INTERNATIONAL
URANIUM (USA)
CORPORATION

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July 5, 2000

VIA OVERNIGHT MAIL

Mr. Phillip Ting, Branch Chief
Fuel Cycle and Safety and Safeguards Branch
Division of Fuel Cycle Licensing
Office of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
2 White Flint North, Mail Stop T-7J9
11545 Rockville Pike
Rockville, MD 20852

Re: Amendment Request to Process an Alternate Feed Material from Heritage Minerals, Inc. at White Mesa Uranium Mill
Source Material License No. SUA-1358

Dear Mr. Ting:

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 monazite sand material resulting from the processing of natural sands for the recovery of the heavy mineral, ilmenite. For ease of reference, this material is referred to herein as the "Uranium Material". The Uranium Material is currently stored at the Heritage Minerals, Inc. ("HMI") site in Lakehurst, New Jersey (the "Lakehurst facility"). The Uranium Material, referred to by HMI as "monazite sand" is currently regulated as Source Material under Source Material License No. SMB 1541 issued by the U.S. NRC.

From 1973 to 1982 ASARCO, Inc. ("ASARCO") dredged and processed natural sands for recovery of heavy minerals, primarily the titanium mineral ilmenite, at the Lakehurst facility. The process utilized gravimetric, magnetic, electrostatic, and heating steps, with no chemical leaching or extraction. The primary byproduct was a lighter tailings fraction stored on site. ASARCO ceased operations in 1982. HMI purchased the property in 1986 and resumed operations until 1990, when all production stopped. During HMI's operation, the facility reprocessed the lighter tailings fraction remaining from ASARCO's operation for further recovery of heavy minerals, and produced an additional product, stored on site as "monazite sand". This monazite sand was licensed by NRC as source material in December of 1990. HMI has prepared a Final Status Survey Plan ("Decommissioning Plan") for termination of the site's NRC license. The Plan includes removal of the monazite sand pile and shipment for off-site management. This amendment request seeks authorization to process the monazite sand,

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referred to herein as the Uranium Material, at IUSA's White Mesa Mill ("the Mill") as an alternate feed/ore.

Based on information available, HMI estimates that the total volume of the Uranium Material is expected to be approximately 1,000 cubic yards ("CY"). According to HMI personnel, this preliminary estimate could increase by as much as 20 percent during removal and shipment. However, due to the relatively small quantity of this material, this license amendment request is for up to 2,000 CY, to ensure that all of the Uranium Material is covered by this amendment.

HMI estimates that the Uranium Material has a uranium content of approximately 0.05 percent by weight (0.06 percent U_3O_8), or greater, for the entire volume of Uranium Material.

The processing of the Uranium Material will not increase the Mill's production to exceed the License Condition No. 10.1 limit of 4,380 tons of U_3O_8 per calendar year. Because production will remain within the limits assessed in the original Environmental Assessment, the process will be essentially unchanged, and the Uranium Material is similar physically and 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 Uranium Material will not change the characteristics of the Mill tailings from the characteristics associated with normal milling operations.

It will be a condition of the license amendment that the Mill shall not accept any Uranium Material at the site unless and until the Mill's Safety and Environmental Review Panel ("SERP") has determined 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 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 Historical Summary of Sources
- 1.2 Radiochemical Data
- 1.3 Hazardous Constituent Data and Reviews
- 1.4 Regulatory Considerations

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CERTIFICATION

Attachment 1	HMI Site Location Maps, Volume Estimates, and Process History
Attachment 2	Uranium Content Estimates, Material Description, and Analytical Data for Uranium Material
Attachment 3	IUSA/UDEQ Protocol for Determining Whether Alternate Feed Materials are RCRA Listed Hazardous Wastes
Attachment 4	HMI Affidavit Confirming No RCRA Listed Hazardous Waste in Uranium Material
Attachment 5	Radioactive Material Profile Record
Attachment 6	Memorandum from Independent Consultant Regarding No RCRA Listed Hazardous Waste in Uranium Material
Attachment 7	White Mesa Mill Equipment Release/Radiological Survey Procedure

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).

- 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 the amendment to process uranium-bearing material owned by Cameco Corporation.

- 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.

- IUSA request to the NRC for license amendment to process uranium-bearing material owned by W.R. Grace Corporation.

- NRC and UDEQ comments and requests for information relative to the IUSA request for the W.R. Grace alternate feed amendment and dust control for the W.R. Grace Uranium Material.

- 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 Officer's Initial Decision to Uphold the Ashland 2 License Amendment.

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. I can be reached at (303) 389.4131.

Sincerely,

Michelle R. Rehmann
Environmental Manager

MRR

Attachments

cc: Ron E. Berg
William N. Deal
David C. Frydenlund
Ron F. Hochstein
John F. Lord
Anthony J. Thompson
Bill von Till/NRC
William J. Sinclair/UDEQ
Don Verbica/UDEQ

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

July 5, 2000

Prepared by:
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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 products from other extraction procedures, which IUSA processes as "ore" at the Mill primarily for the source material content. All waste associated with this processing is, therefore, 11e.(2) byproduct material; or, as stated in the alternate feed analysis noticed in Federal Register Volume 57, No. 93:

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

This application requests an amendment to NRC Source Material License No. SUA-1358 to allow IUSA to process a specific alternate feed, and to dispose of the associated 11e.(2) byproduct material in accordance with the Mill operating procedures.

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-containing materials resulting from the processing of natural sands for the extraction of heavy minerals, primarily the titanium-bearing mineral, ilmenite. For ease of reference, the monazite sand resulting from this process, and described further below in Section 1.1, is referred to herein as the "Uranium Material". The Uranium Material is located at Heritage Mineral Corporation's ("HMI's") facility in Lakehurst, New Jersey (the "Lakehurst facility").

The Uranium Material will be transported by HMI or its transportation contractor from the Lakehurst facility to the Mill. The Uranium Material is currently stored in a tailings pile at this facility. The Site Location Map in Attachment 1 shows the specific location of HMI's Lakehurst facility. The Uranium Material is currently regulated as Source Material by the U.S. NRC.

1.1 Historical Summary of Sources

From 1973 to 1982, ASARCO, Inc. ("ASARCO") dredged and processed natural sands for recovery of heavy minerals, primarily the titanium mineral ilmenite, at the Lakehurst facility. The process utilized gravimetric, magnetic, electrostatic, and heating steps, with no chemical separation involved in the extraction or concentration processes. The sands and heavy minerals were pumped to a wet mill, where the heavy minerals were separated from the slurry and stockpiled for dewatering. The primary byproduct from this separation was a lighter tailings fraction, which was stored on site. The heavy mineral concentrate was heated in a dry mill and

screened to remove coarse material. Titanium oxide bearing minerals, having a relatively high conductivity, were electrically separated from other heavy minerals. The titanium oxide was further refined magnetically to produce the ilmenite product.

ASARCO ceased operations in 1982. From 1982 through 1986, various private companies evaluated the lighter tailings remaining on site for potential recovery of additional heavy minerals, resulting in HMI's purchase of the property in 1986. Mineral Recovery, Inc. ("MRI") leased the property from HMI from 1986 to 1987 and performed tests for recovery of zircon, and additional recovery of titanium minerals. HMI resumed operation of the ilmenite recovery process (similar to ASARCO's process utilizing only physical extraction processes with no chemical leaching or chemical extraction) from 1987 until 1990, when all production stopped. During HMI's operation, the facility reprocessed the lighter tailings fraction remaining from ASARCO's operation for further recover of heavy minerals, and produced an additional product, stored on site, and known as "monazite sand", which subsequently was licensed by NRC as Source Material in December of 1990. HMI has prepared a Final Status Survey Plan ("Decommissioning Plan") for termination of the site's NRC license. The Plan includes removal of the monazite sand pile and shipment for off-site management.

HMI has requested that IUSA recycle the monazite sand, and has asked that we submit this amendment request. HMI estimates that the total volume of Uranium Material is expected to be approximately 1,000 cubic yards ("CY") or 1,500 tons. According to HMI personnel, this preliminary estimate could increase by as much as 20 percent during removal and shipment. However, given the relatively small quantity of Uranium Material, this request for amendment is for approval of up to 2,000 CY (approximately 3,000 tons) of Uranium Material, to ensure that all the Uranium Material is covered by this amendment.

Attachment 1 includes the following items describing HMI's process history and NRC Decommissioning Plan:

1. Process schematic of the HMI operation.

2. Location map of the HMI Lakehurst facility and the monazite sand pile.

3. Site history as described in the NRC Environmental Assessment from the Federal Register (September 1, 1999)

Physically, the Uranium Material is a dry sand, consisting of dense, finely divided solids containing uranium. Attachment 2 contains HMI's radiological data summaries ("Solids Analysis") for the Uranium Material.

1.2 Radiochemical Data

As noted, process history demonstrates that the Uranium Material results from processing natural sands by purely physical extraction processes for the recovery of heavy titanium-bearing minerals, primarily ilmenite.

HMI has estimated that the Uranium Material has a uranium content of approximately 0.05 weight percent (0.06 percent U_3O_8), or greater.

1.3 Hazardous Constituent Data and Reviews

NRC guidance suggests that if a proposed feed material consists of hazardous waste, listed under Section 261.30-33, Subpart D, of 40 CFR (or comparable RCRA authorized State regulations), it would be subject to EPA (or State) regulation under RCRA. To avoid the complexities of NRC/EPA dual regulation, such feed material may not be approved for processing at a licensed mill. If the licensee can show that the proposed feed material does not consist of a listed hazardous waste, this issue is resolved. NRC guidance further states that feed material exhibiting only a characteristic of hazardous waste (ignitable, corrosive, reactive, toxic) that is being recycled, would not be regulated as hazardous waste and could therefore be approved for 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 listed hazardous waste.

1.3.1 IUSA/UDEQ Listed Hazardous Waste Protocol

In a February, 1999 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 a Memorandum and Order of February 14, 2000, the Commission also 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 proactive 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 was 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, IUSA and UDEQ will agree that the material is not a listed hazardous waste.

- 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 from a RCRA listed hazardous waste or RCRA listed process, the material will be rejected.

- The protocol 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".

1.3.2 Application of the Listed Hazardous Waste Protocol

This section describes the relevant portions of the Protocol as they were applied to the Uranium Material.

The IUSA/UDEQ Protocol Diagram states in Decision Step 1, that IUSA will perform a source investigation regarding whether any listed hazardous wastes are located at the site from which the alternate feed material originates. The explanatory text for Protocol Step 1 (on page 1, Item 1, bullet 1) states that the following is one type of information that would be considered satisfactory for decision making purposes in the subsequent Protocol Diagram steps:

> "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."

The Protocol Diagram states in Decision Diamond 2, that if a material "is known not to be or contain any listed hazardous waste", then IUSA and UDEQ will consider the material not to be listed hazardous waste. Item 2 of the Protocol text states that to make the determination in Decision Diamond 2, IUSA may

> "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 source and that the Material has not been mixed with any listed wastes, the Material would not be a listed hazardous waste."

In the Affidavit included as Attachment 4 (the "Affidavit"), HMI confirms that the Uranium Material was generated from a known process (purely physical extraction involving no chemicals) under the control of the generator. HMI, based on site history, and generator's knowledge of their process, has also certified in the Radioactive Material Profile record ("RMPR") included as Attachment 5, that the Uranium Material contains no RCRA listed hazardous wastes.

Historic Process Review

The monazite sand resulted from the physical processing of natural sands. The processing was limited to gravimetric, magnetic, electrostatic, and heating steps, and involved no chemical leaching or solvent extraction. Hence the feed material, and the monazite sand fraction, were never in contact with any organic chemicals at any time during processing. The monazite sand was stored in a separate tailings pile, placed directly on natural soils on site, that was not used for disposal or management of any other material or waste. Although the monazite pile was placed directly on natural soils, no industrial chemicals were used in the process or disposed of on site. Hence, the monazite sand has had no contact with industrial chemicals via the on-site soils.

All components of the Uranium Material are byproducts from the physical processing of sands for the recovery of heavy minerals, which is not a RCRA listed process. HMI has further confirmed that during the site decommissioning activities, the Uranium Material will be segregated, containerized, and shipped separately from any other wastes or materials that may be at the site.

Affidavit

IUSA has required, as a condition of contract with HMI, that HMI provide an Affidavit with a declaration that the Uranium Material is not and does not contain listed hazardous waste. The Affidavit is provided in Attachment 4.

Because the Uranium Material was generated from a known process under the control of the generator, the Affidavit meets the requirement for specific Source Investigation information in the Protocol Diagram Diamond 1 and Step 1. Also, the Affidavit contains specific information about the generation and management of the Uranium Material to support a conclusion that the Uranium Material is not and does not contain any RCRA listed waste as required by Protocol Diagram Diamond 2 and Step 2.

Hence, based on the HMI information and the Protocol, IUSA concurs that the Uranium Material is not a listed hazardous waste.

Radioactive Material Profile Record

In order for IUSA to characterize the Uranium Material, HMI has completed IUSA's RMPR form, stating that the material is not RCRA listed waste. The certification section of the RMPR includes the following text:

> "I certify that the material described in this profile has been fully characterized and that hazardous constituents listed in 10 CFR 40 Appendix A Criterion 13 which are applicable to this material have been indicated on this form. I further certify and warrant to IUC that the material represented on this form is not a hazardous waste as identified by 40 CFR 261 and/or that this material is exempt from RCRA regulation under 40 CFR 261.4(a)(4)."

A copy of the RMPR prepared by HMI for IUSA is provided in Attachment 5.

1.3.3 Review By IUSA Independent Consultant

IUSA has also engaged an independent consultant, experienced in RCRA matters and chemical processing, who has reviewed the site history, analytical data, correspondence, IUSA/UDEQ Protocol, the Affidavit, the RMPR, and license termination planning documents available from HMI to date. The consultant has confirmed that the Uranium Material is not and does not contain RCRA listed hazardous waste. A copy of the consultant's review is provided in Attachment 6.

1.3.4 Compatibility with IUSA Mill Tailings

The Uranium Material contains metals and other constituents that already are present in the Mill tailings disposed of in the Cell 3 impoundment. Generally, the composition of the Uranium Material is very similar to the composition of the materials currently in the Mill's tailings impoundments, because the Uranium Material resulted from the processing of natural ores in which no chemical leaching or solvent extraction occurred, and will not have an adverse impact on the overall Cell 3 tailings composition.

Furthermore, the amount of tailings that would potentially be generated is comparable to the volume that would be generated from processing an equivalent volume of conventional ore. HMI, as described above, may be expected to remove and ship up to 2,000 CY (approximately 3,000 tons) of Uranium Material from the Lakehurst facility over a period of one to three months during the third or fourth quarter of 2000. This volume is well within the maximum annual throughput rate and tailings generation rate for the Mill of 680,000 tons per year. Additionally, the design of the existing impoundments has previously been approved by the NRC, and 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.

It will be a condition of the license amendment that the Mill shall not accept any Uranium Material at the site unless and until the Mill's Safety and Environmental Review Panel ("SERP") has determined that the Mill has sufficient licensed tailings capacity to permanently store:

(a). all 11e.(2) byproduct material that would result from the processing of all the Uranium Materials,
(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.

1.4 Regulatory Considerations

Uranium Material Qualifies as "Ore"

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

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

The Uranium Material is a "other matter" which will be processedprimarily for its source material content in a licensed uranium mill, and therefore qualifies as "ore" under this definition.

Uranium Material Not Subject to RCRA

As described under Section 1.3 above, the Uranium Material to be processed at the Mill will not be 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.

Based on the site history, the determinations by HMI, and the analysis of IUSA's independent expert consultant, IUSA has concluded that Uranium Material from the Lakehurst facility is not listed hazardous waste subject to RCRA.

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 indicate that recoverable uranium is present in the monazite sand pile. HMI has estimated that uranium content is approximately 0.047 weight percent uranium (0.056 percent U_3O_8), or greater. This value was derived by HMI from a weighted average of composite sample data.

The Mill has successfully extracted uranium from ores and alternate feed materials containing similar levels of uranium.

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 test, including the fact that IUSA has a history of successfully extracting uranium from alternate feed materials, and should be considered to have 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 Uranium Material and that the processing will indeed occur. As a result, this license amendment satisfies the Certification Test, and the tailings resulting from the processing of the Uranium Material will be 11e.(2) byproduct material.

2.0 TRANSPORTATION CONSIDERATIONS

The Uranium Material will be shipped by rail in intermodal containers. The Uranium Material will be loaded into covered, exclusive-use containers at the Lakehurst facility. The covered containers will 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. The Uranium Material will be shipped as Radioactive LSA (low specific activity) Hazard Class 7 Hazardous Material as defined by DOT regulations. HMI will arrange with a materials handling contractor for the proper labeling, placarding, manifesting and transport of each shipment of the Uranium Material. Each shipment will be "exclusive use" (i.e., the only material on each vehicle will be the

Uranium Material). HMI may ship a total of approximately 40 to 100 truckloads over the entire project. Shipments are expected to be completed over a period of approximately one to three months.

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

- The material will be shipped as "low specific activity" (LSA) material in exclusive-use containers (i.e., no other material will be on the vehicle with the Uranium Material). The containers will be appropriately labeled, placarded, and manifested, and shipments will be tracked by the shipping company from the Lakehurst facility until they reach the Mill.

- On average during 1998, 385 trucks per day traveled the stretch of State Road 191 between Monticello, UT and Blanding, UT (November 3, 1998 White Mesa Mill communication with the State of Utah Department of Transportation ("UDOT")). The 1998 number of 385 trucks per day was published by UDOT in August of 1999. The next traffic data update, reflecting 1999 traffic rates, will be available from UDOT in August or September of 2000.

- Based on the 1998 UDOT truck traffic information, an average of 10 additional trucks per week traveling this route to the Mill represents an increased traffic load of only 1 percent. Shipments are expected to take place over the course of a limited time period (one to three months).

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

3.0 PROCESS

The Uranium Material will be added to the Mill circuit in a manner similar to that used for the normal processing of conventional ore, either alone or 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, run through an existing trommel before being pumped to Pulp Storage, or may be fed directly to Pulp Storage. The leaching process will begin in Pulp Storage with the addition of sulfuric acid.

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

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

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 intermodal containers via truck and dumped on the Mill ore pad where it will be temporarily stored pending processing. The Uranium Material will be introduced into the Mill circuit, and will proceed through the leach circuit, CCD circuit, and into the 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 Derived Air Concentration ("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 indicates it is a neutral material. Therefore, it is anticipated that no unusual PPE apparel will be required other than coveralls and rubber gloves during material handling activities. Respiratory protection will be implemented as determined.

4.1 Control of Airborne Contamination

IUSA does not anticipate unusual or extraordinary airborne contamination dispersion when handling and 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 handling or processing conventional uranium ore. The successive extraction process circuitry including leaching, CCD, ion exchange, and precipitation are all liquid processes, and the potential for airborne contamination dispersion is minimal. The material will be in slurry form once it has been introduced into the trommel screen..

The Uranium Material is a dry sand with particle sizes ranging from 20 to 270 mesh. The efficiency of airborne contamination control measures during the material handling operations will be assessed while the Uranium Material is in stockpile. 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, which will be implemented throughout the material processing operations.

Personal protective equipment, including respiratory protection as required, will be provided to those individuals engaged in material processing. Additional environmental air samples will be taken at nearby locations in the vicinity of material processing activities to ensure adequate contamination control measures are effective and that the spread of uranium airborne particulates 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 No. 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 vehicle and intermodal container will be performed consistent with standard Mill procedures (Attachment 7). As stated in Section 2.0 above, the shipments of Uranium Material to and from the Mill will be dedicated, exclusive loads. Radiation surveys and radiation levels consistent with DOT *General Requirements for Shipping and Packaging, Subpart I—Class 7 (Radioactive) Materials,* U.S. DOT, 49 CFR 173, October 1, 1998, will be applied to restricted use vehicles and intermodal containers. For unrestricted use, radiation levels will be 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 will be implemented.

5.0 OTHER INFORMATION

5.1 Added Advantage of Recycling

HMI has expressed its preference for use of recycling and mineral recovery technologies for the Uranium Material for three reasons: 1) for the environmental benefit of reclaiming valuable minerals; 2) for the added benefit of reducing radioactive material disposal costs; and 3) for the added benefit of minimizing or eliminating any long term contingent liability for the waste materials generated during processing.

HMI has noted that the NRC licensed Mill has the technology necessary to recycle materials for the extraction of uranium, vanadium, rare earth minerals, and other metals, and to provide for disposal of the 11e.(2) byproduct material, resulting from processing primarily for the uranium,

in the Mill's fully lined existing tailings impoundments. As a result, HMI will contractually require IUSA to recycle the Uranium Material at the Mill primarily for the recovery of uranium.

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 is in the process of entering into a contract with HMI (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.

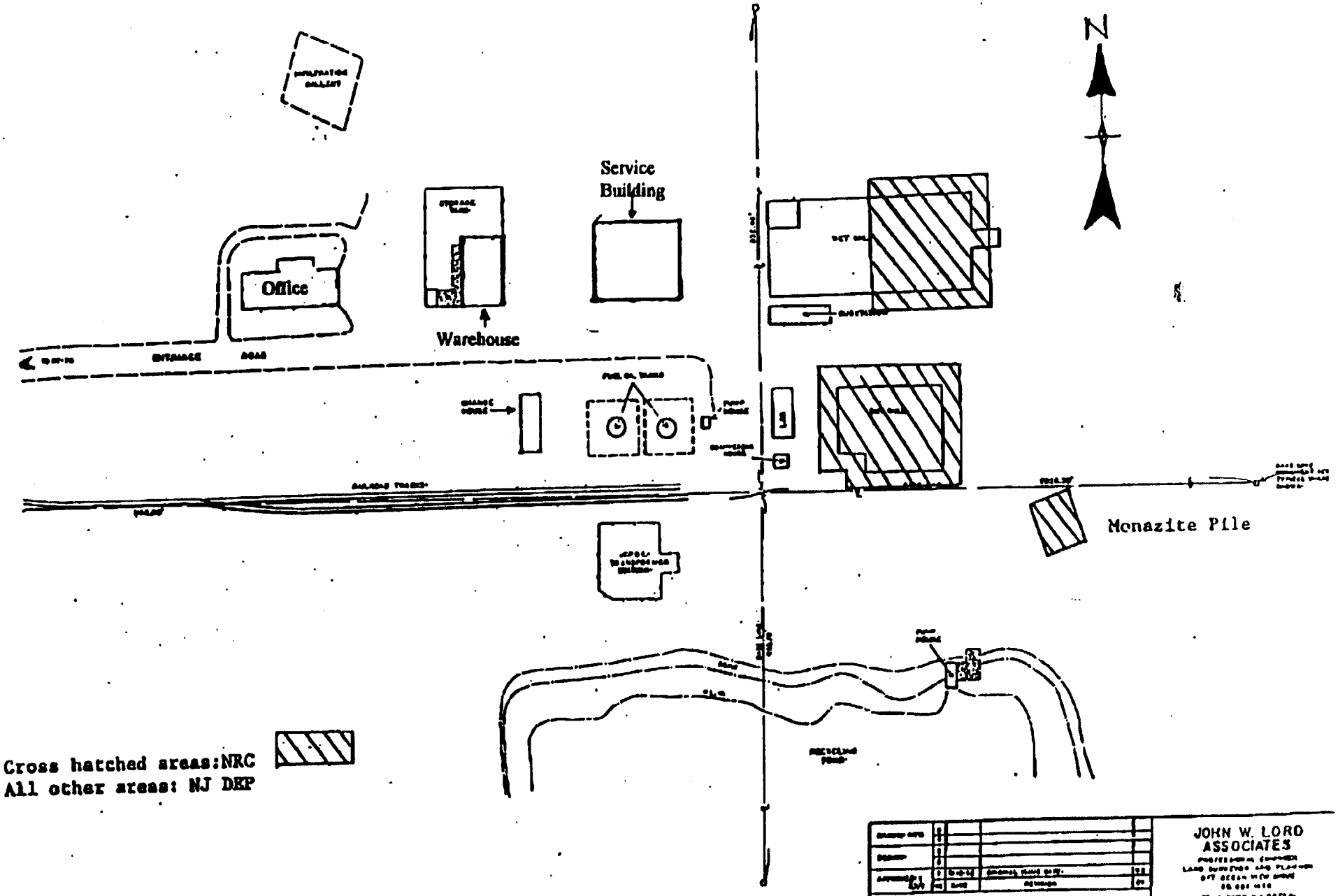
Signature

July 5, 2000
Date

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

ATTACHMENT 1

HMI Site Location Maps, Volume Estimates,
Process History, and Source Material License


Service Building
Office
Warehouse
Monazite Pile
N
Cross hatched areas:NRC
All other areas: NJ DEP
REMEDIATION PROGRAM
HERITAGE MINERALS INC.
LAKEHURST, NEW JERSEY
JOHN W. LORD ASSOCIATES

and make it immediately effective, notwithstanding the request for a hearing. Any hearing held would take place after issuance of the amendment.

If the final determination is that the amendment request involves a significant hazards consideration, any hearing held would take place before the issuance of any amendment.

A request for a hearing or a petition for leave to intervene must be filed with the Secretary of the Commission, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, Attention: Rulemakings and Adjudications Staff, or may be delivered to the Commission's Public Document Room, the Gelman Building, 2120 L Street, NW., Washington, DC, by the above date. A copy of the petition should also be sent to the Office of the General Counsel, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, and to M. Stanford Blanton, Esq., Balch and Bingham, Post Office Box 306, 1710 Sixth Avenue North, Birmingham, Alabama, attorney for the licensee.

Nontimely filings of petitions for leave to intervene, amended petitions, supplemental petitions and/or requests for hearing will not be entertained absent a determination by the Commission, the presiding officer or the presiding Atomic Safety and Licensing Board that the petition and/or request should be granted based upon a balancing of the factors specified in 10 CFR 2.714(a)(1)(i)-(v) and 2.714(d).

For further details with respect to this action, see the application for amendment dated February 22, 1999, supplemented by letters dated March 19 and June 30, 1999, which are available for public inspection at the Commission's Public Document Room, the Gelman Building, 2120 L Street, NW., Washington, DC, and at the local public document room located at the Houston-Love Memorial Library, 212 W. Burdeshaw Street, Post Office Box 1369, Dothan, Alabama.

Dated at Rockville, Maryland, this 26th day of August 1999.

For the Nuclear Regulatory Commission.

L. Mark Padovan,

Project Manager, Project Directorate II, Division of Licensing Project Management, Office of Nuclear Reactor Regulation.

[FR Doc. 99-22766 Filed 8-31-99; 8:45 am]

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NUCLEAR REGULATORY COMMISSION

[Docket No. 40-08980]

Environmental Assessment, Finding of No Significant Impact, and Notice of [illegible] for the Decommissioning of the Lakehurst, NJ Site

Summary and Conclusions

The environmental assessment (EA) reviews the environmental impacts of the decommissioning actions proposed by Heritage Minerals, Incorporated (HMI) of their Lakehurst, New Jersey facility. Based upon the NRC staff evaluation of the HMI Final Status Survey Plan (FSSP), dated November 3, 1997, it was determined that the proposed decommissioning can be accomplished in compliance with the NRC public and occupational dose limits, effluent release limits, and residual radioactive material limits. In addition, the approval of the proposed action, i.e., decommissioning of HMI's Lakehurst, New Jersey facility in accordance with the commitments in NRC license SMB-1541 and the FSSP (decommissioning plan), will not result in significant adverse impact on the environment.

1.0 Introduction

1.1 Background

Heritage Minerals, Inc. is the current holder of NRC radioactive source materials license SMB-1541 (NRC Docket 40-08980) for the possession of radioactive material resulting from operations at their facility located in Lakehurst, New Jersey. The license authorizes HMI to possess at any one time a maximum of 300 kg of uranium in the form of natural uranium as monazite and 15,000 kg of thorium in the form of natural thorium as monazite. Processing of licensed material is not authorized except incident to facility decommissioning activities and packaging materials for shipment.

In December 1996, HMI informed the NRC staff that it intended to decommission the Lakehurst, New Jersey facility. The licensee submitted the Final Status Survey Plan (FSSP or decommissioning plan) to the NRC for review on November 3, 1997. The license was renewed on May 26, 1998 to authorize possession, packaging, storage, and decommissioning in accordance with the FSSP and transfer of products and waste to authorized recipients. Prior to the renewal, a safety evaluation report (SER), which evaluated conformance of the proposed action with NRC regulations and regulatory guidance was prepared and the opportunity for a hearing was publicly noticed in the March 12, 1998, **Federal Register** Notice (63 Federal Register 12114). In response to NRC requests, in 1998-99, HMI provided additional information to clarify certain planned remediation activities. The NRC is considering a license amendment which include additional HMI commitments during facility decommissioning.

1.2 Purpose and Need for Proposed Action

NRC is considering approval of the FSSP to allow Heritage Minerals, Inc. to remove radioactive material attributable to licensed operations at the site, to levels that permit release of the property for unrestricted use and termination of radioactive source materials license SMB-1541.

1.3 Description of Proposed Action

The objective of HMI is to decontaminate and decommission the Lakehurst, NJ facility to permit release for unrestricted use and termination of NRC license SMB-1541. Decommissioning will involve remediation of buildings and other above-grade structures, decontamination of process equipment and sumps, excavation of soil containing monazite sands, and restoration of excavated areas. Soil and other radioactively contaminated materials will be transported to either a licensed disposal facility or recipient authorized to receive such material.

NRC staff reviewed the information provided by HMI in the FSSP describing the proposed decommissioning actions and, by letter dated March 16, 1999, requested additional information regarding specific areas that needed clarification. NRC staff concluded that the decommissioning plan (FSSP) and [illegible] letters dated [illegible], 1999, July [illegible], 1999, from A.J. Thompson, Attorney for HMI, Inc., responding to NRC comments provided an adequate information base for assessing potential environmental impacts from the proposed action.

2.0 Facility Description/Operating History

2.1 Site Locale and Physical

Description The Heritage Minerals, Inc. site is located on Route 70 in Lakehurst, Manchester Township (Ocean County), New Jersey, in the Atlantic Coastal Plain. It encompasses an area of approximately 7000 acres, of which 1000-1200 acres were used for mining operations involving monazite

Other areas remained undisturbed. The plant and production areas including mill tailings containing monazite (produced as a result of previous operations) occupied an estimated 500 acres. The monazite pile is located within a security fence and occupies approximately 700 cubic meters. Areas adjacent to the site are predominantly rural, with bands of existing or recently developed residential communities within Manchester Township.

In the Hydrogeologic Investigation Report prepared for HMI, Fellows, Read, & Associates, Inc. (1989) characterized the geology and hydrogeology of the facility. Geologic deposit formations consist of underlying sediments of stratified clay, silt, sand, and gravel on well-indurated bedrock. The topography is relatively flat, recontoured by surface mining of ilmenite surface deposits. Wetlands form the drainage of adjacent Wrangel Brook, which has an easterly streamflow. Two lakes were created along the Green Branch of Wrangel Brook as a result of mine dredging operations.

Groundwater flow occurs from areas located north and west of the site to east and northeast towards the tributaries of the Toms River. The Toms River and its tributaries represent the major groundwater discharge zones for the region. Local groundwater flow is from upland areas to lower areas where groundwater discharges to streams and wetlands. Site groundwater is recharged by precipitation and flows unconfined through underlying sands. The Green Branch, Michaels Branch, and Davenport Branch of Wrangel Brook serve as local discharge zones for shallow ground water, with subsequent discharge to the Toms River or Barnegat Bay.

2.2 Descriptions of Facility Operations

Between 1973 and 1982 the site was operated by ASARCO, Inc., for dredging and processing sand deposits to extract heavy minerals. The titanium mineral, ilmenite, was the primary mineral recovered by various physical separation methods. There was no chemical separation involved in the extraction and concentration processes. Heavy minerals, including monazite were pumped as slurry to a Wet Mill. At the Wet Mill, the heavy minerals were separated from the slurry, then stockpiled for dewatering, while the lighter fraction was returned to the dredge pond. The heavy mineral concentrate was heated in a Dry Mill, then screened to remove coarse material. The high conductivity of the titanium dioxide bearing minerals allowed electrical separation from other heavy minerals. Further magnetic refinement produced the final ilmenite product. The dry mill tailings containing essentially all the monazite from the heavy minerals concentrate were mixed with water and pumped to an area east of the dry mill building.

ASARCO ceased operations in 1982. Evaluation of residual materials by private companies for commercial use continued until the property was purchased by HMI in 1986. Plant facilities were leased to Mineral Recovery, Inc. (MRI), who performed operational testing for titanium recovery until 1987.

HMI assumed property control, conducting site operations under NRC license until 1990 when all production stopped. Operations were comparable to the ASARCO process, utilizing dry mill tailings as feed material. The tailings were mixed with water, pumped to the wet mill for mineral separation according to their conductive properties, proceeding through a dewatering and drying process. Minerals were recovered and sold as leucoxene and rutile (titanium dioxide products) and zircon. Licensable amounts of monazite were present throughout the electrical and magnetic separation processes. In early 1990, processing of feed materials continued followed by recycle of tailings from the MRI operations. Mill tailings containing monazite were deposited in a stockpile east of the dry mill. Due to economic conditions, HMI terminated all operations in August 1990. Approximately 700 cubic meters of stockpiled tailings remain licensed to HMI.

3.0 Radiological Status of the Facility

3.1 Structures and Equipment

HMI performed decontamination of building surfaces and disposed of contaminated equipment in 1990–1991. Subsequent radiation (screening) surveys were conducted of the interiors of the wet mill and dry mill. Process trains within each building were characterized according to their monazite content and operating history as affected or unaffected areas using NUREG/CR–5849, "Manual for Conducting Radiological Surveys in Support of License Termination" criteria. The methods used to dismantle and decontaminate process equipment in affected areas and for disposition of resultant materials are described in the FSSP. The same methods will be used for decontamination of building interiors prior to the final radiological survey and will serve as the basis for termination of NRC Source Material License SMB–1541.

The final release status surveys described in the FSSP will be performed in accordance with NUREG/CR–5849 criteria. Residual radioactive materials that exist in affected areas will meet current guidelines described in "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use for Termination of Byproduct, Source, and Special Nuclear Material Licenses." (U.S. Nuclear Regulatory Commission, Policy and Guidance Directive FC 83–23, 1983). Details regarding the radiological status of affected areas within the Wet and Dry Mill buildings are described in the next sections. At present, contaminated material containing monazite is being stored in the outdoor tailings pile. A final survey of affected areas will be required by NRC after residual material is removed and decontamination is complete.

Following review of the Heritage Minerals, Inc. site radiological characterization of structures and equipment, the NRC staff finds characterization was performed in accordance with NUREG/CR–5849. The NRC staff review of the FSSP also finds it adequate for remediating structures and equipment to radiological levels below the NRC guidelines for unrestricted release (Nuclear Regulatory Commission, 1983). The staff concludes no adverse environmental impacts will result from planned remediation of the site structures and equipment.

3.1.1 Wet Mill Building. The Wet Mill Building process equipment used to extract product materials from raw feed was grouped into affected and unaffected survey units. The majority of survey units including floors, lower walls, and western mill areas are unaffected. Mechanical separation units and feed sumps involving transfer or processing of product material containing monazite were identified in the FSSP as affected areas. Final radiological surveys of interior surfaces will be within allowable release limits for natural thorium, the primary contaminant of concern. Prior to release of equipment in affected areas for unrestricted use, the NRC release limit of 1,000 dpm/100 cm2 for average surface contamination and maximum release limit of 3,000 dpm/100 cm2 will be met.

3.1.2 Dry Mill Building. Equipment in the Dry Mill Building was used to extract product materials from the Wet Mill process feed. Consistent with Wet Mill Building survey units, Dry Mill Building equipment was also grouped into affected and unaffected areas. Most

areas of the Dry Mill involving monazite including floors, ceiling, and lower walls (up to two meters above floor level) are affected. These include dryers, high tension separators, and sumps. NRC surface contamination release limits are the same as those used for Wet Mill equipment.

3.2 Surface and Subsurface Soils

Radionuclide concentrations and direct radiation levels for surface and subsurface soils at the facility have been measured in the Wet Mill, Dry Mill, dust collectors, tailings (monazite) pile, and at various outdoor locations.

Direct radiation levels inside buildings and outdoor areas were routinely measured by HMI personnel since 1990. Direct gamma exposure rates at ground level and 1 meter above the surface were reported for the monazite pile and areas in and around the Wet and Dry Mills. Average monazite pile perimeter readings ranged between 300–1700 μR/hr up to 2000 μR/hr on the pile. Readings at outdoor locations around buildings were at or near background levels. The highest exposure rates were measured on storage drums located inside the security fence surrounding the pile, at levels up to 3000 μR/hr. Small amounts of residual material (unlicensed) exists from recycled ASARCO tailings deposits in adjoining owner controlled property locations. These areas showed direct gamma radiation readings ranging between 10–150 μR/hr and will not be included in the remediation. Normal background radiation levels for other facility production areas is 7–20 μR/hr.

In July 1996, Radiation Science, Inc. issued a Report of Site Background for HMI which included soil samples at a depth of six inches from undisturbed environment, representative of natural site conditions. Background levels were established by performing gamma spectral analysis for U–238 and Th–232 on 32 samples. Mean values reported for background samples was 0.31 pCi/gm for U–238 concentration and 0.25 pCi/gm for Th–232 concentration. Average dose rates measurements from areas where samples were taken was 3.0 μR/hr.

Sample analysis of soils taken from recycled tailings, an unused settling pond, plant tailings, and new feed materials did not exceed NRC limits for total uranium and thorium (i.e., 10 pCi/g above background) for unrestricted release. Only soil in the monazite pile was measured above licensable source material quantities, and showed total concentrations of Ra–226 and Ra–228 up to 1376 pCi/gm. The FSSP identifies these soils as the material to be considered for remediation activities.

Following review of the HMI site radiological characterization studies for soils, the NRC staff finds the characterization effort and FSSP adequate for determining areas of elevated radioactivity in soils that require remediation to limit concentrations to the NRC limits for unrestricted release (46 Federal Register 52061–52063).

3.3 Surface Water and Groundwater

Analyses for radioactivity of surface water samples collected from existing site monitoring wells and offsite streams were reported by Camp Dresser & McKee, Inc. in 1997 as part of the Mine Tailings Radiological Assessment Plan prepared for the New Jersey Department of Environmental Protection. Concentrations measured for groundwater samples were 2.0–7.0 pCi/l for gross alpha and under 2.0–5.0 pCi/l for gross beta. Results of surface water samples were 2.0–3.9 pCi/l gross alpha and 2.0–4.2 pCi/l gross beta. Due to the insoluble properties of monazite and generally low levels of radiological contamination identified in samples, no concern was found regarding dissolution of radioactivity into groundwater and surface water.

Following staff review of the characterization of surface waters and groundwater around the HMI site, the NRC staff concludes the characterization is adequate and radiological contamination of surface waters and groundwater is below levels that would be a concern for environmental impacts.

3.4 Air

HMI reported results from 1990 air sampling measurements in three locations of the Dry Mill taken by their contractor, Teledyne Isotopes. Air filters were analyzed for gross alpha activity using an alpha scintillation counter. Activity detected was assumed to be Th–232, with reported concentrations less than 1.6×10^{-12} μCi/ml. These concentrations were less than effluent concentrations limits allowed in 10 CFR Part 20, Appendix B, and are therefore found by NRC to be below levels that could lead to adverse environmental impacts. Dust and security control measures provide confidence that air quality will not be degraded during decommissioning activities to levels that exceed NRC limits in 10 CFR Part 20.

4.0 Evaluation of Proposed Methods for Decontamination and Dismantlement of Structures, Buildings, and Equipment

4.1 Decontamination of Buildings, Equipment, and Outdoor Areas

HMI's proposal for decontamination of buildings, equipment, and outdoor areas is provided in the FSSP, supplemented by additional letters clarifying remediation activities in response to NRC's request for additional information. In 1991, process equipment, Wet and Dry Mill buildings, and survey units with operating equipment suspected to contain radioactive material were cleaned and decontaminated. Decontamination methods used for mill equipment included high pressure washing, steaming, general wipe down and scrubbing, blowing, and dusting and sweeping of surfaces. Radiation surveys of buildings and areas around the monazite pile have been performed routinely by HMI since that time.

The FSSP describes the proposed decommissioning activities and methods for protecting workers and the public during removal of monazite contaminated soil. Residual radioactivity remaining inside buildings is confined to fine sand grains present on equipment surfaces. Affected survey units may require further decontamination prior to performing the final status survey. Areas that contain only loosely adhered contamination will be HEPA vacuumed to remove contaminants. Fixtures, tanks, pumps, high tension separators, piping, and heavy equipment will be isolated, disassembled, and decontaminated as necessary, then resurveyed prior to release for unrestricted use. Equipment that cannot be economically decontaminated will be resurveyed, and all equipment with contamination above the NRC limits for unrestricted release or equipment suspected to contain radioactive material will be treated as radioactive waste.

When removal of process equipment from mill buildings is completed building characterization surveys will be conducted. Walls up to two meters and floors are to be surveyed in accordance with the FSSP. Those buildings that contain residual contamination will be decontaminated below NRC guideline values using the most economical and reliable methods available. HMI's objective is to free release all buildings above grade to allow demolition (if deemed necessary) of clean buildings. Decontamination of ground-level floors will include the top surface of the concrete slabs, if needed

Material from demolition of ground-level floors and underlying soils will be surveyed for contamination and remediated.

Surface and subsurface soils with Th-232 concentrations greater than 10 pCi/g is restricted to the monazite pile. HMI proposes two excavations of materials with monazite concentrations greater than 10 pCi/g above background. Contaminated soil (monazite ore) will be excavated, placed into a hopper, and transferred to shipping containers. This will be followed by a second excavation of surface layer soil to be removed in a similar manner. A fenced security area near the existing pile will be established for staging of shipping containers and contaminated equipment prior to transportation off-site. After the second excavation, area radiation levels are expected to be reduced to no more than twice background. Excavation of soil to meet Th-232 cleanup criteria will also serve to remove residual uranium contamination because both contaminants are contained in the monazite-rich soil. Once remediated, the remaining soil will be resurveyed in a manner consistent with NRC-accepted methods to ensure residual thorium and uranium contamination meet the NRC unrestricted release criteria. Soil and other material will be transported from the site either to a licensed disposal facility or exported under NRC Export License XSOU8751, issued to HMI on May 2, 1997.

Under Condition 15 of Materials License SMB–1541, HMI cannot release for unrestricted use areas within plant buildings or the monazite pile without specific, written authorization from the NRC. Based on the NRC review of building and equipment decontamination methods described in the FSSP and supporting documents, NRC concludes that the methods are adequate for ensuring that equipment, buildings, and outdoor areas will meet the NRC guidelines for unrestricted use and no adverse environmental impacts will result from planned activities.

5.0 Decommissioning Alternatives and Impacts

5.1 No Action

No decommissioning action by HMI would constitute a violation of 10 CFR 40.42(d) requirements, which requires that licensees begin site decommissioning of buildings and outdoor areas that contain residual radioactivity after permanently ceasing principal activities. Impacts of the no-action alternative are maintaining an NRC license, which would significantly reduce options for future property use, and require perpetual care and security of the site in its current radiological condition to prevent radiation exposure to monazite contamination and unauthorized public access.

5.2 Proposed Action

The proposed action is the approval to implement the Heritage Minerals, Inc. Final Status Survey Plan, for decommissioning activities at the Lakehurst, New Jersey facility that will permit unrestricted use of the site and termination of License No. SMB–1541. Decommissioning the facility for unrestricted release allows productive use of the land in the future. Site remediation is expected to mitigate potential future environmental impacts attributable to existing radiological contamination resulting from past operations.

5.3 Alternatives to Proposed Action

Two alternatives to the proposed action are considered. The first alternative is to not release the site for unrestricted use and keep the property under license. This alternative is unfavorable because maintaining an NRC license for the site would provide negligible, if any, environmental benefit, but would greatly reduce options for future use of the property. The second alternative involves storage of excavated soils on-site for an indefinite period should HMI be unable to export or transfer the material for disposal. While on-site storage defers the costs associated with disposal at a licensed facility, it removes the property from productive use, resulting in a negative impact to the economic potential of the local area.

The NRC determines the proposed action to be more favorable than either no-action or alternatives to the proposed action.

6.0 Radiation Protection Program

6.1 Radioactive Waste Management and Transportation Program

The radioactive waste management program at the HMI site includes identification, characterization, segregation, packaging, labeling, manifesting, and transporting waste in accordance with NRC, U.S. Department of Transportation (DOT), and other applicable federal, state, and local regulations. Included as contaminated radioactive waste materials from decommissioning activities will be equipment, tools, process material, building debris, decontamination materials (rags, wipes, filters), decontamination waste, soils, residual process equipment waste (sludges), and used personal protective equipment.

Since HMI intends to comply with all applicable requirements, NRC finds the planned radioactive waste management and transportation programs adequate for the materials at the site, and no adverse environmental impacts are expected from waste management activities or transfer of the material offsite.

6.2 Technical and Environmental Specifications

6.2.1 Unrestricted Use Guidelines. Guidelines for unrestricted use for natural thorium and uranium for the Heritage Minerals, Inc. site are Option 1 in the 1981 Branch Technical Position on "Disposal or Onsite Storage of Thorium or Uranium Wastes From Past Operations" (46 FR 52061), and NRC "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use for Termination of Byproduct, Source, and Special Nuclear Material Licensees," Policy and Guidance Directive, FC 83–23. The unrestricted release criteria are identified in the table below.

SOIL RELEASE CRITERIA [1]

Radionuclide	Maximum soil concentration (pCi/g)	Reference
Natural Thorium (Th-232 plus Th-228) if all daughters are in equilibrium	10	(46 *Federal Register* 52061–52063).
Natural Uranium Ores (U-238 plus U-234) if all daughters are present and in equilibrium	10	(46 FR 52061–52063).

[1] If only one radionuclide is present, the maximum concentration is the value listed in this table. If more than one radionuclide is present, however, the ratio between the measured concentration and the corresponding limit listed in this table is determined. The sum of such ratios for all radionuclides present must not exceed one.

6.2.2 Radiological Health and Safety Program. HMI will select a decommissioning contractor who will follow radiation protection procedures sufficient to administer the radiation protection program authorized by License SMB-1541. The radiation protection program has been routinely inspected by NRC staff and found to be well implemented. The proposed action is limited in scope and not expected to include unique health and safety issues outside the scope of the radiation protection program. NRC will conduct site inspections while decommissioning activities are in progress. NRC determines the radiation protection program adequate for the proposed action.

6.2.3 Corporate Organization and Management. The HMI site manager will function as the licensee representative of the decommissioning project to provide oversight for all project activities. The site manager's function is to coordinate scheduling and status reports with the contractor Project Manager (PM) and HMI legal advisor. The PM will maintain overall responsibility for performance of project operations for the duration of the project until decommissioning activities are completed. The PM and decommissioning workers report directly to the HMI technical and legal staff for all project related activities, management direction, and resolution of operational issues. Primary responsibility of the PM includes on-site workforce management to ensure agreed to work schedules are met. The HMI Radiation Safety Officer (RSO) will report to the site manager and continue to perform oversight of all radiological work-related activities throughout the decommissioning project.

From review of job descriptions and responsibilities involved in radiological safety during decommissioning, NRC determines that the designated functions are acceptable to implement the radiological safety program during proposed decommissioning activities.

6.2.4 Radiological Exposure Control. Areas where radioactive materials are used and stored will be posted to control exposures to workers and visitors and avoid the spread of contamination. Measures to be taken to ensure control of contamination include donning of anti-contamination clothing, personnel monitoring, and frequent area radiation surveys. External radiation monitoring will be conducted through the use of environmental dosimeters placed at strategic locations around the monazite pile and work areas. The need for and type of dosimetry for workers and visitors in radiologically controlled areas will be determined by the contractor, and may include issuance of a radiation work permit. The primary dosimeter will be the thermoluminescent dosimeter (TLD) for whole body exposure, however, other types such as extremity TLD's will be employed, as conditions warrant.

For activities that have the potential to generate dusts, airborne particulate monitoring will be performed to demonstrate compliance with 10 CFR Part 20 intake limits, determine whether precautionary measures are needed (engineering controls, use of respiratory equipment), and show how exposures are being maintained ALARA. To reduce the amount of airborne particulates during excavations, the monazite pile will be sprayed with water twice per day. For equipment decontamination within affected survey units, HEPA air filtration in the immediate work area will be used, as needed.

Resuspension and airborne transport of contaminated soil during excavations serves as the primary pathway for off-site releases from decommissioning activities. HMI proposes to measure air particulates in the downwind direction through the use of a high-volume air sampler. Workers involved in excavations will be required to wear respiratory protection until radiological airborne activity levels are determined. HMI does not expect the proposed action will result in the generation of off-site, airborne concentrations that would result in dose to a member of the public in excess of the dose limits in 10 CFR Part 20. Previous results of groundwater and surface water sampling have shown negligible dose contribution due to the low levels of radionuclides during site operations. Decommissioning activities will have no further impact, therefore, additional water sampling is not needed.

HMI's total dose estimates for a worker based on direct gamma exposure rate from airborne soil releases from excavation activities of the monazite pile of 1mR/h is 320 mRem, with dust inhalation dose at 6% of the annual limit of intake (ALI) for the duration of the proposed action. The off-site (public) annual dose limit in 10 CFR Part 20 is 100 mrem. Given the low estimated exposure beyond the site boundary, the air sampling is adequate for off-site monitoring of potential releases to ensure compliance with the dose limits of 10 CFR Part 20.

Following review of radiological exposure controls, NRC determines the proposed program methodologies are adequate for detecting potential environmental impacts prior to license termination.

6.2.5 Security. Security of radioactive material at the HMI facility is maintained by a fence with a locked front entry gate around the perimeter of the monazite pile. Security for mill buildings is minimal, and other site areas are left unattended for long periods. Equipment theft in mill buildings has been a known concern within buildings, but missing equipment was believed to have been decontaminated after operations shut down in 1990. These concerns should be alleviated by the presence of on-site decommissioning personnel. HMI has committed to establishing a fenced exclusion area for shipping containers and equipment removed from buildings which cannot be released for unrestricted use.

NRC determines this is an adequate level of security to ensure radiological safety will be maintained during decommissioning activities at the site.

6.3 Radiological Accident Analysis

Potential accident scenarios considered include building fire and loading or shipping incidents of radioactive materials. Due to the low potential for fire or explosion in building structures and the limited quantities of material used during transfer operations, accidental releases of radioactive materials in quantities that could affect public health and safety are unlikely. A 24-hour number will be established to provide Radiation Safety Officer notifications in the event emergency response is necessary.

The NRC concludes that HMI has adequately addressed the potential for radiological accidents.

7.0 Environmental Impacts

7.1 Radiological Impacts to the Public and Workers

Potential sources of worker exposure from decommissioning activities include characterization work, decontamination and remediation of buildings and associated structures (piping, foundations), and excavation of soils. Past NRC inspections showed activities resulted in no measurable internal or external dose to workers. These activities were similar to the proposed activities and included equipment and building decontamination, radiological characterizations, and monazite pile maintenance. NRC dose calculation based upon excavation and packaging of 700 m^3 of monazite soil at an average thorium soil concentration of 25 pCi/g (highest sample result obtained during

NRC inspection) project an occupational worker exposure under 10 mRem, primarily due to external exposure. Based on the above, the staff believes that worker exposures will be well within the 10 CFR Part 20 annual worker dose limit of 5000 mRem, and that no adverse impacts to workers will result.

Potential sources of radiological impacts to the public from decommissioning activities at the HMI site are similar to those pertaining to worker exposures (decontamination and excavation dusts), but require transport over greater distances to reach off-site receptors. As a result, lower concentrations and doses are expected for members of the public than for workers. Previous NRC inspections showed that worker exposures during past activities were undetectable. Similarly, the public doses from these activities should be undetectable. The NRC staff has determined that HMI has provided adequate plans to ensure that potential radiological impacts to members of the public from the proposed action will not exceed NRC limits and are unlikely to result in adverse environmental impacts

7.2 Nonradiological Impacts

There are no planned direct uses of chemicals in the proposed action, only the excavation of soil, and remediation of equipment and buildings. No other operations have a potential to affect the environment. During scoping and characterization surveys, an assessment of each building will be performed to identify the presence of hazardous or mixed wastes. The survey will identify items requiring management of hazardous substances, if found.

The NRC staff has determined that HMI has acceptably addressed the control of potential releases of nonradiological hazardous materials.

8.0 Agencies and Individuals Consulted

NRC transmitted the FSSP to the New Jersey Department of Environmental Protection (NJDEP), US Environmental Protection Agency, Region 2, and Township of Manchester by letters dated February 13, 1998, for review and comment. The response letter of March 18, 1998 from the NJDEP included comments regarding characterization of areas with thorium levels below licensable quantities and extent of soil removal, was forwarded to HMI for evaluation. HMI addressed the State's comments in their letter of November 30, 1998 to NRC providing acceptable responses to the NJDEP questions. No response was received from the EPA or Manchester Township. HMI has committed to coordinate with the NJDEP and comply with applicable State and local regulations during decommissioning activities.

9.0 Finding of No Significant Impact

The Commission has prepared an EA related to the proposed unrestricted release, and removal from license SMB-1541, of 700 m^3 of monazite-rich soil from the Heritage Minerals, Inc., Lakehurst, New Jersey site. On the basis of the EA, the Commission has concluded that this licensing action would not significantly affect the environment and does not warrant the preparation of an environmental impact statement. Accordingly, it has been determined that a Finding of No Significant Impact is appropriate.

The NRC hereby provides notice that this is a proceeding on a license amendment falling within the scope of Subpart L, "Informal Hearing Procedures for Adjudications in Materials and Operator Licensing Proceedings," 10 CFR Part 2. Pursuant to Sec. 2.1205(a), any person whose interest may be affected by this proceeding may file a request for hearing in accordance with Sec. 2.1205 (d). A request for hearing must be filed within thirty (30) days of the date of publication of this Federal Register Notice.

The request for a hearing must be filed with the Office of the Secretary either:

1. By delivery to the Docketing and Service Branch of the Secretary at One White Flint North, 11555 Rockville Pike, Rockville, MD 20852-2738; or

2. By mail or telegram addressed to the Secretary, U.S. Nuclear Regulatory Commission, Washington, D.C., 20555 Attention: Docketing and Service Branch.

In addition to meeting other applicable requirements of 10 CFR Part 2 of the NRC's regulations, a request for a hearing filed by a person other than an applicant must describe in detail:

1. The interest of the requestor in the proceeding;

2. How that interest may be affected by the results of the proceeding, including the reasons why the requestor should be permitted a hearing, with particular reference to the factors set out in Sec. 2.1205(h),

3. The requestor's area of concern about the licensing activity that is the subject matter of the proceeding; and

4. The circumstances establishing that the request for a hearing is timely in accordance with Sec. 2.1205(d).

In accordance with Sec. 2.1205(f), each request for hearing must also be served, by delivering it personally or by mail, to:

1. Heritage Minerals, Inc., Attention Anthony J. Thompson, Esquire, ShawPittman, 2300 N Street, NW, Washington, DC 20037-1128, and

2. The NRC staff, by delivery to the Executive Director for Operations, One White Flint North, 11555 Rockville Pike, Rockville, MD 20852-2738 or by mail, addressed to the Executive Director for Operations, U.S. Nuclear Regulatory Commission, Washington, DC 20555.

The documents related to this proposed action are available for public inspection and copying at the NRC Public Document Room, 2120 L Street NW., Washington, DC 20555 or at the NRC's Region I offices located at 475 Allendale Road, King of Prussia, PA 19406.

10.0 References

Berger, J.D., "Manual for Conducting Radiological Surveys in Support of License Termination." NUREG/CR-5849. Washington, DC: Nuclear Regulatory Commission, 1992.

Nuclear Regulatory Commission, "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use for Termination of Byproduct, Source, and Special Nuclear Material Licenses," Policy and Guidance Directive FC 83-23, 1983.

Nuclear Regulatory Commission, "Final Generic Environmental Impact Statement in Support of Rulemaking on Radiological Criteria for License Termination of NRC Licensed Nuclear Facilities." NUREG-1496, Volume 2, 1997.

Orlando, D., et al., "NMSS Handbook for Decommissioning Fuel Cycle and Materials Licensees," NUREG/BR-0241, Washington, DC: Nuclear Regulatory Commission, 1997

Dated at King of Prussia, Pennsylvania this 20th Day of August 1999.

For the Nuclear Regulatory Commission

George Pangburn,

Director, Division of Nuclear Materials Safety.

[FR Doc. 99-22767 Filed 8-31-99; 8:45 am]

BILLING CODE 7590-01-P

Final Status Survey Plan
for
License Termination of
Heritage Minerals
NRC License # SMB-1541

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Table of Contents

1.0 Introduction

This decommissioning plan addresses the NRC licensed area and buildings on the Heritage Minerals (HMI) Site in Lakehurst, New Jersey. Beginning in 1987, on sands stockpiled from a previous company's operations, HMI processed several types of commercial minerals through gravimetric, conductive and magnetic separation. No chemicals were used in the process. Operations ceased in 1990. A detailed description of the operations and site history is provided in Appendix C.

One of the commercial minerals produced by HMI, monazite, contains thorium and uranium. Possession of this material, when greater than 0.05% by weight, is a licensed activity regulated by the Nuclear Regulatory Commission (NRC). This document presents a plan for proper removal of licensed material and survey of the site to demonstrate that the property and equipment is suitable for license termination and release for unrestricted use.

A decommissioning cost estimate is included as Attachment I.

2.0 Existing Data Review

The available data on post decontamination surveys consists of fixed and removable measurements obtained by HMI personnel at ten locations, five each in the wet mill and dry mill. The removable alpha and beta results are below any release limits discussed in NRC guidance documents, however the documentation and quality control procedures are not sufficient to satisfy the current requirements for decommissioning as put forth in NUREG-5849. Therefore, the available data on post decontamination measurements will not be suitable for inclusion in the final status survey report.

Another source of existing data is a radon flux mapping procedure developed by SENES Consultants Limited (SENES 95). However, the purpose of that study was "to provide a mapping procedure which calculates radon flux rates for the proposed residential site". The information does not pertain to decommissioning the buildings or affected outdoor areas, and will not be utilized in this plan.

A survey of the natural background levels of uranium and thorium, and the background exposure rate onsite was conducted in 1996 by Radiation Science Inc. Those values were established using sampling and statistical guidance from NUREG- 5849. The information from that study will be used to correct final survey soil samples and exposure rate measurements for the contribution due to background.

Samples of the monazite pile analyzed by Teledyne Isotopes in April of 1990, indicate Ra-226, Pb-214, and Bi-214, all daughters in the uranium series, to be in equilibrium. Likewise, three daughter nuclides in the thorium series, Ac-228, Pb-212, and Tl-208 were found to be in equilibrium. This data is used to support the assumption that all natural series decay chains are in equilibrium.

3.0 Decommissioning Activities

The following list of activities is proscribed in NUREG-5849 as requirements leading to the termination of an NRC license, and serve as a rough work plan for this project.

- Terminate the possession and storage of radioactive material.
- Remove radioactive material from the facility.
- Properly dispose of any radioactive material removed.
- Submit an NRC-314 "Disposition of Radioactive Materials" form.
- Conduct Final Site Survey.
- Submit report to the NRC.

4.0 Release limits

All limits discussed here are selected to allow unrestricted release of the site. HMI's license states "for measurement purposes all contamination may be assumed to be natural thorium in equilibrium with its daughters' Therefore, surface activity limits are based on alpha emissions from natural thorium. Soil concentration limits are based on total uranium (U-238 + U-234) and total thorium (Th-232 + Th-228) in equilibrium with progeny in their respective decay chains. Release limits stated here are above background, and are summarized in Table 2.

The background area in terms of dose rate and uranium and thorium soil concentrations is the unmined areas of the site. During May 1996 an extensive background determination was conducted following the guidance in NUREG-5849. (RSI 7/96) Those values will be used for "background" corrections of soil samples, and as the "baseline" dose rate. They are reproduced in Table 1. The report is included in its entirety in Appendix A.

To date there has been no background values established for equipment and buildings. The background area for surface activity measurements will be the unaffected buildings onsite, (refer to Figure 2). A separate background value will be established for concrete surfaces and metal surfaces, as part of the final site survey.

Parameter	Level
Total uranium Concentration	0.62 pCi/g
Total thorium Concentration	0.48 pCi/g
Exposure Rate	2.84 μR/hr

Table 1 - Background concentrations and exposure rate

4.1 Surface activity

The activity limits specified in HMI's materials license are based on thorium in equilibrium with its daughters. Those values are 1,000 dpm/100 cm^2 average fixed, 3,000 dpm/100 cm^2 maximum fixed and 200 dpm/100 cm^2 maximum removable. These release limits will be used for this decommissioning project.

4.2 Soil concentration

Condition 15 of Heritage Minerals' NRC license specifies "All areas ... on a map of the licensee's site attached to the letter dated September 27,1990 shall be decontaminated to meet the criteria for release for unrestricted use described in Option I of the Branch Technical Position "Disposal or Onsite Storage of Thorium or uranium Wastes from Past Operations". The limit for total thorium is 10 pCi/g, and the limit for total Uranium is also 10 pCi/g. As discussed in the next section, these soil activity limits will also demonstrate compliance with the exposure rate limit.

4.3 Exposure Rate

There are two methods for demonstrating compliance with the dose rate limits. The first method would involve direct measurements with a microRmeter or pressurized ion chamber. The "shine" from the nearby, unlicensed tailings would make this difficult without shielding the meter. However, to obtain readings at waist level would require an extremely large lead cone, which would be unmanageable in the field. The second method is to obtain post-remediation soil samples for laboratory analysis, and base the exposure rate on soil activity once background activity has been subtracted. This is the method that will be employed for this decommissioning. The NRC's Branch Technical Position Paper explicitly states " ..the concentrations are sufficiently low so that no individual may receive an external dose in excess of 10 micro-roentgens per hour above background" The concentrations referred to (Option 1, stated in section 4.2 above) are those selected here for the soil cleanup criteria. In the spirit of ALARA, HMI assumes final soil concentrations will be well below the 10 pCi/g (therefore 10 μr/hr) limits. A limited number of soil concentration- to- exposure calculations using computer software such as Microshield, will be conducted.

Parameter	Release Limit
Total thorium in soil	10 pCi/g
Total uranium in soil	10 pCi/g
Surface activity - max. fixed	3,000 dpm/100 cm^2
Surface activity - avg. fixed	1,000 dpm/100 cm^2
Surface activity - removable	200 dpm/100 cm^2
Exposure rate	10 μR/hr

Table 2 - Release limits above background

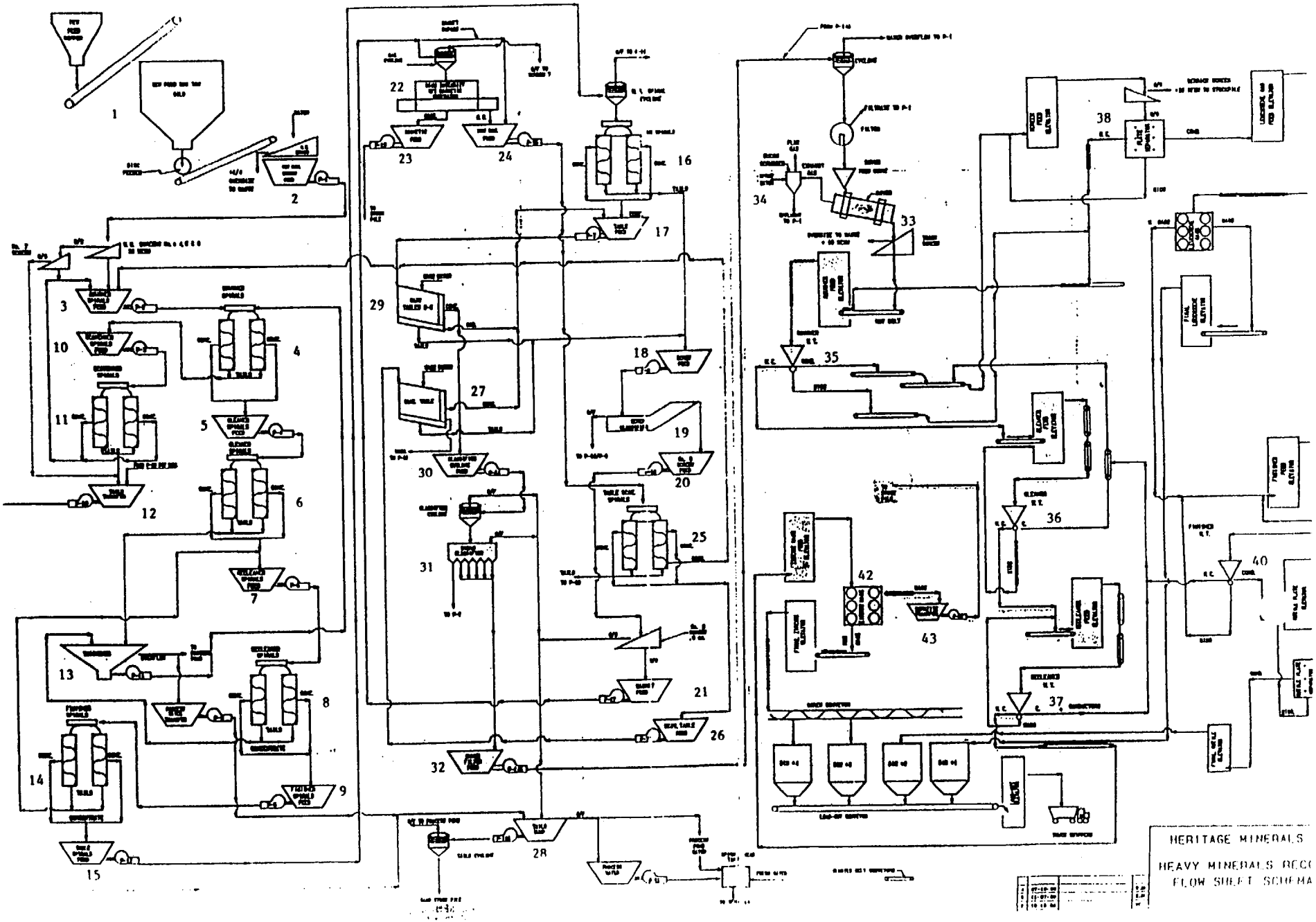
5.0 Affected / Unaffected Survey Units

The basic rationale for dividing the site into affected and unaffected areas is provided in this section. Appendix € provides a detailed description of the operating history used to identify the affected process trains. The site at Heritage Minerals, while no longer processing sands for the concentration of various naturally occurring minerals, remains in a shutdown condition. Some support buildings are still used for equipment storage and repair. The wet and dry mill equipment is non-operational but both buildings contain millions of dollars worth of heavy equipment including; tanks, elevators, high tension separators, piping, and hundreds of tons of heavy equipment and structural supports. The complexity of the interior of both buildings pose a challenge to the application of a two dimensional grid system survey as proscribed in NUREG 5849.

Both the wet and dry mills have distinct process "trains" or routes the incoming material traveled. These routes were not linear, so at some points the depleted stream was diverted, while at others concentration of uranium and thorium occurred. Each mill will be divided into survey units based on the potential for concentration of uranium/thorium and common historical use with regards to material contact, as suggested in NUREG 1505. The process flow diagram (Figure 1) identifies the movement, separation, and enrichment of the various product streams through the mills. The diagram follows the raw material (ASARCO sands) to the finished product streams (zircon, leucoxene, rutile, and monazite) and mill tailings. Each process step represents a further enrichment in Thorium and Uranium since these elements follow the product stream and are removed with the monazite in the final process separation.

Each process step is represented by a physical set of equipment consisting of tanks, piping, conveyors, and/or heavy equipment. Each process step includes duplicate equipment systems. The individual systems handle the same feed material in parallel so as to increase through-put. Since each step enriches the process stream in the product, thorium and uranium are typically more

FIGURE 1



concentrated at the end, than at the beginning of each process step. Once the product leaves the process equipment in transit to the next step, such as in a piping or conveyor system, the concentration of these isotopes remains the same.

Individual process steps (e.g. zircon magnetic separation) and related equipment (e.g. magnetic coils and conveyors) represent logical survey units which can be examined according to the rules of NUREG 5849. This allows application of the NUREG-5849 survey recommendations (affected or unaffected, number of sampling points, and averaging rules) in a meaningful fashion to obtain a report representative of the final plant status. The process trains with the potential to be contaminated based on process knowledge are highlighted on figure 1. Outdoor areas are shown on Figure 2.These survey units are identified and located as described below:

Outdoor Properties- Unaffected

Except for the monazite pile and the area immediately surrounding the pile, all outdoor properties are unaffected. For purposes of the final status survey, the area of open space extending beyond the wet mill building to the north, south, and east by approximately 10 meters will be included in the survey. The area of open space extending approximately 10 meters around the dry mill is also included in the survey. See Figures 2, 3, 4,and 5.

Office Building - Unaffected

The Office Building was used to support administrative personnel. No process material was used in this building. See Figure 2.

Warehouse Building - Unaffected

The Warehouse Building was used for storage of new mechanical equipment and parts. No process material was used in this building. See Figure 2.

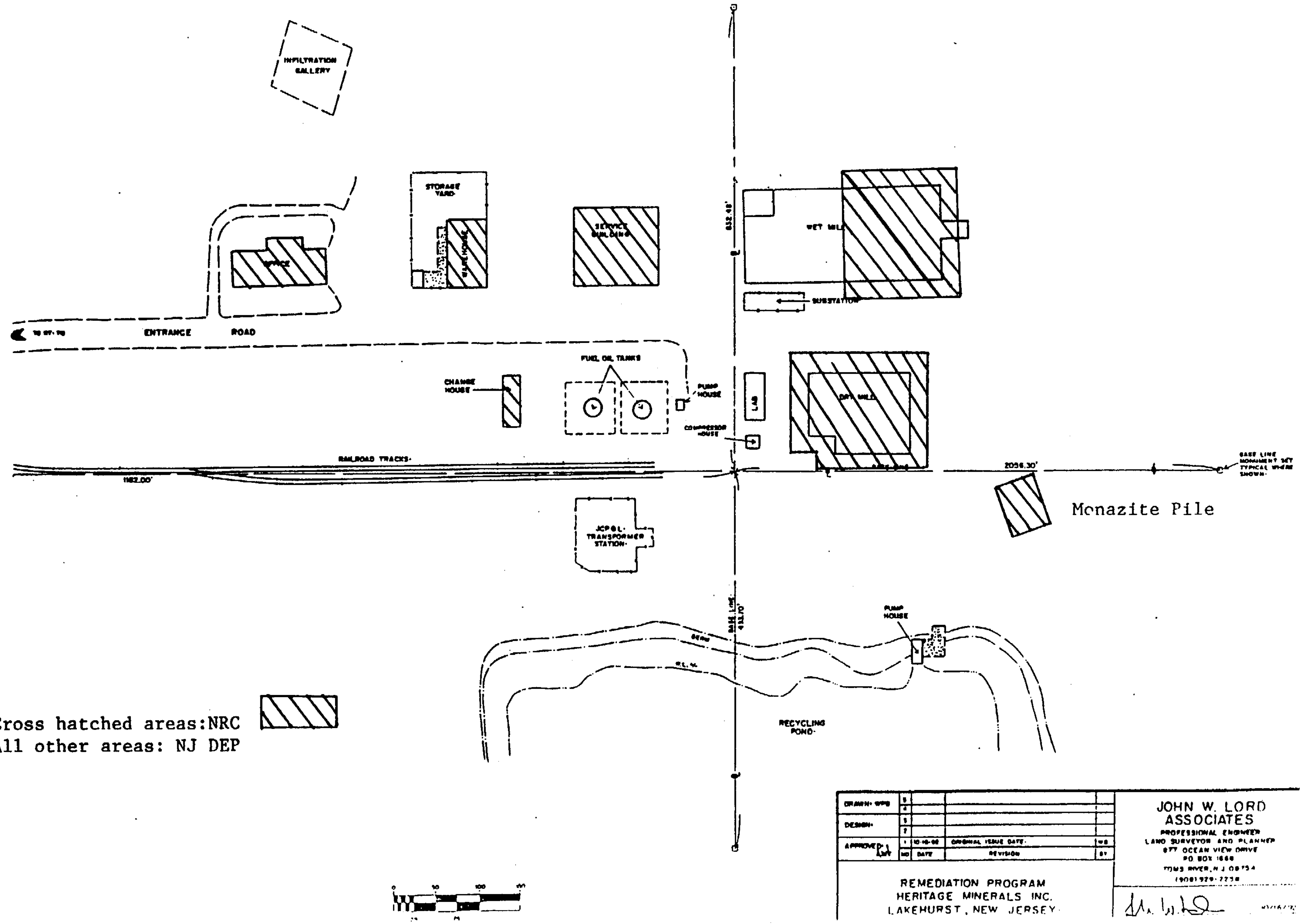
Service Building - Unaffected

The Service Building was used for repair of mechanical equipment from plant operations. No process material was used in this building. See Figure 2.

Change House - Unaffected

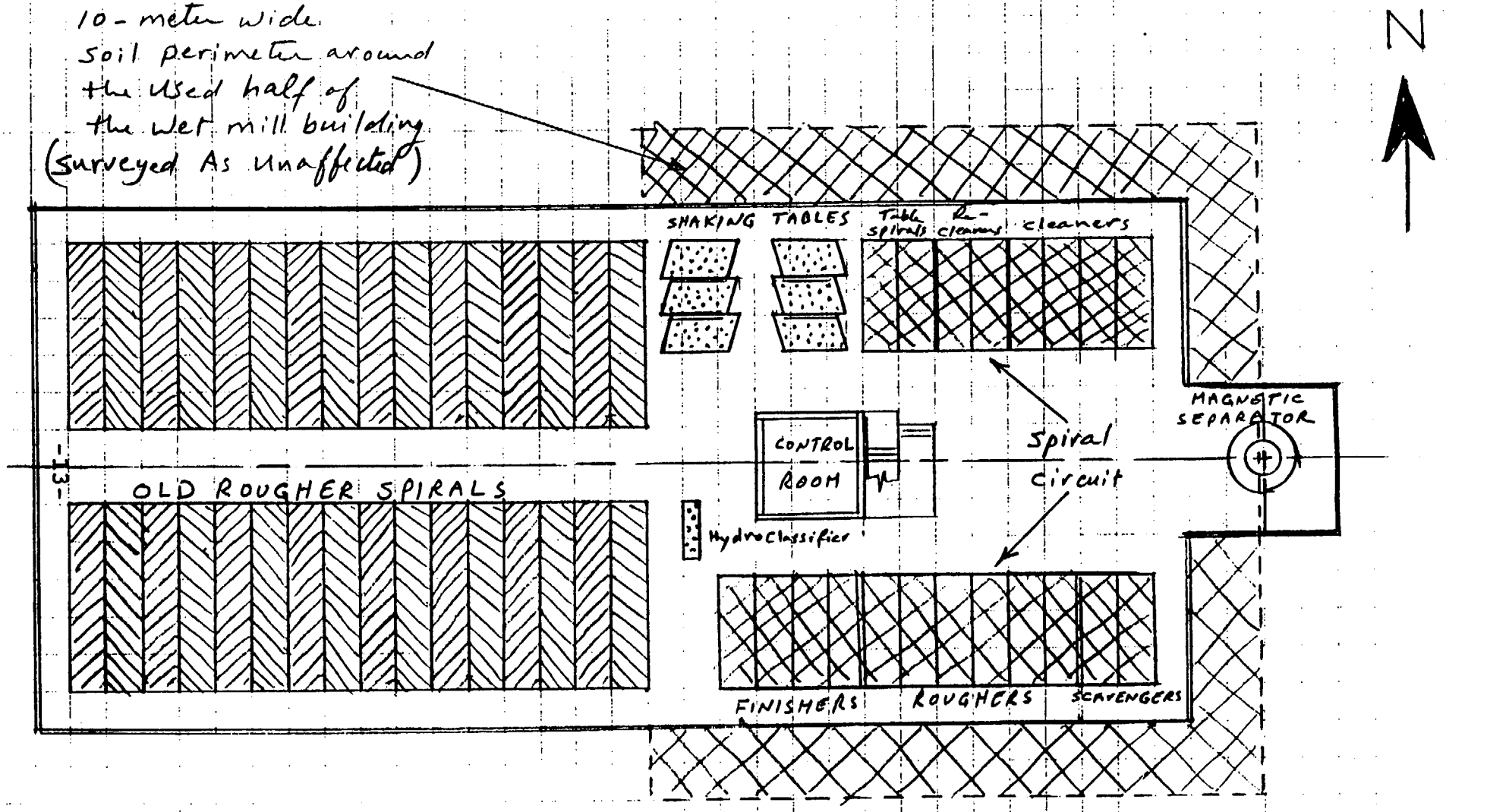
The Change House was used for site personnel only. It included showers and lockers for workers at the site. No process material was used in this building. See Figure 2.

FIGURE 2



Cross hatched areas:NRC
All other areas: NJ DEP

Figure 3



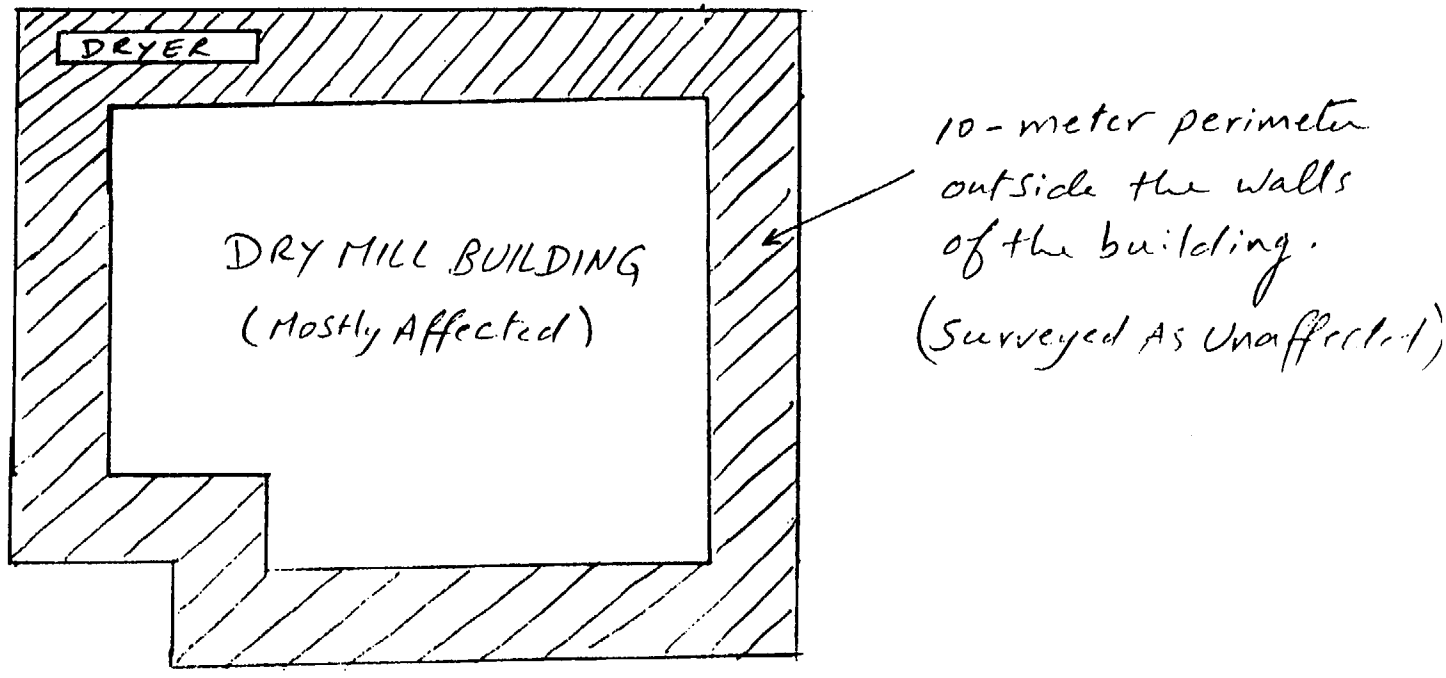
FLOOR PLAN OF THE WET MILL

SHOWING UNUSED, USED BUT UNAFFECTED

AND AFFECTED EQUIPMENT

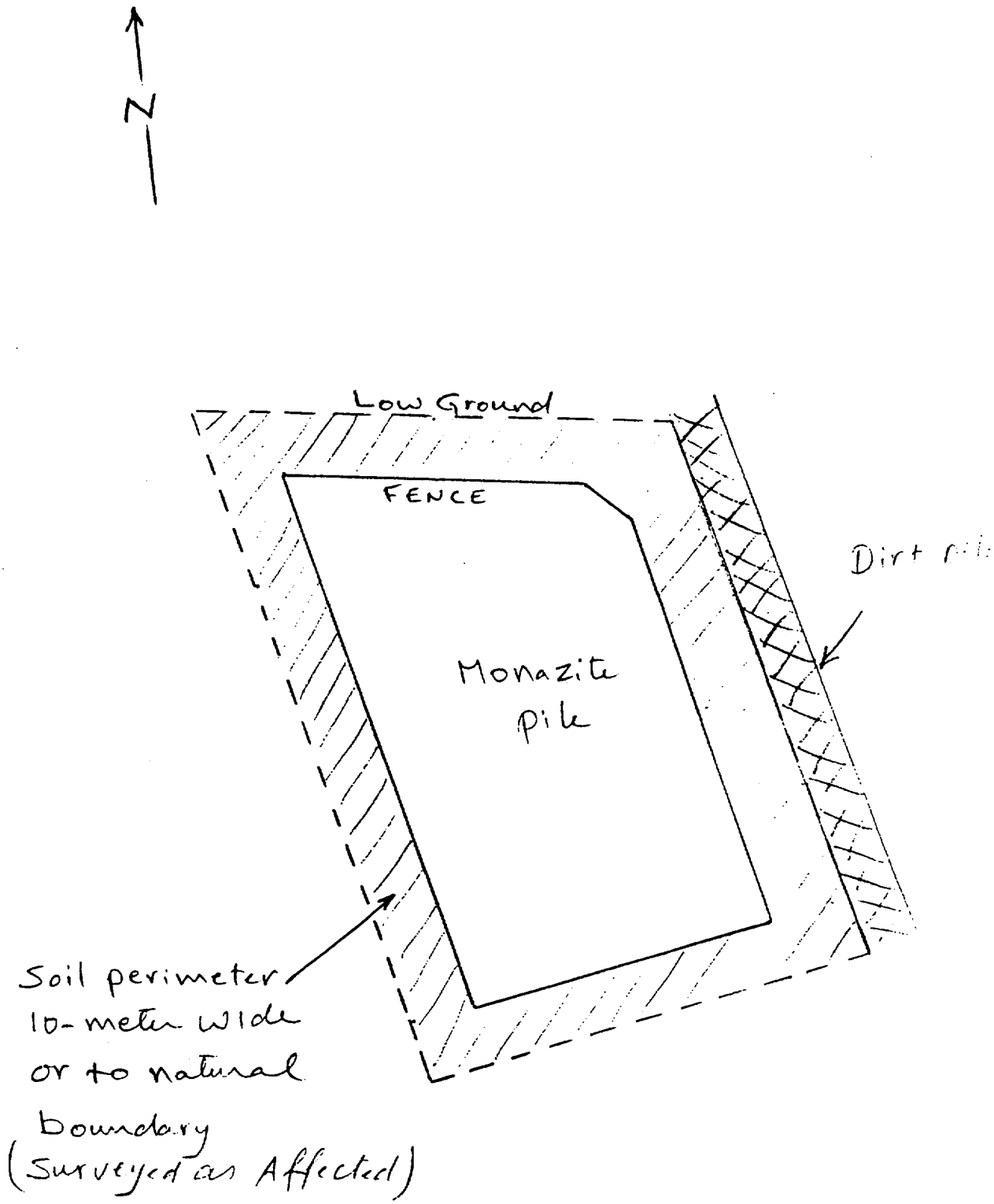
6/4/97

Figure 4



Dry Mill Building and Surrounding Soil

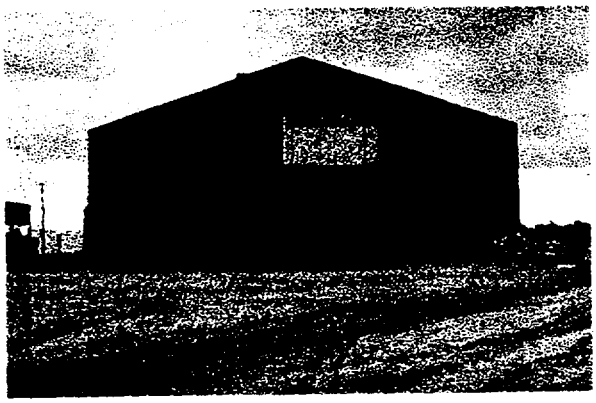
Figure 5



Affected Area At Monazite Pile

Laboratory - Unaffected

The Laboratory was used to analyze product samples from both mills. No process material was used in this building except as analytical samples. See Figure 2.

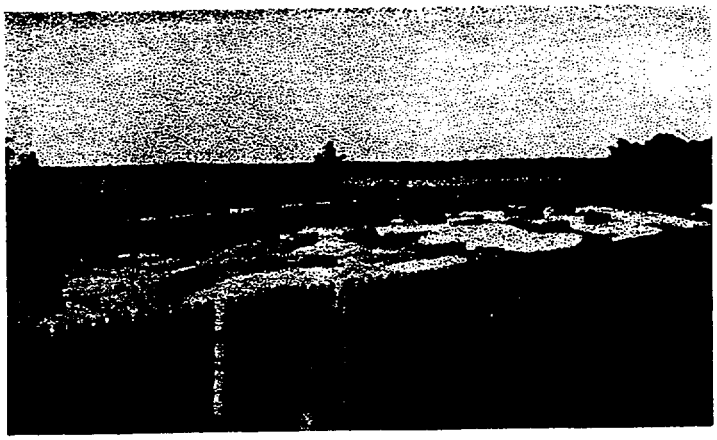


Wet Mill - see Appendix B

The Wet Mill Building contains process equipment used to extract the product materials from the raw feed. The equipment contained in the Wet Mill is divided into survey units as described in Appendix B. Some of these units are affected while the majority are unaffected. The floor and lower walls of the Wet Mill will be surveyed as an unaffected areas.

Dry Mill - see Appendix B

The Dry Mill Building contains process equipment used to extract the product materials from the process feed from the Wet Mill. The equipment contained in the Dry Mill is divided into survey units as described in appendix B. Some of these units are unaffected. The floor, ceiling and lower walls of the Dry Mill will be surveyed as affected areas.



Monazite Pile - Affected

Ten meter square grids will be established around the existing Monazite Pile, including the Monazite Pile and extending 10 meters beyond its current boundaries or to the first natural barrier where monazite would likely accumulate in higher concentrations as a result of wind or rain wash-out since the pile was not always covered. (e.g. the natural sand berms to the east and west and the low ground spot to the north of the

pile). The area encompassed by the grids will be considered as an affected outdoor area.

6.0 Survey protocol

6.1 Affected Survey Units

Indoor

Affected equipment will be surveyed by dismantling as necessary and scanning with an appropriate survey meter 100% of the surface area of a single equipment train within a multiple unit system. Thirty, fixed location, one to two minute integrated measurements will be obtained in each survey unit. A wipe sample will be obtained at the location of each fixed measurement.

Outdoor

Following the packaging of the monazite for shipment, outdoor affected survey units will be scanned over 100% of the surface area with a 2"x2" sodium iodide crystal. Soil samples will be collected at a rate of one per 100 square meter grid.

6.2 Unaffected Survey Units

Indoor

Unaffected units will be surveyed by scanning 10% of the surface area with an appropriate survey meter. As with the affected survey units, thirty fixed location measurements will be obtained in each survey unit, with corresponding wipe samples. If any measurement within a particular survey unit is greater than 25%of the value for unrestricted release provided in section 4.0, then the entire survey unit will be deemed to be affected and resurveyed according to the protocol for survey of affected units as provided in section 6.1.

Outdoor

Outdoor unaffected areas will be scanned over 10% of their surface area, in the same manner as the affected areas. Thirty soil samples will be collected from the unaffected area surrounding both mills. If any soil sample measurement within a particular survey unit is greater than 75%of the value for unrestricted release provided in section 4.0, then the entire survey unit will be deemed to be affected and resurveyed according to the more stringent protocol for survey of affected units as provided in section 6.1. While there is no reason to expect any of the unaffected areas to contain concentrations of monazite ore, the

requirement to upgrade the survey on the basis of a conservative guideline approach offers assurance that the survey unit will be adequately characterized.

7.0 Decontamination plan

7.1 Buildings and equipment

Building surfaces or equipment which may have been impacted by operations consists primarily of metal. No chemicals were used in the process, so it is likely monazite residue will be confined to the surface layer in the form of dust. Since decontamination was performed by Heritge Minerals in 1990 and it is unlikely that any recontamination has occurred, additional decontamination efforts may not be necessary. However, if decontamination becomes necessary, these surfaces would be brushed and vacuumed, using appropriate engineering controls and personnel protective equipment.

7.2 Monazite pile

The monazite pile (approximately 530 m^3) will be packaged in DOT approved containers and prepared for shipment. This will be accomplished using a small front end loader to transfer the material. A staging area will be set up immediately outside the existing fence to serve as a buffer zone between the controlled area and the clean area. Dust control measures may include a temporary enclosure for transfer of material, or a water spray system in the area surrounding operations. Any residual monazite sands on surface soils in the affected areas will be removed in a similar manner.

8.0 Data Reduction

Raw data collected during the final site survey will be validated, and reported in units identical to those of the release limits. For surface activity measurements, the average background from the reference area will be subtracted from the raw counts, and the results adjusted for the meters (4 pi) efficiency and probe area. Results will be reported in dpm/100 cm^2.

Soil samples will be analyzed by gamma spectroscopy. The U-238 activity will be inferred from the 609 kev photopeak of its daughter Bi-214. The Th-232 activity will be estimated from the 238 kev photopeak of its daughter Pb-212. All samples will be dried, sieved, and sealed for twenty eight days prior to counting to remove any concerns about secular equilibrium with the parent nuclides. Results will be reported in picocuries per gram (pCi/g) and adjusted for background. The U-238 results will be doubled to account for the U-234 activity, and reported as total uranium. The Th-238 results will be doubled to account for the Th-228 activity and reported as total thorium.

Appendix C

Process and Decommissioning History

Past Efforts:

Shortly after the final plant shutdown in August, 1990, both mills were subjected to a thorough cleaning and decommissioning as follows:

1. Wet Mill Building:

All equipment in the wet mill building which was in use in the project (whether affected or unaffected) was washed down with high-pressure water hoses and nozzles until no sand was visible on or around the equipment. The collection launders, which are the troughs underneath the spirals used to collect and convey the products were washed next using the high pressure water until all the sand was sluiced down to the sump-pumps on the ground floor. Since the shaking tables were the only "affected" equipment, i.e., they were the only processing equipment to have come in contact with source material, they were pressure washed a second time with the loose edges of the rubber lining lifted so that any sand that might have been entrapped under the lining may be washed off. The same treatment was applied to the launders attached to the table frames for product collection. The sand and water collected in the sumps and pumps were drained on the concrete floor, the sump tanks cleaned with the pressure hoses and the pump casings opened and washed with the high pressure water. The sand collected was transported to the monazite pile using shovels and wheelbarrows.

2. Dry Mill Building:

No water was used in the dryer or the dry mill building because of the electrical equipment present. Instead, high pressure air hoses were used to blow down the sand and dust from the equipment, structural steel, walls and other surfaces. Personnel involved in this activity used dust masks and film-badge monitors. The sand and dust collected on the ground floor were collected using vacuum cleaners and transported to the monazite pile.

Clean up of the mill buildings was performed by plant operators who were familiar with the equipment, the process and the buildings. The work was supervised by Tony Cuculic, then plant Chief Engineer and Radiation Safety Officer.

Following the clean up of the plant buildings, Tony Cuculic, as Radiation Safety Officer, performed a gamma survey of the plant buildings and selected pieces of equipment which were known to be "affected" due to the monazite concentration in the products which were in contact with the equipment. The gamma survey was conducted with a

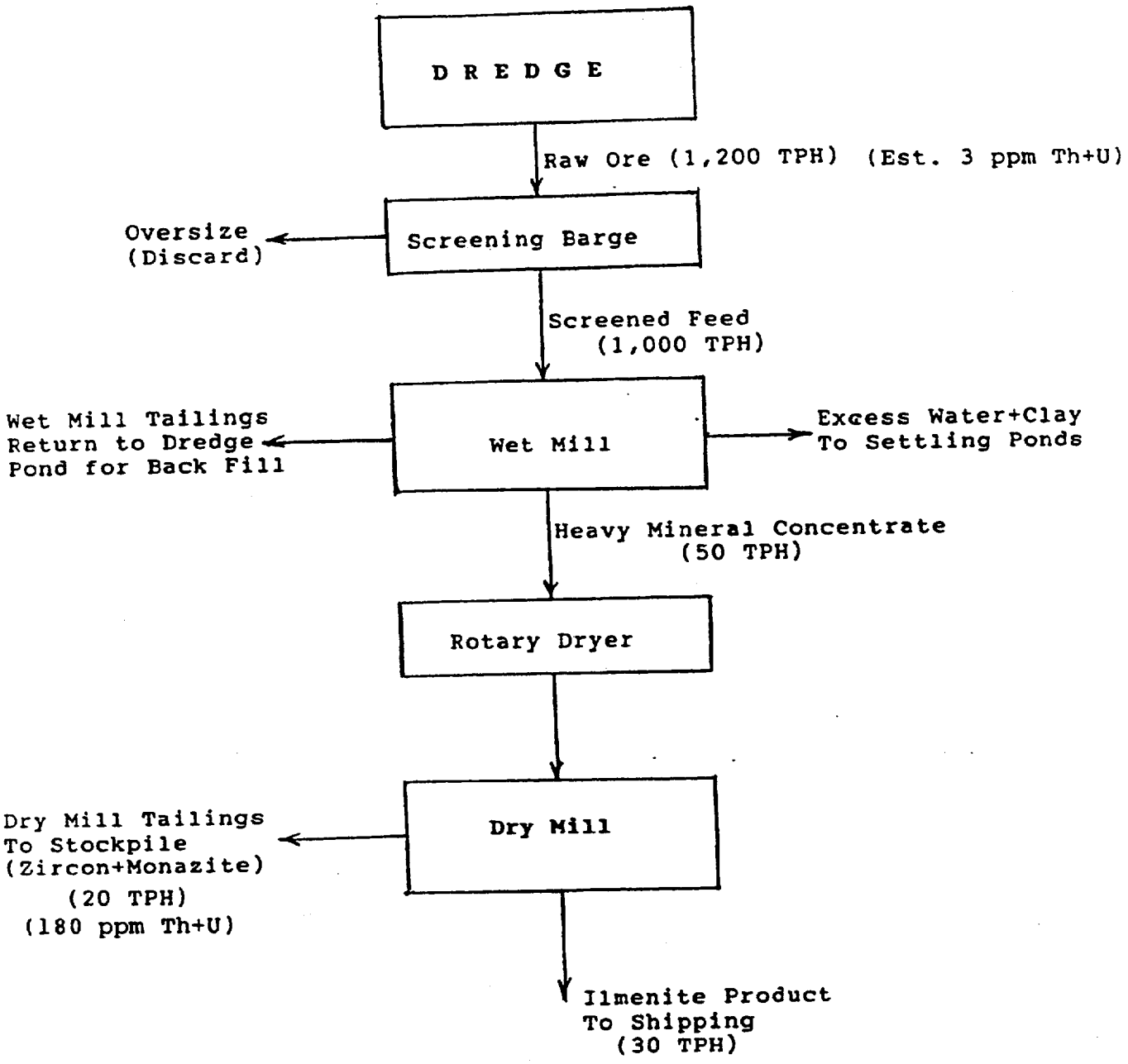


FIGURE 6

ASARCO's OPERATION SCHEMATIC

Ludlum Model 19 micro R meter. In addition, "Fixed Contamination" measurements were made on representative pieces of affected equipment (wet tables, dryer and dry magnets) using an Eberline E120 c/w HP260 "Pancake probe". The same equipment was also subjected to smear testing for "Removable Contamination". Standard filter paper discs were used in the smears and were sent to Teledyne Isotopes for counting.

The above-mentioned surveys and smear tests were performed on January 28, 1991 to verify that the decommissioning work was complete and to reveal any areas that might require additional work. This phase of the work was not intended for submission to the NRC as a Final Status Survey, which was never done because, due to the presence of the monazite pile, the site was not ready for final release.

Unaffected Buildings:

In addition to the two plant buildings there are five other buildings on the site. Namely, the laboratory, the change house, the maintenance building, the warehouse and the main office. All five building are considered "unaffected" because of the fact that monazite-rich products (source material) were never handled or present in any of these buildings. Source-material grade sand was not sampled or analyzed in the laboratory. The maintenance building was not used to repair any of the affected process equipment. Such equipment was maintained and repaired on location in the plant buildings.

Process History and Origin of the Monazite Pile:

Following is a detailed historical description of the entire process, starting from the beginning of the original mining carried out by Asarco prior to the inception of HMI.

ASARCO Operation

The site was operated by ASARCO, Inc. between 1973 and 1982. The operation consisted of hydraulic mining (dredging) of the sand deposits and processing those sands to extract the titanium mineral ilmenite. The mineral composition of the sand deposits at the site were ascertained by earlier geological and mineralogical studies conducted by ASARCO. The deposits contained approximately 95% silica (common sand) and 5% heavy minerals. There are many mineral constituents in the deposits that are heavier than silica, which is why they are called heavy minerals. Ilmenite is the predominant heavy mineral, followed by zircon, kyanite, sillimanite, rutile, staurolite, tourmaline and monazite. Monazite is the mineral that contains thorium and uranium which cause the radioactivity in the deposits.

The following is a description of ASARCO's process, which is also illustrated in Figure 6:

1) At the very beginning, since there was no pond for the dredge, one was created by removing the top soil and sufficient sand using a dragline. The material so removed was stockpiled in a location west of the railroad tracks.

2) The dredged sand was pumped to a screening barge where large roots, clay balls and gravel were removed from the sand. The dredging rate was about 1,200 tons per hour.

3) The screened sand was pumped, still in slurry form, to a land-based concentrating plant consisting of a wet mill and a dry mill. The slurry went first to the wet mill wherein the heavy minerals were concentrated using spiral separators known as Humphreys spirals. The wet mill tailings, consisting primarily of silica sand and water were pumped back to the dredge pond as back-fill of the mined-out areas. At the start of dredging, there was no place to back fill in the newly created dredge pond. Therefore, the wet mill tailings were stored west of the railroad tracks in the same location as the top soil removed by the dragline. This practice created a pile of roughly one million tons of material consisting of top soil and wet mill tailings. This pile is being referred to as Asarco wet mill tailings or old tailings. Based on its history, the radionuclide concentration of this pile is below the natural background concentration of the area. The heavy minerals followed a different path down the spiral and were dewatered and stockpiled outside the wet mill. Approximately 50 tons per hour of heavy-mineral concentrate were produced.

4) A great deal of wash water was used to assist the separation on the spirals and to wash away the fine clay which coated the mineral particles. The excess wash water and suspended clay were decanted off using large holding tanks (sumps) before pumping the sand.

5) The clay-laden water was pumped to a series of large-area settling ponds (about 10 acres) on the north side of the wet mill. The clay was allowed to settle out and the clarified water was recycled to the wet mill. This is the area which is now known as the "Blue Area". The reference came from the color-coded map which was presented to the US NRC by Heritage Minerals during licensure in 1990.

6) It should be noted that the monazite concentration was increased by the ratio of 24:1 as a result of going through the wet mill and concentrating the heavy minerals from 1,200 tons to 50 tons.

7) The heavy mineral concentrate was allowed to drain for several days then transferred to a 200-ton storage silo.

8) Using a disc feeder at the bottom of the storage silo and a conveyor belt, the heavy mineral concentrate was fed to an oil-fired rotary dryer wherein the heavy mineral sands were completely dried and heated to about 300 degrees F.

9) The heated sand was conveyed to the dry mill which contained high-tension electrostatic separators and high-intensity magnetic separators.

10) The ilmenite was separated from the other heavy minerals using the high-tension separators which take advantage of the difference in electrical conductivity among minerals. Ilmenite, which was the desired titanium mineral, is electrically conductive. All the other heavy minerals in the concentrate are non-conductors.

11) The conductor product was then fed to the high-intensity magnetic separators for final cleaning of the ilmenite which was then placed in storage bins pending shipping to customers by rail or truck. About 30 tons per hour were produced.

12) The non-conductor rejects from the high tension separators were referred to as the Dry Mill Tailings. They were mixed with water and pumped to a storage area east of the mill. This is the area now referred to as the "Gray Area".

13) The Dry Mill Tailings, at about 20 tons per hour, contained virtually all the monazite that was contained in 50 tons of heavy minerals concentrate. Therefore the concentration of monazite was increased by the ratio of 2.5:1 relative to the heavy mineral concentrate. Since this is also the monazite that was contained in 1,200 tons of dredge output, it can be concluded that the monazite and its contained thorium and uranium were concentrated by a factor of 1,200:20, or 60:1 above original deposits. A sample of the Dry Mill Tailings was analyzed by the US NRC during an inspection of the Heritage operation in January, 1988. It was found that the ASARCO Dry Mill Tailings (later referred to as the New Feed by Heritage) contained 180 ppm (parts per million) thorium plus uranium (Th+U). Approximately one million tons of Dry Mill Tailings were accumulated in the Gray Area during the ASARCO operation.Based on the above, it is estimated that the unprocessed sand deposits contained about 3 ppm Th+U (180/60=3).

14) ASARCO had planned to process the Dry Mill Tailings at a later date for the extraction and sale of zircon and monazite. Extensive laboratory and pilot-plant testing was performed by ASARCO on the recovery of zircon and monazite. However, deteriorating market conditions caused ASARCO to discontinue all operations at the site in 1982 and sold the property to Heritage Minerals, Inc. in 1986.

Heritage Minerals Operation

After the property was purchased by Heritage in 1986, the plant facilities were leased to Mineral Recovery, Inc. MRI ran additional laboratory and pilot-plant tests for the recovery of zircon and additional titanium minerals left behind by ASARCO, but not monazite which was to remain a part of the Dry Mill Tailings. The test work was conducted at Hazen Research of Golden, Colorado.

Based on the results of the test work and Hazen's recommendations the plant was modified and additional equipment was purchased. The plant started operation in October, 1986. In August, 1987 MRI's lease was terminated and Heritage Minerals took over the operation until August of 1990 when all production stopped. The operating period between October, 1986 and August 1987 (MRI's operation) was mostly a plant break-in and tune-up period during which actual production was minimal. As a result, the bulk of the zircon and titanium values in the New Feed remained in the tailings during this period.

The following is a description of the Heritage plant operation, which is also illustrated in Figure 7:

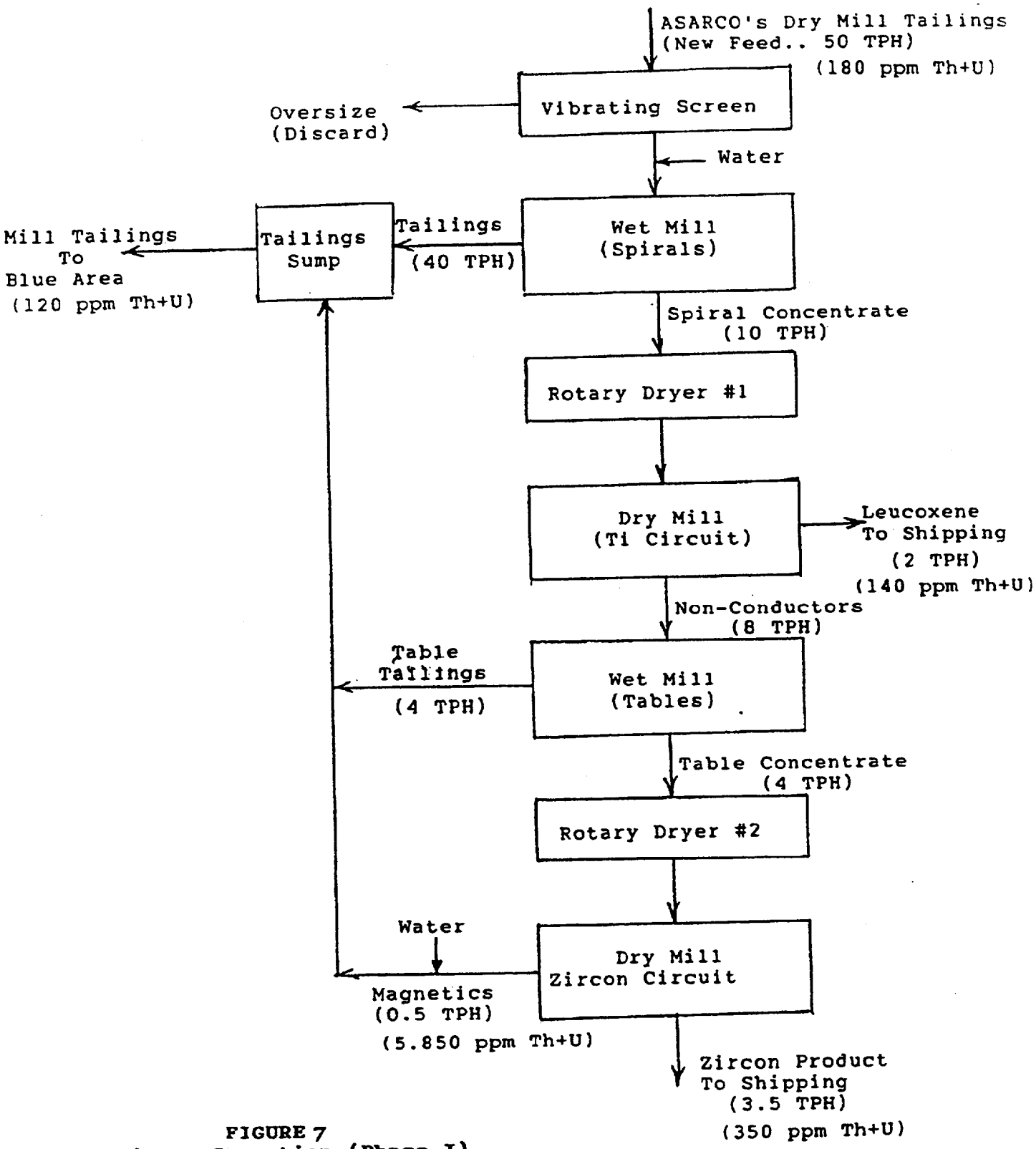


FIGURE 7
Heritage Operation (Phase I)

1) The ASARCO Dry Mill Tailings located in the Gray Area, which will now be referred to as the New Feed for the zircon plant, were mixed with water and pumped to the wet mill at the rate of 50 tons per hour.

2) The slurry was processed over Humphreys spirals to remove any remaining silica sand and some of the aluminum minerals. Although the aluminum minerals are considered heavy minerals, they are considerably lighter than zircon, monazite and titanium minerals. As such it was possible to reject some of those aluminum minerals on the Humphreys spirals. Little or no zircon or monazite were lost in the spiral tailings. Some titanium losses were incurred, however, due to the presence of low-density, weathered ilmenite. The spiral tailings were collected in a large holding tank (sump) and pumped to the area north of the wet mill which was occupied by the clay settling ponds during ASARCO's operation (the Blue Area).

3) The spiral concentrate was dewatered using a vacuum filter then dried and heated to 300 degrees F in an oil-fired rotary dryer, similar to the one used by ASARCO but much smaller.

4) The dry, heated sand was fed to the first section of the dry mill (the Ti circuit) where the titanium minerals were separated using high tension machines. The primary titanium mineral recovered was leucoxene, which is a transition mineral between ilmenite and rutile. Leucoxene is a conductor as are ilmenite and rutile, and hence could be separated using high-tension machines.

5) The conductor product from the high-tension separators was cleaned using high-intensity magnetic separators to produce market-grade leucoxene. Because there is a certain degree of imperfection in any separation process, some zircon and monazite remained with the leucoxene. As a result, the leucoxene product, when analyzed by NRC, was found to contain 140 ppm Th+U. This was well below any regulatory or safety concerns and was acceptable to the customers.

6) The non-conductor product from the high-tension separators contained the zircon, monazite and the remaining aluminum minerals. It was reslurried with water and pumped back to the wet mill.

7) In the wet mill, the non-conductors were fed to a hydraulic classifier and then shaking tables, which were used to reject the remaining aluminum minerals. The table tailings were combined with the spiral tailings in the same holding tank, and were pumped together to the Blue Area.

8) The table concentrate was dewatered on a vacuum filter then dried and heated in a second oil-fired rotary dryer.

9) The dry, heated table concentrate was conveyed to another section of the dry mill (the zircon circuit) where it was treated on high-tension machines to remove any remaining traces of titanium minerals. Those were collected as conductors and returned to the Ti circuit.

10) The non-conductor product from the high-tension machines contained the zircon and monazite plus traces of aluminum minerals. The non-conductors were then fed to

high-intensity magnets to remove magnetic minerals (monazite, staurolite and tourmaline) and thus produce market-grade zircon for sale to customers. Once again, because of the nature of the separation processes, some monazite remained in the zircon product. A sample of zircon was also taken and analyzed by NRC and found to contain 350 ppm TH+U. This was again below the regulatory threshold of 500 ppm set by NRC for "Source Material" requiring licensing. The Th+U content of the zircon was also below the specifications set by customers.

11) The magnetic product, which contained the monazite, was mixed with water and pumped back to the wet mill where it was combined with the spiral tailings and the table tailings in the holding tank to make up the plant tailings that were pumped to the blue Area. When analyzed by NRC along with the other materials, the combined plant tailings were found to contain 120 ppm Th+U, which is less than the 180 ppm that was found in ASARCO's dry mill tailings (Heritage's New Feed). The decrease in Th+U concentration is explained by the loss of monazite to both the zircon and leucoxene product. The analyses show that the Heritage operation resulted in a net improvement in the radiological condition of the site when compared with what it was at the end of ASARCO's operation and before the property was purchased by Heritage. While these numbers are one-time analyses of single samples, they represent the correlation amongst the various products, since all the samples were taken at the same time.

12) The ASARCO Dry Mill Tailings in the Gray Area (the New Feed) were exhausted at the end of February, 1990. At that time, Heritage decided that sufficient zircon and leucoxene had remained in the plant tailings in the Blue Area, especially during MRI's initial operation period, to warrant the recycle of those tailings through the plant for a second round of processing to extract additional zircon and leucoxene products. This was started in March, 1990 and became known as Phase II of the operation.

13) Some minor variations on the above-described process were tested and incorporated in the plant operations in the efforts to improve product quality and yield. For example,additional stages of spirals were added to improve silica and alumina rejection. Another variation, which was incorporated to reduce fuel consumption, was eliminating the second rotary dryer and processing the spiral concentrate directly on the shaking tables prior to processing in the dry mill. A third variation, which was dictated by NRC during the licensing process, involved isolating the monazite-rich magnetic product in a separate holding area rather than combining it with the other tailings. When that practice started, the mill tailings were no longer pumped to the Blue Area but were sent to a separate area east of the wet mill. The monazite-rich magnetics were stored separately in an area southeast of the dry mill. This is the area known as "the Monazite Pile".

14) The above-mentioned variations were incorporated at the start of reprocessing of the plant tailings (phase II) in March, 1990. In August, 1990, after about 200,000 tons of tailings were reprocessed through the plant, Heritage decided to terminate all operations due to the economic downturn which resulted in reduced demand and prices for the plant products.

15) During the final 30 days of operation, the monazite-rich sand was stored in 55-gallon steel drums instead of being pumped to the monazite pile. This was in anticipation of shipping the monazite off site to another processing facility.

The reprocessing of the 200,000 tons of Blue Area tailings during which the monazite was isolated in the Monazite Pile resulted in further improvement in the condition of the site through producing about 150,000 tons of tailings that were virtually monazite free . These tailings were stored separately in an area east of the Blue Area and north of the Gray Area. As a consequence of this practice, approximately 695 cubic yards (1,400 tons) of monazite-rich product were generated and are stored in the Monazite Pile. The Monazite Pile, as well as the plant buildings, are under the control of the NRC according to the terms of License No. SMB-1541. Figure 8 is a schematic of phase II of the plant operation.

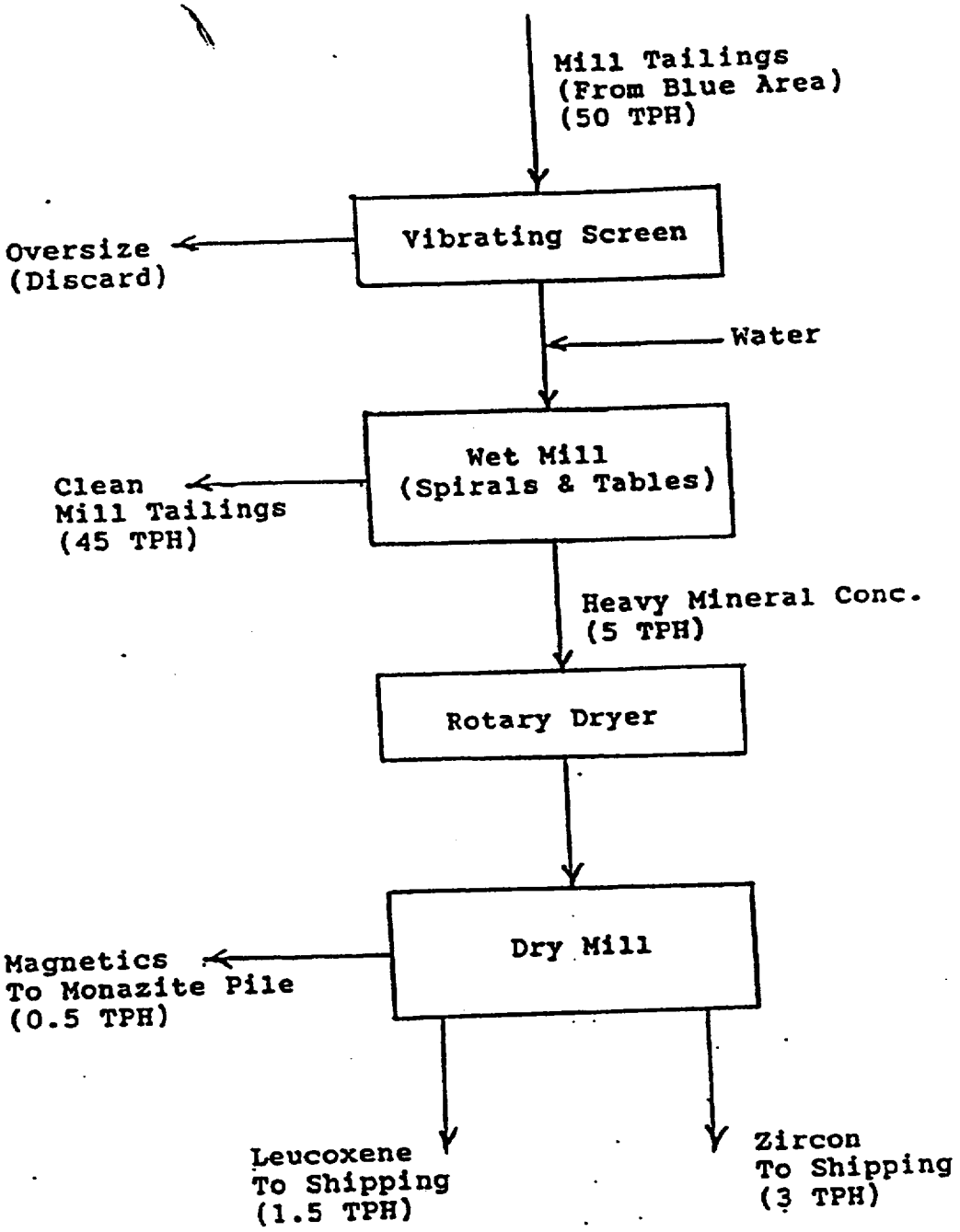


FIGURE 8

Heritage Operation (Phase II)

ShawPittman

A Law Partnership Including Professional Corporations

ANTHONY J. THOMPSON
202.663.9198
anthony.thompson@shawpittman.com

July 13, 1999

Mr. Craig Gordon
U.S. Nuclear Regulatory Commission
Region I
475 Allendale Road
King of Prussia, PA 19406

Dear Craig:

Enclosed is a revised Standby Trust Agreement and a revised draft Project Plan for Heritage Minerals Inc.'s (HMI) decommissioning and decontamination (D&D) program.

HMI continues to actively pursue D&D options but naturally is anxious to have its program "grandfathered" before August 20, 1999. Should you have any questions please do not hesitate to call as time is of the essence.

In closing, I note that HMI has done some analyses of the potential impact of the HMI/ASARCO mining and milling activities on local groundwater. Those analyses, which will be provided to NRC with the results of the Final Status Survey Plan (FSSP) for license termination, demonstrate that there have been no adverse impacts on groundwater at the HMI site. It would also note that the proposed clean up of the monazite pile and decontamination of the mill will pose no threat to local wildlife and similarly, there is no potential risk to aquatic life from such activities, particularly compared with the active mining and milling activities of the past.

With all best wishes.

Sincerely,

Tony

Anthony J. Thompson

JUL 14 1999

Heritage Minerals Inc.'s (HMI's) Plan for the Decommissioning and Decontamination (D&D) of the Site Subject to NRC License #SMB-1541

Project Management

The contractor selected to perform the decommissioning will be licensed to utilize any licensable equipment by the U.S. Nuclear Regulatory Commission (NRC) and qualified by experience to manage a project of this scope. The following list of activities as prescribed in NUREG-5849 will be used as a planning guide.

- Terminate the possession and storage of radioactive material.
- Remove radioactive material from the facility.
- Properly dispose of any radioactive material.
- Submit an NRC Form 313 "Disposition of Radioactive Materials."
- Conduct Final Site Survey.
- Submit report to the NRC.
- NRC License Termination.

Site Mobilization

- An unaffected building will be used to establish alpha background activity for concrete and metal substrates which comprise the construction of the affected buildings on site.
- Environmental dosimeters will be placed at locations around the site prior to any D&D work, particularly near the monazite pile, work areas and background locations. Similarly, prior to any D&D work, dosimeters will be evaluated and, if necessary, calibrated, and at the completion of D&D activities collected and evaluated again. An air sampling unit will be set up near and downwind of the monazite pile. A baseline air sample will be obtained prior to any D&D work. The environmental monitoring is intended to evaluate potential doses to workers and members of the public due to the D&D process.
- Prior to any D&D work on site, both of the mill buildings will be closed to the maximum extent practical to prevent intruder penetrations and/or inadvertent contamination by wind or water forces.

- A secure, fenced-in exclusion area near the existing pile will be set up for the staging of shipping containers filled with monazite ore and any equipment that cannot be released and has been removed from the site buildings. The enclosure will have a gate access that will be locked when the area is unattended, maintaining the security of licensed material per 10 CFR Part 20.

- A site specific Health and Safety Plan (HASP) will be prepared prior to commencement of any D&D work.

(1) Removal of the Monazite Pile

- Monazite ore will be placed into a hopper via a front end loader which will transfer it into a shipping container. Since the monazite pile was deposited on natural soils, the depth of the "first cut" will be determined by the color differential between the dark monazite ore and lightly colored underlying sands. The equipment used to remove the pile will be directed to keep the wheels on "clean" ground during the excavation. Monazite ore will be recovered from any metal drums and packaged as above. Empty drums will be surveyed for release using the criteria that have been established in the Final Status Survey Plan (FSSP). Once the pile has been cleared and packaged, further clean-up will be guided by scanning the area with a shielded NaI crystal to achieve no more than twice-background levels. Workers in this phase of the project will have the required DOT "hazmat" shipper training.

- Twice each day as required by environmental conditions and prior to excavation work, the pile will be sprayed with water to reduce the potential for airborne particulates. Equipment operators and workers in the immediate area will wear respiratory protection until the site supervisor has determined that the occupational limits on airborne activity in 10 CFR 20 are not exceeded. Provided these limits are not exceeded, dust masks will be used for the duration of the work.

- All personnel on site will be badged for evaluation of cumulative exposure during the project.

- At the end of each day, equipment used to transfer the monazite will be located within the exclusion area. A thorough survey of the equipment used to transfer the monazite will be made at the end of the packaging process and will be cleaned as necessary and released after the process has been completed.

(2) Survey and Sample Outdoor Affected and Unaffected Areas

- A 10m by 10m grid will be established and referenced to a permanent landmark. As described in the FSSP each grid will be surveyed and soil samples obtained as required by

the plan. Samples will be sealed with completed chain of custody forms and sent to an NRC licensed laboratory for analysis. Samples will be processed and sealed in counting containers for at least 3 weeks prior to counting to allow secular equilibrium to be achieved. No grading or back-filling will be conducted until after NRC confirmation of the sampling results.

(3) Final Status Survey

- With survey instruments under proper quality control (see FSSP), the final release survey will be initiated at the highest elevation of equipment and proceed downward to ground level. Completed survey units and individual sample locations will be clearly marked for easy replication. The wipe samples for removable radioactivity will be obtained first. Then the area will be wiped clean with a damp cloth and allowed to dry to remove any dust or film that would shield a alpha emitting isotope fixed to the surface of the equipment. The fixed component of any residual radioactivity will then be measured.

- If equipment is discovered which can not be released, an attempt will be made to clean it in place using a HEPA filtered vacuum unit. Suitable PPE and dust masks will be worn during any vacuuming operations. Any item with fixed activity will be dismantled and each piece brought to an area designated for further cleaning on the ground level. Inside a temporary enclosure with HEPA filtered ventilation, various cleaning techniques will be attempted. Equipment which cannot be cleaned to below the release limits in the FSSP after several attempts will be packaged in B-25 boxes and placed in the fenced exclusion area. All such material will be disposed of in a licensed facility.

- Once all designated equipment survey units have been surveyed and any items which can not be released removed, the building survey will be conducted. Walls up to two meters and then floors will be surveyed according to the FSSP. At the completion of the survey, the building will be closed and secured to the extent possible. The temporary lighting will be left in place for any confirmatory surveys.

(4) Final Report

- All field logs, QC charts, and raw data will be reviewed as part of the data validation process. The QA parameters as discussed in the FSSP will be evaluated. Approved data will be used in the statistical data reduction process specified in the FSSP. Survey diagrams will be reviewed and the sample location verified. The final report will provide a discussion of the methods used onsite, a summation of the data, and a statement on the suitability of the site for unrestricted release. Appendice will include raw data, personnel/environmental monitoring data, shipping manifest, QC/field logs, and any other information necessary for a thorough review.

ATTACHMENT 2

Uranium Content Estimates, Material Description, and Analytical Data
for HMI Monazite Sand

II. Solids Analysis (Th & U)

Date	Sample	Analysis, % Th	U	Total
Feb. 1989	Table Conc.	0.048	0.026	0.074
(By NRC)	New Feed	0.009	0.009	0.018
	Comb. Plant Tailings	0.006	0.006	0.012
	Monazite Waste	0.539	0.047	0.585
	Zircon Product	0.007	0.029	0.035
	Leucoxene Product	0.010	0.004	0.014
11/15/89	Recycled Tailings (Low)	0.0058	0.0017	0.0075
	Recycled Tailings (Med.)	0.0180	0.0037	0.0217
	Recycled Tailings (High)	0.0270	0.0071	0.0341
3/8/90	Soil Samples from Unused Settling Pond Shores (under water)			
	# 1 – 7	< 0.0010	< 0.0010	< 0.0020
	8	0.0016	< 0.0010	0.0016
	9	< 0.0010	< 0.0010	< 0.0020
	10	0.0012	< 0.0010	0.0012

III Solids Analyses (Radium)

Date	Sample	Analysis, pCi/g		
		Ra-226	Ra-228	Total
11/15/89	Recycled Tailings (Low)	6	--	--
↓	Recycled Tailings (Med)	13	--	--
	Recycled Tailings (High)	24	--	--
4/19/90	Scraped Tailings Area	3.5 ± 0.4	1.4 ± 0.2	4.9
↓	Bottom of Holding Pond	1.3 ± 0.5	0.81 ± 0.18	2.1
	Monazite Material	186 ± 19	1190 ± 120	1376
4/23/90	Six Background Samples	<0.2 – 0.76	0.16 – 0.57	0.16 –
↓	Asarco Wet Mill Tails	<0.3	<0.07	<0.3
	Clean Tailings (current)	4.6 ± 0.5	1.7 ± 0.2	6.3
5/11/90	Table Circuit Tailings	25 ± 0.3	8.8 ± 0.9	33
6/5/90	New Feed (Recycled Tailing)	15 ± 2	23 ± 2	38
↓	Zircon Comp.	67 ± 7	14 ± 1	81
	Rutile Comp.	13 ± 1	1.5 ± 0.2	14.5
	Leucoxene Comp.	16 ± 2	51 ± 5	67
6/27/90	Leucoxene Truck	10 ± 1	24 ± 2	34
7/5/90	Clay Slimes	2.6 ± 0.7	1.6 ± 0.2	4.2

ATTACHMENT 3

IUSA/UDEQ Protocol
for Determining Whether Alternate feed Materials
are Listed Hazardous Wastes

State of Utah

DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF SOLID AND HAZARDOUS WASTE

Michael O. Leavitt
Governor
Dianne R. Nielson, Ph.D.
Executive Director
Dennis R. Downs
Director

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December 7, 1999

M. Lindsay Ford
Parsons, Behle and Latimer
One Utah Center
201 South Main Street
Suite 1800
Post Office Box 45898
Salt Lake City, Utah 84145-0898

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

Dear Mr. Ford:

On November 22, 1999, we received the final protocol to be used by International Uranium Corporation (IUSA) in determining whether alternate feed materials proposed for processing at the White Mesa Mill are listed hazardous wastes. We appreciate the effort that went into preparing this procedure and feel that it will be a useful guide for IUSA in its alternate feed determinations.

As was discussed, please be advised that it is IUSA's responsibility to ensure that the alternate feed materials used are not listed hazardous wastes and that the use of this protocol cannot be used as a defense if listed hazardous waste is somehow processed at the White Mesa Mill.

Thank you again for your corporation. If you have any questions, please contact Don Verbica at 538-6170.

Sincerely,

Dennis R. Downs, Executive Secretary
Utah Solid and Hazardous Waste Control Board

c: Bill Sinclair, Utah Division of Radiation Control

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Parsons
Behle &
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84145-0898
Telephone 801 532-1234
Facsimile 801 536-6111

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,

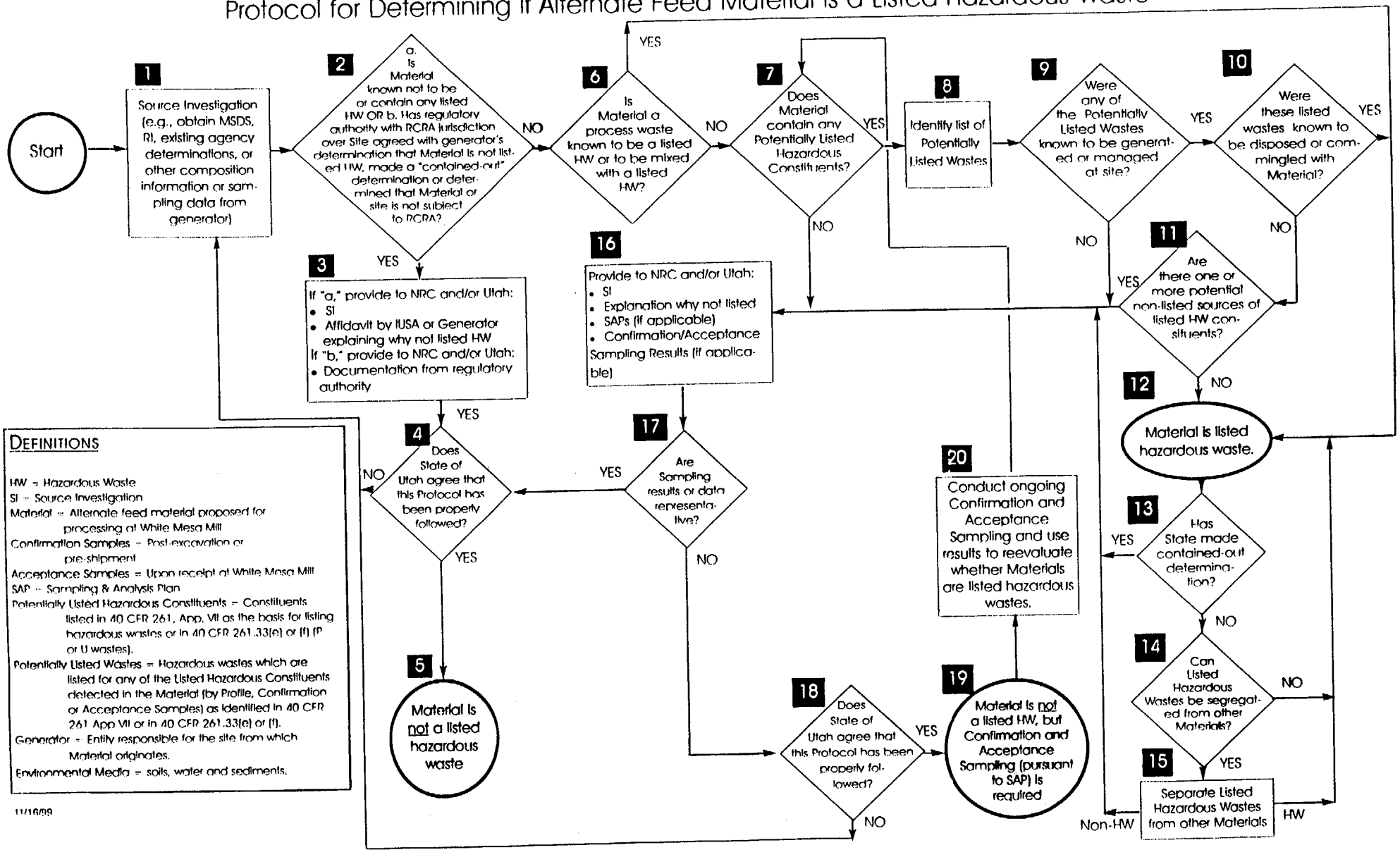
Parsons Behle & Latimer

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 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.

11/16/09

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 not 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).

ATTACHMENT 4

HMI Affidavit
Confirming No RCRA Listed Hazardous Waste in Uranium Material

AFFIDAVIT OF JOHN F. LORD

I, JOHN F. LORD, being duly sworn according to law, depose and state as follows:

1. I am presently under contract as the Manager of Heritage Minerals Inc.'s ("HMI's") Lakehurst, New Jersey facility ("the Facility"). In that capacity I am responsible for decontamination and decommissioning, and NRC license termination at the Facility. ASARCO conducted operations at the Facility from 1973 to 1982. HMI purchased the Facility in 1985. My experience with the Facility dates back to 1957 and includes knowledge of both the ASARCO and HMI operations. During my years at the Facility I have been responsible for site development, plant construction, start up, operations management, decontamination, decommissioning and license termination. I have personal knowledge of the raw materials used, the production processes employed, and the waste handling procedures followed at the Facility.

2. HMI proposes to ship to IUSA's White Mesa Mill in Blanding, Utah, the following materials: monazite sand, for processing as alternate feed material. The monazite sand is a secondary product from the extraction of ilmenite minerals at the Facility, and contains no materials or wastes from any other source.

3. The monazite sand resulted from the recovery of heavy minerals from natural sand deposits. All constituents of the monazite sand come from the heavy mineral recovery process. The heavy mineral recovery process involved only gravimetric, electrical, magnetic and heating steps. No chemical processes were used in either the extraction or concentration of the product minerals. No material from any other source has been or will be added to the monazite sand.

4. After having consulted with HMI's independent environmental consultants familiar with the hazardous waste regulations set out in U.S. Code of Federal Regulations, Title 40261, Subpart D, as amended by the U.S. Federal Register August 6, 1998, to the best of my knowledge, information and belief, the following processing steps are employed in the recovery of heavy minerals:

i.) the proposed alternate feed material does not contain any of the listed wastes enumerated in U.S. Code of Federal Regulations, Title 40 261, Subpart D as amended by the U.S. Federal Register August 6, 1998;

ii.) the proposed alternate feed material has not been mixed with wastes from any other source, which may have been defined as or which may have contained listed wastes enumerated in U.S. Code of Federal Regulations, Title 40 Section 261, Subpart D as amended by the U.S. Federal Register August 6, 1998;

iii.) the proposed alternate feed materials do not contain hazardous wastes from non-specific sources (U.S. RCRA F type wastes) because (a) HMI does not operate any processes at the Facility which produce the types of wastes listed in Section 261.31 of Title 40 of the U.S. Code of Federal Regulations, and (b) HMI has never accepted at the Facility, nor has the proposed alternate feed material ever been combined with, wastes from any other source which contain U.S. RCRA F type wastes as defined therein;

iv.) the proposed alternate feed material does not contain hazardous wastes from specific sources (U.S. RCRA K type wastes) because HMI does not operate any of the processes which produce the types of wastes listed in Section 262.31 of Title 40 of the U.S. Code of Federal Regulations, and (b) HMI has never accepted at the Facility, nor have the proposed alternate feed materials ever been combined with, wastes from any other source which contain U.S. RCRA K type wastes as defined therein;

v.) the proposed alternate feed materials are not U.S. RCRA P or U type wastes as defined in Section 261.33 of Title 40 of the U.S. Code of Federal Regulations because they (a) are not

manufactured or formulated commercially pure grade chemicals, off spec commercial chemical products or manufacturing chemical intermediates, residues from containers that held commercial chemical products or manufacturing chemical intermediates, or any residue or contaminated soil, water or other debris resulting from a spill cleanup, and (b) HMI has never accepted, nor have the proposed alternate feed materials ever been combined with, wastes from any other source with contains U.S. RCRA P or U type wastes as defined therein.

John F. Lord

Sworn to and subscribed before me
this 28th day of June, 2000

Violet Gillies
Notary Public of New Jersey

My Commission Expires:_____

VIOLET GILLIES
A Notary Public of New Jersey
My Commission Expires 1/22/02

ATTACHMENT 5

Radioactive Material Profile Record

Exhibit A

RADIOACTIVE MATERIAL PROFILE RECORD

Generator Name: **Heritage Minerals Inc.** Generator/Waste Stream #: **Not Applicable** Volume of Waste Material: **1,000 yds^3**

Contractor Name: **Radiation Science Inc.** Waste Stream Name: **monazite sands,** Delivery Date:

Check appropriate boxes: Licensed Y **X** N ___ NORM/NARM ___; LLRW ___; MW ___; MW Treated ___; MW Needing Trtmt ___; DOE ___; 11e.(2) ___; **Source Material**

Original Submission: Y **X** N _____; Revision # _____; Date of Revision: _____

Name and Title of Person Completing Form: **Scott Dennerlein, Sr. Health Physicist** Phone: **609 395-1996**

A. CUSTOMER INFORMATION:

GENERAL: Please read carefully and complete this form for one waste stream. This information will be used to determine how to properly manage the material. Should there be any questions while completing this form, contact IUC at 303.389.4131. MATERIALS CANNOT BE ACCEPTED AT IUC WHITE MESA MILL UNLESS THIS FORM IS COMPLETED. If a category does not apply, please indicate. This form must be updated annually.

1. GENERATOR INFORMATION

EPA ID# **Not Applicable** EPA Hazardous Waste Number(s) (if applicable) **Not Applicable**

Plant Address: **Heritage Minerals Inc., Route 70, Mile marker 41, Lakehurst, NJ 08733**

Phone: **732 922-6100** Fax: **732 922-9544**

Location of Material (City, ST): **Lakehurst, NJ**

Generator Contact: **John Lord** Title:

Mailing Address (if different from above): : **Heritage Minerals Inc, 4000 Route 66, Tinton Falls, NJ 07753**

Phone: **732 922-6100** Fax: **732 922-9544**

B. MATERIAL PHYSICAL PROPERTIES (Should you have any questions while completing this section, contact IUC Environmental Management at (303) 389-4131.

1. PHYSICAL DATA (Indicate percentage of material that will pass through the following grid sizes, e,g, 12" 100%, 4" 96%, 1" 74%, 1/4" 50%, 1/40" 30%, 1/200" .5%)

GRADATION OF MATERIAL:

Mesh +20 .25%, +30 .78%, +40 1.74%, +50 2.38%, +70 7.36%, +120 44.75%, +200 40.19%, +270 2.32%, PAN .22%

2. DESCRIPTION: Color ___ Brown/Multi **X** Odor___ Odorless **X**

Liquid___ Solid **X** Sludge___ Powder/Dust___

3. DENSITY RANGE: (Indicate dimensions) **3,000** S.G. lb./ft^3 (lb./yd^3)

4. GENERAL CHARACTERISTICS (% OF EACH)

Soil___ Building Debris___ Rubble___ Pipe Scale___ Tailings___ Process Waste___ Concrete___ Plastic/Resin___

Other constituents and approximate % contribution of each: **100% natural sands**

5. MOISTURE CONTENT: (For soil or soil-like materials).

(Use Std Proctor Method ASTM D-698)

Optimum Moisture Content: _____ %

Average Moisture Content: _____ %

Moisture Content Range: _____ %

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

Generator or Contractor Initials: SWD

C. RADIOLOGICAL EVALUATION

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

	Isotopes	Concentration Range (pCi/g)	Weighted Average (pCi/g)		Isotopes	Concentration Range (pCi/g)	Weighted Average (pCi/g)
a.	**Th-232**	_____to_____	**1,190**	b.	**Ra-226**	_____to_____	**186**
c.	**U-238**	_____to_____	**208**	d.	**Ra-228**	_____to_____	**1,190**
e.	_____	_____to_____	_____	f.	_____	_____to_____	_____

ND – Analyte not detected.

2. Y (N) Is the radioactivity contained in the waste material Low-Level Radioactive Waste as defined in the Low-Level Radioactive Waste Policy Amendments Act of 1985 or in DOE Order 5820.2A. Chapter III? (Please Circle) If yes, check "LLRW" block on line 3 of page 1.
3. (Y) N LICENSED MATERIAL: Is the waste material listed or included on an active Nuclear Regulatory Commission or Agreement State license? (Please Circle)
   (If Yes) TYPE OF LICENSE: Source X; Special Nuclear Material ____; By-Product ____; Norm ____; NARM ____;
   LICENSING AGENCY: **US NRC #SMB1541**

D. CHEMICAL AND HAZARDOUS CHARACTERISTICS

1. DESCRIPTION AND HISTORY OF MATERIAL _____

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

Please describe the history, and include the following:

Y (N) Was this material mixed, treated, neutralized, solidified, commingled, dried, or otherwise processed at any time after generation?
Y (N) Has this material been transported or otherwise removed from the location or site where it was originally generated?
Y (N) Was this material derived from (or is the material a residue of) the treatment, storage, and/or disposal of hazardous waste defined by 40 CFR 261?
Y (N) Has this material been treated at any time to meet any applicable treatment standards?

2. LIST ALL KNOWN AND POSSIBLE CHEMICAL COMPONENTS OR HAZARDOUS WASTE CHARACTERISTICS

		(Y)	(N)			(Y)	(N)			(Y)	(N)
a.	Listed HW	____	X	b.	"Derived-From" HW	____	X	c.	Toxic	____	X
d.	Cyanides	____	X	e.	Sulfides	____	X	f.	Dioxins	____	X
g.	Pesticides	____	X	h.	Herbicides	____	X	i.	PCBs	____	X
j.	Explosives	____	X	k.	Pyrophorics	____	X	l.	Solvents	____	X
m.	Organics	____	X	n.	Phenolics	____	X	o.	Infectious	____	X
p.	Ignitable	____	X	q.	Corrosive	____	X	r.	Reactive	____	X
s.	Antimony	____	X	t.	Beryllium	____	X	u.	Copper	____	X
v.	Nickel	____	X	w.	Thallium	____	X	x.	Vanadium	____	X
y.	Alcohols	____	X	z.	Arsenic	____	X	aa.	Barium	____	X
bb.	Cadmium	____	X	cc.	Chromium	____	X	dd.	Lead	____	X
ee.	Mercury	____	X	ff.	Selenium	____	X	gg.	Silver	____	X
hh.	Benzene	____	X	ii.	Nitrate	____	X	jj.	Nitrite	____	X
kk.	Fluoride	____	X	ll.	Oil	____	X	mm.	Fuel	____	X
nn.	Chelating Agents	____	X	oo.	Residue from water treatment	**NO**					
pp.	Other Known or Possible Materials or Chemicals	**None**									

Generator or Contractor Initials: SW

3. ANALYTICAL RESULTS FOR TOXICITY CHARACTERISTICS. (Please transcribe results, if available, on the blank spaces provided. Attach additional sheets if needed, indicate range or worst-case results).

NOT APPLICABLE/TEST NOT PERFORMED

Metals (circle one):	Total (mg/kg) or TCLP (mg/l)	Organics (circle one):	Total (mg/kg) or TCLP (mg/l)
Lead	_____	_____	_____
Barium	_____	_____	_____
Mercury	_____	_____	_____
Cadmium	_____	_____	_____
Zinc	_____	_____	_____
Chromium	_____	_____	_____
Copper	_____	_____	_____

ND – Analyte not detected

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

NOT APPLICABLE/TEST NOT PERFORMED

Soil pH _____

Paint Filter Test (Pass/Fail)	Liquids _____	No Free Liquid _____
Cyanide _____ Not detected_____	Released	mg/kg
Sulfide _____ Not detected_____	Released	mg/kg

5. IGNITABILITY (40 CFR 261.21[a][2].[4].) **NOT APPLICABLE/TEST NOT PERFORMED**

Flash Point _____ ^{0}F ^{0}C Is the waste a RCRA oxidizer? Y (N)

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

Chemical Component	Concentration	Chemical Component	Concentration	Chemical Component	Concentration
La_2O_3	**19.3 %**	**CoO_2**	**44.56 %**	**Pr_5O_{11}**	**4.93 %**
Nd_2O_3	**17.63 %**	**Sn_2O_3**	**2.76 %**	**Y_2O_3**	**6.22 %**
Gd_2O_3	**1.85 %**	**Dy_2O_3**	**1.05 %**	**Others**	**1.70 %**

E. REQUIRED CHEMICAL LABORATORY ANALYSIS. Generator must submit results of analyses of samples of the material. Results are required from a qualified laboratory for the following analytical parameters unless nonapplicability of the analysis for the material can be stated and justified in attached statements. Attach all analytical results and QA/QC

documentation available. (CAUTION: PRIOR TO ARRANGING FOR LABORATORY ANALYSIS, CHECK WITH IUC AND LABORATORY REGARDING UTAH LABORATORY CERTIFICATIONS.)

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

1. MINIMUM ADDITIONAL ANALYTICAL REQUIRED FOR: **NOT APPLICABLE**

   a. Non-RCRA Waste (Non Mixed Waste e.g., LLRW, NORM): TCLP including the 32 organics, 8 metals, and copper (Cu) and zinc (Zn).

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

Generator or Contractor Initials: SM

3. PRE-SHIPMENT SAMPLES OF MATERIAL TO IUC

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

   International Uranium (USA) Corporation, Attn: Sample Control, 6425 S. Highway 191, P.O. Box 809, Blanding, UT 84511
   Phone: (435) 678-2221

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

   a. All radiologic data used to support the data in item C.1. must be from a certified laboratory.

#E-2801 (UTAH CERTIFIED.) The laboratory holds a current certification for the applicable chemical or radiological parameters from the Utah Department of Health insofar as such official certifications are given.

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

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

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

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

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

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

F. CERTIFICATION

GENERATOR'S CERTIFICATION: I also certify that where necessary those representative samples were or shall be provided to IUC and to qualified laboratories for the analytical results reported herein. I also certify that the information provided on this form is complete, true and correct and is accurately supported and documented by any laboratory testing as required by IUC. I certify that the results of any said testing have been submitted to IUC. I certify that the material described in this profile has been fully characterized and that hazardous constituents listed in 10 CFR 40 Appendix A Criterion 13 which are applicable to this material have been indicated on this form. I further certify and warrant to IUC that the material represented on this form is not a hazardous waste as defined by 40 CFR 261 and/or that this material is exempt from RCRA regulation under 40 CFR 261.4(a)(4).

The Generator's responsibilities with respect to the material described in this form are for policy, programmatic, funding and scheduling decisions, as well as general oversight. The Contractor's responsibilities with respect to this material are for the day-to-day operations (in accordance with general directions given by the Generator as part of its general oversight responsibility), including but not limited to the following responsibilities: waste characterization, analysis and handling; sampling; monitoring; record keeping; reporting and contingency planning. Accordingly, the Contractor has the requisite knowledge and authority to sign this certification on behalf of itself, and as agent for the Generator, on behalf of the Generator. By signing this certification, the Contractor is signing on its own behalf and on behalf of the Generator.

Generator's or Contractor's Signature _____ Title Sr.HealthPhysicist

Date_____

(Sign for the above certifications).

D1. Description and History of Material

Process History and Origin of the Monazite Pile:

Following is a detailed historical description of the entire process, starting from the beginning of the original mining carried out by Asarco prior to the inception of HMI.

ASARCO Operation

The site was operated by ASARCO, Inc. between 1973 and 1982. The operation consisted of hydraulic mining (dredging) of the sand deposits and processing those sands to extract the titanium mineral ilmenite. The mineral composition of the sand deposits at the site were ascertained by earlier geological and mineralogical studies conducted by ASARCO. The deposits contained approximately 95% silica (common sand) and 5% heavy minerals. There are many mineral constituents in the deposits that are heavier than silica, which is why they are called heavy minerals. Ilmenite is the predominant heavy mineral, followed by zircon, kyanite, sillimanite, rutile, staurolite, tourmaline and monazite. Monazite is the mineral that contains thorium and uranium which cause the radioactivity in the deposits.

The following is a description of ASARCO's process, which is also illustrated in Figure 1:

1) At the very beginning, since there was no pond for the dredge, one was created by removing the top soil and sufficient sand using a dragline. The material so removed was stockpiled in a location west of the railroad tracks.
2) The dredged sand was pumped to a screening barge where large roots, clay balls and gravel were removed from the sand. The dredging rate was about 1,200 tons per hour.
3) The screened sand was pumped, still in slurry form, to a land-based concentrating plant consisting of a wet mill and a dry mill. The slurry went first to the wet mill wherein the heavy minerals were concentrated using spiral separators known as Humphreys spirals. The wet mill tailings, consisting primarily of silica sand and water were pumped back to the dredge pond as back-fill of the mined-out areas. At the start of dredging, there was no place to back fill in the newly created dredge pond. Therefore, the wet mill tailings were stored west of the railroad tracks in the same location as the top soil removed by the dragline. This practice created a pile of roughly one million tons of material consisting of top soil and wet mill tailings. This pile is being referred to as Asarco wet mill tailings or old tailings. Based on its history, the radionuclide concentration of this pile is below the natural background concentration of the area. The heavy minerals followed a different path down the spiral and were dewatered and stockpiled outside the wet mill. Approximately 50 tons per hour of heavy-mineral concentrate were produced.
4) A great deal of wash water was used to assist the separation on the spirals and to wash away the fine clay which coated the mineral particles. The excess wash water and suspended clay were decanted off using large holding tanks (sumps) before pumping the sand.
5) The clay-laden water was pumped to a series of large-area settling ponds (about 10 acres) on the north side of the wet mill. The clay was allowed to settle out and the clarified water was

recycled to the wet mill. This is the area which is now known as the "Blue Area". The reference came from the color-coded map which was presented to the US NRC by Heritage Minerals during licensure in 1990.

6) It should be noted that the monazite concentration was increased by the ratio of 24:1 as a result of going through the wet mill and concentrating the heavy minerals from 1,200 tons to 50 tons.

7) The heavy mineral concentrate was allowed to drain for several days then transferred to a 200-ton storage silo.

8) Using a disc feeder at the bottom of the storage silo and a conveyor belt, the heavy mineral concentrate was fed to an oil-fired rotary dryer wherein the heavy mineral sands were completely dried and heated to about 300 degrees F.

9) The heated sand was conveyed to the dry mill which contained high-tension electrostatic separators and high-intensity magnetic separators.

10) The ilmenite was separated from the other heavy minerals using the high-tension separators which take advantage of the difference in electrical conductivity among minerals. Ilmenite, which was the desired titanium mineral, is electrically conductive. All the other heavy minerals in the concentrate are non-conductors.

11) The conductor product was then fed to the high-intensity magnetic separators for final cleaning of the ilmenite which was then placed in storage bins pending shipping to customers by rail or truck. About 30 tons per hour were produced.

12) The non-conductor rejects from the high tension separators were referred to as the Dry Mill Tailings. They were mixed with water and pumped to a storage area east of the mill. This is the area now referred to as the "Gray Area".

13) The Dry Mill Tailings, at about 20 tons per hour, contained virtually all the monazite that was contained in 50 tons of heavy minerals concentrate. Therefore the concentration of monazite was increased by the ratio of 2.5:1 relative to the heavy mineral concentrate. Since this is also the monazite that was contained in 1,200 tons of dredge output, it can be concluded that the monazite and its contained thorium and uranium were concentrated by a factor of 1,200:20, or 60:1 above original deposits. A sample of the Dry Mill Tailings was analyzed by the US NRC during an inspection of the Heritage operation in January, 1988. It was found that the ASARCO Dry Mill Tailings (later referred to as the New Feed by Heritage) contained 180 ppm (parts per million) thorium plus uranium (Th+U). Approximately one million tons of Dry Mill Tailings were accumulated in the Gray Area during the ASARCO operation.Based on the above, it is estimated that the unprocessed sand deposits contained about 3 ppm Th+U (180/60=3).

14) ASARCO had planned to process the Dry Mill Tailings at a later date for the extraction and sale of zircon and monazite. Extensive laboratory and pilot-plant testing was performed by ASARCO on the recovery of zircon and monazite. However, deteriorating market conditions caused ASARCO to discontinue all operations at the site in 1982 and sold the property to Heritage Minerals, Inc. in 1986.

Heritage Minerals Operation

After the property was purchased by Heritage in 1986, the plant facilities were leased to Mineral Recovery, Inc. MRI ran additional laboratory and pilot-plant tests for the recovery of zircon and additional titanium minerals left behind by ASARCO, but not monazite which was to remain a part of the Dry Mill Tailings. The test work was conducted at Hazen Research of Golden, Colorado.

Based on the results of the test work and Hazen's recommendations the plant was modified and additional equipment was purchased. The plant started operation in October, 1986. In August, 1987 MRI's lease was terminated and Heritage Minerals took over the operation until August of 1990 when all production stopped. The operating period between October, 1986 and August 1987 (MRI's operation) was mostly a plant break-in and tune-up period during which actual production was minimal. As a result, the bulk of the zircon and titanium values in the New Feed remained in the tailings during this period.

The following is a description of the Heritage plant operation, which is also illustrated in Figure 2:

1) The ASARCO Dry Mill Tailings located in the Gray Area, which will now be referred to as the New Feed for the zircon plant, were mixed with water and pumped to the wet mill at the rate of 50 tons per hour.
2) The slurry was processed over Humphreys spirals to remove any remaining silica sand and some of the aluminum minerals. Although the aluminum minerals are considered heavy minerals, they are considerably lighter than zircon, monazite and titanium minerals. As such it was possible to reject some of those aluminum minerals on the Humphreys spirals. Little or no zircon or monazite were lost in the spiral tailings. Some titanium losses were incurred, however, due to the presence of low-density, weathered ilmenite. The spiral tailings were collected in a large holding tank (sump) and pumped to the area north of the wet mill which was occupied by the clay settling ponds during ASARCO's operation (the Blue Area).
3) The spiral concentrate was dewatered using a vacuum filter then dried and heated to 300 degrees F in an oil-fired rotary dryer, similar to the one used by ASARCO but much smaller.
4) The dry, heated sand was fed to the first section of the dry mill (the Ti circuit) where the titanium minerals were separated using high tension machines. The primary titanium mineral recovered was leucoxene, which is a transition mineral between ilmenite and rutile. Leucoxene is a conductor as are ilmenite and rutile, and hence could be separated using high-tension machines.
5) The conductor product from the high-tension separators was cleaned using high-intensity magnetic separators to produce market-grade leucoxene. Because there is a certain degree of imperfection in any separation process, some zircon and monazite remained with the leucoxene. As a result, the leucoxene product, when analyzed by NRC, was found to contain 140 ppm Th+U. This was well below any regulatory or safety concerns and was acceptable to the customers.

6) The non-conductor product from the high-tension separators contained the zircon, monazite and the remaining aluminum minerals. It was reslurried with water and pumped back to the wet mill.

7) In the wet mill, the non-conductors were fed to a hydraulic classifier and then shaking tables, which were used to reject the remaining aluminum minerals. The table tailings were combined with the spiral tailings in the same holding tank, and were pumped together to the Blue Area.

8) The table concentrate was dewatered on a vacuum filter then dried and heated in a second oil-fired rotary dryer.

9) The dry, heated table concentrate was conveyed to another section of the dry mill (the zircon circuit) where it was treated on high-tension machines to remove any remaining traces of titanium minerals. Those were collected as conductors and returned to the Ti circuit.

10) The non-conductor product from the high-tension machines contained the zircon and monazite plus traces of aluminum minerals. The non-conductors were then fed to high-intensity magnets to remove magnetic minerals (monazite, staurolite and tourmaline) and thus produce market-grade zircon for sale to customers. Once again, because of the nature of the separation processes, some monazite remained in the zircon product. A sample of zircon was also taken and analyzed by NRC and found to contain 350 ppm TH+U. This was again below the regulatory threshold of 500 ppm set by NRC for "Source Material" requiring licensing. The Th+U content of the zircon was also below the specifications set by customers.

11) The magnetic product, which contained the monazite, was mixed with water and pumped back to the wet mill where it was combined with the spiral tailings and the table tailings in the holding tank to make up the plant tailings that were pumped to the blue Area. When analyzed by NRC along with the other materials, the combined plant tailings were found to contain 120 ppm Th+U, which is less than the 180 ppm that was found in ASARCO's dry mill tailings (Heritage's New Feed). The decrease in Th+U concentration is explained by the loss of monazite to both the zircon and leucoxene product. The analyses show that the Heritage operation resulted in a net improvement in the radiological condition of the site when compared with what it was at the end of ASARCO's operation and before the property was purchased by Heritage. While these numbers are one-time analyses of single samples, they represent the correlation amongst the various products, since all the samples were taken at the same time.

12) The ASARCO Dry Mill Tailings in the Gray Area (the New Feed) were exhausted at the end of February, 1990. At that time, Heritage decided that sufficient zircon and leucoxene had remained in the plant tailings in the Blue Area, especially during MRI's initial operation period, to warrant the recycle of those tailings through the plant for a second round of processing to extract additional zircon and leucoxene products. This was started in March, 1990 and became known as Phase II of the operation.

13) Some minor variations on the above-described process were tested and incorporated in the plant operations in the efforts to improve product quality and yield. For example,additional stages of spirals were added to improve silica and alumina rejection. Another variation, which was incorporated to reduce fuel consumption, was eliminating the second rotary dryer

and processing the spiral concentrate directly on the shaking tables prior to processing in the dry mill. A third variation, which was dictated by NRC during the licensing process, involved isolating the monazite-rich magnetic product in a separate holding area rather than combining it with the other tailings. When that practice started, the mill tailings were no longer pumped to the Blue Area but were sent to a separate area east of the wet mill. The monazite-rich magnetics were stored separately in an area southeast of the dry mill. This is the area known as "the Monazite Pile".

14) The above-mentioned variations were incorporated at the start of reprocessing of the plant tailings (phase II) in March, 1990. In August, 1990, after about 200,000 tons of tailings were reprocessed through the plant, Heritage decided to terminate all operations due to the economic downturn which resulted in reduced demand and prices for the plant products.

15) During the final 30 days of operation, the monazite-rich sand was stored in 55-gallon steel drums instead of being pumped to the monazite pile. This was in anticipation of shipping the monazite off site to another processing facility.

The reprocessing of the 200,000 tons of Blue Area tailings during which the monazite was isolated in the Monazite Pile resulted in further improvement in the condition of the site through producing about 150,000 tons of tailings that were virtually monazite free . These tailings were stored separately in an area east of the Blue Area and north of the Gray Area. As a consequence of this practice, approximately 695 cubic yards (1,400 tons) of monazite-rich product were generated and are stored in the Monazite Pile. The Monazite Pile, as well as the plant buildings, are under the control of the NRC according to the terms of License No. SMB-1541. Figure 3 is a schematic of phase II of the plant operation.

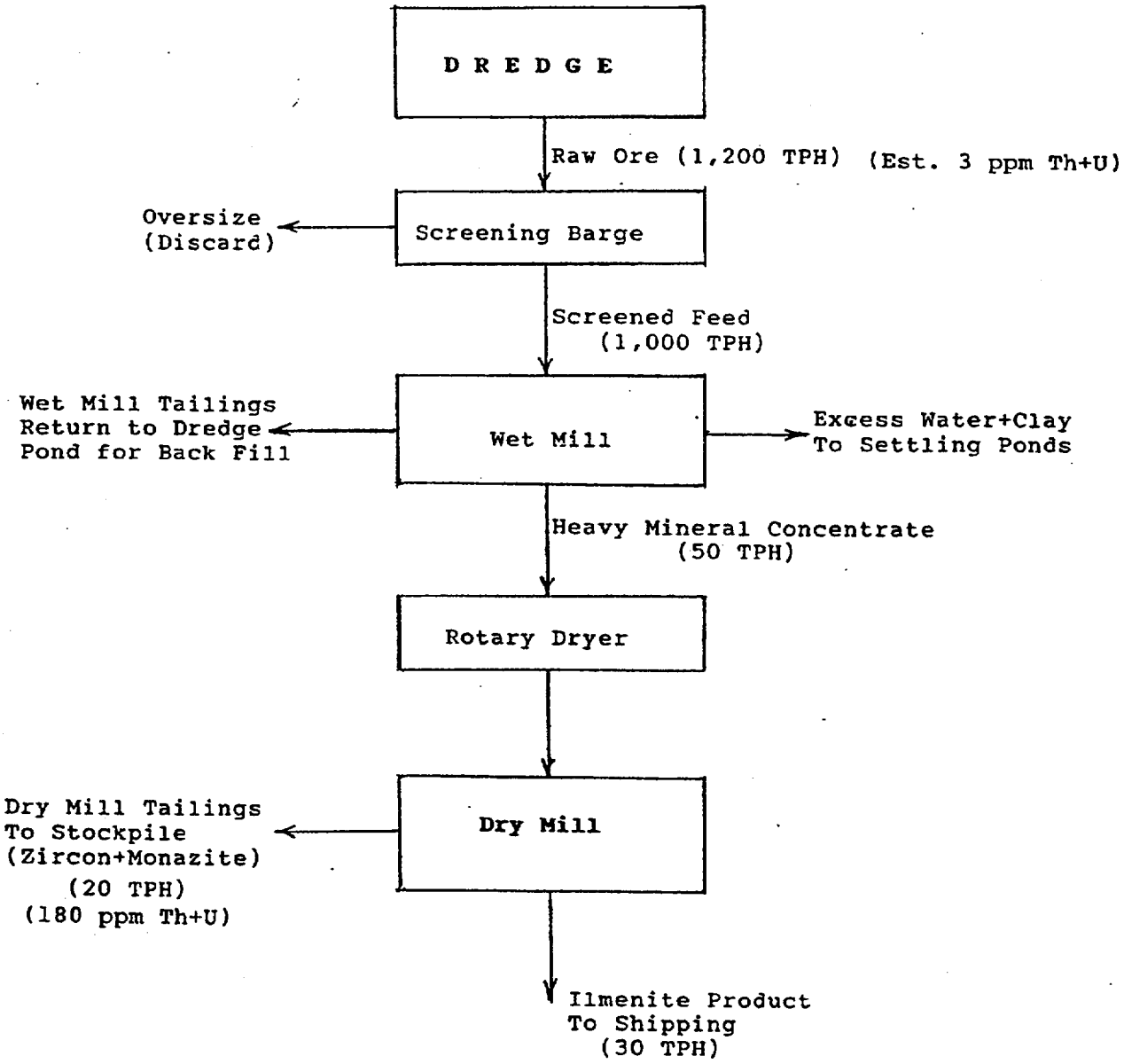

FIGURE 1

ASARCO's OPERATION SCHEMATIC

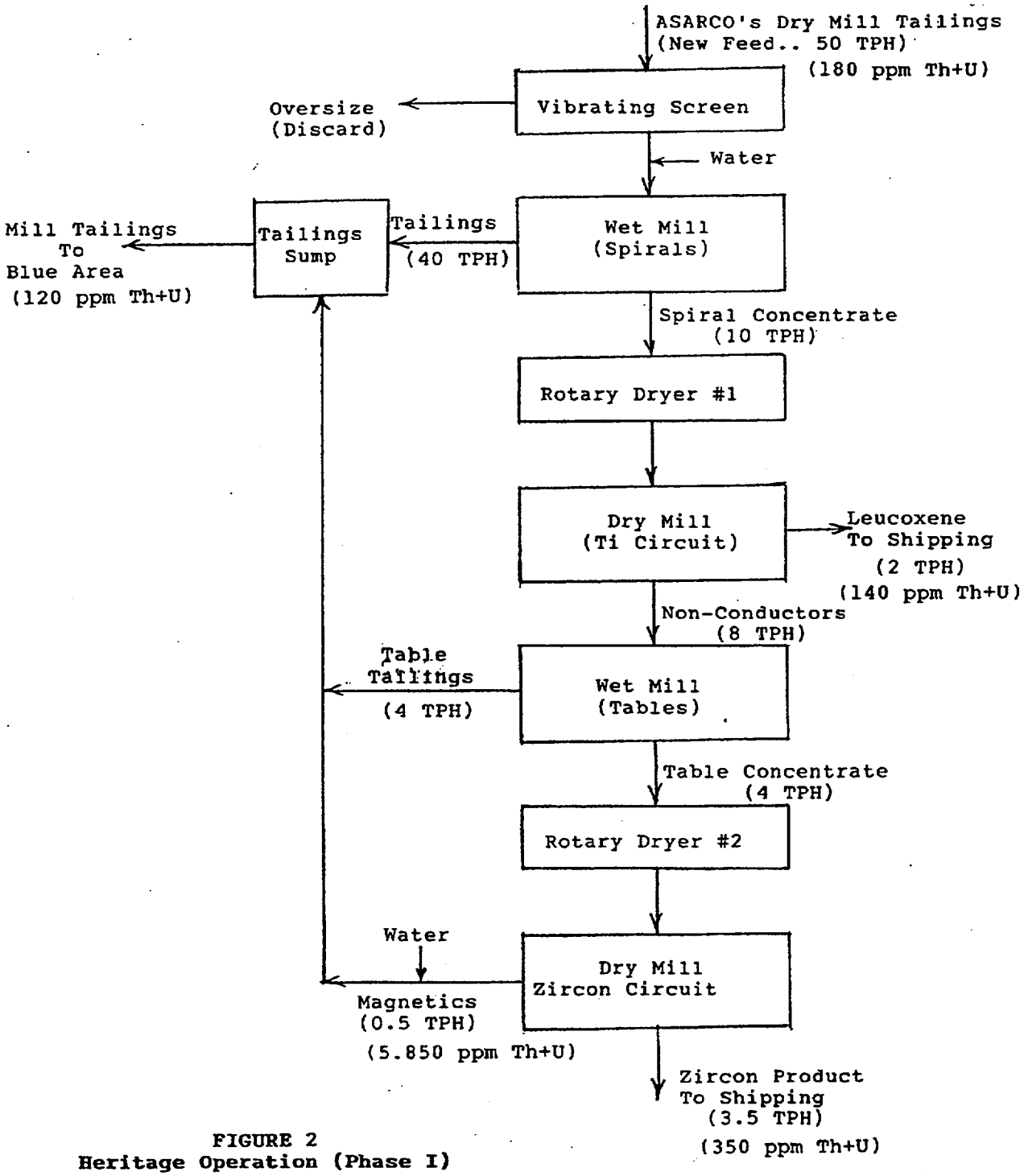

FIGURE 2
Heritage Operation (Phase I)

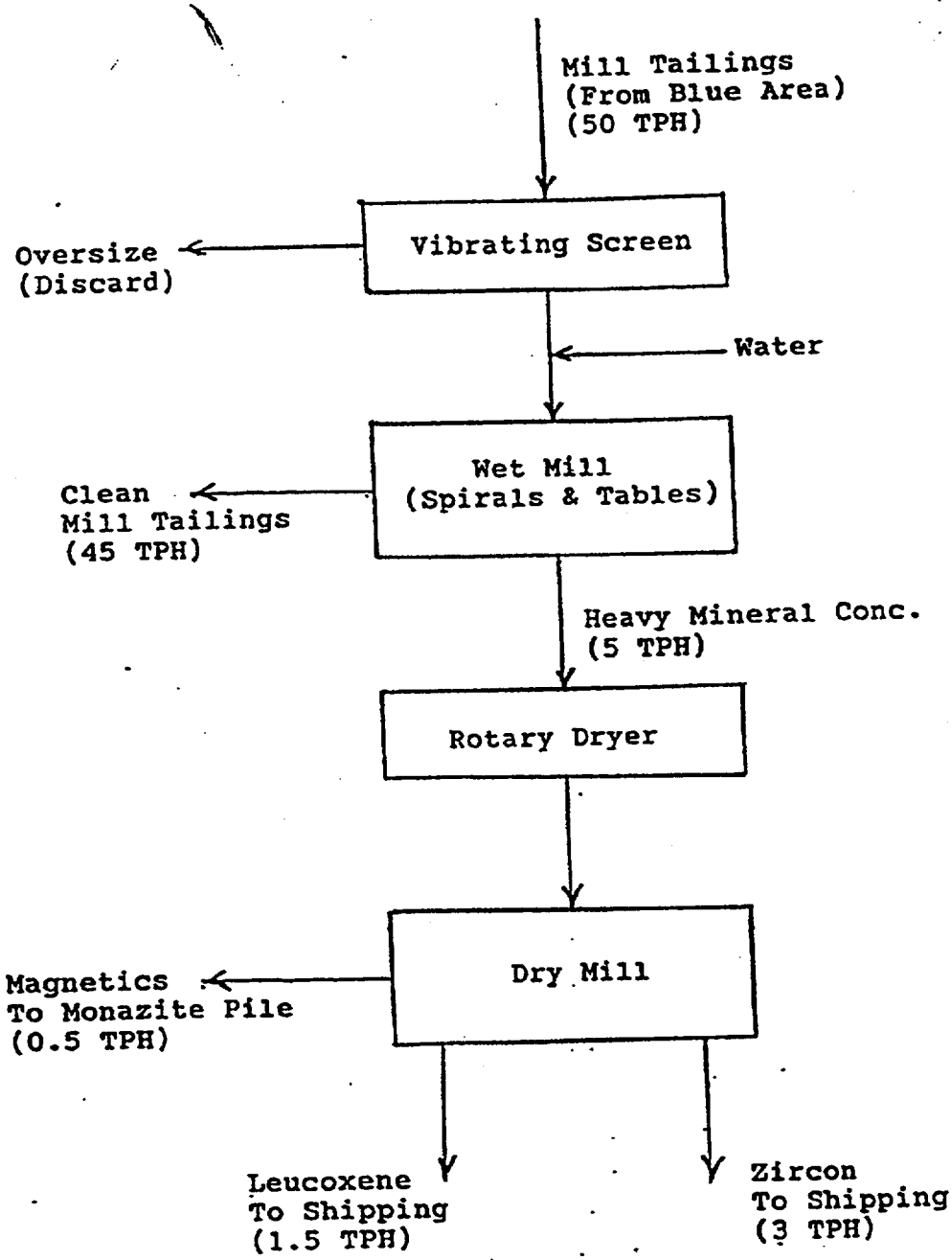

FIGURE 3

Heritage Operation (Phase II)

ATTACHMENT 6

Memorandum from Independent Consultant
Regarding
No RCRA Listed Hazardous Waste in Uranium Material

REVIEW OF HERITAGE MINERALS, INC. INFORMATION TO ASSESS THE POTENTIAL PRESENCE OF RCRA LISTED HAZARDOUS WASTE

I have performed an independent evaluation of the information available to date on Uranium Material from Heritage Minerals Inc. ("HMI") to assess whether any RCRA Listed Hazardous Waste is present.

IUSA has developed a "Protocol for Determining Whether Alternate Feed Materials are Listed Hazardous Wastes" (the "Protocol") (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). The evaluation and recommendations in this Attachment were developed in accordance with this Protocol.

1.0 Source Investigation/Basis of This Evaluation

Sufficient site history and background information was available to perform the Source Investigation required in Step 1 of the Protocol Decision Logic Diagram (the "Protocol Diagram"). To perform my independent evaluation, I have reviewed the following documents:

1. IUSA/UDEQ Protocol for Determining Whether Alternate Feeds Are Listed Hazardous Wastes (IUSA, November, 1999).

2. Site history and process information from HMI's Final Status Survey Plan ("FSSP")

3. Process information, and analytical data from HMI's Response to NRC's and NJDEP's Comments on HMI's FSSP

4. Site History and Process Information as reported in The Federal Register: Vol. 64, No. 169 (September 1, 1999)

5. Affidavit Regarding No RCRA Listed Waste, provided by HMI to IUSA, June 2000

6. Radioactive Material Profile Record ("RMPR") prepared by HMI for IUSA, June 2000

The information is sufficient to conclude that the Uranium Material was generated from a known process under the control of the generator.

2.0 Determination That Material is Known Not to Contain Listed Hazardous Waste

The Protocol Diagram states in Decision Diamond 2, that if a material "is known not to be or contain any listed hazardous waste", then IUSA and UDEQ will consider the material not to be listed hazardous waste. Item 2 of the Protocol text states that to make the determination in Decision Diamond 2, IUSA may,

> "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 source and that the Material has not been mixed with any listed wastes, the Material would not be a listed hazardous waste."

Sufficient information does exist to support such a conclusion. HMI, based on site history, analytical data, and generator's knowledge of their process, has indicated that the Uranium Material contains no RCRA listed hazardous wastes. I have reviewed copies of HMI's FSSP, the September 1, 1999 Federal Register, and the attachments to the RMPR, which describe the origin of the monazite sand pile. The monazite sand was generated from the physical processing of natural sands for the removal of heavy minerals. No chemicals were used in the processing of the natural sands. No chemicals or industrial wastes were combined with or stored with the monazite sand after generation.

This information meets the requirement for specific Source Investigation information in the Protocol Decision Diamond 2 and Step 2, and demonstrates that the Material neither was generated by a listed hazardous waste source nor has been mixed with a listed hazardous waste.

The conclusion that the monazite sand is a natural material is supported by the description and data in the Radioactive Material Profile Record ("RMPR"), which indicate that the monazite sand has the composition and physical properties of natural mineral sands.

3.0 Documentation to Support Determination of No RCRA Listed Hazardous Waste

IUSA has obtained the following documentation to support the determination in Box 2 that the material is "known not to contain any listed hazardous waste".

- An affidavit from HMI confirming that the pond material is not and does not contain RCRA listed hazardous waste associated with any of the four lists: F, P, U, or K.

- A copy of the IUSA RMPR which contains a declaration that the pond material is not and contains no RCRA listed hazardous waste.

I have reviewed both of these documents. These documents are consistent with the document requirements in Protocol Diagram Box 3, for a determination based on site history.

4.0 Conclusions

It is my professional judgement that:

1. The HMI Uranium Material was generated by a known process under the control of the generator.

2. The HMI Uranium Material is not and does not contain RCRA listed hazardous waste.

3. The information made available to me is consistent with the information requirements set forth in the Protocol.

4. This determination of no RCRA listed hazardous waste is consistent with the decision logic of the Protocol.

Jo Ann Tischler
Chemical Engineer

ATTACHMENT 7

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

Section 1.0 - Introduction

International Uranium (USA) Corporation's White Mesa Mill is authorized to process alternate feed materials other than natural uranium ore under Source Material License SUA-1358. Pursuant to the conditions of the above license and amendments, this written procedure describes the evaluations and protocol for the receipt and dumping of materials which will insure the safety of operating personnel and minimize radiological exposures to individuals and the environment to levels As Low As Reasonably Achievable (ALARA).

Section 2.0 – Operating Instructions

2.1 Final Decontamination and Release for Unrestricted Use:

1. Open the tailgate and decontaminate each intermodal bin with a high-pressure water wash. Make sure to wash the inside and outside of each container.

2. After the container is decontaminated, use the yard tractor to move the intermodal bin to the secondary decontamination area.

3. Contact a Radiation Technician to perform a radiological survey of the container and either the Mill Radiation Safety Officer, Mill Maintenance Foreman or the Mill Manager to perform a visual inspection for contamination.

4. If the container does not meet the radiological release survey requirements or visual survey requirements the container will either be returned to the decontamination pad for further decontamination or will be rinsed at the secondary decontamination area.

5. If the container does meet the radiological release survey requirements, the Radiation Technician will place a red sticker on the container that says "THIS CONTAINER HAS BEEN FULLY DECONTAMINATED & SURVEYED FOR "UNRESTRICTED USE" BY:" The RSO or Radiation Technician that performed the release survey will then sign the red sticker and date it.

6. The Radiation Technician will fill out a Decontamination Final Release form to document that the container has been authorized for final release.

7. After the container has been surveyed and has passed all release criteria, the tailgate will be securely fastened.

8. After an intermodal container has been released, the container will be delivered to the designated staging area for empty containers. Containers being released from the White Mesa Mill for "Unrestricted Use" will leave the Mill untarped. These containers may be re-tarped at the transloading facility.

2.2 Decontamination and Release for Restricted Use:

1. Decontaminate each intermodal bin with a high-pressure water wash. Make sure to wash the outside of each container thoroughly.

2. After the container is decontaminated, use the yard tractor to move the intermodal bin to the secondary decontamination area.

3. Contact a Radiation Technician to perform a radiological survey of the container and either the Mill RSO, Mill Maintenance Foreman or the Mill Manager to perform a visual inspection for contamination.

4. If the container does not meet the radiological release survey requirements or visual survey requirements the container will either be returned to the decontamination pad for further decontamination or will be rinsed at the secondary decontamination area.

5. The Radiation Technician will fill out a Decontamination Release form to document that the container has been authorized for release.

6. After an intermodal container has been released, the container will be delivered to the designated staging area for empty containers

Section 3.0 – Hazard Identification & Safety

3.1 Required Personnel Protective Equipment (PPE):

Minimum requirements for PPE are established and enforced to protect employees who must perform tasks involving industrial, chemical and/or radiological hazards. If properly identified and managed, the potential consequences resulting from exposure to these workplace hazards can be reduced significantly. PPE is provided for the safety and well being of every employee but only is effective if properly used.

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.

3.2 Industrial Hazards and Safety:

1. Be aware of other vehicular traffic.

2. Be aware of slippery and icy handrails and walkways.

3. Do not place any part of your body inside the container when the tailgate is opened. Only work under the tailgate after it has been properly blocked open.

4. Be aware of high-pressure wash water.

GUIDELINES FOR DECOMTAMINATION OF FACILITIES AND EQUIPMENT PRIOR TO RELEASE FOR UNRESTRICTED USE OR TERMINATION OF LICENSES FOR BYPRODUCT, SOURCE, OR SPECIAL NUCLEAR MATERIAL

U. S. Nuclear Regulatory Commission
Division of Fuel Cycle, Medical, Academic,
And Commercial Use Safety
Washington, DC 20555

May 1987

The instructions in this guide, in conjunction with Table 1, specify the radionuclides and radiation exposure rate limits which should be used in decontamination and survey of surfaces or premises and equipment prior to abandonment or release for unrestricted use. The limits in Table 1 do not apply to premises, equipment, or scrap containing induced radioactivity for which the radiological considerations pertinent to their use may be different. The release of such facilities or items from regulatory control is considered on a case-by-case basis.

1. The license shall make a reasonable effort to eliminate residual contamination.

2. Radioactivity on equipment or surfaces shall not be covered by paint, plating, or other covering material unless contamination levels, as determined by a survey and documented.

3. The radioactivity on the interior surfaces of pipes, drain lines, or ductwork shall be determined by making measurements at all traps, and other appropriate access points. Provided that contamination at these locations is likely to be representative of contamination on the interior of the pipes, drain lines, or ductwork. Surfaces of premises, equipment, or scrap which are likely to be contaminated but are of such size, construction, or location as to make the surface inaccessible for purposes of measurement shall be presumed to be contaminated in excess of the limits.

4. Upon request, the Commission may authorize a licensee to relinquish possession or control of premises, equipment, or scrap; having surfaces contaminated with materials in excess of the limits specified. This may include, but would not be limited to, special circumstances such as razing of buildings, transfer to premises to another organization continuing work with radioactive materials, or conversation of facilities to a long-term storage or standby status. Such requests must:

   a. Provide detailed, specific information describing the premises, equipment or scrap, radioactive contaminants, and the nature, extent, and degree of residual surface contamination.

   b. Provide a detailed health and safety analysis which reflects that the residual amounts of materials on surface areas, together with other considerations such as prospective use of the premises, equipment, or scrap, are unlikely to result in an unreasonable risk to the health and safety of the public.

5. Prior to release of premises for unrestricted use, the licensee shall make a comprehensive radiation survey, which establishes that contamination is within the limits specified in Table 1. A copy of the survey report shall be filed with the Division of Fuel Cycle, Medical, Academic, and Commercial Use Safety, U. S. Nuclear Regulatory Commission, Washington, DC 20555, and also the Administrator of the NRC Regional Office having jurisdiction. The report should be filed at least 30 days prior to the planned date of abandonment. The survey report shall:

   a. Identify the premises.

   b. Show that reasonable effort has been made to eliminate residual contamination.

   c. Describe the scope of the survey and general procedures followed.

   d. State the findings of the survey in units specified in the instruction.

   Following review of the report, the NRC will consider visiting the facilities to confirm the survey.

TABLE I

ACCEPTABLE SURFACE CONTAMINATION LEVELS

NUCLIDES[a]	AVERAGE[b,c,f]	MAXIMUM[b,d,f]	REMOVABLE[b,e,f]
U-nat, U-235, U-238, and Associated decay products	5,000 dpm a/100 cm^2	15,000 dpm a/100 cm^2	1,000 dpm a/100 cm^2
Transuranics, Ra-226, Ra-228, Th-230, Th-228, Pa-231, Ac-227, I-131, I-133	100 dpm/100 cm^2	300 dpm/100 cm^2	20 dpm/100 cm^2
Th-nat, Th-232, Sr-90, Ra-223, Ra-224, U-232, I-126, I-131, I-133	1,000 dpm/100 cm^2	3,000 dpm/100 cm^2	200 dpm/100 cm^2
Beta-gamma emitters (nuclides With decay modes other than Alpha emission or spontaneous Fission) except Sr-90 and Others noted above.	5,000 dmp By/100 cm^2	15,000 dpm By/100 cm^2	1,000 dpm By/100 cm^2

[a] Where surface contamination by both alpha- and beta-gamma-emitting nuclides exists, the limits established for alpha- and beta-gamma-emitting nuclides should apply independently.

[b] As used in this table, dpm (disintegrations per minute) means the rate of emission by radioactive material as determined by correcting the counts per minute observed by an appropriate detector for background, efficiency, and geometric factors associated with the instrumentation.

[c] Measurements of average contaminant should not be averaged over more than 1 square meter. For objects of less surface area, the average should be derived for each such object.

[d] The maximum contamination level applies to an area of not more than 100 cm^2.

[e] The amount of removable radioactive material per 100 cm^2 of surface area should be determined by wiping that area with dry filter or soft absorbent paper, applying moderate pressure, and assessing the amount of radioactive material on the wipe with an appropriate instrument of known efficiency. When removable contamination on objects of less surface area are determined, the pertinent levels should be reduced proportionally and the entire surface should be wiped.

[f] The average and maximum radiation levels associated with surface contamination resulting from beta-gamma-emitters should not exceed 0.2 mrad/hr at 1 cm and 1.0 mrad/hr at 1 cm, respectively, measured through not more than 7 milligrams per square centimeter of total absorber.