INTERNATIONAL
URANIUM (USA)
CORPORATION

40-8681

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June 15, 2001

VIA OVERNIGHT MAIL

Mr. Melvyn Leach, Branch Chief
Fuel Cycle Licensing Branch
Mail Stop T-8A33
Office of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
2 White Flint North
11545 Rockville Pike
Rockville, MD 20852-2738

Re: Amendment Request to Process an Alternate Feed Material from the Maywood FUSRAP Site at the White Mesa Uranium Mill
Source Material License No. SUA-1358

Dear Mr. Leach:

International Uranium (USA) Corporation ("IUSA") hereby submits the enclosed request to amend Source Material License No. SUA-1358 to authorize receipt and processing of a uranium-bearing alternate feed material. For ease of reference, this material is referred to herein as the "Uranium Material". The Uranium Material will be removed by a U.S. Army Corps of Engineers ("USACE", or the "Corps") contractor from the Maywood Site (the "Maywood Site") in Maywood, New Jersey, which is being managed under the Formerly Utilized Sites Remedial Action Program ("FUSRAP"). The Maywood Site encompasses 88 properties located in the northern New Jersey communities of Maywood, Rochelle Park, and Lodi.

The Maywood Chemical Works ("MCW") began operations at the Maywood Site in 1895. MCW processed uranium and thorium-bearing monazite sands from 1916 to 1956 for extraction of thorium and rare earth elements. Until World War II, the thorium was used for production of thorium nitrate for preparation of gas lantern mantles, and other thorium products. During World War II, MCW processed a portion of the monazite sands for recovery of lanthanum, for production of lanthanum oxide. The uranium contained in the monazite sands was not extracted at the site, and remains in the process residues.

MCW used processing residues, containing uranium and thorium, as fill in a low-lying portion of the property, and later constructed additional buildings on this fill. MCW also used land areas outside of its property boundary as dumping areas, and disposed of uranium and thorium-bearing process residues and other process wastes on these additional areas. In 1932, New Jersey Route 17 was constructed on a portion of the offsite land containing uranium and thorium-bearing process residues. Wastes from the offsite areas were also used by nearby property owners as fill

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material. Uranium and thorium-bearing process residuals also migrated into Lodi Brook and were transported by this surface water channel, resulting in contamination of additional properties. These properties were later developed for both commercial and residential use.

MCW ceased production of thorium in 1956 and processing of monazite stands in 1957. The Stepan Chemical Company (the "Stepan Company") purchased the MCW operation in 1959 and renewed the AEC license in 1961. Stepan Chemical did not perform any thorium processing, and attempted to sell the existing remaining inventories of thorium that were already on site.

The Stepan Company began cleanup of the various uranium and thorium-bearing residue piles in 1963. Between that date and 1968, the Stepan Company consolidated and buried over 19,000 cubic yards ("CY") of such residuals in three burial areas east of Route 17 known as Pits 1, 2 and 3. In 1983, the presence of uranium and thorium contamination was identified throughout the vicinity properties. The Maywood site was added to the National Priorities List, and the U.S. Department of Energy ("DOE") was assigned responsibility for cleanup.

USDOE began cleanup of the site and vicinity residential properties in 1984, and purchased a portion of the Stepan Company property for storage of material excavated during removal actions. The material removed from 25 of the vicinity properties was stored on a portion of the site that is now referred to as the Maywood Interim Storage Site ("MISS"). USDOE managed the material excavated during the remedial actions as 11e.(2) byproduct material. Between 1994 and 1996, USDOE shipped 35,000 CY of this material for off site disposal at facilities licensed for management of 11e.(2) byproduct material. In 1995, USDOE published an Engineering Evaluation/Cost Assessment ("EE/CA") for the remainder of the removal actions needed at the site and vicinity properties. In 1997, responsibility for the FUSRAP program, including the Maywood Site, was transferred from USDOE to the U.S. Army Corps of Engineers ("USACE").

Analytical data provided to IUSA indicate uranium content ranging from non-detectable to approximately 0.06 weight percent uranium (0.072 weight percent U_3O_8), or greater, with an estimated average grade of 0.0018 percent uranium (0.0022 weight percent U_3O_8) for the entire Maywood Site. However, IUSA intends to accept Uranium Material for processing at the Mill (the "IUSA Uranium Material") only if the cutoff criteria that are described in the attached amendment request, to ensure a minimum level of estimated uranium in the IUSA Uranium Materials, are satisfied.

Based on information available from USACE, the total volume of Uranium Material remaining to be removed and shipped from the MISS and adjacent areas is expected to be approximately 336,000 cubic yards ("CY") (or approximately 470,000 tons), although this amount could significantly increase during the excavation process. The IUSA Uranium Material will form only a portion of this amount, although it is impossible at this time to estimate with any accuracy the total expected amount of IUSA Uranium Material. As a result, to ensure that IUSA will not have to reapply for an increased Uranium Material volume, this amendment request is for up to 600,000 CY (840,000 tons) of Uranium Material.

At this time, IUSA does not have a subcontract with the USACE prime contractor, Stone & Webster, Inc. ("S&W") for receipt of the Uranium Material. IUSA is requesting this license amendment in order to qualify to bid on and receive the IUSA Uranium Material, which is a portion of the Uranium Material from this site. The USACE bidding schedule for this site requires that IUSA receive license amendment approval as soon as possible in order to demonstrate qualification to accept the IUSA Uranium Material before proposed initial shipments from the Maywood Site begin as early as the fourth quarter of 2001.

It is our understanding that for the Maywood Site, USACE could be expected to ship the Uranium Material to one or more facilities licensed either to recycle Uranium Material for the extraction of uranium and disposal of resulting byproduct, or to directly dispose of Uranium Material. If IUSA were selected by USACE to receive the IUSA Uranium Material, it would be processed in a similar manner as our conventional ores, for the extraction of uranium.

The processing of the IUSA Uranium Material will not cause 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 the process will be essentially unchanged, and as the IUSA Uranium Material is similar in content to the Mill's existing tailings, this amendment will result in no significant environmental impacts beyond those originally evaluated.

The disposal of the 11e.(2) byproduct material resulting from processing the IUSA Uranium Material will not change the characteristics of the Mill tailings from the characteristics associated with normal milling operations. While the Uranium Material originated from uranium and thorium-bearing monazite sands, a good portion of the thorium was removed in the thorium recovery processes at MCW, and as a result, the Uranium Material has a relatively low thorium content compared to other alternate feeds for which IUSA has already received license amendments. The thorium-232 content for the Maywood Site overall ranges from non-detectable to 3,800 pCi/g with a preliminary estimated overall average of approximately 970 pCi/g. This average is comparable to the thorium content in natural ores and in other licensed alternate feeds such as the uranium materials from Heritage, and the Ashland 2 FUSRAP site. Therefore, IUSA anticipates that there will be no incremental public health, environmental, or safety concerns resulting from the thorium content of the IUSA Uranium Material.

It will be a condition of the license amendment that the Mill shall not accept any IUSA Uranium Material at the site until IUSA has determined, in accordance with a SERP-approved procedure, that the Mill has sufficient licensed tailings capacity. The tailings capacity must be sufficient to permanently store:

(a) all 11e.(2) byproduct material that would result from the processing of all the IUSA Uranium Material;
(b) all other ores and alternate feed materials on site; and
(c) all other materials required to be disposed of in the Mill's tailings impoundments pursuant to the Mill's reclamation plan.

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

INTRODUCTION

1.0 Material Composition and Volume
- 1.1 General
- 1.2 Radiochemical Data
- 1.3 Cutoff Level for IUSA Uranium Material
- 1.4 Hazardous Constituent Data
- 1.5 Regulatory Considerations

2.0 Transportation Considerations

3.0 Process

4.0 Safety Measures
- 4.1 Radiation Safety
- 4.2 Control of Airborne Contamination
- 4.3 Vehicle Scan

5.0 Other Information
- 5.1 Added Advantage of Recycling

CERTIFICATION

Attachment 1	Maywood Site Location Maps, Volume Estimates and Process History
Attachment 2	Uranium Content Estimates, Material Description, and Analytical Data, for the Maywood Site
Attachment 3	IUSA/UDEQ Hazardous Waste Protocol
Attachment 4	Review of Constituents in Maywood Site Uranium Materials to Determine Potential Presence of RCRA Listed Hazardous Waste
Attachment 5	IUSA Letters to ICFKE and IT Regarding Sampling Procedures on Similar Projects
Attachment 6	White Mesa Mill Equipment Release/Radiological Survey Procedure
Attachment 7	USACE Value Engineering Proposal for Ashland 1 and Ashland 2.

To ensure that all pertinent information is included in this and anticipated supplemental submittals, 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).

- U.S. Nuclear Regulatory Commission Interim Alternate Feed Guidance as published in NRC's Regulatory Issue Summary 2000-23 (November 30, 2000)

- Energy Fuels Nuclear ("EFN") request to the NRC for the amendment to process uranium-bearing potassium diuranate ($K_2U_2O_7$) 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.

- IUSA request to the NRC for the amendment to process uranium-bearing material from U.S. Army Corps of Engineers Ashland 2 Site.

- NRC and State of Utah comments and requests for information relative to the IUSA request for the Ashland 2 Site alternate feed amendment, and procedures for determining whether or not the materials contain listed hazardous wastes.

- IUSA request to the NRC for license amendment to process uranium bearing material from US Army Corps of Engineers Ashland 1 Site.

- IUSA request to the NRC for license amendment to process uranium bearing material from US Army Corps of Engineers St. Louis Site.

- IUSA request to the NRC for license amendment to process uranium bearing material from US Army Corps of Engineers Linde Site.

- Protocol for Determining Whether Alternate Feed Materials Are Listed Hazardous Wastes, developed by IUSA with the concurrence of Utah DEQ, November 1999.
- NRC Initial Decision, February 9, 1999, in the Matter of IUSA Receipt of Material from Tonawanda, New York.
- NRC Memorandum and Order, February 14, 2000, in the Matter of IUSA Receipt of Material from Tonawanda, New York, Affirming the Presiding Officers' Initial Decision to Uphold the Ashland 2 License Amendment.
- IUSA request to the NRC for license amendment to process uranium bearing material from W.R. Grace Corporation.
- IUSA request to the NRC for license amendment to process uranium bearing material from W.R. Heritage Minerals, Inc.

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 review the enclosed information, and then attempt to reply to this request within 30 days of submittal.

IUSA understands that some of the removal actions at the Maywood Site are already underway at this time. Although IUSA does not have a subcontract with the USACE contractor at this time, if this request is approved, shipments to the Mill could be expected to begin as soon as early as the fourth quarter of 2001.

As described above, prompt review of this submittal will allow USACE to consider IUSA to reprocess Uranium Material that would otherwise require direct disposal at other facilities. I can be reached at (303) 389-4131

Sincerely,

Michelle R. Rehmann
Environmental Manager

MRR/smc

Attachments

cc: William Von Till/NRC

Ron F. Hochstein
Harold R. Roberts
David C. Frydenlund
William N. Deal
Ronald E. Berg
William Sinclair/UDEQ
Don Verbica/UDEQ

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

June 15, 2001

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Attachment 4	This attachment will be submitted separately.
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INTRODUCTION

International Uranium (USA) Corporation ("IUSA") operates the NRC-licensed White Mesa uranium mill (the "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 byproducts from other extraction procedures, which IUSA processes at IUSA's licensed uranium mill, primarily for their source material content. All waste associated with IUSA's processing is therefore 11e.(2) byproduct material.

This application to amend NRC Source Material License No. SUA-1358 requests an amendment to allow IUSA to process a specific alternate feed, and to dispose of the resulting 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 ("TPY") 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 No. SUA-1358 to authorize receipt and processing of certain uranium-bearing byproducts, which byproducts originally resulted from the processing of monazite sands for the recovery of thorium. For ease of reference, this byproduct material is referred to herein as the "Uranium Material". The Uranium Material is located at properties being managed under the Formerly Utilized Sites Remedial Action Program ("FUSRAP") in Bergen County, New Jersey known as the Maywood FUSRAP Site (the "Maywood Site").

The Uranium Material will be transported by a U.S. Army Corps of Engineers ("USACE", or the "Corps") subcontractor, as part of the FUSRAP Program, from the Maywood site to the Mill. A historic summary of the sources of the Uranium Material is provided below. This history was derived from the documents listed on page 4 of this Amendment Request.

1.1 Historical Summary of Sources

The Maywood Site encompasses 88 properties located in the northern New Jersey communities of Maywood, Rochelle Park, and Lodi. The regional setting of the Maywood site is shown in Drawing #1 of Attachment 1. Drawing #2, also in Attachment 1, shows the specific location of the areas to be remediated at the Maywood site.

The Maywood Chemical Works ("MCW") began operations at the Maywood Site in 1895. The plant produced lithium compounds, detergents, and alkaloids and essential oils from natural plant

sources. MCW also processed monazite sands from 1916 to 1956, for extraction of thorium and rare earth elements. The primarily domestic monazite ore underwent rough mechanical concentration to remove the light sands, followed by fine separation by either gravitational, electromagnetic, or electrostatic separation techniques. Until World War II, the thorium was used for production of thorium nitrate for preparation of gas lantern mantles, and other thorium compounds. During World War II, MCW processed a portion of the monazite sands for recovery of lanthanum, for production of lanthanum oxide. The lanthanum oxide was transferred to other facilities for use in manufacture of optical lenses for the U.S. Army.

MCW used processing residues, containing uranium and thorium, as fill in a low-lying portion of the property, and later constructed additional buildings on this fill. MCW also used land areas outside of its property boundary (primarily to the west of the site) as dumping areas, and disposed of uranium and thorium-bearing residues and other process wastes on these additional areas. In 1932, New Jersey Route 17 was constructed on a portion of the offsite land containing uranium and thorium-bearing process residues. Wastes from the offsite areas were also used by nearby property owners as fill material. Between 1940 and 1983, MCW also constructed six retention ponds (which have since been closed and revegetated) for additional tailings. Between 1940 and 1983, additional material was also deposited in surface mounds near these ponds. Uranium and thorium-bearing process residuals also migrated into Lodi Brook and were transported by this surface water channel, resulting in contamination of additional properties. These properties were later developed for both commercial and residential use.

MCW obtained a source material license from the Atomic Energy Commission ("AEC") in 1954, for possession and processing of source material. MCW stopped production of thorium in 1956 and stopped the processing of monazite stands in 1957. The Stepan Chemical Company (the "Stepan Company"), a pharmaceutical firm, purchased the MCW operation in 1959 and renewed the AEC license in 1961. The Stepan Company did not perform any thorium processing, and attempted to sell off existing inventories of thorium already on site. The Stepan Company later renewed the AEC license for continued storage of remaining thorium product.

The Stepan Company began cleanup of the various uranium and thorium-bearing residue piles in 1963. From that date through 1968, the Stepan Company consolidated and buried over 19,000 cubic yards ("CY") of uranium and thorium-bearing residuals in three burial areas east of Route 17 known as Pits 1, 2 and 3. The AEC Source Material License expired in 1972. In 1976, the NRC required the Stepan Company to renew their license for management of the uranium and thorium-bearing residue pits remaining on site. The Stepan Company remained a licensee from 1976 to 1983. During that time, the presence of uranium and thorium contamination was identified at neighboring properties throughout the vicinity. In 1983 the Maywood site was added to the National Priorities List, and U. S. Department of Energy ("USDOE") was assigned responsibility for cleanup. At that time USDOE and the U.S. Environmental Protection Agency ("EPA") negotiated a Federal Facilities Agreement ("FFA") governing remediation of the Maywood site.

USDOE began cleanup of the site and vicinity residential properties in 1984, and purchased a portion of the Stepan Company property for storage of material excavated during removal actions.

Material removed from 25 of the vicinity properties was stored in an engineered cell referred to as the Maywood Interim Storage Site ("MISS"). USDOE managed the material excavated during the remedial actions as 11e.(2) byproduct material. Between 1994 and 1996, USDOE shipped 35,000 CY of this material for off site disposal at facilities licensed for management of 11e.(2) byproduct material. In 1995, USDOE published an Engineering Evaluation/Cost Assessment ("EE/CA") for the remainder of the removal actions needed at the site and vicinity properties. In 1997, responsibility for the FUSRAP program, including the Maywood Site, was transferred from USDOE to the U.S. Army Corps of Engineers ("USACE"). All actions by the USACE at the Maywood Site are being conducted subject to the administrative, procedural and regulatory provisions of the Comprehensive Environmental Response Compensation and Liability Act ("CERCLA") and a revised FFA renegotiatated between USACE and USEPA.

The FFA divided the Maywood Site site into four operable units ("OUs"):

1) Portions of the Stepan Site
2) The Maywood Interim Storage Site ("MISS") including two sub-areas:
   - the MISS Pile, and
   - other contaminated media at MISS
3) Residential Vicinity properties
4) Governmental and Commercial Vicinity properties

As determined by the FFA, the overall site remediation is being addressed through separate Remedial Investigation/Feasibility Study ("RI/FS") Reports for the Maywood Site and the Stepan Site. USDOE and USACE have prepared an RI/FS for the radioactive contamination at the MISS and Stepan properties, the vicinity properties, and other areas of these sites associated with thorium, lanthanum, and uranium and thorium residue management. The Stepan Company prepared an RI/FS addressing non-radioactive chemical contamination at the Stepan Site, Sears, and adjacent properties. The activities of both programs are being supervised and coordinated by USEPA Region II.

USDOE issued a Final RI report for the Maywood Site in 1992 (USDOE, December 1992). The Stepan Company issued a Final RI report for the chemical contamination areas of the site in 1994 (Stepan Chemical Company, November 1994). As a result, sufficient characterization information on the nature and extent of contamination is already available to assess the composition and sources of Uranium Material to be excavated. It is known, according to information provided by the USACE contractor in the 2001 Request for Proposal for Transportation and Disposal Services for the Maywood Site, that USDOE found no RCRA hazardous waste during the sampling and analytical program for the RI.

Physically, the Uranium Material is a soil-like material consisting of byproducts from monazite sands processing operations (i.e., "tailings"), mixed with site soils. Based on information available from USACE, the volume of Uranium Material remaining to be removed and shipped from the MISS and adjacent areas is expected to be approximately 336,000 cubic yards ("CY") (or approximately 470,000 tons), although this amount could significantly increase during the

excavation of the onsite areas and the remainder of the vicinity properties. IUSA intends to accept only those Uranium Materials that satisfy the cut-off requirements referred to in Section 1.3 below (the "IUSA Uranium Material"), that are designed to ensure a minimum level of estimated uranium content in the IUSA Uranium Material. The IUSA Uranium Material comprises only a portion of the total Uranium Material, although it is impossible at this time to estimate the actual amount with any accuracy (preliminary estimates of the volume of the IUSA Uranium Material are approximately 206,000 CY). Pre-excavation estimates at other FUSRAP sites have been as low as one-half the actual excavated volume. Therefore, to ensure that IUSA will not have to reapply for an increased volume from this site in the future, this request is for up to 600,000 CY (840,000 tons) of IUSA Uranium Material.

As described in detail below, 600,000 CY of IUSA Uranium Material would not approach the Mill's currently approved yellowcake production limit of 4,380 TPY, and as, even without reprocessing, the composition of the Uranium Materials is very similar to the Mill's existing tailings, added volumes of Uranium Material will have no adverse effect on public health, safety, and the environment.

USACE expects to excavate and deliver the Maywood Site Uranium Material over a period seven years or longer. IUSA has previously received NRC approval for license amendments to process Uranium Material from several other FUSRAP sites. If the entire volume of Maywood material were received during a period that overlapped with shipments of these other materials, the processing of the total estimated volume in any one year would not come near the Mill's currently approved yellowcake production limit of 4,380 TPY.

Additional information on the Maywood site is contained in Attachments 1 and 2. Attachment 1 includes the following items describing the Uranium Materials and the Maywood site operational history:

1. A detailed site history of the Maywood Site, is provided in the Executive Sumamry and Chapter 4 of the Remedial Investigation Report for the Maywood Site (USDOE, December 1992) (the "RI").

2. Additional Site history is provided in the Executive Summary of the Remedial Investigation Report ("the Stepan RI") for the Stepan Chemical Site (CH2MHill, November 1994)

3. Additional detail on the remedial action history is provided in Section 2 of the Engineering Evaluation/Cost Analysis for the Maywood Site (USDOE, September 1995).

Attachment 2 includes the following items describing the composition of the Uranium Materials:

1. Tables from Chapter 4 of the RI Report for the Maywood Site (USDOE, December, 1992) describe uranium concentrations in surface and subsurface samples at the Maywood site.

2. A summary of the concentrations of metal, rare earth and organic chemical contaminants is provided in additional Tables from Chapter 4 of the RI Report

1.2 Radiochemical Data

Process history demonstrates that the Uranium Material at the Maywood property resulted from the processing of monazite sands for recovery of thorium. The USACE has classified the portions of the Maywood Uranium Material which have already been shipped off site for disposal, as 11e.(2) byproduct material. It is IUSA's understanding, from discussions with USACE's contractor, Stone & Webster ("S&W"), that USACE also plans to classify a portion of the Uranium Material as pre-1978 11e.(2) byproduct material.

A number of radiological surveys have been conducted at the Maywood site and vicinity properties, which included evaluation of radiological contamination in soils:

- Radiological Survey of Stepan Chemical Company and Surrounding Area, April 1981
- Radiological Surveys of Residential Properties, 1986 through 1989
- Individual Radiological Characterization Reports for Flint Ink, National Community bank, Gulf Gas Station, Interstate 80 properties, 1989
- Individual Radiological Characterization Reports for Susquehanna & Western Railroad, NJ Route 17, 1986
- Individual Radiological Characterization Reports for Bergen Cable, AMF/Voit, Sears, NJ Vehicle Inspection Station, the MISS, Federal Express, Hunter Douglas, Sunoco Gas, 1987

Results of all the foregoing studies were summarized in the Remedial Investigation Report for the Maywood Site.

Site history and available data from over 4,000 samples indicate that recoverable uranium is present in the Uranium Material. Analytical data provided to IUSA indicate uranium content ranging from non-detectable to approximately 0.06 weight percent uranium (0.072 weight percent U_3O_8), or greater, with an estimated average grade of 0.0018 percent uranium (0.0022 weight percent U_3O_8) for the entire Maywood Site. IUSA understands that the USACE contractor plans to issue multiple contracts for transportation and recycling and/or disposal of various portions of the Uranium Material. IUSA further understands that the USACE contractor plans to ship Uranium Material containing non-significant levels of uranium to other facilities. However, as discussed in Section 1.3 below, IUSA intends to accept only those Uranium Materials that meet the cutoff requirements referred to in Section 1.3 below, that are devised to ensure a minimum level of estimated uranium content in the Uranium Material accepted by the Mill.

Although the Uranium Material originated from uranium and thorium- bearing monazite sands, a good portion of the thorium was removed in the thorium recovery processes at MCW, and as a result, the Uranium Material has a relatively low thorium content compared to other alternate feeds for which IUSA has already received license amendments. The thorium-232 content for the

Maywood Site overall ranges from non-detectable to 3,800 pCi/g with an preliminary estimated overall average of approximately 970 pCi/g. This average is comparable to the thorium content in natural ores and in other licensed alternate feeds such as the uranium materials from Heritage, and the Ashland 2 FUSRAP site. Therefore, IUSA anticipates that there will be no incremental public health, environmental, or safety concerns resulting from the thorium content of the IUSA Uranium Material.

The EE/CA for the Maywood Site indicates that on these properties, soils will be excavated which exceed the cleanup criteria of 5 piC/g above background at all depths for radium and thorium combined for the vicinity properties. The cleanup criteria for the vicinity properties are described in detail in Section 2.4 of the EE/CA, provided in Attachment 2. Site specific cleanup criteria are still being developed for the MISS and Stepan OUs. However, according to information provided by USACE/IT in the 2001 request for Proposal, it appears that an overall average uranium concentration for all soils to be managed over the life of the project may be approximately 0.0018 percent, with hot spots ranging up to 0.06 percent, as stated above.

1.3 Cut-Off Level for IUSA Uranium Material

IUSA plans to accept only that portion of the Uranium Material that meets specific cut-off criteria designed to ensure a minimum level for estimated uranium content. IUSA is currently developing the specific details of those criteria and procedures for its application to the Uranium Material. This information will be provided to NRC in a separate submittal to follow this application.

1.4 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 Resource Conservation and Recovery Act ("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.

1.4.1 IUSA/UDEQ Hazardous Waste Protocol

In a recent decision regarding the Mill, the Atomic Safety and Licensing Board Presiding Officer suggested there was a general need for more specific protocols for determining if alternate feed materials contain hazardous components. In their Memorandum and Order of February 14, 2000, the Commission concluded that this issue warranted further staff refinement and standardization.

IUSA has been cognizant of the need for specific protocols to be used in making determinations as to whether or not any alternate feeds considered for processing at the Mill contain listed hazardous wastes, and has taken a pro-active role in the development of such a protocol. IUSA has established a "Protocol for Determining Whether Alternate Feed Materials are Listed Hazardous Wastes" (November 22, 1999). This Protocol has been developed in conjunction with, and accepted by, the State of Utah Department of Environmental Quality ("UDEQ") (Letter of December 7, 1999). Copies of the Protocol and UDEQ letter are provided in Attachment 3. The provisions of the protocol can be summarized as follows:

- In all cases, the protocol requires that IUSA perform a source investigation to collect information regarding the composition and history of the material, and any existing generator or agency determinations regarding its regulatory status.

- The protocol states that if the material is known -- by means of chemical data or site history -- to contain no listed hazardous waste, or if an agency has agreed with a generator that the material is not RCRA listed waste, or made a contained-out determination, IUSA and UDEQ will agree that the material is not a listed hazardous waste. (The contained-out determination specified in the protocol is designated by various state agencies as a "contained-in policy", a "contained-out decision", or both).

- If such a direct confirmation is not available, the protocol describes the additional chemical process and material handling history information that IUSA will collect and evaluate to assess whether the chemical contaminants in the material resulted from listed or non-listed sources.

- The protocol also specifies the situations in which ongoing confirmation/acceptance sampling will be used, in addition to the chemical process and handling history, to make a listed waste evaluation.

- If the results from any of the decision steps indicate that the material or a constituent of the material did result, or most likely resulted, from a RCRA listed hazardous waste or RCRA listed process, the material is rejected.

- The protocol also identifies the types of documentation that IUSA will obtain and maintain on file, to support the assessment for each different decision scenario.

The above components and conditions of the Protocol are summarized in a decision tree diagram, or logic flow diagram, included in Attachment 3, and hereinafter referred to as the "Protocol Diagram". Once IUSA has received the remainder of the chemical characterization documentation for the Maywood Site, IUSA's evaluations of chemical constituents in the Uranium Material will be conducted in conformance with this protocol. The discussion of this evaluation, below, will refer to action boxes and decision diamonds in the Protocol Diagram.

1.4.2 Historic Data Review

In accordance with Box 1 of the Protocol Diagram, IUSA conducted a Source Investigation of historical data available for the Maywood Site. The historical data review included a review of site operational history, chemical contamination information, remediation planning documents and agency determinations available to date. The information reviewed is described in this section.

A detailed site characterization of the Maywood property was conducted by USDOE and described in the RI. Chemical data from the RI have been provided in Attachment 2. The studies include a detailed site and area history; uranium activity data; and metals and organic contaminant concentration data.

As stated above, according to statements by Stone and Webster (the USACE Contractor, "S&W" herein), USDOE found no RCRA hazardous wastes at the Maywood site properties in the characterization studies for the RI.

1.4.3 Consistency of USDOE/USACE Approach with IUSA/UDEQ Hazardous Waste Protocol

As described above, the RI/FS process for the Maywood site has been developed by USDOE/USACE in conjunction with USEPA Region 2, the agency with has regulatory authority over the site. New Jersey Department of Environmental Protection and Energy (NJDEPE) has also concurred with the FFA and the findings to date. USDOE concluded from the RI and background studies that:

- All the radionuclides at MISS appear to be related to the monazite/thorium activity at MCW.
- The rare earth elements appear to be related to the monazite/thorium activity, the lanthanum production activity, or the lithium production activity at MCW.
- The metals and organic chemical characterization indicated that there is no RCRA hazardous waste present at the Maywood Site.

IUSA has determined that the USDOE, USACE, and USEPA finding that the Maywood Site contains no RCRA hazardous waste was based on a rationale consistent with the decision logic in the IUSA/UDEQ Hazardous Waste Protocol.

1.4.4 Review by IUSA Independent Consultant

In addition, as discussed above, IUSA engaged an independent consultant, experienced in chemical process engineering, to review the site history, characterization information, and IUSA protocol, and to make an independent assessment regarding the regulatory determinations made on the Uranium Material. This evaluation included a review of the documents identified above as well as publicly available information on Maywood and Stepan operations obtained from the USACE

Maywood Site Public Information Office web page, the USDOE Baseline Environmental Management Report ("BEMR") web page, and the USEPA Superfund web page, namely:

- FUSRAP Maywood Site History and Background (USACE, November 1997),
- BEMR Maywood Site Summary (USDOE, November 1999), and
- NPL Site Narrative at Listing (USEPA Federal Register Notice, September 8, 1983)

The process source evaluation performed by IUSA's independent consultant is provided in Attachment 6. The consultant has concluded that based on the contamination information currently available:

1. None of the PAHs or phthalates at any of the four Maywood site operable units came from RCRA listed hazardous waste sources. This determination is consistent with Box 8 and Decision Diamonds 9 through 11 in the IUSA/UDEQ Protocol Diagram.

2. None of the VOCs at any of the four Maywood site operable units came from RCRA listed hazardous waste sources. This determination is consistent with Box 8 and Decision Diamonds 9 through 11 in the IUSA/UDEQ Protocol Diagram.

3. None of the metals at any of the four Maywood site operable units came from RCRA listed hazardous waste sources. This determination is consistent with Box 8 and Decision Diamonds 9 through 11 in the IUSA/UDEQ Protocol Diagram.

4. None of the rare earth elements at any of the four Maywood site operable units came from RCRA listed hazardous waste sources. This determination is consistent with Box 8 and Decision Diamonds 9 through 11 in the IUSA/UDEQ Protocol Diagram.

1.4.5 Proposed Confirmatory Sampling and Analysis

In addition to the chemical sampling reported in the RI documents, in order to confirm that material shipped to the Mill complies with the IUSA's Radioactive Material Profile record and, contains no RCRA listed wastes, the USACE contractor will perform three levels of sampling on soils from the Maywood site excavation areas as described below.

The sampling will be similar to the sampling performed by IT Corporation ("IT") the USACE contractor at the Ashland 1 and Ashland 2 sites. The sampling is described in the IUSA letter to ICFKE, dated July 23, 1998, regarding Ashland 2 Confirmatory Sampling, the IUSA letter to Don Verbica, State of Utah DEQ, dated September 4, 1998 regarding ICFKE sampling methodologies at Ashland 2, and the IUSA letter to IT, dated October 20, 1998 regarding sampling at Ashland 1. Copies of these letters are provided in Attachment 5.

Pre-Excavation Profile Sampling

First, prior to development of their site Excavation and Restoration Plan, the USACE contractor will perform pre-excavation sampling ("profile sampling") within the areas determined in the Maywood RI report to contain radiological contamination. The main purpose of the profile sampling is to confirm the extent of radiologic contamination and the boundaries of the remedial excavation. However, samples from within the radiologically contaminated area will also be analyzed according to methods outlined in EPA Guidance SW846 for total Volatile Organic Compounds ("VOCs") and Semivolatile Organic Compounds ("SVOCs"), as well as hazardous characteristics including TCLP.

The USACE contractor will use the profile sampling results, together with other site characterization data, to determine whether any new chemical components are identified within the zone of excavation, that could be RCRA listed hazardous wastes. This data will be provided to IUSA as part of the material profile that will be required by IUSA's subcontract with the USACE prime contractor.

Post-Excavation Confirmatory Sampling

Second, as described above, the USACE contractor will have an approved confirmatory sampling plan in place prior to start of excavation. Upon excavation of the radiologically contaminated material, the USACE contractor will perform additional chemical analyses in accordance confirmatory sampling plan. As a condition of our subcontract, IUSA will require that this sampling be performed at a minimum frequency of one composite sample of six random grabs per 500 CY.

Sampling of Visible Contamination

As a precautionary measure, the excavated material may undergo a third type of sampling. If any excavated pile shows visible indications of organic contamination, such as staining or chemical odor, or which indicates the presence of organics when scanned by a photoionization detector ("PID") IT will, if it has not done so otherwise under the confirmatory sampling plan, collect a random sample in the most visibly contaminated part of the pile, and perform similar analyses in conformance with the confirmatory sampling plan.

Any material that is determined to contain listed hazardous wastes, during any of the three sampling sets, will not be included in the Uranium Material to be shipped to the White Mesa Mill. IUSA will require contractually that the USACE contractor prepare a Sampling and Analysis Plan ("SAP") for this confirmatory sampling program, and make the SAP and resulting analytical data available to the NRC at the NRC's request.

If any new compounds are detected, USACE/S&W will assess whether or not they are from RCRA listed sources. If they are determined to be from potentially listed sources, the material will not be shipped to the Mill.

As a condition of the Transportation and Disposal subcontract, S&W will require that disposal or recycling subcontractors accept title to the material when it is received at the disposal or recycling facility gate. S&W plans to provide all results of on-site characterization at the Maywood site to the receiving facilities before material is shipped from the Maywood site, so that the receiving facilities can confirm that the material complies with their respective acceptance criteria, before it is en route. At this time, IUSA does not propose to perform on-site acceptance sampling of Maywood Uranium Material received at the Mill, because the terms of the potential contract will not allow IUSA to make acceptance decisions based on Mill sampling results.

It is of paramount importance to IUSA that the Uranium Material does not contain any RCRA listed hazardous wastes that could lead to potential jurisdictional issues relating to the Mill's tailings impoundments. Hence IUSA will focus its efforts on careful coordination with S&W for timely review of characterization data, and timely acceptance or rejection decisions based on the characterization data as it is generated at the Maywood site. If results from any of the on site analyses indicate that Uranium Material to be shipped contains RCRA listed waste, the material will be rejected while it is still at the Maywood site, and will not be shipped to IUSA.

1.4.6 Compatibility with IUSA Mill Tailings

The Uranium Material contains metals and other constituents that are already present in the Mill tailings disposed of in the Cell 3 impoundment. Generally, even without reprocessing, the composition of the Uranium Material is very similar to the composition of the materials currently present in the Mill's tailings impoundments, because the Uranium Material resulted from the processing of uranium-bearing ores for the extraction of uranium. Hence, the Uranium Material should not have an adverse impact on the overall Cell 3 tailings composition.

The most frequently encountered compounds at the Maywood Site Uranium material are polynuclear aromatic hydrocarbon compounds ("PAHs"), associated with asphalt paving materials, and the natural decay of organic matter. Even in the areas of the Maywood Site with the highest PAH levels, PAHs were present at levels comparable to the levels in previously approved alternate feeds, such as the Tonawanda Site and St. Louis Site. They are also comparable to levels already considered in the in the Environmental Assessment for the Mill, which anticipated the management of all the Mill's former asphalt paved areas in the tailings cells at reclamation.

Although a few VOC compounds were detected in the Maywood Site Uranium Material, in all cases the concentrations were negligible, and are substantially lower than those anticipated in the EA for the Mill, which anticipated the management of VOC solvents and extractants from the Mill's on site laboratory in the tailings impoundments.

As described in Section 1.2, above, the average thorium-232 level in the Uranium Material is well below the thorium-232 levels in other licensed alternate feeds. Therefore, IUSA anticipates that there will be no incremental public health, environmental, or safety concerns resulting from the thorium content of the IUSA Uranium Material.

Furthermore, the volume of tailings that would potentially be generated by processing of the Uranium Material is comparable to the volume that would be generated from processing an equivalent volume of ore. The USACE, as described above, may be expected to excavate and ship up to 336,000 CY (approximately 470,000 tons) of Uranium Material from Maywood over the life of the project (seven years). This additional volume is well within the maximum annual throughput rate and tailings generation rate for the Mill of 680,000 tons per year. 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.

1.5 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 an "other matter" which will be processed primarily for its source material content in a licensed uranium mill, and therefore qualifies as "ore" under this definition.

Uranium Material Not Subject to RCRA

The USDOE, as predecessor to USACE in managing the FUSRAP sites, has consistently classified certain FUSRAP materials, including the Uranium Material at the Maywood property, as 11e.(2) byproduct material. As mentioned in Section 1.2, above, USACE plan to classify the Uranium Material as pre-1978 11e.(2) byproduct material.

As described in Section 1.3 above, USACE and S&W will developing a confirmatory sampling plan to confirm that the Uranium Material will not be RCRA listed hazardous waste, in accordance with IUSA's RMPR and contract requirements. Material (if any) that contains RCRA listed hazardous waste, will not be shipped to the Mill.

Further, as discussed above, IUSA has also engaged an independent consultant, with expertise in RCRA chemical evaluations, to perform a RCRA status evaluation of the Maywood Site.

The independent expert has reviewed process history and chemical characterization data from over 400 samples collected at locations at the MISS pile, the MISS soils, Stepan soils, and vicinity properties. These samples were analyzed for Volatile Organic Compounds ("VOCs"), Semivolatile Organic Compounds ("SVOCs"), total metals, rare earths, pesticides, herbicides,

Toxicity Characteristic Leaching Procedure ("TCLP") metals, and TCLP SVOCs. The results of these analyses were summarized in the Maywood RI.

The RI indicated that, except for the MISS pile itself, each operable unit of the site contained areas of radiological contamination, areas of chemical contamination (organics, metals, and rare earth elements), and areas with both types present. However, the RI provided chemical characterization data for each of the operable units in sufficient detail to differentiate between those chemical contaminants that were present in the radiologically contaminated soils (which may be shipped to IUSA) and those which were identified in the non-radiologically contaminated soils (which will not be shipped to IUSA).

IUSA's independent consultant has prepared a "Review of Chemical Contaminants in Maywood Site Uranium Material to Determine Potential Presence of RCRA Listed Hazardous Waste" (the "RCRA Review") on the RCRA status of the Maywood Site Uranium Material. The RCRA Review has concluded that no RCRA listed hazardous waste is present in any of the four operable units at the Maywood Site. This finding is consistent with the determination of USDOE, USACE, and USEPA, as published in the Maywood RI, EE/CAs, and Request for Proposal, that the Maywood Site contains no RCRA hazardous waste. A copy of this RCRA review document will be provided to NRC in a separate transmittal to follow this amendment application.

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, site history and available data suggest that recoverable uranium is present in the Uranium Material. Analytical data provided to IUSA indicate uranium content in discrete samples ranging from non-detectable to approximately 0.06 weight percent uranium (0.072 weight percent uranium (0.0022 weight percent U_3O_8), or greater, with an average uranium content for the entire Maywood Site of approximately 0.0018 weight percent uranium (0.0022 weight percent uranium (0.0022 weight percent U_3O_8). This value was derived from an arithmetic average of over 4,000 samples throughout the Maywood properties. As stated above, the Mill will only accept IUSA Uranium Material that satisfies the minimum cut-off levels referred to in Section 1.3 above. Past experience by the Mill with similar alternate feed materials indicates that it is reasonable to expect that uranium will be recovered from the IUSA Uranium Material.

Financial Considerations

In addition to other financial considerations, IUSA will commit contractually to process the Uranium Material at the Mill for recycling of uranium in consideration of receiving a recycling fee.

Other Considerations

There are several other grounds to support the certification text, including the fact that IUSA has a history of successfully extracting uranium from alternate feed materials, and should be considered developed credibility with the NRC, not only for being technically competent, but also for fulfilling its proposals to recover uranium from alternate feeds.

Conclusion

As a result of the above factors, and based on the Commission's reasoning in the NRC *Memorandum and Order, February 14, 2000, In the Matter of International Uranium (USA) Corporation (Request for Materials License Amendment), Docket No. 40-8681-MLA-4*, it is reasonable for the NRC staff to conclude that uranium can be recovered from the IUSA Uranium Material and that the processing will indeed occur. As a result, this license amendment satisfies the Certification Test, and other requirements of the Alternate Feed Guidance, and the tailings resulting from the processing of the IUSA Uranium Material will therefore be 11e.(2) byproduct material.

2.0 TRANSPORTATION CONSIDERATIONS

IUSA does not have a subcontract in place at this time with the USACE remediation contractor. As a result, it has not been determined whether Uranium Material transferred to the Mill would be shipped by truck or by rail in intermodal containers. If intermodal containers are to be used, the Uranium Material would be loaded into covered, exclusive-use containers at the Maywood Site. The covered containers would be loaded onto railcars and transported cross-country to the final rail destination (expected to be either near Grand Junction, Colorado; Cisco, Utah; Green River, Utah; or East Carbon, Utah), where they will be transferred to trucks for the final leg of the journey to the Mill. It is expected that four containers will be shipped per rail car. If the maximum volume requested in this application were to be shipped the Mill, shipment would require a total of up to approximately 7500 cars over the seven-year life of the project. If the maximum volume of 600,000 CY anticipated in this amendment request were to be shipped, IUSA expects that an average of 86 truckloads per week will be used to transport Uranium Material from the rail transfer site to the Mill for a period of up to seven years. If the more likely maximum estimate of approximately 206,000 CY, based n the minimum cutoff level, is shipped to the Mill, shipment would require an average of 46 loads per week for seven years or less.

Alternatively, if truck transport is selected, in the maximum case requested in this application, approximately 86 trucks per week would be loaded at the Maywood Site, and the Uranium Material would be transported by a predetermined surface route directly to the Mill for a period of up to seven years.

The USACE contractor will arrange with the material 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 Maywood to the Mill will be significant:

- The material will be shipped 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 the shipping company will track shipments from the Maywood Site until they reach the Mill.

- On average during 1999, 459 trucks per day traveled the stretch of State Road 191 between Monticello, UT and Blanding, UT (December 12, 2000 transmittal from State of Utah Department of Transportation ("UDOT") to IUSA).

- Based on the UDOT information, an average of 86 additional trucks per week traveling this route to the Mill (the maximum case requested in this application) and 86 return trips represents an increased traffic load of approximately 7.4 percent. The more likely scenario of 48 additional trucks per week each way represents an increase of only 4 percent. The Environmental Statement (NRC, 1979) which provides the environmental assumptions upon which IUSA's current license is based, assumed a maximum of up to 53 truck round trips per day associated with the Blanding ore buying station, and 32 truck round trips per day associated with the Hanksville ore buying station, or a total of nearly 5 times as much traffic as would be generated by transport of the total Uranium Material requested in the maximum case in this application. Shipments are expected to be completed in a period of seven years.

- The containers and trucks involved in transporting the material to the Mill site will be surveyed and decontaminated, as necessary, prior to leaving the Maywood Site for the Mill and again prior to leaving the Mill site for the return trip.

- The Uranium Material will be transported in lined, covered containers, and airborne dusts will be minimal.

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 in combination with other approved alternate feed materials. The Uranium Material will either be dumped into the ore receiving hopper and fed to the SAG mill, or run through an existing trommel, before being pumped to Pulp Storage. The leaching process may 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 of any significance 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.

Yellowcake production from the processing of this material will not cause the currently-approved yellowcake production limit of 4,380 tons per year to be exceeded.

4.0 SAFETY MEASURES

Mill employees involved in handling the Uranium 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 processed in the Mill circuit in virtually the same manner as conventional ore. The material will proceed through the leach circuit, CCD circuit, and into the solvent extraction circuit or ion exchange 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 will be wetted and collected during routine work activity. Samples of the Uranium Material indicate 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 any unusual or extraordinary airborne contamination dispersion when processing the Uranium Material. IUSA also does not anticipate unusual radon gas accumulation or radon exposure from storing or processing the Uranium Material. The contamination potential is expected to be comparable to what is normally encountered when processing conventional uranium ore. The successive extraction process circuitry from grinding or washing, leaching, and CCD, solvent extraction or ion exchange, and precipitation are all liquid processes, and the potential for airborne contamination dispersion is minimal. The material is a moist solid or in a slurry form once it has been introduced into the SAG mill or pulp storage tanks. 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 after the Uranium material is received at the Mill. Appropriate dust suppression techniques will be implemented as per the Mill Standard Operating Procedures. 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 that 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 has been prevented.

4.2 Radiation Safety

The radiation safety program which exists at the 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).

Radiological doses to members of the public in the vicinity of the Mill will not be elevated above levels previously assessed and approved.

4.3 Vehicle Scan

After the cargo has been offloaded at the Mill site, a radiation survey of the and container will be performed consistent with standard Mill procedures (Attachment 6). 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 Mill will be dedicated, exclusive loads; therefore, radiation surveys and radiation levels consistent with DOT requirements will be applied to returning vehicles and cargo.

As described in Section 1.2, above, the average thorium-232 level in the Uranium Material is well below the thorium-232 levels in other licensed alternate feeds. Therefore, IUSA anticipates that there will be no incremental public health, environmental, or safety concerns resulting from the thorium content of the IUSA Uranium Material.

5.0 OTHER INFORMATION

5.1 Added Advantage of Recycling

The Value Engineering Study Team of the USACE has proposed that the Corps use recycling and mineral recovery technologies at a uranium mill to reduce radioactive material disposal costs (See Attachment 7). The Corps notes that the 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 waste generated as 11e.(2) 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 that 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 A, Criterion 2 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.

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 the prime contractor for the FUSRAP Maywood Site remediation, on behalf of the United States Army 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, financial considerations, and other 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

June 15, 2001

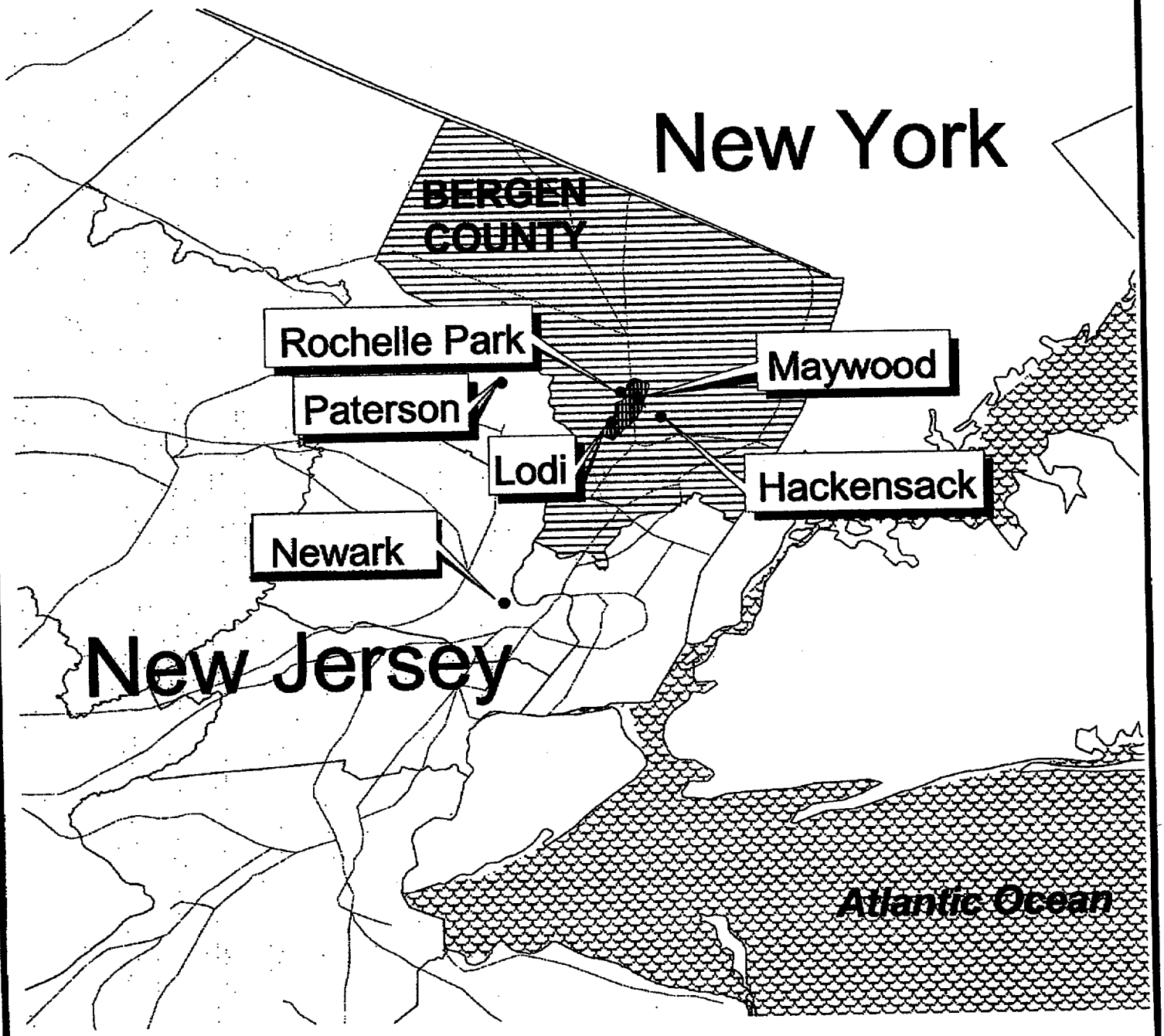
Date

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

ATTACHMENT 1

Maywood Site Location Maps, Volume Estimates, and Process History

DRAWING #1
MAYWOOD SITE LOCATION



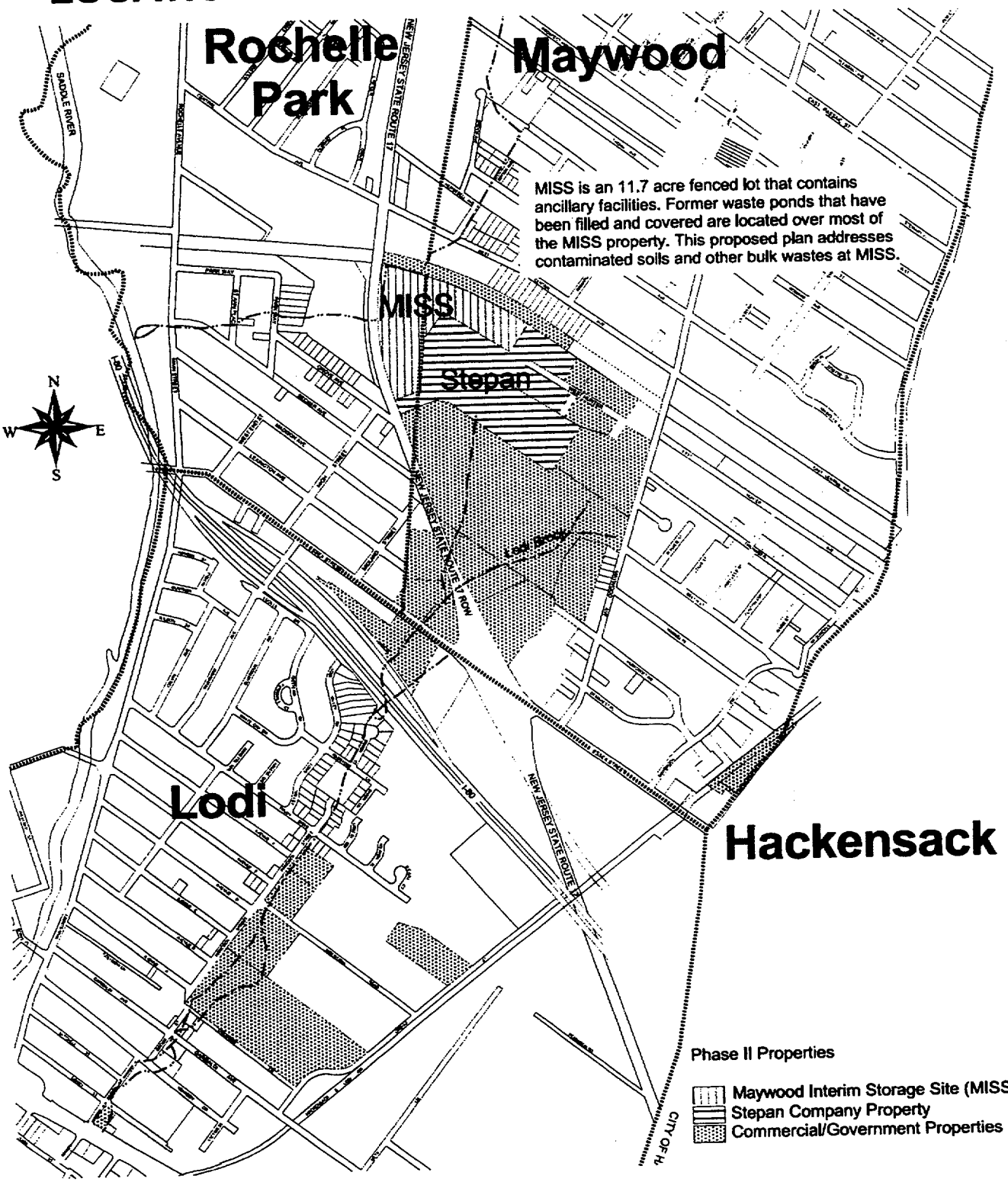
Bergen County
Approximate Location Of The Site

N
W
E
S

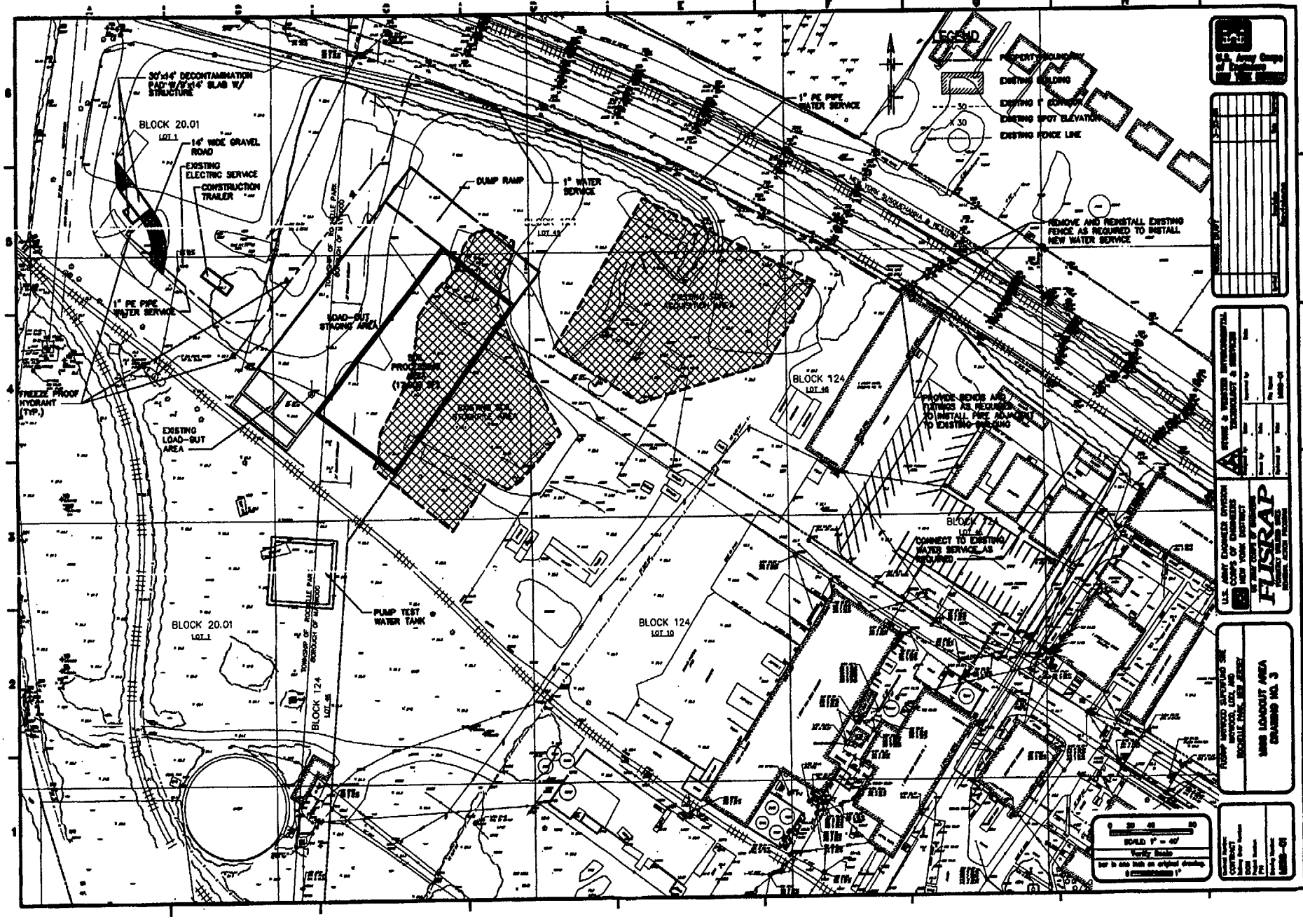
0 5 10 15 20 25 Miles

\\BOSF301\Maywood\Task\02DSGS\2025.apr - Maywood Site Location, Draft April 5, 2001

DRAWING # 2
LOCATION OF PROPERTIES TO BE REMEDIATED



\\BOSF501\Maywood\Task0205\GIS\2025.apr - Location of Properties to be Remediated, Draft April 4, 2001


LEGEND
PROPERTY BOUNDARY
EXISTING BUILDING
EXISTING 1' CONTOUR
EXISTING SPOT ELEVATION
EXISTING FENCE LINE
30'x14' DECONTAMINATION PAD W/ 8'x14' SLAB W/ STRUCTURE
BLOCK 20.01
LOT 1
14' WIDE GRAVEL ROAD
EXISTING ELECTRIC SERVICE
CONSTRUCTION TRAILER
1" PE PIPE WATER SERVICE
FREEZE PROOF HYDRANT (TYP.)
EXISTING LOAD-OUT AREA
LOAD-OUT STAGING AREA
DUMP RAMP
1" WATER SERVICE
PROCESSING (TYPE 2)
EXISTING SOIL STORAGE AREA
EXISTING SOIL STORAGE AREA
PUMP TEST WATER TANK
BLOCK 124
LOT 10
BLOCK 124
LOT 46
BLOCK 124
LOT 48
REMOVE AND REINSTALL EXISTING FENCE AS REQUIRED TO INSTALL NEW WATER SERVICE
PROVIDE BENDS AND FITTINGS AS REQUIRED TO INSTALL PIPE ADJACENT TO EXISTING BUILDING
CONNECT TO EXISTING WATER SERVICE AS REQUIRED
YORK SUSQUEHANNA & HOLLIDAYSBURG
TOWNSHIP OF ROCKAWAY
BOROUGH OF WHARTON
TOWNSHIP OF ROCKAWAY
BOROUGH OF WHARTON
SCALE 1" = 40'
Verify Scale
bar is one inch on original drawing
0 1"
U.S. Army Corps of Engineers
FUSRAP
U.S. ARMY ENGINEER DIVISION
CORPS OF ENGINEERS
NEW YORK DISTRICT
FORMERLY UTILIZED SITES REMEDIAL ACTION PROGRAM
STONE & WEBSTER ENVIRONMENTAL TECHNOLOGY & SERVICES
FUSRAP WHARTON SUPERFUND SITE
WHARTON, LOG, AND ROCKAWAY TOWNS, NEW JERSEY
MBB LOADOUT AREA
DRAWING NO. 3
CONTRACT
MBB-01

ATTACHMENT J-5
TRANSPORTATION, DISPOSAL AND MANAGEMENT SERVICES SCOPE OF WORK

C.1 INTRODUCTION

This Scope of Work (SOW) is for the Maywood Environmental Remediation Project's management services, transportation, and off-site disposal (TD&M) of soil and debris having radioactive contaminants (waste material). These TD&M services represent a significant portion of the remedial activities for the Maywood Environmental Remediation Project (Maywood) in Maywood, New Jersey. This multi-year remedial action is through the U.S. Army Corps of Engineers' (USACE) New York City and Kansas City Districts contract, DACW41-99-D-9001, with Stone & Webster Inc. (Company).

The Maywood Chemical Superfund Site encompasses properties located in the northern New Jersey communities of Maywood, Rochelle Park, and Lodi (SOW Drawing C-1, listed as RFP attachment J-6). Comprehensive assessments over the years have identified the need to perform remedial actions for a set of properties in these communities (SOW Drawing C-2, listed as RFP attachment J-7). The primary radioactive contaminants are Thorium-232 (Th-232) and its decay products along with lesser amounts of the Uranium-238 (U-238) decay chain, including Radium-226 (Ra-226). The USACE estimates that more than 470,000 tons of waste material will be disposed during the remedial project over the next seven years.

C.2 SCOPE OF WORK

The Subcontractor (Offeror) shall furnish all tools, materials, machines, transportation equipment, labor, bonds, insurance, permits, licenses, supervision and perform for the safe transportation and for the permanent and safe disposal of waste materials from the Maywood FUSRAP Site in accordance with all applicable, relevant and appropriate Federal, State, and local laws and regulations. Subcontractor shall be solely responsible for all its actions and inactions from acceptance of the waste material at the Maywood site.

(a) This work shall include, but is not limited to, the following:

1) Transportation Services

a) Methods and Procedures

- Subcontractor shall assume all Transporter responsibilities for the waste material once the Subcontractor has accepted it for transportation.
- Subcontractor shall use the best transportation approach that will allow the specified quantities of waste materials to be moved in a timely manner, at minimum cost and compliant with transportation requirements. Transport of the waste material to the disposal location(s), including reporting documentation, shall be in accordance with all Federal, State, and local laws and regulations.
- Subcontractor shall use the best route to assure minimization of costs and compliance with all transportation requirements.

- Transportation of waste materials anticipates utilization of both rail car (gondola) and containers (intermodal) for waste material transportation. One or more transportation approaches may be proposed.

b) Transportation Equipment

- Use equipment that meets all Federal and state laws and regulations for the transport of the material.
- Delivery of sufficient quantities of clean and serviceable transportation equipment and other necessary material to the location(s) specified by the Company and in accordance with Company's schedule in individual Task Orders. As a minimum Subcontractor shall be able to accept the quantities given in SOW paragraph C.2 (d).
- Transportation equipment shall have the maximum gross weight and tare weight clearly and legibly marked on the container.
- Subcontractor shall replace, within 24 hours at no additional cost to Company, transportation equipment that, at Company's sole discretion, does not pass Maywood's incoming visual inspection and radiological survey requirements.
- Subcontractor shall specify and provide the necessary transportation equipment liner(s) that satisfy applicable Federal, State, and local laws and regulations.

2) Disposal Services

- Subcontractor shall dispose of waste materials (for the defined waste streams) in appropriately licensed disposal facilities that meet all Federal, State, and local laws and regulations. As a minimum, each Subcontractor disposal facility shall be able to accept the quantities given in SOW paragraph C.2 (d).
- Subcontractor shall properly handle and dispose waste material in accordance with the disposal facility's approved plans and procedures. Anticipated plans and procedures would include a waste acceptance plan, waste acceptance criteria, a disposal site safety plan, security procedures, quality assurance plan and procedures, and records management (including auditing and reporting).
- Subcontractor shall return to the Company, a signed copy of the manifest(s) for each waste container accepted at the disposal facility.
- Subcontractor shall provide a certificate of disposal to the Company, for the waste material in each transportation container. At a minimum, the certificate shall identify the waste container, the weight (tons) of waste received, any sample information obtained by the disposal facility, the location of disposal, and any additional information that may be required by Federal, State, and local laws and regulations.
- Subcontractor shall provide documentation in a form satisfactory to Company that the transport equipment has been free released for unrestricted use (subsequent to off-loading at the disposal destination) in accordance with Federal, State, and local laws and regulations.

3) Management Services

- Subcontractor shall coordinate and schedule all transportation and disposal services with Company in accordance with the scope and schedule of each Task Order. This includes the coordination and scheduling of all lower-tier subcontractors, as well as, the timely delivery of transportation containers and equipment, which includes rail rolling stock.

- Subcontractor shall designate a single contact, reachable by telephone, to respond to any unforeseen situation that may arise during Maywood's normal working hours of 7:00 am – 5:00 p.m., Monday through Friday, during the performance of each TD&M Task Order.
- Subcontractor shall provide an on-site representative for each TD&M Task Order to provide practical consulting services and problem resolution during start-up. These services may include, but are not limited to: providing a model bill of lading and manifest forms; advising on the switching of rail cars; review of material classification, weights, volumes, etc.; advising on installation of liners; and closure of intermodal containers. This effort is anticipated to only be necessary in the early stages of a Task Order.
- Subcontractor shall provide final inspection criteria that will be reviewed and agreed upon by Company and used prior to shipment, to accept the loaded gondolas, intermodal units or other forms of container. Subcontractor shall then be responsible for the waste material from that point forward. This final inspection is at the discretion of the Subcontractor and is not mandatory.
- Subcontractor shall resolve all TD&M discrepancies, including but not limited to any non-conformance.
- Subcontractor shall track the waste material to the disposal location(s) in accordance with Federal, State, and local laws and regulations. Subcontractor shall provide Company with a location summary of the en-route equipment by 8:00 am (Eastern Time [Standard or Daylight savings time]) daily. The location summary shall include notations for any anomalies, delays, etc.
- Subcontractor shall immediately notify (within 24 hours) Company upon learning of any potential or actual reportable incident that occurs during the transportation of the waste material. Company's reporting telephone number shall be provided to Subcontractor in each Task Order.
- Subcontractor shall provide a written description of the procedures to be employed in cleaning and/or decontaminating (including verification) of all equipment used by Subcontractor.
- Safety: Subcontractor shall conform to all safety requirements (Federal, State, local and facility). For operations at the Maywood site Subcontractor shall additionally comply with requirements identified in Company's Site Safety and Health Plan (listed as RFP attachment J-9).
- Regulations and Standards: Subcontractor shall comply with all regulatory and Government and applicable Industry standards that apply to its services covered in this Scope of Work. Not limited by but as a minimum Subcontractor shall comply to the latest edition of the following applicable Federal, State, and local laws and regulations and standards:

Maywood Site's	"Materials Handling /Transport and Disposal Plan" (provided as RFP Attachment J-10)
N.J.A.C. 7:26G;	New Jersey Department of Environmental Protection Hazardous Waste Regulations
10 CFR 20;	Standards for the Protection Against Radiation
10 CFR 61;	Licensing Requirements for Land Disposal of Radioactive Waste
40 CFR 302;	Designation, Reportable Quantities (RQs) and Notification
49 CFR 107;	Hazardous Materials Program Procedures
49 CFR 172;	Hazardous Materials Table, Special Provisions, Hazardous Materials Communications, Emergency Response Information, and Training Requirements.
49 CFR 172;	Sub Part F, Special Placarding provisions: Rail

49 CFR 173;	Shippers – General Requirements for Shipping and Packing
49 CFR 174;	Carriage by Rail
49 CFR 178;	Specifications for Packing
EM 385-1-1	USACE Safety and Health Requirements Manual

(b) Services/Equipment/Materials Provided by Company

The Company shall provide the following:

- A rail siding at the Maywood Interim Storage Site (MISS), served by the New York, Susquehanna and Western Railroad (Drawing C-3, listed as RFP attachment J-8), capable of staging approximately twelve (12) gondolas (no room is available at this location to stage/fill other types of waste containers or place onto rail cars). Laydown areas for up to six containers / intermodals will be provided at those properties (to be specified in task order releases) at which materials will be directly loaded.
- Inspection of transportation equipment, upon arrival at project site, for mechanical condition, cleanliness, and radioactive contamination. Company has shall have sole jurisdiction over determination of the acceptability of any transportation equipment.
- Craft Labor for lining and loading waste containers (via Front-end Loader or Excavator), adding absorbent, and for closing and securing liners, tops, tarps, covers, and/or hatches.
- Load weighing via bucket scales on a Front-end Loader or Excavator. Company will use its best efforts to load the transportation equipment to the maximum weight, designated by Subcontractor, for each type of waste container.
- Approximate volume calculation for gondolas.
- Procurement and addition of absorbent to waste material based on moisture content of waste material. As a matter of operational procedure, Company adds absorbent to waste materials with moisture content exceeding 15%.
- Procurement and application of Labels and Placards (as specified by Subcontractor).
- Radiation Control Technicians (or similar) for pre and post inspection of loaded rail cars and/or intermodal containers.
- Completed bills of lading and/or manifests, as specified by Subcontractor and required by Federal, State, and local laws and regulations.

The availability of Company provided services/equipment/materials is based upon adequate notification of its need by the Subcontractor. Such reasonable lead-time shall be mutually agreed upon by Subcontractor and the Company.

(c) Waste Material Characterization:

(1 Currently, the Maywood FUSRAP waste material has been determined to be 11e.(2) and Pre-UMTRCA mill tailings. However, the U.S. Nuclear Regulatory Commission (NRC) may recommend that pre-1978 (pre-UMTRCA) materials be considered source material. To address this potential change in the regulatory definition of the waste material, four classifications are included in this Scope of Work.

The waste material to be transported and disposed under this SOW will be either one or more of the following four classifications:

- 11e(2) Materials – The tailings or waste produced by the extraction or concentration of uranium or thorium from any ore processed primarily for its source material content.

- Pre-UMTRCA mill tailings – According to a letter from the Nuclear Regulatory Commission (NRC) to Envirocare of Utah, Inc. dated January 26, 2001, while this "material is radiologically, physically and chemically similar to and compatible with" 11e(2) material, the NRC "lacks jurisdiction over tailings produced at a facility not licensed by the NRC on the effective date of the Uranium Mill Tailings Radiation Control Act of 1978 (UMTRCA) or thereafter." Therefore, this material is not subject to regulation by the NRC.

- Source Materials – In accordance with 10CFR§40.4, ores which contain by weight one-twentieth of one percent (0.05%) or more of (i) uranium, (ii) thorium, or (iii) any combination thereof.

- Unimportant Quantities of Source Materials-Source material that by weight is less than one-twentieth of 1 percent (0.05%) of the waste mixture or compound, as defined by 10CFR§40.14.

(2) For informational purposes only: The majority of the above material categories may be classified for shipment as one of the following: "Non-DOT regulated", "Radioactive Material, low Specific Activity," N.O.S., Class 7, UN2912, or "Environmentally Hazardous Substances, Solid," N.O.S., Class 9, UN3077 Other shipping classification may be required to comply with DOT regulations.

(3) It is estimated that the percentages of the total quantities for each type waste per transportation method will be as follows:

Current Waste Classifications:

Category of Waste/Transportation	% of Total Weight
• 11(e)(2) material; Railroad Car Transport…	5.5%
• 11(e)(2) material; Intermodal Containers…	0%
• Non-regulated, pre-UMTRCA mill tailing waste material; Railroad Car Transport …	86%
• Non- regulated, pre-UMTRCA mill tailing waste material; Intermodal Containers…	8.5%

Or (With NRC Waste Classifications Changes):

Category of Waste/Transportation	% of Total Weight
• 11(e)(2) material; Railroad Car Transport…	5.5%
• 11(e)(2) material; Intermodal Containers…	0%
• Source Material; Railroad Car Transport …	58%
• Source Material; Intermodal Containers…	3.4%
• Unimportant Quantities of Source Materials, Railroad Car Transport …	28%
• Unimportant Quantities of Source Materials, Intermodal Containers…	5.1%

The above percentages are based on current estimated waste material weight and may not reflect actuals.

(4) Soil conditions and sample analytical data are summarized for informational purposes:

- Primary radionuclide is Thorium-232; with lesser amounts of Radium-226 and Uranium-238.
- Highest concentrations of radioactive constituents (11e.(2) material) are in three burial pits at Stepan. Analytical data not available, however, anticipate Th-232 concentrations ranging between 1,500 and 3,800 pCi/g.
- Ballod pond material data: Th-232, 0 – 2,500 pCi/g; Ra-226, 0-50 pCi/g; U-238, 0-250 pCi/g.
- Sample data collected during site characterization activities of areas other than the high radioactive concentration burial pits and ponds materials, are summarized as follows:

Analyte	Avg. Detection (pCi/g)	Min. Detection (pCi/g)	Max. Detection (pCi/g)	No. of Samples
Ra-226	4.06	0.06	447.00	4324
Th-232	17.19	0.06	1699.00	4315
U-238	10.60	0.09	366.55	4153

- RCRA hazardous wastes were not detected during DOE RI.

Note to bidders: The specific radionuclide activities presented in this section were calculated from data gathered during site characterization activities conducted at the site. These values are representative of the radionuclide activities present prior to remedial activities. The soils presented to the successful bidder for disposal may be substantially different with regard to both extreme and average activities for any or all of these radionuclides.

(d) Schedule and Work Hours:

For planning purposes, the following annual amounts of waste (current waste classifications) are provided. Annualized weights of the two categories of source material which would be applied in place of the pre-UMTRCA (assuming NRC determination) in the proportions shown in the above C.2(c)(3) table.

ANNUAL ESTIMATED WEIGHTS

MATERIAL	WEIGHT (in tons) 2002	2003	2004	2005	2006	2007	2008
11e(2)	--	--	--	--	12,000	14,000	--
Pre-UMTRCA mill tailings or Source Material / Unimportant Quantity Source	60,000	105,000	99,000	46,000	36,000	47,000	51,000
Totals	60,000	105,000	99,000	46,000	48,000	61,000	51,000

The above table estimates the required annual TD&M effort. More definitive schedules are not available at this time, however, schedules will be provided in individual Task Orders.

The Maywood operations normal work hours are 7:00 am to 5:00 p.m., Monday through Friday. The Subcontractor must clearly identify any work hours outside normal work hours necessary to support the Work.

The Company will provide in each Task Order a schedule detailing the period of performance and milestone dates (e.g.; Notice to Proceed; Mobilization of Containers/R.R. Cars; Phased delivery of containers or R.R. Cars; Switch out frequency of Containers / R.R. Cars; Loadout Completion; Completion of Work). Subcontractor acknowledges that the Company is dependent upon the daily delivery of a minimum of containers/intermodal units and/or railroad cars to the Maywood Site, and that substantial delays between deliveries will have an economically detrimental impact to the Company and the Maywood Project. The Company relies upon Subcontractor's timely delivery of containers/intermodal units and/or rail road cars to the Maywood Site and the subsequent timely removal once loaded.

Formerly Utilized Sites Remedial
Action Program (FUSRAP)

Maywood Chemical Company Superfund Site

ADMINISTRATIVE RECORD

Document Number

MISS- 038.

US Army Corps
of Engineers

DOE/OR/21949-337

REMEDIAL INVESTIGATION REPORT
FOR THE MAYWOOD SITE
NEW JERSEY

VOLUME I

DECEMBER 1992

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By

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Oak Ridge, Tennessee

Bechtel Job No. 14501

EXECUTIVE SUMMARY

This executive summary briefly describes the activities and results of a remedial investigation (RI) conducted during 1989, 1990, and 1991 at the Maywood Site in Maywood, New Jersey. The RI was performed by the U.S. Department of Energy (DOE) in cooperation with the Environmental Protection Agency (EPA) Region II. The New Jersey Department of Environmental Protection and Energy was provided an opportunity to participate in developing the scoping and planning documents and to provide oversight to sampling activities.

The following sections provide basic background about the site (ES.1), explain the purpose of the RI and outline its goals (ES.2), and discuss the environmental requirements and agency responsibilities at the site (ES.3). Section ES.4 lists the activities performed at the site, and Section ES.5 summarizes the RI results in terms of the nature and extent of contamination. The potential fate and transport of contaminants are discussed in Section ES.6, and Section ES.7 presents basic conclusions and outlines future requirements for work at the site.

ES.1 BACKGROUND

The Maywood Site is located in Bergen County, New Jersey, approximately 20 km (12 mi) north-northwest of New York City and 21 km (13 mi) northeast of Newark, New Jersey. At Maywood, operations at the former Maywood Chemical Works (MCW) resulted in contamination of numerous properties in the boroughs of Maywood and Lodi and the township of Rochelle Park.

In 1916, MCW began extracting radioactive thorium and rare earths from monazite sand for use in manufacturing industrial products such as mantles for gas lanterns. The slurry that contained waste from the thorium processing operations was pumped to two earthen diked areas west of the plant. Some process wastes, along with tea and coca leaves from other MCW operations, were removed from the MCW property and used as mulch and fill on nearby properties, thereby contaminating those properties. Additional

waste apparently migrated off the property through natural drainage associated with the former Lodi Brook. MCW stopped extracting thorium in 1956, but thorium processing from stockpiled material continued until 1959. The property was sold to the Stepan Company in 1959; Stepan Company has never processed radioactive material.

In 1961, Stepan was issued an Atomic Energy Commission (AEC) radioactive materials license. On the basis of AEC inspections and information related to the property west of New Jersey State Route 17, Stepan agreed to take certain corrective actions and began to clean up residual thorium wastes in 1963, partially stabilizing residues and tailings. From 1966 through 1968, contaminated material was removed from the property west of Route 17 and buried in three burial pits on the Stepan property.

In 1968, AEC surveyed the area west of Route 17 and certified it for use without radiological restrictions. At the time of the survey, AEC was apparently not aware of contaminated waste materials still present in the northeast corner of the property. In 1968, this portion of the Stepan property was sold to a private citizen, who sold it in the 1970s to Ballod Associates; that area is now called the Ballod property.

The presence of radioactive materials in the northeast corner of the Ballod property was discovered in 1980. A survey of the area (Route 17, Ballod property, and Stepan property) identified the contaminants as thorium-232 and radium-226. Additional surveys confirmed high concentrations of thorium-232 in soil samples, and subsequent surveys indicated contamination not only on the Stepan and Ballod properties but also in areas to the north and south.

Subsequent investigations by Oak Ridge National Laboratory indicated that several residential properties were contaminated and required remedial action. DOE was authorized to undertake a decontamination research and development project at the Maywood Site by the Energy and Water Development Appropriations Act of 1984, and the Maywood Site was assigned to DOE's Formerly Utilized Sites Remedial Action Program (FUSRAP). In 1985, to expedite cleanup of the contaminated properties, DOE negotiated access to a 4.7-ha (11.7-acre) portion of the Stepan property for use as an

interim storage facility for contaminated materials; this area was designated as the Maywood Interim Storage Site (MISS). Subsequently, DOE began a program of removal actions (i.e., cleanup) at the vicinity properties and environmental monitoring at MISS. In September 1985, ownership of MISS was transferred to DOE.

The properties contaminated as a result of the original MCW activities include the property previously owned by MCW (now owned by the Stepan Company); MISS; and numerous residential, commercial, and governmental vicinity properties. These properties comprise the Maywood Site.

Many of these properties have been previously investigated, and some have been remediated. At the time of this RI, 25 of the 55 residential properties designated by DOE for remediation had been fully decontaminated, and one has since been partially decontaminated. Thirty have been characterized but remain to be remediated. Eight residential properties were investigated during the RI. Twenty-three commercial/governmental properties had been previously characterized, and a partial removal action had been conducted on the Ballod property. Five commercial/governmental properties were investigated during the RI.

ES.2 PURPOSE AND GOALS OF THE REMEDIAL INVESTIGATION

For the purposes of the Maywood Site RI, DOE grouped the properties into four operable units to obtain the greatest efficiency and effectiveness in performing and managing RI activities:

- Stepan Company property (also referred to as Stepan property)
- MISS
- Residential vicinity properties
- Commercial/governmental vicinity properties

The properties may be grouped differently for evaluating remedial action alternatives or when final remedial actions are

implemented.

The purpose of the RI was to define the nature and extent of contamination at the Maywood Site, determine the fate and transport of contaminants, and identify remedial action objectives. This information will then be used in a feasibility study (FS) to identify potential remedial action alternatives and potential applicable or relevant and appropriate requirements.

Historical data and data collected during the RI have been used to achieve the goals of this RI. The RI gathered data not collected during previous investigations and investigated properties that had been designated for inclusion in FUSRAP but had not been fully characterized.

The RI objectives for each operable unit were as follows:

Stepan property

- Determine the extent of surface radioactive contamination
- Determine horizontal and vertical boundaries of subsurface radioactive contamination
- Identify the chemical contaminants resulting from thorium processing operations
- Determine whether hazardous waste [as defined by the Resource Conservation and Recovery Act (RCRA)] is mixed with radioactive waste
- Determine whether wastes buried at Stepan have migrated from those burial areas
- Confirm the validity of previous surveys' radiological measurements of fixed and removable contamination within buildings
- Confirm the validity of previous surveys' measurements of gamma exposure rates within buildings and over outdoor surfaces

MISS

- Determine whether waste in the storage pile contains RCRA-hazardous waste or polychlorinated biphenyls (PCBs)

- Determine the average concentrations of radioactive waste in the pile
- Determine whether chemical contaminants are present in onsite soil and identify the contaminants
- Determine whether chemical contaminants are migrating from MISS through surface water, sediment, or groundwater
- Quantify the radon and thoron exposure pathways at MISS
- Quantify residual radioactive contamination on structural surfaces in Building 76
- Resolve data gaps to provide further understanding of the MISS groundwater system

Residential vicinity properties

- Determine the extent of surface radioactive contamination on residential vicinity properties not previously characterized
- Determine the horizontal and vertical boundaries of subsurface radioactive contamination on these properties
- Investigate the potential presence of chemical contaminants associated with thorium processing operations
- Determine the mechanisms of contaminant transport
- Measure the gamma exposure rates on each property

Commercial/governmental vicinity properties

- Determine the extent of surface radioactive contamination on commercial/governmental properties investigated as part of this RI
- Determine horizontal and vertical boundaries of subsurface radioactive contamination on these properties
- Investigate the potential presence of chemical contaminants

associated with thorium processing operations

- Determine the mechanisms of contaminant transport
- Measure the gamma exposure rates on each property.

ES.3 CLEANUP RESPONSIBILITIES AND REQUIREMENTS

Responsibility for cleanup of the radioactive and chemical contamination at the Maywood Site is shared by DOE and EPA. DOE's responsibilities are based on its role as manager of FUSRAP and its ownership of MISS; EPA Region II oversees DOE's work because the Maywood Site is listed on the National Priorities List. The shared responsibilities of the two agencies have been detailed in a negotiated federal facilities agreement (FFA) that became effective April 22, 1991.

Under the FFA, DOE is responsible for cleanup of "FUSRAP waste," which, as defined in the FFA, is specifically limited to

- All radioactive and chemical contamination, whether commingled or not, occurring on the DOE-owned MISS

- All radioactive contamination exceeding DOE action levels and related to thorium processing at MCW, occurring on any vicinity property

Chemical or nonradioactive contamination on vicinity properties is DOE's responsibility if the contamination satisfies either of the following conditions:

- If the contamination is mixed or commingled with radioactive contamination that exceeds DOE action levels

- If the contamination originated at DOE-owned MISS or if it is associated with specific thorium manufacturing or processing activities at MCW that resulted in the

radioactive contamination.

Remedial and removal actions at the Maywood Site are being conducted under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act. In addition, all DOE activities must be conducted in compliance with the National Environmental Policy Act, which requires that the environmental consequences of a proposed action be considered as part of the decision-making process for that action.

The FFA requires that EPA review all previous characterization and remediation activities conducted by DOE to determine functional equivalency with technical and substantive requirements of CERCLA, the National Contingency Plan, and the remedial investigation/ feasibility study (RI/FS) process.

The Maywood Site is also being addressed through a separate RI/FS, which is being conducted by Stepan Company under EPA direction and oversight. DOE is addressing radioactive contamination as well as the contaminants that meet the definition of FUSRAP waste set forth by the FFA. Stepan Company is primarily responsible for nonradioactive or chemical contamination under an administrative order of consent signed with EPA in 1987 and an administrative order signed by EPA in 1991. Although DOE and Stepan RI/FS activities are being conducted independently, EPA oversight of both actions will ensure that sufficient coordination occurs between the parties to fully address the Maywood Site without duplication of effort.

ES.4 RI ACTIVITIES

Activities performed to meet the goals of the RI centered on collecting data and compiling information regarding surface features, contaminant sources, surface water and sediments, hydrogeology, meteorology, demography, and ecology. Surface feature investigations concentrated on aerial photographs, topographic maps, owner drawings (where available), and eyewitness accounts. Additional investigations performed included a

ground-penetrating radar survey of burial pits 1 and 2 at Stepan and portions of two commercial properties.

Contaminant source investigations were performed to evaluate potential waste source(s) and to further characterize radiological, chemical, and physical characteristics of materials within various media at the Maywood Site. These included radiological investigations of the four operable units using near-surface gamma radiation surveys, surface and subsurface soil sampling, downhole gamma logging, and gamma exposure rate measurements.

Chemical investigations were performed on various properties to determine whether waste would be characterized as RCRA-hazardous upon removal and whether chemical contamination existed that met the FFA definition of FUSRAP waste.

Surface water/sediment investigations were performed to determine whether radioactive or chemical contaminants originating at MISS are migrating into (and being transported offsite by) the current surface water flow system and to determine any impact of waters from MISS on the surface waters in the vicinity.

The hydrogeologic investigation was conducted to further define the groundwater system at MISS and to provide additional data to supplement previous investigations. Sampling and analysis of groundwater were conducted to investigate the nature, extent, and concentrations of contaminants present in the groundwater and their potential for migration from MISS.

Meteorological, demographic, and ecological data were compiled by reviewing previous characterizations and historical information.

ES.5 NATURE AND EXTENT OF CONTAMINATION

ES.5.1 Stepan Property

The RI confirmed that the primary sources of radioactive contamination on the Stepan property are burial pits 1, 2, and 3. In the burial pits, the maximum concentration of thorium-232, which was the primary contaminant at the Maywood Site, was 1,592 pCi/g (burial pit 1). In addition, surface and subsurface soils

throughout the Stepan property were found to be radioactively contaminated; the maximum concentration of thorium-232 in surface soils was 380 pCi/g, and the maximum depth of subsurface contamination outside the burial pits was 4.6 m (15 ft).

Radioactive contamination on the Stepan property also occurs in areas where thorium processing operations were conducted and where process residues were used as fill material in low-lying areas. However, the areas of contamination are covered by grass or asphalt, so there is little potential for migration via surface water runoff.

DOE conducted limited chemical assessment of the Stepan property because of the separate RI/FS being conducted by the Stepan Company. In this limited chemical assessment, three rare earth elements (cerium, lanthanum, and neodymium) were detected with greater frequency and at higher concentrations than others, primarily in areas of radioactive contamination. These results are not unexpected because several rare earth elements (cerium, lanthanum, and dysprosium) are constituents of monazite sands, the feed material used in the thorium processing operations conducted by MCW. Sampling and analysis were also conducted for metals, volatile organic compounds (VOCs), and semivolatile or base/neutral and acid extractable (BNAE) compounds. Several metals known to be elemental components of monazite sands were detected at the highest concentrations and with the greatest frequency in areas where radioactive contamination also was found. Metals detected in association with radioactively contaminated soils included lithium, lead, arsenic, chromium, and selenium. In areas that are not radioactively contaminated, these metals were detected infrequently and at low concentrations. In these areas, any connection between the metals and thorium processing wastes would be difficult to establish because these metals occur naturally at trace concentrations in the earth's crust. The general occurrence of these metals in industrialized areas such as the Stepan Company property is also highly probable.

Most organic compounds detected at concentrations above representative mean background were polyaromatic hydrocarbons. These may be attributed to the natural decay of organic materials

or coal-derivative products (e.g., asphalt). These compounds are also commonly found in industrialized areas. BNAEs and petroleum hydrocarbons were occasionally found in association with radioactive waste.

ES.5.2 Maywood Interim Storage Site (MISS)

A complete radiological characterization of MISS onsite soils was conducted in 1986, and the data have been presented in a separate report (BNI 1987a). Therefore, radioactive contaminants in onsite soils at MISS were not addressed as part of this RI, other than to determine the average concentrations of uranium-238, radium-226, and thorium-232 in the interim storage pile.

Results of surface water and sediment sampling conducted at one upgradient and three downgradient locations under the routine environmental monitoring program (presented in Section 4.0) indicate no evidence that radioactive contaminants are migrating from MISS via either of these pathways.

Radiological characterization of the groundwater, based on DOE's routine environmental monitoring program, indicates that total uranium, radium-226, and thorium-232 concentrations are comparable at upgradient, offsite, and downgradient wells. The only exception is well B38W12A, which is located on an offsite property downgradient of Stepan and another offsite property, both of which are known to be radioactively contaminated. Though below guideline levels, consistently elevated concentrations of uranium have been detected in this well.

The chemical investigation of the interim storage pile and onsite soils at MISS produced no results that would identify the soil as RCRA-hazardous waste. No PCBs or pesticides were detected in any sample analyzed.

DOE is responsible for all chemical contamination on MISS. Of the 22 metals detected above representative mean background in MISS onsite soils, 8 (arsenic, cobalt, copper, lead, lithium, nickel, selenium, and vanadium) were identified as constituents of thorium ores, uranium analyte metals, or lithium wastes processed or disposed of onsite. These metals and four others (antimony,

barium, chromium, and cadmium) were detected at above-background concentrations. The latter four metals were also detected with varying frequency in areas of radioactive contamination; however, no definite associations were identified that would tie specific metals to radioactive contamination. Lithium, lead, chromium, and arsenic were most commonly found in association with radioactive contamination in the area of former retention ponds that served the entire chemical facility. This common association therefore does not necessarily indicate process waste. Chemical evaluation of soils at MISS identified three rare earth elements (cerium, lanthanum, and neodymium) in significant concentrations and frequency in both fill and native material. As was observed at the Stepan property, rare earth elements exist most frequently in areas of radioactive contamination, primarily in or near areas where historical information indicates that thorium processing took place.

Chemical analysis for VOCs and BNAEs indicated the occurrence of organic compounds at trace levels throughout the site. These compounds were detected at concentrations above mean representative baseline in only two areas: the Building 76 area and areas west of the interim storage pile near the locations of former retention ponds. There was no conclusive evidence of the coexistence of these compounds in radioactively contaminated areas. Historical information indicates that no organic constituents were used in the thorium processing operations at MCW, and the compounds detected are characteristic contaminants of industrialized, multiuse, and urban areas. However, DOE must address all chemical contaminants on MISS.

In groundwater, VOCs (predominantly tetrachloroethene, trichloroethene, dichloroethene, and vinyl chloride) were detected in localized areas at concentrations above existing Safe Drinking Water Act (SDWA) Maximum Contaminant Levels (MCLs). Arsenic, chromium, and sulfate were detected at concentrations above existing and/or proposed SDWA MCLs and Maximum Contaminant Level Goals. Boron and lithium were also detected consistently at concentrations above background. The wells in which these elements were detected are located in areas where the same metals were

detected in soil samples. Because of uncertainties related to the source, nature, and extent of groundwater contamination at MISS, groundwater is addressed as a separate operable unit. A further evaluation of existing data is being conducted. Additional monitoring points have been proposed and are included in a September 1992 addendum to the Maywood field sampling plan. An addendum to the RI report will be provided after this reevaluation and future work are completed.

Analysis of surface water samples for indicator parameters, metals, rare earth elements, mobile ions, and volatile and semivolatile organic compounds detected the metal lithium and three organic compounds at downstream sampling locations. Lithium, because of its high solubility, is probably migrating from MISS and has been carried by Westerly Brook to the Saddle River. The volatiles originate somewhere within the MISS/Stepan watershed or from groundwater seepage into the underground culvert that conveys Westerly Brook under MISS, but the source cannot be conclusively defined because of the industrialized history of the area. There is no evidence that organics were used in the MCW thorium processing operations.

Analyses of sediment samples provided no evidence that metal contaminants are migrating offsite.

ES.5.3 Residential Vicinity Properties

Radioactive contamination is present in both surface and subsurface soils on the residential properties investigated during the RI. Table ES-1 summarizes radionuclide concentrations and depths of contamination for each residential property. Because contaminated surface soils are covered by lawns or asphalt driveways, the potential for contaminant migration through air, surface water runoff, or groundwater infiltration is reduced.

Subsurface contamination appears to have resulted from sediment deposition in the former channel of Lodi Brook or its floodplain except at 90 Avenue C and 79 Avenue B, where contamination is the result of contaminated building materials and fill material, respectively, transported to the properties.

Limited chemical sampling was performed on the residential properties to determine the presence of chemical contamination tied to thorium processing. No evidence of RCRA-hazardous waste, PCBs, or pesticides was found. Metals and rare earth elements detected at MISS and the Stepan property were also detected on these residential properties, but at lower concentrations and with less frequency. In general, metals and rare earth elements were found in areas of radioactive contamination. Their occurrence can probably be attributed to the deposition of thorium process wastes (either by fill material emplacement or by transport via the former channel of Lodi Brook), or, at low concentrations, they may naturally occur in native soils.

ES.5.4 Commercial/Governmental Vicinity Properties

Radioactive contamination is present in surface and subsurface soils on these properties. Table ES-2 summarizes radionuclide concentrations and depths of contamination for each property. Because the contaminated surface soils (like the residential vicinity properties) are covered by lawns or asphalt driveways, the potential for contaminant migration via air, surface water runoff, or groundwater infiltration is reduced.

Limited chemical sampling was performed on these properties. Metals and rare earth elements detected are probably attributable to transport by the former channel of Lodi Brook. Their presence is primarily confined to areas of radioactive contamination. Organic constituents in soils were detected at low frequencies and at generally low concentrations. Tests for RCRA characteristics indicated that no hazardous waste is present, and no PCBs or pesticides were detected.

ES.6 CONTAMINANT FATE AND TRANSPORT

Contaminants identified as FUSRAP waste at the Maywood Site include radionuclides (primarily thorium-232), metals, and rare earth elements. The primary sources of contamination identified were burial pits at Stepan, former retention ponds on MISS, and the

interim storage pile at MISS. The principal migration pathways are groundwater, surface water, and air. Because most of the contaminants are confined to the unsaturated zone, their migration in groundwater is limited. Migration of metals and radionuclides may increase in the groundwater if the contaminants in the unsaturated soil zone reach the water table.

Most of the properties investigated during this RI are covered by grass, other thick vegetation, or asphalt. Therefore, surface water transport and air resuspension are relatively insignificant pathways for migration unless activities occur that disturb the coverings.

ES.7 CONCLUSIONS/FUTURE WORK

Except for groundwater data, this RI has successfully provided the additional data called for in the work plan. No new data gaps were identified that would require further investigation. Therefore, the RI phase of the CERCLA process is considered complete.

Characterization of the nature and extent of groundwater contamination is incomplete. The existing analytical data for groundwater are being reevaluated and integrated with other available data (e.g., the analytical data for soils and the hydrogeologic conceptual model). To aid in the delineation of the nature and extent of contamination entering and exiting MISS, additional monitoring points have been proposed and are included in a September 1992 addendum to the Maywood field sampling plan. An addendum to the RI report will be completed after this reevaluation and other future work are completed.

Additional work to complete the RI/FS-environmental impact study process includes preparation of a baseline risk assessment and an FS to provide information necessary for the selection of an appropriate remedial action alternative. Results of a wetland delineation conducted by Stepan as part of their RI will be factored into the baseline risk assessment and FS for the Maywood Site. Treatability studies will be conducted to evaluate the feasibility of certain treatment technologies; this information

will aid the evaluation of remedial action alternatives.

Future work will include identification of historic/prehistoric resources and endangered species. DOE's routine environmental monitoring of groundwater, surface water, sediment, and air will continue. During remedial action, more detailed radiological surveys of the Stepan buildings will be required to better delineate the extent of contamination. The nature of contamination in burial pit 3 may also require further investigation; access limitations prevented sampling during this RI. For the purposes of future environmental documentation and review and analysis, contaminants found in burial pits 1 and 2 will be assumed to also be present in burial pit 3.

TABLES FOR EXECUTIVE SUMMARY

Table ES-1

Summary of Radiological Data for Residential Vicinity Properties

Property name	Radionuclide Concentrations in Surface Soil (pCi/g)			Radionuclide Concentrations in Subsurface Soil (pCi/g)			Depth of Subsurface Contamination (ft)	Interior Gamma Exposure Rates (μR/h)	Exterior Gamma Exposure Rates[a] (μR/h)
	U-238	Ra-226	Th-232	U-238	Ra-226	Th-232			
70 W. Hunter Ave.	<3.5 - <7.1	0.4 - 1.2	<0.5 - 3.2	<1.8 - <9.2	0.5 - 1.6	0.7 - 4.4	None	N/A	9 - 12
79 Avenue B	<4.2 - <9.8	0.4 - 4.6	0.7 - 68	<0.2 - <7.1	0.3 - 1.6	0.5 - 17.9	0.5 - 1.5	N/A	6 - 8
90 Avenue C	<2.5 - <10	<0.5 - 1.9	1.5 - 17	<1.4 - <35.3	0.4 - 4.2	0.4 - 72.5	0.5 - 2.5	36 - 38	9 - 20
108 Avenue E	<4 - <27	<0.7 - <9	1.1 - 19	<1.8 - <7.8	<0.3 - 2.8	<0.3 - 13	0.5 - 1.0	N/A	6 - 10
112 Avenue E	<2.6 - <17	0.5 - 3.7	0.6 - 34	<1 - <16	<0.2 - 4.4	0.4 - 17	0.5 - 4.0	N/A	9 - 21
113 Avenue E	<2.3 - 37	<0.5 - 3.7	<0.8 - 28	<1.1 - 13	<0.3 - 1.9	<0.4 - 13	0.5 - 1.0	N/A	8 - 14
62 Trudy Dr.	<2 - <9.5	0.6 - 3.7	1.3 - 12.7	<1.4 - 18.2	<0.4 - 10.8	<0.5 - 24.9	0.5 - 9.5	N/A	11 - 19
136 W. Central Ave.	<3.4 - <22.3	<0.6 - 2.3	<0.9 - 111.6	<2.3 - <25	<0.4 - 3.8	<0.6 - 63.9	0.5 - 8.0	12 - 20	8 - 15

[a]Measurements included background. Background for the Maywood area is 9 μR/h.

N/A = no interior measurements obtained because near-surface gamma measurements (coneshield) were within background levels, and there was no indication that contamination extended beneath the residence.

Formerly Utilized Sites Remedial
Action Program (FUSRAP)

Maywood Chemical Company Superfund Site

ADMINISTRATIVE RECORD

Document Number

MISS- 134.

US Army Corps
of Engineers

Engineering Evaluation/Cost Analysis for the Cleanup of Residential and Municipal Vicinity Properties at the Maywood Site, Bergen County, New Jersey

Final
September 1995

Prepared by
U.S. Department of Energy
Former Sites Restoration Division
Oak Ridge, Tennessee

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FIGURES

TABLES

FOREWORD

This engineering evaluation/cost analysis (EE/CA) has been prepared in support of a proposed action to remove radioactively contaminated soils and debris from selected vicinity properties at the Maywood site in Bergen County, New Jersey. The Maywood site consists of properties in the boroughs of Maywood and Lodi and the township of Rochelle Park, New Jersey, that became contaminated with radioactive materials above DOE guidelines as a result of thorium processing operations by the former Maywood Chemical Works. The U.S. Department of Energy (DOE) is responsible for cleanup activities at the Maywood site under its Formerly Utilized Sites Remedial Action Program (FUSRAP), as defined in the Federal Facility Agreement between DOE and the U.S. Environmental Protection Agency (EPA) for the site.

Remedial actions at the Maywood site are being conducted in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA). Pursuant to the Secretarial Policy on the National Environmental Policy Act (NEPA), June 1994, DOE will rely on the CERCLA process for review of actions taken under CERCLA and will incorporate NEPA values to ensure environmental protection controls and opportunities for public involvement are incorporated early in the decision making process. DOE is currently conducting a comprehensive remedial investigation/feasibility study (RI/FS) for remedial action at the Maywood site. The proposed early removal action evaluated in this EE/CA is consistent with the overall cleanup strategy for the site, and will not limit the choice of reasonable alternatives or prejudice the ultimate decision for which the RI/FS is being prepared.

Alternatives considered include: (1) no action, where any cleanup actions for the vicinity properties would await completion of the RI/FS process; and (2) expedited removal of materials exceeding cleanup criteria. The proposed action is to remove contaminated soil and debris from 37 non-DOE-controlled properties and transport these materials to a permanent disposal facility. These properties include 31 residential vicinity properties (one of which has been partially remediated), the unremediated portion of the Ballod property, three parks, a fire station, and a highway right-of-way. The residual radioactive materials at these properties pose no significant near-term threats to the public or the environment due to the relatively low contaminant concentrations and incomplete exposure pathways; however, DOE has determined that an expedited response action to remove these materials (i.e., prior to remediation of the entire Maywood site) would reduce the potential for release of contaminants from these properties into the environment and minimize the related threats to human health and the environment. The proposed action would complete cleanup actions for all residential vicinity properties associated with the Maywood site and facilitate ultimate remediation of the Maywood site by preventing the inadvertent spread of contaminants from these uncontrolled properties.

This EE/CA has been submitted for public comment in accordance with the requirements of 40 CFR 300.415. DOE has carefully reviewed all comments received during the public comment period, and a summary of comments and responses is provided as an Appendix to this document.

ACRONYMS AND ABBREVIATIONS

AEA	Atomic Energy Act of 1954, as amended
AEC	U. S. Atomic Energy Commission
ALARA	as low as reasonably achievable
ANL	Argonne National Laboratory
ARAR	applicable or relevant and appropriate requirement
BNI	Bechtel National, Inc.
BRA	baseline risk assessment
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended
CFR	Code of Federal Regulations
DCG	Derived Concentration Guide
DOE	U. S. Department of Energy
DOT	U. S. Department of Transportation
EE/CA	engineering evaluation/cost analysis
EPA	U. S. Environmental Protection Agency
FFA	Federal Facilities Agreement
FR	Federal Register
FS	feasibility study
FUSRAP	Formerly Utilized Sites Remedial Action Program
FY	fiscal year
MCW	Maywood Chemical Works
MISS	Maywood Interim Storage Site
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NEPA	National Environmental Policy Act of 1969
NJDEP	New Jersey Department of Environmental Protection
NPL	National Priorities List
NRC	U. S. Nuclear Regulatory Commission
ORNL	Oak Ridge National Laboratory
OSHA	Occupational Safety and Health Administration
RCRA	Resource Conservation and Recovery Act, as amended
RESRAD	residual radioactivity computer code
RI	remedial investigation
RI/FS	remedial investigation/feasibility study
ROD	record of decision
SAIC	Science Applications International Corporation
SARA	Superfund Amendments and Reauthorization Act
TBC	to-be-considered (guidelines)
11e(2)	Section 11e(2) of the Atomic Energy Act, defining byproduct material

UNITS OF MEASURE

ft	foot (feet)
ft^2	square foot (feet)
ft^3	cubic foot (feet)
g	gram(s)
hr	hour(s)
kg	kilogram(s)
μg	microgram(s)
μR	micro-roentgen(s)
m^2	square meter(s)
m^3	cubic meter(s)
mg	milligram(s)
mi	mile(s)
mR	milli-roentgen(s)
mrem	millirem(s)
pCi	picoCuries
yd^3	cubic yard(s)

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1. INTRODUCTION

The U. S. Department of Energy (DOE) is implementing a cleanup program for properties in the boroughs of Maywood and Lodi and the township of Rochelle Park, New Jersey, collectively referred to as the Maywood site. DOE is responsible for conducting cleanup activities at the Maywood site under its Formerly Utilized Sites Remedial Action Program (FUSRAP). This program, which currently includes 46 sites in 14 states, was established in 1974 by the U. S. Atomic Energy Commission (AEC), a predecessor agency of DOE. The purpose of FUSRAP is to identify and clean up or otherwise control sites with residual radioactive contamination above current criteria. Residual contamination at the Maywood site resulted from thorium processing operations conducted at the former Maywood Chemical Works (MCW) from 1916 to 1959. Responsibility for the Maywood site was assigned to DOE by Congress under the Energy and Water Development Act of 1984.

Properties within the Maywood site include the DOE-owned Maywood Interim Storage Site (MISS), the adjacent Stepan Company property (formerly Maywood Chemical Works), and other vicinity properties, including numerous residential, commercial, Federal, state, and municipal properties in Maywood, Rochelle Park, and Lodi, New Jersey. These properties are contaminated with the thorium-232, radium-226, and uranium-238 radioactive decay series as a result of thorium processing at MCW. Chemical contaminants are also known to be present on some of the properties.

This engineering evaluation/cost analysis (EE/CA) report has been prepared to evaluate interim cleanup measures for the Maywood site. The scope of the proposed action is to remove contaminated soil and debris from 37 non-DOE-controlled properties and transport these materials to a permanent disposal facility. These properties include 31 residential vicinity properties (one of which has been partially remediated), the unremediated portion of the Ballod property, three parks, a fire station, and a highway right-of-way. The residual radioactive materials at these properties pose no significant near-term threats to the public or the environment due to the relatively low contaminant concentrations and incomplete exposure pathways. However, DOE has determined that an expedited response action to remove these materials (i.e., prior to remediation of the entire Maywood site) would reduce the potential for release of contaminants from these properties into the environment and minimize the related threats to human health and the environment. DOE previously removed contaminated materials from 25 residential vicinity properties at the site during 1984 through 1986, and the proposed action would complete cleanup actions for all residential vicinity properties associated with the Maywood site. Furthermore, the proposed action also would help to alleviate community concerns regarding perceived health risks and potential adverse economic impacts associated with the contamination at these properties.

This proposed action is a component of the comprehensive cleanup program for the Maywood site. Implementation of comprehensive cleanup measures will follow the completion of a remedial investigation/feasibility study (RI/FS) process. The RI/FS process will conclude with the issuance of a record of decision (ROD) that will identify the selected remedy for all

contamination present at the Maywood site. The RI/FS process is being conducted according to the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA). In addition, DOE policy requires the incorporation of the values of the National Environmental Policy Act (NEPA). Details of the RI/FS process are described in the project work plan (ANL/BNI 1992). The proposed removal action is consistent with the comprehensive cleanup strategy for the site. A no-action alternative has also been evaluated, where any cleanup actions for these vicinity properties would await completion of the RI/FS process.

DOE is the lead agency responsible for cleanup activities at the Maywood site. The limits of DOE's responsibilities for the Maywood site are defined under a negotiated Federal Facility Agreement between DOE and the U. S. Environmental Protection Agency (EPA) Region II which became effective April 22, 1991. DOE is responsible for FUSRAP waste, which is specifically defined as:

- All contamination, both radiological and chemical, whether commingled or not, on MISS;
- All radiological contamination above DOE criteria related to past thorium processing at the MCW site occurring on any vicinity properties; and
- Any chemical contamination on vicinity properties that would satisfy either of the following requirements:
  - the chemical contaminants are mixed or commingled with radiological contamination above DOE criteria; or
  - the chemical contaminants originated on MISS or were associated with the thorium processing activities at the MCW site which resulted in the radiological contamination.

Chemical contamination from MCW that is not on MISS (or that is not shown to be migrating from MISS) and not mixed with FUSRAP waste, is being investigated through a separate RI/FS by the Stepan Company, owner of the former MCW property. This investigation is being conducted through an agreement signed by EPA and the Stepan Company in 1987 and an order signed by EPA in 1991. Although the DOE and Stepan Company RI/FS activities are being conducted independently, EPA has oversight over both actions; in consultation with DOE and the Stepan Company, EPA will ensure that sufficient coordination occurs between the parties to fully address the problems of the Maywood site.

The proposed removal action is consistent with CERCLA, which requires that interim actions contribute to the extent practicable to the efficient performance of any anticipated final remedy. The proposed removal action is consistent with the overall cleanup strategy for the

Maywood site, and will not limit the choice of reasonable alternatives or prejudice the ultimate decision for which the RI/FS is being prepared.

The analysis presented in this EE/CA demonstrates that the proposed action can be implemented in a manner that protects human health and the environment. Although portions of several affected vicinity properties are located within the 100-year floodplain of the Saddle River (DOE 1992), mitigative measures can be implemented to control risks associated with flooding; a floodplains assessment is provided in Appendix A. No wetlands would be impacted by the proposed removal action.

The proposed removal action would address the goals of FUSRAP by reducing the potential for further spread of radioactively contaminated soil at the Maywood site. The threats posed by contaminants at the Maywood vicinity properties are considered to be of a non-time-critical nature; that is, no immediate or substantial danger to human health or the environment exists that would necessitate emergency cleanup within six months. However, because contamination exists at properties not owned or controlled by DOE, site activities initiated by property owners (e.g., excavation, renovation) or others (e.g., utility maintenance, road improvements) could result in the further release or spread of contaminants into the environment. Removal of these contaminated materials from their current uncontrolled locations for permanent disposal in an appropriately licensed facility would reduce the potential for inadvertent spread of contamination and minimize potential exposure to these materials.

2. SITE CHARACTERIZATION

2.1 SITE DESCRIPTION

The Maywood site consists of properties in the boroughs of Maywood and Lodi and the township of Rochelle Park, New Jersey, that were contaminated by operations for processing thorium, a radioactive element, at the Maywood Chemical Works (MCW). These operations occurred from the early 1900's through 1959. The three municipalities are located in a densely populated area of Bergen County in northeastern New Jersey, approximately 12 miles north-northwest of New York City and 13 miles northeast of Newark, New Jersey (Figure 2-1). The site is listed on the National Priorities List (NPL) as the Maywood Chemical Company.

To help in developing and evaluating remedial action alternatives, the Maywood site has been divided into several operable units based on land use and the type of contaminated media (e.g., contaminated soils, contaminated buildings) of concern. The location of the properties making up these operable units is shown in Figure 2-2.

The Maywood Interim Storage Site is an 11.7-acre property owned by DOE and located in the borough of Maywood and the township of Rochelle Park. The MISS property was previously part of a 30-acre property owned by the Stepan Company, and it was formerly part of the Maywood Chemical Works. DOE acquired the property from the Stepan Company in 1985. The property contains a waste storage pile, two buildings (Building 76 and a pumphouse), two partially buried structures, temporary office trailers, a reservoir, and two rail spurs. It is bordered on the west by State Route 17, on the north by a New York, Susquehanna, and Western Railroad line, and on the south and east by commercial and industrial properties. Residential properties are located north of the railroad line and within 300 yards to the north of the MISS property boundary. The waste storage pile at MISS previously occupied approximately 2 acres and contained about 35,000 yd^3 of contaminated soils and materials from previous cleanup actions conducted on vicinity properties at the Maywood site. A separate removal action is currently underway to remove the contaminated materials from the pile for permanent disposal at an off-site commercial facility. A building at MISS (Building 76) also houses waste from previous cleanup actions and site investigations. Former waste retention ponds also are located at MISS. The property is enclosed by a chain-link fence and access is restricted within the fenced area. Figure 2-3 indicates principal features of the MISS property.

The Stepan Company, a pharmaceutical manufacturer, is located at 100 West Hunter Avenue in the borough of Maywood, adjacent to MISS. The property covers 18.2 acres, approximately two-thirds of which contains buildings; some of these buildings are located in or near areas where the MCW thorium-processing operations occurred. Burial pits containing thorium-processing and other wastes are located on the site (see Figure 2-3). The property (excluding the main office and parking area) is enclosed by a chain-link fence and access is restricted within the fenced area.

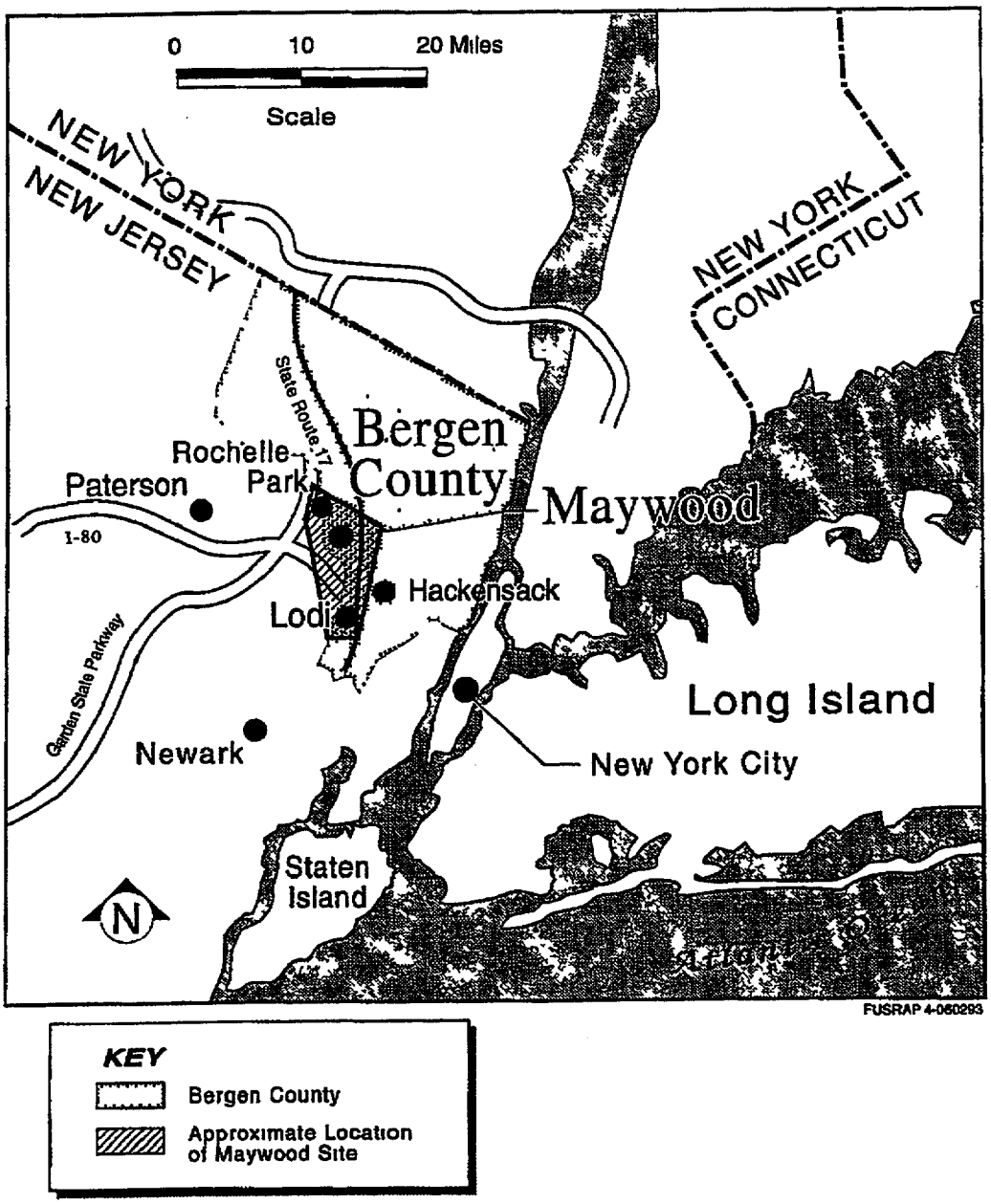

Figure 2-1. Location of the Maywood Site

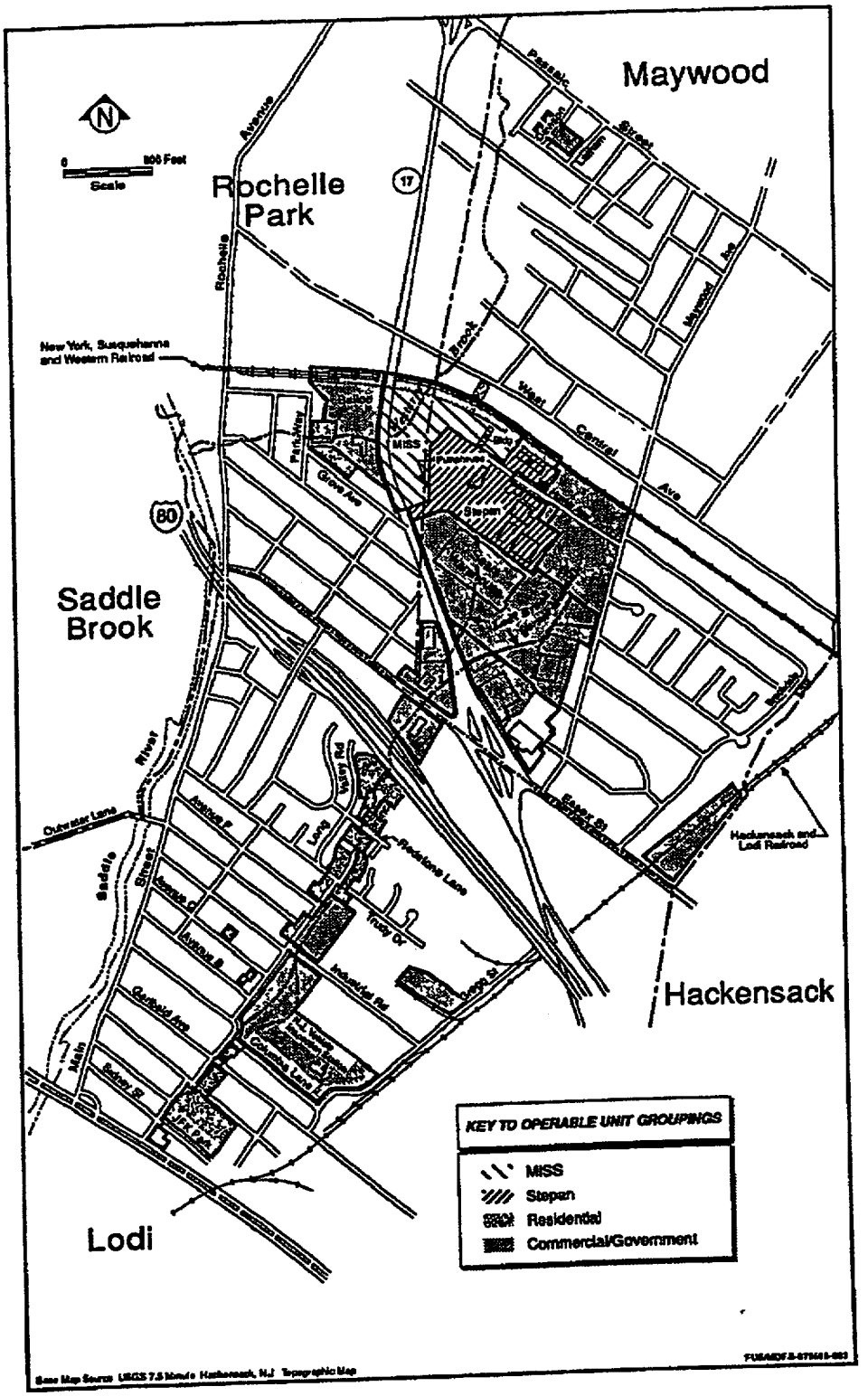

Figure 2-2. Map of the Maywood Site Operable Units

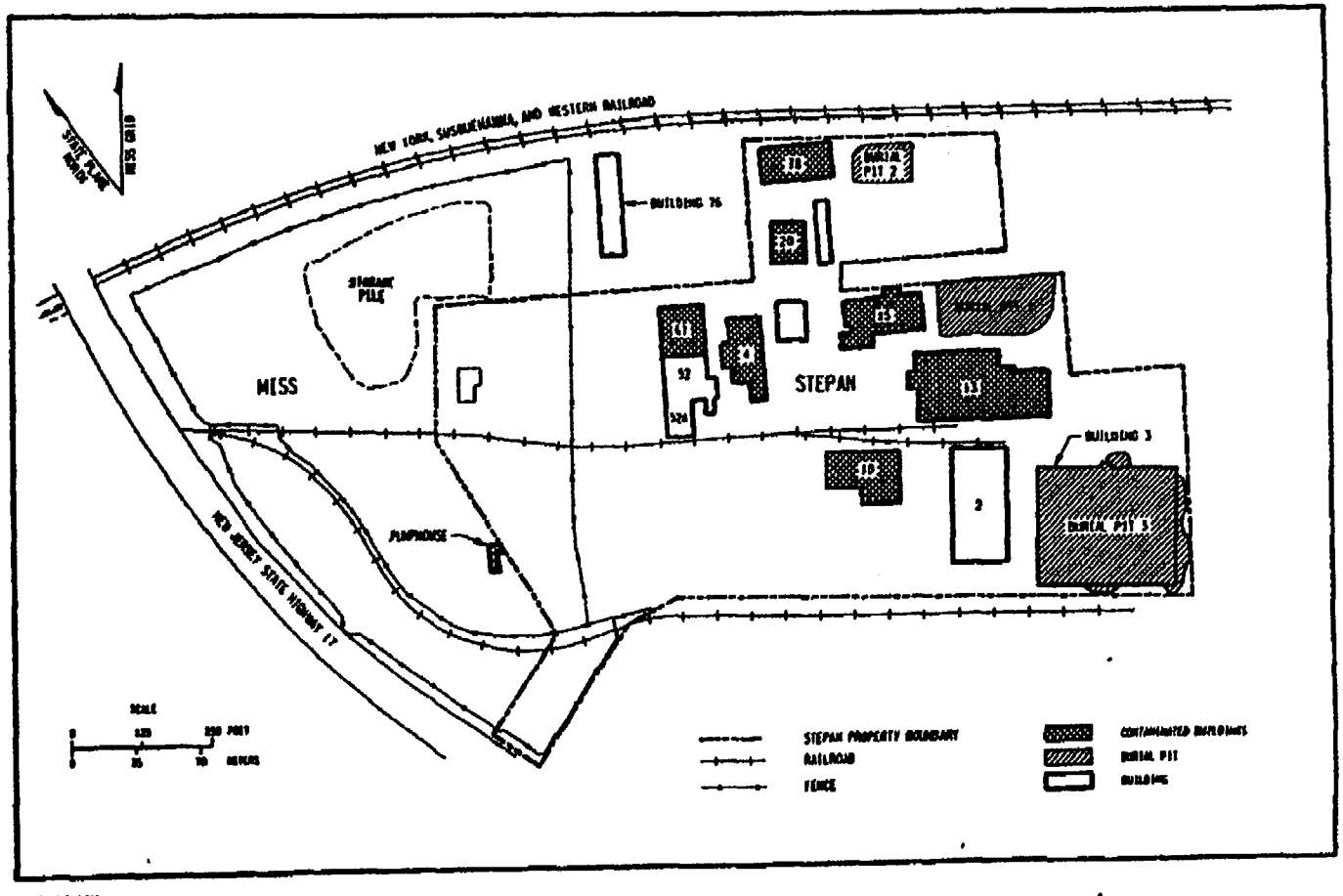

Figure 2-3
Site Map of the Maywood Interim Storage Site and Adjacent Stepan Company Property

Residential vicinity properties in the boroughs of Maywood and Lodi and the township of Rochelle Park contain radioactive contamination from thorium-processing operations. These properties were identified by DOE through surveys performed by Oak Ridge National Laboratory (ORNL). Nine residential properties in Rochelle Park on Grove Avenue and Park Way and eight residential properties in Maywood on Davison Avenue and Latham Street were completely decontaminated by DOE between 1984 and 1986. This decontamination was verified by ORNL and the properties were approved for use without radiological restriction. Eight residential properties in Lodi have also been decontaminated and have been independently verified as clean. One additional property in Lodi was partially remediated during previous removal actions. Of the remaining 31 contaminated residential properties designated for potential remediation by DOE, 29 are located in the borough of Lodi (including the one partially remediated property) and two are located in Maywood. Contamination on these properties appears to be due to two primary mechanisms: deposition of contaminated sediments along former stream channels or use of contaminated material as fill and mulch.

Commercial/government vicinity properties include 27 properties located in Maywood, Rochelle Park, and Lodi. Twenty commercial vicinity properties are part of the Maywood site. State and federally owned properties include areas in the right-of-way for Interstate 80, a State Route 17 embankment, and the New Jersey Vehicle Inspection Station. Four contaminated municipal properties in Lodi (three parks and a fire station), residential streets suspected to have contaminated soils below the surface, and contaminated sediments from Lodi Brook are also included in this operable unit. Three of these properties (Ballod, Sears and State Route 17) were once part of the former MCW property and were used, at least in part, for waste disposal. A portion of one property (Ballod) was remediated during a previous removal action. Most of the other properties were contaminated through the same processes as the residential properties, by movement of contaminated sediments along former stream channels or use of contaminated material as fill and mulch.

Contaminated buildings and structures are located on the Stepan property. Radiologically contaminated buildings include Buildings 4, 10, 13, 15, 20, 67, 78, and the guardhouse (see Figure 2-3). The radiological contamination is generally localized in discrete areas within buildings, and is fixed in place on building floors and surfaces and not easily removed by casual contact. The contaminated buildings are all old buildings that existed during the time that MCW was processing thorium. No buildings on vicinity properties were found to be contaminated, other than one residence in Lodi that contained contaminated building materials from MCW. The contaminated portion of this residential building has been removed and reconstructed.

Eighty-five properties, including the Stepan Company property and MISS, have (or had) residual radioactive contamination resulting from MCW thorium-processing activities, and are included as part of the Maywood site. These properties include 56 residential properties (25 of which have been previously remediated), properties owned by the state or Federal government, municipal properties, and commercial properties (one of which has been partially remediated). Of the 60 properties remaining to be remediated, 37 properties are addressed in this EE/CA.

Most of these properties, which are listed in Table 2-1, have been identified for this removal action based on their current land use as residential properties and municipal parks. One commercial property (Ballod) has been included because of high radiological concentrations. The I-80 right-of-way has been included to reduce the potential for recontamination of remediated vicinity properties.

Several of these vicinity properties are thought to have received radioactive materials through deposition of contaminated sediments along former stream channels of Lodi Brook. However, the brook now flows through an underground culvert across the site, and environmental monitoring data indicate no current migration of site contaminants through this pathway.

2.2 SITE BACKGROUND

The Maywood Chemical Works was constructed in 1895. In 1916, the plant began extracting thorium and rare earths from monazite sands for use in manufacturing industrial products such as mantles for gas lanterns. The plant also produced a variety of other materials, including lithium compounds, detergents, alkaloids, and oils. The plant stopped accepting monazite sands for extraction of thorium in 1956, but it processed stockpiled materials until 1959. Based on available historical information and knowledge of the chemical processes involved, the chemicals identified as having been used in the thorium extraction process include sulfuric acid, nitric acid, ammonium hydroxide, and ammonium oxalate. Oxalic acid was also used at the site in the production of higher-grade thorium.

In the extraction process, waste in a slurry form was produced. Until 1932, the slurry was pumped to two earthen-diked areas west of the plant. At that time, the disposal areas were affected by the construction of State Route 17, which separated the diked areas from the plant and partially buried them. Waste retention ponds also were located throughout the area of MCW that is now MISS.

Some of the process wastes were removed and used as mulch and fill on nearby properties, thereby contaminating those properties with radioactive materials. Although the fill consisted primarily of tea and coca leaves from other MCW processes, these materials were apparently contaminated with the thorium-processing wastes. Other wastes moved off-site from the property through natural drainage of the former Lodi Brook. Most of the open stream channel in Lodi has been replaced by an enclosed storm drain system.

MCW received a radioactive materials license from the AEC in 1954. The property was sold to the Stepan Company in 1959, which received a license from the AEC in 1961. Although the Stepan Company never processed radioactive materials, the company agreed to carry out certain remedial measures in the former disposal area on the west side of State Route 17 (now known as the Ballod property). Stepan began to clean up the thorium processing wastes in 1963. From 1966 through 1968, Stepan removed residues and tailings from the Ballod property and reburied them on the Stepan property in three burial pits. After these actions were completed,

Table 2-1. Properties to be Addressed in the Proposed Removal Action

Property, Location	Current Land Use
Ballod property, Rochelle Park [a]	Commercial [b]
I-80 Right-of-way	Highway ROW [c]
Lodi (Jet Age) Municipal Park, Lodi	Municipal
Fireman's Memorial Park, Lodi	Municipal
John F. Kennedy Municipal Park, Lodi	Municipal
Fire Station No. 2, Lodi	Municipal
60 Trudy Drive, Lodi	Residential
62 Trudy Drive, Lodi	Residential
4 Hancock Street, Lodi	Residential
5 Hancock Street, Lodi	Residential
6 Hancock Street, Lodi	Residential
7 Hancock Street, Lodi	Residential
8 Hancock Street, Lodi	Residential
10 Hancock Street, Lodi	Residential
2 Branca Court, Lodi	Residential
4 Branca Court, Lodi	Residential
6 Branca Court, Lodi	Residential
7 Branca Court, Lodi	Residential
11 Branca Court, Lodi	Residential
14 Long Valley Road, Lodi	Residential
16 Long Valley Road, Lodi	Residential
18 Long Valley Road, Lodi	Residential
20 Long Valley Road, Lodi	Residential
22 Long Valley Road, Lodi	Residential
24 Long Valley Road, Lodi	Residential
26 Long Valley Road, Lodi	Residential
11 Redstone Lane, Lodi	Residential
17 Redstone Lane, Lodi	Residential
106 Columbia Lane, Lodi	Residential
99 Garibaldi Avenue, Lodi	Residential
90 Avenue C, Lodi [a]	Residential
108 Avenue E, Lodi	Residential
112 Avenue E, Lodi	Residential
113 Avenue E, Lodi	Residential
79 Avenue B, Lodi	Residential
136 West Central Avenue, Maywood	Residential
200 Brookdale SE, Maywood [d]	Residential

[a] Partially remediated.

[b] Included in proposed removal action due to potential for near-term development and relatively high contaminant concentrations.

[c] Included in proposed removal action due to potential for contaminants at this property to re-contaminate adjacent vicinity properties included in the proposed action.

[d] This property was formally designated as part of the Maywood site after the remedial investigation was complete. Two additional properties (9 Hancock Street and 19 Redstone Lane) that were originally characterized in the remedial investigation do not require removal action.

AEC certified that the portion of the property west of State Route 17 could be used without radiological restrictions.

Additional radioactive contamination, however, was discovered in the northeast corner of the Ballod property in 1980. The discovery was made after a private citizen reported radioactive contamination near State Route 17 to the New Jersey Department of Environmental Protection (NJDEP). A survey of the area (State Route 17, Ballod property, and Stepan property) conducted by NJDEP identified the contaminants as thorium-232 and radium-226. The U.S. Nuclear Regulatory Commission (NRC) was notified of the results and conducted additional surveys from November 1980 to January 1981. These surveys confirmed that there were high concentrations of thorium-232 in soil samples collected from both the Stepan and Ballod properties. NRC, therefore, requested a thorough survey of the area.

In January 1981, the EG&G Energy Measurements Group conducted an aerial radiological survey of the Stepan property and surrounding properties. The survey, which covered a 3.9-mile^2 area, indicated contamination not only on the Stepan and Ballod properties but also in areas to the north and south of the Ballod property. During February 1981, Oak Ridge National Laboratory (ORNL) performed a separate radiological ground survey of the Ballod property. Those results eventually led to designation of the property for remedial action under FUSRAP. In June 1981, another radiological survey of the Stepan and Ballod properties commissioned by the Stepan Company produced similar findings.

Through a provision of the Energy and Water Development Appropriations Act of 1984, Congress authorized DOE to conduct a decontamination research and development project at the Maywood site. The site was assigned to FUSRAP, and DOE negotiated access to a 11.7-acre portion of the Stepan property for use as an interim storage facility for contaminated materials that were to be removed from vicinity properties. This area is now known as MISS. In September 1985, ownership of MISS was transferred to DOE.

In late 1983, DOE began a program of surveys of properties in the vicinity of the former MCW plant. From 1984 to 1986, DOE completed removal actions at 25 residential properties, and partially remediated one commercial property (Ballod). The waste from these removal actions was placed in storage at MISS. Removal actions at the vicinity properties were halted in 1986 in response to community concerns about additional wastes being brought to MISS.

In July 1991, DOE conducted a time-critical removal action to decontaminate one additional residential property in Lodi. This action was taken in response to radiological surveys which identified gamma exposure rates above DOE guidelines inside a portion of the building. The original owner of the residence was an employee of MCW, who apparently used discarded building and fill materials from MCW in the construction of an addition to the house. Contaminated soil and building materials generated during this removal action were packaged in appropriate containers and placed in Building 76 at MISS for storage.

A separate removal action is currently underway to dispose of 35,000 yd^3 of contaminated soil and debris from the waste storage pile at MISS. These materials were generated from the previous removal actions at 25 vicinity properties between 1984 and 1986. The pile covers an area of approximately 2 acres with an average height of 18 ft. The pile was constructed with an impermeable liner and cover, and a leachate collection system. DOE has maintained a comprehensive environmental monitoring program for air, surface water, sediment, and groundwater at MISS since 1984. The removal action was initiated in October 1994, and is expected to be completed by the end of 1997, assuming necessary funding is available. Waste materials removed from the interim storage pile are being shipped to the Envirocare disposal facility near Clive, Utah.

The Maywood site was placed on the National Priorities List (NPL) by EPA on September 8, 1983. All remedial actions at the site conducted by DOE are being coordinated with EPA Region II under CERCLA. In addition, it is DOE policy to integrate the requirements of CERCLA with the values of NEPA for remedial action at sites for which it has responsibility. The RI/FS conducted under CERCLA is the primary process for ensuring that DOE remedial actions for the site meet environmental regulations. Under the integrated CERCLA/NEPA policy, the CERCLA process is supplemented, as appropriate, to include NEPA values.

During the previous removal actions at the site, the public and local authorities were kept fully informed about the work being planned and conducted by DOE. This was accomplished through coordination with private property owners and local officials regarding logistics of the removal actions, as well as through local media coverage and by issuing public notifications (i.e., press releases). Formal access agreements were obtained with each affected property owner and the borough or township officials before the removal actions were conducted. Any future response activities at the site also will be coordinated with the public and state and local officials according to the community relations plan for the site (BNI 1992).

2.3 ENVIRONMENTAL SETTING

Land Use and Demography. Land use in the vicinity of the Maywood site is a mixture of commercial, light industrial, and residential uses. MISS is zoned for light industrial use. Lands adjacent to MISS are zoned for limited commercial, light industrial, or single-family residential use. Several businesses are located south of MISS. An area north of MISS is used primarily for single-family homes. Along the Maywood/Rochelle Park boundary, north of MISS, is an area zoned for light industrial use. The area east of MISS is predominantly residential. West of MISS is a mixture of commercial, predominantly residential, and light industrial uses. Interstate 80 and State Route 17 separate the commercial properties south of Stepan and MISS from the contaminated residential areas of Lodi. Several municipal parks are within the contaminated residential regions in Lodi. According to the 1990 Census, the population of Maywood was 9,473, Lodi was 22,335, and Rochelle Park was 5,587. The population density in this area is approximately 10,000 people/$mile^2$.

ATTACHMENT 3

IUSA/UDEQ Hazardous Waste Protocol

Parsons
Behle &
Latimer

A PROFESSIONAL
LAW CORPORATION

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November 22, 1999

Don Verbica
Utah Division of Solid & Hazardous Waste
288 North 1460 West
Salt Lake City, Utah

Re: Protocol for Determining Whether Alternate Feed Materials are Listed Hazardous Wastes

Dear Don:

I am pleased to present the final protocol to be used by International Uranium (USA) Corporation ("IUSA") in determining whether alternate feed materials proposed for processing at the White Mesa Mill are listed hazardous wastes. Also attached is a red-lined version of the protocol reflecting final changes made to the document based on our last discussion with you as well as some minor editorial changes from our final read-through of the document. We appreciate the thoughtful input of you and Scott Anderson in developing this protocol. We understand the Division concurs that materials determined not to be listed wastes pursuant to this protocol are not listed hazardous wastes.

We also recognize the protocol does not address the situation where, after a material has been determined not to be a listed hazardous waste under the protocol, new unrefutable information comes to light that indicates the material is a listed hazardous waste. Should such an eventuality arise, we understand an appropriate response, if any, would need to be worked out on a case-by-case basis.

Thank you again for your cooperation on this matter. Please call me if you have any questions.

Very truly yours,

Parsons Behle & Latimer

Lindsay Ford

M. Lindsay Ford

cc: (with copy of final protocol only)
Dianne Nielson
Fred Nelson
Brent Bradford
Don Ostler
Loren Morton
Bill Sinclair
David Frydenlund
David Bird
Tony Thompson

PROTOCOL FOR DETERMINING WHETHER ALTERNATE FEED MATERIALS ARE LISTED HAZARDOUS WASTES[1]

NOVEMBER 16, 1999

1. SOURCE INVESTIGATION.

Perform a good faith investigation (a "Source Investigation" or "SI")[2] regarding whether any listed hazardous wastes[3] are located at the site from which alternate feed material[4] ("Material") originates (the "Site"). This investigation will be conducted in conformance with EPA guidance[5] and the extent of information required will vary with the circumstances of each case. Following are examples of investigations that would be considered satisfactory under EPA guidance and this Protocol for some selected situations:

- Where the Material is or has been generated from a known process under the control of the generator: (a) an affidavit, certificate, profile record or similar document from the Generator or Site Manager, to that effect, together with (b) a Material Safety Data Sheet ("MSDS") for the Material, limited profile sampling, or a material composition determined by the generator/operator based on a process material balance.

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1 This Protocol reflects the procedures that will be followed by International Uranium (USA) Corporation ("IUSA") for determining whether alternate feed materials proposed for processing at the White Mesa Mill are (or contain) listed hazardous wastes. It is based on current Utah and EPA rules and EPA guidance under the Resource Conservation and Recovery Act ("RCRA"), 42 U.S.C. §§ 6901 et seq. This Protocol will be changed as necessary to reflect any pertinent changes to RCRA rules or EPA guidance.

2 This investigation will be performed by IUSA, by the entity responsible for the site from which the Material originates (the "Generator"), or by a combination of the two.

3 Attachment 1 to this Protocol provides a summary of the different classifications of RCRA listed hazardous wastes.

4 Alternate feed materials that are primary or intermediate products of the generator of the material (*e.g.*, "green" or "black" salts) are not RCRA "secondary materials" or "solid wastes," as defined in 40 CFR 261, and are not covered by this Protocol.

5 EPA guidance identifies the following sources of site- and waste-specific information that may, depending on the circumstances, be considered in such an investigation: hazardous waste manifests, vouchers, bills of lading, sales and inventory records, material safety data sheets, storage records, sampling and analysis reports, accident reports, site investigation reports, interviews with employees/former employees and former owners/operators, spill reports, inspection reports and logs, permits, and enforcement orders. *See e.g.*, 61 Fed. Reg. 18805 (April 29, 1996).

- Where specific information exists about the generation process and management of the Material: (a) an affidavit, certificate, profile record or similar document from the Generator or Site Manager, to that effect, together with (b) an MSDS for the Material, limited profile sampling data or a preexisting investigation performed at the Site pursuant to CERCLA, RCRA or other state or federal environmental laws or programs.
- Where potentially listed processes are known to have been conducted at a Site, an investigation considering the following sources of information: site investigation reports prepared under CERCLA, RCRA or other state or federal environmental laws or programs (*e.g.*, an RI/FS, ROD, RFI/CMS, hazardous waste inspection report); interviews with persons possessing knowledge about the Material and/or Site; and review of publicly available documents concerning process activities or the history of waste generation and management at the Site.
- If material from the same source is being or has been accepted for direct disposal as 11e.(2) byproduct material in an NRC-regulated facility in the State of Utah with the consent or acquiescence of the State of Utah, the Source Investigation performed by such facility.

Proceed to Step 2.

2. SPECIFIC INFORMATION OR AGREEMENT/DETERMINATION BY RCRA REGULATORY AUTHORITY THAT MATERIAL IS NOT A LISTED HAZARDOUS WASTE?

a. Determine whether specific information from the Source Investigation exists about the generation and management of the Material to support a conclusion that the Material is not (and does not contain) any listed hazardous waste. For example, if specific information exists that the Material was not generated by a listed waste source and that the Material has not been mixed with any listed wastes, the Material would not be a listed hazardous waste.

b. Alternatively, determine whether the appropriate state or federal authority with RCRA jurisdiction over the Site agrees in writing with the generator's determination that the Material is not a listed hazardous waste, has made a "contained-out" determination[6] with respect to the Material or has concluded the Material or Site is not subject to RCRA.

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6 EPA explains the "contained-out" (also referred to as "contained-in") principle as follows:

> In practice, EPA has applied the contained-in principle to refer to a process where a site-specific determination is made that concentrations of hazardous constituents in any given

(footnote continued on next page)

If yes to either question, proceed to Step 3.

If no to both questions, proceed to Step 6.

3. **PROVIDE INFORMATION TO NRC AND UTAH.**

a. If specific information exists to support a conclusion that the Material is not, and does not contain, any listed hazardous waste, IUSA will provide a description of the Source Investigation to NRC and/or the State of Utah Department of Environmental Quality, Division of Solid and Hazardous Waste (the "State"), together with an affidavit explaining why the Material is not a listed hazardous waste.

b. Alternatively, if the appropriate regulatory authority with RCRA jurisdiction over the Site agrees in writing with the generator's determination that the Material is not a listed hazardous waste, makes a contained-out determination or determines the Material or Site is not subject to RCRA, IUSA will provide documentation of the regulatory authority's determination to NRC and the State. IUSA may rely on such determination provided that the State agrees the conclusions of the regulatory authority were reasonable and made in good faith.

Proceed to Step 4.

4. **DOES STATE OF UTAH AGREE THAT ALL PREVIOUS STEPS HAVE BEEN PERFORMED IN ACCORDANCE WITH THIS PROTOCOL?**

Determine whether the State agrees that this Protocol has been properly followed (including that proper decisions were made at each decision point). The State shall review the information provided by IUSA in Step 3 or 16 with reasonable speed and advise IUSA if it believes IUSA has not properly followed this Protocol in determining

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(footnote continued from previous page)

> volume of environmental media are low enough to determine that the media does not "contain" hazardous waste. Typically, these so-called "contained-in" [or "contained-out"] determinations do not mean that no hazardous constituents are present in environmental media but simply that the concentrations of hazardous constituents present do not warrant management of the media as hazardous waste. ...
>
> EPA has not, to date, issued definitive guidance to establish the concentrations at which contained-in determinations may be made. As noted above, decisions that media do not or no longer contain hazardous waste are typically made on a case-by-case basis considering the risks posed by the contaminated media.

63 Fed. Reg. 28619, 28621-22 (May 26, 1998) (Phase IV LDR preamble).

that the Material is not listed hazardous waste, specifying the particular areas of deficiency.

If this Protocol has not been properly followed by IUSA in making its determination that the Material is not a listed hazardous waste, then IUSA shall redo its analysis in accordance with this Protocol and, if justified, resubmit the information described in Step 3 or 16 explaining why the Material is not a listed hazardous waste. The State shall notify IUSA with reasonable speed if the State still believes this Protocol has not been followed.

If yes, proceed to Step 5.

If no, proceed to Step 1.

5. MATERIAL IS NOT A LISTED HAZARDOUS WASTE.

The Material is not a listed hazardous waste and no further sampling or evaluation is necessary in the following circumstances:

- Where the Material is determined not to be a listed hazardous waste based on specific information about the generation/management of the Material OR the appropriate RCRA regulatory authority with jurisdiction over the Site agrees with the generator's determination that the Material is not a listed HW, makes a contained-out determination, or concludes the Material or Site is not subject to RCRA (and the State agrees the conclusions of the regulatory authority were reasonable and made in good faith) (Step 2); or
- Where the Material is determined not to be a listed hazardous waste (in Steps 6 through 11, 13 or 15) and Confirmation/Acceptance Sampling are determined not to be necessary (under Step 17).

6. IS MATERIAL A PROCESS WASTE KNOWN TO BE A LISTED HAZARDOUS WASTE OR TO BE MIXED WITH A LISTED HAZARDOUS WASTE?

Based on the Source Investigation, determine whether the Material is a process waste known to be a listed hazardous waste or to be mixed with a listed hazardous waste. If the Material is a process waste and is from a listed hazardous waste source, it is a listed hazardous waste. Similarly, if the Material is a process waste and has been mixed with a listed hazardous waste, it is a listed hazardous waste under the RCRA "mixture rule." If

the Material is an Environmental Medium,[7] it cannot be a listed hazardous waste by direct listing or under the RCRA "mixture rule."[8] If the Material is a process waste but is not known to be from a listed source or to be mixed with a listed waste, or if the Material is an Environmental Medium, proceed to Steps 7 through 11 to determine whether it is a listed hazardous waste.

If yes, proceed to Step 12.

If no, proceed to Step 7.

7. DOES MATERIAL CONTAIN ANY POTENTIALLY LISTED HAZARDOUS CONSTITUENTS?

Based on the Source Investigation (and, if applicable, Confirmation and Acceptance Sampling), determine whether the Material contains any hazardous constituents listed in the then most recent version of 40 CFR 261, Appendix VII (which identifies hazardous constituents for which F- and K-listed wastes were listed) or 40 CFR 261.33(e) or (f) (the P and U listed wastes) (collectively "Potentially Listed Hazardous Constituents"). If the Material contains such constituents, a source evaluation is necessary (pursuant to Steps 8 through 11). If the Material does <u>not</u> contain any Potentially Listed Hazardous Constituents, it is not a listed hazardous waste. The Material also is not a listed hazardous waste if, where applicable, Confirmation and Acceptance Sampling results do not reveal the presence of any "new" Potentially Listed Hazardous Constituents (*i.e.*, constituents other than those that have already been identified by the Source Investigation (or previous Confirmation/Acceptance Sampling) and determined not to originate from a listed source).

If yes, proceed to Step 8.

If no, proceed to Step 16.

8. IDENTIFY POTENTIALLY LISTED WASTES.

Identify potentially listed hazardous wastes ("Potentially Listed Wastes") based on Potentially Listed Hazardous Constituents detected in the Material, *i.e.*, wastes which are listed for any of the Potentially Listed Hazardous Constituents detected in the Material, as

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7 The term "Environmental Media" means soils, ground or surface water and sediments.

8 The "mixture rule" applies only to mixtures of listed hazardous wastes and other "solid wastes." *See* 40 CFR § 261.3(a)(2)(iv). The mixture rule does not apply to mixtures of listed wastes and Environmental Media, because Environmental Media are not "solid wastes" under RCRA. *See* 63 Fed. Reg. 28556, 28621 (May 26, 1998).

identified in the then most current version of 40 CFR 261 Appendix VII or 40 CFR 261.33(c) or (f).[9] With respect to Potentially Listed Hazardous Constituents identified through Confirmation and/or Acceptance Sampling, a source evaluation (pursuant to Steps 8 through 11) is necessary only for "new" Potentially Listed Hazardous Constituents (*i.e.*, constituents other than those that have already been identified by the Source Investigation (or previous Confirmation/Acceptance Sampling) and determined not to originate from a listed source).

Proceed to Step 9.

9. WERE ANY OF THE POTENTIALLY LISTED WASTES KNOWN TO BE GENERATED OR MANAGED AT SITE?

Based on information from the Source Investigation, determine whether any of the Potentially Listed Wastes identified in Step 8 are known to have been generated or managed at the Site. This determination involves identifying whether any of the specific or non-specific sources identified in the K- or F-lists has ever been conducted or located at the Site, whether any waste from such processes has been managed at the Site, and whether any of the P- or U-listed commercial chemical products has ever been used, spilled or managed there. In particular, this determination should be based on the following EPA criteria:

Solvent Listings (F001-F005)

Under EPA guidance, "to determine if solvent constituents contaminating a waste are RCRA spent solvent F001-F005 wastes, the [site manager] must know if:

- The solvents are *spent* and *cannot be reused without reclamation* or cleaning.
- The solvents were *used exclusively for their solvent properties*.
- The solvents are spent *mixtures and blends that contained, before use, a total of 10 percent or more (by volume) of the solvents* listed in F001, F002, F004, and F005.

If the solvents contained in the [wastes] are RCRA listed wastes, the [wastes] are RCRA hazardous waste. When the [site manager] does not have guidance information on the use of the solvents and their characteristics before use, the [wastes] cannot be classified as containing a

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9 For example, if the Material contains tetrachloroethylene, the following would be Potentially Listed Wastes: F001, F002, F024, K019, K020, K150, K151 or U210. *See* 40 CFR 261 App. VII.

listed spent solvent."[10] The person performing the Source Investigation will make a good faith effort to obtain information on any solvent use at the Site. If solvents were used at the Site, general industry standards for solvent use in effect at the time of use will be considered in determining whether those solvents contained 10 percent or more of the solvents listed in F001, F002, F004 or F005.

K-Listed Wastes and F-Listed Wastes Other Than F001-F005

Under EPA guidance, to determine whether K wastes and F wastes other than F001-F005 are RCRA listed wastes, the generator "must know the *generation process information* (about each waste contained in the RCRA waste) described in the listing. For example, for [wastes] to be identified as containing K001 wastes that are described as 'bottom sediment sludge from the treatment of wastewaters from wood preserving processes that use creosote and/or pentachlorophenol,' the [site manager] must know the manufacturing process that generated the wastes (treatment of wastewaters from wood preserving process), feedstocks used in the process (creosote and pentachlorophenol), and the process identification of the wastes (bottom sediment sludge)."[11]

P- and U-Listed Wastes

EPA guidance provides that "P and U wastes cover only unused and unmixed commercial chemical products, particularly spilled or off-spec products. Not every waste containing a P or U chemical is a hazardous waste. To determine whether a [waste] contains a P or U waste, the [site manager] must have direct evidence of product use. In particular, the [site manager] should ascertain, if possible, whether the chemicals are:

- Discarded (as described in 40 CFR 261.2(a)(2)).
- Either off-spec commercial products or a commercially sold grade.
- Not used (soil contaminated with spilled unused wastes is a P or U waste).

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10 Management of Investigation-Derived Wastes During Site Inspections, EPA/540/G-91/009, May 1991 (emphasis added).

11 Management of Investigation-Derived Wastes During Site Inspections, EPA/540/G-91/009, May 1991 (emphasis added).

- The sole active ingredient in a formulation."[12]

If Potentially Listed Wastes were known to be generated or managed at the Site, further evaluation is necessary to determine whether these wastes were disposed of or commingled with the Material (Steps 10 and possibly 11). If Potentially Listed Wastes were not known to be generated or managed at the Site, then information concerning the source of Potentially Listed Hazardous Constituents in the Material will be considered "unavailable or inconclusive" and, under EPA guidance,[13] the Material will be assumed not to be a listed hazardous waste.

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12 Management of Investigation-Derived Wastes During Site Inspections, EPA/540/G-91/009, May 1991.

13 EPA guidance consistently provides that, where information concerning the origin of a waste is unavailable or inconclusive, the waste may be assumed not to be a listed hazardous waste. *See e.g.*, Memorandum from Timothy Fields (Acting Assistant Administrator for Solid Waste & Emergency Response) to RCRA/CERCLA Senior Policy Managers regarding "Management of Remediation Waste Under RCRA," dated October 14, 1998 ("Where a facility owner/operator makes a good faith effort to determine if a material is a listed hazardous waste but cannot make such a determination because documentation regarding a source of contamination, contaminant, or waste is *unavailable or inconclusive*, EPA has stated that one may assume the source, contaminant, or waste is not listed hazardous waste"); NCP Preamble, 55 Fed. Reg. 8758 (March 8, 1990) (Noting that "it is often necessary to know the origin of the waste to determine whether it is a listed waste and that, *if such documentation is lacking, the lead agency may assume it is not a listed waste*); Preamble to proposed Hazardous Waste Identification Rule, 61 Fed. Reg. 18805 (April 29, 1996) ("Facility owner/operators should make a good faith effort to determine whether media were contaminated by hazardous wastes and ascertain the dates of placement. The Agency believes that by using available site- and waste-specific information ... facility owner/operators would typically be able to make these determinations. However, as discussed earlier in the preamble of today's proposal, *if information is not available or inconclusive, facility owner/operators may generally assume that the material contaminating the media were not hazardous wastes.*"); Preamble to LDR Phase IV Rule, 63 Fed. Reg. 28619 (May 26, 1998) ("As discussed in the April 29, 1996 proposal, the Agency continues to believe that, *if information is not available or inconclusive, it is generally reasonable to assume that contaminated soils do not contain untreated hazardous wastes ...*"); and Memorandum from John H. Skinner (Director, EPA Office of Solid Waste) to David Wagoner (Director, EPA Air and Waste Management Division, Region VII) regarding "Soils from Missouri Dioxin Sites," dated January 6, 1984 ("The analyses indicate the presence of a number of toxic compounds in many of the soil samples taken from various sites. However, the presence of these toxicants in the soil does not automatically make the soil a RCRA hazardous waste. The origin of the toxicants must be known in order to determine that they are derived from a listed hazardous waste(s). *If the exact origin of the toxicants is not known, the soils cannot be*
(footnote continued on next page)

If yes, proceed to Step 10.

If no, proceed to Step 16.

10. WERE LISTED WASTES KNOWN TO BE DISPOSED OF OR COMMINGLED WITH MATERIAL?

If listed wastes identified in Step 9 were known to be generated at the Site, determine whether they were known to be disposed of or commingled with the Material?

If yes, proceed to Step 12.

If no, proceed to Step 11.

11. ARE THERE ONE OR MORE POTENTIAL NON-LISTED SOURCES OF LISTED HAZARDOUS WASTE CONSTITUENTS?

In a situation where Potentially Listed Wastes were known to have been generated/managed at the Site, but the wastes were not known to have been disposed of or commingled with the Material, determine whether there are potential non-listed sources of Potentially Listed Hazardous Constituents in the Material. If not, unless the State agrees otherwise, the constituents will be assumed to be from listed sources (proceed to Step 12). If so, the Material will be assumed not to be a listed hazardous waste (proceed to Step 16). Notwithstanding the existence of potential non-listed sources at a Site, the Potentially Listed Hazardous Constituents in the Material will be considered to be from the listed source(s) if, based on the relative proximity of the Material to the listed and non-listed source(s) and/or information concerning waste management at the Site, the evidence is compelling that the listed source(s) is the source of Potentially Listed Hazardous Constituents in the Material.

If yes, proceed to Step 16.

If no, proceed to Step 12.

12. MATERIAL IS A LISTED HAZARDOUS WASTE.

The Material is a listed hazardous waste under the following circumstances:

(footnote continued from previous page)

considered RCRA hazardous wastes unless they exhibit one or more of the characteristics of hazardous waste ...").

- If the Material is a process waste and is known to be a listed hazardous waste or to be mixed with a listed hazardous waste (Step 6),
- If Potentially Listed Wastes were known to be generated/managed at the Site and to be disposed of/commingled with the Material (Step 10) (subject to a "contained-out" determination in Step 13), or
- If Potentially Listed Wastes were known to be generated/managed at the Site, were not known to be disposed of/commingled with the Material but there are not any potential non-listed sources of the Potentially Listed Hazardous Constituents detected in the Material (Step 11) (subject to a "contained-out" determination in Step 13).

Proceed to Step 13.

13. HAS STATE OF UTAH MADE A CONTAINED-OUT DETERMINATION.

If the Material is an Environmental Medium, and:

- the level of any listed waste constituents in the Material is "de minimis"; or
- all of the listed waste constituents or classes thereof are already present in the White Mesa Mill's tailings ponds as a result of processing conventional ores or other alternate feed materials in concentrations at least as high as found in the Materials

the State of Utah will consider whether it is appropriate to make a contained-out determination with respect to the Material.

If the State makes a contained-out determination, proceed to Step 16.

If the State does not make a contained-out determination, proceed to Step 14.

14. IS IT POSSIBLE TO SEGREGATE LISTED HAZARDOUS WASTES FROM OTHER MATERIALS?

Determine whether there is a reasonable way to segregate material that is a listed hazardous waste from alternate feed materials that are not listed hazardous wastes that will be sent to IUSA's White Mesa Mill. For example, it may be possible to isolate material from a certain area of a remediation site and exclude that material from Materials that will be sent to the White Mesa Mill. Alternatively, it may be possible to increase

sampling frequency and exclude materials with respect to which the increased sampling identifies constituents which have been attributed to listed hazardous waste.

If yes, proceed to Step 15.

If no, proceed to Step 12.

15. SEPARATE LISTED HAZARDOUS WASTES FROM MATERIALS.

Based on the method of segregation determined under Step 14, materials that are listed hazardous wastes are separated from Materials that will be sent to the White Mesa Mill.

For materials that are listed hazardous wastes, proceed to Step 12.

For Materials to be sent to the White Mesa Mill, proceed to Step 16.

16. PROVIDE INFORMATION TO NRC AND UTAH.

If the Material does not contain any Potentially Listed Hazardous Constituents (as determined in Step 7), where information concerning the source of Potentially Listed Hazardous Constituents in the Material is "unavailable or inconclusive" (as determined in Steps 8 through 11), or where the State of Utah has made a contained-out determination with respect to the Material (Step 13), the Material will be assumed not to be (or contain) a listed hazardous waste. In such circumstances, IUSA will submit the following documentation to NRC and the State:

- A description of the Source Investigation;
- An explanation of why the Material is not a listed hazardous waste.
- Where applicable, an explanation of why Confirmation/Acceptance Sampling has been determined not to be necessary in Step 17.
- If Confirmation/Acceptance Sampling has been determined necessary in Step 17 , a copy of IUSA's and the Generator's Sampling and Analysis Plans.
- A copy of Confirmation and Acceptance Sampling results, if applicable. IUSA will submit these results only if they identify the presence of "new" Potentially Listed Hazardous Constituents (as defined in Steps 7 and 8).

Proceed to Step 17.

17. ARE SAMPLING RESULTS OR DATA REPRESENTATIVE?

Determine whether the sampling results or data from the Source Investigation (or, where applicable, Confirmation/Acceptance Sampling results) are representative. The purpose of this step) is to determine whether Confirmation and Acceptance Sampling (or

continued Confirmation and Acceptance Sampling) are necessary. If the sampling results or data are representative of all Material destined for the White Mesa Mill, based on the extent of sampling conducted, the nature of the Material and/or the nature of the Site (*e.g.*, whether chemical operations or waste disposal were known to be conducted at the Site), future Confirmation/Acceptance Sampling will not be necessary. If the sampling results are not representative of all Material destined for the White Mesa Mill, then additional Confirmation/Acceptance sampling may be appropriate. Confirmation and Acceptance Sampling will be required only where it is reasonable to expect that additional sampling will detect additional contaminants not already detected. For example:

- Where the Material is segregated from Environmental Media, *e.g.*, the Material is containerized, there is a high probability the sampling results or data from the Source Investigation are representative of the Material and Confirmation/Acceptance Sampling would not be required.
- Where IUSA will be accepting Material from a discrete portion of a Site, *e.g.*, a storage pile or other defined area, and adequate sampling characterized the area of concern for radioactive and chemical contaminants, the sampling for that area would be considered representative and Confirmation/Acceptance sampling would not be required.
- Where Material will be received from a wide area of a Site and the Site has been carefully characterized for radioactive contaminants, but not chemical contaminants, Confirmation/Acceptance sampling would be required.
- Where the Site was not used for industrial activity or disposal before or after uranium material disposal, and the Site has been adequately characterized for radioactive and chemical contaminants, the existing sampling would be considered sufficient and Confirmation/Acceptance sampling would not be required.
- Where listed wastes were known to be disposed of on the Site and the limits of the area where listed wastes were managed is not known, Confirmation/Acceptance sampling would be required to ensure that listed wastes are not shipped to IUSA (see Step 14).

If yes, proceed to Step 4.

If no, proceed to Step 18.

18. DOES STATE OF UTAH AGREE THAT ALL PREVIOUS STEPS HAVE BEEN PERFORMED IN ACCORDANCE WITH THIS PROTOCOL?

Determine whether the State agrees that this Protocol has been properly followed (including that proper decisions were made at each decision point). The State shall

review the information provided by IUSA in Step 16 with reasonable speed and advise IUSA if it believes IUSA has not properly followed this Protocol in determining that the Material is not listed hazardous waste, specifying the particular areas of deficiency.

If this Protocol has not been properly followed by IUSA in making its determination that the Material is not a listed hazardous waste, then IUSA shall redo its analysis in accordance with this Protocol and, if justified, resubmit the information described in Step 16 explaining why the Material is not a listed hazardous waste. The State shall notify IUSA with reasonable speed if the State still believes this Protocol has not been followed.

If yes, proceed to Step 19.

If no, proceed to Step 1.

19. MATERIAL IS NOT A LISTED HAZARDOUS WASTE, BUT CONFIRMATION AND ACCEPTANCE SAMPLING ARE REQUIRED.

The Material is not a listed hazardous waste, but Confirmation and Acceptance Sampling are required, as determined necessary under Step 17.

Proceed to Step 20.

20. CONDUCT ONGOING CONFIRMATION AND ACCEPTANCE SAMPLING.

Confirmation and Acceptance Sampling will continue until determined no longer necessary under Step 17. Such sampling will be conducted pursuant to a Sampling and Analysis Plan ("SAP") that specifies the frequency and type of sampling required. If such sampling does not reveal any "new" Potentially Listed Hazardous Constituents (as defined in Steps 7 and 8), further evaluation is not necessary (as indicated in Step 7). If such sampling reveals the presence of "new" constituents, Potentially Listed Wastes must be identified (Step 8) and evaluated (Steps 9 through 11) to determine whether the new constituent is from a listed hazardous waste source. Generally, in each case, the SAP will specify sampling comparable to the level and frequency of sampling performed by other facilities in the State of Utah that dispose of 11e.(2) byproduct material, either directly or that results from processing alternate feed materials.

Proceed to Step 7.

Attachment 1

Summary of RCRA Listed Hazardous Wastes

There are three different categories of listed hazardous waste under RCRA:

- *F-listed wastes from non-specific sources (40 CFR § 261.31(a))*: These wastes include spent solvents (F001-F005), specified wastes from electroplating operations (F006-F009), specified wastes from metal heat treating operations (F010-F012), specified wastes from chemical conversion coating of aluminum (F019), wastes from the production/manufacturing of specified chlorophenols, chlorobenzenes, and chlorinated aliphatic hydrocarbons (F019-F028), specified wastes from wood preserving processes (F032-F035), specified wastes from petroleum refinery primary and secondary oil/water/solids separation sludge (F037-F038), and leachate resulting from the disposal of more than one listed hazardous waste (F039).
- *K-listed wastes from specific sources (40 CFR § 261.32)*: These include specified wastes from wood preservation, inorganic pigment production, organic chemical production, chlorine production, pesticide production, petroleum refining, iron and steel production, copper production, primary and secondary lead smelting, primary zinc production, primary aluminum reduction, ferroalloy production, veterinary pharmaceutical production, ink formulation and coking.
- *P- and U-listed commercial chemical products (40 CFR § 261.33)*: These include commercial chemical products, or manufacturing chemical intermediates having the generic name listed in the "P" or "U" list of wastes, container residues, and residues in soil or debris resulting from a spill of these materials.[1] "The phrase 'commercial chemical product or manufacturing chemical intermediate ...' refers to a chemical substance which is manufactured or formulated for commercial or manufacturing use which consists of the commercially pure grade of the chemical, any technical grades of the chemical that are produced or marketed, and all formulations in which the chemical is the sole active ingredient. It does not refer to a material, such as a manufacturing process waste, that contains any of the [P- or U-listed substances]."[2]

Appendix VII to 40 CFR part 261 identifies the hazardous constituents for which the F- and K-listed wastes were listed.

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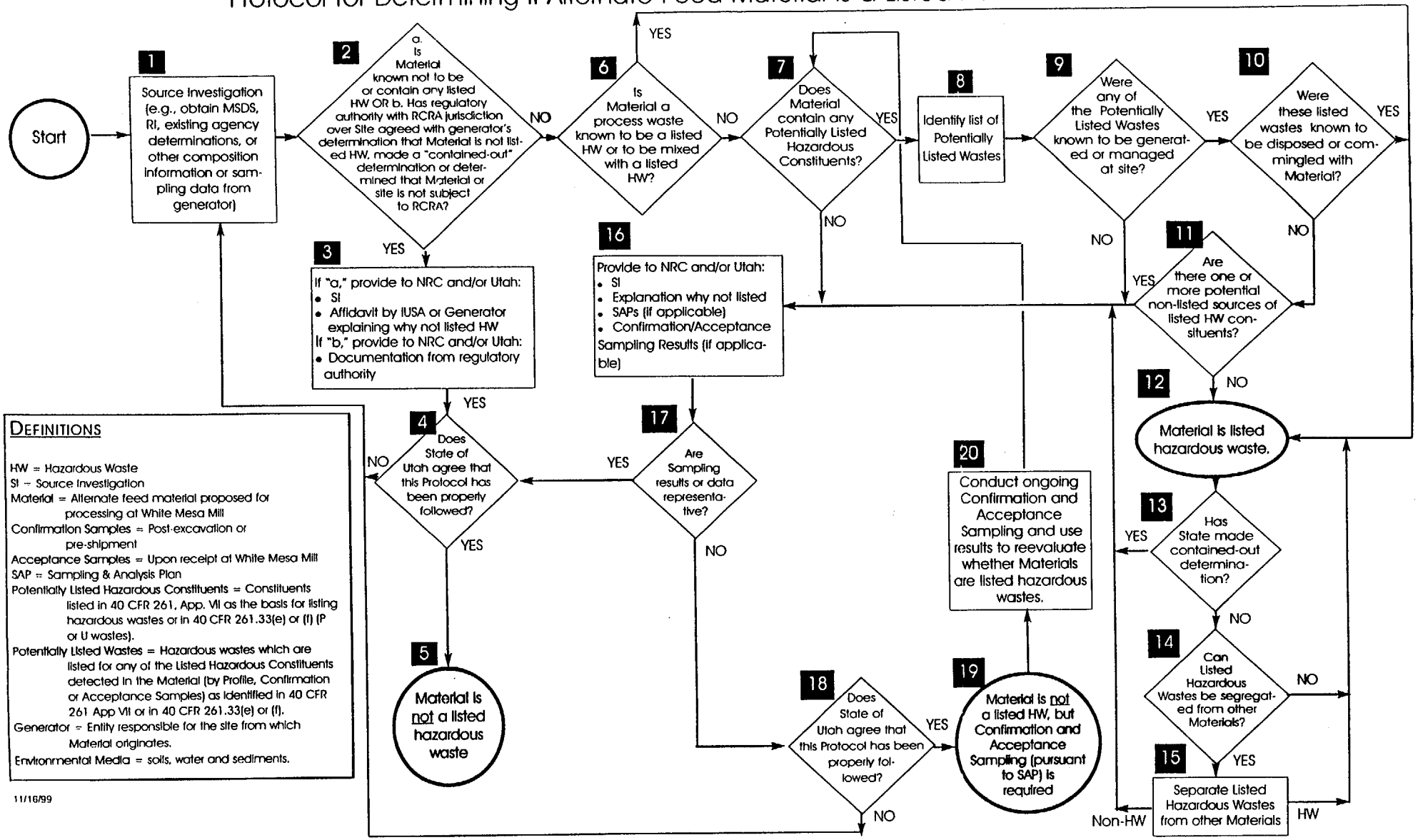
1 P-listed wastes are identified as "acutely hazardous wastes" and are subject to additional management controls under RCRA. 40 CFR § 261.33(e) (1997). U-listed wastes are identified as "toxic wastes." Id. § 261.33(f).

2 40 CFR § 261.33(d) note (1997).

Protocol for Determining if Alternate Feed Material is a Listed Hazardous Waste



DEFINITIONS

HW = Hazardous Waste
SI = Source Investigation
Material = Alternate feed material proposed for processing at White Mesa Mill
Confirmation Samples = Post-excavation or pre-shipment
Acceptance Samples = Upon receipt at White Mesa Mill
SAP = Sampling & Analysis Plan
Potentially Listed Hazardous Constituents = Constituents listed in 40 CFR 261, App. VII as the basis for listing hazardous wastes or in 40 CFR 261.33(e) or (f) (P or U wastes).
Potentially Listed Wastes = Hazardous wastes which are listed for any of the Listed Hazardous Constituents detected in the Material (by Profile, Confirmation or Acceptance Samples) as identified in 40 CFR 261 App VII or in 40 CFR 261.33(e) or (f).
Generator = Entity responsible for the site from which Material originates.
Environmental Media = soils, water and sediments.

11/16/99

ATTACHMENT 4

Review of Chemical Contaminants in Maywood Site Uranium Material to Determine Potential Presence of RCRA Listed Hazardous Waste

This attachment will be submitted separately.

ATTACHMENT 5

IUSA Letters to ICFKE and IT
Regarding Sampling Procedures on Similar Projects

INTERNATIONAL URANIUM (USA) CORPORATION

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

September 4, 1998

Mr. Don Verbica
State of Utah Department of Environmental Quality
Division of Solid and Hazardous Waste
288 North 1460 West
P.O. Box 144880
Salt Lake City, Utah 84114-4880

Re: Conference Call of August 26, 1998

Dear Mr. Verbica:

This letter follows the conference call of August 26, 1998, in which representatives of the State of Utah and International Uranium (USA) Corporation ("IUSA") discussed the methodologies being used to collect and analyze samples of the Ashland 2 materials for *total* Volatile Organic Compounds ("VOC") and Semivolatile Organic Compounds ("SVOC").

This letter summarizes the key elements of the ICF Kaiser ("ICFKE") and IUSA sampling plans for these classes of chemicals.

Sampling and Analysis – ICFKE

First set of samples: Profile Samples

By a memorandum dated August 12, 1998, ICFKE confirmed its agreement to additions to the ICFKE Sampling and Analysis Plan of May 29, 1998, (the "ICFKE SAP") in response to IUSA's request of July 23, 1998 for additional sampling for *total* VOC and SVOC analyses. Copies of the IUSA letter of July 23, 1998 and the ICFKE memorandum are enclosed with this letter

Initial profile sampling was conducted by ICFKE "to characterize the physical and chemical characteristics" of the material to be shipped off-site. The 15 "profile" samples taken prior to commencement of any excavation included analyses by analytical methods SW8260 and SW8270 for VOC and SVOC. The locations for these samples were selected on a random basis within the excavation area. IUSA contacted ICFKE's project field team at the Ashland 2 site on September 3, 1998 for further information on the selection of sampling locations for both pre-excavation samples and pre-shipping carload samples. As a result of this phone conversation we understand that the ICFKE pre-excavation samples were collected near the same bore hole locations as the RI samples, and thus duplicated those Ashland 2 borings which were within the excavation area.

These samples have been collected as described in Standard Operating Procedure ("SOP") S.1, subsection 3.3, as set out in the ICFKE SAP, which reads as follows:

> 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.

It should be noted that SOP 3.1 specifies that this VOC sampling will be collected in such a manner that it is neither mixed nor allowed to volatilize, and it is completed *before* the homogenized sample is prepared for analysis of other organic and inorganic parameters.

Additional Organic Vapor Screening of Soils

The RI found that organic residuals may be present at the Ashland 2 Site. As a precautionary measure, the ICFKE SAP calls for routine scanning with a photoionization detector ("PID") and observation for discolored oily staining of materials in soil excavation areas to identify soil materials potentially contaminated with organic compounds. According to the information supplied by ICFKE during the September 3, 1998 phone call, this procedure was incorporated primarily for the protection of worker health and safety. The PID was not used to determine the extent of organic contamination or limit the number of samples collected for organic analysis.

Second Set of Samples: Pre-shipping Samples

In addition to the above-described organic vapor screening, ICFKE also confirmed in its August 12, 1998 memorandum, in response to IUSA's request of July 23, 1998, its agreement to obtain one random sample per 500 cubic yards ("CY") of excavated material for analysis of total VOCs and SVOCs, by methods SW-8260 and SW-8270, respectively. According to information supplied by ICFKE during the September 3, 1998 phone call, they have performed the sampling as follows:

- Each stockpile of approximately 500 CY was sampled before material was loaded into cars. Samples were collected from six locations in each stockpile and composited into a single sample. If the excavated material showed visible evidence of staining or if a PID indicated the presence of organic compounds, the six samples were taken from the stained material or area indicated by the PID. If neither PID nor visual inspection indicated the presence of organic contaminants, ICFKE used the assistance of a surveyor to determine six locations that were geostatistically representative for each pile. Rail cars were loaded from each material stockpile after it was sampled.

- A split of each composite was shipped to the offsite laboratory for analysis by methods SW 8260 and 8270. A second split was sent to the onsite laboratory for radiological screening. ICFKE has not completed data validation for analytical results from the stockpile sampling. They have agreed to provide IUSA with these sample results and the associated laboratory backup information when the validation process is completed.

Sampling and Analysis – IUSA

I enclose a copy of IUSA's Sampling and Analysis Plan (the "IUSA SAP") which calls for confirmatory sampling of the Ashland 2 material as follows:

- Frequency
  One sample per 100 CY of ore delivered to the Mill, for the first 1,000 CY; and one sample per 500 CY delivered, for all of the remaining ore delivered.

- Analytical Method
  Methods 8260 and 8270 for total VOC and SVOC, in accordance with SW-846, Test Methods for Evaluating Solid Waste, 3rd edition, update 3, 12/96. The procedures, analytical methods, and required quality assurance/quality control methods utilized for sample analyses performed by the contract laboratory are consistent with those requirements established by the EPA under the EPA laboratory certification program.

- Chain of Custody
  As per the Mill Standard Operating Procedures, and detailed in the IUSA SAP

- Quality Assurance/Quality Control
  QC samples will be collected one set per ten field samples. Each set will consist of one soil blank, one soil duplicate, and one soil spike.

We have enclosed a copy of Table 6-2 from the Quality Assurance Project Plan (QAPP) portion of the ICFKE SAP. Please note that this table specifies SW846 methods 8260 and 8270 for the VOC and SVOC analyses, respectively.

We also enclose a copy of a memorandum from Jo Ann Tischler, a chemical engineering consultant with extensive experience in petroleum and petrochemical processing and whom we have retained to provide expert analysis on the potential presence of listed hazard waste, which deals with the identification of waste sources and your F037 concerns.

We will provide you with a copy of IUSA's sampling results once they become available.

We hope this letter addresses your concerns. If you have any questions or require any further information, please contact the undersigned.

Sincerely yours,

David C. Frydenlund
Vice-President and General Counsel

DCF:la

cc: William J. Sinclair
Earl E. Hoellen
Michelle R. Rehmann
Anthony J. Thompson – Shaw, Pittman, Potts & Trowbridge
David R. Bird – Parsons, Behle & Latimer

ICF
EEH

ICF KAISER

ENVIRONMENTAL AND FACILITIES MANAGEMENT GROUP

Baltimore TERC

OFX9808.006

TO: Michelle Rehmann

FROM: Bruce Howard

DATE: August 12, 1998

SUBJECT: Ashland 2 Confirmatory Sampling

Reference your letter dated July 23, 1998, subject as above. I would like to follow-up on my review of the letter and my verbal concurrence to it at that time.

We have and are taking samples of the soil per our sampling and analysis plan. The first 15 sampling results have already been forwarded to you. We will continue to follow the SAP and forward all sample results to you and also meet the commitments in paragraphs 1 and 2 of p. 7 of the subject letter.

Please call me if you have any questions.

SAMPLING AND ANALYSIS PLAN FOR ASHLAND 2 CONFIRMATORY SAMPLING PROGRAM

1.0 INTRODUCTION

International Uranium (USA) Corporation's ("IUSA") White Mesa Mill is authorized to process alternate feed materials other than natural uranium ore, from the Ashland 2 site in Tonawanda, New York, under license condition 10.10 of NRC Source Material License No. SUA-1358, Amendment 6, issued June 23, 1998.

1.1 Background

Under the NRC 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 NRC staff for recycling and extraction of source material.

As stated in the Technical Evaluation Report ("TER") accompanying Amendment 6 ("the Ashland Amendment"), remedial investigations carried out by the DOE at the Ashland 2 site did not find listed hazardous wastes on the Ashland 2 property. In addition, it is the USACE's belief, based on process knowledge and its own analyses, that the material contains no listed 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 contains listed hazardous wastes will not be included in shipments to White Mesa. Also, as committed to in its June 11, 1998 letter, IUSA will conduct testing of Ashland 2 material arriving at the Mill on a regular basis to confirm ICF Kaiser's determinations. Finally, with respect to the possibility that RCRA-listed industrial and chemical byproducts disposed at the former Ashland Oil industrial landfill may possibly have affected materials to be excavated at the Ashland 2 site, the NRC staff states in the TER that the staff considers that ICF Kaiser's sampling program and IUSA's confirmatory analyses will minimize the likelihood that any materials containing listed hazardous wastes, if they exist, will be transported to and processed at the White Mesa Mill.

1.2 Data Quality Objectives

The data quality objectives of this Sampling and Analysis Plan ("SAP") are to collect and analyze samples of the Ashland 2 material, sufficient to allow IUSA to independently verify that the materials received at the Mill do not contain listed hazardous wastes.

1.3 Purpose of this SAP

The purpose of this plan is to describe field sampling procedures and quality assurance/quality control measures to be applied in collecting Ashland 2 confirmatory samples that are sufficient to meet the data quality objectives and to enable any person reviewing this SAP to understand the approaches used.

2.0 STANDARD OPERATING PROCEDURE – SAMPLE COLLECTION

Only members of the environmental department staff trained in the following SOP and additional applicable procedures will perform sampling.

2.1 Sampling Procedure Design

This procedure is designed to ensure that a grab sample of material is collected from the Ashland 2 material ("ore") suitable for organic analyses by standard methods 8260 and 8270. The analytical methodologies employed for analyses of the samples from the ore piles require the immediate placement of the collected sample into a chilled (4 degrees C +/- 2 degrees C) cooler in order to maintain sample preservation and integrity. These coolers are prepared for receipt of samples and packaged according to Standard Operating Procedure ("SOP") 3.

2.2 Ore Labeling and Sample Distribution

Ashland 2 material ("ore") is shipped from the Tonawanda site by rail in closed inter-modal boxes each containing 18 to 22 tons of material. The inter-modal boxes are removed from the railroad flatbed cars at the railroad siding northwest of the Mill and are transferred to the Mill by truck.

When an inter-modal box-load of Ashland 2 ore arrives at the Mill, it will be weighed and logged in at the scalehouse. The truck will then be directed to a specific location where the ore will be unloaded into a segregated pile. After unloading, the truck will return to the scalehouse for re-weighing and radiological release surveying.

Segregated ore loads will be combined and labeled as follows. During Phase I, ore from five box-loads will be combined into nominal 100 cubic yard ("CY") lots. Each lot will be numbered sequentially starting with ASHLOT 1, ASHLOT

2, etc. and labeled accordingly. This method will be used for the first 1,000 CY of ore received.

Phase II will begin after the first 1,000 CYs of ore have been received. During Phase II, box-loads will be combined into nominal 500 CY lots. One 500 CY lot will consist of 25 box-loads. Each lot will be labeled sequentially, in continuation of the numbering used in Phase I.

2.3 Sample Collection Locations

Each lot pile will be sampled at a single randomly-selected location approximately waist high. The sampler will dig with a hand shovel to approximately one foot below the surface of the pile and will take a sample of the subsurface material. A grab sample will be collected, utilizing a clean stainless steel sampling tool, from the newly-exposed subsurface sampling location.

To ensure that the sample will be reasonably representative of the material pile from which it was collected, it will not be size segregated or physically processed. However, large pieces of non-soil debris will be removed before the sample is containerized. The grab sample will be immediately placed in a new sample container (glass with a Teflon lining in the lid) and sent offsite to an EPA-certified laboratory for analysis.

The sampler will place a stake or flag with the sampling dates into the pile at the location where the sample was collected. See 2.4 (10)

2.4 Standard Operating Procedure for Sample Collection

1. Assemble equipment as listed below in section 2.5.

2. Obtain new clean glass sample container with Teflon-lined lids. The sample containers are supplied by the approved EPA-certified laboratory.

3. Label the container with the assigned sample number and date/time of sampling, using a marking pen with indelible ink.

4. Remove approximately one foot of material from the lot pile at a randomly selected location.

5. Using a clean stainless steel sampling tool, collect a grab sample from the sampling location and place the sample in the labeled sample container(s). Prior to placing the sample in the container, remove any large pieces of non-soil material such as wood chips, concrete, or vegetation. Then, quickly fill the sample container.

6. Fill the sample container as completely as possible, leaving as little head space as possible.

7. Immediately seal the sample container, decontaminate the exterior of the container, and place the container in a chilled (4 degrees C) shipping cooler. To prevent tampering, seal the cooler with tape.

8. Complete the Chain-of-Custody Form documenting the collection of the sample, the assignment of the sample ID number, and the person(s) having custody of the samples.

9. Immediately prepare for shipment to the offsite laboratory using the laboratory's express transportation service.

10. Place a stake or flag with the sampling date into the pile at the location where the samples were collected.

11. Record field sampling activities in the field notebook. Items to be entered in the sampling logbook are identified in Section 2.3 of the White Mesa Mill SOP No. 2.

2.5 Equipment List

Sample Collection Equipment

1. Shovel

2. Stainless steel trowel

3. Glass sample containers with Teflon-lined lids

4. Indelible black pen

5. Field notebook

6. Chain-of-custody form

7. Cooler containing ice or Blue Ice

2.6 Decontamination

All equipment utilized in sample collection (i.e., stainless steel trowel, shovel) will be decontaminated after use by washing with soap and water, thoroughly rinsed, and air dried, then placed in protective coverings to maintain clean condition.

3.0 FREQUENCY OF SAMPLE COLLECTION

For the first 1,000 CY of Ashland 2 ore delivered to the mill (Phase I), the ore will be organized into approximately 100 CY lots, comprised of the contents of five box-loads (this will likely be somewhat less than 100 CY). One sample, as described above, will be collected from each 100 CY. For Phase II, the ore will be organized into approximately 500 CY lots comprised of the contents of 25 box-loads. Each lot will be sampled as soon as practicable after receipt of the lot. In all cases, each lot will be sampled and analyzed before it is processed.

4.0 CHAIN OF CUSTODY

4.1 Sample Identification

The grab samples from each lot will be assigned sample ID numbers based on the ore lot from which they were collected. Each sample container will be assigned a sample number which includes an ASHLOT number and an alpha suffix (e.g. ASHLOT 2A, ASHLOT 2B, etc.) Quality control samples may be assigned any one of the ASHLOT numbers and an alpha suffix (e.g. ASHLOT 2C, ASHLOT 2D, etc.). The sampler should record the source of every sample, as well as the QC samples, along with its assigned sample ID number in the field notebook.

Sample numbers will be recorded in the Chain-of-Custody form and each sampler is responsible for the custody of the samples until they are properly transferred or temporarily stored for shipment to the laboratory. Once a sample has been collected and preserved, it will be stored in a designated secure area until shipped to the laboratory.

Samples to be analyzed offsite will be accompanied by a Chain-of-Custody form (see attachment). When transferring samples, the individuals relinquishing and receiving the sample will sign, date, and note the time on the form. This form documents sample custody transfer from the sampler to the offsite laboratory. The offsite laboratory representative who accepts the incoming sample shipment will sign and date the Chain-of-Custody form, completing the sample transfer process. All samples will be shipped offsite via commercial shuttle service or overnight mail.

The procedures for Chain of Custody, sample labeling, sample documentation and tracking, are identified in the White Mesa Mill SOP No. 2, as applicable. The procedures for sample packaging and shipping are identified in SOP No. 3.

5.0 CERTIFIED (CONTRACT) LABORATORY ANALYTICAL REQUIREMENTS

Samples will be analyzed at an off-site, certified contract laboratory in accordance with SW-846, Test Methods for Evaluating Solid Waste, 3rd edition, update 3, 12/96. The specific analytical procedures performed by the laboratory for each sample will be EPA methods:

1. 624/8260 for volatile organic compounds ("VOC"); and

2. 625/8270 for semi-volatile organic compounds ("SVOC").

The procedures, analytical methods, and required quality assurance/quality control methods utilized for sample analyses performed by the laboratory will be consistent with those requirements established by the EPA under the EPA laboratory certification program.

The laboratory will be requested to provide preliminary analytical results by fax within two weeks of receipt of each sample shipment, and full results, with backup and all information necessary for IUSA to perform data validation, within four weeks.

6.0 QUALITY ASSURANCE/QUALITY CONTROL

A set of quality assurance/quality control ("QA/QC") samples will be collected and submitted to the contract laboratory for analysis. The QC sample set will be collected as follows: one QC sample set per ten field samples. Each set will consist of one soil blank, one soil duplicate, one soil spike (obtained from the laboratory, unopened, re-identified, and packaged with field samples). These QC samples will be submitted to the laboratory unknown to them in sequence and identified as field samples.

6.1 QC Field Procedures

During sample collection activities the Site Environmental Manager or his/her designee will observe and audit sample collection activities, sample handling procedures, and chain of custody documentation procedures carried out by personnel collecting samples. The field audit will be performed to verify the following conditions:

1. Field activities are in conformance with sample collection objectives
2. Actual field practice conforms with written procedures
3. Documentation is completed accurately
4. Deficiencies have been addressed and appropriate corrective actions initiated

6.2 QA/QC Objectives

All samples will be collected and submitted to the laboratory in keeping with the applicable objectives delineated in Mill SOPs and the Mill Quality Assurance Project Plan ("QAPP").

6.3 Data Validation and Review

All analytical data will be thoroughly reviewed, validated, and cross-checked by the Environmental Manager at the Mill or his/her designee, for verification, thoroughness, and accuracy. Provisions and objectives of this procedure as applicable are delineated in the above SOP and in the attached Data Validation SOP.

6.4 Management of Ore Lots After Receipt of Analytical Results

No ore lot will be processed prior to receipt of analytical results. Once analytical results are received, ore from 100 CY lots determined to be acceptable, may be combined into 1,000 CY lots before processing.

If the analytical results from any ore lot indicate the presence of contaminants, other than those shown in Table 1, which may have resulted from listed hazardous waste sources, that lot will be isolated with caution tape and tagged. The lot will be marked with a flag or board sign indicating, "Do not process this ore until this posting has been removed by IUSA environmental management."

The warning signs will not be removed from the ore lot until IUSA environmental management has made a written determination, as described in section 6.6 below, that the lot is either suitable for processing or is to be removed by ICF Kaiser as unacceptable material.

6.5 Repeat Sampling of Ore Lots

If, based on analytic results, IUSA environmental management determines that repeated sampling of any ore lot is necessary, samplers will follow the same procedures as outlined above. If repeated sampling is necessary, the sampler will dig three one-foot holes at waist-high level in order to take three samples in the same ore lot at the following locations:

- one sample in or adjacent to the original sample location,
- one sample within three feet of the original sample location, and
- one sample approximately on the opposite side of the pile from the original sample location.

The sampler will add additional stakes or flags marked with sampling dates at the locations of any new samples.

6.6 Determination of Suitability of Ore Lots

If analytical results for any ore lot indicate the presence of hazardous constituents other than those identified in Table 1, IUSA environmental management will evaluate potential sources of the new constituent(s). If any constituents are determined to result from a listed source, IUSA will not process the lot but will either: (a) return it to ICF Kaiser as unacceptable material, or (b) conduct further sampling to determine if a portion of the lot may be segregated from the contaminants and processed at the Mill, with the remainder returned to Kaiser as unacceptable material. Table 1 may be amended, if necessary, as new contaminants are evaluated or additional information becomes available on sources of Ashland 2 wastes.

If the new contaminant(s) are not conclusively determined to result from a listed source, the warning signs will be removed and the lot will be processed.

TABLE 1
Potential Hazardous Constituents in Ashland 2 Materials Not from Listed Sources [1]

Volatile Organic Compounds

Methylene chloride
Acetone
Benzene
Toluene
2 Butanone
1,1,2 Trichlorethane
Ethylbenzene
Xylenes
1,2 Dichlorethane
Chlorbenzene
Trichlorofluoromethane

Semi-volatile Organic Compounds

Naphthalene
Phenanthrene
Fluoranthene
Pyrene
Benzo (a) anthracene
Chrysene
Bis (2 ethyl hexyl) phthalate
Di-n-octyl phthalate
Benzo (b) fluoranthene
Benzo (k) fluoranthene
Benzo (a) pyrene
Indeno (1,2,3 c,d) pyrene
Benzo (g,h,l) perylene
2-Methylnaphthalene
Anthracene
Di-n-butyl phthalate

Footnotes
1. Table 1, Version 1.0. Based on waste source information available as of August 24, 1998.

INTERNATIONAL
URANIUM (USA)
CORPORATION

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

July 23, 1998

Mr. Bruce Howard, Project Manager
ICF Kaiser Engineers, Inc.
9300 Lee Highway
Fairfax, VA 22031-1207

Re: Ashland 2 Confirmatory Sampling

Dear Mr. Howard:

This letter follows our recent discussions regarding our understanding of the confirmatory sampling ICF Kaiser will conduct during excavation of the Ashland 2 materials, to confirm that the material does not contain any listed hazardous wastes. For ease of reference, I have reviewed all those submittals to the NRC or supporting project documents which contain reference to the confirmatory sampling, and have summarized the points made in each with respect to confirmatory sampling for the purpose of ensuring that materials containing listed hazardous wastes are not received or processed at White Mesa Mill. At the conclusion of this letter, I have summarized my understanding of the sampling ICF Kaiser will conduct, and that which International Uranium (USA) Corporation ("IUSA") will conduct at the mill.

1. NRC ALTERNATE FEED GUIDANCE

Under the NRC 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. Therefore, NRC staff acceptance of such residues as feed material depends on their not containing any hazardous waste.

2. NRC LICENSE AMENDMENT REQUEST

License Condition 10.10 authorizes the licensee (IUSA), to receive and process the Ashland 2 material in accordance with the amendment request dated May 8, 1998, as amended by subsequent submittals. The issue of confirmatory sampling is addressed in the May 8, June 3, and June 11, 1998 submittals.

May 8, 1998 License Amendment Request

The May 8 amendment request states the following:

> "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."

June 3, 1998 Response (by IUSA) to NRC Request for Additional Information dated June 1, 1998

In commenting on IUSA's amendment request of May 8, the NRC, in a request for additional information, stated the following concern that previously-submitted information or data had not been sufficient to assess the potential impacts of a former industrial landfill on the Ashland 2 property.

NRC comment:

"Information and data were not provided to assess the potential impacts of the nearby Ashland Oil landfill on the Ashland 2 property."

The NRC pointed out that from 1957 until 1982, Ashland Oil operated an industrial landfill on a portion of the Ashland 2 property. The NRC further stated 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 requested 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 responded as follows:

"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 as 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."

Then, in the same June 1 set of comments, the NRC requested clarification concerning what analyses would be conducted to ensure that materials containing listed hazardous wastes are not received and processed at the White Mesa Mill. In particular, the NRC referenced 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 pointed out, there is at present no indication of listed hazardous wastes at the Ashland 2 site, the NRC requested 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 responded as follows:

"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 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."

<u>June 11, 1998 submittal to NRC</u>

The final submittal to the NRC regarding confirmatory sampling made on June 11, 1998, was based on IUSA's discussions with the NRC Project Manager, in which IUSA proposed to conduct on-site confirmatory sampling of the Ashland 2 Materials, as they are delivered to the White Mesa Mill, at a frequency detailed in the submittal. IUSA proposed to conduct this confirmatory 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 IUSA's letter to the NRC of June 3, 1998. IUSA stated that 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.

IUSA proposed that a two-phase approach to sample frequency 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.

3. NRC TECHNICAL EVALUATION REVIEW ("TER") AND LICENSE AMENDMENT NO. 6

On June 23, 1998, the NRC issued License Amendment 6 to Source Material License SUA-1358. In the TER, the NRC acknowledged that "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)." The NRC further stated that ..."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." Finally, the NRC summarized the purpose of the confirmatory sampling as follows:

> "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."

4. CONTRACT CONDITION 4

The Contract between IUC and ICF Kaiser contains the following condition:

> "While Contractor excavates the Materials from the Ashland 2 site, Contractor shall take and analyze representative samples of the Materials (in accordance with the Sampling and Analysis Plan dated May 29, 1998) for the purpose of ensuring that the Materials comply with the Record and do not contain any listed hazardous wastes.

Prior to shipping Materials to the Mill, Contractor shall forward a copy of the sampling and analysis results to Subcontractor."

5. ICF KAISER SAMPLING AND ANALYSIS PLAN

The Sampling and Analysis Plan ("SAP") prepared by ICF Kaiser, and referenced by IUSA as an attachment to IUSA's June 3 response to NRC comment, describes the following soil profile and precautionary confirmatory analyses to be performed prior to and during excavation, which, as stated above, IUSA submitted to the NRC as measures to ensure that materials containing listed hazardous wastes are not received and processed at White Mesa Mill.

Characterization

A 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 materials and the range of chemical and radionuclide concentrations present. The data collected will, in part, be used to complete the material profile record.

Surface and Near-Surface Soil Samples

The first set of soil samples includes fifteen Material 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. The analytical data will provide "Material Profile" characteristics that are required to ship soils off-site to IUSA. This group of samples is referred to as the "Material Profile Samples."

Organic Vapor Screening

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 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 (SAP Table 5-2).

> Finally, the SAP anticipates 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 analysis 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.

The SAP contemplates that, "if soils are encountered that appear to contain organic contaminants or cause elevated PID readings," ICF Kaiser will analyze for metals, VOCs and SVOCs in a "TCLP extract" from the soil. This procedure appears calculated at identifying whether "wastes or soils exceeding levels of concern for organic compounds or metals" have been encountered. Whether or not a waste is a listed hazardous waste does not depend on the concentration of the listed hazardous constituents in the waste. We are aware of EPA's "contained-in policy" under which a soil containing listed hazardous waste constituents may be determined not to contain (and thus not to be) a listed hazardous waste based on a determination that the concentrations of hazardous constituents present do not warrant management of the soil as hazardous waste. *See e.g.*, 63 Fed. Reg. 28556, 28621 (May 26, 1998). However, such determinations must be made on a case-by-case basis by an appropriate regulatory authority. Therefore, use of the TCLP test is not an appropriate screening test for determining whether the soils contain listed hazardous wastes. Rather, ICF Kaiser should perform a "totals" analysis for VOCs and SVOCs using methods 8260 and 8270, respectively. If any listed hazardous waste constituents[1] are detected using these methods, the soils should, consistent with the SAP, "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 conditions." Notwithstanding the presence of listed hazardous waste constituents, ICF Kaiser may be able to demonstrate that the waste does not meet any relevant hazardous waste listings based on the source of the waste or obtain regulatory approval for a "contained-out" determination. If so, ICF Kaiser should document this determination or approval pursuant to Section D.1 of IUSA's Radioactive Material Profile Record.

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1 As you know, there are three categories of listed hazardous wastes under RCRA: F-listed wastes from non-specific sources; K-listed wastes from specific sources; and P- and U-listed discarded commercial chemical products. *See* 40 CFR §§ 261.30-.33. Whether or not a particular waste meets a hazardous waste listing depends on the source of the waste. ICF Kaiser should identify the listed hazardous waste constituents potentially relevant at the Ashland 2 site based on the processes that might have generated wastes there.

SUMMARY

In summary, based on the prior submittals reviewed above, IUSA has committed to:

1. Receiving results of ICF Kaiser's SAP results; and

2. A two-phase on-site sampling approach at the Mill, to include one sample per each of the first 100 CY, up to 1,000 CY (10 samples); and one sample per each additional 500 CY.

ICF Kaiser's SAP calls for 15 pre-excavation material profile samples, and additional samples, as necessary, based on visual observation of staining or PID results. Based on our discussions, we understand that ICF Kaiser will analyze these samples for the parameters listed on Table 5-2 as specified for "Waste Profile Soil Samples" (copy attached). We also understand that ICF Kaiser will collect and analyze one additional sample per 500 CY for methods 8260 and 8270.

Sincerely yours,

Michelle R. Rehmann
Environmental Manager

MRR/tay

October 20, 1998

Mr. Bruce Howard
ICF Kaiser Engineers, Inc.
9300 Lee Highway
Fairfax, VA 22031-1207

Dear Mr. Howard:

This letter responds to the memorandum from Rusty Tarver to IUSA on October 1, 1998 regarding analytical methods for characterization samples from the Ashland 1 FUSRAP site. These requirements are based on the assumption that the Profile (pre-excavation) sampling program, and Confirmatory (post-excavation) sampling program will be similar to those outlined in letters of agreement between IUSA and ICF Kaiser Engineers ("ICFKE") for Ashland 2. Copies of these letters are attached, for your reference.

The data, as required below, will be necessary either for ICFKE's completion of the IUSA Radioactive Material Profile Record ("RMPR"), a copy of which is attached to this letter, or for IUSA's submittal to NRC or Utah DEQ to confirm that no listed hazardous wastes are present in the material.

1.0 Profile (Pre-Excavation) Analyses

IUSA will require the following analyses on pre-excavation samples.

Table 1.0 Required Analyses

Analysis	Analytical Method	Purpose
pH	SW9045	RMPR
Paint filter test	SW9095A	RMPR
Reactive Sulfide	SW846 Chap7	RMPR
Flash Point	SW1010/1020A	RMPR
HalogenatedOrganics/TOX	SW9020	RMPR
Cyanide	SW9010B/9213	RMPR
Total VOCs	SW846 Method 8260B	Listed waste evaluation
Total SVOCs	SW846 Method 8270C	Listed waste evaluation
Total Metals	SW6010B/7000A/3050B	Listed waste evaluation
PCBs and Pesticides	SW8082/3541	RMPR

1.1 Total VOCs

ICFKE should perform SW846 Method 8260 for total VOCs, not TCLP. Utah DEQ requires total VOCs in their review of listed hazardous waste issues. As you may know, USEPA SW846 guidance allows for calculation of conservative VOC TCLP values, by using the "20 times rule", that is, by dividing the total value by 20 to yield an estimated TCLP value. If ICFKE does not wish to expend the cost to perform both the total VOCs analysis required for IUSA's listed waste evaluation and the TCLP required for filling out IUSA's RMPR, ICFKE may choose to analyze total VOCs only, and calculate TCLP values.

1.2 Total SVOCs

ICFKE should perform SW846 Method 8270 for total SVOCs, not TCLP. Utah DEQ requires total SVOCs in their review of listed hazardous waste issues. If ICFKE does not wish to expend the cost to perform both the total SVOCs analysis required for IUSA's listed waste evaluation and the TCLP required for filling out IUSA's RMPR, ICFKE may choose to analyze total SVOCs only, and calculate TCLP values via the 20 times rule.

1.3 Total Metals.

Larry Nadler of NYSDEC required total metals, not TCLP metals, to resolve the listed hazardous waste issues at Ashland 2. If it becomes necessary to request the same type of determination from NYSDEC on Ashland 1, they will once again require total metals data. If ICFKE does not wish to expend the cost to perform both the total metals analysis required for IUSA's listed waste evaluation and the TCLP required for filling out IUSA's RMPR, ICFKE may choose to analyze total metals only, and calculate TCLP values via the 20 times rule.

1.4 PCBs and Pesticides

PCBs and pesticides are regulated under TSCA and FIFRA, respectively, and their presence above regulatory threshhold concentrations would not make the Ashland 1 Uranium Material a listed hazardous waste. However, if PCB or pesticide levels are high enough to trigger additional regulatory requirements, IUSA would want that information as early as possible. Hence it is a component of IUSA's RMPR.

1.5 Other Analytes

All other analytes listed in Table 1.0, above, are necessary for ICFKE's completion of IUSA's RMPR.

1.6 Validation of Pre-Excavation Data

IUSA requests that ICFKE perform data validation on the pre-excavation data, and provide data qualifiers with the analytical data or shortly afterwards. Our experience with the previous Ashland 2 pre-excavation data seems to indicate that the unvalidated data contain at least three times as many analytes as the validated data. The majority of the analytes which were eliminated from the Ashland 2 data tables after validation were halogenated and non-halogenated volatile solvents which may carry a RCRA listing if their presence cannot be explained, for example, as being due to laboratory influences.

For these reasons, IUSA considers it to be preferable to have all the data validated, and potential future questions by Utah DEQ might make further drive the need for validated analyses. If ICFKE does not perform data validation, the likelihood is increased that NRC or Utah DEQ may question IUSA's listed waste determinations, delaying or precluding our acceptance of the Ashland 1 material.

1.7 Laboratory Backup Records

IUSA *does not require laboratory backup records* from ICFKE for pH, paint filter test, reactive sulfides, cyanide, TOX, and isotopes.

IUSA *does not require laboratory backup records* for VOCs, SVOCs, metals, PCBs and pesticides, if ICFKE performs data validation on all the pre-excavation samples. If ICFKE cannot provide validation of all samples, IUSA will discuss with ICFKE a validation frequency for ICFKE to apply, based on what may be acceptable to NRC and/or Utah DEQ.

IUSA *will require backup* for VOCs, SVOCs, metals, PCBs and pesticides *only if*:
a) ICFKE performs validation, but the data accuracy remains suspect (e.g. too many analytes are confirmed as present, but their presence cannot be physically explained), or
b) ICFKE is able to validate none or only a portion of the data, and NRC or Utah DEQ requires validation of all data.

2.0 Confirmatory (Post-Excavation) Analyses

2.1 Analyses

IUSA requires the same analyses as listed in Table 1.0 above for Confirmatory (post-excavation) samples.

2.2 Labeling

The data IUSA received from ICFKE on Ashland 2 was labeled based on the date the samples were taken – either in-situ or in the excavation stockpiles. ICFKE has advised IUSA that it would be possible to relate analytical data, if an analysis showed that listed waste was present or a stockpile was otherwise problematic, to the container(s) in which the suspect material was shipped. IUSA requests that ICFKE provide a key or method to relate ICFKE sample results for Ashland 1 material to the containers shipped from the site.

2.3 Stained Area Grab Samples

IUSA requests that when ICFKE takes grab samples of stained or high PID areas from excavated stockpiles, ICFKE provide a description of the material from which the extra grab samples were collected, along with the analyses. The labels ("Tar-01 Tar-02 Stain-01, Stain-02," etc.) used on the Ashland 2 grab samples, taken alone, were not sufficient for Utah DEQ or IUSA to relate the analyses to the field observations during excavation.

2.4 Validation of Post-Excavation Data

IUSA requests that ICFKE validate analyses of all samples related to shipments to the Mill. If ICFKE cannot provide validation of all samples, IUSA will develop a recommended frequency based on what may be acceptable to NRC and/or Utah DEQ.

2.5 Laboratory Backup

The same guidelines for laboratory backup records apply as described in Section 1.7 above.

We appreciate your cooperation in our preparations for acceptance of the Ashland 1 material. If you have any questions regarding this letter, I can be reached at (303) 389.4131.

Sincerely yours,

Michelle Rehmann
Environmental Manager

cc: Rusty Tarver, ICFKE
Ron Berg
William Deal
David Frydenlund
Earl Hoellen
Harold Roberts
Central Files

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ATTACHMENT 6

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

1.0 Purpose

The following procedure applies to acceptance, handling, and release of intermodal containers from International Uranium (USA) Corporation (IUSA) White Mesa Mill (Mill). IUSA receives material for processing, in either bulk or non-bulk packaging. This procedure addresses one form of bulk packaging – intermodal containers (IMCs). This procedure may be amended, subject to approval by IUSA's Safety and Environmental Review Panel (SERP), from time to time as appropriate to address the individual requirements of specific feed materials, or projects.

2.0 Ore Receiving

1. Check truck scale for zero balance at the beginning of each shift.

2. Inbound IMCs will be dropped off in a designated staging area near the Scale House outside the Restricted Area.

3. Inspect the inbound IMC for the items listed on the Intermodal Container Inspection Form (copy attached). Notify Mill management of any discrepancies as soon as practicable. The Intermodal Container Inspection Forms will be turned in to the Mill office on a daily basis.

4. Inspect all copies of the Bill of Lading (BOL) to ensure that the shipment is destined for the White Mesa Mill and that all shipping documentation is in order (see Section 8.2). **If any discrepancies are noted notify the Mill Manager immediately.**

5. Assign next available shipment number and White Mesa Mill load number to the inbound IMC. Record the White Mesa Mill load number, inbound date and both the truck and IMC numbers on the Scale house Weight Ticket (SWT).

6. A White Mesa truck will be used to retrieve the loaded IMCs stored in the staging area, outside the Restricted Area, and transport them into the Restricted Area. The Mill truck will be visually inspected and scanned prior to leaving the Restricted Area to pick up a loaded IMC.

3.0 Ore Dumping

1. Prior to the dumping of the IMC the tarp and tarp support structures, if applicable, are inspected for damage and then removed.

2. Connect the Bartlett tipper to the loaded IMC chassis and transport across the truck scales.

3. Enter the loaded weight of the IMC on the IMC SWT.

4. After weighing the IMC, move the tipper and chassis onto the ore storage pad and dump the material in the IMC in a designated area.

5. After all material has been removed from the IMC, transport the empty IMC back across the scales for an empty weight.

6. Record the empty weight on the appropriate IMC SWT.

7. At the end of each day, turn in outbound SWT to Mill Records Manager.

8. The Mill Records Manager will fill out a Daily Materials Receipts form to obtain the net weight of the material in each IMC.

9. After weighing the IMC, the Bartlett tipper will deposit the IMC in a designated area, within the Restricted Area, for decontamination.

10. Use a front-end loader or similar equipment to push material into the designated ore lot pile.

11. Once an ore lot pile is complete, label the pile with the appropriate ore lot number.

4.0 Decontamination and Release of IMCs

All IMCs, chassis and tires will be decontaminated after dumping prior to leaving the White Mesa Mill. Generators or transporters will notify IUSA whether a specific IMC and chassis is to be released for restricted or unrestricted use. Any IMCs that are to be released for restricted use will be decontaminated according to the requirements contained in U.S. Department of Transportation (DOT) Part 49 CFR 173.441 and 173.443 (a copy of which is attached). Any IMCs that are to be released for unrestricted use will be decontaminated according to the requirements found in Table 1 of the Nuclear Regulatory Commission's (NRC's) Policy and Guidance Directive FC-85-23, "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct, Source, or Special Nuclear Material" issued May 1987 (a copy is attached). IMCs requiring repair will be decontaminated for unrestricted release, to facilitate repairs by the transporter at the transporter's own site. IMCs may be repaired without undergoing full decontamination if repaired within the Restricted Area of the Mill.

5.0 Decontamination and Release of IMCs for Restricted Use

1. A White Mesa Mill truck will pick up the empty IMC, from the staging area within the Restricted Area, and transport it to the decontamination pad.

2. Decontaminate the exterior of each IMC, chassis and tires thoroughly, using a high-pressure water wash. Put the chassis into the extended position to improve access to the rear chassis tires.

3. After the IMC is decontaminated, use the White Mesa Mill truck or other designated on-site equivalent equipment to move the IMC to the secondary decontamination area. **At no time will the truck leave the designated decontamination route while transporting a decontaminated IMC and chassis.** Thoroughly inspect the IMC, chassis and tires for external contamination and, if necessary, decontaminate the exterior of the IMC, chassis and tires using a high-pressure water wash

4. Use the White Mesa Mill truck, or other designated on-site equivalent equipment to move the IMC to the tertiary decontamination and final scanning area, following the decontamination route

5. Contact a Radiation Technician to perform a radiological survey of the IMC and a representative of Senior Mill management as designated by the Mill Manager to perform an inspection for visual contamination. The name of the senior Mill management representative who performed the visual inspection will be recorded on the Intermodal Container Inspection Form (a copy of which is attached).

6. The Radiation Technician or RSO will scan the IMC, chassis, tires and White Mesa Mill truck in various locations as shown on the IMC Container Survey for Restricted Release (attached) and document the scan readings on the Container Survey for Restricted Release. For quality control, a minimum of one out of every ten IMCs will have the top of the IMC scanned. During wet conditions, alpha will not be measured. A known alpha to beta ratio, specified by the RSO, will be used to obtain a total activity measurement based the beta/gamma measurement. The release standards to be met for restricted release are contained in U.S. Department of Transportation (DOT) Part 49 CFR 173.441 and 173.443 (a copy of which is attached).

7. If the IMC, chassis or tires do not meet the radiological release survey requirements or shows visually observable contamination, the IMC will either be returned to the secondary decontamination pad for further decontamination or will be washed at the tertiary decontamination area.

8. The Radiation Technician or RSO will fill out a Decontamination Release form (copy attached) to document that the IMC has been authorized for release for restricted use. The Radiation Technician or RSO will place a white sticker on the IMC that says, "EMPTY" and "This package conforms to the conditions and limitations specified in 49 CFR 173.428 for radioactive material, excepted package – empty package, UN2910".

9. The Decontamination Release forms will be turned in to the Mill Administration office on a daily basis for filing and distribution.

10. After an IMC has been released, the IMC will be delivered by a White Mesa Mill truck to the designated staging area for empty IMCs, outside the Restricted Area. After staging a loaded IMC in the designated area, the incoming driver will pick up an empty IMC at the designated area. Prior to leaving the staging area the MHF-LS driver will perform a visual inspection of the IMC, chassis and tires. Leaving his truck outside of the Restricted Area, the driver will return to the Scale House to pick-up the documentation for the empty IMC and sign the Intermodal Container Inspection Form.

11. A Radiation Technician or the RSO will scan the designated decontamination route and staging areas on a weekly basis, or as dictated by the Mill Manager after a severe storm event. The survey readings will be recorded and turned in to the Mill Manager.

6.0 Decontamination and Release of IMCs for Unrestricted Use

1. A White Mesa Mill truck will pick up the empty IMC, from the staging area within the Restricted Area, and transport it to the decontamination pad.

2. Open the tailgate and decontaminate each IMC using a high-pressure water wash. Make sure to thoroughly wash the inside and outside of each IMC, the chassis and tires.

3. After the IMC is decontaminated, use the White Mesa Mill truck or designated on-site equivalent equipment to move the IMC to the secondary decontamination area. **At no time will the truck leave the designated decontamination route while transporting a decontaminated IMC and chassis.**

4. After visual inspection and, if necessary, decontamination at the secondary decontamination area, move the IMC to the tertiary decontamination and final scanning area.

5. Contact a member of the Radiation Department staff to conduct the appropriate radiological survey of the IMC, chassis, tires and White Mesa Mill truck, as

delineated in Section 2.6 of the White Mesa Mill Radiation Protection Manual. The release standards to be met for unrestricted release are contained in Table 1 of the Nuclear Regulatory Commission's (NRC's) Policy and Guidance Directive FC-85-23, "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct, Source, or Special Nuclear Material" issued May 1987 (Copy attached hereto as attachment).

6. Contact a member of the senior Mill management team as designated by the Mill Manager to perform a visual inspection to ensure that there is no visible contamination on either the IMC, the chassis or the tires. The name of the senior Mill management representative who performed the visual inspection will be recorded on the Intermodal Container Inspection form (a copy of which is attached).

7. If the IMC, chassis or tires do not meet the radiological release survey requirements and/or has visually observable contamination, the IMC will either be returned to the secondary decontamination pad for further decontamination or will be washed at the tertiary decontamination area.

8. If the IMC, chassis and tires meet the radiological release survey and visual inspection requirements, the Radiation Technician will place a red sticker on the IMC that says, "THIS CONTAINER HAS BEEN FULLY DECONTAMINATED AND SURVEYED FOR "UNRESTRICTED USE" BY: (FILL IN NAME OF RADIATION TECHNICIAN)". The RSO or Radiation Technician that performed the release survey will then sign the red sticker and date it. In addition, the RSO or Radiation Technician will fill out a Decontamination Final Release Form (a copy of which is attached) to document that the IMC has been cleared for unrestricted release. The form includes a schematic diagram of the IMC with points to be scanned and locations on the schematic to fill in survey values for each IMC. The Decontamination Release Form will be turned in to the Mill Administration Office daily for filing and distribution.

9. After an IMC has been released, the IMC will be delivered by the White Mesa Mill truck to the designated staging area for empty IMCs, outside the Restricted Area. After staging a loaded IMC in the designated area, the incoming driver will pick up an empty IMC at the designated area. Prior to leaving the staging area, the driver will do a visual inspection of the IMC, chassis and tires. Leaving his truck outside of the Restricted Area, the driver will return to the Scale House to pick-up the documentation for the empty IMC and sign the Intermodal Container Inspection Form.

7.0 Hazard Identification and Safety

7.1 Required Personnel Protective Equipment (PPE)

In all areas of the Mill covered by this procedure, hard hats, safety glasses and steel-toed shoes are required as a minimum. These must be worn in all areas of the Mill with the exception of the Administration Building.

7.2 Industrial Hazards and Safety

1. Use caution when chassis are backing onto the Ore Pad.

2. Ensure that all personnel within 50 feet of the area where the IMC is hooked up to the Bartlett tipper are aware that dumping is about to commence.

3. Bartlett tipper operators must use caution during the dumping process. Move at least 25 feet away from the rear of the IMC during the initial dumping operation.

4. Do not place any part of your body inside the IMC when the chassis is being tipped and the tailgate is open. The IMC could be lowered or accidentally fall at any time, which would cause the tailgate to close rapidly and result in injury. Only work under the tailgate after it has been properly blocked open.

5. Be aware of high-pressure wash water.

6. When the crane is in operation, make sure all personnel, except the persons in charge of the tag lines, are 50 feet away from the IMC being moved. The persons in charge of the tag lines should **never** be underneath the IMC that is being moved.

7. Be aware of slippery conditions on the ore pad during periods of inclement weather.

8. Be aware of the potential for ice build-up on and around the decontamination pad during periods of cold weather.

9. Use caution when entering or exiting equipment. Be sure to use the ladders and hand rails. **Do not jump off of the equipment.**

10. Always use a ladder when entering and/or exiting the interior of an IMC.

8.0 Paperwork Tracking

1. Each IMC will have a unique sequential project number assigned to it at the generating facility. This number will be entered onto the Bill of Lading (BOL) and attached to the IMC prior to shipment from the generation site.

2. Upon arrival at the White Mesa Mill, the truck driver will turn in all of his/her paperwork to the Scale House operator who will verify that the BOL number, IMC number and project number assigned to the shipment match on all copies of the BOL. The Scale House operator will also verify that the actual IMC number matches the BOL IMC Number. **If there are any discrepancies in any of the numbers notify Mill management immediately.** Only original paperwork will be accepted. If the original paperwork does not come with the IMC, **notify Mill management immediately**. The Scale House operator will sign the BOL, acknowledging receipt of the material at the Mill, **if all of the paperwork is in order**. Depending on contractual and/or sampling requirements, final acceptance or rejection of certain alternate feed materials may be contingent on analytical results.

3. Each IMC will be transported across the scale at the Mill prior to and after being unloaded. The appropriate information will be entered into the project database. All copies of the SWTs and BOLs will be forwarded to the Mill Records Manager on a daily basis or other frequency specified by Mill Management, from time to time.

4. The Mill Records Manager will compile and reconcile the BOL's and SWTs for distribution. The accounting department will forward a summary of all receipts to the International Uranium corporate office and the generator of the material at least twice monthly, or at other frequencies as determined for the specific project.

ATTACHMENT 7

USACE Value Engineering Proposal for
Ashland 1 and Ashland 2

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)

DELETIONS

ITEM	U/M	QTY	COST	UNIT 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	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	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**)

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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.