40-8681

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

August 19, 1997

International Uranium (USA) Corporation
ATTN: Ms. Michelle Rehmann,
Environmental Manager
Independence Plaza, Suite 950
1050 Seventeenth Street
Denver, Colorado 80265

SUBJECT: ACCEPTANCE REVIEW OF THE RECLAMATION PLAI . nc WHITE MESA URANIUM MILL (SOURCE MATERIAL LICENSE SUA-

Dear Ms. Rehmann:

The U.S. Nuclear Regulatory Commission staff has completed the initial processing, which is an administrative review, of International Uranium (USA) Corporation's (IUC's) site reclamation plan for the White Mesa Uranium Mill, submitted by letter dated February 28, 1997. During its review, the NRC staff identified some omissions or deficiencies, which are discussed in the enclosure. However, the NRC staff does consider IUC's reclamation plan to be acceptable for the purpose of conducting a detailed technical review to further evaluate the proposed plan.

In order to support a timely review schedule, please provide additional information to address the deficiencies identified in the enclosure within 60 days from the date of this letter. In responding to the NRC staff's request, IUC may reference information contained in previous submittals, pursuant to 10 CFR 40.31(a). Page changes to the reclamation plan should be provided as appropriate. Failure to respond to this request for additional information may be grounds for denial of the application, in accordance with 10 CFR 2.108(a).

While awaiting the submission of the identified information, the NRC staff will proceed with the detailed technical review of IUC's plan. Please note that the NRC staff's review may identify further omissions of information or analyses that may require the submittal of additional information. If such omissions are identified, the NRC staff will notify IUC in writing.

NL17/1

If you have any questions concerning this letter or the enclosure, please contact Mr. James Park at (301) 415-6669.

Sincerely,

(Original signed by)
Daniel M. Gillen for)

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

Docket Number 40-8681
License No. SUA-1358

Enclosure: As stated

cc: H. Roberts, IUC
W. Sinclair, Utah DRC

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Enclosure

REQUEST FOR ADDITIONAL INFORMATION
Detailed Site Reclamation Plan for IUC's White Mesa Uranium Mill

International Uranium (USA) Corporation (IUC) should provide the following to address NRC staff-identified deficiencies in "Reclamation Plan: White Mesa Mill, Blanding, Utah" (Rev. 1.0; dated February 1997), as submitted by letter dated February 28, 1997:

GEOTECHNICAL AND RADON BARRIER DESIGN

(1) Information to support a review of the acceptability of the radon barrier design. Specifically:

- (i) A description of the materials to be used for the radon barrier and as random fill
- (ii) An analysis to show that each type of material is available in sufficient quantity
- (iii) An estimate of the potential for cover cracking due to shrinkage
- (iv) A delineation of measures that will be taken to prevent burrowing animals from penetrating the radon barrier

(2) An analysis of the total and differential settlements of the tailings surface and the effects of such settlements on soil cover integrity.

(3) An analysis of the liquefaction potential of subsurface materials and uranium mill tailings.

(4) The locations and depths of the samples used for estimating the properties of the tailings and cover materials in the laboratory, along with details of the laboratory results. Moreover, the standards and/or procedures used to collect the samples and to measure the specific properties should be identified.

(5) A description of the soil sampling methodology and instrumentation, including the method for determining background radium concentration and a description of any other radionuclides (e.g., Th-230) for which samples will be tested.

(6) Rationale by which guideline values were selected in the scoping survey to determine whether an area requires remediation. The method used to determine the actual Ra-226 concentration in the soil should be described as well as the confidence levels used to establish the guideline values.

(7) A description of and rationale for the criteria used to define the extent of windblown tailings contamination beyond which further sampling is not necessary.

(8) A description of the design to be adopted in the breach area of Cell 4A and an analysis to show adequacy of the design to prevent any potential erosion.

(9) A description of how the adequacy of the material properties used in the design of various components of tailing impoundments (e.g., field hydraulic conductivity of cover material, soil/tailings properties used for embankment design) is verified.

(10) A description of the drainage catchment area(s) and diversion channel(s) design.

(11) A replacement of seven pages of illegible data. These pages are in appendix A of Appendix D [Tailings Cover Design White Mesa Mill, October 1996 (pages marked p. 12 through p. 17)] and in appendix G of Appendix D [Tailings Cover Design White Mesa Mill, October 1996 (figure showing cross-section along Cell 4 dike)].

SURFACE WATER HYDROLOGY AND EROSION PROTECTION

(12) It is not clear if the rock durability test results for the proposed sandstone source rock are based on a series of durability tests or on only one test; therefore, additional rock durability testing information is needed. At a minimum, IUC should: (1) provide durability test results for several representative rock samples; (2) verify that the data represents average results for representative samples; and (3) provide separate test results if different rock types were used. Alternately, IUC should provide further justification that the information already provided is adequate to demonstrate rock durability.

Further, IUC should provide information related to the location of the proposed source(s) and, in accordance with the criteria suggested in the NRC Staff Technical Position, should provide details of the petrographic examinations (mineralology, cementation, fractures, clay content, etc) that were conducted on the rock.

(13) Based on a site visit conducted several years ago, the NRC staff is aware that high-quality alluvial rock exists in the site area. Based on the potentially questionable quality of the sandstone source, additional information should be provided regarding this alluvial source and the reasons for its rejection.

(14) Additional information should be provided regarding the construction specifications (Appendix F) and construction testing program to be conducted on the riprap. The specifications should be revised to include specific criteria for rock placement. Specific tolerances for placement should be specified for the riprap and filter, depending on the size of the material being placed. Measures, such as depth checks on a specified grid, should be provided to verify the thickness of the riprap.

In addition, a rock testing program should be provided and should include tests for rock gradation and rock durability. Tests at the 1/3 points of production and/or placement (or every 10,000 yards) have been accepted in the past by NRC staff.

Upon request, the NRC staff can provide IUC with examples of acceptable specifications and testing programs.

(15) The NRC staff notes that a filter layer is not proposed for the riprap layer to be placed on the 1V on 5H side slopes of the cells. In general, a filter layer is not required for top slopes (with relatively flat slopes of about one percent or less), but a filter is likely to be needed for the side slopes. The filter is needed because velocities through the larger

rock voids may erode the underlying soil particles. IUC should provide a filter layer for the side slopes or provide justification that a filter layer is not needed.

(16) Rock aprons/toes are likely to be needed at those locations where the steeper side slopes meet natural ground. Based on site visits to the area, there is evidence of active gullying, and gully headcutting into the cells is possible. Several factors need to be taken into account, and the design of the apron/toe should be based on the following general concepts: (1) provide riprap of adequate size to be stable against the design storm (PMF); (2) provide uniform and/or gentle grades along the apron and the adjacent ground surface such that runoff is distributed uniformly at a relatively low velocity, minimizing the potential for flow concentration and erosion; and (3) provide an adequate apron thickness (depth) to prevent undercutting of the disposal cell by: (i) local scour that could result from the PMP; or (ii) potential gully encroachment, that could occur due to gradual headcutting over a long period of time.

The key elements which IUC needs to consider in the design of riprap protection for the apron/toe are: (1) the downstream portion of the apron/toe which is assumed to have collapsed due to scour or long-term erosion; and (2) scour at the ground surface downstream of the apron/toe. To account for the potential uncertainties in toe design, the NRC staff suggests that it may be prudent to use several different analytical methods to design the riprap for these key elements.

As part of the analysis, IUC should assume that the natural ground downstream of the toe will be eroded due to cumulative local scour and/or erosion at its base, resulting in the collapse of the rock into the eroded area. To determine the depth to which the toe must be placed, it is necessary to estimate the depth of scour which will occur to the natural ground slope just downstream of the toe. The toe should then be placed at least to the estimated depth of scour.

To further document the acceptability of the design of the rock toe/apron, it may be very useful for IUC to provide a geomorphic report. The geomorphic bases for the design of the rock toe should be provided, including a geomorphic evaluation of the potential for formation of gullies. The geomorphic analysis may also document the depth of the gullies in the immediate area and help to justify the selection of a depth of scour.

It should also be noted that rock toes are considered to be critical areas, and the rock quality criteria for these rock toes are not likely to be met by the proposed sandstone source. Use of rock of higher quality appears necessary (see Comment 2).

(17) Review of the calculations/spreadsheets (Appendix F) for the design of the rock on the side slopes indicates that the flow lengths used for the design of the side slope rock (275 feet) does not include the length of the top slope that will contribute runoff to the side slopes. Beginning at the upper end of cell 2 (near Cell 1), it appears that runoff from Cells 2 and 3 will flow southward for over 1000 feet and discharge down the side slopes of the cells. Accordingly, the riprap in these areas should be redesigned, as necessary, to account for the increased flow lengths.

(18) Additional information should be provided for the design of the sedimentation basin and the discharge channel. HEC-1 analyses should be provided, along with HEC-2 input and

output data (or other water surface profile analyses), to document the acceptability of parameters used in the design of the riprap for the channel.

In addition, sedimentation analyses should be provided to show that the capacity of the sedimentation basin is adequate and that the HEC-1 routings adequately account for decreases in storage capacity in the basin due to sediment accumulation over a long period of time. Further, each of the parameters used to design the riprap in the channel should be provided, including channel slope, width, flow rate, and water surface profiles, particularly if flow changes from subcritical to supercritical at some location in the channel.