.0 - 3.0	1.3	1.1	ND	ND	19
36D	3.0 - 4.0	1.7	ND	ND	ND	ND
36E	4.0 - 5.0	1.5	0.9	ND	ND	13
36F	5.0 - 6.0	7.2	ND	ND	ND	ND
36G	6.0 - 7.0	36	ND	ND	ND	ND
36H	7.0 - 8.0	66	ND	ND	ND	ND
36I	8.0 - 9.0	9.6	ND	338	ND	15
36J	9.0 - 10.0	13	1.6	ND	16	15
39A	0 - 1.0	1.2	ND	ND	ND	ND
39B	1.0 - 2.0	0.9	1.0	2.7	ND	18

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Table 3. (cont'd.) Concentration of ^{226}Ra, ^{232}Th, ^{238}U, ^{227}Ac, and ^{40}K in core hole samples

Sample	Depth (ft)	^{226}Ra (pCi/g)	^{232}Th (pCi/g)	^{238}U (pCi/g)	^{227}Ac (pCi/g)	^{40}K (pCi/g)
39C	2.0 - 3.0	0.9	1.1	2.4	ND	21
39D	3.0 - 4.0	1.1	1.1	ND	1.7	21
39E	4.0 - 5.0	1.1	1.0	3.4	2.0	20
39F	5.0 - 6.0	1.3	0.9	2.7	ND	ND
39G	6.0 - 7.0	150	7.7	960	190	ND
39H	7.0 - 8.0	3.0	1.1	ND	<0.1	20
39I	8.0 - 9.0	1.9	1.1	25	ND	22
39J	9.0 - 10.0	1.1	0.9	6.2	ND	21
39K	10.0 - 11.0	1.0	1.0	3.3	ND	19
39L	11.0 - 12.0	1.2	1.0	ND	ND	20
40A	0 - 1.0	1.2	1.0	ND	ND	17
40B	1.0 - 2.0	20	1.5	580	25	ND
40E	4.0 - 5.0	1.6	0.9	ND	ND	17
40F	5.0 - 6.0	1.0	1.0	ND	ND	20
40G	6.0 - 7.0	57	ND	ND	ND	ND
40H	7.0 - 8.0	200	20	ND	380	ND
40I	8.0 - 9.0	48	1.4	90	77	ND
40J	9.0 - 10.0	14	ND	39	16	22
40K	10.0 - 11.0	1.3	ND	ND	ND	ND
40L	11.0 - 12.0	1.0	1.0	2.3	ND	21
42B	1.0 - 2.0	1.6	ND	ND	ND	ND
42C	2.0 - 3.0	2.6	1.3	6.0	1.4	14
42D	3.0 - 4.0	4.5	1.8	ND	2.6	29
42E	4.0 - 5.0	130	5.6	4,300	110	ND
42F	5.0 - 6.0	31	0.7	1,300	18	ND
42G	6.0 - 7.0	1.3	ND	ND	ND	ND
42H	7.0 - 8.0	26	1.2	560	19	15
43A	0 - 1.0	5.6	1.0	18	4.0	19
43B	1.0 - 2.0	1.1	1.0	9.0	ND	21
43C	2.0 - 3.0	1.0	ND	ND	ND	ND
43D	3.0 - 4.0	1.1	ND	ND	ND	ND
43E	4.0 - 5.0	1.0	ND	ND	ND	ND
43F	5.0 - 6.0	1.1	1.0	ND	ND	22
44A	0 - 1.0	2.6	1.0	7.6	ND	18
44B	1.0 - 2.0	5.6	1.3	11	4.5	ND
44C	2.0 - 3.0	2.5	ND	ND	ND	ND
44D	3.0 - 4.0	10	ND	ND	ND	ND
44E	4.0 - 5.0	15	ND	48	23	15
44F	5.0 - 6.0	11	ND	ND	ND	ND
44G	6.0 - 7.0	6.6	ND	ND	ND	ND
44H	7.0 - 8.0	16	ND	ND	ND	ND
44I	8.0 - 9.0	7.3	1.1	27	5.4	19
44J	9.0 - 10.0	0.9	ND	ND	ND	ND
45A	0 - 1.0	6.5	ND	ND	ND	ND
45B	1.0 - 2.0	5.7	ND	ND	ND	ND
45C	2.0 - 3.0	7.5	ND	ND	ND	ND
45D	3.0 - 4.0	33.6	ND	ND	ND	ND

Table 3. (cont'd.) Concentration of ^{226}Ra, ^{232}Th, ^{238}U, ^{227}Ac, and ^{40}K in core hole samples

Sample	Depth (ft)	^{226}Ra (pCi/g)	^{232}Th (pCi/g)	^{238}U (pCi/g)	^{227}Ac (pCi/g)	^{40}K (pCi/g)
45E	4.0 - 5.0	47	ND	ND	13	15
45F	5.0 - 6.0	1.3	ND	ND	ND	ND
45G	6.0 - 7.0	13	1.1	9.7	4.2	18
45H	7.0 - 8.0	5.6	ND	ND	ND	ND
45I	8.0 - 9.0	13	ND	40	ND	ND
45J	9.0 - 10.0	1.1	1.0	11	ND	22
46A	0 - 1.0	12	0.9	6.1	2.2	ND
46B	1.0 - 2.0	3.0	ND	ND	ND	ND
46C	2.0 - 3.0	3.3	ND	ND	ND	ND
46D	3.0 - 4.0	4.4	ND	ND	ND	ND
46E	4.0 - 5.0	1.8	1.0	4.6	0.8	ND
46F	5.0 - 6.0	3.5	1.1	ND	1.9	18
46G	6.0 - 7.0	2.6	1.2	5.4	ND	17
46H	7.0 - 8.0	1.7	ND	ND	ND	ND
46I	8.0 - 9.0	88	1.6	65	ND	15
46J	9.0 - 10.0	1.8	ND	ND	17	ND
47A	0 - 1.0	36	ND	ND	ND	ND
47B	1.0 - 2.0	78	ND	ND	ND	ND
47C	2.0 - 3.0	39	2.6	ND	47	ND
47D	3.0 - 4.0	53	ND	ND	ND	ND
47E	4.0 - 5.0	0.9	1.0	12	ND	19
47F	5.0 - 6.0	1.2	ND	ND	ND	ND
47G	6.0 - 7.0	1.0	ND	ND	ND	ND
47H	7.0 - 8.0	1.0	ND	ND	ND	ND
48A	0 - 1.0	37	ND	ND	ND	ND
48B	1.0 - 2.0	50	ND	ND	ND	ND
48C	2.0 - 3.0	35	ND	ND	ND	ND
48D	3.0 - 4.0	23	2.4	110	33	11
48E	4.0 - 5.0	49	ND	ND	ND	ND
48F	5.0 - 6.0	1.1	1.0	ND	ND	20
49A	0 - 1.0	36	3.6	750	47	ND
49B	1.0 - 2.0	30	ND	ND	ND	ND
49C	2.0 - 3.0	18	1.6	820	18	ND
49D	3.0 - 4.0	13	ND	840	13	ND
49E	4.0 - 5.0	2.5	1.0	73	ND	19
49F	5.0 - 6.0	0.9	ND	33	ND	20
49G	6.0 - 7.0	1.1	0.9	6.9	ND	ND
49H	7.0 - 8.0	1.0	1.0	5.6	ND	19
50A	0 - 1.0	5.3	1.2	60	3.9	20
50B	1.0 - 2.0	1.2	1.0	17	ND	19
50C	2.0 - 3.0	1.0	1.0	2.6	ND	20
50D	3.0 - 4.0	1.1	1.0	2.5	0.8	21
53A	0 - 1.0	1.1	ND	ND	ND	ND
53B	1.0 - 2.0	1.9	ND	ND	ND	ND

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Table 3. (cont'd.) Concentration of ^{226}Ra, ^{232}Th, ^{238}U, ^{227}Ac, and ^{40}K in core hole samples

Sample	Depth (ft)	^{226}Ra (pCi/g)	^{232}Th (pCi/g)	^{238}U (pCi/g)	^{227}Ac (pCi/g)	^{40}K (pCi/g)
53C	2.0 - 3.0	0.9	1.0	ND	ND	18
53D	3.0 - 4.0	1.1	1.0	2.7	ND	20
54A	0 - 1.0	2.5	1.1	38	ND	18
54B	1.0 - 2.0	1.5	1.2	2.6	0.7	22
54C	2.0 - 3.0	0.9	0.9	2.2	ND	ND
54D	3.0 - 4.0	1.6	1.1	1.5	3.8	21
55A	0 - 1.0	6.1	1.1	58	1.9	17.5
55B	1.0 - 2.0	1.3	1.1	6.5	ND	19.4
55C	2.0 - 3.0	1.2	1.0	3.7	ND	19
55D	3.0 - 4.0	1.5	1.0	ND	ND	19
56B	1.0 - 2.0	1.1	ND	ND	ND	ND
56D	3.0 - 4.0	5.6	ND	ND	ND	ND
56E	4.0 - 5.0	1.0	1.2	2.2	ND	24
56F	5.0 - 6.0	1.3	1.0	4.6	ND	22
56H	7.0 - 8.0	0.8	0.9	2.1	ND	19
60A	0 - 1.0	7.3	ND	ND	ND	ND
60B	1.0 - 2.0	0.9	0.8	4.1	ND	17
60C	2.0 - 3.0	1.1	0.9	ND	ND	ND
60D	3.0 - 3.5	1.0	1.1	ND	0.1	22
61A	0 - 1.0	22	1.0	150	7.9	17
61B	1.0 - 2.0	1.9	0.8	25	0.4	15
61C	2.0 - 3.0	3.2	ND	ND	ND	ND
63A	0 - 1.0	2.6	ND	ND	ND	ND
63C	2.0 - 3.0	2.5	ND	ND	ND	ND
63D	3.0 - 4.0	0.9	ND	ND	ND	ND
63E	4.0 - 5.0	2.6	1.0	9.7	ND	ND
63F	5.0 - 6.0	1.2	1.0	ND	0.4	21
63G	6.0 - 7.0	2.3	0.9	ND	ND	21
63H	7.0 - 8.0	1.3	ND	ND	ND	22
64A	0 - 1.0	2.5	ND	ND	ND	ND
64B	1.0 - 2.0	4.5	ND	ND	ND	ND
64C	2.0 - 3.0	2.9	ND	ND	ND	ND
64D	3.0 - 4.0	1.1	ND	ND	ND	ND
64E	4.0 - 5.0	1.4	ND	ND	ND	ND
64F	5.0 - 6.0	0.8	ND	ND	ND	ND
66A	0 - 1.0	137	ND	260	ND	ND
66B	1.0 - 2.0	1.4	1.1	19	ND	23
66C	2.0 - 3.0	2.9	ND	ND	ND	ND
66D	3.0 - 4.0	1.8	ND	ND	ND	ND

[a]ND = not determined.

076157

PRELIMINARY ASSESSMENT

SITE INVESTIGATION

and

HRS SCORING

for

ASHLAND 2

TONAWANDA, NY

JUNE 1987

Prepared for

UNITED STATES DEPARTMENT OF ENERGY

OAK RIDGE OPERATIONS OFFICE

Under Contract No. DE-AC05-81OR20722

By

Bechtel National, Inc.

Advanced Technology Division

Oak Ridge, Tennessee

Bechtel Job No. 14501

the Camillus Shale has total dissolved solids concentrations ranging from 2,000 to 6,000 milligrams per liter, sulfate concentrations of 1,000 to 1,500 milligrams per liter, and chloride concentrations of 1,500 to 2,000 milligrams per liter. This high level of salinity precludes development of this water for domestic consumption without extensive and costly treatment. Use of this water is restricted to certain industries that can tolerate highly saline water. (Ref. 1)

The nearest wells are greater than 0.5 mile from the site. It is assumed that the wells only serve between 1 and 100 people between 0.5 and 3 miles because of the high salinity of the water in the vicinity of the property.

6.0 WASTE

Residues comprised essentially of low-grade uranium ore t ilings, an unconsolidated solid, were deposited on the Haist property during the period 1944-1946. Records indicate that about 8000 tons of residues containing approximately 0.54% uranium were spread out over roughly two-thirds of the former Haist proerty. The waste placed on the former Haist property from a site map dated February 20, 1946 is as follows:

L-19 Sludges(Western ore tailings from 1943)	1.23% Mx_3O_8
P-78 Iron Cake	0.88% Mx_3O_8 5.57% V_2O_5
Pilot Plant Sludges	1.16% Mx_3O_8
L-19 Tailings	0.52% Mx_3O_8

Table 1 lists the composition of the Colorado ore raffinate. This raffinate may be similar to the composition of the tailings

TABLE 1

COMPOSITION OF THE COLORADO RAFFINATE

	%
Al_2O_3	2.1
CaO	41.8
Co	0.13
Fe_2O_3	8.7
Halides	0.2
MgO	21.2
MnO_2	0.8
MoO_3	0.05
Na	0.5 - 5.0
Ni	0.10
P_2O_5	1.2
PbO	0.05
SO_3	15.8
SiO_2	5.4
Th	0.1 - 1.0
TiO_2	0.2
U	0.62
V_2O_5	1.1
Loss on Ignition	76.17

Ag, As, B, Ba, Be, Bi, Cd, Cr, Ga, In, K, Nb, Sb, Sn, Sr, W, Y, Zn and Zr - all less than 0.1% each.

The nitrate content of the Colorado raffinate is similar to that of Pitchblende raffinate.

material placed on the former Haist property.

In 1974, some of the residues (perhaps 30-40%) were moved from the former Haist property to the adjacent Seaway Industrial Park Some of the remaining residue on the Haist property has been relocated by earth-moving equipment and by natural surface water run-off. (Ref. 3) An unknown quantity of contaminated soil and residues have been moved onto the Ashland 2 site.

Attachment E contains figures which show the approximate location of tailings and the extent of contamination in 1976 and 1986, the location of samples taken in the 1976 survey, and the locations of radium concentrations in mud samples in 1976.

6.1 Summary of Contamination

Areas scanned during the 1986 walkover, were scanned using Eberline ratemeter/scaler model PRS-1 and NaI scintillation probe model SPA-3. Paths of scan were 10' - 15' apart with the probe being passed about 2" - 6" above the ground level. Some areas of high, thick brush were scanned as was accessible. (Ref. 7)

The original area designated Ashland 2 is outlined on a copy of an aerial photograph (scale 1"=600'), and measures 1600' by 800'. The entire area was not accessible to scanning due to heavy brush, and swamp. One portion is designated by Ashland Oil as "Fill Area" on their property maps. Although other areas have obviously had some dumping, only the designated "Fill Areas" showed evidence of contamination. (Ref. 7)

"Fill Area" is noted as 600' x 500' on the Ashland Oil maps. A clay cap has been placed on the Western portion of the Fill. The Eastern portion has not been capped and exhibits gamma readings up

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PRELIMINARY ASSESSMENT AND SITE INVESTIGATION FOR LINDE AIR PRODUCTS DIVISION OF UNION CARBIDE TONAWANDA, NY

SEPTEMBER 1987

Prepared for

UNITED STATES DEPARTMENT OF ENERGY

OAK RIDGE OPERATIONS OFFICE

Under Contract No. DE-AC05-81OR20722

By

Bechtel National, Inc.

Oak Ridge, Tennessee

Bechtel Job No. 14501

2,000 mg/l. These high levels of total dissolved solids and salinity preclude the use of this water for potable consumption without extensive and costly treatment. Its use is restricted to certain industries that can tolerate the high salinity and total dissolved solids. (Ref. 2) The nearest residential well is 1.25 miles from the site. (Ref.1)

7.0 LINDE AIR PRODUCTS OPERATIONS

7.1 Background

The Linde Air Products company operated, for the MED, a facility known as the Ceramics Plant. The plant performed three processes: in the Step I process, ores and, occasionally, residues from the Step II operation were processed to produce uranium oxide; in the Step II process, uranium oxide was converted into uranium dioxide; and in the Step III process, uranium dioxide was converted into uranium tetrafluoride. Process flow sheets and uranium mass balances for both the African ore and the Domestic ore are shown in Attachments D-1 through D-4. The discussion here will consider only the Step I process since it was this process which generated the wastes. Residues from Step II process and Step III process were recycled. (Ref. 1)

7.2 Step I Process

Step I began shakedown operations in June/July 1943 and continued operations until mid-July 1946. (Ref. 1)

Sulfuric acid was added to the ore slurry until a pH of 0.7 to 0.8 was reached. Pyrolucite or magnesite (MnO_2) was added to oxidize any reduced uranium. The mixture was digested at 90°C for 3 hours and then cooled with weak wash solution at 60°C.

The uranium was in solution as uranyl sulfate, and many of the impurities (iron, silica, phosphorous, vanadium, alumina) were also partially in solution. (Ref. 1)

Soda ash was added until the pH reached about 9.2. Some of the sodium bicarbonate was also added, which precipitated most of the impurities and left the uranium in solution as sodium uranyl tricarbonate. The slurry was filtered in the Moore filters, and the cake hauled to the tailings pile. (Ref. 1)

The liquors contained vanadium and phosphorous as objectionable impurities. These were removed by the addition of ferrous and ferric sulfates, respectively. The resultant iron cake was filtered off in plate and frame presses and hauled to the tailings pile. The liquors were treated with caustic soda which resulted in the precipitation of the uranium as sodium diuranate. The filtrate from this step was dicharged as waste effluent. (Ref. 1)

The phosphate cake was a similar cake that resulted from the precipitation of phosphorous and lead (during the processing of 3% pitchblende ores) by the addition of sodium sulfide and ferric sulfate. Cobalt, nickel, and molybdenum compounds and small amounts of radium were present in the cake in addition to the phosphate. (Ref. 1)

The vanadium cake (domestic ore processing) was produced from the addition of lead sulfate to precipitate the vanadium as lead vanadate. Liquids (containing the uranium) from the precipitation went to the lead removal tanks, and the slurry was transferred to the lead recovery tanks before disposal. The process was revised in 1945, when ferrous and ferric sulfate were added to the domestic ore soutions to remove the vanadium and phosphorous. These wastes were stored at the Haist property. (Ref. 1)

The sodium diuranate cake was treated with sulfuric acid and ammonium sulfate and was converted to an ammonium uranyl sulfate complex. This was removed in a filter press. The cake (acid leach cake) was fed to a calciner to drive off the ammonia, sulfur dioxide and trioxide, and water, leaving the black oxide of uranium. (Ref. 1)

The treatment of African ore was very similar to that of domestic ore, which is described above. The digestion step required more pyrolucite because more of the uranium was in a reduced state. Also, barium chloride had to be added to act as a "gatherer" for the radium. The African ore contained little vanadium or phosphorous, so the iron sulfate step was omitted. Instead, sodium sulfide was added to remove the lead. The remainder of the process was the same. The molybdenum stayed in solution when the uranium was precipitated. (Ref. 1)

Tables 2 through 4 present the results of the assay of typical ores and products from the Linde plant as wells as the results of selected analyses of residues. These values are from historical records and are all pre-1955. The analysis of solids from the liquid effluent gave the following values (based on one set of samples): (Ref. 1)

Sodium	43.64%
Sulfates	37.21%
Calcium	1.05%
Carbon Dioxide	6.74%
Iron	0.67%
Water	9.04%

7.3 <u>Liquid Effluents in the Step I Process</u>

During the initial operations, uranium was precipitated from

Table 2 : Typical* Analyses of Selected Ores Processed by Linde

Percent of Compound	Domestic Ores		Foreign Ores Pitchblende			Torbernite Q-20
	L-19	GUI	L-30	L-50	R-10	
U_3O_8	15.8	12.5-2.0	10.54	6.7	3.53	17.72
Y_2O_5	2.5	2.35	0.2	2.2	0.26	0.40
MoO_3	0.02		0.35	0.3	0.3	0.31
PbO	0.01		0.9			
P_2O_5	2.5	2.65	0.2	0.14	0.1	4.62
SiO_2	13.0	28.6	50.0	51.4	55.8	51.14
CaO	17.0		1.0	1.0	.52	
NiO						
MgO	0.3		13.0	13.53	11.41	5.16
CoO				0.56	0.2	0.23
Fe_2O_3	12.0	20.2	2.2	1.97	1.74	1.92
Al_2O_3	5.0		9.0	9.42	13.61	6.45
CuO						2.78
CO_2				2.88	2.29	
Na_2O				Nil	0.25	
Ra			(23.7 mg/ton)			

* These values are typical assays and do not necessarily indicate an average. The L-30 and L-50 are very similar ores and as such were not separated in the tables in Appendix B. Similarly, L-19 and GUI are not separated.

Ref. 1

Table 3: Typical Analyses of Product From the Linde Step I Operation

Percent of Compound	Product From Processing		
	L-19 (1943)*	L-19 (1944)**	L-30**
U_3O_8	97.0 (min)	98.2	97.7
Acid Solubles	0.5 (max)		
SiO_2	0.05 (max)	0.52	
Acid Sulfide Metals	0.6 (max)		0.058
$(NH_4)_2CO_3$ Insoluble	0.5 (max)		.027
HNO_3 Insoluble			0.42
Al_2O_3	0.3 (max)		} 0.1
Fe_2O_3	0.2 (max)	0.31	
P_2O_5	0.3 (max)	0.3	0.63
Na_2O		0.08	0.24
V_2O_5	0.05 (max)	0.11	0.054
SO_4	0.05 (max)	0.036	0.29 (SO_3)
Ag	0.0010 (max)		
B	0.0002 (max)		
Cd	0.0005 (max)		
Cl	0.05 (max)		
Mn	0.005 (max)		
Rare Earths	0.0015 (max)		

* The values of L-19 (1943) are specifications for the product while the other two are "typical" values that may not represent an average.

** L-19 was not differentiated from GUI, and L-30 was typical of L-50.

Ref. 1

Table 4: Typical Analyses of Residues at Lake Ontario Ordnance Works and Haist Property*

Ore Residues	Uranium Oxide	Cobalt	Nickel	Copper	Radium	Vanadium Oxide
	Concentrations in g/g of Residues of					
L-19 (Haist)						
Actual	1.1×10^{-3} (2.8×10^{-3})**			1.3×10^{-3}		
Dry	2.5×10^{-3} (6.3×10^{-3})	-	-	2.8×10^{-3}		
L-30						
Actual	1.4×10^{-3} (2.2×10^{-3})	3.4×10^{-3}	1.1×10^{-2}	1.1×10^{-3}	1.6×10^{-5}	
Dry	2.5×10^{-3} (4×10^{-3})	6.2×10^{-3}	2×10^{-2}	2×10^{-3}	3×10^{-5}	
L-50						
Actual	0.7×10^{-3} (1.3×10^{-3})	3.7×10^{-3}	1.2×10^{-2}	1.5×10^{-3}	2.1×10^{-5}	
Dry	1.1×10^{-3} (2×10^{-3})	5.9×10^{-3}	1.9×10^{-2}	2.4×10^{-3}	1.9×10^{-5}	
R-10						
Actual	0.9×10^{-3} (1.8×10^{-3})	3.9×10^{-3}	1.0×10^{-2}	2.7×10^{-3}	7.0×10^{-6}	
Dry	1.2×10^{-3} (2.3×10^{-3})	5.3×10^{-3}	1.3×10^{-2}	3.7×10^{-3}	9.6×10^{-6}	
R-10 Iron Cake (Phosphate Cake)						
Actual	1.6×10^{-3} (4.3×10^{-3})	1.9×10^{-3}	3.1×10^{-2}	-		
Dry	3.4×10^{-3} (9.1×10^{-3})	4×10^{-3}	6.5×10^{-2}	-		
P-78 (Haist) (Phosphate & Vanadium Cake)						
Actual	1.5×10^{-3} (3×10^{-3})			1.2×10^{-3}		
Dry	3.4×10^{-3} (6.7×10^{-3})	-	-	2.5×10^{-3}		($4-7\times10^{-2}$)

* Values in this table are based on 1953 data collected to evaluate reprocessing feasibility and operating data. Data from recent surveys have not been presented.

** The first value is an estimate made for the reprocessing study, the second is based on initial analyses from the operating records.

Ref. 1

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solution using a procedure that involved adding sulfuric acid to the uranium tricarbonate-rich solution and heating it to drive off carbon dioxide; this was followed by adding relatively small amounts of caustic to cause this precipitation. The effluent from this procedure had a pH that allowed its disposal into the sanitary sewer. This method of precipitation was abandoned in 1943, however, because it was relatively slow and allowed more molybdenum and other impurities to contaminate the product than the direct caustic method of precipitation. Linde developed the direct caustic method, which resulted in a better product in less time. The method was essentially a brute-force removal of uranium through the direct addition of caustic to the pregnant solution, driving the pH to levels as high as 11.5. As a result, the uranium precipitated as diuranate, despite the presence of the carbonate. (Ref. 1)

One drawback to this method was that the effluent had a high pH and was no longer acceptable for direct disposal into the sanitary sewer. As an alternative, two options considered were the use of disposal wells or discharge into Two-Mile Creek. Although the discharge into the creek was approved by the State of New York, a decision was make to use disposal wells whenever possible and to rely on the Two-Mile Creek option only when necessary. (Ref. 1)

The effluent disposal wells were approximately 40 m (150 feet) deep and pass through a clay formation, into a gravel and sand layer and a varigated carbonate formation, possibly a mixture of magnesite, and dolomite or limestone. Well logs for three of the disposal wells are presented in Attachment F-5 through F-7. The groundwater in a section of the carbonate formation was identified as saltwater, and the water from the particular aquifer involved was found to be unacceptable for use by Linde. It was believed by the company to have been contaminated prior to 1944 and before the injection of any Step I effluent. The aquifer which Linde injected its waste into is the Camillus Shale as discussed above. It appears that the quality of the water in the Camillus Shale in 1944may have been similar to current conditions. (Ref. 1)

Two-Mile Creek flows through the Linde facility and a park, where it is dammed to create a pond, and then into the Niagara River. The storm sewer discharged into the creek via a storm drainage ditch that entered the creek downstream of the dam (Attachment F-3). One memorandum suggests that the creek may have diluted the effluent 10 to 1; however, analysis of pH data from other memoranda suggest that the creek may have had a flow rate up to 100 times greater than that of the effluent drainage rate. The average pH of the creek, measured over an 8-day period in March 1946, was about 8.3 upstream of the storm sewer discharge and 10.3 downstream of the discharge. Recent estimates of creek flow rates during the summer suggest that, at a minimium, creek flow rates would have been 15 to 40 times the average effluent discharge rates; the flow rates in the creek were much greater in the 1940's because industrial operations discharged plant water into the creek. (Ref. 1)

7.4 <u>Characteristics of the Filtrate</u>

The filtrate discharged to the sewers or wells was a high-pH solution (usually above pH of 10, however, during June 1943 and December 1943 the pH was probably closer to 7) consisting mainly of ions from excess sodium sulfate, sodium carbonate, and sodium hydroxide. In addition, some chloride ions, from the barium chloride added to enhance radium recovery, would also have been present, along with a small amount of a variety of complex anions of many minor elements such as vanadium, nickel, and cobalt (Table 2 lists the constituents of the ores). Ammonium sulfate from the wash of the uranium precipitate would be expected to react rapidly with the caustic and release some ammonia. This was probably the cause of the incidents in which pump house operators were bothered by ammonia emissions from the wells located in the pump house. (Ref. 1)

This complex solution would also contain small quantities of uranium and radium. At the low concentration found in these effluents, it is difficult to project which uranium and radium species would be favored and what their solubility would be. The uranium and radium would be present in solution as well as in colloidal form, and the relative amount of each is difficult to assess. The impact of this is not significant for uranium because standards for insoluble and soluble uranium are the same. However, standards for soluble and insoluble radium differ by a factor of 1000. It is believed that the analytical techniques used at that time would not have differentiated between the soluble and insoluble fractions; hence, the concentrations of uranium and radium in the effluents (based on the techniques used) would be total uranium and radium. An analysis of the solubility of various radium compounds suggests that a significant portion of the radium and probably uranium in the effluent would be soluble. (Ref. 1)

7.5 <u>Volume of Effluents</u>

As indicated previously, the liquid waste from the Step I process, the filtrate from the precipitation of the sodium diuranate which followed the addition of caustic soda, sodium hydroxide (Attachment D-1), was initialllly discharged into the sanitary sewer system. It appears that Linde began disposing of the effluents in onsite wells during or after April 1944 and that, from 1944 to 1946, three wells located in the area of Plant No. 1 and four wells located near the Ceramics Plant were used during various periods for this purpose. From time to time, the wells would become clogged, overflow, and have to be cleaned. During these periods, the effluents would be diverted to a storm sewer that connected with the Niagara River through Two-Mile Creek. Based on the information in progress reports and various operating memoranda, it is estimated that liquid waste volumes generated by the process during the period the wells were in use was as follows:

April to December 1944	121×10^6 l (32×10^6 gal)
Januray to December 1945	193×10^6 l (51×10^6 gal)
January to July 1946	108×10^6 l (28×10^6 gal)
Total	422×10^6 l (111×10^6 gal)

Based on the estimates of liquid effluent from the ore processing from 1945 to 1946, it appears that about 50% of the effluent was injected into the wells and the remainder into the storm sewer. Assuming that a simular dumping ratio existing in 1944 and early 1945, it appears that an additional 70×10^6 l (18×10^6 gal) may have been disposed of in the wells. It is therefore assumed that, during the period from April 1944 to July 1946, about 210×10^6 l (55×10^6 gal) of waste was disposed of in the wells and the remainder in the storm sewer to Two-Mile Creek. All effluents prior to April 1944 ($80 - 100 \times 10^6$ l or $20 - 30 \times 10^6$ gal) are assumed to have been discharged to the sanitary sewer.

(Ref. 1)

7.6 Uranium Concentration in the Effluents

The concentration of uranium in the effluent or the percent of uranium lost varied depending on extraction efficiency; production rate (wash rates, filtering rates); and, to some extent, the type of ore processed. (Ref. 1)

During 1943 and the first two months of 1944, uranium extraction efficiencies generally ranged around 93 to 94 percent. Through the remainder of 1944, efficiencies generally exceeded a 96% uranium recovery rate and occasionally were as high as 98%. Extraction efficencies over 1945 averaged about 98% and were somewhat lower in 1946, probably due to the lower grade material being processed. (Ref. 1)

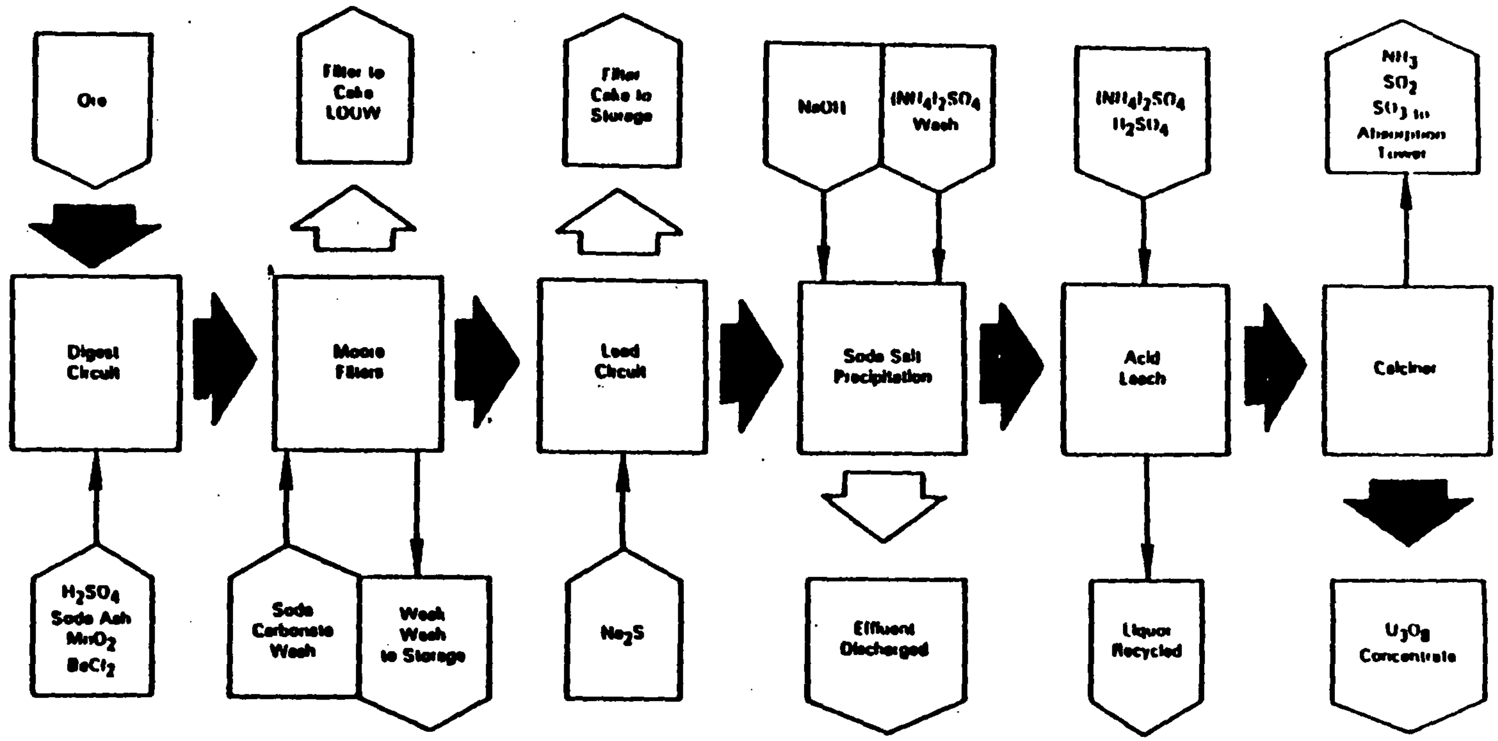
Uranium losses in the effluents in 1943 (during the lower extraction efficiency period) appear to be on the order of 2 to 3 percent of the uranium in the ore. This material was lost to the sewer system. In 1944, however, the data indicate that losses were generally available progress reports indicate that later losses were maintained below 0.5% of the uranium in the ore. (Ref. 1)

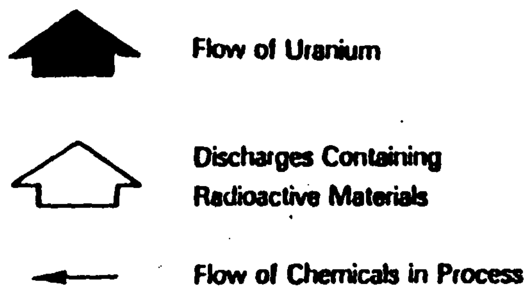
The weekly averages of uranium oxide concentrations in the effluents analyzed from April 1944 to July 1946 ranged between 0.011 and 0.064 gram of uranium oxide per liter of effluent, with the average being about 0.026 gram per liter (g/l). This would imply that the process lost an average of about 26 kg of uranium oxide per million liters or 220 lb of uranium oxide per million gallons of effluent during the period when the wells and storm sewer were being used. Concentrations of uranium oxide in the effluent during the period when the sanitary sewer was used for disposal of the effluent was somewhat higher. It is estimated that the concentrations average 0.15 g/l in 1943 and 0.03 g/l during the first three months of 1944, or about 1200 and 250 lb of uranium oxide per million gallons, respectively. (Ref. 1)

Assuming these loss rates and from 210 x 10^6 l of effluent disposed of in the wells, about 5.4 x 10^3 kg of uranium oxide (about 3 Ci of natural uranium) were discharged to the wells. The remainder of the process effluents discharged to the storm sewer during this period, about 212 x 10^6 l would have contained about 5.6 x 10^3 kg of uranium oxide. Therefore, based on the available data, the total uranium oxide contained in the effluent released from April 1944 to July 1946 was about 11 x 10^3 kg, or about 6 Ci of natural uranium. (Ref. 1)

7.7 Radium Concentration in the Effluents

Some estimates of the maximum amount of radium discharged during the processing of the L-30 and L-50 ores can be made, based on the fact that contracts with African Metals called for the return of at least 95% of the radium in the processed ore. Actual processing operations supposedly held the losses to less than 3% (97% of the radium remained in the residues). Assuming a total of 986 metric tons of U_3O_8 produced from the L-30 and L-50 ores and a uranium extraction efficiency of about 97%, there were 862 metric tons of uranium, or less than 595 Ci of natural uranium (about 290 Ci of ^{238}U) in the ore. This would imply about 290 Ci of ^{226}Ra (in equilibrium with ^{238}U) and maximum effluent losses amounting to 8.5 Ci of ^{226}Ra. A similar analysis for th R-10 ore, but assuming a 95% extraction efficiency, would suggest that a maximum of 2.7 Ci of radium was lost during the processing of the ore. (Ref. 1)

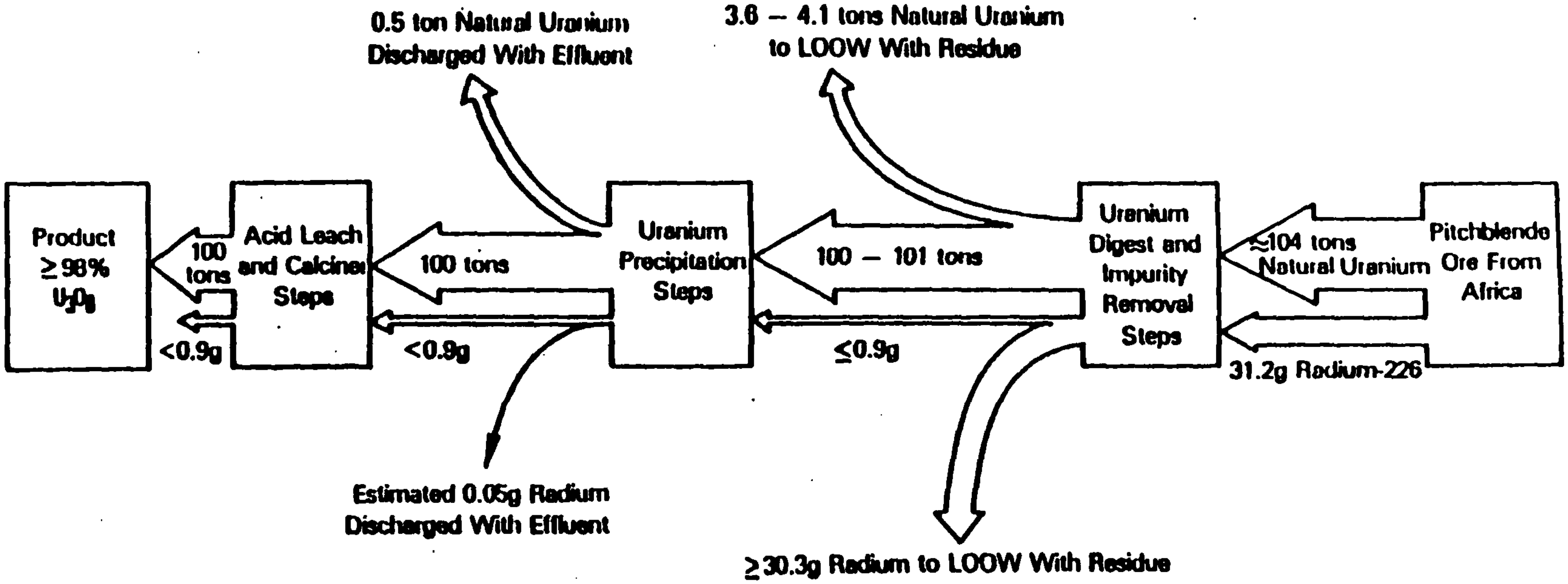




H_2SO_4 – Sulfuric Acid
MnO_2 – Manganese Dioxide
$BaCl_2$ – Barium Chloride
$NaOH$ – Caustic
$(NH_4)_2SO_4$ – Ammonium Sulfate
Na_2S – Sodium Sulfide
NH_3 – Ammonia
SO_2 – Sulfur Dioxide
SO_3 – Sulfur Trioxide
U_3O_8 – Uranium Oxide

Sample Processing Flow Sheet (African Ore)

f. 1



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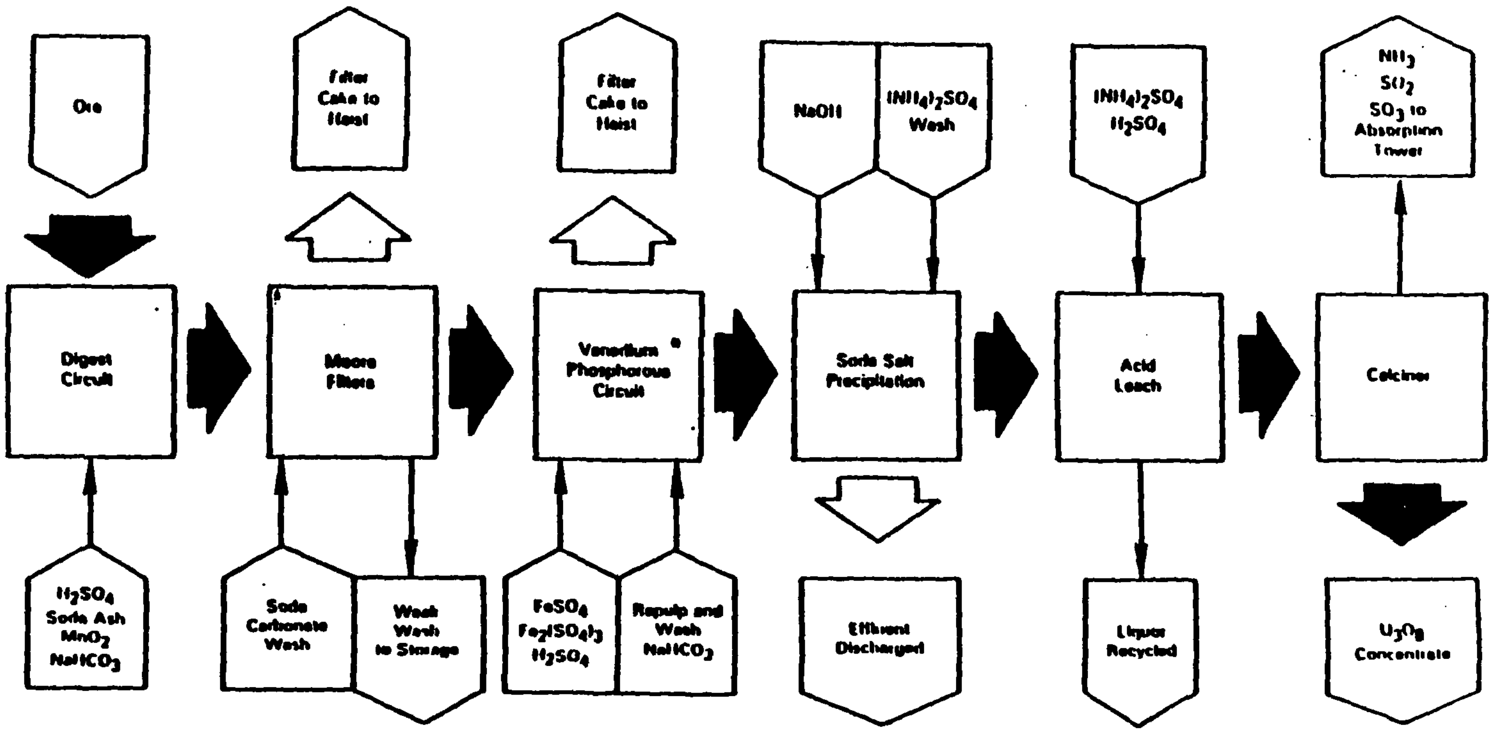
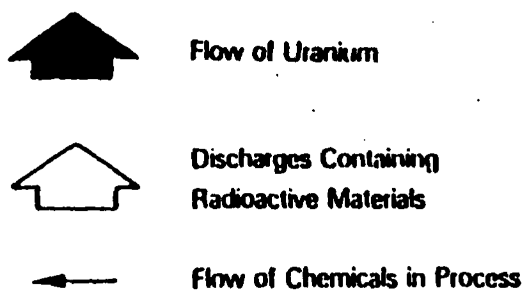
Uranium and Radium Mass Balance for Processing Belgium Congo Pitchblende Ores at the Linde Step I Facility

Ref. 1

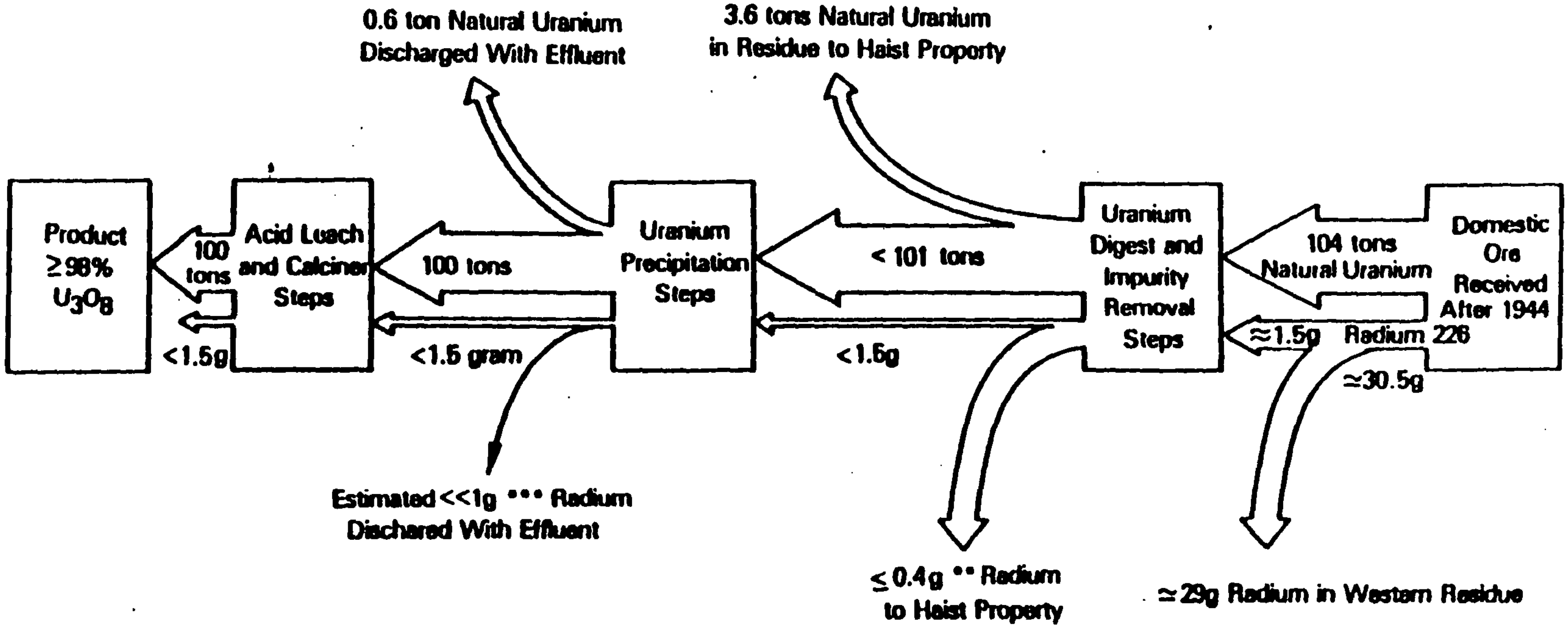




H_2SO_4	- Sulfuric Acid	Na_2CO_3	- Sodium Carbonate (soda ash)
MnO_2	- Manganese Dioxide	NH_3	- Ammonia
$BaCl_2$	- Barium Chloride	SO_2	- Sulfur Dioxide
NaOH	- Caustic	SO_3	- Sulfur Trioxide
$(NH_4)_2SO_4$	- Ammonium Sulfate	U_3O_8	- Uranium Oxide
Na_2S	- Sodium Sulfide	$FeSO_4$	-- Ferrous Sulfate
$NaHCO_3$	- Sodium Bicarbonate	$Fe_2(SO_4)_3$	Ferric Sulfate

* Initially, vanadium was removed by adding lead sulfate, and the soda salt precipitation was an acid-caustic method that involved the addition of H_2SO_4 prior to the caustic; the revised procedure used the direct caustic method.

Sample Processing Flow Sheet (Domestic Ore Revised)*
Ref. 1



*The mass balance for radium in these ores is very uncertain.

**Based on radium in residue samples from the former Haist property; however, this maximum could be higher if there was any dilution with soil or significant dissolution by rainwater of the radium in material stored at Haist.

***This was probably much less than 0.5g, which is the maximum level allowable by a Linde action point for radium. W. Thomas (Corps of Engineers, 1946) suggested that radium in the American ore processing effluent was much less than the concentration in the African ore processing effluent.

Uranium Mass Balance for Domestic Ore Processed at the Linde Step I Facility After November 1944

Ref. 1

ATTACHMENT 2

International Uranium (USA) Corporation
White Mesa Mill
Equipment Release/Radiological Survey Procedure

2.1 Release of Equipment

All materials, equipment and scrap which are intended for release from the mill site for unrestricted use, are surveyed for radiological contamination levels in accordance with the limits set forth in NRC document, "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of License for Byproduct of Source Materials", dated September, 1984. The instructions in this guide in conjunction with Table I specify the radioactivity and Radiation exposure rate limits which are used in accomplishing the decontamination and survey of surfaces and equipment prior to abandonment or release for unrestricted use.

2.1.1. Materials and Scrap

Scrap material and equipment such as pumps, process equipment, etc. which require repair services are cleaned appropriately in an effort to eliminate residual contamination prior to surveying for radiological contamination levels. Radioactivity on the surface of equipment and materials is measured by surveying for alpha contamination, using the appropriate, portable, calibrated alpha survey instruments, such as Eberline Model ESP-1 "Portable Smartmeter " surveying instrument equipped with an AC-3-7 alpha scintillation probe, or other equivalent instrument. Radiation exposure rate measurements are made on these materials using calibrated exposure rate instruments such as a Ludlum Model 3 Beta-Gamma survey meter and probe or equivalent instrument. Materials and equipment are released from the mill site for unrestricted use if the total alpha contamination concentration and exposure rate measurements are less than the applicable limits contained in Table I of the NRC Guide.

2.1.2. Procedure

1. Obtain appropriate calibrated alpha survey instrument from radiological lab.
2. Check meter performance and function using Th-230 calibration source.
3. Survey items on surface for alpha contamination at numerous locations sufficient to determine average and potential maximum contamination levels.
4. Slowly scan over surface of each item @ 1 cm height and determine average and maximum exposure rate measurements.

2.1.2 continued

5. Contamination levels exercised at the mill site for release of equipment for unrestricted use is a total alpha contamination level of 1000 disentigrations per minute per 100 cm^2 (dpm/100 cm^2), and a radiation exposure limit of 0.2 millirad per hour (mr/hr) with a maximum not to exceed 1.0 mr/hr.

6. In the event these limits are exceeded, the item is decontaminated by appropriate means and re-surveyed.

7. If the limits for a total alpha contamination is again exceeded, an alpha smear survey over 100 cm^2 area is taken to determine removable alpha contamination. In addition, a fixed alpha measurement of the area is made using an alpha meter. If the limits of Table I NRC Guide are exceeded, a more rigorous decontamination method is applied.

2.1.3 Vehicle and Mobile Equipment Release

Vehicle and mobile equipment release proceeds on a similar basis as material and equipment release. An alpha survey is made and an exposure survey is made on the interior and exterior surfaces of the vehicle, particularly the tires and exposed undercarriage, if the conveyance is non-dedicated for exclusive use transport. Paying particular attention to the tires and undercarriage during a survey determines whether a vehicle has become contaminated while crossing in and through the mill Restricted Area. The applicable criteria for contamination limits, decontamination, procedures, surveys / re-surveys and ultimate release are identical to those in paragraph 2.1.2.

If a vehicle is classified as exclusive use whose single transport purpose is intended specifically for hauling radioactive materials on a continued basis, then, only the exterior surface and tires of the transport vehicle are surveyed when leaving the restricted area. Examples of these transport vehicles include: ore haulage trucks and closed bulk transport tankers. Applicable alpha contamination and exposure rate levels are those specified in 49 CFR 173.441 and 173.442. The mill site exercises an alpha contamination control level of 1000 dpm/100 cm^2 protocol for the transport vehicle tires only upon exiting the mill site. No internal alpha surveys are done on the internal surfaces of closed transport tankers dedicated for exclusive use until these vehicles become decommissioned.

ATTACHMENT 3

U.S. Army Corps of Engineers
Value Engineering Proposal for
Ashland 1 and Ashland 2

COMMUNITY ROLE IN SELECTION PROCESS

Public input is encouraged by DOE to ensure that the remedy selected for the Tonawanda site meets the needs of the local community in addition to being an effective solution to the problem.

The administrative record file contains all of the documentation used to support the preferred remedy, including the site-specific guideline derivation analyses performed pursuant to DOE Order 5400.5, and is available at the following locations:

Tonawanda Public Information Center
70 Pearce Avenue
Tonawanda, NY 14150

Tonawanda Public Library
333 Main Street
Tonawanda, NY 14150

In addition, information repositories are set up at the following locations:

Kenmore Public Library
160 Delaware Avenue
Kenmore, NY 14217

Parkside Village Public Library
169 Sheridan-Parkside Drive
Town of Tonawanda, NY 13072

Grand Island Memorial Public Library
1715 Bedell Road
Grand Island, NY 14072

The public is encouraged to review and comment on all alternatives described in this Proposed Plan and the supporting Feasibility Study.

Comments on the proposed remedial action at the Tonawanda site will be accepted for 60 days following issuance of the revised Proposed Plan. This 60-day period includes the required 30 days for review under CERCLA, plus an additional 30-day extension. A public meeting will be held during the comment period to receive any verbal comments the public wishes to make. Written comments the public wishes to make or submit regarding the preferred remedy will be received at the meeting or during the 60-day period. Responses to public comments will be presented in a response to comments in the ROD, which will document the final remedy selected for Ashland 1(including Seaway Area D) and Ashland 2 sites.

All written comments should be addressed to:

U.S. Army Corps of Engineers
Buffalo District
FUSRAP Information Center
70 Pearce Avenue
Buffalo, NY 14150

REFERENCES

BNI (Bechtel National, Inc.) 1993. *Remedial Investigation for the Tonawanda Site*, DOE/OR/21949-300, Oak Ridge, TN, February.

DOE 1993a. *Proposed Plan for the Tonawanda Site*, DOE/OR/21950-233, Oak Ridge, TN, November.

DOE 1993b. *Baseline Risk Assessment for the Tonawanda Site*, DOE/OR/21950-003, Oak Ridge, TN, August.

DOE 1993c. *Feasibility Study for the Tonawanda Site*, CNN 110104, Oak Ridge, TN, November.

DOE 1997. *Radionuclide Cleanup Guideline Derivation for Ashland 1, Ashland 2, and Seaway*, DOE/OR/21950-1023, Oak Ridge, TN, September

PROPOSAL NO: C-11
DESCRIPTION: Recycle Uranium, Rare Earth Minerals, and Other Metals

ORIGINAL DESIGN:

Ship material offsite for disposal, or perform soil washing (offsite) to reduce volume; then, dispose of resultant waste streams by shipment to disposal facility(ies).

PROPOSED DESIGN:

Use recycling and mineral recovery technologies at a uranium mill to reduce radioactive material disposal costs. An operating conventional uranium mill, such as the one operated by International Uranium Corporation (IUC) in southeastern Utah, has the technology necessary to recycle materials for extraction of uranium, vanadium, rare earth minerals, and other metals, and to provide for disposal of treated waste in the facility□s fully lined and NRC-compliant existing tailings impoundments. Based on a preliminary review of the materials stored and disposed of in pits or trenches at the Ashland sites, it appears that recoverable levels of uranium, vanadium and/or rare earth minerals may exist in the material to be excavated from these locations as well as other FUSRAP sites.

Since the characterization data is limited, it is difficult to quantify the uranium content and recycle value of this material. It appears, however, that significant portions of the material could be recycled so as to reduce the Corps□ total remediation costs. Until treatability tests confirm the levels of recoverable material, which would reduce the processing cost, a not-to-exceed processing cost is assumed, based on a very low content of recycleable uranium and other minerals of value. This proposal should be revised to indicate larger savings if more favorable data becomes available.

ADVANTAGES:

1. Conforms to Congressional and regulatory mandates which encourage use of recycling.
2. Reduces radioactivity of the material to be disposed of.
3. Recycles uranium and other minerals.
4. Reduces cost of disposal of by-product from recycling operation.
5. Treatment and on-site disposal are performed at one location, with the by-product from recycling being disposed of in an NRC-compliant disposal system, meeting 10 CFR 40 design criteria.
6. 11e(2) by-product is disposed of in an existing tailings impoundment which is consistent with 10 CFR 40 Appendix B intent for nonproliferation of small sites.
7. Actual cost savings for treatment and disposal versus cost of direct disposal can only be greater than projected in this proposal, depending upon the actual content of recoverable uranium or other minerals found in the waste stream .

8. This technology has been demonstrated on multiple waste streams, and has potential applicability to all other FUSRAP sites.

DISADVANTAGES:

1. Transportation by rail is possible to a railhead located within approximately 100 miles of the IUC Mill. However, rehandling of materials for truck transportation via dump bodies or intermodal containers is necessary to transfer materials from the railhead to the IUC Mill site.
2. The Mill has in place an NRC license to possess, store, and dispose of source material; however, an amendment, similar in content and format to previous routinely-granted amendments, may be necessary to accept this material under terms of NRC guidance.
3. Cost estimate for treatment and disposal cannot be refined until further characterization data which indicates the content of uranium, and other minerals of value, is available.
4. NPL status of Ashland 1 and 2 sites may present regulatory hurdles.

JUSTIFICATION:

This proposal will provide a cost effective remediation option. Recycling is a means of meeting Congressional directives to treat waste streams, when possible, and to potentially recycle uranium or other minerals (as mandated under RCRA), while meeting the Public□s and State□s preference that the material not be treated on site, and that is be disposed offsite. Although the cost savings in this proposal are conservatively based on an assumption that only lower levels of uranium or other metals can be recovered, greater cost savings could be projected if treatability tests demonstrate higher content and levels of recovery. Processing at the uranium mill operated by IUC in Utah is used as the basis of this proposal estimate because of its proximity to Envirocare, providing a fair comparison of costs based on locality handling issues and transportation costs.

Note that two cost estimates are provided for this proposal, Estimate A based on the current project estimate which use rates derived from the Bechtel estimates, and Estimate B based on the rates for the current Kansas City contract for RAD disposal. Proposal C-1 addresses this difference.

COST ESTIMATE WORKSHEET **(ESTIMATE A)**

PROPOSAL NO: C-11

DELETIONS

ITEM	U/M	QTY	UNIT COST	TOTAL
Disposal at Envirocare				
Ashland 2(FY98)	CY	19,500	*$215.00	$4,192,500
Ashland 1(FY99)	CY	21,750	215.00	4,676,250
Ashland 1(FY00)		CY21,750	215.00	4,676,250
Loading Facility	CY	1,500	335.00	502,500
TOTAL DELETIONS				$14,047,500

ADDITIONS

ITEM	U/M	QTY	UNIT COST	TOTAL
Process and Dispose at Mill	CY			
Ashland 2(FY98)	CY	19,500	**$110.00	$2,145,000
Ashland 1(FY99)	CY	21,750	110.00	2,392,500
Ashland 1(FY00)	CY	21,750	110.00	2,392,500
Loading Facility	CY	1,500	428.00	642,000
Additional Transportation and Handling Cost				
Ashland 2(FY98)	CY	19,500	$18.00	$351,000
Ashland 1(FY99)	CY	21,750	18.00	391,500
Ashland 1(FY00)	CY	21,750	18.00	391,500
Loading Facility	CY	1,500	18.00	27,000
TOTAL ADDITIONS				$8,733,000

Net Savings (Deletes - Adds)	$5,314,500
***Markups 25%	1,328,625
TOTAL SAVINGS	$6,643,125

***Unit cost is from the current project estimate and is based on Bechtel's disposal rates.**

**Unit cost based on uranium content ≤0.5 percent, and no recovered minerals. A credit of as much as $10/ton could be given for each 0.1 percent incremental increase in uranium content above 0.5 percent. Given the variability of value of other minerals, rare earths, or metals, credits due to such elements would be a function of the market value and content of the particular element. Cost of treatment via processing could be refined and reduced based on the results of treatability tests or other relevant considerations. Addition of these variables all serve to increase cost savings

*** Markups: Includes Contingency (25%)

Note: Additional transportation and handling costs, compared to transportation to Envirocare, of $ 18/CY, include costs of off-loading from gondola cars at the railhead, loading into dumptrucks or container trucks, trucking to the site, and offloading/delivery at the IUC site.

COST ESTIMATE WORKSHEET **(ESTIMATEB)**

PROPOSAL NO: C-11 PAGE NO: 4 OF4

DELETIONS

ITEM	U/M	QTY	COST	UNIT TOTAL	
Disposal at Envirocare					
Ashland 2(FY98)		CY	19,500	*$167.00	$3,256,500
Ashland 1(FY99)		CY	21,750	167.00	3,632,250
Ashland 1(FY00)			CY21,750	167.00	3,632,250
Loading Facility		CY	1500	428.00	642,000
TOTAL DELETIONS					$11,163,000

ADDITIONS

ITEM	U/M	QTY	COST	UNIT TOTAL	
Process and Dispose at Mill		CY			
Ashland 2(FY98)		CY	19,500	**$110.00	$2,145,000
Ashland 1(FY99)		CY	21,750	110.00	2,392,500
Ashland 1(FY00)		CY	21,750	110.00	2,392,500
Loading facility		CY	1,500	110.00	165,000
Additional Transportation and Handling Cost					
Ashland 2(FY98)		CY	19,500	$18.00	$351,000
Ashland 1(FY99)		CY	21,750	18.00	391,500
Ashland 1(FY00)		CY	21,750	18.00	391,500
Loading facility		CY	1,500	18.00	27,000
TOTAL ADDITIONS					$8,256,000
Net Savings (Deletes - Adds)					$2,907,000
***Markups 25%					726,750
TOTAL SAVINGS					$3,633,750

*** Unit cost based on the Kansas City RAD waste disposal Contract rates.**

**Unit cost based on uranium content ≤0.5 percent, and no recovered minerals. A credit of as much as $10/ton could be given for each 0.1 percent incremental increase in uranium content above 0.5 percent. Given the variability of value of other minerals, rare earths, or metals, credits due to such elements would be a function of the market value and content of the particular element. Cost of treatment via processing could be refined and reduced based on the results of treatability tests or other relevant considerations. Addition of these variables all serve to increase cost savings

*** Markups: Includes Contingency (25%)

Note: Additional transportation and handling costs, compared to transportation to

Envirocare, of $ 18/CY, include costs of off-loading from gondola cars at the railhead, loading into dumptrucks or container trucks, trucking to the site, and offloading/delivery at the IUC site.

June 4, 1998

NOTE TO: Susan Fridley, IRMB/IRM

FROM: Jim Park, URB/DWM/NMSS Jim Park

SUBJECT: REQUEST TO DOCKET REVISION TO APPLICATION TO RECEIVE AND PROCESS FUSRAP-ASHLAND 2 ALTERNATE FEED MATERIALS (DOCKET NO. 40-8681)

Please docket the enclosed facsimile cover sheet, dated May 27, 1998, and attachment from Ms. Michelle Rehmann of International Uranium (USA) Corporation (IUSA). By this submittal, IUSA is providing supplement. information (a Radioactive Waste Profile Recored) to its May 8, 1998 amendment request to receive and process alternate feed materials from the Ashland 2 FUSRAP site at the White Mesa uranium mill.

Thank you for your assistance. If you have any questions, I can be reached at 415-6699.

Enclosures: As stated (2)

9806090244 980604
PDR ADOCK 04008681
C PDR

INTERNATIONAL
URANIUM (USA)
CORPORATION

Independence Plaza, Suite 950 ♦ 1050 Seventeenth Street ♦ Denver, CO 80265 ♦ 303 628 7798 (main) ♦ 303 389 4125 (fax)

4096

FACSIMILE TRANSMITTAL

TO:	Jim Park	FAX NO:	301.415.5399
	NRC	PHONE NO:	301.415.6699
FROM:	Michelle R. Rehmann	DATE:	May 27, 1998
	Environmental Manager	PAGE 1 OF:	5
		IF ALL PAGES ARE NOT RECEIVED, PLEASE CALL:	Tammy Youngs
		PHONE NO:	303.628.7798

Attached is additional information on the Ashland 2 amendment.

Michelle Rehmann

MRR/tay
cc: Joseph Holonich

D/1

...71

NL05

IMPORTANT/CONFIDENTIAL: FAX messages are sometimes received by persons other than to the person to whom they are addressed as a result of equipment failure or human error. This Communication is intended solely for the addressee shown above. Please notify our office immediately at any of the telephone or Fax numbers shown above if you are not the addressee or someone responsible for delivering it to the addressee. We retain all rights and privileges as to this communication and prohibit any dissemination, distribution or copying by or to anyone other than the addressee. Our office will arrange for its return by the United States Postal Service or by commercial carrier to us at no cost to you.

9806090245 980604
PDR ADOCK 04008681
C PDR

COPY

RADIOACTIVE WASTE PROFILE RECORD

[illegible] (11/21/97)

[illegible]: [illegible] [illegible]: 7002-01, [illegible]: [illegible]

[illegible]: [illegible] [illegible]: [illegible] [illegible]: [illegible]

[illegible]

[illegible]

[illegible]

A. CUSTOMER INFORMATION:

GENERAL: Please read carefully and complete this form for one waste stream. This information will be used to determine how to properly manage the waste. Should there be any questions while completing this form, contact Envirocare at (801) 532-1330. **WASTES CANNOT BE ACCEPTED AT ENVIROCARE UNLESS THIS FORM IS COMPLETED.** If a category does not apply, please indicate. This form must be updated annually.

1. GENERATOR INFORMATION

EPA ID # N/A   EPA Hazardous Waste Number(s) (if applicable) N/A

Mailing Address: 175 East Park Drive, Building 31, Second Floor, Tonawanda, NY 14151

Phone: (716)447-9380   Fax (716)447-9381

Location of Material (City, ST): Tonawanda, NY

Generator Contact: Rick McNutt   Title Waste Management Coordinator

Mailing Address (if different from above): 151 Lafayette Drive, P.O. Box 350, Oak Ridge, TN 37831-0350

Phone: (423)576-3877   Fax (423)576-4898

B. WASTE PHYSICAL PROPERTIES (Should you have any questions while completing this section, contact Envirocare Customer Support Representative at (801) 532-1330).

1. **PHYSICAL DATA** (Indicate percentage of material that will pass through the following grid sizes, e.g...12" 100%, 4" 96%, 1" 75%, 1/4" 50%, 1/40" 30%, 1/200", 5%.)

GRADATION OF MATERIAL:

12"	100 %
4"	95 %
1"	[illegible] %
1/4"	[illegible] %
1/40"	[illegible] %
1/200"	57 %

2. **DESCRIPTION:** Color Brown/Multi Odor Odorless
   Liquid ___ Solid X Sludge ___ Powder/Dust ___

3. **DENSITY RANGE:** (Indicate dimensions) 40 - 500 S.G. (lb./ft³) lb./yd³

4. **GENERAL CHARACTERISTICS (% OF EACH)**
   Soil 80 Building Debris 5 Rubble 5 Pipe Scale ___ Tailings 5 Process Waste ___ Concrete 5 Plastic/Resin ___
   Other constituents and approximate % contribution of each: *SEE ATTACHMENT 1*

5. **MOISTURE CONTENT:** (For soil or soil-like materials).
   (Use Std Proctor Method ASTM D-698)
   Optimum Moisture Content: 16 %
   Average Moisture Content: 18 [illegible]
   Moisture Content Range: 9 - 22 %.

6. **DESCRIPTION OF WASTE** (Please attach a description of the waste with respect to its physical composition and characteristics. This description can be attached separately or included with the attachment for Item D.1.) *SEE ATTACHMENT 1*

Generator Initials: [signature]
Co-Operators Initials: [signature]

COPY

2. **REQUIRED RADIOLOGICAL ANALYSES.** Please obtain sufficient samples to adequately determine a range and weighted average of activity in the waste. Have a sufficient number of samples analyzed by gamma spectral analysis for all natural and man-made isotopes such that they support the range and weighted average information for the waste stream that will be recorded in item D.1. If Uranium, Plutonium, Thorium, or other non-gamma emitting nuclides are present in the material, have at least (1) sample evaluated by radiochemistry to determine the concentration of these additional contaminants in the material.

3. **PRE-SHIPMENT SAMPLES OF WASTE TO ENVIROCARE**

Once permission has been obtained from Envirocare, please send 5 representative samples of the waste to Envirocare. A completed EC-3000 form must be included with the sample containers. These samples will be used to establish the waste's incoming shipment acceptance parameter tolerances and may be analyzed for additional parameters. Send about two pounds (one liter) for each sample in an air-tight clean glass container via United Parcel Post (UPS) or Federal Express to:

Envirocare of Utah, Inc., Attn: Sample Control. Tooele County, Interstate-80, Exit 49, Clive, Utah 84029
(For Federal Express Use Zip Code 84083). Phone: (801) 521-9619.

4. **LABORATORY CERTIFICATION INFORMATION.** Please indicate below which of the following categories applies to your laboratory data.

a. Note analytical data that is to represent mixed waste must be Utah certified or from the USEPA. All radiological data used to support the data in item C.1. must be from a Utah-certified laboratory.

_X_ **UTAH CERTIFIED.** The laboratory holds a current certification for the applicable chemical or radiologic parameters from the Utah Department of Health insofar as such official certifications are given.

___ **GENERATOR'S STATE CERTIFICATION.** The laboratory holds a current certification for the applicable chemical parameters from the generator's State insofar as such official certifications are given, or

___ **GENERATOR'S STATE LABORATORY REQUIREMENTS.** The laboratory meets the requirements of the generator's State or cognizant agency for chemical laboratories, or:

If using a non-Utah certified laboratory, briefly describe the generator state's requirements for chemical analytical laboratories to defend the determination that the laboratory used meets those requirements, especially in terms of whether the requirements are parameter specific, method specific, or involve CLP or other QA data packages. Note: When process or project knowledge of this waste is applied, additional analytical results may not be necessary to complete Section B, D.2, D.5, or D.6 of this form.

b. For analytical work done by Utah-certified laboratories, please provide a copy of the laboratory's current certification letter for each parameter analyzed and each method used for analyses required by this form.

c. For analytical work done by laboratories which are not Utah-Certified, please provide the following information:

State or Other Agency Contact Person	Generator's State	Telephone Number

Lab Contact Person	Laboratory's State	Telephone Number

V. **CERTIFICATION**

GENERATOR'S CERTIFICATION OF REPRESENTATIVE SAMPLES, ANALYTICAL RESULTS FROM QUALIFIED LABORATORIES, USE OF APPROVED ANALYTICAL AND SAMPLING METHODS, AND ARRANGEMENTS FOR TREATMENT OR NON-PROHIBITED DISPOSAL: I certify that samples representative of the waste described in this profile were or shall be obtained using state- and EPA-approved sampling methods. I also certify that where necessary those representative samples were or shall be provided to Envirocare and to qualified laboratories for the analytical results reported herein. I further certify that the waste described in this record is not prohibited from land disposal in 40 CFR 268 (unless prior arrangements are made for treatment at Envirocare) and that all applicable treatment standards are clearly indicated on this form. I also certify that the information provided on this form is complete, true and correct and is accurately supported and documented by any laboratory testing as required by Envirocare of Utah, Inc. I certify that the results of any said testing have been submitted to Envirocare of Utah, Inc.

Generator's Signature [signature] Title Dep. Dir., ESRD Date 8/14/96
Co-Operator's Signature [signature] Title Program Mgr Date 8/14/96
PLEASE SEE ATTACHMENT 2.
(Sign for the above certifications).

COPY

3. **ANALYTICAL RESULTS FOR TOXICITY CHARACTERISTIC.** (Please transcribe results on the blank spaces provided. Attach additional sheets if needed. Indicate range or worst-case results).

Metals (circle one): Total (mg/kg) or TCLP (mg/l) [circled]

Lead	ND - 2.3		
Barium	ND - 0.741	Mercury	ND - 0.026
Cadmium	ND - 0.078	Zinc	ND - 25.4
Chromium	ND - 0.549		
Copper	ND - 3.6		

ND - Analyte not detected.

Organics (circle one): Total (mg/kg) or TCLP (mg/l)

None Detected

4. **ANALYTICAL RESULTS FOR REQUIRED PARAMETERS:** (Please transcribe results on the blank spaces provided. Attached additional sheets if needed).

Soil pH 5.5 - 8.5 Paint Filter Liquids Test (Pass/Fail) No Free Liquid Cyanide Released Not detected mg/kg Sulfide Released Not detected mg/kg

5. **IGNITABILITY** (40 CFR 261.21(a)(2).(4).)

Flash Point ≥ NA °F °C Is the waste a RCRA oxidizer? Y (N) [circled]

6. **CHEMICAL COMPOSITION** (List all known chemical components and circle the applicable concentration dimensions. Use attachments to complete, if necessary.)

Chemical Component	Concentration		Chemical Component	Concentration	
See attached data sheets.		% mg/kg			% mg/kg
		% mg/kg			% mg/kg
		% mg/kg			
		% mg/kg			

Halogenated Organic (HOC) Compounds (Sum of the list of HOCs) None Detected mg/kg

7. **TREATMENT STANDARDS. (FOR MIXED WASTE ONLY).** Describe the waste's applicable treatment standards. Include the EPA Hazardous Waste Numbers and information with respect to the waste's subcategory (e.g. low mercury subcategory), treatability group (e.g. non-wastewaters), treatment standards and concentration or technology (e.g. 5.7 mg/l selenium in extract or INCIN (incineration)), and any applicable exemptions, exclusions, variances, extension, allowances, etc. The following format is suggested. If additional space is needed, provide an attachment to this profile record.

EPA HW Number	Subcategory	Treatability Group	Treatment Standard(s) and Concentrations or Technology	Any Exemptions, Variances, Extensions or Exclusions (List 40 CFR reference)
N/A				(Y N)
				(Y N)

E. **REQUIRED CHEMICAL LABORATORY ANALYSIS.** Generator must submit results of analyses of samples of the waste. Results are required from a qualified laboratory for the following analytical parameters unless nonapplicability of the analysis for the waste can be stated and justified in attached statements. Attach all analytical results and QA/QC documentation. (CAUTION: PRIOR TO ARRANGING FOR LABORATORY ANALYSES, CHECK WITH ENVIROCARE AND LABORATORY REGARDING UTAH LABORATORY CERTIFICATIONS.)

FOR ALL WASTE TYPES: CHEMICAL ANALYSIS: Soil pH (9045), Paint Filter Liquids Test (9095); Reactivity (cyanide and sulfide).

1. **MINIMUM ADDITIONAL ANALYTICAL REQUIRED FOR:**

   a. Non-RCRA Waste (Non Mixed Waste, i.e. LLRW, NORM): TCLP including the 32 organics, 8 metals, and copper (Cu) and zinc (Zn).
   b. Mixed Waste: Results to show why the waste is hazardous, and the following analytical results:

      (1) TOX (Total Organic Halides SW-846 9020/9022) or volatile & semi-volatile organics (8240+8270, required if TOX > 200 mg/kg)
      (2) Applicable concentration-based treatment standards
      (3) Total and Amenable Cyanide, SW-846 9010 or 9012, required if reactive cyanide > 20 mg/kg

Generator Initials: [signature]
Co-Operators Initials: [signature]

COPY

C. RADIOLOGICAL EVALUATION.

1. **WASTE STREAM INFORMATION.** For each radioactive isotope associated with the waste, please list the following information. Envirocare's license assumes daughter products to be present in equilibrium, these are not required to be listed below and do not require manifesting. (Use additional copies of this form if necessary).

	Isotopes	Concentration Range (pCi/g)	Weighted Average (pCi/g)		Isotopes	Concentration Range (pCi/g)	Weighted Average (pCi/g)
a.	Th-232	ND to <3.54	1.8	g.		to	
b.	Ra-226	ND to 7.4	3.9	h.		to	
c.	U-238	0.32 to <2973	1490	i.		to	
d.	U-235	ND to <218.8	100	j.		to	
e.	U-234	ND to 3592	1800	k.		to	
f.	Th-230	ND to 320.6	160.3	l.		to	

ND - Analyte not detected.

2. Y (N) Is the radioactivity contained in the waste material Low-Level Radioactive Waste as defined in the Low-Level Radioactive Waste Policy Amendments Act of 1985 or in DOE Order 5820.2A, Chapter III? (Please Circle) If yes, check "LLRW" block on line 3 of page 1.

3. Y (N) LICENS[illegible] [illegible]TERIAL: Is the waste material listed or included on an active Nuclear Re[illegible]ulatory Commission or Agreement State license? (Please circle)

(If Yes) TYPE OF LICENSE: Source ____; Special Nuclear Material ____; By-Product ____; NORM ____; NARM ____;

LICENSING AGENCY: ____________________

D. CHEMICAL AND HAZARDOUS CHARACTERISTICS

1. **DESCRIPTION AND HISTORY OF WASTE** *SEE ATTACHMENT 1*

Please attach a description of the waste to this profile. Include the following as applicable: The process by which the waste was generated. Available process knowledge of the waste. The basis of hazardous waste determinations. A list of the chemicals and materials used in or commingled with the waste: a list of any and all applicable EPA Hazardous Waste Numbers, current or former; and, a list of any and all applicable land-disposal prohibition or hazardous-waste exclusions, extensions, exemptions, effective dates, variances or delistings. Attach the most recent or applicable analytical results of the waste's hazardous-waste characteristics, constituents and applicable hazardous-waste treatment standards. Attach any applicable analytical results involving the composition of the waste. Attach any product information or Material Safety Data Sheets associated with the waste. If a category on this Waste Profile Record does not apply, describe why it does not.

Please describe the history, and include the following:

(Y) N Was this waste mixed, treated, neutralized, solidified, commingled, dried, or otherwise processed upon generation or at any time thereafter?

Y (N) Has this waste been transported or otherwise removed from the location or site where it was originally generated?

Y (N) Was this waste derived from (or is the waste a residue of) the treatment, storage, and/or disposal of hazardous waste defined by 40 CFR 261?

Y (N) Has this material been treated at any time to meet any applicable treatment standard?

2. **LIST ALL KN[illegible] [illegible]ND POSSIBLE CHEMICAL COMPONENTS OR HAZARDOUS WASTE CHARACTERISTICS**

		(Y)	(N)			(Y)	(N)			(Y)	(N)
a.	Listed HW		X	b.	"Derived-From" HW		X	c.	Toxic		X
d.	Cyanides		X	e.	Sulfides		X	f.	Dioxins		X
g.	Pesticides		X	h.	Herbicides		X	i.	PCBs		X
j.	Explosives		X	k.	Pyrophorics		X	l.	Solvents		X
m.	Organics		X	n.	Phenolics		X	o.	Infectious		X
p.	Ignitable		X	q.	Corrosive		X	r.	Reactive		X
s.	Antimony		X	t.	Beryllium		X	u.	Copper	X	
v.	Nickel		X	w.	Thallium		X	x.	Vanadium		X
y.	Alcohols		X	z.	Arsenic	X		aa.	Barium	X	
bb.	Cadmium	X		cc.	Chromium	X		dd.	Lead	X	
ee.	Mercury	X		ff.	Selenium		X	gg.	Silver		X
hh.	Benzene		X	ii.	Nitrate		X	jj.	Nitrite		X
kk.	Fluoride		X	ll.	Oil		X	mm.	Fuel		X
nn.	Chelating Agents		X								

oo. Other Known or Possible Materials or Chemicals *SEE ATTACHMENT 1*

Generator Initials: [illegible]

Co-Operators Initials: [illegible]

CATEGORY 1

REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR:9806090139 DOC.DATE: 98/05/29 NOTARIZED: NO DOCKET #
FACIL:40-8681 International Uranium USA Corp., 04008681
AUTH.NAME AUTHOR AFFILIATION
REHMANN,M.R.
RECIP.NAME RECIPIENT AFFILIATION
HOLONICH,J.J. Office of Nuclear Material Safety & Safeguards

SUBJECT: Submits final, "Record of Decision for Ashland 1 (including Seaway Area D) & Ashland 2 Sites,Tonawanda,NY," as supporting info for NRC review of application to amend license SUA-1358.W/o encl.

DISTRIBUTION CODE: NL05D COPIES RECEIVED:LTR 1 ENCL 0 SIZE: 1
TITLE: Standard Distribution for Uranium Recovery (UR) Documents

NOTES:

	RECIPIENT ID CODE/NAME	COPIES LTTR	COPIES ENCL	RECIPIENT ID CODE/NAME	COPIES LTTR	COPIES ENCL
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INTERNAL:	FILE CENTER 01	1	1	NMSS/DWM/DEPY2	1	0
	NMSS/IMNS/IMOB	1	0	OC/LFMB	1	1
	OGC/REGD/SPFC	1	1	RGN 4	1	1
EXTERNAL:	NRC PDR	1	1			

C A T E G O R Y 1 D O C U M E N T

NOTE TO ALL "RIDS" RECIPIENTS:
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TOTAL NUMBER OF COPIES REQUIRED: LTTR 8 ENCL 8

INTERNATIONAL
URANIUM (USA)
CORPORATION

Independence Plaza, Suite 950 • 1050 Seventeenth Street • Denver, CO 80265 • 303 628 7798 (main) • 303 389 4125 (fax)

May 29, 1998

40-8681

Mr. Joseph J. Holonich, Chief
U.S. Nuclear Regulatory Commission
Uranium Recovery Branch
Office of Nuclear Materials
Safety and Safeguards
Mail Stop T7J9
Two White Flint North
11545 Rockville Pike
Rockville, MD 20852-2738

Dear Mr. Holonich:

This letter transmits the final Record of Decision for Ashland 1 (including Seaway Area D) and Ashland 2 Sites, Tonawanda, New York (U.S. Army Corps of Engineers, April 1998) ("the ROD for the Ashland sites") to the NRC as supporting information for the NRC review of our application to amend source material license no. SUA-1358, to allow International Uranium (USA) Corporation to accept and process the Ashland 2 material as an alternate feed at the White Mesa Uranium Mill. In particular, the ROD for the Ashland sites details the scope of the environmental investigations conducted in support of the remedial action ("RA") as well as summaries of baseline human health and ecological risk assessments conducted in support of the RA. I can be reached at 303.389.4131.

Sincerely yours,

Michelle R. Rehmann
Environmental Manager

MRR/tay
Enclosures (1)

1/0
NL05

cc James Park with enclosure
William N. Deal
David C. Frydenlund
Earl E. Hoellen
Harold R. Roberts

9806090139 980529
PDR ADOCK 04008681
C PDR

CATEGORY 1

REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR:9806260176 DOC.DATE: 98/04/30 NOTARIZED: NO DOCKET #
FACIL:40-8681 International Uranium USA Corp., 04008681

AUTH.NAME	AUTHOR AFFILIATION
*	Army, Dept. of, Corps of Engineers
RECIP.NAME	RECIPIENT AFFILIATION

SUBJECT: Final "Record of Decision for Ashland 1 (Including Seaway Area D) & Ashland 2 Sites,Tonawanda,NY."

DISTRIBUTION CODE: NL05D COPIES RECEIVED:LTR 1 ENCL 1 SIZE: 253
TITLE: Standard Distribution for Uranium Recovery (UR) Documents

NOTES:

	RECIPIENT ID CODE/NAME	COPIES LTTR	COPIES ENCL	RECIPIENT ID CODE/NAME	COPIES LTTR	COPIES ENCL
	PARK,J	1	1			
INTERNAL:	FILE CENTER 01	1	1	NMSS/DWM/DEPY2	1	0
	NMSS/IMNS/IMOB	1	0	OC/LFMB	1	1
	OGC/REGD/SPFC	1	1	RGN 4	1	1
EXTERNAL:	NRC PDR	1	1			

CATEGORY 1 DOCUMENT

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TOTAL NUMBER OF COPIES REQUIRED: LTTR 8 ENCL 6

40-8681

US Army Corps
of Engineers®
Buffalo District

FUSRAP

FINAL

RECORD OF DECISION FOR THE ASHLAND 1 (INCLUDING SEAWAY AREA D) AND ASHLAND 2 SITES

TONAWANDA, NEW YORK

April 1998

9806260176 980430
PDR ADOCK 04008681
B PDR

US Army Corps
of Engineers®
Buffalo District

FUSRAP

FINAL

RECORD OF DECISION FOR THE ASHLAND 1 (INCLUDING SEAWAY AREA D) AND ASHLAND 2 SITES

TONAWANDA, NEW YORK

April 1998

I.

DECLARATION FOR THE RECORD OF DECISION

DECLARATION FOR THE RECORD OF DECISION

SITE NAME AND LOCATION

Ashland 1 (including Seaway Area D) and Ashland 2 Sites
Town of Tonawanda, New York

Within this Record of Decision (ROD), any reference to Ashland 1 with respect to cleanup includes the material located at Area D of the Seaway property and any reference to the Ashland sites or the Ashland properties means Ashland 1 (including Seaway Area D) and Ashland 2.

STATEMENT OF BASIS AND PURPOSE

This decision document presents the selected remedial action for the Ashland sites in the Town of Tonawanda, New York. This remedial action was chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended, and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP).

ASSESSMENT OF THE SITE

Actual or threatened releases of hazardous substances from this site, if not addressed by implementing the response action selected in this ROD, may present an endangerment to public health, welfare, or the environment in the future.

DESCRIPTION OF THE SELECTED REMEDY

Background on Remedy Selection

From 1942 to 1946, portions of the property formerly owned by Linde Air Products Corp., a subsidiary of Union Carbide Industrial Gas (Linde), now owned by Praxair, Inc., in the Town of Tonawanda, New York were used for the separation of uranium ores. The separation processing activities, conducted under a Manhattan Engineer District (MED) contract, resulted in elevated radionuclide levels in portions of the Linde property. Subsequent disposal and relocation of the processing wastes from the Linde property resulted in elevated levels of radionuclides at three nearby properties in the Town of Tonawanda: the Ashland 1 property; the Seaway property; and the Ashland 2 property. Together, these three (3) properties, with Linde, have been referred to as the Tonawanda Site.

Under its authority to conduct the Formerly Utilized Sites Remedial Action Program (FUSRAP), the U.S. Department of Energy (DOE) conducted a Remedial Investigation (RI), Baseline Risk Assessment (BRA), and Feasibility Study (FS) of the Tonawanda Site. In November 1993, DOE issued a Proposed Plan (PP) for cleanup of the Tonawanda Site.

Numerous concerns and comments were raised by the community and their representatives regarding the preferred alternative identified in the November 1993 PP and the proposed onsite disposal of remedial action waste.

DOE listened to these concerns, and derived a site-specific cleanup guideline for the site based on values important to the community and in compliance with CERCLA, as amended, and the NCP. In September 1997, DOE prepared a revised PP for the Ashland sites. On October 13, 1997, the Energy and Water Development Appropriations Act was signed into law, transferring responsibility for the administration and execution of FUSRAP from DOE to the United States Army Corps of Engineers (USACE). As a result of this transfer, the revised PP was not issued by DOE.

On November 10, 1997, after reviewing the history of the Ashland sites and potential remedial alternatives, USACE issued the revised PP developed by DOE for cleanup of the Ashland sites.

Remedies for Seaway Areas A, B and C, Linde and Linde vicinity properties will be addressed separately.

Selected Remedy

The remedy selected for the Ashland sites is referred to as Alternative 2A in the PP issued on November 10, 1997. Soils exceeding the site-specific derived guideline of 40 picocuries/gram (pCi/g) Thorium (Th)-230 (DOE 1997) will be excavated and shipped offsite for disposal at an appropriately licensed or permitted facility and the site restored with backfill, loam, and seed.

STATUTORY DETERMINATIONS

The selected remedy is protective of human health and the environment, complies with Federal and State requirements that are legally applicable or relevant and appropriate to hazardous substances which are the subject of this response action, and is cost-effective.

None of the practicable remedial alternatives identified for the Ashland sites provides onsite treatment for the materials to be removed. Several alternatives provide for some degree of offsite disposal, including containment at the final disposal location and any treatment, which may be required to meet the standards of the offsite facility. These alternatives thus would achieve reduction in mobility, although no treatment is planned which will reduce the toxicity or volume of the disposed materials. The remaining alternatives would provide either no removal of materials, or onsite disposal, which would also limit mobility through design of the disposal facility. The FS evaluated currently available treatment technologies for treatment during the removal and found none that would be economically and technologically feasible at this time. Thus, the selected alternative achieves the best possible result in terms of satisfying the statutory preference for remedies that employ treatment that reduces toxicity, mobility, or volume as a principal element.

This remedy will result in radioactive material remaining on-site which is below the cleanup level established in this ROD. Since material will remain on-site, a review will be conducted not later than five (5) years after the initiation of the remedial action to assure that human health and the environment are being protected by the remedial action, in accordance with CERCLA Section 121(c).

Dr. John H. Zirschky
Acting Assistant Secretary of the Army (Civil Works)
108 Army Pentagon
Washington, DC 20310-0108

4/20/98
Date

RECORD OF DECISION
FOR THE
ASHLAND 1 (INCLUDING SEAWAY AREA D)
AND ASHLAND 2 SITES

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ACRONYMS AND ABBREVIATIONS

AEC	Atomic Energy Commission
ALARA	as low as reasonably achievable
ANL	Argonne National Laboratory
ARAR	applicable or relevant and appropriate requirement
BFI	Browning Ferris Industries
BNAE	base/neutral and acid extractable
BNI	Bechtel National, Inc.
BRA	Baseline Risk Assessment
CANiT	Coalition Against Nuclear Materials in Tonawanda
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
cm	centimeter
COC	contaminant of concern
cy	cubic yard(s)
DOE	Department of Energy
EIS	Environmental Impact Statement
EO	Executive Order
EQ	environmental quotient
F.A.C.T.S.	For A Clean Tonawanda Site
FBDU	Ford Bacon Davis Utah, Inc.
ft	foot/feet
FS	Feasibility Study
FUSRAP	Formerly Utilized Sites Remedial Action Program
FY	fiscal year
g	gram
HI	hazard index
HQ	hazard quotient
HTRW	hazardous, toxic, and radioactive waste
ICRP	International Commission on Radiological Protection and Measurements
IJC	International Joint Commission
in	inch
K	potassium
LLRWPA	Low Level Radioactive Waste Policy Act
LWV	League of Women Voters
MCL	maximum concentration level
MED	Manhattan Engineering District
mg	milligram
mrem	millirem
NCP	National Contingency Plan
NEPA	National Environmental Policy Act
NORM	naturally occurring radioactive material

Acronym List (continued)

NPL	National Priorities List
NRC	Nuclear Regulatory Commission
NYSDEC	New York State Department of Environmental Conservation
OEW	ordnance explosive waste
O&M	operations and maintenance
ORAU	Oak Ridge Associated Universities
OSHA	Occupational Safety and Health Administration
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenol
pCi	picocuries
P.L.	Public Law
PP	Proposed Plan
ppm	parts per million
PRG	preliminary remedial goals
PRP	Potentially Responsible Party
QA/QC	quality assurance/quality control
Ra	radium
RfC	reference concentration
RfD	reference dose
RI	Remedial Investigation
RME	reasonable maximum exposure
Rn	radon
ROD	Record of Decision
s	second
SARA	Superfund Amendments Reauthorization Act
SDMP	Sites Decommissioning Management Plan
SFMP	Surplus Facilities Management Program
SF	slope factor
SVOC	semi-volatile organic compound
TAGM	Technical Administrative Guidance Memorandum
TBC	to be considered
TEDE	total effective dose equivalent
Th	thorium
TMA/E	Thermo Analytical/Eberline
U	uranium
UCL	upper concentration limit
UMTRCA	Uranium Mill Tailings Radiation Control Act
U.S.	United States
U.S.C.	United States Code
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
VOC	volatile organic compound
yr	year(s)

II.

DECISION SUMMARY

1. SITE NAME, LOCATION, AND DESCRIPTION

Ashland 1 (including Seaway Area D) and Ashland 2 Sites
Town of Tonawanda, New York

Within this Record of Decision (ROD), any reference to Ashland 1 with respect to cleanup includes the material located at Area D of the Seaway property and any reference to the Ashland sites or the Ashland properties means Ashland 1 (including Seaway Area D) and Ashland 2.

From 1942 to 1946, portions of the property formerly owned by Linde Air Products Corp., a subsidiary of Union Carbide Industrial Gas (Linde), now owned by Praxair, Inc., in the Town of Tonawanda, New York, were used separation of uranium ores. These processing activities, conducted under a Manhattan Engineer District (MED) contract, resulted in radioactive contamination of portions of the property and buildings. Subsequent disposal and relocation of processing wastes from the Linde property resulted in radioactive contamination of three nearby properties in the Town of Tonawanda: the Ashland 1 property, the Seaway property, and the Ashland 2 property. Together these three properties, with Linde, have been referred to as the Tonawanda Site (Figures 1-1 and 1-2).

Section 2 of this ROD provides additional details of the ownership and history of the Ashland sites.

1.1 Geology

The Ashland sites are located within the Erie-Ontario Lowland Physiographic Unit of New York (BNI 1993). The Erie-Ontario Lowland has significant relief characterized by two major escarpments, the Niagara and the Onondaga. The elevation of the ground surface is approximately 590 feet (ft) above mean sea level at the Ashland sites (BNI 1987). The Ashland sites are located east of the Niagara River, which is less than 500 ft from the Ashland sites.

The bedrock underlying the Ashland sites belongs to the upper Salina Group and consists of shale, dolomites with layers of gypsum, and occasionally halite of the Akron, Bertie, Camillus, Syracuse, and Vernon Formations. Locally, the carbonate portions of these formations are a massive, fine-grained limey shale with solution channeling through vertical joints and horizontal bedding planes. Massive gypsum layers, up to 5 ft thick, are interbedded within the shales and dolomites.

The Ashland sites are within the Central Stable Region, which is considered tectonically stable. The U.S. Geological Survey classifies western New York as a Zone 3 earthquake risk region (BNI 1987). Earthquakes within this region have been of moderate intensity (Modified Mercalli VI or VII) or less (BNI 1987).

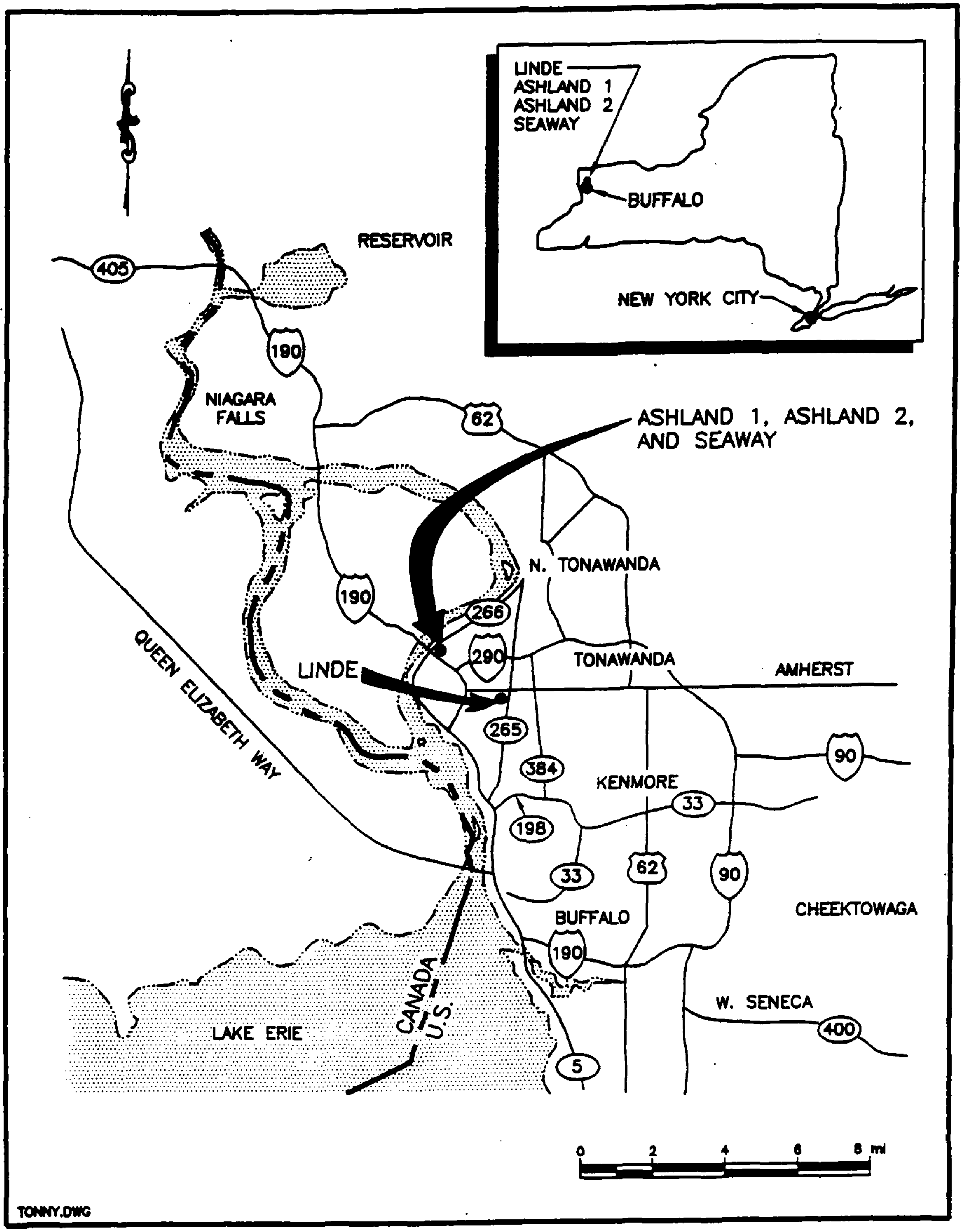
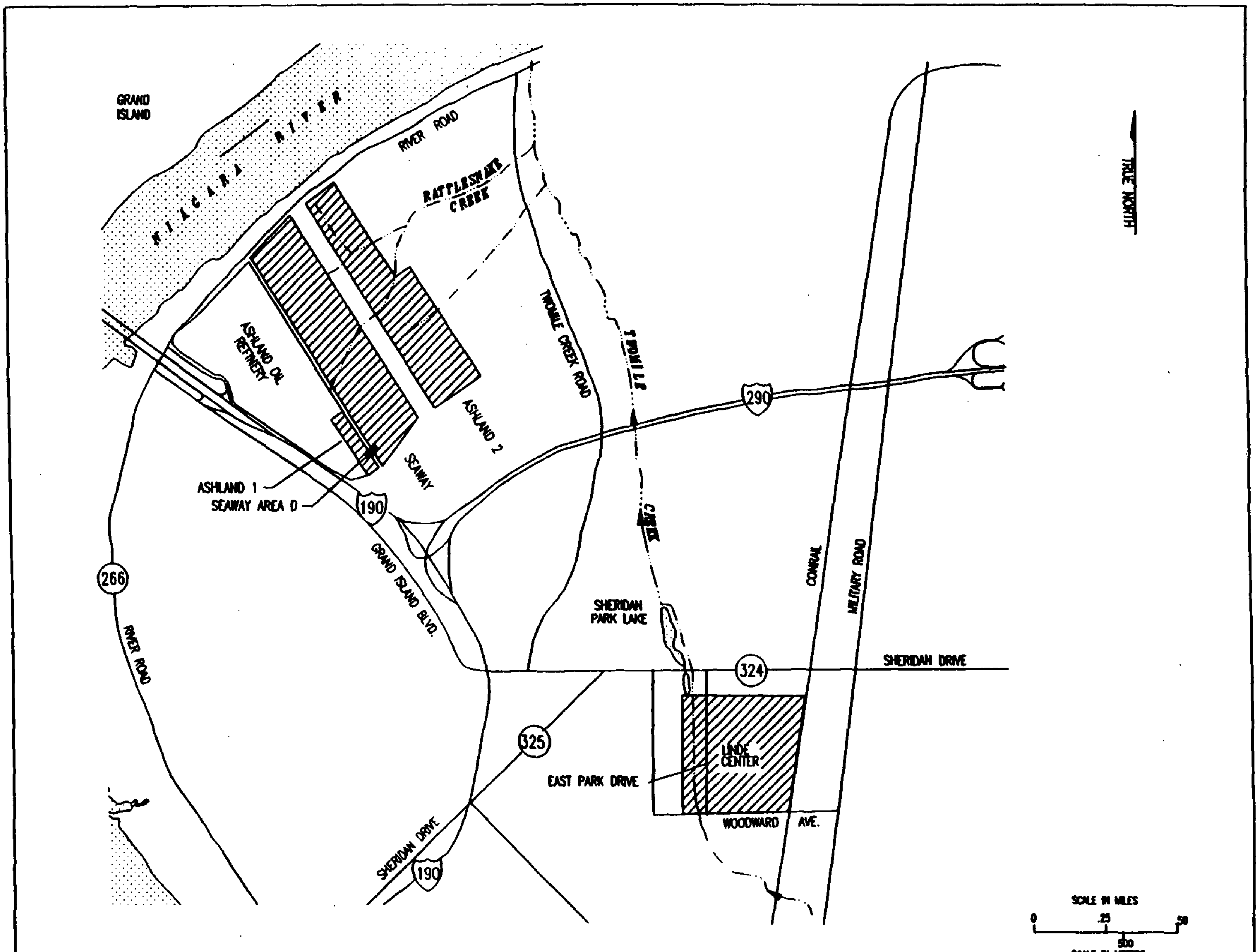


Figure 1-1. Location of the Town of Tonawanda, New York and the Ashland Sites



SOURCE: BNI DRAWING 129F023.DGN

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FIGURE 1-2 LOCATIONS OF ASHLAND 1 (INCLUDING SEAWAY AREA D), ASHLAND 2, LINDE CENTER AND SEAWAY INDUSTRIAL PARK

The advancing and retreating glaciers deposited till, a nonsorted, unstratified mixture ranging in size from clay to boulders, and coarse-grained sandy outwash/ice-contact deposits.

Relatively thick layers of silt and clay were deposited in the glacial lakes. The total thickness of glacial deposits in the Tonawanda area ranges from 55 to 95 ft (BNI 1993).

1.2 Surface Water

Surface water from the Ashland sites drains via Rattlesnake Creek and Twomile Creek to the Niagara River. The 37-mile long river connects Lake Erie to Lake Ontario and is divided into its upper and lower reaches by Niagara Falls. At Strawberry and Grand Islands, the river divides into two channels, the Chippawa Channel and the Tonawanda Channel, located west and east of Grand Island, respectively. The Ashland 1 and 2 and the Seaway properties are located along the upper reach of the river, adjacent to the Tonawanda Channel. The Tonawanda Channel is approximately 1,600 ft wide and 25 ft deep as it passes by the Town of Tonawanda. Runoff from the Linde property flows to Twomile Creek and does not impact the Ashland sites.

Drainage from Ashland 1 travels under the Seaway property through an underground concrete conduit and exits at the Niagara Mohawk property line (See Figure 1-3). Rattlesnake Creek receives this drainage, crosses the Niagara Mohawk property, and then crosses the Ashland 2 property. The creek is approximately 10 ft wide and 3 ft deep at bank-full capacity, and has a 1% slope on the Ashland 2 property. The creek and the adjacent low-lying areas are vegetated with a thick growth of cattails and rushes, which limit flow velocities. The low-lying area is approximately 100 ft wide on Ashland 2. Three small drainage ditches join Rattlesnake Creek after it crosses Ashland 2. The creek then travels approximately 3,200 ft before its confluence with Twomile Creek (BNI 1993).

The Ashland 1 topography is flat except where berms were created to surround storage tanks previously located on the property. The portion of the Ashland 1 property southeast of the bermed area is flat and covered with grass except for the dirt access road and electrical substation area. Drainage from this area is directed toward the ditch running along the east boundary, between Ashland 1 and Seaway. An approximately 3-acre area is enclosed by the berms that surrounded the storage tanks formerly located on the site. The berms are approximately 7 ft high at their highest point. Water from precipitation collects within the bermed area and infiltrates into the soil, evaporates, or flows to the east drainage ditch through small pipes that extend through the berm and under the access road to the ditch.

The Seaway property consists of a long, narrow, rectangular landfill pile with side slopes of approximately 30% (BNI 1993). The ridge of the pile is at the center of the property, resulting in half the surface runoff flowing southwest toward the Ashland 1 property and half flowing northeast onto Ashland 2.

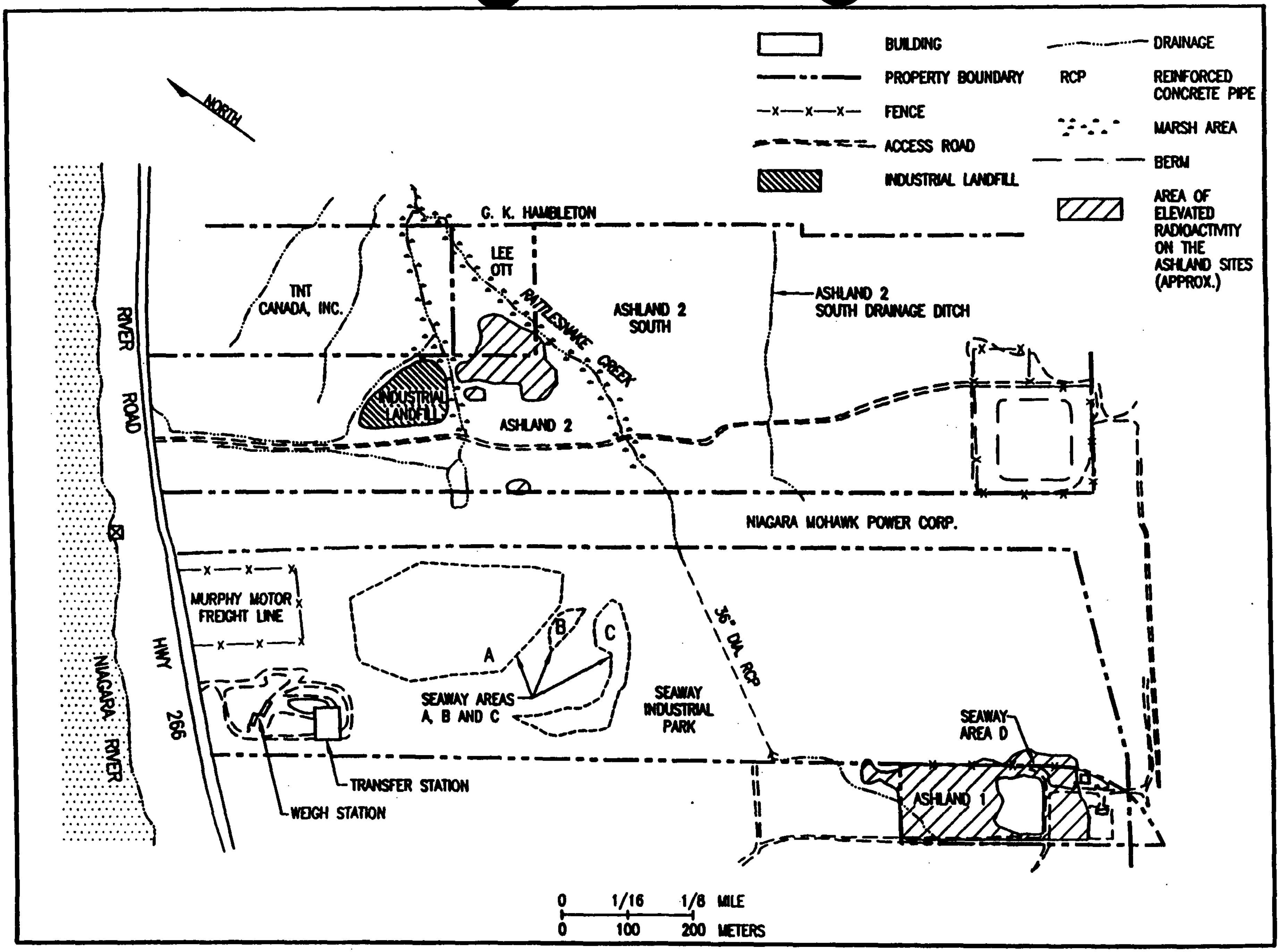

FIGURE 1-3
LOCATION DETAILS - ASHLAND 1, ASHLAND 2 AND SEAWAY PROPERTIES

Storm runoff leaves the Ashland 2 property by five drainage channels. The southeastern portion of the property drains to a small 3-ft wide ditch running northeast toward Twomile Creek. The ditch carries surface drainage from nearly 40% of the total property area (BNI 1993). It travels under Twomile Creek Road through a 30-inch (in) culvert and empties into Twomile Creek approximately 20 ft below the Fletcher Street bridge over Twomile Creek (BNI 1993).

Rattlesnake Creek is the main channel that drains Ashland 2. Approximately 60% of the property's overland runoff empties into Rattlesnake Creek (BNI 1993). The Ashland 1 drainage, which is carried under Seaway and exits Seaway at the Niagara Mohawk property, makes up part of the Rattlesnake Creek flow. A second channel, which drains the western portion of the property, joins Rattlesnake Creek just across the adjacent TNT Canada, Inc. property line. Runoff from Seaway is collected in this channel. Two other ditches draining the northern and southern sides of the property's access road flow into this ditch before it empties into Rattlesnake Creek.

1.3 Groundwater

As described in the Remedial Investigation (RI) (BNI 1993), the geologic column at the Ashland sites includes four major stratigraphic units. The uppermost layer is till (sandy and gravelly clay), which is 20 to 40 ft deep with a veneer of fill material, 1 to 4 ft thick, except under waste piles. Below the till layer is about 25 to 65 ft of varved lacustrine clay and glaciolacustrine clay. The bedrock is about 200 ft thick and consists of shales of the Salina Group.

Ground surface infiltration varies in the different areas of the Ashland sites. The infiltration rate is 0.9 in/ yr at Ashland 1 and Ashland 2, and 7.3 in/yr at Seaway. Because of the low permeability [1×10^{-6} centimeters/second (cm/s)] of the glacial till and clays, very little infiltrating water percolates to the shallow groundwater; therefore, little contaminant transport is possible.

Most of the infiltrating water moves horizontally through the relatively higher conductivity top layer (1×10^{-3} cm/s) forming the perched groundwater system. This perched flow is the major subsurface transport mechanism. The perched water system is recharged locally and discharges into drainage ditches and creeks. For Seaway, the average velocity of perched water flow is estimated to be about 1,049 ft/yr. At Ashland 1 and Ashland 2, the flow velocities are estimated to be 26 ft/yr and 131 ft/yr, respectively.

A semi-confined shallow system occurs principally in sand lenses under the Ashland sites. This shallow system is considered to be semi-confined because it is surrounded by silty-clay material that has lower hydraulic conductivity (less than 10^{-7} cm/s). The sand lenses are approximately 16 to 40 ft below the ground surface. There is enough recharge (deep percolation) into the system from precipitation to cause a response; the response, however, is rather damped. A conservative estimate of recharge is 0.024 ft/yr with an average linear velocity of 0.3 ft/yr. Depth to the shallow system water table ranges from 0 ft (near wetlands) to 20 ft at the Ashland sites.

The shallow groundwater system likely discharges to Rattlesnake Creek downstream of the Ashland sites, the flow being primarily through a series of hydraulically interconnected sand lenses. Contaminant leachates are not likely to reach the shallow groundwater; therefore, this is not likely to be a migration pathway (BNI 1993).

1.4 Land Use

The Ashland sites are located in the Town of Tonawanda. The Town of Tonawanda is bound by the City of Tonawanda to the north, Amherst to the east, Buffalo to the south, and the Niagara River to the west.

The Ashland sites are located in an industrial setting. Old refineries, a truck terminal, and other heavy industries are located in the area. Ashland 1 is located behind a vacant refinery now being utilized as a petroleum distribution center. This property is highly visible from Interstate 190. The Seaway property is a landfill that received refuse until September 1993. It was closed under the New York State Department of Environmental Conservation (NYSDEC) regulations in 1995 and is currently in post closure status including monitoring and operation of a landfill gas flare system installed as part of the closure plan (Erk 1998). The property is a large mound covered in grass, and is highly visible from Interstate 190. The Ashland 2 property is vacant and contains small trees and brush. Although not maintained, the property is not visually obtrusive.

The Town of Tonawanda has adopted a zoning ordinance that regulates land uses. The ordinance provides three residential zoning districts, two commercial districts, and an industrial district. The Town of Tonawanda also has two other districts designated as performance standards and waterfront. The Ashland 1, Ashland 2 and Seaway properties are located in an area zoned as a Waterfront Industrial District.

The Ashland sites are located in the industrial area of the Town of Tonawanda. The border along the City of Tonawanda is approximately one-half mile from these properties. This border marks the only residential area near these properties that is accessible by River Road. In an area west of River Road, fronting the Niagara River, are Isle View Park, vacant land, industrial pipeheads, a wharf, and the Riverwalk bikeway trail. The Riverwalk is a hike-and-bike path along the Niagara River that will eventually link downtown Buffalo with the Barge Canal in the City of Tonawanda. Several major sections have been completed, including the stretch in the Town of Tonawanda. East of River Road are the Ashland sites, vacant land, tank farms, a landfill, and truck terminals. Isle View Park includes a boat ramp, picnic tables, and fishing areas.

The waterfront area of the Town of Tonawanda is being considered for major redevelopment. Development plans are being discussed for the area around Ashland 1, Seaway, and Ashland 2. A major component of these development plans is the relocation of River Road. A portion of the road would be located east of its present location and would run through the front portions of the Seaway and Ashland 2 properties.

A *Waterfront Region Master Plan* (Master Plan) addresses revitalization of the Town of Tonawanda waterfront area. The Master Plan defines a planning region, sets goals and objectives, outlines a plan for future development, and recommends strategies for plan implementation in phases. Several issues are identified for resolution in meeting desired goals and objectives, including "remediation of inactive hazardous waste sites and reuse of the land for recreational and economic development uses which improve the quality of life" (Ernst and Young 1992). The Master Plan information was utilized in evaluating remedial alternatives for the Ashland sites, and the selected alternative will allow development consistent with the Master Plan.

2. SITE HISTORY

2.1 History of the Linde Property

From 1942 to 1946, Linde Center was contracted by MED to separate uranium from pitchblende uranium ore and domestic ore concentrates. These processing activities resulted in elevated levels of radionuclides in portions of the property and buildings. Subsequent disposal and relocation of processing wastes from Linde resulted in elevated levels of radionuclides at three nearby properties in the Town of Tonawanda: the Ashland 1 property, the Seaway property, and the Ashland 2 property.

The history of the Ashland 1, Seaway, and Ashland 2 properties is summarized below. (Refer to Figure 1-3 for locations.)

2.2 History of the Ashland 1, Seaway, and Ashland 2 Properties

In 1943, when commercial operations began at the Linde property, efforts were also underway to identify a disposal site for waste residues produced during uranium processing at the Linde property. In 1943, MED leased a 10-acre tract known as the Haist property, now called Ashland 1, to serve as a disposal site for the uranium ore processing residues. In 1944, MED purchased the Haist property. Residues were deposited at Ashland 1 from 1944 to 1946 and consisted primarily of low-grade uranium ore tailings. Records indicate that approximately 8,000 tons of residues were spread over roughly two-thirds of the property. In 1960, after environmental testing indicated the site met standards at the time for release, the property was transferred to the Ashland Oil Company, a Division of Ashland Petroleum, Inc. (Ashland Oil Company), and has been used as part of this company's oil refinery activities since that time.

In 1974, Ashland Oil Company constructed a bermed area for two petroleum product storage tanks and a drainage ditch on the Ashland 1 property. The majority of the soil removed during construction of the bermed area and drainage ditch was transported by Ashland Oil Company to Seaway and Ashland 2 for disposal. The storage tanks were removed by Ashland Oil Company in 1989.

A portion of the Ashland 2 property was used by Ashland Oil Company as a landfill for disposal of general plant refuse and industrial and chemical by-products. From 1974 to 1982, Ashland Oil Company transported an unknown quantity of soil mixed with radioactive residues from Ashland 1 to an area east of the Ashland 2 industrial landfill. The industrial landfill portion of Ashland 2 was closed and covered with clayey soil in 1982 by Ashland Oil Company. Currently, the Ashland 2 property is vacant and is covered by grass, bushes, and weeds; no commercial operations are currently being conducted.

The Seaway Industrial Park is owned by the Sands Mobile Park Corporation and was operated by Browning Ferris Industries (BFI) as a landfill. Seaway Industrial Park has been used as a landfill for the past 50 to 60 years. Refuse was received at the landfill until 1993 and the landfill was closed in 1995. The residues excavated by Ashland Oil Company from Ashland 1 during storage tank construction activities were deposited on four areas at Seaway. These four areas are identified as areas A, B, C and D on the Seaway property in Figure 1-3. Portions of the residues were later buried under refuse and fill material.

As described in more detail in the RI for the Tonawanda Site (BNI 1993), uranium (U)-238, radium (Ra)-226, and thorium (Th)-230 were selected as the indicator radionuclides for radiological contamination present in the uranium ore processing wastes that originated at Linde while uranium ore processing was conducted under a MED contract.

These indicator radionuclides, along with historical records and information on the inorganic constituents (e.g., copper, lead, vanadium), also present in the MED wastes, were used to track the MED-related wastes from Linde to Ashland 1, Ashland 2 and Seaway. The results of investigations of these properties confirmed the presence of MED-related contamination on portions of the Ashland sites.

The investigations and observations also show the presence of wastes on these properties that are not MED-related, including wastes and oils from refinery operations, industrial dumping and landfilling. These properties have not been characterized for the presence of hazardous substances in other areas which are the responsibility of other parties. The plan proposed for remediation of the Ashland sites addresses cleanup of the radioactive hazardous substances present on these properties as a result of MED-related activities at Ashland 1 as well as non-radiological hazardous substances that may be comingled with radiologically contaminated material.

As described in Sections 5 and 6 of this ROD, no organic substances were found to be associated with MED-related waste, and the inorganics that may be associated with the MED wastes were not found at levels that present risks. Remediation, if required, of hazardous substances that may be present on these properties that are not MED-related are not the subject of response actions under the Formerly Utilized Sites Remedial Action Program (FUSRAP) by the United States Army Corps of Engineers (USACE) and are not included in the plan for remediation of the Ashland sites.

3. HIGHLIGHTS OF COMMUNITY PARTICIPATION

Public input was encouraged to ensure that the remedy selected for the Ashland sites meets the needs of the local community in addition to being an effective solution to the problem. The administrative record file contains all of the documentation used to support the preferred alternative and is available at the following locations:

U.S. Army Corps of Engineers
Public Information Center
1776 Niagara Street
Buffalo, NY 14207-3199

Tonawanda Public Library
333 Main Street
Tonawanda, NY 14150

In addition, information repositories are set up at the following locations:

Kenmore Public Library
160 Delaware Avenue
Kenmore, NY 14217

Parkside Village Public Library
169 Sheridan-Parkside Drive
Town of Tonawanda, NY 13072

Grand Island Memorial Public Library
1715 Bedell Road
Grand Island, NY 14072

News media announcements and letters were also mailed out announcing the availability of draft documents to parties who had expressed an interest in the remediation of the Ashland sites.

The revised Proposed Plan (PP) for the Ashland sites was issued on November 10, 1997 (USACE 1997) and USACE granted a 30-day extension to the comment period. An additional 11 days was added to this extension after several members of the public requested additional time for preparing their comments. With the extension, the comment period totaled 71 days. Other extensions were considered; however, USACE determined that additional extensions were not appropriate.

A public meeting was held on December 17, 1997 to provide information about the remedial alternatives and the opportunity to submit comments on the revised PP. Responses to public comments on the revised PP are presented in the Responsiveness Summary, which is provided as an appendix to this document. The Responsiveness Summary, combined with the Feasibility Study (FS) (DOE 1993b) and revised PP, will constitute the final FS and PP for the Ashland sites.

4. SCOPE OF REMEDIAL ACTION

In the preparation of the FS, sitewide remedial action objectives were established for the four properties that comprised the Tonawanda Site. Preliminary remediation goals were adopted for cleanup of radiologically and chemically contaminated media. General response actions for contaminated media were identified and preliminary alternatives addressing cleanup of remedial units were described, with estimated quantities of contaminated media. These descriptions, which formed the basis for the subsequent more detailed evaluation of alternatives, are summarized in Sections 4.1 through 4.4.

In 1997, a site-specific cleanup guideline for radiological contamination at the Ashland sites was developed. This cleanup guideline is described in Section 4.5.

4.1 Remedial Action Objectives Adopted in the FS

4.1.1 Soils and Sediments

For contaminated soils on the Ashland sites, the FS identifies potential routes and scenarios for human exposure to soil contaminants and quantifies the remedial objective for soils in terms of excess cancer risk and a non-carcinogenic hazard index. Under the National Contingency Plan (NCP), which establishes U.S. Environmental Protection Agency (USEPA) regulations for compliance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), acceptable exposure levels for known or suspected carcinogens are those that represent an excess lifetime cancer risk to an individual of between a few in 10,000 to 1 in 1,000,000 (10^{-4} to 10^{-6}). The FS adopts this objective for remediation of contaminated soils at the Ashland sites.

Potential adverse health effects other than cancer are evaluated as the ratio of the daily intake of a contaminant over the reference dose (RfD) or reference concentration (RfC) for inhalation exposure. USEPA has established RfDs and RfCs for noncarcinogenic contaminants. The ratio of the daily intake to the RfD or RfC is referred to as the hazard quotient (HQ) for individual contaminants. The summation of the HQs for exposures to individual contaminants that may be present at a site is referred to as the hazard index (HI). When the HI exceeds unity (1.0), there may be a concern for adverse health effects. The FS adopts the objective of limiting the HI to 1.0 or less for human exposure to noncarcinogenic contaminants that may be present in soils at the Ashland sites.

For contaminated soils, objectives are also identified that would prevent the transport of contaminants to surface water or surface water sediments in concentrations representing unacceptable environmental risks. For contaminated sediments, remediation objectives are adopted to protect environmental receptors.

The remedial objectives are also referenced to compliance with applicable or relevant and appropriate requirements (ARARs). The principal ARARs for the proposed cleanup of the Ashland properties are described in Section 10 of this ROD.

The principal preliminary remedial goal (PRG) identified in the FS for radiologically contaminated soils and sediments at the Ashland sites are the Department of Energy (DOE) generic guidelines for residual radionuclide contamination (DOE 5400.5) at FUSRAP and Surplus Facilities Management Program (SFMP) sites. These guidelines limit residual concentrations of Ra-226, Ra-228, Th-230 and Th-232 to:

- 5 picocuries/gram (pCi/g), averaged over the first 15 centimeters (cm) of soil below the surface; and
- 15 pCi/g, averaged over 15 cm thick layers of soil more than 15 cm below the surface.

These guidelines take into account ingrowth of Ra-226 from Th-230 and Ra-228 from Th-232, and assume secular equilibrium. If either the combination of Th-230 and Ra-226 or Th-232 and Ra-228 are present, not in secular equilibrium, the appropriate guideline is applied as a limit to the radionuclide with the higher concentration. If other mixtures of radionuclides occur, the concentrations of individual radionuclides are reduced so that (1) the dose for the mixtures will not exceed the basic dose limit; or (2) the sum of the ratios of the soil concentration of each radionuclide to the allowable limit for that radionuclide will not exceed unity (1) (Gilbert et al 1989).

A cleanup guideline for total uranium of 60 pCi/g is also cited in the FS as a remediation goal for the Tonawanda Site. Because uranium ores processed at Linde contained natural uranium, a guideline for U-238 can be calculated based on the percentage of the radioactivity U-238 contributes to the activity of natural uranium (i.e., 47.3 percent) and on the guideline value for uranium (60 pCi/g). For example, a soil sample is considered "contaminated" with uranium or "exceeding the uranium guideline" if the uranium-238 concentration is 28.4 pCi/g or greater [i.e., 47.3 percent of the uranium guideline for Tonawanda soil (60 pCi/g)] above background (BNI 1993).

Subsequently, a site-specific radionuclide cleanup guideline was derived specifically for the Ashland sites (DOE 1997) pursuant to CERCLA, as amended, and the NCP. This guideline involves excavating soils exceeding 40 pCi/g of Th-230 and supersedes the previously defined guidelines. Applying this site-specific guideline to cleanup of the Ashland sites meets the allowable radiological dose limits for current and future use of the property. Additional details of the site-specific guideline are provided in Section 4.5.

4.1.2 Groundwater

Groundwater flow conditions at the Ashland sites are summarized in Section 1.3 of this ROD. As described in Section 1.3, hydrogeologic conditions at the Ashland sites are characterized as consisting of a perched groundwater system and a shallow, semi-confined groundwater system, overlying the deep aquifer. Based on these conditions, the RI and FS conclude that contaminants are not expected to migrate vertically through the low permeability formations characteristic of the subsurface at the Ashland sites.

Groundwater monitoring results confirm this conclusion and indicate that radioactive contaminants from the contaminated areas on the Ashland sites are not migrating to the deep or shallow groundwater systems. Slightly elevated concentrations of contaminants were detected in one monitoring well located in the perched system, but concentrations were below drinking water standards. Also noted in the RI and FS are findings concerning the background quality of the groundwater, which characteristically shows high levels of total dissolved solids, sulfates and chlorides and is considered nonpotable without extensive, costly treatment (BNI 1993).

Based on conclusions that contaminants are not expected to migrate vertically, as confirmed by sampling and the nonpotable nature of backgroundwater groundwater quality, the FS concluded that no groundwater remediation is required.

4.1.3 Surface Water

Impacted surface water will be remediated through the elimination of the sources of contamination (the contaminated site soils and sediments).

4.2 Summary of General Response Actions Identified in the FS

General response actions developed in the FS to satisfy the remedial action objectives for soils and sediments are as follows:

Soils and Sediments

1.	No Action	2.	Removal
3.	Institutional Controls	4.	Treatment
5.	Containment	6.	Disposal

4.3 Remedial Units Adopted in the FS for the Tonawanda Site

Remedial units were defined in the FS to allow flexibility in addressing remediation activities. Remediation activities were divided into specific elements, and alternatives were developed for each element. Four remedial units were identified at the Tonawanda Site; three for the soils and sediment, one for buildings and structures:

- accessible soils (on all properties);
- "access-restricted" soils (on Linde and Seaway properties);

- contaminated sediments (on all properties); and
- buildings/structures (on the Linde property).

For the Ashland sites, the remedial units identified were limited to soils and sediments since all soils are accessible and there are no buildings or structures at the Ashland sites.

As described in Section 4.1.2, remediation of groundwater is not required. Potential contamination of surface water would be addressed through actions taken to remove the sources of contamination, the contaminated soils and sediments. NYSDEC concurs that remediation is not necessary for groundwater and surface water at any of the Ashland sites (NYSDEC 1998).

4.4 Identification of Preliminary Remedial Alternatives

Preliminary remedial alternatives identified in the FS for soils and sediments at the Ashland sites are described below.

4.4.1 Soils

The contaminated soils identified as a result of previous investigative activities contain radionuclides and other inorganics (metals) that are potentially related to MED activities. The RI determined that the MED related inorganic contaminants appear to remain with the MED related radionuclide contaminants in the soils and sediments. The Baseline Risk Assessment (BRA) (DOE 1993a) found that the levels of inorganics that are associated with the MED wastes are not high enough to pose significant risks. For the Ashland sites, a preliminary remedial alternative identified by DOE included removal of all soils with radioactive contamination above the DOE generic guidelines (see Section 4.1). Treatment and disposal options were evaluated first and foremost on their effectiveness in protecting human health and the environment. The alternatives developed in the FS for soils include:

1. no action;
2. institutional controls;
3. containment;
4. removal followed by treatment and disposal options; and
5. removal followed by disposal options.

4.4.2 Sediments

Remedial alternatives available for sediment are similar to those for soils as described in Section 4.4.1. Excavation alternatives for Rattlesnake Creek and associated drainage ditches located at the Ashland sites consist of assembling options to divert surface water flow at specific locations along the creek to permit excavation of contaminated sediments, and grading the stream embankments at specific locations to reduce erosion and re-suspension of stream sediments. After excavation of sediments at Rattlesnake Creek, sediment treatment and disposal options are identical to those developed for contaminated site soils.

4.5 Radionuclide Cleanup Guideline Derivation for Ashland 1, Ashland 2, and Seaway - 1997

In 1997, DOE developed a cleanup guideline for radionuclide contamination present on the Ashland sites. The cleanup guideline adopted for radionuclides in soils at the Ashland sites would require the excavation and disposal off-site of soils exceeding the site-specific derived guideline of 40 pCi/g Th-230. The analysis showed that by adopting this cleanup guideline, all CERCLA risk criteria and ARARs are satisfied (DOE 1997).

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5. SUMMARY OF SITE CHARACTERISTICS

This Section summarizes findings of the RI concerning contamination at the Ashland sites. The contaminants of concern (COCs) from the MED-related materials at the Ashland sites and the COCs selected for modeling exposure and risk are also identified.

For consistency with the data and analysis presented in detail in the RI, FS, and BRA, information on Linde site characteristics is also included where relevant to the characteristics of the Ashland sites.

5.1 Sources, Types, and Distribution of Contaminants

Portions of the Ashland sites are contaminated with radionuclides and metals that originated from uranium ore processing at Linde. In addition, other organic and inorganic contamination has been detected. The source of organic and some inorganic contamination is not considered MED-related (BNI 1993). This section discusses radiological and chemical contaminants separately.

Investigations and surveys prior to the RI, review of historical records and the findings of the RI have determined that hazardous radiologically contaminated substances are present in MED-related wastes on portions of the Ashland sites. The investigations and observations reported in the RI also determined the presence of wastes that are not MED-related on the Ashland sites, including wastes and oils from refinery operations, industrial dumping and landfilling. The data reported in the RI includes information on areas of the Ashland sites that indicates no MED-related wastes are present. Those areas were not characterized to determine the presence of hazardous substances that may require action by other parties.

5.1.1 Radiological Contaminants

Radiological contaminants known or suspected to be present at the Ashland sites resulted from uranium ore processing operations conducted at Linde. Radionuclides from the U-238, U-235, and Th-232 decay chains have been identified in the RI (BNI 1993).

5.1.2 Chemical Contaminants

Chemical contamination, as referred to in this ROD, includes both inorganic and organic substances that are not radioactive hazardous substances.

Chemical contamination sources are described in the RI report (BNI 1993). The chemical contaminants include inorganic constituents present in the filter cake, effluents, fly ash and slag associated with the uranium ore extraction process. Numerous organic chemicals were detected at the Tonawanda Site, including polycyclic aromatic hydrocarbons (PAHs), volatile organic compounds (VOCs), and other semi-volatile organic compounds (SVOCs).

Organic contamination and potentially some inorganic contamination is not attributed to MED-related activities (BNI 1993). However, in the BRA, all chemical contaminants detected at the Ashland sites are evaluated as potential COCs regardless of whether they are within the definition of FUSRAP wastes (DOE 1993a).

5.2 Nature and Extent of Contamination at the Ashland Sites

In the RI, the radiological data were compared to DOE's generic guideline for residual contamination in soils and to the total uranium guideline of 60 pCi/g that was established for the Tonawanda Site. Soil samples exceeding either the generic guideline or the total uranium guideline are referred to as contaminated or as exceeding guidelines.

As detailed in Section 4.1 of this ROD, DOE's generic guidelines for residual contamination in soils limit the concentration of Ra-226, Ra-228, Th-232 and Th-230, to 5 pCi/g in the first 15 cm of surface soil and 15 pCi/g in soils more than 15 cm below the surface.

The total uranium guideline of 60 pCi/g was used to calculate a soil guideline value of 28.4 pCi/g for U-238. (See Section 4.1 of this ROD.)

Sediment and soil are the primary media containing MED-related radioactive materials and metals contamination at the Ashland sites. Contamination detected at the Ashland sites is described in the following sections. (Refer to Figure 1-3 for locations.)

5.2.1 Radioactive Contamination in Soil and Sediment at Ashland 1 (Including Seaway Area D)

U-238, Ra-226, and Th-230 and their respective radioactive decay products are the primary radionuclides of concern at Ashland 1. Th-230 is found throughout Ashland 1 and the vicinity at levels ranging from 0.6 to 4400 pCi/g. Elevated levels of Th-230 were detected mainly in the southern portion of the property and along the northern property line. U-238 contamination appears in the southern and western portions of the property with either Th-230 or Ra-226 or both. U-238 contamination results range from 0.9 to 1500 pCi/g. Depth of U-238 contamination varied. Ra-226 contamination, found less frequently than U-238 or Th-230, is present on the southern and western portions of Ashland 1. Ra-226 concentrations range from 0.6 to 750 pCi/g.

5.2.2 Radioactive Contamination of Soil and Sediment at Ashland 2

Th-230, U-238, and Ra-226 and their respective radioactive decay products are the primary radionuclides of concern at Ashland 2. Th-230 was detected throughout the contaminated areas and along the drainage creeks of Ashland 2 at levels that exceed DOE guidelines. For the most part, Th-230 was detected from surface levels to a depth of 6 ft at concentrations ranging from 0.1 to 2200 pCi/g. U-238 was detected mainly in the center of the large contaminated area along with

Th-230 and/or Ra-226. U-238 was detected in concentrations ranging from 1.3 to 263 pCi/g primarily between the surface and 3 ft. Ra-226 contamination is present mainly in the center of the large contaminated area but occurs less frequently than Th-230 or U-238. Ra-226 typically appears in the same area and at the same depth as U-238 contamination. Ra-226 concentrations ranged from 0.7 to 189 pCi/g.

5.2.3 Chemical Contamination of Soils at the Ashland Sites

VOCs and base/neutral and acid extractables (BNAEs) not associated with MED activities are present in a number of locations at Ashland 1 and Ashland 2 in the surface, subsurface, and undisturbed soils.

Concentrations of lead and vanadium (MED filter cake constituents) at Ashland 1 and Ashland 2 range from scarcely to substantially above background levels. Background levels were established using results of analyses of soils located in the southern portion of Ashland 2 as presented in the RI (BNI 1993). Lead was detected at a maximum concentration of 7,500 parts per million (ppm) compared with a background concentration of 36.7 ppm; vanadium at a maximum of 2,290 ppm with a background of 25.6 ppm. These maximum concentrations were all detected on Ashland 1. The maximum concentrations of these metals were lower on Ashland 2, but were still at least 10 times the background concentrations. Metals related to MED processing activities remain with the MED-related radionuclides in the contaminated soil and would, therefore, be removed as the radionuclide contaminated soils are addressed in remedial activities at the site.

5.2.4 Surface Water

The primary surface water systems at Ashland 1, Seaway, and Ashland 2 are the drainage ditch from Ashland 1 that forms the headwaters of Rattlesnake Creek, the drainage system on the southern portion of Ashland 2, and the drainage ditches that serve a portion of the Seaway landfill.

U-238, Th-230, and Ra-226 and their respective radioactive decay products are the primary MED-related radionuclides of concern in surface water due to transport of suspended soils and sediments. Surface water downstream of Ashland 1 and Seaway and onsite at Ashland 2, appears to be influenced by radioactively contaminated soils and sediments. The concentrations of radionuclides immediately downstream of Ashland 2 return to background levels.

5.2.5 Groundwater

<u>Deep Aquifer</u>

No contamination has been detected in the deep aquifer at the Ashland and Seaway properties. The thick layer of low permeable clay overlying the bedrock precludes migration of contaminants into the deep aquifer (BNI 1993).

Shallow Semi-confined System

The silty sand lenses of this groundwater system are isolated by the surrounding thick lake clay section. Contaminant concentrations measured during investigation activities are at or near measured background concentrations, indicating the isolation of this system from surface water infiltration (BNI 1993).

Perched Groundwater System

A thin layer of fill overlies the thick clay deposit at the Ashland and Seaway properties. Groundwater in this zone tends to flow laterally to discharge points in local surface water bodies. Only slightly elevated concentrations of radioactive contaminants were detected in samples collected in this zone; however, the concentrations were below appropriate DOE guidelines (BNI 1993).

5.3 Radiological Data Evaluation

The goal of the data evaluation was to identify a set of radiological COCs that are likely site-related and then select those COCs that are valid to use in the quantitative risk characterization. Radiological sample analyses for the RI were performed by Thermo Analytical/Eberline, (TMA/E) in accordance with approved protocols. The detailed analytical results are contained in appendices to the RI report (BNI 1993). Data quality objectives and Quality Assurance/Quality Control (QA/QC) procedures are discussed in Appendix D of the RI (BNI 1993).

5.3.1 Rationale and Criteria for Selection of Radiological COCs

Samples from the following media were evaluated for potential radiological COCs: surface and subsurface soils; groundwater; surface water; and sediment from the drainage ditches.

Mean contaminant concentrations were determined using detected results or the value of the quantitation limit, when results were reported as less than that value. Ubiquitous, naturally occurring radionuclides such as potassium (K)-40 were not considered in the BRA (DOE 1993a).

Radionuclides were selected as potential COCs if the mean detected concentrations exceeded twice the arithmetic mean background concentration for that radionuclide in a specific medium. For completeness, all radionuclides in the decay series of a given potential radiological COC were considered in the risk assessment.

5.3.2 Background Levels of Radionuclides

Background samples for each medium were used to identify naturally-occurring levels of radionuclides not affected by onsite sources. Radiological data were compared to arithmetic mean background levels to select the subset of radiological COCs appropriate for quantitative risk assessment, as described in the BRA (DOE 1993a).

5.3.3 Summary of Radiological COCs

The final list of radiological COCs for soil includes Ra-226, Th-230, U-238 and their associated decay products. Th-230, Th-232, Ra-226, and U-238 were identified as radiological COCs in surface water. Th-230 and U-238 were identified as radiological COCs in sediment. Although not considered MED-related, the Th-232 and U-235 series were included in the risk assessment.

5.4 Potential Chemical COCs

The chemical data evaluated are those reported in the RI report for the Tonawanda Site (BNI 1993). The chemical data are organized according to property and medium. Surface soil data were available for the Ashland 1 and Ashland 2 operable properties. There were no chemical data available for Seaway. As a former municipal landfill, Seaway is likely to contain a wide variety of chemical contaminants. Isolation of FUSRAP-derived chemical contamination is not practicable. The uncertainty associated with this data gap is discussed in Section 5 of the BRA (DOE 1993a).

The groundwater in the area is drawn from the Camillus Shale. Because of the high levels of total dissolved solids, sulfates and chlorides, the water from this formation is considered nonpotable without extensive, costly treatment (BNI 1993). Therefore, the groundwater was not evaluated due to the lack of a complete exposure pathway.

Chemicals in the RI database were evaluated in accordance with USEPA data validation guidance in *Risk Assessment Guidance for Superfund, Volume I* (USEPA 1989a). Background samples for soil were used to identify naturally-occurring levels of chemicals and ambient concentrations.

As summarized in Section 6 of this ROD and detailed in the BRA, risks resulting from nonradioactive chemical constituents were found to be within the USEPA acceptable risk range. Therefore, there are no chemical COCs for human health concerns. COCs for ecological receptors are discussed in Section 6.3

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6. SUMMARY OF SITE RISKS

6.1 Human Health Risk Factors

The BRA was prepared to evaluate the risk to human health and the environment from the radioactive and chemical contaminants at the site. In accordance with USEPA guidance, the primary health risks investigated were cancer and other chemical-related illnesses. The assessment evaluated the potential risks that could develop in the absence of cleanup and assumes that no institutional controls (e.g., fencing, maintenance, protective clothing, etc.) are or will be in place. The purpose of the BRA was to determine the need for cleanup and provide a baseline against which the remedial action alternatives were compared. The complete report is in the administrative record file and a brief summary is provided here.

6.1.1 Cancer Risk

The predominant health concern associated with the radioactive contaminants at the Ashland sites is the induction of cancer. The radiological health risks presented in the BRA are limited to this concern. This approach is consistent with USEPA guidance, which notes that, generally, the risk of cancer is limiting and may be used as the sole basis for assessing the radiation-related human health risks for a site contaminated with radionuclides (USEPA 1989a).

The risk to an individual resulting from exposure to chemical carcinogens is expressed as the increased probability of a cancer occurring over the course of a lifetime. To calculate the excess cancer risk, the estimated daily intake, averaged over a lifetime, is multiplied by a chemical-specific slope factor (SF). The SF converts estimated daily intakes averaged over a lifetime of exposure directly to the incremental risk of an individual developing cancer (USEPA 1989a). The carcinogenic risk estimate is generally an upper-bound estimate because the SF is often an upper 95 percentile confidence limit of the probability of response based on experimental animal data (USEPA 1989a). Thus, the USEPA is reasonably confident that the "true risk" will not exceed the risk estimate derived through use of the SF and is likely to be less than that predicted. (USEPA 1989a).

6.1.2 Non-Cancer Risks

The non-cancer HQ assumes that there is a level of exposure (the RfD or RfC, as appropriate) below which it is unlikely for even sensitive populations to experience adverse noncarcinogenic health effects (USEPA 1989a). If the intake exceeds this threshold (i.e., intake/RfD or intake/RfC exceeds unity or 1), there may be concern for potential noncarcinogenic effects (USEPA 1989a). The greater the ratio (intake/RfD or RfC), the greater the level of concern (USEPA 1989a). The HQs for each chemical addressed in the intake and exposure pathway are summed to obtain the HI, which allows assessment of the overall potential for noncarcinogenic effects (USEPA 1989a). When the HI exceeds unity (1), there may be concern for potential adverse health effects.

6.2 Human Health Risk Estimates for the Ashland Sites

For clarity of presentation, the risk estimates resulting from potential radiological and chemical exposures are presented separately in the following sections. Exposure estimates are presented for each exposure scenario for the most probable exposure conditions (mean receptor) and the reasonable maximum exposure conditions (RME receptor).

6.2.1 Radiological Risk Estimates

The radiological risks for the Ashland sites are presented in shaded maps for all scenarios and receptors in the BRA (DOE 1993a). Potential risks as a result of exposure to contaminants found at the Ashland sites were estimated for current and future uses. Radiological risk estimates are discussed in Section 6.2.1.1 for current use and in Section 6.2.1.2 for future use.

The potential receptors and routes of exposure to contamination at the Ashland sites are summarized in the BRA (DOE 1993a). Exposure point concentrations and doses are also presented in the BRA. The estimates of radiological risk consider exposure to contaminated soil, sediment, and indoor and outdoor air.

Contaminated soil and sediment have been identified in various areas at the Ashland sites, as indicated by the characterization and environmental monitoring results. Air is considered a pathway for exposure because of the potential for transport of airborne radioactive particulates from contaminated soil, radon gas from radium contaminated soil, and external gamma irradiation from contaminated soil.

6.2.1.1 Current Use Scenarios

Risk estimates for potential exposure from current site use are presented in Table 6-1. The estimated radiological risks for the mean and RME exposures are within the USEPA target risk range (10^{-4} to 10^{-6}) for current uses of the Ashland sites.

6.2.1.2 Future Use Scenarios

Risk estimates for potential exposure from future property use (commercial/industrial) are also presented in Table 6-1. RME and mean risks at the Former Tank Area in Ashland 1, and the RME risks at the Rattlesnake Creek area in Ashland 2, exceed the USEPA target risk range. Dominant exposure pathway risks in the future use scenarios are similar to those in the current use scenarios in that direct gamma irradiation contributes the bulk of the risk to the receptors. The risks to the children wading in the local creek would be expected to remain constant.

Table 6-1. Summary of Total Radiological Risks for the Ashland Sites

Location	Areas*	Employee		Transient	
		mean	RME	mean	RME
Current Land Use Scenarios					
Ashland 1	Other areas			1×10^{-7}	8×10^{-6}
	Former tank area			1×10^{-6}	1×10^{-4}
Ashland 2	Rattlesnake Creek area			4×10^{-7}	6×10^{-5}
	South portion			5×10^{-9}	5×10^{-6}
Local Creek	Twomile Creek			2×10^{-7} **	9×10^{-7} **
Future Land Use Scenarios					
Ashland 1	Other areas	7×10^{-6}	9×10^{-5}		
	Former tank area	**7×10^{-4}**	**1×10^{-2}**		
Ashland 2	Rattlesnake Creek area	4×10^{-5}	**5×10^{-4}**		
	South portion	4×10^{-7}	2×10^{-5}		
Local Creek	Twomile Creek			2×10^{-7} **	9×10^{-7} **

RME reasonable maximum exposure
NP no pathway
* See the BRA, Section 3, for maps delineating areas.
** Child wading in local creek
Shaded areas/bold numbers exceed the USEPA target risk range
NOTE: All numbers rounded to one significant figure.

6.2.2 Chemical Risk and Hazard Index Estimates

Estimates of risk to site receptors resulting from exposure to chemical carcinogens are presented in Table 6-2, expressed as the increased probability of a cancer occurring over the course of a lifetime. Estimates are presented for both the mean and RME conditions. For both present and future use scenarios, the risk is within acceptable USEPA risk values. Chemical-specific intakes and carcinogenic risks are tabulated in Appendix C of the BRA.

Table 6-2 includes the risk associated with organic compounds not associated with MED activities and inorganic compounds which may not be associated with MED waste. These contaminants are not MED-related, but were included in the risk assessment. The BRA concludes that isolation of MED-related chemical contamination from non MED-related chemical contamination was not practicable in the risk assessment and includes a discussion of the uncertainty this introduces into the assessment. As previously stated, the chemical risks estimated do not exceed USEPA risk thresholds notwithstanding inclusion of the non MED-related contaminants. These findings should not be interpreted to mean that hazardous substances that may be the responsibility of other parties do not exist at levels requiring action by others in areas of the Ashland sites outside of areas determined to be contaminated by MED-related wastes.

The potential for adverse noncarcinogenic health effects is expressed as chemical-specific HQs, which are tabulated in Appendix C of the BRA (DOE 1993a). The HQs were tabulated for all COCs where reference doses are currently available. (Since HIs were all less than 1, the HIs are not tabulated in this document.)

6.3 Ecological Risks

The Ecological Risk Assessment for the Tonawanda BRA follows USEPA's general procedures for ecological assessments under CERCLA (USEPA 1989b). The characterization of habitats and biota at risk are semiqualitative, and screening of COCs and assessment of potential impacts to biota are based on measured environmental concentrations of the constituents and toxicological effects reported in literature.

The Ashland sites are located in an industrial area. Ashland 1, and Seaway provide minimal urban wildlife habitat supporting only cosmopolitan species of birds and small mammals such as crows, gulls, and rates. Ashland 2 supports a more diverse animal community because it contains a mosaic of vegetated habitat types including wetlands hydrologically connected to Rattlesnake and Twomile Creeks and the Niagara River.

Table 6-2. Summary of Chemical Risks for Ashland Sites - Carcinogens*

Location	Employee		Transient	
	mean	RME	mean	RME
Current Land Use Scenarios				
Ashland 1				
Soil ingestion			2×10^{-7}	3×10^{-6}
Particulate inhalation			2×10^{-12}	3×10^{-10}
Ashland 2				
Soil ingestion			2×10^{-7}	2×10^{-6}
Particulate inhalation			1×10^{-10}	1×10^{-8}
Local Creek				
Surface water ingestion			4×10^{-7}	8×10^{-7}
Sediment ingestion			8×10^{-8}	2×10^{-7}
Future Land Use Scenarios				
Ashland 1				
Soil ingestion	3×10^{-7}	4×10^{-6}		
Particulate inhalation	1×10^{-10}	2×10^{-9}		
Ashland 2				
Soil ingestion	4×10^{-7}	4×10^{-6}		
Particulate inhalation	5×10^{-9}	1×10^{-7}		
Local Creek				
Surface water ingestion				
Sediment ingestion				

RME = reasonable maximum exposure
* No areas exceed the USEPA target risk range

Based on published aquatic and oral toxicity data and their mobility and persistence properties, 33 ecological COCs were identified: 3 radionuclides, 21 metals, 7 VOCs and 2 SVOCs. The heavy metals, especially copper, lead, selenium, silver, vanadium, and zinc in Tonawanda properties' soils and surface waters were the greatest source of ecological risk to terrestrial and aquatic populations' exposure by ingestion of soils and direct contact with surface waters. Although no threatened or endangered species were identified, in the absence of remediation, both onsite and offsite organisms and populations at Tonawanda properties will continue to be at risk, particularly at Ashland 2, where wildlife and natural habitats are more extensive.

6.4 Baseline Risk Summary

According to the NCP, acceptable exposure levels for known or suspected carcinogens are generally those that represent an excess upper bound lifetime cancer risk to an individual of between 10^{-6} and 10^{-4}. The BRA determined risks from radiological and chemical exposures if contaminated material was left onsite. For the Ashland sites, human receptors (transients and future employees) could receive radiological doses. For current use scenarios at the Ashland sites, radiological and chemical risks are within acceptable ranges.

Future employees at Ashland 1 and Ashland 2 may be exposed to mean radiological risks of 4×10^{-7} to 7×10^{-4} and RME risks of 2×10^{-5} to 1×10^{-2}. For current and future use, the mean radiological risk to a child wading in the creek is 2×10^{-7} and the RME risk is 9×10^{-7}. Potential noncarcinogenic health effects show hazard indices of less than 1 where 1 or greater is unacceptable. Metals, especially copper, lead, selenium, silver, vanadium, and zinc in soils and surface waters were the greatest sources of ecological risk by ingestion of soils and direct contact with surface waters.

6.5 Uncertainties Related to Risk Estimates

Uncertainties attributable to the numerous assumptions incorporated in the risk estimations are inherent in each step of the risk assessment process. A key factor affecting the exact identification of COCs for the Tonawanda Site is associated with the limitations imposed by the available database. Limited toxicity data available for chemical contaminants prevented the calculation risk for several potential chemical COCs. In addition, the potential COCs identified for the BRA might include chemicals that contribute to overall site risk, but are not necessarily attributable to MED activities.

Because of the inherent uncertainties in the risk assessment process, the results of the human health assessment presented in the BRA should not be taken to represent absolute risk. Rather, estimated risks should be considered to represent the most important source of potential risk at the site, which, once identified, might be evaluated in more detail and remedied appropriately during the remedial action process.

In general, the risk assessment calculations presented are conservative estimates, and tend to result in calculated risks that are greater than actual site risks.

7. DESCRIPTION OF REMEDIAL ALTERNATIVES

As detailed in the FS, remedial action alternatives for the Tonawanda Site were screened to identify those that are most suitable for implementation.

Subsequent to the FS, a site-specific radionuclide cleanup guideline was developed for the Ashland sites. An additional remedial alternative reflecting this site-specific guideline for these properties was identified and evaluated. This alternative is described in Section 7.2.

7.1 Summary of Alternatives Addressed in the FS

Detailed descriptions of the remedial alternatives can be found in the FS which is available in the administrative record file. A total of six alternatives were considered in the FS for their effectiveness in remediating the Tonawanda Site. These alternatives are summarized below:

Alternative 1: No Action. The no-action alternative is required under CERCLA regulations to provide a baseline for comparison with other alternatives. Under this alternative, no action is taken to implement remedial activities. Periodic monitoring of the COC concentrations in appropriate media is continued.

Alternative 2: Complete Excavation with Offsite Disposal. Complete excavation of MED-contaminated soils containing radionuclides above guidelines (generic guidelines) and offsite disposal would remove the source of elevated levels of radionuclides from the site. Removal of material containing radionuclides above guidelines in or near wetland areas would be performed during the dry season to minimize the need for dikes and berms.

Alternative 3: Complete Excavation with Onsite Disposal. Similar to Alternative 2 regarding excavation of soils, however, all excavated soils would be placed in an on-site disposal cell. Institutional controls would be imposed to control access to the onsite engineered disposal cell and the cell would be designed to minimize future exposures or releases to the environment.

Alternative 4: Partial Excavation with Offsite Disposal. For the Ashland sites, all impacted soils are accessible, thus making this alternative the same as Alternative 2.

Alternative 5: Partial Excavation with Onsite Disposal. For the Ashland sites, all impacted soils are accessible, thus making this alternative the same as Alternative 3.

Alternative 6: Containment with Institutional Controls. Containment would involve capping all accessible soils. Removal of any material containing radionuclides above guidelines (generic guidelines) from wetland areas would be performed during the dry season to minimize the need for dikes and berms. This alternative would protect human health and the environment by eliminating exposure pathways. Institutional controls would be required to prevent future access to and disturbance of the contained waste. Applicable standards regarding residual levels of radionuclides would not be met. Therefore, restrictions would be required on the future use of areas of these properties, or alternate concentrations would have to be justified for contaminated soils left in place.

Alternatives 2 through 5 require disposal of large quantities of contaminated soil. As part of the analysis of those alternatives, seven disposal options were evaluated in the FS. Since that time, two alternatives have been eliminated from consideration (DOE-owned facilities in the eastern United States and the western United States). The five remaining disposal options that were evaluated in the FS are:

Onsite disposal in an engineered waste containment structure. The contaminated materials would be excavated and disposed in a waste containment structure located at the Ashland sites. The structure would have a clay liner that prevents migration of water into the structure and minimizes potential buildup of water within the structure. Infiltration of surface water into the structure would be minimized with an impermeable cap consisting of four feet of clay, three feet of protective rip-rap, sand, and topsoil layers. Other material may be used to implement the performance objectives of the structure as determined appropriate during final engineering design.

Offsite disposal in an in-state land waste containment structure. This option involves disposal of the waste materials at a facility within the State of New York. The design requirements for a waste containment structure offsite would be similar to that for an onsite option. Because this facility does not now exist, the use of such an option may only be plausible for long range remedial actions. For the purpose of the 1993 FS/PP (DOE 1993c), it was assumed that DOE would develop a separate disposal facility dedicated to the New York FUSRAP waste.

Offsite disposal at an existing federal facility. This option would be similar to the previous disposal option. The effectiveness and implementability of each federal facility was evaluated in the FS/PP.

Offsite disposal at an appropriately licensed disposal facility. Under this option, the contaminated materials would be excavated and transported offsite to an appropriately licensed disposal facility for permanent disposal.

Offsite beneficial reuse. The potential for the reuse of Tonawanda waste was also evaluated. Potential beneficial reuse options include using soil as cover in radioactive waste facilities; fill material for airport expansion projects, fill material for roadbeds, or similar construction sites.

7.2 Additional Alternative for the Ashland Sites

Subsequent to the FS, a site-specific radionuclide cleanup guideline was developed pursuant to CERCLA, as amended, and the NCP for the Ashland sites. As described in Section 4.5 of this ROD, soils exceeding the site-specific derived guideline of 40 pCi/g of Th-230 would be excavated and shipped offsite for appropriately licensed or permitted disposal.

The additional alternative is referred to as Alternative 2A: Complete Excavation With Off-Site Disposal (using site-specific guidelines). This alternative is the same as Alternative 2, except the guideline used was developed specifically for the Ashland sites, versus the generic guidelines used in Alternative 2.

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8. SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

The alternatives described in Section 7 were evaluated using CERCLA criteria to determine the most favorable actions for cleanup of the Ashland sites. These criteria are described below. The criteria were established to ensure that the remedy is protective of human health and the environment, meets regulatory requirements, is cost effective, and utilizes permanent solutions and treatment to the maximum extent practicable. The results of the detailed evaluation of alternatives to remediate the Ashland sites are summarized in the following sections. The evaluation criteria are described in Section 8.1, followed by a summary of the comparative analysis in Section 8.2.

8.1 Evaluation Criteria

The following two criteria are threshold criteria and must be met.

- *Overall Protection of Human Health and the Environment* - addresses whether an alternative provides adequate protection and describes how risks are eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.

- *Compliance with Federal and State Environmental Regulations* - addresses if a remedy would meet all of the federal and state ARARs.

The following criteria are considered balancing criteria and are used to weigh major tradeoffs among alternatives being evaluated.

- *Long-Term Effectiveness and Permanence* - addresses the remaining risk and the ability of an alternative to protect human health and the environment over time, once cleanup goals have been met.

- *Short-Term Effectiveness and Environmental Impacts* - addresses the impacts to the community and site workers during cleanup including the amount of time it takes to complete the action.

- *Reduction in Toxicity, Mobility, or Volume Through Treatment* - addresses the anticipated performance of treatment that permanently and significantly reduces toxicity, mobility, or volume of waste.

- *Implementability* - addresses the technical and administrative feasibility of an alternative, including the availability of materials and services required for cleanup.

- *Cost* - compares the differences in cost, including capital, operation, and maintenance costs.

The following are considered modifying criteria and are generally taken into account after public comment is received on the PP.

- *State Acceptance* - evaluates whether the State agrees with, opposes, or has no comment on the preferred alternative.

- *Community Acceptance* - addresses the issues and concerns the public may have regarding each of the alternatives as expressed in comments to USACE.

8.2 Alternative Comparison

The advantages and disadvantages of the alternatives were compared, based on the evaluation criteria. The results of the comparison, summarized below, were used to select a preferred alternative. The FS Alternatives 4 and 5 are not included since they are the same as Alternatives 2 and 3, respectively, for the Ashland sites.

Overall Protection of Human Health and the Environment. The alternatives providing complete excavation of soils containing radionuclides above guidelines (generic and site-specific), specifically Alternatives 2, 2A, and 3, provide the greatest degree of protection to human health and the environment, including the ecological system, because the materials containing radionuclides above guidelines are removed from the site and permanently isolated in a disposal facility. A degree of risk to workers is involved with implementing these alternatives, as well as the other remedial action alternatives, because the associated work involves intrusive activities for handling and moving materials containing radionuclides above guidelines at the Ashland sites. These risks can be minimized by using safety procedures and equipment. Alternative 6 provides protection by reducing or eliminating certain exposure pathways. It relies on institutional controls to provide protection of human health and the environment. Alternative 1 provides no increased protection over the current site conditions and will not be protective of human health and the environment over the long-term for foreseeable land uses.

Compliance with ARARs. The FS describes ARARs determined by DOE for Alternatives 1, 2, 3, 4, 5, and 6. Refer to the FS for details. USACE has assessed ARARs for the proposed remediation (Alternative 2A, which is not addressed in the FS) of the Ashland sites. USACE's ARAR assessment of Alternative 2A is presented in Section 10.2 of this ROD. Alternatives 2, 2A and 3 meet ARARs because all soils containing radionuclides exceeding the guidelines (generic and site-specific) would be excavated and permanently isolated in a disposal facility. The other alternatives, all of which involve leaving some soil containing radionuclides above guidelines in place, would not comply with restrictions on residual concentrations in soils. Alternative 1 is noncompliant with ARARs because all waste containing radionuclides above guidelines remains onsite with no additional protection provided.

Long-Term Effectiveness and Permanence. A primary measure of the long-term effectiveness of an alternative is the magnitude of residual risk to human health after remediation. The adequacy and reliability of engineering and/or institutional controls used to manage residual materials that remain onsite must also be considered.

Alternatives 2, 2A, and 3 have the highest degree of long-term effectiveness and permanence because all soils containing radionuclides above generic guidelines, or the site-specific guideline, are excavated and removed from the site, or placed in an engineered disposal cell.

Alternative 6, containment, has a high degree of effectiveness, but relies on long-term management to ensure that exposure pathways remain blocked. The magnitude of residual risk and exposures to human health and the environment is directly related to the adequacy and reliability of the clay cap and institutional controls.

For Alternatives 2, 2A, 3, and 6, risk calculated for a worker involved in maintenance activities at any disposal cell or capped areas for a period of 25 years is similar to the general public's health risk during remediation and is within acceptable levels.

Alternative 1, no action, has low long-term effectiveness because the post-implementation remedial risks equal those now at the site.

Short-term Effectiveness and Environmental Impacts. Short-term effectiveness is measured with respect to protection of community and workers as well as short-term environmental impacts during remedial actions and time until remedial action objectives are achieved. An increase in the complexity of an alternative typically results in a decrease in short-term effectiveness because of increased handling and processing. Also, alternatives involving off-site disposal of wastes would result in a decrease in short-term effectiveness because of the increased time required and transportation-related risks.

Alternative 1, no action, is the most effective in protecting the community and workers and controlling impacts during implementation since no actions that could create impacts are undertaken. Alternative 1 requires the shortest time to implement. The short-term effectiveness of the other alternatives rank in the following order: Alternative 6 (containment), Alternative 3 (complete excavation and on-site disposal), Alternative 2A (complete excavation and offsite disposal using site-specific guideline), and Alternative 2 (complete excavation and offsite disposal using generic guidelines.)

Reduction in Toxicity, Mobility, or Volume through Treatment. None of the alternatives provides treatment onsite for the materials to be removed. Alternatives 2, 2A and 4, which provide for some degree of offsite disposal, will include containment at the final disposal location and any treatment which is required to meet the standards of the offsite facility. These alternatives thus will achieve reduction in mobility, although no treatment is planned which will reduce the toxicity or volume of the disposed materials. The remaining alternatives would provide either no removal of materials, or disposal onsite, which would also limit mobility through design of the disposal facility. The FS evaluated currently available treatment technologies for treatment in the course of removal and found none are economically and technologically feasible at this time. Thus, the preferred alternative achieves the best possible result in regard to these criteria.

Implementability. In regards to implementability, the alternatives were evaluated with respect to the following:

1. ability to construct and operate the technology;
2. reliability of the technology;
3. ease of undertaking additional remedial actions;
4. ability to monitor effectiveness;
5. ability to obtain approvals and coordinate with regulatory agencies;
6. availability of offsite disposal services and capacity; and
7. availability of necessary equipment and specialists.

The degree of difficulty in implementing an alternative increases with the complexity of the remediation activity. The design, engineering, and administrative requirements of Alternative 1, no action, are essentially negligible. The remaining alternatives are all technically and administratively feasible. The engineering, design, and administrative requirements increase with the complexity of the alternatives in the following order: Alternative 6, containment with institutional controls; Alternative 2A, complete excavation and offsite disposal (using site-specific guideline); Alternative 2, complete excavation and offsite disposal; and Alternative 3, complete excavation and onsite disposal. Materials and services for the various alternatives are readily available. The degree of difficulty in implementing these alternatives increases with the amount and type of soils to excavated, the level of permitting required to construct new disposal facilities, and the distance to the selected disposal facility. Alternatives 3 and 6, which involve onsite waste disposal, pose significant administrative difficulties.

Cost. The comparative analysis of costs compares the differences in capital, operations and maintenance (O&M), and present worth values. Costs for each of the alternatives presented in the original plan have been provided in detail in Appendix G of the FS. These costs were for the entire Tonawanda Site, not just the Ashland sites. Since the completion of the original PP, the costing methodology has changed, primarily in the area of assessing program management costs. Additionally, a more detailed analysis of volumes of soils containing radionuclides above generic and site-specific guidelines has been conducted using three-dimensional modeling. These new estimates, based on 1997 dollars, have been made for the Ashland sites only and have been included in the Administrative Record. Table 8-1 presents the current cost estimates for the alternatives.

Table 8-1 Implementation Costs for the Ashland Sites

Alternative	Description	Cost (in 1997$)
1	No Action	$7,000,000
2	Complete Excavation and Offsite Disposal (Generic Guideline)	$72,000,000
2A	Complete Excavation and Offsite Disposal (using site-specific guideline of 40 pCi/g Th-230)	$38,000,000
3	Complete Excavation with Onsite Disposal (Generic Guideline)	$46,000,000
6	Containment with Institutional Controls	$26,000,000

State Acceptance. The USACE has received a letter from NYSDEC indicating concurrence with the proposed remedy (NYSDEC 1998). This letter is included in Appendix A.

Community Acceptance. A PP for the Tonawanda Site was issued in November 1993 for public comment which described the DOE's preferred alternative for cleaning up elevated levels of radionuclides at the Tonawanda Site. Numerous concerns and comments were raised by the community and their representatives regarding the preferred alternative in that PP and the on-site disposal of any remedial action waste.

DOE listened to those concerns and had numerous interactions with the community's representatives in Congress (Congressman LaFalce and his staff), representatives locally [Coalition Against Nuclear Materials in Tonawanda (CANiT) and their consultants], and the NYSDEC over the past year. When FUSRAP was transferred to USACE, Lieutenant Colonel Michael Conrad, Commander of the Buffalo District, met with all key stakeholders for the Ashland sites. Three representatives from For a Clean Tonwawanda Site (F.A.C.T.S.) were included in this meeting. Representatives of this group also submitted comments, both at the public meeting and in writing. The concerns of the community, as stated in the comments to USACE, have been considered in the decision regarding the remedy selection, and the responses are included in the Responsiveness Summary.

USACE considered the input of the community, including opposition to onsite disposal, as expressed in comments on the 1993 PP in developing and issuing the revised PP for the Ashland sites (SAIC 1998).

The revised PP was issued on November 10, 1997 and USACE granted a 30-day extension to the comment period. An additional 11 days was added to this extension after several members of the public requested additional time for preparing their comments. With the extension, the comment period totaled 71 days.

A number of comments were received on the revised PP for the Ashland sites and are addressed in the Responsiveness Summary included herein. After fully considering and addressing each comment, USACE has determined that the selected alternative is the most appropriate remedy for the Ashland sites. This alternative is fully protective of human health and the environment, complies with all ARARs, addresses community concerns, and is acceptable to the state.

9. THE SELECTED REMEDY

The alternative selected for remediation of Ashland sites is Alternative 2A, Complete Excavation with Offsite Disposal (using site-specific guidelines). This alternative is protective of human health and the environment and complies with all ARARs.

It also provides the best balance among the considered alternatives with respect to the evaluation criteria and provides for the development of the Ashland sites consistent with the Master Plan. In addition, implementation of this remedy can be accomplished in compliance with all applicable laws relating to the protection of the public health and the environment. Specific components of the selected alternative are listed below:

- Excavate soils exceeding the site-specific derived guideline of 40 pCi/g Th-230 at the Ashland sites, as described in the document entitled "Radionuclide Cleanup Guideline Derivation for Ashland 1, Ashland 2, and Seaway".

- Ship offsite for appropriately licensed or permitted disposal all soils excavated that exceed the 40 pCi/g Th-230 guideline.

- Restore the sites with clean backfill from an off-site commercial source, and seed to restore vegetative cover at the sites to their original appearance or better.

Although not the least expensive alternative (no action, and containment were estimated to be lower cost alternatives), it is the least expensive of the options which are protective of human health and the environment, addresses community concerns and expectations, and allows for the development and future use of the remediated properties. Because this remedy meets all requirements, there is no justification to spend additional funds for more excavation.

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10. STATUTORY DETERMINATIONS

The selected remedy satisfies the statutory requirements of Section 121 of CERCLA as follows:

- the remedy must be protective of human health and the environment;
- the remedy must attain ARARs or define criteria for invoking a waiver;
- the remedy must be cost effective; and
- the remedy must use permanent solutions and alternative treatment technologies to the maximum extent practicable.

The manner in which the selected remedy satisfies each of these requirements is discussed in the following sections.

10.1 Protection of Human Health and Environment

Upon completion, the selected remedy for the Ashland sites will be fully protective of human health and the environment and meet CERCLA acceptable risk criteria. During remedial activities, institutional controls (e.g., access restrictions) and environmental monitoring and surveillance activities will be maintained to ensure protectiveness, so that no member of the public will receive radiation doses above guidelines from exposure to residual radioactive contaminants.

There are no short-term threats associated with the selected remedy that cannot be readily controlled and mitigated. In addition, no adverse cross-media impacts are expected from the remedy.

10.2 Attainment of ARARs

Agencies responsible for remedial actions under CERCLA must ensure that selected remedies meet ARARs.

Applicable requirements are those cleanup standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location or other circumstance at a CERCLA site. An applicable requirement directly and fully addresses an element of the remedial action.

Relevant and appropriate requirements are those cleanup standards, standards of control, and other substantive environmental protection requirements, criteria or limitations promulgated under federal environmental or state environmental or facility siting laws that while not "applicable" to a hazardous substance, pollutant, contaminant, remedial action, location or other circumstance at a CERCLA site, address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is suited to the particular site.

Only those state standards that are promulgated, are identified by the state in a timely manner, and are more stringent that federal requirements may be applicable or relevant and appropriate.

To-Be-Considereds (TBCs) are non-promulgated advisories, criteria, or guidance issued by a federal or state government that may be useful in developing CERCLA remedies that are not legally binding and do not have the status of potential ARARs.

USACE has determined that the following statute and regulations are ARARs, as that term is defined in CERCLA, for the cleanup of the radionuclides present at the Ashland sites in Tonawanda, New York:

ARARs

Uranium Mill Tailings Radiation Control Act,(UMTRCA), 42 U.S.C. 7901 et. seq. requires the control of residual radioactive material at processing and disposal sites in a safe and environmentally sound manner. This requirement is considered relevant and appropriate to the remedial action at the Ashland sites. The selected remedial action will provide for the removal of radiological contaminants to a level that protects the public health and the environment and meets this requirement.

Subpart B of 40 CFR 192 sets standards for residual concentrations of Ra-226 in soil. It requires that radium concentrations shall not exceed background by more than 5 pCi/g in the top 15 cm of soil or 15 pCi/g in any 15 cm layer below the top layer, averaged over an area of 100 m^2. This requirement is considered relevant and appropriate to the Ashland sites remedial action. The selected remedial action at the Ashland sites will involve removal of soils exceeding the site-specific guideline of 40 pCi/g Th-230. Implementation of the proposed plan will result in radium concentrations below the stated limits.

Subpart D of 40 CFR 192 requires that releases of radon (Rn)-222 and Rn-220 into the atmosphere resulting from the management of uranium and thorium byproduct materials shall not exceed an average release rate of 20 pCi/m^2-s. This requirement is considered relevant and appropriate to the remedial action at the Ashland sites. Implementation of the proposed plan will result in radon releases below the stated limits.

Subpart E of 10 CFR 20 provides standards for determining the extent to which lands must be remediated before decommissioning of a site can be considered complete and the license terminated. These standards are: unrestricted use - 25 mrem/yr total effective dose equivalent (TEDE) and as low as reasonably achievable (ALARA); restricted use with institutional controls - 25 mrem/yr TEDE and ALARA. These standards are considered relevant and appropriate to remediation of the Ashland sites. Implementation of the proposed plan will result in doses below the stated limits.

The selected remedy complies with the ARARs determined for the cleanup of the radionuclides present at the Ashland sites.

TBCs

USACE has determined that NYSDEC Technical Administrative Guidance Memorandum (TAGM) 4003 (NYSDEC 1993) is a TBC. It pertains to criteria for protection of the public from radionuclide materials that will remain on-site and is useful in developing the appropriate remedy for the site.

The guideline derivation process demonstrated that remediation to the cleanup criteria will meet the dose criterion of NYSDEC TAGM 4003 for the intended future use of the Ashland sites.

10.3 Cost Effectiveness

The selected remedy is the most cost-effective because it provides the best balance between the evaluation criteria. Cost-effectiveness is evaluated by comparing costs associated with the remedy versus a composite of the following balancing criteria: long-term effectiveness and permanence, short-term effectiveness, and implementability.

The selected remedy is effective because risks are reduced to acceptable levels. Increased short-term risks to workers, the public, and the environment may occur during implementation of the remedy, but these risks will be minimized by appropriate mitigative measures. Total cost in 1997 dollars for the selected alternative is estimated at $38 million. In consideration of these factors, the selected remedy provides the best overall effectiveness of all alternatives evaluated relative to its cost.

10.4 Utilization of Permanent Solutions and Alternative Treatment Technologies or Resource Recovery Technologies to the Maximum Extent Practicable

The selected remedy for the Ashland sites provides a permanent solution to contamination that currently exists on these properties.

None of the practicable alternatives identified for the Ashland sites provides treatment onsite for the materials to be removed. Several alternatives provide for some degree of offsite disposal, including containment at the final disposal and treatment location which may be required to meet the standards of the offsite facility. These alternatives, thus, would achieve reduction in mobility, although no treatment is planned which will reduce the toxicity or volume of the disposed materials. The remaining alternatives would provide either no removal of materials, or disposal onsite, which would also limit mobility through design of the disposal facility. The FS evaluated currently available treatment technologies for treatment in the course of removal and found none are economically and technologically feasible at this time. Thus, the selected alternative achieves the best possible result in terms of satisfying the statutory preference for remedies that employ treatment that reduces toxicity, mobility, or volume as a principal element.

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John P. Cahill
Commissioner

April 13, 1998

VIA FAX & MAIL

Lieutenant Colonel Michael J. Conrad, Jr.
U.S. Army Engineering District, Buffalo District
1776 Niagara Street
Buffalo, New York 14207-3199

Dear Lieutenant Colonel Conrad:

Re: Proposed Plan for the Ashland 1 and Ashland 2 Sites (November 1997) (including Seaway Area D)

The New York State Department of Environmental Conservation has completed its review of the United States Army Corps of Engineers' (USACE) "Proposed Plan for the Ashland 1 and Ashland 2 Sites (November 1997)." This letter transmits the results of that review and responds to your March 27, 1998 letter to me.

As you know, at the time the FUSRAP program was transferred to the USACE, we had been discussing with the United States Department of Energy (DOE) several questions regarding the impacts to groundwater from residual radioactive material at the Ashland sites. We had requested additional information in a July 10, 1997 letter to James Kopotic of the DOE, and your March 27, 1998 letter provided that additional information. Based on our review of your March 27, 1998 letter, we agree that it is unlikely that groundwater concentrations of radium, thorium, and uranium will approach or exceed Federal Drinking Water Standards due to residual radioactive material on the sites.

Based on the information presented in your March 27, 1998 letter and on our review of the DOE's final "Radionuclide Cleanup Guideline Derivation for Ashland 1, Ashland 2 and Seaway (September 1997)," this Department approves the USACE "Proposed Plan for the Ashland 1 and Ashland 2 Sites (November 1997)." This approval is based on the following conditions, described in the DOE's September 1997 document:

1. At least 15 centimeters (six inches) of clean topsoil will be placed over the remediated areas.

2. Approach 2 (as described in the DOE's September 1997 document) will be followed to implement the cleanup guideline of 40 pCi/g for thorium-230 (Th-230). Approach 2 involves removing all soils that contain Th-230 at or above that cleanup guideline, such that the site-wide Th-230 concentration after remediation will be significantly less than the target cleanup guideline (DOE estimated that the resulting Th-230 would be approximately 12 pCi/g). In apply this criterion, Th-230 concentrations must be averaged over an area not to exceed 100 square feet.

The source term presented in section 2.1.1.2 of DOE's September 1997 document was based on assumptions about the concentration and distribution of radionuclides other than Th-230 present at the sites. DOE used this source term to estimate the radiation doses presented in section 2.1.2. We also analyzed the potential doses due to that source term under a variety of land use scenarios. Based on those dose assessments, we conclude that if the DOE's assumptions about relative radionuclide concentrations prove to be a reasonable approximation to actual site conditions following remediation, plausible uses of the site after remediation are likely to result in doses less than ten millirems per year.

This Department will determine the adequacy of the remediation based on the concentrations of <u>all</u> residual radionuclides, not solely on whether the 40 pCi/g criterion for Th-230 has been met. The projected radiation doses from all residual radioactive material on site must total less than ten millrems per year under plausible, conservative land use scenarios in order to comply with the Department's Cleanup Guideline for Soils Contaminated with Radioactive Materials, *Division of Solid & Hazardous Materials Technical Administrative Guidance Memorandum 4003 ("TAGM 4003")*. We agree that the most likely uses for the land are commercial or industrial. However, we believe that following the proposed remediation, the land will also be suitable for residential use. After remediation, we will perform dose assessments and pathway analyses to estimate potential radiation doses under several land use scenarios. If we find that the site is not suitable for residential use, deed restrictions should be place on the property to preclude such use.

We look forward to reviewing the work plan for this remediation.

If you have any questions or need further information, please contact John Mitchell of this Bureau at (518) 457-2225.

Sincerely,

Paul J. Merges

Paul J. Merges, Ph.D.
Director, Bureau of Pesticides & Radiation
Division of Solid & Hazardous Materials

cc: P. Kranz, Erie County
K. Rimawi, NYSDOH
P. Tarnawskyj, BFI

APPENDIX A

APPENDIX B

RECORD OF DECISION - APPENDIX B

Responsiveness Summary for the Proposed Plan for the Ashland 1 (Including Seaway Area D) and Ashland 2 Sites Tonawanda, New York

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ACRONYMS AND ABBREVIATIONS

AEC	Atomic Energy Commission
ALARA	as low as reasonably achievable
ANL	Argonne National Laboratory
ARAR	applicable or relevant and appropriate requirement
BFI	Browning Ferris Industries
BNAE	base/neutral and acid extractable
BNI	Bechtel National, Inc.
BRA	Baseline Risk Assessment
CANiT	Coalition Against Nuclear Materials in Tonawanda
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
cm	centimeter
COC	contaminant of concern
cy	cubic yard(s)
DOE	Department of Energy
EIS	Environmental Impact Statement
EO	Executive Order
EQ	environmental quotient
F.A.C.T.S.	For A Clean Tonawanda Site
FBDU	Ford Bacon Davis Utah, Inc.
ft	foot/feet
FS	Feasibility Study
FUSRAP	Formerly Utilized Sites Remedial Action Program
FY	fiscal year
g	gram
HI	hazard index
HQ	hazard quotient
HTRW	hazardous, toxic, and radioactive waste
ICRP	International Commission on Radiological Protection and Measurements
IJC	International Joint Commission
in	inch
K	potassium
LLRWPA	Low Level Radioactive Waste Policy Act
LWV	League of Women Voters
MCL	maximum concentration level
MED	Manhattan Engineering District
mg	milligram
mrem	millirem
NCP	National Contingency Plan
NEPA	National Environmental Policy Act
NORM	naturally occurring radioactive material
NPL	National Priorities List
NRC	Nuclear Regulatory Commission
NYSDEC	New York State Department of Environmental Conservation
OEW	ordnance explosive waste
O&M	operations and maintenance
ORAU	Oak Ridge Associated Universities
OSHA	Occupational Safety and Health Administration
PAH	polycyclic aromatic hydrocarbon

Acronyms (continued)

PCB	polychlorinated biphenol
pCi	picocuries
P.L.	Public Law
PP	Proposed Plan
PRG	preliminary remedial goals
PRP	Potentially Responsible Party
QA/QC	quality assurance/quality control
Ra	radium
RAGS	Risk Assessment Guidance for Superfund
RfC	reference concentration
RfD	reference dose
RI	Remedial Investigation
RME	reasonable maximum exposure
ROD	Record of Decision
s	second
SARA	Superfund Amendments Reauthorization Act
SDMP	Sites Decommissioning Management Plan
SFMP	Surplus Facilities Management Program
SF	slope factor
SVOC	semi-volatile organic compound
TEDE	total effective dose equivalent
TAGM	Technical Administrative Guidance Memorandum
Th	thorium
TMA/E	Thermo Analytical/Eberline
U	uranium
UCL	upper concentration limit
UMTRCA	Uranium Mill Tailings Radiation Control Act
U.S.	United States
U.S.C.	United States Code
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
VOC	volatile organic compound
yr	year(s)

1. INTRODUCTION

On November 10, 1997, Buffalo District, United States Army Corps of Engineers (USACE) issued a revised Proposed Plan (PP) for the proposed cleanup of the Ashland 1 (including Seaway Area D) and Ashland 2 sites (The Ashland sites) in Tonawanda, New York. A public meeting was held on December 17, 1997 during which the Corps presented background information and its recommended cleanup strategy for these sites. During the meeting, the public was invited to submit comments and written comments were accepted from November 10, 1997 to January 20, 1998. This Responsiveness Summary addresses the comments received from the public during the public meeting and comment period.

The preferred cleanup remedy for these sites is Alternative 2A, which is identified on page 10 of the revised PP. This alternative meets the commitments made to community representatives, is fully protective of human health and the environment, complies with all applicable or relevant and appropriate laws and regulations, and provides the best balance among the alternatives that were evaluated for these sites.

2. OVERVIEW OF PUBLIC INVOLVEMENT

Summary of Community Relations Activities for the Release of the Proposed Plan for Ashland Sites

The FY 1998 Energy and Water Appropriations Bill transferred administration and execution of the Formerly Utilized Sites Remedial Action Program (FUSRAP) to USACE from the U. S. Department of Energy (DOE). As part of this transfer, the Buffalo District became responsible for reviewing and issuing the PP which had been developed by the DOE. USACE identified concerns expressed by the community previously and after careful evaluation of the plan's ability to be responsive to the community's concerns, the PP was released on November 10, 1997.

Upon the release of the PP on November 10, 1997, a news release announcing the release of the plan for formal public comment was mailed to a total of 48 newspapers and radio stations in the Buffalo area. Legal advertisements announcing the release of the plan were placed in the Niagara Gazette (Thursday, November 13, 1997), The Buffalo News (Thursday, November 13, 1997), and the Tonawanda News (Thursday, November 13, 1997). A total of 210 copies of the plan were mailed to the stakeholders most impacted by the activities at the Ashland sites.

Newspaper advertisements announcing a USACE FUSRAP Public Information Center Open House scheduled for November 19, 1997, were placed in the Tonawanda News (Monday, November 17, 1997), Niagara Gazette (Sunday, November 16, 1977), Buffalo News (Sunday, November 9, 1997), and Ken-Ton Bee (Wednesday, November 12, 1997). These advertisements announced availability of the PP at the Open House.

An Open House was held at the FUSRAP Public Information Center at 70 Pearce Avenue in Tonawanda on November 19, 1997, from 4 - 7 p.m. Handouts available at the Open House were:

- The PP
- A Summary Fact Sheet on the PP,
- A form for submitting written comments,
- A flyer (reworked from the approved news release) announcing the scheduled public meeting

- A Risk Assessment Fact Sheet, and
- A USACE informational brochure.

A notice announcing the availability of the PP was placed in the Federal Register on November 26, 1997.

On December 5, 1997, an invitation to the public meeting scheduled for Dec. 17, encouraging attendance and comments, was sent to the entire Tonawanda mailing list of 729. A news release announcing the public meeting was sent out to a total of 48 newspaper and radio outlets. Newspaper advertisements announcing the public meeting were placed in the Niagara Gazette (December 14, 1997), Buffalo News (Sunday, December 14, 1997), and Tonawanda News (Tuesday, December 16, 1997).

The public meeting was held on December 17, 1997 from 7 p.m. to 9 p.m. at the Philip Sheridan Building, 3200 Elmwood Avenue in Tonawanda. The following handouts were available to the public at that meeting:

- A USACE Buffalo District Support for Others brochure,
- The PP,
- An Ashland 1 and Ashland 2 PP Summary Fact Sheet,
- An Ashland 1 and Ashland 2 Tonawanda, New York Fact Sheet,
- A Radiation in the Environment Fact Sheet,
- A Radiation at FUSRAP Sites Fact Sheet,
- A How Big is a Picocurie Fact Sheet,
- A Radioactivity in Common Products Fact Sheet,
- A Superfund Fact Sheet,
- A Radiation Fact Sheet,
- A Risk Assessment Fact Sheet,
- A comment sheet for comments on the PP,
- A timeline, and an
- Environmental Glossary.

One hundred and thirteen members of the public signed in at the meeting. A court reporter was available at the meeting to record comments. At the meeting, USACE explained the history of the site and the development of the proposed remediation alternative and answered questions on the plan. Thirteen formal comments were made at the meeting.

Comment period ending reminder cards were sent to the entire Tonawanda mailing list of 729 on January 2, 1998. Comment period extension cards were mailed to the entire Tonawanda mailing list of 729 on January 7, 1998.

The USACE FUSRAP Public Information Center was open throughout the comment period from 8 a.m. to 5 p.m., Monday through Thursday, and from 9 a.m. to noon on Friday.

The Administrative Record file was available throughout the comment period at the USACE FUSRAP Public Information Center, and the Tonawanda Public Library, 333 Main Street, Tonawanda, NY. Information Repositories were available at the FUSRAP Information Center; the Tonawanda Public

Library; the Kenmore Public Library, 160 Delaware Avenue, Kenmore, NY; the Parkside Village Public Library, 169 Sheridan-Parkside Drive, Town of Tonawanda, NY; and the Grand Island Memorial Public Library, 1715 Bedell Road, Grand Island, NY.

3. SCOPE AND ORGANIZATION OF THE RESPONSIVENESS SUMMARY

Sixteen sets of comments were received during the comment period, as well as comments received during the public hearing. An assessment was made of the comments received during the public hearing held in 1993 on the original PP to ensure that those comments relevant to the Ashland sites have been addressed by the revised PP or by this responsiveness summary (SAIC 1998). This assessment has been placed in the Administrative Record. Many of the comments received expressed similar questions and concerns.

To provide a more descriptive response to the comments received on the revised PP, the comments were grouped under 11 key subject areas and generic responses were prepared to cover each comment group. These subject areas with corresponding Generic Comment Response IDs include:

Generic Comment Response ID	Comment Subject Area
(A)	Support of PP
(B)	Approach to PP development
(C)	Residual contamination and exposure
(D)	Public involvement during decision making
(E)	Exposures, risks, and monitoring during remediation
(F)	Other sites, segmentation
(G)	Description of Proposed Remedy
(H)	Remedy does not consider recycling
(I)	Authority
(J)	Supporting documentation
(K)	Potentially Responsible Parties (PRPs)

Section 4 presents these generic responses. Section 5 presents a copy of the transcript from the hearing and copies of the comment documents. Each document is followed by responses to the comments contained in the specific comment document.

USACE encourages those interested in learning more about the Ashland sites or other FUSRAP projects to review the Administrative Record (which contains reports and other information), or call USACE's toll free number (1-800-833-6390) to ask questions or to be added to the mailing list for future mailings. The Administrative Record for the Ashland sites is available for public review at the following locations:

U.S. Army Corps of Engineers
Public Information Center
1776 Niagara Street
Buffalo, New York 14207-3199

Tonawanda Public Library
333 Main Street
Tonawanda, New York 14150

In addition, information repositories are set up at the following locations:

Kenmore Public Library
160 Delaware Avenue
Kenmore, New York 14217

Parkside Village Public Library
169 Sheridan-Parkside Drive
Town of Tonawanda, New York 13072

Grand Island Memorial Public Library
1715 Bedel Road
Grand Island, New York 14072

4. GENERIC COMMENTS AND GENERIC RESPONSES

The format used to address each key subject area consists of a set of composite questions representing the range of comments and the main concerns raised on a given issue. Each composite question is then followed by the USACE response. Table 1 provides a list of individuals or organizations submitting comments and Table 2 provides a comment response index including the date, a number for each comment, a brief description of the comment, and a letter designation(s) referring to the Generic Comment Response ID. USACE's responses to the comments are presented in Section 4.1 through 4.11.

The submitted comments have also been placed in the Administrative Record file for the Ashland sites. The Record of Decision (ROD), including this Responsiveness Summary, has also been placed in the Administrative Record file.

Table 1. List of Commenters

Commenter	No.	Representing	Date
Public Hearing Comments	1	Numerous	December 17, 1997
George M. Melrose	2	Town of Tonawanda	December 30, 1997
James M. Rauch	3	For a Clean Tonawanda Site (F.A.C.T.S.)	January 1, 1998
Gladys Gifford	4	Self	January 2, 1998
Lillian C. Detar	5	Self	January 6, 1998
James H. Kyles	6	Parsons Engineering Science, Inc.	January 8, 1998
James M. Rauch	7	F.A.C.T.S.	January 8, 1998
Norman H. Nosenchuck	8	New York State Department of Environmental Conservation (NYSDEC)	January 9, 1998
Gary H. Bauer	9	Self	January 9, 1998
Francis C. Amendola	10	F.A.C.T.S.	January 12, 1998
Leonore (Lee) S. Lambert	11	League of Women Voters (LWV)	January 12, 1998
Harold R. Roberts	12	International Uranium Corp.	January 16, 1998
Shannon D. Work	13	Spokane Tribe of Indians	January 16, 1998
Arlene & Gerald Poltowicz	14	Themselves	January 20, 1998
Leonore (Lee) S. Lambert	15	LWV	January 20, 1998
James M. Rauch	16	F.A.C.T.S.	January 20, 1998
Leonore (Lee) S. Lambert	17	LWV	January 20, 1998

Table 2. Ashland Sites Revised PP Comment Response Index

Date	Commenter/ Comment No.	Comment from	Description	Comment/ Response ID
12/17/97	1	Comments during hearing		
"	1.1	Taylor	Supports permanent solution	A
"	1.2	Swanick	Supports PP	A
"	1.3	Tobe		
"	1.3.1	"	Cleanup to NYSDEC 10 millirem guideline	B
"	1.3.2	"	All excavated material should be sent off-site	G
"	1.3.3	"	No exposure "credit" for cover fill	C
"	1.3.4	"	Backfill with clean fill	C
"	1.4	"	Request for grant to review health and safety issues	E
"	1.5	"	Training for local emergency response teams	G
"	1.6	Calabrese		
"	1.6.1	"	Support for PP	A
"	1.6.2	"	Sites not zoned for farming, ignore unrealistic cleanup goals	B
"	1.7	Sinclair	Supports CANiTs position	A
"	1.8	Rauch		
"	1.8.1	"	Increase in "Background" levels after remediation	B
"	1.8.2	"	NRC regulations should be used	B
"	1.8.3	"	PP created without public involvement	D
"	1.9	Hennessey	Supports PP	A
"	1.10	Krieger	Contact with international Waterways Commission	I
"	1.11	Dole	Monitoring during remediation	E
"	1.12	Lee	Opposes cleanup, waste of money	B
"	1.13	Schafer		
"	1.13.1	"	Is Linde site higher in elevation than Ashland sites	F
	1.13.2	"	Two-mile creek and Niagara river impacts	F

Table 2. Ashland Sites Revised PP Comment Response Index

Date	Commenter/ Comment No.	Comment from	Description	Comment/ Response ID
"	1.13.3	"	Impact of not cleaning up Linde on remediated Ashland sites	F
"	1.14	Finch	Cleanup standard is not sufficient	B
"	1.15	Watson	Cleanup standard is not sufficient, use 5 pCi/g due to radon issues	B
"	1.16	"	Segmentation seaway	F
12/30/97	2	Town of Tonawanda		
"	2.1	"	Support of proposed remedy	A
"	2.2	"	Compliance with NYSDEC TAGM 4003 and DOE Order 5400.5	B
"	2.3	"	Use of clean backfill, define clean backfill	C
"	2.4	"	Describe institutional controls to be used (fences, signs, etc.)	G
"	2.5	"	Future use restrictions	C
"	2.6	"	Residual contamination monitoring	C
"	2.7	"	Describe USACE oversight during remediation	G
"	2.8	"	Post-closure monitoring	C
"	2.9	"	Estimated dates of completion of Ashland 1 and 2 remediation	G
"	2.10	"	Have sufficient funds been appropriated to complete remediation	G
"	2.11	"	Can temporary remediation infrastructure be left for future site development	G
"	2.12	"	Schedule for addressing remaining sites	F
1/1/98	3	F.A.C.T.S.		
"	3.1	"	Extension of review time	D
"	3.2	"	Request for supporting documents	J
"	3.3	"	Potentially Responsible Parties	K
"	4	Gifford		
"	4.1	"	Support PP	A
"	4.2	"	Is rail transport available	G
"	4.3	"	Inform public of transportation risks	E
"	4.4	"	Ashland 2 wetlands	G
"	4.5	"	Investigation of Two-Mile Creek	F

Table 2. Ashland Sites Revised PP Comment Response Index

Date	Commenter/ Comment No.	Comment from	Description	Comment/ Response ID
"	4.6	"	Assessment of residual contamination after remediation, ecological risks	C
"	4.7	"	SARA Right-To-Know during remediation	G
1/6/98	5	Detar	Support PP	A
1/8/98	6	Parsons		
"	6.1	"	Support PP	A
"	6.2	"	Use local contractor for remediation	G
1/8/98	7	F.A.C.T.S		
"	7.1	"	Flawed process	I
"	7.2	"	Lack of USEPA and NRC involvement	I
"	7.3	"	NEPA/CERCLA integration authority	I
"	7.4	"	Authority to conduct Manhattan Engineering District (MED)/ 11.e.(2) remediation	I
"	7.5	"	Lack of sitewide cleanup plan	F
"	7.6	"	Decrease in reported volumes	J
"	7.7	"	Segmentation-no supplement to draft FS-EIS	J
"	7.8	"	Incomplete administrative record	J
"	7.9	"	NRC is responsible for regulating 11.e.(2) materials	I
"	7.10	"	What person is currently authorized to manage 11.e.(2) materials at Ashland	I
"	7.11	"	Why has NRC not listed sites under SDMP program	I
"	7.12	"	NRC SDMP cleanup guideline should be used	B
"	7.13	"	Linde Groundwater contamination - lack of corrective action program	F
"	7.14	"	Segmentation of review process - Groundwater	F
"	7.15	"	Decrease in reported volumes - must satisfy NRC - address non-rad MED contamination	J
"	7.16	"	Vicinity properties (Town landfill, Niagara Mohawk)	F
"	7.17	"	Interim removal actions at Linde	F
"	7.18	"	Mismanagement of NFSS residues	F
"	7.19	"	Future use assumptions	B
"	7.20	"	Thorium guideline vs. future use	B

Table 2. Ashland Sites Revised PP Comment Response Index

Date	Commenter/ Comment No.	Comment from	Description	Comment/ Response ID
"	7.21	"	Long term protectiveness (1,000 yrs vs 10,000 yrs)	C
"	7.22	"	Radon - When will peak concentration occur	B
"	7.23	"	No breakdown of costs	J
"	7.24	"	Commercial disposal profits / site reversion to state or federal govt. after closure	B
"	7.25	"	Disposal cost estimate vs. actual govt. disposal costs	B
"	7.26	"	Linde building decontamination - segmentation	F
"	7.27	"	No attempt by DOE to identify PRPs	K
"	7.28	"	Selection of ultimate disposal site - use of Nevada Test Site	B
"	7.29	"	Status of USACE's PRP cost recovery efforts	K
"	7.30	"	Why was Tonawanda Site not listed on the National Priority List (NPL)	I
"	7.31	"	Why was PP identified as "Final" before public review	J
"	7.32	"	NEPA review terminated - lack of rulemaking	F
"	7.33	"	Eight day comment extension vs. 30 day	D
"	7.34	"	Segmentation - Seaway	F
"	7.35	"	AEC's knowledge of possible BFI indemnification	F
"	7.36	"	ORAU background vs. background used for Ashland sites	B
"	7.37	"	Current source terms for each Tonawanda Site and estimates of residual source terms	B
"	7.38	"	Ownership of 11.e.(2) materials	I
"	7.39	"	Uranium guideline vs. 100 millirem/yr. dose guideline	B
1/9/98	8	NYSDEC		
"	8.1	"	Include "Seaway D" in title	F
"	8.2	"	List Tonawanda Landfill as VP to Linde	F
"	8.3	"	Support for the Thorium cleanup criteria is lacking in the PP	B
"	8.4	"	Cleanup Guideline document not distributed for public review and comment	J
"	8.5	"	Review of cleanup criteria cannot be completed due to lack of GW information	F
"	8.6	"	Segmentation - potential for additional costs	F
"	8.7	"	Request for copy of cost analysis and volume calculations	J

Table 2. Ashland Sites Revised PP Comment Response Index

Date	Commenter/ Comment No.	Comment from	Description	Comment/ Response ID
1/9/98	9	Bauer		
"	9.1	"	Radiation exposures during remediation	E
"	9.2	"	Will remediation result in unrestricted land use	B
"	9.3	"	Seaway areas A, B, and C	F
"	9.4	"	All radioactive waste should be removed	B
"	9.5	"	Waterfront development should not occur during remediation	G
1/12/98	10	F.A.C.T.S.	Extension of review	D
1/12/98	11	LWV/Lambert		
"	11.1	"	Comment period too short	D
"	11.2	"	40 CFR provides for 30 days and 15 day extension	D
"	11.3	"	Request for 60-90 day extension	D
1/16/98	12	IUC		
"	12.1	"	Off-site disposal should include uranium and vanadium recovery	H
"	12.2	"	Ashland 1 should be re-characterized to assess recovery potential	H
"	12.3	"	Sampling during removal to identify highly contaminated material	H
"	12.4	"	Table 1 in PP does not present possible recycling cost savings	H
1/16/98	13	Givens,Funke,Work		
"	13.1	"	No reference to disposal site impacts, specifically Dawn disposal site	G
"	13.2	"	Disposal at sites where license is being challenged	B
"	13.3	"	Transportation safety issue at Dawn disposal site	G
"	13.4	"	PP does not address impacts at disposal sites relative to minority and low-income populations	B
1/18/98	14	Poltowicz	Support for Alternative 2	I
1/20/98	15	LWV/Lambert		
"	15.1	"	Insufficient review time	D
"	15.2	"	F.A.C.T.S was not involved in negotiations	D

Table 2. Ashland Sites Revised PP Comment Response Index

Date	Commenter/ Comment No.	Comment from	Description	Comment/ Response ID
1/20/98	16	F.A.C.T.S		
"	16.1	"	Flawed process	I
"	16.2	"	Lack of USEPA and NRC involvement	I
"	16.3	"	Explain FUSRAP - cite authority	I
"	16.4	"	Authority to integrate NEPA/CERCLA, conduct MED/ 11.e.(2) remediation	I
"	16.5	"	Lack of sitewide cleanup plan	F
"	16.6	"	NEPA review terminated - lack of rulemaking	I
"	16.7	"	Segmentation-no supplement to draft FS-EIS	J
"	16.8	"	Incomplete administrative record	J
"	16.9	"	NRC is responsible for regulating 11.e.(2) materials	I
"	16.10	"	What person is currently authorized to manage 11.e.(2) materials at Ashland	I
"	16.11	"	Why has NRC not listed sites under SDMP program	I
"	16.12	"	NRC SDMP cleanup guidelines should be used	B
"	16.13	"	Linde GW contamination - lack of corrective action program	F
"	16.14	"	Segmentation - Seaway, BFI indemnification	F
"	16.15	"	Segmentation of review process - GW	F
"	16.16	"	Linde building decontamination - segmentation	F
"	16.17	"	Vicinity properties (Town landfill, Niagara Mohawk)	F
"	16.18	"	Decrease in reported volumes - must satisfy NRC - address non-rad MED contamination	J
"	16.19	"	Interim removal actions at Linde	F
"	16.20	"	Mismanagement of NFSS residues	F
"	16.21	"	Long term protectiveness (1,000 yrs vs 10,000 years)	C
"	16.22	"	Radon - When will peak concentration occur	B
"	16.23	"	Future use assumptions	B
"	16.24	"	Thorium guideline vs. future use	B
"	16.25	"	Radon - When will peak concentration occur	B
"	16.26	"	No attempt by DOE to identify PRPs	K

Table 2. Ashland Sites Revised PP Comment Response Index

Date	Commenter/ Comment No.	Comment from	Description	Comment/ Response ID
"	16.27	"	No breakdown of costs	J
"	16.28	"	Disposal cost estimate vs. actual govt. disposal costs	B
"	16.29	"	Commercial disposal profits / site reversion to state or federal govt. after closure	B
"	16.30	"	Selection of ultimate disposal site - use of NTS	B
"	16.31	"	Designation of site waste as "non-defense"	I
"	16.32	"	Status of ACE's PRP cost recovery efforts	K
"	16.33	"	NEPA review terminated - lack of rulemaking	F
"	16.34	"	Eight day comment extension vs. 30 day	D
"	16.35	"	Why was Tonawanda Site not listed on the NPL	I
"	16.36	"	Revised PP is part of full NEPA/CERCLA package, Revised PP not "Final"	J
"	16.37	"	ORAU background vs. background used for Ashland sites	B
"	16.38	"	Current source terms for each Tonawanda site and estimates of residual source terms	B
"	16.39	"	Ownership of 11.e.(2) materials	I
"	16.40	"	Confirm site-specific uranium guideline	B
"	16.41	"	Change in reported average radionuclide concentrations	J
1/21/98	17	LWV/Lambert		
"	17.1	"	Insufficient review time	D
"	17.2	"	Comments cannot be completed until questions raised by F.A.C.T.S. are answered	D

4.1 Comment Response ID - A - Support of Proposed Plan

Includes comments: 1.1, 1.2, 1.6.1, 1.7, 1.9, 2.1, 4.1, 5, 6.1

Generic comment: Several comments were received in support of the PP and the proposed preferred alternative.

Comment Response: The preferred alternative meets commitments made to community representatives, is fully protective of human health and the environment, complies with all applicable or relevant and appropriate requirements (ARARs), and provides the best balance among the alternatives that were evaluated for the Ashland sites. The remediation that will be performed on the Ashland sites will constitute a permanent remedy for the Ashland sites in that materials exceeding the cleanup guideline developed to protect human health and the environment will be removed from these sites for off-site disposal. This action will allow for the future development of these properties consistent with the Town of Tonawanda Waterfront Region Master Plan.

4.2 Comment Response ID - B - Approach to Proposed Plan development (cleanup guideline, extent of removal, volume calculations)

Includes comments: 1.3.1, 1.6.2, 1.8.1, 1.8.2, 1.12, 1.14, 1.15, 2.2, 7.12, 7.15, 7.19, 7.20, 7.22, 7.24, 7.25, 7.28, 7.36, 7.37, 7.39, 8.3, 9.2, 9.4, 13.2, 13.4, 16.12, 16.22, 16.23, 16.24, 16.25, 16.28, 16.29, 16.30, 16.37, 16.38, 16.40, 16.41

Generic comment: Some commenters expressed concern for the approach to the PP development and made recommendations on cleanup criteria, excavated soil disposal options, dose limits and modeling, and the use of site data. When considering the cleanup criteria, commenter opinions ranged from a complete opposition to any removal in the belief that site remediation would be a waste of money, to agreement with the PP that the selected alternative will be protective to future land users, and to recommendations that all radioactive waste from the Ashland sites and all of Seaway should be removed.

Soil disposal options were addressed by several commenters. Some believe that disposal costs are inflated or are otherwise inaccurate, some believe that soil should be deposited on a government-owned facility and not on a commercially-owned facility (to save tax dollars), and some question the selection of the disposal site.

The dose limit for the site was addressed by some commenters with emphasis on the NYSDEC Technical Administrative Guidance Memorandum (TAGM), and DOE and Nuclear Regulatory Commission (NRC) limits. It was also suggested that NRC guidelines be used to develop site remedial alternatives. One commenter suggested the use of Oak Ridge Associated University (ORAU) background data. Additional information was requested regarding the uranium and thorium guideline developments, cost estimate data, and information on residual radionuclide and chemical concentrations.

Response: Cleanup criteria for the Ashland sites were developed using the CERCLA process. The cleanup criteria must satisfy the CERCLA acceptable risk range as well as the ARARs. The Th-230 guideline development considered intended and reasonable future land use, the likely maximum exposed individuals, and the criteria included in the ARARs. The key ARARs included EPA 40 CFR 192 and NRC 10 CFR 20. The result of the guideline development effort was a cleanup criteria of 40 pCi/g Th-230.

The guideline derivation demonstrated that the conditions at the site, after removing soils exceeding the site-specific derived guideline of 40 pCi/g Th-230, will be protective of human health and the environment, meet the ARARs, and meet the acceptable CERCLA risk range established by the USEPA in the NCP. The analysis also demonstrated that at this cleanup criteria level, the estimated doses to receptors for the intended land uses (commercial/industrial) meet the objectives defined in the to be considered (TBC) guideline of 10 mrem/yr (NYSDEC TAGM 4003) for intended land use.

Leaving the site under current conditions (the No Action alternative) could result in dose and risk levels above specified limits under some potential future use scenarios (as indicated in the PP). Remediating the site to the site-specific criteria would likely lower already low estimated doses and risks, but at a cost of up to an additional $34,000,000. This additional cost is not balanced by the benefit of a significant reduction in radiological dose or risk. In summary, the cleanup criteria for the selected alternative (Alternative 2A) is based on conservative assumptions using methods accepted by USEPA, considering all applicable or relevant and appropriate laws standards or requirements, and considering other guidelines, as appropriate.

Disposal options for excavated soil are evaluated in the Ashland sites' detailed cost estimate. These cost estimates are available and have been entered in the administrative record. CERCLA provides that cost is a criteria for evaluation of remedial alternatives, but that it may only be used to compare those remedial alternatives which are protective of human health and the environment and which will comply with ARARs. Among the alternatives considered, the selected remedy is the lowest cost which is both adequately protective and complies with ARARs. Appropriate disposal facilities were evaluated under DOE and are being evaluated by USACE in an effort to reduce cost without compromising the final remedy. The selection of the ultimate disposal site will be addressed as part of the Remedial Action phase of the cleanup using the standard government procurement procedure after completion of the remedial design and prior to commencement of the remedial action.

To assure that estimates do not drastically underestimate actual costs, it is assumed that soils exceeding the cleanup guideline will be excavated and shipped to an off-site disposal facility in the western portion of the United States. The cost of disposal per cubic yard is a negotiated cost and is not intentionally inflated or misrepresented in cost estimates. The ultimate goal of each cost estimate is to allow USACE to accurately project funding requirements for activities such as the remediation of the Ashland sites. It is not beneficial to underestimate or overestimate potential disposal costs.

As mentioned, dose considerations from NRC and NYSDEC were considered in the evaluation of possible Th-230 concentration guidelines. By removing soils exceeding the site-specific derived guideline of 40 pCi/g Th-230, doses to future industrial workers are calculated to be lower than the most conservative criteria considered (NYSDEC) and will also meet criteria for indoor radon concentrations, total radium concentrations, and lifetime risk.

The calculated dose for intended future land use is 7 mrem/yr, which is below the NYSDEC 10 mrem/yr guideline. The dose estimate for a hypothetical non-farming resident at the Ashland sites was also calculated. This dose was estimated to be approximately 20 mrem/yr, which is less than the recently promulgated NRC criteria of 25 mrem/yr, and much less than the value of 86 mrem/yr as stated by one of the commenters.

A uranium guideline of 60 pCi/g total U was previously developed for all of the Tonawanda sites in 1988 by Argonne National Laboratory (ANL) for the DOE. For the Ashland sites, this guideline is superceded by the 40 pCi/g Th-230 guideline. The Th-230 guideline was developed specifically for the Ashland sites taking into account the intended land uses and the effects of all the radionuclides at their relative distribution at the Th-230 guideline value. At this value, the U-238 concentration remaining at the site is expected to be well below the previously derived guideline. The Th-230 guideline was developed using conservative exposure parameters and assumptions, and used site specific data.

The guideline development was performed in accordance with USEPA guidance and provides conservative estimates of dose and risk to a maximally exposed individual. The NRC provides guidance for performing dose calculation in support of decommissioning activities. Although the site is not and has not been licensed by the NRC, the decommissioning criteria is relevant and appropriate and will be met after remediation is complete.

Site data were used in dose and risk calculations to calculate the Th-230 guideline value for Alternative 2A. This data included radiological data collected during the RI activities and stored in the site database. Other studies have been performed (specifically referencing the ORAU study) that could be used in dose and risk estimates. This data and the appropriate quality assurance and quality control information is not, however, maintained in the site database. Considering that the site database already contains data from hundreds of samples, it was not considered appropriate or necessary to incorporate the ORAU (or other) uncontrolled data.

Estimates of the radionuclide concentrations were made for the Ashland Sites using all available Ashland and Seaway data. The first estimate was the average concentrations for the site in the current state before any removal actions are initiated. The average concentrations (95% UCL of Mean), including background, for Ra-226, Th-230, and U-238 were 8.59 pCi/g, 111 pCi/g, 27.2 pCi/g, respectively. After removing soils with Th-230 > 40 pCi/g, the average concentrations (95% UCL of Mean), including background, of the remaining soils were estimated for Ra-226, Th-230, and U-238 to be 1.22 pCi/g, 12.4 pCi/g, and 6.26 pCi/g, respectively. The DOE had considered another approach for remediation that would have resulted in a 2-meter thick soil layer with a uniform soil concentration of 40 pCi/g Th-230. Under this approach, the average concentrations of the remaining soils were estimated for Ra-226, Th-230, and U-238 to be 2.7 pCi/g, 40 pCi/g, and 8.8 pCi/g, respectively. This approach is not being considered by USACE.

4.3 Comment Response ID - C - Residual contamination and exposure

Includes comments: 1.3.3, 1.3.4, 2.3, 2.5, 2.6, 2.8, 4.6, 7.21, 16.21

Generic Comment: Some commenters expressed concern over post-remedial conditions. Comments included concern over the source and application of clean backfill, post-closure monitoring, long-term protectiveness, future indoor radon concentrations, and residual radionuclide concentrations.

Response: Prior to backfilling the excavations with clean fill, the soils remaining will be tested to ensure that the cleanup criteria has been achieved. Clean backfill will be supplied from an off-site commercial source. The USACE intends to backfill excavations with this clean soil, vegetate the area and restore the site to its original appearance (or better).

Once the site has been restored, it can be released for development into an industrial/commercial-use facility with 5-year reviews. Monitoring will not be required and residual radionuclide concentrations will, on average, be much less than the guideline value resulting in actual doses and risks less than specified limits. Consequently, the remedy will be protective of human health and the environment, including ecological receptors at the site.

Because the primary contaminant is Th-230 (with a 77,000 yr half-life), radon concentration will peak well into the future. However, the radon and radium concentrations estimated for the site after remediation are within acceptable limits over the required 1,000 year review period (40 CFR 192), the maximum time period to be modeled according to regulations, and are not anticipated to be of concern given the site history, configuration, and intended land use. For dose modeling, no credit is taken for backfill materials.

4.4 Comment Response ID - D - Public involvement during decision making

Includes comments: 1.8.3, 3.1, 7.33, 10, 11.1, 11.2, 11.3, 15.1, 15.2, 16.34, 17.1, 17.2

Generic Comment: The PP was created without public involvement, excluding one of the stakeholder groups, and leaving stakeholder questions unanswered. The comment period is too short providing insufficient review time.

Comment Response: When the Fiscal Year (FY) 1998 Energy and Water Appropriations Bill transferred administration and execution of FUSRAP to USACE from the DOE, the Buffalo District assumed responsibility for issuing the PP for the Ashland sites. Prior to releasing the PP for public comment, USACE reviewed community concerns to maximize stakeholder opportunity to participate in the decision-making process. Mindful of the concerns about limited public participation in development of the PP, USACE prepared a communications plan for release of the PP. The activities detailed in that communications plan are discussed in Section 2, Overview of Public Involvement. The public involvement opportunities offered by USACE were intended to encourage public participation in the CERCLA decision process, and they do meet the requirements of CERCLA, as amended, and the NCP.

USACE representatives provided several opportunities for stakeholders and the community to receive answers to their questions about the PP. One opportunity was provided at the public meeting on December 17, 1997, prior to the portion of the meeting reserved for the acceptance of public comment. Buffalo District employees also had informal discussions with members of the public on the telephone.

The PP was issued on November 10, 1997 and USACE granted a 30-day extension to the comment period. An additional 11 days was added to this extension after several members of the public requested additional time for preparing their comments. With the extension, the comment period totaled 71 days. Other extensions were considered, however, USACE determined that additional extensions were not appropriate.

When FUSRAP was transferred to USACE, Lieutenant Colonel Michael Conrad, Commander of the Buffalo District, met with all key stakeholders for the Ashland sites. Three representatives from F.A.C.T.S. were included in this meeting. Representatives of this group also submitted comments, both at the public meeting and in writing. Their concerns, as stated in these comments to USACE, have been considered in the decision regarding the remedy selection, and the responses are included in this Responsiveness Summary.

4.5 Comment Response ID - E - Exposures, risks, monitoring during remediation

Includes comments: 1.4, 1.11, 4.3, 9.1

Generic comment: Health/safety issues and risks due to radiation exposure during remediation and transportation should be addressed.

Response: For remediation at the Ashland sites, the remediation contractor will develop, implement and have available for audit, a minimum number of work plans which will be able to demonstrate compliance with USACE requirements: Ionizing Radiation Protection, ER 385-1-80; Radiation Protection Manual, EM 385-1-80; Safety and Occupational Health Document Requirements for Hazardous, Toxic, and Radioactive Waste (HTRW) and Ordnance Explosive Waste (OEW) Activities, ER 385-1-92 (Appendix B); Safety and Health Requirements Manual, EM 385-1-1, 1996.

Additional requirements include the Resident Engineers Management Guide for HTRW Projects, EP 415-1-26 and 260 (Safety); Occupational Health and Safety Administration (OSHA) General Industry Standards 29 CFR 1910.120 and 1096, OSHA Construction Standard 1926.53; NRC Standard 10 CFR 19.20, 10 CFR 20, 10 CFR 30; Department of Transportation Regulations 49 CFR parts 170-179 and 290-397; and USEPA Regulations.

Compliance with the above requirements will ensure that the health/safety issues and risks due to radiation exposure during remediation and transportation, to site workers as well as the surrounding population, will be successfully addressed.

Appropriated funds will be used to fund the cost of response actions on the site, and no particular groups will be provided with funding. USACE will continue to provide information on the remedial action to the public and welcomes public interest in the work throughout the project.

4.6 Comment Response ID - F - Other sites, segmentation

Includes comments: 1.13.1, 1.13.2, 1.13.3, 1.16, 2.12, 4.5, 7.5, 7.13, 7.14, 7.16, 7.17, 7.18, 7.26, 7.32, 7.34, 7.35, 8.1, 8.2, 8.5, 8.6, 9.3, 16.5, 16.13, 16.14, 16.15, 16.16, 16.17, 16.19, 16.20, 16.33

Generic Comment: Comments were made regarding the decision to address the various locations within what was previously been called the "Tonawanda site" separately, and the potential implication it has on; National Environmental Policy Act (NEPA) compliance, cost and the remediation of each site. In addition several specific comments pertaining to planned actions at other sites that are not the subject of the current PP were submitted along with comments regarding references to other sites in the PP.

Comment Response: USACE is addressing all FUSRAP sites, including the Ashland sites, pursuant to the authority of and in compliance with the CERCLA (42 U.S.C. Section 9601 et seq.) and the NCP (40 CFR Part 300). Additionally, in accordance with 32 CFR 651.8, USACE has and will integrate appropriate NEPA procedures into the process required by CERCLA. The CERCLA process is deemed to satisfy the requirements of NEPA.

Before proposing the plan to remediate the Ashland sites, USACE carefully considered the program management principles set forth in NCP, 40 CFR 300.430. Based on those goals it was determined that it was appropriate to remediate the Ashland sites to achieve significant risk reduction quickly while the remainder of the Tonawanda sites are being addressed and to expedite the completion of the total cleanup. It was also noted that due to the geographic position of the Linde site relative to the Ashland sites, there will be no adverse impacts on the Ashland sites from other Tonawanda sites after remediation is complete. Although Linde is higher in elevation than the Ashland sites, drainage from the Linde site is directed to Twomile Creek and does not enter the Ashland sites. Drainage from the Ashland sites is via Rattlesnake Creek to Twomile Creek and into the Niagara River. Testing conducted during the investigation phase of the remedial investigation/feasibility study (RI/FS) process, did not indicate impacts to the surface water at the confluence of Rattlesnake Creek and Twomile Creek, indicating that there is no impact from the Ashland sites on the Niagara River. It was also determined that the cleanup of the Ashland sites will not be inconsistent with nor preclude implementation of the final remedies at the remaining Tonawanda sites. Pursuant to that determination, and consistent with the NCP, 40 CFR 300.430(f)(2), the decision was made to propose a plan to remediate the Ashland sites at this time and prior to proposing remedies at other Tonawanda sites.

Proposing a plan for a separate operable unit of a site is not inconsistent with NEPA compliance. 32 CFR 651.8(a)(8) indicates that completion of a FS prepared in accordance with 40 CFR Part 300 and 40 CFR Part 1500-1508 will affect compliance with NEPA by providing a substantive and procedural standard to ensure full consideration of environmental issues and alternatives, as well as full public participation. In this case, an appropriate FS was completed and the process required by 40 CFR Part 300 for proposing a final decision at a portion of the studied site has been properly followed. Therefore, the decision to proceed at the Ashland sites is in compliance with NEPA.

Regarding the specific comments received about other FUSRAP sites, those concerns will be addressed when action is proposed at those specific sites. The public will continue to be informed of schedules and actions at the other Tonawanda FUSRAP sites through the continued implementation of the Community Relations Plan.

In response to the comments regarding references to other sites in the plan: Seaway D has been added to the title. USACE is aware of the Tonawanda Landfill site, is evaluating the appropriate approach to response, and will be in communication with the Town of Tonawanda officials regarding any response actions. USACE will address additional vicinity properties as designations are made.

In a March 27, 1998 letter to the NYSDEC, USACE responded to NYSDEC questions about groundwater concentrations resulting from residual radioactive contamination at the Ashland sites (USACE 1998). This information is available in the Administrative Record. The USACE response described the use of USEPA's VLEACH model to estimate the leaching of radionuclides to groundwater after the sites are remediated in accordance with the site-specific cleanup guideline of 40 piC/g Th-230 derived from the Ashland sites (DOE 1997).

The modeling used concentrations of total uranium, radium (Ra)-226 and Ra-228 and Th-230 estimated by DOE (DOE 1997) to remain on the Ashland properties after cleanup to site-specific guidelines and very conservative assumptions concerning the solubilities of the radiologically contaminated source material. The results of modeling showed that the resulting concentrations of the radionuclides in groundwater would be below federal drinking water standards that have been calculated to be protective of human health and the environment at levels less than 10^{-6} for increased cancer risk.

Based on the conclusions concerning geological conditions that indicate that contaminant leachate from the Ashland properties are not likely to reach groundwater (BNI 1993), and the prediction using the VLEACH model showing radionuclides at levels in groundwater below drinking water standards (USACE 1998), it was concluded that risks to groundwater from radiological contamination will be minimal after the cleanup at the Ashland properties to the site-specific guideline.

4.7 Comment Response ID - G - Description of Proposed Remedy

Includes comments: 1.3.2, 1.5, 2.4, 2.7, 2.9, 2.10, 2.11, 4.2, 4.4, 4.7, 6.2, 9.5, 13.1, 13.3

Generic comment: Comments were made regarding how USACE was going to implement the PP and ROD. Specific questions related to the activities that will take place during and after the remediation.

Response: USACE has many years experience managing large and complex construction projects. The Buffalo District will tap into the full resources of USACE and associated contractors to ensure that the project is done properly and safely.

The current remediation plan for the Ashland sites is to excavate contaminated soils, move them to a rail siding, and transport them off site by rail. The contractor will be required to submit work plans in advance, subject to government review and approval, which will demonstrate a safe and efficient approach to the work and will also demonstrate understanding of and intent to comply with all worker and public safety requirements which apply to the work in progress. The plans will also be reviewed by regulatory agencies, including coordination with appropriate emergency response organizations, to ensure protection of human health and the environment and compliance with applicable or relevant and appropriate laws and regulations, to the extent applicable, such as the Emergency Planning and Community Right to Know Act of 1986.

The actual work will be conducted by contractors with experience on similar projects. Standard government procurement procedures will be followed by USACE in selecting qualified contractors to perform all necessary work to complete response actions at these sites.

USACE will oversee the work to ensure that it is being done in accordance with the Scope of Work, approved plans, and all safety rules and regulations. USACE's oversight will include significant presence, on-site, when work is being conducted. Reports will be prepared each day of work and the contractors work will be closely monitored and evaluated. This oversight is in addition to the quality control and safety procedures and personnel maintained by the contractor.

USACE will review the contractor's transportation and disposal plan to ensure that it complies with all applicable or relevant and appropriate laws, regulations and executive directives, and is protective of human health and the environment. Specifically, USACE will comply with the Executive Memorandum signed April 29, 1994 by President Clinton which implements requirements for federal actions affecting Indian Tribes and Nations, to the extent applicable and appropriate. Transportation or disposal plans that are judged to be in violation of applicable or relevant and appropriate laws, regulations or executive directives or present an unacceptable risk will not be approved. It is the USACE position that all aspects of the remediation, including transportation and disposal, will be conducted in a manner to minimize risk to public health and the environment.

Throughout the remediation, institutional controls will be used to ensure the safety of workers and the public. Fencing will be placed around the loading area and in other key locations to provide security. Appropriate signs will be used on-site to provide a visual warning of the site hazards. These controls will be removed after the remediation is complete.

Real estate agreements are currently being worked out at each effected property. These agreements state the conditions of use and expected restoration by the government after the remediation. Whether temporary roads and rail loading facilities will be left in-place will be subject to the agreement of the current land owners.

The current schedule shows remediation being completed at Ashland 2 in 1998 and Ashland 1 in 1999. These schedules are based on removing the volume of contaminated soil used in the cost estimates included in the PP. If site conditions vary from the modeled contamination, the project will be done either more quickly or will take longer than planned.

All work is subject to the availability of appropriated funds from Congress. Funds have been and will continue to be requested to complete all the work described for this remedial action. It is anticipated that funds will be made available to initiate the remedial action in a timely manner after the issuance of the ROD and completion of the remedial design.

Funding is currently being requested to ensure that the remedial action for Ashland 1 can be completed in 1999. There is no guarantee, however, that congress will appropriate the funds in 1999 that are ultimately requested for the FUSRAP program.

The conduct of this project does not specifically prevent the concurrent development of adjacent uncontaminated areas, in accordance with the town zoning laws and other applicable or relevant and appropriate laws and regulations. Impact to wetlands will be minimized to the extent practicable during remediation activities. Upon completion of the remediation the Ashland sites will be suitable for use as a commercial or light industrial property in accordance with the Town of Tonawanda Waterfront Region Master Plan.

4.8 Comment Response ID - H - Remedy does not consider recycling

Includes comments: 12.1, 12.2, 12.3, 12.4

Generic Comment: One comment letter was received that raised several questions relating to possible recycling of constituents contained in the soils to be remediated at the site. The commenter felt that cost savings might be realized through the separation and recycling of uranium and vanadium from the excavated soils.

Comment Response: In 1994 soil samples were obtained from several Tonawanda sites, including the Ashland sites, and tests conducted to assess the feasibility of cost effectively reducing the volume of soils requiring disposal as radioactive waste through treatment. Soil washing was the primary process evaluated. However, much of the contamination was found locked within a slag type matrix, making it difficult to chemically extract. The chemical extraction treatment process was not cost effective as it could not produce a clean soil fraction to offset the cost of purchasing and recycling the extractant solution.

Typically, the recovery of metals from soils is done through a chemical extraction process similar to the type evaluated in these treatment tests. As much of the contamination in the soils is bound within a slag type matrix, and the chemical extraction process needed for metals recovery is costly, it is not expected that recovery of metals from the soils would produce a cost savings. Thus, the selected alternative achieves the best possible result in terms of satisfying the statutory preference for remedies that employ treatment that reduces toxicity, mobility or volume as a principal element.

4.9 Comment Response ID - I - Authority

Includes comments: 1.10, 7.1, 7.2, 7.3, 7.4, 7.9, 7.10, 7.11, 7.30, 7.38, 16.1, 16.2, 16.3, 16.4, 16.6, 16.9, 16.10, 16.11, 16.31, 16.35, 16.39

Generic Comment: A number of comments were received that focused on the classification of the radioactive materials being remediated at the Ashland sites and the proper authorities associated with the remediation as well as the regulatory oversight.

Response: USACE is evaluating the nature of the materials to be disposed and will make determinations regarding waste types as necessary for proper offsite disposal. USACE will comply with all applicable or relevant and appropriate laws and regulations for the radioactive or other hazardous substances which will be disposed offsite.

The Energy and Water Development Appropriations Act of 1998, P.L. 105-62, transferred the responsibility for the administration and execution of FUSRAP from DOE to USACE. USACE is proceeding with the remediation of the Ashland sites in accordance with CERCLA (42 U.S.C. 9604 et seq.).

NRC has stated that they do not have jurisdiction over wastes created by MED prior to November 1978. NRC's jurisdiction over byproduct materials began in 1978 and they do not consider it to be retroactive to the time frame when MED material was generated.

In accordance with 32 CFR 651.8(a)(8), it is USACE policy that a feasibility study done in compliance with the NCP (40 CFR 300) provides substantive procedural standards to ensure full consideration of environmental issues and alternatives, and sufficient opportunity for the public to participate in the decision making process, making it unnecessary for a separate NEPA document to be generated.

The PP has been made available for all potentially interested parties to review, including the International Joint Commission (IJC). USACE has not received any comments from the IJC.

4.10 Comment Response ID - J - Supporting documentation

Includes comments: 3.2, 7.6, 7.7, 7.8, 7.15, 7.23, 7.31, 8.4, 8.7, 14, 16.7, 16.8, 16.18, 16.27, 16.36, 16.41

Generic Comment: Several comments were received relating to the availability of supporting documentation used in the preparation of the revised PP and designated as part of the Administrative Record for the site.

Comment Response: Documentation relating to calculations used in the cost evaluation of the investigated remedial alternatives (including volume estimates) have been placed in the Administrative Record and are available for public review. A major component of the cost analysis is the volume of the soils determined to require removal and disposal. The cost estimates used for the development of the revised PP used volumes calculated based on a model of the site contamination generated using existing soil contamination characterization results from all historical sampling conducted at the site. The calculations and results of the modeling have also been placed in the Administrative Record.

It should be noted, however, that the cleanup of the Ashland sites will not be driven by any previous or future volume estimates generated by modeling site conditions. The cleanup of these sites will be driven by the established cleanup criteria. The cost estimates and their corresponding volume estimates were generated and used in the CERCLA process to help evaluate proposed remedial alternatives. The volumes ultimately removed and actual remediation costs will vary as the soils found to require removal during the remediation process are excavated and shipped off-site for disposal.

Additional documents that should be considered for inclusion in the Administrative Record, identified and provided by one commenter, have been placed in the record, as attachments to the comments received. All other appropriate documents have been included in the Administrative Record as well.

As one commenter pointed out, the revised PP for the Ashland sites is one component of the CERCLA documentation of the remediation of the Tonawanda Site as a whole. The document distributed for public comment represents the final version of the revised PP, based on the RI/FS published in 1993 and comments received on that document relevant to the Ashland sites, the guideline derivation document published in July 1997, and the USACE version (Alternative 2A) of the originally stated Alternative 2 in the 1993 PP. The USACE Alternative 2A is equivalent to the Alternative 2 developed by the DOE except that a site-specific guideline is used instead of the generic guidelines.

A concern was raised over the differences in radionuclide concentrations presented in the RI report and subsequent presentations. The averages shown on RI page 4-159 are based upon the "short list" of data shown in the associated tables (4-24 and 4-42). When these short list data locations are plotted on the site drawings, they include only those borings located in the more highly impacted portions of the sites.

The averages used in subsequent presentations are based upon the full data set for each of the sites (found in Tables A-10 & A-15 and A-12 & A-17). These full data sets contain approximately 1.5 times the data that is in the short lists. Since the full data sets include the lower readings from the "non-impacted" portions of the sites, the averages are lower.

4.11 Comment Response ID - K - Potentially Responsible Parties (PRPs)

Includes comments: 3.3, 7.27, 7.29, 16.26, 16.32

Generic Comment: Comments were received regarding the status of any action regarding the pursuit of PRPs at the Tonawanda sites and offers of indemnification to Browning Ferris Industries (BFI).

Comment Response: USACE has begun to research issues regarding PRPs and will pursue all appropriate means to seek reimbursement from responsible parties on behalf of the Federal Government. However, at this time, no decisions have been made regarding specific parties to pursue nor have offers of indemnification been made by USACE to resolve any liabilities that the Federal Government may have.

5. SPECIFIC COMMENTS AND SPECIFIC RESPONSES

This section of the responsiveness summary presents the comment documents, each followed by specific responses to the comments contained within the comment document.

IN THE MATTER

OF

PUBLIC MEETING

RE:

ASHLAND 1 AND ASHLAND 2

PROPOSED PLAN

Minutes of Public Hearing held at the Philip Sheridan Building, Kenmore, New York, on Wednesday, December 17, 1997, commencing at 7:00 P.M.

JEC:pw

DePAOLO-CROSBY REPORTING SERVICES, INC.
BUFFALO, NEW YORK 14202-2102

COL. CONRAD: I would like to welcome you to tonight's public meeting discussing the proposed plan for the cleanup of Ashland 1 and Ashland 2 and the Seaway Area D for Delta.

The proposed plan that was issued by the Corps of Engineers on the 10th of November, we are in the process now of receiving public comments on the proposed plan.

In case you don't know, the proposed plan is indicated or located over there on your right, my left in the blue cover in case you haven't seen that before and that's the purpose of this meeting, is to receive public comment on the proposed plan.

As you know, the Corps of Engineers took over or you may not know, the Corps of Engineers took over the FUSRAP Program starting on the 13th of October, 1997 and that was signed by President Clinton on that day in the Energy and Water Appropriations Bill. It was probably an unprecedented act by moving one program from the Department of Energy into the Corps of Engineers.

Let me talk a little bit about the congressional intent of the transfer from DOE to the Corps of Engineers on this program.

Congress' intent was to oversee the management, the oversight, programming and budgeting, technical investigations, designs, administration and other activities leading to remediation, including remediation for the sites. What you didn't hear me say was the authority. Okay. DOE has the self-regulating capability that Corps does not. I will talk about that a little bit later.

Now, the authority to make rules for cleanup is not part of the Corps of Engineers. That was not transferred over to the Corps of Engineers from the DOE. That still remains at DOE. Right now the way that is working is that there is a proposed memorandum of understanding between the Department of Energy and the Corps of Engineers to handle that transfer but it's quite clear as to the authority that the Corps has to execute not only this cleanup but other cleanups in New York State and Ohio. In fact the Buffalo District has eight FUSRAP sites that I am now responsible for starting on the 13th of October thanks to President Clinton signing that bill.

So, you will hear some issues talked about, whether or not the Corps has the authority to clean up the sites. We have the authority to clean it up, we do not regulate. We do not set the criteria. We have to work through other agencies to establish and to maintain that criteria. That is nothing new for the Buffalo District because I will talk about some of the expert experience we have in other cleanups, in other areas and DOE programs.

Let me talk a little about the -- go ahead to the next slide, please.

Let me talk quickly about tonight's agenda. I have already started into the introduction. After the introduction I'm going to pass it on to Mr. Dave Conboy to give a technical presentation. We will then take a break. Actually I will allow about 15 minutes time period for people to ask questions of Dave Conboy on his technical presentation. We will then take a break. We will then get back up and get public comments and to listen to you and how you feel, what your perspective is, your views on the proposed plan.

Now, again, the primary purpose of this meeting here, I have to hear and we need to record those comments that are coming from the public on this plan.

Starting right now, they transferred the FUSRAP from the Department of Energy to the Corps of Engineers. I already started talking about that. I would also like to add on that when you get the Corps of Engineers, you are getting an organization that is focused on execution and what I mean by execution is, I am being held responsible to making sure that these cleanups are done efficiently, effectively, according to a budget and according to a set amount of dollars given to me to do that. That is the authority. That is the way the Corps operates. It operates on a project management principle. So, I have got a lot of budget managers on these sites making sure that we executing, we are on schedule and in accordance with the budget. That's the way the Corps has operated in the past with projects and that's the way we are going to operate in the operate in the future with these cleanups.

In addition, the dollars that the Corps of Engineers receives for FUSRAP and for other programs, for your information, is program dollars. They are dollars to clean up according to a project for the cleanup site. Those same dollars that we receive to do that work, pays the salary of the Corps of Engineer employees. So, we do not receive any money just for people's salaries to just sit around and administer things. We get program dollars that we have to not only pay contractors and do the work but also pay the salaries. That is key because in order to execute this program, I have got so many millions of dollars, I have to clean up the program as well as pay salaries and that's the way the Corps operates.

Now, the FUSRAP Program at the Corps of Engineers is high priority. This is a four billion to five billion dollar program. Now, you compare that to this program of FUSRAP, nationwide, this is about $140,000,000. After you compare the $140,000,000 to the four or five billion, it's not that much but believe me, because of the nature of this cleanup and the nature of the way the program was transferred from DOE to the Corps, it is a high priority with the Corps of Engineers. I can attest to that personally because I was summoned to Washington, D.C. about two weeks after the program was started and was along with my boss in Cincinnati and we were told by a three-star general, chief of engineers, he told me that I will not fail, okay and so he paid my flight from Buffalo to D.C. just to tell me that. Now, that was incorporated in a two-hour meeting. Okay. That's not the way the Corps operates. Normally I get sent a mission down to Buffalo and I have to execute it but this is such a high level, high Corps of Engineers, they wanted to see my eyeball-to-eyeball to get that done, okay and you can probably understand when a three-star general sitting in Washington, D.C. on this program, he probably wants to get the same thing. So, I had eye-to-eye contact with Lieutenant General Ballard who told me exactly what I had to do here.

Now, you are also getting with the Corps of Engineers, you are also getting the Buffalo District, okay. The Buffalo District Corps of Engineers is sitting right there at Black Rock Lock, about 250 people. The majority are civilians. There are only two people that wear this uniform. I am the commander of the district and my deputy, one of my two deputies is also a major, okay. The rest of them are departmental civilians and we have been involved in civil works projects, the Corps has been involved in civil works projects since 1829. We were in Harborzak in 1829. The Buffalo office has been in Buffalo since 1857, the permanent office there. So, we have been around awhile, okay. All the people, I've got 250 people employed right there at Black Rock Lock that have some experience, actually they have quite a bit of experience in cleanups and as a part of that 250 people, I have got a hazardous, toxic, a radiological waste design center already there, before FUSRAP, before we could even spell FUSRAP 60 days ago, that design center was already there. I have done cleanups for DOD. We have done cleanups for other federal agencies, primarily hazardous and toxic wastes, not a lot of radiological waste cleanup, okay but there has been a lot of radiological waste cleanup with the Corps of Engineers and when we talk about the district, we are talking about the Corps of Engineers.

Now, we have access, we have people from Louisville, Nashville and Baltimore, other districts throughout the nation to come assist us in this endeavor.

So, those are some of the things you are getting with the Buffalo District. You are getting experience because we have done other cleanups before. You have also got people locally to draw from, okay. If you want to know what is going on with these projects, you don't have to very far. We right here in Buffalo and in addition to that, we are very familiar with the public comment period and the process. We do these things with a number of our projects, high-level projects. We end up going through the public comment period. We have a public meeting such as this and some of these meetings aren't quite as well attended as this and I thank you but nevertheless, this is nothing new for the Corps of Engineers to bring people in in this process.

Now, I have told you a little bit about the transfer from the DOE to the Corps of Engineers. I've talked a little bit about what the Corps of Engineers is. I have talked quickly about what the Buffalo District of the Corps of Engineers is going to do. We will talk a little bit now about development of proposed plan. You probably can talk about this, the people in this room can talk more about this bullet than I can. Like I said, before the 13th of October of this year, the Corps of Engineers had nothing to do with FUSRAP. So, there are a lot of people in this room and I know some of these people in the room have been involved with this thing for in excess of five years, ten years, okay. So, a lot of people can talk about the development of the proposed plan.

We reviewed the plan. The Corps of Engineers reviewed the plan and not only the people in Buffalo but we convened a small -- in fact, a fairly large team nationwide and reviewed all of the FUSRAP sites.

We do our cleanups through CERCLA. Most people have heard that acronym before, okay. That's the criteria that we use for cleanups and that's the same criteria that we used to propose the proposed plan and to clean up Ashland 1 and 2. So, we reviewed that thing, not only we as the Buffalo District but we, the Corps of Engineers. We are satisfied that the proposed plan incorporates the CERCLA requirements as well as incorporating the NEPA values that are important, that are law to clean up items of radiological waste, hazardous and toxic, whatever it be across the United States.

So, we have done that process before for other cleanups, primarily hazardous and toxic in other areas and in the more central part of the country. So, we will review that same cleanup with the same plan according to CERCLA criteria.

We are content and satisfied about the way it was structured in the past to do that. If we weren't satisfied, we would not be able to have this public meeting. There is no way we could go out on the street with the proposed plan if we were not satisfied as an agency that it met the intent and the letter of the laws that require us to do environmental cleanups.

Now, the third bullet there in the public input, that's pretty much like I said before, I already said twice, that's the purpose of this meeting right here. We need to hear your concerns, your issues, whatever you think about the proposed plan. We are new on the block. We understand that. There are a lot of things out there that you know, a lot of things out there that we probably don't know and that's the reason for this meeting.

The last thing, of course, no decision has been made. Again, the purpose of this meeting, we have to get all the information, the input from the public to make the proper decision, proper recommendation to get a record of decision on this cleanup.

Now, I'm going to stop talking here shortly and I'm going to pass it over to Dave Conboy who will give you a technical presentation. What I told Dave to do, he has got about a 20 to 25-minute presentation and to help explain the proposed plan in case some people don't understand it. I told Dave we should then allow for about a 15-minute session to answer direct questions on his presentation. After that we will take a break and we will allow for public comment.

Some of the ground rules for the public comment, so we are not here three or four days from now still sitting around the table is that, what you see up there on the slide. Again, one person speaks at a time. We try to limit the discussion to five minutes. That way everybody will get an opportunity to be heard. If you feel you would like to say something more than five minutes, I would ask that you send it in in writing or by some other means. Otherwise, summarize your presentation in five minutes, please.

I have got one break scheduled right now right before the comment period and we will do more if needed.

Okay. We will stay as long as it is necessary.

For your own information and because this is a requirement by law to have this public meeting, we have also incorporated a court reporter to record all of the public comments that are made at this meeting. So, that's the reason for him up here in the front.

All right. Now, the proposed plan is stated basically in a few sentences up here on the next slide. The remedy action is to excavate and ship for off-site disposal soils exceeding 40 picocurie per gram of thorium followed by a site restoration. That is the plan.

Now, what are the benefits of that? There are four basic benefits. It's fully protective of human health and the environment or else there is no way we could put that plan out. It meets all requirements of all relevant regulations, including the DEC regulations. It can be initiated in a timely manner. A timely manner means this year and the fourth bullet is, it's responsive to community concerns.

Okay. What I would like to do now is pass over the baton to Mr. Dave Conboy, the Project Engineer for this proposed plan for the Corps of Engineers. Dave.

MR. CONBOY: Thank you, sir. My name is -- is this mike on? Can you hear me in the back? Hello? Okay. Thank you.

My name is Dave Conboy. I am an environmental engineer with the Buffalo District of the Corps of Engineers and I have been the project engineer on the Ashland 1 and Ashland 2 sites since the Corps took over the program from the Department of Energy. My interest in these sites actually goes back further than that because I grew up on Grand Island almost directly across the Niagara River from the sites and I currently live on Grand Island with my wife and kids. So, I have an appreciation and understanding of some of the concerns that you may have and the level of interest that the community has here in

Tonawanda and I think it's great that we really have a great showing of support and a showing of public participation in this process because like the Colonel said, the major intent of this meeting is to get your public input.

As I see my role, my role is to provide you some background on the site, give you some information on the nature and the extent of the contamination and to help you understand how we came to a conclusion on what our recommended plan was.

So, we have an agenda for tonight that we will follow that hopefully will meet that goal. We will start out, I will go over a discussion of the history of the site, discuss how they became contaminated in the first place, the studies and investigations that were completed, we will discuss those. The studies were done to delineate the extent and the nature of the contamination. Then I will discuss briefly the proposed plan that was issued in 1993 by the Department of Energy and perhaps even more importantly I will discuss some of the responses that we got from that proposed plan and some of the community concerns that came out of that proposal.

From that I will discuss how we took the public input and incorporated that into the alternatives that we are considering in 1997 under the Corps plan and then I will go into a fairly detailed presentation of the technical background, how we came up with the actual cleanup guidelines because I think that's important, the Colonel thinks it's important for you to understand so that we can all basically have the same basis for discussing and commenting on the plan.

This is an aerial view of the site, the Ashland 1 and Ashland 2 site, Ashland 1 being here and Ashland 2 located on the other side of the Seaway Landfill. One thing many of you may know is that the Seaway Landfill is also in the FUSRAP Program. We won't be discussing the Seaway Landfill tonight because we are addressing that FUSRAP site under a different action and in the future we will have a proposed plan and we will have public comment on that plan.

So, tonight we are basically talking about Ashland 1 and Ashland 2. To orient you, the 190 is located here, the Grand Island toll booth is about right here, the Niagara River and then Grand Island is located there.

One thing with Seaway is that there is an area that the Colonel mentioned, Seaway Area D that is included in the proposed plan that we are going to discuss tonight. That's a small area that is located right adjacent to Ashland 1. It's basically just across the boundary from the Ashland 1 property. So, it's included in the cleanup of Ashland 1 and Ashland 2.

Some of the history of the site, as some of you may know, the Linde site was a division of union carbide and had during the second World War some experience in processing uranium ore and that was a benefit to the weapons production and the uranium production program was integral to the Manhattan Project. What they did at the Linde site was they took this low-grade uranium ore and they tried to separate and take away the uranium fraction and when they did that with the process, they also ended up with what was called a waste filter cake. The waste filter cake contained the contaminants that they didn't want in the uranium fraction and that waste filter cake contained low levels of thorium, low levels of radium that could not be separated effectively into the uranium fraction and also radium.

Over the course of the Manhattan Project, approximately 8,000 tons of this filter cake waste were transported off the Linde site to a place that was then known as the Haist property which is now called Ashland 1. After the war, I guess in about 1960, the government did a survey of that property and based on the environmental regulations at that time, identified that property could be released for use, the radiological contamination was not greater than the levels of concern at that time.

So, the property was picked up by Ashland and they used it in the refining business.

Over the course of using that property, in 1974 they decided to build some tanks to store fuel in the area where the waste was disposed and when they excavated to build those tanks and put those tanks in, they took some of that soil from Ashland 1 and transported it to Ashland 2 and also to the Seaway area, various areas in within the Seaway property.

In the 1980s some additional investigations were done at the site because the environmental laws became more strict in the eighties and it was identified that this was really a site that we needed to take a closer look at and identify if there really is a contamination of concern. Consequently it was entered into the FUSRAP Program in 1984.

As the Colonel mentioned, there is an orderly fashion and an orderly process that has to be followed with any environmental investigation and any environmental activity and what we followed was the CERCLA process and that stands for the Comprehensive Environmental Response Compensation and

Liability Act which you may often heard referred to as to the Super Fund. That's the process that is called under the Super Fund because it's a very comprehensive process that forms a very step-wise approach to doing your investigations and perhaps most importantly, forms -- it provides the framework for public input and public comment over the course of the investigation at different times, including after we issue a proposed plan like we are doing tonight.

The different investigations that are done start out with a remedial investigation. That's done first to determine the nature and the extent of the contamination. From that information you gather from that study and do what is called a baseline risk assessment. That study is done to determine if the level of contaminations that are present at the site are of any environmental concern and you look at the present use scenarios and you also look at the future use scenarios. When we looked at it under the present use scenarios, the site was okay because it presently is not occupied and may only have people coming through intermittently but if you look at the future uses of the site which are certainly something that the Town of Tonawanda is interested in, then those sites need remediation.

So, once you decide that you need remediation, you do what is called a feasibility study and this study is done to determine potential alternatives to cleanup and to weigh those alternatives against certain criteria and against each other.

From that and all the previous studies, you do what is called a proposed plan and that proposed plan outlines and again kind of summarizes the previous studies and it also identifies what the proposed plan is.

From that a lot of comments came in that the proposed plan was not acceptable. So, the next study that was done was called a guideline derivation and that was done to see if there might be a site specific solution to this problem that may be able to incorporate the values of the community and still get the site cleaned up.

From all that previous information, the Corps of Engineers took that into the proposed plan and then that kind of summarized the previous investigation and studies and in the proposed plan we present what our recommendation is and the basis for that recommendation.

As the Colonel mentioned, we also incorporated the requirements of NEPA. NEPA is the National Environmental Policy Act that also has a specific process that has to be followed and following the CERCLA process, we incorporated the requirements of NEPA. So, we had an umbrella basically of all the environmental requirements and values within that framework.

This slide shows the general location of contamination and this is again very general and it's based on the studies that were done and you can see that the general areas that were initially identified in studies are in many cases, at least with Ashland 2, much greater than the area than actually turned out to be contaminated and you can see, this is the area of contamination for Ashland 1 and this is the area of contamination for Ashland 2 and if you think about the way that the wastes were disposed of, that makes sense because Ashland 1 was where the majority of the waste was disposed and Ashland 2 is the area that only a small portion of the waste was taken from and disposed and you can also see in the area Seaway D and if there is a Seaway Area D, there must be a Seaway Area, A, B and C and I'm not showing those but those are located here and there are some additional areas there which again we won't be discussing under the proposed plan for tonight.

So, what are the soil contamination levels? What did the studies identify as the contaminants of concern and what were their levels? This chart summarizes the contaminants that were found at Ashland 1 and Ashland 2. The primary contaminants being radium, uranium and thorium and the units for these contaminants are listed as picocuries per gram. I won't go into detail on what that means but it is a level of the activity of the radiolnuclide and basically the higher it is, the more contamination there is.

A couple of things that are important to look at on this chart, first of all, you will notice that the contamination at Ashland 1 is greater than Ashland 2 on average, typically about twice as great and that makes sense because again, the waste was disposed of at Ashland 1 and subsequently transported to Ashland 2 and that process, they certainly excavated probably a lot of clean soil that was mixed in with that.

Another important thing to look at from this chart is that the thorium is the most abundant radiolnuclide. The radium levels on average are about seven percent of the thorium levels and the uranium levels again on average are about 25 percent of the thorium levels and that sort of gives you an indication of why our cleanup is based on thorium because it's the one with the greatest contamination. If we clean that up to a low level, then the other contaminants of concern will be cleaned up to an even lower level.

So, what is our rationale for cleaning up the site? As I mentioned previously, the hazards associated with the site are basically with prolonged direct contact on the site. There really is no risk off site. There is no risk driving by on the thruway. The risk is associated with direct contact and what that means is basically ingesting or eating some soil or possibly inhaling some soil if you are on site. The risk again is not associated with the present use of the site but it's more an impact if you try to use the site for any future development, an industrial park for instance.

Radium is the primary concern at this site. Of the three radiolnuclides that I have identified, radium is the most hazardous and if you remember back to the site, radium is present in the lowest quantities and the lowest concentrations. So, from that standpoint that's good that it's in the lowest quantities. One of the major concerns with radium is that it decays to radon and many of you have probably heard of radon gas as it relates to your house or something of that nature but that is one of the concerns associated with radium.

Another concern associated with thorium is that it decays to radon. Over time, some of the thorium that is out there on site is going to become radium and that's another reason that our cleanup is based on thorium because if we solely based it on cleaning up the radium, on the day that we finished our remediation, that wouldn't be as protective as we want because we want to conserve or we want to look at the thorium to make sure that over time it doesn't grow to create a radium problem on the site. So, that's again another reason why we are looking at the thorium to insure that we are protected over time in the future for the radium.

The 1993 Department of Energy proposed plan, many of you probably know what that was. Basically is was to excavate soil above DOE generic guidelines, DOE generic guidelines and disposed on site. There was going to be an on-site containment cell constructed and the material would be put in there. That plan was overwhelmingly rejected. The community, the community leaders, the community as a whole rejected the concept of having an on-site disposal facility. Number one, it prevents future use of the site. It also just plain not a long-term solution for the community. Nobody wants a waste containment cell in their back yard, certainly not on a nice area fronting the Niagara River. So, that plan was overwhelmingly rejected.

So, what came from that is that we identified many criteria that were important to the community. First of all, we heard that any remedy selected must be protective of human health and the environment. That's a given based on the CERCLA process anyway but certainly that's an important criteria.

Off-site disposal is crucial to any plan. We want no more consideration or you want no more consideration of any on-site disposal facility. Any remediation must allow for future use of the site in accordance with the Town of Tonawanda master plan or the Town of Tonawanda water front development plan which identifies that area for use as basically industrial/commercial and you also said you wanted us to meet the objectives of the New York State DEC guidance document. That's a guidance document that has very conservative exposure levels for exposure to these type of contaminants, much more conservative than similar federal guidance documents. So, you wanted us to be conservative in our cleanup and you also wanted us to initiate the remediation in a reasonable time frame, get on with it, get the stuff out of here so that we can continue with our planning.

So, from that the Corps of Engineers identified five alternatives associated with the site.

The first remedial alternative at any site under the CERCLA process was the no action alternative. Basically at this site that would mean we would do nothing. We would periodically monitor the site, do some ground water testing to make sure nothing has gone off site and that would be it. The cost of that proposal was about $7,000,000.

The next is continue with institutional controls. What that means is that we would basically put a clay cap over the entire site. We may do some limited excavation of some soils or sediments of wetland areas but there would have to be institutional controls after we finish that and that would involve fencing around the site, limiting access to the site and it would also involve some sort of a restriction on future use of the site.

The next option was excavation with on-site disposal and that is excavation of on-site disposal of soils that exceed generic guidelines. You may recognize this as a plan from 1993 that the Department of Energy put forth. It was one that we considered.

The next is excavation with off-site disposal to generic guidelines. Based on our estimates, it was about 85,000 cubic yards of soil that met that criteria and one thing that I will just mention on the volumes, if you may notice from the 1993 plan, it says there is approximately 172,000 cubic yards of material that had to be removed and it's not that the material has gone anywhere or disappeared. What it is is that over the course of time, with any modeling tool, these volumes are calculated using models and over time you gather additional information, you are able to better calibrate your models and you can better define the areas of contamination. So, that's why the volume has reduced from 172,000 to 85,000 in the generic guideline.

Another thing that is very important is that when we do a cleanup, we do it to a specific guideline. We don't do it based on a specific volume. So, any of these volumes may be somewhere incorrect. The bottom line is that when we do our cleanup, it will be protective to the environment and to a specific guideline to make sure that we get all that we are intending to get.

The last alternative investigated was excavation with off-site disposal to site specific guidelines. Looking at that, that was an estimate of about 42,000 cubic yards.

Based on the previous input from the community and our evaluation of the CERCLA criteria, the top three were basically not acceptable. We heard your comments on the previous proposed plan and the other two, the no action and the containment with institutional controls were not a solution that the community wanted. So, we were left with excavation and off-site disposal with either site-specific or generic guidelines and what I would like to do is kind of walk through that process of how we determined what a site-specific guideline is and also explain what generic guideline is and how that fits in.

The generic guidelines are identified in the Department of Energy Order 5400.5. In that order there are stated limits. It states in there that you have to have a limit. After you do your remediation, you can have no greater than five picocurie per gram at the surface or 15 picocuries per gram in the subsurface, that's for radium and thorium. The stated intent of that regulation or the stated intent of that order, that DOE order, is to limit the exposure to the public as a result of that source to less than 30 millirems per year.

So, the order allows you to develop site-specific guidelines and cleanup criteria as long as you meet the intent of the order which is to limit exposure to less than 30 millirems per year for the intended land use of the property.

The other thing that is stated in that Department or Energy order is a requirement to derive limits for other radiolnuclides that don't have stated limits and we did that and that was done for uranium and the cleanup criteria for that was 60 picocuries per gram of total uranium. Uranium under any of the scenarios we are talking about, either site-specific or generic cleanup guidelines is very conservatively removed. So, I'm not going to talk any more about uranium. The rest of the discussion will focus more on the thorium/radium issues.

The other thing that is important for you to recognize with these generic guidelines is that it relates to a Department of Energy order. This is not a law. This is not a regulation. It doesn't carry the weight or the significance of a law or a regulation.

So, how are site-specific guidelines developed? Well, when you develop a site-specific guideline, you have to be protective of human health and the environment. That is always critical. You still must comply with laws and regulations. Laws and regulations, you must demonstrate that your exposure is below certain levels and that's where that exposure level in the DOE order comes in, less than 30 millirems per year and also the more conservative exposure limit in New York State guidance documents.

You also use criteria appropriate for the site and that gets down to how is the land going to be used. Well, we committed to using a criteria that would allow uses of the site as an industrial or commercial facility. So, that's what we have to do.

So now, how does that work? How do you establish site-specific guidelines under CERCLA? First of all, the first thing you have to do is assess the risk after cleanup and I will discuss more about that in a little bit. You also have to identify pertinent regulations. In the case of this cleanup, the regulation that was pertinent was 40 Code of Regulations or CFR 192. This is a regulation that implements the requirements of the law, that law being the uranium mill tailings, Radiation Control Act of 1978.

You also have to, in addition to looking at regulations, you have to look at other things that may be considered. Again these other things don't carry the same weight as your laws and regulations but you still have to consider them. Those other orders or guidance that apply under the Department of Energy Order

5400.5 that we have been talking about, also a proposed regulation from the Department of Energy, 10 CFR 834 and then the New York State Technical Administrative Guidance Memorandum or New York State TAGM that has again the very conservative requirement for exposures and identifying the intended land use is also critical to that.

So, what I would like to do now is kind of walk you through the process that was used to develop the site-specific criteria. As I said, the first thing that has to be done is a risk analysis. After we clean up the site, we have to make sure that the CERCLA risk criteria are met and you can do that by using some calculations to determine what your allowable concentration of thorium is and when that was done for this site, based on the intended land use, after the cleanup you could leave 114 to 123 picocuries per gram of thorium and meet that requirement.

The next regulation that I talked about that was important was 40 CFR 192. There are two requirements under that regulation. The first being you have to limit radon exposure to less than 0.02 working level and I'm not going to describe what that means but that's the requirement of the regulation. In order to do that, it was calculated that the allowable thorium concentration could be 55 picocuries per gram.

The next requirement is limiting radium to a certain level and that level is 5 picocuries per gram at the surface and 15 picocuries per gram in the subsurface. So, this is kind of an important thing to note, that the DOE order regulates thorium and radium. The regulation only has a requirement for limiting the concentration of radium and obviously that is done because of the greater concern associated with radium. When you look at the concentration of radium, at that level, 5 and 15, you have to clean up the thorium to 40 picocuries per gram.

One thing I want to note, that in the modeling process, remember I told you earlier that over time some thorium will decay to radium.

It's important to note that that cleanup criteria is protective. When we finish the remediation, it's also protective over at least the next thousand years. We model over a thousand year period and found out what the worst case would be to limit the concentration of radium to those levels and the answer is, 40 picocuries per gram.

The first criteria listed up there are primary evaluation criteria and again those go back to regulatory requirements that have to be met.

Under the CERCLA process you also consider other evaluations, criteria that they call secondary evaluation criteria and one of those is, the 10 CFR 834, the proposed DOE regulation and the Department of Energy Order 5400.5. In order to meet the stated intent of both of those orders and that proposed regulation, which is to limit the exposure to less than 30 millirems per year, you can have an allowable thorium concentration ranging from 139 to 543 picocuries per gram and the final thing we looked at and perhaps one of the most important things in order to meet our commitments to the community was, what is the exposure level; how do we control the exposure such that it's less than the very conservative 10 millirems per year required by the New York State DEC and when those calculations were run based on the intended land use, we found that we could have 46 to 181 picocuries per gram or thorium.

So, looking at all these criteria, what we did is, we said we want to be very conservative but we want to fully comply with the requirements of CERCLA. So, in order to do that, we select the lowest level that would allow for the most cleanup under the site-specific criteria and that became, that's for the 40 picocuries per gram came from. So, it's based overall on limiting radium to 5 and the surface and 15 at the subsurface.

Another thing I would like to kind of go over, I have been throwing around picocuries per gram and millirems, it may be useful to kind of give an example to explain what that means and kind of what may be the background exposure is for any site. So, we'll start with off-site exposure. What is your additional off-site exposure due to this site either before or after cleanup, really and the answer is really zero. There is no exposure off-site associated with this site. If there was, that would have been cleaned up many years ago.

What is your exposure on site? Basically looking at the 40 picocuries per gram, we ran some scenarios that looked at what would be the additional exposure on site as a result of our cleanup and the answer was, five picocuries per gram. That would be an average. It ranged between, somewhere between I think two and seven picocuries per gram and that would be the maximum kind of average on site.

I am sorry, did I say picocuries per gram? These are millirems. I'm sorry. That is five millirems on site, millirems per year on site.

The New York State guidance level which again is the most conservative guidance out there, limits the additional exposure for any source to ten millirems per year. That has to be less than ten millirems per year.

The next requirement is the NRC, the Nuclear Regulatory Commission guidance values that says, again limiting your exposure to any particular source has to be less than 25 millirems per year.

The last one is the DOE guidance which really has a range of acceptable exposure from somewhere around 30 up to 100 millirems per year and again that's for a particular source.

So, the last thing I want to show you is, what is the exposure at the site, at any site, here, any place due to background and that's the last item and basically that's sort of puts it into perspective I think is that the background exposure that all of us receive on a daily basis throughout the year sums to about 360 millirems over the course of the year. If you live in a place like Denver, it's a couple hundred millirems greater than that and it could be greater in other locations as well.

So, that's sort of helps to put it into perspective the numbers that we are talking about and hopefully it shows graphically that of all the regulatory criteria out there, our proposed cleanup plan for this site is more conservative than any of them.

So, to summarize, the remedy action that the Corps of Engineers is proposing is excavating and removal of the 40 picocuries per gram, soils exceeding 40 picocuries per gram of thorium 230 and shipping it off site for disposal.

The benefits of that, again, hopefully I have shown you why it's fully protective of human health and the environment. It certainly meets all of the relevant regulations and guidelines. I walked you through how we met all of those and it also meets the very conservative New York State guidance value which was an important criteria to the community. Also it can be initiated in a timely manner. As the Colonel mentioned, based on the comments to this plan, we are prepared to start work even next summer and it's responsive to the community concerns.

We heard what your concerns were. We feel that they are incorporated in the proposed plan.

Some of the milestones associated with this, Ashland 1 and 2, the public comment period ends January 9th. All of you hopefully know that and will submit your comments before then and depending on comments received, we will issue a responsiveness summary which is basically an answer to those questions and then issue a record of decision which is a final decision on the site after we fully have considered all of the plans and all of the comments that come in and again, remedial action at Ashland 2 could start as early as the summer of 1998.

I will turn it over, back over to Colonel Conrad right now for the question and answer period.

COL. CONRAD: Now, what we will do right now is allow about 15 minutes worth of questions to, primarily to Dave to just allow some edification or some education on the information that we received. Right now I have got like 14 minutes until eight o'clock. I would like to keep it until eight o'clock and then we will take a break at eight, a ten-minute break at eight and come back here and hear your comments.

First we have a question here.

AUDIENCE MEMBER: What percentage of the US around here exceeds this -- the question is, what percentage of our country exceeds the 40 picocuries per gram?

COL. CONRAD: I don't have that information unfortunately.

MR. CONBOY: Yes. I don't think we can answer that, what percentage exceeds that. I can tell you that on average the background levels of these radiolnuclides and there is background radiolnuclides in all our soil, ranges somewhere between one and three picocuries per gram and it's higher in some areas.

AUDIENCE MEMBER: My daughter lived several years in an area which had very high radon.

They discovered it sort of by word of mouth and her husband brought home a radiation factor and in the summer it was worse. So, they opened all the windows and it helped.

Then they found out it reduced this level by getting a cellar fan. So, that improved the house quite a bit. Meanwhile, they bought a radiation detector and put it up in the kitchen somewhere and then they would walk down in the cellar and turn the fan on, they would turn the fan off and this thing would go off again.

So, there is an area in Pennsylvania that is far worse than I think here but what can you do, nothing, because the government didn't put it there. It was there in the first place and those people are stuck with it and why do we spend so much money on that?

COL. CONRAD: All right, thank you. Any other questions? Yes.

AUDIENCE MEMBER: I am referring to the history of the sites. The word, low-grade uranium is used there. Is the Corps not aware that high-grade ore was processed, 65, ores from the Congo that contained 60 percent more uranium?

MR. CONBOY: I think that we are aware of that because some of the other sites that we are responsible for cleaning up and addressing are -- have those exact problems that you mentioned. However, the indication that we have is that the wastes that were taken from Linde to this property were the lower grade filter cake wastes.

AUDIENCE MEMBER: That is correct. However, this raises a question I have about segmentation of the review process. Is the Colonel aware and the Corps generally aware that this is a five property site and that remediation has already been done at the Linde property which is contaminated with high concentrations of radium and cleanup criteria have been employed there that are different from that being suggested for Ashland 1 and 2?

COL. CONRAD: Yes, we are aware of the ongoing activities at the Linde, cleaning up of the Linde site as well. In fact, we are responsible for those cleanups of the Linde site.

AUDIENCE MEMBER: Are those interim actions, they are not final remediation?

COL. CONRAD: Those are, the cleanups are going on right now at Linde.

AUDIENCE MEMBER: The proposed plan indicates in the preamble that the decontamination work at Linde will not be considered in the future proposed cleanup action. Does that mean that those decontamination actions which were previously identified as interim actions, are now final actions and where is the ROD for them?

COL. CONRAD: Are you referring to the cleanup for Ashland 1 and 2?

AUDIENCE MEMBER: I am referring to the decontamination at Linde.

COL. CONRAD: Well, I would prefer, Jim, that we ask questions about the Ashland 1 and 2 and Seaway site because that's the purpose of this meeting. So, I would ask you to --

AUDIENCE MEMBER: Well, it is relevant because the whole environmental review process here is being subverted by dividing up these sites.

COL. CONRAD: Then I would ask you to ask questions relevant to the Ashland 1 and 2 and Seaway site, please.

AUDIENCE MEMBER: Are you going to address this issue of segmentation that was raised by the DEC previously?

COL. CONRAD: We are reviewing the entire cleanup process and we are going to continue with the cleanup of proposed plan of Ashland 1 and 2 and Seaway. We are not going to slow that process down, if at all possible.

MR. CONBOY: Right. There is nothing in the CERCLA process that prevents you from looking at different sites or doing operable units associated with a bigger site and basically there will be additional documents that will document and confirm what our work is associated with those other sites. In order to completely comply with the CERCLA process on these sites, we are doing a proposed plan and we are doing the public comment period and then we will issue our decision on that.

AUDIENCE MEMBER: My understanding is that that does not satisfy the requirements of NEPA. This is not a NEPA review any longer.

COL. CONRAD: This is a CERCLA review with NEPA requirements incorporated in the CERCLA process.

AUDIENCE MEMBER: Well, that is a NEPA requirement, is it not, being incorporated?

COL. CONRAD: Do you have any other questions?

AUDIENCE MEMBER: Yes, I do. Is this a public participation, a PR campaign or is it a real program to involve the public in a meaningful decision-making process as required by NEPA?

COL. CONRAD: It is, it's exactly that and what I'm trying to do is give other people an opportunity to speak and I will allow you to ask, after another question, I want to allow the other people an opportunity to also ask other questions.

AUDIENCE MEMBER: In this table, 1997

description of options, the volumes listed are 42,000 cubic yards for option 2-A which is the revised option. In the CANiT meeting in July where this was presented by the DOE person, a letter was presented by Commissioner Tobe to the attendants that indicated that the volume was 42,000 cubic yards for the previous derivation of the guideline, the previous approach to being employed. Are you familiar with the difference? The blending was ruled out, right?

MR. CONBOY: Right.

AUDIENCE MEMBER: That was the volume that was identified under approach one, okay.

The September derivation of the guideline indicates that approximately twice the volume determined by the first approach would need to be excavated under the second approach. Can you explain the discrepancies? You are saying now that there is 42,000 cubic yards under the second approach and that was the volume under the first approach and the second approach indicated there would be twice as great. So, 84,000 cubic yards by my calculations.

MR. CONBOY: Right and that is not the understanding that I have. You can submit that in writing, we can take a look at it but one of the things that is important, Jim and I tried to bring it out in the presentation, was that we are not --

AUDIENCE MEMBER: Perhaps the commissioner can shed some light on that.

MR. CONBOY: Well, could I answer your question? Could I answer the question?

AUDIENCE MEMBER: He's the one that presented the letter and you withheld the second page of the letter that indicated the amount. The question on the amount, we question the amount of that criteria would generate and when we got the second page, it indicated 42,000 cubic yards.

MR. CONBOY: Again, that is something we can clarify if you have some confusion about that.

AUDIENCE MEMBER: I certainly do.

MR. CONBOY: But what is important to

understand is that any cleanup that we do will not be to remove 42,000 cubic yards or 84,500 or 50,000 and leave. Our criteria is going to be, do we meet the protection of human health and the environment and applicable laws and regulations. When we do that, whether it's more than that or less than that, then we will determine that our remedial action is complete.

So, I think that's the important thing to take away from that.

COL. CONRAD: Do we have any other questions? The floor, yes.

AUDIENCE MEMBER: How is the waste classified for handling, transport and disposal purposes? Is that 11 E-2 or low-level rad waste?

MR. CONBOY: That's a good question and that's something that we are looking at right now and we are doing some characterizations to determine how it would be categorized for disposal. Right now I believe it is categorized 11 E-2 waste but we are looking at the total profile of the waste to see if there may be some alternative way to profile it. Our intent ultimately is to ship it off site in a legal manner and dispose of it in a legal manner and also cost-effective. So, if there is a better to way to dispose of it by calling it something else, properly under the law, then we are certainly looking into doing that.

COL. CONRAD: Question in the back.

AUDIENCE MEMBER: I notice that the word "interim" is not used anywhere in any of this program so far. Does this indicate that this is now possibly going to be a final like they did in Lewiston? Suddenly that word interim has evaporated.

MR. CONBOY: As far as I know, there was never a proposal that was an interim action to the Ashland 1 or the Ashland 2 properties. The remedy that we have put before you is a final remedy and again it's fully protective of human health and the environment, meets our commitments to the community and complies with all laws and regulations.

AUDIENCE MEMBER: All right. I disagree with that but I will send that to you in writing.

Are transcripts available and how do we get them?

COL. CONRAD: They are available. I don't know, probably the best thing there, Don, is to talk to the Public Information Center and start there but they will be available.

AUDIENCE MEMBER: Two other quick things I just want to touch on. There was a study just completed at the Rockadyne out in California and they found out that long-term exposure to low-level radiation is a heck of a lot worse right along and that is not -- there is a time factor that takes place and that's another thing to talk about, the latent period for cancer due to exposure to low-level radiation. It's 20 to 30 years. Over at Linde, I used to work there it's now called Praxair, I don't know about the residents that live here in Riverview, I heard but our data base, I got 108 cases of cancer. I just wanted to make somebody aware of that. We disagree with a lot of what is being said.

COL. CONRAD: Thank you, Don.

MR. CONBOY: I would just like to address that because I am familiar with some of the studies that you pointed out and we have reviewed them. One thing that is important to note is that in the discussion of those studies of low-level radiation, they are talking about exposure on the order of 1,000 to 5,000 to 10,000, even greater millirems per year. So, that's how they are quantifying low-level radiation. They are not talking about five, four or three or two millirems per year. They are talking about exposure over a thousand times greater than we are talking about here. So, I think that is important information to put out.

AUDIENCE MEMBER: Would you do me a favor and put that in writing?

MR. CONBOY: That will be in writing. It's in the transcript.

AUDIENCE MEMBER: Thank you.

COL. CONRAD: Any other questions? We have a few minutes. Yes.

AUDIENCE MEMBER: What land use scenarios were considered in the risk assessment and secondly, what exposure pathways are assumed in the DEC's guideline, the TAGM guideline number?

MR. CONBOY: Okay. The exposure scenarios that were looked at were basically industrial and commercial and construction workers out there on site putting in a building. The exposure pathways that were considered in the New York State DEC TAGM, I will have to take that question in writing and get an answer back to you. I know that the model that was used is the standard in the industry, the health/physics community. It's called RESRAD and so that was used and it was used in coordination with the state and also the health/physics consultant for one of the stakeholder groups. So, it wasn't done in a vacuum. How it was applied to this site was done with a lot of interaction and a lot of changes. As Jim mentioned, one of the changes that came out of that is how some of the cleanup would be done. So, it was done again with a lot of interaction and using standard procedures.

COL. CONRAD: Any other questions? Yes.

AUDIENCE MEMBER: Could you put that slide back up there with the millirems on there for me, please where you stepped it? Now, the one, two, three, four, five, that is added onto the last one that is at the top, is that correct?

MR. CONBOY: Absolutely. That is correct.

AUDIENCE MEMBER: So you are actually being exposed to more.

MR. CONBOY: Yes.

AUDIENCE MEMBER: Okay.

MR. CONBOY: I guess on average you would say 365 but again the natural variation at different locations.

AUDIENCE MEMBER: But that is added on top of the last one.

MR. CONBOY: Yes.

COL. CONRAD: Jim.

AUDIENCE MEMBER: Talking again about the establishment of site-specific guidelines, if you could get that page up, Sarah. The only one under pertinent regulations that is identified, that's the one, the only one identified is 40 CFR 192.

MR. CONBOY: That is right.

AUDIENCE MEMBER: Is the Corps not aware of 10 CFR 40, the NRC regulation pertaining to formerly utilized uranium mill tailing sites?

MR. CONBOY: Right. That is sort of what we incorporated at the end with the exposure limit, I believe that is less than 25 millirems per year. So, although it was considered, I mean, we basically exceed that in the cleanup.

AUDIENCE MEMBER: Let me just tell you then what I know. 10 CFR 40 is applicable, okay. The NRC regulations in 10 CFR 40 are applicable. The 25 millirem guideline is from a recently passed regulation that does not apply to uranium mill sites. It specifically is excluded from uranium mill sites. The feeling being at NRC that the uranium mill sites were already covered by existing NRC guidance and that guidance is 10 CFR 40 and a branch technical position. The branch technical position required cleanup to a 10 picocuries per gram level for total uranium, which converts to five picocuries of thorium, five picocuries of radium. That is the applicable law and I just question, is the Corps aware that that is applicable law?

MR. CONBOY: I think --

AUDIENCE MEMBER: I would like an answer from the Colonel.

COL. CONRAD: Jim, we have reviewed all the applicable regulations here for this cleanup and we feel like we have captured that on the document. I am familiar with the ones that were shown here on the slide. I'm not familiar with the, personally familiar with the CFR you just quoted. So, I will have to go back and read that, okay.

Are there any other questions before we take a break?

(No response.)

What I would like to do now is take a ten-minute break and we will convene back at 8:15 for the public comment period. Thank you.

(Proceedings recessed for ten minutes.)

COL. CONRAD: Please take your seats for the comment period, please. A little discussion on the ground rules again, we will try to limit your discussions to five minutes and one person at a time. I have the cards here and I will go through them on the first-come, first-serve basis on speaking.

As we first started the program about 65 days ago, I happened to be in Congressman LaFalce's office and updating him on other Corps projects and he is the one that mentioned FUSRAP for the first time. I didn't know anything, what he was talking about and he quickly got me up to speed and let me know some of the people that are involved in the process and one of the people that has been involved in the process from the very beginning is here tonight representing Congressman LaFalce. I would like to start off with Ms. Mary Brennan Taylor representing Congressman LaFalce.

MS. TAYLOR: Thank you, Colonel. Congressman LaFalce is in Monroe County this evening and won't be with us but asked me to represent him.

First I wanted to thank you, Colonel Conrad and your very capable staff for making the transfer of responsibility from the DOE to the Army Corps smooth and positive. Your responsiveness and sense of urgency have been greatly appreciated.

In representing Congressman LaFalce this evening, I can report that he is pleased that before the transition of responsibility occurred, the Department of Energy revised its proposed plan for the cleanup of the Ashland 1 and 2 sites. This permanent solution for cleanup of radioactive contaminants will permit future land use as defined in the 1992 Town of Tonawanda waterfront development master plan.

Congressman LaFalce thanks the community for working closely with him to assure this positive result. I want to take this opportunity to say how rewarding it has been for him and certainly for me to work on this issue. Federal and local government officials and the community have been very responsive and to the benefit of all of us.

I remember when I first began covering environmental issues, the congressman told me how important it was to involve federal officials directly at all of our sites. In the 1970s, the DOE officials toured and inspected the Tonawanda site and took steps to insure the health and safety of the public was protected. Having been to the site, they understood in the eighties why the DOE staff proposal to move waste from Colonie, New York to the Town of Tonawanda was totally unacceptable.

When Congressman LaFalce included language in a conference report to prevent the movement of low-level radioactive waste within New York State to the Town of Tonawanda, the DOE again understood and agreed to follow that position. Now in the late 1990s, the DOE and now the US Army Corps of Engineers fully understands why our government officials and this community want excavation and removal as a long-term solution.

Congressman LaFalce looks forward to continuing to work very closely with federal officials, in particular with Lieutenant Conrad and his staff on this and other issues important to this community and I look forward to continuing working with all of you as well.

Thank you very much for this opportunity.

COL. CONRAD: Next representing New York

State Department of Environmental Conservation, Mr. John Mitchell.

MR. MITCHELL: Hello. My name is John Mitchell and I am an environmental radiation specialist with the New York State Department of Environmental Conservation.

We are currently reviewing the US Army Corps of Engineers' proposed plan for Ashland 1 and 2 and in principle the department has agreed to the use of site-specific cleanup guidelines at other sites and we appreciate the Corps opportunity to review and comment on this document and the department will be submitting written comments before January 9th, 1998. Thank you.

COL. CONRAD: From Erie County, Mr. Charles Swanick.

MR. SWANICK: Thank you, Colonel and just to say welcome to Tonawanda and welcome to FUSRAP. This brings us up to date. For us as the elected side, this is a ten-year effort. Almost ten years to the day we met with the Department of Energy in a very confrontational meeting where they proposed to leave all of the radioactive material that is now present here in the Town of Tonawanda, to create a radioactive depository right on site along the waterfront and they also proposed to bring radioactive material from Colonie, New York to the Town of Tonawanda as a permanent disposal site.

That was the beginning of the relationship with the DOE and for ten years it has been very difficult, very strained and ended up with the creation of an elected group of people both from the Town of Tonawanda, the County, the City of Tonawanda and Grand Island, the state and federal officials to work collectively on one object and that was to insure the radioactive material that was brought here about 50 some years ago in the creation and building of a nuclear bomb, that that material be removed from our community and it be removed to a safe authorized nuclear depository in the country.

The good news, in ten years we have three sites now in the country that can take this material and one of the sites is being proposed for the disposal of this material.

We need to move forward with this cleanup project. It has been too long in coming. There has been too much of a fight over the cleanup itself from going with the disposal on site to total removal to a standard that just doesn't meet the waterfront use of the Town of Tonawanda. We believe that the Army Corps of Engineers has a proposal which meets the needs of the Town of Tonawanda, the people of the Town of Tonawanda, the City of Tonawanda and all of us in Western New York. We need to get that material out and we need to get it out now.

This is federal money that is coming through the efforts of John LaFalce. It is federal dollars coming into our community to be used for cleanup purposes, to clean up a problem that we have nothing to do with.

Most importantly on the standard as you have seen, the standard will meet the use site plan of the Town of Tonawanda which is light industrial. It will allow that land to be developed appropriately. It will allow for the waterfront to begin to expand and grow in the Town of Tonawanda and it will add to what the county has done with Isleview Park and the Riverwalk. This is a very positive step that to be honest with you I'm not sure I would ever see. Ten years on one issue is a long, long time and we went from nowhere to now a commitment of at least $72,000,000 in federal funds to clean up this issue.

For all of us from the elected side and you will hear from other elected officials and I am speaking on behalf of my legislative district which this site is located in, for the people of Grand Island who I represent as well as the people in the City of Tonawanda, we are ready to proceed with the cleanup. We accept the proposed plan that you are offering, Colonel and we wish you quick speed in getting this task underway and getting this material out of our community.

1.2 (cont.)

Thank you.

COL. CONRAD: Next representing Erie County, Mr. Richard Tobe.

MR. TOBE: Thank you. I am sure I speak

for all of us in commending you, Colonel Conrad and Mr. Conboy for the most clear and concise and understandable presentation we have ever had on the subject. So, whether you agree or disagree, thank you for a terrific job in laying this out.

My name is Richard Tobe. I'm Commissioner of the Erie County Department of Environment and Planning. Excuse my voice, I'm not well tonight but I am here in that capacity and Dennis Gorski's behalf, the County Executive and I am also Chairman of CANiT which you have heard about. It's a federation of 13 elected officials. So, my statement is really on behalf of CANiT and the others.

It is with a great sense of relief that I stand here to comment upon the proposed cleanup of the waste plant. We are finally moving.

First though, I want to welcome the Buffalo District Office of the US Army Corps Engineers to this effort. I can't but believe that the transfer of responsibility from US DOE at Oak Ridge, Tennessee to 1776 Niagara Street in Buffalo, New York will have a very substantial impact on this process. We are sure that our concerns will be your concerns. You understand, as we do, the importance of the Niagara River and the Great Lakes to the United States and the world. You understand our fears about high community cancer rates and our school children are your school children. So, welcome.

It has been ten years since we first became involved in cleanup efforts of the Tonawanda sites. The FUSRAP program itself is 23 years old. After all this time, they are finally seeing a profound shift from study, planning and discussions and all too often inaction and delay, to one of action.

Winston Churchill commenting on recent Allied victories at Stalingrad and ElAlemein, after three years of World War said, "This is not the beginning of the end, but perhaps this is the end of the beginning."

I think perhaps for us too, that's where we are. We are finally turning the corner and about to see action but we have a ways to go yet.

The Coalition Against Nuclear Materials in Tonawanda, CANiT, was formed in 1988 initially for the purpose of preventing contaminated waste coming from Colonie, New York to Tonawanda. It took federal law introduced and passed by Congressman LaFalce to prevent that. Since then, CANiT has remained active and has had a series of what we consider victories as we have both seen and monitored the program.

As the Chairman of CANiT tonight, my statement tonight I think reflects the position of the elected officials on the part of CANiT but obviously some of them have and will speak for themselves.

For your records, I have submitted for tonight's testimony, my testimony on behalf of CANiT at the US DOE public meeting held in December of 1993. You already have it there and I'm not going to paraphrase my testimony as the written statement does but suffice as to say, we strongly opposed, did not want it still in

Tonawanda. We wanted the waste out and we would not accept anything but that.

CANiT has been steadfast in that goal. We have not wanted encapsulation of waste here. We want the stuff to be removed and we want all of that to be done so as to protect the health and safety of the residents.

1.3.1

CANiT has insisted that the most stringent human exposure limitation would be used, that was the US DEC guidelines. The New York State guidelines which was discussed earlier and in the slides, was ten millirems which is way, way below what has been previously established as the standard and is now or is about to be the most protective standard now introduced in the United States.

We understand that several federal agencies are considering standards between 25 and 10 millirems and we are pleased that this site, the millirem standard will be used.

We understand that the Corps' comment that it may not be willing to accept that standard for general applicability across the country but we are pleased that they are willing to apply it to our site, regardless of what precedent may be set elsewhere.

1.3.2

CANiT has also taken the position that all material excavate must be shipped off site. We will not accept and the Corps has agreed, that there will not be any form of mixing or blending that will lead to dilution and the possibility of material, radioactive and pulled out of the ground being diluted by mixing staying. We will not accept that and the Corps has agreed and all soils that are excavated will be removed from the site and sent elsewhere, out of Tonawanda, out of Erie County.

1.3.3

We also believe no credit should be given for the application of fill over the site for determining whether or not human health standards are achieved. In that context, with this site being returned to unrestricted use, the clean fill that will be used cannot be taken as credit and of course we agree with that also. We are pleased with that and as was stated and the Corps has agreed with this, that any material that is used for backfill, grading and changing the contour at the site after excavation will be clean fill and that it cannot be in any way contaminated soil.

With those caveats, CANiT does strongly support this proposed plan, passed a resolution to that effect earlier this year in July and we hope and expect that when this process is completed, you will have a record of decision issued, that the Corps will be prepared to maintain the schedule that is laid out and commence the process of removing the radioactive wastes from Tonawanda next year as soon as the weather permits and as soon as the contracts are let.

With that, just two more quick comments, we do expect that we will be reviewing all technical documents after they are prepared for human health and safety and the safety of the workers. We hope the Corps will continue with what the DOE did for us, which is to allow us to have technical assistance, made available to us through a grant and allowed us to engage a consultant who reviewed these documents and who will be available to help us review the technical documents that will follow.

My final comment is to just urge the Corps to work with, when they develop the health and safety and spill prevention and control countermeasures plan to work with all the first responders in Erie County through our office of emergency response to make sure that those people may be called upon to go to an accident or spill related to transportation primarily, are up to speed and understand what the issues are that they might confront.

But with that, we say, let's get going. Thank you, very much.

COL. CONRAD: Representing the Town of Tonawanda, Carl Calabrese.

MR. CALABRESE: Thank you, Colonel.

Ladies and gentlemen, my name is Carl Calabrese and I am Supervisor of the Town of Tonawanda and a member of the Coalition Against Nuclear Waste in Tonawanda, otherwise known as CANiT.

I would like to make a few brief remarks tonight on behalf of the entire town board and the residents of our town. CANiT and our entire town board is officially on record in favor of this cleanup plan before us tonight. This community has suffered with this problem for decades and has been frustrated with the pace of the federal efforts to resolve this issue. We have seen million of dollars spent on studies that seem always to recommend the need for more studies.

CANiT is opposed with one bipartisan voice the idea of permanent restoring these wastes along our waterfront. Earlier this year the US Department of Energy put before us a new plan. This plan would clean up our town so that our entire waterfront master plan could be implemented. All federal and state safety standards would be met and contaminated material would be removed and sent to an out-of-state storage facility that was both licensed and permitted to accept such waste material. With this plan, we finally had a workable and common sense solution to dealing with this material and allowing us to begin the development of a very valuable area of our town.

For these reasons, CANiT, the elected representatives of this community have given its unanimous approval to this plan.

Now, I realize that there will always be some people who will argue that this cleanup plan is not clean enough. They would argue that we should clean these sites to what is called a resident farmer scenario. Briefly this standard would assume that this land would be used for a totally self-sufficient farming operation, in other words, a farmer would eat nothing but the crops and livestock raised on the farm and he would wash it all down with well water taken from the land.

1.6.2

Given that this land has never been and will never be zoned for farming and there is probably no such thing as a totally self-sufficient farmer anywhere in the modern world and that our town has its own municipal water supply, this scenario is both impractical

1.6.2 (cont.)

and unrealistic.

What we are supporting tonight is a practical plan that would protect real people from real problems, as opposed to hypothetical people from hypothetical problems. It will meet all federal and safety standards and allow us to fully implement our waterfront plan.

Finally, I'm very pleased that the Corps of Engineers has now jurisdiction over the cleanup and has agreed to the plan and to the accelerated timetable that was originally developed by the Department of Energy. The Corps under the leadership of Colonel Michael Conrad has committed to a speedy cleanup that will actually see removal of this material by the fall of 1998. This is good news for a community that has worked so long and fought so hard to see this material removed from our landscape.

The town board and CANiT stand ready to assist the Corps in its efforts. We look forward to waving goodbye to this waste as it leaves our town next year and in conclusion, I would like to thank and recognize my colleagues on CANiT. We are a diverse group of elected officials, often known for arguing with each other across partisan lines. That never entered this equation. From day one of CANiT's existence this community through its elected officials, republican and democratic alike, spoke with one voice and one voice only, get it out, clean it up, accept responsibility for it and just take it away and store it in a proper facility and I especially want to recognize the efforts of Rich Tobe who has served as our chairman and done that very, very well.

Thank you, very much.

COL. CONRAD: Also representing the Town of Tonawanda, Mr. Ray Sinclair.

MR. SINCLAIR: Thank you. First of all, it wasn't my intention tonight to come down and say anything. I just wanted to listen but as I sat here listening to what was going on, I had some thoughts, particularly on the CANiT function and the function of the citizens in this town and a lot of things that I'm going to say very quickly have already been said but I think it's worthwhile, I guess I am the lowest of the elected officials involved in this. We have had congressmen and state senators and assemblymen and the county executive and the town supervisor, county legislators and I'm just one of the grunts down there but this has been a concern of mine for the last ten years both as an elected official of the town and also working for the New York State Senate. And I would just like to let you kind of know that, you look out here and the vast majority of people I see in this audience have not been involved very much in this. Some of us, both as parts of CANiT and individual citizens have been involved far more than they wanted to be and maybe far more than we should have been but again, there is a sincere effort to do some good here.

We did see in the beginning of this thing some bumbling, wondering, intimidating, force it down your throat activity. Over the period of time, the citizens stood up. They did at Lexington, they did in the Town of Tonawanda and we got their attention and it's been a long battle, ten years but we are now getting to the point where we are coming to a meeting of the minds and hopefully and meeting that is going to be scientifically appropriate and safety-wise appropriate for our people.

We just -- a lot happened when it first began and caught us all, we were blind-sided. I think the guys that set up that meeting that night, we were just about knocked off our seats and then we started talking about it and decided that we had to do something about it and as I just pointed out, we joined together as primarily elected officials because these are the people that you put there to defend you. They are the ones that you expect to do the public will, to take care of things and as a group, the public officials accepted this.

Now, I will tell you, even if I were, I would have admired them and being a member and close to them, I admire them even more because what we don't like to have is looking out in the audience and half the people are against you already, no matter what you do but this group of officials had the guts to stand up, concerning this issue, make it stick, make them listen to us and hopefully work out some kind of a solution. Our one purpose of this bipartisan group has get it out of here, period and we have really not compromised at all in this and I think this is a tribute again to the input of our citizens. We have many public meetings at various stages of this and just you people who are here tonight, people came out and gave their opinion. You may not agree with me and I may not agree with you. We didn't always agree on anything but as it came down, we were heard. As a result of us being heard, we had action is what this democracy is about and I'm very proud that we as a town took this stance and I'm proud to be a part of the CANiT organization.

We worked to protect the people. We pick up the garbage, we make sure the water is clean, the toilets are flushed and we also work to make sure that nuclear wastes are not dumped on our waterfront here and become a hazard to our people and I think we need to keep this in mind.

My purpose again was simply to outline what CANiT is from a private standpoint. What it is and what it was, what it's going to do. I think I'm also quite pleased and shocked that the Corps of Engineers has been able to pick the ball up on this quickly because when we first heard a year or so ago that this might happen, we thought here we go again, another ten years, going in circles but luckily our wagon circle stayed solid and this community has stood and stood firmly and although internally we have had some disagreement on this, we are going to have more of it but we stand as a community. Our word to the Government of the United States is, this is your waste, take it, get it out of here, give us back our land.

Thank you.

COL. CONRAD: Representing For A Clean Tonawanda Site, this is Jim Rauch.

MR. RAUCH: I am a representative of a government-recognized stakeholder group For A Clean Tonawanda Site. We have been following this thing, this cleanup issue for the past five years. So, it's going on five years now and as I tried to point out earlier, what really is at issue here is future land use, okay. The politicians have all sold out the future residents of the town to these contaminated properties. Because this is an area that attracted people because of the natural asset and will continue to do so, it's an area where people will live, will build houses in the future, I don't care what the town plan is to be. If it's for like commercial, industrial, okay, that isn't the issue. The issue is, this material has a hazard of over 500,000 years. That's the issue.

1.8.1

Now, are we going to protect future generations or not or are we going to continue to allow this stuff to get out into the environment, raise the background level and we are all going to suffer statistical and increased health effects.

That is what the issue is about all the nuclear waste issues confronting the country today and that is why the US Nuclear Regulatory

Commission and regulations governing cleanup sites like Tonawanda, has set much more stringent standards than the politicians, the DOE and the Army Corps are willing to accept.

Now, I'll just read a section from the Branch technical position. This pertains to natural uranium ores such as found at Tonawanda including radium 226 and its daughters. They are not included in the options such as being considered here tonight that would allow 40 or 50 picocuries of thorium, concentration of 40 to 50 picocuries per gram of thorium to be left on site and their wording is exactly this, natural uranium ores are not included because of possible radon 222 emanations and result in higher than acceptable exposure of individuals in private residences if houses were built over buried materials.

1.8.2

That is really the issue here. The NRC is applicable to this site. They have not stepped up to the plate to this date and at this site. We intend to see that they do because their regulations will protect future users and next year Carl Calabrese could be approving a condo development down there on the waterfront or five years from now or whatever. That's a simple fact and that's why the NRC does not allow institutional control. It requires free release to require a more stringent cleanup and free release means, any future use.

Carl eloquently said, well, let's get real. Well, let's get real, folks. As go these properties, so go the rest of the planet. That is what we're dealing with here. If we let it keep going up here and say oh, it's okay, it's only going to be used in industrial now, right, well Carl has already written off the ground water. People on Two Mile Creek Road used to drink water from these wells. Now they don't. They use the water to water the garden and wash the car, okay.

Are we going to always assume that we are going to have clean public water? Well, we have written off the ground water at this site or Carl has. Has the rest of the public? That's our question. We haven't.

We raised these issues with the former DOE in many letters. We identified them and since June of 1996 there were no public meetings. This plan has been cooked up, was cooked up by the politicians and DOE without any public meetings until this past summer when the proposal was released publicly. We raised this issue repeatedly and it's fallen on deaf ears.

The Colonel said in his opening remarks, the Corps is a can-do outfit. We have been given a budget, we are going to do it within the budget. We don't care, you know, paraphrasing now, we are going to do it within the budget irrespective of whether it meets the requirements of existing regulations and these are the NRC regulations. That's what he has been told to do and as a good soldier, he is going to do it if we don't stand up and say let's have the required, lawful, thorough cleanup.

We are only looking at several million, maybe twice as much money being spent to do a lawful cleanup, okay, instead of 38 million we might be looking at 90 million or 70 million, okay. We are looking at 500,000 years of exposure. People are going to live on these properties and are going to get increased rates of cancer in the future, increased health care costs. Health care costs are a big issue, you know, you look at the causes, more and more people are realizing there are a lot of causes of health care costs are environmentally induced.

Thank you.

COL. CONRAD: Mr. John Hennessey.

MR. HENNESSEY: Thank you, Colonel. I am a resident of the town, also work for the DOT, worked for the DEC. If there is an oil spill, I'm there. When we had a spill, I cleaned it up. I guess I'm concerned about this. I live in the area. I have family that lives here. I think that you should clean this up. You have got the money. People have gone to work to provide the money to clean this up and I think that as everybody said and I have been here for ten years, working with CANiT and the rest of the people, I say clean it up. Get it out of this area.

We had a proposal to leave it here and it was rejected. I worked at Ashland a long time and I spent a lot of time working there. They took care of my material that I picked up and dewatered it, things like that and I say for my kids, my grand kids, I said I can't stand this any more. You have got the money. You have got the money. Let's clean it up and get it out of here and thank you for your time.

6.7

COL. CONRAD: Mr. Ralph Krieger.

MR. KRIEGER: Good evening, ladies and gentlemen. I am one of the members of the F.A.C.T.S. organization that has been instrumental in trying to work with getting waste out of the Town of Tonawanda. However, this does not concern the Town of Tonawanda. You happen to be sitting on an international border and you have a joint commission that oversees those waterways. I just want to know, has anybody checked with the joint commission on how much we should leave here and how much we should take out, because your Great Lakes are in great danger from contamination, now not only from nuclear, chemical, biological, they are in serious trouble. You are on the

7.10

forefront, each and every one of you. You are responsible citizens. You vote. It is our obligation to the future generations of this world to try to clean it up.

God knows if we will ever achieve that goal and at what costs.

But we are the keepers now and it's our obligation to do that and I will continue to work with F.A.C.T.S. to see that it's done correctly. Thank you.

COL. CONRAD: Ms. Kathleen Sullivan.

(No response.)

COL. CONRAD: Ms. Francine Dole.

MS. DOLE: I think it's important that everybody be aware when the site is cleaned up of how often it will be monitored for the people that are working there as well as the people in the general public because I know there has got to be a threshold there that is dangerous for the workers and the people as far as dust and air contamination and I haven't heard that issue brought up tonight.

COL. CONRAD: Mr. Frank Lee.

MR. LEE: I guess I'm the only one that opposes this. We are spending a great deal of money to accomplish very little. If we were to dump that whole deposit there into the Niagara River at the rate of two percent every month, that would bring the radiation level of the Niagara River up to average.

Now, if we spent this money to save lives, consider it, if we borrowed this money at six percent it's going to cost us about, let's see, $30,000,000 for every life we save or whatever it is.

Now, we can save a lot more lives with a lot less expense if you want to spend the money somewhere else. You get free taxi service to drunks, you would save $17,000 a year. So, if you can save a life for $300 if you want to do it. However, the people, you can save the lives for $300 don't speak very loud. There are children in far away countries that could use inoculation.

All right. We are willing to spend a great deal of money on something which is treated much

1.12 (cont)

like asbestos. It's blown all out of proportion. We could solve this problem very simply in the beginning by building a park on top of that stuff, all right, nobody would be there very long and the radiation level in the park, I think the figures I have seen would be three percent above normal and that is quite small for here, much smaller than the people that I mentioned in Pennsylvania.

So, if you want to get some bang for the buck, you can do a lot better elsewhere.

COL. CONRAD: Representing For A Clean Tonawanda Site, Mr. Don Finch.

(No response.)

COL. CONRAD: I will move on to Thomas Schafer also representing the F.A.C.T.S. group.

MR. SCHAFER: I can still ask questions, Carl?

COL. CONRAD: We would prefer right now, if we finish shortly we will have some questions and answers that we can handle at the end of the meeting.

MR. SCHAFER: Okay. I had some questions.

COL. CONRAD: You can ask questions now

and they will be recorded and we will be able to get back to you. If you want to put them on the record because we have to address them one way or the other.

MR. SCHAFER: All right. For the record, I used to work at Linde Praxair for about 14 and a half years. 1.13.1 My first question is, is the Linde site geologically higher in elevation than Ashland 1 and 2?

1.13.2 My second question is, were these sites connected by Two Mile Creek during war time to be dumped into the Niagara River and 1.13.3 my third question is, why would you clean up a site when you have not totally cleaned up the Linde site and the scenario and I'm trying to make here is, when I look uphill from the river, Linde is uphill from the water stream. So, that's how I tied that together.

Thank you.

COL. CONRAD: Mr. Don Finch.

MR. FINCH: In February I will be starting my fifth year of research. I think we could say one thing for the F.A.C.T.S. group, we

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have done more research than anybody in Western New York and anybody wants to argue it, step right up but I hope the politicians, CANiT, realize what they are leaving behind for future generations. If I am correct, Native American culture projects any problems that might be at hand, seven generations down the road and I just hope that all these nice speeches and what have you, everybody go home tonight and sleep with a clear conscience, not be worried about the seventh generation down the road.

Thank you.

COL. CONRAD: That finishes up the cards that I received. If there is anyone else that would like to make a public comment? If you would please come up and make your comment and then fill out the card afterwards, please.

MR. WATSON: Bill Watson, Chairman of the City of Tonawanda Environmental Control Board.

First I would like to say that as far as the thorium, the 40 picocuries per gram is unacceptable. By far the five picocuries per gram is far more acceptable.

The concern is that a worker and we are assuming that the worker works for 1,750 hours per year which is the standard assumption, they would receive a level of 800 millirems per year from the radon. This is unacceptable.

I also have a concern that the Niagara landfill is not being addressed. This is an example of addressing one land unit but not addressing the other land unit. This is an example as Jim talked about of the segmentation of the process. This is not allowed by NEPA but it's not that it's not allowed by NEPA that concerns me, what concerns me about the Niagara landfill is that it should be a higher priority than Ashland 1 and Ashland 2 cleanup sites. The reason is, I view the primary cause of concern to the communities, the adjacent communities is the airborne radioactive radon gas.

Now, radon is the primary radiation threat to the surrounding community because it's airborne, because it can move around as the wind moves around. When the wind is blowing 20 miles an hour, it's going to move 20 miles in one hour.

The basic problem is Ashland and I'm not suggesting that we simply cap Ashland 1 and Ashland 2. I do applaud the effort that has been made to remove the radioactive material from both of those sites but I would also like to point out that it's important to realize that Ashland 1 and Ashland 2 could be simply capped and if this was done with a few feet of clay, the radon would not be an appreciable problem. The problem with the Niagara landfill site is it can be capped but because the radioactive material was mixed with garbage for lack of a better word, the garbage produces nothing and this site must be vented to the air.

1.16 (cont)

Now, as one who has a Master's in geology, I am concerned with the permeability when you sink wells in 40 feet deep and then you allow it to be vented. I am further concerned when you decide to pump the radon gas out because it's not coming out fast enough. The reason for this is radon gas has a half life of 3.7 days and basically what is going to happen is that the radon comes out slow, it's going to decay. It's not going to be as much of a danger. That would be half the danger if it takes 3.7 days to come out.

Now, if you speed up the process and pump it out, it doesn't do the half life period, that's going to be much more concentrated.

1.16 (cont)

So, I'm concerned as I said before about the segmentation of the review process and the improper prioritization of the sites, in particular the low priority given to the Niagara landfill.

Now, I realize it constitutes a much more difficult problem because of the mounds of garbage on top of the radioactive waste but the other sites do have simple solutions. This is a solution that basically you don't have. You have to let the methane out, okay, for obvious reasons. It could explode, number one and for number two, it's going to crack the cap as it expands. So, you have to vent it. You have to let it out and in the process you are going to let out radon.

Thank you.

COL. CONRAD: We are right on time for the public meeting for 7:00 to 9:00 P.M. I have no other cards in. What I would like to do now is just review very quickly, the comment period ends on the 9th of January, 1998. You will still have time between now and then to submit written comments or to call us at the Public Information Center. There is plenty of information up here off to the right to pick up and you can get addresses and phone numbers and points of contact.

We will then address the comments before we come out with a final proposed plan on this and we will address each comment heard tonight.

We will also, if you are on the mailing list, we will send out information to you in response to the comments that we heard today. If we are not able to answer all the questions, we are not able to allay all concerns you have heard tonight, we will have to do that in order to proceed with the project.

What I have asked now is, I have got some members of my staff as well as from Bechtel and SIC who have been involved in the process here and I have asked them to hang around for a few more minutes to answer any questions that you might have but the formal presentation is over.

Thank you, very much.

(PROCEEDINGS CONCLUDED.)

* * * * * *

LIST OF SPEAKERS

5.1 Responses to Public Hearing Comments

5.1.1 Response to Taylor Comment

1.1 - The positive nature of this comment, located on page 61 of the Public Hearing Transcript, is noted. The remediation that will be performed on the Ashland sites will constitute a permanent remedy for these sites in that materials exceeding the cleanup guideline developed to protect human health and the environment will be removed from these sites for off-site disposal. This action will allow for the future development of these properties consistent with the Town of Tonawanda Waterfront Region Master Plan.

5.1.2 Response to Swanick Comment

1.2 - The positive nature of this comment, located on pages 65 and 66 of the Public Hearing Transcript, is noted. The remediation that will be performed on the Ashland sites will constitute a permanent remedy for these sites in that materials exceeding the cleanup guideline developed to protect human health and the environment will be removed from these sites for off-site disposal. This action will allow for the future development of these properties consistent with the Town of Tonawanda Waterfront Region Master Plan.

5.1.3 Responses to Tobe Comments (comment located starting on page 72 of the Public Hearing Transcript)

1.3.1 - Cleanup criteria for the Ashland sites were developed using the CERCLA process. The cleanup criteria must satisfy the CERCLA acceptable risk range as well as the ARARs. The Th-230 guideline development considered intended and reasonable future land use, the likely maximum exposed individuals, and the criteria included in the ARARs. The key ARARs included EPA 40 CFR 192 and NRC 10 CFR 20. The result of the guideline development effort was a cleanup criteria of 40 pCi/g Th-230.

The guideline derivation demonstrated that the conditions at the site, after removing soils exceeding the site-specific derived guideline of 40 pCi/g Th-230, will be protective of human health and the environment, meet the ARARs, and meet the acceptable CERCLA risk range established by the USEPA in the NCP. The analysis also demonstrated that at this cleanup criteria level, the estimated doses to receptors for the intended land uses (commercial/industrial) meet the objectives defined in the to be considered (TBC) guideline of 10 mrem/yr (NYSDEC TAGM 4003) for intended land use.

1.3.2 - Excavated soils containing in excess of the 40 pCi/g Th-230 guideline will be shipped offsite for commercial disposal.

1.3.3 - In establishing the guideline for the Ashland sites, no credit was taken for the clean backfill during dose modeling.

1.3.4 - Clean backfill will be supplied from an off-site commercial source.

5.1.4 Response to Tobe Comment (comment located starting on page 72 of the Public Hearing Transcript)

1.4 - Appropriated funds will be used to fund the cost of response actions on the site, and no particular groups will be provided with funding. USACE will continue to provide information on the remedial action to the public and welcomes public interest in the work throughout the project.

5.1.5 Response to Tobe Comment (located on page 73 of the Public Hearing Transcript)

1.5 - The current remediation plan for the Ashland sites is to excavate contaminated soils, move them to a rail siding, and transport them off site by rail. The contractor will be required to submit work plans in advance, subject to government review and approval, which will demonstrate a safe and efficient approach to the work and will also demonstrate understanding of and intent to comply with all worker and public safety requirements which apply to the work in progress. The plans will also be reviewed by regulatory agencies, including coordination with appropriate emergency response organizations, to ensure protection of human health and the environment and compliance with applicable or relevant and appropriate laws and regulations, to the extent applicable, such as the Emergency Planning and Community Right to Know Act of 1986.

5.1.6 Responses to Calebrese Comments (located starting on page 74 of the Public Hearing Transcript)

1.6.1 - The remediation that will be performed on the Ashland sites will constitute a permanent remedy for these sites in that materials exceeding the cleanup guideline developed to protect human health and the environment will be removed from these sites for off-site disposal. This action will allow for the future development of these properties consistent with the Town of Tonawanda Waterfront Region Master Plan.

1.6.2 - Cleanup criteria for the Ashland sites were developed using the CERCLA process. The cleanup criteria must satisfy the CERCLA acceptable risk range as well as the ARARs. The Th-230 guideline development considered intended and reasonable future land use, the likely maximum exposed individuals, and the criteria included in the ARARs. The key ARARs included EPA 40 CFR 192 and NRC 10 CFR 20. The result of the guideline development effort was a cleanup criteria of 40 pCi/g Th-230.

The guideline derivation demonstrated that the conditions at the site, after removing soils exceeding the site-specific derived guideline of 40 pCi/g Th-230, will be protective of human health and the environment, meet the ARARs, and meet the acceptable CERCLA risk range established by the USEPA in the NCP. The analysis also demonstrated that at this cleanup criteria level, the estimated doses to receptors for the intended land uses (commercial/industrial) meet the objectives defined in the to be considered (TBC) guideline of 10 mrem/yr (NYSDEC TAGM 4003) for intended land use.

5.1.7 Response to Sinclair Comment (located on page 80 of the Public Hearing Transcript)

1.7 - The positive nature of this comment is noted. Refer to Section 4.1.

5.1.8 Responses to Rauch Comments (located starting on page 82 of the Public Hearing Transcript)

1.8.1 - Cleanup criteria for the Ashland sites were developed using the CERCLA process. The cleanup criteria must satisfy the CERCLA acceptable risk range as well as the ARARs. The Th-230 guideline development considered intended and reasonable future land use, the likely maximum exposed individuals, and the criteria included in the ARARs. The key ARARs included EPA 40 CFR 192 and NRC 10 CFR 20. The result of the guideline development effort was a cleanup criteria of 40 pCi/g Th-230.

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1.8.2 - Cleanup criteria for the Ashland sites were developed using the CERCLA process. The cleanup criteria must satisfy the CERCLA acceptable risk range as well as the ARARs. The Th-230 guideline development considered intended and reasonable future land use, the likely maximum exposed individuals, and the criteria included in the ARARs. The key ARARs included EPA 40 CFR 192 and NRC 10 CFR 20. The result of the guideline development effort was a cleanup criteria of 40 pCi/g Th-230.

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1.8.3 - The 1998 Energy and Water Appropriations Bill transferred administration and execution of FUSRAP to USACE from the DOE, the Buffalo District assumed responsibility for issuing the PP for the Ashland sites. Prior to releasing the PP for public comment, USACE reviewed community concerns to maximize stakeholder opportunity to participate in the decision-making process. Mindful of the concerns about limited public participation in development of the PP, USACE prepared a communications plan for release of the PP. The activities detailed in that communications plan are listed in Section 2, Overview of Public Involvement. The public involvement opportunities offered by USACE were intended to encourage public participation in the CERCLA decision process, and they do meet the requirements of CERCLA, as amended, and the NCP.

5.1.9 Response to Hennessey Comment (located on page 87 of the Public Hearing Transcript)

1.9 - The remediation that will be performed on the Ashland sites will constitute a permanent remedy for these sites in that materials exceeding the cleanup guideline developed to protect human health and the environment will be removed from these sites for off-site disposal. This action will allow for the future development of these properties consistent with the Town of Tonawanda Waterfront Region Master Plan.

5.1.10 Response to Krieger Comment (located on page 87 of the Public Hearing Transcript)

1.10 - The PP has been made available for all potentially interested parties to review, including the International Joint Commission (IJC). USACE has not received any comments from the IJC.

5.1.11 Response to Dole Comment (located on page 88 of the Public Hearing Transcript)

1.11 - Compliance with the remediation contractor's work plans will successfully address health and safety issues and risks due to radiation exposure during remediation to site workers and the surrounding population.

5.1.12 Response to Lee Comment (located on page 89 of the Public Hearing Transcript)

1.12 - Leaving the site under current conditions (No Action Alternative) could results in dose and risk limits above specified limits under some future use scenarios (as indicated in the PP).

5.1.13 Responses to Schafer Comments (located on page 91 of the Public Hearing Transcript)

1.13.1 - The Linde site is geographically higher in elevation than Ashland 1 and 2.

1.13.2 - Although Linde is higher in elevation than Ashland, the two sites are not connected. Drainage from the Linde site is via Twomile Creek and into the Niagara River. Drainage from the Ashland sites is via Rattlesnake Creek to Twomile Creek.

1.13.3 - Due to the geographic position of the Linde site relative to the Ashland sites, there will be no adverse impacts on the Ashland sites from other Tonawanda sites after remediation is complete.

5.1.14 Response to Finch Comment (located on page 92 of the Public Hearing Transcript)

1.14 - Cleanup criteria for the Ashland sites were developed using the CERCLA process. The cleanup criteria must satisfy the CERCLA acceptable risk range as well as the ARARs. The Th-230 guideline development considered intended and reasonable future land use, the likely maximum exposed individuals, and the criteria included in the ARARs. The key ARARs included EPA 40 CFR 192 and NRC 10 CFR 20. The result of the guideline development effort was a cleanup criteria of 40 pCi/g Th-230.

The guideline derivation demonstrated that the conditions at the site, after removing soils exceeding the site-specific derived guideline of 40 pCi/g Th-230, will be protective of human health and the environment, meet the ARARs, and meet the acceptable CERCLA risk range established by the USEPA in the NCP. The analysis also demonstrated that at this cleanup criteria level, the estimated doses to receptors for the intended land uses (commercial/industrial) meet the objectives defined in the to be considered (TBC) guideline of 10 mrem/yr (NYSDEC TAGM 4003) for intended land use.

5.1.15 Response to Watson Comment (located on page 92 of the Public Hearing Transcript)

1.15 - Cleanup criteria for the Ashland sites were developed using the CERCLA process. The cleanup criteria must satisfy the CERCLA acceptable risk range as well as the ARARs. The Th-230 guideline development considered intended and reasonable future land use, the likely maximum exposed individuals, and the criteria included in the ARARs. The key ARARs included EPA 40 CFR 192 and NRC 10 CFR 20. The result of the guideline development effort was a cleanup criteria of 40 pCi/g Th-230.

The guideline derivation demonstrated that the conditions at the site, after removing soils exceeding the site-specific derived guideline of 40 pCi/g Th-230, will be protective of human health and the environment, meet the ARARs, and meet the acceptable CERCLA risk range established by the USEPA in the NCP. The analysis also demonstrated that at this cleanup criteria level, the estimated doses to receptors for the intended land uses (commercial/industrial) meet the objectives defined in the to be considered (TBC) guideline of 10 mrem/yr (NYSDEC TAGM 4003) for intended land use.

5.1.16 Response to Watson Comment (located on page 93 of the Public Hearing Transcript)

1.16 - These concerns will be addressed when action is proposed at those specific sites. The public will continue to be informed of schedules and actions at the other FUSRAP sites through the continued implementation of the Community Relations Plan.

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Town of Tonawanda

commission for
conservation of the environment

GEORGE B. MELROSE
chairman

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JAN - 5 1998

USACE Buffalo District
Tonawanda FUSRAP Office

December 30, 1997

U S Army Corps of Engineers
Public Information Center
70 Pearce Avenue
Tonawanda N Y 14150

Subject: Proposed Plan for Cleanup of Ashland I & II Sites

The Town of Tonawanda Environment Commission and Planning Board have actively pursued cleanup of the FUSRAP sites in the Town for nearly 20 years and submitted in-depth comments to the DOE 1993 Feasibility Study. We are well pleased with the significant progress made during the past year by DOE under site manager James Kopotic in developing a Proposed Plan and with the aggressive moves being made by the Army Corps of Engineers to implement the plan. The activities by Bechtel are also commended.

We consider that the Proposed Plan will amply protect public heaalth by meeting the rigorous Federal and State standards, that waterfront development will be facilitated in accord with the Town's Master Plan and that all excavated radioactive soils will be disposed of out-of state.

2.1 The Environment Commission and the Planning Board fully support the Proposed Plan for Ashland I, II and Seaway D and encourage its prompt implementat. We concur with CANIT's position. Certain issues which we feel need to be confirmed or addressed are given in the attachment.

We look forward to early actions by the Corps particularly the issuance of the ROD and the start of remedial action. We recommend investigating turn-key bids from licensed private firms, such as TERCs, for excvavation, transport and disposal.

We are very pleased with the expeditious manner in which the Corps has taken responsibility for the project and demonstrated its intent to carry it out promptly and efficiently. Please provide us with a copy of the ROD and the Responsiveness Summary.

Please feel free to call on us to help make early safe remediation a reality.

Sincerely,

George B Melrose, Chair

cc:CANIT, L/Col Conrad

RECYCLED PAPER

Comments to be confirmed or addressed

Attachment to Environment Commission letter of December 30, 1997

2.2 1. Will remediation comply with guidelines of NYS TAGM 4003 and DOE Order 5400.5 specified in the Proposed Plann ? If not, what alternative is proposed.

2.3 2. Will restoration use clean backfill to grade ? Definition of "clean backfill"

2.4 3. Will any fences, signs or other institutional controls be required after closure ?

2.5 4. Will there be any restrictions for use of the sites for commercial, office or light industrial purposes ?

2.6 5. Will dose levels of remaining soil be independently monitored during excavation ?

2.7 6. Please describe the oversight activities, onsite and administrative, to be performed by the Corps during remediation

2.8 7. Describe monitoring and other activities which are to take place after closure.

2.9 8. What are the esitmated dates for completion of closure at Ashland I and II. Could private develoopment begin immediately at that time ?

2.10 9. Have sufficient Federal funds been appropriated and committed for completion of the proposed plan ?

2.11 10. Can temporary roads or rails be constructed and left in place such as to facilitate post-closure site development ?

2.12 11. Regarding the balance of the Tonawanda sites in the Town: Linde (Praxair), Seaway A, B and C and the Town landfill: What is the timeline for making radiological dose assessments, issuing guidelines and distributing proposed final remediation plans ? Are funds available for these efforts ? and for remediation ? What are the estimated closure dates ?

5.2 Responses to Town of Tonawanda Comments

2.1 - The positive nature of this comment is noted. The remediation that will be performed on the Ashland sites will constitute a permanent remedy for these sites in that materials exceeding the cleanup guideline developed to protect human health and the environment will be removed from these sites for off-site disposal. This action will allow for the future development of these properties consistent with the Town of Tonawanda Waterfront Region Master Plan.

2.2 - Cleanup criteria for the Ashland sites were developed using the CERCLA process. The cleanup criteria must satisfy the CERCLA acceptable risk range as well as the ARARs. The Th-230 guideline development considered intended and reasonable future land use, the likely maximum exposed individuals, and the criteria included in the ARARs. The key ARARs included EPA 40 CFR 192 and NRC 10 CFR 20. The result of the guideline development effort was a cleanup criteria of 40 pCi/g Th-230.

The guideline derivation demonstrated that the conditions at the site, after removing soils exceeding the site-specific derived guideline of 40 pCi/g Th-230, will be protective of human health and the environment, meet the ARARs, and meet the acceptable CERCLA risk range established by the USEPA in the NCP. The analysis also demonstrated that at this cleanup criteria level, the estimated doses to receptors for the intended land uses (commercial/industrial) meet the objectives defined in the to be considered (TBC) guideline of 10 mrem/yr (NYSDEC TAGM 4003) for intended land use.

2.3 - Prior to backfilling the excavations with clean fill, the soils remaining will be tested to ensure that the cleanup criteria has been achieved. Clean backfill will be supplied from an off-site commercial source. It is the intention to backfill excavations with this clean soil, vegetate the area and restore the site to its original appearance (or better).

2.4 - No institutional controls will be required at the sites after remediation is completed.

2.5 - Once the site has been restored, it can be released for development into an industrial/commercial-use facility with 5-year reviews as required by CERCLA.

2.6 - Prior to backfilling the excavations with clean fill, the soils will be tested to ensure that the cleanup criteria has been achieved.

2.7 - USACE will oversee the work to ensure that it is being done in accordance with the Scope of Work, approved plans, and all safety rules and regulations. USACE oversight will include a full-time presence, on-site, when work is being conducted. Reports will be prepared each day of work and the contractors work will be closely monitored and evaluated. This oversight is in addition to the quality control and safety procedures and personnel maintained by the contractor.

2.8 - Once the site has been restored, it can be released for development into an industrial/commercial-use facility with 5-year reviews as required by CERCLA. Post-closure monitoring will not be required and residual radionuclide concentrations will, on average, be much less than the guidelines values resulting in actual doses and risks much less than specified limits.

2.9 - The current schedule shows remediation being completed at Ashland 2 in 1998 and Ashland 1 in 1999. These schedules are based on removing the volume of contaminated soil estimated in the PP. If site conditions vary from the modeled contamination, the project will be done either more quickly or will take longer than planned.

2.10 - All work is subject to the availability of appropriated funds from Congress. Funds have been and will continue to be requested to complete all the work described for this remedial action. It is anticipated that funds will be made available to initiate the remedial action in a timely manner after the issuance of the ROD and completion of the remedial design. Funding is currently being requested to ensure that the remedial action can be completed in 1999. There is no guarantee, however, that congress will appropriate the funds in 1999 that are ultimately requested for the FUSRAP program.

2.11 - Real estate agreements are currently being worked out at each affected property. These agreements state the conditions of use and expected restoration by the government after remediation. Whether temporary roads and rail loading facilities will be left in-place will be subject to the agreement of the current land owners.

2.12 - These concerns will be addressed when action is proposed at those specific sites. The public will continue to be informed of schedules and actions at the other Tonawanda FUSRAP sites through the continued implementation of the Community Relations Plan.

F.A.C.T.S.

(For A Clean Tonawanda Site)

"PUTTING THE PIECES TOGETHER"

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January 1, 1998

Lt. Col. Michael J. Conrad, Jr.
Site Manager, FUSRAP Tonawanda Site
Buffalo District, U.S. Army Corps of Engineers
1776 Niagara Street
Buffalo, NY 14207-3199

Subject: Request for extension of comment period on proposed plan for FUSRAP Tonawanda Site

Dear Colonel Conrad:

As you know, F.A.C.T.S. was identified by the U.S. Department of Energy as the only non-governmental community stakeholder group participating in the environmental review process at the Tonawanda Site and we take our public interest advocacy role seriously.

3.1 The purpose of this letter is to request an indefinite extension of the comment period on the proposed plan for the FUSRAP Tonawanda Site until all the essential site-related information which F.A.C.T.S. has requested is provided to us and, subsequently, a reasonable amount of additional time (at least 30 days) so that we may comment upon the proposal in an informed and meaningful manner as provided for by NEPA and CERCLA.

3.2 The requested information includes the following: 1) several items contained in our FOIA requests made to DOE Oak Ridge dated 3-17-96, 11-23-96, and 2-4-97, and our FOIA request to the National Archives and Records Administration dated 2-4-97; these items are the subject of litigation in the U.S. District Court for the Western District of New York, 2) the items contained in our FOIA requests made to DOE Oak Ridge dated 9-3-97 and 11-6-97, 3) the items contained in our FOIL request to the NYS Department of Environmental Conservation dated 12-23-97, and 4) several verbal requests made to you, your staff, and Bechtel staff.

3.3 The items outlined above include information about potentially responsible parties (PRPs) and requests resulting from our lack of access to the decisionmaking process over the past year and a half and the information utilized in that process. As you know we were not made a party to the discussions between John LaFalce's office (and presumably the CANiT politicians) and DOE which led to the current proposal.

We thank you for your prompt attention to this request.

Sincerely,

James Rauch

5.3 Responses to F.A.C.T.S. Comments

3.1 - The PP was issued on November 10, 1997 and USACE granted a 30-day extension to the comment period. An additional 11 days was added to this extension after several members of the public requested additional time for preparing their comments. With the extension, the comment period totaled 71 days. Other extensions were considered, however, USACE determined that additional extensions were not appropriate.

3.2 - Documentation relating to calculations used in the cost evaluation of the investigated remedial alternatives (including volume estimates) have been placed in the Administrative Record and are available for public review. A major component of the cost analysis is the volume of the soils determined to require removal and disposal. The cost estimates used for the development of the revised PP used volumes calculated based on a model of the site contamination generated using existing soil contamination characterization results from all historical sampling conducted at the site. The calculations and results of the modeling have also been placed in the document repository for public review and are part of the Administrative Record.

3.3 - USACE has begun to research issues regarding PRPs and will pursue all appropriate means to seek reimbursement from responsible parties on behalf of the Federal Government. However, at this time, no decisions have been made regarding specific parties to pursue nor have offers of indemnification been made by USACE to resolve any liabilities that the Federal Government may have.

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JAN - 5 1998

USACE Buffalo District
Tonawanda FUSRAP Office

174 Capen Boulevard
Buffalo, NY 14226
January 2, 1998

Lt. Col. Michael J. Conrad, Jr.
FUSRAP Public Information Center
70 Pearce Avenue
Tonawanda, NY 14150

Dear Lt. Col. Conrad:

Since I was unable to attend the meeting December 17th, here are a few of my thoughts and reactions to the "Proposed plan for the Ashland I and Ashland II sites."

One of my primary concerns has to do with the transfer of FUSRAP responsibilities from the DOE to the Army Corps of Engineers. Citizens and elected officials of the area have worked diligently for ten years to achieve the agreement with DOE which is summarized in the resolution passed by CANiT on July 23, 1997. I hope and expect that all of the work leading to that document will be respected by the Corps. Further, I recommend that the Corps be diligent in its follow-up to all participants from the public, so as to ensure that public trust in the whole process can be maintained.

I commend you for the excellent hand-outs made available at the December 17th meeting (and sent to me at my request). Difficult concepts are presented in clear and unambiguous language, so that the public, such as myself, can acquire a rudimentary understanding of the underlying science that applies to the site. When I study your materials, I become confident that you are competent to do the job.

My specific comments on the Proposed Plan, dated November 1997:

4.1 p. *i* I endorse Alternative 2A as the appropriate remedy for Ashland I & II, with particular reference to using the NYSDEC guideline TAGM, which is a stricter standard than that of the DOE.

4.2, 4.3 p. 3-4 The maps show only access roads through the sites. Is any rail available for transportation of materials to the disposal site? Whatever mode is used, it will be extremely important to inform the public as to the risk of exposure to human health and to the environment during the trucking of materials away from the site.

p. 6 In addition, since Rattlesnake Creek and its wetlands are in Ashland II,
4.4 I recommend that the Corps offer a suitable remediation plan for this ecologically sensitive area. One concern the public has is whether radioactivity is currently
4.5 seeping through the watershed and out to the Niagara River via Two Mile Creek. I further recommend that the Corps conduct a thorough investigation of the Two Mile Creek watershed to determine what specific risks to wildlife and natural habitats currently exist.

4.6 p. 8 Removal of the contaminated soils is the goal. I agree with that goal. It occurs to me, however, that there may be residual contamination in the environment, chiefly through the wildlife and natural habitats. Is there any way to assess such factors? Further, there could be unintended consequences that develop as the
4.7 excavation of contaminated material proceeds. Therefore, it is essential that the Community Right to Know element of SARA be adequately put in place before any bulldozer begins its work.

Sincerely,

Gladys Gifford

5.4 Responses to Gifford Comments

4.1 - The positive nature of this comment is noted. The remediation that will be performed on the Ashland sites will constitute a permanent remedy for these sites in that materials exceeding the cleanup guideline developed to protect human health and the environment will be removed from these sites for off-site disposal. This action will allow for the future development of these properties consistent with the Town of Tonawanda Waterfront Region Master Plan.

4.2 - Rail transportation may be utilized during waste shipment from the Ashland sites.

4.3 - USACE will review the contractor's transportation and disposal plan to ensure that it complies with all applicable or relevant and appropriate laws, regulations and executive directives, and is protective of human health and the environment.

4.4 - Impact to wetlands will be minimized to the extent practicable during remediation.

4.5 - Testing conducted during the investigation phase of the RI/FS process, did not indicate impacts to the surface water at the confluence of Rattlesnake Creek and Twomile Creek, indicating that there is no impact from the Ashland sites on the Niagara River.

4.6 - Once the site has been restored, it can be released for development into an industrial/commercial-use facility with 5-year reviews as required by CERCLA. Monitoring will not be required and residual radionuclide concentrations will, on average, be much less than the guideline value resulting in actual doses and risks less than specified limits. Consequently, the remedy will be protective of human health and the environment, including ecological receptors at the site.

4.7 - The current remediation plan for the Ashland sites is to excavate contaminated soils, move them to a rail siding, and transport them off site by rail. The contractor will be required to submit work plans in advance, subject to government review and approval, which will demonstrate a safe and efficient approach to the work and will also demonstrate understanding of and intent to comply with all worker and public safety requirements which apply to the work in progress. The plans will also be reviewed by regulatory agencies, including coordination with appropriate emergency response organizations, to ensure protection of human health and the environment and compliance with applicable or relevant and appropriate laws and regulations, to the extent applicable, such as the Emergency Planning and Community Right to Know Act of 1986.

January 6, 1998

U S Army Corps of Engineers
FUSRAP Public Information Center
70 Pearce Avenue
Tonawanda, N.Y. 14150

Dear Sir or Madam,

I would like to make a comment about the Ashland Sites - "Thank God some progress is finally being made!"

I've listened to the same "go-round" at meetings for about ten years so the meeting with the Army Corps was refreshing.

4

The news said the Clean-up would take place during the fall of 1998, I wish it was sooner. I am seventy seven years old so getting to meetings is more difficult but I will continue to be active as long as necessary. I am relieved that something is being done for the future of the Children and our source of fresh water.

Thank you.

Sincerely
Lillian C. Detar

RECEIVED
JAN - 8 1998
USACE Buffalo District
Tonawanda FUSRAP Office

Lillian C. Detar
326 Westchester Blvd.
Kenmore, NY 14217-1316

5.5 Response to Detar Comment

5. – The positive nature of this comment is noted. The remediation that will be performed on the Ashland sites will constitute a permanent remedy for these sites in that materials exceeding the cleanup guideline developed to protect human health and the environment will be removed from these sites for off-site disposal. This action will allow for the future development of these properties consistent with the Town of Tonawanda Waterfront Region Master Plan.

PARSONS ENGINEERING SCIENCE, INC.

180 Lawrence Bell Drive, Suite 100 • Williamsville, New York 14221 • (716) 633-7074 • Fax: (716) 633-7195

January 8, 1998

U.S. Army Corps of Engineers
FUSRAP Public Information Center
70 Pearce Avenue
Tonawanda, New York 14150

RECEIVED
JAN 12 1998
USACE Buffalo District
Tonawanda FUSRAP Office

RE: Proposed Plan for Cleanup of Ashland I and II Sites

Gentlemen:

6.1 Parsons Engineering Science, Inc. (Parsons) has followed with interest the remediation strategy for the various properties comprising the FUSRAP Tonawanda Site for a number of years. We recognize the importance of succeeding on this program to the Corps, to the Buffalo District, and to the residents of the Town of Tonawanda. Based on Parsons' experience at USDOD and USDOE facilities with permitting, processes, deactivation, decontamination, decommissioning, transportation logistics, environmental health and safety, remediation, quality assurance, and validation/certification, we believe that the *Proposed Plan for the Ashland 1 and Ashland 2 Sites (USACE, 11/97)* will be protective of human health and the environment, and will facilitate development of Tonawanda's waterfront, an activity which Parsons strongly supports. Parsons is pleased to recommend to the Corps the prompt implementation of the remedy described in the Plan.

During the Public Information session on December 17th, Lt. Col. Conrad made a strong impression on us regarding the advantage of local Corps involvement. He noted that by bringing the Buffalo District on board, Congress not only made available a technically qualified and results-oriented agency, but also enabled a body of interested local citizens to be at the helm of the cleanup. We at Parsons applaud and support this position. However, this begs the question, "how will the Corps maximize the opportunities for qualified local companies under the FUSRAP program?"

6.2 We believe that, as a local business, it is imperative to reiterate the added value available to the remediation through the involvement of local companies in the upcoming design and construction tasks at the various properties. The waste was generated locally; local residents and businesses have lived with its presence for years...now it can be managed effectively using local talent and resources. Parsons believes that, while providing an out-of-town Corps' contractor through such programs as the Louisville or Baltimore District Total Environmental Restoration Contract (TERC) programs is an approach to site remediation, <u>it is not the most effective and efficient one</u>. It does not maximize support of the local economy and contracting community, and reduces the local control and oversight of work performance and contract management. We strongly encourage the Buffalo District to utilize qualified local contractors for the remedial design, construction management, and remediation of this problem.

We applaud the efforts of the Corps and its existing contractors in advancing this project. We look forward to the local business community participating in the Ashland sites' remedial program.

Please feel free to call us at (716) 633-7074 if you have any questions on this matter.

Very truly yours,

PARSONS ENGINEERING SCIENCE, INC.

James H. Kyles
Manager, New York Operations

cc: The Honorable John J. LaFalce
Legislator Charles M. Swanick
Commissioner Richard M. Tobe
Supervisor Carl J. Calabrese

5.6 Parsons Comment Responses

6.1 - The positive nature of this comment is noted. The remediation that will be performed on the Ashland sites will constitute a permanent remedy for these sites in that materials exceeding the cleanup guideline developed to protect human health and the environment will be removed from these sites for off-site disposal. This action will allow for the future development of these properties consistent with the Town of Tonawanda Waterfront Region Master Plan.

6.2 - The actual work will be conducted by contractors with experience on similar projects. Standard government procurement procedures will be followed by USACE in selecting qualified contractors to perform all necessary work to complete response actions at these sites.

Received 1/20/98

F.A.C.T.S.

(For A Clean Tonawanda Site)

"PUTTING THE PIECES TOGETHER"

Box 566
Kenmore, NY 14217-0566

Phone: (716) 876-9552
Fax: (716) 876-9552

COMMENTS ON "PROPOSED PLAN FOR THE ASHLAND 1 AND ASHLAND 2 SITES, TONAWANDA, NEW YORK, NOVEMBER 1997, FINAL, USACE/OR/21950-1029"

James M. Rauch

January 8, 1998

Opening Comments

7.1 1) We believe the environmental review process for the Tonawanda Site, started by the Department of Energy (DOE) and recently transferred to the U.S. Army Corps of Engineers (ACE), is flawed and raises serious questions that need to be objectively resolved.

7.2 2) A fundamental question is why were the EPA and the U.S. Nuclear Regulatory Commission (NRC) not involved in the environmental review process as co-lead agencies from the start. As far as we know, there has been no NRC involvement in the process. Other than as described in comment 30, we know of no involvement by EPA (see U.S. Nuclear Regulatory Commission Is the Authorized Regulator section and comments 30, 17, and 18 below)

7.3 3) What statute(s) and/or regulations authorize ACE to continue the integrated NEPA/CERCLA EIS environmental review process commenced by DOE in 1988 at the DOE FUSRAP Tonawanda Site? Please cite specific statute(s) and/or regulations and section(s) thereof.

7.4 4) What statute(s) and/or regulations authorize ACE to conduct remediation of the MED/AEC 11.e.(2) byproduct materials present at the FUSRAP Tonawanda Site? Please cite specific statutes(s) and/or regulations and section(s) thereof.

7.5 5) Former DOE Assistant Secretary Thomas Grumbly made a commitment to the community to provide a sitewide final cleanup plan by the end of 1996. This was not done. This revised Proposed Plan released by ACE presents final remediation alternatives covering only the Ashland 1 (now including Area D of the Seaway property) and Ashland 2 properties. Why has a sitewide final cleanup plan not been presented? Please provide a thorough, objective explanation.

7.6 6) This revised Proposed Plan covers only the Ashland 1, including Seaway Area D, and Ashland 2 properties, and does not give any contaminated volume figures for any of the alternatives. The contaminated volumes for Alternatives 2 and 2A only of this revised PP were given by ACE in a handout (see reference) at the December 17, 1997 public hearing. The contaminated volume given, 85,000 cubic yards, for the limited version (limited to only Ashland 1, including Seaway Area D, and Ashland 2) of the draft RI/FS-EIS's Alternative 2 (complete cleanup by generic guidelines) is much less than half that determined by the draft RI/FS-EIS (a $6 million dollar package) for these properties, 172,200 cubic yards. We find this change to be incredible (see comment 15).

7.7 7) This revised Proposed Plan contains non-sitewide alternatives and a new alternative, Alternative 2A, that are not analyzed in the draft FS-EIS. The rudimentary information given in the revised PP's description of these non-sitewide alternatives is insufficient to meet the public review requirements of NEPA and CERCLA (see comment 33). The draft FS-EIS is geared to a sitewide analysis and lacks the breakdown of non-sitewide alternatives information and analysis (e.g. costs, economies of scale) necessary under the narrowed scope to compare the alternatives, raising issues of segmentaion and making it impossible to comment in the meaningful way provided for by the NEPA/CERCLA public review process. A supplement to the draft FS-EIS to correct these obvious deficiencies must be prepared and subjected to public review. (see <u>Cost</u> and <u>Segmentation</u> sections and comments 14, 15, 16, 28, 29, 34, and p 8 of reference 1.)

7.8 8) Our review of the Administrative Record shows it to be incomplete. We request that all documents listed as references in the draft RI/BRA/FS-EIS documents and those documents' references be made part of the Administrative Record, whether they are physically placed in the record or incorporated by reference. We also request that the documents described in the attached list of reference documents to these comments be incorporated into the Administrative Record. According to staff at the Tonawanda Public Information Center, DOE/ACE has no record of much, if not all, of the correspondence on this list.

<u>U.S. Nuclear Regulatory Commission Is the Authorized Regulator</u>

7.9 9) We think the U.S. Nuclear Regulatory Commission (NRC) is responsible for regulating the management and disposition of all the MED/AEC 11.e.(2) byproduct materials present at the Tonawanda Site. Title II of the Uranium Mill Tailings Radiation Control Act of 1978 (UMTRCA), which amends the Atomic Energy Act of 1954 (AEA), specifically directs the U.S. Nuclear Regulatory Commission (NRC) to control the management of 11.e.(2) byproduct materials located at inactive mill tailings sites such as the Tonawanda Site. Almost two years ago, we asked NRC to assume its statutory responsibilities at one of the Tonawanda Site properties, i.e. to regulate the release of radon gas from a controversial active gas extraction/cogenerator system being installed at the Seaway property (see references 58, 13, 14, 57, 59 to 65 and FOIA list). We made this request after we eventually learned that New York State's failure to implement the necessary regulations and program on the state level, as prescribed by UMTRCA, apparently had resulted in the State's loss of jurisdiction over 11.e.(2) byproduct materials in 1981 (see references 18 to 19, 59, and 69), which authority then reverted to NRC. We also notified NRC of problems with the interim actions at Linde by copy of correspondence to NYS and DOE (see comments 17, and 18).

10) To implement the requirements of UMTRCA, NRC modified its Title
10 Part 40 regulations "Domestic Licensing of Source Material",
including sections 40.2a, 40.3, and 40.21. What persons are curently
authorized to receive, possess, use, transfer, provide for long-term
7.10 care, deliver, and/or dispose of the byproduct materials located at
each of the five FUSRAP Tonawanda Site properties: Linde, Ashland 1,
Ashland 2, Seaway, and the Town of Tonawanda Landfill? In each case,
please identify the specific license granting such authority and the
name and address of the authorized person.

11) Over the last 10 years the NRC has developed a program for
remediation of problematic contaminated sites, the definition of
problematic including sites with large volumes of contaminated soils.
Known since 1991 as the Sites Decommissioning Management Plan (SDMP),
this program oversees the cleanup of both licensed and unlicensed
sites. The program is described in NRC report NUREG-1444 and several
7.11 other reports including the April 1992 SDMP Action Plan (57 FR 13389).
For a site to be listed in the program it must meet one or more of
five qualifying criteria. Though all the Tonawanda Site properties do
meet many of these qualifying criteria, none of the properties has
been listed in the SDMP program. We believe this represents a
significant oversight by NRC.

12) We believe that the cleanup guidelines used by NRC in its SDMP
program are applicable guidelines, under Sec. 84.a.(1) of UMTRCA, to
remediation of the Tonawanda Site. The April 1992 SDMP Action Plan
lists the cleanup criteria for SDMP sites; these criteria have been
consistently applied to cleanup of listed SDMP sites. The action plan
list includes the "Branch Technical Position (BTP) on Disposal or
Onsite Storage of Thorium or Uranium Wastes from Past Operations"
(46 FR 52061), the Office of Nuclear Material Safety and Safeguards'
Policy and Guidance Directive FC 83-23, and EPA's Interim National
Primary Drinking Water Regulations (40 CFR Part 141). Since the
7.12 Tonawanda Site properties meet many of of the SDMP's qualifying
criteria, there is no reason that these cleanup guidelines should not
be included in the environmental review. The SDMP guidelines are the
best available guidelines for a site of this type, even if the site
has not been listed in the program. In addition to these guidelines,
Sec. 84.a(2) of UMTRCA requires that NRC management of all 11.e.(2)
byproduct material at Title II uranium byproduct material sites such
as Tonawanda conform to 40 CFR Part 192 sections 192.30 to 192.34, as
well as the regulations prescribed therein. Also, the requirements
specified in Sec. 84.a.(3) of UMTRCA must be met.

13) With respect to 40 CFR 192 Sec. 192.33 "Corrective action
programs," in my comments on the draft RI/FS-EIS (see comment 31,
reference 3), I pointed out that water from well B29W09D at Linde
contained radium-226 in concentrations exceeding the EPA drinking
7.13 water standard of 5 pCi/l (draft RI pp 4-216, 4-217, 7-18) and I
called for further evaluation of groundwater impacts and the
identification of potential remediation techniques. In response, DOE
maintained that, since groundwater in the area is not currently used

for drinking water, drinking water guidelines are not applicable. However, according to NYS DEC, "(a)ll fresh groundwater in the State is classified as GA, with an intended best usage as a source of drinking water ... regardless of its current use." (see pp 24, 25 of enclosure to reference 4.) Section 192.33 requires that a corrective action program "be put into operation as soon as is practicable, and in no event later than eighteen (18) months after a finding of exceedance." To our knowledge, no such action has been taken. Why not? (see comment 11)

<u>Segmentation of Review Process</u>

14) The issue of groundwater impacts must be addressed on a sitewide basis rather than a property-specific basis. NEPA requires that cumulative impacts be addressed together; NEPA prohibits segmentation of the review process. (Also see comments 7, 16, and 26.) The analyses used in all draft BRA exposure scenarios (p B-2), and in the "Radionuclide Cleanup Guideline Derivation for Ashland 1, Ashland 2,
7.14 and Seaway" (p 16) incorrectly ruled out groundwater as an exposure pathway - see comment 13 above. Also, in the August 1988 "Derivation of Uranium Residual Radioactive Material Guideline for the Ashland 1 and 2 Sites", the perched groundwater system was ruled out (p 5), even though this unit is capable of useable flow rates. Accordingly, these analyses should be revised. (see comments 7, 16, 26, and 34)

<u>Volumes of Contaminated Soils/Sediments</u>

15) The description of the contaminated soil and sediment volumes in the draft FS (pp 4-4, 4-7, and 4-8) provides no property-specific breakdown (uniform sitewide cleanup is assumed). However, EMAB previously reported (reference 2) property-specific volumes for draft FS Alternative 2 (determined using DOE's Order 5400.5 generic guidelines of 5/15 pCi/g for Ra-226 and Th-230, and a Tonawanda site-specific guideline of 28.4 pCi/g for U-238) of 120,200 cubic yards (cy) for Ashland 1, 52,100 cy for Ashland 2, and 117,000 cy for Seaway (with no breakdown by area, however, together Areas A and D contain 91,000 cy). EMAB sitewide totals are consistent with the draft FS totals. <u>Not including Seaway area D</u>, the EMAB Alternative 2 total for Ashland 1 and 2 is <u>172,300 cubic yards</u>. The revised PP gives no volumes. However, for the same alternative, using the same generic
7.15 guidelines as EMAB, the handout supplied at the ACE December 17, 1998 public hearing gives a contaminated soil volume sum for the Ashland 1 (<u>including Seaway Area D</u>) and Ashland 2 properties of <u>85,000 cubic yards</u>. This is a discrepancy of much more than 87,000 cubic yards. We find this to be incredible. It suggests to us that NRC assumption of the environmental review process may be advisable (see comment 9). A supplement to the draft FS is required. Does the revised PP volume include contaminated sediments? According to the draft FS, these total 10,150 cubic yards. Please provide a detailed explanation of the method(s), e.g. computer model(s), used to calculate the volumes for the draft FS and the revised PP, and fully describe all differences. The method(s) employed must be acceptable to NRC, with regard to 11.e.(2) material, and NYS/EPA, with regard to non-radiological MED/AEC contamination (chemical COCs).

Extent of Contamination

7.16

16) The required NEPA/CERCLA review for these properties is deficient (see comment 7). NEPA requires an objective assessment of the cumulative impacts of a proposed action. The proposed action is the final remediation of Tonawanda Site properties identified as being contaminated with MED/AEC radioactive wastes. The draft RI states (p 7-38) that two vicinity properties, the Conrail property to the northeast of Linde and the Niagara Mohawk property adjacent to Seaway, are contaminated and will require designation into the Tonawanda RI/FS-EIS review process and that additional properties, R. P. Adams and the Town of Tonawanda landfill will require further investigation. The extent of major underground contamination at Linde associated with the injection wells has not been adequately addressed (see comment 10). The streambed of Twomile Creek, the G. K. Hambleton property and the Benson Development Co. property adjacent to Ashland 2 may also be contaminated. There may be others. The Town of Tonawanda landfill is said to contain over 15,000 cubic yards of contamination (EMAB, see reference 2) resulting from the deposition of sediments dredged from Twomile Creek. This property contains material with the highest average radium concentration (68 pCi/g) and total activity of any of the properties (EMAB). The Town of Tonawanda landfill was apparently designated into the remediation process in December 1992. But it was not included in the draft RI/BRA/FS analyses, nor were any of these other properties with the exception of the Niagara Mohawk property (pp 4-1, 4-2 of the draft FS). Have any of these properties or any other vicinity properties been designated for cleanup? Please supply information documenting why or why not in each case.

Interim Removal Actions

7.17

17) It is our understanding that interim actions must meet all applicable guidelines (see reference 70). We raised the issue of what building decontamination criteria are applicable to the interim actions at Linde in our December 20, 1996 comments (reference 67) on the November 1996 interim action "EE/CA for Building 30 at Praxair." Subsequently, we learned that surface decontamination criteria for radium were recommended by Oak Ridge National Laboratories (ORNL) for the decontamination of the Linde buildings based on findings contained in the May 1978 ORNL survey report for Linde (see first enclosure to reference 18). We asked both DOE and NYS Department of Labor address this issue (see references 18 to 21). NYS DOL responded that they had no juridiction over the matter. DOE evaded the issue. Neither DOE nor ACE has issued a response to comments on this EE/CA. In the meantime, we have been assured that these interim actions were not final remediation. The work continues using the fiftyfold less stringent uranium criteria (see references 50, 51). The revised PP (p 1) states that there will be no further review of the buildings at Linde following completion of the interim actions because "remediation of the Linde buildings has been addressed separately using Engineering Evaluations/Cost Analysis (EE/CA) documentation and public reviews." This implies that these interim actions constitute final remediation. When recently confronted on this issue, ACE (Bechtel) responded that there was other information contradicting the findings of ORNL. We

asked for that information, however, no such information has been provided. We have no reason to believe either the ORNL experts' findings or recommendation to be incorrect, and so, we must conclude that DOE/ACE are willfully failing to employ appropriate radium decontamination criteria necessary for unrestricted release of these buildings. We do not believe this would be happening if NRC was exercising its proper regulatory role at the Tonawanda Site.

18) Since the mismanagement of R-10 residues at the Niagara Falls Storage Site (see pp 1 to 8 of reference 5), we have been concerned that soil cleanup will not be performed properly. Regarding removal of the soil pile at Linde, we raised this issue in our comments on the January 1996 "EE/CA for Praxair Interim Actions" and subsequently we
7.18 repeated our concerns (see references 66, 15, and 20). It is unclear to us, just how the removal and segregation of contaminated soil was done. In addition, we wonder why NYSDEC, has continued to act as if it has regulatory authority over these 11.e.(2) wastes, after being informed by NRC that it lacked jurisdiction over them (see comment 9 and Administrative Record). We wonder why DOE and ACE are willing to continue this charade.

<u>Future Land Use</u>

19) Cleanup guidelines should be adjusted to protect future site users. It is unlikely, but certainly not inconceivable, that a resident farmer use could occur on these properties at some time in the future. The land is certainly capable of supporting such use as evidenced by early town history. The Ashland 2 property is re-vegetating nicely and is increasingly attractive to recreationists and wildlife, including deer. We think it is very reasonable to expect
7.19 that future land uses for these waterfront properties will include various residential suburban occupancy styles, including single family 1-story and 2-story, with or without basement, duplexes, condominiums, etc. Some of these residences are likely to have home vegetable gardens. Simply because the existing use is a less intensive use and the current Town Master Plan does not currently contemplate residential uses in certain areas does not mean such use patterns will not change. Therefore, we think a resident scenario that includes limited food and water ingestion pathways is a reasonable future use and environmental review should include such use.

20) The revised PP's thorium guideline is not sufficiently protective of such expected future residential users. Under the modeled urban resident use scenario, which assumes no food or water pathways and no clean cover, the proposed site-specific 40 pCi/G Th-230 cleanup guideline (Approach 2) is estimated to result in a dose not including
7.20 radon inhalation (see comment 22) of 86 millirems/yr. This dose is roughly 9 times the NYSDEC TAGM - 4003 dose guideline of 10 millirems/yr, and certainly not an ALARA dose. With 8 inches of cover, the dose is reduced to an estimated 13 millirems/yr, still in excess of the TAGM; however, cover requires institutional controls (deed restrictions). We have little confidence in the long-term effectiveness of such controls (for even hundreds of years, when the duration of the radioactive hazard is hundreds of thousands of years).

21) None of the alternatives provide sufficient long-term protectiveness, a fundamental CERCLA requirement. NEPA requires cumulative impacts be fully addressed. We believe the arbitrary 1000 year timeframe employed in the dose calculations and risk analysis is too a short time period to fairly apprise the public of cumulative long-term adverse health impacts. We think a 10,000 year timeframe is
7.21 more appropriate, as is done for other radioactive wastes. Long-term cumulative dose estimates that consider ongoing radium ingrowth from residual levels of thorium should be provided for all proposed alternatives. Peak doses and risks and their time of occurrence should be presented (see comments 22, and 27).

Radon Doses

22) We think the 40 pCi/g Th-230 cleanup level allows radon doses from the 11.e.(2) material that are too great. We think that radon doses attributable to the 11.e.(2) material should be calculated and included in the total doses reported to the public. Inhalation of radon gas from uranium mill tailings is the major component of total dose at sites such as the Tonawanda Site, yet it is DOE/ACE policy not to include doses attributable to the tailings in determining compliance with the basic dose guideline. Instead, an effort is made to demonstrate compliance with EPA's 4 pCi/l guideline for radon in indoor air. According to DOE/ACE's industrial worker exposure scenario for the Ashland properties, an industrial worker exposed to
7.22 EPA's guideline concentration will receive approximately 200 millirems/yr radon dose, with the major portion of this dose coming from the 11.e.(2) waste material left behind (at the 40 pCi/g Th-230 Approach 1 cleanup level). For a typical residential scenario, the radon dose will be approximately 500 to 800 millirems/yr, again with the major dose portion coming from the 11.e.(2) material. In addition, the EPA guideline will be exceeded after 1000 years due to radium ingrowth from the 40 pCi/g residual thorium level. What is the peak indoor radon concentration estimated to be under Approach 2 for the urban resident scenario? When will this peak concentration occur? We believe NRC's approach to this radon problem as embodied in their SDMP program is much more rational and highly preferable.

Costs

23) The revised PP provides no breakdown of cost components for the implementation of each alternative, as was done in the November 1993 draft FS. The validity of the cost data presented in the FS were subject to intense criticism by the community. The major specific
7.23 components cited as being inflated were unit transportation costs, unit disposal costs, management overhead, and unreasonably large contingency allowances. An objective, updated supplement to the draft FS providing each revised cost component must be prepared and subjected to public review.

24) Regarding disposal site costs, the commercial disposal cost (for Envirocare, Clive, Utah) was given in the draft FS as $216/cubic yard.
7.24 Why should a private disposal firm which collects large profits, above and beyond actual disposal costs, be used for disposal, when after the

operation closes down in a relatively short while responsibility for the site will revert to the public sector anyway, either state or federal government? It makes no sense to the taxpayer.

7.25 25) We believe the $270/cubic yard disposal cost given for the Nevada Test Site (p 3-13 of reference 54) is artificially inflated and does not reflect the actual cost of disposal. This same report gives a figure of $94/cy disposal cost for a hypothetical DOE disposal facility (p 4-3 to 4-7). We believe this figure contains components not applicable to NTS, an operating, federally-owned facility. We request a realistic evaluation of NTS disposal costs be performed by an independent agency such as GAO. We think actual disposal costs at NTS are be both significantly less than $94/cy and significantly less than Envirocare's current charge. (Also see comment 28).

7.26 26) We have criticized the decontamination of buildings at the Linde property as being wasteful, particularly in view of the radium issue (see comment), compared to the less costly demolition of the buildings as prescribed in the community-supported draft FS-EIS's Alternative 2 (all four buildings were to be demolished at a direct cost of approximately $1.5 million [lines 2a, 2b, and 2c on p G-29]). So far, approximately $8 million has been spent on building decontamination (see reference 42). We have asked ACE for an updated total of building decontamination costs. Please supply the evaluation referred to in response 8 of enclosure to reference 21. Since "too-high" cost has been frequently cited by DOE as a reason for not employing more stringent sitewide cleanup guidelines, these high interim action costs may prejudice selection of sitewide remedy, and therefore, represent segmentation of the review process.

7.27 27) We are aware of no efforts on the part of DOE to identify potentially responsible parties at the Tonawanda Site (see comment 29). Since such an issue has been made of "too-high" cost by DOE/ACE with respect to thorough, sitewide cleanup, we believe identification of PRPs prior to any cleanup decision is necessary to avoid public perception that cost was the overriding factor in the decision. Also, in response to "too-high" cost claims, we suggest that an objective study be done to estimate the sitewide, long-term (10,000 years) cumulative morbidity and mortality costs associated with Alternative 1 using a limited resident farmer scenario (see comment 19). To put the cleanup cost issue in perspective, we have often pointed out the cost of implementing sitewide Alternative 2 is roughly half the cost of a single space shuttle mission.

Offsite Storage Location

7.28 28) To us, the selection of the most physically suitable long-term storage site for the Tonawanda Site wastes is an essential part of the review process. We raised this issue often at meetings of CANiT and reiterated it in a letter to DOE's James Owendoff (see references 15 and 16). Not all disposal facilities licensed to accept 11.e.(2) material are equivalent in this respect. The best physical location will provide the longest duration of waste isolation and avoid most (if not all) costs of active maintenance (see pp 8, 9 of reference 5).

We believe the playas of the Nevada Test Site to be at least equivalent to Envirocare's Clive, Utah location in these respects. However, DOE has designated Tonawanda Site wastes as "non-defense" wastes which are not eligible for storage at NTS under DOE's current regime. This makes no sense to us or the National Academy of Science's National Research Council (see p 36 of reference 68). (Also see comment 25)

<u>Identification of Potentially Responsible Parties (PRPs)</u>

7.29

29) It is a requirement of CERCLA that potentially responsible parties (PRPs) be identified and pursued for recovery of remediation costs. As far as we know, this has not been done for any of the Tonawanda Site properties. Congress pointedly reiterated this mandate in the Conference Report attached to the FY 1998 Energy and Water Development Appropriations Act, saying "the Corps of Engineers is expected to immediately pursue cost recovery from the responsible parties at FUSRAP sites either through a negotiated settlement or a court action." What are ACE's results in this regard? We expect that this fundamental requirement will be met before any decision is made.

Our research into this issue reveals the following:

With regard to Ashland 1, information we received from the General Services Administration via FOIA in May 1997 shows that the Ashland Oil Company did know of the MED/AEC contamination when they purchased the Haist property at GSA auction through quitclaim deed in 1960 (contrary to DOE's Authority Review document, reference 71), and that before purchasing the property Ashland sought assurance that it would not be held liable for any subsequent decontamination of the property (see references 72, 73) . We also note that according to various DOE documents (see references 52, 53) the wastes when deposited in the mid-forties contained approximately 0.54% uranium. Possession of such materials containing 0.05% or more of uranium, by weight, required a license from AEC. We are awaiting receipt via FOIA to DOE Oak Ridge of the 1958 AEC radiological survey report which reportedly formed the basis for free release of the property. Presumably this report will help establish if there were licensable concentrations of uranium present at the time of the sale. If so, does AEC's failure to license the transfer of the MED/AEC wastes to Ashland Oil as required under the applicable 10CFR40 regulations establish some portion of federal liability for the cost of remediation of this property?

With regard to Ashland 2, Ashland Oil Co. transferred wastes from Ashland 1 to both Seaway and Ashland 2 between 1974 and 1982. New York State was the responsible regulator, federal licensing authority over these materials having been delegated by AEC to the state through the 10-15-62 State Agreement (see reference). The NYS Department of Labor reportedly established control over the Ashland MED/AEC wastes by letter dated 9-11-78 (see reference 74). However, transfer of wastes from Ashland 1 to Ashland 2 continued into 1982, according to DOE (draft BRA p 1-10). Does New York's failure to exercise license control over the Ashland 1 materials, thereby allowing Ashland to transfer portions thereof to both the Seaway property and Ashland 2, establish some portion of state liability for the cost of remediation of these properties? We note that NYS regulatory authority over these materials reverted to NRC late in 1981 (see comment 9), possibly before the transfers to Ashland 2 and Seaway ceased.

With regard to Linde, we have requested via FOIA to DOE Oak Ridge the MED/AEC uranium production contracts with Linde (as they are identified on page 127 of reference 54) and documentation of the decontamination and decommissioning activities performed prior to release of the MED/AEC uranium refinery operations to Linde. As with Ashland 1, presumably this information (contract conditions governing wastes and radiological surveys done before AEC vacated the premises) will help establish the extent of federal liability for remediation at this property, if any. We note that documents uncovered in the course of a New York State Assembly investigation in 1981 seem to indicate federal government liability for radioactive effluent injected into onsite wells and released to surface waters and storm and sanitary sewers (see reference 55).

<u>Environmental Review Process</u>

7.30 30) The Administrative Record contains correspondence between DOE and EPA regarding the hazard ranking system (HRS) score of the Tonawanda Site which shows that based on that ranking the Tonawanda Site should have been placed on the NPL. This was not done. Please explain why the 9-24-87 DOE draft Federal Facilities Agreement was not executed, why EPA did not assume co-lead agency status, and provide EPA's and DOE's documentation of the rationale for why the Tonawanda Site was not placed on the NPL.

7.31 31) The title of the Proposed Plan misidentifies it as "Final". Under NEPA/CERCLA environmental review procedures, documents made available for public comment are identified as "draft" or "public draft". The "final" documents are issued only following the close of the public comment period. The "final" documents should reflect any and all revisions made as a result of the public comments. The revised Proposed Plan should contain text explaining that it is but one part of the total NEPA/CERCLA environmental review package, which includes the draft RI/BRA/FS-EIS documents, on which ACE is seeking comments. NEPA requires that all public comments previously made on the apparently unmodified draft RI/BRA/FS-EIS documents be thoroughly addressed in the final EIS, as well as all current comments on the total review package. NEPA sets specific requirements on the form and content of agency responses to public comments: the final review document must contain a response to comments section in which each comment must be individually identified and paired with a detailed response, unless there are a large number of essentially identical comments.

7.32 32) In issuing the 1988 Notice of Intent to Prepare an Environmental Impact Statement to evaluate alternative remedial actions for the long-term management of Tonawanda Site wastes, DOE determined that "an EIS is the appropriate level of NEPA review necessary to adequately inform decision-makers and the public of reasonable alternatives for minimizing any adverse impacts of the proposed action" (p 1-5 of the draft RI). In announcing "suspension" of the integrated NEPA/CERCLA public environmental review process in April 1994 and on many subsequent occasions, DOE said that NEPA review was not being terminated at the Tonawanda Site, that thereafter the policy would be to incorporate NEPA values into CERCLA documentation (see references 6 to 17, 20, 21, 23, 24, 43 to 48). DOE has a record of blatantly ignoring NEPA requirements (see pp 1 to 8 of reference 5). The notice issuing this Proposed Plan for public comment (11-13-97 <u>Buffalo News</u>) refers to a DOE policy change ("Secretarial Policy on the National Environmental Policy Act, June 1994") and states that ACE will follow the same policy. We are disappointed that ACE appears to share the DOE view that substantive public review requirements of NEPA can be avoided simply by issuing a non-promulgated policy statement. Was any rulemaking done by either agency to validate these changes? If so, please describe and provide documentation of same.

33) In announcing the "suspension" of the NEPA/CERCLA integrated public environmental review process in April 1994 and on many subsequent occasions, DOE henceforth committed to provide fully informed participation to all interested members of the public in an open decisionmaking process to select a sitewide remediation plan. However, DOE ceased public work plan meetings after the 2-28-95 meeting, and thereafter dealt almost exclusively with the CANiT politicians. CANiT was awarded a second DOE self-serving TAP grant (see references 22 to 34). There were no public meetings from the time of the public meeting on June 18, 1996 until the CANiT meeting on July 1, 1997 (see references 36 to 47, and 49). During this period of time, the current proposal was secretly negotiated with the CANiT politicians; neither F.A.C.T.S. nor other interested members of the
7.33 community had access to this decisionmaking process. During this period we filed a complaint against DOE in federal district court in an attempt to obtain information responsive to several of our FOIA requests (see reference FOIAs). With the exception of Praxair, representatives of the property-owner stakeholders have not participated at the public meetings (see comments 29 and 35). DOE's failure to adhere to its 1994 commitment has kept F.A.C.T.S. and the interested public at a substantial informational disadvantage. (see references 15, 17, 23, 24, 35, 36 to 41, 43 to 47, and FOIA). Because of this situation, we requested an indefinite extension of the comment period until this information gap and lag-time could be corrected (see reference 76). It is our understanding that a minimum 30 day extension of the comment period is provided for upon timely request. An eight day (from date of proper notice) extension only was granted.

34) Excluding Seaway from review and remediation ~~together~~ with the Ashland properties, considering its location between the Ashland properties, makes no sense to us. There are ~~be~~ obvious cost economies
7.34 of scale in performing remediation of all three properties together. This appears to be a clear violation of the NEPA prohibition against segmentation. What is ACE's current plan for remediation of this property, if there is none, why not?

7.35 35) We have uncovered what we believe is evidence of a possible indemnification arrangement on the part of DOE in its relations with Browning-Ferris Industries, operator of the Niagara Landfill at the Seaway property. We are very concerned about the negative impact such an arrangement, if consummated, might have on the form of remediation at this property. Information regarding this possibility is one of the matters currently the subject of F.A.C.T.S.' litigation (see FOIA list). What is ACE's knowledge of this matter, if any? This is a matter requiring investigation.

Background Values

7.36 36) Representative area-wide background values for the radionuclides were determined by ORAU. These values are significantly lower than the values from Ashland 2 South that are being used in the calculation of contaminated volumes. We believe the Ashland 2 South values have been biased by their historic proximity to the disposal piles at Ashland 1 and should not be used in calculations to determine removal volumes. The ORAU values given in the draft RI are appropriate.

Source Terms

7.37 37) Please provide estimates of the current source terms for each Tonawanda Site property using all available soil and sediment data. Please provide estimates of the residual source terms for each property following cleanup to 1) the NRC SDMP guidelines, and 2) the 40 pCi/g Th-230 guideline, both approaches.

Miscellaneous Specific Comments

7.38 38) According to DOE, "(i)n general, it is FUSRAP's policy that ownership of 11e(2) byproducts [sic] material at FUSRAP sites remains with the property owner until custody has been transferred to the Department of Energy (DOE)." (see reference 75 and comment 29) We have requested via FOIA to DOE Oak Ridge the legal basis for this policy, both in general terms and in terms specific to the Tonawanda Site properties. This information request is currently being litigated in the U.S. District Court for the Western District of New York (see reference FOIA).

7.39 39) Please confirm that the site-specific guideline for uranium (to meet DOE's 100 millirem/yr basic dose guideline) of 60 pCi/g (28.4 pCi/g U-238) was determined from a resident farmer exposure scenario. The dose/source concentration ratio for the external exposure pathway is given as zero in Table 4 (p 9); is this only a typo? Please clarify exactly what "takes up residence in the immediate vicinity of the Ashland 1 and 2 sites" means (p 5). Does it mean within the decontaminated area or outside of it? We also note that Table 3-1 of the draft FS erroneously implies the U guideline is 60 pCi/g U-238.

List of Reference Documents, Attached to F.A.C.T.S.' Comments on "Proposed Plan for the Ashland 1 and Ashland 2 Sites, Tonawanda, New York, November 1997, Final", to be added to Administrative Record

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56) 1-19-96 letter from F.A.C.T.S. to John Mitchell, NYSDEC

57) 2-29-96 letter from NYSDEC's Paul J. Merges to Craig Gordon, U.S. Nuclear Regulatory Commission

58) 3-26-96 letter from F.A.C.T.S. to Dennis Sollenberger, U.S. Nuclear Regulatory Commission, w/ enc.

59) 4-23-96 letter from NRC's Craig Z. Gordon to NYSDEC's Paul J. Merges

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61) 9-30-96 letter from F.A.C.T.S. to Jeffrey L. Bartlett, NRC

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67) F.A.C.T.S.' "Comments on 'Engineering Evaluation/Cost Analysis (EE/CA) for Building 30 at Praxair', November 1996, U.S. Dept. of Energy, James M. Rauch, December 20, 1996

68) "Safety of the High-Level Uranium Ore Residues at the Niagara Falls Storage Site, Lewiston, New York", National Research Council of the National Academy of Sciences, 1995

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70) 6-1-95 letter from Michael B. Gerrard to DOE Site Manager John Michael Japp

71) "Authority Review for the Seaway Industrial Park in Tonawanda, New York", undated, enclosure to document 10 of F.A.C.T.S.' 3-17-96 FOIA request to DOE Oak Ridge

72) Documents provided in response to F.A.C.T.S.' FOIA request to GSA

73) Documents provided in response to F.A.C.T.S.' FOIA request to GSA

74) 6-24-80 letter from NYS Energy Office's John P. Spath to Andrew Wallo, Aerospace Corporation

75) Memorandum from DOE's James W. Wagoner II to DOE's L. Price, Subject: Ownership of 11(e)2 Byproduct Material

76) 1-1-98 letter from F.A.C.T.S. to ACE's Col. Michael J. Conrad

77) 6-7-95 FOIA request from Don Finch to DOE HQ Freedom of Information Officer

78) 7-17-95 letter in response to #50, from DOE's GayLa D. Sessoms

79) 2-17-97 F.A.C.T.S.' FOIA request to DOE Oak Ridge

80) "Ashland 1 and Ashland 2 Proposed Plan Public Meeting, December 17, 1997, U.S. Army Corps of Engineers" handout

FOIA list: all F.A.C.T.S. FOIA requests made to DOE, U.S. General Services Administration, and National Archives and Records Administration; all F.A.C.T.S. FOIL requests made to NYS Department of Labor, and NYS Department of Environmental Conservation; and the complete contents of all responses to all of these requests to date.

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73) Selected documents from U.S. General Services Administration response to F.A.C.T.S.' FOIA request
74) 6-24-80 letter from NYS Energy Office's John P. Spath to Andrew Wallo, Aerospace Corporation, document 14 of FOI list 1a
75) Memorandum from DOE's James W. Wagoner II to DOE's L. Price, Subject: Ownership of 11(e)2 Byproduct Material
76) 1-1-98 letter from F.A.C.T.S. to USACE's Col. Michael J. Conrad
77) "CANiT Politicians Flip-Flop on Cleanup at Tonawanda Nuclear Site", article by Jim Rauch, Alt/Buffalo Alternative Press, September 25 - October 9, 1996
78) "Ashland 1 and Ashland 2 Proposed Plan Public Meeting, December 17, 1997, U.S. Army Corps of Engineers" handout
79) "Difficulty of Isolating Residual HLW in Tank(s) at West Valley", September 14, 1997, Raymond C. Vaughan, Coalition on West Valley Nuclear Wastes
80) "Radionuclide Cleanup Guideline Derivation for Ashland 1, Ashland 2, and Seaway, Tonawanda, New York, September 1997"

FOI list 1:

a) Documents provided in response to item 3 of F.A.C.T.S. 3-17-96 FOIA request to DOE Oak Ridge (OR 96-047) and 10-7-96 appeal

b) Documents provided in response to item 1 of F.A.C.T.S.' 2-4-97 FOIA request to DOE Oak Ridge (OR 97-021), NOTE: This item is the subject of litigation in Federal District Court, see Vaughn Index of documents withheld in entirety

c) Letters provided by NYSDEC Region 9:

1) 11-3-94 letter from DOE's Ron Kirk to BFI's Robert Hughes
2) 11-29-93 letter from DOE's Ron Kirk to NYSDEC's Yavuz Erk
3) 7-19-93 letter from NYSDEC's Paul D. Eismann to NLI's Paul Barley
4) 2-6-95 letter from BFI's Robert D. Hughes to NYSDEC's Paul Merges
5) 2-23-95 letter from NYSDEC's Paul J. Merges to BFI's Robert D. Hughes

FOI list 2: Documents provided in response to Mr. Don Finch's 12-6-96 and 1-31-97 FOIL requests to NYS Department of Labor (File No. 96-0695)

FOI list 3: Documents provided in response to F.A.C.T.S.' 2-1-97 FOIA request to U.S. General Services Administration (R2-97-029, property B-NY-543)

FOI list 4: Documents requested in items 4 and 5 of F.A.C.T.S.' 9-3-97 FOIA request to DOE Oak Ridge (OR 97-206)

FOI list 5:

a) Documents requested in item 2 of Mr. Don Finch's 6-7-95 FOIA request to DOE Headquarters (9506130002)

b) Documents requested in item 2 of F.A.C.T.S.' 11-23-96 FOIA request to DOE Oak Ridge (OR 96-209), NOTE: This item is the subject of litigation in Federal District Court

c) Documents requested in F.A.C.T.S.' 3-5-97 FOIA request to DOE Oak Ridge

5.7 Responses to F.A.C.T.S. Comments

7.1 – USACE is addressing the Ashland sites pursuant to the Energy and Water Development and Appropriations Act of 1998, P.L. 105-62, and in compliance with CERCLA, as amended, and the NCP.

7.2 – USACE can not address the activities of other federal agencies prior to the enactment of the Energy and Water Development Appropriations Act of 1998, PL. 105-62, which transferred the responsibility for administration and execution of FUSRAP, including FUSRAP actions at the Ashland sites, to USACE.

7.3 – The Energy and Water Development Appropriations Act of 1998, P.L. 105-62, transferred the responsibility for the administration and execution of FUSRAP from DOE to USACE. USACE is proceeding with the remediation of the Ashland sites in accordance with CERCLA (42 U.S.C. 9604 et seq.).

7.4 – The Energy and Water Development Appropriation Act of 1998, PL. 105-62, transferred the responsibility for and control over the administration and execution of FUSRAP to USACE. USACE is proceeding with the remediation of FUSRAP sites pursuant to CERCLA (42 U.S.C. 9604 et seq.).

7.5 – USACE can not address the activities of other federal agencies prior to the enactment of the Energy and Water Development Appropriations Act of 1998, PL. 105-62, which transferred the responsibility for administration and execution of FUSRAP to USACE. Concerns about other Tonawanda sites will be addressed when action is proposed at those specific sites. The public will continue to be informed of schedules and actions at the other Tonawanda FUSRAP sites through the continued implementation of the Community Relations Plan.

7.6 – A concern was raised over the apparent change in average concentrations of soils to be remediated at the Ashland sites between the RI report and subsequent presentations. The averages shown on RI page 4-159 are based upon the "short list" of data shown in the associated tables (4-24 and 4-42). When these short list data locations are plotted on the site drawings, they include only those borings located in the more highly impacted portions of the sites. The averages used in subsequent presentations are based upon the full data set for each of the sites (found in Tables A-10 & A-15 and A-12 & A-17). These full data sets contain approximately 1.5 times the data that is in the short lists. Since the full data sets include the lower readings from the "non-impacted" portions of the sites, the averages are lower.

7.7 – The revised PP for the Ashland sites is one component of the CERCLA documentation of the remediation of the Tonawanda Site as a whole. The document distributed for public comment represents the final version of the revised PP, based on the RI/FS published in 1993 and comments received on that document relevant to the Ashland sites, the guideline derivation document published in July 1997, and the USACE version (Alternative 2A) of the originally stated Alternative 2 in the 1993 PP. The USACE Alternative 2A is equivalent to the Alternative 2 developed by the DOE except that a site-specific guideline is used instead of the generic guidelines.

7.8 - Additional documents that should be considered for inclusion in the Administrative Record, identified and provided, have been placed in the record, as attachments to the comments received. All other appropriate documents have been included in the Administrative Record as well.

7.9 - NRC has stated that they do not have jurisdiction over wastes created by MED prior to November 1978. NRC's jurisdiction over byproduct materials began in 1978 and they do not consider it to be retroactive to the time frame when MED material was generated.

7.10 - Because NRC does not have jurisdiction over MED wastes created prior to November 1978, USACE is not required to obtain an NRC license for the materials at the Ashland sites.

7.11 - Because NRC does not have jurisdiction over MED wastes created prior to November 1978, the Sites Decommissioning Management Plan does not apply to the Ashland sites.

7.12 - Cleanup criteria for the Ashland sites were developed using the CERCLA process. The cleanup criteria must satisfy the CERCLA acceptable risk range as well as the ARARs. The Th-230 guideline development considered intended and reasonable future land use, the likely maximum exposed individuals, and the criteria included in the ARARs. The key ARARs included EPA 40 CFR 192 and NRC 10 CFR 20. The result of the guideline development effort was a cleanup criteria of 40 pCi/g Th-230.

The guideline derivation demonstrated that the conditions at the site, after removing soils exceeding the site-specific derived guideline of 40 pCi/g Th-230, will be protective of human health and the environment, meet the ARARs, and meet the acceptable CERCLA risk range established by the USEPA in the NCP. The analysis also demonstrated that at this cleanup criteria level, the estimated doses to receptors for the intended land uses (commercial/industrial) meet the objectives defined in the to be considered (TBC) guideline of 10 mrem/yr (NYSDEC TAGM 4003) for intended land use.

7.13 - These concerns will be addressed when action is proposed at those specific sites. The public will continue to be informed of schedules and actions at the other Tonawanda FUSRAP sites through the continued implementation of the Community Relations Plan.

7.14 - In a March 27, 1998 letter to NYSDEC, USACE responded to NYSDEC questions about groundwater concentrations resulting from residual radioactive contamination at the Ashland sites (USACE 1998). The USACE response described the use of USEPAs VLEACH model to estimate the leaching of radionuclides to groundwater after the sites are remediated in accordance with the site-specific cleanup guideline of 40 piC/g Th-230 derived from the Ashland sites (DOE 1997).

The modeling used estimated concentrations of total uranium, Ra-226 and Ra-228 and Th-230 (DOE 1997) to remain on the Ashland sites after cleanup to site-specific guidelines and very conservative assumptions concerning the solubilities of the radiologically contaminated source material. The results of modeling showed that the resulting concentrations of the radionuclides in groundwater would be below federal drinking water standards that have been calculated to be protective of human health and the environment at levels less than 10^{-6} for increased cancer risk.

Based on the conclusions concerning geological conditions that indicate that contaminant leachate from the Ashland properties are not likely to reach groundwater (BNI 1993), and the prediction using the VLEACH model showing radionuclides at levels in groundwater below drinking water standards (USACE 1998), it was concluded that risks to groundwater from radiological contamination will be minimal after the cleanup at the Ashland properties to the site-specific guidelines.

7.15 - Documentation relating to calculations used in the cost evaluation of the investigated remedial alternatives (including volume estimates) have been placed in the Administrative Record and are available for public review. A major component of the cost analysis is the volume of the soils determined to require removal and disposal. The cost estimates used for the development of the revised PP used volumes calculated based on a model of the site contamination generated using existing soil contamination characterization results from all historical sampling conducted at the site. The calculations and results of the modeling have also been placed in the document repository for public review and are part of the Administrative Record. It should be noted, however, that the cleanup of the Ashland sites will not be driven by any previous or future volume estimates generated by modeling site conditions. The cleanup of these sites will be driven by the established cleanup criteria. The cost estimates and their corresponding volume estimates were generated and used in the CERCLA process to help select the most cost effective and protective alternative for remediating the sites, also considering commitments made to the community concerning the ultimate disposal of waste removed from the sites. The volumes ultimately removed and actual remediation costs will vary as the soils found to require removal during the remediation process are excavated and shipped off-site for disposal.

7.16 - These concerns will be addressed when action is proposed at those specific sites. The public will continue to be informed of schedules and actions at the other Tonawanda FUSRAP sites through the continued implementation of the Community Relations Plan.

7.17 - These concerns will be addressed when action is proposed at those specific sites. The public will continue to be informed of schedules and actions at the other Tonawanda FUSRAP sites through the continued implementation of the Community Relations Plan.

7.18 - These concerns will be addressed when action is proposed at those specific sites. The public will continue to be informed of schedules and actions at the other Tonawanda FUSRAP sites through the continued implementation of the Community Relations Plan.

7.19 - Cleanup criteria for the Ashland sites were developed using the CERCLA process. The cleanup criteria must satisfy the CERCLA acceptable risk range as well as the ARARs. The Th-230 guideline development considered intended and reasonable future land use, the likely maximum exposed individuals, and the criteria included in the ARARs. The key ARARs included EPA 40 CFR 192 and NRC 10 CFR 20. The result of the guideline development effort was a cleanup criteria of 40 pCi/g Th-230.

The guideline derivation demonstrated that the conditions at the site, after removing soils exceeding the site-specific derived guideline of 40 pCi/g Th-230, will be protective of human health and the environment, meet the ARARs, and meet the acceptable CERCLA risk range established by the USEPA in the NCP. The analysis also demonstrated that at this cleanup criteria level, the estimated doses to receptors for the intended land uses (commercial/industrial) meet the objectives defined in the to be considered (TBC) guideline of 10 mrem/yr (NYSDEC TAGM 4003) for intended land use.

7.20 - As mentioned, dose considerations from DOE, NRC, and NYSDEC were considered in the evaluation of possible Th-230 concentration guidelines. By removing soils exceeding the site-specific derived guideline of 40 pCi/g Th-230, doses to future industrial workers are calculated to be lower than the most conservative criteria considered (NYSDEC) and will also meet criteria for indoor radon concentrations, total radium concentrations, and lifetime risk.

The calculated dose for intended future land use is 7 mrem/yr, which is below the NYSDEC 10 mrem/yr guideline. The dose estimate for a hypothetical non-farming resident at the Ashland sites was also calculated. This dose was estimated to be approximately 20 mrem/yr, which is less than the recently promulgated NRC criteria of 25 mrem/yr, and much less than the value of 86 mrem/yr as stated by one of the commenters.

7.21 - The remedy will be protective of human health and the environment, including ecological receptors at the site. Because the primary contaminant is Th-230 (with a 77,000 yr half-life), radon concentration will peak well into the future. However, the radon and radium concentrations estimated for the site after remediation are within acceptable limits over the required 1,000 year review period (40 CFR 192), the maximum time period to be modeled according to regulations, and are not anticipated to be of concern given the site history, configuration, and intended land use.

7.22 - As mentioned, dose considerations from DOE, NRC, and NYSDEC were considered in the evaluation of possible Th-230 concentration guidelines. By removing soils exceeding the site-specific derived guideline of 40 pCi/g Th-230, doses to future industrial workers are calculated to be lower than the most conservative criteria considered (NYSDEC) and will also meet criteria for indoor radon concentrations, total radium concentrations, and lifetime risk.

The calculated dose for intended future land use is 7 mrem/yr, which is below the NYSDEC 10 mrem/yr guideline. The dose estimate for a hypothetical non-farming resident at the Ashland sites was also calculated. This dose was estimated to be approximately 20 mrem/yr, which is less than the recently promulgated NRC criteria of 25 mrem/yr, and much less than the value of 86 mrem/yr as stated by one of the commenters.

7.23 - Documentation relating to calculations used in the cost evaluation of the investigated remedial alternatives (including volume estimates) have been placed in the Administrative Record and are available for public review. A major component of the cost analysis is the volume of the soils determined to require removal and disposal. The cost estimates used for the development of the revised PP used volumes calculated based on a model of the site contamination generated using existing soil contamination characterization results from all historical sampling conducted at the site. The calculations and results of the modeling have also been placed in the document repository for public review and are part of the Administrative Record.

7.24 - Disposal options for excavated soil are evaluated in the site's detailed cost estimate. These cost estimates are available and have been entered in the administrative record. CERCLA provides that cost is a criteria for evaluation of remedial alternatives, but that it may only be used to compare those remedial alternatives which are protective of human health and the environment and which will comply with ARARs. Among the alternatives considered, the selected remedy is the lowest cost which is both adequately protective and complies with ARARs. Appropriate disposal facilities were evaluated under DOE and are being evaluated by USACE in an effort to reduce cost without compromising the final remedy. The selection of the ultimate disposal site will be addressed as part of the Remedial Action phase of the cleanup using the standard government procurement procedure after completion of the remedial design and prior to commencement of the remedial action.

To assure that estimates do not drastically underestimate actual costs, it is assumed that soils exceeding the cleanup guideline will be excavated and shipped to an off-site disposal facility in the western portion of the United States. The cost of disposal per cubic yard is a negotiated cost and is not intentionally inflated or misrepresented in cost estimates. The ultimate goal of each cost estimate is to allow USACE to accurately project funding requirements for activities such as the remediation of the Ashland sites. It is not beneficial to underestimate or overestimate potential disposal costs.

7.25 – The selection of the ultimate disposal site will be addressed as part of the Remedial Action phase of the cleanup using the standard government procurement procedure after completion of the remedial design and prior to commencement of the remedial action.

7.26 – These concerns will be addressed when action is proposed at those specific sites. The public will continue to be informed of schedules and actions at the other Tonawanda FUSRAP sites through the continued implementation of the Community Relations Plan.

7.27 – USACE has begun to research issues regarding PRPs and will pursue all appropriate means to seek reimbursement from responsible parties on behalf of the Federal Government. However, at this time, no decisions have been made regarding specific parties to pursue nor have offers of indemnification been made by USACE to resolve any liabilities that the Federal Government may have.

7.28 – The selection of the ultimate disposal site will be addressed as part of the Remedial Action phase of the cleanup using the standard government procurement procedure after completion of the remedial design and prior to commencement of the remedial action.

7.29 – USACE has begun to research issues regarding PRPs and will pursue all appropriate means to seek reimbursement from responsible parties on behalf of the Federal Government. However, at this time, no decisions have been made regarding specific parties to pursue nor have offers of indemnification been made by USACE to resolve any liabilities that the Federal Government may have.

7.30 – If a release scores sufficiently high pursuant to the Hazardous Ranking System, it may be considered for placement on the NPL. The final decision to include a particular release rests with USEPA after they have done an analysis of the available information. USACE is not aware of the specific reason why USEPA chose not to include the Ashland sites on the NPL. A Federal

Facility Agreement is only required pursuant to Section 120(e) of CERCLA, as amended (42 U.S.C. 9620(e)) when a facility is placed on the NPL.

7.31 - The revised PP for the Ashland sites is one component of the CERCLA documentation of the remediation of the Tonawanda Site as a whole. The document distributed for public comment represents the final version of the revised PP, based on the RI/FS published in 1993 and comments received on that document relevant to the Ashland sites, the guideline derivation document published in July 1997, and the USACE version (Alternative 2A) of the originally stated Alternative 2 in the 1993 PP. The USACE Alternative 2A is equivalent to the Alternative 2 developed by the DOE except that a site-specific guideline is used instead of the generic guidelines.

7.32 - USACE is addressing all FUSRAP sites, including the Ashland sites pursuant to the authority of the Energy and Water Development Act of 1998, P.L. 105-62, and in compliance with CERCLA (42 U.S.C. 9601 et seq.) and the NCP (40 CFR Part 300). Additionally, in accordance with 32 CFR 651.8, USACE has and will integrate appropriate NEPA procedures into the process required by CERCLA. The CERCLA process is deemed to satisfy the requirements of NEPA.

7.33 - The 1998 Energy and Water Appropriations Bill transferred administration and execution of FUSRAP to USACE from the DOE, the Buffalo District assumed responsibility for issuing the PP for the Ashland sites. Prior to releasing the PP for public comment, USACE reviewed community concerns to maximize stakeholder opportunity to participate in the decision-making process. Mindful of the concerns about limited public participation in development of the PP, USACE prepared a communications plan for release of the PP. The activities detailed in that communications plan are listed in Section 2, Overview of Public Involvement. The public involvement opportunities offered by USACE were intended to encourage public participation in the CERCLA decision process, and they do meet the requirements of CERCLA, as amended, and the NCP.

When FUSRAP was transferred to USACE, Lieutenant Colonel Michael Conrad, Commander of the Buffalo District, met with all key stakeholders for the Ashland sites. Three representatives from F.A.C.T.S. were included in this meeting. Representatives of this group also submitted comments, both at the public meeting and in writing. Their concerns, as stated in these comments to USACE, have been considered in the decision regarding the remedy selection, and the responses are included in this Responsiveness Summary.

7.34 - USACE is addressing all FUSRAP sites, including the Ashland sites, pursuant to the authority of the Energy and Water Development Act of 1998, P.L. 105-62, and in compliance with CERCLA (42 U.S.C. 9601 et seq.) and the NCP (40 CFR Part 300). Additionally, in accordance with 32 CFR 651.8, USACE has and will integrate appropriate NEPA procedures into the process required by CERCLA. The CERCLA process is deemed to satisfy the requirements of NEPA.

Before proposing the plan to remediate the Ashland sites, USACE carefully considered the program management principles set forth in NCP, 40 CFR 300.430. Based on those goals it was determined that it was appropriate to remediate the Ashland sites to achieve significant risk reduction quickly while the remainder of the Tonawanda sites are being addressed and to expedite the completion of the total cleanup.

7.35 - These concerns will be addressed when action is proposed at those specific sites. The public will continue to be informed of schedules and actions at the other Tonawanda FUSRAP sites through the continued implementation of the Community Relations Plan.

7.36 - Site data were used in dose and risk calculations to calculate the Th-230 guideline value for Alternative 2A. This data included radiological data collected during the RI activities and stored in the site database. Other studies have been performed (specifically referencing the ORAU study) that could be used in dose and risk estimates. This data and the appropriate quality assurance and quality control information is not, however, maintained in the site database. Considering that the site database already contains data from hundreds of samples, it was not considered appropriate or necessary to incorporate the ORAU (or other) uncontrolled data.

7.37 - Estimates of the radionuclide concentrations were made for the Ashland Sites using all available Ashland and Seaway data. The first estimate was the average concentrations for the site in the current state before any removal actions are initiated. The average concentrations (95% UCL of Mean), including background, for Ra-226, Th-230, and U-238 were 8.59 pCi/g, 111 pCi/g, 27.2 pCi/g, respectively. After removing soils with Th-230 > 40 pCi/g, the average concentrations (95% UCL of Mean), including background, of the remaining soils were estimated for Ra-226, Th-230, and U-238 to be 1.22 pCi/g, 12.4 pCi/g, and 6.26 pCi/g, respectively. The DOE had considered another approach for remediation that would have resulted in a 2-meter thick soil layer with a uniform soil concentration of 40 pCi/g Th-230. Under this approach, the average concentrations of the remaining soils were estimated for Ra-226, Th-230, and U-238 to be 2.7 pCi/g, 40 pCi/g, and 8.8 pCi/g, respectively. This approach is not being considered by USACE.

7.38 - USACE cannot respond to statements concerning DOE's policies or DOE's response to Freedom of Information Act requests.

7.39 - A uranium guideline of 60 pCi/g total U was previously developed for all of the Tonawanda sites in 1988 by ANL for the DOE. For the Ashland sites, this guideline is superceded by the 40 pCi/g Th-230 guideline. The Th-230 guideline was developed specifically for the Ashland sites taking into account the intended land uses and the effects of all the radionuclides at their relative distribution at the Th-230 guideline value. At this value, the U-238 concentration remaining at the site is expected to be well below the previously derived guideline. The Th-230 guideline was developed using conservative exposure parameters and assumptions, and used site specific data.

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

John P. Cahill
Commissioner

JAN 0 9 1998

VIA FAX AND MAIL

Lt. Col. Michael J. Conrad, Jr.
U.S. Army Engineering District, Buffalo District
1776 Niagara Street
Buffalo, New York 14207-3199

Dear Colonel Conrad:

Re: Proposed Plan for the Ashland 1 and Ashland 2 Sites, Tonawanda, NY

The New York State Department of Environmental Conservation has reviewed the United States Army Corps of Engineers' (US ACE) November 1997 Proposed Plan for the Ashland 1 and Ashland 2 sites in Tonawanda, New York. Here are our comments:

8.1 1) As a general comment, since the proposed plan addresses Seaway Area D, this should be documented in the title.

8.2 2) On page 2 in the section entitled "Site Background," the Tonawanda landfill should be mentioned as a vicinity property to the Linde site, and should be included as part of the Tonawanda site.

3) While it is understood that the supporting documents are contained in the administrative record file for the sites which can be found at the Public Information Center and Tonawanda Public Library, the analyses supporting
8.3 the 40 pCi/g thorium-230 release criteria should have been presented in this document. Although the United States Department of Energy (DOE) printed a
8.4 final "Radionuclide Cleanup Guideline Derivation for Ashland 1, Ashland 2, and Seaway" in September 1997, this proposed cleanup criterion was never distributed for public review and comment. This Department reviewed a second draft of the document, dated November 1996, and discussed several questions with DOE before the program was transferred to US ACE. Some of the issues we raised were addressed in the September 1997 final document; however, we only received a copy on December 24, 1997. We have not had adequate time to review it. Other-

issues, which we have discussed with both DOE and US ACE, regarding

8.5 groundwater are still outstanding. We will provide our analysis of the proposed cleanup criterion once we have received the additional information on groundwater, which US ACE has agreed to provide.

4) This proposal addresses only part of the Tonawanda FUSRAP site. Any remedial measure selected for Ashland 1, Ashland 2, and Seaway D is not likely to physically or technically preclude one or more remedial measures for the rest of the site. However, to avoid any adverse effects of segmenting this project, the US ACE should assess whether there are any economic impacts to planning the remediation of Ashland 1 and 2 and Seaway D separately from Linde, Seaway A, B, and C, and the Tonawanda landfill. There may be cost savings in seeking one contract for disposal of all wastes from the Tonawanda FUSRAP site. 8.6

5) Table 1 on page 10 presents revised implementation costs for each alternative. We request a copy of the analyses that form the basis for these revised estimates, including the "more detailed analysis of volumes of soils containing radionuclides above generic and site-specific guidelines." 8.7

As noted above, we will provide analysis of proposed criteria and we also have to resolve issues relative to groundwater. Thank you for the opportunity to review and comment on this document. If you have any questions, or need further information, please have your staff contact John Mitchell, of my staff, at (518) 457-2225.

Sincerely,

Norman H. Nosenchuck, P.E.
Director
Division of Solid & Hazardous Materials

5.8 Responses to NYSDEC Comments

8.1 - Comment noted, changes made.

8.2 - USACE is aware of the Tonawanda Landfill site, is evaluating the appropriate approach to response, and will be in communication with the landfill owner and operator regarding any response actions. USACE will address additional vicinity properties as designations are made.

8.3 - Cleanup criteria for the Ashland sites were developed using the CERCLA process. The cleanup criteria must satisfy the CERCLA acceptable risk range as well as the ARARs. The Th-230 guideline development considered intended and reasonable future land use, the likely maximum exposed individuals, and the criteria included in the ARARs. The key ARARs included EPA 40 CFR 192 and NRC 10 CFR 20. The result of the guideline development effort was a cleanup criteria of 40 pCi/g Th-230.

The guideline derivation demonstrated that the conditions at the site, after removing soils exceeding the site-specific derived guideline of 40 pCi/g Th-230, will be protective of human health and the environment, meet the ARARs, and meet the acceptable CERCLA risk range established by the USEPA in the NCP. The analysis also demonstrated that at this cleanup criteria level, the estimated doses to receptors for the intended land uses (commercial/industrial) meet the objectives defined in the to be considered (TBC) guideline of 10 mrem/yr (NYSDEC TAGM 4003) for intended land use.

8.4 - Documentation relating to calculations used in the cost evaluation of the investigated remedial alternatives (including volume estimates) have been placed in the Administrative Record and are available for public review. A major component of the cost analysis is the volume of the soils determined to require removal and disposal. The cost estimates used for the development of the revised PP used volumes calculated based on a model of the site contamination generated using existing soil contamination characterization results from all historical sampling conducted at the site. The calculations and results of the modeling have also been placed in the document repository for public review and are part of the Administrative Record.

8.5 - In a March 27, 1998 letter to NYSDEC, USACE responded to NYSDEC questions about groundwater concentrations resulting from residual radioactive contamination at the Ashland sites (USACE 1998). The USACE response described the use of USEPAs VLEACH model to estimate the leaching of radionuclides to groundwater after the sites are remediated in accordance with the site-specific cleanup guideline of 40 piC/g Th-230 derived from the Ashland sites (DOE 1997).

The modeling used concentrations of total uranium, Ra-226 and Ra-228 and Th-230 estimated by DOE (DOE 1997) to remain on the Ashland properties after cleanup to site-specific guidelines and very conservative assumptions concerning the solubilities of the radiologically contaminated source material. The results of modeling showed that the resulting concentrations of the radionuclides in groundwater would be below federal drinking water standards that have been calculated to be protective of human health and the environment at levels less than 10^{-6} for increased cancer risk.

Based on the conclusions concerning geological conditions that indicate that contaminant leachate from the Ashland properties are not likely to reach groundwater (BNI 1993), and the prediction using the VLEACH model showing radionuclides at levels in groundwater below drinking water standards (USACE 1998), it was concluded that risks to groundwater from radiological contamination will be minimal after the cleanup at the Ashland properties to the site-specific guidelines.

8.6 - Before proposing the plan to remediate the Ashland sites, USACE carefully considered the program management principles set forth in the NCP - 40 CFR 300.430. Based on those goals it was determined that it was appropriate to remediate the Ashland sites to achieve significant risk reduction quickly while the remainder of the Tonawanda sites are being addressed and to expedite the completion of the total cleanup. It was also determined that the cleanup of the Ashland sites will not be inconsistent with nor preclude implementation of the final remedies at the remaining Tonawanda sites. Pursuant to that determination, and consistent with the NCP, 40 CFR 300.430(f)(2), the decision was made to propose a plan to remediate Ashland at this time and prior to proposing remedies at other Tonawanda sites.

8.7 - Information provided.

Friday, January 9, 1998

Gary H. Bauer
22 Newell Apt. 6
Tonawanda, N.Y.
14150
(716) 694-0393

Mr. Gary H. Bauer
Apt. 6
22 Newell Ave.
Tonawanda, NY 14150

RECEIVED
JAN 12 1998
USACE Buffalo District
Tonawanda FUSRAP Office

Michael J. Conrad, Jr.
Lieutenant Colonel, U.S. Army
FUSRAP Public Information Center
70 Pearce Avenue
Tonawanda, N.Y. 14150

Dear Colonel Conrad,

Please consider this letter as my public comment regarding the latest proposal to clean-up the leftover WWII radioactive waste from all of the Tonawanda Sites.

As a citizen living in the Town of Tonawanda, I have three major concerns:

9.1 (1.) Can the radioactive waste be cleaned-up safely, without increasing the exposure risk over what it already is, to workers or citizens living nearby?

9.2 (2.) Will the radioactive waste be completely removed using a zero-tolerance level for radiation exposure after the clean-up, so that the land can be re-used for any purpose, including growing food to eat?

9.3 (3.) Will the radioactive waste now buried under tons of everyday garbage at the Niagara Landfill (Seaway site), be completely removed, so that only the issue of dealing with the methane gas from everyday garbage will be required, versus the present dilemma of dealing with both methane gas and radon gas?

If the answer to any of the three concerns is no, then any attempt to clean-up the radioactive waste should be placed on hold until all three concerns can reasonably be answered with a yes.

Because of the exposure risk involved with a radioactive waste clean-up, it is extremely important that any effort to improve health conditions be done with caution and safety, and most importantly, be done right the first time, so that future generations do not have to deal with the same problem. In the case of radioactive waste clean-ups, doing something, is not better than doing nothing – it is worse!

9.5 Also, proposed Town of Tonawanda new, waterfront development should not occur during the radioactive waste clean-up and should not occur at all unless the clean-up concerns can all be answered with a yes.

Although I strongly agree that the radioactive waste should be completely removed and shipped to a safe, liscensed storage space (like Clive, Utah) until science research and technology can render the waste harmless to the environment, it is equally important that all of the radioactive waste is safely and completely removed, so that the land can be re-used for any purpose without harm to humans in the future. 9.7

Sincerely,

[signature]

5.9 Responses to Bauer Comments

9.1 - For remediation at the Ashland sites, the remediation contractor will develop, implement and have available for audit, a minimum number of work plans which will be able to demonstrate compliance with USACE requirements: Ionizing Radiation Protection, ER 385-1-80; Radiation Protection Manual, EM 385-1-80; Safety and Occupational Health Document Requirements for HTRW and OEW Activities, ER 385-1-92 (Appendix B); Safety and Health Requirements Manual, EM 385-1-1, 1996.

Compliance with the above requirements will ensure that the health/safety issues and risks due to radiation exposure during remediation and transportation, to site workers as well as the surrounding population, will be successfully addressed.

9.2 - Cleanup criteria for the Ashland sites were developed using the CERCLA process. The cleanup criteria must satisfy the CERCLA acceptable risk range as well as the ARARs. The Th-230 guideline development considered intended and reasonable future land use, the likely maximum exposed individuals, and the criteria included in the ARARs. The key ARARs included EPA 40 CFR 192 and NRC 10 CFR 20. The result of the guideline development effort was a cleanup criteria of 40 pCi/g Th-230.

The guideline derivation demonstrated that the conditions at the site, after removing soils exceeding the site-specific derived guideline of 40 pCi/g Th-230, will be protective of human health and the environment, meet the ARARs, and meet the acceptable CERCLA risk range established by the USEPA in the NCP. The analysis also demonstrated that at this cleanup criteria level, the estimated doses to receptors for the intended land uses (commercial/industrial) meet the objectives defined in the to be considered (TBC) guideline of 10 mrem/yr (NYSDEC TAGM 4003) for intended land use.

Once the site has been restored, it can be released for development into an industrial/commercial-use facility with 5-year reviews as required by CERCLA.

9.3 - These concerns will be addressed when action is proposed at those specific sites. The public will continue to be informed of schedules and actions at the other Tonawanda FUSRAP sites through the continued implementation of the Community Relations Plan.

9.4 - Cleanup criteria for the Ashland sites were developed using the CERCLA process. The cleanup criteria must satisfy the CERCLA acceptable risk range as well as the ARARs. The Th-230 guideline development considered intended and reasonable future land use, the likely maximum exposed individuals, and the criteria included in the ARARs. The key ARARs included EPA 40 CFR 192 and NRC 10 CFR 20. The result of the guideline development effort was a cleanup criteria of 40 pCi/g Th-230.

The guideline derivation demonstrated that the conditions at the site, after removing soils exceeding the site-specific derived guideline of 40 pCi/g Th-230, will be protective of human health and the environment, meet the ARARs, and meet the acceptable CERCLA risk range established by the USEPA in the NCP. The analysis also demonstrated that at this cleanup criteria level, the estimated doses to receptors for the intended land uses (commercial/industrial) meet the objectives defined in the to be considered (TBC) guideline of 10 mrem/yr (NYSDEC TAGM 4003) for intended land use.

9.5 - The conduct of this project does not specifically prevent the concurrent development of adjacent uncontaminated areas, in accordance with the town zoning laws and other applicable or relevant and appropriate laws and regulations. Impact to wetlands will be minimized to the extent practicable during remediation activities. Upon completion of the remediation the Ashland sites, the site will be suitable for use as a commercial or light industrial property in accordance with the Town of Tonawanda Waterfront Region Master Plan.

FRANCIS C. AMENDOLA
ATTORNEY AT LAW
305 Elmwood Avenue
Buffalo, New York 14222
(716) 884-6733

RECEIVED
JAN 14 1998
USACE Buffalo District
Tonawanda FUSRAP Office

January 12, 1998

U.S. Army Corps of Engineers
Public Information Center
70 Pearce Avenue
Tonawanda, NY 14150

Re: Comment Period, Proposed Plan for the Ashland 1 and Ashland 2 Sites

Dear Sir/Madam:

I am writing on behalf of F.A.C.T.S. (For a Clean Tonawanda Site) to request an indefinite extension of the comment period relative to the Proposed Plan for the Ashland 1 and Ashland 2 Sites or, in the alternative, a minimum thirty (30) day extension as required by the applicable regulation. 40 C.F.R. Part 300.430(f) states that "upon timely request, the lead agency will extend the comment period by a minimum of 30 additional days." The language of the regulation is mandatory, and the requirement that an extension be granted upon timely request is not made contingent upon the length of the initial period. Given that the request previously submitted by F.A.C.T.S. was timely, the Corps' grant of an extension of only 11 additional days is in clear violation of the regulations. I trust the Corps will see fit to correct this situation.

Thank you for your kind attention.

Very truly yours,

Francis C. Amendola

FRANCIS C. AMENDOLA

5.10 Response to Amendola Comment

10. – The PP was issued on November 10, 1997 and USACE granted a 30-day extension to the comment period. An additional 11 days was added to this extension after several members of the public requested additional time for preparing their comments. With the extension, the comment period totaled 71 days. Other extensions were considered, however, USACE determined that additional extensions were not appropriate.

LEAGUE OF WOMEN VOTERS
OF THE GREATER BUFFALO AREA
1272 Delaware Ave., Buffalo, NY 14209-2401 Tel: 716-884-3550

January 12, 1998

Lt. Col. Michael J. Conrad, Jr.
Site Manager, FUSRAP Tonawanda Site
Buffalo District, U.S. Army Corps of Engineers
1776 Niagara Street
Buffalo, NY 14207-3199

Dear Colonel Conrad:

It has come to our attention that a cleanup plan has been proposed for the FUSRAP Tonawanda waste site and that the comment period would come to an end shortly.

11.1 As advocates for the rights of citizens to a healthy environment and to participation in the decision-making process we believe that the time between the plan's release in November, the public hearing in December and the closing of comments in January was unrealistic. We understand that questions of interested parties remain unanswered.

11.2 When I attempted to reach you by telephone I was told that the comment period would probably be extended by ten to fifteen days. I objected to Sara Snyder of your office that that was not enough time. She promised to relay the message to you. It is our understanding that Title 40 Code of Federal Regulations provides for a minimum of thirty days extension upon public request. Certainly more time that ten to fifteen days is in order.

11.3 We urge you to extend the comment period sixty to ninety days to allow for all pertinent questions to be answered, and for adequate time thereafter for review and comment by concerned individuals and groups.

Sincerely,

Leonore S. Lambert

Leonore S. Lambert
Vice President, Administration
League of Women Voters of the Greater Buffalo Area

5.11 Responses to LWV/Lambert Comments

11.1, 11,2, & 11,3 - The PP was issued on November 10, 1997 and USACE granted a 30-day extension to the comment period. An additional 11 days was added to this extension after several members of the public requested additional time for preparing their comments. With the extension, the comment period totaled 71 days. Other extensions were considered, however, USACE determined that additional extensions were not appropriate.

IUC
INTERNATIONAL
URANIUM (USA)
CORPORATION

Independence Plaza, Suite 950 • 1050 Seventeenth Street • Denver, CO 80265 • 303 628 7798 (main) • 303 389 4125 (fax)

January 16, 1998

RECEIVED
JAN 2 0 1998
USACE Buffalo District
Tonawanda FUSRAP Office

Mr. Michael J. Conrad, Jr.
Lieutenant Colonel
Commanding
U.S. Army Engineer District
Buffalo District
Formerly Utilized Sites Remedial Action Program
70 Pearce Avenue
Buffalo, NY 14150

Re: Comments on Proposed Plan for the Ashland 1 and Ashland 2 Sites

Dear Lt. Conrad:

As one of the only licensed, operating uranium and vanadium processing facilities in the United States, we would like to take this opportunity to comment on the "Proposed Plan for the Ashland 1 and Ashland 2 Sites", issued November 1997 by your office.

Summary:

12.1 If any of the off-site disposal alternatives are chosen (Alternatives 2, 3, 4 and 2A) as the final remedy, such remedies should explicitly encourage the use of waste recycling techniques. It appears that there are attractive "ore grades" of uranium and vanadium in portions of the Ashland sites which can be economically recovered. Employing recovery/recycling techniques will decrease the cost of off-site disposal and increase the volume of materials, which can be removed from contaminated areas. In contrast, the proposed plan issued by the U.S. Army Corps of Engineers appears to favor strict ad simple (landfill) disposal for Alternatives 2, 2A, 3 and 4.

Discussion:

Utilizing recycling and mineral recovery technologies to reduce radioactive material disposal costs is a relatively new approach not widely understood. International Uranium (USA) Corporation (IUC) began pioneering the use of the U.S. Nuclear Regulatory Commission's "alternative feed material" policies in 1996. Under this approach, IUC has undertaken material recycling programs for a variety of concerns, including Allied Signal, Cabot Corporation and the U.S. Department of Energy. Earlier in 1997, IUC saved over $3 million in taxpayer costs by reprocessing the so-called "Cotter Concentrate" for the Department of Energy's Nevada Test Site; residual material was placed in IUC's 11e(2) impoundment. IUC's modern mineral processing complex in Southeastern Utah allows us to recycle materials for uranium, vanadium and rare earth ores. New capital equipment investments made in 1997 have made our facility the most efficient in the country.

Based upon our preliminary analysis of the materials stored at the Ashland 1 and 2 sites, it appears that economically recoverable levels of uranium and vanadium exist there. The levels of uranium concentrations are so high in some portions of the Ashland site that some disposal sites may be prohibited from taking such material. Specifically, based on information provided in the February 1993 "Remedial Investigation Report for the Tonawanda Site" and the 1978 report "Radiological Survey of Ashland Oil Company", it appears that the Southeast and Northern portions of the Ashland 1 site contain economically recoverable levels of uranium and vanadium. Uranium sludge rests here with concentrations of 0.52% up to 1.23% uranium, along with significant values of vanadium.

Since DOE's characterization data is limited, it is difficult to quantify the value of this material. It is clear, however, that significant portions of this material can be recycled so as to reduce the Corps' total remediation costs. Decreasing disposal costs will allow the Corps to increase the volume of materials shipped offsite, assuming budgets remain constant. Allowing for recycling also will decrease disposal costs, since tipping fees are often based on curie content and material volume.

Despite this material recycling opportunity, it appears that the off-site disposal options addressed in the Proposed Plan favor the use of conventional disposal facilities and inadvertently tend to preclude innovative recycling. Because of this situation, we make the following suggestions:

12.1 (cont.)

1. The Corps should explicitly allow and encourage recovery and recycling of valuable products from Ashland 1 and 2.

12.2

2. The Corps should undertake more rigorous material characterization studies at Ashland 1, so as to evaluate mineral recovery economics and verify conformance with disposal site requirements.

12.3

3. The Corps should guard against disposal contractors' proclivity to "average" material radionuclide content, thereby avoiding recycling opportunities. For example, the Corps could require material mobilization contractors to conduct periodic material sampling programs in order to monitor for relatively high uranium, vanadium and rare earth values. (Some type of material testing will undoubtedly be required by the disposal contractors, in any case.)

12.4

4. Implementation costs provided in Table 1 of the Proposed Plan do not reflect cost savings which can be realized from recycling approaches.

We appreciate the opportunity to provide these comments on the Proposed Plan for the Ashland 1 and Ashland 2 Sites. We would welcome the opportunity to discuss these matters with you, as it appears that other FUSRAP sites might present additional recycling opportunities.

Very truly yours,

Harold R. Roberts
Executive Vice President

HRR/pl

cc: T. Burns
G. Butterworth
D. Conboy
P. Griffin
R. Pilon

H:\USERS\PLL\WP\HRR\LETTERS.98\CONRAD116.ltr

5.12 Responses to International Uranium Corporation (IUC) Comment

12.1, 12.2, 12.3, and 12.4 - In 1994 soil samples were obtained from several Tonawanda sites, including the Ashland sites, and tests conducted to assess the feasibility of cost effectively reducing the volume of soils requiring disposal as radioactive waste through treatment. Soil washing was the primary process evaluated. However, much of the contamination was found locked within a slag type matrix, making it difficult to chemically extract. The chemical extraction treatment process was not cost effective as it could not produce a clean soil fraction to offset the cost of purchasing and recycling the extractant solution.

Typically, the recovery of metals from soils is done through a chemical extraction process similar to the type evaluated in these treatment tests. As much of the contamination in the soils is bound within a slag type matrix, and the chemical extraction process needed for metals recovery is costly, it is not expected that recovery of metals from the soils would produce a cost savings. Thus, the selected alternative achieves the best possible result in terms of satisfying the statutory preference for remedies that employ treatment that reduces toxicity, mobility or volume as a principal element.

GIVENS, FUNKE & WORK
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RECEIVED
JAN 20 1998
USACE Buffalo District
Tonawanda FUSRAP Office

January 16, 1998

Sarah Snyder
FUSRAP Information Center
70 Pearce Avenue
Tonawanda, NY 14150

Re: Spokane Tribe of Indians' Comments on the Proposed FUSRAP Remedial Action, Ashland 1 Site and Ashland 2 Site, Tonawanda, New York

Dear Ms. Snyder:

I am Special Legal Counsel to the Spokane Tribe of Indians on various natural resource matters. One of the matters on which I work for the Tribe concerns an inactive uranium millsite located just off the Spokane Indian Reservation, but immediately adjacent to it and to an important Reservation waterway known as Chamokane Creek. Operated for decades by Dawn Mining Company, the millsite is known to contaminate both surface and ground waters, including waters to which the Tribe holds federally protected and adjudicated rights. See *United States v. Anderson*, 736 F.2d 1358 (9th Cir. 1984). Under its off-reservation authority, the State of Washington in February 1995 licensed Dawn to convert a vast open impoundment at the site into a disposal cell for Atomic Energy Act 11.e(2) byproduct material. These comments are submitted on behalf of the Spokane Tribe regarding the USACE's proposed remedial action for the Ashland 1 and Ashland 2 properties at the Tonawanda, N.Y. FUSRAP site. They are specific to impacts to the Spokane Indian Reservation anticipated to be caused by alternatives which require offsite disposal, including Alternatives 2 and 4, and the preferred alternative 2A. Further, these comments also extend to the supporting documents, as allowed in the November, 1997 Proposed Plan for the Ashland 1 and Ashland 2 sites.

INTRODUCTION

An Executive Memorandum issued by President Clinton on April 29, 1994 implements four key guiding principles for federal actions affecting Indian tribes and tribal trust resources:

1) federal departments and agencies are to "operate[] within a government-to-government relationship with federally recognized tribal governments,"

---

2) federal departments and agencies "shall consult . . . prior to taking actions that affect federally recognized tribal governments,"

3) federal departments and agencies "shall assess the impact of Federal Government plans, projects, programs, and activities on tribal trust resources and assure that tribal government rights and concerns are considered during the development of such plans, projects, programs, and activities," and

4) federal departments and agencies "shall take appropriate steps to remove any procedural impediments to working directly and effectively with tribal governments on activities that affect the trust property and/or governmental rights of the tribes."

These principles have not been realized.

Within the brief period available to the Tribe for reviewing the USACE's revised proposed plan and supporting documents, it has been ascertained that some of the materials to be excavated from the Ashland properties for off-site disposal may be Atomic Energy Act
13.1 11.e(2) byproduct material. If so, the revised proposed plan, the proposed plan, the feasibility study and supporting documents are deficient because they do not discuss impacts specific to disposal at facilities licensed to receive such materials, particularly where tribes and their resources might be negatively impacted. At present, there are only three facilities in the United States licensed to receive 11.e(2) material for disposal: one was licensed in New Mexico last year by the Nuclear Regulatory Commission, another is located in Utah, and the third is Dawn's facility next to the Spokane Indian Reservation. To the Tribe's knowledge, only the license at the Utah facility is presently not under legal challenge. Conceivably,
13.2 however, administration of federal procurement and contracting laws may lead to an agreement by USACE to dispose 11.e(2) material at one of the other two facilities despite the questionable legal status of their licenses.

RISK TO TRIBAL TRUST RESOURCES AND HUMAN HEALTH

The proposed plan asserts that Alternative 2A "is protective of human health and
13.1 (cont.) welfare and the environment." The Tribe questions whether this conclusion can properly be reached when the potential impacts at the disposal end of the proposal are not even considered. The Tribe is heavily dependent on the ground and surface waters of the Chamokane Creek Basin. See *United States v. Anderson.* In addition to supporting Reservation fish and wildlife, uses of this basin's waters include domestic, ranching, farming, and a Tribal fish hatchery. At present, the Dawn site is known to contaminate Chamokane Creek's surface water and an

upper aquifer at the site. Tribal technical staff have determined it likely that the site also contaminates a deep aquifer from which drinking water is drawn. Further, the High Density Polyethylene liner in Dawn's disposal cell is only 30 mil, and is over 16 years old. The manufacturer's warranty for the liner expired more than one year ago. Similar concerns have been raised by Department of Energy technical staff who should be consulted by USACE before determining to send Tonawanda waste to eastern Washington. Beyond this, it is imperative that the Tribe be consulted with concerning any possible federal action which might threaten its Reservation, and that such consultation be conducted sufficiently early in the process that it will have a meaningful effect on the outcome.

In applying the evaluation criteria, the revised proposal plan, in typical fashion, focuses on the subject Tonawanda sites. Alternative 2A is rated high in such areas as "Overall Protection of Human Health and the Environment" and "Long-term Effectiveness and Permanence" based on the justification that the material will be "permanently isolated in a disposal facility" or "placed in an engineered disposal cell." As discussed above, however, these conclusions when applied to Dawn's facility are highly suspect from a technical standpoint. Moreover, from a federal Indian policy standpoint, they are wholly unsupported since no effort has been made by USACE to "assess the impact of Federal Government plans, projects, programs, and activities on tribal trust resources and assure that tribal government rights and concerns are considered during the development of such plans, projects, programs and activities." See Presidential Memorandum dated April 29, 1994. The reason the principles in the Presidential Memorandum exist is the federal trust responsibility to tribes and their resources, developed through more than 150 years of jurisprudence. States have no such responsibility, and indeed throughout history have routinely taken strongly adverse positions to tribes as sovereigns. In fact, this responsibility can be neither delegated to states nor abdicated by the federal government. *Assiniboine and Sioux Tribes v. Bd. of Oil and Gas*, 792 F.2d 782 (9th Cir. 1986). Thus, when disposal of federal waste is considered for a state-licensed site like Dawn's it is incumbent upon the responsible federal agency as trustee to ensure no injury to affected tribes and their resources. While offsite disposal impacts are often not considered in environmental reviews for reclamation, they must be where federal trust duties have not been addressed in the process of licensing the disposal facility. And this must be accomplished before the federal action has proceeded down a path where federal procurement and contracting laws render it irreversible.

If Dawn's facility is a potential disposal site, the Spokane Tribe's "rights and concerns" must yet be considered. In the context of trust resources, those "rights and concerns" include the following. What are the impacts the DMC site and the additional FUSRAP waste will have on Reservation resources? Will the quality or quantity of these waters be impacted in any way by the proposed alternative? What impacts will result to Reservation fish and wildlife? What are the likely human health impacts if the FUSRAP waste in Dawn's impoundment contaminates the deep aquifer? What will be required as mitigation should this occur? Shouldn't the condition and integrity of the specific disposal cell at the facility be taken into account in order to complete this analysis? Have there been irreversible and irretrievable commitments of Tribal resources? How would a Tribal natural resource damage action under CERCLA for harm to Reservation resources affect the cost analysis of Alternative 2A? Does the federal government's trust responsibility over Tribal trust resources permit the disposal of FUSRAP materials at Dawn's site? These questions must be answered and a more meaningful opportunity for Tribal consultation presented before USACE commits to a course which may lead to further injury of Tribal trust resources.

TRAFFIC SAFETY RISKS TO TRIBE

13.3 The route selected by Dawn to transport its waste includes a narrow, winding and hilly highway which serves as the primary route for Tribal members and employees travelling to and from the Spokane Indian Reservation. The Tribe presently is contesting selection of this route, and will be submitting to the State of Washington the enclosed document entitled "Traffic Safety Study, State Route 231, Reardan to Ford, Dawn Mining Mill Site Closure Proposal," which are formal comments prepared by a Tribal traffic safety consultant on a State conducted study, and which are to be considered as additional Tribal comments regarding the Ashland remediation.

In general, the issues of trust responsibility raised in the above section concerning threats to human health and natural resources apply equally to the traffic threats Dawn's plan poses to Tribal membership. Although traffic impacts are considered in the Feasibility Study and elsewhere, the guiding principles of the 1994 Executive Memorandum are not satisfied. The Tribe must be consulted with on a government-to-government basis and impacts to the Tribe must be assessed prior to implementation of the plan.

In assessing these impacts, the following must be considered. According to Washington data, nearly one-half of the accidents studied along Dawn's route result in death or injury. Dawn's proposal will increase large truck traffic on State Route 231 by 400% to 600%. Large trucks, during the period in which the State's studies provide such statistics, represented nearly one-sixth of the accidents in this corridor. A particularly winding stretch of this route is in a canyon adjacent to a stream which flows onto the Spokane reservation, and represents an area in which nearly one-fourth of the accidents studied along Dawn's preferred route occurred. Spills of radioactive waste from accidents in either this canyon or at a dangerous bridge which crosses the Spokane River will result in contamination of critical Tribal waters and other resources. Beyond an assessment of these issues, the Tribe, consistent with the Presidential Memorandum and the United States' trust responsibility, is entitled to consultation.

THE ASHLAND PLAN RAISES ISSUES OF ENVIRONMENTAL JUSTICE

13.J The need to examine the disposal end of the Ashland plan is important, not just to satisfy the guiding principles of the 1994 Presidential Memorandum, but also to satisfy the mandate of Executive Order 12898, dated February 11, 1994. That executive order requires agencies of the executive department to act consistent with the principle of environmental justice. In other words, these agencies must consider and address the disproportionate impact their actions have on minority and low income populations. Clearly, all impacts to the Spokane Tribe and its Reservation discussed above fall within this mandate. Federal agencies cannot escape applying this analysis to the disposal end of remediation actions where, as here, the licensing entity is not required to conduct a similar analysis. In this regard, environmental justice principles associated with the Ashland plan — as it relates to Dawn's facility — must be satisfied in addition to meeting the government's trust obligations to the Spokane.

CONCLUSION

The Spokane Tribe appreciates the opportunity to submit these comments and the attached comments to the USACE. In particular, the extension granted is appreciated. Please advise at the earliest opportunity whether the consultation sought in these comments can be arranged. Also, please keep me advised as to future developments on this and other FUSRAP projects which might affect my client's interests.

Sincerely,

SHANNON D. WORK
Attorney at Law

SDW.jaf

enclosures

Traffic Safety Study

RECEIVED

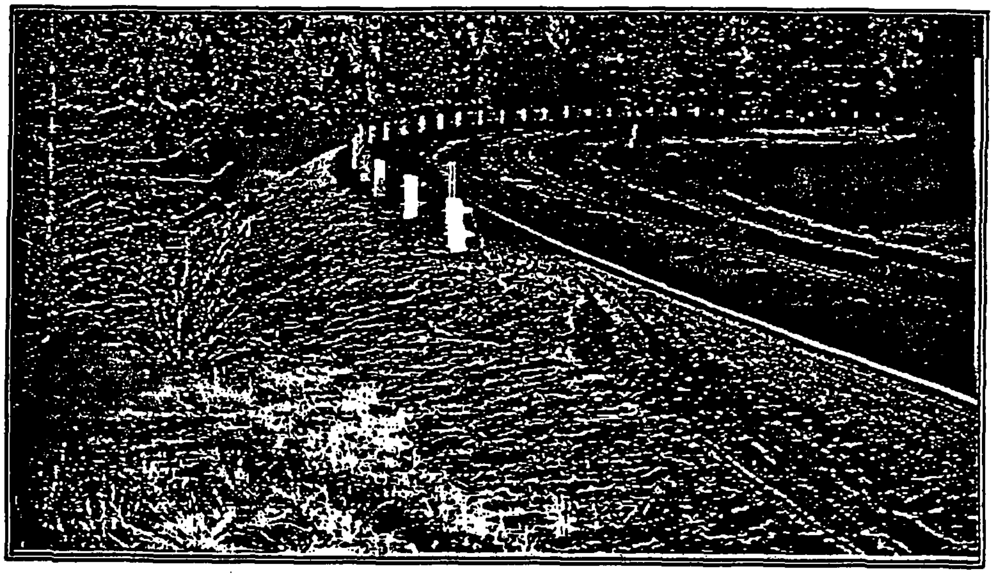
JAN 2 0 1998

USACE Buffalo District
Tonawanda FUSRAP Office

State Route 231

Reardan to Ford

Dawn Mining Mill Site Closure Proposal



January 1998

William E. Haro and Associates

William E. Haro, P.E.
2111 - 239th Place SE
Issaquah, WA 98029
425.392.7288

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Purpose of Report

In May of 1997, the Eastern Region of the Washington State Department of Transportation (WSDOT) completed a safety study entitled "SR 231 - Safety Study for the Closure of the Dawn Mining Mill Site". This study analyzed a number of roadway safety related items on SR 231 between the town of Reardan, WA and the access road to the Dawn Mining Company site just south of Ford, WA. Upon my review of this study I have found that although most roadway safety topics have been analyzed and discussed, the study basically serves as an analysis of existing conditions. The safety related impacts to SR 231 in view of the transport of hazardous and/or radioactive material with large, 5 axle vehicles on a consistent daily schedule for a long time period are not specifically discussed.

Enclosed in this report you will find my analysis and professional opinions specifically related to the transport of hazardous materials with large trucks on this section of SR 231. This analysis will be made with the existing roadway conditions as the foundation and the Dawn Mining Company (DMC) proposal built upon this foundation to give a better picture of the possible impacts to the safety of persons and the environment if DMC's proposal occurs.

Traffic Conditions - Existing and Proposed

This portion of the SR 231 corridor is the primary commuter route for Spokane Indian Reservation residents and Tribal employees traveling to and from the Spokane Indian Reservation. The SR 231 corridor is a rural two lane highway with reported 1996 traffic volumes of 1400 Average Daily Traffic (ADT) with 13.5% trucks just north of Reardan, 900 ADT with 11.6% trucks just south of the junction with SR 291, and 1100 ADT with 14.9% trucks just south of Ford. WSDOT reports that at the time of these counts (July 1996), approximately 1.4% of the total ADT consisted of large trucks, with large trucks defined as those having 5 axles or a length of at least 55 feet. Annual traffic growth rates of 4% to 5% are reported.

The current DMC proposal to import contaminated waste to its facility specifies 38 round trips per day, or an addition of 76 vehicles per day to the existing ADT. Table 1 outlines the impact to existing traffic conditions for total vehicle traffic, general truck traffic, and large truck traffic (5 axle or >55' in length) at the three locations on SR 231 where counts were taken in July of 1996. This table provides a framework for evaluating the increase in traffic safety concerns due to the DMC proposal. A traffic growth rate of 5% is used and 1999 is assumed to be the year contaminated material begins being imported to the DMC site.

Again, the assumptions made for Table 1 include an annual traffic growth rate of 5%, that the percentage of trucks in the traffic stream prior to the hauling of contaminated material to the DMC site remains constant, that the DMC proposal is implemented in 1999, and that large trucks (5 axle or >55' length) are used to transport the contaminated material. All these assumptions are reasonable based on available information.

As seen in Table 1, overall traffic growth from 1996 to 1999 is a significant but modest 16%. The largest changes to the traffic stream due to the implementation of the DMC proposal involve trucks. The percentage increase in overall truck traffic ranges from 55% just north of Reardan to 86% just south of the SR 291 junction.

Table 1 - 1996 vs 1999 Average Daily Traffic, Average Daily Trucks, and Average Daily Large Trucks (5 axle or >55' length)

	SR 231 north of Reardan	SR 231 south of SR 291 Jct	SR 231 south of DMC access road
1996 ADT	1419	909	1130
1999 ADT	1643	1052	1308
% increase	16%	16%	16%
1996 Trucks	192	105	168
1999 Trucks	298	198	271
% increase	55%	86%	61%
1996 Large Trucks	20	13	15
1999 Large Trucks	99	91	93
% increase	395%	600%	520%

The percentage increase in large trucks is most significant and alarming. As seen in Table 1, the percentage increase in large trucks ranges from 395% just north of Reardan to 600% just south of the junction with SR 291.

The increase in regular and large truck traffic as outlined in Table 1 will serve as the basis for my analysis of roadway safety concerns based on the DMC proposal. It should be noted that the Dawn Mining Company estimates that approximately 25 million cubic feet of material will be hauled at 500 cubic feet per load. They state that this calls for 38 one way trips per day (76 two way trips), 260 days per year for five years. During recent safety mitigation discussions, Dawn Mining Company has stated a willingness to suspend hauling during times school buses pick up and drop off school children along SR 231. They further stated a willingness to suspend hauling during periods of poor weather and road conditions. If these mitigative measures are invoked, it seems likely that the estimated number of trips per day would have to increase in order to end operations in five years, or if daily trips remain constant, hauling could extend into the sixth or seventh year. Either scenario would increase negative impacts.

Existing Lane and Overall Pavement Widths

The WSDOT safety study states that SR 231 "generally has adequate alignment with one, 11 foot lane in each direction and shoulders ranging from 2 to 4 foot in width". The surfacing requirements of the shoulder are not mentioned.

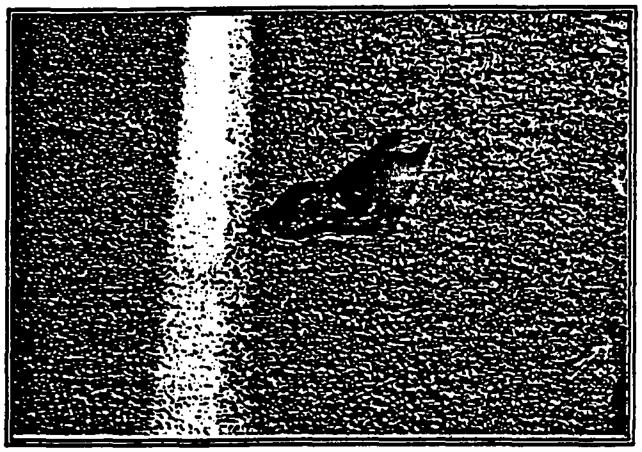


Figure 1 - Typical shoulder within SR 231 corridor

Any improvements made to the existing roadway would require an upgrade of existing lane and shoulder widths to a minimum of 12 foot and 3 foot, respectively (this assumes >1000 ADT and >10% trucks, both reasonable assumptions). The existing lane and shoulder widths do not meet those required of today's roadway project design standards. In other words, the increased lane and shoulder widths would be required of any roadway safety or capacity improvement projects as outlined in the Modified Design Standard requirements.

I am concerned about these lane and shoulder width issues with respect to the huge increase in large trucks proposed by the DMC. What concerns me more is that I disagree with the existing lane and shoulder width measurements reported in the WSDOT study. Table 2 below shows lane and shoulder width measurements taken at a number of locations within the corridor. It should be noted that in my opinion, the shoulders in this corridor need to be paved in order to be considered a shoulder due to the generally soft, sandy material found beyond the edge of the pavement. Lane widths reported below are measured from the center of the centerline stripe to the center of the fogline, and shoulder widths are measured from the center of the fogline to the edge of the pavement. What is often overlooked is that effective lane widths are taken from the inside of the centerline stripe to the inside to the fogline, thus these effective lane widths are approximately 0.25 feet to 0.75 feet less than those shown in Table 2.

Table 2 - Existing lane and shoulder widths at selected locations

Location	Lane Width (ft)	Shoulder Width (ft)	Overall Pvmt Width (ft)
MP 34.4	10.75	1.25	24
MP 35.5	10.25	1.75	24
MP 36.7	10.5	2.5	26
MP 38.8	10.25	2.75	26
MP 40.7	10.25	1.75	24
MP 43.8	10.25	1.75	24
MP 44.7 (Spokane River Br.)	10.5	1.5	24
MP 46.4	10.25	1.25	23

As seen in Table 2, typical lane widths for the corridor are just over 10 feet, and typical shoulder widths are under 2 feet. Overall pavement width is typically 24 feet. These widths differ significantly from those reported by WSDOT, and differ even more from those required by the Modified Design Standard.

These travel lane and shoulder widths are of concern considering the proposed increase in large trucks by the DMC. Large trucks have difficulty remaining in their travel lane on straight sections of highway at these lane widths. In horizontal curves, particularly in those of 900 foot radius or less, it is unreasonable to expect that large trucks will always remain within their lane with these typical lane widths. The proposed increase in large trucks will negatively impact motorists who meet such trucks at highway speeds. In addition, the likelihood that two trucks will meet on a horizontal curve will significantly increase with the DMC proposal. This concern will be discussed in more detail in the next section.

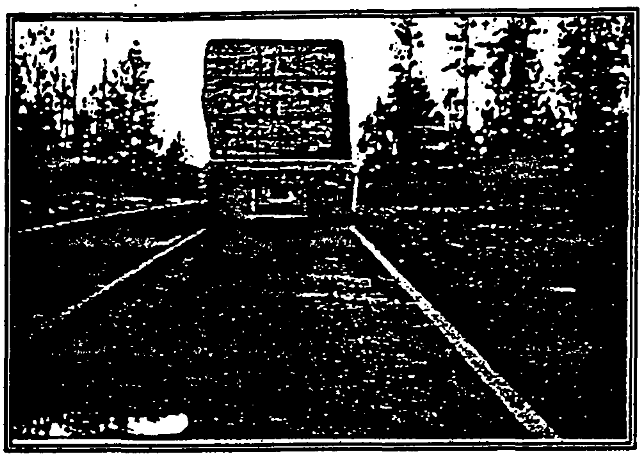


Figure 2 - Typical lane width

Horizontal Curves and Off-tracking

There are a number of horizontal curves of note within the corridor. Particularly noteworthy are horizontal curves of less than 900 foot radius. Horizontal curves with short radii present tracking concerns for large trucks on roadways with narrow lane and overall pavement widths such as SR 231. Due to the greater width and length of large vehicles, the wheel path can be wider than the lane of travel within the horizontal curve due to the rear wheels of the large vehicle tracking inside the front wheels. This is referred to as off-tracking.

The off-tracking phenomenon in curves with narrow roadway width conditions can cause the large vehicle to cross the centerline when negotiating the horizontal curve. This concern is often compounded by the fact that the forward sight line between the large vehicle and a vehicle approaching in the opposite direction is often limited by the horizontal curve itself.

I believe that off-tracking is of significant concern in this corridor, particularly if the current DMC proposal is implemented. Six main factors constitute the majority of my concern:

1) Overall lane and pavement widths are too narrow at certain horizontal curves within this corridor which will often result in large trucks off-tracking within these curves.

2) Sight distance is limited at certain horizontal curves, giving motorists less time to react to an approaching large vehicle that has crossed the centerline due to 1 above.

3) If the DMC proposal is implemented, there will be a 395% to 600% increase in large vehicles on SR 231, resulting in many more instances where large vehicles could cross the centerline at certain horizontal curves, particularly those listed in Table 3.

4) If the DMC proposal is implemented, there will be many more occurrences of two large vehicles approaching from opposite directions meeting within the smaller radius horizontal curve. Also of significant note is the increase in chance of a large vehicle and a school bus meeting per above, because it is unclear whether the DMC would cease operations only during normal morning and afternoon bus transport times or during all times of school bus operations (extracurricular).

5) There will be a significant increase in the chance that two large vehicles will meet while a pedestrian is standing or walking along the roadway or a cyclists is riding along the roadway if the DMC proposal is implemented. Should this happen in a roadway section with a steep embankment or guardrail, there could be no place for a pedestrian or cyclist to shy away from the roadway edge.

6) The huge increase in large vehicles will cause a proportionate increase in off-tracking in the small radius horizontal curves. This in turn will likely break down the shoulder areas adding to maintenance and safety concerns. The existing shoulders are typically narrow and soft beyond the pavement edge. If the shoulders lose width due to off-tracking, the concerns in the small radius curves will increase as the overall pavement width decreases.

Figure 3 - Off-tracking in horizontal curve

In my opinion, the chance for a head on or run off the road collision at the less than 900 foot radius curves will significantly increase if the DMC proposal is implemented unless mitigative action is taken. The WSDOT safety report agrees that pavement widening is needed on certain curves due to large vehicle off-tracking.

The only fatality reported in this corridor by the WSDOT safety study appears to have occurred at the crest vertical/horizontal curve combination at MP 38.8. This was reported as a head on accident (two vehicles colliding head on from opposite directions). Because information on this accident is limited in the WSDOT study, further investigation into the specifics of this accident are needed, but it seems likely that the accident occurred in the horizontal curve. The probability of occurrence of this type of collision will increase if the DMC proposal is implemented and the <900 foot horizontal curves are not improved.

From my field review of the corridor, I am listing below in Table 3 a number of curves that I suspect to be less than 900 foot in radius. Horizontal and vertical stopping sight distance (SSD) measurements are also included at certain curves. It should be noted that Geometric Design of Highways and Streets by the American Association of State Highway and Transportation Officials (AASHTO) recommends 450 feet to 550 feet of stopping sight distance (SSD) for 55 mile per hour design speeds on level ground, and an additional 65 feet for 4% to 5% downgrades.

Table 3 - Horizontal curves suspected to have less than 900 foot radius

Location of Suspected <900' Radius Horizontal Curve	Lane Width (ft)	Overall Pavement Width (ft)	Horizontal Stopping Sight Dist. (ft)	Vertical Stopping Sight Dist. (ft)
MP 34.5 (rock cut)	10.5	24	–	–
* MP 35.5	10.25	24	–	–
* MP 36.7	10.5	26	430	–
MP 38.8	10.5	24	395	285
MP 43.8	–	24	–	–
MP 44.5	–	24	–	–
MP 44.8	–	24	–	–

* There are a series of curves from MP 35.5 to MP 37.0 that need to be further investigated.

The minimum lane width and minimum total roadway width for a 900 foot radius horizontal curve per the Modified Design Level is 11 feet and 26 feet, respectively. However, wider minimum lane widths and total pavement widths are required as the horizontal curve radius becomes less than 900 feet. For instance, a 500 foot radius horizontal curve requires a minimum 12 foot lane width and 28 foot total pavement width.

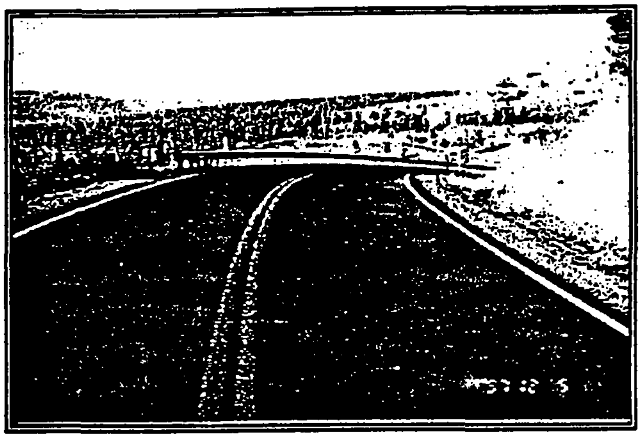


Figure 4 - Northbound at MP 38.8 - crest vertical & small radius horizontal curve combination

Before the current DMC proposal were to be implemented, I highly recommend that the exact radius of each suspect curve be determined and the curve widened to at least the minimum widths outlined in the Modified Design Level. Action should be taken to mitigate the large increase in likelihood of head on and run off the road collisions in these curve areas. Further shoulder widening should be considered beyond these minimums in areas where pedestrians are likely to be walking and no refuge area exists for their safety.

Existing Roadway Lighting

There is currently no roadway lighting along this corridor. Roadway lighting at selected locations, including the intersections of SR 231 at Little Falls Rd, SR 291, Corkscrew Canyon Rd, and the DMC access Rd, could help improve motorist safety during dark conditions. The WSDOT safety study specifically mentions that increasing driver awareness may help to reduce accidents at the Little Falls Rd intersection. Roadway lighting at this intersection would help better identify this intersection to motorists at night, dawn, and dusk.

Roadway lighting should certainly be included in any intersection improvement projects, including the addition of turn lanes on SR 231 at the DMC access Rd. Turn lanes require a driver decision approaching an intersection, and during darkness, dawn, or dusk, roadway lighting can help better define the lane choice decision faced by the motorist.

It should be noted that during late fall and early winter, dawn, dusk, and darkness extend into typical truck hauling hours and school bus pickup times. The use of roadway lighting at intersections and school bus pick up zones can help mitigate vehicle and pedestrian visibility concerns.

Little Falls Road Intersection

Of the twelve intersection collisions reported in the WSDOT safety study, eight occurred at the Little Falls Rd intersection. This constitutes 67% of all intersection collisions. Seven of these eight collisions were at right angle, indicating vehicles from Little Falls Rd turning into vehicles on SR 231.

Little Falls Rd via this intersection is a main access point to and from the state highway system and the Spokane Indian Reservation. The increase in large trucks proposed by the DMC will likely increase the severity of the angle accidents at this intersection due to the increased likelihood of any angle accident occurring involving a large truck on SR 231 (recall that general trucks will increase as much as 86% and large trucks will increase as much as 600% with the DMC proposal).

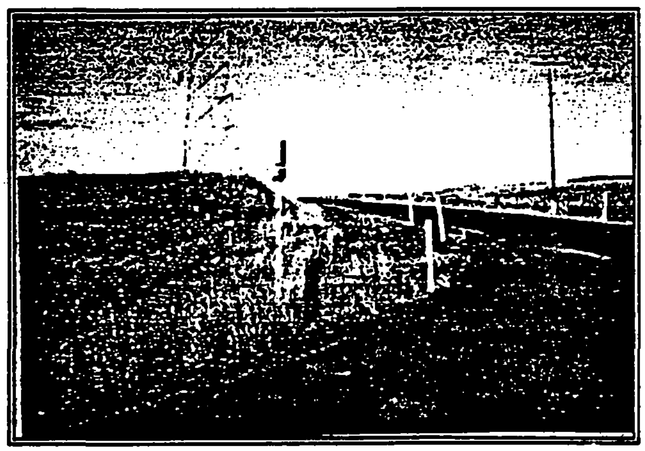


Figure 5 - West leg of Little Falls Rd & SR 231 intersection looking north

The WSDOT safety study states that increasing driver awareness at this intersection could lessen the possibility of accidents occurring.

To address collisions at this intersection, I recommend the following actions:

1) The installation of left turn channelization on SR 231 at the intersection. Although not readily warranted based on accident type, this improvement would do three things to decrease accident potential in my opinion. First, it would provide a refuge area on SR 231 for left turning vehicles from Little Falls Rd. Second, it would provide vehicles on SR 231 additional avoidance maneuver space. Third, it provides vehicles on SR 231 a visual queue that an intersection is approaching.

2) The installation of roadway lighting at the intersection. This improvement would also provide increased intersection awareness for vehicles on both SR 231 and on Little Falls Rd. Due to the lane choice decision, intersection lighting should be part of implementing recommendation 1 above.

3) Installation of highly reflective intersection warning signs on SR 231 in both directions approaching the intersection. Supplemental "Little Falls Rd" street names signs should be included as well. I recommend Diamond Grade VIP sheeting be used on these signs for enhanced nighttime performance.

4) The angle accidents should be studied to determine if any were caused due to vehicles on Little Falls Rd running the stop signs. If so, correctable measures in addition to roadway lighting could be implemented. Such measures include stop ahead signs, stop bars, and possibly a flashing beacon atop the stop signs.

School Bus Stops

School bus stops present a concern mainly due to the potential for conflict between the stopped school bus with its entering and/or existing school age passengers, and traffic on the highway. This concern is compounded by four main factors in highway situations. First, if there are a significant amount of trucks, especially large trucks, there can be increased likelihood for a collision because of the increased braking time that is required of such vehicles and their decreased maneuverability. Second, poor sight distance from highway traffic to the bus stop leaves less time for a motorist, especially the operator of a large vehicle, to react to the situation ahead. Third, the younger the child using the bus, the less capable the child is of dealing with the complexities of a highway school bus stop. Fourth, should buses pull over to allow vehicles to pass, large trucks will have difficulty accelerating to prevailing highway speeds, especially on grades, and a greater frequency of passing large trucks will occur.

As a pedestrian required to stand and walk aside highway traffic, school aged children are at significant risk as outlined above. In my opinion, elementary school children are at most risk. These young, inexperienced pedestrians have less experience in negotiating highway traffic. They are more apt to dart into traffic for no apparent reason. Until the age of approximately twelve, their depth perception and peripheral vision is not yet fully developed, leaving them less equipped to deal with bus stops beside high speed highways. Of course, as with most of the safety situations analyzed in view of a proposal like the DMC proposal, increasing truck traffic on the highway, particularly large truck traffic, increases the concern significantly due to vehicle size and width, increase in braking time, and decrease in maneuverability.

Per my field observations, school buses do regularly use SR 231 in this corridor. There are a number of "School Bus Stop Ahead" signs (S3-1) posted along the corridor. The presence of this type of signing alerts me to sight distance concerns between highway traffic and the bus stops. Per the Manual of Uniform Traffic Control Devices (MUTCD), which is the WSDOT standard for signing and striping roadways, this type of signing is intended for use where sight distance to the school bus stop is 500 feet or less, not just everywhere a school bus stop exists. For 55 mph, minimum stopping sight distance (SSD) requirements are 450 to 550 feet as reported by the American Association of State Highway and Transportation Officials (AASHTO). AASHTO also clearly states that these minimum SSD requirements are for passenger car operation and that "trucks as a whole, especially larger and heavier units, require longer stopping distance from a given speed than passenger vehicles do". Thus my concern over sight distance to these bus stop locations, particularly considering the DMC proposal.

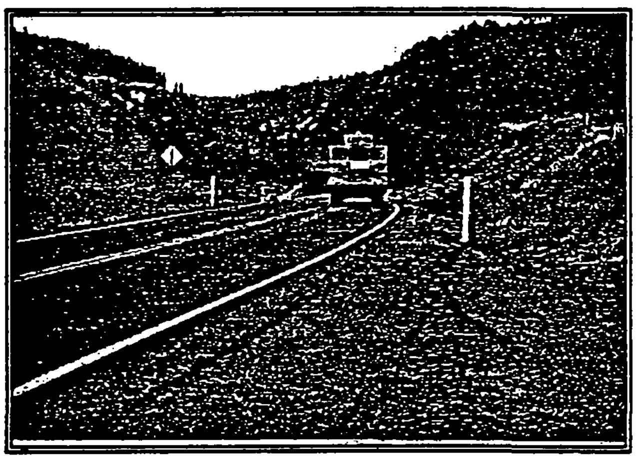


Figure 6 - School bus southbound at MP 38.8

If the current DMC proposal is implemented, I recommend three actions to address school bus stop concerns:

1) Construct bus pullouts at each bus stop location capable of removing the school bus from the highway completely.

2) Restrict the transport of hazardous materials during the school bus pickup and drop off times.

3) Review the location of bus stops and consider elimination or relocation of those located on upgrades or in areas of limited sight distance. Resulting pedestrian facility needs have to be considered for relocated stops.

A question may arise to the need for implementation of both recommendations one and two above. I feel that both should be implemented together as follows. First, it may be difficult to enforce the transport restriction during school bus pick up and drop off times. Thus, these restrictions may not always be observed. At the risk of making judgments without knowing the specifics on the contractor that will be transporting the hazardous materials, it has been my experience that in general, permit requirements for hauling are not always followed unless these requirements are strictly and regularly enforced. Second, school bus pick up and drop off times are not always restricted to the morning and afternoon. For instance, kindergarten classes are often half day and thus can have pick up and drop off around noon.

It has been reported to me that the current DMC proposal includes a provision for not transporting hazardous material during school bus pick up and drop off times. I highly recommend follow up on two issues prior to implementing this provision. First, have the local school districts provide a complete drop off and pick up schedule. Note the times outside the typical morning and afternoon routes. Will transport of hazardous materials be suspended during all times school buses use the highway? Last, design an enforcement plan including a schedule of penalties. Due to the lack of a weigh station on SR 231 within this corridor, enforcement could be difficult to implement. Suggestions for enforcement include regularly scheduled spot checks by the Washington State Patrol (WSP) or a commissioned private contractor.

Guardrail, Bridge Rail, and Clear Zone

Guardrail is a mitigative measure that can be employed to address hazards such as side slopes, fixed objects, and water in the event of a vehicle leaving the roadway. At bridges, bridge rail and bridge approach rail can be used to prevent errant vehicles from going over the side of the bridge structure, or striking the end of the structure. A clear zone is an unobstructed area beyond the edge of the roadway shoulder for the recovery of vehicles that leave the roadway.

My field investigation showed that there are many locations within this corridor where guardrail is warranted by current WSDOT standards, but no guardrail is provided. In addition, there are many existing locations of substandard guardrail including concrete post and post and cable types.

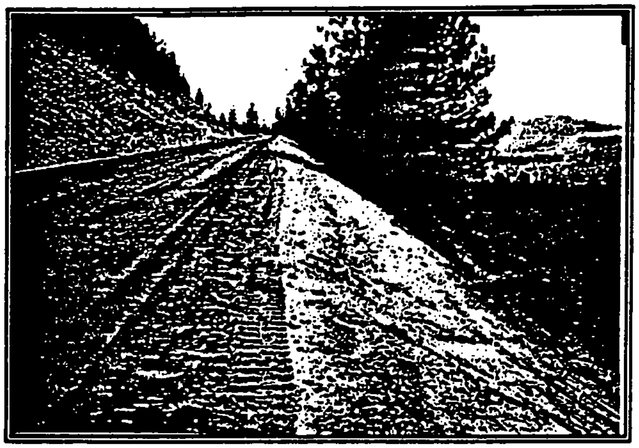


Figure 7 - High embankment without guardrail on the grade south of the Spokane River

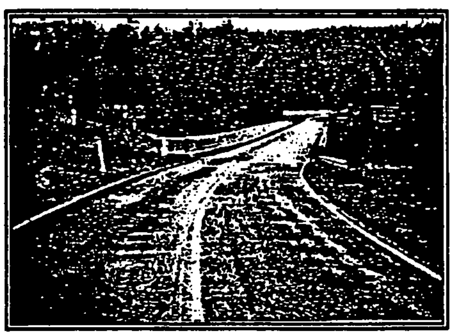
The need and justification for mitigating the hazards presented by the existing side slope, water, and fixed object hazards along the SR 231 corridor in my opinion will increase if the current DMC proposal is implemented. More large trucks within the corridor will present increased opportunities for conflicts resulting in run off the road types of accidents as these trucks travel through and interact with other vehicles.

It is interesting to note that in the 52 non-intersection accidents reported in this corridor, it is likely that at least 43 involve vehicles leaving the roadway. If the two accidents that hit guardrail but did not break through are included, approximately 87 % of all non intersection accidents involve vehicles that either left the roadway or would have had guardrail not been present. It is my opinion that this percentage will likely remain the same if the DMC proposal is implemented, however the number of total accidents will likely increase. One can conclude from this accident data that vehicles leaving the road is a main concern and thus guardrail where warranted could be used to attempt to address this.

It should be noted that there are locations of water adjacent to the roadway in this corridor, as well as drainage and river crossings. It is reasonable to say that most of the streams and drainage courses empty into the Spokane River, which forms the south border of most of the Spokane Indian Reservation. If a large truck transporting hazardous material were to leave the road and spill hazardous material into a stream or drainage course, the impact to the environment, particularly the Spokane River, could be significant. Again, barrier protection such as guardrail is one measure that can address this.

The WSDOT safety study states that further evaluation of approximately 15,000 feet of guardrail installation will be required if the ADT on SR 231 continues to grow. This statement likely reflects that for locations where guardrail is warranted for installation, it may not be recommended if the embankment is not high enough or steep enough for a given roadway ADT. This cost/benefit approach to installing guardrail does not appear to take into account the types of vehicles using the road, the likelihood that those vehicles may leave the roadway, roadway surface conditions (% time ice and snow on road), roadway grades, and perhaps most importantly in this case, the type of cargo being regularly transported on the road. Could the daily transport of hazardous material have an impact on the cost effectiveness of guardrail installation? I think so.

The WSDOT safety study also states that approximately 20,000 lineal feet of existing guardrail should be replaced to meet current standards. However, my field observations showed only about a quarter of this amount (4500 feet) of existing guardrail that needs upgrade. Thus accomplishing a total upgrade of existing guardrail to meet today's standards is not as overwhelming as may be initially reported by WSDOT.



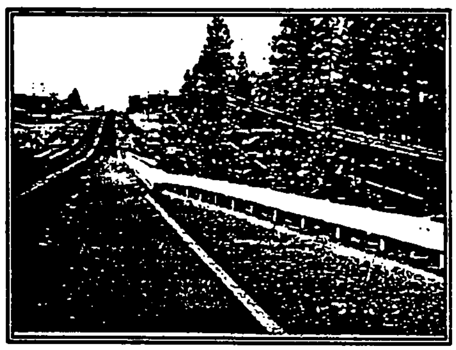


Figure 8 - Spokane River bridge rail that does not meet current WSDOT performance criteria (*left*), and an upgraded bridge approach (*right*)

At the Spokane River bridge, bridge rail and bridge end protection do not meet current standards. The installation of flared guardrail on the bridge approaches and thrie beam rail on the inside of the existing concrete bridge rail is recommended. These measures will help prevent vehicles, especially large trucks carrying hazardous material, from entering the Spokane River. Because of the possible terrible consequences of such an event to the motorist as well as the environment, the needed upgrades to the bridge rail and bridge end protection are highly recommended if the DMC proposal goes forward.

There are many locations adjacent to SR 231 where the clear zone area could be cleared of obstructions to improve safety. Areas with trees in the clear zone can be mitigated at a very reasonable cost. The rock cuts at MP 34.7 present a significant clear zone obstruction.

Drainage Crossings

The drainage crossing at MP 40.7 is of concern because at times the existing 24" diameter corrugated metal drain pipe is overwhelmed by storm water flow and siltation. This results in a flow of water over SR 231 and this presents a hazard to all vehicles on the highway. Large trucks transporting hazardous materials per the current DMC proposal may have difficulty negotiating the flooded roadway if the water over the roadway is not identified by the vehicle operator in time. Depending on the depth of water, this could cause the vehicle to lose control and overturn and/or leave the roadway. This presents the potential for hazardous material to enter the drainage stream and be carried to the Spokane River.

Due to the above mentioned concerns, I recommend that if the DMC proposal is implemented, the drainage crossing at MP 40.7 be improved so that water and mud flow across the highway is eliminated.

Grades

My field investigation revealed that there are a number of grades that would affect the speed of fully loaded large trucks on SR 231 within this corridor. However, three grades stand out as most significant due to their length. These three grades are shown in Table 4.

Of the three grades listed in Table 4, the last grade from MP 44.8 to MP 45.9 is of most concern to me if the current DMC proposal is implemented. The upgrade is in the northbound direction, which is the direction the large trucks transporting material to the DMC site will be fully loaded. In addition, this is the longest and steepest grade, with a maximum grade of approximately 7% at MP 45.7. Also, a major intersection with SR 291 is located within this grade.

Table 4 - Significant grades

Location of Grade	Length (miles)	Approx. Avg. Grade	Direction of Upgrade
MP 35.5 to MP 38.4	2.9	4.5%	Southbound
MP 43.6 to MP 44.5	0.9	5.5%	Southbound
MP 44.8 to MP 45.9	1.1	* 6%	Northbound

* Maximum grade of 7% at MP 45.7

Assuming the large trucks in the current DMC proposal begin this grade at MP 44.8 at the speed limit of 55 miles per hour, truck speed will steadily decrease to approximately 17 miles per hour at MP 45.4, and then decrease further to approximately 14 mph at the 7% grade at MP 45.7. These speeds will continue to the crest of the grade at MP 45.9. Heavy truck acceleration tables show that it can take just under 2 miles for these vehicle to reach the speed limit after the upgrade has ended (assuming flat road after the grade). This means these vehicles may not reach the speed limit again until approximately MP 47.8. It should be noted that it may be very difficult for large vehicles to actually begin this grade at the speed limit of 55 miles per hour as assumed above due to the horizontal curve at the beginning of the grade. If large vehicles actually begin the grade at a speed that is lower than the 55 miles per hour speed limit, the large vehicle will reach its lowest speed even sooner, increasing the time that it could delay the progress of the normal traffic stream.

I have two main concerns with this grade if many additional large trucks use it on a daily basis. First, the faster a heavy truck can travel at the beginning of the upgrade, the longer it can maintain its speed. Thus, there will be an incentive for truck operators to speed on the downgrade and horizontal curve approaching the Spokane River bridge in order to hit the beginning of the upgrade at as great of speed as possible. The horizontal curve just to the south of the Spokane River bridge is suspected to have less than a 900 foot radius, thus off-tracking in this curve is already of concern. Speeding through the curve compounds this concern. This of course will increase the accident potential northbound on SR 231 through the village and curve area south of the bridge, and on the approach to the bridge itself. Second, the huge speed differential between regular traffic on the grade and the large trucks destined for the DMC site will tend to cause motorist frustration and will encourage passing. This concern is magnified by the presence of no passing zones on the grade and at the intersection with SR 291.

Figure 9 - Car closely following truck (*left*) then passing (*right*) on southbound grade south of the Spokane River

As shown in Table 5, this speed differential is estimated to be at least 41 mph at some points of the grade. The time differential between a passenger car and a large truck to negotiate the three miles that the large truck will be traveling at reduced speeds is approximately 142 seconds.

Table 5 - Large truck vs. passenger car on northbound grade north of the Spokane River

Location	Approx. Car Speed (mph)	Approx. Large Truck Speed (mph)	Approx. Speed Differential (mph)	Elapsed Time for Car Since Start of Grade (sec)	Elapsed Time for Large Truck Since Start of Grade (sec)
MP 44.8 (Start of Grade)	55	55	0	0	0
MP 45.0	55	40	15	13	15
MP 45.4	55	17	38	39	65
MP 45.7	55	14	41	59	135
MP 45.9	55	17	38	72	181
MP 46.3	55	42	13	98	230
MP 46.9	55	50	5	137	277
MP 47.8	55	55	0	196	338

There are many locations within the three grades listed in Table 5 that warrant guardrail installation. The proposed increase in large vehicles on these grades increases the justification and cost effectiveness of guardrail installation, particularly considering the high, steep embankments, and the significant amount of time ice and snow is on the road surface.

The Dawn Mining Company has stated they would suspend operations during inclement weather conditions, however, roadway surface conditions, not weather, is the main concern. Unfortunately, it is difficult to predict roadway surface conditions from forecasted weather. For example, during my field study on December 5th, 1997, conditions were cool and dry with clear skies and the high temperature in Reardan in the middle thirties. These are typical conditions for late fall and early spring. Frost was on the roadway during the morning hours with a considerable amount remaining throughout the day on the grade approaching and to the south of the Spokane River (MP 43.6 to MP 44.5). This downgrade is on a north facing slope and is shaded for most of the day. It had frost on the roadway surface the entire day I visited this corridor. I anticipate that this section of roadway with its nearly 6% grade for downhill trucks will have reduced traction roadway conditions with frost or snow for considerable amounts of time during late fall and winter. As previously mentioned, this section contains non standard barrier protection, an embankment of approximately 100 feet in height, and a horizontal curve of less than 900 foot radius just prior to the Spokane River bridge.

Trends

Based on accident information contained in the 1991 FEIS, 1994 FSEIS, and the 1997 WSDOT safety study, there is a trend of increasing accidents on SR 231 within the corridor between the years of 1983 and 1995. Average total yearly accidents within the corridor are as follows for the given time period: '83 to '86 = 7.8 accidents/year, '87 to '89 = 10 accidents/year, '90 to '92 = 10 accidents/year, '93 to '95 = 12.3 accidents/year. Based on the proceeding data, there has been a steady increase in accidents in the SR 231 corridor from the early eighties to the middle nineties. It is also seen that over half (52%) of the reported accidents in the WSDOT safety study involved injury or death, with a total of 58 injuries and one fatality occurring in the 60 accidents reported in the study. If the current DMC proposal is implemented, it is more likely that this trend of increasing accidents will continue.

The 1991 FEIS shows specific data on accidents involving large trucks. It is seen that between the years of 1983 and 1987, nine accidents involving large trucks occurred within the corridor. There were 39 total accidents during this time period, thus 23% of these accidents involved large trucks. Because the accident data reported in the 1997 WSDOT safety study did not include a key for the vehicle type code, it is difficult to readily determine the amount of large vehicles involved in the accidents reported in this study. However, it is very likely that whatever the percentage of accidents involving large trucks in the WSDOT safety study is, this percentage would significantly increase if the current DMC proposal is implemented.

Conclusion

This report and the engineering analysis contained herein is intended to serve as more than simply an analysis of existing roadway conditions within the SR 231 corridor between the towns of Reardan, WA and Ford, WA. Rather, this report is intended to analyze the safety related impacts to SR 231 with respect to the consistent transport of hazardous material with large trucks over a long period of time.

Based on my analysis, it is my opinion that if the current DMC proposal is implemented, roadway safety in a number areas will be negatively and significantly impacted. The 395% to 600% increase in large trucks will compound the safety concerns in a number of small (<900 foot) radius horizontal curves that have lane and shoulder widths that do not meet the Modified Design Level. The most significant of these concerns include large trucks off-tracking and crossing the roadway centerline. Existing lane and shoulder widths within the corridor were found to be significantly narrower than those reported in the WSDOT safety study, and the introduction of a 395% to 600% increase in the wide large vehicles is a concern considering the lane and shoulder widths found.

The impact to safety at school bus stops within the SR 231 corridor was also found to be significant, especially for elementary school students. These concerns are based on a number of factors, including the increased braking time required by large vehicles, especially at bus stops where braking sight distance between highway traffic and stopped buses is limited. Also of concern is introducing a significant increase in large trucks on the highway to young, inexperienced pedestrian school children, many of whom are at an age where depth perception and peripheral vision are not yet fully developed. Any proposal to restrict large trucks during school pick up and drop off times should be met with scrutiny as school children are often transported outside the normal morning and afternoon times and enforcement and implementation of such large truck transport restrictions can be difficult.

Mitigative measures that can be helpful in addressing "leave the highway" types of accidents are not present at many locations within the corridor. Field investigation showed that many locations within the corridor where these types of accidents are of concern could benefit from guardrail installation or hazard removal from clear zones. Approximately 87% of all non intersection accidents reported in the WSDOT safety study involve vehicles that either left the highway or likely would have had guardrail not been present. In addition, nearly a mile of existing guardrail within the corridor does not meet current WSDOT standards. Large trucks that in an accident could leave the roadway and spill their load of hazardous materials present a significant environmental concern as well, particularly if the spill occurs at the Spokane River or one of its tributaries.

The introduction of a huge increase in large trucks would significantly impact overall traffic operations on the many grades within the corridor, particularly the over mile long northbound grade situated just north of the Spokane River. There will be an incentive for the operators of large trucks to speed on the approaches to upgrades in order to maintain their speed for longer distances. The huge speed differential between the normal traffic stream and large trucks on significant upgrades will tend to increase motorist frustration and encourage passing although a significant amount of no passing zones are present of these grades. In addition, large trucks within the corridor will have to negotiate frost, ice, and snow roadway conditions for considerable amounts of time during the late fall and winter.

As outlined above, the DMC proposal will negatively impact roadway safety in a number of areas. As these negative impacts are realized, so typically are an increase in traffic accidents due to the increase likelihood for accidents these negative impacts create. I am of the opinion that the accident rate within the SR 231 corridor will increase if the current DMC proposal is implemented. I would also expect that due to the type of vehicle that would most significantly increase within the corridor, namely large trucks, the severity of accidents will also likely increase due to vehicle size and associated concerns such as increased linear momentum and braking time.

Since SR 231 is the primary commuter route for the Spokane Indian Reservation residents and Tribal employees, the Tribe will be particularly affected by the impacts of the current DMC proposal and the probable increase in total accidents and accident severity.

5.13 Responses to Givens, Funke & Work Comments

13.1 - USACE will review the contractor's transportation and disposal plan to ensure that it complies with all applicable or relevant and appropriate laws, regulations and executive directives, and is protective of human health and the environment. Specifically, USACE will comply with the Executive Memorandum signed April 29, 1994 by President Clinton which implements requirements for federal actions affecting Indian Tribes and Nations, to the extent applicable and appropriate. Transportation or disposal plans that are judged to be in violation of applicable or relevant and appropriate laws, regulations or executive directives or present an unacceptable risk will not be approved. It is the USACE position that all aspects of the remediation, including transportation and disposal, will be conducted in a manner to minimize risk to public health and the environment.

13.2 - The selection of the ultimate disposal site will be addressed as part of the Remedial Action phase of the cleanup using the standard government procurement procedure after completion of the remedial design and prior to commencement of the remedial action.

13.3 - USACE will review the contractor's transportation and disposal plan to ensure that it complies with all applicable or relevant and appropriate laws, regulations and executive directives, and is protective of human health and the environment. Specifically, USACE will comply with the Executive Memorandum signed April 29, 1994 by President Clinton which implements requirements for federal actions affecting Indian Tribes and Nations, to the extent applicable and appropriate. Transportation or disposal plans that are judged to be in violation of applicable or relevant and appropriate laws, regulations or executive directives or present an unacceptable risk will not be approved. It is the USACE position that all aspects of the remediation, including transportation and disposal, will be conducted in a manner to minimize risk to public health and the environment.

13.4 - The selection of the ultimate disposal site will be addressed as part of the Remedial Action phase of the cleanup using the standard government procurement procedure after completion of the remedial design and prior to commencement of the remedial action.

US Army Corps of Engineers®

COMMENTS

Proposed Plan for the Ashland 1 and Ashland 2 Sites

Written comments will be accepted if postmarked by January ~~8~~ 20, 1998

1/18/98

14.1 We, as local residents, would opt for Alternative 2 (pg 6 - Proposed Plan for The Ashland I And Ashland 2 Sites) as the preferred cleanup remedy to be undertaken.

These radioactive materials have been in our midst since 1946. We feel the time has come to remove it all! Residential and Industrial development will bring us all closer to this site eventually.

Arlene Piltowicz   Gerald Piltowicz

If you would like to receive a copy of the Responsiveness Summary or would like to be added to our mailing list, please fill in your:

Name: ____________

Address: ____________

We are on your mailing list already.

RECEIVED
JAN 20 1998
USACE Buffalo District
Tonawanda FUSRAP Office

Responsiveness Summary? Yes X   Mailing List? Yes ____

5.14 Response to Poltowicz Comment

14. – The revised PP for the Ashland sites is one component of the CERCLA documentation of the remediation of the Tonawanda Site as a whole. The document distributed for public comment represents the final version of the revised PP, based on the RI/FS published in 1993 and comments received on that document relevant to the Ashland sites, the guideline derivation document published in July 1997, and the USACE version (Alternative 2A) of the originally stated Alternative 2 in the 1993 PP. The USACE Alternative 2A is equivalent to the Alternative 2 developed by the DOE except that a site-specific guideline is used instead of the generic guidelines.

Author: NANCY J STICHT
Date: 1/20/98 5:27 PM
Priority: Normal
TO: FRANK PARSON
TO: DAVID J CONBOY
TO: RAYMOND L PILON
TO: SARAH L SNYDER
Subject: League of Women Voters

---------------------------------- Message Contents ----------------------------------

I returned the call which Sara had rec'd from Lee Lambert, League of Women Voters, in which she inquired about the status of her request for an extension of the public comment period. Prior to my call to her, I spoke with Frank Parson to clear with him the fact that I was going to let Ms. Lambert know that we had received her letter and were working on a response. Frank asked me to relay the following message: if the League can provide more specific rationale regarding impact or a compelling reason why their comments could not be submitted on a timely basis, we would consider that information in any accommodation decision. (Also, I now understand from Frank that FACTS IS going to present their comments today and only supplement their comments with additional materials by next week. When I spoke with Sara at 5:00, Jim Rauch was at the Public Info Center, making copies of the attachments to his comments.)

Ms. Lambert stated that she was speaking on behalf of "the group called FACTS" as well as for all citizens' rights.
She said that the League did not become aware of the
15.1 scheduled public meeting until approx. 10 Dec, and they
were unable to attend. Their newsletter had already gone
out, so there was insufficient time to relay info to their
membership, to perform necessary research, or to set up a
meeting of their own to discuss the proposed plan or the
15.2 League's position. She also expressed concern that FACTS
was "shut out of all negotiations".

She needs to know if she must submit her specific concerns in writing or if she could do so verbally; she is awaiting our further instruction on Wednesday morning. (I assume we will discuss at our 8:00 a.m. meeting???)

5.15 Responses to LWV/Lambert Comments

15.1 - The PP was issued on November 10, 1997 and USACE granted a 30-day extension to the comment period. An additional 11 days was added to this extension after several members of the public requested additional time for preparing their comments. With the extension, the comment period totaled 71 days. Other extensions were considered, however, USACE determined that additional extensions were not appropriate.

15.2 - When FUSRAP was transferred to USACE, Lieutenant Colonel Michael Conrad, Commander of the Buffalo District, met with all key stakeholders for the Tonawanda sites. Three representatives from F.A.C.T.S. were included in this meeting. Representatives of this group also submitted comments, both at the public meeting and in writing. Their concerns, as stated in these comments to USACE, have been considered in the decision regarding the remedy selection, and the responses are included in this Responsiveness Summary.

F.A.C.T.S.

(For A Clean Tonawanda Site)

"PUTTING THE PIECES TOGETHER"

Box 566
Kenmore, NY 14217-0566

Phone: (716) 876-9552
Fax: (716) 876-9552

COMMENTS ON "PROPOSED PLAN FOR THE ASHLAND 1 AND ASHLAND 2 SITES, TONAWANDA, NEW YORK, NOVEMBER 1997, FINAL, USACE/OR/21950-1029"

James M. Rauch

January 20, 1998

RECEIVED
JAN 2 0 1998
USACE Buffalo District
Tonawanda FUSRAP Office

Opening Comments

16.1 1) We believe the environmental review process for the Tonawanda Site is flawed and raises serious questions that need to be thoroughly and objectively addressed and resolved. See Environmental Review Section and remaining comments.

16.2 2) Why are the EPA and the U.S. Nuclear Regulatory Commission (NRC) not involved in the environmental review process? As far as we know, there has been no NRC involvement in the process. Other than as described in comment 37, we know of no involvement by EPA. We believe NRC oversight of this process is necessary. (See U.S. Nuclear Regulatory Commission Is the Authorized Regulator section and comments 14, 16, 18, 19, and 20)

16.3 3) We have made repeated requests of the U.S. Department of Energy (DOE) to explain the FUSRAP program. To date, we have not been informed of the legal authority pursuant to which FUSRAP was established. Was FUSRAP established by the Atomic Energy Commission (AEC) or by DOE? Was FUSRAP established by Act of Congress? If so, which Act? Please cite to specific section and/or subsection. Was FUSRAP established under authority granted by the Atomic Energy Act (AEA)? If so, please cite the specific section and/or subsection of the AEA. Was FUSRAP established under authority granted by the Uranium Mill Tailings Radiation Control Act (UMTRCA)? If so, please cite the specific section and/or subsection of UMTRCA. Was FUSRAP established under authority granted by any other statute, regulation or any other legal authority? If so, please cite such authority by title, section and/or subsection.

16.4 4) What statute(s) and/or regulations authorize the U.S. Army Corps of Engineers (USACE) to conduct cleanup activities, including but not limited to investigations, removals or remediations or other responses, involving the MED/AEC 11.e.(2) byproduct materials present at the FUSRAP Tonawanda Site? Please cite specific sections and/or subsections of applicable authority.

16.5 5) Former DOE Assistant Secretary Thomas Grumbly made a commitment to the community to provide a sitewide final cleanup plan by the end of 1996 for the entire Tonawanda Site. This was not done. This revised Proposed Plan released by USACE presents final remediation alternatives that address only the Ashland 1 property (now including Area D of the Seaway property) and Ashland 2 property. Why has a sitewide final cleanup plan not been presented? Please provide a thorough, objective explanation. (See comment 14)

16.6 6) The notice issuing this revised Proposed Plan for public comment (11-13-97 Buffalo News) refers to a DOE policy change ("Secretarial Policy on the National Environmental Policy Act, June 1994") and states that USACE will follow the same policy. USACE appears to share the DOE view that community-identified NEPA issues (see comment 21 and Administrative Record) can be avoided simply by issuing a non-promulgated policy statement. Was any rulemaking done by either agency to validate these changes? If so, please describe and provide documentation of same. Does USACE believe NEPA review is not applicable to final remediation decision-making at the Tonawanda Site? If so, please explain fully, citing specific statute(s) and/or regulations and section(s) thereof. (see Environmental Review Process section, comment 33).

16.7 7) a) This revised Proposed Plan presents limited (to Ashland 1 and 2) versions of the draft RI/FS-EIS's sitewide alternatives 2, 3 and 6, and a new alternative, 2A, that is not analyzed in the 1993 draft RI/FS-EIS. The rudimentary information and analysis given in the revised PP for these limited alternatives is insufficient to satisfy the public review requirements of NEPA and CERCLA (see comments 12, 14, 16 to 18, 21 to 32, and 36). b) The draft RI/FS-EIS itself is deficient in certain respects regarding NEPA and CERCLA requirements (see comments 12, 13, 15, 17, 21, 23, 27, 30 to 32, 37 and 38). c) The draft RI/FS-EIS is geared to an analysis of sitewide alternatives and lacks the breakdown of information and analysis (e.g. costs) necessary to compare the non-sitewide, limited alternatives of this PP to each other or to the sitewide alternatives in the meaningful way provided for by the NEPA and CERCLA public review processes (see comments 14, 16, 18, 26 and 31). d) The narrowed scope of the PP alternatives also raises issues of segmentation of the review process (see comments 14, 16, and 17). e) A supplement to the draft RI/FS-EIS to correct these obvious deficiencies must be prepared and subjected to public review.

16.8 8) Our review of the Administrative Record shows it to be incomplete. We request that all documents listed as references in the 1993 draft RI/BRA/FS/PP-EIS documents and those documents' references be made part of the Administrative Record, whether they are physically placed in the record or incorporated by reference. We also request that the documents described in the attached list of reference documents to these comments be incorporated into the Administrative Record. According to staff at the Tonawanda Public Information Center, DOE/USACE has no record of much of the correspondence on this list.

U.S. Nuclear Regulatory Commission Is the Authorized Regulator

16.9 9) We think the U.S. Nuclear Regulatory Commission (NRC) is the agency responsible for regulating the management and disposition of all the MED/AEC 11.e.(2) byproduct materials present at the Tonawanda Site properties. Title II of the Uranium Mill Tailings Radiation Control Act of 1978 (UMTRCA), which amends the Atomic Energy Act of 1954 (AEA), specifically directs the U.S. Nuclear Regulatory Commission (NRC) to control the management of any 11.e.(2) byproduct materials. This includes such materials located at inactive uranium mill tailings sites such as the Tonawanda Site.

16.10 10) To implement the requirements of UMTRCA, NRC modified its Title 10 Part 40 regulations "Domestic Licensing of Source Material", including sections 40.2a, 40.3, and 40.21. What persons are currently authorized to receive, possess, use, transfer, provide for long-term care, deliver, and/or dispose of the byproduct materials located at each of the five FUSRAP Tonawanda Site properties: Linde, Ashland 1, Ashland 2, Seaway, and the Town of Tonawanda Landfill? In each case, please identify the specific license granting such authority and the name and address of the authorized person.

16.11 11) Over the last 10 years the NRC has developed a program for remediation of problematic contaminated sites, the definition of problematic including sites with large volumes of contaminated soils. Known since 1991 as the Sites Decommissioning Management Plan (SDMP), this program oversees the cleanup of both licensed and unlicensed sites. The program is described in NRC report NUREG-1444 and several other reports including the April 1992 SDMP Action Plan (57 FR 13389). For a site to be listed in the program it must meet one or more of five qualifying criteria. Though all the Tonawanda Site properties <u>do</u> meet many of these qualifying criteria, none of the properties has been listed in the SDMP program. We believe this represents a significant oversight by NRC. Almost two years ago, we asked NRC to assume its statutory responsibilities at one of the Tonawanda Site properties, i.e. to regulate the release of radon gas from a controversial active gas extraction/cogenerator system being installed at the Niagara Landfill on the Seaway property (see references 56 to 66 and FOI list 1). We made this request after learning that New York State's failure to implement the necessary regulations and program on the state level, as specified by UMTRCA, had resulted in the State's loss of authority over 11.e.(2) byproduct materials no later than November 8, 1981 (see references 18 to 19, 59, and 70), which authority and jurisdiction then reverted to NRC. Over this same time period, we have notified NRC, by copy of correspondence to NYS and DOE, of problems with the interim actions at Linde (see comments 19, and 20).

16.12 12) We believe that the cleanup guidelines used by NRC in its SDMP program are applicable guidelines, under Sec. 84.a.(1) of UMTRCA, to remediation of the Tonawanda Site. The April 1992 SDMP Action Plan lists the cleanup criteria for SDMP sites; these criteria have been consistently applied to cleanup of listed SDMP sites. The action plan list includes the "Branch Technical Position (BTP) on Disposal or Onsite Storage of Thorium or Uranium Wastes from Past Operations"

(46 FR 52061), the Office of Nuclear Material Safety and Safeguards' Policy and Guidance Directive FC 83-23, and EPA's Interim National Primary Drinking Water Regulations (40 CFR Part 141). Since the Tonawanda Site properties meet many of of the SDMP's qualifying criteria, there is no reason that these cleanup guidelines should not be included in the environmental review. The SDMP guidelines are the best available guidelines for a site of this type, even if the site has not been listed in the program. In addition to these guidelines, Sec. 84.a(2) of UMTRCA requires that NRC management of all 11.e.(2) byproduct material at Title II uranium byproduct material sites such as Tonawanda conform to 40 CFR Part 192 sections 192.30 to 192.34, as well as the regulations prescribed therein. Also, the SWDA/RCRA requirements specified in Sec. 84.a.(3) of UMTRCA must be met.

16.13 13) With respect to 40 CFR 192 Sec. 192.33 "Corrective action programs," in my comments on the draft RI/FS-EIS (see comment 31, reference 3), I said that water from well B29W09D at Linde contained radium-226 in concentrations exceeding the EPA drinking water standard of 5 pCi/l (draft RI pp 4-216, 4-217, 7-18) and I called for further evaluation of groundwater impacts and the identification of potential remediation techniques. In response, DOE maintained that, since groundwater in the area is not currently used for drinking water, drinking water guidelines are not applicable. However, according to NYS DEC, "(a)ll fresh groundwater in the State is classified as GA, with an intended best usage as a source of drinking water ... regardless of its current use." (see pp 24 and 25 of enclosure to reference 4) Section 192.33 requires that a corrective action program "be put into operation as soon as is practicable, and in no event later than eighteen (18) months after a finding of exceedance." To our knowledge, no such action has been taken. Why not?

<u>Segmentation of Review Process</u>

16.14 14) a) This revised PP proposes a final remediation plan. In view of its location between the Ashland properties, we believe the exclusion of the Seaway property from review and remediation concurrently with the Ashland properties is a clear violation of the NEPA prohibition against segmentation of the review process: there are obvious cost economies of scale to be had in performing remediation of all three properties together; and groundwater impacts should be addressed in a sitewide manner (see comments 13 and 15). What is USACE's current plan for final remediation of this property? If there is none, why not? b) A provision of the August 6, 1996 agreement between Congressman LaFalce (and the CANiT politicians) and DOE, to which other stakeholders including F.A.C.T.S. were not party (see references 45 to 47, 15 to 17, 20, 21, and 77), is to leave the "access-restricted" wastes in Areas B and C of the Seaway property. Leaving 11.e.(2) wastes (25,900 cubic yards, by draft FS-EIS generic guidelines) in a biogas-generating municipal landfill is unacceptable according to current waste management practices (e.g. see section IV 6.d.(c) of DOE Order 5400.5). Is this USACE's intention? c) Via our FOIA requests, we have discovered what we believe is evidence of a possible indemnification arrangement between DOE and Browning-Ferris Industries, operator of the Niagara Landfill at the Seaway property. We are concerned that such an arrangement, if consummated, may be behind DOE's agreement with the CANiT politicians not to excavate Seaway Areas B and C. Information which may confirm this possibility is one of the matters currently the subject of F.A.C.T.S.' litigation (see FOI list 1b). What is USACE's knowledge of this matter, if any? This is a matter requiring investigation and resolution prior to the remediation decision.

16.15 15) The issue of groundwater impacts must be addressed on a sitewide basis rather than a property-specific basis. NEPA requires that cumulative impacts be addressed together; NEPA prohibits segmentation of the review process. The analyses used in all draft BRA exposure scenarios (p B-2), and in the "Radionuclide Cleanup Guideline Derivation for Ashland 1, Ashland 2, and Seaway, Tonawanda, New York, September 1997" (p 16 of reference 80) incorrectly ruled out groundwater as an exposure pathway - see comment 13 above. Also, in the "Derivation of Uranium Residual Radioactive Material Guideline for the Ashland 1 and 2 Sites, August 1988", the perched groundwater system was ruled out (p 5), even though this unit is capable of useable flow rates. Accordingly, these analyses should be revised. (See comments 7, 17)

16.16 16) We have criticized the decontamination of buildings at the Linde property as being wasteful, particularly in view of the radium cleanup criteria issue (see comment 19), compared to the less costly demolition of the buildings prescribed by the community-supported draft FS-EIS's Alternative 2 (all four buildings were to be demolished at a direct cost of approximately $1.5 million [lines 2a, 2b, and 2c on p G-29]). So far, approximately $8 million has been spent on building decontamination (see reference 42). We have asked USACE for an updated total of building decontamination costs. Please supply the evaluation referred to in response 8 of enclosure to reference 21. Since "too-high" cost has been frequently cited by DOE as a reason for not employing more stringent cleanup guidelines, we believe these excessive interim action costs are prejudicing the final sitewide remedy selection process, and therefore, represent segmentation of the review process (see comments 14, and 26).

16.17 17) The proposed action is the final remediation of Tonawanda Site properties identified as being contaminated with MED/AEC wastes. However, the full extent of MED/AEC contamination has not been determined and included in the review process. The NEPA/CERCLA process requires an objective assessment of the cumulative impacts of a proposed action. The draft RI states (p 7-38) that two vicinity properties, the Conrail property to the northeast of Linde and the Niagara Mohawk property adjacent to Seaway, are contaminated and will require designation into the Tonawanda RI/FS-EIS review process and that additional properties, R. P. Adams and the Town of Tonawanda landfill will require further investigation. The extent of major underground contamination at Linde associated with the injection wells has not been adequately addressed (see comment 13). The streambed of Twomile Creek, the G. K. Hambleton property and the Benson Development Co. property adjacent to Ashland 2 may also be contaminated. There may be others. The Town of Tonawanda landfill is said to contain over 15,000 cubic yards of contamination (EMAB, see reference 2) resulting from the deposition of sediments dredged from Twomile Creek. This property contains material with the highest average radium concentration (68 pCi/g) and total activity of any of the properties (EMAB). We have been told that the Town of Tonawanda landfill was designated into the remediation process in December 1992. But it was not included in the draft RI/BRA/FS analyses, nor were any of these other properties with the exception of the Niagara Mohawk property (pp 4-1, 4-2 of the draft FS). Have any of these properties or any other vicinity properties been designated for cleanup? Please supply information documenting why or why not in each case.

Volumes of Contaminated Soils/Sediments

18) This revised Proposed Plan's alternatives cover only the Ashland 1 property, including Seaway Area D, and Ashland 2 property. The revised PP does not give contaminated volume figures for any of the alternatives (see comment 7a). The contaminated volumes ("of soils") for Alternative 2 and Alternative 2A were given by USACE in a handout (see reference 78) at the December 17, 1997 public hearing only. The contaminated volume given in the handout for the limited version of the draft FS-EIS's Alternative 2 is 85,000 cubic yards. We question the validity of this volume. This volume is much less than half that
91.18 determined by the draft RI/FS-EIS (a $6 million dollar study) for these properties: 172,300 cubic yards. This is a discrepancy of more than 87,000 cubic yards. [See details in brackets below] We find this to be incredible. It suggests to us that assumption of the environmental review process by NRC may be necessary (see comment 9). A supplement to the draft FS is required. Does the revised PP volume include contaminated sediments? According to the draft FS, these total 10,150 cubic yards. Please provide a detailed explanation of the method(s), e.g. computer model(s), used to calculate the volumes for the draft FS and the revised PP, and fully describe all differences. The method(s) employed must be acceptable to NRC, with regard to 11.e.(2) material, and NYS/EPA, with regard to non-radiological MED/AEC contamination (chemical COCs).

[The description of the contaminated soil and sediment volumes in the draft FS (pp 4-4, 4-7, and 4-8) provides no property-specific breakdown (it was prepared assuming uniform sitewide cleanup): it lists 310,000 cubic yards (cy) of accessible soils, 31,300 cy of "access-restricted" soils and 10,150 cy of sediments; for a total of 352,300 cy. However, EMAB previously reported (reference 2) property-specific volumes for the draft FS's Alternative 2 (determined using the same draft FS Table 3-1 generic guidelines used in the draft FS: 5/15 pCi/g for Ra-226 and Th-230, and a Tonawanda site-specific guideline of 28.4 pCi/g for U-238). The EMAB volumes are 120,200 cy for Ashland 1, 52,100 cy for Ashland 2, and 117,000 cy for Seaway (with no breakdown by area, however, Areas A and D together contain 91,000 cy [NYSDEC]). The EMAB sitewide totals are consistent with the draft FS totals if the 15,200 cy EMAB lists for the Town of Tonawanda landfill are included in the draft FS total although the draft FS makes no such statement (see comment 7b). Therefore, not including Seaway area D, the draft FS Alternative 2 total for Ashland 1 and 2 is 172,300 cubic yards. Using the same generic guidelines as the draft FS-EIS, USACE now lists a contaminated soil volume of 85,000 cubic yards for Ashland 1 (including Seaway Area D) and Ashland 2.]

Interim Removal Actions

16.19 19) a) It is our understanding that interim actions must meet all applicable guidelines (see reference 71). We raised the issue of criteria applicable to the building decontamination interim actions at Linde in our December 20, 1996 comments (reference 68) on the November 1996 interim action "EE/CA for Building 30 at Praxair." Subsequently, we learned the surface decontamination criteria for radium were recommended by Oak Ridge National Laboratories (ORNL) for the decontamination of the Linde buildings based on findings contained in the May 1978 ORNL survey report for Linde (see first enclosure to reference 18). These radium criteria are fifty times more stringent that the uranium criteria selected by DOE, We asked both DOE and NYS Department of Labor to address this issue (see references 18 to 21). NYS DOL responded that they had no jurisdiction over the matter (see FOI list 2). DOE evaded the issue. Neither DOE nor USACE has issued a response to comments on this EE/CA. The work continues using the fiftyfold less stringent uranium criteria (see references 50, 51). Why?

b) The revised PP (p 1) states that there will be no further review of the buildings at Linde following completion of the interim actions because "remediation of the Linde buildings has been addressed separately using Engineering Evaluations/Cost Analysis (EE/CA) documentation and public reviews." This implies that these interim actions constitute final remediation. When recently confronted on this issue, USACE (Bechtel) responded that other information was available contradicting the findings of ORNL. We asked for that information; no such information has been provided. If any such information exists, we ask that it be provided. We have no reason to believe either the ORNL experts' findings or recommendation to be incorrect, and so, we must conclude that DOE/USACE are willfully failing to employ appropriate radium decontamination criteria necessary for unrestricted release of these buildings. We believe this will result in workers being exposed to higher doses than would be the case if NRC were fulfilling its regulatory responsibilities at the Tonawanda Site.

16.20 20) Since the mismanagement of R-10 residues at the Niagara Falls Storage Site (see pp 1 to 8 of reference 5), we have been concerned that soil cleanup will not be performed properly at the Tonawanda Site. Regarding the soil pile at Linde, we raised this issue in our comments on the January 1996 "EE/CA for Praxair Interim Actions" and subsequently we repeated our concerns (see references 66, 15, and 20). It is unclear to us, just how the removal of the pile to Building 30 and the segregation of contaminated material from "clean" material was done. Our understanding is that only contaminated materials went into the pile. What guidelines and process were used to separate "clean" material from the 3700 cubic yards of material reported as being shipped to Envirocare? Are the guidelines used as protective as the NRC's SDMP program guidelines? What has been done with the material not shipped? Please explain in detail. In addition, we wonder why NYSDEC, has continued to act as if it has regulatory authority over these 11.e.(2) wastes, after being informed by NRC that it lacked jurisdiction over these materials (see comment 9 and Administrative Record). We wonder why DOE and now USACE are willing to participate in this chicanery.

Long-term Protectiveness

21) None of the alternatives provides sufficient long-term protectiveness. From the outset of the review process, long-term health risks have been identified by the community as a primary issue. NEPA requires all relevant and cumulative impacts be objectively addressed. The 11.e.(2) materials are very long-lived radioactive wastes; they will remain hazardous for hundreds of thousands of years. The CERCLA-based 1000 year timeframe employed in the guideline derivation and risk analysis is far too short time period to fairly apprise the public of peak doses and long-term adverse health impacts resulting from ingrowth of radium from the guideline level of thorium proposed to be left behind at the properties. We think a minimum 10,000 year timeframe is appropriate, as is used for other long-lived radioactive wastes (see reference 79 and comment 43 of reference 3). We suspect the main reason DOE, and now USACE, seek to use only the CERCLA review process is to avoid this NEPA issue. (See comments 6, 25, and 26) We suggest that an objective study be done to estimate the sitewide, long-term (at least 10,000 years) cumulative morbidity and mortality costs associated with Alternative 1 using a limited resident farmer scenario (see comments 15 and 23).

22) The site-specific thorium guideline of 40 pCi/g (see comment 36) was chosen because it represents the greatest concentration of thorium that can be left behind that will not result in exceedance of EPA's 15 pCi/g subsurface radium guideline (40 CFR Part 192) for the next 1000 years (due to radium ingrowth from thorium [pp ES-3 to ES-5 of reference 80]). What is not said is the fact that ongoing radium ingrowth will result in a radium concentration peak of almost 40 pCi/g approximately 8000 years beyond the CERCLA timeframe modeled. Please provide peak doses and the associated risks resulting from radium ingrowth from the site-specific guideline levels of thorium and uranium for all proposed alternatives. The future date of occurrence of the dose peaks also should be presented (see comments 7a, 7b, 7e, 25, and 26).

Future Land Use

23) Cleanup guidelines should be adjusted to protect future site users. It is unlikely, but certainly not inconceivable, that a resident farmer use could occur on these properties at some time in the future. The land is certainly capable of supporting such use as evidenced by early town history. The Ashland 2 property is re-vegetating nicely and is increasingly attractive to recreationists and wildlife, including deer. We think it is very reasonable to expect that future land uses for these waterfront properties will include various residential occupancy styles, including single family, with or without basement, duplexes, condominiums, etc. Some of these residences are likely to have home vegetable gardens. Simply because the existing use is a less intensive use and the current Town Master Plan does not currently contemplate residential uses in certain areas is no reason to believe such use patterns will not change. Therefore, a resident scenario that includes limited food and water ingestion

pathways is a reasonable future use and environmental review should include such a use (see comment 21).

16.24 24) The revised PP's thorium guideline is not sufficiently protective of such expected future residential users. Under the modeled <u>urban</u> resident use scenario, which assumes no food or water pathways and no clean cover, the proposed site-specific 40 pCi/G Th-230 cleanup guideline (Approach 2) is estimated to result in a dose, not including radon inhalation (see comment 25), of 86 millirems/yr. This dose is roughly 9 times the NYSDEC TAGM - 4003 dose guideline of 10 millirems/yr, and certainly not an ALARA (as low as reasonably achievable) dose. With 8 inches of clean soil cover, the dose is reduced to an estimated 13 millirems/yr, still in excess of the TAGM; however, ensuring that the cover remains undisturbed requires institutional controls (deed restrictions). We have little confidence in the long-term effectiveness of such controls (for even hundreds of years, when the duration of the radioactive hazard is hundreds of thousands of years). (Also see comment 25)

<u>Radon Doses</u>

25) a) Radon doses attributable to the 11.e.(2) material should be calculated and included in the total doses reported to the public. The 40 pCi/g Th-230 cleanup level allows radon doses from the 11.e.(2) material that are too great. Inhalation of radon gas from uranium mill tailings is the major component of the total dose at sites such as the Tonawanda Site, yet it has been DOE policy, adopted now by USACE, not to include radon doses attributable to the tailings in determining compliance with the basic dose guideline. This policy does not meet the NEPA requirement that all relevant impacts be objectively reviewed. Instead, an exercise is done to demonstrate compliance with EPA's 4 pCi/l guideline for radon in indoor air. 16.25 According to the industrial worker exposure scenario used for the Ashland properties, an industrial worker exposed to EPA's guideline concentration will receive approximately 200 millirems/yr of dose from radon. At 1000 years, we believe a major portion of this dose will come from the 11.e.(2) waste material left behind following cleanup (to the 40 pCi/g Th-230 Approach 1 cleanup level). For the residential scenario, the radon dose will be approximately 500 to 800 millirems/yr, again with a major portion of the dosen coming from the 11.e.(2) material. For each of these scenarios, at the end of the 1000 year time period modeled, what are USACE's conservative estimates of the portion of these radon doses originating from the 11.e.(2) materials? In addition, without radon mitigation measures, the EPA guideline may be exceeded after 1000 years due to radium ingrowth from the 40 pCi/g residual thorium level. What are the peak indoor radon concentrations estimated to be under both Approach 1 and Approach 2 for the urban resident scenario? When will these peak concentrations occur?

b) We believe NRC's approach to this radon problem as embodied in the SDMP program's BTP guidelines to be more rational. The BTP presents two choices for managing uranium wastes such as those at the Tonawanda Site. Option 1 allows unrestricted use following cleanup by requiring that residual levels of Ra-226, Th-230, and U-238 (members of the natural uranium decay chain) be reduced to no more than 5 pCi/g.

Option 2 allows residual levels of these decay chain members up to 20 pCi/g (based on limiting radon exposure to approximately the EPA limit of 4 pCi/l) but requires four feet of clean cover soil. Option 2 is only applicable to properties zoned for industrial use. A covenant identifying the radioactive materials present and specifying that the land may not be used for residential building must run with the land. (See comment 24)

<u>Costs</u>

16.26 26) We are aware of no efforts on the part of DOE to identify potentially responsible parties at the Tonawanda Site (see comment 32). Since such an issue has been made of "too-high" cost by DOE/USACE with respect to thorough, sitewide cleanup, we believe identification of PRPs prior to any cleanup decision is necessary to avoid the public perception that cost was the overriding factor in the decision. To put the cleanup cost issue in perspective, we have often pointed out the cost of implementing sitewide Alternative 2 is roughly half the cost of a single space shuttle mission (see reference 16).

16.27 27) The revised PP provides no breakdown of cost components for the implementation of each alternative, as was done in the November 1993 draft RI/FS-EIS. The validity of the cost data presented in the draft FS-EIS were the subject of intense criticism by the community (e.g. see comments by George Melrose). The main components cited as being significantly inflated were unit transportation costs, unit disposal costs, management overhead, and unreasonably large contingency allowances. An objective, updated RI/FS-EIS supplement providing revised cost components should be prepared and subjected to public review. (See comment 7)

16.28 28) We believe the $270/cubic yard disposal cost given for the Nevada Test Site (p 3-13 of reference 54) is artificially inflated and does not reflect the actual cost of disposal. This same report gives a figure of $94/cy disposal cost for a hypothetical DOE disposal facility (p 4-3 to 4-7). We believe this figure contains components not applicable to NTS, an operating, federally-owned facility. We request a realistic evaluation of NTS disposal costs be performed by an independent agency such as GAO prior to the remedy decision. We expect actual disposal costs at NTS to be both significantly less than $94/cy and significantly less than Envirocare's current charge. (Also see comments 30 and 31).

16.29 29) The commercial disposal cost (for Envirocare, Clive, Utah) was given in the draft RI/FS-EIS as $216/cubic yard. Why should a private disposal firm which collects large profits, above and beyond actual disposal costs, be used for disposal when, after the operation closes down in a relatively short while, responsibility for the site will revert to the public sector anyway, either the state or federal government? It makes no sense to the taxpayer. What is Envirocare's current disposal charge?

<u>Offsite Storage Location</u>

30) For us, the selection of the most physically suitable long-term

16.30 storage site for the Tonawanda Site wastes is an essential part of the review process. We raised this issue often at meetings of CANiT and reiterated it in a letter to DOE's James Owendoff (see references 15 and 16). Not all disposal facilities licensed to accept 11.e.(2) material are equivalent in this respect. The best physical location will provide the longest duration of waste isolation and avoid most (if not all) costs of active maintenance (see pp 8, 9 of reference 5). We believe the playas of the Nevada Test Site to be at least equivalent to Envirocare's Clive, Utah location in these respects. Does USACE agree? If not, please explain why not. (Also see comment 28)

16.31 31) DOE has designated Tonawanda Site wastes as "non-defense" wastes which are not eligible for storage at NTS under DOE's current regime. This makes no sense to us or the National Academy of Science's National Research Council (see p 36 of reference 69), especially in view of the fact that the Linde uranium refinery operated under MED/AEC contracts to produce uranium destined for atomic bombs. What is USACE's opinion on this matter? What can be done about this situation?

Identification of Potentially Responsible Parties (PRPs)

16.32 32) It is a requirement of CERCLA that potentially responsible parties (PRPs) be identified and pursued for recovery of remediation costs. As far as we know, this has not been done for any of the Tonawanda Site properties. Congress pointedly reiterated this mandate in the Conference Report attached to the FY 1998 Energy and Water Development Appropriations Act, saying "the Corps of Engineers is expected to immediately pursue cost recovery from the responsible parties at FUSRAP sites either through a negotiated settlement or a court action." What are USACE's results in this regard? We expect this fundamental requirement will be met before any decision is made. Information provided under Freedom of Information (FOI) requests reveals the following:

With regard to Ashland 1, information we received from the General Services Administration via FOIA request (see FOI list 3) shows that the Ashland Oil Company did know of the MED/AEC contamination when they purchased the Haist property at GSA auction through quitclaim deed in 1960 (contrary to DOE's Authority Review document, reference 72, part of FOI list 1), and that before purchasing the property Ashland sought assurance that it would not be held liable for any subsequent decontamination of the property. We also note that according to various DOE documents (see references 52, 53) the wastes when deposited in the forties contained approximately 0.54% uranium. Possession of such materials containing 0.05% or more of uranium, by weight, required a license from AEC. We are awaiting receipt via FOIA to DOE Oak Ridge of the 1958 AEC radiological survey report which reportedly formed the basis for free release of the property (see FOI list 4). Presumably this report will help establish if there were licensable concentrations of uranium present at the time of the sale. If so, does AEC's failure to license the transfer of the MED/AEC wastes to Ashland Oil as required under the applicable 10 CFR Part 40 regulations establish some portion of federal liability for the cost of remediation of this property?

With regard to Ashland 2, Ashland Oil Co. transferred wastes from Ashland 1 to both Seaway and Ashland 2 between 1974 and 1982. New York State was the responsible regulator, federal licensing authority over these materials having been delegated by AEC to the state through the 10-15-62 State Agreement (see reference 70). The NYS Department of Labor reportedly established control over the Ashland MED/AEC wastes by letter dated 9-11-78 (see reference 74, part of FOI list 1). However, transfer of wastes from Ashland 1 to Ashland 2 continued into 1982, according to DOE (draft BRA p 1-10). Does New York's failure to exercise license control over the Ashland 1 materials, thereby allowing Ashland to transfer portions thereof to both the Seaway property and Ashland 2, establish some portion of state liability for the cost of remediation of these properties? We note that NYS regulatory authority over these materials apparently reverted to NRC no later than November 8, 1981 (see comment 9), possibly before the transfers to Ashland 2 and Seaway ceased.

With regard to Linde, we have requested via FOIA to DOE Oak Ridge the MED/AEC uranium production contracts with Linde (as they are identified on page 127 of reference 54) and documentation of the decontamination and decommissioning activities performed prior to release of the MED/AEC uranium refinery operations to Linde (see FOI list 5). As with Ashland 1, presumably this information (contract conditions governing wastes and radiological surveys done before AEC vacated the premises) will help establish the extent of federal liability for remediation at this property, if any. We note that documents uncovered in the course of a New York State Assembly investigation in 1981 seem to indicate federal government liability for radioactive effluent injected into onsite wells and released to surface waters and storm and sanitary sewers (see reference 55).

<u>Environmental Review Process</u>

33) In issuing the 1988 Notice of Intent to Prepare an Environmental Impact Statement to evaluate alternative remedial actions for the long-term management of Tonawanda Site wastes, DOE determined that "an EIS is the appropriate level of NEPA review necessary to adequately inform decision-makers and the public of reasonable alternatives for minimizing any adverse impacts of the proposed action" (p 1-5 of the draft RI). Public scoping identified long-term health impacts as a primary issue. DOE then prepared and released for public comment in 1993 an environmental review package called a Draft RI/BRA/FS/PP-EIS. In its comments, the community adamantly and overwhelmingly rejected the DOE-preferred Alternative 5, a common theme being this alternative was not sufficiently protective in the long-term (see comment 21).
16.33 Instead, the community supported Alternative 2, identified in the original Proposed Plan as "Complete Excavation with Offsite Disposal". DOE then "suspended" this integrated NEPA/CERCLA EIS environmental review process in April 1994, saying that NEPA review was not being terminated at the Tonawanda Site, the policy in future would be to "incorporate NEPA values into CERCLA documentation" (see references 5 to 17, 20, 21, 23, 24, 43 to 48). In practice, this has not happened (see comment 7). DOE has a record of blatantly ignoring NEPA

requirements at the Niagara Falls Storage Site (see pp 1 to 8 of reference 5); the resulting mess there is now USACE's problem. What will it take to ensure that the remediation of these sites is objectively addressed?

34) In announcing the "suspension" of the integrated NEPA/CERCLA EIS public review process in April 1994 and on many subsequent occasions, DOE henceforth committed to provide fully informed participation to all interested members of the public in an open decisionmaking process to select a sitewide remediation plan. However, DOE ceased public work plan meetings after the 2-28-95 meeting, and thereafter dealt almost exclusively with the CANiT politicians (see references 43, 44, 1, 5 to 17, 20, 21, and 22 to 36). A second self-serving DOE TAP grant was awarded to CANiT (see references 22 to 34). There were no public meetings from the time of the public meeting on 6-18-96 until the CANiT meeting on 7-1-97 (see references 37 to 42, 45 to 49 and
16.34 77). During this period of time, the current proposal was secretly negotiated with the CANiT politicians. Neither F.A.C.T.S. nor other interested members of the community had access to this decisionmaking process. During this period we filed a complaint against DOE in federal district court in an attempt to obtain information responsive to several of our FOIA requests (see reference FOI lists). With the exception of Praxair, representatives of the property-owner stakeholders have not participated at the public meetings (see comments 14 and 32). DOE's failure to adhere to its 1994 commitment has kept F.A.C.T.S. and the interested public at a substantial informational disadvantage. Because of this situation, we requested an indefinite extension of the comment period until this information gap and lag-time could be corrected (see reference 76). It is our understanding that a minimum 30 day extension of the comment period is provided for upon timely request. An eight day (from date of proper notice) extension only was granted.

35) The Administrative Record contains correspondence between DOE and EPA regarding the hazard ranking system (HRS) score of the Tonawanda Site which shows that based on that ranking the Tonawanda Site should
16.35 have been placed on the NPL. This was not done. Please explain why the 9-24-87 DOE draft Federal Facilities Agreement was not executed, why EPA did not assume co-lead agency status, and provide EPA's and DOE's documentation of the rationale for why the Tonawanda Site was not placed on the NPL. We note that the 1993 draft RI (p 7-34) reports evidence of offsite migration of contaminated sediments and surface water.

36) The revised Proposed Plan should contain text explaining that it is but one part of the total NEPA/CERCLA environmental review package on which USACE is seeking comments. This review package should
16.36 include the new document "Radionuclide Cleanup Guideline Derivation for Ashland 1, Ashland 2, and Seaway, Tonawanda, New York, September 1997" in addition to all the draft RI/BRA/FS-EIS documents. The information contained in the new "Radionuclide Cleanup Guideline Derivation for Ashland 1, Ashland 2, and Seaway, Tonawanda, New York, September 1997" is essential to an informed public review process, yet this document was not distributed to the public along with the revised Proposed Plan at the December 17, 1997 public hearing. Little, if

any, of this information was presented at the public hearing. This is a serious abuse of NEPA and CERCLA public review requirements. NEPA requires that all public comments previously made on the apparently unmodified draft RI/BRA/FS-EIS documents be thoroughly addressed in the final EIS, as well as all current comments on the total review package. NEPA sets specific requirements on the form and content of agency responses to public comments: the final review document must contain a response to comments section in which each comment must be individually identified and paired with a detailed response, unless there are a large number of essentially identical comments. Also, the title of the Proposed Plan misidentifies it as "Final". Under NEPA/CERCLA environmental review procedures, documents made available for public comment are identified as "draft" or "public draft". The "final" documents are issued only following the close of the public comment period. The "final" documents should reflect any and all revisions made as a result of the public comments.

Background Values

16.37 37) Representative area-wide background values for the radionuclides were determined by ORAU. These values are significantly lower than the values from Ashland 2 South that are being used in the calculation of contaminated volumes. We believe the Ashland 2 South values have been biased by their historic proximity to the disposal piles at Ashland 1 and should not be used in calculations to determine removal volumes. The ORAU values given in the draft RI are appropriate.

Source Terms

16.38 38) Please provide estimates of the current source terms for each Tonawanda Site property using all available soil and sediment data. Please provide estimates of the residual source terms for each property following cleanup to 1) the NRC SDMP guidelines, and 2) the 40 pCi/g Th-230 guideline, both approaches.

Miscellaneous Specific Comments

16.39 39) According to DOE, "(i)n general, it is FUSRAP's policy that ownership of 11e(2) byproducts [sic] material at FUSRAP sites remains with the property owner until custody has been transferred to the Department of Energy (DOE)." (see reference 75 and comment 29) We have requested via FOIA to DOE Oak Ridge the legal basis for this policy, both in general terms and in terms specific to the Tonawanda Site properties. This information request is currently being litigated in the U.S. District Court for the Western District of New York (see FOIA list 2). What is USACE's position on this issue? We note that, following enactment of UMTRCA, NRC granted a general license to receive title to 11.e.(2) byproduct material. Does this receipt of title to 11.e.(2) material satisfy the 10 CFR Part 40 section 40.3 licensing requirement to own such material, i.e. is there a distinction between title and ownership?

16.40 40) Regarding the August 1988 "Derivation of Uranium Residual Radioactive Material Guideline for the Ashland 1 and 2 Sites", please confirm that the site-specific guideline for uranium (to meet DOE's

100 millirem/yr basic dose guideline) of 60 pCi/g (28.4 pCi/g U-238) was determined from a resident farmer exposure scenario, and provide a complete description of the scenario's exposure parameters. The dose/source concentration ratio for the external exposure pathway is given as zero in Table 4 (p 9); is this only a typo? Please clarify exactly what "takes up residence in the immediate vicinity of the Ashland 1 and 2 sites" means (p 5). Does it mean within the decontaminated area or outside of it? We also note that Table 3-1 of the draft FS erroneously implies the U guideline is 60 pCi/g U-238.

41) The average radionuclide concentrations given in the draft RI for Ashland 1 (p 4-159) and Ashland 2 (p 4-190) are considerably higher than those given in USACE's the December 17, 1997 public hearing handout (reference 78). Please explain.

5.16 Responses to F.A.C.T.S. Comments

16.1 - USACE is addressing the Ashland sites pursuant to the Energy and Water Development and Appropriations Act of 1998, P.L. 105-62, and in compliance with CERCLA, as amended, and the NCP.

16.2 - USACE can not address the activities of other federal agencies prior to the enactment of the Energy and Water Development Appropriations Act of 1998, PL. 105-62, which transferred the responsibility for administration and execution of FUSRAP, including FUSRAP actions at the Ashland sites, to USACE.

16.3 - USACE is unaware of the specific legal basis for the DOE FUSRAP Program. However, the Energy and Water Development Appropriation Act of 1998, PL. 105-62, transferred the responsibility for and control over the administration and execution of FUSRAP to USACE. USACE is proceeding with the remediation of those sites pursuant to CERCLA (42 U.S.C. 9604 et seq.).

16.4 - The Energy and Water Development Appropriations Act of 1998, P.L. 105-62, transferred the responsibility for the administration and execution of FUSRAP from DOE to USACE. USACE is proceeding with the remediation of the Ashland sites in accordance with CERCLA (42 U.S.C. 9604 et seq.).

16.5 - Before proposing the plan to remediate the Ashland sites, USACE carefully considered the program management principles set forth in NCP 40 CFR 300.430. Based on those goals it was determined that it was appropriate to remediate the Ashland sites to achieve significant risk reduction quickly while the remainder of the Tonawanda sites are being addressed and to expedite the completion of the total cleanup. It was also determined that the cleanup of the Ashland sites will not be inconsistent with nor preclude implementation of the final remedies at the remaining Tonawanda sites. Pursuant to that determination, and consistent with the NCP, 40 CFR 300.430(f)(2), the decision was made to propose a plan to remediate Ashland at this time and prior to proposing remedies at other Tonawanda sites.

16.6 - In accordance with 32 CFR 651.8(a)(8), it is USACE policy that a feasibility study done in compliance with the NCP (40 CFR 300), provides substantive procedural standards to ensure full consideration of environmental issues and alternatives, and sufficient opportunity for the public to participate in the decision making process, making it unnecessary for a separate NEPA document to be generated.

16.7 - The revised PP for the Ashland sites is one component of the CERCLA documentation of the remediation of the Tonawanda Site as a whole. The document distributed for public comment represents the final version of the revised PP, based on the RI/FS published in 1993 and comments received on that document relevant to the Ashland sites, the guideline derivation document published in July 1997, and the USACE version (Alternative 2A) of the originally stated Alternative 2 in the 1993 PP. The USACE Alternative 2A is equivalent to the Alternative 2 developed by the DOE except that a site-specific guideline is used instead of the generic guidelines.

16.8 - Additional documents that should be considered for inclusion in the Administrative Record, identified and provided, have been placed in the record, as attachments to the comments received. All other appropriate documents have been included in the Administrative Record as well.

16.9 - NRC has stated that they do not have jurisdiction over wastes created by MED prior to November 1978. NRC's jurisdiction over byproduct materials began in 1978 and they do not consider it to be retroactive to the time frame when MED material was generated.

16.10 - Because NRC does not have jurisdiction over MED wastes created prior to November 1978, USACE is not required to obtain an NRC license for the materials at the Ashland sites.

16.11 - Because NRC does not have jurisdiction over MED wastes created prior to November 1978, the Sites Decommissioning Management Plan does not apply to the Ashland sites.

16.12 - Cleanup criteria for the Ashland sites were developed using the CERCLA process. The cleanup criteria must satisfy the CERCLA acceptable risk range as well as the ARARs. The Th-230 guideline development considered intended and reasonable future land use, the likely maximum exposed individuals, and the criteria included in the ARARs. The key ARARs included EPA 40 CFR 192 and NRC 10 CFR 20. The result of the guideline development effort was a cleanup criteria of 40 pCi/g Th-230.

The guideline derivation demonstrated that the conditions at the site, after removing soils exceeding the site-specific derived guideline of 40 pCi/g Th-230, will be protective of human health and the environment, meet the ARARs, and meet the acceptable CERCLA risk range established by the USEPA in the NCP. The analysis also demonstrated that at this cleanup criteria level, the estimated doses to receptors for the intended land uses (commercial/industrial) meet the objectives defined in the to be considered (TBC) guideline of 10 mrem/yr (NYSDEC TAGM 4003) for intended land use.

16.13 - These concerns will be addressed when action is proposed at those specific sites. The public will continue to be informed of schedules and actions at the other Tonawanda FUSRAP sites through the continued implementation of the Community Relations Plan.

16.14 - Proposing a plan for a separate operable unit of a site is not inconsistent with NEPA compliance. 32 CFR 651.8(a)(8) indicates that completion of a feasibility study prepared in accordance with 40 CFR Part 300 will effect compliance with NEPA by providing a substantive and procedural standard to ensure full consideration of environmental issues and alternatives, as well as full public participation. In this case, an appropriate feasibility study was completed and the process required by 40 CFR Part 300 for proposing a final decision at a portion of the studied site has been properly followed. Therefore, the decision to proceed at the Ashland sites is in compliance with NEPA.

16.15 - Proposing a plan for a separate operable unit of a site is not inconsistent with NEPA compliance. 32 CFR 651.8(a)(8) indicates that completion of a feasibility study prepared in accordance with 40 CFR Part 300 will effect compliance with NEPA by providing a substantive and procedural standard to ensure full consideration of environmental issues and alternatives, as well as full public participation. In this case, an appropriate feasibility study was completed and the process required by 40 CFR Part 300 for proposing a final decision at a portion of the studied site has been properly followed. Therefore, the decision to proceed at the Ashland sites is in compliance with NEPA.

In a March 27, 1998 letter to NYSDEC, USACE responded to NYSDEC questions about groundwater concentrations resulting from residual radioactive contamination at the Ashland sites (USACE 1998). The USACE response described the use of USEPA's VLEACH model to estimate the leaching of radionuclides to groundwater after the sites are remediated in accordance with the site-specific cleanup guideline of 40 piC/g Th-230 derived from the Ashland sites (DOE 1997).

The modeling used concentrations of total uranium, Ra-226 and Ra-228 and Th-230 estimated by DOE (DOE 1997) to remain on the Ashland properties after cleanup to site-specific guidelines and very conservative assumptions concerning the solubilities of the radiologically contaminated source material. The results of modeling showed that the resulting concentrations of the radionuclides in groundwater would be below federal drinking water standards that have been calculated to be protective of human health and the environment at levels less than 10^{-6} for increased cancer risk.

Based on the conclusions concerning geological conditions that indicate that contaminant leachate from the Ashland properties are not likely to reach groundwater (BNI 1993), and the prediction using the VLEACH model showing radionuclides at levels in groundwater below drinking water standards (USACE 1998), it was concluded that risks to groundwater from radiological contamination will be minimal after the cleanup at the Ashland properties to the site-specific guidelines.

16.16 - These concerns will be addressed when action is proposed at those specific sites. The public will continue to be informed of schedules and actions at the other Tonawanda FUSRAP sites through the continued implementation of the Community Relations Plan.

16.17 - These concerns will be addressed when action is proposed at those specific sites. The public will continue to be informed of schedules and actions at the other Tonawanda FUSRAP sites through the continued implementation of the Community Relations Plan.

16.18 - Documentation relating to calculations used in the cost evaluation of the investigated remedial alternatives (including volume estimates) have been placed in the Administrative Record and are available for public review. A major component of the cost analysis is the volume of the soils determined to require removal and disposal. The cost estimates used for the development of the revised PP used volumes calculated based on a model of the site contamination generated using existing soil contamination characterization results from all historical sampling conducted at the site. The calculations and results of the modeling have also been placed in the Administrative Record.

It should be noted, however, that the cleanup of the Ashland sites will not be driven by any previous or future volume estimates generated by modeling site conditions. The cleanup of these sites will be driven by the established cleanup criteria. The cost estimates and their corresponding volume estimates were generated and used in the CERCLA process to help evaluate proposed remedial alternatives. The volumes ultimately removed and actual remediation costs will vary as the soils found to require removal during the remediation process are excavated and shipped off-site for disposal.

16.19 - These concerns will be addressed when action is proposed at those specific sites. The public will continue to be informed of schedules and actions at the other Tonawanda FUSRAP sites through the continued implementation of the Community Relations Plan.

16.20 - These concerns will be addressed when action is proposed at those specific sites. The public will continue to be informed of schedules and actions at the other Tonawanda FUSRAP sites through the continued implementation of the Community Relations Plan.

16.21 - Because the primary contaminant is Th-230 (with a 77,000 yr half-life), radon concentration will peak well into the future. However, the radon and radium concentrations estimated for the site after remediation are within acceptable limits over the required 1,000 year review period (40 CFR 192), the maximum time period to be modeled according to regulations, and are not anticipated to be of concern given the site history, configuration, and intended land use. For dose modeling, no credit is taken for backfill materials.

16.22 - Cleanup criteria for the Ashland sites were developed using the CERCLA process. The cleanup criteria must satisfy the CERCLA acceptable risk range as well as the ARARs. The Th-230 guideline development considered intended and reasonable future land use, the likely maximum exposed individuals, and the criteria included in the ARARs. The key ARARs included EPA 40 CFR 192 and NRC 10 CFR 20. The result of the guideline development effort was a cleanup criteria of 40 pCi/g Th-230.

The guideline derivation demonstrated that the conditions at the site, after removing soils exceeding the site-specific derived guideline of 40 pCi/g Th-230, will be protective of human health and the environment, meet the ARARs, and meet the acceptable CERCLA risk range established by the USEPA in the NCP. The analysis also demonstrated that at this cleanup criteria level, the estimated doses to receptors for the intended land uses (commercial/industrial) meet the objectives defined in the to be considered (TBC) guideline of 10 mrem/yr (NYSDEC TAGM 4003) for intended land use.

16.23 - A uranium guideline of 60 pCi/g total U was previously developed for all of the Tonawanda sites in 1988 by ANL for the DOE. For the Ashland sites, this guideline is superceded by the 40 pCi/g Th-230 guideline. The Th-230 guideline was developed specifically for the Ashland sites taking into account the intended land uses and the effects of all the radionuclides at their relative distribution at the Th-230 guideline value. At this value, the U-238 concentration remaining at the site is expected to be well below the previously derived guideline. The Th-230 guideline was developed using conservative exposure parameters and assumptions, and used site specific data.

16.24 - Dose considerations from DOE, NRC, and NYSDEC were considered in the evaluation of possible Th-230 concentration guidelines. By removing soils exceeding the site-specific derived guideline of 40 pCi/g Th-230, doses to future industrial workers are estimated to fall below the lowest value while also meeting criteria for indoor radon concentrations, total radium concentrations, and lifetime risk. The dose estimate for a hypothetical non-farming resident at the Ashland sites was calculated in the referenced guideline derivation document as well. This estimate concluded that the resulting dose estimate is approximately 20 mrem/yr, which is less than the recently promulgated criteria of 25 mrem/yr, and much less than the value of 86 mrem/yr as stated.

16.25 - Dose considerations from DOE, NRC, and NYSDEC were considered in the evaluation of possible Th-230 concentration guidelines. By removing soils exceeding the site-specific derived guideline of 40 pCi/g Th-230, doses to future industrial workers are estimated to fall below the lowest value while also meeting criteria for indoor radon concentrations, total radium concentrations, and lifetime risk. The dose estimate for a hypothetical non-farming resident at the Ashland sites was calculated in the referenced guideline derivation document as well. This estimate concluded that the resulting dose estimate is approximately 20 mrem/yr, which is less than the recently promulgated criteria of 25 mrem/yr.

16.26 - USACE has begun to research issues regarding PRPs and will pursue all appropriate means to seek reimbursement from responsible parties on behalf of the Federal Government. However, at this time, no decisions have been made regarding specific parties to pursue nor have offers of indemnification been made by USACE to resolve any liabilities that the Federal Government may have.

16.27 - Documentation relating to calculations used in the cost evaluation of the investigated remedial alternatives (including volume estimates) have been placed in the Administrative Record and are available for public review. A major component of the cost analysis is the volume of the soils determined to require removal and disposal. The cost estimates used for the development of the revised PP used volumes calculated based on a model of the site contamination generated using existing soil contamination characterization results from all historical sampling conducted at the site. The calculations and results of the modeling have also been placed in the Administrative Record.

It should be noted, however, that the cleanup of the Ashland sites will not be driven by any previous or future volume estimates generated by modeling site conditions. The cleanup of these sites will be driven by the established cleanup criteria. The cost estimates and their corresponding volume estimates were generated and used in the CERCLA process to help evaluate proposed remedial alternatives. The volumes ultimately removed and actual remediation costs will vary as the soils found to require removal during the remediation process are excavated and shipped off-site for disposal.

16.28 - Disposal options for excavated soil are evaluated in the site's detailed cost estimate. These cost estimates are available and have been entered in the administrative record. CERCLA provides that cost is a criteria for evaluation of remedial alternatives, but that it may only be used to compare those remedial alternatives which are protective of human health and the environment and which will comply with ARARs. Among the alternatives considered, the selected remedy is the lowest cost which is both adequately protective and complies with ARARs. Appropriate disposal facilities were evaluated under DOE and are being evaluated by USACE in an effort to reduce cost without compromising the final remedy. The selection of the ultimate disposal site will be addressed as part of the Remedial Action phase of the cleanup using the standard government procurement procedure after completion of the remedial design and prior to commencement of the remedial action.

To assure that estimates do not drastically underestimate actual costs, it is assumed that soils exceeding the cleanup guideline will be excavated and shipped to an off-site disposal facility in the western portion of the United States. The cost of disposal per cubic yard is a negotiated cost and is not intentionally inflated or misrepresented in cost estimates. The ultimate goal of each cost estimate is to allow USACE to accurately project funding requirements for activities such as the remediation of the Ashland sites. It is not beneficial to underestimate or overestimate potential disposal costs.

16.29 - The selection of the ultimate disposal site will be addressed as part of the Remedial Action phase of the cleanup using the standard government procurement procedure after completion of the remedial design and prior to commencement of the remedial action.

16.30 - USACE will review the contractor's transportation and disposal plan to ensure that it complies with all applicable or relevant and appropriate laws, regulations and executive directives, and is protective of human health and the environment. The selection of the ultimate disposal site will be addressed as part of the Remedial Action phase of the cleanup using the standard government procurement procedure after completion of the remedial design and prior to commencement of the remedial action.

16.31 - A concern was raised over the differences in radionuclide concentrations presented in the RI report and subsequent presentations. The averages shown on RI page 4-159 are based upon the "short list" of data shown in the associated tables (4-24 and 4-42). When these short list data locations are plotted on the site drawings, they include only those borings located in the more highly impacted portions of the sites.

The averages used in subsequent presentations are based upon the full data set for each of the sites (found in Tables A-10 & A-15 and A-12 & A-17). These full data sets contain approximately 1.5 times the data that is in the short lists. Since the full data sets include the lower readings from the "non-impacted" portions of the sites, the averages are lower.

16.32 - USACE has begun to research issues regarding PRPs and will pursue all appropriate means to seek reimbursement from responsible parties on behalf of the Federal Government. However, at this time, no decisions have been made regarding specific parties to pursue nor have offers of indemnification been made by USACE to resolve any liabilities that the Federal Government may have.

16.33 - USACE is addressing all FUSRAP sites, including the Ashland sites, pursuant to the authority of and in compliance with the CERCLA (42 U.S.C. Section 9601 et seq.) and the NCP (40 CFR Part 300). Additionally, in accordance with 32 CFR 651.8, USACE has and will integrate appropriate NEPA procedures into the process required by CERCLA. The CERCLA process is deemed to satisfy the requirements of NEPA.

16.34 - When FUSRAP was transferred to USACE, Lieutenant Colonel Michael Conrad, Commander of the Buffalo District, met with all key stakeholders for the Tonawanda sites. Three representatives from F.A.C.T.S. were included in this meeting. Representatives of this group also submitted comments, both at the public meeting and in writing. Their concerns, as stated in these comments to USACE, have been considered in the decision regarding the remedy selection, and the responses are included in this Responsiveness Summary.

The PP was issued on November 10, 1997 and USACE granted a 30-day extension to the comment period. An additional 11 days was added to this extension after several members of the public requested additional time for preparing their comments. With the extension, the comment period totaled 71 days. Other extensions were considered, however, USACE determined that additional extensions were not appropriate.

16.35 - A Federal Facility Agreement is only required pursuant to Section 120(e) of CERCLA, as amended (42 U.S.C. 9620(e)) when a facility is placed on the list.

16.36 - The revised PP for the Ashland sites is one component of the CERCLA documentation of the remediation of the Tonawanda Site as a whole. The document distributed for public comment represents the final version of the revised PP, based on the RI/FS published in 1993 and comments received on that document relevant to the Ashland sites, the guideline derivation document published in July 1997, and the USACE version (Alternative 2A) of the originally stated Alternative 2 in the 1993 PP. The USACE Alternative 2A is equivalent to the Alternative 2 developed by the DOE except that a site-specific guideline is used instead of the generic guidelines.

16.37 - Site data were used in dose and risk calculations to calculate the Th-230 guideline value for Alternative 2A. This data included radiological data collected during the RI activities and stored in the site database. Other studies have been performed (specifically referencing the ORAU study) that could be used in dose and risk estimates. This data and the appropriate quality assurance and quality control information is not, however, maintained in the site database. Considering that the site database already contains data from hundreds of samples, it was not considered appropriate or necessary to incorporate the ORAU (or other) uncontrolled data.

16.38 - Estimates of the radionuclide concentrations were made for the Ashland Sites using all available Ashland and Seaway data. The first estimate was the average concentrations for the site in the current state before any removal actions are initiated. The average concentrations (95% UCL of Mean), including background, for Ra-226, Th-230, and U-238 were 8.59 pCi/g, 111 pCi/g, 27.2 pCi/g, respectively. After removing soils with Th-230 > 40 pCi/g, the average concentrations (95% UCL of Mean), including background, of the remaining soils were estimated for Ra-226, Th-230, and U-238 to be 1.22 pCi/g, 12.4 pCi/g, and 6.26 pCi/g, respectively. The DOE had considered another approach for remediation that would have resulted in a 2-meter thick soil layer with a uniform soil concentration of 40 pCi/g Th-230. Under this approach, the average concentrations of the remaining soils were estimated for Ra-226, Th-230, and U-238 to be 2.7 pCi/g, 40 pCi/g, and 8.8 pCi/g, respectively. This approach is not being considered by USACE.

16.39 - USACE cannot respond to statements concerning DOE's policies or DOE's response to Freedom of Information Act requests.

16.40 – A uranium guideline of 60 pCi/g total U was previously developed for all of the Tonawanda sites in 1988 by ANL for the DOE. For the Ashland sites, this guideline is superceded by the 40 pCi/g Th-230 guideline. The Th-230 guideline was developed specifically for the Ashland sites taking into account the intended land uses and the effects of all the radionuclides at their relative distribution at the Th-230 guideline value. At this value, the U-238 concentration remaining at the site is expected to be well below the previously derived guideline. The Th-230 guideline was developed using conservative exposure parameters and assumptions, and used site specific data.

16.41 – A concern was raised over the apparent change in average concentrations of soils to be remediated at the Ashland sites between the RI report and subsequent presentations. The averages shown on RI page 4-159 are based upon the "short list" of data shown in the associated tables (4-24 and 4-42). When these short list data locations are plotted on the site drawings, they include only those borings located in the more highly impacted portions of the sites. The averages used in subsequent presentations are based upon the full data set for each of the sites (found in Tables A-10 & A-15 and A-12 & A-17). These full data sets contain approximately 1.5 times the data that is in the short lists. Since the full data sets include the lower readings from the "non-impacted" portions of the sites, the averages are lower.

Snyder, Sarah

From: NANCY J STICHT [Nancy.J.Sticht@LRB01.usace.army.mil]
Sent: Wednesday, January 21, 1998 1:14 PM
To: slsnyder@bechtel.com
Subject: League of Women Voters

———————— Forwarded ————————
From: MICHELLE F BARCZAK
Date: 1/21/98 11:39AM
To: NANCY J STICHT
To: DAVID J CONBOY
To: TIMOTHY E BYRNES
Subject: League of Women Voters

17.1 I spoke to Lee Lambert of LWV after our meeting this morning. After explaining that I was following up on Nancy's call, I told her that the Commander did not believe that it was necessary to extend the comment period but that he would extend the same courtesy to her group that had been exteded to FACTS. Specifically, I said that the District had agreed to accept a supplementation of FACTS' submittal up until early next week. She indicated that next week would be impossible for her group do to logisitically. I then suggested that she put together, in writing, a brief summary of her group's specific problems regarding their ability to provide comments and that the LTC may find it appropriate to consider accepting comments provided by their group beyond the extended time provided to FACTS. However, I was very careful not to promise any additional time. I also tried to make the point that while everyone's comments are important to us, it is important that we move on with the process.

17.2 Ms. Lambert also asked whether all of the public's (FACTS') questions had been answered because she felt that comments could not be provided if they did not have all of the information that they asked for. I told her that we had or shortly would be providing all available answers and documents to FACTS.

Michelle

5.17 Responses to LWV/Lambert Comments

17.1 & 17.2 - The PP was issued on November 10, 1997 and USACE granted a 30-day extension to the comment period. An additional 11 days was added to this extension after several members of the public requested additional time for preparing their comments. With the extension, the comment period totaled 71 days. Other extensions were considered, however, USACE determined that additional extensions were not appropriate.

40-8681

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

June 1, 1998

International Uranium (USA) Corporation
ATTN: Ms. Michelle Rehmann
Independence Plaza, Suite 950
1050 Seventeenth Street
Denver, Colorado 80265

SUBJECT: ACKNOWLEDGMENT OF MAY 8, 1998, REQUEST FOR LICENSING ACTION

Dear Ms. Rehmann:

The U.S. Nuclear Regulatory Commission has completed the initial processing, which is an administrative review, of International Uranium (USA) Corporation's (IUSA's) application dated May 8, 1998, for an amendment to Source Material License SUA-1358. By this submittal, IUSA requested NRC approval to receive and process material from the Ashland 2 Formerly Utilized Sites Remedial Action Program (FUSRAP) site in Tonawanda, New York, at IUSA's White Mesa uranium mill.

During its review, the NRC staff identified some omissions or deficiencies, which are discussed in the enclosure. However, IUSA's submittal is considered acceptable for the purpose of conducting a detailed technical review to evaluate further the proposed licensing action.

In order to support a timely review schedule, please provide additional information to address the deficiencies identified in the enclosure within 30 days from the date of this letter. In accordance with 10 CFR 2.108(a), failure to respond to this request for additional information may be grounds for denial of the application.

While awaiting the submission of the identified information, the NRC staff will proceed with the detailed technical review of IUSA's amendment application. Please note that the staff's review may identify a need for additional information or analyses for completing the requested licensing action. If a need for further information is identified, the NRC staff will notify IUSA in writing.

NL17 //

NRC FILE CENTER COPY

9806080244 980601
PDR ADOCK 04008681
C PDR

If you have any questions concerning this letter or the enclosure, please contact Mr. James Park, the NRC Project Manager for the White Mesa site, at (301) 415-6699.

Sincerely,

[D. Gillen for]

Joseph J. Holonich, Chief
Uranium Recovery Branch
Division of Waste Management
Office of Nuclear Material Safety
and Safeguards

Docket No. 40-8681
License No. SUA-1358

Enclosure: As stated

cc: W. Sinclair, UT

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If you have any questions concerning this letter or the enclosure, please contact Mr. James Park, the NRC Project Manager for the White Mesa site, at (301) 415-6699.

Sincerely,

Joseph J. Holonich, Chief
Uranium Recovery Branch
Division of Waste Management
Office of Nuclear Material Safety
and Safeguards

Docket No. 40-8681
License No. SUA-1358

Enclosure: As stated

cc: W. Sinclair, UT

REQUEST FOR ADDITIONAL INFORMATION
Request to Process Ashland 2 FUSRAP Material at IUSA's White Mesa Uranium Mill

International Uranium (USA) Corporation (IUSA) should provide the requested information to address the following NRC staff-identified deficiencies in IUSA's amendment request, submitted by letter dated May 8, 1998:

1. Insufficient information and data were provided to adequately characterize material at the Ashland 2 site.

   BACKGROUND:

   Information and characterization data provided by IUSA dealt predominantly with material at the FUSRAP Ashland 1 site, which was the original location for the disposal of Manhattan Engineering District (MED)-related ore processing residues. Subsequently, an unknown quantity of these MED-related residues and associated contaminated soils were relocated to the Ashland 2 property. While characterization data concerning the Ashland 1 material provide some indication of the potential radiological and chemical constituents present at the Ashland 2 site, information and data specific to the Ashland 2 site also should be provided.

   Therefore, IUSA should provide data and supporting information specifically addressing the radiological and chemical composition of materials at the Ashland 2 site.

2. Information and data were not provided to assess the potential impacts of the nearby Ashland Oil landfill on the Ashland 2 property.

   BACKGROUND:

   From 1957 until 1982, Ashland Oil operated an industrial landfill on a portion of the Ashland 2 property. This landfill was used for the disposal of general refuse, and chemical and industrial byproducts. An unknown quantity of MED-related ore processing residues and contaminated soils from the Ashland 1 site were relocated to the Ashland 2 site, and disposed in an adjoining area to the east of this landfill.

   It is not clear from IUSA's submittal what impacts this landfill may have or has had on the Ashland 2 site, and more specifically, on material from this site that may be sent to the White Mesa mill for processing. Therefore, IUSA should provide the following information so that the NRC staff can assess these potential impacts:

   - Maps indicating the locations of materials to be excavated in anticipation of being transported to the White Mesa mill and the spatial/areal relationship of these materials to the former Ashland Oil landfill.

- The results of (1) chemical analyses conducted on water collected from the Rattlesnake Creek tributaries separating the landfill from the rest of the Ashland 2 property, and (2) soil sampling analyses conducted adjacent to these tributaries and across from the landfill.

3. Information and analyses were not provided to support an environmental analysis of the potential impacts associated with the excavation of material from the Ashland 2 site.

   BACKGROUND:

   In accordance with the National Environmental Protection Act of 1969, as amended, NRC is required to assess the potential environmental impacts associated with its licensing actions. In accordance with 40 CFR 1508.7, such assessments are required to include the cumulative impacts on the environment, when added to other foreseeable past, present, or future actions, regardless of the Federal or non-Federal agency undertaking such other actions.

   Potentially significant impacts may be associated with the U.S. Army Cc.,js of Engineers' (USACE's) excavation of material from the Ashland 2 property for transport offsite. Information in the application indicates that the Ashland 2 site contains a variety of wildlife habitats, including wetlands that are hydrologically connected to the Rattlesnake and Twomile Creeks and the Niagara River.

   IUSA should provide an environmental report addressing the information identified in 10 CFR 51.45, focusing on the potential environmental impacts associated with the excavation of the Ashland 2 material. Alternatively, if an environmental analysis has been performed already by the U.S. Department of Energy (DOE) or the USACE, IUSA should provide a full description of the analyses conducted and the conclusions reached by the DOE or the USACE.

4. It is not clear what analyses will be conducted to ensure that materials containing listed hazardous wastes are not received and processed at the White Mesa mill.

   BACKGROUND:

   Under NRC's alternate feed guidance issued on September 22, 1995, licensees will not be approved to receive and process materials that are or contain hazardous wastes listed under 40 CFR 261.30-33 (or comparable Resource Conservation and Recovery Act-authorized State regulations). Although, at present, there is no indication of listed hazardous wastes at the Ashland 2 site, it is stated In IUSA's application that the USACE contractor, ICF Kaiser, will conduct additional testing of excavated materials prior to their shipment to ensure that such wastes are not present.

   IUSA should provide a copy of the sampling and analysis plan developed by ICF Kaiser for this confirmatory sampling program. In addition, IUSA should discuss any additional analyses it will conduct and the record keeping procedures it will implement to ensure that materials containing listed hazardous wastes are not received and processed at the White Mesa mill.

CATEGORY 1

REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

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FACIL:40-8681 International Uranium USA Corp., 04008681
AUTH.NAME AUTHOR AFFILIATION
REHMANN,M.R.
RECIP.NAME RECIPIENT AFFILIATION
HOLONICH,J.J. High-Level Waste & Uranium Recovery Projects Branch (NMS

SUBJECT: Submits response to NRC 980601 RAI re amend request to proceees alternate feed at White Mesa U Mill.

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INTERNATIONAL URANIUM (USA) CORPORATION

Independence Plaza, Suite 950 • 1050 Seventeenth Street • Denver, CO 80265 • 303 628 7798 (main) • 303 389 4125 (fax)

June 3, 1998

Via Facsimile and Overnight Mail

40-8681

Mr. Joseph J. Holonich, Branch Chief
High Level Waste and Uranium Recovery
Projects Branch
Division of Waste Management
Office of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
2 White Flint North, Mail Stop T-7J9
11545 Rockville Pike
Rockville, MD 20852

Re: Amendment Request to Process an Alternate Feed at White Mesa Uranium Mill
Source Material License SUA-1358
Response to NRC Request for Additional Information dated June 1, 1998

Dear Mr. Holonich:

Thank you for your letter of June 1, 1998, in which the U.S. Nuclear Regulatory Commission advised International Uranium (USA) Corporation ("IUSA") of completion of the NRC's initial processing, and administrative review of IUSA's application dated May 8, 1998. In that application, IUSA requested an amendment to Source Material License SUA-1358 to authorize receipt and processing of material from the Ashland 2 Formerly Utilized Sites Remedial Action Program ("FUSRAP") site in Tonawanda, New York, at IUSA's White Mesa uranium mill.

As was stated in the May 8 application transmittal letter, expedited review by the NRC of this application is essential to meeting the FUSRAP objectives and contractor's schedule for the site; therefore, we appreciate NRC's prompt transmittal, together with your administrative review letter, of the NRC Request for Additional Information regarding this amendment application. It is our hope that this prompt response to the NRC's Request for Additional Information will further enhance completion of NRC's review and approval of the Ashland 2 amendment request.

RESPONSES TO REQUEST FOR ADDITIONAL INFORMATION

The following discussion responds to the four items listed in the NRC Request for Additional Information, which was transmitted to IUSA with the June 1, 1998 acknowledgement of May 8, 1998 by NRC.

NL05

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NRC Comment

1. Insufficient information and data were provided to adequately characterize material at the Ashland 2 site.

In this comment, the NRC notes that the information and characterization data provided by IUSA appeared to deal predominantly with material at the FUSRAP Ashland 1 site, which was the original location for the disposal of Manhattan Engineering District (MED)-related ore processing residues. While observing that the data concerning the Ashland 1 material provide some indication of the potential radiological and chemical constituents present at the Ashland 2 site, the NRC requests that IUSA provide data and supporting information specifically addressing the radiological and chemical composition of materials at the Ashland 2 site.

IUSA Response

IUSA requests that the NRC please refer to the Record of Decision for the Ashland 1 (Including Seaway Area D) and Ashland 2 Sites ("ROD"), which IUSA transmitted to the NRC on May 29, 1998, and to the enclosed Sampling and Analysis Plan ("SAP") for the FUSRAP Ashland 2 Remedial Action (May 29, 1998). The ROD describes the areas and degree of contamination at Ashland 2, and states that there was no evidence of hazardous waste contamination at the site where radioactive wastes were found. In addition to the general characterization information contained in the ROD, the Field Sampling Plan ("FSP") portion of the SAP contains a summary of the sampling results from the Remedial Investigation ("RI") conducted at the Ashland 2 site.

The summary of the RI investigation data is contained in Subsection 1.2.3 of the FSP, which also states that "the RI focused on radioactive contaminants; metals related to ore processing activities; and chemicals whose presence could classify the site wastes as RCRA-hazardous, or be a potential safety concern if workers involved in site remediation were exposed to them". The sampling results from the RI are summarized in Tables 1-1 and 1-2 of the FSP, in Section 1.2.3.

For purposes of characterizing the presence and concentrations of natural uranium at Ashland 2, the RI assumed that it would not be necessary to measure uranium-235 and uranium-234 levels, because the ore processing conducted at Linde did not affect the isotopic ratios of the natural uranium isotopes. Therefore, as stated in the FSP, it was assumed that 47.3 percent of the radioactivity of natural uranium comes from uranium-238; 2.2 percent from uranium-235; and 50.5 percent from uranium-234. Thus, citing the RI, the FSP indicates that uranium-234 and uranium-235 activities in soil samples can be calculated from measured uranium-238 activities. For example, Figure 1-5 of the FSP shows nine samples of material that would have to be excavated (i.e., the corresponding thorium-230 content exceeds the site-specific cleanup level of 40 pCi/g) with uranium-238 activity in the range of 100-200 pCi/g. Given that the uranium-238 activity represents just under half of the total activity for natural uranium, these values imply a natural uranium activity, for these samples, of approximately 200-400 pCi/g. This range of activity levels corresponds with an average uranium content in excess of 0.05 percent (with 582 pCi/g equal to approximately 0.1 percent uranium, see 40CFR Parts 302 and 355, Administrative

Reporting Exemptions for Certain Radionuclide Releases: Final Rule, March 19, 1998, Technical Background Document, October 1997, 102RQ-RN-2-2-3, U.S. EPA).

The RI data also show samples with greater activity levels due to uranium-238, as well as some with lower activity levels than the 100-200 pCi/g range; however, those materials with lower activity levels, which contribute to the averages listed at the end of Table 1-1 of the FSP would not contribute to the average uranium content of the material to be excavated and sent for processing at the White Mesa mill. That average uranium content, although not reasonably predictable with current data, is expected to be higher than the average in Table 1-1, because in accordance with the Excavation and Restoration Plan and the Site Operations Plan (ICF Kaiser for USACE, May 22, 1998) (copy enclosed) only materials containing thorium-230 activity in excess of the 40 pCi/g guideline are to be excavated. All materials with lower levels (and correspondingly lower levels of uranium) will be left at Ashland 2.

NRC Comment

2. Information and data were not provided to assess the potential impacts of the nearby Ashland Oil landfill on the Ashland 2 property.

The NRC points out that from 1957 until 1982, Ashland Oil operated an industrial landfill on a portion of the Ashland 2 property. The NRC further states that it is not clear from IUSA's submittal what impacts this landfill may have or has had on the Ashland 2 site, or on the material that may be removed from Ashland 2 and sent to the White Mesa mill for processing. The NRC requests maps clarifying the locations of materials to be excavated for transport to the mill, and the relationship of the areas to be excavated relative to the former Ashland Oil landfill.

IUSA Response

The enclosed map provided to IUSA by ICF Kaiser, U.S. Army Corps of Engineers Ashland 1, Ashland 2, and Seaway Existing Conditions Plan, Drawing No. 66723-RD1, shows the area where the radioactively-contaminated soils and processing byproducts are to be removed, as well as the location of the previous industrial waste disposal area. As the map shows, and as ICF Kaiser confirms, the area where the radioactive soil was disposed at Ashland 2, and which is the area to be excavated, is separated from the industrial landfill by a creek. In addition, ICF Kaiser reports that the area in which the byproducts were placed is clearly definable from the ground and maps, and no excavation is currently anticipated to take place at the industrial landfill. In any event, such excavation would not be included in the current removal action.

NRC Comment

3. Information and analyses were not provided to support an environmental analysis of the potential impacts associated with the excavation of the material from the Ashland 2 site.

The NRC explains that in accordance with the National Environmental Protection Act of 1969, as amended, NRC is required to assess the potential environmental impacts associated with its licensing actions. For purposes of the Ashland 2 remediation, the NRC notes that potentially significant impacts may be associated with the U.S. Army Corps of Engineers' ("USACE's") excavation of material from the Ashland 2 property for transport offsite, particularly with regard to wildlife habitats and wetland areas. The NRC requests that IUSA either (1)provide an environmental report addressing the information identified in 10 CFR 51.45; or (2)alternatively, if an environmental analysis has been performed by either the U.S. Department of Energy ("DOE") or the USACE, IUSA should provide a full description of the analyses conducted and the conclusions reached by the DOE or the USACE.

IUSA Response

IUSA requests that NRC please review the ROD discussion of the environmental impact of the removal action. In addition, IUSA provides the following description of the environmental analyses conducted and the conclusions reached by the DOE and the USACE concerning the selection of the remediation option for Ashland 2.

Under its authority to conduct the Formerly Utilized Sites Remedial Action Program ("FUSRAP"), the DOE conducted a Remedial Investigation ("RI"), Baseline Risk Assessment ("BRA"), and Feasibility Study ("FS") of the Tonawanda Site. All of these investigations conformed with the CERCLA process for collecting sufficient data in a remedial investigation to assess risks to both human health and ecological receptors, with the results being used to select remedial actions in the FS. As is consistent with CERCLA process, as in the NEPA process, community involvement was a key component in remedy selection; in fact, it drove the selected remedy of off-site transport of the materials which were found to pose a risk to ecological receptors.

In November 1993, DOE issued a Proposed Plan ("PP") for cleanup of the Tonawanda Site. Numerous concerns and comments were raised by the community and their representatives regarding the preferred alternative identified in the November 1993 PP and the proposed onsite disposal of remedial action waste.

DOE listened to these concerns, and derived a site-specific cleanup guideline for the site based on values important to the community and in compliance with CERCLA, as amended, and the NCP. In September 1997, DOE prepared a revised PP for the Ashland sites. On October 13, 1997, the Energy and Water Development Appropriations Act was signed into law, transferring responsibility for the administration and execution of FUSRAP from DOE to the USACE. As a result of this transfer, the revised PP was not issued by DOE.

On November 10, 1997, after reviewing the history of the Ashland sites and potential remedial alternatives, USACE issued the revised PP developed by DOE for cleanup of the Ashland sites. The selected remedy for the Ashland sites, based on the studies and community input defined above, is referred to as Alternative 2A in the PP issued on November 10, 1997. Soils exceeding the site-specific derived guideline of 40 pCi/g thorium-230 will be excavated and shipped offsite, to an appropriately licensed or permitted facility, and the site restored with backfill, loam, and seed.

USACE determined that the selected remedy is protective of human health and the environment, complies with Federal and State requirements that are legally applicable or relevant and appropriate to materials which are the subject of this response action, and is cost-effective. None of the practicable remedial alternatives identified for the Ashland sites provided for onsite treatment for the materials to be removed. Section 8.2 of the ROD details the advantages and disadvantages of each of the alternatives, based on CERCLA criteria, as they were evaluated in the FS.

In summary, as stated in the ROD, the intent of the selected remedial alternative, which is a removal action, will result in the site having contaminated soil and residual processing materials removed, and then clean fill being returned and the natural, pre-existing drainage pattern restored. The soils will be revegetated to match the existing vegetation on site. There will be no impact on wetlands, and the site will be improved environmentally when the radioactive soils are removed and clean soil emplaced. There is no requirement for an EIS, because other ecological assessments had been performed. One such ecological assessment, which meets Federal guidelines, was the Ecological Risk Assessment for the Tonawanda Baseline Risk Assessment. The Ecological Risk Assessment conformed with the U.S. Environmental Protection Agency's general procedures for ecological assessments under CERCLA (USEPA, 1989), included characterization of habitats and biota, screening of chemicals of concern ("COCs"), and assessment of potential impacts to biota, based on measured environmental concentrations of the constituent and toxicological effects reported in literature. The ROD, in Section 6.3, cited the results of the Ecological Risk Assessment as a basis for concluding that that remediation would reduce potential risk to Ashland 2 wildlife and natural habitats.

NRC Comment

4. It is not clear what analyses will be conducted to ensure that materials containing listed hazardous wastes are not received and processed at the White Mesa mill.

The NRC references NRC's alternate feed guidance issued on September 22, 1995, which requires that license applications will not be approved to receive and process materials that are or contain hazardous wastes listed under 40CFR 261.30-33 (or comparable Resource Conservation and Recovery Act-authorized State regulations). Although, as NRC points out, there is at present no indication of listed hazardous wastes at the Ashland 2 site, the NRC requests that IUSA provide a copy of the sampling and analysis plan developed by ICF Kaiser for the confirmatory sampling plan referenced in IUSA's application; and, that IUSA discuss any additional analyses it will conduct and the record keeping procedures it will implement to ensure that materials containing listed hazardous wastes are not received and processed at the White Mesa Mill.

IUSA Response

As stated above, a copy of the Sampling and Analysis Plan ("SAP"), which includes a Field Sampling Plan ("FSP") and a Quality Assurance Project Plan ("QAPjP"), is enclosed for NRC's review. ICF Kaiser will take additional field samples to confirm the absence of hazardous wastes as listed in RCRA. Also, all soil being shipped to IUC will be tested and manifested in accordance with the SAP, to confirm the absence of hazardous wastes in the soil. The duplicative check will ensure that no hazardous materials are transported in the materials excavated and shipped to the White Mesa Mill. IUSA has reviewed the SAP, and considers it acceptable for purposes of ensuring that sufficient data are obtained and that quality control and quality assurance measures will be in place to ensure that no materials containing hazardous wastes are transported to the White Mesa mill. As the SAP is satisfactory to IUSA, IUSA would not propose that additional independent sampling or analyses be performed. IUSA will require that confirmatory sampling results be included in the material transfer packages, which IUSA will require be provided to IUSA in advance of shipments being received at White Mesa Mill.

SUMMARY AND CONCLUSION

Again, IUSA appreciates NRC's timely response to the Ashland 2 amendment request. We sincerely hope that the information provided above is sufficient to allow the NRC to conclude this review. Should your staff have any questions regarding this information, I can be reached at 303.389.4131.

Sincerely yours,

Michelle R. Rehmann
Environmental Manager

MRR/mrr
cc Ron E. Berg
William N. Deal
David C. Frydenlund
Earl E. Hoellen
Harold R. Roberts
James Park, U.S. NRC (with enclosures)
Bruce Howard, ICF Kaiser
William J. Sinclair, State of Utah

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PARK,J. Division of Waste Management (NMSS 940403)
RECIP.NAME RECIPIENT AFFILIATION
FRIDLEY,S. Information & Records Management Branch (Post 890827)

SUBJECT: Requests that attached attached repts prepared by ICF Kaiser for remedial action at FUSRAP Ashland 2 site near Tonawanda, NY,be docketed.

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June 24, 1998

NOTE TO: Susan Fridley, IRMB/IRM

FROM: Jim Park, URB/DWM/NMSS *Jim Park*

SUBJECT: REQUEST TO DOCKET REPORTS CONCERNING ASHLAND 2 SITE (DOCKET NO. 40-8681)

Please docket the enclosed three reports prepared by ICF Kaiser for remedial action at the FUSRAP Ashland 2 site near Tonawanda, New York. These reports were submitted by International Uranium (USA) Corporation (IUSA) by transmittal letter, dated June 3, 1998, in support of IUSA's responses to the NRC staff's June 1, 1998, request for additional information on IUSA's proposal to receive and process material from the Ashland 2 FUSRAP Site. Previously, the transmittal letter was sent for docketing by note dated June 9, 1998.

Thank you for your assistance. If you have any questions, I can be reached at 415-6699.

Enclosures: As stated (3)

9806290108 980624
PDR ADOCK 04008681
B PDR

SITE OPERATIONS PLAN

FUSRAP ASHLAND 2 REMEDIAL ACTION
TONAWANDA, NEW YORK

MAY 22, 1998
CONTRACT NO. DACA31-95-D-0083, TERC,
TASK ORDER NO. 23

ICF KAISER

Worldwide Excellence in Meeting Client Needs

U.S. ARMY CORPS OF ENGINEERS
BUFFALO DISTRICT OFFICE

FORMERLY UTILIZED SITES REMEDIAL ACTION PROGRAM

9806290122 980624
PDR ADOCK 04008681
B PDR

PART VI (ATTACHMENT A)
CONTRACTOR SUBMITTAL REQUIREMENTS SUMMARY

SUBMITTAL SCHEDULE
S ~~Prior to Shipment~~
B Prior to Balance of Payment
A Per S/C Schedule
M Prior to Mobilization
W Prior to Commencing Work
Y Prior to Progress Payment for Each Specific Task
Z As Required

SUBMITTAL TYPE REQUIRED
O Original
P Print/photocopy
T Transparency
M Microfilm
PH Photograph
FD Floppy Disk
S Sample

DISTRIBUTION DESIGNATION
CA Contract Administrator

NOTICES

1. *To each item submitted, attach a copy of this form and circle the title of the item being submitted.*
2. *Failure to submit required submittals as delineated on this form may result in withholding of payment in accordance with provisions of the contract.*
3. *The Contract Administrator is responsible for distributing submittals to the requesting Department (e.g., Construction). The Department is responsible for further distributions (e.g., Site Superintendent).*

Item No./ Submittal Titles	Clause, Specification, or Scope of Work Paragraph	Contractor send Submittal to	Submittal Codes	
			Schedule	(No.) and Type
1.1 Analytical results and the disposition method for the water collected from the rail car loading area	Scope of Work (SOW), Sec., 3.4.2	CA	Z	O
1.2 In-situ volume of soil to be excavated from each site	SOW, Sec., 3.5.3	CA	20 working days prior to excavation	O
1.3 Pre-excavation lines and grades for the contaminated areas at each site	SOW, Sec., 3.6.1	CA	20 working days prior to excavation	O
1.4 Lessons learned during Ashland 2 excavation	SOW, Sec., 3.6.10	CA	15 working days after completing the remediation	O
1.5 Inform USACE about the remediated areas	SOW, Sec., 3.7.2	CA	Following the remediation	O
1.6 Analytical results of the samples collected from the remediated excavation areas	SOW, Sec., 3.7.2	CA	5 working days after completing the remediation	O
1.7 Information required by the CERCLA process to document closure of the Tonawanda Site	SOW, Sec., 3.7.4	CA	30 working Days after completing remediation	O
1.8 Name and location of borrow source for the general fill material	SOW, Sec., 3.8.3	CA	10 working days prior to use	O
1.9 Test results for the general fill material	SOW, Sec., 3.8.4	CA	10 working days prior to use	O
1.10 As-built drawings for the backfilled areas	SOW, Sec., 3.8.8	CA	15 working days after completing site restoration	O
1.11 Name and other information related to the licensed/permitted disposal facility	SOW, Sec., 3.9.1	CA	30 working days prior to waste transportation	O
1.12 Report of weekly radiological surveys performed on the haul routes and the rail car loading area	SOW, Sec., 3.9.3	CA	3 working days after performing the survey	O

PART VI (ATTACHMENT A)
CONTRACTOR SUBMITTAL REQUIREMENTS SUMMARY

SUBMITTAL SCHEDULE
S Prior to Shipment
B Prior to Balance of Payment
A Per S/C Schedule
M Prior to Mobilization
W Prior to Commencing Work
Y Prior to Progress Payment for Each Specific Task
Z As Required

SUBMITTAL TYPE REQUIRED
O Original
P Print/photocopy
T Transparency
M Microfilm
PH Photograph
FD Floppy Disk
S Sample

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Item No./ Submittal Titles	Clause, Specification, or Scope of Work Paragraph	Contractor send Submittal to	Submittal Codes	
			Schedule	(No.) and Type
1.13 Copy of the waste profile sheets and other shipping documents	SOW, Sec., 3.9.9	CA	2 working days prior to waste transportation	O
1.14 Certficate of Disposal	SOW, Sec., 3.9.10	CA	B	O
1.15 Repair/restoration work proposal	SOW, Sec., 3.11	CA	Z	O
1.16 Design Package Specifications	SOW, Sec., 3.12.1	CA	30 working days prior to Mobilization	O
1.17 Site Operations Plan	SOW, Sec., 3.12.2	CA	15 working days prior to Mobilization	O
1.18 Excavation and Restoration Plan	SOW, Sec., 3.12.3	CA	20 working days Prior to Excavation	O
1.19 Waste Management, Transportation, and Disposal Plan	SOW, Sec., 3.12.4	CA	20 working days prior to Excavation	O
1.20 Sampling and Analysis Plan	SOW, Sec., 3.12.5	CA	20 working days prior to Excavation	O
1.21 Regulatory Compliance Plan	SOW, Sec., 3.12.6	CA	20 working Days prior to Excavation	O
1.22 Safety and Health Plan	SOW, Sec., 3.12.7	CA	21 working days prior to Consummation of Delivery Order	O
1.23 Construction Quality Control Plan	SOW, Sec., 3.12.8	CA	15 working Days prior to Excavation	O
1.24 Project Records	SOW, Sec., 5.1	CA	B	O
1.25 Final Status Survey Report	SOW, Sec., 5.2	CA	B	O

ICF Kaiser Engineers, Inc. TERC Contract No. DACA 31-95-D-0083	Project Number 66723	Project Name Ashland 2 FUSRAP	Task Order No. 23	Date: 02/24/98 Page 2 of 2

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LIST OF ACRONYMS

ALARA .... As Low As Reasonably Achievable
ARARs .... Applicable or Relevant and Appropriate Requirements
COR .... Contracting Officer's Representative
FUSRAP.......... Formerly Utilized Sites Remedial Action Program
ICF Kaiser .... ICF Kaiser Engineers, Inc.
SHSO.............. Site Health and Safety Officer
Site OPs.......... Site Operations Plan
USACE............ U. S. Army Corps of Engineers

1.0 INTRODUCTION

The U.S. Army Corps of Engineers (USACE) Buffalo District has been designated to remediate the radiologically-contaminated sites located in the town of Tonawanda, New York. This effort is part of the USACE's Formerly Utilized Sites Remedial Action Program (FUSRAP), which was established to identify, investigate, and clean up or control sites previously used by the Atomic Energy Commission (AEC) and its predecessor, the Manhattan Engineer District (MED).

ICF Kaiser Engineers, Inc. (ICF Kaiser), under Total Environmental Restoration Contract (TERC) No. DACA 31-95-D-0083, Task Order No. 23, has been designated the Remedial Action Contractor for the Ashland 2 Site. The primary objective of the Ashland 2 Site remediation effort is the timely and effective cleanup of the Site in accordance with Alternative 2A of U.S. Army Corps of Engineers Proposed Plan for the Ashland 1 and Ashland 2 Sites. This alternative provides for the complete excavation and off-site disposal of materials using a site-specific guideline of 40 pCi/g Th-230. This alternative meets the commitments made to community representatives and is believed to provide the best balance among the considered alternatives with respect to the evaluation criteria, will protect human health and the environment, and will comply with ARARs while providing for the release of the property for future use as defined in the 1992 Town of Tonawanda Waterfront Development Master Plan.

The remediation effort will be conducted in such a manner to provide a level of protection to the public and remediation workers consistent with applicable radiation exposure guidelines and with the objective of achieving ALARA exposure levels.

1.1 PURPOSE

This Site Operations Plan describes the project organization, key personnel and lower tier subcontractors that will implement the remedial action; premobilization activities; pre-remediation construction activities; remediation operations; and schedule. Associated plans and design specifications supporting the Site Operation Plan are listed in Table 1-1. All of these Plans are stand-alone documents. The Site Operations Plan and associated plans are considered "living documents" and may be modified, with the approval of the USACE to accommodate conditions encountered during implementation of the remedial action.

1.2 BACKGROUND

From 1942 to 1946, portions of a site in the Town of Tonawanda, New York were used for separation of uranium ores. These processing activities, conducted under a MED contract, resulted in elevated levels of radionuclides in portions of the property and buildings. Subsequent disposal and relocation of processing wastes resulted in elevated levels of radionuclides at three nearby properties: the Ashland 1 property, the Seaway property, and the Ashland 2 property. Together these four properties are referred to as the Tonawanda Site. Figure 1-1 is a location map of the Site.

MED leased a 4 hectare (10-acre) tract named Ashland 1, to serve as a disposal site for wastes from the uranium ore separation process. Wastes were deposited at Ashland 1 from 1944 to 1946 and consisted primarily of low-grade uranium ore tailings. Records indicate that approximately 7,300 metric tons (8,000 tons) of residues were spread over roughly two-thirds of the property. In 1960, the property was transferred to Ashland Oil and has been used as part of this company's oil refinery activities since that time.

In 1974, Ashland Oil constructed a bermed area for two petroleum product storage tanks and a drainage ditch on the Ashland 1 property. Approximately 4,600 m^3 (6,000 yds^3) of soil, containing radioactive residues and commingled MED-related inorganic constituents, were removed during construction activities. The majority of the excavated soil was transported to Ashland 2 and an adjacent tract for disposal.

A portion of the Ashland 2 property was used by Ashland Oil as a landfill for disposal of general plant refuse and industrial and chemical by-products. The radioactive residues and commingled inorganic constituents removed from Ashland 1 were deposited in an area of Ashland 2 adjoining the Ashland Oil landfill area. The industrial landfill portion of Ashland 2 was closed and covered with clay soil

Table 1-1

Ashland 2 Site Remedial Action
Associated Plans and Design Packages
Supporting the Site Operations Plan

Design Package Specifications and Drawings

Excavation, Backfill, and Restoration Plan

Waste Management, Transportation, and Disposal Plan

Sampling and Analysis Plan

Regulatory Compliance Plan

Health and Safety and Emergency Response Plan(s)

Construction Quality Control Plan

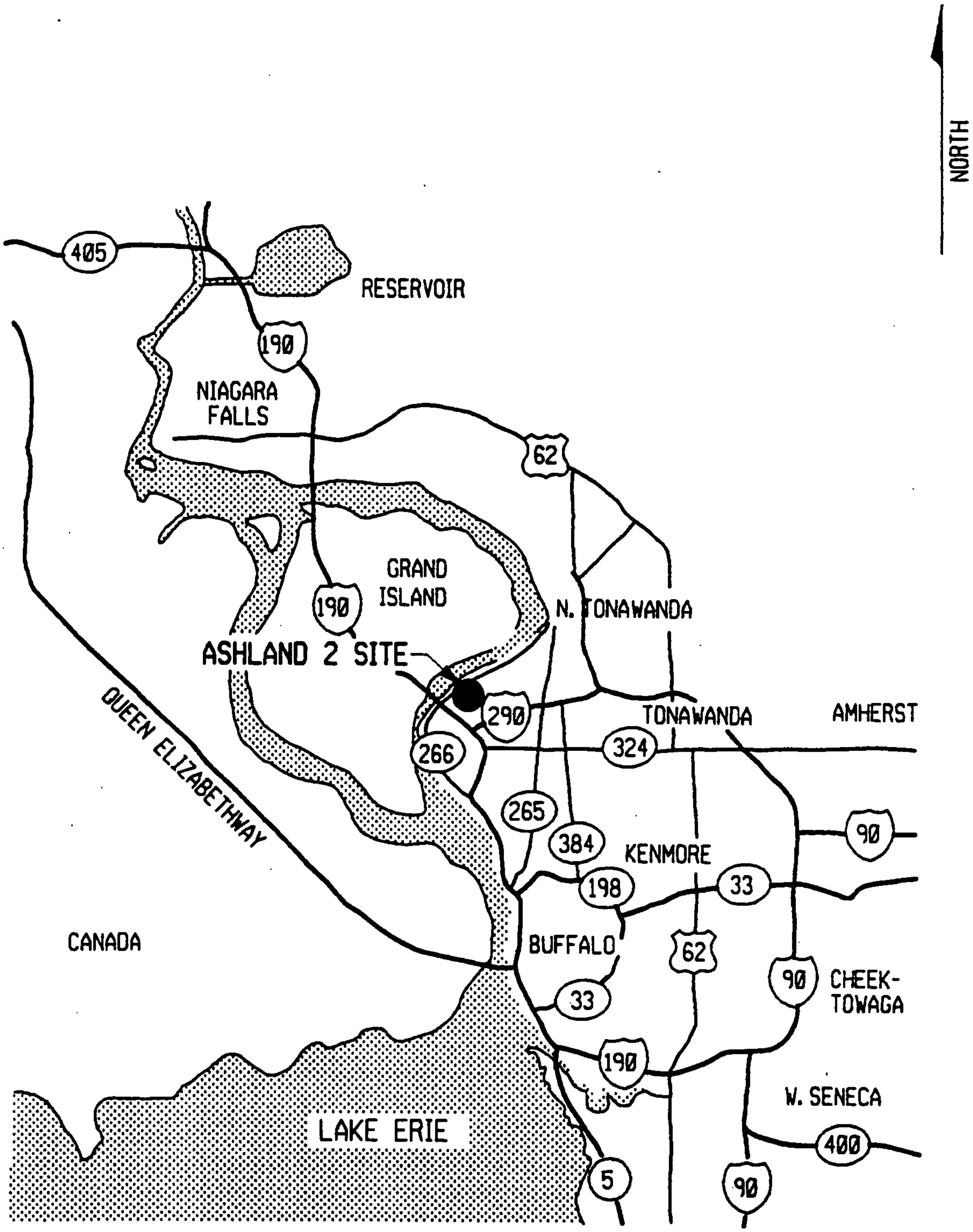


FIGURE 1-1

FUSRAP ASHLAND 2 REMEDIAL ACTION TONAWANDA, NEW YORK	LOCATION MAP
ICF KAISER ENGINEERS PITTSBURGH, PA	DATE: 4/15/98 DR.: D.M. SCALE: NOT TO SCALE FILE NAME: 20155007

in 1982 by Ashland Oil. Currently, the Ashland 2 property is vacant and is covered by a vegetative growth (e.g., grass, bushes, and weeds); no commercial operations are currently being conducted.

Historical investigations of Ashland 2 discussed in the Remedial Investigation indicate two sources of elevated levels of radionuclides: surface and subsurface soils. The primary radionuclides in the soils are U-238, Ra-226, Th-230, and their respective decay products, and the associated MED-related chemical constituents (e.g., copper, lead, vanadium). These materials are the principal Constituents of Concern (COCs) for Ashland 2.

Congress authorized the United States Department of Energy (DOE) to remediate these areas with elevated levels of radionuclides. DOE began conducting this evaluation under FUSRAP. A Proposed Remediation Plan for the site was issued in November 1993 for public comment which described the DOE's preferred alternative for cleaning up elevated levels of radionuclides. Numerous concerns and comments were raised by the community and their representatives regarding the preferred alternative and the on-site disposal of remedial action waste.

A revised Proposed Plan for the Ashland 2 properties was prepared by the DOE in September 1997. On October 13, 1997, the Energy and Water Development Appropriations Act, 1998 was signed into law as Public Law 105-62. Pursuant to this law, the FUSRAP was transferred from the DOE to USACE. As a result of this transfer the DOE did not issue the revised Proposed Plan and the responsibility for this project was transferred to USACE.

2.0 PROJECT ORGANIZATION, KEY PERSONNEL, AND LOWER TIER SUBCONTRACTORS

The project will be managed using an organizational approach which designates a Project Manager and a dedicated Construction Manager supported by a nucleus of engineering personnel and key subcontractors. In order to ensure that the project meets the Quality Assurance requirements established by TERC, the Ashland 2 project will be under the direction of the ICF Kaiser TERC Program Manager.

The goals of the proposed Project Team are to provide responsible and responsive technical management, effective cost and schedule control, highly qualified technical personnel, effective communication with USACE, and assurance that quality and safety standards are met for this remediation effort. To meet these goals, the project organization proposes the following features:

- Direct reporting and technical supervision among the various components, with clearly defined project control responsibilities and authorities;
- Experienced and qualified key technical personnel assigned to major Work Breakdown Elements, for each task;
- Direct interaction of project technical personnel with USACE and frequent project review meetings; and
- Independent quality assurance and safety functions interacting directly with USACE and monitoring the activities and outputs of project organizational elements.

Members of the Project Team are accustomed to working within a multi-disciplinary framework utilizing the resources of ICF Kaiser. As a result, potential interfacing problems and conflicts are minimized and are readily and quickly resolved, should they occur. Other plans for ensuring the successful interface of various organizational elements are: close coordination in planning stages; firm definition of work and assignment of responsibilities/authorities through discrete work packages; and regular communications among program personnel. Interactions among the technical work elements will take place continuously. Successful interactions depend on development of detailed plans, execution of the work according to plan, and early warning and immediate control when plans are disrupted.

2.1 ICF KAISER TOTAL ENVIRONMENTAL RESTORATION CONTRACT (TERC)

The Project Management Team for the FUSRAP Ashland 2 Site Remedial Action consists of two cohesive and interacting management units. The first management unit consists of the TERC Program Management Team. The personnel and their responsibilities are discussed here. The second management team consists of the specific Ashland 2 Project Team. The personnel and their responsibilities are discussed in Section 2.2.

The TERC Program Manager, Mr. Bruce Howard, has complete management authority and responsibility for all work performed under TERC. The TERC Program Manager directs the program management organization as a central resource for management, continuity and control of all TERC program activities. The centralized program management is organized to facilitate communication with and reporting to USACE and to expedite and support project execution.

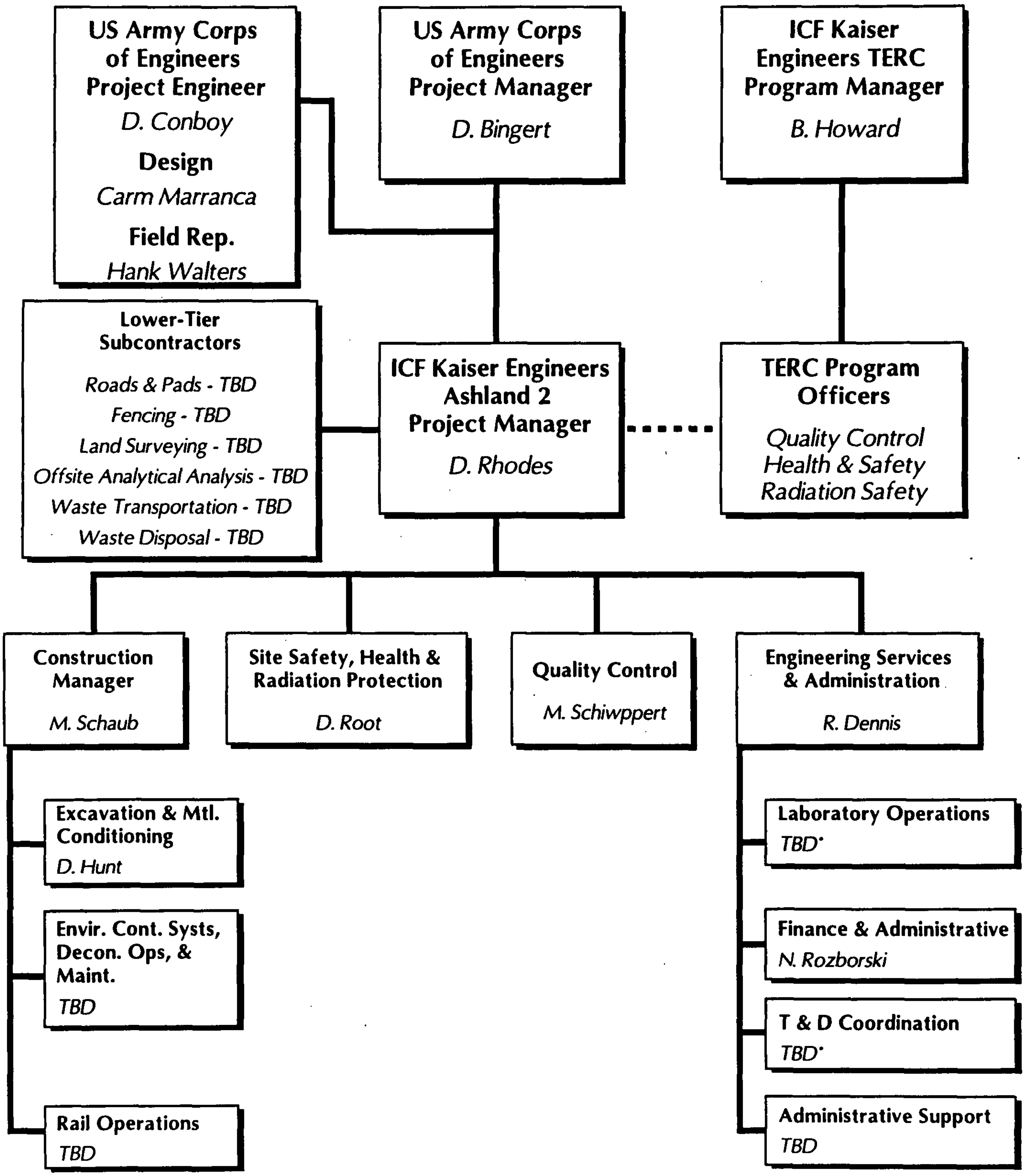
Mr. Howard will be assisted by the TERC Program Quality Control Manager, Health and Safety Officer, Radiation Safety Officer, and the Remedial Manager. These personnel will report directly to the Program Manager, and will have a direct line of communication with the Ashland 2 Project Manager and their counterparts on the Project Team.

2.2 ASHLAND 2 PROJECT ORGANIZATION AND KEY PERSONNEL

The project organization and key personnel that will be employed in performing the Ashland 2 Remedial Action are depicted on Figure 2-1. Professional resumes of the team are provided in Appendix A. A description of overall duties and responsibilities by major functional work area follows.

FUSRAP Ashland 2 Remedial Action
Project Organization & Key Personnel

Figure 2-1



TBD = To Be Determined
TBD * = Possible Additional Subcontracted Service

ICF KAISER

2.2.1 Project Management

The Project Manager, Construction Manager, and Engineering Services and Administration Manager are responsible for overall coordination and direction of the remediation effort. They serve as the principal points of contact with the USACE project organization and are responsible for overall quality, schedule, and cost compliance; project staffing and employee relations; subcontractor approval, management and direction; and bottom-line health, safety, and regulatory compliance.

2.2.2 Site Safety, Health and Radiation Protection

The Site Safety, Health, and Radiation Protection Officer will be responsible for day-to-day compliance monitoring of the approved Site Health and Safety and Emergency Response Plans, including site-specific personnel training; maintenance of the medical monitoring program; ALARA Program implementation; management of personnel PPE, respiratory protection and decontamination operations; and operations support to the on-site construction work force.

As a pre-condition for assignment to the Site, all Site workers will be 40-hour OSHA HAZWOPER certified and will be covered under medical monitoring programs meeting CFR 1910.120. General Employee Radiation Training and associated radiological monitoring will be handled as Site-specific activities.

2.2.3 Quality Control

The Site Quality Control Officer will be responsible for day-to-day compliance monitoring of the approved Quality Control Plans specified in the Construction Quality Control Plan and Sampling and Analysis Plan, including records filing and archiving, and the provision of operational support to the on-Site work force.

2.2.4 Remediation Construction

Remediation construction consisting of mobilization, site preparation activities (i.e., installation of roads, fences, etc.) and operations (i.e., excavation, material conditioning, etc.) will be under the day-to-day management of the Construction Manager. The Construction Manager will directly oversee mobilization construction activities with limited support from construction technicians (i.e., a junior superintendent or field engineer). For remediation operations, he will be supported by superintendents in each of the following major functional areas:

- Excavation and Material Conditioning consisting of excavation; stock piles (i.e., >40 pCi/g and <40 pCi/g) management; >40 pCi/g material conditioning, if required; >40 pCi/g load-out and transport to the rail facility; backfill of <40 pCi/g material and restoration; and records maintenance and transfer to the Site Quality Control Officer.
- Rail Operations consisting of rail car inspection and on-site movement; load-out and weighing; placarding; decontamination; coordination with the on-site Transportation and Disposal Coordinator; and records maintenance and transfer to the Site Quality Control Officer.
- Environmental Control Systems Decontamination Operations and Maintenance consisting of operation of the water and dust control systems; nonpersonnel decontamination operations (i.e., equipment, debris, roads, etc.); facilities and equipment maintenance; and records maintenance and transfer to the Site Quality Control Officer.

2.2.5 Engineering Services and Administration

The Engineering Services and Administration Manager will be responsible for the day-to-day direction and oversight of the on-site laboratory operations; off-site transportation and disposal; engineering support services; and administrative support services. He/She will directly oversee the majority of the engineering and administrative support activities during the mobilization construction phase of the project. For remediation operations, he/she will be supported by on-site supervisory staff in each of the following major functional areas:

- Laboratory Operations consisting of maintenance of the air and water monitoring programs; real time soil scanning in support of the excavation and material stockpile operations; free release program oversight; radiological monitoring; on-site laboratory analysis for rail car shipments and radiation control both inside and outside designated exclusion zones; verification sampling; off-site laboratory analysis coordination; facilities and equipment radiological monitoring; and records maintenance and transfer to the Site Quality Control Officer.
- Transportation and Disposal Coordination consisting of waste manifesting; rail car switching, scheduling, and tracking; disposal coordination and records transfer; and records maintenance and transfer to the Site Quality Control Officer.
- Engineering consisting of establishment and maintenance of the Site coordinate system; land surveying (i.e., property boundaries, pre-and post-excavation limits, and post-restoration); cost schedule and earned value tracking; inspection and testing support; regulatory compliance monitoring; and records maintenance and transfer to the Site Quality Assurance Officer.
- Data Management consisting of maintenance of field sampling logs and records; maintenance and storage of on-site and off-site laboratory data; and validation and tabulation of data for practical use.
- Administrative Support consisting of contract administration; purchasing and procurements; property management; timekeeping; and clerk/clerical support services.

2.2.6 Lower Tier Subcontractors

Subcontractor services are presently anticipated for the installation of roads and pads; fencing; and utilities connections during the mobilization and site preparation phase of the project. Subcontractors services during remedial operations will include land surveying, off-site laboratory analyses (i.e., verification and QC), waste transportation and disposal, and possibly on-site laboratory operations, including provision of radiation protection technicians.

2.3 PROJECT LABOR FORCE

The Ashland 2 project will be manned with four major labor categories. These four labor categories are listed below.

2.3.1 Ashland 2 - On-Site Management

These personnel consist of project management staff assigned to the Site from the ICF Kaiser's home office salaried manpower pool and will consist of the Project Manager; Construction Manager; Engineering Services and Administrative Manager; Quality Control Officer; Site Safety, Health and Radiation Protection Officer; and Construction Superintendents.

2.3.2 Home Office Support Staff

Home office support staff will be temporarily assigned to the project on an as-needed basis and will consist of ICF Kaiser's TERC Program Management and engineers, scientists and technical specialists principally from the Pittsburgh, Baltimore, and Fairfax offices.

2.3.3 Subcontractor Support Services

Subcontractor support services will be procured through competitive bidding in accordance with ICF Kaiser's Baltimore TERC and U.S. Government FAR requirements. Subcontractors will be selected based upon demonstrated experience; technical approach; staff experience; cost and schedule commitments; and business classification. All subcontractors will have identical health, safety, and radiation protection and quality assurance requirements as that specified for the project work force.

2.3.4 Union Craft Laborers and Operators

ICF Kaiser proposes to staff all Site laborers and operators positions utilizing local union craft under a direct hire arrangement through the Henry J. Kaiser Company (HJKCO), a wholly owned subsidiary.

HJKCO has signed National Environmental Agreements with the Laborers International Union and the Operating Engineers International Union. ICF Kaiser's Director of Labor Relations and the TERC Program Remedial Manager plan to meet with representatives of the local union trades during April to develop a strong working relationship and discuss staffing requirements and schedule.

3.0 PRE-MOBILIZATION ACTIVITIES

Pre-Mobilization Activities includes all preparatory activities necessary for the execution of work under the Ashland 2 Remedial Action Project. Preparatory activities include, but are not limited to, the submittal of the Site Specific Plans. These Plans are discussed in Section 3.1. A pre-remediation investigation will occur prior to initiating intrusive activities. The investigation is summarized in Section 3.2.

3.1 SITE SPECIFIC PLANS

As part of the pre-mobilization activities, Site Specific Work Plans will be generated to allow the Remedial Action to be completed in an organized and efficient manner. Table 1-1 listed each of the Site-specific plans. An overview of the plans follows.

3.1.1 Regulatory Compliance Plan

The Regulatory Compliance Plan is a stand-alone document that identifies all ARARs, codes, standards, permits, and regulations required for performing Site remediation.

3.1.2 Design Package Specifications and Drawings

The Design Package Specifications and Drawings were generated under the supervision of a Registered P.E. The Civil Design Package provides plan views, details, and cross-sections to facilitate remedial construction, annotated with specifications and notes.

All assumptions and specifications supporting the design packages are provided as a stand-alone Design Package Specifications document which includes scope of the specifications; drawings; special conditions or provisions; mobilization/demobilization requirements; civil surveys; clearing and grubbing; site preparation; support facilities; loading facility; stormwater management facilities; excavation and handling of materials; chain-link fencing; final cover placement; revegetation; and Site cleanup and repair.

3.1.3 Construction Quality Control (CQC) Plan

The CQC Plan provides procedures to assure that all work activities comply with the various project plans and QC requirements. The plan is structured to cover general requirements including purpose, scope, layout and use of the document; project plans; Site background and scope of work; QC program organization, personnel qualifications and training, letter of authority, inspection phases, record-keeping, and deficiency management reporting; project records and documentation; construction testing; definable features of work; and references.

3.1.4 Health and Safety and Emergency Response Plan(s)

The Health and Safety and Emergency Response Plan(s) are stand-alone documents that provide for a safe and healthy work environment for employees and to protect property from damage or loss from accidents or other causes. The Plans provide detail regarding compliance with all applicable Federal, State, and DOD safety and health codes, standards, and regulations, including USACE ER-385-1-92 (Appendix B) and Occupational Safety and Health Act (OSHA) 29 Code of Federal Regulations (CFR) 1910.120.

The Health and Safety and Emergency Response Plans are provided as three volumes consisting of:

- Volume 1 - <u>General for FUSRAP Sites</u>, general requirements in reference to plan contents; hazard analysis; medical surveillance; bioassay program; personal protective equipment (PPE), and air monitoring; restricted work areas; training requirements; emergency response and notification; and waste minimization and pollution prevention awareness.
- Volume 2 - <u>Site Specific Appendices</u>, emergency assistance services; description and history of the Ashland 2 Site; task by task analysis of radiological, chemical, physical, and other hazards; medical surveillance and bioassay requirements; PPE requirements; site specific

health and safety requirements; training; emergency response and notifications; and references.

- Volume 3 - FUSRAP Radiation Safety Manual, covering purpose, scope, policies, audits, responsibilities, and work authorizations.

3.1.5 Sampling and Analysis Plan

The Sampling and Analysis Plan provides procedures for the sampling and analysis of site materials and equipment. The Plan includes specific testing and QC procedures in reference to air particulate sampling and analyses; pre-and post-water filtering sampling and analysis; soil real-time screening and verification, rail car shipping, on-site stockpiles, and backfill materials; scans and smears of rail cars, lab, offices, support trailers, haul roads, tools, and equipment; testing procedures in support of the Site Free Release Program; and quality control procedures and documentation.

3.1.6 Waste Management, Transportation, and Disposal Plan

The Waste Management, Transportation, and Disposal Plan covers the identification, characterization, preparation, packaging, transportation, and disposal of all waste streams from the Site and includes details on the Plan purpose and scope; waste sources and classification; regulatory requirements; waste management procedures; and notifications, documentation, and reporting.

3.1.7 Excavation, Backfill, and Restoration Plan

The Excavation, Backfill, and Restoration Plan describes in detail the procedures and techniques required to complete the remediation excavation activities. The Plan provides details on specific excavation procedures for the "main" area and remote "hot spots"; stockpiling materials; backfill and compaction; monitoring and environmental controls, including perimeter air monitoring, dust control, water control, waste (i.e. >40 pCi/g) moisture content control, and sediment and erosion control; decontamination procedures for equipment and debris; and site restoration plan.

3.2 PRE-REMEDIATION INVESTIGATION

A pre-remediation investigation will be performed prior to the initiation of intrusive work activities within the areas of contamination. The overall scope of the investigation will include the following:

- Establish radiological baseline conditions of on-site and off-site properties prior to the commencement of field construction and operation activities. This will include "remote hot spots", probable haul road routes and the rail facilities areas.
- Delineation of excavation limits in the field to permit "fine-tuning" of design packages, plans, and specifications, as needed.
- Waste sampling and analysis for waste profile development and negotiations with transportation and disposal subcontractor(s).
- Initial civil surveys of property(ies) boundaries, pre-excavation lines and grades and establishment of a site coordinate system.
- In-field verification of any proposed facility/utility protection measures.
- "Ground-truthing" of field conditions to permit finalization of design packages and construction/operations plans.

A findings report will be prepared to document data generated during the investigation.

3.3 NOTIFICATIONS

Niagara Mohawk Power Corporation will be provided written notice at least five (5) days prior to commencing any construction work on their fee owned lands in accordance with the July 14, 1997 Consent. Notice will be given to:

Mr. James M. Miller, Inspection Department
Niagara Mohawk Power Corporation
144 Kensington Avenue
Buffalo, NY 14214 (716) 831-7300

Erie County Water Authority will be contacted prior to commencing any construction work in the area of the twin 48-inch diameter transmission mains along the Niagara Mohawk Power Corporation right-of-way. At that time, copies of applicable portions of the Ashland 2 Plans and Engineering Drawings along with previous evaluations (January 14, 1998) completed by Price Brothers Pressure Pipe Division will be reviewed with the Authority's Distribution Engineer. Specific plans and details, developed and stamped by a New York State Professional Engineer, will be prepared and submitted to assure protection of the mains, if required by the Authority.

4.0 PRE-REMEDIATION CONSTRUCTION ACTIVITIES

Major construction items which will be installed in support of remediation operations are summarized in this section of the Site Operations Plan. Due to the "fast-track" nature of the remediation effort, specific alignments and quantities, including Site layout, are subject to modifications based upon the results of the Pre-remediation Investigation (Section 3.2) and Final Site Specific Plans (Section 3.1).

4.1 CONSTRUCTION MOBILIZATION

Mobilization includes procurement and installation of necessary facilities, equipment, and materials to perform the Remedial Action. Mobilization activities also include the assignment of personnel to the job site; personnel radiation safety and site-specific construction safety training; and regulatory permitting and notifications, if required.

4.2 SITE LAYOUT AND KEY COMPONENTS

The Site Layout includes all directions and drawings required to prepare the Project Site in order to perform the remedial action (i.e., excavation, backfill, T&D of waste, and Site restoration). Detailed design drawings and specifications can be found in the Design Package Specifications. The General Site Layout is provided in Figure 4-1.

4.2.1 Roads

Unimproved roads currently exist within the Ashland 2 project Site. Drawing 66723-RD1, Existing Conditions Plan, shows their locations. However, in order to maintain a more efficient and organized access to the various excavations and other areas such as decontamination and rail facilities, additional roadway access will be created. The Site Preparation Plan (Drawing 66723-RD2) shows the upgraded Site layout. All existing roads will be upgraded. A new road will be constructed from the former tank area to the rail transport facility. All pre-existing and newly constructed roads will be maintained during the duration of the project.

Access to the Site and the rail facility will be restricted by fences and locked gates. The main entrance on River Road will be controlled by manned security gates during operational hours. The gate will remain closed and locked at all other times.

4.2.2 Utilities and Connection Points

Utilities are required for the completion of the remedial action activities. Utilities will be brought onto the project Site to provide services to the Laboratory/Office Complex and decontamination facility. The Support Facilities Plan (Drawing 66723-RD3) provides details regarding utility connection points and installation.

Electrical power will be supplied by Niagara Mohawk Power Corporation. Located within the laboratory/office complex will be a service entrance panel and distribution panel. Service will then be routed to all offices, decontamination trailers, and other facilities, as needed. Drawing 66723-RD3 provides additional details.

Potable water is also available from off-site. The Town of Tonawanda Water and Sewer Authority will provide the connection at River Road. Back-flow prevention is included as a part of the connection.

Telephone service will be provided by Bell Atlantic and is assumed to be accessed at River Road.

4.2.3 Office/Laboratory Complex

An Office/Laboratory Complex will be installed to support the remediation effort. Access to the complex will be from River Road. The office complex will provide support for engineering and administrative personnel and U. S. Army Corps of Engineers on-Site personnel. The Support Facilities Plan (Drawing 66723-RD3) shows the location of the office trailers and laboratory trailer within the complex. Four trailers will be provided within the complex; one each for the USACE, ICF Kaiser, the Laboratory, and employees.

Ample parking will be provided, along with power, water, communications, and sanitation. The entire complex will be secured utilizing chain-link fence.

Located with the Office/Laboratory Complex will be support zone facilities, which include decontamination facilities, for both personnel and equipment, discussed in Section 4.2.4. The tool/equipment trailer and supplies will be accessed through the Office/Laboratory Complex. As stated previously, the Complex will be secured with fencing. The decontamination and other support facilities will also be fenced within the Exclusion Zone.

4.2.4 Decontamination Facilities and Support Zone

The Decontamination (DeCon) and Support Zone include both the personnel and equipment DeCon trailers and pads and tool supply trailers. There will be two personnel DeCon trailers. These trailers will be located outside the Office/Lab Complex fence, but within the "clean" support zone. The equipment DeCon pad will be located directly adjacent to the support zone fencing, but within the Exclusion Zone. This will ensure that, prior to exiting the exclusion work area, all equipment can be decontaminated and verified clean. Potable water and electrical power will be provided. Water from the DeCon areas will be collected in a sump and pumped to the on-site water containment basin.

A PVC-lined water containment basin (Drawing 66723-RD5) located within the Exclusion Zone will be used to store Site excavation, decontamination, and rail facility waters. An in-line water filtering system is also provided to permit use of the water for on-site (i.e. within the areas exceeding the cleanup criteria) dust control and reuse for DeCon operations.

The equipment storage areas, tool trailer, and equipment decontamination pad will be located within the fenced area as indicated on Drawing 66723-RD3.

4.2.5 Exclusion Zone

The Exclusion Zone is the area where all excavation activities are to occur. Entrance into the exclusion zone will be through a double-swing, chain-link gate. The Site Preparation/Layout Plan (Drawing 66723-RD2) shows the Exclusion Zone in relation to the Office/Lab Complex, the DeCon Areas, and the Rail Complex (Section 4.2.6). Entrance into the Exclusion Zone will be restricted to trained personnel only. All persons entering the Exclusion Zone must wear appropriate safety attire and abide by the HASP and related Radiation Work Permits (RWPs). Exiting from the Exclusion Zone will only be through areas designated in the HASP.

4.2.6 Rail Facilities

Provisions for the installation of "on-site" rail facilities have been included in the Site Operations Plan. Several rail shipping scenarios are presently under review including:

- Gondola Cars - Direct load contaminated material at an on-site rail facility.
- Flat Bed Cars - Containerized contaminated material loaded at an on-site rail facility.
  - Containerized contaminated material loaded at an off-site rail facility.

On-site rail facilities, if required, will be located on the southeast corner of the Ashland 2 Site. The entire facility will be fenced. Access to the facility will be through a double-swing, chain-link gate from the Exclusion Zone. Rail car access into the facility will also be through two double-swing, chain-link gates. The facility can be viewed on the Site Layout/Preparation Plan (Drawing 66723-RD2) and on the Loading Facility Plan (Drawing 66723-RD4). The facility will be self-supporting with electrical power, water, and communication support services.

The rail loading facility consists of a soil unloading area, decontamination facilities, and a water collection/storage system. The entire complex pad will be concrete with a 6-inch berm surrounding the pad to provide water management support. From this facility, all >40 pCi/g Th-230 materials will be loaded for transportation to the appropriate disposal facility.

5.0 REMEDIATION OPERATIONS

5.1 EXCAVATION AND MATERIAL SEGREGATION

All contaminated material and soils >40 pCi/g Th-230 will be excavated for off-site disposal. Prior to initiating excavation activities, the area will be cleared and grubbed as indicated in the specifications. All trees and brush will be cut to ground level, chipped, and stored within the Exclusion Zone. These materials will be sampled to assure compliance with the Site-specific guideline of 40 pCi/g Th-230. In the unlikely event that these materials, or portions thereof, exceed the guideline, provisions will be made to incorporate the materials with >40 pCi/g Th-230 excavated soils for off-site disposal.

Excavation will be carried out using conventional excavators, backhoes, front-end loaders, and articulated dump trucks. Water spraying and misting equipment will be available at all times to control dust emissions. All equipment will remain within the Exclusion Zone until final decontamination and free release from the Site.

Two work crews and associated equipment will be utilized, one for excavating materials >40 pCi/g Th-230, and the other for excavating material <40 pCi/g Th-230. Additionally, two separate storage areas for excavated material (one for >40 pCi/g Th-230 materials, and one for <40 pCi/g Th-230 materials) will be provided within the Site Exclusion Zone (Figure 4-1). Within each storage area, materials will be further segregated in multiple stockpiles, as necessary, based on visual observations or PID readings.

A description of the general excavation sequence follows. Please refer to the Excavation, Backfill and Restoration Plan for additional details.

1. Complete civil survey (See Design Specifications and Excavation, Backfill and Restoration Plan) by a New York Registered Land Surveyor of the entire excavation area.
2. Complete radiological surface scan of entire area in accordance with procedures specified in Section 4.0 of the Sampling and Analysis Plan. Delineate all areas > and <40 pCi/g Th-230. Delineate temporary truck haul routes to minimize cross contamination.
3. Excavate six to eight (6-8) inches of soil from the delineated areas and transport materials to the respective Exclusion Zone storage areas.
4. Repeat steps (2) and (3) until no areas can be detected with >40 pCi/g Th-230 materials.
5. Complete final radiological surface scan and obtain verification samples in accordance with procedures specified in Section 5.5 of the Sampling and Analysis Plan.
6. Complete civil survey (See Design Specifications and Excavation, Backfill and Restoration Plan) of vertical and horizontal excavation limits by a New York Registered Land Surveyor.

Modification of the excavation sequence may be required for remote areas with soils >40 pCi/g Th-230, depending upon the size and location of the area. In some instances, real-time radiological scans may be required continuously. Additionally, it may be necessary to establish a temporary staging area for a <40 pCi/g Th-230 stockpile within the fenced area. Specific procedures will be developed and submitted to USACE for approval, for any remote area with soils >40 pCi/g Th-230 discovered during the course of the remedial action.

5.2 MATERIAL CONDITIONING, LOAD-OUT, AND TRANSPORT TO RAIL FACILITY

Material >40 pCi/g within the Exclusion Zone storage area may require conditioning to meet soil moisture shipping and disposal requirements. Moisture reduction will be accomplished in one of several ways, or combinations thereof, including: air drying of the soil by "working" the material with an excavator or loader, mixing the material with "dry" material, and the addition of sorbent in the shipping container. The material will be tarped during non-operational hours or during severe precipitation events.

As previously indicated (Section 4.2.6), several rail shipping scenarios are presently under review. Under the gondola car scenario, >40 pCi/g Th-230 material will be loaded into tarped, tri-axle dump trucks used exclusively to transport materials to the on-site rail loading facility where they will be dumped and loaded into the rail cars using a front-end loader. Under the containerized shipping scenario, the containers would be directly loaded at the storage area and subsequently transported by truck to the on-site rail facility or an off-site intermodal staging area following completion of the radiological screening and sampling/analyses procedures specified in Sections 4.3, 5.5 and 5.8 of the Sampling and Analysis Plan.

All trucks will remain on the "contaminant-free" haul road within the Exclusion Zone (Figure 4-1). All vehicles leaving the Exclusion Zone will be scanned, and if leaving the Site property, "swiped" prior to release. In the unlikely event that contamination is discovered, the vehicles will be decontaminated at the equipment decontamination facility prior to release.

5.3 RAIL FACILITIES OPERATIONS

As stated in Section 4.2.6, two on-site rail shipping scenarios are presented, the use of gondola cars and the use of flat bed rail cars. The rail facility will be self-supporting with its own electrical, water and communication services. The facility will be supported with its own crew in order to complete rail car inspections and on-site movement, manifesting of the shipments, coordination of the off-site shipment of the containers, decontamination of equipment and personnel, operation of environmental controls, and general housekeeping associated with the area and operations. The Loading Facility Plan (Drawing 77723-RD4) provides a detailed view of the facility and its layout.

Under the gondola car scenario, soil with concentrations > 40 pCi/g Th-230 will be brought to the rail shipping area and staged on the soil stockpile storage area. The soil will be dumped into an area delineated with concrete barriers in order to control movement and weather impact of the soil prior to shipment off-site. Soil placed in the gondolas will be weighed using a scale attachment located on the loader.

Under the containerized shipping scenario (i.e., flat bed cars), containerized soil will be transferred from a truck directly onto flat bed rail cars for off-site shipment. Under each of the off-site shipping scenarios transportation vehicles will not leave the rail facility until it has completed and cleared radiological screening. The use of flat bed rail cars will require weighing the material prior to shipment off-site. Should this transportation mode be chosen a portable scale will be installed. Each container will be weighed prior to being loaded onto the rail car.

Once the soil has been stabilized for off-site shipment to the disposal facility, all manifests and instructions to carriers will be completed. An overview of waste disposal, transportation and manifesting is provided in Section 5.4. Details are provided in the Waste Management, Transportation and Disposal Plan.

5.4 WASTE MANIFESTING, TRANSPORTATION, AND DISPOSAL

Shipping manifests, instructions to the carrier, and advance shipment notification forms will be prepared and submitted to the USACE for approval and signature. A separate set of forms will be prepared for each rail car or container. As previously indicated in Section 4.2.6, waste materials will be shipped by rail in gondola cars or in containers on flat cars. A minimum of six (6) samples will be collected from each gondola car or shipping container, composited, and analyzed at the On-Site laboratory for waste characterization purposes. These samples will be archived at the Site until formal waste acceptance and certificates of disposal are received from the disposal facility.

All waste materials will be properly packaged and labeled in accordance with DOT Hazardous Materials Regulations contained in 49 CFR Parts 171 through 180. In addition, a unique identification number will be assigned to each container or rail car to permit tracking of the waste from shipment through off-site disposal and receipt of the certificate of acceptance and disposal.

All exterior surfaces of the cars and/or containers will be scanned and "swiped" to verify the absence of exterior contamination prior to release from the Site.

All rail shipments under both the gondola and containerized scenarios are presently anticipated to be completed under contract with Conrail. All coordination and tracking of shipments will be through a single Conrail point-of-contact irrespective of the "secondary" rail companies involved in car movements.

All radioactive waste materials are presently anticipated to be disposed of at the Envirocare of Utah facility in Clive, Utah under NRC License SMC-1559 and Utah Division of Radiation Control State Radioactive Material License UT 2300249. However, with proper approvals by the NRC and USACE, the waste materials from the site may be disposed of at International Uranium located in Utah.

Details on waste manifestation, transportation, and disposal, as well as the Envirocare of Utah facility, are provided in the Waste Management, Transportation and Disposal Plan.

5.5 ENVIRONMENTAL CONTROL SYSTEMS AND MONITORING PROGRAM

Throughout the remedial action, environmental controls will be implemented to control erosion and sedimentation, manage stormwater runoff, and minimize dust emissions.

5.5.1 Erosion and Sedimentation Controls

Prior to performing any intrusive work at the site, erosion and sedimentation controls shall be installed as required. Silt fencing will be utilized to minimize the transport of sediment in stormwater runoff. Drawing Numbers 66723-RD3, 66723-RD4 and 66723-RD5 indicate the proposed locations for silt fence installation. Silt fence shall be installed downslope of all areas where intrusive work is to occur and downslope of all soil stockpile areas. Silt fence shall be installed and maintained in active work areas and downslope of revegetated areas until an adequate stand of vegetation is established as indicated in the Drawings and Specifications.

5.5.2 Stormwater Runoff

Prior to any intrusive work, all stormwater runoff will flow off-site via the existing swales and ditches, as presently occurs. Within the Exclusion Zone, excavation will be performed such that the areas are excavated in relatively level horizontal lifts, and graded to a sump where stormwater runoff will be collected and pumped to the on-site containment basin. The excavation area sump shall be maintained as the excavation progresses. Depending on the size of the excavation area, multiple sumps may be required. Stormwater runoff from areas outside of the excavated areas will not be collected, but shall be diverted from excavation areas, to the extent possible, utilizing drainage ditches and diversion berms.

5.5.3 Dust Suppression

Throughout construction, all exposed areas and access and haul roads will be watered as needed to minimize dust emissions. Water for dust suppression within areas exceeding the cleanup criteria will be obtained from the stormwater runoff collected in the on-site containment basin; water for dust suppression in all other areas will be obtained from an on-site potable water source located near the proposed truck/equipment decon pad. Water obtained from the on-site containment basin will be filtered to remove potentially contaminated sediment from the water prior to use for dust suppression. Dust suppression will occur, as needed, based on visual observation and air monitoring results. A water truck will be present on-site at all times.

5.5.4 Perimeter Air Monitoring

High volume air samplers will be installed at six locations around the perimeter of the Site in order to assess the levels of airborne radioactive particulates that are migrating off-site. One sampler will be located on the north side of the Site along River Road; this sampler will be used to quantify concentrations in the air leaving the north end of the property. Another sampler will be placed on the north side of the property between the excavation area and the trailer area; this sampler will be used to quantify the level of airborne contamination that is reaching the on-site office area. A third sampler will be placed along the eastern boundary on the Ott property to quantify the levels of airborne contamination migrating eastward from the work area. Two samplers will be located along the south end of the Site. These samplers will be used to quantify the levels of airborne contamination around the rail loading area and the levels that might be migrating off-site in a southerly direction. One air sampler will be located at the west side of the property at the boundary with the Seaway Landfill. This station will be used to quantify the levels that may be migrating off-site in a westerly direction.

radiation levels detected are significant. If radioisotope activities in the air samples are deemed excessive, then corrective steps will be taken immediately to reduce dust levels in the work area. Details regarding the perimeter air monitoring program are included in the Field Sampling Plan.

5.6 DECONTAMINATION AND FREE RELEASE OPERATIONS

All equipment coming into contact with contaminated materials will be decontaminated to levels set forth in NRC Regulatory Guide 1.86, a summary of which is provided in Table 5-1.

All equipment will be dedicated for single use for the duration of the project and will remain within the Exclusion Zone at the main Site or at the rail facility, until decontaminated, surveyed, and verified in conformance with free release limits.

All equipment will be dry brushed/scraped prior to transport to the Site Decon facility (Figure 4-1) to reduce contamination within the Exclusion Zone. At the Decon facility, the following sequence will be followed until the equipment is verified clean.

- low pressure (2,000 psi) wash until visibly clean
- low pressure detergent wash with brushing
- *high pressure wash (10,000 psi)*
- sandblasting

The use of solvents may be necessary to strip outer layers of porous rubber parts (e.g. tires). This procedure will only be used as a last resort. Other porous parts, (e.g. seats, wiper blades, etc.) which cannot be readily decontaminated, will be removed and treated in the same manner as >40 pCi/g Th-230 material. Air filters, oil filter, and crankcase oil will also be replaced prior to final release. The air filters and oil filters will be treated in the same manner as >40 pCi/g materials. Oils will be sampled and recycled following free release verification.

5.7 ON-SITE LABORATORY AND RADIATION CONTROL OPERATIONS

An extensive monitoring, sampling, and on-site analytical program will be implemented in order to:

- Ensure that all contaminated soil materials exceeding the cleanup criteria are removed from the site.
- Minimize the volume of soil inadvertently removed from the site which is below the cleanup standards.
- Verify that all rail cars, trucks, automobiles, equipment, and other items leaving the site are surveyed and meet the federal Free Release criteria for unrestricted use.
- Ensure that quantities of airborne dust containing radionuclides leaving the site are at or below acceptable levels.
- Monitor and verify that exposure of workers to external gamma radiation and airborne alpha emitters is within an acceptable limit and is ALARA.
- Monitor the levels of radionuclides leaving the Site via surface water and sediments.
- Confirm that the Site meets the cleanup requirements stated in the Project Scope-of-Work and the Record of Decision.

The quantitative analytical data generated as a result of these activities will be sufficient in type, quantity, and quality such that the cleanup of the site is verified, minimization of exposure to on-site workers can be quantified, and migration of radioactive materials to adjacent properties and roads is proven to be negligible. Each aspect of on-site monitoring, sample collection, and field laboratory operations are presented in the Sampling and Analysis Plan.

Table 5-1

Ashland 2 Site Remedial Action
Decontamination and Free Release Operations
Surface Contamination Guidelines

Radionuclides[b]	Allowable Total Residual Surface Contamination (dpm/100 cm^2)[a]		
	Average[c,d]	Removable[d,f]	Maximum[d,e]
Transuranics Ra-226 Ra-228 Th-230 Th-228 Pa-231 Ac-227 I-125 I-129	100	20	300
Th-Natural Th-232 Sr-90 Ra-223 Ra-224 U-232 I-126 I-131 I-133	1,000	200	3,000
U-Natural U-235 U-238 and associated decay products	5,000α	1,000α	15,000α
Beta-gamma emitters (radionuclides with decay modes other than alpha emission or spontaneous fission) except Sr-90 and others noted above	5,000β-γ	1,000β-γ	15,000β-γ

a As used in this table, dpm (disintegrations per minute) means the rate of emission by radioactive material as determined by correcting the counts per minute measured by an appropriate detector for background, efficiency, and geometric factors associated with the instrumentation.

b Where surface contamination by both alpha-and beta-gamma-emitting radionuclides exists, the limits established for alpha-and beta-gamma-emitting radionuclides should apply independently.

c Measurements of average contamination should not be averaged over an area of more than 1 m^2. For objects of less surface area, the average should be derived for each such object.

d The average and maximum dose rate associated with surface contamination resulting from beta-gamma emitters should not exceed 0.2 mrad/h and 1.0 mrad/h, respectively, at 1 cm.

e The maximum contamination level applies to an area of not more than 100 cm^2.

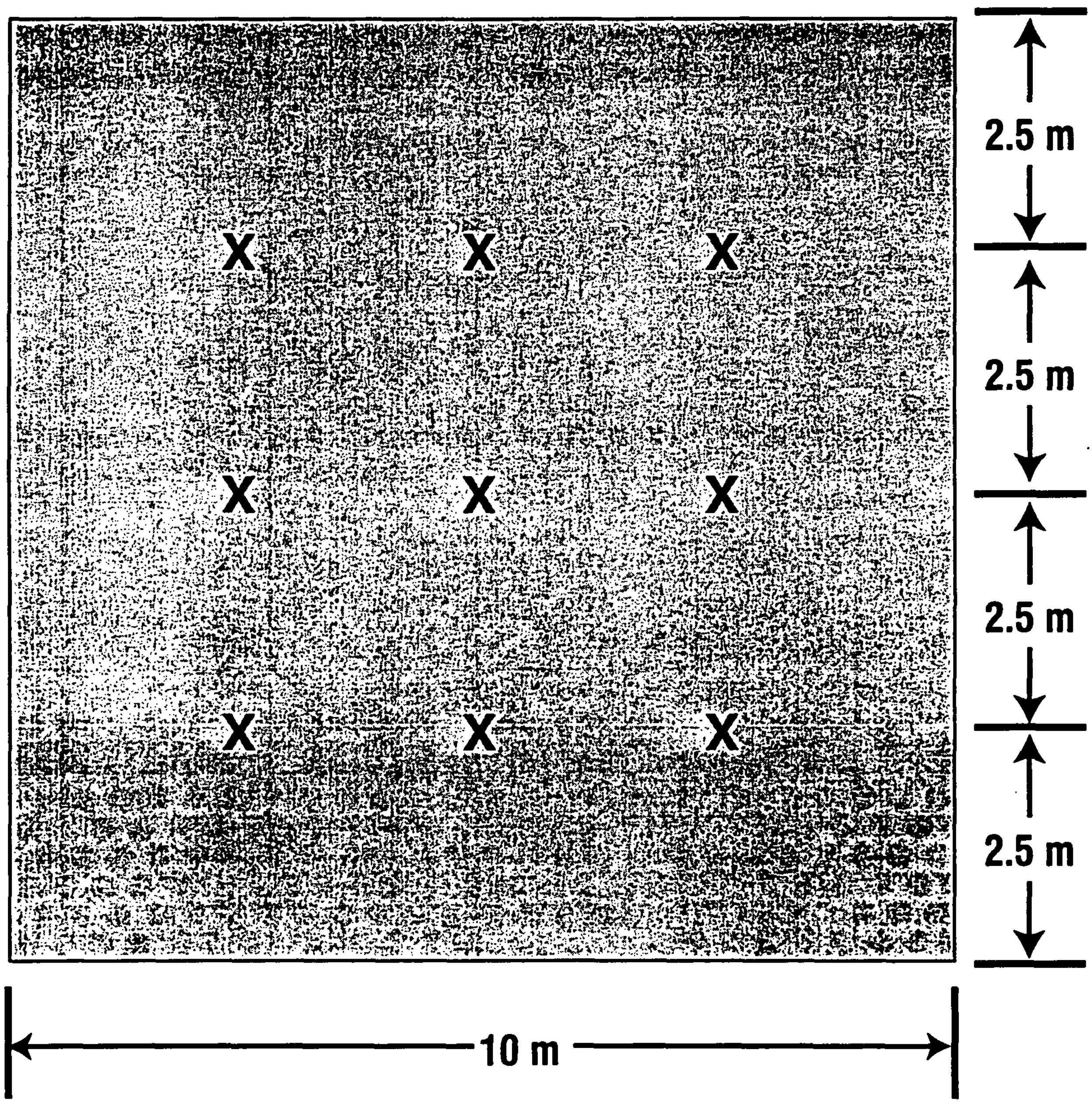
f The amount of removable radioactive material per 100 cm^2 of surface area should be determined by wiping that area with dry filter or soft absorbent paper, applying moderate pressure, and measuring the amount of radioactive material on the wipe with an appropriate instrument of known efficiency. When removable contamination on objects of surface area less then 100 cm^2 is determined, the activity per unit area should be based on the actual area and the entire surface should be wiped. The numbers in this column are maximum amounts.

Figure 5-1

Ashland 2 Remedial Action

Final Verification

Sampling Pattern for Composite Preparation within Decontaminated Grid Block



X = Location for soil sample

5.8 FINAL STATUS SURVEY SAMPLING AND ANALYSIS

Final status survey sampling and analyses will be performed following excavation of all >40 pCi/g Th-230 materials and prior to backfilling, in accordance with the statistical approach presented in MARSSIM. These procedures are outlined in the Final Status Survey Plan. A final direct radiation level surface "scan" will be made of the excavation area(s) and surrounding areas to assure the absence of any "hot spots" prior to formal verification sampling.

Verification samples will be collected from each 10m x 10m grid block within the excavated portions of the Site (Figure 5-2). Nine (9) samples will be collected from each block, composited and split into two (2) samples. One split will be screened at the on-site laboratory to verify acceptable levels of radioactivity (i.e. <40 pCi/g Th-230). Upon confirmation, the sample will be archived and the corresponding split will be submitted for analysis at an independent off-site laboratory. Of this second split, an additional ten (10) percent of the samples will be randomly split from the second split of samples and sent to a second off-site laboratory for quality control analysis.

If elevated readings (i.e., >40 pCi/g Th-230) are obtained during the initial direct radiation level surface "scan" or from the on-site laboratory screening, remediation efforts will be resumed at the subject grid and the area will be resurveyed and sampled.

Details on all screening, sampling, and analyses procedures in reference to verification samples are provided in the FUSRAP Ashland 2 Final Status Survey Plan.

5.9 SUPPORTING OPERATIONS

5.9.1 Health, Safety, and Radiation Protection

The Health and Safety and Emergency Response Plan (Plan) will be implemented and audited to ensure both worker and public protection throughout the remediation effort. The Plan establishes requirements in regard to medical surveillance and bioassays, personal protective equipment and air monitoring, restricted work areas, hazardous and radiation work permits, training requirements, emergency response and notifications, and waste minimization and pollution prevention. The provisions of the Plan are mandatory for all on-site employees, including subcontractor employees.

The ALARA Program is a commitment on the part of the management of this project to closely monitor all dosimetry and seek methods or techniques to further reduce the radiation levels personnel may receive. All reasonable efforts will be made to keep radiation exposures, as well as releases of radioactive material to unrestricted areas, to levels that are as low as reasonably achievable (ALARA). Toward this end, several ALARA principles will be used:

- The Site Safety, Health and Radiation Protection Officer will have sufficient delegated authority to enforce regulations and administrative practices concerning any aspect of the health, safety, and radiation protection program.
- Personnel will be trained in safety procedures and ALARA philosophies to a level commensurate with their work scope.
- Safety audits will be conducted.
- Hazardous and Radiation Work Permits will be required.
- Radiation exposures will be minimized where practical, by the use of time, distance, shielding, and administrative controls.

The Site Safety, Health and Radiation Protection Officer, in consultation with the Project Manager and applicable TERC Program Officers (Figure 2-1), will establish environmental health and safety policies and conduct independent audits of the implementation of those policies.

Access to the Site and the Rail Facility will be controlled to protect workers from unnecessary radiation exposure and to minimize the potential for the spread of radiation. Each area (i.e. the Site and Rail Facility) will be divided into three zones:

- Contamination Zone - Actual areas of contamination. Represents area that has highest inhalation exposure potential and/or presents a high probability of skin contact.
- Contamination Reduction Zone - Areas immediately surrounding the Contamination Zone, including the personnel and equipment decontamination facilities.
- Clean Zone - Areas outside the Contamination Reduction Zone where adverse exposure is unlikely.

Access to these areas will be controlled for people, vehicles, and equipment by fencing and posting the area, or by using other methods to prevent inadvertent entrance. The locations of the Contamination Zone, Contamination Reduction Zone, and Clean Zone are presented on Figure 4-1. Smoking, drinking, eating, or other activities that would enhance the transfer of radionuclides into the human body will be prohibited within the Contamination and Contamination Reduction Zones.

An air sampling program will commence with any operations that have the potential for radionuclides to become airborne and will continue until all Site work is completed. High volume samplers will typically be used for area monitoring. Personal sampling pumps may be employed for worker breathing zone air sampling. Data from the high volume monitors will be used to assess releases due to excavation operations. Air filters will be analyzed for radioisotope identification and quantification to ascertain the airborne concentration.

Work at the Site will be performed under Level C and D protection. Level C protection will be required for all activities and/or in all areas where the potential for air-borne particulates exists. This includes excavation sites, storage piles, and material loading areas. Full-face, cartridge-type air purifying respirators will be utilized, as directed by the Site Safety, Health and Radiation Protection Officer, during periods of potential dust generation.

5.9.2 Quality Controls

The Construction Quality Control Plan (CQC Plan) will be implemented and audited to ensure that all technical design and construction quality objectives are met and conform to the requirements of the Task Order. The CQC Plan identifies the project Quality Control Organization; defines communications, documentation, and record-keeping procedures; and establishes quality control procedures, including the necessary supervision and tests.

The Site Quality Control Officer will work directly with the Project Manager and TERC Program Quality Control Manager and will be delegated authority to enforce the requirements and administrative practices concerning any aspect of the quality control program. A three-phase control process for each definable feature of work will be implemented. These include:

- Preparatory Phase Inspection - Review and document applicable specifications and verify that the necessary resources, conditions, and controls are in place.
- Initial Phase Inspection - Check and document preliminary work for compliance with procedures and specifications, establish acceptable level of workmanship and check for omissions and resolve differences of interpretation.
- Follow-Up Phase Inspection - On-Site monitoring and documentation of the practices and operations taking place and verifying continued compliance with the project Specifications and requirements. Outstanding and nonconforming items or practices will be identified, along with corrective measures.

Upon conclusion of a definable feature of work, a review will be completed to verify that all documentation is in order prior to close-out and transfer of files to USACE.

5.10 SITE RESTORATION

Following the completion of all remedial activities, such as excavation, final status survey sampling (confirmatory sampling), and backfill, the Site will be restored. In general, a 12-inch layer of general fill material will be placed over the remediated areas. The fill will be free of stones, clods, and lumps greater than 3 inches maximum in size. The location of the borrow source will be provided. The borrow material will be tested after the location has been determined to ensure that the soil is free of chemical or radiological contaminants. The results of any testing will be submitted to the USACE for approval prior to bringing the material on-site.

General fill will be placed in loose lift thickness of approximately eight (8) inches and compacted with on-site dozers (minimum of three (3) passes). Positive drainage will be achieved at the completion of backfill activities. A vegetative cover will be established over the backfilled areas through hydroseeding or other similar technology to control erosion. At the conclusion of all restoration activities, a final survey will be completed in order to determine the final grade.

Specific information on vegetative cover details/erosion control measures and final survey requirements can be found in the Excavation, Backfill, and Restoration Plan. All sampling requirements for the borrow material can also be found in the Sampling and Analysis Plan.

5.11 PERSONNEL, EQUIPMENT, AND FACILITIES DEMOBILIZATION

At the conclusion of remedial activities, ICF Kaiser will demobilize from the Ashland 2 site. All equipment will be decontaminated and equipment tested and cleared through the free release program. Details are provided in Section 5.7, the Sampling and Analysis Plan, and Health and Safety Plan.

Additionally, radiological surveys of the haul roads, and decontamination facilities will be performed to meet the requirements of the free release programs. All records, including all post work submittals, will be submitted to the USACE.

USACE may wish to consider possible use of the Ashland 2 office/laboratory, decontamination and water holding facilities in support of the Ashland 1 remedial action effort. ICF Kaiser Engineers will be prepared to work closely with USACE in regard to any desired transfers of facilities and equipment to Ashland 1.

6.0 SCHEDULE

A preliminary schedule for the Ashland 2 Remedial Action is provided in Figure 6-1. It should be noted that the Ashland 2 Project is presently in an early planning phase. Figure 6-1 is presented solely for discussion purposes.

APPENDIX A KEY PERSONNEL RESUMES

Function	Individual
TERC Program Manager	B. Howard
Ashland 2 Project Manager	D. Rhodes
Construction Manager	M. Schaub
Site Safety, Health & Radiation Protection	D.Root
Quality Control	M. Schwippert
Engineering Services & Administration	R. Dennis
Laboratory Operations	TBD
Transportation & Disposal Coordination	TBD

Corporate Resume

Employee Identification

Name: Howard, Bruce K
ID: 11323
Location: VA01

Resume Information

Title: Corporate
Description: Mr. Bruce Howard is a Senior Project Manager with ICF Kaiser Engineers and currently serves as the Program Manager for the Baltimore TERC. Mr. Howard accumulated twenty-five years of progressive. successful management experience in positions of increasing responsibility and scope within the U.S. Army Corps of Engineers, Department of Defense, and ICF Kaiser International, Inc. Mr. Howard is an internationally experienced engineer and seasoned program/project manager. He supervised the construction of a wide array of building, environmental, and road projects. He was the lead project manager on the design and construction of large, complex environmental remediation projects. Also, he lead and coordinated the development of facility wide safety and environmental programs. He has developed a reputation as an innovative, responsible, excellence-oriented leader who is adept at building strong teams and producing quality results under challenging conditions.

Status: Current As Is

Resume Text:

BRUCE HOWARD

EDUCATION

1979, MS, Environmental Engineering, University of Florida (No. 1 Graduate)
1971 BS, Chemistry, South Dakota School of Mines and Technology
International Experience: Germany, Laos, Thailand, Bangladesh, Western Samoa, Estonia, Bosnia, Korea, Republic of the Marshall Islands, Federated States of Micronesia

EXPERIENCE

Mr. Bruce Howard is a Senior Project Manager with ICF Kaiser Engineers and currently serves as the Program Manager for the Baltimore TERC. Mr. Howard accumulated twenty-five years of progressive. successful management experience in positions of increasing responsibility and scope within the U.S. Army Corps of Engineers, Department of Defense, and ICF Kaiser International, Inc. Mr. Howard is an internationally experienced engineer and seasoned program/project manager. He supervised the construction of a wide array of building, environmental, and road projects. He was the lead project manager on the design and construction of large, complex environmental remediation projects. Also, he lead and coordinated the development of facility wide safety and environmental programs. He has developed a reputation as an innovative, responsible, excellence-oriented leader who is adept at building strong teams and producing quality results under challenging conditions.

Installation/Program Management:

Mr. Howard commanded the Waterways Experiment Station from July 1993 to June 1997 and provided the overall direction and program guidance to engineers and scientists in the execution of a $300 million research and development program. He lead and coordinated the operation and training of all aspects of the installation to include the safety and environmental programs. Under his tutelage the installation received a 100% rating from the Mississippi DEQ and Regional EPA for their compliance programs in Hazardous Waste Storage and Management (The Waterways Experiment Station was the only Department of Army authorized installation for the storage of hazardous wastes)

Technology Development:

He led the development of key technologies in the environmental remediation field including the patenting and licensing of the Peroxone Oxidation System to remediate contaminated ground water; the Site Characterization and Analysis Penetrometer System that provides inexpensive, in situ pollutant identification and quantification; and software development of the nationally-known Ground Water Modeling System.

International Work:

Mr. Howard was selected by the office of the Secretary of Defense for the Environment to travel to Estonia and provide the environmental pollution assessment of the abandoned Soviet Air Bases. The evaluation recommendations resulted in follow-on remediation projects.

Project Engineer

Mr. Howard served as the project engineer for the design and construction of the initial hazardous waste, groundwater treatment plant at Rocky Mountain Arsenal. At the time this project was the most modern, efficient, cost-effective technology available.

Construction Management:

Mr. Howard was selected by the U.S. Army Corps of Engineers' Commander to lead a team of engineers to evaluate and construct a permanent bridge across the Sava River from Croatia to Bosnia and complete the task within 60 days. Commended for the successful completion of this complex project on time and under challenging conditions. Results of this successful project were published in the November 1996 edition of the Military Engineer.

Contract Administration/Project Management

Mr. Howard served as the resident engineer responsible for the construction and Contract Management of over $50 million of construction projects with the Omaha District, Corps of Engineers. At the Waterways Experiment Station, he was responsible for the overall direction, oversight, and approval of all contractual actions totaling over $100 million per year.

Organizational Management

Mr. Howard lead and guided all facets of the 2000 personnel at the Waterways Experiment Station. During a three year period he reduced by two thirds the accident rate to make the station one of the top installations within the Corps of Engineers worldwide. Additionally the installation received a 100% rating for its environmental and hazardous waste programs by the Mississippi DEQ. As a result of these and other excellent programs the installation was selected as the national runner up for the Community of Excellence in 1996 and was selected as the Army's R&D Organization of the year for 1996.

PUBLICATIONS

Engineer Magazine, April 1997, From Sandbags to Computers

Military Engineer, November 1996, Crossing the Sava River

EMPLOYMENT HISTORY

ICF Kaiser Engineers, Inc.	Vice President	1997-present
U.S. Army Corps of Engineers, Department of Defense	Colonel	1972-1997

Authors: Joe VanVoorhees/CORPORATE/US, LocalDomainServers
Author: Joe VanVoorhees/CORPORATE/US Created: 04/13/98
Editor: Patti Skinner/CORPORATE/US Last Update: 05/07/98

Corporate Resume

Employee Identification

Name: Dennis, Reid L
ID: 09447
Location: NY99

Resume Information

Title: Corporate
Description:

Status: In Resume System

Resume Text:
REID L. DENNIS, P.E.

EDUCATION

M.S., Civil Engineering/Environmental Engineering, Texas A&M University (1984)
B.S., Civil Engineering, Texas A&M University (Cum Laude, 1981)
B.S., Biology, Sam Houston State University (1974)

REGISTRATIONS AND CERTIFICATIONS

Professional Engineer; Virginia
PE Pending in Maryland, Delaware and Pennsylvania

OSHA 29 CFR 1910.120 40-hour Safety Training for Levels A-D Site Entry
Advanced HNU & OVA Training
Supervisory Training

EXPERIENCE:

Mr. Dennis has over 20 years of experience as a consulting engineer and environmental scientist. He has participated in numerous multi-disciplined hazardous waste, industrial and municipal projects. He is a Senior Project Manager/Principal Engineer in the Environment and Engineering Group of ICF Kaiser, International, Inc., where he is manager of three remediation projects for the Fairfax office. Prior to joining ICF Kaiser, Mr. Dennis served as Program Manager for a Hazardous, Toxic and Radioactive Waste (HTRW) Indefinite Delivery Order (IDO) Contract with USACE Baltimore, as well as Project Manager for a Remedial Investigation/Feasibility Study (RI/FS) for USACE Baltimore at Fort Eustis, Virginia. He also has over 5 years of experience working with USACE Omaha as Project Manager for numerous RI/FS activities.

Hazardous Waste Site Remediation

Superfund Site in Fredericksberg, VA. Mr. Dennis is currently managing the investigation, design and remediation of a former creosote facility located in Fredericksberg, VA. Activities include final characterization of the extent of creosote- (dissolved as well as dense non-aqueous phase liquid (DNAPL)) related polynuclear Aromatic Hydrocarbon (PAH) contamination in both the surficial soil as well as groundwater at the site, design of remediation for both soil and groundwater, negotiations with USEPA Region III on cleanup levels, and remediation. Significant accomplishments as Project Manager for the L. A. Clarke Superfund Site:

- Developed and performed a surface soil sampling program which, for the first time, fully satisfied EPA

Region III. The data collected was use to ultimatly determine that no action was required to remediate the surface soils at the site resulting in considerable cost savings for the client.

- Identified the technology and scoped a subsurface investigation for the potential presence of DNAPL at the site using a CPT equipped with a rapid optical screening tool (ROST). The CPT/ROST unit successfully identified the presence and quantity of DNAPL present at the site without generating soil cuttings or DNAPL waste at a fraction of the cost using conventional methods (geoprobe or HSA). The data collected was used to determine that the extent of DNAPL present was insignificant and did not warrant removal resulting in considerable cost savings for the client.

Superfund Site in Montross, VA. Mr. Dennis is currently managing the investigation, design and remediation of a former plating facility located in Montross, VA. Activates include a pre-design field effort to finalize characterization of the extent of contamination associated with TCE, bench scale studies, pilot scale studies, design of the full scale system, implementation and operation. Significant accomplishments as project manager for the Arrowhead Site:

- Developed and performed an expedited Pre Remedial Design Field Effort to fully characterize the nature and extent of contamination using state-of-the art technologies (including CPT and low-flow sampling). The effort was performed in 1/2 the time planned.

- Identified the potential to apply zero valet wall passive remediation technology to plume remediation, met with University of Waterloo to develop the concept, scoped and managed a FS to evaluate the applicability, and presented the concept to EPA III in place of conventional groundwater pump and treat. Implementation of the first zero valet reactive wall in Region III is expected to begin is early as spring, 1998, pending EPA Region III approval.

-

RCRA Site in Dickson, TN. Mr. Dennis managed the investigation of a former plating facility located in Dickson, TN. Activities include a pre-design field effort to finalize characterization of the extent of contamination primarily associated with TCE.

Environmental Assessment

Mr. Dennis completed a fast track investigation and assessment of a property transfer activity in Michigan for a private sector client. The project involved initial assessment of Michigan's recently promulgated Baseline Environmental Assessment requirements. Mr Dennis was responsible for heading up the focused site investigation, as well as extensive statistical analysis of the compiled data. The effort resulted in assessing that the contamination formerly associated with the site was actually existent as part of the background, and that the site did not warrant further regulation.

Program and Project Management for USACE

Mr. Dennis was involved with several projects for the U.S. Army Corps of Engineering for the Baltimore as well as the Omaha Districts. He was Program Manager for an HTRW IDO Contract for the Baltimore District. He was responsible for developing the 255/254, interviewing and winning the contract for Montgomery Watson. As Program Manager, he was responsible for assignment of Project Managers, as well as overall QA/QC of the deliverables submitted to the District.

Mr. Dennis has an extensive relationship with USACE Omaha, and served as the primary contact for his firm for all work associated with Forts Eustis, Story, and Lee. At Fort Eustis, he was Project Manager for IR/Pre FS, which involved completion of a series of investigations of numerous sites at Fort Eustis. This project included joint efforts with local regulators (USEPA and VDEQ) to accelerate activities at Fort Eustis in anticipation of becoming an NPL site. Mr. Dennis was also Project Manager for a project at the Helicopter Maintenance Area of Fort Eustis, Virginia. The project was associated with characterizing a JP-4 spill associated with the site, and involved a detailed site characterization and corrective action plan pursuant to the Commonwealth of Virginia's Underground Storage Tank regulations. The investigation involved a combination of soil, ground water, surface water and sediment sampling, and an intensive soil gas and hydropunch survey. The project also included a detailed treatability study for ground water remediation associated with an aquifer test. The study involved investigation of treatment of BTEX-contaminated ground water via oil/water separation, air stripping, GAC treatment, and possibly other techniques associated with BETX removal such as UV degradation. The project was on a fast track schedule, involving integration of numerous activities within both the Virginia office as well as other MW offices, and required a high attention to detail and management.

Mr. Dennis was Project Manager for preliminary assessments, site investigations, remedial investigation, and feasibility studies at Fort Story, Virginia, Fort Eustis, Virginia and NIKE base in Hampton Roads, Virginia. He served as field team leader during the field activities associated with those projects, which involved investigations of 30 separate sites. The investigative activity, which lasted for three months, involved installation and/or sampling of 59 monitoring wells, 119 soil borings, 89 sediments, and 41 underground tanks. In addition, the field activities included soil gas and geophysical surveys.

At Fort Lee, Virginia, Mr. Dennis was the Project Manager for a preliminary assessment and site investigation, a project involving investigations at nine sites. This investigation included the installation of 45 monitoring wells, 24 soil borings, and several sediment and surface water samples at the sites for characterizational purposes. He was also involved as QA/QC Coordinator for the Petroleum Training Facility Investigation and Site Characterization Report.

Private Sector Experience

Specialty Chemical Manufacturer, MN. Mr. Dennis was involved with a pilot pretreatment study for a specialty chemical manufacturer located in Blooming Prairie, Minnesota, in which he assisted in developing a report based on data gathered by the client using pilot sequencing batch reactor. MW was involved with setting up the pilot facility as well as overseeing the client's personnel. Mr. Dennis was then involved in the subsequent predesign activity for the same client, which included evaluation and subsequent recommendation of an SBR equipment supplier, development of bid specifications, selection of construction sites, and predesign of the pretreatment facility.

Waste Management Facility, AK. Mr. Dennis has also participated in a large scale feasibility study for construction of a Waste Management Facility (WMF) located on the North Slope of Alaska for a private client. The feasibility study was focused around interpretation of regulatory changes associated with oil field exploration and production waste, and three scenarios were developed based upon the changes. The WMF included a receiving area, a drum handling area, a liquids and solids processing area and a disposal area. The disposal area included an incinerator.

CH2M Hill, Virginia and Louisiana

Mr. Dennis worked as an environmental engineer for this firm and participated in numerous multi-disciplined hazardous waste, industrial, and municipal projects. He was particularly skilled in the planning and performance of hazardous waste site closures, field investigations and pilot studies, and was particularly qualified for projects that required both health and safety protection as well as innovative and creative techniques.

Mr. Dennis has experience as a design engineer for hazardous waste treatment systems. He served as a design engineer for a hazardous waste treatment facility that included containment, neutralization, heavy metals precipitation, solidification, pneumatic solidification material transfer, and ultimate disposal. Mr. Dennis assisted in selecting equipment, specifying pipe layouts, developing detailed hydraulics for viscous material transfer, review of pneumatic conveyance system designs for workability, preparing specifications for construction, and other critical portions of the design.

He has participated in on-site sampling of ground water, surface water, soils, and sediments and has acted as field coordinator, a site safety officer, and well installation inspector. Mr. Dennis is certified for Levels A, B, C, and D hazardous waste field work and is qualified site safety officer for levels B, C, and D.

Cleve Reber Site, LA. Mr. Dennis' field experience on large-scale hazardous waste site activities is extensive. Mr. Dennis served as lead field engineer and field manager during portions of the remedial investigation as well as pilot testing at the Cleve Reber Site in Louisiana. He was responsible for overseeing the drum excavation operation and assisting with Level B logistics as well as ambient air sampling during the final phase of the Remedial Investigation. He was field manager during the pilot study, which involved investigation of various physical/chemical and biological treatment technologies for treatment of leachate generated on site. Mr. Dennis served as lead field engineer at the Petro Processors hazardous waste site for EPA under the REM IV contract. Mr. Dennis was responsible for assuring that the PRP executed the work as delineated in the specifications and plans previously approved by EPA. The site was composed of two former disposal areas located approximately 4 miles apart, and a 40acre vault being constructed between the two former disposal areas. Activities at the site included construction of a double-lined (clay, HPDE) vault, construction of roadways and associated support facilities, solidification of high organic waste sludge, excavation of solidified sludges and contaminated material, and transportation of the contaminated material to the vault for final containment.

Love Canal, NY. Mr. Dennis was field manager on a dioxin sampling effort at the Love Canal site in New York, in which soil samples were obtained from area residents' yards for analysis. Mr. Dennis was responsible for setting up and managing the logistics associated with the large-scale sampling effort, which included coordinating the field activities of 30 people.

RAMPS, USEPA. Mr. Dennis' experience in hazardous waste work has also included the preparation of remedial action master plans (RAMPS). He worked as project manager on four RAMPS for EPA Zone I Contracts and as an assistant project manager for an additional four EPA Zone I and nine EPA Zone II contracts. His responsibilities included the supervision of up to seven RAMP managers.

Industrial Clients. Mr. Dennis conducted investigations of numerous hazardous waste sites and several industrial facilities including Wildcat Landfill (Delaware); Petro Processors and Bayou Sorrell (Louisiana); Winthrop (Maine); LaPari, DeImperio, Shope, and Gems (New Jersey); South Valley (New Mexico); Batavia, Niagara County Landfill, Sinclair, and York Oil (New York); Che4m Dyne (Ohio); MOTCO, Bio Ecology, Crystal Chemical, French, Sikes Pit, Harris Farley, and Highlands Acid Pit (Texas).

Among his activities for industrial clients, Mr. Dennis has been involved in several characterization studies and predesign projects. Mr. Dennis served as lead design engineer for a frozen food processing plant. The project involved modification of the client's existing wastewater treatment and conveyance system to connect to a new municipal sewer main being installed. The client also wanted to know the available options for disposal of approximately 5,000 cubic yards of waste frying oil sludge that were on site. For the design effort, Mr. Dennis was responsible for performing a site survey, compiling data on the existing system, designing modifications and additions to the existing system, and developing a technical report discussing options for disposal of the waste frying oil sludge. The report recommended reuse as supplemental boiler feed at a considerable savings to the client.

Mr. Dennis has also worked on projects for integrated electronics research and development facilities. He was project engineer for studies at Bell Laboratories facilities in Whippany, Murray Hill, Crawford Hill, and Holmdel, New Jersey. His activities included collecting data on existing piping layouts, characterizing wastewater, evaluating treatment options, evaluating and selecting alternatives, and predesigning multiphase treatment systems. Characterization of the wastewater at several of the facilities involved obtaining flow-weighted composite samples collected simultaneously at four locations using automatic samplers and flow meters installed under level B protection. Mr. Dennis served as lead field engineer on all the projects and managed a field team of up to five people.

Mr. Dennis was involved as design engineer for a 65gpm treatment system for Bell Communications Research. The system consisted of hydroxide precipitation, clarification, filtration, air stripping, carbon absorption, and neutralization. Mr. Dennis' responsibilities included process selection, layout, drafting supervision, and specification preparation.

For other industrial clients, Mr.Dennis designed several small neutralization systems for deionization units and plating rinse baths, and performed a dissolved air flotation pilot study for packing plant.

Municipal Clients. Mr. Dennis has been involved in several pilot projects including two studies dealing with both advanced wastewater and water treatment systems. The advanced wastewater treatment pilot study used a scaled-down treatment system to obtain information related to controlling bulking sludge for the Upper Occoquan Sewage Authority. The information obtained resulted in the creation of an innovative, cost-effective design. Mr. Dennis also helped design, troubleshoot, operate, organize, and evaluate the data for 80-gpm advanced water treatment system for the City of Newport News. The system was used to select filter media, to evaluate a "superpulsator" clarifier, and to investigate the use of powered activated carbon to remove trihalomethane precursors.

Prior Experience

Before obtaining his Civil Engineering Degree, Mr. Dennis was involved in oil spill technical surveillance and consultation for the Texas A&M Oil and Hazardous Waste Spill Response Team. The team was active in the evaluation of methodology used for spill on the Texas coastline. Mr. Dennis' primary duties included the biological assessment of damage, mapping of contaminated areas and oil movement, the measurement of currents and tides, and design for optimal placement of containment booms.

During this time spent at Texas A&M, Mr. Dennis also participated in a detailed study of the ability of activated alumina and granular activated carbons to remove chromium and lead from wastewater for the Department of the Interior.

Before this, Mr. Dennis worked as a lab technician for a petroleum products facility (LUBRIZOL) in Deer Park, Texas, and was head environmental chemist for a wastewater analytical laboratory (AQUA CHEM) in the same town, His primary duties included physical, chemical, and biological wastewater characterization via standard method technology; quality control organization and implementation; and representative sampling of various waste streams.

Mr. Dennis served as an environmental scientist for a National Science Foundation study of the American Alligator. The study focused on the analysis of pesticides in the alligator's food chain (aquatic snakes). Among his responsibilities were water and biological sampling, species identification, and chemical analysis of animal tissues and water.

ORGANIZATIONS

American Society of Civil Engineers
Water Pollution Control Federation

PUBLICATIONS

With Maria Pijnenburg and Damian Sandoval, "An Integrated Approach for Cost Effectively Characterizing and Locating Free Product and Related Dissolved Contaminant Plumes" Poster presented at DOD Conference, Pasco, Washington. (1992)

With Bill Batchelor, "A Surface Complex Model for Adsorption of Trace Components from Wastewater." Journal Water Pollution Control Federation, 59, #12 (1987).

With Bill Batchelor, Patti Jo Burkett, John Lindner, and Pe-der Yang. U.S. Department of Interior. "Treatment of Domestic Wastewater for Reuse with Organic Oxide Adsorbents." (1983)

With Roy W. Hann, Jr., Harry Young Jr., and David James. "Technical Aspects of the Esso Bayway Oil Spill." Environmental Engineering Division, Civil Engineering Department, Texas A&M University. 1979.

With Roy W. Hann, Jr., "Levels of Efforts from Previous Spills." In Texas A&M University training course manual, Prevention, Abatement, and Control of Pollution from Ships. 1978.

Authors: Sam Lindsey, LocalDomainServers
Author: Sam Lindsey/CORPORATE/US Created: 11/15/95
Editor: Patti Skinner/CORPORATE/US Last Update: 05/01/98

Michael P. Schaub

Summary of Qualifications:

Manager with over 25 years of experience in the design, construction and modifications of complex projects for A/E's, general contractors and owners. Demonstrated track record of successfully negotiating initial contracts, modifications and bringing projects in under budget and on schedule.

- Construction Management
- Contract Administration and Negotiation
- Field Construction Supervision
- Field Construction Inspection
- Field Safety Inspection
- Logistics Planning & Overview
- Project Management Systems
- Construction Operations Planning and Implementation
- Construction Claims Preparation and Analysis
- Constructability Review
- Subcontracting
- Contractor Selections and Awards
- Document Control Programs
- RCRA-Environmental Compliance
- Corrective Action Programs
- Mediation and Arbitration
- Construction Methods Studies

Professional Employment Experience:

1994 to Present

E.P. Johnson Construction and Environmental Inc.
Tri Cities, WA
General Manager

Successfully negotiated a contract with an American / Chinese firm to disassemble and containerize a large sawmill in Northern Washington for shipment to China. The project was completed under budget and three months ahead of schedule. The sawmill has since been re-assembled and is operating in China. Effectively and efficiently provided overall administration in excess of 20 field projects of various types in several regions of the Pacific Northwest simultaneously. Accomplishments: Implemented a contract document control program for tracking project costs and scheduling impacts. This gave the company the documentation to successfully negotiate contract changes and modifications. Increased the volume of contracts from three million to seven million, 60% of which were negotiated contracts.

1993-1994

ICF Kaiser Hanford
D.O.E. Facility, Richland, WA
Contract Administrator and Start-up Coordinator

The prime contract was for a 70 million dollar waste water treatment facility to remove low level radio nuclides from the Concentrated Tank Farm condensate. Administered the mechanical portion of the contract from the foundations though start-up. Directed the start-up of the facility. Integrated the requirements of the operations group with contractors start-up group. Accomplishment: Established a path forward for the operations and design people to work together towards the common goal of a safe, economical working facility. Coordinated the requirements of three oversight groups who were overviewing the construction and start-up of the facility.

1992-1993 ICF Kaiser Engineers
Mechanical Contract Administrator and Start-up Coordinator

Removed the existing wind tunnel and directed the mechanical construction of the new 250 million dollar 12 foot diameter heavy steel plate state of the art wind tunnel for NASA at the AMES Research Center Mountian View, California. Acted as the liaison between NASA and the mechanical contractor during construction. NASA was the design engineer and procured the major mechanical components. Accomplishments: Identified several major constructability problems during the review process, eliminating cost overruns and possible litigation by the contractors. Established start-up sequencing by system. Coordinated the efforts of the electrical and mechanical groups for a smooth start-up.

1990-1992 D/R/C Joint Venture
Design Build Group
Northern Michigan
Field Manager

Coordinated the enclosure of the buildings so the interior work could continue during the severe Northern Michigan winters. Prepared contract documents for major contracts for a 50 million dollar, maximum-security prison in Northern Michigan. Accomplishments: Developed a six month schedule enhancement allowing inmate occupation early and saving the state of Michigan the cost of fines mandated by the courts for overcrowded prisons. Negotiated wetlands agreement with the State Department of Natural Resources.

1989-1990 Rust Engineers
Iron Mountain, MI
Start-up Coordinator

Established the startup boundaries and sequencing of over 200 systems for a 250 million-dollar paper mill expansion in Iron Mountain, MI. Coordinated over 100 tie-ins with the existing facility during shutdowns.
Supervised the start-up groups as they started the different systems including a package boiler. Accomplishments: Directed the erection and start-up of a state of the art oxygen delignification reactor used in the production of high gloss paper. Because of the knowledge of the systems that the start-up group had we were included in the initial assignments by the International Labor Unions.

1987-1989 Pascal & Ludwig Engineers
Southern California
Project Manager

Supervised the construction of a 5 million-dollar potable water booster station in a highly congested and elite area of Southern California. Assembled bid packages and selected sub-contractors. Coordinated and sequenced the pump station tie-in to the supply line during an 8-hour shutdown. Accomplishments: Successfully negotiated major contract modifications with the owner and design engineer.

1985-1987 Oregon Steel Mills
Portland, OR
Construction Manager

Responsible for the installation of a 70 million-dollar upgrade to the facility. Select major contractors through the bid process and negotiations. Coordinated and negotiated the interface between two major suppliers of a new bottom tap furnace. Accomplishment: Integrated new machinery into the shear facility without loss of production. Completed a three month plant enhancement program overall ahead of schedule.

1979-1985 Kaiser Engineers/ Raymond International
Superintendent
Construction Engineer

Developed the start-up scoping documents and procedures and coordinated the start-up of a 3 billion-dollar coal gasification facility in North Dakota. Supervised the field engineering staff during the construction of a 200 million-dollar Aluminum Smelter Plant Expansion in Goldendale, WA. Coordinated between the design group in Oakland, CA and the field. Directed the many tie-ins to the existing facility without interruptions to the production schedule. Oversaw the smooth start-up of the facility. Supervised up to 200 craft workers installing the mechanical portion of a 150 million-dollar upgrade to an iron ore concentrator in Northern Minnesota. Coordinated design changes between the client and design group in Oakland, CA. Supervised the re-design of a seven-mile pipeline to facilitate the start-up of the facility.

1973-1979 Bechtel Power Corp.
San Francisco, CA
Survey Party Chief
Superintendent

Supervised the rebar cad welding and heavy rigging crews during the construction of Units 1 & 2 Palo Verde Nuclear Power Station, Phoenix, AZ. Re-designed cad welding procedure resulting in a 20% increase in daily cad welding production per crew. Supervised the construction of two 300' water clarifiers on a 260 million-dollar Iron Ore Concentrator in Northern Michigan. Coordinated the interface between the manufactures technical representatives and the field crews for a smooth installation and start-up of the facility. Accomplishments: Promoted to Chief of Survey on a 140 million-dollar expansion of an Iron Ore Facility in Northern Minnesota. Oversaw the setting of the line and grade for all civil and mechanical work on the project. Accomplished not having to remove or replace any concrete foundations due to survey error.

Education:
Associates Degree Civil Engineering/Surveying; Minnesota
Contract Administration Seminars; Bechtel / Kaiser
Expediting Seminars; Kaiser
Claims Negotiating Seminars; Kaiser / Pascal & Ludwig

Citizenship: U.S. citizen

MICHAEL P. SCHAUB
P.O. Box 2105
Colstrip, MT 59323

MARK T. SCHWIPPERT
3589 Winchester Drive
East Aurora, New York 14052
(716) 652-1304

SUMMARY

Multi-faceted professional with diverse technical skills and results-oriented peformance capabilities. Extensive involvement with the design, implementation and management of geologically-related projects. Progressive personal development in areas of strategic planning, manpower coordination, engineering knowledge and communications skills.

EXPERIENCE PROFILE

GEOLOGIST/PROJECT MANAGER

Waste Resource Associates, Inc. Niagara Falls, New York 1991-1998

Accountability: Coordination and supervision of site investigations and assessments, remedial action plans and property development projects. Collection, evaluation and technical management of geologic, hydrogeologic, geotechnical and analytical data.

Performance Analysis: Principal Investigator and Team Leader; supervision of technical staff; procurement and direction of subcontractor services; design and execution of environmental testing programs; evaluation of remedial alternatives; design and implementation of regulatory compliance and health & safety programs; preparation of bid specification documents and scope-of-work proposals; planning and regulatory support for commercial development projects; permit preparation; compilation of summary report documents; sales and marketing presentations; new client development.

Achievements: Obtained professional licenses and accreditations; designed and implemented Radiation Safety Program as required by NYSDOL Radioactive Materials license; serve as Radiation Safety Officer.

FIELD GEOLOGIST

Gypsum Energy Management Company Darien Center, New York 1983-1990

Accountability: Planning, coordination and supervision of gas field drilling operations. Development and execution of strategies to enhance energy reserves through evaluation of geologic and engineering data.

Performance Summary: Collected and evaluated geologic, geophysical, production and reservoir engineering data; developed and interpreted geologic maps and cross-sections; designed and utilized effective casing and cementing programs which ensured ground water protection; contributed to enhanced well treatment programs and drilling techniques; directed and evaluated subcontractor services; assessed borehole video camera data; prepared permits and regulatory compliance reports; selected well site locations and pipeline routes; assisted with landowner and community liaison.

Achievements: Completed degree program while working part-time; designed and implemented a company-wide Hazard Communication program in compliance with EPA regulations.

TECHNICAL REPRESENTATIVE/PROJECT ENGINEER

Core Laboratories, Inc. Shreveport, Louisiana 1980-1982

Accountability: Operation and management of mobile laboratory facility equipped for data collection and evaluation in support of petroleum exploration and drilling projects. Supervision and training of entry-level employees.

Performance Summary: Collected, analyzed and recorded geologic and hydrocarbon data during active drilling operations; operated gas chromatography and flame ionization equipment for oil/gas assessment; performed stratigraphic correlations by comparing geophysical scout data with real-time, borehole-derived measurements;logged and described drill core; identified and evaluated potential pay zones; recorded and drafted daily log data; reported information to client; served as liaison between operator and driller.

Achievements: Promoted to Crew Chief within one year; completed advanced level Technical Grading Program; recalled to service by a major client based on prior performance.

EDUCATION

B.A., Geology State University College at Buffalo Buffalo, New York
B.S., Biology Allegheny College Meadville, Pennsylvania

PROFESSIONAL LICENSES

Licensed Professional Geologist PG No. PG00079G Commonwealth of Pennsylvania
Certified Professional Geologist CPG NO. 9446 American Institute of Professional Geologists
Licensed Lead Inspector L-4733 State of Illinois

TRAINING AND CERTIFICATIONS

U.S.A.C.E. Construction Quality Control for Contractors (May,1998-pending)
40-hour OSHA Hazardous Waste Site Worker
24-hour EPA/HUD Lead Inspector
40-hour EPA/HUD Lead Abatement Contractor/Supervisor
16-hour EPA/HUD Lead Risk Assessor
NYSDOL Radiation Safety Officer
Manufacturer's XRF Operator Training- Niton, RMD, Metorex/Outokumpu

PROFESSIONAL SOCIETIES

Buffalo Association of Professional Geologists
American Institute of Professional Geologists
Association of Ground Water Scientists and Engineers
American Association of Petroleum Geologists
AAPG- Division of Environmental Geosciences

Nancy A. Rozborski
69 Pine Woods Drive
North Tonawanda, New York 14120
(716) 693-2755

OBJECTIVE: A management position within Human Resources which will utilize my Benefits and Finance background

EXPERIENCE:

March 1997 to April 1998 **MERCY HOSPITAL**
Buffalo, New York

Benefits Specialist

Responsible for administration and management of all employee benefit plans, including health insurance, life insurance, defined benefit pension plan, 403(b) plans (ERISA and Non-ERISA), Section 125 Plan, Long Term Disability, COBRA and HIPAA administration. Provided cost/benefit analysis on potential plan changes as a result of union negotiations. Evaluated and implemented plan design changes, determined financial impacts of new legislation, and developed employee awareness initiatives.

Sept. 1996 to Feb. 1997 **CHRIS TUCKER HOMES, INC.**
North Tonawanda, New York

Administrative Assistant

Responsible for all aspects of small office administration including accounts payable and receivable, job costing, and general office for a custom home builder. Established automated accounts payable tracking system, and job costing system.

April 1995 to Aug. 1996 **CALIBER SYSTEM, INC. (formerly Roadway Services, Inc.)**
Akron, Ohio

Benefits Manager - Retirement and Savings Plans

Responsible for managing all aspects of daily operation of various employee benefit plans, including Pension, 401(k), Stock Bonus, Dividend Reinvestment, Employee Stock Ownership Plan (ESOP) and Canadian Retirement & Savings Plan. Additional responsibilities included Incentive Compensation processing for various operating companies. Position required extensive background knowledge of ERAS, DOL and IRC regulations with respect to day-to-day operations, as well as Human Resource Management System (HRMS) and SunGard OMNIPLAN software interface.

July 1994 to April 1995 — **WESTINGHOUSE ELECTRIC CORPORATION HEADQUARTERS**
Pittsburgh, Pennsylvania

Senior Benefit Services Consultant

Responsible for negotiating health and welfare insurance contracts with providers, with applicable performance and trend rates. Duties included monitoring performance against contract requirements and assessing appropriate penalties/actions. Assisted negotiations team in the implementation, and subsequent communication of proposed language/plan design changes with respect to Health and Welfare Plans for the bargained units. Performed as final appeal administrator for proper application of benefit policy claims.

July 1991 to June 1994 — **WESTINGHOUSE ELECTRIC CORPORATION - Naval Systems Division**
Cleveland, Ohio

Human Resource Specialist - Benefits

Responsible for administration of Salaried and Hourly Employee Pension Plans covering 1250 participants and 401(k) Savings Plans covering 1000 participants. Other responsibilities included preparation of Form 5500's, PBGC premium calculation, and data retrieval for ADP/ACP testing. Responsible for plan revisions and updates, SAR generation and SPD preparation. This position required a large amount of interface with employees and insurance carriers, regarding conflict resolution. Assisted in other Human Resource functions including labor relations, compensation and training.

Dec. 1986 to July 1991 — **WESTINGHOUSE ELECTRIC CORPORATION - Naval Systems Division**
Cleveland, Ohio

Supervisor of Accounting Services

Responsible for management of $155 million annual Cash Disbursement group, $55 million annual Payroll, and $5 million annual Travel departments. Assisted in the design and successful conversion of the payroll system from an IBM platform tot an HP platform. Developed detailed procedure manuals to support new system. Implemented a PC-based pension statement system, as well as participated in the evaluation process of a new travel system.

EDUCATION:

State University of New York at Buffalo (SUNYAB)
B.S. in Business Administration, December 1984
Major: Accounting

REFERENCES: **Available upon request**

EXCAVATION AND RESTORATION PLAN

FUSRAP ASHLAND 2 REMEDIAL ACTION
TONAWANDA, NEW YORK

MAY 22, 1998
CONTRACT NO. DACA31-95-D-0083, TERC,
TASK ORDER NO. 23

ICF KAISER

Worldwide Excellence in Meeting Client Needs

U.S. ARMY CORPS OF ENGINEERS
BUFFALO DISTRICT OFFICE

FORMERLY UTILIZED SITES REMEDIAL ACTION PROGRAM

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PDR ADOCK 04008681
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19591

PART VI (ATTACHMENT A)
CONTRACTOR SUBMITTAL REQUIREMENTS SUMMARY

SUBMITTAL SCHEDULE

S ~~Prior to Shipment~~
B Prior to Balance of Payment
A Per S/C Schedule
M Prior to Mobilization
W Prior to Commencing Work
Y Prior to Progress Payment for Each Specific Task
Z As Required

SUBMITTAL TYPE REQUIRED

O Original
P Print/photocopy
T Transparency
M Microfilm
PH Photograph
FD Floppy Disk
S Sample

DISTRIBUTION DESIGNATION

CA Contract Administrator

NOTICES

1. *To each item submitted, attach a copy of this form and circle the title of the item being submitted.*
2. *Failure to submit required submittals as delineated on this form may result in withholding of payment in accordance with provisions of the contract.*
3. *The Contract Administrator is responsible for distributing submittals to the requesting Department (e.g., Construction). The Department is responsible for further distributions (e.g., Site Superintendent).*

Item No./ Submittal Titles	Clause, Specification, or Scope of Work Paragraph	Contractor send Submittal to	Submittal Codes: Schedule	Submittal Codes: (No.) and Type
1.1 Analytical results and the disposition method for the water collected from the rail car loading area	Scope of Work (SOW), Sec., 3.4.2	CA	Z	O
1.2 In-situ volume of soil to be excavated from each site	SOW, Sec., 3.5.3	CA	20 working days prior to excavation	O
1.3 Pre-excavation lines and grades for the contaminated areas at each site	SOW, Sec., 3.6.1	CA	20 working days prior to excavation	O
1.4 Lessons learned during Ashland 2 excavation	SOW, Sec., 3.6.10	CA	15 working days after completing the remediation	O
1.5 Inform USACE about the remediated areas	SOW, Sec., 3.7.2	CA	Following the remediation	O
1.6 Analytical results of the samples collected from the remediated excavation areas	SOW, Sec., 3.7.2	CA	5 working days after completing the remediation	O
1.7 Information required by the CERCLA process to document closure of the Tonawanda Site	SOW, Sec., 3.7.4	CA	30 working Days after completing remediation	O
1.8 Name and location of borrow source for the general fill material	SOW, Sec., 3.8.3	CA	10 working days prior to use	O
1.9 Test results for the general fill material	SOW, Sec., 3.8.4	CA	10 working days prior to use	O
1.10 As-built drawings for the backfilled areas	SOW, Sec., 3.8.8	CA	15 working days after completing site restoration	O
1.11 Name and other information related to the licensed/permitted disposal facility	SOW, Sec., 3.9.1	CA	30 working days prior to waste transportation	O
1.12 Report of weekly radiological surveys performed on the haul routes and the rail car loading area	SOW, Sec., 3.9.3	CA	3 working days after performing the survey	O

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1.13 Copy of the waste profile sheets and other shipping documents	SOW, Sec., 3.9.9	CA	2 working days prior to waste transportation	O
1.14 Certficate of Disposal	SOW, Sec., 3.9.10	CA	B	O
1.15 Repair/restoration work proposal	SOW, Sec., 3.11	CA	Z	O
1.16 Design Package Specifications	SOW, Sec., 3.12.1	CA	30 working days prior to Mobilization	O
1.17 Site Operations Plan	SOW, Sec., 3.12.2	CA	15 working days prior to Mobilization	O
1.18 Excavation and Restoration Plan	SOW, Sec., 3.12.3	CA	20 working days Prior to Excavation	O
1.19 Waste Management, Transportation, and Disposal Plan	SOW, Sec., 3.12.4	CA	20 working days prior to Excavation	O
1.20 Sampling and Analysis Plan	SOW, Sec., 3.12.5	CA	20 working days prior to Excavation	O
1.21 Regulatory Compliance Plan	SOW, Sec., 3.12.6	CA	20 working Days prior to Excavation	O
1.22 Safety and Health Plan	SOW, Sec., 3.12.7	CA	21 working days prior to Consummation of Delivery Order	O
1.23 Construction Quality Control Plan	SOW, Sec., 3.12.8	CA	15 working Days prior to Excavation	O
1.24 Project Records	SOW, Sec., 5.1	CA	B	O
1.25 Final Status Survey Report	SOW, Sec., 5.2	CA	B	O

ICF Kaiser Engineers, Inc. TERC Contract No. DACA 31-95-D-0083	Project Number 66723	Project Name Ashland 2 FUSRAP	Task Order No. 23	Date: 02/24/98 Page 2 of 2

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None

LIST OF ACRONYMS

AEC................. Atomic Energy Commission
ALARA .... As Low As Reasonably Achievable
ARARs .... Applicable or Relevant and Appropriate Requirements
ASTM .... American Society for Testing and Materials
COR .... Contracting Officer Representative
E&R................. Excavation and Restoration
FUSRAP.......... Formerly Utilized Sites Removal Action Program
ICF Kaiser .... ICF Kaiser Engineers, Inc.
MED .... Manhattan Engineer District
pCi/g................ picocuries per gram
RA................... Remedial Action
TERC .... Total Environmental Restoration Contract
Th .... Thorium
USACE............ U. S. Army Corps of Engineers
USCS .... Unified Soil Classification System

1.0 INTRODUCTION

The United States Army Corps of Engineers (USACE), Buffalo District has been designated to remediate the radiologically contaminated sites located in the town of Tonawanda, New York. This effort is part of the USACE's Formerly Utilized Sites Remedial Action Program (FUSRAP), which was established to identify, investigate and cleanup or control sites previously used by the Atomic Energy Commission (AEC) and its predecessor, the Manhattan Engineer District (MED).

ICF Kaiser Engineers, Inc. (ICF Kaiser), under Total Environmental Restoration Contract (TERC) No. DACA 31-95-D-0083, Task Order No. 23, has been designated the Remedial Action (RA) Contractor for the Ashland 2 Site. The primary objective of the Ashland 2 Site Remediation effort is the timely and effective cleanup of the site in accordance with Alternative 2A of the U.S. Army Corps of Engineers Proposed Plan for the Ashland 1 and Ashland 2 Sites. This alternative provides for the complete excavation and off-site disposal of materials using a site specific guideline of 40 pCi/g Th-230. This alternative meets the commitments made to community representatives and is believed to provide the best balance among the considered alternatives presented in the Proposed Plan. With respect to the evaluation criteria, this alternative will protect human health and the environment and will comply with Applicable or Relevant and Appropriate Requirements (ARARs) while providing for the release of the property for future use as defined in the 1992 Town of Tonawanda Waterfront Development Master Plan.

The remediation effort will be conducted in a manner that provides a level of protection to the public and remediation workers consistent with applicable radiation exposure guidelines and with the objective of achieving as low as reasonably achievable (ALARA) exposure levels.

ICF Kaiser has been contracted to develop an Excavation and Restoration Plan (E&R Plan) for the Ashland 2 Site. The purpose of the E&R Plan is to identify equipment and establish procedures for excavating radioactive soils with activity greater than 40 pCi/g Th-230, backfilling the excavation areas using soils with activity less than 40 pCi/g Th-230 and restoring the site to topographic conditions that may have existed prior to the removal of radiological contamination. In accordance with the USACE Proposed Plan for the Ashland 1 and Ashland 2 Sites, this E&R Plan has been developed to provide the technical basis for excavation activities and to complement the construction drawings and specifications required for implementing Remedial Action.

1.1 SCOPE OF WORK

The five major components of the E&R Plan are as follows:

- Excavation. The Excavation section will provide information on excavating procedures, safety during excavation, equipment, site personnel, monitoring and oversight, site surveys, confirmation and verification sampling, main area excavation and excavation of remote 'isolated areas'.
- Backfilling and Compaction. The Backfilling and Compaction section will present information on general backfilling procedures, backfilling of the main excavation area and backfilling of remote 'isolated areas'.
- Monitoring and Environmental Control. In this section, information will be presented on perimeter air monitoring, dust control, stormwater management and Erosion and Sediment Control.
- Decontamination. The Decontamination section will provide information on the equipment and procedures to be used in the decontamination of construction equipment and oversize debris.
- Site Restoration. In this section, information will be presented on the final cover soil, revegetation, which includes soil preparation, seeding, fertilizing and mulching, and maintenance of vegetated areas.

1.2 LOCATION AND DESCRIPTION

The Ashland 2 Site is located approximately 0.8 mile north of the intersection of New York Interstate Routes 190 and 290 in the town of Tonawanda, New York. The Ashland 2 Site covers approximately 110 acres and is situated approximately 2500 feet southeast of the Niagara River. Site latitude is approximately 78° 54' 55" and site longitude is approximately 42° 59' 55". Figure 1-1 presents a general layout of the Ashland 2 Site. The Ashland 2 Site is accessible by way of River Road (New York State Route 266) and is bounded to the northeast by G.K. Hambleton Corporation, to the southwest by Niagara Mohawk Power Company, to the southeast by a railroad spur owned by Conrail and to the northwest by River Road. Figure 1-2 presents a location map for the Ashland 2 Site. The topography of the Ashland 2 Site is relatively flat. However, in the area where excavation is proposed and where soils with activity greater than 40 pCi/g Th-230 exist, small mounds with elevations approximately 10 to 15 feet higher than the general elevation of the surrounding area are present. Site ground cover consists of a dense vegetation of grass, brush and small trees. The average height of the brush, which resides over a majority of the Ashland 2 Site is four to five feet.

The excavation areas are located in the central portion of the Ashland 2 Site, southeast of an existing industrial Landfill and northwest of an unnamed tributary. The excavation areas are shown on Figure 1-2.

1.3 SITE HISTORY

From 1942 until 1946, portions of the Linde Site (currently Praxair) and a few select buildings located at Linde in the Town of Tonawanda, New York, were used for separation of uranium ores. These processing activities, conducted under an MED contract, resulted in elevated levels of radionuclides in portions of the property and buildings. Subsequent disposal and relocation of processing wastes from the Linde property resulted in elevated levels of radionuclides at three nearby properties in the Town of Tonawanda: the Ashland 1 property, the Seaway property, and the Ashland 2 property. Together these four properties are referred to as the Tonawanda Site.

A portion of the Ashland 2 property was used by Ashland Oil as a landfill for disposal of general plant refuse and industrial and chemical by-products. The radioactive residues and inorganic constituents removed from Ashland 1 were deposited in an area of Ashland 2 adjoining the Ashland Oil landfill area. The industrial landfill portion of Ashland 2 was closed and covered with clay soil in 1982 by Ashland Oil. Currently, the Ashland 2 property is vacant and is covered by a vegetative growth (e.g., grass, bushes, and weeds); no commercial operations are currently being conducted.

1.4 SCHEDULE

An overall schedule for remedial action is presented in the Site Operations Plan. Within that schedule are several activities covering excavation, backfilling and site restoration. The schedule is event oriented and is subject to change based on weather conditions or other unforeseen delays.

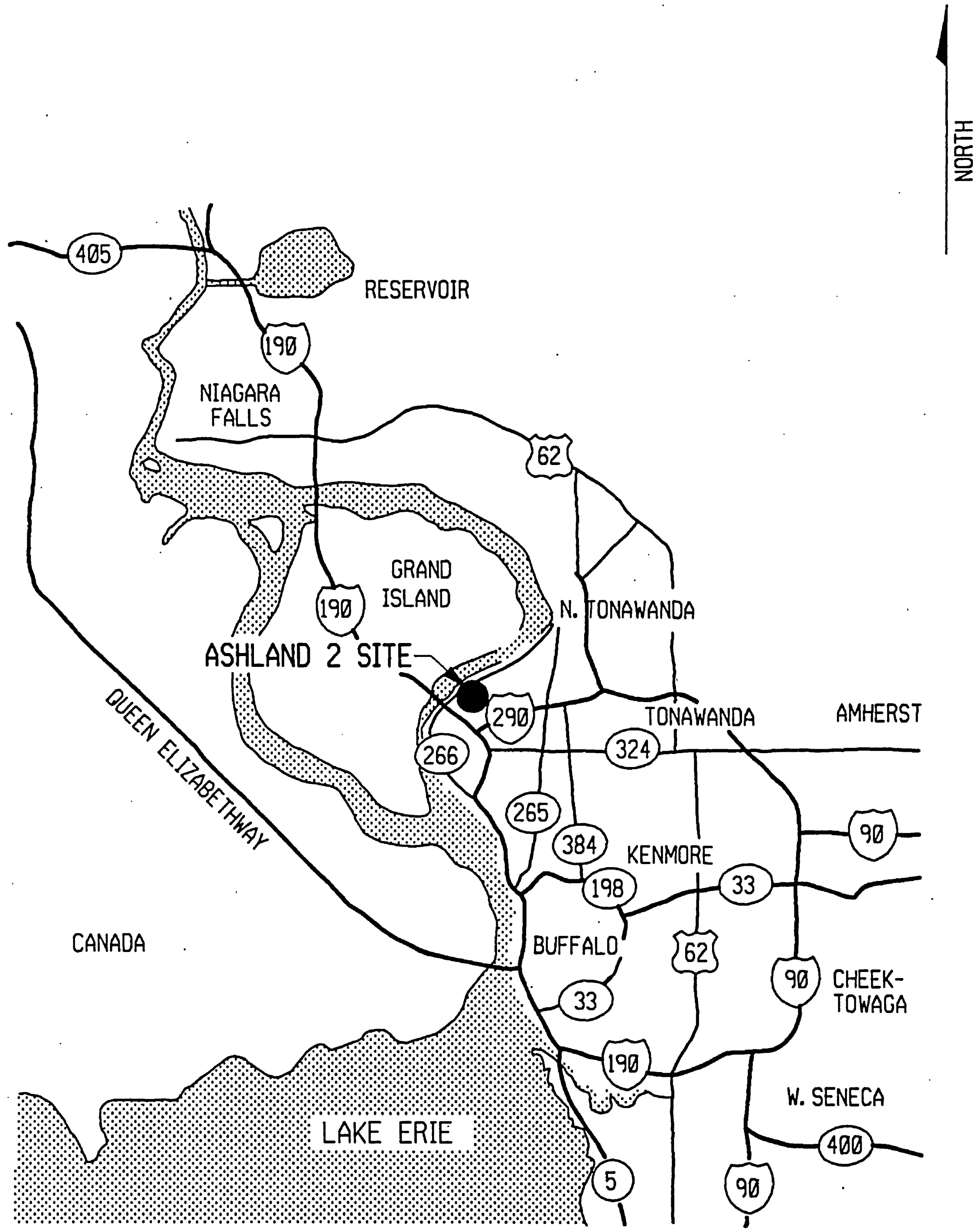

FIGURE 1-2		
FUSRAP ASHLAND 2 REMEDIAL ACTION TONAWANDA, NEW YORK	LOCATION MAP	
ICF KAISER ENGINEERS PITTSBURGH, PA	DATE: 4/15/98	DR.: D.M.
	SCALE: NOT TO SCALE	FILE NAME: 20155011

2.0 EXCAVATION

This section of the E&R Plan discusses the various procedures, equipment and personnel to be used in the excavation of radiologically contaminated soil. Excavation of these soils is anticipated to occur within a main excavation area and several smaller ancillary areas. These areas are shown on Drawing 66723-RD5. During the excavation process, material will be designated to one of three different categories. Radiologically contaminated soils with activity greater than 40 pCi/g Th-230, hereinafter referred to as greater than 40 soils, will be segregated for off-site disposal. Radiologically contaminated soils with activity less than 40 pCi/g Th-230, hereinafter referred to as less than 40 soils, will be stockpiled on-site for later use. Debris, which will be defined as material larger than twelve (12) inches, as measured in any one direction will be segregated for decontamination and disposal.

2.1 GENERAL EXCAVATION PROCEDURE

Excavation of radiologically contaminated soil will commence after the area of excavation has been delineated on the existing ground surface. The current delineated area of greater than 40 soils is presented on Drawing 6723-RD5. Each six-inch lift of the excavation area below the existing ground surface will be delineated using a Walkover Gamma Radiation Survey Method. This method is presented in great detail in the Final Status Survey Plan. Areas of greater than 40 soil and less than 40 soil will be delineated.

After the areas have been delineated, a hydraulic excavator will excavate the greater than 40 soils in minimum depth increments of six inches. The excavator will be located on an area where greater than 40 soils exist at the current ground surface elevation where excavation is taking place; therefore it will be dedicated to excavation of greater than 40 soils. The excavator will load the greater than 40 soils into an off-road truck that will transport the greater than 40 soils through the delineated excavation area to a staging area adjacent to the excavation. Haul roads used for transportation of greater than 40 soils through the excavation area will be located within greater than 40 soil areas. The exact haul road location will be determined at the time a specific lift is being excavated. The staging area will also be delineated as a greater than 40 soil area.

The off-road truck will dump the greater than 40 soil in the staging area. A front end loader will load the greater than 40 soils into a 12 to 15 cubic yard on-road dump truck, attempting to keep the exterior of the truck from coming in contact with greater than 40 soils. The dump truck will be dedicated to 'clean' areas that are uncontaminated, while front end loader will be restricted to areas where greater than 40 soils are present on the ground surface. The on-road dump truck will be filled to approximately 80 to 90 percent of capacity, to avoid any accidental spillage during transportation of the soils, and covered with a tarpaulin. The dump truck will then transport the greater than 40 soils to the rail loading area, using a dedicated 'clean' access road.

Excavation of less than 40 soils will proceed in the same manner as excavation of greater than 40 soils. A hydraulic excavator will be dedicated to the excavation of less than 40 soils and will be located on an area where less than 40 soils exist at the ground surface elevation where excavating is taking place. Less than 40 soil will be loaded into a dedicated off-road truck that will transport the soil to a less than 40 stockpile area. Haul roads used for transportation of less than 40 soils through the excavation area will be located within less than 40 soil areas. The less than 40 stockpile area will be located on the industrial landfill adjacent to the excavation, but a select distance away from the stockpile area where greater than 40 soils are located. The off-road truck will dump the less than 40 soils at the stockpile area, where they will be held until needed for backfilling operations. A discussion of backfilling is presented in Section 3.0 of this E&R Plan.

Appropriate measures to control stormwater and sediment will be implemented throughout the time that less than 40 soils are stockpiled. These measures will consist of the installation and maintenance of silt fence around the entire perimeter of the staging area "footprint" and/or tarping, as required.

It will not be necessary to perform radiological surveys on the exterior of trucks hauling greater than 40 or less than 40 soils to their respective stockpiles. The trucks will be dedicated to areas where the material they are hauling exists on the ground surface. The stockpile areas are also dedicated to the materials they are storing. No contamination of other areas by either greater than 40 or less than 40 soil is anticipated, because of these restrictions.

Debris encountered during excavation of greater than 40 or less than 40 soils will be segregated from the soils at the stockpile or staging areas, respectively. Identification of debris will be performed visually by field personnel. The debris will be decontaminated as discussed in Section 4.0 of this E&R Plan.

2.2 SAFETY

The excavation activities discussed in this section of the E&R Plan can be conducted only if proper procedures and practices are instituted to ensure the health and safety of personnel from both radiological exposure and physical and/or mechanical hazards. A site specific Health and Safety and Emergency Response Plan for the Ashland 2 Site has been developed in accordance with the Occupational Safety and Health Administration' s Safety and Health Standards 29 CFR 1910.120, 29 CFR 1926, and the Hazard Communication Standard 29 CFR 1910.1200. The purpose of the Health and Safety and Emergency Response Plan is to establish safe procedures and practices for the Remedial Action Contractor, ICF Kaiser and subcontractor personnel engaged in field activities associated with the Remedial Action at the Ashland 2 Site. The following sections of the Health and Safety and Emergency Response Plan contain information that will directly affect the conduct of excavation activities at the Ashland 2 Site.

- Hazard Analysis, Section 2.0 of Volume 1;
- Personal Protective Equipment and Apparel and Air Monitoring; Section 5.0 of Volume 1;
- Restricted Work Areas; Section 6.0 of Volume 1;
- Training Requirements; Section 7.0 of Volume 1;
- Personnel Dosimetry; Section 2.0 of Volume 3;
- Self Reading Dosimeters; Section 5.0 of Volume 3;
- Radiological Bioassays; Section 10.0 of Volume 3;
- Posting of Areas; Section 13.0 of Volume 3;
- Access/Egress Control; Section 14 of Volume 3;
- Roles and Responsibilities; Section 16.0 of Volume 3;
- Types of Radiological Surveys; Section 18.0 of Volume 3;
- Performing Radiological Surveys; Section 19.0 of Volume 3;
- Equipment and Materials Release Surveys; Section 23.0 of Volume 3;
- Radioactive Decontamination and Waste Control; Section 24.0 of Volume 3;
- Personnel Decontamination; Section 25.0 of Volume 3;
- Equipment Decontamination; Section 26.0 of Volume 3;

2.3 EQUIPMENT

As presented in Section 2.1 several pieces of equipment will be required to conduct excavation activities. A brief description of each of these pieces of equipment and their intended use is provided below.

Hydraulic excavator- A hydraulic excavator operates using the same principles as a backhoe, except at a larger scale. It is also the principal excavating tool for the machine (unlike a backhoe, which may be attached to the rear of a front end loader or dozer). The hydraulic excavator will be of a track mounted variety, rather than wheel mounted. Track mounted hydraulic excavators provide better traction and flotation, better maneuverability, quicker repositioning and good overall stability. The bucket to be used in excavation will be either an excavation bucket or a utility bucket. The standard bucket capacity is approximately 0.5 cubic yards for a 24-inch wide bucket and 0.75 cubic yard for a 36-inch wide bucket. Hydraulic excavators have a boom and stick assembly that can typically reach soil at ground level 25 to 35 feet away and can excavate to a depth of 10 to 20 feet. However, as depth increases, reach decreases and as reach increases, depth decreases. Depth and reach can be maximized by utilizing a high horsepower excavator (typically, higher horsepower equates to greater reach and depth) or by specifying a longer boom and stick assembly. Two hydraulic excavators will be used during the excavation of greater than 40 and less than 40 soils at the main excavation area and the remote 'isolated areas', respectively. One hydraulic excavator will be dedicated to greater than 40 soils and one will be dedicated to less than 40 soils, respectively.

Front End Loader- A front end loader is utilized in situations where a large volume of soil may need to be moved in one bucket. The front end loader will be of the wheel mounted variety. A wheel mounted front end loader can travel quickly between the stockpile soils and the location of the truck it is loading. The bucket to be used for excavation is called a general purpose bucket. The standard bucket capacity is approximately 5.0 cubic yards for a 9 feet wide bucket and 7.5 cubic yards for a 12 feet wide bucket. The width of the machine varies from 8 feet to 11 feet. One front end loader will be used to load greater than 40 soils from the stockpile area into the on-road dump trucks.

On-road and off-road dump trucks- Dump trucks to be used in moving soil at the site will have capacities of 12 to 15 cubic yards. The off-road trucks will transport greater than 40 and less than 40 soils from the location where they are excavated to the stockpile (for greater than 40 soils) or staging (for less than 40 soils)areas. There are no designed or prelocated access roads within the excavation area for the trucks to use, because the topography and elevation of the excavation area changes as excavation proceeds. It is anticipated that off-road trucks will be used in these situations. To transport greater than 40 soils from the stockpile area to the loadout area, a distance of approximately 0.6 miles, trucks will utilize an existing gravel access road. The characteristics of the road (width, grade, condition) permit the use of conventional on-road dump trucks to travel the route. It is anticipated that two off-road trucks will be incorporated into the loading and staging/stockpiling procedures for greater than 40 and less than 40 soils, respectively (four total) and three on-road trucks will be used to transport greater than 40 soils from the stockpile area to the loadout facility.

Compaction Equipment - Compaction equipment will be required during the backfilling operations discussed in Section 3.0 of this E&R Plan. The type of compactor to be used will be based on the material classification of the backfill and the size of the backfill. It is anticipated that the backfill material will primarily be sand, therefore a vibratory smooth drum or rubber-tired compactor will be utilized. If the backfill is a silt or clay, a sheepsfoot roller will be the most effective compactor, but the smooth drum compactor would provide adequate compaction. These compactors require an operator to be seated on the piece of equipment, and will be used at both the main excavation and 'isolated area' excavation. However, if an area to be backfilled within a 'isolated area' excavation is less than 15 feet in diameter, a smaller piece of compaction equipment may be required.

Water truck - A water truck will be required on-site to assist in the control of dust during remedial action. The truck will be required to control dust on the access road between the excavation and the load out area, within the excavation area during excavation and within the excavation during backfill operations. The water to be used for dust control will be obtained from stormwater collection devices or from potable water sources. Section 4.2 of this E&R Plan discusses dust control in further detail.

2.4 PERSONNEL

Experienced personnel will be required to implement excavation activities as discussed herein. Equipment operators for hydraulic excavators, front end loaders and dump trucks will be required. The number of operators required will be dependent on the number of shifts to be worked. Operators will be required to comply with the personal protective equipment and radiological procedures established in the Health and Safety and Emergency Response Plan.

Experienced personnel will also be required to oversee activities in a non-operator capacity. Spotters will be required to assist in the excavation and loading activities. After excavation is completed, they will spot loads for location and placement of backfill materials. Maintenance personnel will also be required to clean up spills of greater than 40 and less than 40 soils resulting from misspotted loading of dump trucks or dump trucks spilling soil in transport to the load out facility. Finally, an excavation coordinator will be required to supervise all activities and to coordinate equipment and labor between several work areas.

2.5 QUALITY ASSURANCE AND OVERSIGHT

As excavation proceeds it will be necessary to document conditions prior to excavation, during excavation, after excavation, after backfilling and after final cover construction. Documentation activities may include, but not be limited to: quantity of greater than 40 and less than 40 soil removed from excavation areas, location of soils removed from excavation areas (using elevation and planar coordinates), quantity of backfill materials delivered, compaction of backfilled materials, quantity of final cover material delivered and area requiring revegetation. These activities will be documented by ICF Kaiser personnel, or their appointed representative. To assist ICF Kaiser personnel in observing and documenting these activities, a Construction Quality Control Plan has been developed that establishes the Quality Assurance and Quality Control needs and requirements of the project. These needs and requirements conform with needs and requirements of the U.S. Army Corps of Engineers, current industry and ICF Kaiser requirements.

2.6 SURVEYING

As discussed in section 2.5 of this E&R Plan, documentation is required for various tasks associated with excavation, backfilling and restoration. Since a significant amount of the documentation involves topographic mapping, a surveyor will be responsible for performing many of these tasks. In addition to providing documentation information, the work that he performs will be used to establish quantities that provide the basis of payment to contractors performing the excavation, backfilling and/or restoration. All surveying will be performed under the supervision of a land surveyor registered in the State of New York.

It is anticipated that the surveyor will use the end area method (10 foot section spacing and one foot contour interval accuracy) to establish the total quantity of greater than 40 and less than 40 soil removed from the excavation. This will require the surveyor to develop pre-excavation and post-excavation topography for the excavation area. The same principle will be used to establish the quantity of backfill placed in the excavation. Performing these activities may require the surveyor to work alongside excavation equipment, therefore safety and consideration between the two parties is paramount.

The surveyor will need to possess the proper training to be permitted on-site. This training will include radioactive training and 20 hour health and safety training for surveyors. The details associated with this training are discussed in the Health and Safety and Emergency Response Plan.

2.7 WALKOVER SURVEYS AND CLEANUP VERIFICATION SAMPLING

In conjunction with the general excavation procedures discussed in Section 2.1 of this E&R Plan and as discussed in Section 2.8 below, walkover surveys and final status survey sampling will be performed. The walkover gamma radiation surveys will be performed during excavation activities. Prior to the excavation of a six inch thickness of soil from the excavation area, a radiological survey team will scan the area to establish the limits of greater than 40 and less than 40 soil. These limits will be initially established with pin flags; then after a second confirmational scan, the final limits will be established with spray paint. The walkover surveys will be performed in areas other than those where actual excavation activities are being performed, thereby reducing the risk of accident/injury to the survey team and reducing their exposure to airborne particles associated with excavation.

The equipment, procedures and personnel used in conducting the walkover gamma radiation surveys is discussed in the Sampling and Analysis Plan.

The final status survey sampling will be performed when all of the greater than 40 soils have been removed from the excavation, a final walkover gamma radiation survey has been performed and an on-site laboratory analysis of excavated soils has been completed. These soil samples will be taken from the bottom and from the sidewalls of the excavation. The samples are taken to verify that all greater than 40 soils have been removed from the excavation. The equipment and procedures used and the number of samples to be taken in performing final status survey sampling is discussed in the Final Status Survey Plan.

2.8 MAIN EXCAVATION

The general excavation procedures have been discussed in Section 2.1 of this E&R Plan. This section will discuss specific tasks associated with the main area excavation. The main area excavation is the area where approximately 80% to 90% of the greater than 40 and less than 40 soils will be excavated.

Prior to excavation, several scope tasks are identified and addressed. These tasks consist of the following:

- overhead utility lines in the vicinity of the excavation will be identified and marked as needed. Minimum allowable distances between these lines and the excavation will be verified and compared with the actual distances. Nonconforming issues will be addressed prior to the commencement of excavation.
- a fence will be installed to establish the limits of the exclusion zone. The location of the fence will be based upon the overall anticipated size of the excavation, the additional area required to slope back the excavation as it increases to its maximum depth (estimated at 12 feet) and the location and aerial size of the stockpile and staging areas for greater than 40 and less than 40 soils, respectively.
- the location of the stockpile and staging areas will be established and erosion and sediment control for those areas will be installed.
- the surficial limits of excavation of greater than 40 and less than 40 soils will be established in accordance with the procedures briefly discussed in Section 2.1 of this E&R plan and in the Final Status Survey Plan.
- an initial topographic survey will be conducted to establish preconstruction conditions.

During excavation, several new scope tasks are identified and addressed. These tasks consist of the following:

- Tentative locations for haul roads within the excavation area will be established. Separate roads will be established for transporting greater than 40 soils to the staging area and less than 40 soils to the stockpile area, to reduce the potential for cross contamination.
- Each bucket of soil excavated will be surveyed to verify the findings of the Walkover Gamma Radiation Survey discussed in Section 2.1 of this E&R Plan.
- Excavation of greater than 40 soils will be performed prior to the excavation of less than 40 soils, for each six-inch depth elevation unless it is necessary to remove less than 40 soils to access greater than 40 soils. If pre-removal of less than 40 soils is not possible, some less than 40 soils may be treated as and excavated along with greater than 40 soils. This may occur as the depth of the excavation increases to maintain excavation slope safety.
- Dust nuisance will be reduced using procedures discussed in the Site Operations Plan. Dust nuisance will be reduced through the use of controlled spraying and watering and, tarping, as needed. The quantity of water used in controlling dust will be controlled so that the moisture content of greater than 40 soils can be maintained within the limits established by the disposal facility. These moisture content limits must be achieved in order for the greater than 40 soils to be accepted at the disposal facility. As needed, a field or laboratory moisture content analysis of a soil sample will be performed.
- Greater than 40 soils with moisture content less than the minimum required by the disposal facility will be supplemented with additional water either in the excavation or at the staging

area. Greater than 40 soils with moisture content greater than the minimum required by the disposal facility will be managed by disking or air drying soil at the staging area.

- Sumps will be constructed on an as needed basis to control stormwater runoff within the excavation. Excavation of the minimum six inch depth intervals will be sloped towards these sumps. All slopes will be established in a direction away from the existing drainage ditches located adjacent to the excavation area, if possible. Stormwater collected in the sump will be pumped to the on-site containment basin.
- Hazardous materials encountered during excavation of greater than 40 or less than 40 soils will result in a stoppage of work and the notification of appropriate personnel, including the U.S. Army Corps of Engineers and ICF Kaiser.
- It is anticipated that haul roads for greater than 40 and less than 40 soils will not cross over each other, but if the situation arises it will be addressed using the temporary installation of heavy tarping over one of the roads or an equivalent crossing method, or a field decision regarding location of roads.
- Oversized material and debris will be segregated after it has been received at the staging or stockpile area and placed in its own area.
- Monitoring of dust and airborne debris will be conducted in accordance with the Quality Assurance Project Plan and the Site Operations Plan.
- As needed, temporary seeding of excavation slopes and stockpile or staging areas will be performed to reduce the potential for erosion. Tarping may also be used to reduce the potential for erosion.
- After final status survey sampling has been completed in accordance with section 2.7, a topographic survey will be performed to establish the final limits of excavation, volume of soil removed and pay item quantities.

In conjunction with excavation activities, several scope issues associated with ancillary work are identified and addressed. These issues consist of the following:

- Off-road trucks will be loaded to their capacity when transporting greater than 40 and less than 40 soils to the staging and stockpile areas, respectively. If some accidental spillage of soil were to occur, it would not require cleanup, since the roads are to be located within areas of respective work. The work will be performed in a manner that reduces the risk of spillage.
- On-road trucks transporting greater than 40 soil from the staging area to the load out facility will be loaded to a specified percentage (approximately 90%) of their capacity to reduce the potential for spillage. The loads will also be covered with a tarp to reduce dust emissions during transport.
- Exterior areas of on-road trucks will be visually inspected for the presence of greater than 40 soil prior to departing to the loadout facility.

2.9 ISOLATED AREA EXCAVATIONS

This section will discuss specific tasks associated with the excavation of remote 'isolated areas'. Remote isolated areas account for approximately 10% to 20% of the greater than 40 and less than 40 soils to be excavated.

Prior to excavation, several scope tasks are identified and addressed. These tasks consist of the following:

- Overhead utility lines in the vicinity of the excavation will be identified and marked as needed. Minimum allowable distances between these lines and the excavation will be verified and compared with the actual distances. Nonconforming issues will be addressed prior to the commencement of excavation.

- A fence will be installed to establish the limits of the exclusion zone. The location of the fence will be based upon the overall anticipated size of the excavation and the additional area required to slope back the excavation as it increases to its maximum depth.
- The surficial limits of excavation of greater than 40 and less than 40 soils will be established in accordance with the procedures briefly discuss in Section 2.1 of this E&R Plan and fully detailed in the Final Status Survey Plan.
- An initial topographic survey will be conducted to establish preconstruction conditions.

During excavation, several new scope issues are identified and addressed. These issues consist of the following:

- Excavation of greater than 40 soils will be performed prior to the excavation of less than 40 soils, for each six-inch depth elevation, unless it is necessary to remove less than 40 soils to access greater than 40 soils. If pre-removal of less than 40 soils is not possible, some less than 40 soils may be treated as and excavated along with greater than 40 soils. This may occur as the depth of the excavation increases to maintain excavation slope safety.
- Dust nuisance will be reduced using procedures discussed in the Site Operations Plan. Dust nuisance will be reduced through the use of controlled spraying and watering and tarping, as needed. The quantity of water used in controlling dust will be controlled so that the moisture content of greater than 40 soils can be maintained within the limits established by the disposal facility. These moisture content limits must be achieved in order for the greater than 40 soils to be accepted at the disposal facility. As needed, a field or laboratory moisture content analysis of a soil sample wills be performed.
- Greater than 40 soils with moisture content less than the minimum required by the disposal facility will be supplemented with additional water either in the excavation or at the staging area. Greater than 40 soils with moisture content greater than the minimum required by the disposal facility will be managed by disking or air drying soil at the staging area.
- Sumps will be constructed on an as needed basis to control stormwater runoff within the excavation. Excavation of the minimum six inch depth intervals will be sloped towards these sumps. All slopes will be established in a direction away from the existing drainage ditches located adjacent to the excavation area. Stormwater collected in the sump will be pumped to the containment basin.
- Hazardous materials encountered during excavation of greater than 40 or less than 40 soils will result in a stoppage of work and the notification of appropriate personnel, including the U.S. Army Corps of Engineers and ICF Kaiser.
- Oversized material and debris will be segregated after it has been received at the staging or stockpile area and placed in its own area.
- Monitoring of dust and airborne debris will be conducted in accordance with the Quality Assurance Project Plan and the Site Operations Plan.
- After Final Status Survey sampling has been completed in accordance with section 2.7, a topographic survey will be performed to establish the final limits of excavation, volume of soil removed and pay item quantities

In conjunction with excavation activities, on-road trucks transporting greater than 40 soil from the remote isolated areas to the staging area will be loaded to a specified percentage of their capacity to reduce the potential for spillage. The loads will also be covered with a tarp to reduce dust emissions during transport.

3.0 BACKFILLING AND COMPACTION

This section of the E&R Plan discusses the various procedures, equipment and personnel to be used in the backfilling and compaction of completed excavation areas. Material to be used as backfill will be obtained from the less than 40 material stockpiled during excavation activities discussed in Section 2.0 of this E&R Plan. The quantity of material to be installed as backfill will be less than the quantity of material excavated by an amount approximately equal to the quantity of greater than 40 soil designated for off-site disposal. The backfill material will be sampled and analyzed to verify that all greater than 40 soils have been removed.

3.1 BACKFILL PROCEDURE FOR MAIN EXCAVATION AND REMOTE ISOLATED AREAS

Backfilling of the main excavation area and the remote isolated areas will commence after the Final Status Survey sampling program has confirmed that all greater than 40 soils have been removed. Following this sampling, the surveyor will perform a topographic survey to establish the final limits of excavation, volume of soil removed and pay item quantities.

A hydraulic excavator previously used for excavation of greater than 40 or less than 40 soils will be decontaminated and mobilized to the less than 40 stockpile area. The hydraulic excavator will load less than 40 soils into a decontaminated on-road truck, which will transport the soil using existing access roads into the excavation area. The on-road trucks will be loaded to a specified percentage of their capacity to reduce the potential for spillage. The loads will also be covered with a tarp to reduce dust emissions during transport.

The less than 40 soil will be dumped at the excavation and spread in loose horizontal lifts approximately 8 to 10 inches thick. A dozer or the wheel mounted front end loader previously used to load greater than 40 soil at the staging area (after it has been decontaminated) will be used to spread the less than 40 soil after dumping. Lift thickness will be monitored using visual observation or through the use of graduated or ruled stakes or flags. The soils will then be compacted to a specified density, in accordance with the New York State Department of Transportation Standard Specifications. The type of compaction equipment selected will be based on the classification of the backfill material and the aerial aerial size of the area to be compacted. 'Isolated areas' may not be of adequate size to permit full size riding compactors to work within potentially limited areas. Backfilling and compaction will be performed using the procedures and requirements for safety, equipment, personnel, quality assurance and oversight and surveying, as discussed in Sections 2.2 through 2.6, respectively.

It will not be necessary to backfill the main excavation area to pre-excavation elevations, since the main excavation area is located at an elevation approximately 10 to 15 feet higher than the elevation of the surrounding area, as discussed in Section 1.2 of this E&R Plan. Backfill will be installed to the approximate elevation of the area surrounding the excavation. Minor grade adjustments will be made to promote positive drainage and to account for the 12-inch thick final cover to be placed over the backfill.

Decontaminated debris, as defined in Section 2.0 of this E&R Plan, will not be used as backfill. material greater than 12 inches will be classified as greater than 40 soil and managed accordingly.

After all less than 40 soils have been placed within the excavation as backfill and compacted, the area will be graded as needed to eliminate ponding and promote positive drainage. The backfill material will be terminated at an elevation approximately 12 inches below the proposed final grade of the area, to permit construction of the final cover, as discussed in section 6.0 of this E&R Plan.

Stormwater accumulating in the excavation during backfilling and compaction operations will be directed to sumps. The sumps need not be of the excavated variety, however backfill should be sloped slightly in a field specified direction to allow stormwater to collect in an isolated area and to promote positive drainage off of backfill. Collected stormwater will be pumped to the on-site containment basin Stormwater collection measures will continue until the final cover has been installed as discussed in Section 6.0 of the E&R Plan.

Dust nuisance will be reduced using procedures discussed in the Site Operations Plan. Dust nuisance will be reduced primarily through the use of controlled spraying and watering. The quantity of water used in controlling dust will be controlled so that moisture content of backfilled soils can be maintained at or near optimum to obtain the maximum dry density during compaction operations.

4.0 MONITORING AND ENVIRONMENTAL CONTROLS

Prior to and during excavation and backfilling activities, several environmental controls will need to be established and maintained. These controls consist of air monitoring, dust control, stormwater management and erosion and sediment control. The following sections briefly discuss the equipment and procedures associated with each control.

4.1 AIR MONITORING

Air monitoring will be conducted during excavation and backfill activities. Air monitoring will consist of perimeter air monitoring and personal air monitoring. Perimeter air monitoring will use high volume air samplers installed at five locations to monitor the levels of airborne radioactive particulates that may be migrating off-site. The air samplers will be installed, operated and maintained in accordance with the manufacturer's instructions. A detailed discussion of perimeter air monitoring is presented in the Sampling and Analysis Plan.

Personal air samplers will be used to collect dust samples in the excavation areas to monitor worker exposure levels. Equipment and operation of personal air samplers is discussed in the Health and Safety and Emergency Response Plan. A detailed discussion of personal air sampling is presented in the Sampling and Analysis Plan.

4.2 DUST CONTROL

During excavation and backfilling activities, dust nuisance will be reduced using procedures discussed in the Site Operations Plan. Water for dust suppression will be obtained from the containment basin that collects stormwater runoff or from an on-site potable water source. Water obtained from the containment basin will be filtered to remove sediment from the stormwater and be utilized for dust control only in excavation areas. Potable water from off-site will be used to control dust in all non-excavation areas.

4.3 STORMWATER MANAGEMENT

Stormwater management for excavation activities and for backfilling operations will begin prior to the initiation of those activities and continue until completion. Stormwater management for excavation is discussed in Sections 2.8 and 2.9 and stormwater management for backfill is discussed in section 3.1 of this E&R Plan. Stormwater runoff from areas other than those identified as excavation areas will not be disturbed and will be maintained in existing drainageways.

4.3 EROSION AND SEDIMENT CONTROL

Erosion and Sediment control measures will simply consist of the installation of silt fence and the maintenance of the fence for the duration of construction activities. Silt fence will be installed downslope of all areas where excavation or backfilling activities are to be performed or where staging or stockpile areas have been designated and will be maintained until an adequate stand of vegetation has been established. Maintenance of silt fence will consist of the removal of sediment that has caused the fence bulging or to be moved from a vertical position. The sediment removed during silt fence maintenance will be classified as greater than 40 soil and will be managed accordingly.

5.0 DECONTAMINATION

This section of the E&R Plan discusses the procedures and equipment to be used in the decontamination of materials, equipment and personnel utilized in excavation and backfilling activities and the decontamination of materials and equipment after work is complete and demobilization from the site begins at the Ashland 2 Site. Decontamination to be conducted will include radiological and chemical decontamination.

Personnel decontamination will be performed at the main decontamination trailer located within the support area. This area is located adjacent to the excavation area. Equipment decontamination will be performed at a decontamination pad located in an area between the excavation area and the support area. Equipment to be decontaminated include excavators, dump trucks, front end loaders and dozers. It will also include shovels, picks and survey equipment that comes in contact with greater than 40 or less than 40 material.

Decontamination procedures will vary with the type of decontamination to be performed and the extent of decontamination but will include, at a minimum:

- Brushing and/or scraping;
- Low volume, low pressure washing;
- Low pressure detergent washing with brushing;
- High pressure washing.

Material that cannot be decontaminated or would be very labor intrusive to decontaminate will be combined with greater than 40 soils and disposed off-site.

During demobilization, specific radioactive release criteria will need to be met prior to any equipment or materials leaving the Ashland 2 site. The concentration levels to be met, the decontamination procedure and the frequency of monitoring are specified in the Sampling and Analysis Plan.

6.0 SITE RESTORATION

This section of the E&R Plan discusses the various procedures, equipment and personnel to be used in site restoration activities. Areas to be considered for site restoration activities include the backfilled area, remote isolated areas and other ancillary areas disturbed by construction activities. Site restoration includes the construction of a 12-inch thick final cover and the vegetation of the final cover. The scope for vegetation includes soil preparation, fertilizing, seeding and mulching of all disturbed areas. It also include the maintenance of seeded areas for a specified time period. Soil material to be used in site restoration consists of certified clean material imported from off-site. The soil will not contain rocks, debris, material greater than three inches in diameter or other objectionable material and will posses a specified percentage of organic matter.

6.1 SITE RESTORATION PROCEDURE

After backfilling and compaction operations have been completed as discussed in Section 3.0 of this E&R Plan, site restoration activities will commence. On-road dump trucks will deliver certified clean soil to the Ashland 2 Site using existing access roads and dump the soil at designated disturbed areas. Chemical and radioactive analyses of the soil to be used as final cover will be required to document the cleanliness of the soil. The certified clean soil will be spread in loose horizontal lifts 6 to 12 inches thick. A dozer or the wheel mounted front end loader previously used to load greater than 40 soil at the staging area (after it has been decontaminated) will be used to spread the soil after dumping. Lift thickness will be monitored using visual observation or through the use of graduated or ruled stakes or flags. The soils will then be compacted to a specified density, in accordance with the New York State Department of Transportation Standard Specifications. The type of compaction equipment selected will be based on the classification of the backfill material and the aerial size of the area to be compacted. Construction of the final cover will be performed using the procedures and requirements for safety, equipment, personnel, quality assurance and oversight and surveying, as discussed in Sections 2.2 through 2.6, respectively. Graded slopes to eliminate ponding and to establish positive drainage during backfill activities described in Section 3.0 will permit surface water runoff from the final cover to positively drain to predetermined locations. These locations are shown on Drawing 66723-RD5 and will terminate in either of the existing ditches on the north or south sides of the final cover for the main excavation. Final covers for 'isolated areas' will be graded to drain in the same direction as adjacent topography.

After the soil for the final cover has been installed, vegetation activities will commence. The method for establishing vegetation will be hydroseeding or an equivalent method. It is recommended that the amount of seed used in vegetation be increased by 50% over estimates stated in specifications to ensure an adequate stand of grass. This is due to the limited or non-existent maintenance that is typically specified for a period of one year after seeding.

Following site restoration, the surveyor will perform a topographic survey to establish the final limits of final cover and backfilling, volume of soil used as backfill and pay item quantities. Final cover quantity will be subtracted from backfill quantity by simply multiplying the disturbed area by 12 inches.

SAMPLING AND ANALYSIS PLAN

FUSRAP ASHLAND 2 REMEDIAL ACTION
TONAWANDA, NEW YORK

MAY 29, 1998
CONTRACT NO. DACA31-95-D-0083, TERC,
TASK ORDER NO. 23

ICF KAISER

Worldwide Excellence in Meeting Client Needs

NL05

U.S. ARMY CORPS OF ENGINEERS
BUFFALO DISTRICT OFFICE

FORMERLY UTILIZED SITES REMEDIAL ACTION PROGRAM

9806290117 980624
PDR ADOCK 04008681
C PDR

PART VI (ATTACHMENT A)
CONTRACTOR SUBMITTAL REQUIREMENTS SUMMARY

SUBMITTAL SCHEDULE

S ~~Prior to Shipment~~
B Prior to Balance of Payment
A Per S/C Schedule
M Prior to Mobilization
W Prior to Commencing Work
Y Prior to Progress Payment for Each Specific Task
Z As Required

SUBMITTAL TYPE REQUIRED

O Original
P Print/photocopy
T Transparency
M Microfilm
PH Photograph
FD Floppy Disk
S Sample

DISTRIBUTION DESIGNATION

CA Contract Administrator

NOTICES

1. *To each item submitted, attach a copy of this form and circle the title of the item being submitted.*
2. *Failure to submit required submittals as delineated on this form may result in withholding of payment in accordance with provisions of the contract.*
3. *The Contract Administrator is responsible for distributing submittals to the requesting Department (e.g., Construction). The Department is responsible for further distributions (e.g., Site Superintendent).*

Item No./ Submittal Titles	Clause, Specification, or Scope of Work Paragraph	Contractor send Submittal to	Submittal Codes	
			Schedule	(No.) and Type
1.1 Analytical results and the disposition method for the water collected from the rail car loading area	Scope of Work (SOW), Sec., 3.4.2	CA	Z	O
1.2 In-situ volume of soil to be excavated from each site	SOW, Sec., 3.5.3	CA	20 working days prior to excavation	O
1.3 Pre-excavation lines and grades for the contaminated areas at each site	SOW, Sec., 3.6.1	CA	20 working days prior to excavation	O
1.4 Lessons learned during Ashland 2 excavation	SOW, Sec., 3.6.10	CA	15 working days after completing the remediation	O
1.5 Inform USACE about the remediated areas	SOW, Sec., 3.7.2	CA	Following the remediation	O
1.6 Analytical results of the samples collected from the remediated excavation areas	SOW, Sec., 3.7.2	CA	5 working days after completing the remediation	O
1.7 Information required by the CERCLA process to document closure of the Tonawanda Site	SOW, Sec., 3.7.4	CA	30 working Days after completing remediation	O
1.8 Name and location of borrow source for the general fill material	SOW, Sec., 3.8.3	CA	10 working days prior to use	O
1.9 Test results for the general fill material	SOW, Sec., 3.8.4	CA	10 working days prior to use	O
1.10 As-built drawings for the backfilled areas	SOW, Sec., 3.8.8	CA	15 working days after completing site restoration	O
1.11 Name and other information related to the licensed/permitted disposal facility	SOW, Sec., 3.9.1	CA	30 working days prior to waste transportation	O
1.12 Report of weekly radiological surveys performed on the haul routes and the rail car loading area	SOW, Sec., 3.9.3	CA	3 working days after performing the survey	O

PART VI (ATTACHMENT A)
CONTRACTOR SUBMITTAL REQUIREMENTS SUMMARY

SUBMITTAL SCHEDULE
S Prior to Shipment
B Prior to Balance of Payment
A Per S/C Schedule
M Prior to Mobilization
W Prior to Commencing Work
Y Prior to Progress Payment for Each Specific Task
Z As Required

SUBMITTAL TYPE REQUIRED
O Original
P Print/photocopy
T Transparency
M Microfilm
PH Photograph
FD Floppy Disk
S Sample

DISTRIBUTION DESIGNATION
CA Contract Administrator

NOTICES

1. *To each item submitted, attach a copy of this form and circle the title of the item being submitted.*
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Item No./ Submittal Titles	Clause, Specification, or Scope of Work Paragraph	Contractor send Submittal to	Submittal Codes: Schedule	Submittal Codes: (No.) and Type
1.13 Copy of the waste profile sheets and other shipping documents	SOW, Sec., 3.9.9	CA	2 working days prior to waste transportation	O
1.14 Certficate of Disposal	SOW, Sec., 3.9.10	CA	B	O
1.15 Repair/restoration work proposal	SOW, Sec., 3.11	CA	Z	O
1.16 Design Package Specifications	SOW, Sec., 3.12.1	CA	30 working days prior to Mobilization	O
1.17 Site Operations Plan	SOW, Sec., 3.12.2	CA	15 working days prior to Mobilization	O
1.18 Excavation and Restoration Plan	SOW, Sec., 3.12.3	CA	20 working days Prior to Excavation	O
1.19 Waste Management, Transportation, and Disposal Plan	SOW, Sec., 3.12.4	CA	20 working days prior to Excavation	O
1.20 Sampling and Analysis Plan	SOW, Sec., 3.12.5	CA	20 working days prior to Excavation	O
1.21 Regulatory Compliance Plan	SOW, Sec., 3.12.6	CA	20 working Days prior to Excavation	O
1.22 Safety and Health Plan	SOW, Sec., 3.12.7	CA	21 working days prior to Consummation of Delivery Order	O
1.23 Construction Quality Control Plan	SOW, Sec., 3.12.8	CA	15 working Days prior to Excavation	O
1.24 Project Records	SOW, Sec., 5.1	CA	B	O
1.25 Final Status Survey Report	SOW, Sec., 5.2	CA	B	O

ICF Kaiser Engineers, Inc. TERC Contract No. DACA 31-95-D-0083	Project Number 66723	Project Name Ashland 2 FUSRAP	Task Order No. 23	Date: 02/24/98 Page 2 of 2

FIELD SAMPLING PLAN (FSP)

FUSRAP ASHLAND 2 REMEDIAL ACTION
TONAWANDA, NEW YORK

MAY 29, 1998
PART 1 OF SAMPLING AND ANALYSIS PLAN

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LIST OF ABBREVIATIONS AND ACRONYMS

AEC..............................Atomic Energy Commission
ASTM ....American Society for Testing and Materials
BNI ....Bechtel National Inc.
C ....Centigrade
CCQC...........................Contractor Chemical Quality Control
COC ....chain of custody
cpm ....counts per minute
CQC ....Contractor Quality Control
DCQCR ....Daily Chemical Quality Control Reports
FS ....Feasibility Study
FSP ....Field Sampling Plan
FUSRAP........................Formerly Utilized Sites Remedial Action Program
GPS ....global positioning system
HJKCO ....Henry J. Kaiser Company
IATA ....International Air Transport Association
ICF Kaiser ....ICF Kaiser Engineers, Inc.
IDW..............................investigation-derived wastes
LEL...............................Lower Explosive Limit
MARSSIM ....Multi-Agency Radiation Survey and Site Investigation Manual
MED ....Manhattan Engineer District
NRC .............................U.S. Nuclear Regulatory Commission
PID ....photoionization detector
PPE..............................Personal Protective Clothing and Equipment
PRG ....preliminary remediation goals
QA................................Quality Assurance
QAPjP ....Quality Assurance Project Plan
QC...............................Quality Control
RCT..............................radiation control technician
RI ....Remedial Investigation
ROD ....Record of Decision
SAP..............................Sampling and Analysis Plan
SHSO ....Site Health & Safety Officer
SOPs............................Standard Operating Procedures
SVOC ....Semi-Volatile Organic Compounds
TCLP............................toxic characteristic leaching procedure
TERC ....Total Environmental Restoration Contract
USACE.........................U. S. Army Corps of Engineers
USCS ....Unified Soil Classification System
VOC ....Volatile Organic Compounds

1.0 INTRODUCTION

The U.S. Army Corps of Engineers (USACE) Buffalo District has been designated to remediate the radiologically-contaminated sites located in the town of Tonawanda, New York. This effort is part of the USACE's Formerly Utilized Sites Remedial Action Program (FUSRAP), which was established to identify, investigate, and cleanup or control sites previously used by the Atomic Energy Commission (AEC) and its predecessor, the Manhattan Engineer District.

ICF Kaiser Engineers, Inc. (ICF Kaiser), under Total Environmental Restoration Contract (TERC) No. DACA 31-95-D-0083, Task Order No. 23, has been designated the Remedial Action Contractor for the Ashland 2 Site. The primary objective of the Ashland 2 Site remediation effort is the timely and effective cleanup of the Site in accordance with Alternative 2A of the USACEs "Proposed Plan for the Ashland 1 and Ashland 2 Sites (USACE, 1997)" and the recently approved Record of Decision (ROD) (USACE, 1998). Alternative 2A provides for the complete excavation and off-site disposal of materials using a site-specific cleanup criteria of 40 pCi/g Th-230. This alternative meets the commitments made to community representatives and is believed to provide the best balance among the considered alternatives with respect to the evaluation criteria, will protect human health and the environment, and will comply with ARARs while providing for the release of the property for future use.

According to the approved ROD (USACE, 1998) the Th-230 should be reduced to less than 40 pCi/g for soils remaining on-site. The Feasiblity Study (FS) identified other preliminary remediation goals (PRG) for other radionuclides of concern: Ra-226 and U-238. PRGs of 15 pCi/g for Ra-226 (averaged over 15 cm thick layers and more than 15 cm below the land surface) and 60 pCi/g total uranium were mentioned in the FS. Assuming natural ratios for U-238, U-235, and U-234 in the Ashland 2 soils, the equivalent PRG for U-238 would be 28.4 pCi/g (i.e., 47.3% of total uranium PRG). Based on soil analytical data presented in the RI (BNI, 1993) and the Correlation Study (BNI, 1998), soils that had less than 40 pCi/g of Th-230 usually had less than 28.4 pCi/g of U-238 and less than 15 pCi/g of Ra-226. Hence, if all soils are removed from the site that contain Th-230 above 40 pCi/g to achieve ROD requirements, then the other PRGs in general will also be met. For the remainder of this document, soils that contain greater than 40 pCi/g of Th-230 and must be shipped off-site for disposal will be referred to as ">40 soil." Soils that have Th-230 activity less than 40 pCi/g will be referred to as "<40 soil", and these soils can be left on-site.

The remediation effort will be conducted in such a manner to provide a level of protection to the public and remediation workers consistent with applicable radiation exposure guidelines and with the objective of achieving ALARA exposure levels.

This document, the Sampling and Analysis Plan (SAP) has been prepared in accordance with the guidelines presented in "Requirements for the Preparation of Sampling and Analysis Plans", EM 200-1-3 (USACE, 1994) and the Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM) (USEPA et al; 1997). It is comprised of two parts, the Field Sampling Plan (FSP) and the Quality Assurance Project Plan (QAPjP). The purpose of the FSP is to outline the rationale, the methods, and the procedures for conducting field screening to assess the levels of radionuclides in the site soils; acquisition of samples for laboratory testing; and verifying that the site has been cleaned up to the levels specified in the ROD. The purpose of the QAPjP is to outline the data quality objectives for the project, specific Quality Assurance (QA) and Quality Control (QC) activities, and the laboratory activities necessary to assure that the data collected meet the data quality goals established for the project.

The FSP is provided below. The field screening and sampling procedures are outlined in the text of this document. Specific details of these procedures are provided in Appendix A, Standard Operating Procedures (SOPs). The QAPjP is bound behind the FSP.

1.1 SITE HISTORY

The Manhattan Engineer District (MED) and its immediate successor, AEC, conducted numerous activities across the country during the 1940s and 1950s involving research, development, processing, and production of uranium and thorium, and storage of processing residues. Nearly all of this work involved some participation by private contractors and institutions. These sites contaminated during the early period of the nuclear program were decontaminated or stabilized in accordance with survey methods and guidelines then in existence. These sites were subsequently released for other uses. Since that time, however, guidelines have become more stringent and sites are being reevaluated and remediated under FUSRAP. The Linde, Ashland 1, Ashland 2, and Seaway Industrial Park sites are all located in Tonawanda, New York, and together constitute one of the FUSRAP projects.

From 1942 to 1946, several buildings at the Linde site (currently Praxair) located in the Town of Tonawanda, New York, were used by Linde for separation of seven different uranium ores under a MED contract. Four of the ores came from Africa and three came from the United States. The US ores were residuals left from the extraction of vanadium. The vanadium removal process also removed much of the naturally-occurring radium from the ores. Thus the US ore residues were low in radium compared to the levels of uranium and thorium. The African ores contained uranium in secular equilibrium with thorium and radium. Because of the relative abundance of radium in the residue from the processing of the African ores, these ore residues were kept separate from the domestic residues to preserve the potential for later extraction of radium. These African ore residues were shipped to the former Lake Ontario Ordnance Works where they were stored (BNI, 1993).

MED leased a 10-acre tract known as the Haist property, now called Ashland 1, to serve as a disposal site for wastes from the processing of the domestic ores. Records indicate that approximately 8,000 tons of residues were spread over roughly two-thirds of the Ashland 1 property between 1944 and 1946. In 1960, the property was transferred to Ashland Oil and has been used as part of this company's oil refinery activities since that time (BNI, 1993).

In 1974, Ashland Oil constructed a bermed area for two petroleum product storage tanks and a drainage ditch on the Ashland 1 property. Approximately 6,000 yds^3 of soil, containing radioactive residues and commingled MED-related inorganic constituents, were removed during these construction activities. The majority of the excavated soil was transported to Ashland 2 and the Seaway Industrial Park for disposal.

A portion of the Ashland 2 property was also used by Ashland Oil as a landfill for disposal of general plant refuse and industrial and chemical by-products. The radioactive residues and commingled inorganic constituents removed from Ashland 1 were deposited in an area of Ashland 2 adjoining the Ashland Oil landfill area. The industrial landfill portion of Ashland 2 was closed and covered with clay soil in 1982 by Ashland Oil.

1.2 SUMMARY OF EXISTING SITE DATA

This section provides a general discussion of the current understanding of the physical characteristics of the site and the levels and extent of radionuclides, inorganic constituents, and organic chemicals in site soils. Information in this section is drawn from the Remedial Investigation (RI) report (BNI, 1993), and a study performed in February 1998 to correlate radiological field screening results with results obtained from laboratory analysis of samples of the soils collected from these screened areas (BNI, 1998).

1.2.1 Site Physical Characteristics

The Ashland 2 Site consists of properties owned by Ashland Oil, Inc., Niagara Mohawk Power corporation, and Lee E. Ott, Figure 1-1. The total area of these three properties is about 150 acres. The property is currently vacant and vegetated with native grasses and shrubs.

The only utilities known to be located in the Ashland 2 site area include a 48" diameter water main located along the eastern property line and Niagara Mohawk Power Corporation high-voltage transmission lines, which run parallel to the southwest property line (see Figure 1-1).

The largest area of suspected contamination at Ashland 2 lies in a filled area encompassing approximately 6 to 10 acres at the confluence of two unnamed drainage ways with a maximum topographic relief of 10 to 15 ft (Figure 1-2). The two drainage ways receive storm water runoff from the contaminated areas.

The primary drainage way of the site (Rattlesnake Creek) is fed by a 3-ft diameter reinforced concrete pipe that crosses from Ashland 1, beneath the Seaway Landfill, discharging into Rattlesnake Creek at the southern property line with Niagara Mohawk Power (Figure 1-2). Rattlesnake Creek, as it crosses the site, is approximately 10 feet wide and three feet deep at bank full capacity. The Rattlesnake Creek floodplain is approximately 100 ft wide and is covered with a thick growth of cattails and bulrushes. The thick vegetation in the channel greatly reduces flow velocities. Although flow in the creek is perennial, wide fluctuations in stream flow are typical (BNI, 1993).

1.2.2 Surficial Site Geology

Three types of geologic deposits are commonly found at the land surface in this area of New York, all of which were related to the glaciers that retreated from this area 12,000 to 15,000 years ago. As the glaciers retreated, they left behind till (a compact, dense, unsorted gravely clay) and coarse-grained glacial outwash deposits (Muller, 1977; Cadwell, 1988). Also, deposits of silt and clay were deposited in the Late Wisconsin glacial lakes. The total thickness of glacial deposits at the Tonawanda site ranges from 55 to 95 ft.

Maps by Muller (1977) and Cadwell (1988) show lake sediments at the land surface in the area occupied by the Ashland 2 site. Descriptions of the geologic materials encountered during the drilling of test holes and wells in the site area, however, indicate that the uppermost glacial deposits may be till and not lake clays (BNI, 1993).

The uppermost geologic unit is a massive silty clay with various amounts of embedded sand and gravel (BNI, 1993). The deposit is hard and compact; locally, cracks described as desiccation fractures filled with clay and organic matter extend to a depth of 15 ft. The fine grain size and apparently structureless nature of the deposit do not allow fluids to be transmitted readily, except through fractures in the clay (BNI, 1993). A thin interval of organic-rich silt and clay underlies the surface drainages at the Ashland 2 site (BNI, 1993).

Fill material at the Ashland 2 site that display the highest levels of radionuclide contamination are described as reddish in color and contain very little clay. This reddish material is presumed to be the MED filter cake residue (BNI, 1998). It can be readily distinguished from the natural soils which are typically medium to dark brown in color and have a higher clay content (BNI, 1998).

1.2.3 Former Site Investigations.

A Remedial Investigation (RI), Baseline Risk Assessment, Feasibility Study (FS), and a Proposed Plan for the Site have been issued. Field sampling activities conducted at the Ashland 2 site during the RI focused on radioactive contaminants; metals related to ore processing activities; and chemicals whose presence could classify the site wastes as RCRA-hazardous, or be a potential safety concern if workers involved in site remediation were exposed to them.

The sampling results from the RI are summarized in Tables 1-1 and 1-2. None of the organic chemicals or metals were found at levels that would result in the soils being characterized as RCRA hazardous wastes. The areas where radiological contaminants were found at elevated levels and the depths at which the radiological contamination was found is depicted in Figure 1-2. Radiologically contaminated soils are primarily at depths of zero to five feet, and generally extend no deeper than eight feet. The maximum activities of thorium-230, uranium-238, and radium-226 encountered during the RI were 2,200, 263, and 189 pCi/g, respectively.

Uranium-235 and uranium-234 levels were not measured during the RI because the ore processing conducted at Linde did not affect the isotopic ratios of the natural uranium isotopes. In general, 47.3 percent of the radioactivity of natural uranium comes from uranium-238; 2.2 percent is from uranium-235, and 50.5 percent is from uranium-234. Therefore, uranium-234 and uranium-235 activities in soil samples can be calculated from measured uranium-238 activities.

In February 1998, a study was conducted at the site on behalf of the USACE to determine how well levels of gross gamma radiation measured with field screening instruments correlated with concentrations of radionuclides in soil samples measured by either alpha or gamma spectroscopy (BNI, 1998). Figures 1-3 through 1-6 are graphs that depict the relationships between the field screening results (gross gamma measurements) and the activities of radionuclides based on laboratory analyses. As can be seen from these graphs, good correlations between the field screening measurements and laboratory results. Thus, field screening using gross gamma radiation measurements should provide an adequate means to identify soils with Th-230 activity that exceed the site cleanup criteria. Only within a relatively small range of gross gamma radiation values (between 20,000 and 24,000 counts per minute [cpm] by a SPA-3 NaI(Tl) detector), was it difficult to accurately determine whether activities of thorium-230 were above or below the cleanup levels of 40 pCi/g. The highest activities of Th-230, U-238, and Ra-226 detected in 39 samples during the Correlation Study were 3,204, 222, and 223 pCi/g, respectively.

1.3 SITE-SPECIFIC SAMPLING AND ANALYSIS CONCERNS

The following section outlines specific sampling concerns and the methods that will be used to address these concerns.

1.3.1 Location and Elevation of Radiation Walkover Surveys and Sampling Points

Gamma walkover surveys of the excavation areas, gamma walkover surveys of the ancillary areas, and collection of discrete soil samples will be performed on a frequent basis before, during, and after remedial activities. It is important that the location of the sampling and data measurement points be accurately located, so that when analytical data are returned from the on-site or off-site laboratories, the sampling locations can be reidentified in case additional sampling or remediation needs to occur. For most of the gamma walkover surveys and for the collection of discrete soil locations, the horizontal locations will be determined using global positioning system (GPS) equipment. GPS can generally determine the horizontal location of a point to ±3 feet or better. However, most GPS units can not measure elevations very accurately (e.g., ±6 feet). Therefore, standard engineering surveying equipment will be used to measure corner points of walkover survey grids and locations and elevations of sampling points when necessary. Benchmarks will be placed at key locations around the site to allow quick surveys of location and elevation to be made.

1.3.2 Distinguishing Native Soils from Waste Ore Residuals

Previous site studies have demonstrated that the ore residues that are the source of the radionuclides in the Ashland 2 area may be detectable visually (BNI, 1998). These wastes are reportedly reddish in color while the natural soils are medium to dark brown in color. Further, the texture of the waste differs from the native soils. The native soils reportedly have a higher clay content than do the ore residues (BNI, 1998). Consequently, the color and texture of the materials may be a good indicator of the presence of radionuclides. During the initial phases of the site remedial action, the physical properties of the soils and wastes and the results of field and laboratory analyses of the different materials will be evaluated to determine how reliable visual and textural cues will be in distinguishing the materials that exceed the cleanup criteria from those that are clearly below the cleanup criteria. If the materials to be removed can be accurately discriminated by visual characteristics, all field personnel will be instructed in the procedures to accurately use the color and texture of the materials to discriminate the radiologically contaminated waste from the unaffected clean soil.

1.3.3 Identifying Soils at the Cleanup Criteria Threshold

The Correlation Study conducted in February 1998 (BNI, 1998), indicated that field screening values of gross gamma radiation were a reliable indicator of waste materials containing radionuclides in excess of the site cleanup criteria (40 pCi/g Thorium-230). When the field screening counts were greater than 24,000 cpm using a hand held SPA-3 NaI(Tl) detector, the activity of Th-230 was always greater than 40 pCi/g. When field screening counts by a SPA-3 detector were below 20,000 cpm, the Th-230 activity was always less than 40 pCi/g. In the interval between 20,000 and 24,000 cpm, the SPA-3 detector could not reliably predict whether the Th-230 levels were just slightly above or just slightly below the cleanup criteria.

It is not currently known how much of the site soils may fall within this zone where field screening can not be reliably used to assess the radiological content of the soil nor whether other criteria such as color or texture (see Section 1.3.2) can be reliably used to predict the radiological content of these soils Consequently, efforts during the early stages of the remedial activities will be made to sample and analyze soils that fall into this range and to refine the field screening approach.

If the volume of soil within this zone is large and field screening criteria can not be used to readily discriminate the radiological content of these soils, they will be left in place until samples of these soils can be assessed by on-site gamma spectroscopy analysis. If the volume of soil that falls within this zone is small and field screening criteria can not be used to discriminate the soils that exceed the cleanup criteria, they will be assumed to be in excess of the cleanup criteria and will be managed along with other waste and soils to be shipped off-site.

1.3.4 Variability of Background Radiation Levels

It is possible that the radiation levels in the area of the remedial action will fluctuate during the removal action. The background gamma radiation may be significantly affected by the volume of excavated soils managed on-site prior to loading for off-site shipment. For this reason, on-site background will be checked periodically (at least once per day or more frequently when large volumes of stockpiled soils are on-site) at several established background monitoring stations. The background gamma levels will be used to adjust the field screening levels used to discriminate soils for removal from those to be left on-site.

FIGURE 1-3
TH-230 ACTIVITY IN DISCRETE SAMPLES vs. FIELD-MEASURED GROSS GAMMA RADIATION
FULL RANGE OF 39 SAMPLES

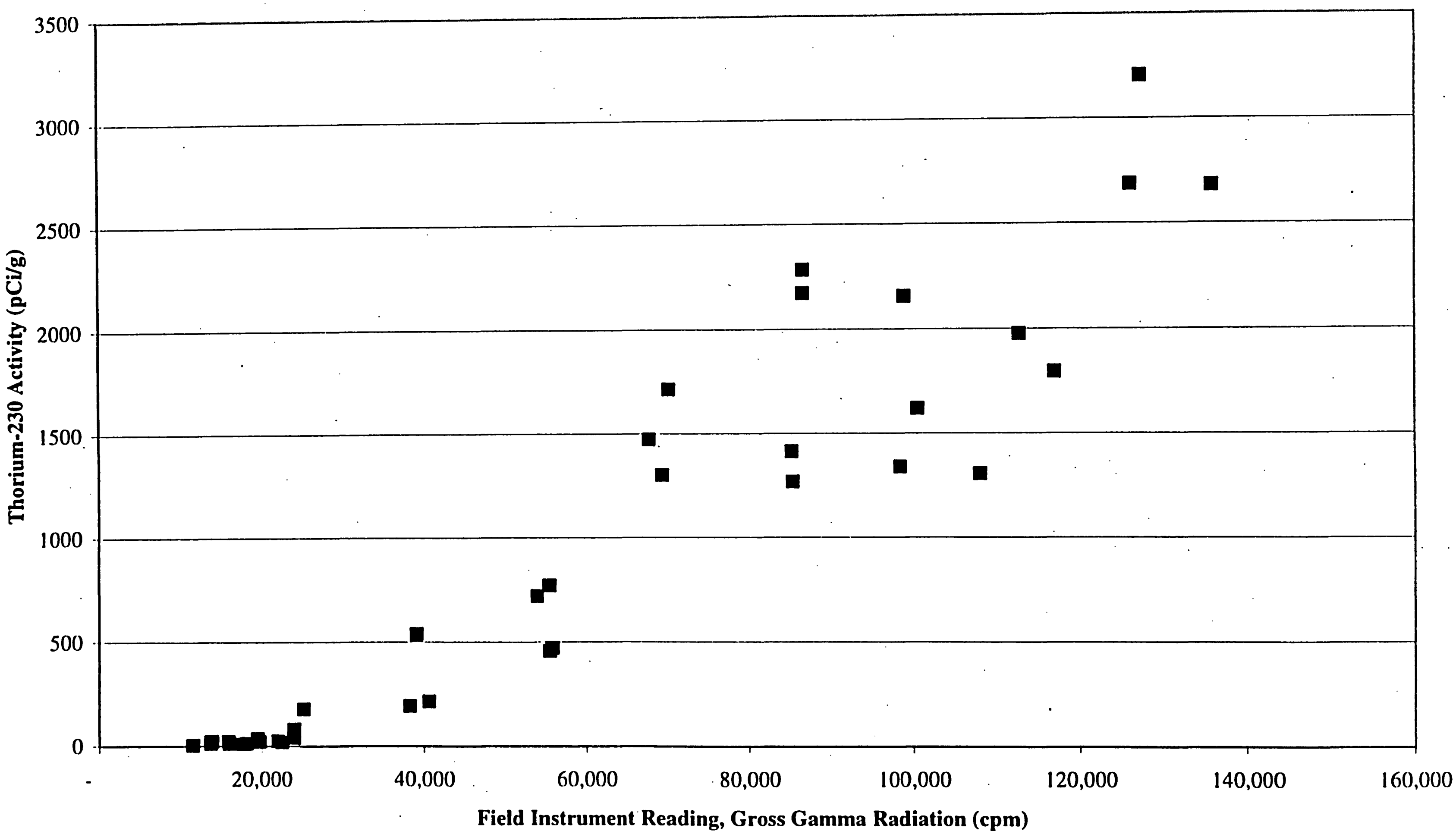


FIGURE 1-4
TH-230 ACTIVITY IN DISCRETE SAMPLES vs. FIELD-MEASURED GROSS GAMMA RADIATION
LOW RANGE OF ACTIVITY (n = 16 SAMPLES)

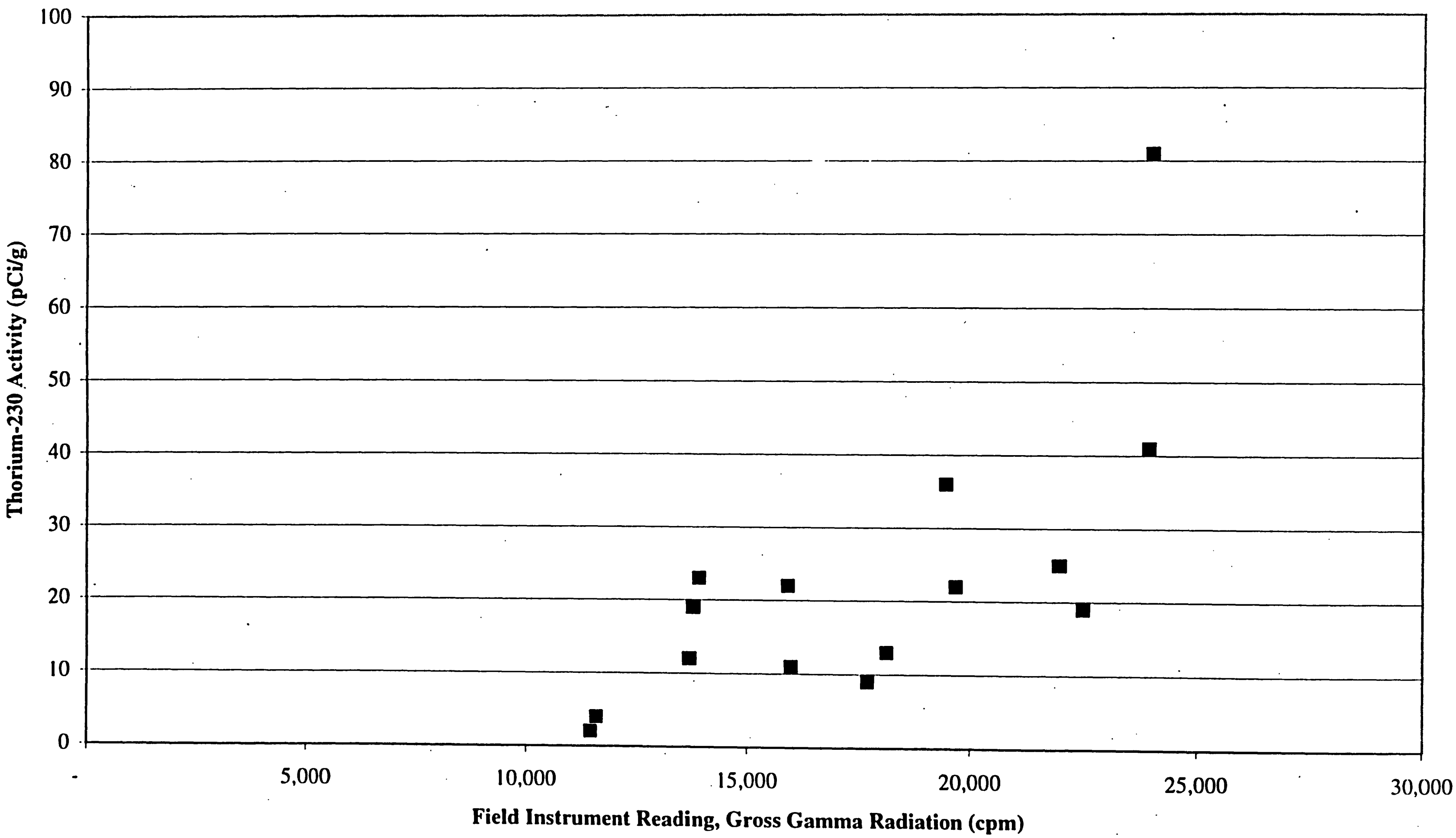


FIGURE 1-5
U-238 AND RA-226 ACTIVITIES IN DISCRETE SAMPLES vs. FIELD-MEASURED GROSS GAMMA RADIATION: FULL RANGE OF 39 SAMPLES

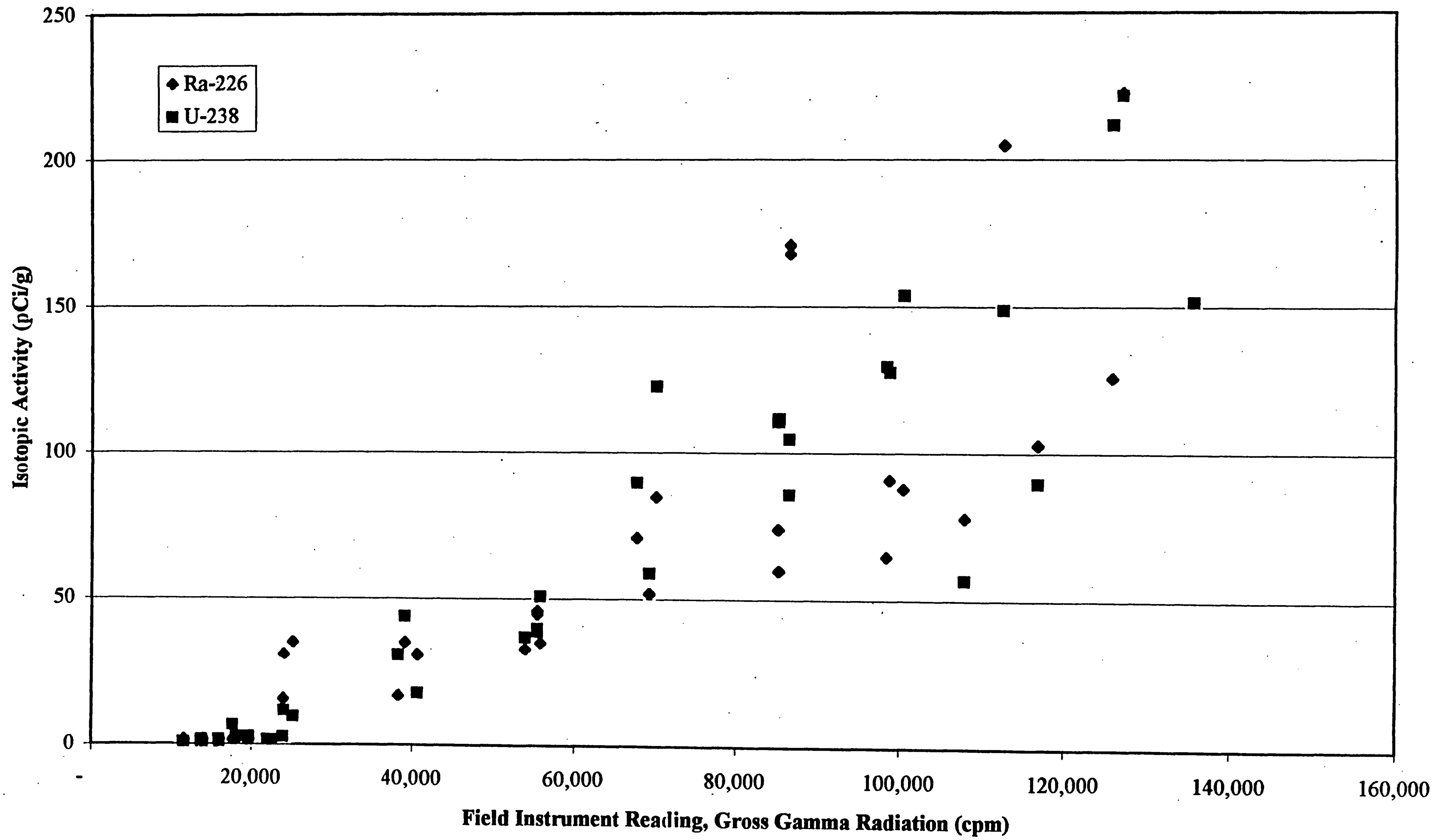


FIGURE 1-6
U-238 AND RA-226 ACTIVITIES IN DISCRETE SAMPLES vs. FIELD-MEASURED GROSS GAMMA RADIATION: LOW RANGE OF ACTIVITY (n = 23 SAMPLES)

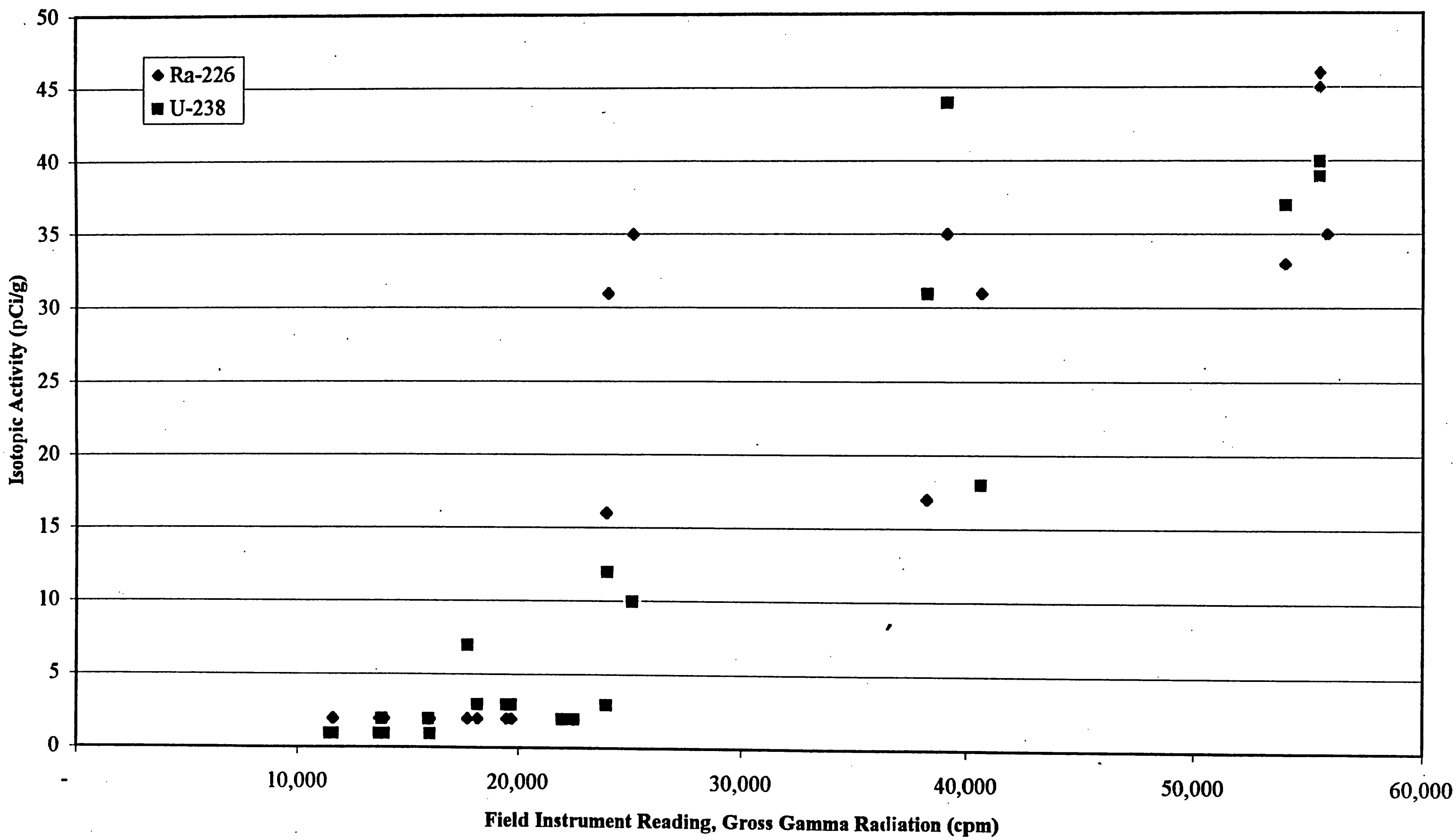


FIGURE 1-7: PROBABILITY CHART
Fraction of discrete soil samples within a range of gross gamma scan readings that exceed the Th-230 site-specific guideline for Ashland 2

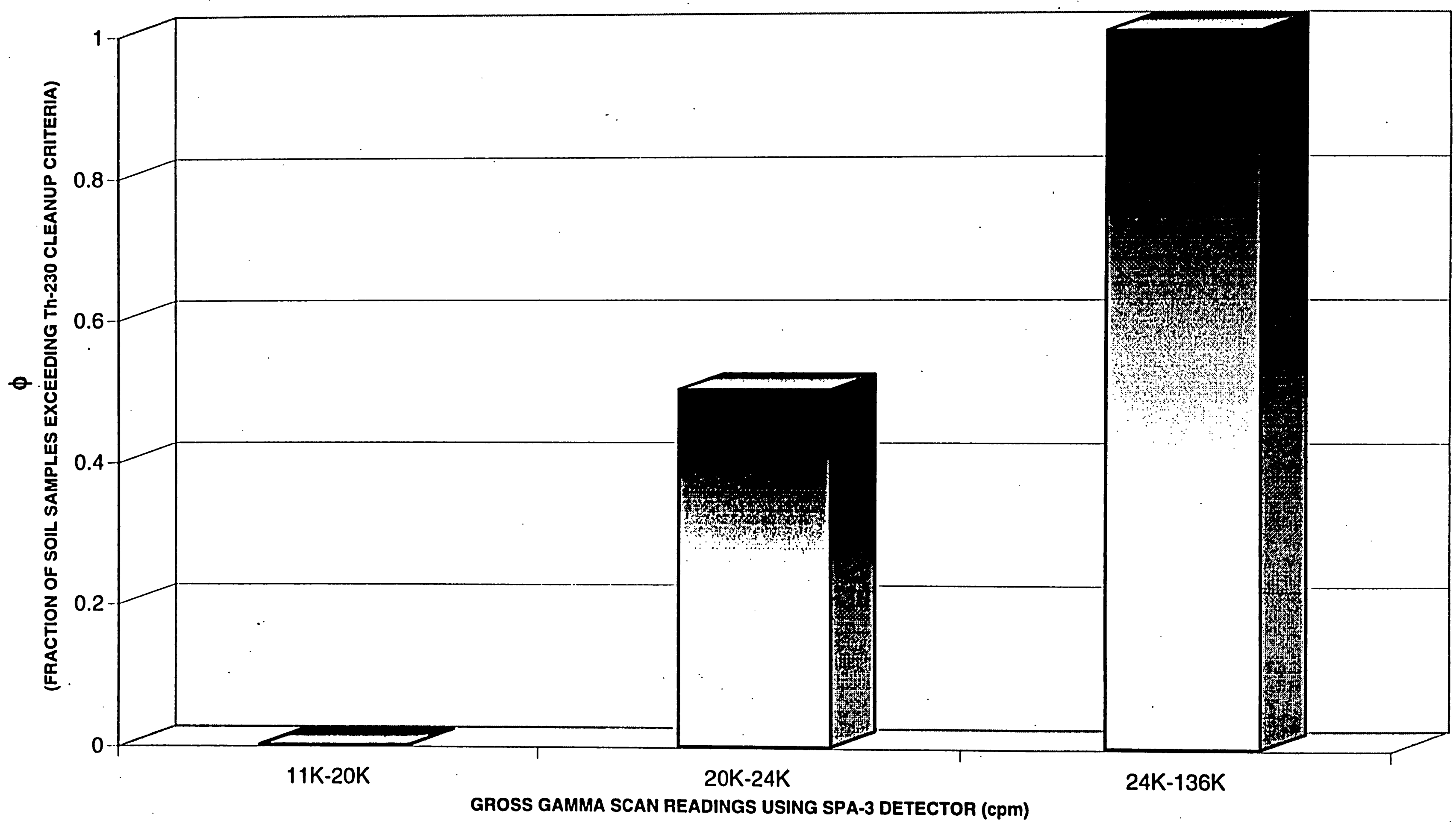


Table 1-1 *

Radionuclide Concentrations in Soil Samples at Ashland 2

Borehole Number[a]	Coordinate East	Coordinate North	Depth (ft)	Concentration (pCi/g) Uranium-238	Radium-226	Thorium-232	Thorium-230
Background (mean)				3.1	1.1	1.2	1.4
B32R109	2400	3100	0 - 3[b]	68.5	1.6	1.5	7.5
B32W03	2406	2070	0 - 2	2	1.2	1.2	0.9
	2406	2070	2 - 3[b]	8.1	1.9	1.4	44
B32R03	2425	2600	0 - 1[b]	37.1	7.4	1.4	96
	2425	2600	1 - 2	4	0.9	1.2	NA[c]
	2425	2600	2 - 3[b]	23.8	5	1.5	91
	2425	2600	3 - 4	6	1	1.3	5.4
	2425	2600	4 - 5	4	1	1	NA
	2425	2600	5 - 6	3.1	1.2	1.2	NA
B32R110	2430	1800	0 - 1[d]	3.9	3	1.7	14
	2430	1800	1 - 2	2	2.2	1.2	11.1
	2430	1800	2 - 3	4.5	2	2	0.7
B32R19	2500	2200	0 - 1[b]	6	2.1	1	43
	2500	2200	1 - 2	4	1.3	1.1	5.6
	2500	2200	2 - 3	2.2	1	0.8	1
	2500	2200	3 - 4	3	1	1	NA
	2500	2200	4 - 5	3	0.9	1	NA
	2500	2200	5 - 6	4	1.1	1	NA
B32R08	2500	2450	0 - 1[b]	6.1	1.7	1.4	520
	2500	2450	1 - 2[b]	182.5	60.1	2	520
	2500	2450	2 - 3[b]	150.9	59	4.1	NA
	2500	2450	3 - 4	7.1	2.8	1.7	NA
	2500	2450	4 - 5[b]	3.1	3.2	2	77
	2500	2450	5 - 6[b]	17	4.2	1.6	77
	2500	2450	7 - 8[b]	7	1	1	57
B32R04	2550	2575	0 - 1[b]	263.3	61.5	27	1,500
	2550	2575	1 - 2	15	1.7	1.2	NA
	2550	2575	2 - 3	5.8	1.5	1.1	NA
	2550	2575	3 - 4	10.4	2.3	1.6	NA
	2550	2575	4 - 5[b]	8.2	3.1	1.3	58
	2550	2575	5 - 6	4	1.1	1.1	3
	2550	2575	6 - 7.5	2.3	1.1	1.2	NA
	2550	2575	7.5- 9	4.6	1	1.2	NA
B32R05	2600	2550	0 - 1[b]	154.2	189	2	2,200
	2600	2550	1 - 2[b]	89.7	42.6	5	2,200
	2600	2550	2 - 3	4	1	1.6	NA
	2600	2550	3 - 4[b]	147	50.1	7	840
	2600	2550	4 - 5[b]	3	1	1	460
	2600	2550	5 - 6	3	0.8	0.8	7.1
	2600	2550	6 - 7	2.5	1.2	1	NA
	2600	2550	7 - 8	3	0.9	0.9	NA
	2600	2550	8 - 9	3.4	4.6	1	NA

* Table 1-1 is reprinted from the Remedial Investigation Report Table 4-42 (BNI, 1993)

Table 1-1
(continued)

Borehole Number[a]	Coordinate East	Coordinate North	Depth (ft)	Concentration (pCi/g) Uranium-238	Radium-226	Thorium-232	Thorium-230
B32R09	2600	2450	0 - 1[b]	30.1	18.8	4	500
	2600	2450	1 - 2	8.1	5.8	1	NA
	2600	2450	2 - 3[b]	141.2	42.7	2.5	440
	2600	2450	3 - 4	4	1.7	1	5.1
	2600	2450	4 - 5[b]	4.4	1.2	1.1	310
	2600	2450	5 - 6	4	1	1	NA
	2600	2450	6 - 7.5	4	0.9	1.4	NA
	2600	2450	7.5- 9	3	1	1	NA
B32R02	2600	2660	0 - 1[b]	26	51	1	11
	2600	2660	1 - 2[b]	6	1	1.1	11
	2600	2660	2 - 3[b]	5	1.4	1.1	41
	2600	2660	3 - 4	5	1	1.2	2.7
	2600	2660	4 - 5	3	1	1	NA
	2600	2660	5 - 6	6	1	1.1	NA
B32R17A	2625	2250	0 - 1	7.8	2.8	1.1	NA
	2625	2250	1 - 2[b]	29.1	2.9	2.6	NA
	2625	2250	2 - 3[b]	65.0	5.3	2.3	310.0
	2625	2250	3 - 6[b]	17.8	3.7	1	44.0
B32R06	2740	2540	0 - 1[b]	163.2	46.6	8	1,440
	2740	2540	1 - 2[b]	168	66.7	3.1	NA
	2740	2540	2 - 3[b]	244.6	61.2	2	NA
	2740	2540	3 - 6[b]	67.8	15.2	1.6	330
	2740	2540	6 - 7	20.3	1.7	1	NA
	2740	2540	7 - 8	19.9	0.8	0.6	NA
	2740	2540	8 - 9[b]	2.6	0.8	1.1	21
B32R120	2750	2650	0 - 1[d]	7.7	1.6	1.5	5.6
	2750	2650	1 - 2	5.2	1.2	1	NA
	2750	2650	2 - 3	2	1.6	1.3	NA
	2750	2650	3 - 4	3	1	1	NA
	2750	2650	4 - 5	3	0.8	1	NA
	2750	2650	5 - 6	3	1	1	NA
B32R10	2775	2447	0 - 1	3	1.4	1.2	2.1
	2775	2447	1 - 2[b]	4.4	1	1.7	39
	2775	2447	2 - 3[b]	6.3	1.7	1.8	15
	2775	2447	3 - 4	4	1.1	1	13
	2775	2447	4 - 5	4	1.2	1.2	NA
	2775	2447	5 - 6	4	1	1	NA
	2775	2447	6 - 7	5	0.9	1	NA
	2775	2447	7 - 8	4	1	1.1	NA
	2775	2447	8 - 9	3	0.9	1.1	NA
B32R121	2775	2750	0 - 3[b]	27.2	1.6	1.4	5.9

Table 1-1
(continued)

Borehole Number[a]	Coordinate East	Coordinate North	Depth (ft)	Concentration (pCi/g) Uranium-238	Radium-226	Thorium-232	Thorium-230
B32R123	2800	2150	0 - 1[d]	3	1	1	11
	2800	2150	1 - 2	3.1	0.7	1	0.8
	2800	2150	2 - 3	2	0.8	1	0.2
	2800	2150	3 - 4	3	1	0.9	0.2
	2800	2150	4 - 5	1.8	0.7	0.9	0.1
	2800	2150	5 - 6	3	1.2	1	1.3
B32R15	2800	2350	0 - 1[b]	88.9	35.2	3	14
	2800	2350	1 - 2[b]	106	23.3	5	NA
	2800	2350	2 - 3	4.9	1.3	1.3	NA
	2800	2350	3 - 4	5.9	1.2	1.2	NA
	2800	2350	4 - 5[b]	7	3.9	1.7	45
	2800	2350	5 - 6[b]	3	1.1	1	29
B32R11A	2875	2450	0 - 1[b]	48.5	10.2	2	NA
	2875	2450	1 - 2[b]	55.7	18.5	1	NA
	2875	2450	2 - 3[b]	21.5	8.1	1.5	NA
	2875	2450	3 - 4[b]	38	12.5	2	NA
	2875	2450	4 - 5[b]	36.5	11.5	1.5	NA
	2875	2450	5 - 6[b]	141.5	44.1	2	NA
	2875	2450	6 - 7.5[b]	110.9	24.7	1	490
	2875	2450	7.5- 9	2.8	1.2	1.4	2.6
B32R129	2925	2475	0 - 1[d]	6.3	1.9	1.6	6.1
	2925	2475	1 - 3	3.7	1	1	NA
B32R130	2950	2675	0 - 1[b]	9.4	1.3	1	17
	2950	2675	1 - 2	4	1	1	NA
	2950	2675	2 - 3	5	1.4	1.3	NA
	2950	2675	3 - 4	3.9	1	0.9	NA
	2950	2675	4 - 5	3	1.1	1	NA
	2950	2675	5 - 6	3	1	1	NA
B32R131	3000	2600	0 - 1[b]	42.8	1.9	1.3	13
	3000	2600	1 - 2	11.4	1.6	1.6	3.5
	3000	2600	2 - 3	7	1	2	1.1
	3000	2600	3 - 4	3	1.1	0.9	1.1
	3000	2600	4 - 5	4.1	1.2	1.3	0.5
	3000	2600	5 - 6	4	1	1	1.3
B32R135	3050	2600	0 - 1	2	0.9	1.1	0.7
	3050	2600	1 - 2	3	1	1.1	2.2
	3050	2600	2 - 3	2.5	1.4	1.3	1.3
	3050	2600	3 - 6[b]	2	1.1	1.3	20
B32R136	3100	2500	0 - 1.5[b]	68.9	2.4	1.7	9.9
	3100	2500	1.5- 3	10.4	1.4	1	NA
B32R137	3200	2300	0 - 1[b]	35.5	2.1	1.6	NA
	3200	2300	1 - 2	8.1	1.1	1.1	0.9
	3200	2300	2 - 3	6.4	1.4	1.3	NA
B32R155	2908	1904	0 - 0.5[b]	12	3.6	1.1	81

Table 1-1
(continued)

Borehole Number[a]	Coordinate East	Coordinate North	Depth (ft)	Concentration (pCi/g) Uranium-238	Radium-226	Thorium-232	Thorium-230
B32R901	2575	1610	0 - 2[b]	5.3	5.3	1.2	56
	2575	1610	2 - 4[b]	6.6	4.9	1.2	42
	2575	1610	6 - 8	2.5	1.1	1	1.5
B32R902	2545	1680	0 - 2[b]	13	0.9	1.1	62
	2545	1680	2 - 4	3.1	1.3	1	5.4
	2545	1680	6 - 8	2.5	1.1	1	1.5
B32R903	2520	1745	0 - 2[b]	2.8	4.2	0.9	18
	2520	1745	2 - 4	3.3	1.4	1	2.1
	2520	1745	6 - 8	2	0.7	0.4	0.4
AVERAGE				25.2	8.4	1.6	168.7
STANDARD DEVIATION				48.4	21.4	2.4	424.9
MINIMUM				1.8	0.7	0.4	0.1
MAXIMUM				263.3	189.0	27.0	2,200.0

[a]Sampling locations are shown in Figure 2-10.

[b]Contaminated soil interval.

[c]NA - not analyzed.

[d]Contaminated between 0 and 0.5 ft.

Table 1-2 *

Organic Compound Concentrations in Soil Samples at Ashland 2

Compound	Sampling Location[a] and Depth (ft) B32R05 0-2	B32R08 0-2	B32R08 2-6	B32R14 0-2	B32R14 2-6	B32R12 0-2	B32R12 2-6
(Concentrations are reported in units of µg/kg)							
VOCs							
1,2-Dichloroethane	--[b]	--[b]	--[b]	170	38	--[b]	--[b]
Chlorobenzene	--[b]	--[b]	--[b]	17	--[b]	--[b]	--[b]
Methylene chloride	--[b]	--[b]	--[b]	25	17	--[b]	--[b]
Toluene	--[b]	--[b]	--[b]	--[b]	--[b]	36	21
Trichlorofluoromethane	--[b]	--[b]	--[b]	44	--[b]	2	5.9
BNAEs							
2-Methylnaphthalene	--[b]	--[b]	6,600	--[b]	--[b]	--[b]	--[b]
Anthracene	--[b]	--[b]	830	--[b]	--[b]	--[b]	--[b]
Benzo(a)anthracene	--[b]	350	--[b]	2,700	--[b]	--[b]	--[b]
Benzo(a)pyrene	--[b]	--[b]	--[b]	3,400	--[b]	--[b]	--[b]
Bis(2-ethylhexyl)phthalate	450	240	--[b]	--[b]	--[b]	--[b]	--[b]
Chrysene	--[b]	--[b]	3,200	--[b]	--[b]	--[b]	--[b]
Fluoranthene	160	610	--[b]	4,900	--[b]	--[b]	--[b]
Indeno(1,2,3-cd)pyrene	--[b]	--[b]	1,100	--[b]	--[b]	--[b]	--[b]
Phenanthrene	240	690	7,900	4,000	--[b]	--[b]	--[b]
Pyrene	160	770	2,800	4,000	--[b]	--[b]	--[b]

* Table 1-2 is reprinted from the Remedial Investigation Report Table 4-44 (BNI, 1993)

Table 1-2
(Continued)

Compound	B32R16 6-10	B32R01 0-2	B32R01 2-4	B32R11 0-2	B32R11 2-6	B32R11 6-8	B32R17 0-2	B32R02 0-2
	Sampling Location[a] and Depth (ft)							
	(Concentrations are reported in units of µg/kg)							
VOCs								
Benzene	16	--[b]	--[b]	--[b]	--[b]	--[b]	--[b]	--[b]
Ethylbenzene	23	--[b]	--[b]	--[b]	360	--[b]	--[b]	--[b]
Toluene	7.8	3.6	4	--[b]	150	--[b]	--[b]	--[b]
Trichlorofluoromethane	14	--[b]	--[b]	--[b]	--[b]	--[b]	--[b]	--[b]
BNAEs								
Anthracene	--[b]	--[b]	--[b]	--[b]	--[b]	180[c]	--[b]	--[b]
Benzo(a)anthracene	--[b]	--[b]	--[b]	--[b]	340[c]	--[b]	--[b]	--[b]
Chrysene	--[b]	--[b]	--[b]	--[b]	340[c]	--[b]	--[b]	--[b]
Di-n-Butylphthalate	--[b]	--[b]	--[b]	89[d]	64[d]	100[d]	76[d]	100[d]
Fluoranthene	--[b]	--[b]	--[b]	160[c]	67[c]	120[c]	--[b]	--[b]
Phenanthrene	--[b]	--[b]	--[b]	160[c]	67[c]	190[c]	--[b]	--[b]
Pyrene	--[b]	--[b]	--[b]	160[c]	120[c]	110[c]	--[b]	--[b]

[a]Sampling locations are shown in Figure 2-11.

[b]Detected at or below the detection limit.

[c]Value estimated by laboratory.

[d]Value estimated laboratory; also found in laboratory blank.

2.0 PROJECT ORGANIZATION, KEY PERSONNEL, AND LOWER TIER SUBCONTRACTORS

The project will be managed using an organizational approach which designates a Project Manager and a dedicated Construction Manager supported by a nucleus of engineering personnel and key subcontractors. In order to ensure that the project meets the Quality Assurance requirements established by the TERC contract, the Ashland 2 project will be under the direction of the ICF Kaiser TERC Program Manager.

The goals of the proposed Project Team are to provide responsible and responsive technical management, effective cost and schedule control, highly qualified technical personnel, effective communication with USACE, and assurance that quality and safety standards are met for this remediation effort. To meet these goals, the project organization proposes the following features:

- Direct reporting and technical supervision among the various components, with clearly defined project control responsibilities and authorities;
- Experienced and qualified key technical personnel assigned to major Work Breakdown Elements, for each task;
- Direct interaction of project technical personnel with USACE and frequent project review meetings; and
- Independent quality assurance and safety functions interacting directly with USACE and monitoring the activities and outputs of project organizational elements.

Members of the Project Team are accustomed to working within a multi-disciplinary framework utilizing the resources of ICF Kaiser. As a result, potential interfacing problems and conflicts are minimized and are readily and quickly resolved, should they occur. Other plans for ensuring the successful interface of various organizational elements are: close coordination in planning stages; firm definition of work and assignment of responsibilities/authorities through discrete work packages; and regular communications among program personnel. Interactions among the technical work elements will take place continuously. Successful interactions depend on development of detailed plans, execution of the work according to plan, and early warning and immediate control when plans are disrupted.

2.1 ICF KAISER TOTAL ENVIRONMENTAL RESTORATION CONTRACT (TERC)

The Project Management Team for the FUSRAP Ashland 2 Site Remedial Action consists of two cohesive and interacting management units. The first management unit consists of the TERC Program Management Team. The personnel and their responsibilities are discussed here. The second management team consists of the on-site Ashland 2 Project Team. These personnel and their responsibilities are discussed in Section 2.2.

The TERC Program Manager, Mr. Bruce Howard, has complete management authority and responsibility for all work performed under the TERC contract. The TERC Program Manager directs the program management organization as a central resource for management, continuity, and control of all TERC program activities. The centralized program management is organized to facilitate communication with and reporting to USACE and to expedite and support project execution.

Mr. Howard will be assisted by the TERC Program Quality Control Manager, Health and Safety Officer, Radiation Safety Officer, and the Remedial Manager. These personnel will report directly to the Program Manager, and will have a direct line of communication with the Ashland 2 Project Manager and their counterparts on the Project Team.

2.2 ASHLAND 2 PROJECT ORGANIZATION AND KEY PERSONNEL

The project organization and key personnel that will be employed in performing the Ashland 2 Remedial Action are depicted on Figure 2-1. A description of overall duties and responsibilities by major functional work area follows.

2.2.1 Project Management

The Project Manager, Construction Manager, and Engineering Services and Administration Manager are responsible for overall coordination and direction of the remediation effort. They serve as the principle points of contact with the USACE project organization and are responsible for overall quality, schedule, and cost compliance; project staffing and employee relations; subcontractor approval, management and direction; and bottom-line health, safety, and regulatory compliance.

2.2.2 Site Safety, Health and Radiation Protection

The Site Safety, Health, and Radiation Protection Officer will be responsible for day-to-day compliance monitoring of the approved Site Health and Safety and Emergency Response Plans, including site-specific personnel training; maintenance of the medical monitoring program; ALARA Program implementation; management of personnel PPE, respiratory protection and decontamination operations; and operations support to the on-site construction work force.

As a pre-condition for assignment to the Site, all Site workers will be 40-hour OSHA HAZWOPER certified and will be covered under medical monitoring programs meeting CFR 1910.120. General Employee Radiation Training and associated radiological monitoring will be handled as Site-specific activities, as specified in the Site Health and Safety Plan.

2.2.3 Quality Control

The Site Quality Control Officer will be responsible for day-to-day compliance monitoring of the approved Quality Control Plans specified in the Construction Quality Control Plan and Sampling and Analysis Plan, including records filing and archiving, and the provision of operational support to the on-Site work force.

2.2.4 Remediation Construction

Remediation construction consisting of mobilization construction activities (i.e., installation of roads, fences, etc.) and operations (i.e., excavation, material conditioning, etc.) will be under the day-to-day management of the Construction Manager. The Construction Manager will directly oversee mobilization construction activities with limited support from construction technicians (i.e., a junior superintendent or field engineer). For remediation operations, he will be supported by superintendents in each of the following major functional areas:

- Excavation and Material Conditioning consisting of excavation; stock piles (i.e., >40 pCi/g and <40 pCi/g Thorium-230) management; >40 pCi/g material conditioning, if required; >40 pCi/g load-out and transport to the rail facility; backfill of <40 pCi/g material and restoration; and records maintenance and transfer to the Site Quality Control Officer.
- Rail Operations consisting of rail car inspection and on-site movement; load-out and weighing; placarding; decontamination; coordination with the on-site Transportation and Disposal Coordinator; and records maintenance and transfer to the Site Quality Control Officer.
- Environmental Control Systems, Decontamination Operations, and Maintenance consisting of operation of the water and dust control systems; nonpersonnel decontamination operations (i.e., equipment, debris, roads, etc.); facilities and equipment maintenance; and records maintenance and transfer to the Site Quality Control Officer.

2.2.5 Engineering Services and Administration

The Engineering Services and Administration Manager will be responsible for the day-to-day direction and oversight of the on-site laboratory operations; off-site transportation and disposal; engineering support services; and administrative support services. He/She will directly oversee the majority of the engineering and administrative support activities during the mobilization construction phase of the project. For remediation operations, he/she will be supported by on-site supervisory staff in each of the following major functional areas:

- Laboratory Operations consisting of maintenance of the air and water monitoring programs; real time soil scanning in support of the excavation and material stockpile operations; free release program oversight; radiological monitoring; on-site laboratory analysis for rail car shipments and radiation control both within and outside designated exclusion zones; Final Status Survey sampling; off-site laboratory analysis coordination; facilities and equipment radiological monitoring; and records maintenance and transfer to the Site Quality Control Officer.
- Transportation and Disposal Coordination consisting of waste manifesting; rail car switching, scheduling, and tracking; disposer coordination and records transfer; and records maintenance and transfer to the Site Quality Control Officer.
- Engineering consisting of establishment and maintenance of the Site coordinate system; land surveying (i.e., property boundaries, pre-and post-excavation limits, and post-restoration); cost schedule and earned value tracking; inspection and testing support; regulatory compliance monitoring; and records maintenance and transfer to the Site Quality Assurance Officer.
- Administrative Support consisting of contract administration; purchasing and procurements; property management; timekeeping; and clerk/clerical support services.

2.2.6 Lower Tier Subcontractors

Subcontractor services are presently anticipated for the installation of roads and pads; fencing; and utilities connections during the mobilization phase of the project. Subcontractors services during remedial operations will include land surveying, off-site laboratory analyses, waste transportation and disposal, on-site laboratory operations, and radiation control technicians.

2.3 PROJECT LABOR FORCE

The Ashland 2 project will be manned with four major labor categories. These four labor categories are listed below.

2.3.1 Ashland 2 On-Site Management

These personnel consist of project management staff assigned to the Site from the ICF Kaiser's home office salaried manpower pool and will consist of the Project Manager; Construction Manager; Engineering Services and Administrative Manager; Quality Control Officer; Site Safety, Health and Radiation Protection Officer; and Construction Superintendents.

2.3.2 Home Office Support Staff

Home office support staff will be temporarily assigned to the project on an as-needed basis and will consist of ICF Kaiser's TERC Program Management and engineers, scientists and technical specialists, principally from the Pittsburgh, Baltimore, and Fairfax offices.

2.3.3 Subcontractor Support Services

Subcontractor support services will be procured through competitive bidding in accordance with ICF Kaiser's Baltimore TERC and U.S. Government FAR requirements. Subcontractors will be selected based upon demonstrated experience; technical approach; staff experience; cost and schedule commitments; and business classification. All subcontractors will have identical health, safety, and radiation protection and quality assurance requirements as that specified for the project work force.

2.3.4 Union Craft Laborers and Operators

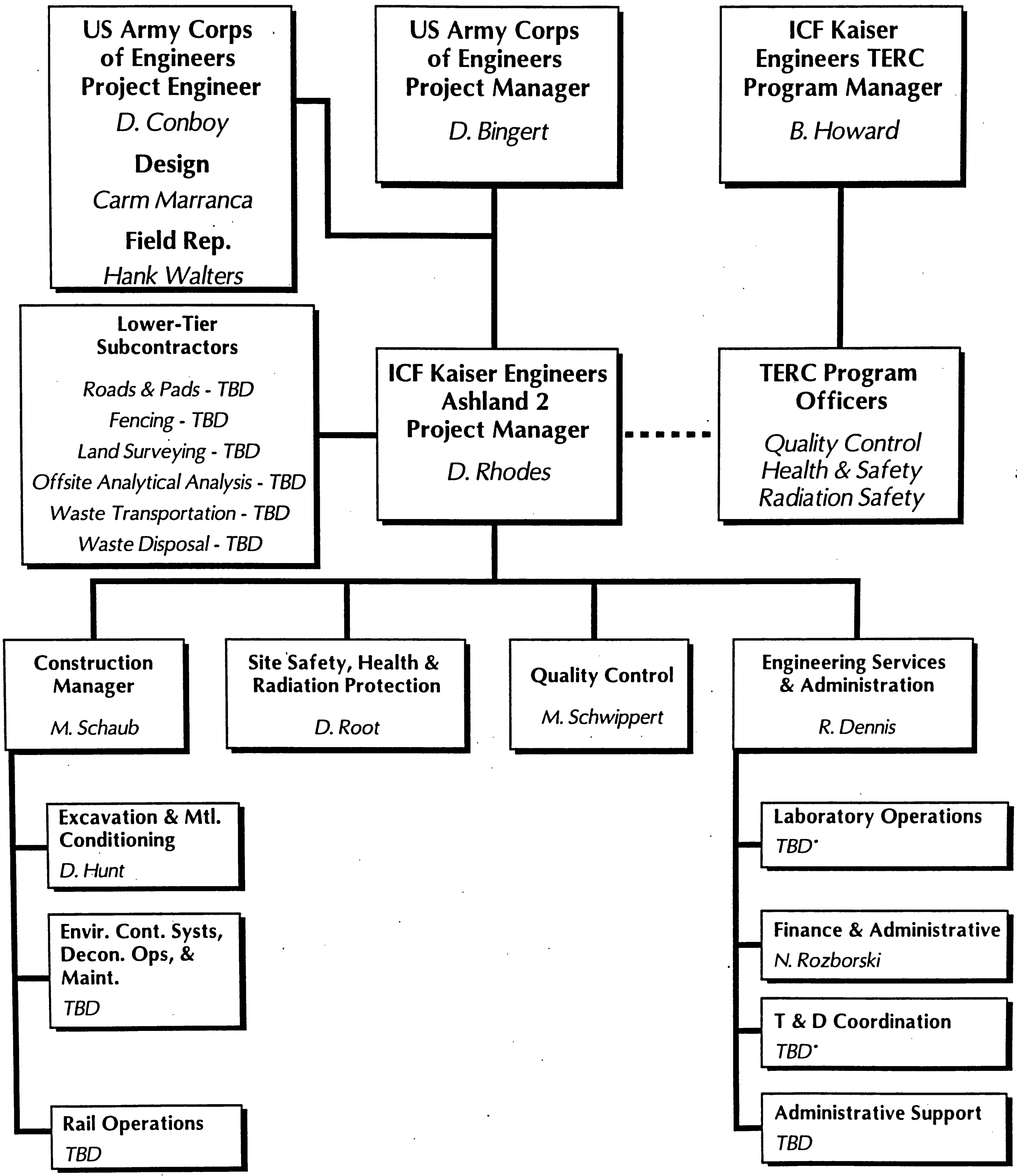
ICF Kaiser proposes to staff all Site laborers and operators positions utilizing local union craft under a direct hire arrangement through the Henry J. Kaiser Company (HJKCO), a wholly owned subsidiary.

HJKCO has signed National Environmental Agreements with the Laborers International Union and the Operating Engineers International Union. ICF Kaiser's Director of Labor Relations and the TERC

Program Construction Manager plan to meet with representatives of the local union trades during April to develop a strong working relationship and discuss staffing requirements and schedule.

FUSRAP Ashland 2 Remedial Action
Project Organization & Key Personnel

Figure 2-1



TBD = To Be Determined
TBD * = Possible Additional Subcontracted Service

ICF KAISER

3.0 SCOPE AND OBJECTIVES

Sampling during the cleanup of the Ashland 2 site will involve on-site in-situ screening of various media using field screening instruments, as well as collection of samples for both on-site and off-site analysis. In this section of the FSP, the scope and objectives of the sampling programs are outlined.

3.1 SCOPE AND OBJECTIVES OF THE FIELDS SCREENING ACTIVITIES

Field screening activities will include a preconstruction-site survey, periodic radiological screening of all ancillary site facilities, screening of all shipping containers and railcars as the arrive on-site and as they leave, and post-remediation surveying. Prior to initiation of any site remediation work, a preconstruction-site survey will be performed for the ancillary areas that will be disturbed during remediation (e.g., haul roads, parking lot, trailer area, soil stockpile areas, loadout area). The objective of this survey is to verify that other unknown areas of radiological contamination do not exist on the site. If small areas are detected, they will be marked and the extent determined by additional field screening. The levels of radionuclides in these additional areas will be documented with on-site and off-site analysis of samples by gamma and alpha spectroscopy.

The native grasses and shrubs in the area of known contamination will be removed prior to remediation. Following removal and shredding of the vegetation, samples of the shredded material will be analyzed in the on-site laboratory using gamma spectroscopy.

All site facilities such as parking areas, shipping areas, office trailers, and the on-site laboratory area will be periodically screened to assure that radiological contaminants are not inadvertently tracked into clean areas. If any contamination in the clean areas is detected, it will be marked and removed.

All containers and rail cars used to ship wastes from the site will be screened on arrival to assure that the containers and cars are clean. The outside surfaces will also be screened after they have been filled to assure that no unacceptable levels of contamination are present on the outside of the containers.

At the completion of the remedial action, the disturbed portions of the site will be resurveyed via gamma walkover surveys to assure that wastes have not been inadvertently tracked into clean areas of the site. In addition, if any >40 soil is discovered, it will also be identified. These materials will be excavated and placed into the large excavation if Th-230 is <40 pCi/g, or shipped off-site if Th-230 exceeds 40 pCi/g.

3.2 SCOPE AND OBJECTIVES OF THE FIELD SAMPLING ACTIVITIES

Field sampling will conducted to serve three purposes: to characterize the physical and chemical characteristics of the waste to be shipped off-site for disposal; to refine the correlation between gross gamma measurements (i.e., screening criteria) and laboratory values of isotopic activities; and to verify the cleanup criteria has been attained in all remediated areas.

The waste characterization study will be conducted first. These samples will be collected in areas where contaminant levels are suspected to be the highest. These samples will be used to determine the physical characteristics of the soils and the range of chemical and radionuclide concentrations present in the wastes. This study is a prerequisite of the disposal site. The disposal site waste profile requirements will determine the number of samples and the nature of the testing protocol. It will include at a minimum quantifying the levels of all radionuclides present in the wastes, and the levels of organic constituents which may be leached from the waste following the US EPA's toxic characteristic leaching procedure (TCLP).

The correlation study will be used to determine the field screening levels that indicate when the level of Th-230 exceeds the soil cleanup level. This study will focus on discriminating soils that are at, or near the soil cleanup threshold. The study will also examine if other factors such as soil color or texture can be used to identify the soils and waste to be removed.

Low-volume air samplers will collect particulates (i.e., dust) from the atmosphere at locations around the perimeter of the property. These samples will be analyzed on-site to determine levels of radionuclides being blown off-site before, during, and after remediation. Levels of radionuclides in water and sediment samples collected from the unnamed swales that discharge water from the site will also be monitored before, during, and after remedial activities to ensure that the disturbances are not causing the release of radionuclides into surface waters.

Large numbers of wipe samples will be collected during the project to ensure that surfaces of rail cars, automobiles, trucks, and equipment leaving the exclusion area comply with applicable regulations regarding radioactivity. These samples will be analyzed in the on-site laboratory for gross alpha and gross beta/gamma activities.

4.0 FIELD SCREENING ACTIVITIES

This section of the FSP covers the activities used to semiquantitatively characterize (i.e., screen) the levels of radiation emanating from natural materials, rail cars, vehicles, equipment, wastes, or other solid surfaces at the Site. In addition, screening procedures for detecting organic vapors are also discussed. The text briefly describes each activity; more detailed information is included in the Standard Operating Procedures (SOPs) included in Appendix A attached at the end of this report.

4.1 RADIOLOGICAL SURVEYS OF VEGETATION

Roughly 10 to 15 acres of the Ashland 2 Site will require clearing and grubbing before the site remedial activities. The vegetation growing on the site consists primarily of native grasses, brush, and small trees. There are no data currently available that suggest any of the vegetation is contaminated, and ICF Kaiser does not believe that any vegetation contains significant levels of radionuclides. However, as the vegetation is cleared and shredded, the vegetation from soil areas suspected of being contaminated will be segregated and stockpiled separately. Hand-held gross gamma meters will be used to perform general scans of the shredded vegetation. Samples of the shredded vegetation will be collected and submitted for on-site analyses using gamma spectroscopy. The procedures for collection and labeling of vegetation samples are presented in SOP S.7 and discussed in Section 5.9.

4.2 RADIOLOGICAL SURVEYS OF GROUND SURFACE AREAS

The Ashland 2 Site, including properties belonging to Niagara Mohawk Power Corporation and Lee E. Ott, covers an area of about 150 acres. However, the area known to contain radiologically contaminated soils is only about 6 to 10 acres in size. Soils at the site will be radiologically surveyed using NaI(Tl) gamma scintillation detectors. Five different types of gamma surveys of soils will be performed during the course of this project:

- A walkover gamma survey of portions of the site will be conducted prior to the start of remedial activities
- Walkover surveys of each lift of each "pit" during excavation activities
- Surveys of soil materials in excavators as soil is removed from the pit floors
- Routine surveys of roads, parking lots, loadout areas, decon pads, and soil stockpile areas during remedial activities to ensure that radioactive materials are not being spilled or dispersed around the site as a result of the remedial activities, and
- Final survey of the disturbed areas following remedial activities, but prior to placement of clean topsoil.

4.2.1 Walkover Gamma Survey of Site Prior to Remedial Activities

Prior to the start of remedial activities, a walkover gamma survey will be performed for portions of the site that are outside of the exclusion zone (i.e., areas that are known to contain radioactive materials), but will be disturbed during remedial activities. These areas include the haul road, rail loadout area, parking lot, trailer area, soil stockpile area, and water retention pond (see Figure 1-1). These areas will be surveyed in order to: establish the initial radiation conditions before remedial activities begin, obtain data for areas where no surveys have previously been performed, and look for soil areas that contain elevated radiation levels that might have been missed during previous investigations. This survey will be performed using a NaI(Tl) gamma scintillation detector, coupled with a single channel scaler/rate meter (Table 4-1).

Permanent reference points will be established around the Site which are outside of the areas to be disturbed and which can serve as benchmarks for walkover radiological surveys, physical engineering surveys, or other activities requiring benchmarks. Walkover survey grids will be designed using the reference points as cornices to each land parcel. The survey will be performed by operators walking straight parallel lines over a parcel area at a constant velocity while "swinging" the detector close to the ground surface. The survey lines will be spaced ten feet apart. Guide markers will be established to assure that the operators walk straight lines and achieve complete area coverage. Once a parcel survey is completed, the data will be checked for completeness and accuracy, and plotted showing contours of the gross gamma readings. If the results appear to be reasonable and complete, the survey team will move on to the next parcel until the designated area to be surveyed is completed. Details concerning the equipment, the procedures for data acquisition, and the interpretation of results are presented in SOP R.2.

4.2.2 Walkover Gamma Surveys of Excavation Pits

The contaminated areas will be excavated in 6 to 12 inch lifts. Before each new lift is started, a radiological survey team will survey the area with the GPS equipment and procedures described in SOP R.1. The range of gross gamma values obtained by a SPA-3 NaI(Tl) detector which separates soils with less than 40 pCi/g of Th-230 (<40 soil) from soils with greater than 40 pCi/g of Th-230 (>40 soil) is approximately 20,000 to 24,000 cpm (BNI, 1998). The purpose of the gamma surveys for each excavation lift will be to delineate as closely as possible the areas that are below the cleanup criteria from the areas that exceed the cleanup criteria.

The survey team will walk straight lines while swinging the gamma radiation detector as close to the ground as possible. The data recorder will record geographic location data and gamma radiation levels simultaneously at a preset interval (e.g. 5 seconds) as the area is being traversed. The areas where gross gamma readings exceed the threshold value will be clearly marked with pin flags. When the grid survey is completed, the team will return to the flagged areas and walk around taking additional readings and refining the outline of the area containing >40 soils. Once the perimeter of each area is better defined, spray paint, lath, and flagging will be used to delineate the area boundary. This type of radiological survey will be conducted only in areas where excavation equipment is not operating, thereby reducing risk of accidents and to reduce exposure of the survey team to airborne particulates.

Eighteen thousand cpm is the gamma reading that will initially be used to separate >40 soils from <40 soils. Soil samples from borderline areas (i.e., 18,000 to 24,000 cpm) will be collected and analyzed in the on-site laboratory and off-site laboratory so that the correlation between gross gamma field measurements and uranium, thorium, and radium isotopes can be periodically refined and updated.

Details concerning the equipment, the procedures for data acquisition, and the interpretation of results for a walkover gamma radiation survey is presented in SOP R.1. The rationale and methods for collecting, labeling, and analyzing soil samples from the pit floor are discussed in Section 5.5.

4.2.3 Radiation Surveys of Excavated Soil

Separate excavators will be working on the pit floor for <40 and >40 soil areas. A "clean excavator" will only be excavating <40 soil and a "dirty excavator" will only be excavating >40 soil. This approach will minimize cross contamination and reduce the risk of >40 soil going to the <40 soil stockpile. As an added precaution, a radiation control technician (RCT) will be assigned to each "clean excavator" and check each load of soil to confirm that gross gamma levels are indeed below the threshold gamma radiation level of 18,000 cpm. The RCT will use a hand-held NaI(Tl) instrument (Table 4-1) for scanning each load of soil. Any soils that exceed the threshold gamma radiation level will be placed in the >40 soil stockpile destined for off-site disposal.

4.2.4 Radiation Surveys of Roads, Parking Lots, Loadout Areas, Rail Line, and Soil Stockpile Areas During Remedial Activities

Many areas on-site could potentially become contaminated as a result of the remedial activities because of spillage, inadvertent tracking of mud on tires, and surface water erosion. To reduce the potential for tracking of contamination around the site or off-site, the roads, parking lots, loadout areas, and the rail line (Figure 1-1) will be surveyed regularly in order that spills and tracked contamination can be identified and cleaned up quickly without further spread of contamination. Routine surveys of these areas and good "housekeeping practices" will help to reduce the potential for dispersion of the radionuclides.

Weekly surveys of the <40 stockpile (Figure 1-1) will also be performed as a secondary precaution to ensure that only clean soils are being placed on the pile. If a higher than acceptable gross gamma radiation level is encountered on the <40 soil stockpile, then this part of the stockpile will be quarantined and no additional soil will be added to the quarantined area. The area will be surveyed in greater detail and soil samples will be collected for analysis in the on-site laboratory. If the analyses show that the soil in question is below the cleanup criteria (i.e., 40 pCi/g Th-230), then the soil will remain on the pile and the quarantine will be lifted for the section of the pile. If the soil is found to have Th-230 activities greater than cleanup criteria, then the soil will be moved to the >40 stockpile destined for off-site disposal. The <40 stockpile will be resurveyed in the areas in question and more soil will be removed if necessary so that gross gamma measurements are below the threshold reading.

At a minimum, the roads and loadout area will be surveyed once every three days. The parking lots, rail line, and clean soil storage area will be surveyed once per week. The RCT will walk over the areas with a NaI(Tl) detector. If all of the readings are below the threshold value of 18,000 cpm, then the RCT will describe the survey in his/her logbook, including the date, time, and range of readings. If the RCT encounters any readings above the threshold value, then he/she will survey the area in greater detail, mark out the areas of elevated readings, and inform his/her superior as to the location and nature of the detected contamination problem. Corrective action will then be taken immediately to cleanup the area and place the contaminated materials in the pile destined for off-site disposal.

The equipment and procedures used to perform these area surveys are described in SOP R.2.

4.2.5 Final Gamma Radiation Survey of Site at the End of Remedial Activities

When all >40 soil has presumably been removed from an excavation area, a final gamma radiation walkover survey will be performed with the gamma detector/GPS equipment as a double-check to increase the confidence that the area has been cleared of any >40 soil. Once the radiation survey indicates that it is highly probable that the area is clear of any >40 soil, then the Final Status Survey can be performed for the area that has been surveyed.

The GPS equipment and procedures used for the final gamma radiation survey are described in SOP R.1.

4.3 ORGANIC VAPOR SCREENING OF SOILS

Organic residual wastes are present at the Ashland 2 Site (BNI, 1993). However, during remedial activities for the radiologically-contaminated soils, it is not anticipated that wastes or soils exceeding levels of concern for organic compounds or metals will be encountered. As a precautionary measure, however, soil excavation areas will be routinely scanned with a photoionization detector (PID) and viewed for discolored oily staining in order to identify soil materials potentially contaminated with organic compounds. If suspect soils are encountered, samples will be collected and sent off-site for analysis of volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), and metals using TCLP methods.

The procedures for calibrating and operating the PID instrument is presented in SOP C.1. Collection and labeling of soil samples for off-site organic and inorganic analyses are discussed in Section 5.5 and SOP S.1.

4.4 RADIOLOGICAL SURVEYS OF VEHICLES, RAILROAD CARS, EQUIPMENT, AND OTHER SOLID SURFACES

Equipment, containers, or vehicles that enter a radiologically controlled area must be monitored for surface contamination before release from the Site for unrestricted use. First, the item's surface will be surveyed using hand-held gross alpha instruments and pancake probes (Table 4-1) to determine total values of alpha and beta/gamma radiation (Table 4-2). Then, levels of removable surface alpha contamination will be quantified based on the collection and on-site analysis of surface wipe samples. Finally, these data will be compared against release criteria presented in U.S. Nuclear Regulatory Commission (NRC) Regulatory Guide 1.86 and NRC Policy and Guidance Directive FC 83-23. The levels of allowable surface alpha contamination applicable to the Ashland 2 Site are the most restrictive (Table 4-2, line 1) because of the Th-230 presence at the site.

For loaded rail cars, each individual rail car will be surveyed using the equipment and procedures presented in SOP R.3. In general, the outside of the rail car will be visually inspected. Any loose dirt, mud, or other debris attached to the rail car will be removed. The surface of the car will then be surveyed with a hand-held beta/gamma survey instrument and a hand-held gross alpha survey instrument (Table 4-1) around all sides, top, and underneath of each car. The highest readings and locations where found will be recorded on the Rail Car Data Survey form. The MicroR meter will then be held at a height equal to the vertical center of the rail car and a distance of one meter away. The surveyor will slowly walk around the rail car, keeping the instrument at a distance of one meter, and record the highest reading observed for all four sides on the Rail Car Data Survey form.

Five surface wipe samples will be collected from each loaded rail car ready to leave the Site. These will be collected from surface locations that yielded the highest gross alpha and gross beta/gamma exposure readings. Collection and on-site analyses of surface wipe samples are described in greater detail in Section 5.8 and SOP S.3.

Vehicles, equipment, and other items, like the rail cars, will also be surveyed and cleared before leaving the Site. The equipment and procedures for performing a "Free Release" survey are contained in SOP R.4. Hand-held gross alpha and gross beta/gamma meters will be used for these surveys (Table 4-1). Surface wipe samples will collected and analyzed using the same procedures specified for the rail cars (SOP S.3). The scanning and analytical results from each Free Release survey will be entered onto the Free Release form.

Any rail cars, equipment, vehicles, or other items that fail the Free Release survey will undergo decontamination as needed to where it meets release criteria.

Besides using these procedures to test items leaving the Site, all railroad cars or other waste shipment containers coming <u>onto</u> the Site will also be radiologically surveyed in order to verify that they are clean before being loaded with Ashland 2 wastes. If the railroad cars or shipping containers are not "clean," then they will not be accepted and will be returned to the vender at the vender's expense.

4.5 RADIOLOGICAL SCREENING OF USED PERSONAL PROTECTIVE CLOTHING AND EQUIPMENT (PPE)

At the end of each work shift, Tyveks, latex gloves, air-purifying respirator cartridges, and other used PPE must be discarded. These items will be scanned with a hand-held gross beta/gamma instrument and separated into two piles. One pile will be designated clean and will be disposed of as regular trash. The other pile will be considered contaminated and will be included with the soil materials destined for disposal at an off-site facility. The equipment and procedures for performing radiation surveys of used PPE are presented in SOP R.6.

Table 4-1
Field Equipment Required for On-Site Screening and Monitoring Purposes

TASK	FIELD INSTRUMENTS	RELEVANT SOPs
Radiation Grid Surveys (Sitewide and Excavation Areas)	Gamma scintillation [Na(I)Tl] detector w/ single channel scaler/rate meter; combined with GPS system and data recording capabilities.	R.1
Radiation Surveys of Ancillary Areas (Roads, Parking Lots, Railway, Loadout Area, Soil Storage Areas)	Gamma scintillation [Na(I)Tl] detector w/ single channel scaler/rate meter	R.2
Scanning of Vehicles, RR cars, and Equipment for Free Release	Pancake Probe (halogen-quenched GM detector) Hand-held gross alpha survey meter (for surface measurements) Surface wipes	R.3, R.4 S.3
Scanning RR cars to comply with DOT regulations	MicroR survey meter	R.3
Perimeter Air Monitoring	Low volume air samplers and appropriate filters	S.6
Screening Soils for Organic Vapors	Photoionization Detector (PID); O2/Lower Explosion Limit (LEL) Meter	C.1 C.2
Surface Water Monitoring and Sampling	Specific Conductance meter Turbidity meter	C.3 C.4

Table 4-2

Ashland 2 Site Remedial Action
Decontamination and Free Release Operations
Surface Contamination Guidelines[a]

Radionuclides[b]	Allowable Residual Surface Contamination (dpm/100 cm^2)[c]		
	Total Average[d,e]	Removable[e,g]	Total Maximum[e,f]
Transuranics Ra-226 Ra-228 Th-230 Th-228 Pa-231 Ac-227 I-125 I-129	100[h]	20[h]	300[h]
Th-Natural Th-232 Sr-90 Ra-223 Ra-224 U-232 I-126 I-131 I-133	1,000	200	3,000
U-Natural U-235 U-238 and associated decay products	5,000α	1,000α	15,000α
Beta-gamma emitters (radionuclides with decay modes other than alpha emission or spontaneous fission) except Sr-90 and others noted above	5,000β-γ[h]	1,000β-γ[h]	15,000β-γ[h]

a These regulations are derived from NRC Regulatory Guide 1.86 and NRC Policy and Guidance Directive FC 83-23.

b Where surface contamination by both alpha-and beta-gamma-emitting radionuclides exists, the limits established for alpha-and beta-gamma-emitting radionuclides should apply independently.

c As used in this table, dpm (disintegrations per minute) means the rate of emission by radioactive material as determined by correcting the counts per minute measured by an appropriate detector for background, efficiency, and geometric factors associated with the instrumentation.

d Measurements of average contamination should not be averaged over an area of more than 1 m^2. For objects of less surface area, the average should be derived for each such object.

e The average and maximum dose rate associated with surface contamination resulting from beta-gamma emitters should not exceed 0.2 mrad/h and 1.0 mrad/h, respectively, at 1 cm.

f The maximum contamination level applies to an area of not more than 100 cm^2.

g The amount of removable radioactive material per 100 cm^2 of surface area should be determined by wiping that area with dry filter or soft absorbent paper, applying moderate pressure, and measuring the amount of radioactive material on the wipe with an appropriate instrument of known efficiency. When removable contamination on objects of surface area less then 100 cm^2 is determined, the activity per unit area should be based on the actual area and the entire surface should be wiped. The numbers in this column are maximum amounts.

h Applicable to Ashland 2 Site Remedial Action due to presence of Th-230 and Ra-226 contamination.

5.0 FIELD SAMPLING AND ANALYTICAL ACTIVITIES

This section of the FSP covers the sampling activities and the sample analyses to be performed on-site and off-site. The quantitative analytical data that are generated as a result of these activities will be sufficient in type, in quantity, and in quality such that the cleanup of the site is verified, radiation exposure to on-site workers is minimized, and migration of radioactive materials to adjacent properties and roads is proven to be negligible.

A subcontractor has not been selected yet to set up and operate the on-site laboratory. Therefore, the specific types of equipment and operating procedures for the lab equipment are currently being determined. SOPs for the on-site laboratory will be developed once the selection process is completed.

5.1 GEOPHYSICS (NOT APPLICABLE)

5.2 SOIL GAS SURVEY (NOT APPLICABLE)

5.3 GROUNDWATER (NOT APPLICABLE)

5.4 SUBSURFACE SOIL (NOT APPLICABLE)

5.5 SURFACE SOIL AND SEDIMENT

5.5.1 Rationale

Surface soil, near-surface soil, and sediment samples will be collected before, during , and after the remedial activities for several different purposes. This subsection is intended to describe the numbers, locations, purpose, and rationale for collecting each type of soil and sediment sample.

5.5.1.1 Surface and Near-Surface Soil Sample Locations

Soil samples will be collected and analyzed during the remedial action program for four different purposes.

The first set of soil samples includes fifteen Waste Profile samples of surface and near surface soils that are radiologically contaminated and will be collected prior to the start of remedial activities. These samples will be collected early in the program and will be sent off-site for analyses (Table 5.1). The analytical data will provide "Waste Profile" characteristics that are required to ship soils off-site to a licensed disposal facility. This group of samples is referred to as the "Waste Profile Samples." Eight of the samples will be discrete surface soil samples collected from locations where the walkover gamma radiation survey indicates the highest gamma radiation readings occur (see Section 4.2.1). These eight samples will be collected from 0 to 12 inches deep using a shovel and trowel to obtain the samples. Seven other soil samples in this group will be collected from just below the ground surface (1 to 4 feet deep) using a hand auger. These near-surface samples will be collected from locations approximately equal to locations where high activities of radionuclides were detected during the RI program, including borehole locations B32R004, B32R005, B32R006, B32R009, B32R015, B32R017, and B32R136 (Figure 1-2). The procedures for collecting the surface soil samples and auger samples are described in SOP S.1.

The second set of soil samples will be collected during the remedial activities and is referred to as the "Soil Characterization Samples." This group includes over 1000 samples which will be collected and analyzed (Table 5-1) during the course of the soil excavation activities. These samples will be collected from the excavation pit floor and from elsewhere on-site (e.g., haul road, soil storage area, loadout area) where the gamma walkover surveys show gamma radiation levels to be at the threshold values and it is unclear whether the soil materials are >40 or <40. The collection of these samples and rapid analyses in the on-site laboratory will provide a means to quickly assess whether or not soil materials should be sent off-site for disposal.

If soils are encountered that appear to contain organic contaminants or cause elevated PID readings, then samples of these soils will be collected and sent to the off-site laboratory for analyses of volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), and metals using the Toxic Characteristic Leaching Procedure (TCLP), and for PCBs (Table 5-2). The procedures for collecting soil samples are included in SOP S.1.

The third type of soil samples to be collected are samples from each rail car that is shipped to the licensed waste disposal facility. These "Rail Car Samples" will each consist of six samples that are randomly collected from each loaded rail car and are then composited. These samples will be analyzed in the field laboratory (Table 5-1) and the results will be included on the manifest sheets that accompany the rail cars to the waste disposal facility. The procedures for collecting and compositing the Rail Car Samples are described in SOP S.2.

The fourth set of soil samples to be collected during the project is the "Final Status Survey." These samples will be collected from excavation pit floors and side slopes after all contaminated soils have been removed and a gamma radiation walkover survey of each excavation area has been performed. They will also be collected from other survey units around the Site. The purpose of these samples is to confirm that all contaminated soils exceeding the cleanup criteria have been removed. These samples will be sent to the off-site laboratory for analyses. Details of the statistical sampling design, sampling procedures, numbers of samples, and analytical protocols are described in a separate document (Final Status Survey Plan).

5.5.1.2 Sediment Sample Locations

Two different types of sediment samples will be collected during the course of the project. The first type of samples involve sediments that accumulate in the sumps, the water retention pond, and the silt fences and are potentially contaminated. Each of these sediment locations will be sampled and analyzed weekly in the field laboratory (Table 5-1). When necessary, the sediment that has accumulated at these locations will need to be removed. The laboratory analyses will dictate whether the sediments will be placed in the <40 soil storage pile, or whether it will be placed in the pile destined for off-site disposal.

The second type of sediments to be sampled and analyzed are sediments from the two drainage swales that lie adjacent to the main excavation area (Figure 1-1). Sampling locations are shown on Figure 5-1. These four locations will be sampled weekly before, during, and up to one month after remedial activities are performed. The samples will be analyzed in the field laboratory (Table 5-1). Results from these analyses will help determine whether radiologically-contaminated soils are migrating off-site, and whether remedial activities are accelerating the rate of off-site migration. If the data indicate that off-site migration is measurable, then additional steps for controlling soil erosion will be evaluated and implemented to reduce off-site migration of contaminated sediments.

The procedures for collecting sediment samples are the same as for surface soil samples (SOP S.1).

5.5.1.3 Discrete/Composite Soil and Sediment Sampling Requirements

All soil and sediment samples collected during the project will be discrete samples, except for the composite soil samples that will be collected from each rail car load that is destined for off-site disposal. The procedures for collecting and compositing the Rail Car Samples are described in SOP S.2.

5.5.1.4 Field and Laboratory Analyses

Table 5-1 lists the types and approximate numbers of soil and sediment samples that will be collected during the field program, the field measurements that will be made, the analyses that will be performed in the field laboratory, and the analyses that will be performed in the off-site laboratory. For all samples, gross gamma measurements will be performed using hand-held field instruments, and analyses of moisture content and gamma spectroscopy will be performed in the field laboratory. All of the Waste Profile Samples and Final Status Survey Samples will be sent off-site for laboratory analyses, as listed in Tables 5-1 and 5-2.

It is anticipated that a few of the Soil Characterization Samples (approximately 8) might be collected and sent to the off-site laboratory for analyses of metals, VOCs, SVOCs, and PCBs, in addition to the U, Th, and Ra isotopes normally analyzed. This will happen if soil organic staining is observed or VOCs are detected based on PID readings. Sampling of the soil materials in question will occur if the soil is significantly stained, if the PID reading directly above the soil surface exceeds 100 ppmv, or the PID reading in the breathing air zone (i.e., 5 ft above ground surface) exceeds 2 ppmv.

If organic-contaminated soil is suspected to be present, all excavation work in that area will cease until sampling and analyses of soil samples are completed, and the data can be evaluated. If organic contamination is present in TCLP extracts at levels that would cause the soils to be classified as RCRA hazardous, then the soils will remain in place until the USACE decides what should be done with the soil and the work plans are modified to deal with the change in site conditions.

5.5.1.5 Upgradient, QA/QC, and Blank Samples and Frequency

Background levels of uranium, thorium, and radium isotopes in soils were determined previously during the RI (BNI, 1993) using soil samples collected from the Ashland 2 South area, which is outside the area containing radioactive waste materials. Therefore, additional sampling and characterization for background levels is unnecessary.

Sample replicates (i.e., blind duplicates) will be sent to the field laboratory and the off-site laboratory at a frequency of one replicate per 20 soil and sediment samples analyzed. The replicate samples will be analyzed for the same parameters that the primary samples are being analyzed. The procedure for collecting sample replicates is presented in SOP S.1 and S.2.

Rinsate samples will be collected only if samples are being sent off-site for organic or inorganic analyses. The rinsate samples will be collected by passing distilled water over decontaminated trowels and mixing bowls, and placing the rinsate samples in appropriate sample bottles. One rinsate sample will be collected for every 20 soil and sediment samples collected for non-radiological analysis. The procedure for collecting a rinsate sample is presented in SOP S.8.

5.5.2 Procedures

5.5.2.1 Sampling Methods for Surface Soil and Sediment

Surface soil samples will be collected from a depth of 0 to 6 inches using a decontaminated trowel. Sediment will be collected from the uppermost 2 inches of material. In each case, gross gamma survey measurements will generally be employed to select discrete sampling locations that have the highest gross gamma values. If soil sampling locations are vegetated, the above-ground vegetation and top one inch of soil material will be scraped off and discarded. For dry soil and sediment sampling locations, the soil will be stirred and mixed in-place and then placed directly into sample jars. If the soil or sediment sampling location is saturated or contains standing water, then the sample material will be dug up with the trowel, placed into a stainless steel mixing bowl, excess water will be decanted out of the bowl, and the material will be thoroughly mixed using the trowel. The trowel will then be used to place sample material into the sample jars.

For the Waste Profile Samples to be collected near the beginning of the field activities, seven of the samples will be collected from depths of one to four feet deep using a decontaminated hand auger. The augered material will be placed on a clean sheet of plastic and will be scanned with a hand-held gross gamma NaI(Tl) detector. The specific depth interval sent off-site for analysis will be the interval displaying the highest gross gamma measurements. The material selected will be homogenized with a trowel and placed directly into a sampling jar, as discussed in SOP S.1.

Each Rail Car Sample is a composite of six discrete soil samples. The six samples will be collected randomly from the surface of each loaded car, will be placed in a stainless steel bowl, and will be thoroughly homogenized. After mixing, composited sample material will be placed in the required sample jars and will be tightly sealed and labeled. The procedure for collecting a composited Rail Car soil sample is presented in SOP S.2.

5.5.2.2 Field Measurement Procedures and Criteria

For each Waste Profile Sample, Soil Characterization Sample, and sediment samples not submerged beneath standing water, a gross gamma radiation measurement will be made from directly above the sample (SOP R.2) and a location and elevation will be determined. For most of the sampling sites, the locations will be determined using the GPS instrument (SOP R.1). However, in many cases, engineer's surveying equipment and methods will be used to get a more accurate fix on sampling location and elevation.

A PID instrument will be used to check for organic vapors that might be emanating from surface soils. The procedures for calibrating and operating the PID instrument are included in SOP C.1. For each new lift in an excavation area, the area will be spot checked with the PID following the walkover gamma survey. Oily spots, wet spots, or locations that smell of organic vapors will be preferentially surveyed using the PID. If organic vapors are positively detected at 100 ppmv at the ground surface or 2 ppmv above ambient levels in the breathing air zone, then the soils will be considered as possibly impacted by VOCs and will be sampled for off-site analyses of metals, VOCs, SVOCs, and PCBs (Table 5-2).

5.5.2.3 Sampling for Radiological Analyses

All soil and sediment samples collected at the site will be measured in the field laboratory using gamma spectroscopy to estimate activity levels of U-238, Ra-226, and Th-230 isotopes. For the soil and sediment samples sent to the off-site laboratory (Table 5-1), each will be analyzed for uranium, thorium, and radium isotopes using gamma and alpha spectrometric methods.

5.5.2.4 Sampling for Chemical Analyses

The fifteen Waste Profile Soil Samples will be analyzed in the off-site laboratory for a number of organic and inorganic parameters (Table 5-2).

If soils are encountered during excavation activities which appear to contain organic compounds or cause PID measurements to exceed threshold criteria, then a discrete soil sample will be collected and shipped off-site for analysis of metals, VOCs, SVOCs (by TCLP), and PCBs (Table 5-2).

5.5.2.5 Sample Containers and Preservation Techniques

All soil and sediment samples that are collected for on-site and off-site radiological analyses will be placed in a one liter, wide-mouth polyethylene bottles. Samples for radiological analyses do not need to be refrigerated.

Waste Profile Samples will require two 32-once wide-mouth glass sample jars for the organic and inorganic analyses (Table 5-2). These sample containers will be cooled to 4 degrees Centigrade (C) immediately upon collection.

Soil samples that are being analyzed off-site for SVOCs and PCBs will be placed in one 16-ounce amber glass jar with a Teflon cap liner. Samples that are to be analyzed off-site for VOCs will be placed in one 4-ounce amber glass jar. These sample containers will be cooled to 4 degrees C immediately upon collection.

5.5.2.6 Field Quality Control Sampling Procedures

For each twenty soil samples collected for the on-site laboratory, one blind duplicate will be submitted to the on-site laboratory and one replicate sample will be sent to the off-site laboratory for the same analyses. Thus, three splits of the same sample will be analyzed. When replicate samples are being collected, the sample material will be placed in a stainless steel mixing bowl, will be thoroughly mixed with a stainless steel spoon, and will be used to fill the required sample jars (SOP S.1).

5.5.2.7 Decontamination Procedures

Soil and sediment sampling equipment include stainless steel trowels, spoons, mixing bowls and a hand auger. All soil sampling equipment will be decontaminated after each use as follows:

- scraping off dirt and mud,

- scrubbing with Alconox and potable water solution,
- rinsing with potable water,
- and rinsing with distilled water

All used decon solutions will be placed in a 55-gallon drum, which will be periodically emptied into the stormwater/wastewater retention pond.

5.6 SURFACE WATER AND WASTEWATER

5.6.1 Rationale

Storm runoff water and decontamination wastewaters will be collected in several sumps and a retention pond at the Site. No runoff waters from the disturbed areas or the soil stockpile areas will be allowed to leave the site. Waters from the sumps will be transferred to the retention pond, where sediment will be allowed to settle. Nearly all U, Th, or Ra present will be sorbed to the suspended solids. By allowing the suspended sediment to settle, the clarified water will be clean and will be used to water the roads, soil storage areas, and other areas in the exclusion zone only, that require dust control. A sample of water from the pond will be collected weekly and analyzed for gross alpha radiation. If large storm events occur and water in the pond is turbid, water samples will be collected and analyzed more frequently.

When water is flowing in the drainage swales, samples will be collected upgradient and downgradient of the work area in order to determine whether radionuclides are entering the swales. These sampling events will be infrequent and will depend on the frequency and magnitude of storm events that occur during remedial activities.

At the present time, it is planned that no water collected in the retention pond will be discharged off-site. With the frequency, duration, and magnitude of rainstorms in the Buffalo area; however, it is not likely that all water in the retention pond can be used for on-site dust control. Hence, there is an effort currently being conducted to determine whether discharge to the drainage swales on-site or discharge to the local sanitary sewer operated by the Town of Tonawanda is feasible. Where the water is eventually discharged and the allowable limits for radionuclides and non-radiological parameters contained in the discharge water will have a major effect on the water sampling and analysis program. Therefore, this section (5.6) will be significantly altered in the event that retention pond water is discharged off-site.

5.6.1.1 Surface Water Sample Locations

One sample will be collected from the storm water/wastewater retention pond (Figure 5-1) on a weekly basis. One grab sample will be collected from four different locations in the drainage swales during storm events if water is flowing. Two of the sampling points will be located in separate swales upgradient of the work area and two will be located at the property line downgradient of the work area (Figure 5-1).

5.6.1.2 Sample Collection for On-Site and Off-Site Laboratory Analysis

Each water sample will be a discrete sample; compositing of water samples will not be performed. For each sample collected, the specific conductance and the turbidity of the water will be measured in situ (Table 4-1). Samples will be analyzed in the on-site laboratory for gross alpha radiation. One in every 20 samples will be sent to the off-site laboratory for isotopic analysis.

Sampling of the drainage swales will start about two weeks before the site preparation in order to collect samples before the area disturbance begins; these samples will be analyzed in the field laboratory as soon as it is operational. Sampling of the drainage swales will continue for about one month after demobilization occurs. These last samples will be sent to the off-site laboratory for analysis of gross alpha.

5.6.1.3 Upgradient, QA/QC, and Blank Samples and Frequency

Two sampling locations in the drainage swales have been selected which are at the eastern side of the Site and are upgradient of the work area (Figure 5-1). These two sampling sites will serve as background and analytical data from these points will be compared against the two downgradient points to determine whether site remedial activities have any effect on the total alpha activity in the surface water.

For every twenty samples of surface water collected, replicate samples will be submitted to the field and off-site laboratories for analysis of gross alpha radiation.

Water samples will be collected by dipping sample bottles directly into the water being sampled, so no sampling equipment will be used to collect the samples. Rinsate blanks will not be required.

5.6.2 Procedures

5.6.2.1 Sampling Methods for Surface Water - General

Water samples will be collected by lowering the sample bottle (one-liter polyethylene) into the water and allowing the bottle to fill. No sampling equipment will be used. For the retention pond, samples will be collected from the shoreline and no wading will be involved.

5.6.2.2 Sampling Methods for Surface Water - Filtration

Since nearly all of the radioisotopes are sorbed onto suspended sediment, water samples will not be filtered. Hence, total gross alpha activity will be measured in each water sample.

5.6.2.3 Field Measurement Procedures and Criteria

For each surface water sample collected, the specific conductance and turbidity of the water will be measured in situ. These field instruments will be calibrated, maintained, and operated according to the manufacturer's specifications (SOPs C.3 and C.4).

5.6.2.4 Sample Containers and Preservation Techniques

Water samples will be placed into one-liter polyethylene bottles. No refrigeration of these samples is necessary. Note: samples will be shaken vigorously in the laboratory to resuspend the sediment prior to dispensing the sample for analysis of gross alpha radiation.

5.6.2.5 Field Quality Control Sampling Procedures

For every 20 surface water samples collected, one replicate sample will be collected. Each replicate sample will be analyzed for gross alpha radiation.

5.6.2.6 Decontamination Procedures

No field sampling equipment will be used, so no decontamination needs to be performed.

5.7 AIR QUALITY

5.7.1 Rationale

Low volume air samplers will be installed at six locations around the perimeter of the work area (Figure 5-1) in order to assess the levels of airborne radioactive particulates that are migrating off-site. Two samplers will be placed on the north side, two on the south side, one on the west side, and one on the east side of the Site.

Personal air samplers will be used to collect dust samples in the work area so that exposure levels to the workers can be quantified. Equipment and procedures for the personal air samplers are discussed in the Health and Safety Plan.

5.7.1.1 Sample Locations

The locations where air samplers will be installed are shown in Figure 5-1. One sampler will be located on the north side of the Site along River Road; this sampler will be used to quantify concentrations in the air leaving the north end of the property. Another sampler will be placed on the north side of the primary excavation area; this sampler will be used to quantify the level of airborne contamination that may be reaching the on-site office area. A third sampler will be placed along the eastern boundary on the Ott property to quantify the levels of airborne contamination migrating eastward from the work area. One sampler on the west side of the Niagara-Mohawk property will be used to quantify airborne contaminants migrating westward. Two samplers will be located along the south end of the Site. These samplers will be used to quantify the levels of airborne contamination around the rail loading area and the levels that might be migrating off-site in a southerly direction.

5.7.1.2 Discrete/Composite Sampling Requirements

The low volume air samplers will collect samples from discrete locations but each sample will represent a composite over time. At the beginning of the project (several weeks before the beginning of site preparation work), the air samplers will be activated with filters changed on a weekly basis. These samples will represent ambient conditions prior to work activities. When excavation and loading activities are occurring, the filters will be changed daily. The samplers will run 24 hours a day.

5.7.1.3 Sample Collection and Field and Laboratory Analyses

The air samplers will be operated and maintained according to the manufacturer's instructions. At the end of each day, the filter will be removed from the sampler, placed in a glassine envelope, and delivered to the on-site laboratory for gross alpha analysis (Table 5-1). If the gross alpha level is five times ambient levels, then the filter will be sent to the off-site laboratory for digestion and analysis of specific isotopes using alpha spectrometry. Details on the operation of the air samplers, and the collection and labeling of the samples are presented in SOP S.6.

5.7.1.4 QA/QC and Blank Samples

For every 100 air filter samples, one of the samples measured on-site will be sent to the off-site lab and analyzed for gross alpha activity. Since the radiological analyses are not destructive, the same exact sample can be measured more than once. No field blanks will be analyzed. However, the field lab will occasionally run the tray counters with a new filter in them; these analyses serve as lab blanks.

5.7.2 Procedures

5.7.2.1 Sampling Methods

A new filter will be placed in each sampler and the date and time will be recorded in the field logbook. The sampler will be operated according to the manufacturer's instructions. At the end of the sampling period (one day to one week), the filter will be removed, placed in a glassine envelope, and a sample number will be recorded on an outer envelope. The date and time that the filter was removed from the sampler will be recorded on the outside of the packet and in the field logbook. Details regarding the operation and sampling procedures for the air samplers are presented in SOP 5.6.

5.7.2.2 Sample Containers and Preservation Techniques

When removed from a sampler, the filter will be placed in a glassine envelope and outer protective envelope. After the outer envelope is properly labeled, it will be delivered to the on-site laboratory. No preservation or refrigeration of the sample is necessary.

5.7.2.3 Field Quality Control Sampling Procedures

Since the radiological analyses of filter samples are nondestructive, the same sample can be measured more than once. Hence, no filter samples will be collected specifically for QA/QC purposes. For every 100 air filter samples collected, one of the samples measured on-site will be sent to the off-site lab and reanalyzed for gross alpha radiation.

5.7.2.4 Decontamination Procedures

The air samplers will be cleaned once every month, by wiping the air intake and filter holder area first with a clean damp towel and then with a clean dry towel. At the end of the project, the samplers will be disassembled and thoroughly cleaned.

5.8 SURFACE WIPES

5.8.1 Rationale

Surface wipe samples will be collected from the outer surfaces of any rail cars, trucks, automobiles, equipment, sample containers, or other items leaving the exclusion area or rail loading area that could be potentially contaminated. The sampling and analysis of wipes from these objects is required before they can be released from the Site for unrestricted use. Wipe samples are used to measure the amount of gross alpha activity that can be removed from a solid surface (i.e., removable activity).

5.8.1.1 Sample Locations

One or more surface wipe samples (100 cm^2) will be collected from each object leaving the exclusion areas. The number of wipe samples per object will depend on the size of the object. Each object will be scanned first using hand-held gross alpha and gross beta/gamma meters. The wipe samples will be collected from surface areas that exhibit the highest gross beta/gamma and/or alpha readings.

5.8.1.2 Sample Collection and Laboratory Analyses

A soft, dry filter paper will be used to wipe a 100 cm^2 surface area using moderate pressure. The filter paper will be placed in a properly labeled glassine envelope and protective outer envelope, and submitted to the on-site laboratory for gross alpha analysis. The procedure for collecting a wipe sample is presented in SOP S.1. The equipment and procedures for calibrating and operating the gross alpha counter is presented in SOP S.3.

5.8.1.3 QA/QC and Blank Samples

Since a wipe sample cannot be replicated, no attempt will be made to collect replicate samples. Alpha counting is nondestructive and the same sample can be counted numerous times. For QA/QC purposes, one out of every 20 wipe samples will be recounted in the field laboratory to determine method reproducibility. In addition, one sample out of every 100 will be sent to the off-site lab and analyzed for gross alpha activity. This confirmatory analysis will be used as a check to determine the accuracy of the method.

5.8.2 Procedures

5.8.2.1 Sampling Methods

After an object being surveyed is scanned, areas of highest activity will be sampled with a wipe to determine the amount of removable activity. A soft, dry filter paper will be used to wipe a 100 cm^2 surface area using moderate pressure. The wipe will be placed in a properly labeled glassine envelope and submitted to the on-site laboratory for gross alpha analysis. The procedure for collecting a wipe sample is presented in SOP S.3.

5.8.2.2 Field Measurement Procedures and Criteria

Each object being surveyed for Free Release will first be scanned with a hand-held gross beta/gamma and a gross alpha meter. The procedures for using these instruments are discussed in Section 4.4.

5.8.2.3 Sample Containers and Preservation Techniques

When the wipe sampling procedure is completed, the wipe will be placed in a prelabeled glassine envelope and submitted to the on-site laboratory, as discussed in SOP S.3. No refrigeration or preservatives are necessary for these samples.

5.8.2.4 Field Quality Control Sampling Procedures

One in every 20 wipe samples will be recounted in the on-site laboratory to determine reproducibility of the method. One in every 100 samples will be sent to the off-site laboratory for confirmatory analysis.

5.8.2.5 Decontamination Procedures

Not applicable. Sampling equipment (i.e., the filter paper) is nonreusable and disposable.

5.9 VEGETATION

5.9.1 Rationale

As soon as the on-site laboratory is assembled and operational, the vegetation samples will be analyzed for U-238, Ra-226, Th-230 isotopes and gross gamma activity using gamma spectrometry.

If the vegetation samples analyzed in the on-site laboratory show that the Th-230 activities are below the applicable cleanup levels for soil (i.e., 40 pCi/g), then the suspect vegetation will be considered "clean". The "clean" shredded vegetation will eventually be used for mulch during site restoration. If the on-site laboratory analyses show the suspect vegetation contains Th-230 above the soil cleanup criteria then the contaminated vegetation will be mixed with contaminated soils and will be shipped off-site for disposal.

5.9.1.1 Sample Locations

Three samples from the clean shredded vegetation pile and seven samples of shredded vegetation from the suspect vegetation pile will be collected at random and analyzed in the on-site laboratory.

5.9.1.2 Sample Collection and Laboratory Analyses

Discrete samples of vegetation will be placed in one liter polyethylene bottles (SOP S.7). The bottles will be properly labeled and submitted for on-site analysis of U-238, Th-230, and Ra-226 isotopes using gamma spectroscopy.

5.9.1.3 QA/QC and Blank Samples

One blind duplicate sample will be collected from the vegetation pile suspected of being contaminated and will also be analyzed in the field laboratory using gamma spectroscopy.

5.9.2 Procedures

5.9.2.1 Sampling Methods

Discrete samples of shredded vegetation will be placed firmly in one liter wide-mouth polyethylene bottles, which will then be tightly capped and properly labeled (SOP 5.7).

5.9.2.2 Field Measurement Procedures (Not Applicable)

5.9.2.3 Sample Containers and Preservation Techniques

Samples will be placed in one liter wide-mouth polyethylene bottles. No refrigeration or preservatives are necessary for these samples.

5.9.2.4 Field Quality Control Sampling Procedures

One blind duplicate sample will be collected and analyzed in the on-site laboratory. A mixing bowl will be filled with shredded vegetation, which will be thoroughly mixed with a stainless steel spoon. Two one-liter bottles will be filled with the sample material. One bottle will be designated as a regular sample and the other bottle will be a blind duplicate.

5.9.2.5 Decontamination Procedures

The stainless steel bowl and spoon will be decontaminated (see Section 5.5.2.7).

Table 5-1
On-Site and Off-Site Radiological Analyses

SAMPLE TYPE	ANALYSIS	APPROX. NO. OF ON-SITE ANALYSES*	APPROX. NO. OF OFF-SITE ANALYSES*
Shredded Vegetation	gross gamma	10	0
	gamma spectrometry	10	0
Air Filters	gross alpha	750	8
	alpha spectrometry	38	4
Waste Profile Soil Samples	gross gamma	15	15
	gamma spectrometry	15	15
Soil Characterization Samples	gross gamma	2400	50
	gamma spectrometry	2400	50
Rail Car Soil Samples	gross gamma	300	15
	gamma spectrometry	300	15
Final Status Survey Samples	analyzed off-site	0	See Final Status Survey Plan
Surface Wipe Samples	gross alpha	1500	20
	gross beta/gamma	1500	20
Surface Water	gross alpha	162	10
	alpha spectrometry	0	10
Surface Sediment	gross gamma	162	10
	gamma spectrometry	162	10

* In addition, duplicate analyses will be performed at a frequency of 5%.

Table 5-2
Off-Site Sample Analyses of Non-Radiological Parameters

Sample Type	Analysis	Number of Samples	Analytical Method	Preservative	Holding Time	Required Detection Limit
Waste Profile Soil Samples	Grain size	15	ASTM D-422	None	6 months	N/A
	Density	15	ASTM D-854	None	6 months	N/A
	Standard proctor	15	ASTM D-698	None	6 months	N/A
	pH	15	SW9045	Cool 4°C	48 hours	N/A
	Paint filter	15	SW9095	Cool 4°C	7 days	N/A
	Reactive sulfide	15	SW846, chap 7	Cool 4°C	7 days	500 mg/kg
	Reactive cyanide	15	SW846, chap 7	Cool 4°C	7 days	250 mg/kg
	Flash point	15	SW1010/20	Cool 4°C	7 days	N/A
	TOX	15	SW9020	Cool 4°C	28 days	1 mg/kg
	Total cyanide	15	SW9010/12	Cool 4°C	14 days	1 mg/kg
	Amenable cyanide	15	SW9010/12	Cool 4°C	14 days	1 mg/kg
	Volatile organics	15	SW8260	Cool 4°C	14 days	10 ug/kg
	Semivolatile organics	15	SW8270	Cool 4°C	extract: 14 days analyze: 40 days	1 mg/kg
Soil Characterization Samples	TCLP Volatile Organics	15	1311, SW 8260	Cool 4°C	extract: 14 days analyze: 28 days	--
	TCLP Semivolatile Organics	15	1311, SW 8270	Cool 4°C	extract: 14 days analyze: 61 days	--
	TCLP Metals	15	1311, SW 6000/7000	Cool 4°C	6 months	--
	PCBs	15	SW 8082	Cool 4°C	extract: 14 days analyze: 40 days	--

6.0 SAMPLE CHAIN OF CUSTODY/DOCUMENTATION

The procedures outlined in this section are provided to assure that all site remediation activities are fully and accurately documented. Included in this section are procedures for maintaining field notebooks, documenting remedial progress with photographs, documenting site sampling procedures, and maintaining site documents.

6.1 FIELD LOGBOOK

All activities performed at the Site will be recorded in bound, field logbook(s). All logbooks will be kept at the Site while remedial activities are ongoing. At the completion of the site cleanup, logbooks and all other records (e.g., chains-of-custody) will be transferred to the Tonawanda office of ICF Kaiser for use in completing the final reports. At the completion of the project, all logbooks and other records will be transferred to the USACE for inclusion in the project file.

Field logbooks are legal documents, and thus need to be thoughtfully, accurately, and legibly prepared to qualify as the legal record of all site activities. Logbooks will be reviewed periodically to assure that quality records of site activities are being maintained. Information to be recorded in field logbooks must be as accurate and as detailed as practical; however, logbook entries must be factual statements only; no judgmental comments should be included. All field activities must be recorded in the bound logbooks at the time they occur. If an amendment is made to the logbook, it must be identified as an amendment, dated, and signed by the person making the amendment.

Field logbooks may include one or a combination of the following: Site Logbook, Sampling Logbook, Health & Safety Logbook, and/or Visitor Logbook. Overall site activities are recorded in the Site Logbook, with activity-specific information detailed in the appropriate activity logbook. Each logbook is described in the following sections. The Construction Manager shall be responsible for the preparation and maintenance of project field activity logbooks. This responsibility may be delegated to a designated Field Operations Leader or, in the case of the Health & Safety Logbook, the Site Health & Safety Officer (SHSO). Logbook formats shall be at the discretion of the individual Construction Manager while adhering to the following basic requirements:

- All field logbooks must be weatherproof and permanently bound with consecutively numbered pages.
- The project name, ICF Kaiser Engineers accounting number, and site name and address are to be written on the cover of each logbook.
- Entries are to be made using permanent waterproof blue or black ink.
- Erasures are not permitted. Errors must be crossed-out with a single-line <u>so that the error is not obscured</u>, initialed by the person making the entry, and dated.
- A new page is to be started each day with the signature of the person responsible for making the entries. The end of each daily entry will be indicated by "End of log for the day <u>*applicable date*</u>" along with the signature of the person responsible for the entries. If the last entry for a particular day does not end at the bottom of a page, a line is to be drawn diagonally down the remainder of the page, and the bottom of the page must be signed and dated.
- Blank pages that may be inadvertently left in the logbook are to have a large 'X' drawn across the entire page along with the signature of the appropriate field team member.
- All pages must include the date at the top of the page and the time of day, in military time, in the left margin preceding each entry.

In general, logbook entries can be defined by the following four categories: daily logbook entries, observations, sample collection activities, and health & safety information. Examples of the types of information that should be recorded in the logbook include, but are not limited to, the following:

Daily Logbook Entries

⇒ Record the time of site entry.

⇒ Record the weather conditions - specific information regarding amount of rainfall, wind speed and direction must be recorded along with any changes in the weather conditions during that day's activities.

⇒ Record the names of all team members and their responsibilities during that day's activities.

⇒ Record general discussion of visitor activities including a list of all visitors on the Site that day.

⇒ Record all conversations held with other persons responsible for or in some way involved with the Site.

⇒ Record a step-by-step explanation of site activities. This can be accompanied by photographs and/or sketches, as appropriate, to better describe activities.

Observations

⇒ Record descriptions of site physical or topographic features pertinent to site activities.

⇒ Record remediation activities, construction details, equipment used, problems encountered, and explanation of any down time.

⇒ Record information on arrival and removal from the site of all shipping containers or rail cars. Details regarding the number of containers received and quantity of materials shipped should be included.

⇒ Describe stratification of the subsurface, soil or water conditions, and other subsurface data. Soil sample descriptions will be recorded using the Unified Soil Classification System (USCS), ASTM D2488 (see SOP 5.1).

⇒ Record field measurements exactly as taken. All calculations made should be entered in the logbook indicating the measurements and formula used in performing the calculation.

⇒ All observation entries must be identified with a location, use sketches to illustrate locations when appropriate.

Sample Collection Activities

⇒ Record the names of samplers.

⇒ Record the sample number(s).

⇒ Describe sample location coordinates and elevation, indicate references to any photographs taken, maps, or sketches made, as appropriate.

⇒ Reference the sampling equipment used, including serial numbers of field screening or testing instruments.

⇒ Record the results of field instrument calibrations.

⇒ Record sampling method(s) used.

⇒ Record the time interval of sampling (military time).

⇒ Detail any variance from original plans.

⇒ Explain any mishaps or malfunctions and the action taken to correct the mishap/malfunction, including the rationale and by whose authority the action was taken.

⇒ Decontamination procedures used and method of disposal of generated waste.

⇒ Identification of specific QC samples.

Health & Safety Information

⇒ Record the results and readings of daily health and safety monitoring equipment calibration.

⇒ Detail any background locations and measurements taken.

⇒ List the level of Personal Protective Equipment (PPE) used during the day.

⇒ Record PID and LEL readings taken during remediation.

⇒ Describe any incidents, accidents, and course of action taken and by whose authority.

6.2 SITE PHOTOGRAPHS

A site photograph log will be maintained on-site by the site manager. All photographs taken by site personnel will be described in the photograph log book. The log book will be a bound notebook in which the date, number of photos, and a brief description of the contents of the photographs and an explanation of the purpose for taking the photographs will be included. Maps or sketches showing the photograph number, approximate position of the camera and the direction in which the photos were taken, will be recorded in the notebook. All printed photographs will have a note written on the back to indicate the date taken, the photograph number, and the page in the photographic log where the photograph is described.

A separate file will be maintained to store the photographic negatives. The negatives will be kept in separate envelopes with the date(s) and the number of photographs taken marked on the outside.

6.3 SAMPLE NUMBERING SYSTEM

The sample numbering system will be used to identify each sample taken and to provide a tracking procedure for retrieval of information. Sample numbers will be generated in the ASH2-XX-YYY-NNN format as follows:

1. ASH2 = Ashland 2 site.
2. X = Sample type, as follows:

   AF = Air filter

   FS = Final status survey soil

   LW = Liquid waste

   SL = Soil

   WP = Wipe

   SW = Surface water

   SD = Sediment

   VG = Vegetation

3. YYY = Survey Unit Number for final status survey samples, or for sampling location where repetitive samples are being collected (e.g., surface water sample location SW3).

4. NNN = Sequential sample number for each type of sample. Note that final status survey sample numbers will be sequential within each survey unit. Replicate and blank samples will be given a "900" number by sample type, in sequence.

5. Examples:

   ASH2-FS-001-003: Final status soil sample taken from Survey Unit 001 at location 003.

   ASH2-LW-901: first blank or replicate sample of liquid waste.

6.4 SAMPLE DOCUMENTATION

6.4.1 Sample Labels

Sample labels will be completed for each sample using waterproof ink. If inclement weather conditions prohibit use of waterproof ink, a logbook notation should explain that a pencil was used to fill out the sample label because a pen would not function under field conditions. Information to be recorded on each label includes: site name, sample number, date and time of collection, name of sampler. Mistakes on the label should be corrected as described in section 6.5.

6.4.2 Sample Log Sheets

Sampling crews will record all specific sampling information (i.e., sample number, date, time, etc.) on sample log sheets (see QAPjP Appendix B and SOP F.2). The make, model, and serial number (if applicable) of sample collection equipment, field analytical equipment, and physical measuring equipment will also be recorded on the log sheet.

Sample log sheets will be numbered consecutively to follow the sequence of sampling. Use of sample log sheets will be noted in the site logbook.

Sample log sheets completed in the field may not be transcribed to clean sheets. All sample log sheets and sample summary sheets will be assembled in a loose leaf binder.

Separate log sheets for other field activities, such as field analyses, etc., may be used as needed, upon approval by the Site Manager. Use of such data sheets will be noted in the site logbook.

6.4.3 Chain-of-Custody Records

Samples are accompanied by a Chain-of-Custody (COC) Record Form (see QAPjP Appendix B and SOP F.3). When transferring samples, the individuals relinquishing and receiving will sign, date and note the time on the Record. This Record documents sample custody transfer from the sampler, often through another person, to the laboratory. The Chain-of-Custody Record is filled out as follows:

1. Enter header information (project number and name). For each station number, enter date, time, composite/grab, station location, number of containers, analytical parameters, and sample identification number (in remarks column).

2. Sign, date and enter the time under "Relinquished by" entry.

3. Make sure that the person receiving the sample signs the "Received by" entry, or enter the name of the carrier (e.g., UPS, Federal Express) under "Received by." Receiving laboratory will sign "Received for Laboratory by" on the lower line and enter the date and time.

4. Enter the bill-of-lading or Federal Express airbill number under "Remarks," if appropriate.

5. Place the original (top, signed copy) of the Chain-of-Custody Record Form in the appropriate sample shipping package. Retain a copy with field records.

Common carriers will usually not accept responsibility for handling Chain-of-Custody Record Forms. This necessitates packing the record in the sample container (enclosed in a plastic zip-lock bag). As long as custody forms are sealed inside the sample container and the custody seals are intact, commercial carriers are not required to sign off on the custody form.

The laboratory representative who accepts the incoming sample shipment will sign and date the Chain-of-Custody Record, completing the sample transfer process. It is then the laboratory's responsibility to maintain custody records throughout sample preparation and analysis.

6.5 CORRECTIONS TO DOCUMENTATION

All field documentation, including field logbooks, labels, sample log sheets, and chain of custody records are completed using black waterproof ink. Any corrections are made by drawing a line through the error, initialing and dating the change, and entering the correct information. Erasures are not permitted.

7.0 SAMPLE PACKAGING AND SHIPPING

All samples to be shipped off-site must be analyzed on-site to determine the levels of radionuclides present. This will allow for proper packaging and shipping via IATA Dangerous Goods Regulations. By IATA definition, a material must have an activity greater than 2,000 pCi/g in order to be considered radioactive. If the radioactivity of a material is < 2,000 pCi/g, it does not need to be shipped as radioactive.

The following procedure applies only to unpreserved radioactive samples. If preserved samples are being shipped, consult the IATA regulations for proper packaging, labeling, marking, and documentation.

1. Tabulate the activities of the radionuclides present in each of the samples on the Sample Shipping Worksheet (see QAPjP Appendix B; this can easily be set up on a computer spreadsheet so that all of the calculations are done automatically). The activity ratio for each sample bottle must be less than 1.0 in order to be shipped by IATA regulations. Each bottle is considered a package for shipping purposes, while the cooler is an overpack. Shipping requirements apply to each package not to the total overpack container.

2. Prepare the cooler(s) for shipment:
   - Tape drain(s) shut.
   - Place mailing label with laboratory address on top of cooler(s).

3. Prepare the sample bottles.
   - Check to see that lids are on tight and that bottle labels are firmly affixed.
   - Spray the bottles with tap water and wipe with a paper towel.

4. Measure the removable surface contamination of each sample bottle as follows. Wipe a 300 cm^2 area of the bottle (or the whole bottle if the area is < 300 cm^2) with an absorbent material (filter paper). Measure the activity of the wipe. The removable contamination for each bottle must be <1 pCi/cm^2 to be shipped using exemption packaging.

5. Arrange the sample containers in front of their assigned coolers.

6. Seal each sample container in a separate zip-loc plastic bag and arrange the sample containers in the coolers.

7. If ice is required for preservation, place cube ice in strong plastic bags and put the bags directly on and around the sample containers.

8. Fill the remaining space with vermiculite.

9. Sign the chain-of-custody (COC) form (or obtain the signature) and indicate the time and date the samples are relinquished to the overnight carrier.

10. Seal the proper COC copy in a zip-loc bag and place it inside the cooler.

11. Attach a "RADIOACTIVE" label to the <u>inside</u> of the cooler lid, or write the word "RADIOACTIVE" on the <u>inside</u> of the cooler lid. The word must be visible to anyone who opens the cooler during transport.

12. Close the lid and latch the cooler.

13. Sign and date two custody seals. Carefully peel the custody seals from their backings and place them intact over the front and back edges of the cooler. Cover the seals with clear protection tape.

14. Tape the cooler shut on both ends, making several complete revolutions with strapping tape (do not cover the custody seals).

15. Send the shipment to the analytical laboratory via overnight carrier, completing the carrier required shipping papers.

16. Telephone the laboratory and provide the following information:

- Your name
- Project name
- Number of samples sent to the laboratory for analysis
- Airbill numbers

8.0 INVESTIGATION-DERIVED WASTES (IDW)

There are four types of wastes that will be generated during remediation of the Ashland 2 Site, including:

- General trash
- Contaminated clothing, filters, etc.
- Excess sample collected for analysis
- Decontamination fluids

The wastes will be disposed as follows:

General Trash

General trash may include items such as packaging material, office paper, unused sample jars, pallets, wood, non-contaminated protective clothing, and any other non-contaminated waste materials. A roll-off container will be located at the site, and arrangements will be made with a local hauler to pick up the general garbage once a week.

Contaminated Clothing, Filters, etc.

Contaminated materials generated during the Ashland 2 Site remediation will mainly consist of used personal protective equipment (boots, gloves, tyvek), but will also include used sample jars, used air filters, etc. All such waste will be collected as generated, placed in a rail car with the contaminated soil, and shipped to Envirocare for disposal with the soil.

Excess Sample Collected for Analysis

Numerous types of samples will be collected during field operations, for both on-site and off-site analyses. All excess materials remaining after on-site analysis will be disposed with the original materials from which the sample was taken, unless the sample is archived. In other words, contaminated solids will be disposed with the contaminated soils, and non-contaminated solids will be disposed with general trash.

Decontamination Fluids

The work features have been laid out at the site such that all surface water run-off and decontamination fluids will be collected in a retention pond. Solids will be allowed settle to the bottom of the pond, while liquids will be tested to determine the level of radioactivity. If below release criteria, the water will be used for on-site dust suppression. Water remaining in the pond at the completion of remediation will be disposed at an off-site disposal facility. Solids remaining once the water has been removed will be analyzed, excavated, and disposed such that the pond area meets site cleanup criteria.

9.0 CONTRACTOR CHEMICAL QUALITY CONTROL (CCQC)

There are five features of work that require chemical quality control during the Ashland 2 remediation project: mobilization, sample collection and on-site analysis, final status survey, off-site sample shipment, and off-site sample analysis. The individual tasks associated with each definable feature of work were grouped to facilitate implementation of the 3-phase inspection process. QC measures to be implemented during each definable feature of work are discussed below.

9.1 MOBILIZATION

Mobilization consists of furnishing all materials, labor, and equipment to perform the work indicated in the Scope of Work and Specifications (ICF Kaiser, 1998b). Part of the mobilization task includes set up of the on-site laboratory.

The QC Chemist will check that the following are in place at the on-site laboratory:

- The required instrumentation is on-site and in good working order.
- All supplies have been procured from a reputable supplier, in sufficient quantity.
- Calibration standards are NIST traceable.
- All instruments have been properly calibrated and meet the requirements set forth in the QAPjP.
- Analysts have the appropriate education and experience for their assigned tasks.
- The lab has implemented a well-defined quality assurance program.
- Analytical methods are available for each type of analysis to be performed; analysts are familiar with the methods.

9.2 SAMPLE COLLECTION AND ON-SITE SAMPLE ANALYSIS

Various types of samples will be collected throughout the remediation, including air filters, decontamination wastes, wipes, soils being shipped for disposal, and waste profile samples. These samples will be analyzed on-site for gross alpha, gross beta/gamma, Th-230, Ra-226, and uranium isotopes, as detailed in the QAPjP.

- During sampling, the QC Chemist will check that:
  - ⇒ Samples are collected as specified in the FSP.
  - ⇒ Sample documentation is being properly completed.
  - ⇒ Sampling equipment is properly decontaminated.
  - ⇒ Quality control samples are collected at the proper frequency.
- The QC Chemist will check the laboratory during on-site sample analysis for the following:
  - ⇒ Calibration standards are NIST traceable.
  - ⇒ All instruments have been properly calibrated at the method-required frequency, and meet the requirements set forth in the QAPjP.
  - ⇒ Analytical methods have been derived from reliable sources.
  - ⇒ Quality control samples are being analyzed at the proper frequency.
  - ⇒ Appropriate corrective actions are being taken when the QC sample results are outside control limits.
  - ⇒ Preventive maintenance is regularly performed and documented.
  - ⇒ The lab routinely measures the background signal of their instrumentation.

9.3 FINAL STATUS SURVEY

Final status survey will be conducted on a Survey Unit basis. A coordinate system will be laid out over each Survey Unit, random-start systematic sampling will be conducted using a triangular grid, 21 surface soil samples will be collected within each Survey Unit. The samples will be analyzed at the off-site laboratories.

- During sample collection, the QC Chemist will check that:
  - ⇒ The grid has been properly laid out and documented.
  - ⇒ Sampling locations have been properly located.
  - ⇒ The appropriate number of samples were collected.
  - ⇒ Samples are collected as specified in the FSP.
  - ⇒ Sample documentation is being properly completed.
  - ⇒ Sampling equipment is properly decontaminated.
  - ⇒ Quality control samples are collected at the proper frequency.
- The QC Chemist will check the laboratory during on-site sample analysis for the following:
  - ⇒ Calibration standards are NIST traceable.
  - ⇒ All instruments have been properly calibrated at the method-required frequency, and meet the requirements set forth in the QAPjP.
  - ⇒ Analytical methods have been derived from reliable sources.
  - ⇒ Quality control samples are being analyzed at the proper frequency.
  - ⇒ Appropriate corrective actions are being taken when the QC sample results are outside control limits.
  - ⇒ Preventive maintenance is regularly performed and documented.

9.4 SHIP SAMPLES FOR OFF-SITE ANALYSIS

Various types of samples will be shipped to an off-site laboratory for analysis. The QC Chemist will check the shipping process for:

- Properly completed chain-of-custody forms.
- Proper sample documentation.
- Shipment in accordance with IATA regulations
- Proper sample packaging

9.5 OFF-SITE SAMPLE ANALYSIS

Various samples will be analyzed by an off-site laboratory. The QC chemist will verify that the off-site lab has performed the following:

- Calibration standards are NIST traceable.
- All instruments have been properly calibrated at the method-required frequency, and meet the requirements set forth in the QAPjP.
- Analytical methods have been derived from reliable sources.
- Quality control samples are being analyzed at the proper frequency.
- Appropriate corrective actions are being taken when the QC sample results are outside control limits.

- Preventive maintenance is regularly performed and documented.
- All supplies have been procured from a reputable supplier, in sufficient quantity.
- Analysts have the appropriate education and experience for their assigned tasks.
- The lab has implemented a well-defined quality assurance program.
- Analytical methods are available for each type of analysis to be performed; analysts are familiar with the methods.
- SW846 analyses meet QC criteria specified in the QAPjP.
- Analytical reports contain all of the information needed to perform data validation, as specified in the QAPjP.
- Balances, refrigerators, freezers, and the water supply are checked and documented daily.

10.0 DAILY CHEMICAL QUALITY CONTROL REPORTS (DCQCR)

The QC Chemist will provide the following input into the CQC System Manager's Daily Report:

- Field measurements taken.
- Samples collected (including locations, types, numbers, analyses).
- Inspections performed.
- Equipment calibrations performed.
- Analytical data validated.
- Problems encountered and resolution.
- Variances from the approved SAP.
- Analytical laboratory audits
- Corrective actions planned or implemented.
- Other information as requested by the CQC System Manager.

11.0 CORRECTIVE ACTIONS

11.1 FIELD ACTIVITIES

The initial responsibility for reporting and documenting an out-of-control event lies with the on-site personnel. On-site personnel must immediately notify the Site Project Manager, who is responsible for immediately reporting out-of-control events to the CQC System Manager and for documenting the event. The Site Project Manager is responsible for investigating identified problems and implementing corrective action, or for assigning other personnel to perform these tasks. The Site Project Manager must also verify that the corrective action has eliminated the problem in question. All field personnel have the authority to stop work when an out-of-control event has occurred that could impact the quality of the site work. Corrective actions will be decided upon by the Site Project Manager in consultation with the Project Manager and CQC System Manager.

Corrective actions in the field are likely to be immediate in nature and can be implemented by field personnel or the Site Project Manager; the corrective action will usually involve reanalysis, repeating the instrument calibration, or resampling at a particular location. Once an out-of-control event has occurred and the Site Project Manager and CQC System Manger have been notified, the following steps will be taken to regain control:

1. The Site Project Manager will investigate and determine the probable cause of event.
2. The Site Project Manager will consult with the CQC System Manager regarding appropriate corrective actions.
3. The Site Project Manager will decide on an appropriate corrective action.
4. The Site Project Manager will implement or direct the Contractor(s) to implement immediate corrective action.
5. The CQC System Manager will verify the effectiveness of the corrective action and decide on further actions if necessary.

The CQC System Manager will document each out-of-control event by recording the situation and its resolution (including all notifications and corrective actions taken) in the Daily QC report. Possible causes, proposed corrective action(s), and the date the corrective action(s) occurred will be recorded. The CQC System Manager will check to be sure that corrective action has been taken, the corrective action appears effective, and the situation has been fully resolved.

11.2 LABORATORY

At the laboratory level, re-analysis and other corrective measures are required if specific control limits established in the standard methods are exceeded. The bench chemist directly responsible for the test must know the current operating and acceptance limits, and take the required corrective actions (including sample re-analysis). Bench results must also be reviewed by the laboratory staff to insure that all method-specified QA requirements have been met. The report is then prepared and submitted for final QA check. Each person in the review process has the authority to require re-extraction and re-analysis of a sample if QC problems are identified.

The QC Chemist is responsible for proper data validation in accordance with Section 11.0 of the QAPjP. If data validation or QC audits result in detection of unacceptable conditions, the QC Chemist will be responsible for timely notification of the laboratory. The laboratory Quality Assurance Officer will be responsible for developing and initiating corrective action, and verifying that the corrective action has resolved the problem. Corrective action may include:

- Re-analyzing samples if holding time criteria permit;
- Re-sampling and analyzing;
- Evaluating and amending sampling and analytical procedures; and
- Accepting data acknowledging level of uncertainty.

Data inadequacies attributable to Site-specific interferences or conditions may require that sampling procedures or analytical methods be modified.

12.0 PROJECT SCHEDULE

A tentative schedule for project activities are presented in the "Site Operations Plan", Section 6.0.

Mobilization, site preparation, and initial site monitoring will occur in May and June 1998. Excavation and waste shipping activities will occur in June through October 1998. Final Status Surveys will be performed in stages in September through November 1998. Backfilling, regrading, and topsoiling of excavation areas will occur in October and November 1998. Demobilization will occur in November and December 1998. On-site monitoring and radiological surveys will occur in May through December 1998.

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APPENDIX A
STANDARD OPERATING PROCEDURES

STANDARD OPERATING PROCEDURE C.1
CALIBRATION AND USE OF A PHOTOIONIZATION DETECTOR (PID)

1.0 Scope and Application

The purpose of this Standard Operating Procedure (SOP) is to delineate protocols for field operations with a photoionization detector (HNu Model PI-101). The photoionization detector (PID) is used to detect, measure, and provide a direct reading of the concentration of trace gases, particularly organics, in the atmosphere. The PID contains an ultraviolet light source that emits photons with an energy level high enough to ionize organics, but not high enough to ionize the primary components of atmospheric air (e.g., oxygen, nitrogen). The current produced by the ions released during ionization is measured and the corresponding concentration is displayed directly in parts per million (ppm). The concentration measurements are used to establish levels of protection and other control measures, such as action levels. The PID will not detect compounds above the ionization potential of the lamp used (e.g., methane).

Use of this SOP will provide monitoring of vapor during implementation of field operations.

2.0 Materials

a. HNu Model PI-101 with 11.7 eV ultraviolet lamp probe
b. Tygon tubing
c. Flow regulator
d. Isobutylene (100 ppm) Calibration Gas

3.0 Procedure

3.1 Calibration

3.1.1 Before attaching the probe, check the function switch on the control panel to ensure that it is in the off position. Attach the probe by plugging it into the interface on the top of the readout module.

3.1.2 Turn the function switch to the battery check position. The needle on the meter should read within or above the green region. If not, recharge the battery. If the red indicator light comes on, the battery needs recharging or service may be necessary.

3.1.3 To ZERO the instrument, turn the function switch to the standby position and rotate the zero adjustment knob until the meter reads zero. If the span adjustment setting is changed after the zero is set, the zero should be rechecked and adjusted. Allow the instrument to warm up for 3-5 minutes to ensure that the zero reading is stable. If necessary, readjust the zero.

3.1.4 Set the function switch to the 0-200 ppm range.

3.1.5 Attach a regulator to a disposable cylinder of isobutylene (100 ppm). Connect the regulator to the probe of the PID with a piece of clean Tygon tubing. Turn on the valve of the regulator.

3.1.6 Record the initial span control setting.

3.1.7 Adjust the instrument display to a reading of 82 ppm. By adjusting the display to 82 ppm, the instrument is calibrated to read total organic vapor ionized at 11.7 eV quantitated relative to benzene. If 75 ppm isobutylene calibration gas is used, adjust the instrument display to a reading of 61 ppm.

3.1.8 Record the final span control setting.

3.1.9 After the instrument has been calibrated, turn the function switch to the 0-20 ppm range and record the background reading.

3.2 Operation

3.2.1 Set the function switch to the appropriate range. If the concentration of gases or vapors is unknown, set the function switch to 0-20 ppm range. Adjust if necessary.

3.2.2 While taking care not to permit the PID to be exposed to excessive moisture, dirt, or contaminants, monitor the field sampling activities.

NOTE: Do not place the probe too close to the monitoring media (e.g., soil or liquids) because the inlet can become clogged.

3.2.3 When sampling activities are completed or at the end of the day, carefully clean the outside of the PID with a damp disposable towel to remove all visible dirt. Return the PID to a secure area and place on charge.

3.2.4 With the exception of the probe's inlet and exhaust, the PID can be wrapped in clear plastic to prevent it from becoming contaminated and to prevent water from getting inside in the event of precipitation. If the instrument becomes contaminated, make sure to take necessary steps to decontaminate it.

4.0 Maintenance

During periods of analyzer operation, dust and other foreign materials are drawn into the probe, forming deposits on the surface of the UV lamp and in the ion chamber. These deposits interfere with the ionization process and cause erroneous readings. The UV lamp and ion chamber should be cleaned if the meter readings are low, erratic, unstable, non-repeatable, are drifting, or show moisture sensitivity. At a minimum, the cleaning should be performed on a monthly basis.

The following items cover basic field maintenance and servicing procedures for the HNu Model PI-101. In general, maintenance procedures not covered below are to be left to trained service personnel.

4.1 Disassemble the probe and remove the 11.7 eV lamp and the ion chamber in a careful manner.

4.2 Apply a freon or chlorinated organic solvent with a non-abrasive tissue and rub gently. Do not clean the lamp with water, water miscible solvents such as methanol or acetone, or the cleaning compound used for the 9.5 and 10.2 eV lamps.

4.3 Inspect the ion chamber for dust and deposits. If dusts or deposits are present, remove the outer Teflon® ring and the four screws holding the retaining ring. Gently move the retaining ring aside and remove the screen. Use a tissue or swab moistened with methanol to clean the assembly. Reassemble the probe after ensuring no liquid is present. If the instrument still does not perform properly, replace the lamp or refer to the owner's manual.

5.0 Precautions

5.1 The HNu PI-101 is designed to sample air or vapors only. DO NOT allow any liquids or low boiling vapors to get into the probe or meter assembly.

5.2 High concentrations of any gas will cause erroneous readings. High humidity can cause the instrument readings to vary significantly from the actual concentration of gases or vapors present. This is true even though the PID cannot react to water vapor.

5.3 High humidity or exposure to concentrations of low boiling vapors will contaminate the ion chamber, causing a steady decrease in sensitivity.

5.4 Do not look at the light source from a distance closer than 6 inches with unprotected eyes. Observe only briefly. Continued exposure to ultraviolet light energy generated by the light source can be harmful to eyesight.

5.5 Place the instrument on charge after each use. The lead acid batteries cannot be ruined by over charging.

5.6 Never interchange lamps with different eV ratings. Since the amplifier and other components of the HNu are designed for a specific eV lamp, a lamp with a different eV rating will cause the instrument not to operate properly.

5.7 Turn the function switch to the OFF position before performing any maintenance operations.

6.0 References

ICFKE, 1988. Field Equipment Manual.

7.0 Attachments

None.

STANDARD OPERATING PROCEDURE C.2
CALIBRATION AND USE OF A COMBUSTIBLE GAS/OXYGEN/HYDROGEN SULFIDE MONITOR

1.0 Scope and Application

The purpose of this Standard Operating Procedure (SOP) is to delineate protocols for field operations with a combustible gas/oxygen/hydrogen sulfide monitor. The monitor continuously and simultaneously monitors the level of ambient oxygen, hydrogen sulfide, and combustible gases. Although the instrument only displays readings for one gas at a time, all three of the gases are continuously being monitored and an alarm will sound if any of the gases reaches a preset unsafe limit. Combustible gases are displayed in percent of the lower explosive limit (LEL) in 1% increments, hydrogen sulfide in parts per million (ppm) in 1 ppm increments, and oxygen (OX) in percent by volume in 0.1% increments. Information from the monitor is used to identify unsafe work areas (e.g., oxygen-deficient atmospheres, explosive atmospheres) and establish control measures, such as levels of protection.

Use of this SOP will provide monitoring of vapor during implementation of field operations.

2.0 Materials

a. Combustible gas/oxygen/hydrogen sulfide monitor
b. Pentane (25% LEL) calibration gas
c. Flow regulator
d. Replacement screens
e. Oxygen sensors
f. Hydrogen sulfide sensors
g. Combustible gas sensors

3.0 Procedure

3.1 To switch the instrument on, press ON. Once the display stabilizes, the monitor is ready for use.

3.2 To check the LEL alarm setting, switch the display to the LEL mode and slowly turn the Z LEL adjustment in a clockwise direction until the alarm sounds. When the alarm level is reached, turn the adjustment back and forth to observe the percent LEL at which the alarm is activated. Once the display is observed, turn the adjustment back to read zero. The factory setting for the LEL alarm is 10%.

3.3 To check the Hydrogen sulfide alarm setting, follow the same procedure above while turning the Z PPM adjustment. The factory setting for the hydrogen sulfide alarm is 10 ppm.

3.4 To check the OX setting, observe the display reading after switching to OX mode, which should be 20.9% in normal room air. Slowly turn the S OX adjustment in a counterclockwise direction until the low oxygen alarm setting is reached; then turn the adjustment back and forth to verify the setting. After the low oxygen alarm is located, turn the S OX adjustment in a clockwise direction until the high oxygen alarm setting is reached and turn the adjustment back and forth to verify the setting. Once both the high and low oxygen alarms settings have been verified, return the display to the original setting. The factory settings for the oxygen alarms are 19.5% for the low and 23.5% for the high.

3.5 Only the hydrogen sulfide and LEL require zero calibration. In clean air, switch the display to hydrogen sulfide mode and turn the Z PPM adjustment in a counterclockwise direction until the minus sign appears. Turn the Z PPM adjustment in a clockwise direction until the minus sign disappears and the display reads 000. Switch the display to the LEL mode and proceed through the same steps while turning the Z LEL adjustment.

3.6 Switch the display to the LEL mode and attach the span gas (25% LEL pentane) to the monitor using the calibration cup. Allow the gas to flow for approximately two minutes. With the gas flowing, adjust the S LEL control so the display reads the % LEL printed on the calibration gas cylinder to the nearest percent. Repeat these steps using a known concentration of hydrogen sulfide and the S PPM adjustment. Utilizing clean, ambient air adjust the S OX to read 20.9% oxygen. If the oxygen content of ambient air is in question, calibration should be performed utilizing a calibration gas with a known percentage of oxygen in nitrogen.

3.7 After calibrating the instrument, the instrument is ready for use. Combustible gases, percent oxygen and hydrogen sulfide are constantly monitored. The display may be converted from oxygen to combustibles to hydrogen sulfide by depressing the push-buttons on the front of the cover.

4.0 Maintenance

4.1 Screen Replacement - To replace the stainless-steel screens which protect the sensors, remove the 4 screws which hold the bezel and screens in place. Replace the screen if forced air cleaning does not remove the dust particles and dirt clogging the screen. Never use any type of solvent to clean the screen.

4.2 Sensor Replacement Disassembly - To replace any of the sensors, the following sequence must be followed in order to access the sensors: (1) remove the bezel and screens, (2) remove the carrying strap and screws from each side of the case, (3) separate the two case halves, and (4) turn the top half over and lay face down next to case bottom. Disconnect the battery pack connector before replacing any sensors.

4.3 Oxygen Sensor Replacement - Pull apart the two halves of the small black connector in the sensor leads, remove the two long #2 screws that go through the front of the case bottom and into the oxygen sensor retaining bracket. Lift the oxygen sensor and bracket out of the instrument and ensure that the plastic mounting ring is still in place. Install the new sensor by following these steps in reverse. Once the new sensor is installed the instrument will likely sound the high oxygen alarm. The new sensor will require approximately 10 minutes to stabilize.

4.4 Hydrogen Sulfide Sensor Replacement - The oxygen sensor must first be removed. Once the oxygen sensor is removed, locate the three long #2 screws that extend through the case bottom and into the PC board and lift the PC board from the case bottom with the sensor attached. Remove the sensor by lifting it from the sockets that it is connected to via small pins. Remove the small wire that shorts two of the terminals in the new sensor and insert it into the sensor board. Reassemble the remaining components of the instrument.

4.5 Combustible Gas Sensor Replacement - The oxygen sensor must first be removed. Once the oxygen sensor is removed, disconnect the LEL sensor from the regulator PC board by disconnecting the three circuit connectors. Remove the two screws that fasten the LEL sensor to the case bottom. Install the new sensor while ensuring that the sealing gaskets are properly installed. Reassemble the remaining components of the instrument.

5.0 Precautions

5.1 The platinum filament, which is used to measure the concentration of combustible gases can be damaged by certain compounds such as silicones, halides, leaded gasoline, and oxygen-enriched atmospheres.

5.2 The monitor does not provide a valid reading of the LEL or hydrogen sulfide concentration in oxygen-deficient atmospheres.

5.3 If any alarms sound, personnel should immediately cease all work operations and eliminate any ignition sources. Refer to the Health and Safety Plan for specifications on monitoring and resumption of work activities.

6.0 References

Industrial Scientific Model HMX271® Operator's Manual.

7.0 Attachments

None.

STANDARD OPERATING PROCEDURE C.3
CALIBRATION AND USE OF A SPECIFIC CONDUCTANCE METER

1.0 Scope and Application

The purpose of this Standard Operating Procedure (SOP) is to delineate protocols for the calibration and use of a field meter to measure specific conductance (S.C.) in water. The meter should be used to measure S.C. *in situ* in the surface water body being sampled or monitored. The water quality meter may be a stand-alone S.C. meter or it may be a combined multiprobe unit used to measure temperature, pH, specific conductance, turbidity, and/or other water quality parameters.

2.0 Materials

a. Specific conductance or multiprobe water quality meter
b. Deionized water
c. Conductivity calibration solutions

3.0 Procedure

3.1 General Instructions

Instruments should be made by a well-known, reputable company. Instruments should be field-rugged. Instruments that are sensitive to water, heat, cold or are of fragile construction should be avoided. The range of the instrument should bracket the expected sample concentrations. Qualified individuals (chemists, geochemists, experienced field personnel) who have used the instrument in the past should be consulted.

Many field models of the instruments listed above exist on the market. In order to avoid limiting the field personnel to one particular make or model of instrument, only general calibration instructions are presented here. Always use the owner/operator manual as the primary source of information on calibration procedures.

All calibration and maintenance activities are recorded in the instrument logbook assigned to each field instrument. The field team leader is responsible for ensuring that field teams implement and document these procedures in each instrument logbook.

Before going to the field, locate all necessary field supplies (deionized water, tissues, buffers, standards, etc.). Ensure each instrument is in operational order (good batteries, functional LCDs or analog displays, etc.). Locate back-up instruments in the case of failure.

3.2 Calibration

3.2.1 Locate a clean, protected area in which to set up and calibrate instrument. Ensure sufficient supply of deionized water and tissue (such as Kim Wipes or Kaydrys) to clean instrument(s). Ensure a sufficient supply of all necessary buffers and standard solutions. Have an owner/operator manual available for use.

3.2.2 Turn on power to meter and check to determine if battery power is within acceptable range for the meter. If battery is low, replace batteries and recheck power.

3.2.3 Calibrate meter to zero conductance according to instrument operating manual. A ZERO pot is used to set the zero.

3.3.3 Calibrate the meter using a standard KCl solution. Choose the conductance of the standard to be near the expected range of the samples (commonly, solution has a S.C. of 1413 uS/cm). The probe is immersed in the standard solution, and the SPAN or CAL pot is used to set the conductivity value.

If the meter has an automatic temperature compensation option, use it during calibration. If not, calibrate the meter with the standard solution at 25°C. Temperature readings are then to be obtained from all samples so that the conductivity readings can be manually temperature compensated.

3.2.4 Temperature - The temperature sensor is calibrated at the factory and does not require field calibration.

3.3 Operation of Instrument

3.3.1 Adjust meter dial to read temperature. Once instrument reading has stabilized, read the temperature and record the value in the field notebook and on the Sample Collection Log.

3.3.2 Adjust the meter to read conductivity. If more than one span range is available to read conductance, use scale where reading is closest to the center of the range. Record the reading in the field notebook and on the Sample Collection Log.

4.0 Maintenance

The meter and electrode should be cleaned and maintained as specified in the owners operating manual. In general, the electrode and cable coming in contact with water should be rinsed in potable water and dried between each use. The electrodes present on the conductivity sensor may become tarnished over time and require polishing. To service the conductivity sensor, polish the entire surface of the electrode using #400 wet/dry sandpaper.

5.0 Precautions

None.

6.0 References

None.

7.0 Attachments

None.

STANDARD OPERATING PROCEDURE C.4
CALIBRATION AND USE OF A TURBIDITY METER

1.0 Scope and Application

The purpose of this Standard Operating Procedure (SOP) is to delineate protocols for the calibration and use of a field meter to measure turbidity *in situ* in the surface water body being sampled or monitored. The water quality meter may be a stand-alone turbidity meter or it may be a combined multiprobe unit used to measure temperature, pH, specific conductance, and/or other water quality parameters.

2.0 Materials

a. Turbidity or multiprobe water quality meter
b. Deionized water
c. Turbidity calibration solutions

3.0 Procedure

3.1 General Instructions

Instruments should be made by a well-known, reputable company. Instruments should be field-rugged. Instruments that are sensitive to water, heat, cold or are of fragile construction should be avoided. The range of the instrument should bracket the expected sample concentrations. Qualified individuals (chemists, geochemists, experienced field personnel) who have used the instrument in the past should be consulted.

Many field models of the instruments listed above exist on the market. In order to avoid limiting the field personnel to one particular make or model of instrument, only general calibration instructions are presented here. Always use the owner/operator manual as the primary source of information on calibration procedures.

All calibration and maintenance activities are recorded in the instrument logbook assigned to each field instrument. The field team leader is responsible for ensuring that field teams implement and document these procedures in each instrument logbook.

Before going to the field, locate all necessary field supplies (deionized water, tissues, buffers, standards, etc.). Ensure each instrument is in operational order (good batteries, functional LCDs or analog displays, etc.). Locate back-up instruments in the case of failure.

3.2 Calibration

3.2.1 Locate a clean, protected area in which to set up and calibrate instrument. Ensure sufficient supply of deionized water and tissue (such as Kim Wipes or Kaydrys) to clean instrument(s). Ensure a sufficient supply of all necessary buffers and standard solutions. Have an owner/operator manual available for use.

3.2.2 Turn on power to meter and check to determine if battery power is within acceptable range for the meter. If battery is low, replace batteries and recheck power.

3.2.3 Calibrate the meter according to instrument operating manual. A ZERO pot is used to set the zero.

3.3.3 Calibrate the meter using a standard KCl solution. Choose the conductance of the standard to be near the expected range of the samples (commonly, solution has a S.C. of 1413 uS/cm). The probe is immersed in the standard solution, and the SPAN or CAL pot is used to set the conductivity value.

3.3 Operation of Instrument

3.3.1 Adjust meter dial to read temperature. Once instrument reading has stabilized, read the temperature and record the value in the field notebook and on the Sample Collection Log.

3.3.2 Adjust the meter to read conductivity. If more than one span range is available to read conductance, use scale where reading is closest to the center of the range. Record the reading in the field notebook and on the Sample Collection Log.

4.0 Maintenance

The meter and electrode should be cleaned and maintained as specified in the owners operating manual. In general, the electrode and cable coming in contact with water should be rinsed in potable water and dried between each use. The electrodes present on the conductivity sensor may become tarnished over time and require polishing. To service the conductivity sensor, polish the entire surface of the electrode using #400 wet/dry sandpaper.

5.0 Precautions

None.

6.0 References

None.

7.0 Attachments

None.

STANDARD OPERATING PROCEDURE S.1
COLLECTION OF SURFACE SOIL SAMPLES

1.0 Scope and Application

The purpose of this Standard Operating Procedure (SOP) is to delineate protocols for sampling surface soils. Soil samples will be used to: define areas where nuclide activities exceed cleanup levels, determine if and where contaminated soil may have been spilled or tracked through an area, and confirm when excavation activities have successfully removed all soils designated for removal (i.e., cleanup verification samples).

2.0 Materials

a. Stainless-steel trowel
b. Stainless-steel tray or bowls
c. Stainless-steel spoon or spatula
d. Shovel
e. Photoionization Detector (PID)
f. Sample Collection Log Sheet
g. Sample bottles
h. Shipping containers (coolers)

3.0 Procedure

3.1 Collect a soil sample from a depth of 0 to 6 inches using a decontaminated stainless-steel trowel or a shovel; remove all rock fragments, vegetation debris, and roots.

3.2 Field screen the soil sample with a properly calibrated PID. To field screen the soil sample, a decontaminated stainless-steel trowel will be used to make a cross-sectional slice(s) of the soil sample, or to score a longitudinal line the length of the soil sample deep enough to expose a porous surface. .

3.3 The portion of the soil sample registering the highest PID measurement will be sampled for VOC analysis. A stainless steel spoon or spatula will be used to transfer soil material into the appropriate sample jar for VOC analysis.

3.4 Once VOC sampling is complete, the following procedure will be followed. A sufficient amount of soil from the specified sampling interval will be placed on a decontaminated stainless-steel tray or bowl. After any rocks or organic matter have been removed, the soil will be homogenized using the coning and quartering method (ASTM C702-80). In this method, the soil will be thoroughly mixed by turning the entire sample over three times using a stainless-steel trowel or spoon. Following the last turning, the entire sample will be shoveled into a conical pile in the middle of the tray. The conical pile will then be carefully flattened to a uniform thickness and diameter by pressing down the apex. The flattened soil will be divided into four equal quarters. The sampling personnel will then make a determination as to whether the amount of oil on the tray is larger than the volume of the sample bottles. If the amount of soil is larger, one or two quarters will be discarded. If two quarters are discarded, opposite quarters will be selected. After removal of one or more quarters, the entire coning and quartering sequence will be repeated until the amount of soil on the tray is approximately equal to the volume of the sample bottles to be filled.

3.5 Place the required soil volumes in the sample bottles, tightly cap, and fill in all required information on the bottle label.

3.6 Place the sample bottles into a sample cooler with ice and preserve at 4 $\pm$ 2 degrees C.

3.7 Fill in required information of the Chain-of-Custody form and the Sample Collection Log Sheet.

NOTE: All soil sampling locations will be marked on a site map. A description of the sampling site will be entered into the field logbook. This description will be adequate to allow the sampling station to be revisited at some future date.

3.8 Place a wooden stake or some other marker at the sampling location so that the location can be surveyed later with the GPS and/or licensed surveyor.

4.0 Maintenance

Not Applicable.

5.0 Precautions

5.1 Refer to the Health and Safety Plan for appropriate health and safety precautions.

6.0 References

ASTM Method C702-80. Reducing Field Samples of Aggregate to Testing Size

7.0 Attachments

None.

STANDARD OPERATING PROCEDURE S.4
COLLECTION OF SURFACE WATER SAMPLIES

1.0 Scope and Application

The purpose of this Standard Operating Procedure (SOP) is to delineate protocols for sampling surface water. This procedure can be applied to the collection of surface water samples from streams and other surface water bodies. Surface water samples provide an indication of the amount of contaminant in the surface water body.

If multiple surface water samples are to be collected from a stream, samples will be collected from the furthest point downstream, moving upstream as the sampling progresses. Surface water will be sampled before sediment to prevent the collection of fine-grained substrate, which may be introduced into the surface water from sediment sampling activities.

2.0 Materials

a. Sample containers
b. Field Notebook
c. Water quality meters for measuring temperature, specific conductance, and turbidity

3.0 Procedure

3.1 Inside of ample containers will first be rinsed with the sample water prior to collection.

3.2 Hold the bottle upside down, immerse the top of the bottle several inches under the water, then turn the bottle upright to fill. This will prevent floating debris or surface film from entering the sample.

3.3 Remove the bottle from the water, add the proper preservative, and cap.

3.4 Surface water samples should be immediately stored at 4 ± 2°C.

3.5 Specific conductance, temperature, and turbidity will be measured after sample collection using a multi-probe water quality meter. The multi-probe water quality meter will be calibrated before and after each day of sampling.

3.6 For all surface water samples, mark the sampling locations on a site map. Photograph (if desired) and describe each location, and place a numbered stake above the visible high water mark on the bank closest to the sampling location. The photographs and descriptions must be adequate to allow the sampling location to be relocated at some future date.

4.0 Maintenance

Water quality meters should be maintained as specified in the instruments operating manual(s).

5.0 Precautions

5.1 Refer to the Health and Safety Plan for health and safety precautions.

5.2 Decontaminate the sampling equipment between sampling locations.

5.3 Avoid disturbing the surface water during submersion of the sample bottles.

6.0 References

None

7.0 Attachments

None.

STANDARD OPERATING PROCEDURE S.5
COLLECTION OF SEDIMENT SAMPLES

1.0 Scope and Application

The purpose of this Standard Operating Procedure (SOP) is to delineate protocols for sampling sediments. This procedure can be applied to the collection of sediment samples from streams, rivers, lakes, ponds, and other surface water bodies. Sediment samples indicate the amount of contamination adsorbed on sediment particles and/or the amount of wastes transported in the surface water body.

If multiple sediment samples are to be collected from a stream, samples will be collected from the furthest point downstream, moving upstream as the sampling progresses. Where applicable, surface water will be sampled before sediment to prevent the collection of fine-grained substrate, which may be introduced into the surface water from sediment sampling activities.

2.0 Materials

a. Stainless-steel bowl
b. Stainless-steel trowel
c. Sample containers
d. Photoionization detector (PID)
e. Gross gamma radiation meter
f. Field notebook

3.0 Procedure

3.1 Samples can be collected with decontaminated trowel if there is little or no water on top of the sediment at the particular sampling location, and if the water velocity is low. For sampling locations where the water above the sediment is greater than 4 inches in depth, a shovel or other device will be used. This will ensure the integrity of the surface layer of sediment and will minimize the loss of fine-grained material in the sediment.

3.2 All sediment samples will be screened with a properly calibrated PID and a gross gamma radiation meter. Sediment samples collected for all analyses except TCL volatile organics will be thoroughly homogenized before being placed in the sample containers. Rocks, twigs, and other debris will be removed from the sample prior to homogenization if they are not considered part of the sample. Samples for VOC analyses will be taken as individual grab samples, and will not be homogenized. They will be placed directly into two 40-mL VOC sample vials. Non-VOC samples will be homogenized by the method described below.

3.3 Following removal of rocks, twigs, leaves and other debris, the sediment will be removed from the sampling device and placed in a decontaminated stainless-steel bowl and homogenized. The sediment will be thoroughly mixed by turning the entire sample over three times using a stainless-steel trowel.

Following the last turning, the required sediment volumes will be placed in the sample bottles. Excess liquid should be decanted off the sample whenever possible.

3.4 Sediment should be placed in the proper sample jars, which should then be tightly capped and properly labelled.

3.5 A description of properties of the sediment (color, texture, odor, organic content, grain size) should be recorded in the field logbook immediately after sample collection.

3.6 Sediment samples will be immediately stored at 4°C.

3.7 All sediment sample locations will be marked on a site map. A wooden stake will be placed above the visible high water mark on the bank closest to the sampling location along with surveyors flagging tied to nearby vegetation. A description of the sampling site will be entered into the field logbook. This description will be adequate to allow the sampling station to be reoccupied at some future date in the event that the field markers are lost.

4.0 Maintenance

PID and gross gamma radiation meters should be maintained as specified in the instrument operating manuals.

5.0 Precautions

5.1 Refer to the Health and Safety Plan for other appropriate health and safety precautions.

5.2 Decontaminate the sampling equipment between sampling locations.

6.0 References

USEPA, 1989. Region II CERCLA QA Manual. Revision 1.

7.0 Attachments

None.

STANDARD OPERATING PROCEDURE S.10
SAMPLE PACKAGING AND SHIPPING

1.0 Scope and Application

The purpose of this Standard Operating Procedure (SOP) is to delineate protocols for the packing and shipping of samples to the off-site laboratory for analysis.

2.0 Materials

a. Waterproof hard plastic coolers
b. Custody seals
c. Absorbent packing material
d. Sample documentation
e. Ice
f. Plastic garbage bags
g. Clear tape
h. Clear ziploc bags
i. Inert cushioning material

3.0 Procedure

3.1 Place each sample in the shipping cooler as collected.

3.2 Ensure sample caps are tightened.

3.3 Fill out required information on the sample label

3.4 Enclose each sample in a clear ziploc bag, and make sure that sample labels are visible.

3.4 Place inert cushioning material (e.g., bubble wrap) in the bottom of the cooler.

3.5 Place all the samples inside a garbage bag and tie the bag.

3.6 Double bag and seal loose ice in ziploc bags to prevent melting ice from soaking the packing material. Place the ice outside the garbage bags containing the samples. Place sufficient ice in cooler to maintain the internal temperature at 4±2°C during transport.

3.7 Fill cooler with enough absorbent (e.g., vermiculite) and packing material to prevent breakage of the sample bottles and to absorb the entire volume of the liquid being shipped (off site sample shipments only).

3.8 Enclose sample documentation (i.e., COCs) in a waterproof plastic bag and tape the bag to the underside of the cooler lid. If more than one cooler is being used, place all documentation in one cooler. Number the coolers and note on the sample documentation the cooler number in which each sample was shipped.

3.9 Tape the cooler shut with clear tape over the hinges and place tape over the cooler drain.

3.10 Seal coolers at a minimum of two locations with signed custody seals.

3.12 Attach completed shipping label to the top of the cooler.

3.13 Ship all samples via overnight delivery within 24 hours of collection (off site sample analyses only) or transport in cooler to on-site laboratory for analysis.

4.0 Maintenance

Not Applicable.

5.0 Precautions

None.

6.0 References

USEPA. 1990. Sampler's Guide to the Contract Laboratory Program. EPA/540/P-90/006, Directive 9240.0-06, Office of Emergency and Remedial Response, Washington, D.C., December 1990.

USEPA. 1991. User's Guide to the Contract Laboratory Program. EPA/540/O-91/002, Directive 9240.0-01D, Office of Emergency and Remedial Response, January 1991.

7.0 Attachments

None

STANDARD OPERATING PROCEDURE D.1
DECONTAMINATION OF SAMPLING EQUIPMENT AND OTHER SMALL EQUIPMENT ITEMS

1.0 Scope and Application

All sampling equipment must be decontaminated following each use in order to prevent cross-contamination. In addition, equipment and other items leaving the site must be surveyed for radioctive contamination and be decontaminated, when contamination is detected. This Standard Operating Procedure (SOP) describes the procedures to be followed for decontaminating sampling equipment and other equipment items.

2.0 Materials

a. Plastic sheeting
b. Buckets
c. Potable water
d. Distilled water
e. Low phosphate detergent (i.e., alconox)
f. Aluminum foil

3.0 Procedure

3.1 Sampling Equipment

All sampling equipment will be decontaminated after each use in accordance with the following procedures.

3.1.1. Wash and brush the equipment with presampled and approved water and low phosphate detergent (i.e., alconox).

3.1.2. Rinse off detergent with potable water.

3.1.3 Rinse equipment with distilled water.

3.1.4 Allow equipment to air dry.

3.1.5 Wrap equipment in aluminum foil (shiny side out).

3.2 Small equipment items and other items leaving the site must meet "free release" requirements. If decontamination is required, then the following procedures shall be used.

3.2.1. Wash and brush the equipment with presampled and approved water and low phosphate detergent (i.e., alconox).

3.2.2. Rinse off detergent with potable water.

3.2.3 Allow equipment to air dry.

3.2.4 Resurvey equipment and decontaminate again, if necessary, in order to meet free release requirements.

4.0 Maintenance

Not Applicable.

5.0 Precautions

5.1 Once a piece of equipment has been decontaminated, be careful to keep it in such condition until needed.

5.2 Refer to the Health and Safety Plan for appropriate health and safety precautions.

6.0 References

USEPA, 1989. Region II CERCLA Quality Assurance Manual. Revision 1.

7.0 Attachments

None.

STANDARD OPERATING PROCEDURE D.2
DECONTAMINATION OF TRAILERS AND ON-SITE LABORATORY

1.0 Scope and Application

The purpose of this Standard Operating Procedure (SOP) describes decontamination procedures for removing or neutralizing contaminants that have accumulated in the decontamination trailer and on-site laboratory. An inspection will be performed weekly to determine the need for decontamination of the structures.

2.0 Material

- Health and Safety Plan
- Liquinox or equivalent laboratory grade detergent
- Potable water
- Vacum cleaner and Shop vac
- Mops, wash cloths, and towels
- Field logbook

3.0 Procedures

3.1 Read the Health and Safety Plan and comply with applicable requirements and procedures.

3.2 Perform the following steps for decontamination of the trailer and on-site laboratory.

- All surfaces that are determined to be contaminated will be vaccumed first, then scrubbed with brushes, wash cloths, and/or mops with soapy water.
- Rinse the surfaces with potable water.
- Allow surfaces to air dry.

3.3 Document all decontamination procedures in the field logbook.

4.0 Maintenance

Not Applicable.

5.0 Precautions

Perform decontamination procedures using experienced/qualified personnel.

6.0 References

None

7.0 Attachments

None

STANDARD OPERATING PROCEDURE D.3
DECONTAMINATION OF EXCAVATING EQUIPMENT, VECHILES, AND RAIL CARS

1.0 Scope and Application

The purpose of this Standard Operating Procedure (SOP) is to explain the protocol for decontamination of excavating equipment (i.e. excavators, dump trucks, backhoes, rail cars, vehicles, and bull dozers). Personal decontamination guidelines are presented in the Site Health and Safety Plan.

2.0 Material

- Health and Safety Plan
- Liquinox or equivalent laboratory grade detergent
- Potable water
- Scrub brushes
- Portable pressure sprayer
- Heavy gauge plastic sheeting
- Field logbook

3.0 Procedures

3.1 Read the Health and Safety Plan and comply with applicable requirements and procedures.

3.2 Perform the following steps for the decontamination of large pieces of excavating equipment prior to performing intial site activities and after subsequent activities.

- Excavate a decontamination pit at a designated location and install a plastic liner to allow the collection of decontamination fluids.
- Remove visible dirt with a brush.
- Wash the external surfaces of the excavating equipment with sopy water and a high pressure sprayer. If necessary, use a scrub brush to wash the equipment until all visible dirt, grime, grease, oil, loose paint, rust flakes, etc., have been removed.
- Rinse the equipment with potable water.
- Collect the decontamination fluids and associated sediments into a lined pit or a container and treat in the same manner as investigative derived waste (IDW).

3.6 Document all decontamination procedures in the field logbook.

4.0 Maintenance

Not Applicable.

5.0 Precautions

Perform decontamination procedures using experienced/qualified personnel.

6.0 References

Department of Air Force, 1991 (reprint). Handbook to Support the Installation Restoration Program (IRP). Stagements of Work, Volume 1 - Remedial Investigation/Feasibility Study RI/FS.

7.0 Attachments

None

STANDARD OPERATING PROCEDURE F.1
FIELD LOGBOOK

1.0 Scope and Application

The purpose of this Standard Operating Procedure (SOP) is to delineate protocols for recording field survey and sampling information in a field logbook.

2.0 Materials

a. Field Logbook
b. Indelible black ink pen

3.0 Procedures

3.1 Field Logbooks

All activities performed at the Site will be recorded in bound, field logbook(s). All logbooks will be kept at the Site while remedial activities are ongoing. At the completion of the site cleanup, logbooks and all other records (e.g., chains-of-custody) will be transferred to the Tonawanda office of ICF Kaiser for use in completing the final reports. At the completion of the project all logbooks and other records will be transferred to the USACE for inclusion in the project file.

Field logbooks are legal documents, and thus need to be thoughtfully, accurately, and legibly prepared to qualify as the legal record of all site activities. Logbooks will be reviewed periodically to assure that quality records of site activities are being maintained. Information to be recorded in field logbooks must be as accurate and as detailed as practical, however logbook entries must be factual statements only; no judgmental comments should be included. All field activities must be recorded in the bound logbooks at the time they occur. If an amendment is made to the logbook, it must be identified as an amendment, dated and signed by the person making the amendment.

Field logbooks may include one or a combination of the following: Site Logbook, Sampling Logbook, Health & Safety Logbook, and/or Visitor Logbook. Overall site activities are recorded in the Site Logbook, with activity-specific information detailed in he appropriate activity logbook. Each logbook is described in the following sections. The Construction Manager shall be responsible for the preparation and maintenance of project field activity logbooks. This responsibility may be delegated to a designated Field Operations Leader or, in the case of the Health & Safety Logbook, the Site Health & Safety Officer (SHSO). Logbook formats shall be at the discretion of the individual Construction Manager while adhering to the following basic requirements:

- All field logbooks must be weatherproof and permanently bound with consecu tively numbered pages.

- The project name, ICF Kaiser Engineers accounting number, and site name and address are to be written on the cover of each logbook.
- Entries are to be made using permanent waterproof blue or black ink.
- Erasures are not permitted. Errors must be crossed-out with a single-line so that the error is not obscured, initialed by the person making the entry, and dated.
- A new page is to be started each day with the signature of the person responsible for aking the entries. The end of each daily entry will be indicated by "End of log for the day *applicable date*" along with the signature of the person responsible for the entries. If the last entry for a particular day does not end at the bottom of a page, a line is to be drawn diagonally down the remainder of the page, and the bottom of the page must be signed and dated.
- Blank pages that may be inadvertently left in the logbook are to have a large 'X' drawn across the entire page along with the signature of the appropriate field team member.
- All pages must include the date at the top of the page and the time of day, in military time, in the left margin preceding each entry.

In general, logbook entries can be defined by the following four categories: daily logbook entries, observations, sample collection activities, and health & safety information. Examples of the types of information that should be recorded in the logbook include, but are not limited to, the following:

3.2 Daily Logbook Entries

⇒ Record the time of site entry.

⇒ Record the weather conditions - specific information regarding amount of rainfall, wind speed and direction must be recorded along with any changes in the weather conditions during that day's activities.

⇒ Record the names of all team members and their responsibilities during that day's activities.

⇒ Record general discussion of visitor activities including a list of all visitors on the Site that day.

⇒ Record all conversations held with other persons responsible for or in some way involved with the Site.

⇒ Record a step-by-step explanation of site activities. This can be accompanied by photographs and/or sketches, as appropriate, to better describe activities.

3.3 Observations

⇒ Record descriptions of site physical or topographic features pertinent to site activities.

⇒ Record remediation activities, construction details, equipment used, problems encountered, and explanation of any down time.

⇒ Record information on arrival and removal from the site of all shipping containers or rail cars. Details regarding the number of containers received and quantity of materials shipped should be included.

⇒ Describe stratification of the subsurface, soil or water conditions, and other subsurface data. Soil descriptions will be recorded using the Unified Soil Classification System (USCS), ASTM D2488.

⇒ Record field measurements exactly as taken. All calculations made should be entered in the logbook indicating the measurements and formula used in performing the calculation.

⇒ All observation entries must be identified with a location, use sketches to illustrate locations when appropriate.

3.4 Sample Collection Activities

⇒ Record the names of samplers.

⇒ Record the sample number(s).

⇒ Describe sample location coordinates and elevation, indicate references to any photographs taken, maps, or sketches made, as appropriate.

⇒ Reference the sampling equipment used, including serial numbers of field screening or testing instruments.

⇒ Record the results of field instrument calibrations.

⇒ Record sampling method(s) used.

⇒ Record the time interval of sampling (military time).

⇒ Detail any variance from original plans.

⇒ Explain any mishaps or malfunctions and the action taken to correct the mishap/malfunction, including the rationale and by whose authority the action was taken.

⇒ Decontamination procedures used and method of disposal of team generated waste.

⇒ Identification of specific QC samples.

3.5 Health & Safety Information

⇒ Record the results and readings of daily health and safety monitoring equipment calibration.

⇒ Detail any background locations and measurements taken.

⇒ List the level of Personal Protective Equipment (PPE) used during the day.

⇒ Record OVA and/or HNu readings taken during remediation.

⇒ Describe any incidents, accidents, and course of action taken and by whose authority.

3.6 Site Photographs

A site photograph log will be maintained on site by the site manager. All photographs taken by site personnel will be described in the photograph log book. The log book will be a bound notebook in which the date, number of photos, and a brief description of the contents of the photographs and an explanation of the purpose for taking the photographs will be included. Maps or sketches showing the photograph number, approximate position of the camera and the direction in which the photos were taken, will be recorded in the notebook. All printed photographs will have a note written on the back to indicate the date taken, the photograph number and the page in the photographic log where the photograph is described.

A separate file will be maintained to store the photographic negatives. The negatives will be kept in separate envelopes with the date(s) and the number of photographs taken marked on the outside.

3.7 Sample Labels

Sample labels will be completed for each sample using waterproof ink. If inclement weather conditions prohibit use of waterproof ink, a logbook notation should explain that a pencil was used to fill out the sample label because a pen would not function under field conditions. Information to be recorded on each label includes: site name, sample number, date and time of collection, name of sampler. Mistakes on the label should be corrected as described below.

3.8 Sample Log Sheets

Reference F-2.SOP for additional procedures on data entry on field parameter forms.

3.9 Corrections to Documentation

All field documentation, including field logbooks, labels, sample log sheets, and chain of custody records are completed using black waterproof ink. Any corrections are made by drawing a line through the error, initialing and dating the change, and entering the correct information. Erasures are not permitted.

4.0 Maintenance

Not Applicable.

5.0 Precautions

None.

6.0 References

None.

7.0 Attachments

None

STANDARD OPERATING PROCEDURE F.2
SAMPLE COLLECTION LOG

1.0 Scope and Application

The purpose of this Standard Operating Procedure (SOP) is to delineate protocols for recording groundwater, surface water, soil, and sediment sampling information on field parameter forms.

2.0 Materials

a. Applicable Sample Log Forms
b. Indelible black ink pen

3.0 Procedure

Field parameter forms (FPFs) or sample log forms will be used to record information pertinent to groundwater, surface water, soil and sediment sampling. Once completed, the original FPF will be given to the onsite or offsite laboratory with the appropriate samples, while a duplicate will be kept by ICF KE as part of the project documentation. Groundwater and soil will have a separate field lo book plus FPFs. All entries on FPFs will be made with an indelible black ink pen. All corrections will consist of line-out deletions that are initialed and dated.

3.1 Sample Log Sheets

Sampling crews will record all specific sampling information (i.e., sample number, date, time, etc.) on sample log sheets (see Attachment A). The make, model, and serial number (if applicable) of sample collection equipment, field analytical equipment, and physical measuring equipment will also be recorded on the log sheet.

Sample log sheets will be numbered consecutively to follow the sequence of sampling. Use of sample log sheets will be noted in the site logbook.

Sample log sheets completed in the field may not be transcribed to clean sheets. All sample log sheets and sample summary sheets will be assembled in a loose leaf binder.

Separate log sheets for other field activities, such as field analyses, etc., may be used as needed, upon approval by the Site Manager. Use of such data sheets will be noted in the site logbook.

Below is a list of the information which will be needed for completion of FPFs:

a. INST CODE: Pohatcong Valley Groundwater Contramination Site (PV).

b. AREA: Not applicable.

c. SITE No.: Record the three letter PSA designation (e.g., ANC for American National Can).

d. FILE NAME: Circle "CSO" for soil, "CSE" for sediment, "CSW" for surface water, "CGW" for groundwater, and "CQC" for rinse blanks and trip blanks.

e. SITE ID: Not applicable.

f. DATE: Enter the date the sample was collected.

g. TIME: Enter the time (military format) the sample was collected.

h. FIELD SAMPLE No.: Record a code specific for the sample (e.g., 132SS-1).

i. LAB ID No.: Record a code specified by the laboratory for the sample (i.e., the code printed on the sample bottle label).

j. DEPTH (TOP): Record the top of the depth to be sampled (e.g., ground surface = 0 ft).

k. DEPTH INTERVAL: Record the interval over which the sample will be collected (e.g., 2 ft for soil borings).

l. UNITS: Record the units over which the sample was collected (i.e., feet).

m. SITE TYPE: Circle "AHOL" when buckets augers are used for collection of surface soil samples, "BORE" for subsurface soil samples collected from soil borings and monitoring wells, "WELL" for collection of groundwater samples, "LAKE" for collection of surface water and sediment samples from a lake, "STRM" for collection of surface water and sediment samples from a stream, "RIVR" for collection of surface water and sediment samples from a river, "SWAP" for collection of surface water and sediment samples from a swamp, "EXCV" for collection of soil samples from a test pit or trench, "POND" for collection of surface water and sediment samples from a pond, "SUMP" for collection of surface water and sediment samples from a sump, "TRIP" for a trip blank, and "RNSW" for a rinse blank. If the site type is not covered by one of the codes listed above, the site type will be specified in the blank listed as "OTHER".

n. Sample Cover: Indicate whether the sample is covered by organic matter ("VEG"), dirt ("DIRT"), or other (e.g., asphalt).

o. Sample Above Groundwater: Indicate whether the sample was collected above or below groundwater.

p. Rinse Blank ID: Record the ID of the rinse blank that is associated with the samples.

q. Trip Blank ID: Record the ID of the trip blank that is associated with the samples, only if aqueous samples are collected for VOC analysis.

r. Duplicate Sample ID: Record the ID of the field duplicate that is associated with the samples.

s. USEPA Split Sample ID: Record the ID of the split sample that is collected at the same time as the field samples.

t. ANALYTE: Indicate the analyses that will be performed on the sample.

u. PRESER.: Indicate the preservation requirements for the sample.

v. CAL REF: Record the calibration reference for the Hydrolab®.

w. pH: Record the pH of the groundwater or surface water at the time of sample collection.

x. TEMP: Record the temperature in degrees Celsius (0C) of the groundwater or surface water at the time of sample collection.

y. DO: Record the concentration of dissolved oxygen in milligrams per liter (mg/L) of the groundwater or surface water at the time of sample collection.

z. REDOX: Record the oxidation/reduction potential (in electron volts) of the groundwater or surface water at the time of sample collection.

aa. TURBIDITY: Record the turbidity in Nephalometric Turbidity Units (NTUs) of the groundwater or surface water at the time of sample collection.

bb. COND: Record the conductivity in microSiemens per centimeter (1S/cm) of the groundwater or surface water at the time of sample collection.

cc. COLOR: Record the color of the soil or sediment sample.

dd. TEXTURE: Record the texture (e.g., sand, clay) of the soil or sediment sample.

ee. PID: Record the PID measurement in ppm for the soil or sediment sample.

ff. SAMPLER: The signature of the person completing the form

gg. DATE: The date the form was completed.

4.0 Maintenance

Not Applicable.

5.0 Precautions

None.

6.0 References

USEPA, 1984. User's Guide to the Contract Laboratory Program.

7.0 Attachments

Attachment A - Field Parameter Form

ASHLAND 2 FUSRAP SITE

SAMPLE LOG SHEET

Sample Number: ____________________ Page # ________

Sample Media: ____________________

Survey Unit ID: ____________________

Sampling Method

Sample Depth

Sample Date & Time

Sample Location

Sample Description

Sample Type:

Grab ________

Composite ________

Weather:

Notes:

Sample Disposition

On-site lab ________

Off-site lab ________

On-Site Analyses

Parameter	Preservative	Volume	COC #

Off-Site Analyses

Parameter	Preservative	Volume	COC #

Shipping Info:

Date ________

Time ________

Carrier ________

Airbill # ________

Destination ________

STANDARD OPERATING PROCEDURE F.3
CHAIN-OF-CUSTODY FORM

1.0 Scope and Application

The purpose of this Standard Operating Procedure (SOP) is to delineate protocols for use of the Chain-of-Custody (COC) Form. Sample personnel should be aware that a sample is considered to be in a person's custody if the sample is: (a) in a person's actual possession; (b) in view after being in a person's possession; (c) locked up so that no one can tamper with it after having been in physical custody.

2.0 Materials

a. Chain-of-Custody Form
b. Indelible black ink pen

3.0 Sample Handling System

3.1 Sample Numbering System

The sample numbering system will be used will be used to identify each sample taken and to provide a tracking procedure for retrieval of information. Sample numbers will be generated in the ASH2-X-YYY-NNN format as follows:

1. ASH2 = Ashland 2 site.
2. X = Sample type, as follows:

   A = Air filter
   F = Final status survey soil
   L = Liquid waste
   S = Soil
   W = Wipe

3. YYY = Survey Unit Number. This portion of the sample number will only be used for final status survey samples.
4. NNN = Sequential sample number for each type of sample. Note that final status survey sample numbers will be sequential within each survey unit. Replicate and blank samples will be given a "900" number by sample type, in sequence.
5. Examples:

   ASH2-F-001-003: Final status soil sample taken from Survey Unit 001 at location 003.

   ASH2-L-901: first blank or replicate sample of liquid waste.

3.2 Preservation and Holding Time

Many analytical methodologies require the addition of a preservative and also have established holding times in order to stabilize and maintain sample integrity. Table 6-2 shows the sample analyses to be performed along with the preservation and holding time requirements. The clock for sample holding time begins at sample collection.

4.0 SAMPLE CUSTODY

4.1 Field Custody Procedures

1. Bottles for samples to be analyzed off-site will be shipped from the laboratory to the site via commercial shuttle service or overnight mail. The bottles will be received by field personnel and stored in a designated secure area until they are needed. Bottles for samples to be analyzed on-site will be obtained from a commercial supplier, and will be stored unopened in a designated secure area.

2. Field blanks will be prepared at the laboratory performing the analyses. Blanks will be shipped on ice and under chain of custody to the field sampling team. Upon receipt, the field sampling team will sign the chain of custody and place the blank water in cold storage until used at the site.

3. Samples will be collected as described previously in this SAP. Sample location and sample number will be recorded on the Chain of Custody Record (see Appendix B). The sampler is responsible for the custody of the samples until they are properly transferred or dispatched. Once a sample has been collected and preserved (if appropriate), it will be secured in a locked vehicle, locked trailer, custody sealed cooler, or in visual site of the person assuming the sample custody until shipment to the laboratory.

4.2 Transfer of Custody and Shipment

Samples to be analyzed both on-site and off-site are accompanied by a Chain-of-Custody Record Form (see Appendix B). When transferring samples, the individuals relinquishing and receiving will sign, date and note the time on the Record. This Record documents sample custody transfer from the sampler, often through another person, to the laboratory. The Chain-of-Custody Record is filled out as follows:

1. Enter header information (project number and name). For each station number, enter date, time, composite/grab, station location, number of containers, analytical parameters, and sample identification number (in remarks column).

2. Sign, date and enter the time under "Relinquished by" entry.

3. Make sure that the person receiving the sample signs the "Received by" entry, or enter the name of the carrier (e.g., UPS, Federal Express) under "Received by." Receiving laboratory will sign "Received for Laboratory by" on the lower line and enter the date and time.

4. Enter the bill-of-lading or Federal Express airbill number under "Remarks," if shipping samples off-site.

5. Place the original (top, signed copy) of the Chain-of-Custody Record Form in the appropriate sample shipping package. Retain a copy with field records.

   The custody record is completed using black waterproof ink. Any corrections are made by drawing a line through the error, initialing and dating the change, and entering the correct information. Erasures are not permitted.

   Samples for on-site analyzes will be delivered to the on-site lab. Samples for off-site analysis will be sent via common carrier. Common carriers will usually not accept responsibility for handling Chain-of-Custody Record Forms. This necessitates packing the record in the sample container (enclosed in a plastic zip-lock bag). As long as custody forms are sealed inside the sample container and the custody seals are intact, commercial carriers are not required to sign off on the custody form.

   The laboratory representative who accepts the incoming sample shipment will sign and date the Chain-of-Custody Record, completing the sample transfer process. It is then the laboratory's responsibility to maintain custody records throughout sample preparation and analysis.

4.3 Laboratory Custody

Both the on-site and off-site analytical laboratory will end the sample shipment COC and initiate their own COC for sample analysis.

5.0 Shipping

All samples to be shipped off-site must be analyzed on-site to determine the concentrations of radionuclides present. This will allow for proper packaging and shipping via IATA Dangerous Goods Regulations. Note that by IATA definition, a material must have an activity greater than 2,000 pCi/g in order to be considered radioactive. If the radioactivity of a material is < 2,000 pCi/g, it does not need to be shipped as radioactive.

The following procedure was written for unpreserved samples. If preserved samples are being shipped, consult the IATA regulations for proper packaging, labeling, marking, and documentation.

1. Tabulate the activities of the radionuclides present in each of the samples on the Sample Shipping Worksheet (see Appendix B, this can easily be set up on a Spreadsheet so that all of the calculations are done automatically) The activity ratio for each sample bottle must be less than 1.0 in order to be shipped by IATA regulations. Note that each bottle is considered a package, while the cooler is an overpack. Shipping requirements are for each package.

2. Prepare the cooler(s) for shipment:

   - Tape drain(s) shut.
   - Place mailing label with laboratory address on top of cooler(s).

3. Prepare the sample bottles:

   - Check to see that lids are on tight and that bottle labels are firmly affixed.

- Spray the bottles with tap water and wipe with a paper towel

4. Measure the removable surface contamination of each sample bottle as follows. Wipe a 300 cm^2 area of the bottle (or the whole bottle if the area is < 300 cm^2) with an absorbent material (filter paper). Measure the activity of the wipe. The removable contamination for each bottle must be <1 pCi/cm^2 to be shipped using exemption packaging.
5. Arrange the sample containers in front of their assigned coolers.
6. Seal each sample container in a separate zip-loc plastic bag and arrange the sample containers in the coolers.
7. Place cube ice in strong plastic bags and put the bags directly on and around the sample containers (if ice is required for preservation).
8. Fill the remaining space with vermiculite.
9. Sign the chain-of-custody (COC) form (or obtain the signature) and indicate the time and date the samples are relinquished to the overnight carrier.
10. Seal the proper COC copy in a zip-loc bag and place it inside the cooler.
11. Attach a "RADIOACTIVE" label to the inside of the cooler lid, or write the word "RADIOACTIVE" on the inside of the cooler lid. The word must be visible to anyone who opens the cooler during transport.
12. Close the lid and latch the cooler.
13 Sign and date two custody seals. Carefully peel the custody seals from their backings and place them intact over the front and back edges of the cooler. Cover the seals with clear protection tape.
14. Tape the cooler shut on both ends, making several complete revolutions with strapping tape (do not cover the custody seals).
15. Send the shipment to the analytical laboratory via overnight carrier, completing the carrier required shipping papers.
16. Telephone the laboratory and provide the following information:
    - Your name
    - Project name
    - Number of samples sent to the laboratory for analysis
    - Airbill numbers

4.0 Maintenance

Not Applicable.

5.0 Precautions

None.

6.0 References

USEPA, 1984. User's Guide to the Contract Laboratory Program.

7.0 Attachments

Attachment A - Chain-of Custody

No. 1313

ICF KAISER

CHAIN OF CUSTODY RECORD

PROJ. NO.	PROJECT NAME					NO. OF CONTAINERS									REMARKS
SAMPLERS: *(Signature)*															
STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION										

Relinquished by: *(Signature)*	Date/Time	Received by: *(Signature)*	Relinquished by: *(Signature)*	Date/Time	Received by: *(Signature)*
Relinquished by: *(Signature)*	Date/Time	Received by: *(Signature)*	Relinquished by: *(Signature)*	Date/Time	Received by: *(Signature)*
Relinquished by: *(Signature)*	Date/Time	Received for Laboratory by: *(Signature)*	Date/Time	Remarks	

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

STANDARD OPERATING PROCEDURE F.4
RADIOACTIVE WASTE SHIPMENT AND DISPOSAL RECORD

1.0 Scope and Application

The purpose of this Standard Operating Procedure (SOP) is to explain the protocol for "Radioactive Waste Shipment and Disposal Record" on Environcare's manifest. The instructions on Attachment A and Attachment B satisfy the requirement of Envirocare and the Utah Division of Radiation Control. If another shipper is used, appropriate modifications will be incorporated in Attachments 1 and 2.

ATTACHMENT 1

RADIOACTIVE WASTE SHIPMENT AND DISPOSAL RECORD

Most of the information required on Envirocare's manifest "Radioactive Waste Shipment & Disposal Record" (RSR) is self-explanatory. These instructions explain the particular requirements to satisfy the needs of Envirocare and the Utah Division of Radiation Control.

Items (1) - (4) are self-explanatory.

Item (5): # of Packages - Enter total number of packages on this manifest.

Weight (Tons) - Total weight on this manifest. If you wish to report weight in pounds, line out "Tons" and enter "lbs".

Proper Shipping Name and Hazard Class - If other than the two indicated, fill in with proper name and class.

DOT ID Number - Use ID number from 49 CFR 172.101.

Item (6) Total # of Packages/Cars, Etc. - Same as Item (5).

Volume Cu. Ft. - Total volume of waste on this manifest, not rail car or truck volume. If you wish to use Cu. Yds., line out and enter "Yds".

Activity in millicuries - List total radioactivity content of each nuclide on the continuation sheets. Space is provided for listing other nuclides and, if needed, those filled in may be lined out and substituted. Put total of all reported nuclides in "All Isotope box.

Signature - The Authorized Customer must sign and date the certification.

Item (7) Record # - This if for your own unique record number.

Lower Left Corner

Type of Container - Self-explanatory. If your container, e.g., bag, is not included, write over any that are not pertinent.

Container Volume Cu. Ft. - List the average volume of waste in one of each type of container.

# of Packages - Total number of each type of package on the manifest.

Cu. Ft. Per Container Type - Total volume of waste shipped in each type of container. This is the product of the other columns. If volume is in Cu. Yds., line out "Ft." and enter "Yds".

Shipment Totals - Not required for first column "Container volume Cu. Ft.". Enter total of all types of packages in second column. There is no box, but enter total volume of waste for all types of containers at bottom of third column "Cu. Ft. Per Con Type".

Continuation Sheet

Generator Name - Enter Generator name.

Agent/Broker - Enter Agent/Broker name, if used.

Bates - Leave blank.

Record Number - Use Record Number from page 1.

Column (8)	Item Number - Numerical list, 1 - n, of individual packages on the manifest.
Column (9)	Container Type - Enter Container description.
Column (10)	Container Volume (C.F.) - Enter volume of waste in each container. If you use cubic yards, line out "C.F." and enter "C.Y."
Column (11)	Container Weight (tons) - Enter weight of waste in each container. If you use pounds, line out "tons" and enter "lbs".
Column (12)	Physical Form - this should be "Solid".
Column (13)	Waste Class - Waste Class A, B, or C from 10 CFR 61.55. This should be "A".
Column (14)	Solidification Agent (if used) - Trade name or generic description of any solidification agent used.
Column (15)	Waste Description - Enter appropriate description, such as soil, pond sludge, dewatered resin, construction debris, etc.
Column (16)	Chemical Form/Chelating Agent - Give the principle chemical form(s) and chelating agent(s) (if used).
Column (17)	Percent Chelating Agent by Weight - Complete if a chelating agent is present.
Column (18)	Radionuclide(s) Present - List all significant radionuclides present in the package, following the concept of Envirocare License Condition 6. For example, Ra-225 and Th-232 in secular equilibrium with their daughters, list only the Ra-226 or Th-232 and not the daughters. For U-238 and Ra-

	226, list both U-238 and Ra-226. For depleted uranium list D.U., not U-238.
Column (19)	Total Activity (mCuries) - List total activity of each radionuclide present.
Column (20)	Concentration (psi/gram) - List average activity concentration (pCi/g) for each radionuclide in each package.
Column (21)	Special Nuclear Material (kg) - Contained weight of Special Nuclear material (kg) in each package.
Column (22)	Source Material (kg) - Contained weight of Source Material (kg) in each package.
Columns (23) & (24)	Radiation levels (mR/h)(uR/h) - Record the surface and 1-meter total gamma exposure rates for each package (including background). Either mR/h or uR/h may be used. Line out the inappropriate unit.
Column (26)	Transport Index - Enter DOT Transport Index (49 CFR 173.403(bb)).
Column (27)	Fissile Class - Enter Fissile Class for shipments of Special Nuclear Material.
Column (28)	D.O.T. Label - Enter D.O.T. Label as required by 49 CFR 173.444.
Page Totals	Column (8) Column (10) Column (11) Column (19) Column (20)

Total of packages on this page
Total volume of waste on this page
Total weight of waste on this page
Total activity of nuclides on this page.
Average radioactivity of nuclides on this page

(Column 19)/(Column 11).

Disposition of Copies: Green - Must be mailed to and approved by Envirocare of Utah before shipping.

White. Yellow. Pink - Must accompany waste in transit.
Gold - Customer copy.

ENVIROCARE OF UTAH, INC.
TRANSPORT POLICIES AND PROCEDURES

1. FOR SCHEDULING PURPOSES, ENVIROCARE OF UTAH, INC., MUST BE NOTIFIED A MINIMUM OF THREE DAYS IN ADVANCE OF DELIVERY TO CLIVE, UTAH. THIS NOTIFICATION MUST BE IN WRITING.

2. RADIOACTIVE SHIPMENT RECORDS (RSR's) MUST BE MAILED OR FAXED BEFORE SHIPMENT TO ENVIROCARE'S MAIN SALT LAKE CITY OFFICE, "ATTN: SCHEDULER/PLANNER". ENVIROCARE'S RADIATION SAFETY OFFICER WILL REVIEW THE RECORD FOR ACCURACY AND COMPLETION. UPON FINAL REVIEW, ENVIROCARE WILL NOTIFY THE TRANSPORTER, GENERATOR, BROKER OR ALL THREE OF SHIPMENT APPROVALS/DISAPPROVALS.

3. ALL CORRESPONDENCE REGARDING TRANSPORTATION TO AND FROM ENVIROCARE'S CLIVE FACILITY MUST BE DIRECTED TO ENVIROCARE'S APPOINTED SCHEDULER/PLANNER.

4. FAILURE TO COMPLY WITH ENVIROCARE'S POLICIES AND PROCEDURES WILL NECESSARILY LEAD TO DELAYS AND POSSIBLE NON-ACCEPTANCE OF TRANSPORTED WASTE.

QUALITY ASSURANCE PROJECT PLAN (QAPjP)

FUSRAP ASHLAND 2 REMEDIAL ACTION
TONAWANDA, NEW YORK

MAY 29, 1998
PART 2 OF SAMPLING AND ANALYSIS PLAN

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LIST OF ACRONYMS

ASTM .... American Society for Testing and Materials
CAP.................. Corrective Action Plan
CAR .... Corrective Action Report
CERCLA........... Comprehensive Environmental Response, Compensation, and Liability Act
COC .... Chain of custody
COO................. Chief Operating Officer
COR .... USACE Contracting Officer Representative
CQC .... Construction Quality Control
CQCP.............. Construction Quality Control Plan
DCGL .... Derived Concentration Guideline Level
DQO .... Data Quality Objective
EFMG.............. ICF Kaiser Environment and Facilities Management Group
ER .... USACE Engineering Regulation
FSP .... Field Sampling Plan
FUSRAP.......... Formerly Utilized Site Remedial Action Program
H&S.................. Health and Safety
HASP .... Health and Safety Plan
ICF Kaiser .... ICF Kaiser Engineers, Inc.
LBGR .... Lower Bound of the Gray Region
M&TE .... Measurement and Testing Equipment
MARSSIM .... Multi-Agency Radiation Survey and Site Investigation Manual
MED .... Manhattan Engineering District
NIST................. National Institute of Standards and Technology
O&M................. Operation and Maintenance
OSHA .... Occupational Safety and Health Administration
PARCC............ Precision, Accuracy, Representativeness, Completeness, Comparability
QA.................... Quality Assurance
QAO .... Quality Assurance Officer
QAPjP .... Quality Assurance Project Plan
QC.................... Quality Control
QIP................... Quality Improvement Process
RA.................... Remedial Action
RPD .... Relative Percent Difference
SAP.................. Sampling and Analysis Plan
USACE............ United States Army Corps of Engineers
USEPA............ United States Environmental Protection Agency

1.0 PROJECT DESCRIPTION

From 1942 to 1946, portions of the Linde site (currently Praxair) were used for separation of uranium ores. The processing activities were conducted under a Manhattan Engineer District (MED) contact. MED leased a 10 acre tract now called Ashland 1 to serve as a disposal site for wastes from the uranium ore separation process. Records indicate that approximately 8,000 tons of residues were spread over roughly 2/3 of the Ashland 1 property. In 1974, Ashland Oil constructed petroleum storage tanks on the facility and in doing so removed approximately 6,000 cubic yards of soil containing radioactive residues and commingled MED-related inorganic constituents. The majority of the excavated soil was transported to Ashland 2 and Seaway for disposal.

A portion of the Ashland 2 property was used by Ashland Oil as a landfill for disposal of general plant refuse and industrial and chemical byproducts. The radioactive and commingled inorganic constituents removed from Ashland 1 were deposited in an area of Ashland 2 adjoining the Ashland Oil landfill area. The industrial landfill portion of Ashland 2 was closed and covered with clay soil in 1982 by Ashland Oil.

The U.S. Army Corps of Engineers (USACE) is tasked with remediating the radiologically contaminated sites located in the town of Tonawanda, New York. This effort is part of USACE's Formerly Utilized Sites Remedial Action Program (FUSRAP). Remediation of the Ashland 2 Site is being managed by the USACE under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and its implementing regulations found in the National Contingency Plan. (40 CFR 300).

The principal constituents of concern at Ashland 2 include uranium-238, radium-226, thorium-230 (and their respective decay products), and the following associated MED-related metals: copper, lead, and vanadium. The constituents are present in surface and subsurface soils, stream sediments, and surface waters, but were not detected in groundwater during the remedial investigation. Volatile organics, base/neutral organics, and acid extractable organics not associated with MED activities are present throughout Ashland 2 surface and subsurface soils. The Tonawanda Feasibility Study assumed that the soils were not RCRA hazardous.

The remedial action to be performed includes excavation of all MED-related soils containing > 40 pCi/g Th-230 and shipment offsite for commercial disposal. Th-230 was detected from surface soils to a depth of 6 feet at concentrations ranging from 0.1 to 2200 pCi/g. U238 was present at depths up to three feet at concentrations of 1.3 to 263 pCi/g, while Ra-226 typically appears at the same depths as U-238 in concentrations ranging from 0.7 to 189 pCi/g.

Soil excavation and disposal is scheduled to begin at the Ashland 2 site on June 1, 1998, with work to be completed by approximately September 30, 1998. Numerous types of samples will be collected and analyzed onsite to expedite the remediation process, including decontamination wastes, wipes, disposal soils, and verification soils. Selected soils will also be sent to an offsite lab for analysis, including waste profile samples and final status survey samples. Waste profile samples will be analyzed in accordance with the permit requirements of the disposal facility, while the final status survey samples will be collected following remediation to confirm that the following cleanup goal has been achieved:

Th-230 < 40 pCi/g

By achieving this goal, all CERCLA risk criteria and ARARs are satisfied as detailed in the Record of Decision for the Ashland 1 and Ashland 2 Sites, Section 4.5, April 1998.

2.0 PROJECT ORGANIZATION

The organization established for this project is depicted in Figure 2-1 and includes project management, technical staff, QC staff, and subcontractors. Additional QC staff may be added as necessary to meet QC requirements for each definable feature of work. The quality related responsibilities and authority of the key members of this organization are outlined below. Changes in project management and QC personnel require a QAPjP revision and approval of the USACE Project manager.

2.1 PROJECT MANAGER

Mr. Derrick Rhodes will serve as the Project Manager for the Ashland 2 remediation project. Mr. Rhodes assumes overall responsibility for project quality and is the interface between project staff, USACE, and the corporate QA and Health & Safety organizations. The project manager has the authority and responsibility to implement corrective actions based on findings or recommendations from the QA, H&S, or USACE oversight staff. The project manager is responsible for planning, scheduling, and assigning personnel to best meet project needs. Mr. Rhodes is the only person who can approve major changes to the scoping documents (with prior approval of USACE). He also has the authority to require corrective action by subcontractors for work not performed in accordance with the SAP or the CQCP. Mr. Rhodes is responsible for the quality and timeliness of all project activities, including those performed by subcontractors.

2.2 CONTRACTOR QUALITY CONTROL SYSTEM MANAGER

Mr. Mike Schwippert is the designated Contractor Quality Control (CQC) System Manager for the Ashland 2 remediation project. Replacement of this function can only be made with the prior written consent of the USACE. Mr. Schwippert's sole function on this project will be to serve as CQC System Manager. As CQC System Manager, Mr. Schwippert has authority to enforce the procedures defined in the CQC Plan and this SAP. Mr. Schwippert has the authority to stop work in order to ensure that project activities comply with specifications of the CQCP, SAP, contract, Delivery Order, and ROD. This authority applies equally to all project activities, whether performed by ICF Kaiser or its subcontractors and suppliers.

The CQC System Manager is responsible for planning and executing QC oversight of project operations, and ensuring compliance with specified QC requirements. Specifically, the CQC System Manager is responsible for: (1) developing, assessing the effectiveness of, and maintaining the SAP, CQCP, and related procedures; (2) reviewing and approving the qualifications of proposed technical staff and subcontractors; (3) planning and ensuring the performance of preparatory, initial, follow-up, and completion inspections for each definable feature of work; (4) identifying quality problems and verifying that appropriate corrective actions are implemented; (5) ensuring that the requisite QC records are generated and retained as prescribed in the CQCP; and (6) verifying that subcontracted laboratories have appropriate USACE certifications and operate under a documented QC program that complies with the QAPjP and applicable requirements of the contract, Delivery Order, and ROD.

The CQC System Manager or his designated Shift CQC System Manager is to be physically on site whenever project-related field work is in progress. If Mr. Schwippert is to be absent from the site, an alternative CQC System Manager will be designated and will be given equivalent responsibilities and authority. Periods of absence of the CQC System Manager are not to exceed 2 continuous weeks or 30 workdays during a calendar year. Mr. Schwippert or his alternate will be available for emergency contact on a 24-hour basis.

2.3 SHIFT CQC SYSTEM MANAGER

The Shift CQC System Managers will have the same authority as the CQC System Manager on their respective shifts. The specific responsibilities assigned to the Shift CQC Managers during their respective shifts will include (1) identifying quality problems and verifying that appropriate corrective actions are implemented, and (2) preparing and submitting to the CQC System Manager a shift QC Status Report for inclusion in the Daily QC Report.

2.4 QC CHEMIST

The QC Chemist will work with the CQC System Manager and assist with verification that the laboratory licenses, permits, and certifications are in compliance with USACE, USEPA, and Utah regulations. He will be responsible for ensuring analytical data is validated at the level required by the Data Quality Objectives. The QC Chemist is responsible for coordinating sampling, analysis, and data package production with the laboratory. The QC Chemist will also be responsible for performing a technical review of the chemical analytical data, providing the validated data in a database, ensuring chemical analytical data validation documentation is maintained in a retrievable manner, and providing a daily assessment of the data validation status to the CQC System Manager for inclusion in the Daily QC Report.

2.5 LABORATORY

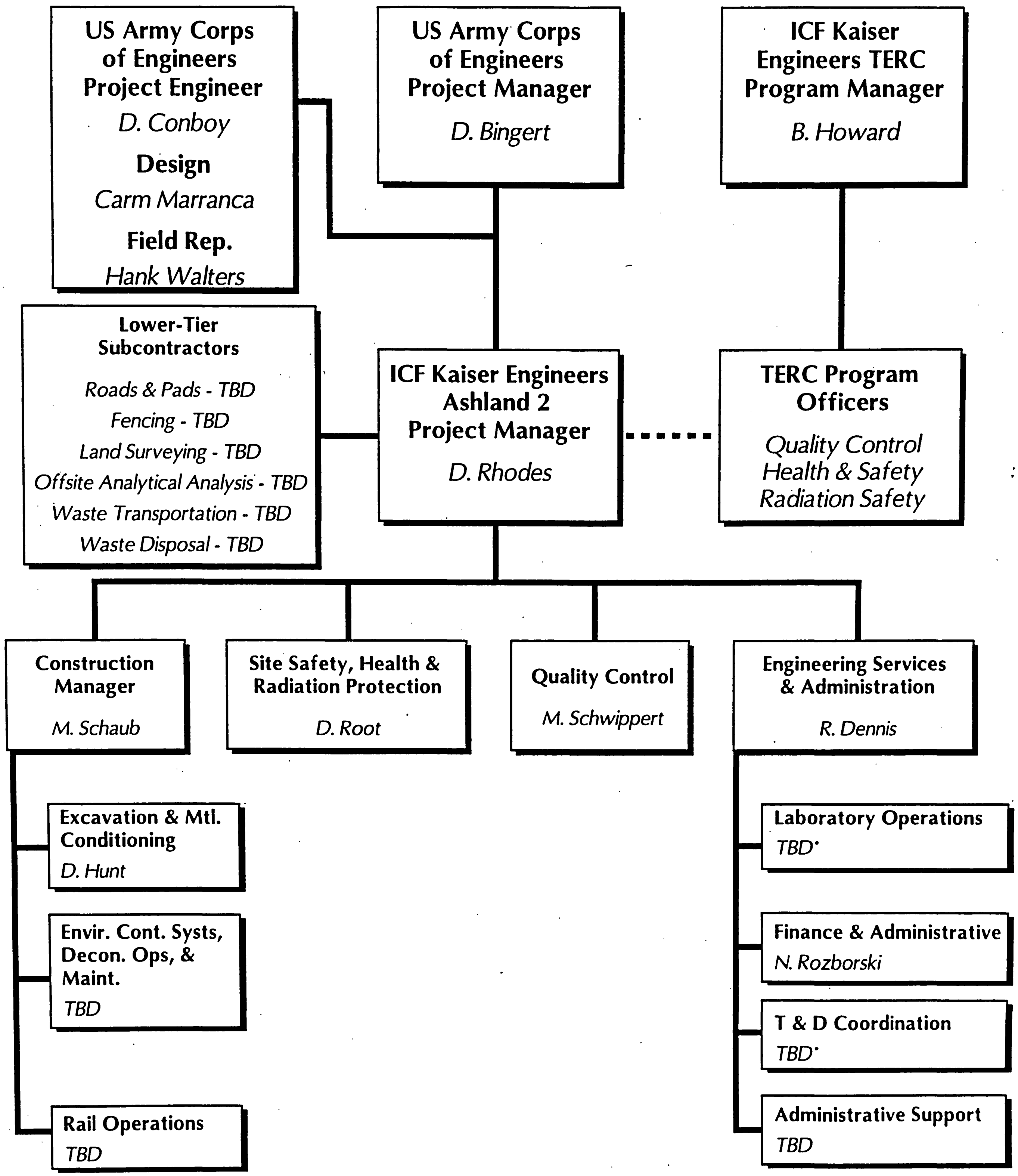
Quanterra Environmental Services, St. Louis facility will retain responsibility for all bench level QA/QC, data reduction, reporting, and analytical performance monitoring. Quanterra has been certified by the state of Utah and is under contract to the USACE St. Louis District to support FUSRAP analytical activities, and is therefore qualified to perform all sample analyses scheduled for the Ashland 2 remediation. The qualification process ensures that the analytical laboratory has the management system, technical staff organization, facilities, and equipment required to complete the sample analyses in a timely, cost effective manner which yields quality results.

<u>Quanterra QA Manager</u>

The laboratory QA Manager, Dr. Margaret Winter coordinates and oversees data quality and corrective action. She has the ability and authority to recommend and implement immediate corrective action. The QA Manager reports directly to the president of Quanterra. A detailed list of his duties is included in the job description kept on file at Quanterra.

FUSRAP Ashland 2 Remedial Action
Project Organization & Key Personnel

Figure 2-1



TBD = To Be Determined
TBD * = Possible Additional Subcontracted Service

ICF KAISER

3.0 DATA QUALITY OBJECTIVES

The preferred remedial alternative to be implemented at the Ashland 2 Site includes complete soil excavation and off-site disposal of those soils exceeding the site-specific excavation guideline of 40 pCi/g. Numerous types of samples will be collected to support the remediation as it progresses, including air, surface water, sediments, wipes, soils, and waste profile samples. However, the final status survey of the site will determine if the cleanup criteria has been met. The final status survey samples are the only samples to which the DQO process is applicable, and this has been addressed in detail in the Final Status Survey Plan.

4.0 SAMPLING LOCATIONS AND PROCEDURES

All aspects of field operations, including rationale and collection procedures for each type of sample are detailed in the Field Sampling Plan portion of the SAP.

5.0 SAMPLE HANDLING AND CUSTODY

5.1 SAMPLE NUMBERING SYSTEM

The sample numbering system will be used will be used to identify each sample taken and to provide a tracking procedure for retrieval of information. Sample numbers will be generated in the ASH2-X-YYY-NNN format as follows:

1. ASH2 = Ashland 2 site.
2. X = Sample type, as follows:

   A = Air filter
   F = Final status survey soil
   L = Liquid waste
   S = Soil
   W = Wipe

3. YYY = Survey Unit Number. This portion of the sample number will only be used for final status survey samples.

4. NNN = Sequential sample number for each type of sample. Note that final status survey sample numbers will be sequential within each survey unit. Replicate and blank samples will be given a "900" number by sample type, in sequence.

5. Examples:

   ASH2-F-001-003: Final status soil sample taken from Survey Unit 001 at location 003.

   ASH2-L-901: first blank or replicate sample of liquid waste.

5.2 PRESERVATION AND HOLDING TIME

Many analytical methodologies require the addition of a preservative and also have established holding times in order to stabilize and maintain sample integrity. Table 6-2 shows the sample analyses to be performed along with the preservation and holding time requirements. The clock for sample holding time begins at sample collection.

5.3 SAMPLE CUSTODY

Field Custody Procedures

1. Bottles for samples to be analyzed off-site will be shipped from the laboratory to the site via commercial shuttle service or overnight mail. The bottles will be received by field personnel and stored in a designated secure area until they are needed. Bottles for samples to be analyzed on-site will be obtained from a commercial supplier, and will be stored unopened in a designated secure area.

2. Field blanks will be prepared at the laboratory performing the analyses. Blanks will be shipped on ice and under chain of custody to the field sampling team. Upon receipt, the field sampling team will sign the chain of custody and place the blank water in cold storage until used at the site.

3. Samples will be collected as described previously in this SAP. Sample location and sample number will be recorded on the Chain of Custody Record (see Appendix B). The sampler is responsible for the custody of the samples until they are properly transferred or dispatched. Once a sample has been collected and preserved (if appropriate), it will be secured in a locked vehicle, locked trailer, custody sealed cooler, or in visual site of the person assuming the sample custody until shipment to the laboratory.

Transfer of Custody and Shipment

Samples to be analyzed both on-site and off-site are accompanied by a Chain-of-Custody Record Form (see Appendix B). When transferring samples, the individuals relinquishing and receiving will sign, date and note the time on the Record. This Record documents sample custody transfer from the sampler, often through another person, to the laboratory. The Chain-of-Custody Record is filled out as follows:

1. Enter header information (project number and name). For each station number, enter date, time, composite/grab, station location, number of containers, analytical parameters, and sample identification number (in remarks column).

2. Sign, date and enter the time under "Relinquished by" entry.

3. Make sure that the person receiving the sample signs the "Received by" entry, or enter the name of the carrier (e.g., UPS, Federal Express) under "Received by." Receiving laboratory will sign "Received for Laboratory by" on the lower line and enter the date and time.

4. Enter the bill-of-lading or Federal Express airbill number under "Remarks," if shipping samples off-site.

5. Place the original (top, signed copy) of the Chain-of-Custody Record Form in the appropriate sample shipping package. Retain a copy with field records.

The custody record is completed using black waterproof ink. Any corrections are made by drawing a line through the error, initialing and dating the change, and entering the correct information. Erasures are not permitted.

Samples for on-site analyzes will be delivered to the on-site lab. Samples for off-site analysis will be sent via common carrier. Common carriers will usually not accept responsibility for handling Chain-of-Custody Record Forms. This necessitates packing the record in the sample container (enclosed in a plastic zip-lock bag). As long as custody forms are sealed inside the sample container and the custody seals are intact, commercial carriers are not required to sign off on the custody form.

The laboratory representative who accepts the incoming sample shipment will sign and date the Chain-of-Custody Record, completing the sample transfer process. It is then the laboratory's responsibility to maintain custody records throughout sample preparation and analysis.

Laboratory Custody

Both the on-site and off-site analytical laboratory will end the sample shipment COC and initiate their own COC for sample analysis.

5.4 SHIPPING

All samples to be shipped off-site must be analyzed on-site to determine the concentrations of radionuclides present. This will allow for proper packaging and shipping via IATA Dangerous Goods Regulations. Note that by IATA definition, a material must have an activity greater than 2,000 pCi/g in order to be considered radioactive. If the radioactivity of a material is < 2,000 pCi/g, it does not need to be shipped as radioactive.

The following procedure applies to unpreserved, radioactive samples. If preserved samples are being shipped, consult the IATA regulations for proper packaging, labeling, marking, and documentation.

1. Tabulate the activities of the radionuclides present in each of the samples on the Sample Shipping Worksheet (see Appendix B, this can easily be set up on a Spreadsheet so that all of the calculations are done automatically) The activity ratio for each sample bottle must be less than 1.0 in order to be shipped by IATA regulations. Note that each bottle is considered a package, while the cooler is an overpack. Shipping requirements are for each package.

2. Prepare the cooler(s) for shipment:
   - Tape drain(s) shut.
   - Place mailing label with laboratory address on top of cooler(s).

3. Prepare the sample bottles.
   - Check to see that lids are on tight and that bottle labels are firmly affixed.

- Spray the bottles with tap water and wipe with a paper towel

4. Measure the removable surface contamination of each sample bottle as follows. Wipe a 300 cm^2 area of the bottle (or the whole bottle if the area is $<$ 300 cm^2) with an absorbent material (filter paper). Measure the activity of the wipe. The removable contamination for each bottle must be <1 pCi/cm^2 to be shipped using exemption packaging.

5. Arrange the sample containers in front of their assigned coolers.

6. Seal each sample container in a separate zip-loc plastic bag and arrange the sample containers in the coolers.

7. Place cube ice in strong plastic bags and put the bags directly on and around the sample containers (if ice is required for preservation).

8. Fill the remaining space with vermiculite.

9. Sign the chain-of-custody (COC) form (or obtain the signature) and indicate the time and date the samples are relinquished to the overnight carrier.

10. Seal the proper COC copy in a zip-loc bag and place it inside the cooler.

11. Attach a "RADIOACTIVE" label to the inside of the cooler lid, or write the word "RADIOACTIVE" on the inside of the cooler lid. The word must be visible to anyone who opens the cooler during transport.

12. Close the lid and latch the cooler.

13 Sign and date two custody seals. Carefully peel the custody seals from their backings and place them intact over the front and back edges of the cooler. Cover the seals with clear protection tape.

14 Tape the cooler shut on both ends, making several complete revolutions with strapping tape (do not cover the custody seals).

15 Send the shipment to the analytical laboratory via overnight carrier, completing the carrier required shipping papers.

16 Telephone the laboratory and provide the following information:

- Your name
- Project name
- Number of samples sent to the laboratory for analysis
- Airbill numbers

5.5 DOCUMENTATION

5.5.1 Field Logbooks

All activities performed at the Site will be recorded in bound, field logbook(s). All logbooks will be kept at the Site while remedial activities are ongoing. At the completion of the site cleanup, logbooks and all other records (e.g., chains-of-custody) will be transferred to the Tonawanda office of ICF Kaiser for use in completing the final reports. At the completion of the project all logbooks and other records will be transferred to the USACE for inclusion in the project file.

Field logbooks are legal documents, and thus need to be thoughtfully, accurately, and legibly prepared to qualify as the legal record of all site activities. Logbooks will be reviewed periodically to assure that quality records of site activities are being maintained. Information to be recorded in field logbooks must be as accurate and as detailed as practical, however logbook entries must be factual statements only; no judgmental comments should be included. All field activities must be recorded in the bound logbooks at the time they occur. If an amendment is made to the logbook, it must be identified as an amendment, dated and signed by the person making the amendment.

Field logbooks may include one or a combination of the following: Site Logbook, Sampling Logbook, Health & Safety Logbook, and/or Visitor Logbook. Overall site activities are recorded in the Site Logbook, with activity-specific information detailed in the appropriate activity logbook. Each logbook is described in the following sections. The Construction Manager shall be responsible for the preparation and maintenance of project field activity logbooks. This responsibility may be delegated to a designated Field Operations Leader or, in the case of the Health & Safety Logbook, the Site Health & Safety Officer (SHSO). Logbook formats shall be at the discretion of the individual Construction Manager while adhering to the following basic requirements:

- All field logbooks must be weatherproof and permanently bound with consecutively numbered pages.
- The project name, ICF Kaiser Engineers accounting number, and site name and address are to be written on the cover of each logbook.
- Entries are to be made using permanent waterproof blue or black ink.
- Erasures are not permitted. Errors must be crossed-out with a single-line so that the error is not obscured, initialed by the person making the entry, and dated.
- A new page is to be started each day with the signature of the person responsible for making the entries. The end of each daily entry will be indicated by "End of log for the day *applicable date*" along with the signature of the person responsible for the entries. If the last entry for a particular day does not end at the bottom of a page, a line is to be drawn diagonally down the remainder of the page, and the bottom of the page must be signed and dated.
- Blank pages that may be inadvertently left in the logbook are to have a large 'X' drawn across the entire page along with the signature of the appropriate field team member.
- All pages must include the date at the top of the page and the time of day, in military time, in the left margin preceding each entry.

In general, logbook entries can be defined by the following four categories: daily logbook entries, observations, sample collection activities, and health & safety information. Examples of the types of information that should be recorded in the logbook include, but are not limited to, the following:

Daily Logbook Entries

⇒ Record the time of site entry.

⇒ Record the weather conditions - specific information regarding amount of rainfall, wind speed and direction must be recorded along with any changes in the weather conditions during that day's activities.

⇒ Record the names of all team members and their responsibilities during that day's activities.

⇒ Record general discussion of visitor activities including a list of all visitors on the Site that day.

⇒ Record all conversations held with other persons responsible for or in some way involved with the Site.

⇒ Record a step-by-step explanation of site activities. This can be accompanied by photographs and/or sketches, as appropriate, to better describe activities.

Observations

⇒ Record descriptions of site physical or topographic features pertinent to site activities.

⇒ Record remediation activities, construction details, equipment used, problems encountered, and explanation of any down time.

- ⇒ Record information on arrival and removal from the site of all shipping containers or rail cars. Details regarding the number of containers received and quantity of materials shipped should be included.
- ⇒ Describe stratification of the subsurface, soil or water conditions, and other subsurface data. Soil descriptions will be recorded using the Unified Soil Classification System (USCS), ASTM D2488 (see Appendix A).
- ⇒ Record field measurements exactly as taken. All calculations made should be entered in the logbook indicating the measurements and formula used in performing the calculation.
- ⇒ All observation entries must be identified with a location, use sketches to illustrate locations when appropriate.

Sample Collection Activities

- ⇒ Record the names of samplers.
- ⇒ Record the sample number(s).
- ⇒ Describe sample location coordinates and elevation, indicate references to any photographs taken, maps, or sketches made, as appropriate.
- ⇒ Reference the sampling equipment used, including serial numbers of field screening or testing instruments.
- ⇒ Record the results of field instrument calibrations.
- ⇒ Record sampling method(s) used.
- ⇒ Record the time interval of sampling (military time).
- ⇒ Detail any variance from original plans.
- ⇒ Explain any mishaps or malfunctions and the action taken to correct the mishap/malfunction, including the rationale and by whose authority the action was taken.
- ⇒ Decontamination procedures used and method of disposal of team generated waste.
- ⇒ Identification of specific QC samples.

Health & Safety Information

- ⇒ Record the results and readings of daily health and safety monitoring equipment calibration.
- ⇒ Detail any background locations and measurements taken.
- ⇒ List the level of Personal Protective Equipment (PPE) used during the day.
- ⇒ Record OVA and/or HNu readings taken during remediation.
- ⇒ Describe any incidents, accidents, and course of action taken and by whose authority.

5.5.2 Site Photographs

A site photograph log will be maintained on site by the site manager. All photographs taken by site personnel will be described in the photograph log book. The log book will be a bound notebook in which the date, number of photos, and a brief description of the contents of the photographs and an explanation of the purpose for taking the photographs will be included. Maps or sketches showing the photograph number, approximate position of the camera and the direction in which the photos were taken, will be recorded in the notebook. All printed photographs will have a note written on the back to indicate the date taken, the photograph number and the page in the photographic log where the photograph is described.

A separate file will be maintained to store the photographic negatives. The negatives will be kept in separate envelopes with the date(s) and the number of photographs taken marked on the outside.

5.5.3 Sample Labels

Sample labels will be completed for each sample using waterproof ink. If inclement weather conditions prohibit use of waterproof ink, a logbook notation should explain that a pencil was used to fill out the sample label because a pen would not function under field conditions. Information to be recorded on each label includes: site name, sample number, date and time of collection, name of sampler. Mistakes on the label should be corrected as described below.

5.5.4 Sample Log Sheets

Sampling crews will record all specific sampling information (i.e., sample number, date, time, etc.) on sample log sheets (see QAPjP Appendix B). The make, model, and serial number (if applicable) of sample collection equipment, field analytical equipment, and physical measuring equipment will also be recorded on the log sheet.

Sample log sheets will be numbered consecutively to follow the sequence of sampling. Use of sample log sheets will be noted in the site logbook.

Sample log sheets completed in the field may not be transcribed to clean sheets. All sample log sheets and sample summary sheets will be assembled in a loose leaf binder.

Separate log sheets for other field activities, such as field analyses, etc., may be used as needed, upon approval by the Site Manager. Use of such data sheets will be noted in the site logbook.

5.5.5 Corrections to Documentation

All field documentation, including field logbooks, labels, sample log sheets, and chain of custody records are completed using black waterproof ink. Any corrections are made by drawing a line through the error, initialing and dating the change, and entering the correct information. Erasures are not permitted.

6.0 ANALYTICAL PROCEDURES

Solid and liquid samples collected during the remediation will be analyzed to determine waste disposal options, guide the remediation, and monitor the safety of site workers and nearby residents. The specific analyses to be performed (based on the purpose of the sampling) are detailed in the Tables 6-1 and 6-2.

6.1 ON-SITE LABORATORY

Remediation samples will be analyzed at the on-site laboratory in accordance with the following procedures:

- Multi-Agency Radiation Survey and Site Investigation Manual, Section 7.7, December 1997 - Radiological Analytical Methods.

All on-site radiological analyses will be performed by a sub contractor using performance based methods. The following performance criteria are specified for radiological analyses:

1. All analytical methods must be derived from reliable sources, such as those listed in section 7.7 of MARSSIM.

2. Quality control samples must routinely be analyzed, including:

   Blanks

   Replicates

   Reference materials (as applicable)

   Control samples

   Spiked samples (as applicable)

At least one blank, replicate, control sample, and spiked sample (as applicable) must be analyzed with each batch of samples. QC sample analytical results must meet control limits derived from historical performance data, designed to indicate that the analyses are in control. Reference materials analysis is not required with each batch, but they should be analyzed on a periodic basis.

Reference and spiking solutions may not be available from National Institute of Standards and Technology (NIST) or commercial vendors for selected radionuclides. In cases where material availability or technical feasibility prohibit reference material or spiked sample analyses, the lab need not meet the above requirements, but should document the reason for not analyzing a reference material or spiked sample. The QC chemist must review and approve each such occurrence.

3. The lab should have a preventive maintenance program in place.

4. The analytical instrumentation must be calibrated at an acceptable frequency using standards covering the range of expected sample concentrations. Traceability of the standard materials must be documented and maintained. Calibration linearity must meet historically derived criteria.

5. The lab should routinely measure the background signal of their instrumentation.

All analytical reports will require full documentation of each analysis performed, including all QC and calibration information and the raw data necessary to allow for recalculation of the result.

6.2 OFF-SITE LABORATORY

Remediation samples will be analyzed at an off-site laboratory in accordance with the following procedures:

- SW-846, Test Methods for Evaluating Solid Waste, 3rd edition, update 3,12/96.
- American Society for Testing and Materials, 1998 Annual Book of ASTM Standards.
- Multi-Agency Radiation Survey and Site investigation Manual, Section 7.7, December 1997 - Radiological Analytical Methods.

Chemical analyses will be performed using SW846 methods, which are essentially performance-based methods. The following criteria are specified for SW846 methods (as applicable for a given method):

- Sample holding times (SW846 criteria)
- GC/MS tuning criteria (method-specific criteria)
- Initial and continuing calibration (method-specific criteria)
- Detection limits (historical, performance-based criteria)
- Laboratory blanks (SW846 criteria)
- Laboratory control sample (historical, performance-based criteria)
- Surrogate spike recoveries (historical, performance-based criteria)
- Matrix spike/duplicate analysis (historical, performance-based criteria)
- Internal standard area (method-specific criteria)

All radiological analyses will be performed using performance based methods. A laboratory will usually perform better using methods it routinely employs as opposed to using other methods with which it has less experience. The lab is also likely to have historical data on performance for methods it routinely uses. The following performance criteria are specified for radiological analyses:

1. All analytical methods must be derived from reliable sources, such as those listed in section 7.7 of MARSSIM.

2. Quality control samples must routinely be analyzed, including:

   Blanks

   Replicates

   Reference materials (as applicable)

   Control samples

   Spiked samples (as applicable)

At least one blank, replicate, control sample, and spiked sample (as applicable) must be analyzed with each batch of Ashland 2 samples. QC sample analytical results must meet control limits derived from historical performance data, designed to indicate that the analyses are in control. Reference materials analysis is not required with each batch, but they should be analyzed on a periodic basis.

Reference and spiking solutions may not be available from National Institute of Standards and Technology (NIST) or commercial vendors for selected radionuclides. In cases where material availability or technical feasibility prohibit reference material or spiked sample analyses, the lab need not meet the above requirements, but should document the reason for not analyzing a reference material or spiked sample. The QC chemist must review and approve each such occurrence.

3. The lab should have a preventive maintenance program in place.

4. The analytical instrumentation must be calibrated at an acceptable frequency using standards covering the range of expected sample concentrations. Traceability of the standard materials must be documented and maintained. Calibration linearity must meet historically derived criteria.

5. The lab should routinely measure the background signal of their instrumentation.

All chemical analytical documentation and record maintenance will be in accordance with SW846 requirements, as appropriate. All analytical reports will require full documentation of each analysis performed, including all QC and calibration information and the raw data necessary to allow for recalculation of the result.

Table 6-1

On-Site Sample Analyses

Ashland 2 FUSRAP Site

Type	Matrix	Assumptions	On-site Analyses	Approximate Number of Samples
Low Volume Perimeter Air	Filter	Assume 6/day for 6 months	Gross alpha	1080
Surface water	Liquid	Assume 6/week for 6 months	Gross alpha	156
Wipes	Wipe	Assume 20/day for 5 months	Gross alpha	2600
			Gross beta/gamma	2600
Soils & sediments	Solid	Assume 20/day for 5 months	Gamma spectrometry	2600
Waste Profile	Solid	Waste profile for Envirocare	Gross gamma	15
			Gamma spectrometry	15
Final Status Survey	Solid		Gamma spectrometry	310

Table 6-2

Off-Site Sample Analyses

Ashland 2 FUSRAP Site

Sample Type	Analysis	Approximate Number of Samples	Analytical Method	Preservative	Holding Time	Required Detection Limit
Air filter	U, Th, & Ra isotopes	20	(1)	None	6 months	(2)
Surface water	Gross alpha	20	(1)	None	6 months	15 pCi/g
	U, Th, & Ra isotopes	20	(1)	None	6 months	5 pCi/g
Soils & sediments	Gross gamma	180	(1)	None	6 months	(2)
	U, Th, & Ra isotopes	180	(1)	None	6 months	(2)
Waste Profile Soils	Th isotopes	15	(1)	None	6 months	(2)
	Ra isotopes	15	(1)	None	6 months	(2)
	U isotopes	15	(1)	None	6 months	(2)
	Gross gamma	15	(1)	None	6 months	15 pCi/g
	Gross alpha	15	(1)	None	6 months	15 pCi/g
	Grain size	15	ASTM D-422	None	6 months	N/A
	Density	15	ASTM D-854	None	6 months	N/A
	Standard proctor	15	ASTM D-698	None	6 months	N/A
	pH	15	SW9045	Cool 4°C	48 hours	N/A
	Paint filter	15	SW9095	Cool 4°C	7 days	N/A
	Reactive sulfide	15	SW846, chap 7	Cool 4°C	7 days	500 mg/kg
	Reactive cyanide	15	SW846, chap 7	Cool 4°C	7 days	250 mg/kg
	Flash point	15	SW1010/20	Cool 4°C	7 days	N/A
	TOX	15	SW9020	Cool 4°C	28 days	1 mg/kg
	Total cyanide	15	SW9010/12	Cool 4°C	14 days	1 mg/kg
	Amenable cyanide	15	SW9010/12	Cool 4°C	14 days	1 mg/kg
	Volatile organics	15	SW8260	Cool 4°C	14 days	10 ug/kg
	Semivolatile organics	15	SW8270	Cool 4°C	extract: 14 days analyze: 40 days	1 mg/kg
Final Status Survey	Th-230	310	(1)	None	6 months	(2)
	Ra-226	310	(1)	None	6 months	(2)
	Total U	310	(1)	None	6 months	(2)

(1) The lab should employ the method it uses routinely that will give accurate & precise results.
(2) Cleanup levels at the site are as follows: < 40 pCi/g Th-230, < 15 pCi/g Ra, < 60 pCi/g total U. The detection limit for each radionuclide should be half the cleanup level.

7.0 CALIBRATION PROCEDURES AND FREQUENCY

7.1 ON-SITE LABORATORY INSTRUMENTATION

Analyses will be performed in the on-site lab using performance based criteria. Performance based criteria for field instrument calibration are as follows:

- Each instrument directly or indirectly used in sample analysis must be calibrated at the start of each day and at a frequency sufficient to demonstrate that the instrument is operating properly. Calibration linearity must meet historically derived criteria, and must be documented. Note that some radiological instrumentation requires one week to calibrate. In such cases that lab must provide documentation of the initial calibration, and must analyze a daily calibration check sample to verify that the instrument calibration remains valid.
- Standards preparation must document reagent purity, traceability, and preparation method.
- Balances must be checked daily to demonstrate proper operation; the daily check(s) must be documented.
- Refrigerator and freezer temperature must be checked daily to demonstrate proper operation; the daily check(s) must be documented.

7.2 OFF-SITE LABORATORY INSTRUMENTATION

SW846 and ASTM methods specify the calibration procedure and frequency. All such analyses performed must include the specified calibration methods at the required frequency.

Radiological analyses will be performed in the off-site lab using performance based criteria. Performance based criteria for field instrument calibration are as follows:

- Each instrument directly or indirectly used in sample analysis must be calibrated at the start of each day and at a frequency sufficient to demonstrate that the instrument is operating properly. Calibration linearity must meet historically derived criteria, and must be documented. Note that some radiological instrumentation requires one week to calibrate. In such cases that lab must provide documentation of the initial calibration, and must analyze a daily calibration check sample to verify that the instrument calibration remains valid.
- Standards preparation must document reagent purity, traceability, and preparation method.
- The laboratory water supply must be checked daily to demonstrate the absence of organic, inorganic, radiological, and all other analytical parameters.
- Balances must be checked daily to demonstrate proper operation; the daily check(s) must be documented.
- Refrigerator and freezer temperature must be checked daily to demonstrate proper operation; the daily check(s) must be documented.

8.0 INTERNAL QC CHECKS

The precision and accuracy of the field sampling procedures will be checked through the preparation, collection, submission and analysis of replicate samples, split samples, and rinsate blanks. Replicate samples, splits, and blanks will be labeled so as to be indistinguishable from Site samples to laboratory analysts. Collection of these quality control samples will be recorded in the master site notebook.

A rinsate blank will consist of two sets of laboratory cleaned sample containers. One set of containers will be filled at the laboratory with analyte free water (ASTM Type II or equivalent). At the field location, the analyte free water will be passed over and through sample equipment and placed in the empty set of sample containers for analysis. (An extra set of VOA vials will be provided to replenish the amount lost during transfer). The rinsate blank water will be shipped from the laboratory at 4°C and held in the field at 4°C. One rinsate blank will be submitted per sampling event or per twenty (20) samples collected for chemical analyses, whichever is more frequent. Rinsate blanks will be analyzed for the same chemical parameters as the samples collected that day.

Field replicates will be used to assess sampling and analytical precision, and will be prepared by dividing a single sample into two equal aliquots for separate analyses. Replicate samples will be collected at a frequency of one in twenty samples, per matrix, per analytical method.

Split samples will be collected at 10% of the final status survey locations within each Survey Unit. Split samples will be collected using the procedure detailed above for replicates. They will be sent to a Quality Assurance laboratory for radiological analyses, to serve as a check of the primary laboratory. The check will be performed by calculating split sample RPDs, which are expected to be $\leq$ 50%.

9.0 CALCULATION OF DATA QUALITY INDICATORS

Quality control indicators will be calculated as follows:

Precision

$$RPD = \frac{\text{difference between the two measured values}}{\text{average of the two measured values}}$$

Accuracy

$$Recovery = \frac{\text{Spike Sample Result - Sample Result}}{\text{Spike Added}} \times 100$$

Completeness

$$Completeness = \frac{\text{Number of usable results}}{\text{Number of planned results}} \times 100$$

10.0 CORRECTIVE ACTIONS

10.1 FIELD ACTIVITIES

The initial responsibility for reporting and documenting an out-of-control event lies with the on-site personnel. On-site personnel must immediately notify the Construction Manager, who is responsible for immediately reporting out-of-control events to the CQC System Manager and for documenting the event. The Construction Manager is responsible for investigating identified problems and implementing corrective action, or for assigning other personnel to perform these tasks. The Construction Manager must also verify that the corrective action has eliminated the problem in question. All field personnel have the authority to stop work when an out-of-control event has occurred that could impact the quality of the site work. Corrective actions will be decided upon by the Construction Manager in consultation with the Project Manager and CQC System Manager.

Corrective actions in the field are likely to be immediate in nature and can be implemented by field personnel or the Construction Manager; the corrective action will usually involve reanalysis, repeating the instrument calibration, or resampling at a particular location. Once an out-of-control event has occurred and the Construction Manager and CQC System Manger have been notified, the following steps will be taken to regain control:

1. The Construction Manager will investigate and determine the probable cause of event.
2. The Construction Manager will consult with the CQC System Manager regarding appropriate corrective actions.
3. The Construction Manager will decide on an appropriate corrective action.
4. The Construction Manager will implement or direct the Contractor(s) to implement immediate corrective action.
5. The CQC System Manager will verify the effectiveness of the corrective action and decide on further actions if necessary.

The CQC System Manager will document each out-of-control event by recording the situation and its resolution (including all notifications and corrective actions taken) in the Daily QC report. Possible causes, proposed corrective action(s), and the date the corrective action(s) occurred will be recorded. The CQC System Manager will check to be sure that corrective action has been taken, the corrective action appears effective, and the situation has been fully resolved.

10.2 LABORATORY

At the laboratory level, re-analysis and other corrective measures are contractually required if specific control limits established in the standard methods are exceeded. The bench chemist directly responsible for the test must know the current operating and acceptance limits, and take the required corrective actions (including sample re-analysis). Bench results must also be reviewed by the laboratory staff to insure that all method-specified QA requirements have been met. The report is then prepared and submitted for final QA check. Each person in the review process has the authority to require re-extraction and re-analysis of a sample if QC problems are identified.

The QC Chemist is responsible for proper data validation in accordance with Section 11.0 of this QAPjP. If data validation or QC audits result in detection of unacceptable conditions, the QC Chemist will be responsible for timely notification of the laboratory. The laboratory Quality Assurance Officer will be responsible for developing and initiating corrective action, and verifying that the corrective action has resolved the problem. Corrective action may include:

- Re-analyzing samples if holding time criteria permit;
- Re-sampling and analyzing;
- Evaluating and amending sampling and analytical procedures; and
- Accepting data acknowledging level of uncertainty.

Data inadequacies attributable to Site-specific interferences or conditions may require that sampling procedures or analytical methods be modified.

11.0 DATA REDUCTION, VALIDATION, AND REPORTING

11.1 DATA REDUCTION AND REVIEW

Data reduction includes all automated and manual processes for reducing or organizing raw data generated by the laboratory. Data are initially collected, converted to standard reporting units, and recorded in standard formats by the laboratory chemist. The chemist may use a variety of data reduction methods, including standard algorithms for computer generated and reduced data, or calculations and integrations for manually produced data. For the published and referenced methods used during remediation activities, the lab will be required to adhere to the method calculation requirements. In addition, the calculations and data reduction will be checked at the department level to ensure that they have been properly performed. The lab QA manager or his designee will be responsible for reviewing a percentage of the data reductions.

Each analyst will review their work based on method-specific criteria. If not met, they will notify their supervisor (who may also notify the lab QAO as appropriate) and take the necessary corrective action. Supervisors and section heads will review a percentage of all data generated by each analyst within their section. Supervisory review will be more all-encompassing than analyst review, and will include all aspects of sample preparation, standard preparation, sample analysis, QC sample analysis and results, documentation, and report preparation. Likewise the QAO or their staff will review a percentage of all results generated by all sections to the laboratory, performing a similar review to the supervisor.

11.2 DATA VALIDATION

Once the data package is received from the laboratory, the electronic data will be downloaded into an electronic database. The database will serve as basic reference source for data validation as well as for project data use. Prior to releasing data for use by project staff, each data package will undergo a formal validation procedure to examine laboratory compliance with QA requirements and other factors which determine the quality of the data. All validation will be performed by the ICF Kaiser.

<u>SW846 Analytical Data</u>: Samples collected during the remediation that are analyzed for organics using SW846 methods will be validated to verify that the analytical data is adequate for its intended use. The laboratory will be required to generate and deliver a full "CLP-type" data package for all analyses.

ICF Kaiser will validate the organic analytical data in accordance with the USEPA National Functional Guidelines for Organic Data Review (USEPA, 1994b), as applicable to SW846-generated data. At a minimum, the following factors will be examined:

- Sample holding times (SW846 criteria)
- Sample chain-of-custody
- GC/MS tuning criteria (method-specific criteria)
- Initial and continuing calibration (method-specific criteria)
- Detection limits (project-specific criteria)
- Laboratory blanks
- Surrogate spike recoveries (method-specific criteria)
- Matrix spike/duplicate analysis (method-specific criteria)
- Field replicate analysis
- Field blank contamination
- Internal standard area
- Raw data review (as specified for each individual QC parameter)

The data will be validated by sample delivery group (SDG). An SDG will consist of a group of environmental samples as received from the laboratory, along with the associated field and method blanks. Data review may reveal missing data or other deliverables, on a package by package basis.

Once the validation for an SDG is completed, a validation report will be prepared that summarizes the results of the validation process, including:

- QC parameters reviewed
- Lab compliance with QC criteria
- Data quality (and associated data flags) of analytes not meeting specific QC criteria. All data not meeting QC criteria will be flagged in accordance with the 2/94 NFG requirements.

All Other Analytical Data: During remediation, selected soil and water samples will be analyzed for chemical, physical, and radiological parameters using non-SW846 methods to determine waste disposal options and establish Site conditions. Data thus generated will be reviewed to ensure that analyses were performed in accordance with the specified method using the following parameters:

1. Holding time: Sample holding times will be compared with those established by USEPA. Analyses performed beyond the holding time will be estimated and may be rejected.
2. Blank results: The method and rinsate blanks will be checked to determine analyte concentration. If the blank results are above the detection limit, sample results ≤ five times the method blank result will be qualified, and all others will be acceptable.
3. Instrument calibration: The data will be checked to determine if the instrument was properly calibrated prior to sample analysis and that the calibration was checked periodically during the analysis. Improper or lack of initial calibration will be grounds for data rejection. It is expected that continuing calibrations will meet historically derived RPD criteria. If these criteria are not met, the data will be estimated and a careful evaluation of the data will be performed to determine usability.
4. Replicate analysis: RPDs will be calculated for all of the field and laboratory replicates. It is expected that field replicate soils will have RPDs < 50% and waters < 35%, while lab replicates are expected to have RPDs <35%. If these criteria are not met, the data will be estimated and a careful evaluation of the data will be performed to determine usability.
5. Detection limits: The reported detection limits will be evaluated to determine if they meet the project objectives.
6. Calculations: Ten percent of the calculations will be checked to verify that the lab performed them properly. If improperly performed calculations are identified, a larger portion of the data will be checked for errors. Corrected values will be reported to the data users.
7. Reference Material: Reference material or control sample results will be checked to verify they fall within the acceptable recovery ranges. If not, it will be verified that the lab took appropriate corrective action. Lack of corrective action may cause the data to be rejected.
8. Raw Data: The raw analytical data will be checked for problems such as elevated background signal, proper analytical sequence, consistent dates, etc. Problems identified will be reported and a careful evaluation of the data will be performed to determine usability.
9. Spike analysis: Spike recoveries will be calculated to evaluate accuracy. It is expected that the recoveries will meet historically derived, method-specific criteria, although they can be highly matrix dependent. If the recoveries are not in the specified range, the data will be estimated and a careful evaluation of the data will be performed to determine usability.
10. Laboratory Control Samples: Spike recoveries will be calculated to evaluate accuracy. It is expected that the recoveries will meet historically derived, method specific criteria. If the recoveries are not in the specified range, the data will be estimated and a careful evaluation of the data will be performed to determine usability.

11.3 DATA REPORTING

The laboratory will report SW846 analytical results in a "CLP-type" data package. All other analytical data will be reported in a data package that includes sample results, associated QC data, raw data for all field and QC samples, and all other information needed to recalculate the analytical results as well as perform a complete data validation.

The analytical laboratory will store the analytical data in electronic format and hard copy for a period of three years. ICF Kaiser will receive the data in both electronic and hard copy formats. The hard copy format will be placed in storage once the data has been validated. The electronic data will be entered into a database from whence data users can extract the data they desire. The database system will indicate whether the data has been validated. Once validation is complete, the non-validated data will not be available to the data users. The final, completed database will be stored in an electronic format for a period of three years.

11.4 DATA MANAGEMENT

Table 11-1 shows the various types of data that will be generated during remediation of the Ashland 2 Site. Sample analyses will be conducted both on-site and off-site. All data, including that generated on-site, will be stored on site. Hard copy data will be filed by sample type by date of analysis. Electronic data will be stored on the site computer in an Excel spreadsheet format. Selected portions of the data may be loaded into a database for further processing and statistical analysis - primarily the final status survey soil sample data generated at the off-site lab.

Table 11-1

Types of Data Generated During Remediation

Ashland 2 FUSRAP Site

Data Type	Analysis		Deliverable	
	On-site	Off-site	Hard-copy	Electronic
Air filters	X	%	X	X
Wipes	X	%	X	X
Waste profile soils		X	X	X
Rail car soils	X	%	X	X
Final status survey soils	X	X	X	X
Excavation pit rad surveys	X		X	X
Excavated soil rad surveys	X		X	
Haul road rad surveys	X		X	
Loading area rad surveys	X		X	
Rail line rad surveys	X		X	
Soil stockpile rad surveys	X		X	
Equipment rad surveys	X		X	
PPE rad surveys	X		X	
Soil stockpile rad analysis	X	X	X	X
Soil organic vapors	X		X	
Stream water	X	%	X	X
On-site collection pond water	X	X	X	X

% = A precentage of the data will be sent to the off-site lab for analysis.

12.0 PREVENTIVE MAINTENANCE

Proper preventive maintenance of field equipment is a necessary element in achieving equipment reliability and minimizing equipment downtime.

Field equipment will be properly calibrated, charged, and in good general working condition at the beginning of each day. Health and safety monitoring equipment calibration procedures and frequencies are presented in the HASP. Any non-operational field equipment will be removed from service and returned to the equipment center, and a replacement will be obtained. Most field equipment will not be repaired in the field. Selected spare parts will be kept in the field to be inserted as replacements as needed. Maintenance records will be kept for each field instrument. These records will be reviewed prior to instrument use in the field to ensure that all maintenance and calibration are up-to-date.

All field instruments will be properly protected against inclement weather conditions during the field investigation. Each instrument is specially designed to maintain its operating integrity during variable temperature ranges that are representative of ranges that will be encountered during cold-weather working conditions. At the end of each working day, all field equipment will be decontaminated, taken out of the field, and secured in a cool, dry room for overnight storage.

All subcontractor equipment will arrive at the site in proper working condition. Before the start of work each day, the field supervisor will inspect all equipment for fluid leaks. If a leak is detected, the equipment will be removed from service for repair or replacement. Additional construction preventive maintenance requirements are provided in the CQCP.

In addition, the following general preventative maintenance guidelines will be followed:

- Be certain each instrument is working properly before going to the field. Perform a calibration to be sure it falls within the right range.
- Make sure the proper electrical power is available in the field.
- Know what you are doing before you operate any instrumentation. Get instruction or help if you are unsure.
- Do not shove the HNu or OVA probe into the ground.
- If the instrument is battery operated, have a spare battery. If it requires charging, be sure to charge it each night.

The on-site laboratory subcontractor will be required to have a detailed preventive maintenance program, which includes documentation of procedures performed. Details regarding the off-site laboratory's preventive maintenance program can be found in the laboratory's QA/QC Plan.

13.0 PERFORMANCE AND SYSTEM AUDITS

13.1 FIELD PROCEDURES

During field activities, the CQC System Manager or his designee will observe and audit field sample collection activities, sample handling procedures, and chain of custody/documentation procedures employed by Site personnel against the FSP and QAPjP requirements. The field audit will be performed following the initiation of major field activities, to verify the following conditions:

- Field activities are in conformance with documents governing project operations;
- Actual practice agrees with written instructions;
- Appropriate field logbooks have been established; and
- Deficiencies have been addressed and appropriate corrective actions have been initiated.

The CQC System Manager will have full authority to stop Site operations if procedures are not in conformance with the QA objectives set forth in the FSP or QAPjP. A report documenting the audit findings and recommendations will be sent to the Project Manager for inclusion in the project files.

The contractor(s) affected by the audit will also be notified of the audit findings and recommended corrective action. Additional construction-related audits will be performed as detailed in the CQCP.

13.2 LABORATORY

Both the on-site and the off-site analytical laboratories will be audited by the QC Chemist or his designee prior to the analysis of the first Site sample. The on-site lab will be audited by off-site personnel chosen by the QC Chemist. The audits will be performed a minimum of once per month during field activities, with the first audit occurring two weeks following the initiation of field work. Serious deficiencies discovered during the audits will be documented and corrective actions will be taken within 2 business days of discovery of the deficiencies. Samples will not be analyzed until all major deficiencies have been corrected by the laboratory.

A copy of the audit report will be sent to the Construction Manager for inclusion in the project files.

14.0 QC REPORTS TO MANAGEMENT

The CQC System Manager and QC Chemist will prepare the following quality assurance reports:

- Field audit results, including situations identified, corrective actions implemented, and overall assessment of field operations.
- Laboratory audit results, including major and minor situations identified, laboratory response to the problems, impact on data quality and overall assessment of the laboratory.
- Data validation summary reports for each data package, as detailed in Section 11.0.

In addition, the QC Chemist will provide the following input into the CQC System Manager's Daily Report:

- Field measurements taken.
- Samples collected (including locations, types, numbers, analyses).
- Inspections performed.
- Equipment calibrations performed.
- Problems encountered and resolution.
- Variance from the approved SAP.
- Corrective actions planned or implemented.

APPENDIX A
REFERENCES

APPENDIX A REFERENCES

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APPENDIX B
STANDARD FORMS

ICF KAISER

No. 1313

CHAIN OF CUSTODY RECORD

PROJ. NO.	PROJECT NAME					NO. OF CONTAINERS										REMARKS
SAMPLERS: *(Signature)*																
STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION											

Relinquished by: *(Signature)*	Date/Time	Received by: *(Signature)*	Relinquished by: *(Signature)*	Date/Time	Received by: *(Signature)*
Relinquished by: *(Signature)*	Date/Time	Received by: *(Signature)*	Relinquished by: *(Signature)*	Date/Time	Received by: *(Signature)*
Relinquished by: *(Signature)*	Date/Time	Received for Laboratory by: *(Signature)*	Date/Time	Remarks	

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

ASHLAND 2 FUSRAP SITE

SAMPLE LOG SHEET

Sample Number: ____________________ Page # ________

Sample Media: ____________________

Survey Unit ID: ____________________

Sampling Method	Sample Disposition On-site lab ________ Off-site lab ________			
Sample Depth				
Sample Date & Time	On-Site Analyses			
	Parameter	Preservative	Volume	COC #
Sample Location				
Sample Description				
Sample Type: Grab ________ Composite ________	Off-Site Analyses			
	Parameter	Preservative	Volume	COC #
Weather:				
Notes:				
	Shipping Info: Date ________ Time ________ Carrier ________ Airbill # ________ Destination ________			

ASHLAND 2 FUSRAP SITE
SAMPLE SHIPPING WORKSHEET

Sample	Radionuclide	Concentration (pCi/g)	Amount (g)	Activity (B)	A_2	$10^{-3}A_2$	$B/10^{-3}A_2$
	Th-230				0.005	0.000005	0
	Ra-226				0.5	0.0005	0
	Other:						
	Th-230				0.005	0.000005	0
	Ra-226				0.5	0.0005	0
	Other:						
	Th-230				0.005	0.000005	0
	Ra-226				0.5	0.0005	0
	Other:						
	Th-230				0.005	0.000005	0
	Ra-226				0.5	0.0005	0
	Other:						
	Th-230				0.005	0.000005	0
	Ra-226				0.5	0.0005	0
	Other:						
	Th-230				0.005	0.000005	0
	Ra-226				0.5	0.0005	0
	Other:						
	Th-230				0.005	0.000005	0
	Ra-226				0.5	0.0005	0
	Other:						
	Th-230				0.005	0.000005	0
	Ra-226				0.5	0.0005	0
	Other:						
	Th-230				0.005	0.000005	0
	Ra-226				0.5	0.0005	0
	Other:						
	Th-230				0.005	0.000005	0
	Ra-226				0.5	0.0005	0
	Other:						
	Gross alpha				0.0005	5E-07	0
	Gross gamma				0.5	0.0005	0
					TOTAL		0

1. Pico = 10^{-12}
2. Use gross alpha and gross gamma only if the specific radionuclides are not known.
3. The activity (A_2) of any other radionuclides can be obtained from Table 10.4.A of the IATA Dangerous Goods Regulations.
4. To ship excepted quantity, the total $B/10^{-3}A_2$ for each sample bottle must be < 1.00. Note that each bottle it considered a package, while the cooler is an overpack. Package requirements are activity < $10^{-3}A_2$ and surface area contamination < 1 pCi/g.

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AUTH.NAME AUTHOR AFFILIATION
REHMANN,M.R.

RECIP.NAME RECIPIENT AFFILIATION
HOLONICH,J.J. High-Level Waste & Uranium Recovery Projects Branch (NMS

SUBJECT: Submits supplemental info re Intl Uranium (USA) Corp amend request re Ashland 2 matls.Description of proposed on-site confirmatory sampling of subject site,provided.

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IUC INTERNATIONAL URANIUM (USA) CORPORATION

Independence Plaza, Suite 950 • 1050 Seventeenth Street • Denver, CO 80265 • 303 628 7798 (main) • 303 389 4125 (fax)

June 11, 1998

VIA FACSIMILE AND OVERNIGHT MAIL

Mr. Joseph J. Holonich, Branch Chief
High Level Waste and Uranium Recovery
Projects Branch
Division of Waste Management
Office of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
2 White Flint North, Mail Stop T-7J9
11545 Rockville Pike
Rockville, MD 20852

Re: Amendment Request to Process an Alternate Feed at White Mesa Mill
Source Material License SUA-1358
Ashland 2 Amendment Request

Dear Mr. Holonich:

The purpose of this letter is to provide supplemental information concerning the International Uranium (USA) Corporation ("IUSA") amendment request regarding the Ashland 2 Materials. As discussed earlier this week with Mr. James Park, the NRC Project Manager, IUSA proposes to conduct on-site confirmatory sampling of the Ashland 2 Materials, as they are delivered to the White Mesa Mill, at the frequency detailed below.

IUSA proposes to conduct this verification sampling in addition to requiring that the confirmatory sampling results obtained under the Remediation Contractor's (ICF Kaiser) sampling program be transmitted to IUSA in advance of shipments being received at White Mesa Mill, as per our letter to the NRC of June 3, 1998.

Details of the sampling and analysis protocols, including analytical methods, will be documented in a Sampling and Analysis Plan ("SAP"), prior to receipt of the Ashland 2 Materials. The data quality objective of the SAP will be to collect data that will allow IUSA to independently verify that no materials containing listed hazardous wastes are received and processed at the White Mesa Mill.

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Sample Frequency

A two-phase approach to sample frequency will be applied:

Phase I

One sample per each of the first 100 cubic yards ("CY"), up to 1,000 CY (i.e., 10 samples for phase I)

Phase II

One sample per each additional 500 CY.

I can be reached at 303.389.4131.

Sincerely yours,

Michelle R. Rehmann
Environmental Manager

MRR/smp
cc James Park
William J. Sinclair
David C. Frydenlund
Earl E. Hoellen
Harold R. Roberts
William N. Deal

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AUTH.NAME AUTHOR AFFILIATION
KIM,D. Shaw, Pittman, Potts & Trowbridge
RECIP.NAME RECIPIENT AFFILIATION

SUBJECT: "Introduction to Formerly Utilized Sites Remedial Action Program (FUSRAP)."

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	OGC/REGD/SPFC	1	1	RGN 4	1	1
EXTERNAL:	NRC PDR	1	1			

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FUSRAP

HOME BEMR CONTENTS U.S. MAP

Introduction to Formerly Utilized Sites

REMEDIAL ACTION PROGRAM (FUSRAP)

PROGRAM MISSION

In 1974 the Atomic Energy Commission established the Formerly Utilized Sites Remedial Action Program (FUSRAP) under authorities granted by the Atomic Energy Act of 1954, as amended. FUSRAP encompasses 46 sites in 14 states and is funded through the U.S. Department of Energy Oak Ridge Operations Office. Its mission is to identify, investigate, and clean up or control sites where residual radioactivity exceeding current guidelines remains from the early years of the nation's atomic energy program or other sites assigned to the Department of Energy by Congress.

NATIONAL MAP

ENVIRONMENTAL RESTORATION

During the 1940s, 1950s, and 1960s, work in support of the atomic energy program was performed at sites throughout the United States. Activities at some sites were conducted during World War II under the Manhattan Engineer District; other sites were involved in peacetime activities under the Atomic Energy Commission. Both the Manhattan Engineer District and the Atomic Energy Commission were predecessors of the Department of Energy. During the 1940s, uranium ore was shipped to the Manhattan Engineer District from the Belgian Congo or mined in the western United States and Canada. Most of the North American ore went directly into processing. The African ore was placed in temporary storage and was then sent either directly to a processing facility or to a sampling and assaying facility before being processed. After processing, the ore was sent to either a uranium enrichment facility or a uranium metal machining plant. Wastes from uranium processing were transported to storage and disposal facilities. Enriched uranium was sent directly to weapons development sites, and machined uranium was sent to production reactors, primarily the Hanford Reservation in the State of Washington in the 1940s and the Savannah River Plant in South Carolina in the 1950s. These reactors produced basic materials used in making nuclear weapons; the materials were then shipped from the production reactors to weapons development facilities.

Generally, sites used for Manhattan Engineer District/Atomic Energy Commission-related activities were decontaminated and released for use under the cleanup guidelines in effect at the time. Because those guidelines were less stringent than today's guidelines, small amounts of radioactive materials remained at some of the sites. Over the years, contamination sometimes spread, primarily through the soil or air, to vicinity properties as the result of releases from operating facilities or when buildings were dismantled or materials were moved.

In 1974 the Atomic Energy Commission established FUSRAP to study and clean up these sites. When Manhattan Engineer

District-related radioactive material is thought to be present, historical records are reviewed, radiological surveys of the site are performed, and contractual liability is established. If radioactive material related to Manhattan Engineer District or Atomic Energy Commission activities is found, cleanup is authorized under FUSRAP. Congress has also added to FUSRAP some sites with industrial contamination similar to that produced by Manhattan Engineer District or Atomic Energy Commission activities.

FUSRAP MAJOR OBJECTIVES

1. Find and evaluate sites that supported Manhattan Engineer District/Atomic Energy Commission nuclear work (or other sites assigned by Congress) and determine whether they need cleanup and/or control.
2. Clean up or maintain these sites so that they meet current guidelines.
3. Dispose of or stabilize radioactive material in a way that is safe for the public and the environment.
4. Perform all work in compliance with appropriate federal laws and regulations and comply with state and local environmental laws and land-use requirements.
5. Certify the sites for appropriate future use.

The Department of Energy continues to improve its FUSRAP objectives and modify the scope of the program as it learns from previous activities under FUSRAP and other national cleanup programs. The Office of Environmental Restoration, within the Office of Environmental Management at the Department of Energy Headquarters in Washington, D.C., provides program guidance for FUSRAP and other Environmental Management programs and provides for designation activities. Day-to-day technical, administrative, and financial management of FUSRAP activities is the responsibility of the Former Sites Restoration Division of the Department of Energy Operations Office in Oak Ridge, Tennessee.

Other federal agencies, state and local governments, and property owners also play key roles in FUSRAP. Federal agencies such as the U.S. Environmental Protection Agency provide oversight and regulatory direction for Department of Energy activities at some FUSRAP sites. State governments ensure compliance with state regulations. Local governments work to ensure the protection of the community and help inform the public about cleanup activities. Property owners may provide critical information about past activities at FUSRAP sites and current community concerns. The Department of Energy actively solicits input from these and other stakeholders at FUSRAP sites.

STAKEHOLDER INTERACTION

Developing strong partnerships between the Department of Energy and its stakeholders is a major goal of FUSRAP. This exchange of information occurs through many channels. For example, active citizen advisory groups at four sites are providing input into the Department of Energy decisionmaking process, and many stakeholders participate in regularly scheduled workshops, availability sessions, and site tours. In addition, the Department of Energy has established relationships with educational systems within the affected communities. FUSRAP staffers have spoken about careers in the environmental field to many college and secondary school students in FUSRAP communities. Other students have participated in demonstrations of monitoring equipment and protective clothing. High school seniors near one FUSRAP site participated with the Department of Energy in a mock public meeting. Some of the tools that facilitate interaction with stakeholders include four public information centers that serve as information resources and meeting places, newsletters, fact sheets, and brochures. A FUSRAP videotape is available on request, and speakers are available for civic and service clubs and community organizations. A 24-hour toll-free public access line is available for stakeholders who have questions or comments. The number is 1-800-253-9759.

There were no Baseline Report-specific stakeholder efforts conducted for FUSRAP. However, if you would like additional information, please contact:

Public Participation	Technical Liaison
Melyssa Noe (423) 241-3315 noemp@doe oro.gov	Paul Blom (301) 427-1692 paul.blom@em.doe.gov

The Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (also known as Superfund) is the main law governing cleanup of many FUSRAP sites. Removal actions under this act involve monitoring, cleaning up, and removing contamination. The process for remedial actions involves study, design, and construction of longer-term remedial responses.

Six of the 46 FUSRAP sites are on the Environmental Protection Agency National Priorities List. At these sites, Federal Facilities Agreements between the Department of Energy and the Environmental Protection Agency guide cleanup. The federal facilities agreement sets cleanup priorities, defines responsibilities and interactions, and establishes a schedule for work at a site. The Department of Energy integrates the Comprehensive Environmental Response, Compensation, and Liability Act activity with other laws that apply to the site. Potentially applicable laws include the National Environmental Policy Act of 1969, which sets basic national policy on environmental protection; the Resource Conservation and Recovery Act, which is the principal federal statute governing management of hazardous chemical waste; the Toxic Substances Control Act; the Clean Air Act; the Clean Water Act; the Safe Drinking Water Act; and state and local regulations. The types of waste found at each site primarily determine the laws that apply.

The waste at FUSRAP sites consists primarily of low concentrations of uranium, radium, and thorium on building surfaces and in soil. Much of this residual radioactive material resulted from processing ore to recover uranium and thorium. This waste is "A by-product" material known as ll(e)2 (defined by the Atomic Energy Act of 1954, as amended by the Uranium Mill Tailings Radiation Control Act of 1978). Very low levels of uranium from the machining of uranium metal are found at several FUSRAP sites. This waste is classified as low-level radioactive waste and is stored or disposed of according to applicable federal, state, and local regulations and guidelines. The Department of Energy currently uses both commercial disposal facilities and federal sites to dispose of the waste. The estimated total volume of waste at the 46 FUSRAP sites is 1.9 million cubic meters (2.3 million cubic yards).

Each FUSRAP site requires a site-specific waste management strategy that appropriately addresses pollution control; waste treatment, storage, disposal, and transportation; interface requirements; and implementation of new technology. Pollution control measures include using ventilation controls that capture fumes and particulates; installing air cleaning equipment with a high degree of collection efficiency; applying water mist to suppress dust during construction and decontamination; and using sedimentation and erosion controls such as silt fencing, hay bales, stone riprap, and vegetative groundcover to minimize run-on and runoff.

TECHNOLOGY DEVELOPMENT SUCCESS

A new waste treatment technology currently being tested uses a soil-washing machine to separate clean soils from soils contaminated above guidelines, thereby reducing the volume of waste requiring disposal. FUSRAP is dedicated to waste minimization to reduce the volume of waste for disposal. This reduction benefits the environment and reduces costs. Another example of technology development is the use of a mobile rock-crushing machine to reduce the amount of waste requiring shipment to a commercial disposal facility. Building rubble and debris are fed through the machine and are reduced to a soil-like material that has a much lower unit cost for disposal.

Under FUSRAP, each site is remediated to a standard that considers possible future uses for the land. Cleaning up FUSRAP sites not only eliminates potential health hazards and protects the environment, but also may allow previously unusable or restricted property to be returned to uses that benefit the community. At sites cleaned up to levels that allow unrestricted land use, people can live safely on the property, drink water from onsite wells, or grow crops or livestock for food. At sites where future residential or agricultural use would not be likely, industrial cleanup standards may apply, and there may be restrictions on how the property can be developed. The Department of Energy currently estimates that all FUSRAP sites will be completed by the year 2016, at a total cost of approximately $2.5 billion. The overall cost and duration of the program are consistent with the 1995 estimate. However, changes due to re-estimating the sites and rescheduling the priority of work within the program have led to differences between the 1995 and 1996 estimated costs within each state. The following table depicts these differences.

Comparison With Previous Estimate

State	Thousands of Dollars		
	1995 Estimate Less 1995 Expenditure	1996 Estimate	Percent Change
Connecticut	4,171	22,321	435
Illinois	2,010	2,464	23
Maryland	9,797	21,493	119
Massachusetts	15,565	12,762	(18)
Missouri	518,220	682,978	32
New Jersey	418,785	391,919	(6)
New York	349,241	171,078	(51)
Ohio	258,594	153,725	(41)

Base case cost estimates and completion dates in this Baseline Environmental Management Report support the present scope of remedial action assumptions based on plans that are currently under review and may require revision. For example, the planned or proposed remedies for some sites have not been implemented because they were not acceptable to everyone in the affected communities. The Department of Energy continues to work with these communities to identify alternative remedies; cost estimates may need to be adjusted appropriately when an agreement is reached on the cleanup option.

Selection of cleanup options is more complex at some of the larger FUSRAP sites than at smaller sites. Site narratives for the larger, more complex sites or groups of sites (Maywood, Middlesex Sampling Plant, and Wayne in New Jersey; the four sites in St. Louis, Missouri; the four Tonawanda Site properties in New York; and Ventron in Massachusetts), include a discussion of the current-scope assumptions on which the Baseline Environmental Management Report cost estimates were based and a range of cost estimates associated with remedial options under consideration. The Department of Energy is carefully assessing alternative remedial options, including emerging treatment technologies, innovative contracting arrangements, hazard assessment of inaccessible material, applying cleanup standards for continued industrial use, and other approaches to addressing environmental challenges more rapidly and effectively and at less expense to the taxpayer, while still providing a remedy that protects human health and the environment.

FUSRAP is dedicated to controlling costs and maximizing productivity and efficiency. A formal program is in place that encourages all employees to participate in the FUSRAP effort to improve productivity, reduce costs, and increase quality and value. The FUSRAP Productivity Improvement Program provides a systematic way to quantify employee initiatives and ensures individual recognition for achievement. Since its inception in 1989, the Productivity Improvement Program, in conjunction with the Cost Savings Initiatives Program, has produced documented savings of $74.5 million. The full-time equivalent personnel estimate for FUSRAP is approximately 300 during the next three years. This estimate does not include Headquarters personnel or field subcontract labor.

DESCRIPTION OF PERSONNEL

Current Composition

The current staffing requirements in the table below represent the skill mix required to conduct the work for the overall FUSRAP program. The contractor work force is mostly a mix of professional and labor that plans and performs the remediation of the various sites. The federal staff are captured in the Oak Ridge Operations Office narrative, Description of Personnel section.

Full-Time Equivalent Composition Table*

LABOR CATEGORY	[redacted]	CONTRACTOR FTEs*						[redacted]
		DIRECT			INDIRECT			
		1996	1997	1998	1996	1997	1998	
General Managers, Exec., Fl. Sup.		33.6	33.6	33.6	0	0	0	
Gen. Admin Sec. and Clerical		28	28	28	0	0	0	
Admin and Other Professionals		28	28	28	0	0	0	
Engineers		100.8	100.8	100.8	0	0	0	
Scientists		28	28	28	0	0	0	
Technicians		39.2	39.2	39.2	0	0	0	
Crafts		5.6	5.6	5.6	0	0	0	
Laborers and Other Gen. Workers		8.4	8.4	8.4	0	0	0	
Operators		8.4	8.4	8.4	0	0	0	
TOTAL		280	280	280	0	0	0	

*The projections for Full-Time Equivalent employees are based on FY 1996 planning baselines (see Reader's Guide).

Site Management Structure

The Department of Energy hires companies from the private sector to manage and perform FUSRAP activities. As the project management contractor, Bechtel National, Inc. conducts site investigations and cleanups and manages the field activities and construction necessary for remedial action. As the environmental studies contractor, Science Applications International Corporation helps the Department of Energy plan site investigations, evaluates cleanup alternatives, and ensures that all FUSRAP activities comply with environmental requirements. Bechtel's contract is a program management contract, while Science Applications International Corporation is a support services contract, and both have expiration dates of 1998. Other organizations, such as Oak Ridge National Laboratory, Oak Ridge Institute for Science and Education, and Argonne National Laboratory provide program management support functions including designation and verification services.

CONTRACTING OPPORTUNITIES
If you would like more information about performing work for the Department of Energy's Environmental Management program at this site, please contact:

Major Procurements	**Small Business Procurements**
Peter Dayton Director Procurements and Contracts Division., AD-42 United States Department of Energy Oak Ridge Operations Office P.O. Box 2001 Oak Ridge, TN 37831-8755 p: (423) 576-0795 f: (423) 576-9189	Chiquita Young Procurements and Contracts Division., AD-42 United States Department of Energy Oak Ridge Operations Office P.O. Box 2001 Oak Ridge, TN 37831-8755 p: (423) 576-5657 f: (423) 576-9189

COMPLETED FUSRAP SITES

Since FUSRAP began, the Department of Energy has examined records or performed surveys on more than 400 sites. To date, 46 sites in 14 states have been designated for inclusion in FUSRAP. The Department of Energy began limited cleanup at some sites in 1979, and major remedial action has been under way since 1981. Thousands of cubic yards of radioactive material have been removed from residential and commercial properties and stored at the Department of Energy-controlled and monitored interim storage sites in Maywood, Middlesex, and Wayne, New Jersey; Colonie, New York; and Hazelwood, Missouri. The Department has completed cleanup at 21 of the 46 FUSRAP sites nationwide (see map). Information on completed sites is summarized in the listing by state below. Sections on individual states discuss the FUSRAP sites that are currently active.

California

University of California, Berkeley, CA

Gilman Hall, located on the University of California-Berkeley campus, was the site of nuclear research involving plutonium and uranium in support of Manhattan Engineer District/Atomic Energy Commission activities during the 1940s. Researchers bombarded small amounts of uranium with cyclotron-produced neutrons to produce minute quantities of plutonium. Radiological surveys in 1976 and 1981 under FUSRAP identified low-level radioactive contamination in several areas of the building, nearly all of the contamination resulted from uranium compounds that had spilled onto floors and walls. A few locations contained higher-energy gamma emitters. The Department of Energy initiated remedial action (including decontamination, removal, and shielding) in 1981 and completed remediation of all Manhattan Engineer District-related radioactive contamination in 1982. A total of 23 cubic meters (30 cubic yards) of low-level radioactive waste was shipped to Hanford for disposal.

Connecticut

Seymour Specialty Wire, Seymour, CT

Seymour Specialty Wire in Seymour, Connecticut, is a 24-hectare (60-acre) site located on Franklin Street along the west side of the Naugatuck River and just north of State Route 67. Reactive Metals, Inc., a subsidiary of Bridgeport Brass Company, later known as the Seymour Specialty Wire Company, formerly occupied the site. From 1962 to 1964, Reactive Metals used one building at the site for developmental extrusion of natural uranium metal under an Atomic Energy Commission contract and for related activities that included uranium machining, storage of radioactive material, and analytical support. Characterization of the building confirmed that uranium and its decay products were the primary contaminants. Remedial action was completed in 1993 under an expedited protocol and consisted primarily of building surface decontamination with some minor soil excavations. In 1994, 28 cubic meters (37 cubic yards) of low-level radioactive waste was transported to Envirocare of Utah for disposal

Illinois

Granite City Steel, Granite City, IL

The Granite City Steel site, currently owned by National Steel Corporation, is located at 1417 State Street in Granite City, Illinois, northeast of the Mississippi River and across the river from St. Louis, Missouri. From 1958 to 1966, General Steel Castings Corporation (the previous site occupant) x-rayed uranium ingots for the Atomic Energy Commission under purchase orders issued by Mallinckrodt Chemical Company, a prime Atomic Energy Commission contractor. The site includes a two-story metal and concrete building where uranium ingots were x-rayed, x-ray film was developed, and two government-owned betatrons (magnetic induction electron accelerators) were housed. Radiological surveys in 1989 and 1991 identified small amounts of residual radioactivity in several discrete areas in the building. The site was decontaminated in June 1993, and 1.5 cubic meters (two cubic yards) of low-level radioactive waste was transported to Envirocare of Utah for disposal.

National Guard Armory, Chicago, IL

The National Guard Armory is located at 52nd Street and Cottage Grove, Chicago, Illinois. In the 1940s, the Manhattan Project leased the site from the State of Illinois for uranium processing and storage of radioactive material. The site was returned to the State of Illinois in 1951. During the 1980s, radiological surveys and characterization identified radioactive contamination in three small areas on the grounds, on some interior building surfaces, and in sludges from the catch basin system, which were also found to contain Resource Conservation Recovery Act hazardous chemical constituents. Remediation of radioactive contamination (totaling 18 cubic meters [24 cubic yards] of low-level radioactive waste) was completed in 1988. In July and August 1988, mixed waste containing ignitable Resource Conservation and Recovery Act hazardous waste was treated to remove the ignitable characteristic. It was then shipped to Argonne National Laboratory for interim storage before final disposal at the Hanford facility in April 1989 along with the other radioactive waste.

University of Chicago, Chicago, IL

The University of Chicago site includes seven buildings (the new Chemistry Laboratory and Annex, West Stands, Ryerson Physical Laboratory, Eckhart Hall, Kent Chemical Laboratory, Jones Chemical Laboratory, and Ricketts Laboratory) that were associated with Manhattan Engineer District/Atomic Energy Commission nuclear research and development between 1942 and 1952. When the Manhattan Engineer District/Atomic Energy Commission operations at the university ceased, the facilities were decontaminated to meet health and safety criteria then in effect, and the first three buildings were dismantled. Radiological surveys in 1976 and 1977 identified residual radioactive contamination in the remaining four buildings. The Department of Energy completed remediation of most onsite radioactive contamination in 1984. In 1987, the Department of Energy conducted characterization and remedial action for the duct system of the Jones Chemical Laboratory. Remediation was completed in 1987, a total of 34 cubic meters (45 cubic yards) of low-level radioactive waste was shipped to Hanford for disposal. The certification docket releasing the site for use with no radiological restrictions was issued in 1990

Massachusetts

Chapman Valve, Indian Orchard, MA

The Chapman Valve site is located in Indian Orchard, a suburb of Springfield, Massachusetts. The Crane Company, which had occupied the site since 1959, vacated the buildings in 1987. During 1948, Chapman Valve engaged in a program involving machining of uranium rods for Brookhaven National Laboratory. Uranium operations were terminated in November 1948. At that time, Chapman Valve possessed more than 12,150 kilograms (27,000 pounds) of metal scrap, oxides, and sweepings. This material was removed from the site several months after the contract was completed, and the building was decontaminated to standards in effect at the time. A 1991 survey conducted by Oak Ridge National Laboratory indicated that the residual uranium contamination at the site exceeded today's more stringent cleanup criteria and was typical for Manhattan Engineer District/Atomic Energy Commission operations.

The Department of Energy conducted site characterization in late 1994 and early 1995. In July 1995, it began remedial action, which consisted of removal of contaminated material by brushing/scrubbing and vacuuming. The Department completed the remedial action in August 1995. It shipped a total of 15 cubic meters (20 cubic yards) of low-level radioactive waste to Envirocare of Utah for disposal.

Michigan

General Motors, Adrian, MI

The General Motors site consists of a large manufacturing plant located at 1450 Beecher Street in Adrian, Michigan, approximately 48 kilometers (30 miles) northwest of Toledo, Ohio, and 56 kilometers (35 miles) southwest of Ann Arbor, Michigan. The plant, one of many large buildings located at the General Motors complex, currently manufactures plastic parts for automotive and truck divisions and employs more than 1,000 people. During the 1940s, the site was operated as an aluminum extrusion plant that made parts for the U.S. Army Air Force. The Bridgeport Brass Company, a division of National Distillers and Chemical Corporation, operated the plant under contract to the Atomic Energy Commission in the 1950s. Operations included production of uranium fuel elements for the Hanford and Savannah River Plant reactors and developmental extrusion work on thorium and depleted, natural, and slightly enriched uranium. Martin Marietta Corporation later owned the site. The current owner, Chevrolet Manufacturing Division of General Motors Corporation, purchased the site in 1974.

Contamination consisted of uranium residues located predominantly in drain lines beneath the facility. Earlier cleanup and decontamination efforts removed the majority of the contamination at the facility. Contaminated clay pipe was removed from under the floor in the sump area in the mid-1980s; several drums of contaminated materials were transported to Idaho for disposal with the onsite assistance of Argonne National Laboratory. Packing and shipping costs were paid by the Department of Energy. In 1995, the Department of Energy conducted additional remedial action, consisting of decontamination of drain pipe, floors, and sumps. Waste generated during the decontamination efforts included decontamination water and contaminated sump oils and oily sludges. Waste minimization and cost savings initiatives included the use of supplemental standards for buried drainlines and former extrusion press pits, the onsite treatment and release of decontamination water, and the solidification of oils and sludges. Cleanup began in April and was completed in July 1995. A total of 229 cubic meters (175 cubic yards) of low-level radioactive waste was shipped to Envirocare of Utah for disposal.

New Jersey

Kellex/Pierpont, Jersey City, NJ

The Kellex/Pierpont site is located at the intersection of New Jersey Route 440 and Kellogg Street in Jersey City, New Jersey. This site originally consisted of approximately 17 hectares (43 acres) with more than 20 buildings. The M.W. Kellogg Company established the Kellex Corporation as a subsidiary in 1943 for the purpose of designing and constructing the first gaseous diffusion uranium enrichment plant (the K-25 Plant in Oak Ridge, Tennessee) under contract to the Manhattan Engineer District. Work for the Manhattan Engineer District/Atomic Energy Commission during the 1940s and early 1950s included research and development of fuel reprocessing and component testing with uranium hexafluoride as well as development and use of uranium processing and recovery techniques. In 1951, the Vitro Corporation of America assumed all the rights and obligations of Kellex. The Atomic Energy Commission contract work was discontinued at the Jersey City site in 1953, and the laboratory building where most of the Atomic Energy Commission work was conducted was decontaminated and demolished. All other original buildings were also subsequently demolished. Jersey City and Pierpont Associates, Inc., later purchased portions of the site. Various businesses currently occupy them. Radiological surveys and characterization in 1977 and 1979 identified a number of areas of above-background radioactivity in the northern and western portions of the site, and the site was assigned to FUSRAP. The Department of Energy completed remedial action, consisting of removal of contaminated soil and debris, in 1981. It shipped a total of 208 cubic meters (273 cubic yards) of low-level radioactive waste to Barnwell, South Carolina, for disposal.

Middlesex Municipal Landfill, Middlesex, NJ

The Middlesex Municipal Landfill site is located within the Borough of Middlesex in Middlesex County, New Jersey, approximately 26 kilometers (16 miles) southwest of Newark. The site consists of approximately one hectare of a 15-hectare (three acres of a 37-acre) unimproved landfill that was used from 1948 to 1960 for disposal of waste from the Middlesex Sampling Plant, located one kilometer (0.5 mile) to the south-southwest. In 1960, elevated gamma radiation levels attributable to contamination in the soil transported from the Middlesex Sampling Plant were detected on a portion of the Middlesex Municipal Landfill site; the Atomic Energy Commission removed approximately 496 cubic meters (650 cubic yards) of contaminated soil to the New Brunswick Laboratory in New Jersey. A church was constructed in 1963 on a two-hectare (five-acre) parcel of the former landfill property. Radiological surveys in 1974 and 1978 identified a contaminated area of approximately one hectare (three acres) bordering the church property; the primary contaminant was radium-226, with lesser amounts of uranium-238. The majority of the landfill site remains the property of the Borough of Middlesex.

The Middlesex Municipal Landfill site was included in FUSRAP in 1980. Cleanup of radioactive contamination at the Middlesex Municipal Landfill, which consisted of excavation of contaminated soil, was initiated in 1984 and completed in 1986 A total of 23,824 cubic meters (31,210 cubic yards) of waste was generated during remedial action and placed in interim storage at the Middlesex Sampling Plant.

New Mexico

Acid/Pueblo Canyons, Los Alamos, NM

The Acid/Pueblo Canyons site in Los Alamos, New Mexico, is a half-hectare (one-acre) area, bounded by a residential subdivision and the town of Los Alamos, where deep canyons were the discharge area for untreated radioactive liquid wastes from research. The site was the location of the TA-45 waste treatment plant and was owned by the War Department during the initial period of waste disposal. In 1947, control of the lands was transferred to the Atomic Energy Commission. After decontamination and decommissioning in 1966 and 1967, ownership of the treatment plant site, Acid Canyon, and the portion of Pueblo Canyon east of Acid Canyon was transferred to Los Alamos County

The Department of Energy completed remediation of the radioactive contamination in 1982. A total of 298 cubic meters (390 cubic yards) of low-level radioactive waste was generated during remedial action; all contaminated materials were disposed of at Los Alamos National Laboratory Radioactive Waste Disposal Area G (T-54). A final certification docket certifying that the site was in compliance with applicable radiological guidelines was issued on August 28, 1984.

Bayo Canyon, Los Alamos, NM

The Bayo Canyon site in Los Alamos, New Mexico, is located in Los Alamos and Santa Fe counties and is bounded by Kwage Mesa to the south, Otowi Mesa to the north, and the Township of Los Alamos on the west. The Bayo Canyon site is a .6-hectare (1.5-acre) waste burial area 40 kilometers (25 miles) northwest of Santa Fe and 99 kilometers (62 miles) northeast of Albuquerque where debris from decontamination and decommissioning of buildings, sewer facilities, and surface areas was disposed. The U.S. Government owned the site from 1943 to 1967 and originally used it for experiments involving conventional high explosives and radioactive sources in conjunction with nuclear weapons development. On July 1, 1967, the Atomic Energy Commission unsuccessfully attempted to transfer land for unconditional use, including the portion located in Santa Fe County, to the incorporated county of Los Alamos. The Department of Energy completed remediation of the radioactive contamination in 1982. It remediated a total of 1,160 cubic meters (1,520 cubic yards) of low-level waste and designated it to remain in situ.

Chupadera Mesa, White Sands Missile Range, NM

The Chupadera Mesa site is part of the fallout area from the first atomic bomb test conducted for the Manhattan Engineer District on July 16, 1945, at the White Sands Proving Grounds in New Mexico. The Chupadera Mesa area was and continues to be both privately and publicly owned. The area is used for raising cattle and producing alfalfa and row crops. Based on results of a radiological survey published in 1984, the Department of Energy determined that this site did not require radiological remedial action.

New York

Baker and Williams Warehouses, New York, NY

The Baker and Williams Warehouses site consists of three adjacent warehouse buildings on the west side of central New York City. During the early 1940s, these warehouses were used by the Manhattan Engineer District/Atomic Energy Commission for short-term storage of uranium concentrates produced in Port Hope, Canada, from African ores. The buildings are nine, seven, and eleven stories high. Each building has a basement, a total area of 828 square meters (9,200 square feet), and is constructed of fireproof materials including steel, concrete, asphalt, terra-cotta, and brick. A variety of materials, including paint, stucco, plaster, and a black foam material, covered the wall surfaces. With few exceptions, floors are currently used for storage.

Oak Ridge Associated Universities performed the designation survey in 1989 and detected residual radioactive material in excess of guidelines on the floor and lower walls of the east bay of the basement and on over 80 percent of the west bay first floor area in one of the three warehouses. The designated warehouse was remediated and verified in 1991, and the waste generated was shipped to Hanford for disposal. During the initial designation survey, the third warehouse was not accessible. When access was granted in 1991, the third warehouse was also found to contain residual radioactive material above guidelines. Cleanup of the third warehouse was completed in August 1992, and the wastes were shipped to Envirocare of Utah for disposal. The remedial action generated a total of 10 cubic meters (13 cubic yards) of low-level radioactive waste, which was disposed of at licensed out-of-state disposal facilities.

Niagara Falls Storage Site Vicinity Properties, Lewiston, NY

The Niagara Falls Storage Site is a Department of Energy facility located in Lewiston, New York, approximately 16 kilometers (10 miles) north of Niagara Falls. It is currently used for storage of radioactive residues, soils, and rubble. The site is a remnant of the U.S. Army's original 3,036-hectare (7,500-acre) Lake Ontario Ordnance Works, portions of which were intended for use by the Army for TNT production early in World War II and later were used by the Manhattan Engineer District for storage and transshipment of radioactive materials. As a result of the storage operations, other portions of the former Lake Ontario Ordnance Works also became contaminated as some of the radioactive materials stored at the site migrated away from the storage locations, primarily through onsite or offsite drainage ditches, as the result of water and wind erosion. After the area of the site was reduced from 3,036 hectares (7,500 acres) to the 77 hectares (191 acres) currently occupied by the Niagara Falls Storage Site, radioactively contaminated areas adjacent to or near the site were referred to as the Niagara Falls Storage Site Vicinity Properties. a total of 38,168 cubic meters

(50,000 cubic yards) of low-level waste, which was disposed of by placement in an engineered wast These 25 properties cover approximately 526 hectares (1,300 acres).

Remedial action for the Niagara Falls Storage Site Vicinity Properties, consisting of cleaning and restoring offsite drainage ditches and excavating contaminated soils and rubble, was completed in 1986 The cleanup generated e containment structure at the Niag__ Falls Storage Site.

Ohio

Alba Craft, Oxford, OH

The Alba Craft site, located at 10-14 West Rose Avenue, Oxford, Ohio, was an operating machine shop where uranium slugs were machined. The former Alba Craft Laboratory facility was a U-shaped building (open on the south side), with a total area of approximately 630 to 720 square meters (7,000 to 8,000 square feet).

From 1952 to 1957, Alba Craft provided a variety of machine shop services on natural uranium metal for National Lead Company of Ohio (a primary Atomic Energy Commission contractor). Early work included general and developmental machining of threaded reactor fuel slugs for use at the Department of Energy's Savannah River Site. Subsequent production-scale operations consisted of hollow drilling and turning of slugs for the Savannah River and Hanford reactors. During machining operations, equipment and portions of the building, grounds, and four vicinity properties became contaminated with low levels of radioactivity. After Atomic Energy Commission operations ended, the site was decontaminated to meet guidelines then in effect.

In 1992, radiological characterization revealed residual uranium contamination of the floor, roof support beams, and drains and in two isolated areas outdoors. Remedial action, which included decontamination and demolition of the laboratory building, decontamination at vicinity properties, and excavation of contaminated soil, was initiated in August 1994 and completed in February 1995 The cleanup generated a total of 2,394 cubic meters (3,136 cubic yards) of low-level radioactive waste, which was shipped to Envirocare of Utah for disposal.

Associate Aircraft, Fairfield, OH

The former Associate Aircraft Tool and Manufacturing Company facility, an operating machine shop with a total area of approximately 1,800 to 2,250 square meters (20,000 to 25,000 square feet), is located at 3660 Dixie Highway, Fairfield, Ohio, near Cincinnati. The building is a one-story masonry block structure where Associate Aircraft machined hollow uranium slugs for the Hanford and Savannah River reactors in 1956 under contract to the Atomic Energy Commission and National Lead Company of Ohio. Historical records note that the machining work was confined to one portion of the building; the portion of the site that was used in uranium operations has not been substantially remodeled. After the Atomic Energy Commission operations ended, the site was decontaminated to meet guidelines then in effect.

In June 1992, a radiological survey verified that uranium contamination was not present on the front portion of the property but indicated contamination in concrete expansion joints and on the upper surface of roof support beams. In September 1992, a radiological survey of the remainder of the property identified additional residual uranium indoors and limited contamination outside the building. Remedial action, including building decontamination; excavation of contaminated soil, drain lines, piping, and debris; and removal of lead-containing paint and asbestos floor tiles, was initiated in December 1994 and completed in May 1995 The cleanup generated a total waste volume of 125 cubic meters (164 cubic yards) (including 122 cubic meters [160 cubic yards] of low-level radioactive waste and 3 cubic meters [four cubic yards] of mixed waste), which was shipped to Envirocare of Utah for disposal.

HHM Safe Co., Hamilton, OH

The HHM Safe Co. building in Hamilton, Ohio, is a large rectangular building that was used intermittently in machining uranium slugs from uranium billets in the 1940s and 1950s under subcontract to DuPont and the University of Chicago in support of Manhattan Engineer District/Atomic Energy Commission work. In 1988 and 1989, radiological surveys verified that radioactive contamination had been removed from the first and second floors during previous decontamination efforts

However, a survey in 1993 identified areas of contamination above guidelines in portions of the flooring and walls in many areas on the third floor of the building. Remedial action, which consisted of building decontamination involving the third floor, including removal of sections of flooring containing lead anchor bolt sleeves, was initiated in December 1994 and completed in February 1995. The cleanup generated a total waste volume of 18 cubic meters (23 cubic yards) (including 15 cubic meters [20 cubic yards] of low-level radioactive waste and 2 cubic meters [3 cubic yards] of mixed waste), which was shipped to Envirocare of Utah for disposal.

Oregon

Albany Research Center, Albany, OR

The Albany Research Center site, located in Albany, Oregon, is an 18-hectare (45-acre) partially fenced area with 39 buildings where the U.S. Bureau of Mines conducted metallurgical operations involving natural radioactive materials between 1948 and 1978. The site is bounded on the north by Queen Avenue, on the west by Broadway Street, on the east by Liberty Street, and on the south by a tennis club. The Federal Government owns the buildings and the Albany Research Center controls them.

From 1948 to 1978, the Bureau of Mines conducted metallurgical research that involved melting, machining, welding, and alloying of uranium and thorium for the Atomic Energy Commission and the Energy Research and Development Administration; research on alloys of uranium and thorium began in 1955 under an Atomic Energy Commission contract. At various times during these operations, process buildings and surrounding areas were decontaminated to meet guidelines then in effect. A radiological assessment in 1978 and radiological characterization in 1984 indicated the need for additional site remediation.

Phase 1 of remedial action under FUSRAP, conducted in 1987 and 1988, included building decontamination, excavation, backfilling and seeding of excavated areas, and transportation of 2,290 cubic meters (3,000 cubic yards) of soil and rubble to the Department of Energy Hanford Reservation for disposal. During remedial action, workers found polyclorinated biphenyl contamination in an onsite lime pit formerly used to segregate heavy metals from waste residue. Additional areas of radioactive contamination exceeding guidelines (primarily in building areas not previously surveyed under FUSRAP) also were identified in 1988; these areas were remediated in 1990 and 1991 during Phase 2 of the cleanup A total waste volume of 2,857 cubic meters (3,743 cubic yards), including 2,817 cubic meters (3,690 cubic yards) of low-level radioactive waste and 69 cubic meters (53 cubic yards) of mixed waste, was shipped to Hanford for disposal. A final certification docket certifying that the site is in compliance with applicable radiological guidelines was issued in April 1993

Pennsylvania

Aliquippa Forge, Aliquippa, PA

The Aliquippa Forge site, located in Aliquippa, Pennsylvania, is a 3-hectare (7.5-acre) site located just west of the Ohio River. It is bordered on the east by Beaver Avenue and on the south by First Street. In the late 1940s, the Atomic Energy Commission operated a rolling mill, two furnaces, and cutting and extruding equipment for converting uranium billets into rods at the site, which was owned by the Vulcan Crucible Steel Company during the Atomic Energy Commission contract period. In 1950, the site was decontaminated to meet guidelines then in effect. The current site owner is the Beaver County Corporation for Economic Development.

In 1978, a radiological survey identified radioactive contamination exceeding current guidelines on floors and walls of one of the onsite buildings, on overhead beams above furnaces formerly used to heat uranium billets, and beside the cooling basin outside the building. The site was included in FUSRAP in 1983. The Department of Energy characterized a portion of the site in 1986 and in 1988 it conducted an interim remedial action in the building where radioactive contamination had been identified. Wastes generated by this phase of remedial action were shipped to the Department of Energy Hanford facility for disposal. The Department of Energy erected a fence to enclose a portion of the remediated building and prevent access to areas where contamination exceeded applicable cleanup guidelines. The second phase of remedial action (including additional building decontamination and excavation of soil and concrete) was initiated in 1993 and completed in September 1994. The total volume of low-level radioactive waste remediated was 726 cubic meters (951 cubic yards). The total included 344 cubic meters (451 cubic yards) transported to Envirocare of Utah for disposal and 382 cubic meters

(500 cubic yards) that was crushed and used as fill material onsite by agreement with state regulators.

C.H. Schnoor, Springdale, PA

The C.H. Schnoor site is located at 644 Garfield Street in Springdale, Pennsylvania. Records indicate that the same location was referred to as 643 Railroad Street in 1943, when C.H. Schnoor & Company began providing metal fabrication services in support of Manhattan Engineer District operations. The current owner is Conviber, Inc., a manufacturer of industrial conveyor belts. The site originally consisted of a concrete block building, where extruded uranium metal rods were machined during the 1940s to produce slugs used as feed material for production reactors, and a loading dock, where uranium spills may have occurred. The building was later enlarged, and a new loading dock was added.

In 1987, a radiological survey identified elevated radiation levels over a small area inside the building where uranium was machined. Additional surveys in 1989 and 1990 confirmed the presence of radioactive contamination in excess of guidelines beneath the building floor. Analysis of soil samples showed concentrations of uranium-238 ranging from 90 to 20,000 picocuries per gram. The analysis did not detect contamination outside the building. Remedial action, consisting of building decontamination and removal of concrete, was initiated in August 1994 and completed in September 1994. The total waste volume was 516 cubic meters (676 cubic yards). The total includes 478 cubic meters (626 cubic yards) transported to Envirocare of Utah for disposal and approximately 38 cubic meters (50 cubic yards) that was crushed and used as fill material onsite by agreement with state regulators.

Tennessee

Elza Gate, Oak Ridge, TN

The Elza Gate site originally consisted of five warehouses and other smaller structures used by the Manhattan Engineer District to store pitchblende and processed residues generated in work related to the Manhattan Project. None of the original structures remain; the one existing onsite building was erected on one of the concrete pads remaining after dismantlement of the original buildings. Department of Energy predecessor agencies later used the site to store electrical equipment. Jet Air, Inc. also used the site as a metal-plating facility. In 1988, the property was sold to a development company that plans to develop the site as an industrial park.

Elza Gate was included in FUSRAP in 1988, and the Department of Energy conducted site characterization in 1989 and 1990. Radiological and chemical characterization identified elevated levels of radium-226, uranium-238, lead, and polychlorinated biphenyls in site soils. Site cleanup was completed in phases. The first phase, which involved removal of the radioactively contaminated concrete floor and subsoil from the onsite building, was completed in the spring of 1991 with temporary onsite storage of contaminated soil and concrete rubble. The second phase, which consisted of removing all remaining contaminated material from exterior locations, was completed in 1992. A total volume of 5,916 cubic meters (7,750 cubic yards) of FUSRAP waste containing byproduct material was remediated. Polychlorinated biphenyl-contaminated soil was transported to a commercial facility for disposal, and the remaining material was transported to the Department of Energy Oak Ridge Reservation for storage.

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DOE/EM-0233
April 1995

U.S. Department of Energy
Office of Environmental Restoration

This document was produced by the
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Additional information on the Formerly Utilized Sites Remedial Action Program (FUSRAP) is available through the 24-hour-a-day FUSRAP Public Access Line at 1-800-253-9759.

Additional information about FUSRAP, or other DOE Environmental Management activities, is available through the Center for Environmental Management Information at 1-800-7EM-DATA (1-800-736-3282).

Cover Photograph At the Colonie, NY Site Open House and Tour, a health and safety coordinator explains to community members about radiation in the environment

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Site Name	Location	Description	Site Origin	Vicinity Properties	Waste Types	Estimated Waste
New Jersey [cont'd]						
Maywood	Maywood/ Rochelle Park	DOE-owned/leased site This site consists of the Maywood Interim Storage Site (MISS) and the Stepan Company property. MISS is a 12-acre fenced lot with a 2-acre interim waste storage pile The Stepan property, a 18-acre fenced area adjacent to MISS, contains an active chemical production facility.	NPL site: Assigned by Congress	83	By-product material, Thorium, Uranium, Radium	395,000yd³
Middlesex Sampling Plant	Middlesex	DOE-owned site Bulk of Belgian Congo uranium ores and other uranium ores used by U S. was handled on 9.6 acres, 4 buildings, and 2 storage piles More than 70% of site is covered with asphalt	DOE assigned	None	Radium, Thorium, Uranium (Mixed Waste)	88,510yd³
New Brunswick Laboratory	New Brunswick	DOE-owned/leased site. 5.6 acres in densely populated area 30 miles from NYC and 60 miles from Philadelphia. Laboratory includes large main building, a plutonium laboratory complex, a hot-cell building, and 9 ancillary structures.	DOE assigned	None	LLW (Radium, Thorium, Plutonium)	4,500yd³
Wayne Interim Storage Site	Wayne	DOE-owned/leased site. 6 4-acre fenced site including an office building, a warehouse, and a 2 7-acre interim waste storage pile. Waste is radioactively contaminated surface and subsurface soil and building rubble from previous cleanup actions.	NPL site, Assigned by Congress	23	By-product material, Thorium Uranium, Radium	109,000yd³
New York						
Ashland 1	Tonawanda	10 8-acre site that is part of the Ashland Oil Company Refinery Waste is low-grade uranium residues (approx 8,000 tons) of 0.54% uranium found over 2/3 of site to a depth of 1 to 5 ft	DOE assigned	None	By-product material, Radium, Thorium, Uranium	120,200yd³

Site Name	Location	Description	Site Origin	Vicinity Properties	Waste Types	Estimated Waste
New York [cont'd]						
Ashland 2	Tonawanda	115 acres of contaminated soil covered by vegetation at a non-operating facility. Contaminated soil from Ashland 1 disposed at Ashland 2.	DOE assigned	None	By-product material, Radium, Thorium, Uranium	52,100yd³
Linde Air Products	Tonawanda	135 acres bordered by industries, businesses, undeveloped land, and a golf course. 5 buildings were used for uranium separation and conversion processes.	DOE assigned	1	By-product material, Radium, Thorium, Uranium	71,000yd³
Seaway Industrial Park	Tonawanda	93 acres with no buildings and little vegetation containing approx. 6,000yd³ of soil excavated from Ashland 1 site. Soil containing low-grade uranium ore tailings is limited to 14 acres of the site	DOE assigned	None	By-product material, Radium, Thorium, Uranium	117,000yd³
Bliss & Laughlin Steel	Buffalo	A single large building with a floor area of 12,000m². Contamination is limited to a 300m² floor area in the southeast part of the building where uranium rods were machined and straightened in 1952	DOE assigned	None	LLW (Uranium)	20yd³
Colonie	Colonie	DOE-owned/leased site 11 acres of fenced plant buildings with uranium processing equipment All buildings and some grounds are radioactively contaminated Mixed light-industrial, commercial, and residential area. Contaminated waste from 53 vicinity properties are stored inside plant	Assigned by Congress	56	LLW (Uranium), Mixed Waste, Chemical	53,909yd³
Niagara Falls Storage Site	Lewiston/ Youngstown/ Niagara Falls	DOE-owned/leased site. 191-acre fenced area where radioactive low-grade residues from the Linde site and portion of high-grade residues from SLDS are stored in an encapsulated disposal design	DOE assigned	26	By-product material, K-65, Radium, Thorium, Uranium	205,000yd³

Atomic Energy Act (AEA): The Act of 1946 placed responsibility for production and control of nuclear materials within a civilian agency, originally the Atomic Energy Commission. The Act of 1954 allowed the Atomic Energy Commission to license private companies to use nuclear materials to build and operate nuclear power plants.

Atomic Energy Commission (AEC): The authority established by Congress to provide civilian control of atomic weapons under the Atomic Energy Act of 1946 The Act was amended in 1954 to permit peaceful uses of atomic energy. The AEC was dissolved by the Energy Reorganization Act of 1974.

By-Product Material: Includes wastes from the processing of ores primarily to recover their source material (uranium and thorium) content.

Decontamination and Decommissioning (D&D): Decontamination is the removal of contamination from facilities, soils, or equipment by washing, chemical action, mechanical cleaning, or other techniques. Decommissioning is the process of removing a facility from operation followed by entombment, decontamination, dismantlement, or conversion to another use.

Enrichment: The process of separating the isotopes of uranium from each other. In the United States, this is done using the gaseous diffusion process. Enriched uranium has more uranium-235 than natural uranium.

Fission: The splitting of a heavy nucleus into two roughly equal parts (which are nuclei of lighter elements), accompanied by the release of a relatively large amount of energy and frequently one or more neutrons. Fission can occur spontaneously, but usually is caused by the absorption of gamma rays, neutrons, or other particles.

Hazardous Waste: A solid waste (which includes solids, liquids, and contained gases), or combination of solid wastes, that because of its quantity, concentration, or physical, chemical, or infectious characteristics may 1) cause or significantly contribute to an increase in mortality or an increase in irreversible or incapacitating illness, or 2) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed. Some wastes are listed as hazardous under certain U.S. Environmental Protection Agency regulations.

High-Level Waste: Material that remains following the chemical reprocessing of spent nuclear fuel and irradiated targets from reactors. It contains a combination of transuranics and fission products in concentrations high enough to require permanent isolation.

Irradiation: Exposure to radiation of wavelengths shorter than those of visible light (gamma, x-ray, or ultraviolet). Irradiation is used for medical purposes, for the destruction of bacteria in foodstuffs, or for the sterilization of medical instruments.

Isotopes: One of two or more atoms with nuclei that have the same number of protons but a different number of neutrons.

K-65: Highly concentrated radium waste from processing high-grade uranium ore.

Lithium: A soft, silvery, highly reactive metallic element that is used as a heat transfer medium in thermonuclear weapons.

Low-Level Waste: Radioactive waste not classified as high-level, transuranic, spent nuclear fuel, by-product material, or uranium mill tailings. Low-level waste typically has small amounts of radioactivity in large amounts

40-8681

DEPARTMENT OF THE ARMY
BUFFALO DISTRICT, CORPS OF ENGINEERS
1776 NIAGARA STREET
BUFFALO, NEW YORK 14207-3199

JUN 16 1998

REPLY TO
ATTENTION OF
Office of Counsel

SUBJECT: Description of Material to be Disposed from Ashland 1 (including Seaway D) and Ashland 2 Sites

United States Nuclear Regulatory Commission
Waste Management Section
Washington, D.C. 20555-0001

Dear Sir or Madam:

This letter is submitted on behalf of the United States Army Corps of Engineers (USACE), in support of the environmental remediation work under the Formerly Used Sites Remedial Action Program (FUSRAP). Specifically this concerns the final remedial action at the FUSRAP sites known as Ashland 1, Ashland 2, and Seaway D in the town of Tonawanda, New York (the "Ashland Sites"). The work is being performed in accordance with the Comprehensive Environmental Response, Compensation and Liability Act, 42 United States Code 9601 et seq., and a Record of Decision issued pursuant to CERCLA. USACE was designated by Congress to execute the FUSRAP environmental remediation work in the Energy and Water Resources Appropriation Act of 1998, Public Law 105-62.

As part of the remedial action for these sites, materials will be removed from subsurface locations and taken off site. These materials contain radioactive uranium and thorium in relative low concentrations, however they are of interest to the International Uranium Corporation, Inc. (IUC) as feed materials for processing for their uranium or thorium content. IUC has a Nuclear Regulatory Commission license, and has submitted a request to the NRC to amend their license to allow them to take this material from the Ashland FUSRAP sites.

USACE has been advised that the NRC has requested a certification of the types of materials to be taken by IUC, as a condition to the issuance of the license amendment. Based on information and documents provided to USACE by the Department of Energy (DOE) and its contractors, it is our belief that the materials in question resulted from the

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processing of ores for uranium at the Union Carbide Corporation, Linde plant in Tonawanda, New York. These materials were apparently the spent wastes from the Linde processes, and were deposited on the property now known as the Ashland 1 site. In later years, they were moved by the Ashland Oil Company, or their agents, to other parts of the Ashland Sites. The available information indicates that the Linde processing occurred during the 1940's, pursuant to contracts with the Manhattan Engineer District. To the best of our knowledge, no later processing was the source of the radioactive materials that are being addressed in this FUSRAP project at the Ashland Sites. To the best of our knowledge, no Atomic Energy Commission or NRC or Agreement State licensed activities are the source of any part of the radioactive materials to be addressed in this project.

In addition, the site characterization information from the Remedial Investigation performed for DOE indicated radioactive isotopes at the site ranged from background levels to 1500 pCi/g for uranium-238, 4400 pCi/g for thorium-230 and 750 pCi/g for radium-226. An estimated total volume of material to be removed from the Ashland Sites is 42,000 cubic yards. The materials to be taken from the Ashland Sites will be sampled and analyzed for the presence of characteristic hazardous waste, and no hazardous waste regulated under the Resource Conservation and Recovery Act, 42 USC 6901 et seq. will be shipped to IUC.

In reliance on the historical and site characterization information available to this agency, it is the conclusion of USACE that the materials to be removed from the Ashland Sites as part of this FUSRAP project meet the definition of byproduct material resulting from the processing of ores for their uranium or thorium content as provided in 42 USC 2014(e)(2), commonly referred to as "11(e)(2)" material. Since this material was not processed after the passage of the Uranium Mill Tailings Radiation Control Act (UMTRCA) in 1978, which created regulatory jurisdiction over such 11(e)(2) materials, the materials at the Ashland Sites are not subject to licensing by the NRC. (See NRC Letter to USACE dated March 2, 1998.) Thus the materials meet the definition of 11(e)(2) materials, however they are not NRC licensed or subject to NRC regulation. USACE does require that the facility receiving the excavated materials from the Ashland Sites, in this case proposed to be IUC, have all legally applicable licenses, permits, or approvals from all regulators with jurisdiction over their operations, including the proposed handling of the materials from the Ashland Sites.

Office of Counsel

SUBJECT: Description of Material to be Disposed from Ashland 1 (including Seaway D) and Ashland 2 Sites

If there are any further questions regarding this project or the proposed activities at IUC, please feel free to contact Michelle Barczak of my staff at (716) 879-4183.

Sincerely,

Michael J. Conrad
Lieutenant Colonel, U.S. Army
Commanding

Uranium Mill Facilities, Notice of Two Guidance Documents: Final Revised Guidance on Disposal of Non-Atomic Energy Act of 1954, Section 11e.(2) Byproduct Material in Tailings Impoundments; Final Position and Guidance on the Use of Uranium Mill Feed Materials Other Than Natural Ores

AGENCY: Nuclear Regulatory Commission.

ACTION: Notice of final guidance.

SUMMARY: The U.S. Nuclear Regulatory Commission has finalized two uranium mill licensing guidance documents after consideration of comments received in response to a request for public comment in a Federal Register notice published May 13, 1992 (57 FR 20525). Only minor changes were made to the proposed guidance documents titled, "Revised Guidance on Disposal of Non-Atomic Energy Act of 1954, Section 11e.(2) Byproduct Material in Tailings Impoundments" and "Position and Guidance on the Use of Uranium Mill Feed Materials Other Than Natural Ores."

ADDRESSES: Copies of the comments and the NRC staff responses, as well as SECY–91–243, can be examined at the Commission's Public Document Room at 2120 L Street NW. (lower level), Washington DC.

FOR FURTHER INFORMATION CONTACT: Myron Fliegel, Office of Nuclear Material Safety and Safeguards, U.S. Nuclear Regulatory Commission, Washington, DC 20555; telephone (301) 415–6629.

SUPPLEMENTARY INFORMATION:

Final Revised Guidance on Disposal of Non-Atomic Energy Act of 1954, Section 11e.(2) Byproduct Material in Tailings Impoundments

1. In reviewing licensee requests for the disposal of wastes that have radiological characteristics comparable to those of Atomic Energy Act (AEA) of 1954, Section 11e.(2) byproduct material (hereafter designated as "11e.(2) byproduct material") in tailings impoundments, staff will follow the guidance set forth below. Since mill tailings impoundments are already regulated under 10 CFR part 40, licensing of the receipt and disposal of such material (hereafter designated as "non-11e.(2) byproduct material [1]") should also be done under 10 CFR part 40.

2. Radioactive material not regulated under the AEA shall not be authorized for disposal in an 11e.(2) byproduct material impoundment.

3. Special nuclear material and Section 11e.(1) byproduct material waste should not be considered as candidates for disposal in a tailings impoundment, without compelling reasons to the contrary. If staff believes that such material should be disposed of in a tailings impoundment in a specific instance, a request for approval by the Commission should be prepared.

4. The 11e.(2) licensee must demonstrate that the material is not subject to applicable Resource Conservation and Recovery Act (RCRA) regulations or other U.S. Environmental Protection Agency (EPA) standards for hazardous or toxic wastes prior to disposal. To further ensure that RCRA hazardous waste is not inadvertently disposed of in mill tailings impoundments, the 11e.(2) licensee also must demonstrate, for waste containing source material, as defined under the AEA, that the waste does not also contain material classified as hazardous waste according to 40 CFR part 261. In addition, the licensee must demonstrate that the non-11e.(2) material does not contain material regulated under other Federal statutes, such as the Toxic Substances Control Act. Thus, source material physically mixed with other material, would require evaluation in accordance with 40 CFR part 261, or 40 CFR part 761. (These provisions would cover material such as: Characteristically hazardous waste; listed hazardous waste; and polychlorinated biphenyls.) The demonstration and testing should follow accepted EPA regulations and protocols.

5. The 11e.(2) licensee must demonstrate that there are no Comprehensive Environmental Response, Compensation and Liability Act issues related to the disposal of the non-11e.(2) byproduct material.

6. The 11e.(2) licensee must demonstrate that there will be no significant environmental impact from disposing of this material.

7. The 11e.(2) licensee must demonstrate that the proposed disposal will not compromise the reclamation of the tailings impoundment by demonstrating compliance with the reclamation and closure criteria of appendix A of 10 CFR part 40.

8. The 11e.(2) licensee must provide documentation showing approval by the Regional Low-Level Waste Compact in whose jurisdiction the waste originates as well as approval by the Compact in whose jurisdiction the disposal site is located.

9. The Department of Energy (DOE) and the State in which the tailings impoundment is located, should be informed of the Nuclear Regulatory Commission findings and proposed action, with a request to concur within 120 days. A concurrence and commitment from either DOE or the State to take title to the tailings impoundment after closure must be received before granting the license amendment to the 11e.(2) licensee.

10. The mechanism to authorize the disposal of non-11e.(2) byproduct material in a tailings impoundment is an amendment to the mill license under 10 CFR part 40, authorizing the receipt of the material and its disposal. Additionally, an exemption to the requirements of 10 CFR part 61, under the authority of § 61.6, must be granted. (If the tailings impoundment is located in an Agreement State with low-level waste licensing authority, the State must take appropriate action to exempt the non-11e.(2) byproduct material from regulation as low-level waste.) The license amendment and the § 61.6 exemption should be supported with a staff analysis addressing the issues discussed in this guidance.

Final Position and Guidance on the Use of Uranium Mill Feed Material Other Than Natural Ores

Staff reviewing licensee requests to process alternate feed material (material other than natural ore) in uranium mills should follow the guidance presented below. Besides reviewing to determine compliance with appropriate aspects of appendix A of 10 CFR part 40, the staff should also address the following issues:

1. Determination of Whether the Feed Material is Ore

For the tailings and wastes from the proposed processing to qualify as 11e.(2) byproduct material, the feed material must qualify as "ore." In determining whether the feed material is ore, the following definition of ore must be used:

Ore is a natural or native matter that may be mined and treated for the extraction of any of its constituents or any other matter from which source material is extracted in a licensed uranium or thorium mill.

2. Determination of Whether the Feed Material Contains Hazardous Waste

If the proposed feed material contains hazardous waste, listed under subpart D §§ 261.30–33 of 40 CFR (or comparable RCRA authorized State regulations), it would be subject to EPA (or State) regulation under RCRA. To avoid the

[1] "non-11e.(2) byproduct material" as used here is simply an encompassing term for source, special nuclear, and 11e.(1) byproduct materials.

complexities of NRC/EPA dual regulation, such feed material will not be approved for processing at a licensed mill. If the licensee can show that the proposed feed material does not contain a listed hazardous waste, this issue is resolved.

Feed material exhibiting only a characteristic of hazardous waste (ignitable, corrosive, reactive, toxic) would not be regulated as hazardous waste and could therefore be approved for recycling and extraction of source material. However, this does not apply to residues from water treatment, so acceptance of such residues as feed material will depend on their not containing any hazardous or characteristic hazardous waste. Staff may consult with EPA (or the State) before making a determination of whether the feed material contains hazardous waste.

3. Determination of Whether the Ore is Being Processed Primarily for its Source-Material Content

For the tailings and waste from the proposed processing to qualify as 11e.(2) byproduct material, the ore must be processed primarily for its source-material content. There is concern that wastes that would have to be disposed of as radioactive or mixed waste would be proposed for processing at a uranium mill primarily to be able to dispose of it in the tailings pile as 11e.(2) byproduct material. In determining whether the proposed processing is primarily for the source-material content or for the disposal of waste, either of the following tests can be used:

a. *Co-disposal test:* Determine if the feed material would be approved for disposal in the tailings impoundment under the "Final Revised Guidance on Disposal of Non-Atomic Energy Act of 1954, Section 11e.(2) Byproduct Material in Tailings Impoundments," or revisions or replacements to that guidance. If the material would be approved for disposal, it can be concluded that if a mill operator proposes to process it, the processing is primarily for the source-material content. The material would have to be physically and chemically similar to 11e.(2) byproduct material and not be subject to RCRA or other EPA hazardous-waste regulations, as discussed in the guidance.

b. *Licensee certification and justification test:* The licensee must certify under oath or affirmation that the feed material is to be processed primarily for the recovery of uranium and for no other primary purpose. The licensee must also justify, with reasonable documentation, the certification. The justification can be based on financial considerations, the high uranium content of the feed material, or other grounds. The determination that the proposed processing is primarily for the source material content must be made on a case-specific basis.

If it can be determined, using the aforementioned guidance, that the proposed feed material meets the definition of ore, that it will not introduce a hazardous waste not otherwise exempted, and that the primary purpose of its processing is for its source-material content, the request can be approved.

Dated at Rockville, Maryland, this 13th day of September 1995.

For the Nuclear Regulatory Commission.

Joseph J. Holonich,

Chief, High-Level Waste and Uranium Recovery Projects Branch, Division of Waste Management, Office of Nuclear Material Safety and Safeguards.

[FR Doc. 95-23531 Filed 9-21-95; 8:45 am]

BILLING CODE 7590-01-P

SECURITIES AND EXCHANGE COMMISSION

[Rel. No. IC-21362; No. 812-9602]

Golden American Life Insurance Company, et al.

September 15, 1995.

AGENCY: Securities and Exchange Commission ("SEC" or "Commission").

ACTION: Notice of Application for an Order under the Investment Company Act of 1940 ("1940 Act").

APPLICANTS: Golden American Life Insurance Company ("Golden American"), Separate Account B ("Account B") and Separate Account D ("Account D"—together with Account B, "Separate Accounts"), and Directed Services, Inc. ("DSI").

RELEVANT 1940 ACT SECTION: Order requested under Section 6(c) of the 1940 Act granting exemptions from Sections 12(b), 26(a)(2) and 27(c)(2) thereof and Rule 12b-1 thereunder.

SUMMARY OF APPLICATION: Applicants seek an order permitting the deduction of mortality and expense risk charges, including an asset-based enhanced death benefit charge, from the assets of the Separate Accounts in connection with the offering of certain variable annuity contracts ("Contracts") and certain other variable annuity contracts ("Future Contracts") issued in the future by Golden American that are materially similar to the Contracts. Applicants also request that the order permit the deduction of a mortality and expense risk charge from the assets of any other separate accounts ("Future Accounts") established in the future by Golden American in connection with the offering of the Future Contracts.

FILING DATE: The application was filed on May 11, 1995, and amended on August 29, 1995.

HEARING OR NOTIFICATION OF HEARING: An order granting the application will be issued unless the Commission orders a hearing. Interested persons may request a hearing by writing to the Secretary of the Commission and serving Applicants with a copy of the request, personally or by mail. Hearing requests should be received by the Commission by 5:30 p.m. on October 10, 1995, and should be accompanied by proof of service on Applicants in the form of an affidavit or, for lawyers, a certificate of service. Hearing requests should state the nature of the requestor's interest, the reason for the request, and the issues contested. Persons may request notification of a hearing by writing to the Secretary of the Commission.

ADDRESSES: Secretary, Securities and Exchange Commission, 450 5th Street, NW., Washington, DC 20549. Applicants, c/o Mitchell M. Cox, Esq., Vice President, Assistant Secretary and Associate General Counsel, Golden American Life Insurance Company, 1001 Jefferson Avenue, 4th Floor, Wilmington, Delaware 19801.

FOR FURTHER INFORMATION CONTACT: Yvonne M. Hunold, Assistant Special Counsel, or Patrice M. Pitts, Special Counsel, Office of Insurance Products (Division of Investment Management), at (202) 942-0670.

SUPPLEMENTARY INFORMATION: The following is a summary of the application; the complete application is available for a fee from the Public Reference Branch of the Commission.

Applicants' Representation

1. Golden American is a stock life insurance company authorized to do business in all jurisdictions, except New York. Golden American is a wholly-owned subsidiary of BT Variable, Inc. and a wholly-owned indirect subsidiary of Bankers Trust Company.

2. The Separate Accounts were established by Golden American as segregated asset accounts to fund variable annuity contracts. Account B is registered under the 1940 Act as a unit investment trust. Account D is registered under the 1940 Act as a non-diversified open-end management company. Registration statements on Form N-4 and Form N-3, registering the Contracts as securities under the

1996 BEMR

Ashland 2

HOME BEMR CONTENTS U.S. MAP

Ashland 2, one of the four Tonawanda Site properties, is located at 4545 River Road in the Town of Tonawanda, New York, approximately 5 kilometers (3 miles) northwest of Buffalo. The property occupies approximately 47 hectares (115 acres) and is bordered by privately and publicly owned undeveloped property, which is primarily vacant and overgrown with grass and brush. See Ashland 1 for site map.

TONAWANDA SITES LOCALITY MAP

SITE MAP

Estimated Site Total

(Thousands of Current Year Dollars)

	FY 1996	1997	1998	1999	2000	
Environmental Restoration	333	6,436	1,324	27		*Grey shaded area reflects annual cost estimates for the first five years of the site BEMR Base Case (as of October 1995) and includes 3% annual inflation, see Readers' Guide.*
1996 Appropriation	281			*These levels reflect the current estimates for compliance with applicable statutes and agreements (as of March 1996), see Readers' Guide.*		
1997 Congressional Request		327				

(Five-Year Averages, Thousands of Constant 1996 Dollars)

	FY 1996-2000	2005	2010	2015	2020	2025	2030	Life Cycle*
Environmental Restoration	1,571	39						8,048

** Total Life Cycle is the sum of the annual costs in constant FY 1996 dollars.*

FACILITY MISSION

From 1957 to 1982, Ashland Oil used a portion of the Ashland 2 property as a landfill for disposal of general plant refuse and industrial and chemical byproducts. Ashland Oil closed the landfill in 1982 and covered it with two feet of clay. The source of radioactive constituents at Ashland 2 was residues from uranium separation processes conducted at the nearby Linde Center during the 1940s. The waste was disposed of at Ashland 1 and later transported to landfills at Ashland 2 and Seaway. Between 1974 and 1982, Ashland Oil transported an unknown quantity of soil mixed with radioactive residues from Ashland 1 to an area east of the Ashland 2 landfill.

The primary constituents of concern are uranium-238, radium-226, and thorium-230. The radioactive constituents at Ashland 2 pose minimal risks to the public because the gamma dose rate from the material is very low and access to the site is restricted. Ashland Petroleum Company is not currently conducting commercial operations at Ashland 2.

FUTURE USE

Ashland Petroleum Company currently owns Ashland 2. The company has not determined its future use after site remediation. Because the site is near the Niagara River, the local community has included it in a waterfront development master plan that identifies the area for use in commercial and light industrial development. This cost estimate adopts the master plan assumption of Industrial/Commercial use.

ENVIRONMENTAL RESTORATION

The Department of Energy has not conducted any remedial action at Ashland 2. Remedial investigation activities conducted in 1989 indicate that a total of 40,000 cubic meters (52,000 cubic yards) of soil contains residual low-level radioactivity above guidelines.

Ashland 1, Ashland 2, Seaway Industrial Park, and Linde Air Products are included in the Tonawanda Site integrated environmental documentation process to comply with requirements of the Comprehensive Environmental Response, Compensation, and Liability Act and the National Environmental Policy Act. Key regulators are Environmental Protection Agency Region II and the New York State Department of Environmental Conservation.

Major Environmental Restoration Activity Milestones

TASK	COMPLETION DATE Fiscal Year
Assessment (Record of Decision)	1997
Remedial Action	2005

ASSESSMENT

The Department conducted four characterization efforts at Ashland 2 to evaluate radioactive constituents and hydrogeological characteristics. Surface water and soil samples were characterized in 1976 and 1980, respectively. In 1986, a walkover survey of the property was performed, and Engineering-Science conducted the first phase of an investigation of the inactive industrial landfill under contract to the New York State Department of Environmental Conservation. Chemical and radiological analyses were performed on surface water and soil samples from a drainage ditch. In 1988, the second phase of the landfill investigation included hydrogeological characterization of the Ashland area and radiological and chemical characterization of surface water, sediment, and ground water.

The radioactive contamination at Ashland 2 originated from the disposal of the domestic ore filter cake at Ashland 1 and subsequent excavation, transportation, and disposal of the filter cake, which was mixed with soil, at Ashland 2. The primary constituents of interest are uranium, thorium-230, radium-226, and metals present in the filter cake (aluminum, calcium, copper, iron, lead, magnesium, manganese, phosphorus, and vanadium). Analytical results of the soil investigation at Ashland 2 indicated that the Manhattan Engineer District-related radionuclides and associated metals were generally confined to the area between the two primary drainage ditches (the two branches of Rattlesnake Creek) and the access road; investigations detected minor amounts along the floodplains of the drainage ditches. The maximum depth of radioactive contamination at Ashland 2 is 2.7 meters (9 feet), in the area between the two drainage ditches. Smaller areas located throughout the property have shallower contamination, typically 0.15 to 1.5 meters (0.5 to 5 feet). The highest concentrations occur in the center of the large contaminated area, primarily in the top 1.5 meters (5 feet) of soil. Investigations found no hazardous waste.

Ground-water monitoring in 1988 and 1989 revealed no radioactive constituents. Quarterly well inspections and water level measurements are conducted at Ashland 2.

REMEDIAL ACTION

The Department of Energy has not conducted any remedial action at Ashland 2. The scenario used for the Baseline Environmental Management Report cost estimate assumes complete excavation of the contaminated soils and onsite disposal at Ashland 1. The cost estimate assumes that a total waste volume of 40,000 cubic meters (52,000 cubic yards) at Ashland 2 will be transported to the proposed Ashland containment cell. Although this approach, which was originally identified in the proposed plan issued in November 1993, forms the basis of this cost estimate, the Department of Energy acknowledges that the community did not approve that plan and is currently discussing alternatives with the community. The Department will adjust the cost estimate appropriately if an alternate remedy is selected.

Environmental Restoration Activities Cost Estimate

(Five-Year Averages, Thousands of Constant 1996 Dollars)								
	FY 1996-2000	2005	2010	2015	2020	2025	2030	Life Cycle*
FUSRAP - Ashland 2 Site								
Assessment	118							589
Remedial Action	1,453	39						7,459
Total	1,571	39						8,048

** Total Life Cycle is the sum of the annual costs in constant FY 1996 dollars.*

FUNDING ESTIMATE

The following table presents estimated funding information for Ashland 2.

Nondefense Funding Estimate

(Five-Year Averages, Thousands of Constant 1996 Dollars)								
	FY 1996-2000	2005	2010	2015	2020	2025	2030	Life Cycle*
Environmental Restoration	1,571	39						8,048

** Total Life Cycle is the sum of the annual costs in constant FY 1996 dollars.*

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About This Document
Posted 08/14/1996 (fr)

40-8681

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

June 23, 1998

International Uranium (USA) Corporation
ATTN: Ms. Michelle Rehmann,
Environmental Manager
Independence Plaza, Suite 950
1050 Seventeenth Street
Denver, Colorado 80265

SUBJECT: AMENDMENT 6 TO SOURCE MATERIAL LICENSE SUA-1358, INTERNATIONAL URANIUM (USA) CORPORATION'S WHITE MESA URANIUM MILL, BLANDING, UTAH

Dear Ms. Rehmann:

The U.S. Nuclear Regulatory Commission (NRC) staff has completed its review of International Uranium (USA) Corporation's (IUSA's) request to amend NRC Source Material License SUA-1358, submitted by letter dated May 8, 1998. Additional information was provided by facsimile on May 27, 1998, and by letters dated May 29, June 3, and June 11, 1998. By these submittals, IUSA requested that SUA-1358 be amended to allow the receipt and processing of uranium-bearing material from the Ashland 2 Formerly Utilized Sites Remedial Action Program (FUSRAP) site, near Tonawanda, New York.

The details of the amendment request are discussed in the NRC staff's Technical Evaluation Report (TER) (Enclosure 1). In the TER, the staff documents the basis for its evaluation of IUSA's amendment request, which the staff has reviewed in accordance with 10 CFR Part 40, Appendix A, requirements and NRC staff guidance "Final Position and Guidance on the Use of Uranium Mill Feed Material Other Than Natural Ores" (60 FR 49296; September 22, 1995). Based on its review, the NRC staff has found the proposed amendment to be acceptable.

Therefore, pursuant to Title 10 of the Code of Federal Regulations, Part 40, Source Material License SUA-1358 is hereby amended by adding License Condition No. 10.10. All other conditions of this license shall remain the same. The enclosed license is being reissued to incorporate the above modification (Enclosure 2). An environmental review was not performed since this licensing action is categorically excluded under 10 CFR 51.22(c)(11).

It is important to note that the material in question may be defined as 11e.(2) byproduct material as defined in the Atomic Energy Act of 1954. However, this material is not subject to NRC regulation until it is received by IUSA, an NRC licensee, for processing for its source-material content under IUSA's NRC license, because the material (uranium mill tailings) was produced by an activity not licensed by NRC after November 8, 1978.

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PDR ADOCK 04008681
C PDR

NRC FILE CENTER COPY

If you have any questions regarding this letter or the enclosures, please contact Mr. James Park, the NRC Project Manager for the White Mesa mill, at (301) 415-6699.

Sincerely,

[Original signed by]

Joseph J. Holonich, Chief
Uranium Recovery Branch
Division of Waste Management
Office of Nuclear Material Safety
and Safeguards

Docket No. 40-8681
SUA-1358, Amendment No. 6
Case Closed: L51656

Enclosures: As stated (2)

cc: W. Sinclair, UT

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DATE	6/18/98		6/23/98		6/23/98			

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If you have any questions regarding this letter or the enclosures, please contact Mr. James Park, the NRC Project Manager for the White Mesa mill, at (301) 415-6699.

Sincerely,

Joseph J. Holonich, Chief
Uranium Recovery Branch
Division of Waste Management
Office of Nuclear Material Safety
and Safeguards

Docket No. 40-8681
SUA-1358, Amendment No. 6

Enclosures: As stated (2)

cc: W. Sinclair, UT

TECHNICAL EVALUATION REPORT
REQUEST TO RECEIVE AND PROCESS ASHLAND 2 FUSRAP MATERIAL

DOCKET NO. 40-8681 LICENSE NO. SUA-1358

LICENSEE: International Uranium (USA) Corporation

FACILITY: White Mesa Uranium Mill

PROJECT MANAGER: James Park

SUMMARY AND CONCLUSIONS:

The U.S. Nuclear Regulatory Commission (NRC) staff has reviewed International Uranium (USA) Corporation's (IUSA's) request dated May 8, 1998, to receive and process uranium-bearing material from the Formerly Utilized Sites Remedial Actions Program (FUSRAP) Ashland 2 site, in the Town of Tonawanda, New York. IUSA provided additional information by facsimile on May 27, 1998, and by letters dated May 29, June 3, and June 11, 1998.

The staff has reviewed IUSA's request against the September 1995 guidance pertaining to alternate feed materials and finds the amendment request to be acceptable.

DESCRIPTION OF LICENSEE'S AMENDMENT REQUEST:

By its submittal dated May 8, 1998, IUSA requested that NRC Source Material License SUA-1358 be amended to allow the receipt and processing of alternate feed material (i.e., material other than natural uranium ore) at its White Mesa uranium mill located near Blanding, Utah. The uranium-bearing material in question, weighing approximately 24,000 to 25,000 dry tons, is located at the Ashland 2 FUSRAP site, in the Town of Tonawanda, New York, which currently is under the management of the U.S. Army Corps of Engineers (USACE). IUSA provided additional information by facsimile on May 27, 1998, and by letters dated May 29, June 3, and June 11, 1998.

Site and Material Information

The material consists of uranium ore processing residues and contaminated soils associated with activities conducted by the Manhattan Engineering District (MED) during the mid-1940s. Approximately 8000 tons of waste products resulting from the processing of pitchblende (UO_2) and domestic uranium ores at nearby facilities were disposed originally at a site known as the Haist property (now called Ashland 1). In 1960, the Ashland 1 property was transferred to the Ashland Oil Company.

In 1974, Ashland Oil constructed a bermed area for two petroleum storage tanks and a drainage ditch on the Ashland 1 property. Approximately 4600 m^3 (6000 yd^3) of soil containing MED-related residues and commingled inorganic constituents were removed from the site, with an indeterminate quantity of these soils transported to the Ashland 2 site for disposal. These residues and commingled inorganic constituents were placed in an area of the Ashland 2 property that adjoined an industrial landfill operated by Ashland Oil. This landfill, which was closed and capped with clay soil in 1982, accepted general refuse and chemical and industrial byproducts from 1957 to 1982.

During remedial investigation activities carried out by the U.S. Department of Energy (DOE) in the late 1980s and early 1990s, the primary "constituents of interest" identified at the Ashland 2 site were uranium, thorium-230, radium-226, and metals present in the ore filter cake (aluminum, calcium, copper, iron, lead, magnesium, manganese, phosphorous, and vanadium). Investigations further indicated that the MED-related radionuclides and associated metals generally were confined to an approximately 20,000 m^2 (4.9 acre) area between the two branches of Rattlesnake Creek (DOE, 1996a).

Currently, the Ashland 2 property, which is owned by the Ashland Petroleum Company, is vacant and largely overgrown with grass, bushes, and weeds. The property also contains marshy areas that are hydrologically connected to the Rattlesnake and Twomile Creeks and to the Niagara River (USACE, 1997).

Transportation Considerations

Following excavation of the material at the Ashland 2 site, it will be shipped by train and exclusive-use trucks from the Town of Tonawanda to the White Mesa mill in intermodal containers. After being loaded and sealed at the site, the containers will be transported by truck to a nearby intermodal rail terminal. The containers will be loaded on flatbed railcars and transported cross-country to the final rail destination (expected to be either near Grand Junction, Colorado; Cisco, Utah; or Green River, Utah), where they will be transferred to trucks for the final leg of the journey to the White Mesa mill. It is expected that approximately 60 trucks per week will be used to transport the material from the final rail destination to the mill.

Trucks used to transport the material to the mill site will be radiometrically scanned upon arrival to ensure that leakage has not occurred and that radiation levels are within appropriate limits. The trucks will be scanned again prior to their release from the mill site restricted area. In addition, the intermodal containers used to transport the material will be properly closed, cleaned (if necessary), surveyed, and documented before leaving the White Mesa site.

Although the material in question may meet the definition of 11e.(2) byproduct material under the Atomic Energy Act of 1954 (AEA), this material is not subject to NRC regulation until it is received by IUSA, an NRC licensee, for processing for its source-material content under the

NRC license, because the material was produced by an activity not licensed by NRC after November 8, 1978. Therefore, in addition, the material is not subject to NRC jurisdiction during transport.

Handling and Processing at the Mill Site

At the mill site, the Ashland 2 material will be emptied from the intermodal containers and stockpiled. It will be processed alone or commingled with conventional ores, and in the same fashion as that used to process such ores. No modifications to the mill circuit will be necessary to process this material.

The efficiency of airborne contamination control measures will be assessed while the material is in stockpile. Airborne particulate samples and breathing zone samples will be collected in those areas during initial material processing activities and analyzed for gross alpha. Sampling results will be used to establish health and safety guidelines to be implemented throughout the processing operations.

IUSA will provide appropriate personal protective equipment (coveralls, gloves, and respiratory protection (if needed)) to individuals engaged in handling the material. Additional environmental air samples will be collected at nearby locations to the material processing activities and analyzed to ensure that the established contamination control measures are adequate and effective.

TECHNICAL EVALUATION:

The NRC staff has reviewed IUSA's request in accordance with 10 CFR Part 40, Appendix A, requirements and NRC staff guidance "Final Position and Guidance on the Use of Uranium Mill Feed Material Other Than Natural Ores" (60 FR 49296; September 22, 1995). This guidance (referred to hereinafter as the alternate feed guidance) requires that the staff make the following determinations in its reviews of licensee requests to process material other than natural uranium ores:

(a) Whether the feed material meets the definition of "ore;"

(b) Whether the feed material contains hazardous waste; and

(c) Whether the ore is being processed primarily for its source-material content.

Determination of whether the feed material is "ore"

For the tailings and wastes from the proposed processing to qualify as 11e.(2) byproduct material, the feed material must qualify as "ore." In the alternate feed guidance, ore is defined as

> "... a natural or native matter that may be mined and treated for the extraction of any of its constituents or any other matter from which source material is extracted in a licensed uranium or thorium mill."

The proposed alternate feed material contains varying concentrations of uranium, ranging from non-detectable to greater than 1.0 percent by weight, depending on the sample location. IUSA believes that recoverable amounts of uranium are present, and that, on average, the uranium concentration for this material will be approximately 0.05 percent or greater by weight. IUSA is proposing to extract this uranium. Therefore, the material meets the definition of ore, because it is a "matter from which source material is extracted in a licensed uranium or thorium mill."

Determination of whether the feed material contains hazardous waste

Under the alternate feed guidance, proposed feed material which contains a listed hazardous waste will not be approved by the NRC staff for processing at a licensed mill. Feed materials which exhibit only a characteristic of hazardous waste (i.e., ignitability, corrosivity, reactivity, or toxicity) would not be regulated as hazardous waste and could therefore be approved by the staff for recycling and extraction of source material. However, this does not apply to residues from water treatment. Therefore, NRC staff acceptance of such residues as feed material would depend on their not containing any hazardous or characteristic hazardous waste.

Remedial investigations carried by the DOE did not find listed hazardous wastes on the Ashland 2 property (DOE, 1996a). In addition, it is the USACE's belief, based on process knowledge and its own analyses, that the material contains no hazardous wastes (USACE, 1998). However, to guard against the potential for material containing such wastes being sent to White Mesa for processing, ICF Kaiser, the USACE contractor charged with excavating the material and preparing it for shipment offsite, will conduct confirmatory testing of excavated materials prior to their shipment to ensure that listed hazardous wastes are not present. Any material that testing indicates contains hazardous wastes will not be included in shipments to White Mesa. Finally, as committed to in its June 11, 1998, letter, IUSA will conduct testing of Ashland 2 material arriving at the site on a regular basis to confirm ICF Kaiser's determinations.

With respect to the possibility that industrial and chemical byproducts disposed at the former Ashland Oil industrial landfill have affected materials to be excavated at the Ashland 2 site, the staff considers that ICF Kaiser's sampling program and IUSA's confirmatory analyses will minimize the likelihood that any impacted materials, if they exist, will be transported to and processed at the White Mesa mill.

Therefore, the NRC staff finds that the Ashland 2 material to be processed at the White Mesa mill will not be hazardous waste or contain a listed hazardous waste. The staff has determined also that the Ashland 2 material is not a residue from water treatment. This material consists of wastes from the initial processing of uranium ores and associated contaminated soils.

Therefore, the NRC staff considers the uranium-bearing material acceptable for the extraction of source material.

Determination of whether the feed material is being processed primarily for its source-material content

To show that potential alternate feed material is being processed primarily for its source-material content, a licensee must either (1) demonstrate that the material would be approved for disposal in the tailings impoundment under the "Final Revised Guidance on Disposal of Non-Atomic Energy Act of 1954, Section 11e.(2) Byproduct Material in Tailings Impoundments;" or (2) certify, under oath or affirmation, that the material is being processed primarily for the recovery of uranium and for no other primary purpose. Any such certification must be supported by an appropriate justification and accompanying documentation.

The licensee has provided a signed affirmation that the uranium-bearing material is being processed primarily for the recovery of uranium and for no other primary purpose. IUSA states that the uranium content of the material, in conjunction with the financial considerations discussed below, makes processing the Ashland 2 material economically attractive to IUSA.

It is IUSA's intent to process the Ashland 2 material either alone or commingled with conventionally-mined uranium ores during the same mill run. The licensee believes that this arrangement will result in several benefits which directly influence the cost of processing:

- The financial costs of stockpiling ore on the mill site will be reduced since ores will be processed through the mill at a higher rate;
- IUSA will be able to respond more quickly to changing market prices for uranium and vandadium by reducing the time between mining of the ore and producing and selling the product (i.e., U_3O_8 and V_2O_5);
- In processing the Ashland 2 material with the conventional ores, IUSA will be better able to smooth out the variability in conventional ore production and delivery to the mill, and thus run the mill for longer periods of time; and
- IUSA will be able to retain trained mill workers for longer periods of time, resulting in a more efficient workforce and a reduced fear of losing trained employees.

The combination of these benefits, IUSA believes, will reduce the costs of processing the Ashland 2 material, thus making the overall costs of running the mill economical to recover the relatively low concentrations of uranium and other recoverable elements in the material.

In addition, the DOE, which managed the FUSRAP sites prior to the USACE, determined previously that the Ashland 2 material meets the definition of 11e.(2) byproduct material under the AEA (DOE, 1995; 1996b). Therefore, the material could be disposed of directly in the White Mesa tailings impoundments. As such, the material meets the co-disposal test in the staff's guidance, and because it does, it can be concluded that IUSA will be processing the Ashland 2 material primarily for its source-material content.

It is important to note, however, that, although the material in question may meet the definition of 11e.(2) byproduct material under the AEA, this material is not subject to NRC regulation until it is received by IUSA, an NRC licensee, for processing for its source-material content under the NRC license, because the material was produced by an activity not licensed by NRC after November 8, 1978. Therefore, in addition, the material is not subject to NRC jurisdiction during transport.

Conclusions concerning alternate feed material designation

Based on the information provided by the licensee, the NRC staff finds that the Ashland 2 material is alternate feed material because: (1) it meets the definition of "ore," (2) the material to be processed at the White Mesa mill will not be or contain listed hazardous wastes, and (3) it is being processed primarily for its source-material content.

Other considerations

The NRC staff also has concluded that the processing of this material will not result in (1) a significant change or increase in the types or amounts of effluents that may be released offsite; (2) a significant increase in individual or cumulative occupational radiation exposure; (3) a significant construction impact; or (4) a significant increase in the potential for or consequences from radiological accidents. This conclusion is based on the following information:

a. Yellowcake produced from the processing of this material will not cause the currently-approved yellowcake production limit of 4380 tons per year to be exceeded. In addition, and as a result, radiological doses to members of the public in the vicinity of the mill will not be elevated above levels previously assessed and approved.

b. No modifications to the mill circuit design are necessary to process the Ashland 2 material.

c. Tailings produced by the processing of this material will be disposed of on-site in an existing lined tailings impoundment (Cell 3). The addition of these tailings (a maximum of 25,000 tons) to Cell 3 will increase the total amount of tailings in the cell by one percent, to a total of approximately 70 percent of cell capacity; therefore, no new impoundments are necessary. The design of the existing impoundment, which includes a leak detection system, previously has been approved by NRC, and IUSA is required by its NRC license to conduct regular monitoring of the impoundment liners and of the groundwater around the impoundments to detect leakage if it should occur.

d. In general, the Ashland 2 material is similar in composition to the mill tailings currently disposed of in the Cell 3 impoundment, because it contains metals and other parameters which are present already in the tailings. In addition, the amount of tailings (a maximum of 25,000 tons) produced by processing the Ashland 2 material is not significant in comparison to the total amount of tailings currently in the cell (approximately 1.35 million tons). Finally, as stated previously, IUSA is required to conduct regular monitoring of the impoundment leak detection systems and of the groundwater in the vicinity of the impoundments to detect leakage if it should occur. Therefore, the staff considers that any environmental impacts that could be associated with the disposal of the Ashland 2 tailings will be minimal.

e. For the following reasons, it is not expected that transportation impacts associated with the movement of the Ashland 2 material by train and truck from the Town of Tonawanda, New York to the White Mesa mill will be significant:

- The material will be shipped as "low specific activity" material in exclusive-use containers (i.e., no other materials will be in the containers with the uranium-bearing material). The containers will be appropriately labeled, placarded, and manifested, and shipments will be tracked by the shipping company from the Ashland 2 site until they reach the White Mesa mill.

- On average during 1996, 370 trucks per day traveled the stretch of State Road 191 between Monticello, UT and Blanding, UT (personal communication with the State of Utah Department of Transportation). IUSA anticipates an additional 60 trucks per week (or approximately 8.6 trucks per day) traveling this route to the mill, representing an increased traffic load of only two percent. Shipments are expected to take place over the course of a limited time period (three to four months).

- The containers and trucks involved in transporting the material to the mill site will be surveyed and decontaminated, as necessary, prior to leaving the Ashland 2 site for White Mesa and again prior to leaving the mill site for the return trip.

f. The potential for employee exposures from the handling and processing of this material is not expected to be any more significant than that normally encountered with the milling of conventional uranium ores. Mill employees involved in handling the material will be provided with personal protective equipment (e.g., coveralls, rubber gloves), including respiratory protection, if necessary. Airborne particulate and breathing zone sampling results will be used to establish health and safety guidelines to be implemented throughout the processing operations.

REFERENCES:

U.S. Army Corps of Engineers (USACE), 1998, "Record of Decision for the Ashland 1 (Including Seaway Area D) and Ashland 2 Sites, Tonawanda, New York," April 1998.

USACE, 1997, "Proposed Plan for the Ashland 1 and Ashland 2 Sites, Tonawanda, New York," USACE/OR/21950-1029, November 1997.

U.S. Department of Energy (DOE), 1996a, "1996 BEMR: Ashland 2," available on the Internet at <http://eagle.emweb.icx.net/bemr96/asho.html>.

DOE, 1996b, "Introduction to Formerly Utilized Sites REMEDIAL ACTION PROGRAM (FUSRAP)," available on the Internet at <http://www.em.doe.gov/bemr96/fusrap.html>.

DOE, 1995, "Formerly Utilized Sites Remedial Action Program (FUSRAP): Building Stakeholder Partnerships to Achieve Effective Cleanup," Office of Environmental Restoration, DOE/EM-0233, April 1995.

RECOMMENDED LICENSE CHANGE:

Pursuant to Title 10 of the Code of Federal Regulations, Part 40, Source Material License SUA-1358 will be amended by the addition of License Condition No. 10.10 as follows:

10.10 The licensee is authorized to receive and process source material from the Ashland 2 Formerly Utilized Sites Remedial Action Program (FUSRAP) site, located near Tonawanda, New York, in accordance with the amendment request dated May 8, 1998, as amended by the submittals dated May 27, June 3, and June 11, 1998.

[Applicable Amendment: 6]

ENVIRONMENTAL IMPACT EVALUATION:

An environmental report covering the information identified in 10 CFR 51.45 was not required from the licensee. The environmental impacts associated with the excavation of this material and associated site cleanup activities were addressed previously by the USACE and found to be not significant (USACE, 1998).

Because IUSA's receipt and processing of the material will not result in (1) a significant change or increase in the types or amounts of effluents that may be released offsite; (2) a significant increase in individual or cumulative occupational radiation exposure; (3) a significant construction impact; or (4) a significant increase in the potential for or consequences from radiological accidents, an environmental review was not performed since actions meeting these criteria are categorically excluded under 10 CFR 51.22(c)(11).

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Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974 (Public Law 93-438), and Title 10, Code of Federal Regulations, Chapter I, Parts 30, 31, 32, 33, 34, 35, 36, 39, 40, and 70, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, possess, and transfer byproduct, source, and special nuclear material designated below; to use such material for the purpose(s) and at the place(s) designated below; to deliver or transfer such material to persons authorized to receive it in accordance with the regulations of the applicable Part(s). This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, as amended, and is subject to all applicable rules, regulations, and orders of the Nuclear Regulatory Commission now or hereafter in effect and to any conditions specified below.

Licensee	
1. International Uranium (USA) Corporation [Applicable Amendments: 2]	3. License Number SUA-1358, Amendment No.6
2. 6425 S. Highway 191 P.O. Box 809 Blanding, Utah 84511 [Applicable Amendments: 2]	4. Expiration Date March 31, 2007
	5. Docket or Reference No. 40-8681

6. Byproduct, Source, and/or Special Nuclear Material	7. Chemical and/or Physical Form	8. Maximum Amount that Licensee May Possess at Any One Time Under This License
Natural Uranium	Any	Unlimited

SECTION 9: *Administrative Conditions*

9.1 The authorized place of use shall be the licensee's White Mesa uranium milling facility, located in San Juan County, Utah.

9.2 All written notices and reports to the NRC required under this license, with the exception of incident and event notifications under 10 CFR 20.2202 and 10 CFR 40.60 requiring telephone notification, shall be addressed to the Chief, Uranium Recovery Branch, Division of Waste Management, Office of Nuclear Material Safety and Safeguards.

Incident and event notifications that require telephone notification shall be made to the NRC Operations Center at (301) 816-5100.

9.3 The licensee shall conduct operations in accordance with statements, representations, and conditions contained in the license renewal application submitted by letter dated August 23, 1991, as revised by submittals dated January 13, and April 7, 1992, November 22, 1994, July 27, 1995, December 13, and December 31, 1996, and January 30, 1997, which are hereby incorporated by reference, and for the Standby Trust Agreement, dated April 29, 1997, except where superseded by license conditions below.

Whenever the word "will" is used in the above referenced documents, it shall denote a requirement. [Applicable Amendment: 2]

9.4 A. The licensee may, without prior NRC approval, and subject to the conditions specified in Part B of this condition:

(1) Make changes in the facility or process, as presented in the application.

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(2) Make changes in the procedures presented in the application.

(3) Conduct tests or experiments not presented in the application.

B. The licensee shall file an application for an amendment to the license, unless the following conditions are satisfied.

(1) The change, test, or experiment does not conflict with any requirement specifically stated in this license, or impair the licensee's ability to meet all applicable NRC regulations.

(2) There is no degradation in the essential safety or environmental commitments in the license application, or provided by the approved reclamation plan.

(3) The change, test, or experiment is consistent with the conclusions of actions analyzed and selected in the EA dated February 1997.

C. The licensee's determinations concerning Part B of this condition, shall be made by a "Safety and Environmental Review Panel (SERP)." The SERP shall consist of a minimum of three individuals. One member of the SERP shall have expertise in management and shall be responsible for managerial and financial approval changes; one member shall have expertise in operations and/or construction and shall have responsibility for implementing any operational changes; and, one member shall be the corporate radiation safety officer (CRSO) or equivalent, with the responsibility of assuring changes conform to radiation safety and environmental requirements. Additional members may be included in the SERP as appropriate, to address technical aspects such as health physics, groundwater hydrology, surface-water hydrology, specific earth sciences, and other technical disciplines. Temporary members or permanent members, other than the three above-specified individuals, may be consultants.

D. The licensee shall maintain records of any changes made pursuant to this condition until license termination. These records shall include written safety and environmental evaluations, made by the SERP, that provide the basis for determining changes are in compliance with the requirements referred to in Part B of this condition. The licensee shall furnish, in an annual report to NRC, a description of such changes, tests, or experiments, including a summary of the safety and environmental evaluation of each. In addition, the licensee shall annually submit to the NRC changed pages to the Operations Plan and Reclamation Plan of the approved license application to reflect changes made under this condition.

The licensee's SERP shall function in accordance with the standard operating procedures submitted by letter dated June 10, 1997.

[Applicable Amendments: 3]

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9.5 The licensee shall maintain an NRC-approved financial surety arrangement, consistent with 10 CFR 40, Appendix A, Criteria 9 and 10, adequate to cover the estimated costs, if accomplished by a third party, for decommissioning and decontamination of the mill and mill site, for reclamation of any tailings or waste disposal areas, ground-water restoration as warranted and for the long-term surveillance fee. Within three months of NRC approval of a revised reclamation/decommissioning plan, the licensee shall submit, for NRC review and approval, a proposed revision to the financial surety arrangement if estimated costs in the newly approved plan exceed the amount covered in the existing financial surety. The revised surety shall then be in effect within 3 months of written NRC approval.

Annual updates to the surety amount, required by 10 CFR 40, Appendix A, Criteria 9 and 10, shall be submitted to the NRC at least 3 months prior to the anniversary date which is designated as June 4 of each year. If the NRC has not approved a proposed revision to the surety coverage 30 days prior to the expiration date of the existing surety arrangement, the licensee shall extend the existing surety arrangement for 1 year. Along with each proposed revision or annual update, the licensee shall submit supporting documentation showing a breakdown of the costs and the basis for the cost estimates with adjustments for inflation, maintenance of a minimum 15 percent contingency fee, changes in engineering plans, activities performed and any other conditions affecting estimated costs for site closure. The basis for the cost estimate is the NRC approved reclamation/decommissioning plan or NRC approved revisions to the plan. The previously provided guidance entitled "Recommended Outline for Site Specific Reclamation and Stabilization Cost Estimates" outlines the minimum considerations used by the NRC in the review of site closure estimates. Reclamation/decommissioning plans and annual updates should follow this outline.

The currently approved surety instrument, a Performance Bond issued by National Union Fire Insurance Company in favor of the NRC, and the associated Standby Trust Agreement, dated April 29, 1997, shall be continuously maintained in an amount not less than $11,469,859 for the purpose of complying with 10 CFR 40, Appendix A, Criteria 9 and 10, until a replacement is authorized by the NRC.

[Applicable Amendments: 2, 3, 5]

9.6 Standard operating procedures shall be established and followed for all operational process activities involving radioactive materials that are handled, processed, or stored. SOPs for operational activities shall enumerate pertinent radiation safety practices to be followed. Additionally, written procedures shall be established for non-operational activities to include in-plant and environmental monitoring, bioassay analyses, and instrument calibrations. An up-to-date copy of each written procedure shall be kept in the mill area to which it applies.

All written procedures for both operational and non-operational activities shall be reviewed and approved in writing by the radiation safety officer (RSO) before implementation and whenever a change in procedure is proposed to ensure that proper radiation protection principles are being applied. In addition, the RSO shall perform a documented review of all existing operating procedures at least annually.

9.7 Before engaging in any activity not previously assessed by the NRC, the licensee shall administer a cultural resource inventory. All disturbances associated with the proposed development will be completed in compliance with the National Historic Preservation Act (as amended) and its implementing regulations (36 CFR 800), and the Archaeological Resources Protection Act (as amended) and its implementing regulations (43 CFR 7).

In order to ensure that no unapproved disturbance of cultural resources occurs, any work resulting in the discovery of previously unknown cultural artifacts shall cease. The artifacts shall be inventoried and evaluated in accordance with 36 CFR Part 800, and no disturbance shall occur until the licensee has received authorization from the NRC to proceed.

The licensee shall avoid by project design, where feasible, the archeological sites designated "contributing" in the report submitted by letter dated July 28, 1988. When it is not feasible to avoid a site designated "contributing" in the report, the licensee shall institute a data recovery program for that site based on the research design submitted by letter from C. E. Baker of Energy Fuels Nuclear to Mr. Melvin T. Smith, Utah State Historic Preservation Officer (SHPO), dated April 13, 1981.

The licensee shall recover through archeological excavation all "contributing" sites listed in the report which are located in or within 100 feet of borrow areas, stockpile areas, construction areas, or the perimeter of the reclaimed tailings impoundment. Data recovery fieldwork at each site meeting these criteria shall be completed prior to the start of any project related disturbance within 100 feet of the site, but analysis and report preparation need not be complete.

Additionally, the licensee shall conduct such testing as is required to enable the Commission to determine if those sites designated as "Undetermined" in the report and located within 100 feet of present or known future construction areas are of such significance to warrant their redesignation as "contributing." In all cases, such testing shall be completed before any aspect of the undertaking affects a site.

Archeological contractors shall be approved in writing by the Commission. The Commission will approve an archeological contractor who meets the minimum standards for a principal investigator set forth in 36 CFR Part 66, Appendix C, and whose qualifications are found acceptable by the SHPO.

9.8 The licensee is hereby authorized to possess byproduct material in the form of uranium waste tailings and other uranium byproduct waste generated by the licensee's milling operations authorized by this license. Mill tailings shall not be transferred from the site without specific prior approval of the NRC in the form of a license amendment. The licensee shall maintain a permanent record of all transfers made under the provisions of this condition.

9.9 The licensee is hereby exempted from the requirements of Section 20.1902 (e) of 10 CFR Part 20 for areas within the mill, provided that all entrances to the mill are conspicuously posted in accordance with Section 20.1902 (e) and with the words, "Any area within this mill may contain radioactive material."

9.10 Release of equipment or packages from the restricted area shall be in accordance with "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct, Source, or Special Nuclear Material," dated May 1987, or suitable alternative procedures approved by the NRC prior to any such release.

License Number

SUA-1358, Amendment No. 6

Docket or Reference Number

40-8681

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SECTION 10: ***Operational Controls, Limits, and Restrictions***

10.1 The mill production rate shall not exceed 4380 tons of yellowcake per year.

10.2 All liquid effluents from mill process buildings, with the exception of sanitary wastes, shall be returned to the mill circuit or discharged to the tailings impoundment.

10.3 Freeboard limits for Cells 1-I, 3, and 4A, and tonnage limits for Cell 3, shall be as stated in Section 3.0 to Appendix E of the approved license application.

10.4 Disposal of material and equipment generated at the mill site shall be conducted as described in the licensee's submittals dated December 12, 1994 and May 23, 1995, with the following addition:

A. The maximum lift thickness for materials placed over tailings shall be less than 4-feet thick. Subsequent lifts shall be less than 2-feet thick. Each lift shall be compacted by tracking of heavy equipment, such as a Cat D-6, at least 4 times prior to placement of subsequent lifts.

10.5 In accordance with the licensee's submittal dated May 20, 1993, the licensee is hereby authorized to dispose of byproduct material generated at licensed in situ leach facilities, subject to the following conditions:

A. Disposal of waste is limited to 5000 cubic yards from a single source.

B. All contaminated equipment shall be dismantled, crushed, or sectioned to minimize void spaces. Barrels containing waste other than soil or sludges shall be emptied into the disposal area and the barrels crushed. Barrels containing soil or sludges shall be verified to be full prior to disposal. Barrels not completely full shall be filled with tailings or soil.

C. All waste shall be buried in Cell No. 3 unless prior written approval is obtained from the NRC for alternate burial locations.

D. All disposal activities shall be documented. The documentation shall include descriptions of the waste and the disposal locations, as well as all actions required by this condition. An annual summary of the amounts of waste disposed of from off-site generators shall be sent to the NRC.

10.6 The licensee is authorized to receive and process source materials from the Allied Signal Corporation's Metropolis, Illinois, facility in accordance with the amendment request dated June 15, 1993.

10.7 The licensee is authorized to receive and process source material from Allied Signal, Inc. of Metropolis, Illinois, in accordance with the amendment request dated September 20, 1996, and amended by letters dated October 30, and November 11, 1996.

10.8 The licensee is authorized to receive and process source material, in accordance with the amendment request dated March 5, 1997. [Applicable Amendments: 1]

10.9 The licensee is authorized to receive and process source material from Cabot Performance Materials' facility near Boyertown, Pennsylvania, in accordance with the amendment request dated April 3, 1997, as amended by submittals dated May 19, and August 6, 1997. [Applicable Amendments: 4]

10.10 The licensee is authorized to receive and process source material from the Ashland 2 Formerly Utilized Sites Remedial Action Program (FUSRAP) site, located near Tonawanda, New York, in accordance with the amendment request dated May 8, 1998, as amended by the submittals dated May 27, June 3, and June 11, 1998.

[Applicable Amendment: 6]

SECTION 11: *Monitoring, Recording, and Bookkeeping Requirements*

11.1 The results of sampling, analyses, surveys and monitoring, the results of calibration of equipment, reports on audits and inspections, all meetings and training courses required by this license and any subsequent reviews, investigations, and corrective actions, shall be documented. Unless otherwise specified in the NRC regulations all such documentation shall be maintained for a period of at least five (5) years.

11.2 The licensee shall implement the effluent and environmental monitoring program specified in Section 5.5 of the renewal application, as amended by the submittal dated June 8, 1995, and as revised with the following modifications or additions:

A. Stack sampling shall include a determination of flow rate.

B. Surface water samples shall also be analyzed semiannually for total and dissolved U-nat, Ra-226, and Th-230, with the exception of the Westwater Creek, which shall be sampled annually for water or sediments and analyzed as above. A sediment sample shall not be taken in place of a water sample unless a water sample was not available.

C. Groundwater sampling shall be conducted in accordance with the requirements in License Condition 11.3.

D. The licensee shall utilize lower limits of detection in accordance with Section 5 of Regulatory Guide 4.14 (Revision 1), for analysis of effluent and environmental samples.

E. The inspections performed semiannually of the critical orifice assembly committed to in the submittal dated March 15, 1986, shall be documented. The critical orifice assembly shall be calibrated at least every 2 years against a positive displacement Roots meter to obtain the required calibration curve.

[Applicable Amendment: 5]

11.3 The licensee shall implement a groundwater detection monitoring program to ensure compliance to 10 CFR Part 40, Appendix A. The detection monitoring program shall be in accordance with the report entitled, "Points of Compliance, White Mesa Uranium Mill," submitted by letter dated October 5, 1994, as modified by the following:

A. The leak detection system for all ponds will be checked weekly. If liquid is present, it shall be analyzed for chloride, sulfate, selenium, and pH. The samples will be statistically analyzed to determine if significant linear trends exist, and the results will be submitted to NRC for review.

B. If a significant linear trend is indicated, the licensee will submit a proposed corrective action for review and approval to NRC. The corrective action shall include a discussion on delineation of the areal extent and concentration of hazardous constituents.

C. The licensee shall sample monitoring wells WMMW-5, -11, -12, -14, -15, and -17, on a quarterly basis. Samples shall be analyzed for chloride, potassium, nickel, and uranium, and the results of such sampling shall be included with the environmental monitoring reports submitted in accordance with 10 CFR 40.65.

11.4 During extended periods of mill standby, eight-hour annual sampling for U-nat, Ra-226, Th-230 and Pb-210 may be eliminated if routine airborne sampling show levels below 10 percent of the appropriate 10 CFR Part 20 limits.

During periods of standby, sampling frequencies for area airborne uranium sampling within the mill may be reduced to quarterly, provided measured levels remain below 10 percent of the derived air concentration (DAC). If these levels exceed 10 percent of the DAC, the sampling frequency should follow the recommendations in Regulatory Guide 8.30.

11.5 Calibration of in-plant air and radiation monitoring equipment shall be performed as specified in the license renewal application, under Section 3.0 of the "Radiation Protection Procedures Manual," with the exception that in-plant air sampling equipment shall be calibrated at least quarterly and air sampling equipment checks shall be documented.

11.6 The licensee shall perform an annual ALARA audit of the radiation safety program in accordance with Regulatory Guide 8.31.

SECTION 12: *Reporting Requirements*

12.1 The licensee shall submit to NRC for review, by June 30, 1997, a detailed reclamation plan for the authorized tailings disposal area which includes the following:

A. A post-operations interim stabilization plan which details methods to prevent wind and water erosion and recharge of the tailings area.

B. A plan to determine the best methodology to dewater and/or consolidate the tailings cells prior to placement of the final reclamation cover.

C. Plan and cross-sectional views of a final reclamation cover which details the location and elevation of tailings. The plan shall include details on cover thickness, physical characteristics of cover materials, proposed testing of cover materials (specifications and quality assurance), the estimated volumes of cover materials and their availability and location.

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D. Detailed plans for placement of rock or vegetative cover on the final reclaimed tailings pile and mill site area.

E. A proposed implementation schedule for items A through D above which defines the sequence of events and expected time ranges.

F. An analysis to show that the proposed type and thickness of soil cover is adequate to provide attenuation of radon and is adequate to assure long-term stability, as well as an analysis and proposal on methodology and time required to restore ground water in conformance to regulatory requirements.

G. The licensee shall include a detailed cost analysis of each phase of the reclamation plan to include contractor costs, projected costs of inflation based upon the schedule proposed in item E, a proposed contingency cost, and the costs of long-term maintenance and monitoring.

12.2 The licensee shall submit a detailed decommissioning plan to the NRC at least twelve (12) months prior to planned final shutdown of mill operations.

FOR THE NUCLEAR REGULATORY COMMISSION

Date June 23, 1998

Joseph J. Holonich, Chief
Uranium Recovery Branch
Division of Waste Management
Office of Nuclear Material Safety
and Safeguards

SIZE E

NOTES

1. EXISTING TOPOGRAPHY, SITE FEATURES, AND AREAS EXCEEDING SITE SPECIFIC RADIOLOGICAL GUIDELINES WERE INDICATED ON DRAWINGS PROVIDED BY THE UNITED STATES ARMY CORPS OF ENGINEERS-BUFFALO DISTRICT.
2. MONITORING WELL LOCATIONS WERE OBTAINED FROM DRAWING NUMBER 132-DDXXX-C04 PROVIDED BY THE UNITES STATES ARMY CORPS OF ENGINEERS-BUFFALO DISTRICT.
3. EXACT LOCATION OF EXISTING 20" DIA. CONCRETE WATER LINE SHALL BE VERIFIED THROUGH THE TOWN OF TONAWANDA WATER AND SEWER AUTHORITY.
4. APPROXIMATE LOCATION OF EXISTING INDUSTRIAL LANDFILL WAS OBTAINED FROM FIGURE 1-15 INCLUDED IN THE REMEDIAL INVESTIGATION REPORT FOR THE TONAWANDA SITE, DATED FEBRUARY 1993.
5. PROPERTY LINE LOCATIONS SHALL BE FIELD VERIFIED PRIOR TO REMEDIAL ACTIVITIES.
6. LOCATIONS OF EXISTING MONUMENT NUMBERS 3 AND 4 WERE OBTAINED FROM DRAWING NUMBERS 132-DDXXX-C02 AND 132-DDXXX-C03 PROVIDED BY THE UNITED STATES ARMY CORPS OF ENGINEERS - BUFFALO DISTRICT.
7. APPROXIMATE LOCATION OF EXISTING 48" DIA. WATER MAINS WAS OBTAINED FROM DRAWING NUMBER Ø14-Ø91-2 PREPARED BY DONALD GALLO, CONSULTING ENGINEER, FOR THE ERIE COUNTY WATER AUTHORITY. THE CONTRACTOR SHALL COORDINATE WITH THE ERIE COUNTY WATER AUTHORITY TO SEE IF ANY MEASURES SHALL BE TAKEN TO PREVENT DAMAGE TO THE 48" DIA. WATER MAINS FROM TRUCK TRAFFIC.

REFERENCE DRAWINGS

132-DDXXX-C01	ASHLAND 1, ASHLAND 2, AND SEAWAY SITE AND VICINITY PLAN (BECHTEL)
132-DDXXX-C02	ASHLAND 1, ASHLAND 2, AND SEAWAY OVERHEAD CLEARANCES AT HAUL ROUTES AND RAIL CAR LOADING AREA (BECHTEL)
132-DDXXX-C03	NIAGARA MOHAWK RIGHT-OF-WAY (AT ASHLAND 2) OVERHEAD CLEARANCES AT REMEDIATION AREAS AND HAUL ROUTE (BECHTEL)
132-DDXXX-C04	ASHLAND 1, ASHLAND 2, AND SEAWAY MONITORING WELL LOCATIONS (BECHTEL)
Ø14-Ø91-2	NIAGARA MOHAWK PLAN AND PROFILE STA. 114+65 TO STA. 128+65

LEGEND

- BUILDING
- PROPERTY BOUNDARY
- DITCH/SWALE
- MARSH AREA
- AREAS EXCEEDING SITE SPECIFIC RADIOLOGICAL GUIDELINES
- EXISTING CONTOUR
- TREE LINE
- B55W037S EXISTING MONITORING WELL
- UTILITY POLE
- EXISTING WATER LINE
- EXISTING MONUMENT

SCALE
0 200 400 600 FEET

REV.	DATE	ISSUE DESCRIPTION	DR	CHK	DES	GROUP LEADER	PROJ ENGR
D	5-22-98	RESPONSE TO USACE COMMENTS (5-13-98)	DM	RR	RR		RR
C	4-23-98	RESPONSE TO USACE COMMENTS (4-16-98)	DM	RR	RR		RR
B	4-1-98	RESPONSE TO USACE COMMENTS (3-30-98)	DM	RR	RR		RR
A	3-26-98	ISSUED FOR REVIEW AND COMMENT	DM	RR	RR		RR

U.S. ARMY CORPS OF ENGINEERS
FORMERLY UTILIZED SITES
REMEDIAL ACTION PROGRAM

ICF KAISER ENGINEERS, INC.
PITTSBURGH, PENNSYLVANIA

ASHLAND 1, ASHLAND 2, AND SEAWAY
EXISTING CONDITIONS PLAN

JOB NUMBER	USACE CONTRACT NO.	SCALE
66723	DACA31-95-D-0083	AS NOTED

DRAWING NO.
66723-RD1

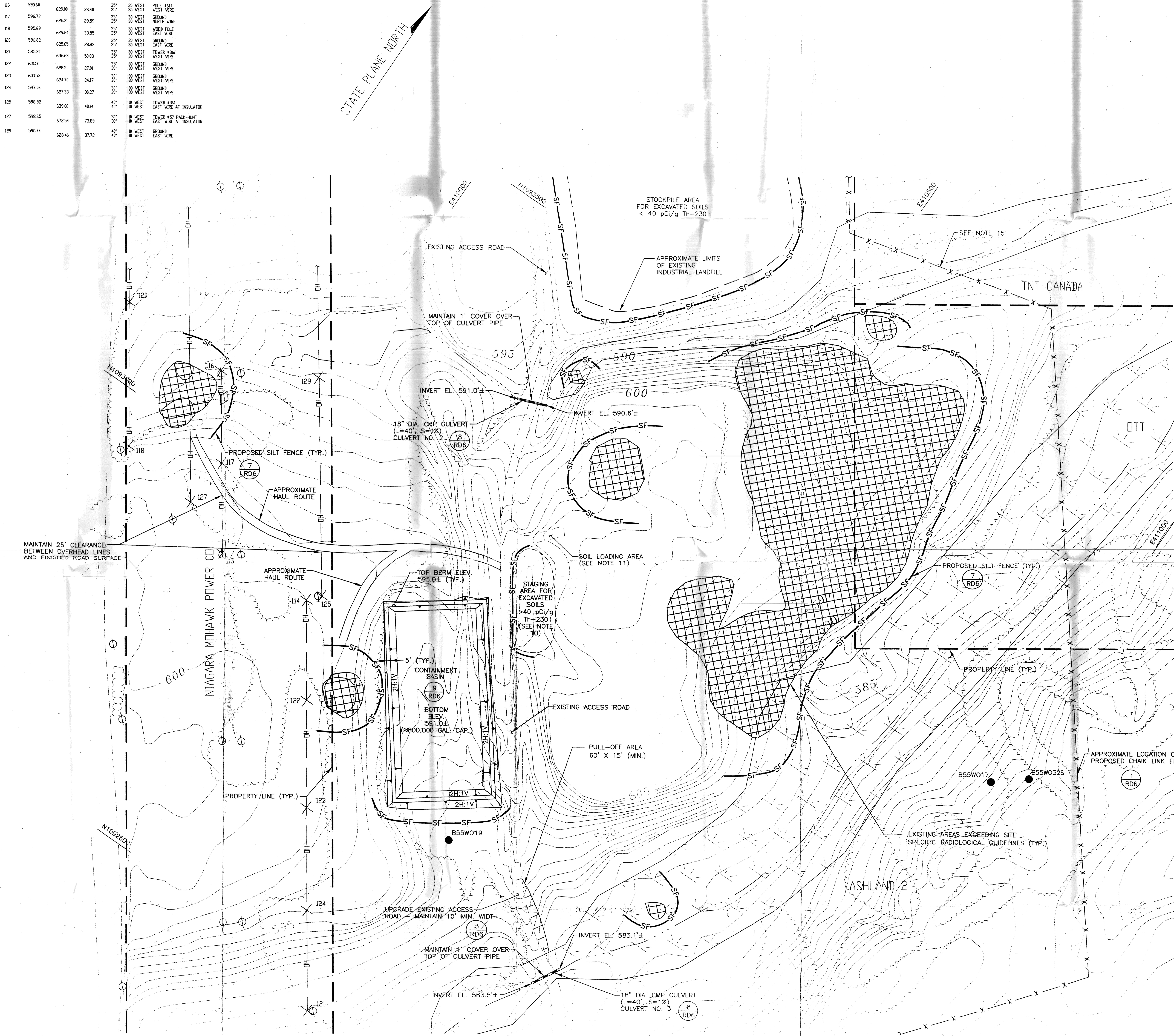
ANSTEC APERTURE CARD

9807100060

SIZE E

EXISTING ELECTRIC OVERHEAD LINE CLEARANCES

POINT	GROUND ELEVATION	WIRE ELEVATION	CLEARANCE IN FEET (SEE NOTE 17)	TEMP.	WIND (MPH)	DESCRIPTION
114	598.87			35°	30 WEST	GROUND
		639.17	40.30	35°	30 WEST	WEST WIRE AT INSULATOR
115	598.69			35°	30 WEST	POLE #613
		633.82	35.13	35°	30 WEST	WEST WIRE
116	590.60			35°	30 WEST	POLE #614
		629.00	38.40	35°	30 WEST	WEST WIRE
117	596.72			35°	30 WEST	GROUND
		626.31	29.59	35°	30 WEST	NORTH WIRE
118	595.69			35°	30 WEST	WOOD POLE
		629.24	33.55	35°	30 WEST	EAST WIRE
120	596.82			35°	30 WEST	GROUND
		625.65	28.83	35°	30 WEST	EAST WIRE
121	585.80			35°	30 WEST	TOWER #362
		636.63	50.83	35°	30 WEST	WEST WIRE
122	601.50			35°	30 WEST	GROUND
		628.51	27.01	30°	30 WEST	WEST WIRE
123	600.53			30°	30 WEST	GROUND
		624.70	24.17	30°	30 WEST	WEST WIRE
124	597.06			30°	30 WEST	GROUND
		627.33	30.27	30°	30 WEST	WEST WIRE
125	598.92			40°	10 WEST	TOWER #361
		639.06	40.14	40°	10 WEST	EAST WIRE AT INSULATOR
127	598.65			30°	10 WEST	TOWER #57 PACK-HUNT
		672.54	73.89	30°	10 WEST	EAST WIRE AT INSULATOR
129	590.74			40°	10 WEST	GROUND
		628.46	37.72	40°	10 WEST	EAST WIRE



NOTES

1. EXISTING TOPOGRAPHY, SITE FEATURES, AND AREAS EXCEEDING SITE SPECIFIC RADIOLOGICAL GUIDELINES WERE INDICATED ON DRAWINGS PROVIDED BY THE UNITED STATES ARMY CORPS OF ENGINEERS-BUFFALO DISTRICT.
2. THE LOCATION AND CONDITION OF EXISTING FENCING SHALL BE DETERMINED IN THE FIELD. ADDITIONAL FENCING OTHER THAN THAT PROPOSED ON THE DRAWING MAY NEED TO BE INSTALLED.
3. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE SPECIFICATIONS.
4. LOCATIONS AND ELEVATIONS OF PROPOSED BASIN, STOCKPILE AREAS, ETC. ARE APPROXIMATE AND MAY BE ADJUSTED AS NEEDED BASED ON FIELD CONDITIONS.
5. EXCAVATION ACTIVITIES SHALL PROGRESS SUCH THAT ALL OPEN EXCAVATION AREAS WILL DRAIN TO A SUMP AREA. MULTIPLE SUMPS MAY BE NEEDED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR SUMP DESIGN. IN GENERAL, ALL RAINFALL FALLING ON EXCAVATED AREA SHALL BE COLLECTED AND PUMPED TO THE CONTAINMENT BASIN.
6. THE CONTAINMENT BASIN SHALL BE CONSTRUCTED AND SILT FENCE SHALL BE INSTALLED PROR TO ANY EARTHMOVING ACTIVITIES.
7. REFER TO DRAWING NUMBER 66723-RD6 FOR CULVERT SCHEDULE.
8. PROPERTY LINE LOCATIONS SHALL BE FIELD VERIFIED PROIR TO REMEDIAL ACTIVITIES.
9. EXISTING DITCHES OR DRAINAGE ALONG ACCESS ROAD SHALL BE UPGRADED AND ADDITIONAL CULVERT PIPES OTHER THAN THOSE SHOWN SHALL BE INSTALLED AS NEEDED TO PROMOTE POSITIVE DRAINAGE.
10. A GEOTEXTILE FABRIC SHALL BE PLACED BENEATH THE SOILS AT THE SOIL STAGING AREA TO ACT AS A MARKER/SEPARATION LAYER.
11. THE CONTRACTOR SHALL GRADE THE INDICATED AREA AND PLACE A LAYER OF WOVEN GEOTEXTILE FABRIC OVERLAIN WITH COMPACTED AGGREGATE. THE AREA SHALL BE OF SUFFICIENT SIZE TO ALLOW DUMP TRUCKS TO STAGE AND BE LOADED WITH SOILS TO BE TAKEN TO THE LOADING FACILITY.
12. THE LIMITS OF EXISTING AREAS EXCEEDING SITE SPECIFIC RADIOLOGICAL GUIDELINES ARE APPROXIMATE AND MAY VARY BASED ON INFORMATION OBTAINED FROM ARGONNE NATIONAL LABORATORY AND THE PRECONSTRUCTION RADIATION SURVEY. SILT FENCE LOCATIONS SHALL BE ADJUSTED ACCORDINGLY SUCH THAT SILT FENCING IS INSTALLED DOWNSLOPE OF ALL EXCAVATION AREAS.
13. LIMITS OF EXCAVATION SHALL BE MINIMIZED TO THE EXTENT POSSIBLE TO ALLOW PROPER REMOVAL OF >40pCi/g SOILS. ADDITIONALLY, ALL EXCAVATION SIDE SLOPES SHALL BE SLOPED OR SHORED IN ACCORDANCE WITH OSHA REGULATIONS.
14. HAUL ROUTES FOR TRANSPORTING SOILS TO THE STAGING AND STOCKPILE AREAS MAY SHIFT OR MOVE AS NEEDED BASED ON AREA BEING EXCAVATED AND SITE CONDITIONS. THE CONTRACTOR SHALL COORDINATE HAUL ROUTE LOCATION TO MINIMIZE OR ELIMINATE POSSIBLE CROSS-CONTAMINATION.
15. IF ACCESS AGREEMENT WITH TNT CANADA IS NOT IMPLEMENTED AT TIME OF CHAIN LINK FENCE INSTALLATION, CONTRACTOR SHALL INSTALL TEMPORARY FENCING ALONG DTT BORDER UNTIL AGREEMENT IS REACHED.
16. ELEVATIONS ON OVERHEAD ELECTRIC LINES WERE OBTAINED FROM DRAWING NUMBER 132-DDXXX-C03 PROVIDED BY THE UNITED STATES ARMY CORPS OF ENGINEERS - BUFFALO DISTRICT.
17. ALTHOUGH OVERHEAD LINE CLEARANCES ARE SHOWN TO THE NEAREST COMPUTED 0.01', DUE TO THE NATURE OF THE GROUND AND WIRES, PRECISION IS MOST LIKELY TO THE NEAREST 0.4'.
18. ADEQUATE CLEARANCE SHALL BE MAINTAINED BETWEEN EQUIPMENT AND OVERHEAD ELECTRIC LINES AS PER NIAGARA MOHAWK POWER CORP. REQUIREMENTS.

REFERENCE DRAWINGS

66723-RD2	SITE PREPARATION/LAYOUT PLAN (ICFKE)
66723-RD6	DETAILS AND SECTIONS (ICFKE)
132-DDXXX-C03	NIAGARA MOHAWK RIGHT-OF-WAY (AT ASHLAND 2) OVERHEAD CLEARANCES AT REMEDIATION AREAS AND HAUL ROUTE (BECHTEL)

LEGEND

- PROPERTY BOUNDARY
- DITCH/SWALE
- MARSH AREA
- AREAS EXCEEDING SITE SPECIFIC RADIOLOGICAL GUIDELINES
- EXISTING CONTOUR
- TREE LINE
- B32W003 EXISTING MONITORING WELL
- UTILITY POLE
- OH EXISTING OVERHEAD ELECTRIC LINE
- 122 OVERHEAD LINE SHOT LOCATION AND NUMBER (BY NBMS)
- PROPOSED CULVERT
- X PROPOSED CHAIN LINK FENCE
- SF PROPOSED SILT FENCE
- DETAIL NUMBER / DRAWING NUMBER WHERE DETAIL IS SHOWN

SCALE 0 50 100 150 FEET

REV.	DATE	ISSUE DESCRIPTION	BY	CH'K	ENG'R	GROUP LEADER	PROJ. ENG'R
B	5-22-98	RESPONSE TO USACE COMMENTS (5-13-98)	DE	RR	RR		RR
A	4-23-98	ISSUED FOR REVIEW AND COMMENT	DE	RR	RR		RR

U.S. ARMY CORPS OF ENGINEERS
FORMERLY UTILIZED SITES
REMEDIAL ACTION PROGRAM

ICF KAISER ENGINEERS, INC.
PITTSBURGH, PENNSYLVANIA

ASHLAND 2
EXCAVATION PLAN

AMSTEC APERTURE CARD

JOB NUMBER	USACE CONTRACT NO.	SCALE
66723	DACA31-95-D-0083	AS NOTED

DRAWING NO.
66723-RD5

9807100061

34 X 44