February 5, 2002

via electronic and first class mail

Mr. Dan M. Gillen, Chief
Fuel Cycle Facilities Branch
Division of Fuel Cycle Safety
and Safeguards
Office of Nuclear Material Safety
and Safeguards
U.S. Nuclear Regulatory Commission
Washington, D. C. 20555-0001
DMG2@nrc.gov

RE: Docket No. 40-8681 International Uranium (USA) Corporation White Mesa Mill, near White Mesa and Blanding, Utah

Dear Mr. Gillen:

According to the license for International Uranium (USA) Corporation's White Mesa Mill (License No. SUA-1358), previous White Mesa Mill licensees received permission from the Nuclear Regulatory Commission (NRC) to receive and process various materials from the Allied Signal, Inc., Metropolis, Illinois, facility (now the Honeywell facility).

There appears to be only two license conditions in SUA-1358 granting the licensee of the White Mesa Mill permission to receive materials from the Metropolis uranium-hexafluoride facility—License Conditions 10.6 and 10.7.

License Condition 10.6 states:

> The licensee is authorized to receive and process source materials from the Allied Signal Corporation's Metropolis, Illinois, facility in accordance with the amendment request dated June 15, 1993.
> [Amendment 34, October 1, 1993]

On October 1, 1993, the NRC issued Amendment 34 to SUA-1358, in response to the June 15, 1993, amendment request. The October 1, 1993, memorandum to the file from the Project Manager (ACN: 9311170091) discusses the issuance of Amendment 34. The memo indicates that the licensee requested to process approximately 1700 barrels of calcium fluoride from Allied Signal containing approximately 2.0 % uranium. These barrels were already at the White Mesa Mill at the time of the amendment request.

There is no indication in the issuance that Amendment 34 granted authorization for the receipt and processing of additional drums of calcium fluoride that would be coming to the White Mesa at some future time.

License Condition 10.7 states:

The licensee is authorized to receive and process source material from Allied Signal, Inc., of Metropolis, Illinois, in accordance with the amendment request dated September 20, 1996, and amended by letters dated October 30, and November 11, 1996.
[Amendment 43, December 20, 1996]

On December 20, 1996, the NRC issued Amendment 43 to SUA-1358 in response to the September 20, 1996, amendment request, as supplemented (ACN: 9703140137 and 9703140139). The amendment granted the licensee permission to process uranium-bearing potassium diurinate ($K_2U_2O_7$) in a solution of potassium hydroxide/potassium fluoride (KOH/KF) shipped from Metropolis, Illinois. The Technical Evaluation Report (TER) for the amendment issuance stated that the materials would be shipped in either "dry" form in drums or slurry form in tanks. The dry material would be dumped into the transfer tank and pumped to the leach circuit, or dumped onto the ore-loading belt. The amount to be shipped was approximately 2,475 tons. The TER also stated that "the uranium content of the materials is between 7 and 10 percent."

The December 20, 1996, TER stated that the uranium content of the potassium hydroxide/potassium fluoride (KOH/KF) is between 7 and 10 percent.

However, there is additional information from IUSA that was submitted to the Presiding Officer in an adjudicatory proceeding (Docket No. 40-8681-MLA-8) on November 13, 2000 (ACN: ML003769943). This information was provided to the Presiding Office in response to an Order, dated October 26, 2000 (ACN: ML003767937). The November 13 filing contained an attachment and appendices that documented the uranium and thorium isotopic activities in the ores and radioactive wastes that had been processed and the resultant product. These feed materials and yellowcake were associated with the processing at the White Mesa Mill since the mill started operation.

(Note that the question at hand in the proceeding was the percentage of thorium-232 in materials previously processed at White Mesa. In presenting this data, IUSA purposefully lumped together the two thorium isotopes, thorium-230 (a decay product of U-238) and thorium-232 (with its own decay chain). IUSA's did this to mislead the Presiding Officer, who, apparently, did not differentiate between the two thorium isotopes.)

The data provided by IUSA on November 13, 2000, shows that the weight of uranium in the KOH/KF material ranged from 3.6 to 51.3%, for an average of 28.6% (179,560 pCi/g). All but 3 of the 92 samples were above the 10% uranium mentioned in the TER. Therefore the average uranium concentration was from 3 to 4 times what was considered by the NRC when evaluating the license amendment request.

As of 2001, the KOH/KF amounts to 0.036% of the total tonnage of uranium-bearing materials processed at the Mill. But, it constitutes 3.15 % of the total curies of uranium disposed of in the tailings impoundment. This is about 100 times what would be expected if the KOH/KF were "similar" to natural ore.

Some questions:

1. How does the NRC account for this discrepancy between the TER, which (I assume) would have been based on the licensee's application, and the actual data provided by IUSA?

2. Would there be any additional impact on the health and safety of the workers or the public or the environment because of the higher uranium concentration of the KOH/KF materials?

3. Is there documentation that the health and safety of the workers, public, and the environment were considered by the licensee in handling of the KOH/KF materials that had a much greater uranium content than was previously assessed by NRC staff.

There is no indication in the December 20, 1996, TER that White Mesa was also being authorized to receive and process calcium fluoride from the Metropolis facility.

Attachment A and the appendices to IUSA's November 13, 2000, filing document the fact that calcium fluoride was received for processing and disposal at White Mesa in 1995/1996 and 1999. Attachment A states that 2,343 tons of calcium fluoride containing 3% uranium (20,100 pCi/g uranium and 14,448 pCi/g thorium-230) had been processed at White Mesa. A footnote indicates that the data was from White Mesa Mill production logs for only 1995/1996 and 1999 and that data from previous runs was not available.

It is possible, because the licensee intended to use the calcium fluoride to "enhance" the uranium recovery process, that some or all of the drums of calcium fluoride processed in 1995/1996 were left over from the 1993 batch of drums. But, the data related to the drums of calcium fluoride processed in 1999, indicate that 3,200 "old" drums and 6,105 "new" drums were processed in 1999. The number of "old" drums is a lot more than the 1,700 drums authorized in 1993. So, it appears that after 1993 at least 4,405 additional drums of calcium fluoride were shipped to White Mesa from Metropolis.

Possibly, I have missed something here? But, I believe that this information leads to some additional, obvious questions:

4. When did the licensee request permission to receive and process the additional drums of calcium fluoride from Metropolis that was shipped between 1993 and 1999?

5. When did the NRC authorize the shipment of these additional drums (old and new) to the White Mesa Mill for processing?

6. How were the additional drums handled at White Mesa? Were the contents of the drums dumped on the ore-loading belt? Were extra safety procedures implemented when these drums of calcium fluoride were added to the ore on the ore-loading belt? What standard operating procedures were used when the contents of the drums were added to the process?

7. Did any NRC inspection of the Mill identify the receipt and processing of materials from Metropolis, Illinois that has not been authorized?

8. If, in fact, the current licensee received and processed unauthorized drums of calcium fluoride, is this a violation of the conditions of the license?

Please provide a response to these questions above and any other information that would shed light on this situation..

I request that the NRC refrain from authorizing any further shipments of materials from the Metropolis, Illinois, facility to any licensed uranium processing facility until these questions have been adequately resolved.

Enclosed are the 1993 and 1996 staff evaluations of the license amendments and data sheets from IUSA's November 13, 2000, filing in MLA-8.

Please make this letter publicly available on ADAMS.

Thank you for promptly addressing my concerns. If you have any questions regarding this letter, please feel free to contact me.

Sincerely,

Sarah M. Fields

Sarah M. Fields
P.O. Box 143
Moab, Utah 84532
smfielda@moci.net

Enclosure: As stated
cc: John Lusher
William von Till (e-mail)

UNITED STATES

NUCLEAR REGULATORY COMMISSION

REGION IV

URANIUM RECOVERY FIELD OFFICE
BOX 25325
DENVER, COLORADO 80225

OCT 01 1993

URFO:DCW
Docket No. 40-8681
SUA-1358, Amendment No. 34
04008681820R
X61108

MEMORANDUM FOR: Docket File No. 40-8681

FROM: Dana C. Ward, Project Manager

SUBJECT: AMENDMENT NO. 34 TO SOURCE MATERIAL LICENSE SUA-1358 FOR THE WHITE MESA MILL TO PROCESS ALLIED MATERIAL

Introduction

By letter dated June 15, 1993, Umetco Minerals Corporation (Umetco) requested amendment of Source Material License SUA-1358 for the White Mesa Mill to authorize the processing of alternate feed material received from Allied Signal Corporation (Allied) located in Metropolis, Illinois. The alternate feed material consists of filter cake as a residual product from Allied's processing operations to convert concentrated U_3O_8 to uranium hexafloride.

The amendment request was submitted subsequent to a letter from this office dated May 5, 1993, notifying Umetco that the processing of the alternate feed material would require a license amendment. Otherwise, Umetco would have to return the material to Allied and could not dispose of it in the tailings impoundment. Further, if Umetco wants to process the alternate feed material, they would have to certify that the material does not contain hazardous waste, and that the feed material is being processed for the recovery of uranium, and not for any other primary purpose. Umetco's amendment request of June 15, 1993, affirmed that the material would be processed for its source material content and no other primary purpose. Umetco also affirmed by letter dated September 3, 1993, that the material does not contain RCRA hazardous waste.

Background

The Allied facility located in Metropolis, Illinois, receives yellowcake shipments from Umetco White Mesa and other producers for refinement to uranium hexafluoride. During this process certain waste products are produced as byproducts to the production of uranium hexafluoride. These waste products, such as filter cake, are uranium bearing and through reprocessing at a mill

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additional uranium which would have been otherwise lost can be extracted. This reprocessing is what Umetco proposes to do with the filter cake material from Allied.

At the time of the June 15, 1993, application request, Umetco had in storage approximately 1700 barrels of waste generated from the Allied operation. The material contained within the barrels is best characterized as calcium fluoride with approximately 2 percent natural uranium. Umetco has determined from past practices at the Uravan Plant in Colorado that the addition of calcium fluoride to the process circuit will enhance uranium recovery. Therefore, Umetco has determined that the addition of the uranium hexafluoride to the ore will increase uranium recovery on the order of 2500 pounds of additional uranium per month.

10 CFR 40.4 defines byproduct material as the wastes produced by the extraction of uranium from any ore processed primarily for its source material content. However, only "unrefined and unprocessed ore" is defined in 10 CFR 40.4. As the source material from Allied is clearly not an "unrefined and unprocessed ore," the draft generic guidance as provided in SECY-91-347 which was published in the Federal Register on May 13, 1992, must be used to define the material. The staff review of the amendment application using the draft guidance is discussed below.

Discussion

The draft guidance prepared by the Office of Nuclear Materials Safety and Safeguards (NMSS) consists of three items which must be addressed. The first item states that the proposed feed material must meet the new definition of ore as follows:

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

The Allied source material clearly would meet the second part of the new definition, as uranium source material would be extracted in a licensed uranium mill.

The second item which must be addressed is whether the feed material is classified as hazardous or mixed waste subject to EPA regulation under the Resource Conservation and Recovery Act (RCRA). Umetco's June 15, and September 3, 1993, responses address this issue.

The information provided by Umetco indicates that the sludge material is not a hazardous waste as defined in RCRA. This conclusion is based on the assertion that the material does not meet the definition of "Characteristic Wastes" and does not contain a listed hazardous substance. The conclusion regarding

"Characteristic Wastes" is based on the statement that the material is not ignitable, corrosive, or reactive, as defined in 40 CFR 261 and did not fail the TCLP test.

The last item discussed in the draft guidance addresses the issue of whether the ore is being processed primarily for its source material content. This certification was requested by the staff in a May 5, 1993, letter to Umetco. Umetco provided the requested certification by letter dated June 15, 1993.

In the decision sustaining the issuance of Amendment No. 30 to Umetco's license for the processing of Teledyne Wah Chang material, the presiding officer stated that the staff should consider the economics of future license amendments concerning processing of alternate feed materials. The staff has determined through statements made in Umetco's amendment request dated June 15, 1993, that Umetco's major economic gain from the processing of this material would be from the sale of any uranium extracted and not from any other economic incentives given by Allied. Using the guidance supplied by the program office via telephone on September 28, 1993, it was agreed that this was adequate determination that the processing of this material would be primarily for the recovery of uranium and not for any other primary purpose.

The staff reviewed the chemical constituents of the Allied source material and the tailings solution at the site. The information was provided by Umetco in their June 15, 1993, letter. Several inorganics were detected in the Allied material at levels well within the existing ranges determined for the tailings. One inorganic, barium, was determined to be present in the Allied material, but not detected in the Umetco tailings. The concentration of barium was determined to be 0.2 mg/l in the source material. This level is well below the ground-water standard of 1.0 mg/l, and the EPA toxic level of 100 mg/l. Umetco has determined that this low concentration would not contribute to any adverse effect to the tailings, and therefore, the Allied material after processing will be compatible with the existing tailings.

The tailings cells at the Umetco site are synthetically lined and include leak detection systems. No evidence of leakage from the cells has been detected. Leakage would be quickly detected by the rise of water levels in the detection system. The staff therefore concludes that changes to the environmental monitoring program for this action at the White Mesa Mill are not necessary.

In accordance with the categorical exclusion contained in paragraph (c)(11) of 10 CFR 51.22, an environmental assessment is not required for this licensing action. That paragraph states that the categorical exclusion applies to the issuance of amendments to licenses for uranium mills provided that (1) there is no significant change in the types or significant increases in amounts of any effluent that may be released offsite, (2) there is no significant increase in individual or cumulative occupational radiation exposure, (3) there is no significant construction impact, and (4) there is no significant increase in the potential for or consequences from radiological accidents.

The licensing action discussed in this memorandum meets these criteria as the proposed amendment will not significantly change or increase the amounts of any effluent, will not sigrificantly increase exposures, will have no construction impacts, and will not increase the potential for radiological accidents. An environmental report is therefore not necessary from the licensee since the amendment does not meet the criteria of 10 CFR 51.60(b)(2).

Conclusion

The staff has completed its review of Umetco's June 15, 1993, amendment request and supporting submittals. The staff concludes that the feed materials proposed for processing at the White Mesa Mill meet the criteria listed in the draft guidance provided by NMSS and the recommendations for future licensing actions determined by the presiding officer in the Teledyne case. The staff therefore recommends that Source Material License SUA-1358 be amended to authorize the processing of Allied material by adding License Condition No. 56 to read as follows:

56. The licensee is authorized to receive and process source materials from the Allied Signal Corporation's Metropolis, Illinois, facility in accordance with the amendment request dated June 15, 1993. [Applicable Amendments: 34]

The issuance of this amendment was discussed via telephone with Scott Schierman of Umetco on September 29, 1993.

Dana C. Ward

Dana C. Ward
Project Manager

Case Closed: 04008681820R
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bcc:
Docket No. 40-8681
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PM:URFO DCW	DD:URFO EFH	D:URFO:RIV		
DCWard/lv	EFHawkins	REHall		
09/15/93	09/17/93	09/ /93		

TECHNICAL EVALUATION REPORT
FOR REQUEST TO RECEIVE AND PROCESS MATERIAL FROM ALLIED SIGNAL, INC.

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

LICENSEE: Energy Fuels Nuclear, Inc.

FACILITY: White Mesa Uranium Mill

PROJECT MANAGER: James Park

SUMMARY AND CONCLUSIONS:

The U.S. Nuclear Regulatory Commission staff has reviewed Energy Fuels Nuclear, Inc.'s (EFN's) request to receive and process uranium-bearing potassium diurinate ($K_2U_2O_7$) in a solution of potassium hydroxide/potassium fluoride (KOH/KF) from Allied Signal, Inc. of Metropolis, Illinois (Allied). Based on its review of EFN's information provided by letters dated September 20, October 30, and November 11, 1996, the NRC staff considers the amendment request to be acceptable.

DESCRIPTION OF LICENSEE'S AMENDMENT REQUEST:

By submittal dated September 20, 1996, and amended by letters dated October 30 and November 11, 1996, EFN requested that NRC Source Material License SUA-1358 be amended to allow receipt and processing of uranium-bearing potassium diurinate ($K_2U_2O_7$) in a KOH/KF solution. This material would be shipped to EFN's White Mesa mill from Allied, either in a "dry" form (moisture content greater than 5 percent) in overpacked 55-gallon drums or as a slurry aboard tanker trucks. Approximately 2475 tons of the material will be shipped. The uranium content of the material is between 7 and 10 percent.

Depending on whether the material arrives in a dry or slurry form, EFN will implement slightly different methods for introducing it into the mill circuit. Slurried material will be pumped from the tanker truck directly into a transfer tank. After pH and density adjustments, the slurry will be introduced into the leach circuit. The potential for airborne contamination dispersion in this process is minimal.

For dry material, drums either will be (1) dumped into the transfer tank and pumped to the leach circuit, or (2) dumped onto the ore loading belt, processed through the semi-autogenous grinding (SAG) mill, and then introduced into the circuit. Dust dispersion will be minimized through the use of available water spray systems.

In either situation, no changes to the mill circuit are required to process this material.

EFN will provide personal protective equipment, including respiratory protection, to individuals engaged in processing the material. Airborne particulate samples will be collected and analyzed for gross alpha

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concentrations and KOH/KF dust concentrations. Full-face respiratory protection will be implemented during the entire sequence of material dumping operations if KOH/KF dust concentrations or uranium airborne concentrations exceed specified limits. Spills and splashed material that may be encountered during this initial material processing will be wetted and collected during routine work activity. Employees will be required to wear coveralls and rubber gloves at all times when handling this material.

Trucks used to transport the material to the mill site will be radiometrically scanned prior to their release from the site restricted area.

TECHNICAL EVALUATION:

The NRC staff has reviewed EFN's request in accordance with 10 CFR Part 40, Appendix A, requirements and NRC staff guidance "Final Position and Guidance on the Use of Uranium Mill Feed Material Other Than Natural Ores" (60 *FR* 49296; September 22, 1995). This guidance (referred to hereinafter as the alternate feed guidance) requires that the staff make the following determinations in its reviews of licensee requests to process material other than natural uranium ores.

1. Whether the feed material meets the definition of "ore;"

2. Whether the feed material contains hazardous waste; and

3. Whether the ore is being processed primarily for its source-material content.

<u>Determination of whether the feed material is "ore"</u>

For the tailings and wastes from the proposed processing to qualify as 11e.(2) byproduct material, the feed material must qualify as "ore." In the alternate feed guidance, ore is defined as

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

EFN is proposing to extract source material from the KOH/KF solution. Therefore, the KOH/KF solution meets the definition, because it is a "matter [that is not natural or native] from which source material is extracted in a licensed uranium or thorium mill."

<u>Determination of whether the feed material contains hazardous waste</u>

EFN has certified and affirmed that the KOH/KF solutions do not meet the classification as a "waste," as defined under the provisions of the Resource Conservation and Recovery Act (RCRA). EFN certified and affirmed that the Allied material is not discarded or abandoned, but is a product for which EFN will pay Allied in order to recover the uranium present.

Determination of whether the feed material is being processed primarily for its source-material content

To show that potential alternate feed material is being processed primarily for its source-material content, a licensee must either (1) demonstrate that the material would be approved for disposal in the tailings impoundment under the "Final Revised Guidance on Disposal of Non-Atomic Energy Act of 1954, Section 11e.(2) Byproduct Material in Tailings Impoundments;" or (2) certify under oath or affirmation that the material is being processed primarily for the recovery of uranium and for no other primary purpose.

The licensee has provided a signed affirmation that the Allied material is being processed primarily for the recovery of uranium and for no other primary purpose. For [illegible], the high uranium content of the material (7 to 10 percent) justifies processing this material to extract uranium.

Conclusions concerning alternate feed material designation

Based on the information provided by the licensee, the NRC staff finds that the Allied material is alternate feed material because: (1) it meets the definition of "ore," (2) it does not contain hazardous waste, and (3) it is being processed primarily for its source-material content.

Other considerations

The NRC staff has also concluded that the processing of this material will not result in (1) a significant change or increase in the types or amounts of effluents that may be released offsite; (2) a significant increase in individual or cumulative occupational radiation exposure; (3) a significant construction impact; or (4) a significant increase in the potential for or consequences from radiological accidents. This conclusion is based on the following information:

a. Processing of this material will not result in an exceedance of the currently-approved annual yellowcake production limit of 4380 tons of U_3O_8.

b. No physical changes to the mill circuit are required to process this material.

c. Processing this material will not require EFN to enlarge its tailings facilities.

d. Trucks transporting the material to the mill site will be surveyed and decontaminated, as necessary, in accordance with EFN's procedures, before leaving the site.

e. Individuals will be provided with personal protective equipment, including respiratory protection, and be required to wear coveralls and rubber gloves while handling this material. Airborne particulate samples will be collected and analyzed for gross alpha concentrations and KOH/KF dust concentrations. Full-face respiratory protection will

be implemented if specified limits/concentrations are exceeded. Spilled and splashed material during initial material processing will be wetted and collected during routine work activity.

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. 59 as follows:

59. The licensee is authorized to receive and process source material from Allied Signal, Inc. of Metropolis, Illinois, in accordance with the amendment request dated September 20, 1996, and amended by letters dated October 30, and November 11, 1996.

ENVIRONMENTAL IMPACT EVALUATION:

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

ATTACHMENT A

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 App
(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 m
(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. Schlager in letter of 7/10/97 and tonnage based on actual Mill receipts. (See Appendix N.)

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%

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.

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%

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.

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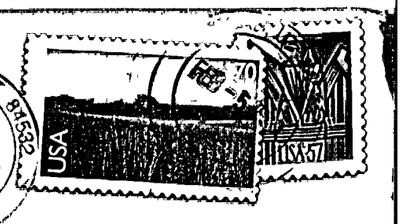

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