INTERNATIONAL
URANIUM (USA)
CORPORATION

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40-8681

May 5, 2000

VIA FACSIMILE AND OVERNIGHT MAIL

Mr. Thomas H. Essig, Branch Chief
Uranium Recovery and Low Level Waste Branch
Division of Waste Management
Office of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
2 White Flint North
11545 Rockville Pike
Rockville, MD 20852

Re: Amendment Request to Process an Alternate Feed Material from W.R. Grace at the White Mesa Uranium Mill
Source Material License SUA-1358

Dear Mr. Essig:

International Uranium (USA) Corporation ("IUSA") hereby submits supplemental information in response to questions and comments received from discussions with Mr. von Till of the NRC staff during the week of April 17, 2000 regarding the above-named request for amendment to Source Material License SUA-1358.

Comment

NRC requested that IUSA clarify that sufficient capacity is available in the existing tailings management system for the disposal of the tailings from the W.R. Grace material and the other approved and pending materials, plus the estimated quantity from the eventual reclamation of the tailings system and the mill site.

Response

In response to this request, IUSA contracted Harold Roberts, P.E., a former employee of IUSA, to perform a study to determine the current capacity remaining in the tailings system and the

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projected requirements for alternate feed materials and reclamation of the White Mesa Mill site. A copy of the final report prepared by Mr. Roberts is attached for your reference.

The report concludes that based on historical production records and survey data, Cells 2 and 3 have a remaining capacity of 1,174,000 tons, as shown below. This estimate assumes a conversion factor of 86 dry pounds per cubic foot (i.e. 1.16 tons per cubic yard).

	Tons
Cell 2	35,000
Cell 3	1,139,000
Total	**1,174,000**

The projected storage requirements for material that is already approved and W.R. Grace are shown below. Also included are estimates of material that are potential sources of feed for the Mill over the remainder of 2000 (i.e. Linde, Molycorp and Heritage Minerals).

	Tons
Ashland 1	93,600
W.R. Grace	108,000
11e.(2) Material	950
Reclamation Material	1,056,000
Sub-Total	**1,258,550**
Other Potential Alternate Feeds	146,200
Total	**1,404,000**

With projections of 1,404,000 tons from processing alternate feeds and the estimated disposal quantities from final site reclamation, this leaves a short fall of approximately 230,000 tons of capacity.

In order to provide for sufficient tailings capacity, IUSA proposes a modification to the implementation of the Reclamation Plan to allow for storage, in the Cell 1-I impoundment area, of an estimated 325,000 tons of relatively dry contaminated material generated during the final reclamation of the facility. The use of Cell 1-I impoundment for specific reclamation material would have no significant environmental impact because the material would be placed relatively dry and immediately covered with the final reclamation cap. The reclamation materials would be placed along the upstream face of the dike between Cell 1-I and Cell 2, extending along the entire length of the dike. The total additional area would be approximately 9 acres. The tailings area cap, including random fill, clay cap and rock armour would extend from the Cell 2 area as a continuous layer over the additional material.

The differential cost, from the approved Reclamation Plan, for the use of Cell 1-I impoundment for storage of final reclamation material is estimated at about $239,000. The current approved Reclamation Plan will not be revised at this time because of the following factors:

1. Several of the feeds included in this tailings analysis are not commercially secured at this time.

2. The use of Cell 4A is still an alternative if IUSA is successful in obtaining further alternate feed contracts.

3. The estimated additional costs for the use of Cell 1-I are well within the Reclamation Plan's current contingency estimate of $1.5 million.

IUSA will revisit the assumptions made for the use of Cell 1-I during either the annual surety update or as part of the preparation of the Final Decommissioning Plan.

IUSA therefore requests that the NRC approve the W.R. Grace amendment as modified by the tailings management and alteration to the reclamation material management plan described herein and the attached Engineer's report.

I entrust the foregoing provides the NRC with the information required. I can be reached at (303) 389.4153 if there are any further questions or comments NRC may have.

Sincerely,

Ron F. Hochstein, P.Eng.
President & C.E.O.

MRR

cc: Ronald E. Berg
William N. Deal
David C. Frydenlund
Michelle R. Rehmann
William Sinclair/UDEQ
Don Verbica/UDEQ
William von Till/NRC

Tailings Capacity Evaluation

White Mesa Uranium Mill
Blanding, Utah

Prepared by

Harold R. Roberts, P.E.

for

International Uranium (USA) Corporation
Denver, Colorado

May 2000

Table of Contents

White Mesa Uranium Mill - Tailings Capacity Evaluation

Introduction

Introduction

The purpose of this report is to evaluate the remaining capacity of the White Mesa Uranium Mill Tailings Management System. In the past, calculations have been done utilizing undocumented or sometimes inaccurate data and assumptions, resulting in conflicting answers and uncertainty in the reliability of the final information. Efforts have been taken in preparing this report to ensure that historical records and references were verified for accuracy, instances of conflicting information were resolved, and the basis of the conclusions in this report are documented with calculations, assumptions and references.

Based on the results of the capacity evaluation, the report also evaluates alternatives for providing the necessary tailings storage capacity for the next 2 year time period, as well as accounting for disposal of the volume of contaminated waste material projected to be generated as a part of final site decommissioning. Estimated costs are summarized for each of the alternatives.

In addition, based on different scenarios for processing of Alternate Feed Materials, the water balance was updated to verify that processing rates and timing were realistic with respect to the current status of the system.

I. Base Tailings Capacity

Base Tailings Capacity

Cell 2

Cell 2 was constructed as a part of the initial phase design[1] of the Tailings Management System at the White Mesa Uranium Mill. Completed in May of 1980, it was the first Cell constructed to hold tailings sand. The design capacity and dry weight of the stored tailings was based on previous studies of similar tailings impoundments and a review of available literature by the design engineers. The initial design factor of 92 dry pounds per cubic foot (dpcf) was slightly higher than some reported values, but was considered appropriate due to the planned beaching method of tailings disposal. The Cell was constructed according to the design drawings except for modifications to the east end of the Cell, which resulted in an estimated 5 percent increase in the capacity. This was achieved because the natural topography on the east end was approximately 10 feet higher in elevation than the dike crest between Cell 2 and Cell 1-I. By extending the liner up to this higher elevation the additional capacity was made available.[2] The original area-capacity curves of Cell 2 indicated a capacity of 1,190 acre-feet. The additional volume on the east end of the Cell increased the capacity to approximately 1,249 acre-feet.

Field tests, during the first 18 months of operation, of the in-place density of tailings in Cell 2, indicated that the original design factor of 92 dpcf may have been too optimistic and the design factor was reduced to 80 dpcf for design of subsequent cells. In 1985, additional calculation of the in-place density of the tailings in the Cell by means of aerial photography indicated an even lower value of 74 dpcf. While the aerial photography should yield a more accurate estimate of the in-place density, uncertainties in the actual elevation of tailings under the small remaining pool area reduced the accuracy of the measurement. The only real test for determining the actual in-place density of the sand in Cell 2 is a comparison of the design volume to the actual final quantity of tailings placed in the Cell. The status of the Cell at this time allows for that comparison, resulting in a high degree of confidence in the number. Production records indicate that as of December 31, 1999, a total of 2,316,708 dry tons of tailings material had been placed in Cell 2. The Cell still contains a small amount of disposal capacity in the south-central area of the Cell. This remaining capacity, estimated from the February 1999 topographic map, is approximately 30,000 cubic yards, or 35,000 tons of tailings, assuming a density of 1.16 dry tons per cubic yard. This will bring the total quantity of tailings material in the Cell to 2,351,708 dry tons. Compared against the adjusted volume of the Cell, the final tailings density is 86.45 dpcf. This factor can be used to realistically estimate the final capacity, in terms of dry tons, of subsequent cells.

(1) Engineers Report, Tailings Management System by D'Appolonia Consulting Engineers, June 1979.

(2) Construction Report, Initial Phase - Tailings Management System, by D'Appolonia Consulting Engineers, February 1982.

Cell 3

Cell 3 was originally designed using an adjusted in-place density factor for the tailings of 80 dpcf. The area capacity curves for the Cell indicate a design capacity of 1,530 acre-feet before installation of liner cover. The estimated volume of liner cover was 175,000 cubic yards of soil. After installation of this cover material, the capacity of the cell was estimated to be 1,420 acre feet. A comparison of the final excavation contours, from the ***Construction Report, Second Phase - Tailings Management System, March 1983,*** indicates the Cell was constructed very close to the original design.

In order to maximize the amount of tailings storage in the Cell, approximately 70,000 tons of tailings sands were recovered from the tailings slurry being discharged to Cell 2, and utilized for cover of the synthetic liner. This was accomplished by use of a cyclone to separate the sand fraction from the slimes, with the sands being discharged into Cell 3 by use of a conveyor belt and the slimes discharging to Cell 3 as a slurry. This activity resulted in an increase in the tailings storage capacity of the Cell to approximately 1,455 acre-feet.

In order to project the actual final capacity of Cell 3, the factor for tailings density determined from Cell 2 is applied to the constructed volume of Cell 3. Applying the factor of 86 dpcf to the design capacity of 1,455 acre-feet yields a tailings capacity of 2,725,000 dry tons.

Usable Capacity

Production records indicate that as of December 31, 1999, 1,587,057 dry tons of tailings material has been placed in Cell 3. This leaves a remaining tailings capacity in Cell 3 of 1,139,000 dry tons. Because Cell 3 is the furthest down gradient active tailings cell, sufficient freeboard must be maintained in the Cell to store the estimated Probable Maximum Precipitation/Probable Maximum Flood (PMP/PMF) event from the upstream surface drainage area. This PMF/PMP event and the calculated flood volume of 123.4 acre feet, is documented in the ***January 1990 Drainage Report***, submitted by Umetco Minerals to the NRC. Therefore, until additional down gradient tailings cells are available to capture this flood volume, the available storage volume of Cell 3 will be reduced by 123.4 acre feet, or approximately 232,000 dry tons of tailings material. This reduces the active capacity of Cell 3 to approximately 907,000 dry tons.

The remaining storage volume in Cell 2 adds an additional 35,000 tons of capacity, bringing the total capacity of the existing system to 1,174,000 dry tons, although the allowance for the required freeboard in Cell 3 reduces the immediate usable capacity to 942,000 dry tons.

II. Forecast Tailings Requirements

Forecast Tailings Requirements

Until the next active tailings cell is fully operational and available for storage of solid tailings material, contingency plans need to be in place to ensure that:

1) Current tailings storage capacity is available for disposal of the existing and planned feed sources for the Mill, and;

2) Adequate capacity is available to dispose of the expected contaminated material from Cell 1-I, Cell 4A, and the Mill process area decommissioning.

Alternate Feeds are currently projected to add an additional 348,000 dry tons (300,000 cubic yards) of tailings to the system. The sources of Alternate Feeds, approved by amendment to the Mill's Source Materials License, include Ashland 1 and St. Louis, although there are no plans to receive any St. Louis material at this time. Amendment requests to receive W. R. Grace and Linde are currently before the NRC for review and approval. Amendment requests are being prepared for material from Molycorp and Heritage Minerals. A summary of the potential sources, with details of estimated quantities, are listed in the attached Table II-1.

In addition, the current approved Reclamation Plan projects disposal, into Cell 2 and Cell 3, of approximately 910,000 cubic yards of debris, soil, liner material and pond crystals. The source and types of materials are detailed in Table II-2. Of the total estimated quantities of material, approximately 280,000 cubic yards will be relatively dry soil (less that 10% moisture content) and debris, and the remaining portion will be crystals, pond sludges, and liner material, the majority of which will be higher moisture content.

The current remaining capacity of Cell 2 and Cell 3 is 1,174,000 dry tons of tailings, or 1,010,000 cubic yards. Based on these projections there is an apparent shortfall in approved storage capacity of 200,000 cubic yards, or 230,000 dry tons, in the system, as currently permitted.

Table II - 1

Alternate Feed Sources and Estimated Volumes

•	Ashland 1		93,600 dry tons
•	Molycorp		4,250 dry tons
•	Heritage Minerals		1,550 dry tons
•	Linde		140,400 dry tons
•	W. R. Grace		108,000 dry tons
	Sub-Total		347,800 dry tons
•	11e.(2) - In-situ waste disposal	Crow Butte	50 dry tons
		USX	500 dry tons
		Uranium Resources	200 dry tons
		Power Resources	200 dry tons
	Total		348,750 dry tons

Table II-2

Mill Site Decommissioning - Required Disposal Volumes

Mill Yard area [(1)]	91,300 yd^3
Ore Pad [(1)]	54,300 yd^3
Windblown Material [(1)]	94,100 yd^3
Mill debris (estimated)	
Concrete	15,000 yd^3
Structural Steel	8,000 yd^3
Piping and Tankage	10,000 yd^3
Electrical	2,000 yd^3
Misc.	5,000 yd^3
Subtotal	279,700 yd^3
Additional Material from Cell 1-I and Cell 4A	
Cell 1-I, crystals and contaminated soil	524,800 yd^3
Cell 4A, crystals and contaminated soil	106,100 yd^3
Subtotal	630,900 yd^3
Total Material from Site Reclamation	910,600 yd^3

(1) From Reclamation Plan, White Mesa Mill
International Uranium (USA) Corporation
Revision 2, May 1999

III. Alternatives

Alternatives

Based on the **Forecast Tailings Requirements** (Section II), there is an apparent shortfall in existing approved storage capacity of 200,000 cubic yards, if all of the estimated quantities of reclamation materials and currently projected processing volumes are disposed of in Cell 2 or Cell 3.

Alternatives to handle the additional volume are:

1) Initiating use of Cell 4A, or;

2) Modifying the existing Reclamation Plan to allow for disposal and capping, upon final site reclamation, of a quantity of contaminated material in the Cell 1-I impoundment area.

The refurbishment of the Cell 4A impoundment is estimated to cost in the range of \$1.4 to \$2.5 million, depending on the scenario chosen for replacement of the synthetic liner, i.e. single or double liner system. In addition to this cost, once tailings solids are placed into Cell 4A, the Reclamation Plan will need to be modified to take into account the cost of the full radon cap and the reduction of the downstream slopes to meet the long term stability requirements. Based on the cost for installation of the Cell 3 cap, and the earth moving cost for random fill to accomplish the required slope reduction, the additional reclamation cost for Cell 4A is estimated to be \$1,231,000. See Table III-1. This includes a credit for the costs which were included in the current estimate to remove the crystals and liner.

The second alternative is to modify the Reclamation Plan to allow for placement of approximately 280,000 yd^3 of material from the Mill site cleanup, along the north slope of the Cell 2 dike, within a portion of the current Cell 1-I. The current Reclamation Plan specifies that all of the contaminated materials from Cell 1-I are to be removed from the cell upon final site reclamation, and the impoundment is to act as a sedimentation basin with an outlet to the canyon on the west side of the site. A scenario, which does not deviate from the general concepts of the existing Reclamation Plan, is to use a portion of the existing Cell 1-I excavation to store low moisture content material from the mill site, windblown areas and the mill debris, upon final decommissioning of the site

Under this scenario, upon final decommissioning, only the crystals and sludge from Cell 1-I and Cell 4A, would be placed into the remaining capacity in Cell 2 and Cell 3. This would consume approximately 630,000 yd^3 of the remaining capacity in Cell 2 (30,000 yd^3) and Cell 3 (980,000 yd^3). 380,000 yd^3 of capacity would then be eligible for use in the ongoing Mill operations. This remaining capacity will be sufficient to store the current anticipated alternate feed materials, totalling approximately 300,000 yd^3.

The remaining contaminated materials and debris from the Mill area reclamation would be placed along the upstream face of the dike between Cell 1-I and Cell 2, extending along the entire length of the dike. See Figure IV-1. The estimated volume of this material, 280,000 yd^3, would cover an area approximately 160 feet wide along the 2,400 foot length of the dike. The total additional area would be approximately 9 acres. The width of the additional contaminated material would vary depending on the final volume of cleanup materials, and the concept would give the added advantage of having additional storage, if needed, in the remaining area of the Cell. The tailings area cap, including random fill, clay cap and rock amour would extend from the Cell 2 area as a continuous layer over the additional material. While the material placed in the Cell 1-I area will not have a bottom liner, the fact that the material is placed relatively dry (estimated to be less than 10% moisture content) and quickly covered with an engineered cap, will prevent any natural precipitation from moving through the material. This will eliminate the potential for migration of contaminants from this area. The current reclamation plan specifies that the Cell 1-I impoundment area is to act as a sedimentation basin with an outfall to the canyon on the west side of the site. This concept will still be preserved with approximately 80% of the Cell 1-I area still available for the sedimentation basin. The final location of the outfall channel will be adjusted based on the volume and area of material stored in Cell 1-I.

The cost for handling all the volumes of contaminated materials are included in the cost estimate of the current approved Reclamation Plan. The only additional cost for this option is the extension of the final cover over the additional area in Cell 1-I. Assuming the same unit rates and productivity as estimated for the Cell 3 cap, the additional area will increase the reclamation cost by $239,000, including all of the NRC required factors and contingencies. See Table III-2.

Table III-1

Additional Cost for Reclamation of Cell 4A

Cost per Acre (from Cell 3 estimate)		$20,873.00
Total Additional Acres		45
Base Cost		$939,285.00
Additional Slope Reduction along north/south dike		$150,000.00
Credit for Cell Clean out costs		($120,000.00)
Sub-total		$969,285
Profit Allowance	10.00%	$96,928.50
Contingency	15.00%	$145,392.75
Licensing and Bonding	2.00%	$19,385.70
Total Additional Cost		**$1,230,992**

Table III-2

Cost for Reclamation of Additional Area of Cell 1-I

Cost per Acre (from Cell 3 estimate)		$20,873.00
Total Additional Acres		9
Base Cost		$187,857.00
Profit Allowance	10.00%	$18,785.70
Contingency	15.00%	$28,178.55
Licensing and Bonding	2.00%	$3,757.14
Total Additional Cost		**$238,578**

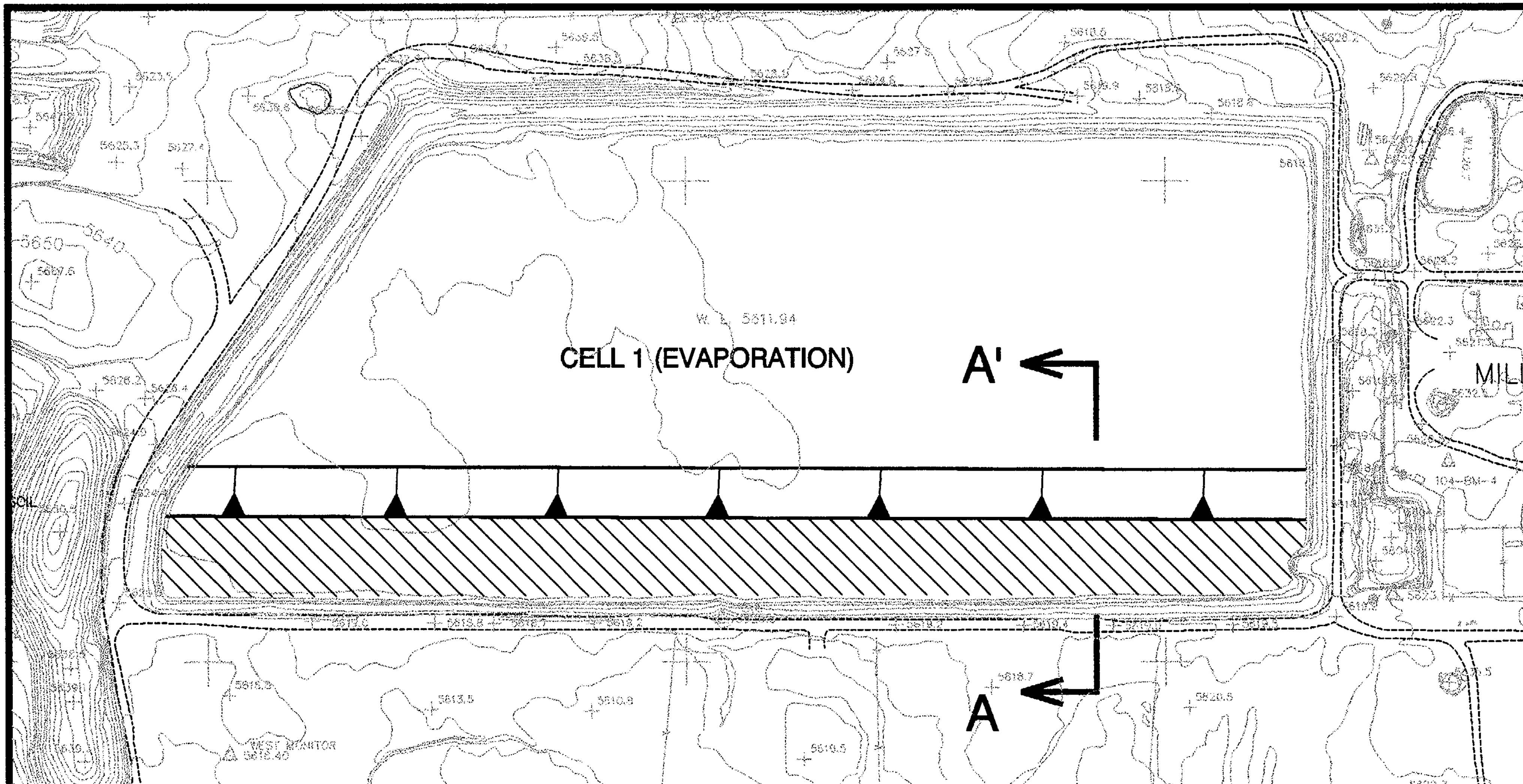
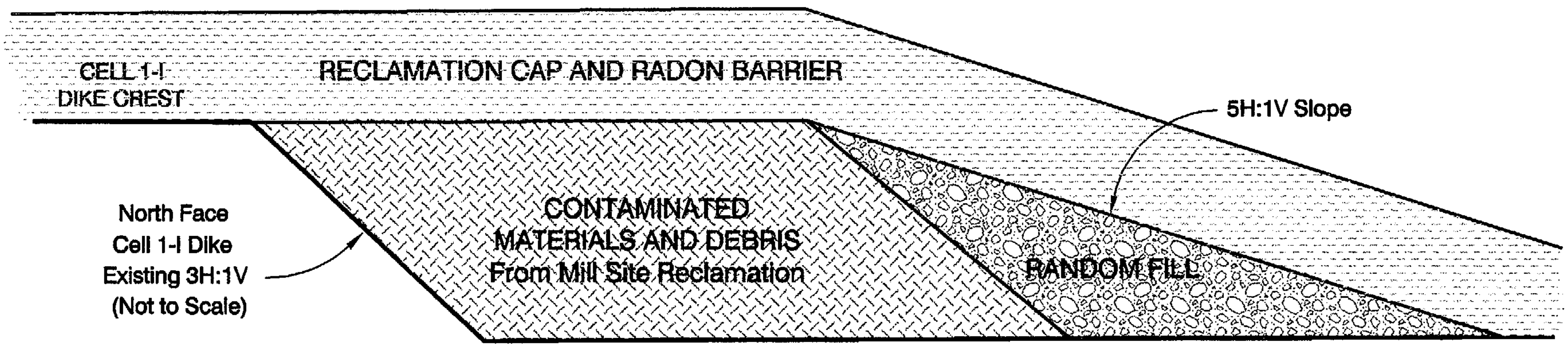


Figure III-I

International Uranium (USA) Corporation

Project: White Mesa Mill			
REVISIONS	County: San Juan	State: Utah	
Date / By	Location:		
	PROPOSED DISPOSAL AREA FOR MILL SITE CONTAMINATED MATERIALS AND DEBRIS		
	Scale: 1"=300'	Date: May 4, 2000	Cell1rec
	Author: HRR	Drafted By: SleddCad	



SECTION A-A'

(See Figure III-I)

International Uranium (USA) Corporation

Project	White Mesa Mill
County: San Juan	State: Utah
Location:	
REVISIONS (Date / By)	CROSS SECTION A-A'
Scale: N/A	Date: May 4, 2000 — Xsect-A
Author: HRR	Drafted By: SleddCad

IV. Water Balance

Water Balance

Based on two alternatives for processing of Alternate Feed Materials over the next 2 years at the White Mesa Uranium Mill, the water balance has been updated to ensure the processing schedules and timing are realistic. Processing schedule, volumes and characteristics for both alternatives are detailed in Table IV-1 and Table IV-2. Because the White Mesa Mill is a non-discharging facility, all the excess process solutions and precipitation runoff from the facility must be contained and eventually evaporated or reused in the process.

The original design for the facility envisioned the use of Cell 1-I and the active tailings cell for providing the necessary surface area to evaporate the excess water. The original design also included a potential expansion of evaporation-only capacity by the addition of Cell 1-E. The early operators of the Mill elected to construct tailings disposal cells earlier than they would normally be needed to provide the additional evaporation capacity, rather than construct an evaporation-only cell.

The updated water balance is based on the following operating assumptions:

1) Evaporation capacity is based on 55 acres of free water surface in Cell 1-I, and 30 acres of free water surface in Cell 3.

2) Evaporation loss is only from the free water surface.

3) Precipitation gain is from 105% of the area of Cell 1-I and from 110% of the free water surface of Cell 3. This assumption attempts to account for excess water flowing into the ponds from surrounding areas.

4) Feed stock characteristics and processing schedules per the attached Table IV-1 and Table IV-2.

5) Processing runs based on campaigns with and without materials from W. R. Grace.

6) Starting pond water elevations from White Mesa Mill records for April 1, 2000.

7) Evaporation and precipitation estimates from original Initial Phase Design, lake evaporation option.

8) Mill operates at 1,000 dry tons per day at 90% efficiency. (27,000 dry tons per calendar month)

9) Total water discharged to tailings system based on <u>overall</u> 45% slurry discharge density (1.22 tons of fresh water per 1.0 dry ton of ore fed) See Table II-3 for water/solids ratios at various slurry densities.

10) Each cubic foot of dry solids discharged below the free water surface displaces 0.6 cubic feet of water. Therefore, each dry ton of solids displaces 13.95 cubic feet of existing pond water in addition to the water added from the process water makeup. See Table IV-3 for total water gain at various slurry densities.

Precipitation records are kept monthly by the White Mesa Mill environmental staff and can be compared directly against the projected amounts. Evaporation is much more difficult to monitor, except as a comparison of projected amounts against the actual gain or loss each month in the ponds. Essentially the attached models should be used as a guide and will generally be within a reasonable degree of accuracy based on the assumptions. Data should be input monthly to the model as an attempt to fine tune the assumptions to the actual circumstances, and to adjust processing schedules or rates in anticipation of expected problems.

The current water balance models from both processing scenarios are attached as Table IV-4 and Table IV-5. The Mill should be reasonably safe, from a water balance perspective, in expecting to complete the operating campaign as planned under both processing scenarios. The Mill will see an increase in the available water storage capacity up to almost 275 acre-feet by the time processing begins in September of 2000. The capacity will diminish during the winter months, to approximately 35 acre-feet in April of 2001. At that point, projected evaporation will allow the Mill to complete the planned processing campaign in the early fall of 2001.

Because the storage capacity drops as low as 35 acre-feet, the water balance should be continually monitored prior to Mill startup to ensure the projected capacity is available at startup. The 35 acre-feet of capacity is well within the margin of error in the model given the uncertainties in some of the assumptions. One extremely wet summer month, resulting in a combination of high precipitation and low evaporation, could consume a large portion of the 35 acre-feet. In addition, failure to maintain an overall tailings discharge density of 45% will also adversely effect the water balance. The overall evaporation capacity of the Mill is at one of its lowest points in the operating history. Careful monitoring of the pond levels and operating discipline with respect to fresh water usage are critical to maintaining the projected operating schedule.

Table IV-1

Assumptions on volume, characteristics and processing rate of feed materials

(With WR Grace)

- Ashland 1	Tons received	120,000	
	Moisture, as received	22 %	
	Dry tons received	93,600	
	Processing start date	01/01	
	Processing rate (dtpd)	1,000	30 days/month
- St. Louis	Tons received	0	
	Moisture, as received	NA	
	Dry tons received	NA	
	Processing start date	NA	
	Processing rate (dtpd)	NA	
- Molycorp	Tons received	5,000	
	Moisture, as received	15 %	
	Dry tons received	4,250	
	Processing start date	01/01	
	Processing rate (dtpd)	100	
- Heritage	Tons received	1,600	
	Moisture, as received	3 %	
	Dry tons received	1,552	
	Processing start date	02/01	
	Processing rate (dtpd)	100	

Table IV-1 (continued)

Assumptions on volume, characteristics and processing rate of feed materials

(With WR Grace)

- Linde	Tons received	180,000
	Moisture, as received	22%
	Dry tons received	140,400
	Processing start date	04/01
	Processing rate (dtpd)	1000
- W R Grace	Tons received	135,000
	Moisture, as received	20%
	Dry tons received	108,000
	Processing start date	09/00
	Processing rate (dtpd)	1000
- 11e.(2)	Crow Butte (PRI)	50
	USX	500
	URI	200
	Highland	200

Table IV-2

Assumptions on volume, characteristics and processing rates of feed materials

(Without WR Grace)

- Ashland 1	Tons received		120,000	
	Moisture, as received	22 %		
	Dry tons received	93,600		
	Processing start date	09/00		
	Processing rate (dtpd)		1,000	30 days/month
- St. Louis	Tons received	0		
	Moisture, as received	NA		
	Dry tons received	NA		
	Processing start date	NA		
	Processing rate (dtpd)		NA	
- Molycorp	Tons received	5,000		
	Moisture, as received	15 %		
	Dry tons received	4,250		
	Processing start date	09/00		
	Processing rate (dtpd)		100	
- Heritage	Tons received	1,600		
	Moisture, as received	3 %		
	Dry tons received	1,552		
	Processing start date	10/00		
	Processing rate (dtpd)		100	

Table IV-2 (continued)

Assumptions on volume, characteristics and processing rates of feed materials

(Without WR Grace)

- Linde	Tons received	180,000
	Moisture, as received	22%
	Dry tons received	140,400
	Processing start date	01/01
	Processing rate (dtpd)	1000
- W R Grace	Tons received	
	Moisture, as received	
	Dry tons received	
	Processing start date	
	Processing rate (dtpd)	
- 11e.(2)	Crow Butte (PRI)	50
	USX	500
	URI	200
	Highland	200

Table IV-3

Water Balance - Assumptions

% Solids	Tons water per ton ore	Cubic feet of water per ton of ore*
50	1.00	46.0
45	1.22	53.1
40	1.50	62.0
35	1.86	73.5
30	2.33	88.7
25	3.00	110.1

* includes estimated volume displaced by solids

Each ton of ore discharged below water surface displaces 13.95 cubic feet of water

Table IV - 4 - White Mesa Mill - Water Balance
(With WR Grace)

		2000									2001												2002			
		April	May	June	July	August	September	October	November	December	January	February	March	April	May	June	July	August	September	October	November	December	January	February	March	
Surface Area																										
Cell 1-I (Acres)	(Max Level) 5615.40	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	
Solution Elevation		5614.95	5614.62	5614.13	5613.47	5612.79	5612.42	5611.90	5611.77	5611.69	5611.81	5611.90	5611.97	5612.03	5611.70	5611.21	5610.56	5609.87	5609.50	5608.98	5608.85	5608.77	5608.89	5608.98	5609.05	
Precip Gain (ft.)	1.05	0.061	0.053	0.035	0.096	0.149	0.079	0.140	0.079	0.114	0.096	0.070	0.061	0.061	0.053	0.035	0.096	0.149	0.079	0.140	0.079	0.114	0.096	0.070	0.061	
Evap Loss (ft.)	1.00	-0.392	-0.542	-0.692	-0.783	-0.517	-0.600	-0.267	-0.158	0.000	0.000	0.000	0.000	-0.392	-0.542	-0.692	-0.783	-0.517	-0.600	-0.267	-0.158	0.000	0.000	0.000	0.000	
Available ac-ft.		24.7	42.9	89.8	105.9	143.7	164.0	192.6	199.6	204.0	197.7	192.4	188.6	185.2	203.4	230.3	266.4	304.2	324.4	353.1	360.1	364.4	358.2	352.9	349.0	
Cell 3 (Acres)	(Max Level) 5603.00	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	
Solution Elevation		5601.32	5600.99	5600.51	5599.85	5599.17	5598.81	5599.39	5600.37	5601.39	5602.60	5603.80	5604.97	5606.13	5606.91	5607.52	5607.96	5608.37	5609.11	5609.56	5609.44	5609.36	5609.48	5609.58	5609.66	
Precip Gain (ft.)	1.10	0.064	0.055	0.037	0.101	0.156	0.083	0.147	0.083	0.119	0.101	0.073	0.064	0.064	0.055	0.037	0.101	0.156	0.083	0.147	0.083	0.119	0.101	0.073	0.064	
Evap Loss (ft.)	1.00	-0.392	-0.542	-0.692	-0.783	-0.517	-0.600	-0.267	-0.158	0.000	0.000	0.000	0.000	-0.392	-0.542	-0.692	-0.783	-0.517	-0.600	-0.267	-0.158	0.000	0.000	0.000	0.000	
Month end elev.		5600.99	5600.51	5599.85	5599.17	5598.81	5598.29	5599.27	5600.29	5601.51	5602.70	5603.88	5605.04	5605.81	5606.42	5606.86	5607.28	5608.01	5608.59	5609.44	5609.36	5609.48	5609.58	5609.66	5609.72	
Available ac-ft.		60.2	74.8	94.5	114.9	125.8	141.3	112.0	81.3	44.8	-24.1	-59.2	-94.1	-117.2	-135.5	-148.8	-161.2	-183.3	-200.7	-222.2	-190.9	-194.5	-197.5	-199.7	-201.7	
Production Add.		0.0	0.0	0.0	0.0	0.0	-32.9	-32.9	-32.9	-32.9	-32.9	-32.9	-32.9	-32.9	-32.9	-32.9	-32.9	-32.9	-29.0	0.0	0.0	0.0	0.0	0.0	0.0	
Net		60.2	74.8	94.5	114.9	125.8	108.4	79.0	48.4	11.9	-57.0	-92.1	-127.0	-150.1	-168.4	-181.7	-194.1	-216.2	-229.7	-222.2	-190.9	-194.5	-197.5	-199.7	-201.7	
		5600.99	5600.51	5599.85	5599.17	5598.81	5599.39	5600.37	5601.39	5602.60	5603.80	5604.97	5606.13	5606.91	5607.52	5607.96	5608.37	5609.11	5609.56	5609.44	5609.36	5609.48	5609.58	5609.66	5609.72	
Total Available Cell 1-I and Cell		85.0	117.7	164.3	220.9	269.5	272.3	271.7	248.0	215.9	140.7	100.3	61.6	35.1	35.0	48.6	72.3	88.0	94.7	130.9	169.1	169.9	160.6	153.2	147.4	
Precipitation (in.)		0.7	0.6	0.4	1.1	1.7	0.9	1.6	0.9	1.3	1.1	0.8	0.7	0.7	0.6	0.4	1.1	1.7	0.9	1.6	0.9	1.3	1.1	0.8	0.7	23.6
Evaporation (in.)		-4.7	-6.5	-8.3	-9.4	-6.2	-7.2	-3.2	-1.9	0	0	0	0	-4.7	-6.5	-8.3	-9.4	-6.2	-7.2	-3.2	-1.9	0	0	0	0	-94.8
																									Net (Two years)	71.2
Production																										
(dry tons)	53.1										24,000	24,200	27,000	18,400												93,600
Ashland 1																										0
St. Louis											3,000	1,250														4,250
Molycorp												1,552														1,552
Heritage														8,600	27,000	27,000	27,000	27,000	23,800							140,400
Linde							27,000	27,000	27,000	27,000																108,000
W R Grace																										0
11(e)ii																										0
																										0
		0	0	0	0	0	27,000	27,000	27,000	27,000	27,000	27,002	27,000	27,000	27,000	27,000	27,000	27,000	23,800	0	0	0	0	0	0	347,802

Table IV - 5 - White Mesa Mill - Water Balance

(Without WR Grace)

		2000 April	May	June	July	August	September	October	November	December	2001 January	February	March
Surface Area													
Cell 1-I (Acres)	(Max Level) 5615.40	55	55	55	55	55	55	55	55	55	55	55	55
Solution Elevation		5614.95	5614.62	5614.13	5613.47	5612.79	5612.42	5611.90	5611.77	5611.69	5611.81	5611.90	5611.97
Precip Gain (ft.)	1.05	0.061	0.053	0.035	0.096	0.149	0.079	0.140	0.079	0.114	0.096	0.070	0.061
Evap Loss (ft.)	1.00	-0.392	-0.542	-0.692	-0.783	-0.517	-0.600	-0.267	-0.158	0.000	0.000	0.000	0.000
Available ac-ft.		24.7	42.9	69.8	105.9	143.7	164.0	192.6	199.6	204.0	197.7	192.4	188.6
Cell 3 (Acres)	(Max Level) 5603.00	30	30	30	30	30	30	30	30	30	30	30	30
Solution Elevation		5601.32	5601.00	5600.52	5599.87	5599.19	5598.85	5599.43	5600.42	5601.45	5602.68	5603.89	5605.07
Precip Gain (ft.)	1.20	0.070	0.060	0.040	0.110	0.170	0.090	0.160	0.090	0.130	0.110	0.080	0.070
Evap Loss (ft.)	1.00	-0.392	-0.542	-0.692	-0.783	-0.517	-0.600	-0.267	-0.158	0.000	0.000	0.000	0.000
Month end elev.		5601.00	5600.52	5599.87	5599.19	5598.85	5598.34	5599.33	5600.36	5601.58	5602.79	5603.97	5605.14
Available ac-ft.		60.1	74.5	94.1	114.3	124.7	140.0	110.2	79.3	42.5	-26.6	-62.0	-97.0
Production Add.		0.0	0.0	0.0	0.0	0.0	-32.9	-32.9	-32.9	-32.9	-32.9	-32.9	-32.9
Net		60.1	74.5	94.1	114.3	124.7	107.0	77.3	46.4	9.6	-59.6	-94.9	-129.9
		5601.00	5600.52	5599.87	5599.19	5598.85	5599.43	5600.42	5601.45	5602.68	5603.89	5605.07	5606.23
Total Available Cell 1-I and Cell		**64.8**	**117.4**	**163.9**	**220.2**	**268.4**	**271.0**	**269.9**	**246.0**	**213.6**	**138.2**	**97.5**	**58.7**
Precipitation (in.)		0.7	0.6	0.4	1.1	1.7	0.9	1.6	0.9	1.3	1.1	0.8	0.7
Evaporation (in.)		-4.7	-6.5	-8.3	-9.4	-6.2	-7.2	-3.2	-1.9	0	0	0	0
Production (dry tons)													
Ashland 1	53.1						24,000	24,200	27,000	18,400			
St. Louis													
Molycorp							3,000	1,250					
Heritage								1,552					
Linde										8,600	27,000	27,000	27,000
W R Grace													
11(e)ii													
		0	0	0	0	0	27,000	27,002	27,000	27,000	27,000	27,000	27,000

	April	May	June	July	August	September	October	November	December	2002 January	February	March	
Surface Area													
Cell 1-I (Acres)	55	55	55	55	55	55	55	55	55	55	55	55	
Solution Elevation	5612.03	5611.70	5611.21	5610.56	5609.87	5609.50	5608.98	5608.85	5608.77	5608.89	5608.98	5609.05	
Precip Gain (ft.)	0.061	0.053	0.035	0.096	0.149	0.079	0.140	0.079	0.114	0.096	0.070	0.061	
Evap Loss (ft.)	-0.392	-0.542	-0.692	-0.783	-0.517	-0.600	-0.267	-0.158	0.000	0.000	0.000	0.000	
Available ac-ft.	185.2	203.4	230.3	266.4	304.2	324.4	353.1	360.1	364.4	358.2	352.9	349.0	
Cell 3 (Acres)	30	30	30	30	30	30	30	30	30	30	30	30	
Solution Elevation	5606.23	5607.01	5607.50	5606.84	5606.17	5605.82	5605.31	5605.21	5605.14	5605.27	5605.38	5605.46	
Precip Gain (ft.)	0.070	0.060	0.040	0.110	0.170	0.090	0.160	0.090	0.130	0.110	0.080	0.070	
Evap Loss (ft.)	-0.392	-0.542	-0.692	-0.783	-0.517	-0.600	-0.267	-0.158	0.000	0.000	0.000	0.000	
Month end elev.	5605.91	5606.53	5606.84	5606.17	5605.82	5605.31	5605.21	5605.14	5605.27	5605.38	5605.46	5605.53	
Available ac-ft.	-120.3	-138.8	-144.3	-95.1	-84.7	-69.4	-66.2	-64.2	-68.1	-71.4	-73.8	-75.9	
Production Add.	-32.9	-29.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Net	-153.2	-167.8	-144.3	-95.1	-84.7	-69.4	-66.2	-64.2	-68.1	-71.4	-73.8	-75.9	
	5607.01	5607.50	5606.84	5606.17	5605.82	5605.31	5605.21	5605.14	5605.27	5605.38	5605.46	5605.53	
Total Available Cell 1-I and Cell	**32.0**	**35.6**	**86.0**	**171.3**	**219.5**	**255.0**	**286.9**	**295.9**	**296.4**	**286.8**	**279.1**	**273.2**	
Precipitation (in.)	0.7	0.6	0.4	1.1	1.7	0.9	1.6	0.9	1.3	1.1	0.8	0.7	23.6
Evaporation (in.)	-4.7	-6.5	-8.3	-9.4	-6.2	-7.2	-3.2	-1.9	0	0	0	0	-94.8
												Net (Two years)	71.2
Production (dry tons)													
Ashland 1													93,600
St. Louis													0
Molycorp													4,250
Heritage													1,552
Linde	27,000	23,800											140,400
W R Grace													0
11(e)ii													0
													0
													0
	27,000	23,800	0	0	0	0	0	0	0	0	0	0	239,802

V. Conclusion

Conclusion

Tailings Capacity and Alternatives

The review and calculation of remaining tailings storage capacity in the White Mesa Uranium Mill's Tailings Management System indicates the following capacity figures for each of the active tailings cells permitted to store tailings solids. All volumes are presented in terms of both dry tons and cubic yards of storage, assuming the conversation factor of 86 dry pounds per cubic foot (1.16 tons per cubic yard), as determined from the Cell 2 statistics. Volumes and tonnage are also presented for additional factors which impact the evaluation of the current status of the system.

Projected and Remaining Capacities

	Tons	Cubic Yards
Cell 2	35,000	30,000
Cell 3	1,139,000	980,000
Total Remaining Capacity	1,174,000	1,010,000
Alternate Feeds	348,000	300,000
Mill Site Contaminated Materials	1,056,000	910,000
Total Disposal Volume	1,404,000	1,210,000
Current Freeboard Pool Volume	232,000	200,000

The total remaining capacity of tailings disposal is 1,174,000 tons, with projections of 1,404,000 tons from processing alternate feeds and the estimated disposal quantities from final site reclamation. This leaves a short fall of approximately 230,000 tons of capacity. Alternatives include refurbishment and use of the previously constructed Cell 4A, or modification of the approved Reclamation Plan to allow for storage, in the Cell 1-I impoundment area, of an estimated 325,000 tons of relatively dry contaminated material generated during final reclamation of the facility. Conceptual approval of this alternative will the give the Mill operation the flexibility of deferring for the near term, the decision

to incur an additional $2.6 to $3.7 million of construction and reclamation liability by activating Cell 4A. The use of the Cell 1-I impoundment would have little or no environmental impact because the material would be placed relatively dry and immediately covered with the final reclamation cap.

Water Balance

During the next two years, the Mill should be reasonably safe, from a water balance perspective, in expecting to complete the operating campaign as planned. The Mill will see an increase in the available water storage capacity up to almost 275 acre-feet by the time the Mill begins processing ore in September of 2000. The capacity will diminish during the winter months, to approximately 35 acre-feet in April of 2001. At that point, projected evaporation will allow the Mill to continuing processing through the planned campaign ending in early fall.

The water balance should be continually monitored prior to Mill startup to ensure the projected capacity is available at startup. The current overall evaporation capacity is at one of its lowest points in the operating history of the Mill. Careful monitoring of the pond levels and operating discipline with respect to fresh water usage are critical to maintaining the projected operating schedule.

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