



INTERNATIONAL  
URANIUM (USA)  
CORPORATION

40-8681

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October 13, 1999

**VIA FACSIMILE AND OVERNIGHT COURIER**

Mr. John J. Surmeier, Chief  
Uranium Recovery and Low-Level Waste Branch  
Division of Waste Management  
Office of Nuclear Materials Safety and Safeguards  
U.S. Nuclear Regulatory Commission  
2 White Flint North  
11545 Rockville Pike  
Rockville, MD 20852

Re: Request for Amendment of License No. SUA-1358; Revised Freeboard  
Limit Calculation Procedure and Adjustment of Freeboard Amount -  
White Mesa Uranium Mill

Dear Mr. Surmeier:

International Uranium (USA) Corporation ("IUSA") hereby submits the enclosed request to amend Source Material License SUA-1358 ("Amendment Request") to permit IUSA to use the attached revised Freeboard Limit Calculation Procedure and to adjust the freeboard amount in accordance with existing license conditions. The Amendment Request describes the current procedure; explains why the current procedure is unnecessarily and extremely conservative in calculation of the freeboard limit; and proposes a revised procedure more appropriate to actual operating conditions at the Mill.

The effect of the modification to the procedure is to more realistically account for the addition of tailings sand in the year ahead, based on the actual operating projection for the mill. As explained in the amendment request, the only revision to the procedure would be to include an estimate of the next 12 months mill throughput, plus a factor of safety, in lieu of the existing assumption of maximum tonnage for the following 12 months. Attached to the amendment request is IUSA's revised procedure. Proposed language for the License Amendment has been attached to the Amendment Request as Attachment 2.

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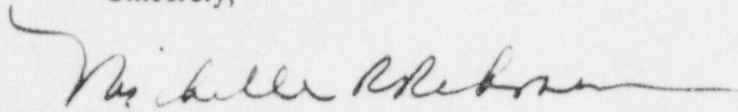
Mr. John J. Surmeier

October 13, 1999

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IUSA requests that the NRC please attempt to reply to this request within 30 days of this transmittal date. Should NRC wish to discuss this request, please contact Harold Roberts at 303.389.4160 or the undersigned at 303.389.4131.

Sincerely,

A handwritten signature in cursive script, appearing to read "Michelle R. Rehmann".

Michelle R. Rehmann  
Environmental Manager

MRR

Attachment

cc/att: William von Till  
Earl E. Hoellen  
Harold R. Roberts  
David C. Frydenlund  
William N. Deal

License Amendment Request – SUA 1358  
International Uranium (USA) Corporation  
White Mesa Uranium Mill

The depth requirement to handle the PMP for Cell 3 is constantly changing as new tailings are placed in the Cell and the available storage capacity is subsequently reduced. Current conditions are such that Cell 2 essentially has no available storage capacity for the PMP flood, and it is assumed that Cell 1-I is operated at its maximum capacity and also has no available storage capacity. Therefore Cell 3 must be able to handle the entire volume of runoff caused by a PMP event. Existing License Condition 10.3 references a requirement for re-evaluation of the Cell 3 freeboard when the Mill has placed 600,000 tons of tailings in Cell 3 after October 23, 1989. The purpose of this amendment request is to revise the procedure for calculation of the Cell 3 freeboard limit.

Current Procedure

The procedure for re-evaluation of the freeboard limits was presented in a submittal by Umetco Minerals to the Nuclear Regulatory Commission on January 10, 1990. The 1990 submittal presented the basis and calculations for the PMP storm event and the wind wave run up factor. The procedure, as presented in the January 10, 1990 submittal, for re-calculation of the freeboard limit is stated as follows:

Procedure Freeboard Limits for Cell 3

*The following procedure is intended to be used to determine the maximum operating pool level in Cell 3. This procedure is necessary because tailings sand deposition occupies some of the volume required to hold a PMP event. A summary of the procedure is as follows:*

- 1. From a survey of the Cell, the pool surface area will be determined.*
- 2. From this area 17.3 acres will be subtracted. The wave run up requirement is determined. The maximum operating pool level is then calculated from the dike crest elevation minus the flood volume requirements divided by the pool area minus the wave run up requirements.*

*The basis of the procedure will now be discussed.*

*During the period of March 1988 through October 1989, 465,839 dry tons of tailings were added to Cell 3. From topographic maps generated from aerial photographs, see Figure 2, the pool surface area of Cell 3 was reduced by 11.9 acres. Total dry tons divided by change in pool area extent yields the number of tons required to reduce pool size by one acre, or 39,146 dry tons per acre.*

The maximum amount of tailings that could be discharged in a one-year time period is 2,000 dry tons per day for 365 days with 93% mill availability, or 678,900 dry tons. The maximum tonnage divided by the number of tons required to reduce pool size by one acre yields the maximum expected pool area reduction, or 17.3 acres. This number is then subtracted from the pool surface area determined by survey or topographic means, yielding the reduced pool area.

The flood volume requirements are 123.4 acre-feet as per section titled Cell 1 through 4. The flood volume divided by the reduced pool area is the freeboard required for the flood. Wind-wave run-up is calculated as per the section titled Wave Run-up. The PMP freeboard requirement plus the wave run-up requirement yield the total required freeboard.

Note that this procedure overestimates the required freeboard and therefore is a conservative method. The overestimation is a result of not taking credit for the volume available for flood storage above the sand surface. In other words, this method assumes that the sand at the edges of the pool rises vertically to the top of the cell. The procedure also does not take credit for soil retention losses considered in the three cases used to develop the freeboard vs pool surface area graph.

The following example is calculated using the above procedure. On October 22, 1989 the pool area in Cell 3, determined by aerial photography, was 46.2 acres.

$$46.2 - 17.3 = 28.9 \text{ acres}$$

This is the area in which the storm volume must be stored. The storm volume was determined to be 123.4 acre-feet.

$$123.4 \text{ acre-feet} / 28.9 \text{ acres} = 4.3 \text{ feet}$$

$$4.3 \text{ feet} + 0.7 \text{ feet} = 5.0 \text{ feet}$$

$$5608.0 \text{ feet} - 5.0 \text{ feet} = 5603.0 \text{ feet msl}$$

This procedure will be used yearly if the mill operates on a continuous basis (emphasis added). If the mill is shut down, then this procedure will be used and a submittal made to the NRC when 600,000 dry tons have been placed in Cell 3.

The current procedure results, unnecessarily, in an extremely conservative freeboard limit. As stated in the procedure, the calculation overestimates the required pool area available for liquid storage by taking no credit for the additional storage provided as the water spreads out over the sand surfaces which are below the freeboard limit. In addition, the procedure also requires that the storage capacity be further reduced by the projected maximum volume of tailings generated by full time operation of the mill during

the following 12 months. This effectively takes up at least half of the available pool area and results in an even more conservative freeboard limit, given the operating schedule at the mill over the past 8 to 10 years, which has been only intermittent, at best.

When Umetco Minerals developed the recalculation procedure, the inclusion of the maximum possible tonnage for the following 12 months was reasonable, because the mill was in fact operating at or near the maximum design capacity of the mill. With our current situation, the mill is projected to process only 80,000 to 100,000 dry tons over the next 12 months. This is less than 20% of the future tonnage assumed by the current procedure.

IUSA requests that the License be amended to reflect a reference to the January 10, 1990 submittal with a revision to the recalculation procedure. The only revision to the procedure would be to include an estimate of the next 12 months' mill throughput, plus a factor of safety, in lieu of the existing assumption of maximum tonnage for the following 12 months. The proposed revised procedure is attached as Attachment 1. Proposed language for the License Amendment has been attached as Attachment 2.

The effect of the modification to the procedure is to more realistically account for the addition of tailings sand in the year ahead, based on the actual operating projection for the mill.

Because the recalculation procedure already contains conservative assumptions detailed above, this modification to the procedure will have no adverse impact to the overall safety and stability of the tailings system. In fact, under certain circumstances, the revised procedure will actually result in an earlier recalculation of the freeboard limits because of the 1.5 multiple applied to the production estimate. The existing procedure unreasonably penalizes the mill operation by forcing unrealistic production estimates into the calculation procedure.

## Attachment 1

### Revised Procedure

#### Procedure Freeboard Limits for Cell 3

*The following procedure is intended to be used to determine the maximum operating pool level in Cell 3. This procedure is necessary because tailings sand deposition occupies some of the volume required to hold a PMP event. A summary of the procedure is as follows:*

- 1. From a survey of the Cell, the pool surface area will be determined.*
- 2. An estimate of the maximum tons of dry tailings to be generated during the next 12 months will be made. This amount will be multiplied by 1.5 as a factor of safety, yielding the Maximum Mill Production. The wave run up requirement is determined. The maximum operating pool level is then calculated from the dike crest elevation minus the flood volume requirements divided by the pool area minus the wave run up requirements.*

*The basis of the procedure will now be discussed.*

*During the period of March 1988 through October 1989, 465,839 dry tons of tailings were added to Cell 3. From topographic maps generated from aerial photographs, see Figure 2, the pool surface area of Cell 3 was reduced by 11.9 acres. Total dry tons divided by change in pool area extent yields the number of tons required to reduce pool size by one acre, or 39,146 dry tons per acre.*

*The Maximum Mill Production divided by the number of tons required to reduce pool size by one acre yields the maximum expected pool area reduction. This number is then subtracted from the pool surface area determined by survey or topographic means, yielding the reduced pool area.*

*The flood volume requirements are 123.4 acre-feet as per section titled Cell 1 through 4. The flood volume divided by the reduced pool area is the freeboard required for the flood. Wind-wave run-up is calculated as per the section titled Wave Run-up. The PMP freeboard requirement plus the wave run-up requirement yield the total required freeboard.*

*Note that this procedure overestimates the required freeboard and therefore is a conservative method. The overestimation is a result of not taking credit for the volume available for flood storage above the sand surface. In other words, this method assumes that the sand at the edges of the pool rises vertically to the top of the cell. The procedure also does not take credit for soil retention losses considered in the three cases used to develop the freeboard vs pool surface area graph.*

*For the 12 months following October 13, 1999 the freeboard limit is calculated as follows:*

*From the most recent aerial photograph taken on February 13, 1999, the pool area in Cell 3, determined by aerial photography, was 34.3 acres.*

*The maximum volume of dry tailing to be processed by the mill during the next 12 months following October 13, 1999 is estimated to be 100,000 dry tons. Multiply this estimated amount by 1.5 to determine the Maximum Mill Production.*

$$100,000 \text{ dry tons} \times 1.5 = 150,000 \text{ dry tons}$$

$$150,000 \text{ dry tons} / 39,146 \text{ dry tons per acre} = 3.8 \text{ acres}$$

$$34.3 - 3.8 = 30.5 \text{ acres}$$

*This is the area in which the storm volume must be stored. The storm volume was determined to be 123.4 acre-feet.*

$$123.4 \text{ acre-feet} / 30.5 \text{ acres} = 4.05 \text{ feet}$$

$$4.05 \text{ feet} + *0.78 \text{ feet} = 4.83 \text{ feet (use 4.8 feet)}$$

$$5608.0 \text{ feet} - 4.8 \text{ feet} = 5603.2 \text{ feet msl}$$

*\* In the previous procedure wind-wave runup was rounded to 0.7 feet. This procedure uses this value to 2 decimal places.*

*Under no circumstance will the freeboard limit be higher than 5603.0 feet msl, which is 5.0 feet below the Cell 3 dike crest.*

*Use 5603.0 as the revised freeboard limit.*

*This procedure will be used yearly to recalculate the Cell 3 freeboard. If, during any such year, the actual volume of mill production approaches the Maximum Annual Mill Production / 1.5, then the Cell 3 freeboard will be re-evaluated based on the revised mill production estimates for the next twelve month period.*

## Attachment 2

### Section 10: Operational Controls, Limits, and Restrictions

10.3 Freeboard limits for Cells 1-I, 3 and 4A, shall be set periodically in accordance with the procedures set out in Section 3.0 to Appendix E of the approved license application, including October 13, 1999 revisions made to the January 10, 1990 Drainage Report. The freeboard limit for Cell 3 shall be set periodically in accordance with the procedures set out in the October 13, 1999 revision to the Drainage Report.