RAS 2382

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING BOARD PANEL

Before Administrative Judges:
Ann Marshall Young, Presiding Officer
Dr. Charles N. Kelber, Special Assistant

IN THE MATTER OF:	*	
	*	
INTERNATIONAL URANIUM (USA) CORPORATION	*	Docket No. 40-8681-MLA-8
	*	ASLBP No. 00-782-08-MLA
	*	
(Source Material License Amendment)	*	November 13, 2000
	*	

INTERNATIONAL URANIUM (USA) CORPORATION'S RESPONSE TO THE PRESIDING OFFICER'S OCTOBER 26, 2000 REQUEST FOR INFORMATION

INTRODUCTION

By Order dated October 26, 2000, Presiding Officer Young requested that International Uranium (USA) Corporation ("IUSA") "provide specific information, with citation to and copies of relevant sources included, regarding the specific radiological content and picocuries-per-gram amounts and levels of prior materials authorized by IUSA's license or previous amendments thereto and transported to the White Mesa Mill through Moab, Utah." October 26 Order ("Order") at 2.[1] The information and copies of relevant sources requested in the Order is attached hereto in the form of an Affidavit of Ron F. Hochstein and the table and source documents appended thereto.

IUSA believes that the attached Affidavit, and the appendices thereto, responds to the information request of the Presiding Officer and to the concerns raised by Petitioner. IUSA

[1] By Order dated November 6, 2000, the Presiding Officer granted IUSA's Motion for Extension of Time, providing that IUSA must file this Response not later than November 13, 2000. As requested by

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submits that the information provided herewith establishes what IUSA has always maintained: that the subject of the pending license amendment, alternate feed material from the HMI site in New Jersey proposed to be transported to and processed at IUSA's White Mesa Mill, is within the range of materials previously approved and, indeed, is less radiologically active and poses less radiological hazard, than many of the feeds previously approved for transport to and processing at the Mill. Thus, Petitioner cannot show (and most assuredly, has not shown) any concrete and particularized injury-in-fact redressable by intervention in this proceeding.

Even if Petitioner were to establish that the transportation of radiologically active material through Moab somehow caused her harm, denying the pending license amendment would not redress that "harm." Indeed, IUSA and other licensees have transported, and will continue to transport, larger quantities of similar or more radiologically active feeds through Moab in accordance with existing licenses. As discussed at greater length below, however, the Petitioner's failure, after numerous opportunities, to establish any injury-in-fact allegedly caused by the pending license amendment necessarily defeats Petitioner's bid for standing and moots the redressability issue.

ARGUMENT

A. The HMI Monazite Sands That Are The Subject Of The Pending License Amendment Pose No Greater Radiological Threat Than Other Feeds Processed At The Mill.

In order to establish her standing to obtain a hearing on IUSA's pending license amendment, the Petitioner must show not only that she suffers an injury-in-fact, but "that the injury fairly can be traced to the challenged action; and ( ) that the injury is likely to be redressed

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that Order, IUSA has provided data on radiological activity for uranium and thorium separately and in total.

by a favorable decision."[2] As IUSA has pointed out in its prior pleadings and as further discussed below, Petitioner has, despite repeated attempts, been unable to demonstrate any injury resulting from the transportation and processing of the HMI monazite sands as contemplated by the pending license amendment. Even assuming, however, that Petitioner were to demonstrate that she was injured by the transportation of radiologically active materials through Moab, Utah, she cannot show that this hypothetical injury would be redressed by denying the particular license amendment at issue.

The pending license amendment concerns only IUSA's request to process up to 2,000 cubic yards (approximately 3,000 tons) of monazite sands from the HMI facility.[3] As detailed in the attached Affidavit and appendices thereto, the radiological activity of the sands is estimated at 335 picocuries per gram from uranium and 1,190 picocuries per gram from thorium. This compares to conventional ore, which typically ranges from 1,100 to 8,600 picocuries per gram from uranium and thorium, and yellowcake product, which typically is over 480,000 picocuries per gram from uranium.

As noted at footnote 11of IUSA's August 24, 2000, Opposition to Request for Hearing, "transportation of the HMI materials to the White Mesa Mill is expected to result, on average, in an additional ten trucks per week traveling State Road 191 in the Moab area for between one and

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[2] *Dellums v. NRC*, 863 F. 2d 968, 971 (D.C. Cir. 1988); *Shoreham-Wading River Central School District v. NRC*, 931 F. 2d 102, 105 (D.C. Cir. 1991). *See Long Island Lighting Co.* (Shoreham Nuclear Power Station, Unit 1), LBP-91-1, 33 NRC 15, 28-29 (1991); *Long Island Lighting Co.* (Shoreham Nuclear Power Station, Unit 1), LBP-91-7, 33 NRC 179, 192, 194-95 (1991).

[3] Amendment Request at 2.

three months." The Utah Department of Transportation previously has estimated that this route already is traveled by approximately 2000 trucks per week.[4]

As discussed in greater detail in the attached Affidavit of Ron F. Hochstein and as reflected in the table and source documents appended thereto, the HMI monazite sands that are the subject of the pending license amendment are less radiologically active and are smaller in quantity than many of the alternate feeds and natural ores that IUSA already is licensed to process. Most of these feeds, some of the ore, and virtually all of the Mill's yellowcake product are or have been trucked through Moab.[5] The requested amendment for the receipt and processing of the HMI material, will not, as a practical matter, cause any change in the White Mesa Mill's operations currently permitted by its existing license, or in the radioactivity or quantity of material trucked through Moab. Petitioner cannot demonstrate that the requested amendment causes any redressable injury. Consequently, Petitioner cannot establish standing and is not entitled to a hearing.

B. Petitioner Still Articulates No Injury-in-Fact in Support of Standing.

While a finding that the transportation of the HMI monazite sands through Moab poses no additional risks over other previously licensed activities at the Mill is sufficient to establish that the Petitioner does not have standing in this matter, a contrary finding would be only a necessary, but not sufficient, condition to establish standing. IUSA has asserted multiple times in the course of this proceeding that the Petitioner has failed to demonstrate the "concrete and particularized" injury-in-fact required to establish standing to obtain a hearing on IUSA's

[4] IUSA license amendment request (citation) at 9.

[5] Affidavit of Ron Hochstein at 2 (paragraph 7).

requested license amendment.[6] After numerous opportunities, Petitioner still has failed to articulate any more than a vague unhappiness with the prospect that trucks carrying HMI monazite sands may pass through Moab. Petitioner has not even suggested how the trucks carrying material from the HMI facility may cause her harm (*i.e.*, how she is harmed by the license amendment at issue).

As IUSA and the Presiding Officer previously have noted, "[s]tanding is not a mere legal technicality, it is in fact an essential element in determining whether there is any legitimate role for a court or an agency adjudicatory body in dealing with a particular grievance."[7] The Presiding Officer's October 26 Order requesting additional information does not seek additional argument on this issue and IUSA will not reiterate here its arguments previously presented. IUSA respectfully submits, however, that whatever the nature and volume of material trucked through Moab, that does not, by itself, establish that Petitioner suffers injury-in-fact by issuance of IUSA's requested license amendment.

Petitioner may also dislike that gasoline, various compressed gases, nitrogen fertilizer, or biomedical wastes are trucked through Moab. Petitioner's possible distaste for truck transport of potentially hazardous materials, however, does not confer on Petitioner standing to raise a legal challenge to this activity absent a showing of some particularized harm. The same is true here, irrespective of the precise radiological composition of the material at issue.[8] Moreover, as

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[6] *See, e.g.*, IUSA's August 24, 2000, Opposition to Request for Hearing at 5-7; Petitioner's repeated failure to demonstrate an injury-in-fact has also been discussed in IUSA's subsequent pleadings and in the course of the telephonic hearing on September 14, 2000.

[7] *Westinghouse Electric Corp.*, CLI-94-07, 39 NRC 322, 1994 Lexis 31, ** 5-6 (1994).

[8] It bears mention again, however, that the HMI monazite sand which is the subject of the particular license amendment at issue is relatively innocuous and, in both uranium and thorium components, is significantly less radioactive than many other materials trucked through Moab, both by IUSA and by others. Certainly, as acknowledged by Anthony Thompson's September 27, 1990 letter attached to Petitioner's "First Supplement," filed October 18, 2000, trucking the monazite sand

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mentioned in IUSA's August 24, 2000 Opposition to Hearing Request (at 6-7, fn. 11), the NRC previously has concluded that "the transportation of radioactive materials in accord with NRC and DOT regulations will not have a significant adverse impact on the environment."[9]

Many hazardous and radioactive substances are transported every day throughout the United states in accordance with DOT regulations, in a manner that has been determined to pose an acceptable level of risk to the public. Yellowcake, which typically contains over three hundred times the level of radioactivity contained in the HMI monazite sands, has been and continues to be transported over the highways of the United States from all uranium mills and in situ mining facilities to conversion facilities, in accordance with NRC and DOT regulations. Other, more highly radioactive materials also are transported between nuclear fuel cycle facilities in accordance with NRC and DOT regulations. Petitioner's inability to articulate any concrete and particularized harm is consistent with this finding of "no significant adverse impact" from these types of activities.

CONCLUSION

IUSA has enclosed herewith the information requested by the Presiding Officer's October 26, 2000, Order, regarding the "radiological content and picocuries-per-gram amounts and levels of the Heritage Minerals materials proposed to be transported under the present

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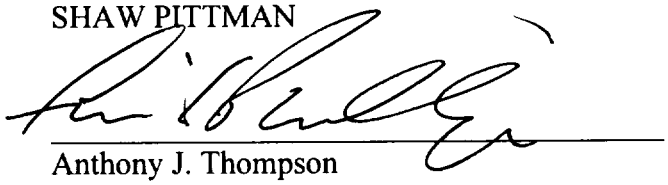
> over great distances entails some risk as compared to on-site disposal, but not in relation to trucking similar radiologically active materials or such materials as gasoline or any other potentially hazardous substance. However, generalized risk is not the same as particularized harm. The fact that everyday activities pose multiple risks to each of us does not impart to each of us standing to challenge each of these activities. If an individual's general distaste for an activity were sufficient to confer standing to challenge the activity, commerce rapidly would grind to a halt.

[9] 49 Fed. Reg. 9375 (March 12, 1984).

license amendment application (including both total figures and for uranium and thorium separately)"[10] of the HMI monazite sand and other materials for which IUSA previously has obtained license amendments permitting transport and processing. IUSA submits that the information enclosed makes clear that transportation of the HMI material poses no more risk, in kind or degree, than any of the other materials that IUSA is licensed to handle at its White Mesa Mill. Additionally, irrespective of any risk attendant to transportation of the HMI material, Petitioner has made no showing that she will suffer any concrete and particularized harm thereby. Consequently, IUSA respectfully requests that Petitioner's Request for Hearing be denied and this proceeding terminated.[11]

Respectfully submitted this 13th day of November, 2000.

SHAW PITTMAN



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COUNSEL TO INTERNATIONAL
URANIUM (USA) CORPORATION

[10] Presiding Officer's November 6, 2000 Order at 2 (paragraph 4).

[11] As discussed above, Petitioner's Request should be denied because it lacks merit. On strictly procedural grounds, Petitioner's Request should be dismissed for repeatedly failing to comply, without any reasonable excuse, with the filing deadlines and procedures established by the Presiding Officer for the governance of this proceeding which the Petitioner initiated.

AFFIDAVIT OF RON F. HOCHSTEIN

I, Ron F. Hochstein, on information and belief, state and attest as follows:

1. I am the President and Chief Executive Officer of International Uranium (USA) Corporation ("IUSA"). I have held this position since April, 2000. I have been employed by IUSA since October, 1999. I have worked in the metals mining, processing and recovery business for over 15 years.

2. I received my B.S. degree in Metallurgical Engineering from the University of Alberta in 1983, and I received my MBA degree from the University of British Columbia in 1987. I am certified as a Professional Engineer in the Province of Ontario, Canada.

3. IUSA processes and recovers uranium, vanadium, and other metals, from ore and from alternate feed materials, at IUSA's White Mesa Mill near Blanding, Utah (the "Mill"), pursuant to a source material license (the "Mill License") issued by the Nuclear Regulatory Commission ("NRC") in 1980. The Mill License was renewed in 1985 and again in 1997. Any time that IUSA proposes to process an alternate feed from a new source, IUSA must first apply for and receive from the NRC an amendment to the Mill License, specifically permitting processing of the proposed alternate feed. Tailings from processing are placed in lined, permitted tailings cells at the Mill. Presently, the tailings cells contain approximately 4 million tons of tailings.

4. As President and Chief Executive Officer of IUSA, I am responsible for all operational activities of IUSA. In preparing this affidavit, I have had assistance and input from IUSA's Environmental Manager, the Mill's Manager and the Mill's Radiation Safety Officer. My calculations have also been reviewed by an independent expert who is a professional engineer and who has significant institutional knowledge about the Mill's activities.

5. To date, the Mill has obtained 10 license amendments from the NRC permitting it to process a variety of alternate feed materials. These alternate feed materials have varied widely in mineral composition and level of radiological activity. IUSA's pending license amendment seeks NRC authorization to accept and process at the Mill approximately 2,900 tons (1,500 cubic yards) of monazite sands (the "Heritage Materials") from the Heritage Minerals, Inc. facility in Lakehurst, New Jersey.

6. I have attached hereto ("Attachment A") specific information, with citation to and copies of relevant sources included, regarding the specific uranium and thorium content in picocuries-per-gram amounts and total levels in curies (including figures for uranium and thorium separately) of the Heritage Materials and of materials authorized by the Mill's license or previous amendments thereto and transported to the Mill through Moab, Utah.

7. It is evident from Attachment A that the total picocuries-per-gram for the uranium and thorium contained in the Heritage Materials is well within the levels of prior materials authorized by the Mill's license or previous amendments thereto and transported to the

Mill through Moab, Utah, and that the total curies added to the Mill's tailings cells from the Heritage Materials is insignificant.

8. In demonstration of the point referenced in the previous paragraph, the estimated total activity of uranium and thorium for the Heritage Materials is 1,525 picocuries per gram. This compares to 3,101 picocuries per gram for natural uranium ores, and up to 735,226 picocuries per gram for other alternate feed materials, such as the Cotter Concentrates. The weighted average uranium and thorium activity levels of licensed feed materials and products shipped to or produced at the Mill is 4,809 picocuries per gram, and the average for yellowcake product produced at the Mill and shipped through Moab over the last 20 years is 482,400 picocuries per gram.

9. As indicated by these results, the transportation of the Heritage Materials through Moab, Utah, and the receipt and processing of the Heritage Materials at the Mill will pose no incremental risks, threats or harm to the public beyond those posed by the Mill's normal and previously licensed activities. The Mill and transportation contractors that will transport the Heritage Materials are fully experienced in handling alternate feed materials such as the Heritage Materials in a manner that is protective of public health, safety and the environment.

Affirmed by me this 10 day of November, 2000.

Ron F. Hochstein

ATTACHMENT A

11/10/00

Uranium and Thorium Activities in Licensed Ores and Products

Mill Feed & Production	Description	Tons	Uranium Isotopes Average (Wt% U)	Uranium Isotopes Activity Average (pCi/g)	Total Uranium Inventory (Ci)	Thorium Isotopes Activity Average* (pCi/g)	Thorium Inventory * (Ci)	Estimated Total Activity of U and Th (pCi/g)	Estimated Total Inventory of U and Th (Ci)
Linde (2)	Soil	140,400	0.07%	469	59.8	40	5	509	**65**
Ashland 1 (3)	Soil	108,810	0.06%	402	39.7	238	24	640	**63**
Heritage (4)(5)	Monazite Sands	2,910	0.05%	335	0.89	1,190	3.1	1,525	**4**
Cabot (6)	Tantalum residues	16,828	0.343%	2,298	35.1	473.0	7.23	2,771	**42**
Natural Ores (7)(8)(9)(10)	Mill Inception to Date	3,846,667	0.310%	2,077	7,254	1,024	3,576	3,101	**10,830**
Ashland 2 (11)	Soil	43,981	0.01%	67	2.7	6,950	278	7,017	**280**
Cameco (12)	KF product	1,966	4.6%	30,800	55.0	3,170	5.7	33,970	**61**
Allied Signal (13)(14)	Calcium Fluoride	2,343	3.0%	20,100	43	14,448	30.74	34,548	**74**
Cameco (15)	Phosph. regen. product	557	8.0%	53,600	27.1	-	-	53,600	**27**
Cameco (16)	Calcined product	2,197	6.53%	43,751	87.3	16,472	32.86	60,223	**120**
Allied Signal (17)	KOH solution recovery	1,526	26.8%	179,560	249	-	-	179,560	**249**
Rhone-Poulenc (18)(19)	Uranyl nitrate hexahydrate	17	50%	335,000	5.0	0.10	0.00	335,000	**5**
Cameco (20)	UF4 with filter ash	10	65%	435,500	3.9	0.10	0.00	435,500	**4**
Uranium Product (21)	Yellowcake	14,153	72%	482,400	6,199	-	-	482,400	**6,199**
Nev. Test Site (22)	Cotter Concentrate	363	16.00%	107,200	35.3	628,026	207	735,226	**242**
CURRENT ESTIMATED FEED TOTAL		**4,182,728**			**14,097**		**4,169**		**18,266**
CURRENT ESTIMATED WEIGHTED AVERAGE				**3,712**		**1,098**		**4,809**	

* Total thorium activity is stated to the degree the information is available.

Notes:

(1) Appendix A includes general calculations for conversion of units.
(2) Based on Linde Amendment Application, IT pre-excavation field data 7/00, and RMPR (See Appendix B)
(3) Tonnage based on current estimates from the Ashland site, other information based on License Amendment Application, IT pre-excavation field data and RMPR (See Appendix C).
(4) Based on Heritage License Amendment Application and RMPR (See Appendix D)
(5) Thorium estimate provided by S. Fields of 4,000 pCi/g is for only a portion of the material being sent to IUC. The value quoted is the estimated average value for all the material sent to IUC.
(6) Cabot information included in Appendix E.
(7) Tons and wt% based on Mill production logs (See Appendix F)
(8) Thorium values estimated by the Mill's Radiation Safety Officer (See Appendix F)
(9) Mill head grades typically range from 0.11% to 0.86% uranium or 1,100 to 8,603 pCi/g.
(10) Only a portion of the natural ores were transported through Moab, Utah.
(11) Production based on Mill production report, uranium and thorium information contained in Appendix G.
(12) KF data is included in Appendix H.
(13) Data from Mill production logs only for production in 1996 and 1999, data for previous runs is not available (See Appendix I).
(14) Thorium content based on discussions with generator (See Appendix I)
(15) Tonnage based on Mill receipts. Uranium based on License Amendment information (See Appendix J)
(16) Tonnage based on Mill production and receipts. Head grade based on actual production estimates. (See Appendix K)
(17) Tonnage and assays based on Mill production. Thorium content based on information from generator. (See Appendix L).
(18) Based on USNRC Technical Evaluation Report for Energy Fuels Nuclear License Amendment #41 and Rhone Poulenc Data (12/21/94). See Appendix M.
(19) This material was not trucked through Moab, Utah.
(20) No material has been received at the Mill to date. The information is based on the License Amendment information (See Appendix J).
(21) Tonnage based on actual Mill production logs and average grade based on Mill data (See Appendix F). A majority of the yellowcake is shipped through the Moab area.
(22) Values calculated by K. Schiager in letter of 7/10/97 and tonnage based on actual Mill receipts. (See Appendix N.)

APPENDIX A

General Calculations

Uranium / Thorium in Ores & Feeds

Conversions and Calculations Used

1) To find Total Uranium Activity (pCi/g) in natural Uranium when Uranium % by weight is known:

$$U_{\substack{TOT \\ act}} \left(\frac{pCi}{g}\right) = U_{TOT}\,(\%) \times \frac{670\ \frac{pCi}{g}}{0.1\%\ U}$$

2) To find Total Uranium Activity (pCi/g) in natural Uranium when U_{238} activity (pCi/g) is known:

$$U_{\substack{TOT \\ act}} \left(\frac{pCi}{g}\right) = \frac{U_{238}\ \left(\frac{pCi}{g}\right)_{act}}{0.475}$$

3) To find U or Th inventory in Ci if U or Th activity (pCi/g) is known

$$U_{inv}\ \text{or}\ Th_{inv}\ (Ci) = \frac{U\ \text{or}\ Th_{act}\ \left(\frac{pCi}{g}\right) \times \left(454\ \frac{g}{lb}\right) \times \left(\frac{2000\ lb}{ton}\right) \times \left(\frac{tons}{feed}\right)}{10^{12}\ \frac{pCi}{Ci}}$$

4) To find Estimated Total Activity of U and Th

$$Tot\ Act\ \left(\frac{pCi}{g}\right) = U_{\substack{TOT \\ ACT}} \left(\frac{pCi}{g}\right) + Th_{\substack{TOT \\ ACT}} \left(\frac{pCi}{g}\right)$$

5) To find U or Th activity in pCi/g if U or Th inventory in Ci is known

$$U_{\substack{TOT \\ act}}\ \text{or}\ Th_{\substack{TOT \\ act}} = \frac{U\ \text{or}\ Th_{invent}\ (Ci) \times 10^{12}\ \frac{pCi}{Ci}}{\left(\frac{454\ g}{lb}\right) \times \left(\frac{2000\ lb}{ton}\right) \times \left(\frac{tons\ of\ feed}{}\right)}$$

6) To find U_{238} inventory in Ci if U_{TOT} (Ci) is known

$$U_{238\ inv} = \left(U_{TOT\ inv}\right) \times .475$$

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Uranium / Thorium in Ores & Feeds

Conversions and Calculations Used

Per 40 CFR 302 + 355
Administrative Exemptions for Reporting Certain Radionuclide Releases
Technical Background Doc. Oct 1997
Final Rule 3/19/98

Activity Distribution in Natural Uranium Ores

Isotope	% of Total Activity
U^{234}	47.5%
U^{235}	2.3
U^{238}	50.2
Total	100.0%

582 pCi/g $\approx$ 0.1% $U_{\text{TOT isotopes}}$

JAY 11/2/00

APPENDIX B

Linde

INTERNATIONAL
URANIUM (USA)
CORPORATION

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

March 16, 2000

VIA OVERNIGHT MAIL

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

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

Dear Mr. Essig:

International Uranium (USA) Corporation ("IUSA") hereby submits the enclosed request to amend Source Material License SUA-1358 to authorize receipt and processing of a uranium-bearing alternate feed material. For ease of reference, this material is referred to herein as the "Uranium Material". The Uranium Material will be removed by a U.S. Army Corps of Engineers ("USACE", or the "Corps") contractor from the Linde site in Tonawanda, New York, which is being managed under the Formerly Utilized Sites Remedial Action Program ("FUSRAP").

NRC has already approved two license amendments authorizing IUSA's acceptance of Uranium Material from the same process source as the Linde Uranium Material. The Linde Site is the source of the Uranium Material that was eventually deposited at both the Ashland 1 and Ashland 2 sites. IUSA's license amendment dated October 15, 1998 granted approval for processing the portion of the Linde Material that had been deposited at Ashland 1. IUSA's license amendment dated June 23, 1998 granted approval for processing the portion of Linde Material that had been transferred from Ashland 1 to Ashland 2. This amendment request seeks authorization to process the remainder of the Uranium Material at the original generation and storage site at Linde.

Based on information available, the approximate volume of Uranium Material to be removed and shipped from the Linde Site is expected to be approximately 70,000 cubic yards ("CY"), although this amount could significantly increase during the excavation process. As a result, to

ensure that IUSA will not have to reapply for an increased Uranium Material volume, this amendment request is for up to 100,000 CY of Uranium Material.

Average uranium content is difficult to estimate, although site history and available data suggest that recoverable uranium is present. Analytical data provided to IUSA indicate uranium content ranging from non-detectable to approximately 0.3 weight percent, or greater, with an estimated average grade of 0.07 percent uranium for the entire Linde Site.

At this time, IUSA does not have a subcontract with the USACE prime contractor for receipt of the Uranium Material. IUSA is requesting this license amendment in order to qualify to bid on and receive some or all of the Uranium Material from this site. The USACE bidding schedule for this site requires that IUSA receive license amendment approval as soon as possible in order to demonstrate qualification to accept the Uranium Material before proposed initial shipments from the Linde Site begin in 2000.

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

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

The disposal of the 11e.(2) byproduct material resulting from processing the Uranium Material will not change the characteristics of the Mill tailings from the characteristics associated with normal milling operations.

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

INTRODUCTION

1.0 Material Composition and Volume
- 1.1 General
- 1.2 Radiochemical Data
- 1.3 Hazardous Constituent Data
- 1.4 Regulatory Considerations

2.0 Transportation Considerations

3.0 Process

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

5.0 Other Information
- 5.1 Added Advantage of Recycling
- 5.2 Reprocessing of 11e.(2) Byproduct Materials under UMTRCA

CERTIFICATION

Attachment 1	Linde Site Location Maps, Volume Estimates and Process History
Attachment 2	Uranium Content Estimates, Material Description, Analytical Data, and Preliminary Material Characterization Report for the Linde Site
Attachment 3	IUSA/UDEQ Hazardous Waste Protocol
Attachment 4	Review of Constituents in Linde Site Uranium Materials to Determine Potential Presence of Listed Hazardous Waste
Attachment 5	New York State Technical Administrative Guidance Memorandum on "Contained-In" Criteria for Environmental Media
Attachment 6	White Mesa Mill Equipment Release/Radiological Survey Procedure
Attachment 7	USACE Value Engineering Proposal for Ashland 1 and Ashland 2.
Attachment 8	Classification of Uranium Material as 11e.(2) Byproduct Material

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 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.

- Protocol for Determining Whether Alternate Feed Materials Are Listed Hazardous Wastes, developed by IUSA with the concurrence of Utah DEQ, November 1999.

- NRC Initial Decision, February 9, 1999, in the Matter of IUSA Receipt of Material from Tonawanda, New York.

- NRC Memorandum and Order, February 14, 2000, in the Matter of IUSA Receipt of Material from Tonawanda, New York, Affirming the Presiding Officers' Initial Decision to Uphold the Ashland 2 License Amendment.

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 of today's date.

IUSA understands that the established schedule calls for removal actions at the Linde Site to begin in 2000. The contractor plans to begin excavations in the second quarter of 2000. Although IUSA does not have a subcontract with the USACE contractor at this time, if this request is approved, shipments to the Mill could be expected to begin as soon as the second quarter of 2000.

As described above, prompt review of this submittal will allow USACE to consider IUSA to reprocess Uranium Material that would otherwise require direct disposal at other facilities. I can be reached at (303) 389.4131

Sincerely,

for Michelle R. Rehmann
Environmental Manager

MRR/smc

Attachments

cc: William Von Till/NRC
Earl E. Hoellen
Ronald F. Hochstein
David C. Frydenlund
William N. Deal
Ronald E. Berg
William Sinclair/UDEQ
Don Verbica/UDEQ

From Linde
Amendment Request
3/16/00

5. Portions of the Record of Decision for the Linde Site (USACE, March 2000) describe the regulatory framework and remediation goals relative to the radiological and chemical contamination at the site.

1.2 Radiochemical Data

Process history demonstrates that the Uranium Material at the Linde property resulted from the processing of natural, mined uranium-bearing ores, and from the processing of uranium-bearing residuals from natural ores originally processed at other facilities for vanadium. The USACE has classified the portions of the Linde Uranium Material which were disposed of at and later excavated from the Ashland 1 and Ashland 2 Sites, as 11e.(2) byproduct material. It is IUSA's understanding, from discussions with USACE's contractor, IT Corporation ("IT"), that USACE/IT also plan to classify the Linde Uranium Material as pre-1978 11e.(2) byproduct material.

Three radiological surveys have been conducted at Linde, which included evaluation of radiological contamination in soils:

- Oak Ridge National Laboratory, November 1976
- Ford, Bacon, and Davis, December 1981, and
- Oak Ridge Associated Universities, 1981.

Results of all three studies were summarized in the Remedial Investigation Report for the Tonawanda Site.

Average uranium content is difficult to estimate, although site history and available data indicate that recoverable uranium is present. Analytical data provided to IUSA indicate that potential uranium concentrations at Linde range in samples from nondetectable to 0.3 percent. Based on these available data, the weighted average grade of uranium for the entire Linde Site is estimated by IUSA to be approximately 0.07 percent. As stated above, the material containing nondetectable levels is not likely to be excavated and hence is not likely to be included in the material shipped to the Mill. Indeed, there is a financial disincentive to the government to excavate material that is lower in radioactivity levels than the specific cleanup levels.

The ROD for the Linde Site indicates that on this property, soils will be excavated which exceed the cleanup criteria of 5 piC/g radium for surface soils, 15 pCi/g radium for shallow soils, and a standard based on a "sum of the ratios" method for three other radioactive contaminants including total uranium, Ra-226, Th-230. The cleanup criteria are described in detail in Section 9 of the ROD, provided in Attachment 2. Based on the RI characterization data and ROD, it appears that an average uranium concentration in soils to be excavated per this guideline may be approximately 0.07 percent, with hot spots ranging up to 0.3 percent, as stated above.

1.3 Hazardous Constituent Data

Table 4-6

Radionuclide Concentrations in Soil in Areas of Radioactive Contamination at Linde

Borehole[a]	Sampling Depth (ft)	Uranium-238 (pCi/g)	Radium-226 (pCi/g)	Thorium-232 (pCi/g)	Thorium-230 (pCi/g)
Background (mean)					
Area 1		3.1	1.1	1.2	1.4
B29R01	0 - 1[b]	16.0	4.0	2.0	1.5
	1 - 2	8.0	3.0	1.0	2.4
B29R05	0 - 1	8.0	4.0	1.4	4.4
	1 - 2[c]	14.0	8.0	1.0	23.0
	2 - 3	11.0	1.7	2.0	1.3
B29R07	0 - 1[c]	15.0	7.0	2.0	30.0
	2 - 3	9.0	1.0	1.0	1.1
B29R10	0 - 2[b]	9.0	5.0	1.0	5.9
	2 - 4[c]	16.0	7.0	1.0	12.0
B29R12	0 - 1[b]	11.0	4.0	3.0	2.7
	2 - 4	6.0	2.3	2.0	1.5
Minimum		6.0	1.0	1.0	1.1
Maximum		16.0	8.0	3.0	30
Mean		11.2	4.3	1.6	7.8
Standard Deviation		3.4	2.2	0.6	9.4
Area 2					
B29R65	0 - 1[b]	8.0	3.5	1.0	7.2
	1 - 2	9.0	2.5	1.9	2.8
B29R66	0 - 1	4.0	0.6	0.4	0.9
	2 - 4[b]	40.0	2.2	1.0	1.3
B29R68	0 - 2[c]	14.0	3.1	1.0	6.3
B29R69	0 - 2[c]	16.0	14.0	3.0	23.0
	2 - 4	4.0	1.2	1.2	2.8
B29R71	0 - 1[b]	15.0	3.2	0.9	5.0
	2 - 4	16.0	2.3	1.0	3.0
B29R73	0 - 1[b]	7.0	2.4	2.5	6.7
	1 - 2	7.0	2.5	1.0	3.6
Minimum		4.0	0.6	0.4	0.9
Maximum		40.0	14.0	3.0	23.0
Mean		12.7	3.4	1.4	5.7
Standard Deviation		9.7	3.4	0.7	5.8
Area 3					
B29R100	0 - 1[b]	7.0	2.2	2.5	6.0
	2 - 4	7.0	1.1	0.7	1.5
B29R101	1 - 3[c]	54.0	12.0	2.0	23.0
	3 - 5	8.0	1.5	1.3	1.6
B29R103	1 - 1.5[c]	7.0	8.0	2.2	16.0
	3 - 4	4.0	1.1	1.2	1.6
B29R104	0 - 1[b]	8.0	3.3	3.3	4.2
	1 - 2	4.0	2.1	0.9	8.7
B29R105	0 - 2[c]	9.0	1.9	0.6	2.0
	2 - 3[c]	31.0	5.0	1.2	8.2
B29R112	0 - 1[b]	15.0	4.0	1.0	5.7
	2 - 3	6.0	2.3	2.0	1.9
B29R114	0 - 2[b]	9.0	5.5	2.6	4.2
	2 - 3	7.0	2.3	1.2	1.3

Table 4-6
(continued)

Page 2 of 3

Borehole[a]	Sampling Depth (ft)	Uranium-238 (pCi/g)	Radium-226 (pCi/g)	Thorium-232 (pCi/g)	Thorium-230 (pCi/g)
Area 3 (cont'd)					
B29R116	0 - 1[c]	150.0	240.0	5.0	710.0
	2 - 3[c]	170.0	22.0	3.0	46.0
B29R128	0 - 0.5	5.4	1.3	0.9	0.5
	0 - 1[c]	4.0	4.9	0.9	21.0
	1 - 2	6.4	1.8	0.9	2.3
	2 - 3	5.9	1.4	1.0	2.6
B29R129	0 - 0.5[b]	16	9.1	0.9	6.3
B29R130	0 - 0.5[b]	6.9	4.0	1.4	12.0
B29R132	0 - 0.5[b]	16.0	9.1	0.9	6.3
B29R134	0 - 0.5[b]	4.7	1.6	1.1	6.5
B29R138	0 - 0.5[b]	9.6	3.6	0.8	5.5
B29R140	0 - 0.5[b]	10.0	5.2	0.7	8.2
B29R142	0 - 1[c]	14.0	6.7	1.0	15.0
	1 - 2	8.4	1.6	1.4	2.6
	2 - 3	5.2	1.6	1.0	1.5
B29R143	0 - 1	10.0	3.6	1.2	2.6
	1 - 2	4.9	1.1	1.4	1.1
	2 - 3[c]	8.0	1.1	1.8	17.0
B29R144	0 - 1[b]	5.5	3.7	1.4	10.0
	1 - 2	5.3	1.2	1.0	0.4
	2 - 3	5.6	1.2	1.5	0.6
B29R145	0 - 1[c]	100.0	43.0	1.9	110.0
	1 - 2[c]	21.0	17.0	2.2	40.0
	2 - 3[c]	8.3	12.0	1.0	29.0
B29R146	0 - 1[c]	37.0	14.0	1.2	65.0
	1 - 2	2.6	2.1	1.1	2.6
	2 - 3	5.1	1.6	1.1	2.3
B29R151	0 - 1[b]	2.6	2.3	1.3	7.5
	1 - 2	8.3	0.8	1.0	1.2
	2 - 3	6.8	0.7	0.8	1.2
B29R152	0 - 1[b]	2.6	2.3	1.3	7.5
	1 - 2	8.3	0.8	1.0	1.2
	2 - 3	6.8	0.7	0.8	1.2
B29R153	0 - 1	8.6	3.7	0.9	0.8
	1 - 2[c]	3.7	0.7	1.2	26.0
	2 - 3	2.8	0.9	1.3	1.2
B29W11D	0 - 1[b]	12.0	5.0	1.0	5.7
	4 - 5	6.0	1.6	1.1	1.0
Minimum		2.6	0.7	0.6	0.4
Maximum		170.0	240.0	5.0	710.0
Mean		17.1	9.4	1.4	24.4
Standard Deviation		32.9	33.3	0.8	97.1
Area 4					
B29R23	0 - 2[b]	13.0	6.0	1.0	1.3
	2 - 4	17.0	2.0	2.0	1.6
B29R24	0 - 1.5	4.0	0.8	1.0	0.7
	1 - 3[c]	8.0	5.5	1.2	14.0
B29R25	0 - 0.5[c]	24.0	3.8	1.0	18.0
	2 - 4	5.0	1.0	1.0	1.7
B29R27	2 - 4[c]	83.0	3.7	0.9	38.0
	4 - 5	7.0	1.7	1.0	2.3

Table 4-6

(continued)

Page 3 of 3

Borehole[a]	Sampling Depth (ft)	Uranium-238 (pCi/g)	Radium-226 (pCi/g)	Thorium-232 (pCi/g)	Thorium-230 (pCi/g)
Area 4 (cont'd)					
B29R28	1 - 2[c]	20.0	10.0	1.0	27.0
	2 - 4	5.0	5.0	1.0	7.4
B29R29	0 - 1[c]	88.0	42.0	1.0	88.0
	2 - 4[c]	32.0	14.0	1.0	19.0
B29R32	0 - 1[b]	7.0	4.0	1.6	6.3
	2 - 3	5.0	1.6	1.0	2.0
B29R34	0 - 2[c]	60.0	14.0	2.0	25.0
	2 - 4[c]	20.0	7.0	1.0	10.0
	4 - 6	14.0	1.7	3.0	1.7
B29R36	1.5 - 2.5[c]	21.0	3.1	1.2	5.4
	6.5 - 7.5[c]	30.0	1.1	1.4	1.6
B29R38	1 - 3[c]	930.0	150.0	3.0	820.0
	5 - 7[c]	62.0	9.0	1.4	33.0
B29R40	2 - 3[c]	72.0	1.6	1.0	5.1
	5 - 6	8.0	2.2	3.0	1.0
B29R41	1 - 2	2.0	1.6	1.0	2.1
	2 - 3[c]	15.0	13.0	1.0	16.0
B29R43	0 - 2[b]	10.0	4.0	3.0	2.9
	2 - 4	9.0	2.7	1.0	2.4
B29R44	0 - 1[b]	10.0	2.7	0.7	6.5
	2 - 3	9.0	2.2	1.4	1.5
B29R45	1 - 2[c]	43.0	11.0	2.0	19.0
	2 - 3	9.0	1.3	1.0	1.8
B29R46	0 - 1[c]	170.0	22.0	1.0	110.0
	2 - 3[c]	100.0	6.0	1.3	24.0
B29R48	0 - 2[b]	11.0	2.4	4.0	2.3
	2 - 6	8.0	2.5	1.0	1.4
B29R50	0 - 2[b]	6.0	2.6	1.0	6.1
	2 - 4	7.0	1.5	1.0	1.8
B29R52	0 - 1	7.0	1.8	1.0	4.1
	1 - 2[c]	12.0	6.0	1.0	14.0
B29R53	0 - 1[b]	11.0	6.0	1.0	4.5
	1 - 2	8.0	2.4	1.0	2.2
B29R125	0 - 1.5[c]	9.0	7.0	2.0	2.6
	1.5 - 3[c]	45.0	24.0	2.0	13.0
	3 - 6[c]	100.0	30.0	2.0	27.0
B29W9D	0 - 2[c]	13.0	7.0	1.0	15.0
	2 - 4	2.0	1.0	1.0	1.2
Minimum		2.0	0.8	0.7	0.7
Maximum		930.0	150.0	4.0	820.0
Mean		46.8	9.8	1.4	30.7
Standard Deviation		136.0	22.4	0.7	119.5

[a]Sampling locations are shown in Figure 2-1.

[b]Radioactively contaminated to 0.15 m (0.5 ft).

[c]Radioactively contaminated soil interval.

Signed Copy

RADIOACTIVE MATERIAL PROFILE RECORD

Generator Name: _U.S. Army Corps of Engineers_ Generator/Waste Stream : _Linde soils/debris_; Volume of Waste Material _30-70 K Tons_____

Contractor Name: IT Corporation_____, Waste Stream Name: _Linde Material_____, Delivery Date:_September 2000___

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

Original Submission: Y __x____ N _____; Revision # __0___; Date of Revision: _____ Pre-1978

Name and Title of Person Completing Form: _Jim Pitts/T & D Coordinator_____ Phone: __716-517-4582_____

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# NY7210814151_____ EPA Hazardous Waste Number(s) (if applicable) ____None_____

Mailing Address: USACE c/o Praxair, Inc./175 East Park Dr., Building 31 - Tonawanda, NY 14150_____

Phone: _716-517-4145_____ Fax: ___716-517-4211_____

Location of Material (City, ST): _Tonawanda, NY 14150_____

Generator Contact: __James D. Boyle_____ Title: ___COR_____

Mailing Address (if different from above): _same_____

Phone: __716-879-4283_____ Fax: _____

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:

12"	__90%
4"	__80%
1"	__60%
1/4"	__50%
1/40"	__40%
1/200"	__30%

2. DESCRIPTION: Color ___ Brown/Multi___ Odor___Odorless___

Liquid___ Solid_x Sludge___ Powder/Dust___

3. DENSITY RANGE: (Indicate dimensions) _80 -_110 lb./ft^3

4. GENERAL CHARACTERISTICS (% OF EACH)

Soil_80% Building Debris____ Rubble_10% Pipe Scale____ Tailings_10%Process Waste____ Concrete____ Plastic/Resin____

Other constituents and approximate % contribution of each: _____

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

(Use Std Proctor Method ASTM D-698)

Optimum Moisture Content: __17___ %

Average Moisture Content: __22___ %

Moisture Content Range: _12-28_____ %

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.)_See Attached PMCR

Generator or Contractor Initials: _____

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. U-238	15 to 5,000	400	b.	to	
c. Th-230	2 to 800	40	d.	to	
e. Ra-226	2 to 800	24	f.	to	

ND – Analyte not detected. *This is natural uranium with relative concentrations of daughter isotopes are out of equilibrium because the material has been previously processed for mineral extraction.

2. 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. 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 _____; Special Nuclear Material _____; By-Product _____; Norm ____; NARM ____;

LICENSING AGENCY: _____

D. CHEMICAL AND HAZARDOUS CHARACTERISTICS

1. DESCRIPTION AND HISTORY OF MATERIAL _See Attached PMCR___

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. 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 Was this material mixed with hazardous waste(s), treated, neutralized, solidified, commingled, dried, or otherwise processed at any time after generation?

N Has this material been transported or otherwise removed from the location or site where it was originally generated?

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?

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		x				

pp. Other Known or Possible Materials or Chemicals _____

Generator or Contractor Initials: _____

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

Metals: Average Total (mg/kg) ppm				Organics:	Total (µg/kg) ppb
Lead	<288				
Barium	<367	Mercury	<1.5	Methylene Chloride**	BDL to 49
Cadmium	<0.9	Zinc	<175	2-Butanone**	BDL to 140
Chromium	<40			Trichloroethene**	BDL to 250
Copper	<271			Arochlor-1260**	BDL to 740

ND – Analyte not detected See Attached PMCR and Lab Results Summary of Waste Pre-Characterization Samples for additional data.

***These quantities are well below the NYSDEC TAGM 3028 "action levels" for a listed hazardous waste determination by the state of New York.*

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

Soil pH 6-11 Paint Filter Liquids Test (Pass/Fail) No Free Liquid pass Cyanide Released Not detected x mg/kg Sulfide Released Not detected x mg/kg

5. IGNITABILITY (40 CFR 261.21[a][2].[4].)

Flash Point n/a °F °C Is the waste a RCRA oxidizer? Y Nx

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

Chemical Component	Concentration	Chemical Component	Concentration
See attached data	% mg/kg		% mg/kg
	% mg/kg		% mg/kg
	% mg/kg		
	% mg/kg	Halogenated Organic (HOC) Compounds (Sum of the list of HOCs)	< 1 mg/kg

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. (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:

   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: _____

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.

_x_ 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 certify that samples representative of the material described in this profile were or shall be obtained using state- and EPA-approved sampling methods. I also certify that where necessary those representative samples were or shall be provided to 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 (Sign for the above certifications). James D Boyle Title COR Date 9/13/00

APPENDIX C

Ashland 1

From Ash 1
Amendment Request
10/15/00

3. Table 4-26 from the Remedial Investigation (RI) Report for the Tonawanda Site (USDOE, February, 1993) identifies the organic contaminants detected on the Ashland 1 property.

4. A portion of the Record of Decision for the Ashland 1 and Ashland 2 Sites, Tonawanda, New York (USACE, April, 1998), which describes the site history, scope of remedial action, and summary of site characteristics for the Ashland 1 and 2 sites.

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

6. Portions of the NY State Department of Environmental Conservation Phase I Site Investigation, Ashland Petroleum Company, Engineering Science, January, 1986

7. Portions of the NY State Department of Environmental Conservation Phase II Site Investigation, Ashland Petroleum Company, Engineering Science, October, 1989

Over the years, leaching has spread contamination from the Uranium Material to adjacent soils, increasing the volume to be removed. The Corps estimates that the volume of the Uranium Material is approximately 25,000 to 30,000 cubic yards ("CY"). Physically, the Uranium Material is a moist material consisting of byproducts from uranium processing operations (ie., "tailings"), mixed with site soils (RI Report USDOE, February, 1993).

1.1 Radiochemical Data

Process history demonstrates that the Uranium Material results from the processing of natural, mined uranium-bearing ores. It is currently being managed, and would be disposed of (if not reprocessed) as 11e.(2) byproduct material. In the transcript of the public meeting on ROD for the Ashland 1 and Ashland 2 sites, USACE site manager, Col. Conrad, indicates that the USACE expects to dispose the Uranium Material as 11e.(2)byproduct. IUSA has previously provided NRC a copy of this ROD and public meeting transcript, prior to our letter of June 8, 1998 regarding the Ashland 2 amendment request. We have included copies of the pertinent pages of the transcript in Attachment 1 of this amendment request. In addition, Attachment 1 also includes a letter and Radioactive Waste Profile Record dated August 19, 1996, from Bechtel, the previous contractor at the Tonawanda site under USDOE, to Envirocare of Utah in which Bechtel states that the uranium material from the Tonawanda site (Ashland 1, Ashland 2, Seaway and Linde) is 11e.(2) byproduct material, and that the material contains no listed hazardous waste.

Average uranium content is difficult to estimate, although site history and available data suggest that recoverable uranium is present. Analytical data provided to IUSA indicate uranium content ranging from non-detectable to approximately 0.4 weight percent, or greater. A summary of radionuclide concentrations in Ashland 1 soil, from Table 4-24 of the Tonawanda Site Remedial Investigation Report, is provided in Attachment 1. The ICF Kaiser Record of Decision for the Ashland 1 and 2 sites indicates that soils will be excavated which exceed the derived cleanup

guideline of 40 pCi/g Th-230. Based on the RI Table 4-24, the average uranium concentration in soils to be excavated per this guideline has been estimated by IUSA to be approximately 0.06 weight percent, which, using the same method of calculation, is expected to be greater than the average uranium concentration of the Ashland 2 materials.

1.2 Hazardous Constituent Data

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

The USDOE, based on site history, RI site characterization data, and field observations, has indicated that the Uranium Material contains no RCRA listed hazardous wastes. The USACE, based on its analysis of the Uranium Material and process knowledge, believes that the Uranium Material contains no RCRA listed hazardous wastes. Process history and analytical data are described in Attachment 1.

IUSA has also engaged an independent consultant, experienced in refinery and chemical processing, who has reviewed the site history and the chemical analyses available to date from the RI. The consultant has confirmed that the contaminants identified at Ashland 1 are unlikely to have come from listed sources. A review and evaluation of the analytes detected in the RI at Ashland 1, and rationale supporting the RI determination that the Uranium Materials do not contain listed hazardous waste, is provided in Attachment 4.

To supplement the RI contamination data, the USACE contractor will perform three levels of sampling on soils from the Ashland 1 excavation area. The sampling will be similar to the sampling performed by ICF Kaiser Engineers ("ICFKE"), the USACE contractor at the Ashland 2 site, as described in the IUSA letter to ICFKE, July 23, 1998 regarding Ashland 2 Confirmatory Sampling, and the IUSA letter to Don Verbica, State of Utah DEQ, September 4, 1998 regarding ICFKE sampling methodologies at Ashland 2, copies of which letters are attached provided in Attachment 5.

As described in the above letters, the three levels of sampling will be as follows. First, prior to development of their site Excavation and Restoration Plan, the USACE contractor will perform pre-excavation sampling ("profile sampling") within the area determined in the USDOE RI report to contain radiological contamination. The primary purpose of the profile sampling is to confirm the extent of radiological contamination and the boundaries of the remedial excavation.

Appendix A

RADIOACTIVE MATERIAL PROFILE RECORD

Generator Name: U.S. Army Corp. of Eng. Generator /Waste Stream: Ashland I ; Volume of Waste Material 120,000 yd³
Contractor Name: IT corporation Waste Stream Name: Ashland I , Delivery Date: 6/99
Check appropriate boxes: Licensed Y ___ N ✓ NORM/NARM ___; LLRW ___; MW ___; MW Treated ___; MW Needing Trmt ___; DOE ___; 11e.(2) ✓
Original Submission: Y ✓ N ___; Revision # ___; Date of Revision: ___ pre-1978
Name and Title of Person Completing Form: James T. Pitts, TCM Phone: 716-873-1074

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# N/A EPA Hazardous Waste Number(s) (if applicable) None
Mailing Address: 4545 River Road
Phone: 716-873-1074 Fax: 716-873-4091
Location of Material (City, ST): Tonawanda, NY
Generator Contact: Henry Walters Title: Corp. field representative
Mailing Address (if different from above): 1776 Niagara street, Buffalo, NY 14207
Phone: 716-879-4437 Fax: 716-879-4310

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:

12"	100 ~~100%~~
4"	95 ~~95%~~
1"	90 ~~90%~~
1/4"	85 ~~84%~~
1/40"	60 ~~65%~~
1/200"	30 ~~57%~~

5 5/21/99

2. DESCRIPTION: Color ___ Brown/Multi ___ Odor ___ Orderless ✓
Liquid ___ Solid ✓ Sludge ___ Powder/Dust ___
(Soil and soil-like)

3. DENSITY RANGE: (Indicate dimensions) 90 - 110 S.G. (lb./ft³) lb./yd³

4. GENERAL CHARACTERISTICS (% OF EACH)
Soil 85 Building Debris ___ Rubble 10 Pipe Scale ___ Tailings 5 Process Waste ___ Concrete ___ Plastic/Resin ___
Other constituents and approximate % contribution of each: ___

5. MOISTURE CONTENT: (For soil or soil-like materials).
(Use Std Proctor Method ASTM D-698)

Optimum Moisture Content: 16 %
Average Moisture Content: 18 %
Moisture Content Range: 9-22 %

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

Generator Initials: HWW
Co-Operator Initials: ___

C. RADIOLOGICAL EVALUATION

1. WASTE STREAM 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-230	0 to 13,760		b.	to	
c. Ra-226	1.1 to 204		d.	to	
e. U-238	2.5 to 1275		f.	to	

ND – Analyte not detected. See Analysis submitted earlier for further information.

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 Cirlc) If yes, check "LLRW" block on line 3 of page 1.

3. Y (N) LICENSED MATERIAL: Is the waste materil (material) listed or included on an active Nuclear Regulatory Commission or Agreement State license? (Please Circle)

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

LICENSING AGENCY: _____

D. CHEMICAL AND HAZARDOUS CHARACTERISTICS

1. DESCRIPTION AND HISTORY OF MATERIAL Attached I

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 determinations. A list of the chemicals and materials used in or commingled with the waste; a list of any and all applicable EPA Hazardous Waste Numbers, current or former; and a list of any and all applicable land-disposal prohibition or hazardous-waste exclusions, extensions, exemptions, effective dates, variances or delistings. Attach the most recent or applicable analytical results of the material's hazardous-waste characteristics, constituents and applicable hazardous-waste treatment standards. 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 upon generation or at any time thereafter?

(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 waste a residue of) the treatment, storage, and/or disposal of hazardous waste defined by 40 CFR 261?

Y (N) Has this material been treated at any time to meet any applicable treatment 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	
mm. Chelating Agents		X	oo. Other Known or Possible Materials or Chemicals					

Generator Initials: HWW

Co-Operators Initials: _____

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

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

Lead	6,200	Mercury	0.72
Barium	956	Zinc	2,000
Cadmium	63		
Chromium	171		
Copper	2430		

ND – Analyte not detected

(Please see full Analysis)

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

_____	___	_____	_____
_____	___	_____	_____
_____	___	_____	_____
_____	___	_____	_____

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

Soil pH 5-9 Paint Fliter Liquids Test (Pass/Fail) No Free Liquid ✓ Cyanide Released _____ Not detected mg/kg ✓ Sulfide Released ____ Not detected mg/kg ✓

5. IGNITABILITY (40 CFR 261.21[a][2].[4].)

Flash Point N/A °F °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
See attached data sheets ___	_____ % mg/kg	_____	_____ % mg/kg
_____	_____ % mg/kg	_____	_____ % mg/kg
_____	_____ % mg/kg		
_____	_____ % mg/kg		

Halogenated Organic (HOC) Compounds (Sum of the list of HOCs) 21 mg/kg

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

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

Generator Initials: HWW
Co-Operator Initials: _____

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

3. PRE-SHIPMENT SAMPLES OF MATERIAL TO IUC

Once permission has been obtained from 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.

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

F. CERTIFICATION

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

Generator's Signature Greg W Walker Title C.O.R. Date 5/25/99
Co-Operator's Signature _____ Title _____ Date _____
(Sign for the above certifications).

CHEMICAL AND HAZARDOUS CHARACTERISTICS

History

From 1942 to 1946, five onsite buildings now owned by Praxair were used in uranium processing for MED in support of the war effort. The process separated uranium from pitchblende and domestic ore concentrates. A total of 28,300 tons of ore was processed between 1943 and 1946.

Praxair buildings are included with Ashland 1, Ashland 2, and Seaway Industrial Park in the Tonawanda Site Waste Stream because residues from uranium processing at Praxair were disposed of at nearby Ashland 1 and at the Niagara Falls Storage Site in Lewiston, New York. Some of the radioactive soil at Ashland 1 was later excavated during petroleum storage tank construction and moved to two other properties in Tonawanda, Ashland 2 and Seaway Industrial Park.

In 1943, Ashland 1 (formerly known as the Haist property) was leased by MED for use by the federal government. In 1944, MED purchased the property to serve as a disposal site for approximately 8,000 tons of uranium ore refinery residues from the nearby Linde Air Products facility. The process residues were spread over two-thirds of the Ashland 1 property to estimated depths of 1 to 5 ft. Ashland Oil purchased the property in 1960, after AEC determined that levels of residual radioactivity were below guidelines then in effect and released the land as surplus. In 1974, Ashland Oil constructed bermed areas and two petroleum storage tanks at Ashland 1. Most of the soil removed during construction of the bermed area and drainage ditch was moved to the nearby Ashland 2 and Seaway properties. The storage tanks were removed in 1989, but the berms remained. The estimated site total waste volume is 120,200 yd3 .

Description of Waste Material

Current remedial action activities at Praxair include decontamination and/or demolition of site buildings and remediation of a soil pile. Waste generated during the building remedial action activities will include items such as metal, miscellaneous dust, wood, fiberglass, glass, PPE, ceramics, masonry, roofing materials, electrical equipment, conduit, plaster, rubber, graphite, HDPE, caulking, welding rod, solidified liquids, respirator cartridges, and asbestos-containing-material. Remediation of the on-site soil pile will result in the generation of radioactively contaminated soil and gravel mixed with building rubble. The materials in the soil pile came from four different operations conducted by the site owner. These operations include the construction of a building, the renovation of the parking lot, building decontamination efforts, and the demolition of a building. Most of these operations included site fill material, which contains local slag with naturally occurring radioactive constituents above the regional background levels.

Future remedial action activities are expected to include remediation of soil with residual radioactivity levels above guidelines at Ashland 1, Ashland 2 and Seaway.

Radiological and Chemical Constituents

Following decontamination efforts in 1949 and again in 1981, remedial investigation activities in 1991 identified surface radioactivity above guidelines in the buildings used for uranium processing at Praxair and elevated radionuclide levels in soil. Radionuclides of concern are uranium-238, thorium-232, and thorium-230 (the primary radioactive constituent). Sources of radioactivity are subsurface soils (largely inaccessible because they are covered by building foundations and paving) and residual radioactivity (primarily fixed) in the four buildings.

The primary radioactive constituents of concern at Ashland 1 and Ashland 2 and Seaway are uranium-238, radium-226, and thorium-230 and metals in the soils and sediments.

Due to the complexity of this waste stream, it is quite possible that trace quantities of RCRA regulated solvents, semi-volatiles, and other chemicals may show up in the analytical data. Bechtel National, Inc. has taken great precautionary measures to ensure that no listed hazardous waste has been added to this waste stream. Bechtel has no reason to believe, after historical research, personal interviews, and physical inspections, that any of this waste stream contains any amount of listed waste. Furthermore, there have been no spills of listed waste into this waste stream, none of this waste has been generated as a result of the treatment, storage, or disposal of a listed hazardous waste, and no waste has been mixed with, or is contained in, or commingled with this waste stream.

Chemical and radiological constituents are summarized in Tables 1-3.

Table 4-24

Summary of Radionuclide Concentrations in Contaminated Soil at Ashland 1

Borehole Number[a]	Coordinate East	Coordinate North	Depth (ft)	Concentration (pCi/g) Uranium-238	Radium-226	Thorium-232	Thorium-230
Background (mean)				3.1	1.1	1.2	1.4
B03R001	4000	550	0 - 2[b]	11.6	1.4	0.8	9
	4000	550	4 - 6	3	1	1	NA[c]
B03R002	4200	550	0 - 1[b]	2.2	1.2	0.9	5.4
	4200	550	2 - 3	4.9	1.1	0.7	NA
	4200	550	3 - 4	3.3	0.8	1.6	0.9
B03R004	4300	550	0 - 1	3	1.6	1.2	1.6
	4300	550	2 - 3[d]	23.9	5	1.4	86
B03R008	4400	600	0 - 1	3	1.2	1.4	0.9
	4400	600	5 - 6[d]	16.9	2.7	1	78
B03R009	4500	550	0 - 1	2.7	1.6	1.2	3.9
	4500	550	2 - 3[d]	80	4.9	1.2	NA
	4500	550	3 - 4[d]	149.8	26.4	1	900
B03R019	4700	300	0 - 2[d]	208	13.1	2	940
	4700	300	2 - 4[d]	72.4	8.2	1	140
	4700	300	4 - 6[d]	104.8	8.5	1	NA
B03R017	4700	550	0 - 2[d]	5.2	2.3	1.5	18
	4700	550	2 - 4[d]	18.3	9.7	1	NA
	4700	550	4 - 6	5.2	1.3	1	8.4
B03R018	4750	400	0 - 2[d]	253	750.2	2	3,500
	4750	400	2 - 4[d]	314.2	92.7	2	NA
	4750	400	4 - 6	18.6	2.8	1	NA
	4750	400	6 - 8[d]	68.9	6.9	2	130
B03R022	4800	200	0 - 2	5.2	1.3	1	2.2
	4800	200	6 - 8	4	1.4	1.3	2
	4800	200	8 - 10[d]	39	5.5	1	NA
	4800	200	10 - 11[d]	70.4	3.4	1.1	75
B03R111	4850	620	0 - 1[b]	5.2	1.5	1.4	7
	4850	620	1 - 2	4	1.2	1	NA
	4850	620	2 - 3	4	1	1.1	NA
B03R026	4900	300	0 - 2[d]	560.7	169.1	1	4,400
	4900	300	2 - 8[d]	88	23.1	2	500
	4900	300	9 - 10	1.0	0.6	0.9	NA
B03R025	4900	400	0 - 2[d]	291.6	79.3	2	3,000
	4900	400	2 - 4[d]	103	29.5	1	NA
	4900	400	6 - 7	6.9	1.5	1.4	3.9
	4900	400	9 - 10	1.0	0.7	0.9	NA

Table 4-24
(continued)

Borehole Number[a]	Coordinate East	Coordinate North	Depth (ft)	Concentration (pCi/g) Uranium-238	Radium-226	Thorium-232	Thorium-230
B03R024	4900	550	0 - 2	4.9	1.5	1	6.3
	4900	550	4 - 6[d]	28.9	4.9	0.9	NA
	4900	550	6 - 7[d]	12.3	1.8	1	25
B03W004	4948	205	2 - 3[d]	4.6	4.3	1	93
	4948	205	8 - 9[d]	173.3	61.2	1.5	NA
	4948	205	12 - 13	2	0.7	0.8	1.4
B03R031	4950	240	0 - 2[d]	3	2.1	0.8	41
	4950	240	8 - 10[d]	25.6	10.5	1.9	NA
	4950	240	12 - 13	3.9	0.9	1.3	1
B03R029A	4950	455	0 - 2[d]	6	9.9	1.7	170
	4950	455	6 - 8[d]	24.6	10.3	1.3	NA
	4950	455	13 - 14	2.6	0.9	1.2	2.6
B03R030	4970	380	0 - 2[d]	17.2	1.9	1.1	26
	4970	380	2 - 4	9.2	1.3	1	8.4
B03R032	5000	600	0 - 1[b]	3.5	1.2	1.1	8.9
	5000	600	3 - 4	4.6	1.9	1.5	NA
	5000	600	4 - 5	6.1	1.5	2.3	4.2
B03W003	5050	540	0 - 2[b]	4.1	1.2	1	12
	5050	540	8 - 9	2.7	0.9	1	4.8
B03R113	5050	600	0 - 1[b]	4	1.8	1.3	7
	5050	600	1 - 2	5.3	3.9	1	NA
	5050	600	2 - 3	5.5	2	1	NA
B03R035	5070	240	0 - 2[d]	32.2	1.1	1	2.1
	5070	240	2 - 3	12.8	0.9	1	2.2
	5070	240	7 - 8	3	0.9	0.8	NA
B03R034	5070	350	0 - 1[d]	31.8	4.6	1.9	49
	5070	350	2 - 4	6.4	1.3	1.1	14
B03R132	5090	550	1 - 2	4.6	1.8	1.3	3.3
	5090	550	5 - 6[d]	15	2.5	0.9	20
	5090	550	7 - 8[d]	500	29	7.1	700
B03R033	5100	550	0 - 2[b]	15.8	3.7	2.1	9.3
	5100	550	4 - 6[d]	212	14	1	NA
	5100	550	6 - 8[d]	208.2	10.4	1	300
B03R033A	5100	550	1 - 2[d]	2.2	0.8	0.6	67
	5100	550	5 - 6[d]	510	27	4.6	470
	5100	550	7 - 8[d]	580	25	4.1	660
B03R131	5103	541	1 - 2[b]	4.2	1.1	0.8	8.3
	5103	541	5 - 6[d]	42	3.4	1.2	44
	5103	541	7 - 8[d]	620	32	4.3	570

Table 4-24

(continued)

Borehole Number[a]	Coordinate East	Coordinate North	Depth (ft)	Concentration (pCi/g) Uranium-238	Radium-226	Thorium-232	Thorium-230
B03R133	5110	551	0 - 1	2.7	0.9	0.5	1.5
	5110	551	5 - 6[d]	1,500	54	2.3	810
	5110	551	7 - 8[d]	17	1.6	1.1	30
B03R040	5140	200	0 - 2[d]	45.2	54.4	1	1,200
	5140	200	6 - 8[d]	110.2	58.6	2	NA
	5140	200	8 - 10[d]	75.2	36.6	1	810
B03R039	5140	340	0 - 2[b]	3.8	1.5	1.5	6.4
	5140	340	2 - 3	15.9	1.3	0.9	4.6
B03R38	5140	450	0 - 2[d]	9.7	2.1	1	21
	5140	450	6 - 7	3	1	1	1.2
B03R114	5150	610	0 - 1[d]	4	1.7	1.1	13
	5150	610	1 - 2	4.5	1.6	1.2	NA
	5150	610	2 - 3	4	1.3	1.4	NA
B03R134	5173	453	0 - 0.5[d]	56.3	0.9	0.5	7.5
B03R119	5250	620	0 - 1[d]	12.2	6.2	1	74
	5250	620	1 - 2	5	1.4	1.4	NA
	5250	620	2 - 3	4	1	1	NA
B03R135	5290	517	0 - 1[d]	37	13	1.2	470
	5290	517	1 - 2[d]	4.7	1.8	1	52
	5290	517	2 - 3	6.6	0.8	1	8
	5290	517	3 - 3	46.7	1.1	0.7	5.9
B03R137	5318	313	0 - 1[b]	15	1.2	1.2	4.1
	5318	313	1 - 2	4.7	1.1	1.2	3.5
B03R044	5350	350	0 - 1[b]	3.2	1.8	1.3	10
	5350	350	3 - 4	2.8	1.2	1	NA
	5350	350	9 - 10	4.3	1.3	1	4.7
B03R043	5350	400	0 - 2[d]	5	2	1	23
	5350	400	7 - 8	2.7	0.8	1.3	0.9
B03R042A	5350	550	0 - 2[d]	8	1.7	1	17
	5350	550	9 - 10[d]	18.2	3.6	1.9	48
B03R124	5350	625	0 - 1[b]	10	2	1.5	7
	5350	625	1 - 2	19.6	4.1	1.1	NA
	5350	625	2 - 3	4	1	1	NA
B03R050	5400	200	0 - 2	2	1	1	1.4
	5400	200	4 - 6[d]	177.2	60	5.5	NA
	5400	200	10 - 12	12.2	0.9	0.9	3.8

Table 4-24

(continued)

Borehole Number[a]	Coordinate East	Coordinate North	Depth (ft)	Concentration (pCi/g) Uranium-238	Radium-226	Thorium-232	Thorium-230
B03R049	5400	250	0 - 2[b]	2	1.5	1.1	8.7
	5400	250	8 - 10[d]	17	2.1	1	43
B03R047	5400	600	0 - 1[b]	3.5	1.5	1.3	10
	5400	600	2 - 3	1	0.8	1.2	0.9
B03R051	5450	550	0 - 4	4.6	2.6	1.5	3.2
	5450	550	8 - 9[d]	5.8	1.2	1.5	26
	5450	550	9 - 10	2	1	1.3	NA
B03R054	5500	250	0 - 2[b]	2.5	2.1	1.3	12
	5500	250	6 - 7	2.4	1.2	0.8	9.6
AVERAGE				66.7	15.0	1.4	237.4
MINIMUM				1.0	0.6	0.5	0.9
MAXIMUM				1500.0	750.2	7.1	4400.0
STANDARD DEVIATION				179.3	70.8	0.9	692.9

[a]Sampling locations are shown in Figures 2-7 and 2-9.

[b]Contaminated between 0 and 0.5 ft.

[c]NA - not analyzed.

[d]Contaminated soil interval.

APPENDIX D

Heritage

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 _____ °F °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).

IUC INTERNATIONAL URANIUM (USA) CORPORATION

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

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,

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

2.0 Transportation Considerations

3.0 Process

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

5.0 Other Information
- 5.1 Added Advantage of Recycling

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

APPENDIX E

Cabot

INTERNATIONAL
URANIUM (USA)
CORPORATION

RECORD OF DISCUSSION

Date:	November 8, 2000	
Conversation Between:	William N. Deal	of IUC
And	Ron F. Hochstein	of IUC

Topic of Discussion: Uranium feed grades of processed materials

Distribution:

Based on mill production records the uranium grades of the Ashland 2, Cabot and Cameco calcine material are as follows:

Material	% U_3O_8	%U
Ashland 2	0.012%	0.01%
Cabot	0.404%	0.343%
Calcine	7.58%	6.53%

White Mesa Mill
DAILY CABOT MATERIAL RECEIPTS

Date: 3/27/98

Cabot Shipment Number	Invoice No.	Container Number In	White Mesa Mill Load No.	Gross Weight In Includes Tractor	Tractor Weight	Gross Weight In Trailer & Container	Date Out	White Mesa Mill Load No.	Gross Weight Out Includes Tractor	Tractor Weight	Gross Weight Out Trailer & Container	Net Material Weight	% Moist.	Net Material Dry Wt.
1230	607	NTNU93150	6991	63760	15860	47900	3/27/98	6999	42000	24480	17520	30380	33.2	20293.84
1231	1141	I2647	6992	75680	16780	58900	3/27/98	7000	44080	24480	19600	39300	31.2	27038.40
1232	776	IS26334	6993	75460	16680	58780	3/27/98	7001	43760	24480	19280	39500	32.9	26504.50
1233	779	IS26460	6997	74520	16040	58480	3/27/98	7002	43900	24480	19420	39060	33.4	26013.96
1234	739	I25637	6998	75980	17700	58280	3/27/98	7003	43900	24480	19420	38860	29.5	27396.30
1235	1220	I25690	7024	73020	17720	55300	3/27/98	7025	43980	24480	19500	35800	12.8	31217.60
1236	714	NTNU93033	7026	71780	17780	54000	3/27/98	6995	42100	24480	17620	36380	27.7	26302.74
1237	756	I2616	7027	74420	16400	58020	3/27/98	7033	44060	24480	19580	38440	34.1	25331.96
1238	X366104	IS26462	7028	76320	17720	58600	3/27/98	6988	43980	24480	19500	39100	31.7	26705.30
1239	866	IS26490	7029	75260	17160	58100	3/27/98	7043	43800	24480	19320	38780	30.6	26913.32
1240	1168	IS26303	7032	74580	16580	58000	3/27/98	7041	44540	24480	20060	37940	33.6	25192.16
1241	1170	PLRU51151	7034	75800	16980	58820	3/27/98	7039	43700	24480	19220	39600	31	27324.00
1242	868	IS26323	7035	75980	17820	58160	3/27/98	7038	43920	24480	19440	38720	31.2	26639.36
1243	872	PLRU25675	7047	74660	17600	57060	3/27/98	6990	44460	24480	19980	37080	33.6	24621.12
										Daily Total Tons		264.47		183.7473
										Total Tons To Date		24080.95		16828.88

CABOT

— REVISED —

TO: Mark Tornetta

FROM: R. A. Hard

cc: Tom Odle
Tony Hickl
Bob Barron
Tony Campitelli
Nick Feola

Post-it™ brand fax transmittal memo 7671 | # of pages ▸

To D. Mount	From Tony C.
Co.	Co.
Dept.	Phone #
Fax # 552	Fax #

DATE: July 5, 1994

Subject: **Average Composition of Tantalum Residues**

In discussions with outsiders about the composition of our residues, we are often asked for complete analyses. Although we have many analyses of Ta and Cb, we do not have many total analyses. However, in 1990 we submitted ten 55-gallon drums of material from bins 2,4,7,8 to Metallurg for them to evaluate for furnace concentration in Germany. In thorough German fashion, they made total analyses of the material and gave us the results.

I compiled the results of their analyses which were expressed as the elements, and calculated the average values and the standard deviation, then converted the values to normal fluorides. Lo and behold, I came out with 100% accountability! The data and results are shown in Table 1. The only discrepancy is that the calculated fluoride is 51%, whereas their average fluoride is 39%. This can be explained by assuming that some of the compounds are present as oxyfluorides rather than fluorides. This is most likely true of Cb,Ti and Zr and possibly Al.

Note that they report an average of 5.57% Ta_2O_5, whereas we used 2.48% in the AFE. My leaching studies averaged 3.82%, which I think is closer to the real value. Also, note that the uranium was analyzed at 0.19% and the thorium at 0.43%. We normally quote the uranium at 0.3% and the thorium at 0.4%.

We have another potential source of good analytical data at the Bureau of Mines from thirteen samples from all bins, but they won't send us the results until we sign the CREADA. Until then, I recommend we use the last column in Table 1 as the "official analyses" of the residues.

R. A. Hard

Robert A. Hard, Consultant

TARESID.RAH
Attachment

TABLE 1-TYPICAL SAMPLES OF CABOT'S TANTALUM RESIDUE

Percent by Weight in Dry Sludge

Sample No.	1	2	3	4	5	6	7	8	9	10	Average	Std.Dev.
Ta(water sol	2.02%	3.28%	2.51%	1.06%	4.15%	2.63%	1.75%	2.11%	1.00%	0.69%	2.12%	1.02%
Cb(water so	1.93%	1.86%	2.03%	0.74%	2.55%	1.92%	2.47%	2.53%	0.80%	0.71%	1.75%	0.70%
Ta(water in	1.58%	1.02%	0.69%	1.59%	0.17%	0.64%	0.43%	1.50%	1.68%	0.11%	0.94%	0.58%
Cb(water in	1.87%	0.84%	0.47%	1.91%	0.17%	0.63%	0.43%	1.26%	2.17%	0.09%	0.98%	0.73%
Ca	17.90%	12.30%	12.70%	12.80%	13.30%	13.20%	17.40%	21.70%	19.60%	13.50%	15.44%	3.23%
Al	9.60%	10.50%	11.20%	10.00%	13.30%	11.10%	6.50%	5.70%	4.90%	9.10%	9.19%	2.55%
Fe	1.10%	1.60%	1.30%	1.30%	1.70%	4.60%	1.70%	0.90%	0.80%	0.30%	1.53%	1.11%
Ti	0.70%	0.50%	0.50%	0.30%	0.30%	0.70%	0.30%	0.80%	0.60%	0.10%	0.48%	0.21%
F	39.00%	39.00%	40.50%	29.00%	42.50%	46.00%	39.20%	35.10%	34.90%	44.00%	38.92%	4.70%
SO4	0.60%	1.30%	0.90%	0.40%	0.30%	0.20%	0.30%	0.50%	0.60%	0.30%	0.54%	0.32%
C	5.20%	1.70%	1.70%	1.20%	1.00%	0.60%	1.30%	1.20%	5.50%	1.30%	2.07%	1.67%
Cr	1.60%	0.90%	0.70%	0.10%	0.10%	0.30%	0.50%	1.20%	1.60%	0.10%	0.71%	0.56%
Pb	0.06%	0.20%	0.20%	0.08%	0.01%	0.02%	0.00%	0.30%	0.07%	0.01%	0.10%	0.10%
Mg	1.20%	1.20%	1.20%	2.20%	2.10%	2.30%	2.10%	1.30%	1.30%	2.30%	1.72%	0.49%
Ba	4.00%	2.10%	2.10%	0.70%	0.30%	1.00%	2.00%	1.70%	4.30%	0.40%	1.86%	1.32%
Zr	2.00%	2.10%	2.20%	7.00%	5.40%	6.40%	5.30%	2.70%	2.10%	5.40%	4.06%	1.91%
Sn	3.00%	11.60%	11.30%	3.30%	0.50%	0.50%	0.30%	2.40%	3.30%	0.60%	3.68%	4.05%
Th	0.20%	0.30%	0.30%	0.70%	0.50%	0.70%	0.50%	0.30%	0.30%	0.50%	0.43%	0.17%
U	0.10%	0.30%	0.30%	0.20%	0.20%	0.20%	0.10%	0.20%	0.10%	0.20%	0.19%	0.07%
Mn												
Total Ta2O	6.55%	7.83%	5.82%	4.82%	7.86%	5.94%	3.97%	6.56%	4.88%	1.46%	5.57%	1.82%
Total Cb2O	5.43%	3.86%	3.58%	3.79%	3.89%	3.65%	4.15%	5.41%	4.25%	1.14%	3.92%	1.12%
%soluble												
Ta2O5	30.83%	41.91%	43.10%	21.98%	52.78%	44.18%	44.12%	32.08%	20.50%	47.39%	37.89%	10.36%
Cb2O5	35.52%	48.17%	56.78%	19.53%	65.56%	52.65%	59.58%	46.66%	18.84%	62.06%	46.53%	15.93%
Average Ta2O5												

Average Values Expressed as Fluorides

TaF5	3.23%
CbF5	3.55%
TaF5	1.43%
CbF5	1.99%
CaF2	30.11%
AlF3	31.02%
FeF3	3.09%
TiF4	1.13%
F	
SO4	0.32%
C	1.67%
CrF3	1.49%
PbF2	0.11%
MgF2	4.44%
BaF2	2.20%
ZrF4	7.45%
SnF4	6.03%
ThF4	0.59%
UF4	0.25%
Total as Fluorides	100.11%

TYPICAL SAMPLES OF CABOT'S TANTALUM RESIDUE

Percent by Weight in Dry Sludge

Sample No.	1	2	3	4	5	6	7	8	9	10	11
Ca	17.90%	12.30%	12.70%	12.80%	13.30%	13.20%	17.40%	21.70%	19.60%	13.50%	12.10%
Al	9.60%	10.50%	11.20%	10.00%	13.30%	11.10%	6.50%	5.70%	4.90%	9.10%	5.70%
Fe	1.10%	1.60%	1.30%	1.30%	1.70%	4.60%	1.70%	0.90%	0.80%	0.30%	2.63%
Ti	0.70%	0.50%	0.50%	0.30%	0.30%	0.70%	0.30%	0.80%	0.60%	0.10%	1.28%
F	39.00%	39.00%	40.50%	29.00%	42.50%	46.00%	39.20%	35.10%	34.90%	44.00%	
SO4	0.60%	1.30%	0.90%	0.40%	0.30%	0.20%	0.30%	0.50%	0.60%	0.30%	
C	5.20%	1.70%	1.70%	1.20%	1.00%	0.60%	1.30%	1.20%	5.50%	1.30%	
Cr	1.60%	0.90%	0.70%	0.10%	0.10%	0.30%	0.50%	1.20%	1.60%	0.10%	0.20%
Pb	0.06%	0.20%	0.20%	0.08%	0.01%	0.02%	0.00%	0.30%	0.07%	0.01%	0.30%
Mg	1.20%	1.20%	1.20%	2.20%	2.10%	2.30%	2.10%	1.30%	1.30%	2.30%	1.50%
Ba	4.00%	2.10%	2.10%	0.70%	0.30%	1.00%	2.00%	1.70%	4.30%	0.40%	4.20%
Zr	2.00%	2.10%	2.20%	7.00%	5.40%	6.40%	5.30%	2.70%	2.10%	5.40%	3.32%
Sn	3.00%	11.60%	11.30%	3.30%	0.50%	0.50%	0.30%	2.40%	3.30%	0.60%	
Th	0.20%	0.30%	0.30%	0.70%	0.50%	0.70%	0.50%	0.30%	0.30%	0.50%	0.19%
U	0.10%	0.30%	0.30%	0.20%	0.20%	0.20%	0.10%	0.20%	0.10%	0.20%	0.19%

APPENDIX F

White Mesa Mill Production

INTERNATIONAL URANIUM (USA) CORPORATION

November 9, 2000

METALLURGICAL BALANCE

19-C

	Month September, 2000			Year to date-September, 2000			Inception-to-date		
INPROCESS INVENTORY:	Tons	Grade	Lbs. U3O8	Tons	Grade	Lbs. U3O8	Tons	Grade	Lbs. U3O8
Pulp Storage Tanks - beginning			0			0			0
Plant Circuit -beginning			0			0			0
Total Beginning Inventory			* 14,500			* 14,500			0
Pulp Storage Tanks - ending			0			0			0
Plant Circuit - ending			0			0			0
Total Ending Inventory			14,500			14,500			* 14,500
(Increase) Decrease - In Process Inventory			0			0			(14,500)
RECOVERY									
Ore to Pulp Storage Tanks	0	0.00	0	0	0.000	0	3,846,667	0.365	28,078,382
Adjustments to Prior Months	0		0	0		0	(4,829)		23,558
Other Mill Feed Additions	0	0.000	0	0	#DIV/0!	0	63,144	1.171	1,478,746
Total Adjusted Mill Feed	0	0.000	0	0	#DIV/0!	0	3,904,982	0.379	29,580,686
In Process Inventory Change			0			0			(14,500)
Total Possible Production			0			0			29,566,186
Indicated Production			0			0			28,320,080
Concentrate Adjustments - Final Wts & Assays			0			0			(18,023)
Adjusted Production			0			0			28,302,057
Per Cent Recovery			0.00%			#DIV/0!			95.72%
LOSSES									
Insoluble Tailings			0			0			1,291,429
Soluble Tailings			0			0			(31,740)
Total Tailing Losses			0			0			1,259,689
ACCOUNTABILITY									
Total Tailings & Production			0			0			29,561,746
Total Possible Production			0			0			29,566,186
Unaccountable (Gain) Loss			0			0			4,440
FINAL CONCENTRATES:									
Beginning Inventory			0			316,802			0
Adjusted Production			0			792			28,305,400
Concentrate Shipments (incld. Final Adjust.)			0			317,594			28,305,399
Ending Inventory			0			0			0

Prepared by: Terry Slade

*Includes 14,500 pounds of intermediate product from Cabot run.

xc: R. Hochstein, W.N. Deal, J. Conrad

Natural Ore Average Thorium Calculation

I) Assumptions

- Ore processed = 3,846,667 tons
- Uranium ore grade = 0.310%U
- Uranium ore in secular equilibrium
- Uranium 238 specific activity = 0.333×10^{-6} Ci/g

II) Calculation of uranium processed

$3.85 \times 10^{6} \times 0.310\% = 11{,}925$ tons

11,925 tons x 2,000 lbs/ton x 453.6 g/lb = 1.08×10^{10} grams U_{nat}

III) Conversion of mass to activity

Unat = 99.27% U_{238} and 0.72% U_{235}

$1.08 \times 10^{10} \times 99.27\% = 1.07 \times 10^{10}$ g U_{238}

1.07×10^{10} g x 0.333×10^{-6} Ci/g = 3,576 Ci

Assuming secular equilibrium implies that activities are equal, that is thorium 230 activity in the natural ore = 3,576 Ci.

APPENDIX G

Ashland 2

INTERNATIONAL
URANIUM (USA)
CORPORATION

RECORD OF DISCUSSION

Date: November 8, 2000
Conversation Between: William N. Deal of IUC
And Ron F. Hochstein of IUC

Topic of Discussion: Uranium feed grades of processed materials

Distribution:

Based on mill production records the uranium grades of the Ashland 2, Cabot and Cameco calcine material are as follows:

Material	% U_3O_8	%U
Ashland 2	0.012%	0.01%
Cabot	0.404%	0.343%
Calcine	7.58%	6.53%

ENERGY LABORATORIES, INC.
SHIPPING: 2393 SALT CREEK HIGHWAY • CASPER, WY 82601
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LABORATORY ANALYSIS REPORT - INTERNATIONAL URANIUM CORP

Sample ID:	Ashland Feed II
Laboratory ID:	98-54668
Sample Matrix:	Soil
Sample Date/Time:	09-11-98 @ 07:00
Date Received:	09-14-98
Report Date:	October 8, 1998

Radiometric		Method	Detection Limit	Units	Results
Uranium	^{Nat}U	200.8	0.01	pCi/g	150
Radium -226	^{226}Ra	903.0	0.01	pCi/g	40.7
Radium Precision ±					0.7
Thorium-230	^{230}Th	907.0	0.01	pCi/g	6950
Thorium Precision ±					178
Lead -210	^{210}Pb	NERHL-65-4	0.05	pCi/g	56.5
Lead Precision ±					0.7

dmc r:\reports\clients98\intl_uran_corp\soil\rc54668.xls

APPENDIX H

Cameco KF

ENERGY LABORATORIES
Billings • Casper • Gillette • Rapid City
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MAILING: P.O. BOX 3258 • CASPER, WY 82602
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LABORATORY ANALYSIS REPORT - INTERNATIONAL URANIUM (USA) CORPORATION

Project:	White Mesa Mill
Sample ID:	Cameco Feed .
Laboratory ID:	99-21143
Sample Matrix:	Soil
Sample Date/Time:	03-22-99
Date Received:	03-24-99
Report Date:	April 18, 1999

Radiometric		Method	Detection Limit	Units	Results
Uranium	^{Nat}U	200.8	0.01	pCi/g	30800
Radium-226	^{226}Ra	903.0	0.01	pCi/g	1550
Radium Precision ±					4.11
Thorium-230	^{230}Th	907.0	0.01	pCi/g	3170
Thorium Precision ±					27.4
Lead -210	^{210}Pb	NERHL-65-4	0.05	pCi/g	101
Lead Precision ±					2.75

Cameco Feed KF majority of matl on hand.

WHITE MESA MILL
K-F PRODUCT INVENTORY
11/10/2000 14:39

				BEGINNING INVENTORY		RECEIPTS		FEED		ENDING INVENTORY			
DATE SHIPPED	DATE REC'D	DISPATCH NO.	LOT NO.	NO. DRUMS	NET WEIGHT	NO. DRUMS	NET WEIGHT	NO. DRUMS	NET WEIGHT	NO. DRUMS	NET WEIGHT	GRADE REC'D	GRADE PROC.
01/29/1999	02/01/1999	67605		0	0	88	30780	0	0	88	30780		
02/05/1999	02/08/1999	67804		88	30780	88	27780	0	0	176	58560		
02/12/1999	02/15/1999	68022		176	58560	116	42720	0	0	292	101280		
02/19/1999	02/24/1999	68312		292	101280	120	41540	0	0	412	142820		
03/05/1999	03/09/1999	68745		412	142820	120	42140	0	0	532	184960		
03/12/1999	03/15/1999	47780		532	184960	120	40460			652	225420		
03/19/1999	03/23/1999	69190		652	225420	116	42600			768	268020		
03/26/1999	03/30/1999	69430		768	268020	140	43420			908	311440		
03/31/1999	04/05/1999	47950		908	311440	140	41260			1048	352700		
04/12/1999	04/16/1999	69895		1048	352700	140	43200			1188	395900		
04/16/1999	04/19/1999	70049		1188	395900	144	42660			1332	438560		
04/20/1999	04/23/1999	70111		1332	438560	136	43720			1468	482280		
04/30/1999	05/04/1999	70461		1468	482280	124	43140			1592	525420		
05/11/1999	05/14/1999	70782		1592	525420	125	43340			1717	568760		
05/21/1999	05/27/1999	71113		1717	568760	124	42500			1841	611260		
05/28/1999	06/02/1999	48332		1841	611260	152	43180			1993	654440		
06/04/1999	06/09/1999	48350		1993	654440	136	42200			2129	696640		
06/10/1999	06/14/1999	71665		2129	696640	136	42200			2265	738840		
06/11/1999	06/17/1999	48274		2265	738840	136	43360			2401	782200		
06/17/1999	06/22/1999	71886		2401	782200	119	43580			2520	825780		
06/25/1999	06/29/1999	48445		2520	825780	124	43300			2644	869080		
07/08/1999	07/12/1999	48444		2644	869080	124	42760			2768	911840		
07/09/1999	07/13/1999	48501		2768	911840	122	43180			2890	955020		
07/15/1999	07/19/1999	72699		2890	955020	118	43440			3008	998460		
07/16/1999	07/20/1999	72711		3008	998460	108	42060			3116	1040520		
07/23/1999	07/26/1999	72941		3116	1040520	127	42720			3243	1083240		
07/30/1999	08/02/1999	73120		3243	1083240	140	43420			3383	1126660		
07/29/1999	08/02/1999	73065		3383	1126660	138	42620			3521	1169280		
08/05/1999	08/09/1999	73263		3521	1169280	132	42780			3653	1212060		
08/12/1999	08/16/1999	73463		3653	1212060	146	43440			3799	1255500		
08/13/1999	08/17/1999	73477		3799	1255500	144	42360			3943	1297860		
08/19/1999	08/23/1999	73631		3943	1297860	140	42700			4083	1340560		
08/20/1999	08/24/1999	73719		4083	1340560	148	43180			4231	1383740		
08/27/1999	08/31/1999	73881		4231	1383740	156	43980			4387	1427720		

WHITE MESA MILL
K-F PRODUCT INVENTORY
11/10/2000 14:39

				BEGINNING INVENTORY		RECEIPTS		FEED		ENDING INVENTORY			
DATE SHIPPED	DATE REC'D	DISPATCH NO.	LOT NO.	NO. DRUMS	NET WEIGHT	NO. DRUMS	NET WEIGHT	NO. DRUMS	NET WEIGHT	NO. DRUMS	NET WEIGHT	GRADE REC'D	GRADE PROC.
08/26/1999	08/31/1999	48733		4387	1427720	152	43800			4539	1471520		
09/03/1999	09/07/1999	74067		4539	1471520	155	43800			4694	1515320		
09/02/1999	09/07/1999	74073		4694	1515320	140	46300			4834	1561620		
09/09/1999	09/13/1999	74215		4834	1561620	146	44540			4980	1606160		
09/10/1999	09/13/1999	74255		4980	1606160	120	42720			5100	1648880		
09/17/1999	09/21/1999	74463		5100	1648880	136	73780			5236	1722660		
09/16/1999	09/21/1999	74461		5236	1722660	127	43540			5363	1766200		
09/23/1999	09/27/1999	74658		5363	1766200	142	43700			5505	1809900		
09/24/1999	09/28/1999	74726		5505	1809900	120	44640			5625	1854540		
10/07/1999	10/11/1999	75122		5625	1854540	132	44500			5757	1899040		
10/07/1999	10/11/1999	75121		5757	1899040	132	45060			5889	1944100		
10/04/1999	10/09/1999	75019		5889	1944100	134	46980			6023	1991080		
10/08/1999	10/12/1999	75141		6023	1991080	134	43560			6157	2034640		
10/14/1999	10/18/1999	75268		6157	2034640	132	43520			6289	2078160		
10/15/1999	10/18/1999			6289	2078160	124	42300			6413	2120460		
10/21/1999	10/25/1999			6413	2120460	130	33120			6543	2153580		
10/22/1999	10/27/1999	49046		6543	2153580	124	43140			6667	2196720		
10/28/1999	11/01/1999	49078		6667	2196720	130	45320			6797	2242040		
10/29/1999	11/02/1999	49092		6797	2242040	108	42540			6905	2284580		
11/05/1999	11/09/1999	49155		6905	2284580	128	43540			7033	2328120		
11/11/1999	11/15/1999	76208		7033	2328120	114	43480			7147	2371600		
11/18/1999	11/22/1999	49267		7147	2371600	124	43600			7271	2415200		
11/19/1999	11/24/1999	76460		7271	2415200	130	43900			7401	2459100		
11/26/1999	11/29/1999	49275		7401	2459100	124	43180			7525	2502280		
11/26/1999	11/30/1999	76696		7525	2502280	130	43440			7655	2545720		
12/03/1999	12/06/1999	76910		7655	2545720	144	43860			7799	2589580		
12/02/1999	12/07/1999	76851		7799	2589580	145	43900			7944	2633480		
12/09/1999	12/13/1999	49353		7944	2633480	142	43980			8086	2677460		
12/10/1999	12/13/1999	77115		8086	2677460	145	43700			8231	2721160		
12/17/1999	12/20/1999	49053		8231	2721160	142	44060			8373	2765220		
12/16/1999	12/20/1999	77320		8373	2765220	138	43400			8511	2808620		
12/16/1999	12/20/1999	77364		8511	2808620	134	43940			8645	2852560		
12/17/1999	12/22/1999	77417		8645	2852560	136	43940			8781	2896500		
12/23/1999	12/28/1999	49443		8781	2896500	128	44480			8909	2940980		

WHITE MESA MILL
K-F PRODUCT INVENTORY
11/10/2000 14:39

				BEGINNING INVENTORY		RECEIPTS		FEED		ENDING INVENTORY			
DATE SHIPPED	DATE REC'D	DISPATCH NO.	LOT NO.	NO. DRUMS	NET WEIGHT	NO. DRUMS	NET WEIGHT	NO. DRUMS	NET WEIGHT	NO. DRUMS	NET WEIGHT	GRADE REC'D	GRADE PROC.
12/23/1999	12/28/1999	77561		8909	2940980	138	43360			9047	2984340		
12/27/1999	12/31/1999	77612		9047	2984340	128	44680			9175	3029020		
12/27/1999	12/31/1999	49490		9175	3029020	120	44820			9295	3073840		
01/07/2000	01/11/2000	77811		9295	3073840	126	43920			9421	3117760		
01/06/2000	01/11/2000	77817		9421	3117760	128	44220			9549	3161980		
01/13/2000	01/17/2000	77998		9549	3161980	130	44560			9679	3206540		
01/13/2000	01/17/2000	49523		9679	3206540	133	44140			9812	3250680		
01/14/2000	01/19/2000	78100		9812	3250680	126	43980			9938	3294660		
01/14/2000	01/19/2000	78075		9938	3294660	130	43520			10068	3338180		
01/20/2000	01/24/2000	78242		10068	3338180	132	43900			10200	3382080		
01/21/2000	01/25/2000	78272		10200	3382080	135	44100			10335	3426180		
01/27/2000	01/31/2000	49567		10335	3426180	135	44120			10470	3470300		
01/28/2000	01/31/2000	78528		10470	3470300	140	44000			10610	3514300		
01/27/2000	01/31/2000	49607		10610	3514300	113	43140			10723	3557440		
01/28/2000	02/02/2000	78570		10723	3557440	131	43120			10854	3600560		
02/03/2000	02/08/2000	78655		10854	3600560	137	44120			10991	3644680		
02/03/2000	02/08/2000	78693		10991	3644680	134	43480			11125	3688160		
02/04/2000	02/08/2000	49645		11125	3688160	134	44280			11259	3732440		
02/04/2000	02/09/2000	78749		11259	3732440	142	44180			11401	3776620		
02/10/2000	02/14/2000	78872		11259	3732440	132	44220			11391	3776660		
02/10/2000	02/14/2000	78845		11391	3776660	137	43840			11528	3820500		
02/17/2000	02/21/2000	49744		11528	3820500	134	43920			11662	3864420		
02/14/2000	02/21/2000	79123		11662	3864420	140	43640			11802	3908060		
02/18/2000	02/22/2000	79138		11802	3908060	152	44120			11954	3952180		
02/24/2000	02/28/2000	79298		11954	3952180	142	44020			12096	3996200		
02/25/2000	03/01/2000	79354		12096	3996200	128	43700			12224	4039900		
03/02/2000	03/06/2000	76541		12224	4039900	118	44440			12342	4084340		
03/03/2000	03/06/2000	79618		12342	4084340	123	43780			12465	4128120		
03/09/2000	03/13/2000	79817		12465	4128120	130	44080			12595	4172200		
03/09/2000	03/13/2000	79792		12595	4172200	124	43780			12719	4215980		
03/10/2000	03/14/2000	79794		12719	4215980	129	44800			12848	4260780		
03/10/2000	03/15/2000	79815		12848	4260780	118	38260			12966	4299040		
04/20/2000	04/24/2000	81059		12966	4299040	124	44280			13090	4343320		
04/20/2000	04/24/2000	50160		13090	4343320	133	44420			13223	4387740		

WHITE MESA MILL
K-F PRODUCT INVENTORY
11/10/2000 14:39

				BEGINNING INVENTORY		RECEIPTS		FEED		ENDING INVENTORY			
DATE SHIPPED	DATE REC'D	DISPATCH NO.	LOT NO.	NO. DRUMS	NET WEIGHT	NO. DRUMS	NET WEIGHT	NO. DRUMS	NET WEIGHT	NO. DRUMS	NET WEIGHT	GRADE REC'D	GRADE PROC.
04/28/2000	05/02/2000	81325		13223	4387740	144	45140			13367	4432880		
04/28/2000	05/02/2000	50197		13367	4432880	134	44460			13501	4477340		
05/04/2000	05/05/2000	50212		13501	4477340	129	44300			13630	4521640		
05/26/2000	05/30/2000	82190		13630	4521640	130	43940			13760	4565580		
05/26/2000	05/30/2000	50297		13760	4565580	129	42940			13889	4608520		
06/01/2000	06/05/2000	50373		13889	4608520	131	43080			14020	4651600		
06/09/2000	06/14/2000	50411		14020	4651600	122	42400			14142	4694000		
10/12/2000	10/16/2000	50592		14142	4694000	113	42920			14255	4736920		
10/13/2000	10/17/2000	50969		14255	4736920	143	43100			14398	4780020		
10/12/2000	10/16/2000	50592		14398	4780020	113	42920			14511	4822940		
TOTAL						14653	4867120	0					
					Net Wt (less empty drum wt)		3932259						
					Ave Drums/Load	130.8304	43456.4						
					Ave Gross Wt. Drum	332.1586							
					Ave Empty wt Drum	63.8							
					Ave Net Wt/Drum	268.3586							

APPENDIX I

Allied Signal – Calcium Fluoride

1996 Campaign

ALLIED CALCIUM FLUORIDE FED TO PROCESS

DATE	MILL LOT #	WET TONS	% H20	DRY TONS	GOVERNING % U308	LBS U308	FINAL?
12-3-95	LOT 1	74.55	2.85	72.43	3.000	4,345.52	Y
12-30-95	LOT 2	269.38	3.85	259.01	2.490	12,898.64	Y
1-12-96	LOT 3	161.25	4.55	153.91	2.210	6,802.96	Y
1-22-96	LOT 4	140.56	2.30	137.33	2.190	6,014.93	Y
	ADJUST			(67.61)	2.414	(3,264.21)	
ADJUST							
	TOTALS	645.74		555.06	2.414	26,797.84	

2.05% U

ACTUAL ORE TONS/GOVERNING GRADE	555.06	2.414	26,797.84
• MINE PROBE	555.06	0	0.00
VARIANCE	(0.00)		(26,797.84)
ESTIMATED REMAINING MILL FEED	(0.00)		(26,797.84)

• UMETCO GROSS WEIGHT 621.565 TONS LESS 66.18 TONS TARE =555.385 WET TONS

555.385 x % H20 = DRY TONS

CaF_2 Summary Sheets
1999 Campaign

Month		No. Drums	Weight	Lbs. U3O8
June	old	550	323,780	9,903
	new	0	-	-
	Total / Avg	550	323,780	9,903
July	old	860	510,111	22,056
	new	700	406,264	15,478
	Total / Avg	1560	916,375	37,534
August	old	1150	681,933	24,989
	new	500	290,189	9,745
	Total / Avg	1650	972,122	34,734
September	old	640	374,567	17,627
	new	860	499,430	19,273
	Total / Avg	1500	873,997	36,900
October	old	0	-	-
	new	845	490,288	19,830
	Total / Avg	845	490,288	19,830
Total	old	3200	1,890,392	74,575
	new	2905	1,686,170	64,325
	Total / Avg	6105	3,576,562	138,900

Average Grade (% U3O8)	3.88%
Average Grade (%U)	3.29%

INTERNATIONAL
URANIUM (USA)
CORPORATION

RECORD OF DISCUSSION

Date:	November 8, 2000	
Conversation Between:	Marshall Sheppard	of Honeywell
And	Ron Hochstein	of IUC
Topic of Discussion:	Thorium Content of Allied Signal Material	
Distribution:	David Frydenlund	

The thorium content of the KOH solution recovery material is very low, for all intents and purposes, zero.

For the calcium fluoride material the thorium content will be based on the thorium content of the plant feed because all of the thorium will report to this stream. Based on 12 years of operating data, the average thorium content of the plant feed is 14,448 Pci/g; therefore, the average thorium concentration for the calcium fluoride material is estimated at 14,448 Pci/g.

APPENDIX J

Cameco – UF_4 and Regen

CAMECO URANIUM MATERIALS INVENTORY

Designation	Weight (approximately)	Current Inventory No. of packages (approximately)	Uranium Content (estimated)	lbs Recoverable	Comments	Approx. % of Total Weight
UF4 / Filter Ash	9,000 kg 9 tonne 19,800 lb 9.9 ton	30 Drums	5,850 kg U 12,900 lb U (~65% U)	11,000 lb U	In 55 gal steel drums. Periodic shipments to be decided.	0.5%
Regeneration Product	401, 000 kg 401 tonne 884,000 lb 442 ton	2,000 Drums	~ 16,000 kg U ~ 35,300 lb U (1-20% U)	31,700 lb U	In 55 gal blue poly drums. Generate 300 drums/year.	18.8%

INTERNATIONAL
URANIUM (USA)
CORPORATION

RECORD OF DISCUSSION

Date:	November 8, 2000	
Conversation Between:	Tom Smith	of Cameco
And	Ron F. Hochstein	of IUC

Topic of Discussion: Thorium Content of Cameco Materials

Distribution:

The thorium content of the regen will be negligible. For the UF4 material the estimated value is less than 0.1 pCi/g.

WHITE MESA MILL
REGEN BY-PRODUCT INVENTORY
11/10/2000 14:56

				BEGINNING INVENTORY		RECEIPTS		FEED		ENDING INVENTORY	
DATE SHIPPED	DATE REC'D	DISPATCH NO.	LOT NO.	NO. DRUMS	NET WEIGHT	NO. DRUMS	NET WEIGHT	NO. DRUMS	NET WEIGHT	NO. DRUMS	NET WEIGHT
02/08/1999	02/12/1999	67879		0	0	56	30540	0	0	56	30540
02/17/1999	02/22/1999	68191		56	30540	54	30280	0	0	110	60820
02/24/1999	02/26/1999	68476		110	60820	57	34140	0	0	167	94960
03/01/1999	03/03/1999	68588		167	94960	57	24980	0	0	224	119940
03/17/1999	03/22/1999	RP99-05		224	119940	57	32240			281	152180
03/25/1999	03/29/1999	69387		281	152180	57	30020			338	182200
03/26/1999	03/30/1999	RP99-07		338	182200	57	32920			395	215120
04/06/1999	04/09/1999	RP99-08		395	215120	57	31620			452	246740
04/13/1999	04/19/1999	69908		452	246740	57	29760			509	276500
04/19/1999	04/23/1999	70115		509	276500	57	31240			566	307740
04/21/1999	04/26/1999	70299		566	307740	57	28400			623	336140
04/26/1999	04/29/1999	70356		623	336140	57	30060			680	366200
05/06/1999	05/10/1999	70626		680	366200	57	23440			737	389640
05/13/1999	05/17/1999	70880		737	389640	57	28900			794	418540
05/17/1999	05/20/1999	70971		794	418540	57	29320			851	447860
05/20/1999	05/25/1999	RP99-16		851	447860	57	25640			908	473500
05/26/1999	05/30/1999	71242		908	473500	57	26000			965	499500
06/07/1999	06/11/1999	71608		965	499500	57	25520			1022	525020
06/09/1999	06/14/1999	RP99-19		1022	525020	57	25660			1079	550680
06/10/1999	06/16/1999	71756		1079	550680	57	17820			1136	568500
06/18/1999	06/21/1999	71817		1136	568500	57	22740			1193	591240
06/16/1999	06/21/1999	71863		1193	591240	57	24560			1250	615800
06/21/1999	06/24/1999	RP99-23		1250	615800	57	24820			1307	640620
06/22/1999	06/25/1999	RP99-24		1307	640620	57	28820			1364	669440
06/24/1999	06/28/1999	72141		1364	669440	57	30360			1421	699800
08/09/1999	08/12/1999	73341		1421	699800	57	29340			1478	729140
08/11/1999	08/14/1999	73433		1478	729140	57	28580			1535	757720

WHITE MESA MILL
REGEN BY-PRODUCT INVENTORY
11/10/2000 14:56

				BEGINNING INVENTORY		RECEIPTS		FEED		ENDING INVENTORY	
DATE SHIPPED	DATE REC'D	DISPATCH NO.	LOT NO.	NO. DRUMS	NET WEIGHT	NO. DRUMS	NET WEIGHT	NO. DRUMS	NET WEIGHT	NO. DRUMS	NET WEIGHT
08/10/1999	08/16/1999	RP99-27		1535	757720	57	30960			1592	788680
08/16/1999	08/19/1999	73545		1592	788680	57	30100			1649	818780
08/24/1999	08/27/1999	83831		1649	818780	57	31180			1706	849960
08/27/1999	08/30/1999	73888		1706	849960	57	32300			1763	882260
08/30/1999	09/03/1999	RP99-32		1763	882260	57	31420			1820	913680
09/08/1999	09/13/1999	74178		1820	913680	57	31960			1877	945640
09/08/1999	09/13/1999	RP99-33		1877	945640	57	31480			1934	977120
09/10/1999	09/13/1999	74274		1934	977120	57	32480			1991	1009600
09/14/1999	09/17/1999	74276		1991	1009600	57	30300			2048	1039900
10/14/1999	10/18/1999	75311		2048	1039900	57	34440			2105	1074340
10/19/1999	10/21/1999	RP99-38		2105	1074340	57	32860			2162	1107200
10/26/1999	10/29/1999	75724		2162	1107200	57	32760			2219	1139960
10/31/1999	11/01/1999	75738		2219	1139960	57	33400			2276	1173360
10/25/1999	10/29/1999	RP99-41		2276	1173360	57	31360			2333	1204720
02/23/2000	02/28/2000	79299		2333	1204720	57	32540			2390	1237260
04/24/2000	04/27/2000	RP2000-02		2390	1237260	57	32780			2447	1270040
TOTAL				TOTAL REC'D		2447	1270040	0	0		
				TOTAL NET(LESS DRUM WT)			1113921				
				AVE /LOAD		56.907	29535.81				
				AVE WT/DRUM		519.019					
				AVE EMPTY WT		63.8					
				AVE NET WT/DRUM		455.219					

APPENDIX K

Cameco – Calcine

Thorium Data - Calcined Product

(Bq/g)

	990303	990310	990428	990502	990819	990822	991023	991026	000203	000507	000528
U-Nat	3.4	2.7	3.6	3.6	4.6	4.0	3.1	2.8	2.2	4.1	2.9
Th-234	166392	123792	198715	151358	62546	78301	184719	197084	108239	101481	157944
Th-230	784	675	644	566	418	465	652	661	386	348	819
Th-232		18					40			9.2	
Th-228		2.6					2.5			5.7	

INTERNATIONAL
URANIUM (USA)
CORPORATION

RECORD OF DISCUSSION

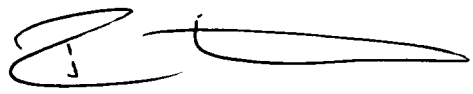
Date:	November 8, 2000	
Conversation Between:	William N. Deal	of IUC
And	Ron F. Hochstein	of IUC

Topic of Discussion: Uranium feed grades of processed materials

Distribution:

Based on mill production records the uranium grades of the Ashland 2, Cabot and Cameco calcine material are as follows:

Material	% U_3O_8	%U
Ashland 2	0.012%	0.01%
Cabot	0.404%	0.343%
Calcine	7.58%	6.53%



WHITE MESA MILL
CALCINED BY-PRODUCT INVENTORY
11/10/2000 14:49

				BEGINNING INVENTORY		RECEIPTS		FEED		ENDING INVENTORY	
DATE SHIPPED	DATE REC'D	DISPATCH NO.	LOT NO.	NO. DRUMS	NET WEIGHT	NO. DRUMS	NET WEIGHT	NO. DRUMS	NET WEIGHT	NO. DRUMS	NET WEIGHT
01/29/1999	02/01/1999	67576		0	0	110	40180	0	0	110	40180
02/04/1999	02/08/1999	67775		110	40180	110	43400	0	0	220	83580
02/05/1999	02/09/1999	67843		220	83580	110	37480	0	0	330	121060
02/05/1999	02/09/1999	None		330	121060	110	38800	0	0	440	159860
02/10/1999	02/15/1999	67972		440	159860	110	34080	0	0	550	193940
02/12/1999	02/16/1999	68094		550	193940	110	37080	0	0	660	231020
02/13/1999	02/17/1999	68093		660	231020	110	37360	0	0	770	268380
02/18/1999	02/24/1999	None		770	268380	110	36260	0	0	880	304640
02/20/1999	02/24/1999	68305		880	304640	110	35960	0	0	990	340600
02/19/1999	02/24/1999	68303		990	340600	110	37420	0	0	1100	378020
02/26/1999	03/01/1999	68530		1100	378020	110	35520	0	0	1210	413540
02/25/1999	03/01/1999	68489		1210	413540	110	34040	0	0	1320	447580
02/25/1999	03/01/1999	68480		1320	447580	110	33900	0	0	1430	481480
	03/04/1999			1430	481480			31	7890.719	1399	473589.3
03/03/1999	03/05/1999	68673		1399	473589	110	36640		0	1509	510229.3
	03/05/1999			1509	510229			200	50907.86	1309	459321.4
	03/06/1999			1309	459321			240	61089.44	1069	398232
	03/07/1999			1069	398232			188	47853.39	881	350378.6
03/04/1999	03/08/1999	68733		881	350379	110	37000			991	387378.6
	03/08/1999			991	387379			192	48871.55	799	338507
	03/09/1999			799	338507			240	61089.44	559	277417.6
	03/10/1999			559	277418			236	60071.28	323	217346.3
	03/11/1999			323	217346			252	64143.91	71	153202.4
03/10/1999	03/12/1999	68908		71	153202	110	36740	0	0	181	189942.4
03/09/1999	03/12/1999	68876		181	189942	110	32860	0	0	291	222802.4
03/09/1999	03/12/1999	68873		291	222802	110	39480	0	0	401	262282.4
	03/12/1999			401	262282			247	62871.21	154	199411.2
03/10/1999	03/13/1999	68778		154	199411	110	39020	0	0	264	238431.2
03/11/1999	03/15/1999	68919		264	238431	110	37080			374	275511.2
03/11/1999	03/15/1999	68930		374	275511	110	39000			484	314511.2
	03/15/1999			484	314511			122	31053.8	362	283457.4

WHITE MESA MILL
CALCINED BY-PRODUCT INVENTORY
11/10/2000 14:49

				BEGINNING INVENTORY		RECEIPTS		FEED		ENDING INVENTORY	
DATE SHIPPED	DATE REC'D	DISPATCH NO.	LOT NO.	NO. DRUMS	NET WEIGHT	NO. DRUMS	NET WEIGHT	NO. DRUMS	NET WEIGHT	NO. DRUMS	NET WEIGHT
	04/06/1999			1112	594977			270	68725.62	842	526251.1
	04/07/1999			842	526251			158	40217.21	684	486033.9
04/05/1999	04/08/1999	99-44		684	486034	110	38000			794	524033.9
	04/09/1999			794	524034			138	35126.43	656	488907.5
04/06/1999	04/09/1999	99-45		656	488907	110	39260			766	528167.5
04/09/1999	04/12/1999	69830		766	528167	110	37660			876	565827.5
04/09/1999	04/12/1999	69805		876	565827	110	37680			986	603507.5
04/07/1999	04/12/1999	99-46		986	603507	110	37600			1096	641107.5
04/09/1999	04/12/1999	69825		1096	641107	110	37500			1206	678607.5
	04/12/1999			1206	678607			314	79925.35	892	598682.2
	04/13/1999			892	598682			231	58798.58	661	539883.6
	04/14/1999			661	539884			160	40726.29	501	499157.3
04/12/1999	04/15/1999	69889		501	499157	110	32660			611	531817.3
04/12/1999	04/15/1999	69877		611	531817	110	39040			721	570857.3
04/12/1999	04/15/1999	69886		721	570857	110	31260			831	602117.3
04/12/1999	04/15/1999	69887		831	602117	110	38620			941	640737.3
04/13/1999	04/16/1999	69900		941	640737	110	33680			1051	674417.3
	04/15/1999			1051	674417			234	59562.2	817	614855.1
04/14/1999	04/19/1999	69953		817	614855	110	34360			927	649215.1
04/14/1999	04/19/1999	700043		927	649215	110	35720			1037	684935.1
04/15/1999	04/19/1999	99-57		1037	684935	110	34300			1147	719235.1
	04/19/1999			1147	719235			266	67707.46	881	651527.6
	04/20/1999			881	651528			86	21890.38	795	629637.2
	04/21/1999			795	629637			222	56507.73	573	573129.5
	04/22/1999			573	573130			129	32835.57	444	540293.9
	04/23/1999			444	540294			131	33344.65	313	506949.3
04/20/1999	04/23/1999	70152		313	506949	110	33380			423	540329.3
04/13/1999	04/23/1999	70132		423	540329	110	31140			533	571469.3
04/20/1999	04/23/1999	70115		533	571469	110	35360			643	606829.3
	04/26/1999			643	606829	0		351	89343.3	292	517486
04/15/1999	04/16/1999	70175		292	517486	110	36120			402	553606

WHITE MESA MILL
CALCINED BY-PRODUCT INVENTORY
11/10/2000 14:49

				BEGINNING INVENTORY		RECEIPTS		FEED		ENDING INVENTORY	
DATE SHIPPED	DATE REC'D	DISPATCH NO.	LOT NO.	NO. DRUMS	NET WEIGHT	NO. DRUMS	NET WEIGHT	NO. DRUMS	NET WEIGHT	NO. DRUMS	NET WEIGHT
05/11/1999	05/14/1999	99-82		257	670471	110	37560			367	708031.3
	05/14/1999			367	708031			200	50907.86	167	657123.4
05/14/1999	05/17/1999	70903		167	657123	110	35340			277	692463.4
05/12/1999	05/17/1999	70840		277	692463	110	34420			387	726883.4
05/12/1999	05/17/1999	70847		387	726883	110	38360			497	765243.4
05/13/1999	05/17/1999	70860		497	765243	110	35940			607	801183.4
	05/17/1999			607	801183			110	27999.32	497	773184.1
	05/18/1999			497	773184			200	50907.86	297	722276.2
05/17/1999	05/19/1999	99-87		297	722276	110	33540			407	755816.2
	05/19/1999			407	755816			200	50907.86	207	704908.4
	05/20/1999			207	704908			207	52689.64	0	652218.7
05/18/1999	05/24/1999	70967		0	652219	110	41820			110	694038.7
05/20/1999	05/24/1999	71109		110	694039	110	35680			220	729718.7
05/21/1999	05/24/1999	99-93		220	729719	110	33700			330	763418.7
05/19/1999	05/24/1999	99-89		330	763419	110	36200			440	799618.7
05/21/1999	05/24/1999	71086		440	799619	110	39880			550	839498.7
	05/24/1999			550	839499			242	61598.51	308	777900.2
05/21/1999	05/25/1999	71168		308	777900	110	37540			418	815440.2
05/21/1999	05/25/1999	71181		418	815440	110	32000			528	847440.2
05/20/1999	05/25/1999	71107		528	847440	110	35620			638	883060.2
	05/25/1999			638	883060			181	46071.62	457	836988.6
	05/26/1999			457	836989			457	116324.5	0	720664.1
05/27/1999	05/30/1999	71254		0	720664	110	34880			110	755544.1
05/27/1999	05/30/1999	71274		110	755544	110	40860			220	796404.1
05/28/1999	05/30/1999	71293		220	796404	110	32420			330	828824.1
05/28/1999	05/30/1999	71316		330	828824	110	35900			440	864724.1
05/27/1999	06/01/1999	71268		440	864724	110	35680			550	900404.1
05/28/1999	06/01/1999	99-102		550	900404	110	33320			660	933724.1
05/28/1999	06/01/1999	71319		660	933724	110	40460			770	974184.1
05/28/1999	06/01/1999	71296		770	974184	110	35220			880	1009404
05/27/1999	06/01/1999	71271		880	974184	110	37300	0		990	1011484

WHITE MESA MILL
CALCINED BY-PRODUCT INVENTORY
11/10/2000 14:49

				BEGINNING INVENTORY		RECEIPTS		FEED		ENDING INVENTORY	
DATE SHIPPED	DATE REC'D	DISPATCH NO.	LOT NO.	NO. DRUMS	NET WEIGHT	NO. DRUMS	NET WEIGHT	NO. DRUMS	NET WEIGHT	NO. DRUMS	NET WEIGHT
03/21/2000	03/24/2000	80191		4400	1564264	110	29140			4510	1593404
03/21/2000	03/24/2000	2000-007		4510	1576284	110	29880			4620	1606164
04/24/2000	04/27/2000	81193		4620	1593404	110	33340			4730	1626744
04/27/2000	05/01/2000	2000-010		4730	1606164	110	34200			4840	1640364
05/01/2000	05/05/2000	2000-011		4840	1626744	110	32420			4950	1659164
05/26/2000	05/30/2000	82208		4950	1640364	110	27140			5060	1667504
05/29/2000	05/31/2000	82250		5060	1659164	110	27640			5170	1686804
05/29/2000	06/01/2000	82273		5170	1667504	110	26240			5280	1693744
06/01/2000	06/05/2000	82370		5280	1686804	110	33900			5390	1720704
06/05/2000	06/08/2000	2000-016		5390	1693744	110	33740			5500	1727484
06/06/2000	06/09/2000	82520		5500	1720704	110	35500			5610	1756204
06/21/2000	06/26/2000	51099		5610	1727484	110	26760			5720	1754244
06/21/2000	06/26/2000	2000-018		5720	1756204	110	26380			5830	1782584
09/19/2000	09/22/2000	2000-020		5830	1754244	110	33420			5940	1787664
09/21/2000	09/26/2000	2000-021		5940	1782584	110	32080			6050	1814664
09/22/2000	09/26/2000	2000-023		6050	1787664	110	29020			6160	1816684
09/22/2000	09/26/2000	2000-022		6160	1814664	110	31420			6270	1846084
09/29/2000	10/03/2000	2000-025		6270	1816684	110	25180			6380	1841864
09/28/2000	10/04/2000	2000-024		6380	1846084	110	26640			6490	1872724
10/30/2000	11/03/2000	2000-029		6490	1841864	110	31180			6600	1873044
10/30/2000	11/03/2000	2000-028		6600	1872724	110	34280			6710	1907004
10/30/2000	11/03/2000	2000-030		6710	1873044	110	31920			6820	1904964

TOTAL		**17270**	**5497720**	**10450** **2659936**
Total Net Wt.(less drum wt)			**4395894**	
Averages Per Load		**109.3038**	**35017.32**	
Ave Gross Wt Per Drum		**318.33932**		
Ave Empty Drum Wt		**63.8**		
Ave Net Wt Per Drum		**254.53932**		

APPENDIX L

Allied Signal – KOH

INTERNATIONAL
URANIUM (USA)
CORPORATION

RECORD OF DISCUSSION

Date:	November 8, 2000	
Conversation Between:	Marshall Sheppard	of Honeywell
And	Ron Hochstein	of IUC
Topic of Discussion:	Thorium Content of Allied Signal Material	
Distribution:	David Frydenlund	

The thorium content of the KOH solution recovery material is very low, for all intents and purposes, zero.

For the calcium fluoride material the thorium content will be based on the thorium content of the plant feed because all of the thorium will report to this stream. Based on 12 years of operating data, the average thorium content of the plant feed is 14,448 Pci/g; therefore, the average thorium concentration for the calcium fluoride material is estimated at 14,448 Pci/g.

KOH Material Uranium Analysis

Control No.	Sample No.	Net Weight (lbs.)	U_3O_8 Analysis g/l	U_3O_8 Analysis Wt %	U_3O_8 Analysis Wt %	Calculated Uranium (Wt %)
KOH-1	1D	43,540		30.30%	30.3%	25.7%
KOH-2 *	1S	30,440	326		32.6%	27.6%
KOH-3	2S	27,820		13.83%	13.8%	11.7%
KOH-4	2D	40,960		22.35%	22.4%	19.0%
KOH-5	3S	28,460	198		19.8%	16.8%
KOH-6	4S	30,180	389		38.9%	33.0%
KOH-7	5S	26,380	362		36.2%	30.7%
KOH-8	3D	43,020		42.40%	42.4%	36.0%
KOH-9 *	4D	43,160		32.60%	32.6%	27.6%
KOH-10 *	6S	23,840	326		32.6%	27.6%
KOH-11	5D	43,020		36.80%	36.8%	31.2%
KOH-12	6D	36,320		37.70%	37.7%	32.0%
KOH-13	7S	30,400	401		40.1%	34.0%
KOH-14	8S	30,880	294		29.4%	24.9%
KOH-15	9S	29,100	432		43.2%	36.6%
KOH-16	7D	42,660		30.70%	30.7%	26.0%
KOH-17	10S	27,620	427		42.7%	36.2%
KOH-18	11S	27,080	605		60.5%	51.3%
KOH-19	8D	44,860		40.10%	40.1%	34.0%
KOH-20	9D	38,420		39.40%	39.4%	33.4%
KOH-21	12S	29,560	541		54.1%	45.9%
KOH-22	13S	27,580	332		33.2%	28.2%
KOH-23	10D	45,140		18.30%	18.3%	15.5%
KOH-24	14S	27,860	400		40.0%	33.9%
KOH-25	15S	28,440	395		39.5%	33.5%
KOH-26	11D	45,400		15.10%	15.1%	12.8%
KOH-27	16S	28,820	358		35.8%	30.4%
KOH-28	17S	27,480	371		37.1%	31.5%
KOH-29	1RS	26,780	247		24.7%	20.9%
KOH-30	12D	44,020		31.70%	31.7%	26.9%
KOH-31	2RS	29,560	119		11.9%	10.1%
KOH-32	3RS	26,360	42		4.2%	3.6%
KOH-33	13D	42,780		37.40%	37.4%	31.7%
KOH-34	4RS	29,060	115		11.5%	9.8%
KOH-35	5RS	29,340	202		20.2%	17.1%
KOH-36	6RS	30,320	370		37.0%	31.4%
KOH-37	14D	38,440		36.50%	36.5%	31.0%
KOH-38	7RS	27,500	480		48.0%	40.7%
KOH-39	8RS	27,800	496		49.6%	42.1%
KOH-40	9RS	27,720	359		35.9%	30.4%
KOH-41	10RS	29,420	403		40.3%	34.2%
KOH-42	15D	34,080		43.70%	43.7%	37.1%
KOH-43	16D	37,420		35.00%	35.0%	29.7%
KOH-44	11RS	27,000	219		21.9%	18.6%
KOH-45	12RS	31,920	135		13.5%	11.4%
KOH-46	17D	38,000		21.00%	21.0%	17.8%
KOH-47 **	18D	41,290		38.20%	38.2%	32.4%
KOH-48 **	13RS	28,440	159		15.9%	13.5%
KOH-49 **	14RS	28,440	153		15.3%	13.0%
KOH-50 **	15RS	28,440	98		9.8%	8.3%

KOH Material Uranium Analysis

Control No.	Sample No.	Net Weight (lbs.)	U_3O_8 Analysis g/l	U_3O_8 Analysis Wt %	U_3O_8 Analysis Wt %	Calculated Uranium (Wt %)
KOH-51 **	16RS	28,440	265		26.5%	22.5%
KOH-52 **	19D	41,290		38.30%	38.3%	32.5%
KOH-53 **	17RS	28,440	177		17.7%	15.0%
KOH-54 **	18RS	28,440	294		29.4%	24.9%
KOH-55 **	20D	41,290		33.30%	33.3%	28.2%
KOH-56 **	19RS	28,440	211		21.1%	17.9%
KOH-57 **	20RS	28,440	142		14.2%	12.0%
KOH-58 **	21D	41,290		20.60%	20.6%	17.5%
KOH-59 **	21RS	28,440	179		17.9%	15.2%
KOH-60 **	22RS	28,440	370		37.0%	31.4%
KOH-61 **	23RS	28,440	197		19.7%	16.7%
KOH-62 **	22D	41,290		37.80%	37.8%	32.1%
KOH-63 **	23D	41,290		45.60%	45.6%	38.7%
KOH-64 **	24RS	28,440	229		22.9%	19.4%
KOH-65 **	25RS	28,440	156		15.6%	13.2%
KOH-66 **	26RS	28,440	216		21.6%	18.3%
KOH-67 **	27RS	28,440	386		38.6%	32.7%
KOH-68 **	28RS	28,440	493		49.3%	41.8%
KOH-69 **	29RS	28,440	419		41.9%	35.5%
KOH-70 **	24D	41,290		51.50%	51.5%	43.7%
KOH-71 **	25D	41,290		46.60%	46.6%	39.5%
KOH-72 **	30RS	28,440	357		35.7%	30.3%
KOH-73 **	31RS	28,440	179		17.9%	15.2%
KOH-74 **	32RS	28,440	190		19.0%	16.1%
KOH-75 **	26D	41,290		38.60%	38.6%	32.7%
KOH-76 **	27D	41,290		38.00%	38.0%	32.2%
KOH-77 **	33RS	28,440	160		16.0%	13.6%
KOH-78 **	34RS	28,440	236		23.6%	20.0%
KOH-79 **	35RS	28,440	151		15.1%	12.8%
KOH-80 **	28D	41,290		36.90%	36.9%	31.3%
KOH-81 **	36RS	28,440	122		12.2%	10.3%
KOH-82 **	37RS	28,440	187		18.7%	15.9%
KOH-83 **	29D	41,290		40.90%	40.9%	34.7%
KOH-84 **	30D	41,290		35.20%	35.2%	29.8%
KOH-85 **	38RS	28,440	472		47.2%	40.0%
KOH-86 **	39RS	28,440	298		29.8%	25.3%
KOH-87 **	31D	41,290		32.91%	32.9%	27.9%
KOH-88 **	32D	41,290		42.29%	42.3%	35.9%
KOH-89 **	40RS	28,440	143		14.3%	12.1%
KOH-90 **	41RS	28,440	167		16.7%	14.2%
KOH-91 **	33D	41,290		51.20%	51.2%	43.4%
KOH-92 **	34D	41,290		41.20%	41.2%	34.9%
TOTAL		3,052,650				
WEIGHTED AVG					31.6%	26.8%

* Uranium assay based on average.

** Weights not available, average weight used.

APPENDIX M

Rhone-Poulenc

Facsimile Cover Sheet

To: Scott Schirman
Energy Fuels Nuclear, Inc.
(801)-678-2224

From: D. K. Little
Company: Rhône-Poulenc Basic Chemicals
Phone: (409)-233-7871 ext. 8635
Fax: (409)-233-4682

Date: December 21, 1994
Pages including this cover page: 1

Comments: Uranyl Nitrate

We have two lots of Uranyl Nitrate. The analysis is listed in the table below. As you can see, we separate the initial Thorium content of the ore so that the Uranium Nitrate has a very low level of Thorium.

Determinations/Lot No.	Units	9434608	9434210
Density	g/ml	1.57	1.59
ThO2+U3O8	g/l	481	509
U3O8	g/l	480	508
ThO2/U3O8	%	<0.1	<0.1

cc: G. Jones, R. Harrington, J. Richardson

F941220.DOC

ENERGY LABORATORIES

ENERGY LABORATORIES, INC.
P.O. BOX 3258 • CASPER, WY 82602 • PHONE (307) 235-0515
254 NORTH CENTER, SUITE 100 • CASPER, WY 82601 • FAX (307) 234-1639

LABORATORY ANALYSIS REPORT – Energy Fuels Nuclear, Inc.

Report Date: 02–14–95

Sample I.D.: Uranyl Nitrate acid
Sample Date:
Sample Number: 95–11807

Major Ions		Units	Results	Detection Limit
Nitrate	NO_3	mg/l	56335	0.10
Non–Metals				
Acid Normality		–	2.49	–
Radiometric				
Uranium	U–Nat	g/l	500	0.3
Thorium 230	Th_{230}	pCi/l	97.5	0.2
Thorium Precision ±			30.5	

Report Approved by: R.A. Laslug

PIM 11807efc.wk3

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

September 28, 1995

Mr. Donald Sparling
Manager of Uranium Processing
Energy Fuels Nuclear, Inc.
POB 787
Blanding, Utah 84511

SUBJECT: REVIEW OF REQUESTS TO AMEND SOURCE MATERIAL LICENSE SUA-1358 FOR THE WHITE MESA MILL, BLANDING, UTAH, LICENSE AMENDMENT 41

Dear Mr. Sparling:

The U.S. Nuclear Regulatory Commission staff has completed its review of Energy Fuels Nuclear, Inc.'s (EFN's) requests to amend Source Material License SUA-1358 for the White Mesa mill submitted by letters dated January 12, June 8, and July 27, 1995. This letter and its enclosures document the results of the staff's review of EFN's submittals.

In its letter dated January 12, 1995, EFN requested an amendment to license SUA-1358 to receive and process uranium from uranyl nitrate solution from Rhone-Poulenc Chemicals (RPC). The uranyl nitrate solution is considered a commercial product and source material for which EFN will pay RPC. The solution will be pumped from 55 gallon drums and fed directly into the White Mesa Mill yellowcake precipitation circuit. The processing of the uranyl nitrate solution will not increase the mill's production to exceed the License Condition No. 12 limit of 4,380 tons of U_3O_8 per calendar year. Therefore, Source Material License SUA-1358 will be amended to add License Condition No. 58 to receive and process source material from RPC. The staff's technical evaluation of the amendment request is Enclosure 1 and a copy of the amended license is Enclosure 2 to this letter.

In a letter dated June 8, 1995, EFN requested that license SUA-1358 be amended to remove License Condition No. 24 B (LC-24B) which requires quarterly monitoring of environmental radon using thermoluminescent dosimeter (TLD) chips. The use of TLDs is not considered reliable for detection of the new 10 CFR Part 20 standard, 0.1 pCi/l; therefore, their use is no longer applicable. A copy of the amended license with LC-24B removed is Enclosure 2 and a copy of the staff's technical evaluation of the amendment request is Enclosure 3 to this letter.

EFN, by a letter of July 27, 1995, also requested a license amendment to discontinue high volume air particulate radionuclide sampling at monitoring station BHV-3. EFN concludes that the twelve years of data collected at the BHV-3 monitoring station form a sufficient basis for establishing background

concentrations at the White Mesa Mill site. The NRC staff considers that EFN's approach is appropriate; therefore, License Condition 24 has been amended to discontinue airborne radionuclide sampling at BHV-3. The staff's technical evaluation of the amendment request is Enclosure 4 to this letter and a copy of the amended license is Enclosure 2.

All other conditions of Source Material License SUA-1358 shall remain the same. The license is being reissued to incorporate the above modifications (Enclosure 2).

If you have any questions regarding this letter or the enclosures, please contact Ms. Charlotte Abrams of my staff at (301) 415-5808.

Sincerely,

Joseph J. Holonich, Chief
High-Level Waste and Uranium
Recovery Projects Branch
Division of Waste Management
Office of Nuclear Material Safety
and Safeguards

Docket No. 40-8681
SUA-1358
Cases Closed: L51223
L51297
L51276

Enclosures: As stated

cc: W. Sinclair, UT

TECHNICAL EVALUATION REPORT
FOR REQUEST TO RECEIVE AND PROCESS MATERIAL FROM RHONE-POULENC CHEMICALS

DOCKET NO. 40-8681, LICENSE NO. SUA-1358

LICENSEE: Energy Fuels Nuclear, Inc. (EFN)

FACILITY: White Mesa mill, located near Blanding, Utah

PROJECT MANAGER: Charlotte Abrams

SUMMARY AND CONCLUSIONS:

The U.S. Nuclear Regulatory Commission staff has reviewed EFN's request to receive and process uranium from uranyl nitrate solutions from Rhone-Poulenc Chemicals (RPC). Based on its review, of information provided by the Licensee by letters of January 12, March 23, and July 21, 1995, the staff concludes that the requested amendment is acceptable. The bases for the staff's conclusion are in the "Technical Evaluation" section below.

DESCRIPTION OF LICENSEE'S AMENDMENT REQUEST:

By a letter of January 12, 1995, EFN requested that the license for the White Mesa Mill be amended to receive and process uranium from uranyl nitrate from RPC. The RPC uranyl nitrate contains approximately 54% uranium in a liquid form. The uranyl nitrate is packaged in 60 drums with a total net weight of 43,469 pounds. Total calculated U_3O_8 is 13,620 pounds or approximately 4.5 pounds of uranium per gallon of solution. The thorium content is less than 0.1% and the nitrate content is 14.3%.

To safely introduce the material into the mill circuit the Licensee plans to pump the uranyl nitrate solutions from the drums directly into a yellowcake precipitation tank using a chemical pump attached to the top of each drum. Any solution left in a drum after pumping is complete will be poured into the yellowcake thickener sump for reprocessing. All drums will be pumped into the yellowcake thickener catchment basin to avoid any spillage of solutions. In the event of a spill, the solutions would be contained and washed into the yellowcake thickener sump immediately.

The material is in solution; therefore, there will be no airborne hazard during transfer of the uranyl nitrate from the drums. As a precaution against exposure from splashing or ingestion of the material, workers will wear protective clothing and face shields when emptying solutions from the drums into the yellowcake precipitation sump. In the event of worker exposure from splashed uranyl nitrate solutions, the Licensee has a safety shower and eye wash station located in the area where the work is being conducted.

TECHNICAL EVALUATION:

The RPC material is considered an "alternate feed." Therefore, in addition to reviewing the licensee's request to determine its compliance with 10 CFR Part 40, Appendix A, the staff also considered issues outlined in the "Final

Position and Guidance on the Use of Uranium Mill Feed Material Other Than Natural Ores" (hereafter, alternate feed guidance) that addresses licensee requests to process alternate feed material.

For the tailings and wastes from the proposed processing to qualify as 11e.(2) byproduct material, the proposed alternate feed materials must qualify as "ore." In the alternate feed guidance ore is defined as "a natural or native matter that may be mined and treated for the extraction of any of its constituents or any other matter from which source material is extracted in a licensed uranium or thorium mill." Therefore, the uranyl nitrate solutions proposed for processing by the Licensee qualify as "ore," because they meet the definition of "any other matter from which source material is extracted in a licensed uranium or thorium mill."

The Licensee has certified and affirmed that the solutions do not meet the classification as waste as defined under the provisions of the Resource Conservation and Recovery Act (RCRA). The RPC material was not discarded or abandoned, but is a commercial product for which the Licensee is paying the supplier (RPC) in order to process and recover uranium.

The Licensee has provided affirmation that the RPC material is being processed primarily for the recovery of uranium and for no other primary purpose. The uranium content of the material is 4.5 pounds per gallon of solution. The processing of the solutions will involve introduction into the end of the mill circuit. Therefore, processing costs to recover the uranium for the uranyl nitrate solutions are minimal, and processing of this material will be profitable to the Licensee.

The staff has also concluded that the processing of this material will not result in any significant change to license or the conclusions made in the analysis of environmental impacts to the White Mesa site. No physical changes in the mill circuit will result. Processing the RPC material will not require the licensee to enlarge its tailings facilities, and mill production will not exceed the Licensee's previously approved License Condition 12 which limits production to 4,380 tons of U_3O_8 per year.

RECOMMENDED LICENSE CHANGE:

Pursuant to Title 10 of the Code of Federal Regulations, Part 40, Source Material License SUA-1358 is amended by the addition of License Condition No. 58 as follows:

58. The Licensee is authorized to receive and process source material from Phone-Poulenc Chemicals, Freeport, Texas, in accordance with the amendment request dated January 12, 1995, and supplemented by information provided by letters of March 23, 1995, and July 21, 1995. All Rhone-Poulence material shall be processed or removed from the site prior to finishing the mill run that began in August 1995.

ENVIRONMENTAL IMPACT EVALUATION:

An environmental review was not performed since this action is categorically excluded under 10 CFR 51.22(c)(11).

APPENDIX N

Cotter

Date Shipped	Control No.	No. Drums	Type Shipme	*Drums D.O.E. Net Weight	Drums Wet Sample Grade %U3O8	(D.O.E. Wt) Drums Estimated Contained Lbs. U3O8
05/30/97	Cotter-01	45	Drums	42,840	18.90	8,097
May 1997 Subtotal		45		42,840	18.90	8,097
06/03/97	Cotter-02	45	Drums	25,741		0
06/03/97	Cotter-03	45	Drums	25,907		0
06/11/97	Cotter-04	45	Drums	24,324		0
06/12/97	Cotter-05	45	Drums	26,776		0
06/16/97	Cotter-06	45	Drums	26,776		0
06/18/97	Cotter-07	45	Drums	24,638		0
06/20/97	Cotter-08	45	Drums	25,785		0
06/24/97	Cotter-09	45	Drums	26,025		0
06/25/97	Cotter-10	45	Drums	24,886		0
06/25/97	Cotter-11	45	Drums	26,677		0
06/25/97	Cotter-12	45	Drums	25,619		0
06/27/97	Cotter-13	45	Drums	26,750		0
06/30/97	Cotter-14	45	Drums	25,975		0
June 1997 Subtotal		585		335,879		0
07/07/97	Cotter-15	45	Drums	26,155		0
07/09/97	Cotter-16	45	Drums	25,589		0
07/11/97	Cotter-17	45	Drums	24,324		0
07/14/97	Cotter-18	45	Drums	26,928		0
07/16/97	Cotter-19	45	Drums	25,778		0
07/19/97	Cotter-20	45	Drums	24,783		0
07/21/97	Cotter-21	45	Drums	26,233		0
07/25/97	Cotter-22	45	Drums	25,326		0
07/28/97	Cotter-23	45	Drums	25,326		0
07/28/97	Cotter-24	45	Drums	25,488		0
07/30/97	Cotter-25	45	Drums	24,693		0
July 1997 Subtotal		495		280,623		0
07/07/97	Cotter-26	45	Drums	26,649		0
07/09/97	Cotter-27	40	Drums	23,049		0
07/11/97	Cotter-28	38	Drums	16,029		0
August 1997 Subtotal		123		65,727		0
1997 Total Year to Date		1,248		725,069	18.90	8,097

*Net weight is from D.O.E. drum list and therefore does not include weights of drums.

cc to: WNID (Fax)
[redacted]
RAM
EEH
This report is final, except for one word change on page 3 - original will be picked up by Ron Berg and copies made with Dr. Schiager's C.V. attached.
MRK

Keith J. Schiager, PhD
690 East 4149 South
Salt Lake City, UT 84107-2934

7 May 1997

Energy Fuels Nuclear, Inc.
ATTN.: Michelle Rehmann,
Environmental Manager
1515 Arapahoe Street, Suite 900
Denver, CO 80202

RE: **Review of Potential Health and Environmental Impacts Resulting from the Use of Cotter Concentrate as Feed Material for the White Mesa Mill**

Dear Ms. Rehmann:

In response to your request, I have reviewed the potential health and environmental impacts that might be imposed by the use of the Cotter Concentrate as a feed material for the White Mesa Mill in Blanding, Utah. My opinions are based upon my review of the documents listed below and upon information obtained by personal communication with you and with Mr. Ronald Berg, the on-site radiation safety officer at the mill.

Documents Reviewed

1) Request to Amend Source Material License SUA-1358, White Mesa Mill, Docket No. 40-8681, revision of March 5, 1997, submitted by Energy Fuels Nuclear, Inc. to the U. S. Nuclear Regulatory Commission, but not including Attachments 2, 3, 3a and 4.

2) Amendment 1 to Source Material License SUA-1358, Energy Fuels Nuclear, Inc.'s White Mesa Mill, Blanding Utah, issued on April 2, 1997, by the U. S. Nuclear Regulatory Commission, including the Technical Evaluation Report prepared by the NRC staff.

3) Table of data entitled "POPULATION A RESULTS FOR GAMMA RAY SPECTROMETRY (RADIONUCLIDES)," undated.

Radiological Characteristics of the Cotter Concentrate

Because of my professional experience, you asked specifically that I review any potential radiological concerns related to the use of the Cotter Concentrate. The available data demonstrate conclusively that this material has no potential to increase any radiation risk to the general public or to the environment. According to Attachment 1 to the license amendment application, Table I, Characteristics of the Cotter Concentrate, the 420 tons of Cotter

Concentrate contain a total of 270 curies of Th-230 and 3.6 curies of Pa-231. Samples from 20 drums were previously analyzed by gamma-ray spectrometry to determine the concentrations of several other radionuclides. In these drums, the Th-230 concentration ranged from 333 to 931 nanocuries per gram (nCi/g) with a mean value of 585 nCi/g. The numbers of the drums from which these samples were obtained indicated that they were selected to represent all of the Cotter Concentrate. The total Th-230 activity in 420 tons, based on the mean value from these samples, is 240 curies — a rather good agreement for two independent analytical results.

In the same 20 sampled drums, the mean Ra-226 concentration was only 3.59 nCi/g, with a range of 0.89 to 8.39 nCi/g. These data indicate that the radium has been removed during previous processing and is not in equilibrium with its thorium parent. Based on these samples, the entire 420 tons contain approximately 1.5 curies of radium-226.

Physical Characteristics of the Cotter Concentrate

The Cotter Concentrate is currently contained in approximately 1,225 55-gallon drums, and weighs approximately 420 tons. According to the amendment application, the estimated average uranium content is 10 percent. Physically, the material consists of a moist solid (up to 50 percent moisture). Descriptions of the material, including analytical data included with the amendment request, were reviewed for this report.

The extraction of uranium for the weapons program is not unique to the Belgian Congo ore, from which the Cotter Concentrate was derived. Essentially all of the uranium mills in the Colorado Plateau and, in fact, in the entire country, processed uranium for the weapons program. Thus, there is nothing particularly unique or hazardous about the Cotter Concentrate when compared with other uranium feed materials. However, because the physical form of this material is different from a raw ore in that it has been previously milled and submitted to extraction processes, extra precautions are planned, and have been approved, for transporting, handling, processing and disposing of the byproduct materials resulting from extracting the uranium from the Cotter Concentrate. In the section on Radiation Safety Issues the extra precautions to be applied in each of these areas are described, and the adequacy of these measures are reviewed in terms of protection of workers and the public from radiation exposure.

Characteristics of White Mesa Mill Tailings

Mr. Berg informed me that the White Mesa Mill processes some high-grade ore from the Arizona strip containing as much as 3-5 percent uranium, with occasional specimens as high as 20 percent, but that the average concentration in the mill feed over the life of the mill has been 0.361% U_3O_8, or 0.338% uranium. I assumed that the uranium isotopes were present in the ore in their natural abundances, i.e. 99.27% U-238 and 0.72% U-235, and that

their decay products (Th-230, Ra-226 and Pa-231) were in secular equilibrium in the ore. Based on the foregoing data and assumptions, the existing 3.9 million tons of tailings contain approximately 4,000 curies each of thorium-230 and radium-226, and 185 curies of protactinium-231.

Radiation Safety Issues

It is readily apparent that, both in terms of volume and in terms of radioactivity content, the Cotter Concentrate represents a small contribution to the existing tailings. The very low concentration of radium-226 indicates that the addition of this material to the existing tailings pile will have absolutely no effect on radon emissions from the pile.

The DOE will place each of the 55-gallon steel drums inside an 85-gallon steel drum to ensure against leakage. Transportation will be in accordance with Department of Transportation regulations for low specific activity radioactive material. The drums and the trucks will be surveyed for contamination before leaving the Nevada Test Site and upon arrival at the White Mesa Mill. This procedure would detect any potential leakage during transport and prevent inadvertent contact with any contamination that might be present. After the drums have been unloaded at the mill, the truck will again be surveyed to ensure that it is clean when it leaves the mill site.

As already noted, the ~~liquid~~ moisture content of the Cotter Concentrate minimizes the possibility of airborne contamination as the drums are opened and dumped into the mix transfer tank or the grizzly of the SAG mill. However, in keeping with the philosophy that all exposures should be kept as low as reasonably achievable (ALARA), employees will be provided with personal protective apparel and full-face respirators. Employees will wear the usual coveralls and rubber gloves; any spills or splashed material will be wetted and collected as the work progresses. Air in the work area will be sampled for particulate materials and analyzed for total alpha concentrations; if a concentration exceeding 25% of the occupational exposure limit is detected, the use of respirators will be mandated during the entire dumping operation.

At locations where dust could be generated by the handing or processing operations, e.g. where material is dumped onto the ore transfer belt and within the ore transport tunnel, water sprays are used for dust suppression. If the concentrate is dumped into the mix transfer tank instead of being introduced through the SAG mill grizzly, a water spray system on the mix tank will be used. Air samples collected from these areas of potential exposure will be analyzed to determine whether additional protective measures are needed. All of these precautions are designed to ensure that radiation exposures of employees and of the general public are ALARA.

Based upon my detailed review of the plans for recovery of uranium from the Cotter Concentrate by the White Mesa Mill, I conclude that Energy Fuels Nuclear, Inc. is taking all

of the appropriate radiation safety precautions to protect their employees, the public and the environment.

Sincerely,

Keith J. Schiager, Ph.D.
Certified Health Physicist

KEITH J. SCHIAGER

Director Emeritus, Radiological Health Department, University of Utah

Professional Credentials:

B.S. (Physics), 1956, Colorado State University
M.P.H. (Radiological Health), 1962, University of Michigan
Ph.D. (Environmental Health), 1964, University of Michigan
Certified Health Physicist, 1964, American Board of Health Physics
Author of more than 70 journal publications and research reports.

Professional Experience:

Argonne National Laboratory, Argonne, IL, 1957-61
Health Physicist.
Colorado State University, Ft. Collins, CO, 1964-74
Dept. of Radiology and Radiation Biology, Asst. Prof. 1964-68; Assoc. Prof. 1969-74; Radiation Control Officer 1965-70; Director, Environmental Health Services 1967-70; Director, Radiation Health Specialists Training Program 1969-73; Faculty Affiliate 1978-86.
Los Alamos Scientific Laboratory, Los Alamos, NM, 1973-75
Alternate Leader, Environmental Studies Group.
University of Pittsburgh, Pittsburgh, PA, 1975-78
Professor of Health Physics; Director, Radiation Protection Assistance Program; Vice-Chairman, Radiation Safety Committee.
ALARA Inc. (a Colorado corporation for radiation protection consulting)
President, full-time 1978-82; part-time 1983-94.
University of Utah, Salt Lake City, UT, 1982-
Director and Radiation Safety Officer, Radiological Health Department, 1982-94.
Director Emeritus, Radiological Health Department, 1994-

Professional Affiliations:

American Academy of Health Physics
Health Physics Society
International Radiation Protection Association
Society of Sigma Xi

Biographical Citations:

American Men and Women of Science, Physical and Biological Sciences
Who's Who in Technology Today, Vol. 4, Civil and Earth Sciences.
Who's Who in the West

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Professional Society and Advisory Committee Activities:

American Academy of Health Physics
Charter member 1986-; Emeritus 1996-;
Professional Ethics Committee, member 1987-90
President-Elect 1989; President 1990; Past President 1991

Council of Scientific Society Presidents, member 1991-94.

Health Physics Society
Plenary member 1958- ; Fellow 1987- ; Emeritus 1996-
President-Elect 1991-2; President 1992-93; Past President 1993-94
Midwest Chapter, charter member 1959-62
Local Arrangements Committee for Chicago, member 1961-62
Central Rocky Mountain Chapter, member 1964-73, 1978-82, president 1967-68 & 1980-81
Local Arrangements Committee for Denver, member 1967-68
Special Workshop on Uranium Mining Health Physics, chairman 1968
Symposium Committee, member 1969-72
Education and Training Committee, member 1972-76, chairman 1974-76
Rio Grande Chapter, member 1973-75
Western Pennsylvania Chapter, member 1975-78
Board of Directors, member 1976-79
Finance Committee, member 1976-79
Ad Hoc Committee on Sectionalization, chairman 1977-79
Ad Hoc Committee on International Units, Standards Subcommittee 17, member 1977-78
Great Salt Lake Chapter, member 1983-, president 1984-85
Environmental Radiation Section Steering Committee, member 1983-85
Local Arrangements Committee for Salt Lake City, chairman 1986-87
Ad Hoc Committee on Local Arrangements Procedures, chairman 1988-89
Scientific and Public Issues Committee, member 1991-96, chairman 1993-94
Awards Committee, member 1993-97, chairman 1993-94

International Radiation Protection Association
IRPA Congress 7, Sydney, Australia, HPS delegate 1988
IRPA Congress 8, Montreal, Canada, vice-chair of HPS delegation 1992
IRPA Congress 9. Vienna, Austria, HPS delegate 1996

National Academy of Sciences, Institute of Medicine
Committee on the Crossroads Nuclear Test, member 1993-96
Dose Assignment Working Group, member 1994-95

National Council on Radiation Protection and Measurements
Scientific Committee 46, Operational Radiation Safety, member 1982-97
Council member 1989-95; Scientific Committee 1-3, Collective Dose, member 1990-91

University of California, President's Council Environmental Health & Safety Panel, 1993-94

U.S. Environmental Protection Agency, Science Advisory Board
Radiation Advisory Committee, consultant 1986, member 1987-90;
Subcommittee on Radon Mitigation, chairman 1987-88;
Subcommittee on Radon Measurements, chairman 1987-88;
Committee on Indoor Air Quality & Total Human Exposure, member 1987-90.

U.S Uranium and Transuranium Registries, Advisory Committee, 1990-; Chair 1993-95

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Schiager, K.J. and A.H. Dahl, 1968, Radon Progeny Inhalation Study, Third Year Summary Report. COO-1500-6, to the U.S. Atomic Energy Commission on contract No. AT(11-1)-1500, Colorado State University, Ft. Collins, Colorado.

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Schiager, K.J. and S.T. Bard, 1968, Environmental Radiation Surveillance Program Design for the Fort St. Vrain Nuclear Generating Station, for Public Service Company of Colorado on contract No. FSV-0027, Colorado State University, Ft. Collins, Colorado.

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Schiager, K.J., 1969, Monitoring of Airborne Radon Progeny with Thermoluminescent Dosimeters, presented at the Nuclear Science Symposium, Institute of Electrical and Electronics Engineers, San Francisco, California, October 1969.

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Schiager, K.J. and S.T. Bard, 1973, Environmental Radiation Surveillance Program, 1972 Annual Report and Summary of 1969-1972 Preoperational Measurements, for Public Service Company of Colorado on contract No. FSV-0027, Colorado State University, Ft. Collins, Colorado.

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K. J. Schlager, 4/97

AMAX Environmental Services, Inc., Denver, CO
American Mining Congress, Washington, D.C.
Anaconda Company, Denver, CO
Arthur D. Little Company, Cambridge, MA
Association of American Railroads, Washington, D.C.
Bendix Field Engineering Corp., Grand Junction, CO
Colorado School of Mines Research Institute, Golden, CO
Colorado State University, Fort Collins, CO
Communicable Disease Center, U.S.P.H.S., Atlanta, GA
Cotter Corporation, Denver, CO
D'Appolonia Consulting Engineers, Inc., Pittsburgh, PA
Eastman Kodak Company, Windsor, CO
Environmental Research and Technology, Ft. Collins, CO
Estech General Chemical Co., Bradenton, FL
Exxon Company USA, Houston, TX
Florida Phosphate Council, Inc., Lakeland, FL
Gulf Mineral Resources Co., Denver, CO
Gulf Research and Development, Pittsburgh, PA
Harvard University, Cambridge, MA
IT Corporation, Pittsburgh, PA
Jacobs Engineering Group Inc., Albuquerque, NM
Joy Manufacturing Co., Denver, CO
J.R. Simplot Co., Pocatello, ID
Oak Ridge National Laboratory, Oak Ridge, TN
Occidental Chemical Co., Lathrop, CA
Phillips Uranium Co., Albuquerque, NM
Public Service Company of Colorado, Denver, CO
Rocky Mountain Energy Co., Broomfield, CO
SENES Consultants Limited, Toronto, Ontario, Canada
University of Michigan, Ann Arbor, MI
University of Missouri, Columbia, MO
University of New Mexico, Albuquerque, NM
University of Washington, Seattle, WA
University of Wyoming, Laramie, WY
Utah State Insurance Fund, Salt Lake City, UT
Utah State University, Logan, UT
U.S. Bureau of Indian Affairs, Albuquerque, NM
U.S. Bureau of Mines, Denver, CO and Salt Lake City, UT
U.S. Department of Energy, Washington, D.C.
U.S. Department of Justice, Washington, D.C.
U.S. Environmental Protection Agency, Washington, D.C.
U.S. Geological Survey, Reston, VA and Denver, CO
Veteran's Administration Medical Center, Salt Lake City, UT
Western Nuclear, Inc., Denver, CO
Western Zirconium Division of Westinghouse, Ogden, UT
Westinghouse Electric Corp., Pittsburgh, PA

Cotter Ore Thorium Calculation

I) Assumptions

- Ore processed = 363 tons
- From Schiager report the ore tonnage was assumed to be 420 tons
- Total thorium activity = 240 Ci assuming 420 tons of material from Schiager's report

II) Calculation of thorium for reduced tonnage

363 tons ÷420 tons x 240 Ci = 207 Ci

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING BOARD PANEL

Before Administrative Judges:
Ann Marshall Young, Presiding Officer
Dr. Charles N. Kelber, Special Assistant

IN THE MATTER OF:	*	
	*	Docket No. 40-8681-MLA-8
INTERNATIONAL URANIUM (USA) CORPORATION	*	ASLBP No. 00-782-08-MLA
	*	
(Source Material License Amendment)	*	November 13, 2000

CERTIFICATE OF SERVICE

I hereby certify that I caused true and complete copies of the foregoing International Uranium (USA) Corporation's Response to the Presiding Officer's October 26, 2000 Request for Information in the above-captioned matter to be served, first-class, postage prepaid mail and also by electronic mail to the individuals indicated by an asterisk on this 13th day of November, 2000 to:

The Honorable G. Paul Bollwerk, III
Chief Judge
U.S. Nuclear Regulatory Commission
Two White Flint North
11545 Rockville Pike
Mail Stop T-3 F23
Rockville, MD 20852

U.S. Nuclear Regulatory Commission
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Office of the Secretary *
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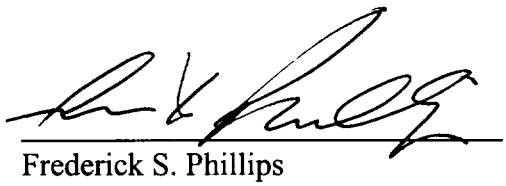

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A Law Partnership Including Professional Corporations

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November 13, 2000

By First-Class Mail

Office of Rulemakings and Adjudication
U.S. Nuclear Regulatory Commission
11555 Rockville Pike
Rockville, MD 20852

Re: International Uranium (USA) Corporation

Dear Sir or Madam:

Enclosed for filing in the above-referenced matter is the original and three copies of the International Uranium (USA) Corporation's Response to the Presiding Officer's October 26, 2000 Request for Information. Copies of the enclosed have been served on counsel of record as indicated in the enclosed certificate of service.

Please return the file-stamped copy in the enclosed self-addressed pre-paid envelope.

Sincerely,

Frederick S. Phillips

Enclosures

Document #: 1025262 v.1