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HRI, INC.

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59.

MRR 19

RETURN ORIGINAL TO PDR, HQ.

March 16, 1993

DOCKETED

MAR 19 1993

Mr. Ramon E. Hall, Director **Uranium Recovery Field Office** U.S. Nuclear Regulatory Commission P.O. Box 25325, Region IV Denver, Colorado 80225

Dear Mr. Hall:

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Pursuant to your request for additional information pertaining to the Crownpoint and Churchrock ISL projects, please find attached the following documents:

- 1. Cross referenced responses pursuant to your February 19, 1993 let er to the revised Churchrock Environmental Report (E.R.) only.
- 2. Hydro Resources, Inc. Churchrock Project Revised Environmental Report, March 1993.
- -3. Section 9 Pilot Summary Report, March 1992.

Certified & Mary C. Hood

The information contained herein address primarily the Churchrock project although many responses are equally applicable to the Crownpoint and UNIT I locations. Shortly, we will also be addressing each question within your February 19 letter as applicable to both the Crownpoint and UNIT I locations, and responding under separate cover. Within these separate correspondences we will reference to the revised Churchrock Environmental Report, where appropriate, rather than repeat the text.

Regarding the structure of the revised Environmental Report, we have duplicated the format and most of the content of the original E.R. submitted on 4-88, however, we have changed certain items pursuant to the February 19, 1993 letter.

DESIGNATED ORIGINAL 090067

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1638 South Second Gallup, New Mexico 87301 Telephone (505) 863-4990 Appendices A, B and C remain the same and will not be resubmitted. Appendices D is resubmitted because the milldose run has been revised. Also, new Appendices E and F have been included in the report.

Please feel free to contact me with questions pertaining to this matter.

Yours very truly, Mark S. Pelizza Environmental Manager

MSP/dlg Encl.

cc: w/enclosure (1 copy each)

D. Sitzler, BLM

- L. Robbins, BIA
- G. Farris, BIA
- S. Hoskie, The Navajo Nation
- P. Rogers, The Navajo Nation
- R. Ohrborn, NMED
- C. Wohlenberg, NM State Engineer

NUCLEAR REGULATORY COMMISSION **Review Comments on HRI/Churchrock Environmental Report** Chapter 2 Site Characteristics

1. The text in Section 2.1 and Figure 2.1-2 are ambiguous. Please verify where surface processing facilities and mining units will be located.

2 Figure 2.1-2 indicates HRI's so-called Mancos properties, but the land is not discussed in the text. Is this land included in the mining plan and the current license and permit applications? Reference to this property should be deleted if it is not part of the application.

- 3. Section 2.2 and 2.3 should be revised to reflect any changes in land use and population to be hired locally.
- 4. Section 2.3 should project the number of persons to be employed and the numbers projected to be hired locally.
- 5. In order to comply with the National Historic Preservation Act, archeological data supplied in the ER and supplements needs to be updated indicating any sites which are eligible for or listed upon the National Register of Historic Places. The ER should further indicate the potential affects that mining may have on each such site. In the event such properties exist, has the SHPO approved the mitigation plan, and has the Navajo Nation been consulted regarding site evaluations?

Please provide a map showing the locations of sites in relation to facilities, wellfields, roads, pipelines, etc.

- 6. Please include a table in Section 2.5 providing monthly pan evaporation data.
- 7. On page 62, last paragraph, the list of stratigraphic units is ambiguous in relation to stratigraphic columns in Figure 2.6-2. Please revisit this text to clarify stratigraphic relationship and nomenclature related to the Mesaverde Group.

Response #1: Subject text revised on page 2.

Response #2: Subject Figure and text revised on page 4.

Response #3: These items are reflected in Section 7.1.6, page 337 - 339.

Response #4: This item is reflected in Section 7.1.6, page 337 - 339.

Response #5: Text in Section 2.4, page 34 revised

The wellfield and site layout with respect to Archaeological sites is shown on Figure 3.3-1. All of these facilities will be on the surface or routed to coord archaeological sites.

Response #6: This item is reflected in Section 2.5.4, page 60.

Response #7: Section 2.6 has been further revised.

NUCLEAR REGULATORY COMMISSION Review Comments on HRI/Churchrock Environmental Report Chapter 2 Site Characteristics

- On Figure 2.6-2, the Gallup and Mancos units are indicated in reverse in order in the explanation. Please supplement this diagram stressing local geological details over regional relationships.
- Section 2.6.2; Please clarify whether this project covers more than Section 8, and update the ER with appropriate geologic and mineralogical information on those areas.
- Page 70, paragraph 2; Please clarify whether mineralization in the Dakota Formation will be affected by this project.
- 11. The ER does not provide even general information on ore occurrence in the mine zone. For purpose of description in the EIS, we require general information describing ore stratigraphy and mineralogy, ore grade, and dimensions of the ore bodies and proposed mine units. The level of detail required should not compromise proprietary information.
- Section 2.6.2; Please provide a map showing the underground mine of the old Churchrock Mine indicating both Dakota and Morrison workings. Provide an analysis of the effect these will have on control of injection and recovery of lixiviant.
- 13. Provide a map showing the outline of ore bodies, overlaying production fields (with monitor wells), and areas to be produced by year for the first 5 years, then in 5-year increments for the rest of the project life. Estimate the quantity and quality of the mineral resource, define the ore grade (grade thickness), identify any resources that will remain with reason for not mining these resources, and estimate the recovery rate (resources present vs. resources recovered).

Response #8: Section 2.6 has been further revised.

Response #9: Section 2.6.2 covers both Section 8 and 17 and has been revised accordingly.

Response #10: This item is discussed on revised page 82.

Response #11: This item is discussed in the revised Section 2.6.2.

Response #12: Revised Figure 2.6-2 and 2.6-3 and text in 2.6.2 responds to this item.

Response #13: Revised Figure 3.1-6 responds to this item.

NUCLEAR REGULATORY COMMISSION Review Comments on HRI/Churchrock Environmental Report Chapter 2 Site Characteristics

14. Section 2.7.1.1: Provide information indicating the number and locations of water-supply wells within the area of influence of this project. In addition, how many are within a mile outside the area of influence?

- Figure 2.7-25; This Figure was not included in all copies of the submittal.
- Page 183, paragraph 4; Has the commercial pump test been completed? If so, then the data generated needs to be included.
- Section 2.9.1; The correct method for measuring gamma radiation is to hold the instrument one meter above ground level (about waist height).
- Table 2.9-3; Please revise this table to indicate the units of measurement.
- 19. BIA requests general information regarding ore reserves for royalty purposes. Please update speculate ore reserves for both the Churchrock and Crownpoint project. What is HRI's mining schedule, and how does it compare to projected uranium prices?

Response #14: Water wells within one mile are shown on Figure 2.1-7.

Response #15: Replaced as Figure 2.7-16 in updated Environmental Report.

Response #16: Chapter 2.7.2 contains the results of the most recent pump test.

Response #17: Revised Section 2.9.1 is attached.

Response #18: Revised Table 2.9-3 is attached.

Response #19: This item will be addressed under separate cover.

NUCLEAR REGULATORY COMMISSION Review Comments on HRI/Churchrock Environmental Report Chapter 3 - Churchrock ER Facility Description

- Please update the current facility description sections of HRI submittals, replacing them with one version describing both Churchrock and Crownpoint facilities.
- Page 232: Provide an analysis or rationale for selecting 400-foot spacing of perimeter monitor wells.
- Page 232: Overlying aquifer monitoring as discussed is vague. This needs to be improved, specifying monitor well density, casing, and screening details.
- Page 232: Justify the proposed lack of underlying aquifer monitoring. If additional monitoring is proposed here, provide the same level of detail as for overlying aquifers.
- 5. Table 3.3-1 provides well completion specifications, listing specifications for fiberglass and schedule 40 PVC. No information is provided showing these materials area adequate for the proposed production depths and pressures. Analyze these alternatives, along with others, and provide HRI rationale for this proposal.
- Page 232: It is not clear in the ER that well integrity test procedures will stimulate proposed operating conditions plus an engineering safety factor. The procedure needs to be conservative, and the description more specific.
- 7. Table 3.1-1: Please provide specific information addressing well casings: (1) Are there references for casing strengths, and other specifications? (2) What is the burst strength of the casings? (3) Does the operating pressure take into account the depth of the wells? (4) Does the collapse pressure take into account the operating temperature? (5) An operating safety factor of 1 for the injection/production wells does not appear acceptable. Why does HRI believe that they are sufficient?

Response #1: Figure 2.2-1 of the updated report shows the location of all HRI Chruchrock and Crownpoint facilities.

Response #2: The revised Section 3.1.1, page 162 contains a response to this item

Response #3: The revised Section 3.1.1, page 162 contains a response to this item.

Response #4: The revised Section 3.1.1, page 162 contains a response to this item.

Response #5: The revised Section 3.1.2, page 163 through 1⁻¹ contains a detailed response to this item.

Response #6: The revised Section 3.1.2, page 170 contains a response to this test.

Response #7: Table 3.1-1, page 164 responds to this item.

NUCLEAR REGULATORY COMMISSION Review Comments on HRI/Churchrock Environmental Report Chapter 3 - Churchrock ER Facility Description

(6) Will any tubing be used? Provide all the specifics for the tubing.

- Table 3.1-2 discusses the Churchrock Section 8 mine plan, including a leaching and restoration demonstration project. Does this constitute a pilot project? Please explain more fully.
- 9. Table 3.1-3: During scoping meeting presentation, HRI indicated ground water would not require fortification with sodium bicarbonate. However, this table indicates a mining bicarbonate concentration of 800 ppm, whereas baseline concentrations are typically 200 ppm. Please clarify this discrepancy. Also, at what rate is oxygen added, or what is its concentration in the lixiviant?
- 10. Page 242: No information is provided which addresses selecting ground water constituents to be monitored, or monitoring frequency determining baseline ground water quality, and setting control limits. Additionally, no response procedure is described to address potential lixiviar.t excursions. NRC's Staff Technical Position No. WM-8102, "Ground Water Monitoring at Uranium In-Situ Solution Mines," should be used as a basis for baseline cletermination.
- Poorly abandoned drill holes are discussed on page 179. Please describe HRI's corrective actions in the event that these provide hydraulic communication between aquifers.
- 12. Page 243: NRC policy addressing liquid effluents is evolving, and may preclude any release of byproduct material to the environment. Foreseeing this contingency, HRI should develop evaporation pond designs with adequate capacity to contain all process solutions for the life of the project.

Only if unlined steel casing is used.

Response #8: The preliminary demonstration timetable is shown in Section 3.1.4 and is discussed in Section 6.3.

Response #9: Bicarbonate is elevated in the leach solution during ion exchange resulting in the necessary concentrations of 800 ppm. Dissolved oxygen is added at approximately 50-150 ppm.

Response #10: A detailed response to this item is within the revised Section 3.1.7 on page 172.

Response #11: A response to thic item is shown in Section 2.7.3, page 113.

Response #12: Waste disposal options are discussed in Section 4.3.

NUCLEAR REGULATORY COMMISSION Review Comments on HRI/Churchrock Environmental Report Chapter 3 - Churchrock ER Facility Description

- 13. Page 243 includes a brief description of waste retention pond design construction. Further information needs to be provided to show that byproduct material will be adequately controlled. Information and design specifications should be submitted in accordance with NRC Regulatory Guide 3.11, "Design, Construction and Inspection of Embankment Retention Systems for Uranium Mills."
- page 243: Provide additional information regarding standpipe design, monitoring frequency, indicator species, and corrective action.
- Pages 248 and 255. The ER states that IX processing will be conducted with an up-flow (unpressurized?) process. This information conflicts with subsequent discussions held at the mine site.
- 16. Please provide details on the description of equipment monitoring systems found on page 253. Specifically, describe the materials to be used to construct tanks, piping, and pipelines in the plant and to the wellfields. In addition, describe HRI's proposed monitoring system that will be used to detect failures in the lixiviant distribution system.
- 17. Please supplement this Chapter 3, or another appropriate section with an outline of HRI's proposed environmental monitoring program. The program should be modeled upon recommendations found in NRC's Regulatory Guide 4.14, "Radiological Effluent and Environmental Monitoring at Uranium Mills."

Response #13: Section 3.2.2 addresses this item.

Response #14: Section 3.2.2 addresses this item.

Response #15: This item is discussed in detail in Section 3.2.4.

Response #16: This item is addressed in Section 3.2.2, 3.3 and 4.2.2.

Response #17: Table 4.4-1 contains this information.

NUCLEAR REGULATORY COMMISSION Review Comments on HRI/Churchrock Environmental Report Chapter 4 - Churchrock ER Effluent Control Systems

- NRC will require radiological surveys of wellfields after they are reclaimed, but before they are released for unrestricted use. Therefore, HRI may wish to address how radionuclides in drill cuttings and well development water will be distinguished from licensed materials. In addition, BIA, the State and local authorities have similar views and require HRI to address the disposition of these materials.
- 2. Page 254 indicates that production bleed will be treated and released via land irrigation. Regardless of the treatment, measurable concentrations of licensed material would be released to the unrestricted area using this technique. Alternative methods of liquid effluent disposal and their environmental effects should be evaluated, and the rationale provided for the preferred alternative.
- Page 254 implies that production bleed will be kept separate from other effluent streams, like depleted eluant and dilute HCI. Is this so?
- 4. Page 254: The discussion of processing accidents is rather brief. Please describe plant features and procedures which will reduce the possibility of spills. In addition, indicate plant and wellfield features which will be employed to mitigate the effects of potential spills.

 Page 255 states liquid restoration wastes will be treated for land application. This makes no distinction between R.O. permeate and brine. Because R.O brine typically is to degraded to be released to the environment, this topic must be addressed. Response #1: This item is discussed in Section 4.2.1.

Response #2: Options are discussed in Section 4.3.

Response #3: This item is discussed under Section 4.2.2, page 193.

Response #4: This item is discussed under Section 4.2.2, page 194-196.

Response #5: This item is discussed under Section 4.3.3, page 200.

NUCLEAR REGULATORY COMMISSION Review Comments on HRI/Churchrock Environmental Report Chapter 4 - Churchrock ER Effluent Control Systems

6. Table 4.3-1 indicates test data for BaCl removal of radium from waste streams. The discussion indicates that the tests achieved Ra values of 0.20 to 0.66 pCi/liter, and claims that these values are "below discharge specifications". What specifications are being cited?

Response #6: This item is clarified under Section 4.3.4, page 198.

NUCLEAR REGULATORY COMMISSION Review Comments on HRI/Churchrock Environmental Report Chapter 5 - Operations Review Based Upon the Churchrock Environmental Report, 1988

- Please modify the entire operations description correcting all references to the State of Texas.
- Page 261: Is the Environmental Manager located onsite? If not, can the RSO stop production at any time for a radiological concern?
- Page 263 Item 9, how does the RWP system work into this?
- 4. Page 264. Production Manager. If the Production Manager has the authority to immediately implement any action to correct a radiation safety hazard, will the RSO be immediately notified through official channels (procedure) in writing?
- Page 265: Plant Superintendent. Same comment as for the Production Manager.
- Page 266: Operating Procedures. The applicant interchanges SWPs and RWPs. Does the licensee maintain any difference? RWPs and SWPs must be reviewed annually by the RSO, and that review documented.
- Page 268: Contamination on Skin and Clothing. HRI must also address beta/gamma surveys.
- Page 270, ALARA committee: Unclear on reports due out from the committee. These reports should be out ASAP (60 days) not annually.
- 9. Pages 284-290, training What will be the minimum length of training for the various groups (new employees, supervisors, etc.) of people trained? Will there be a written exam? If so, what will be a passing grade? Training on personal monitoring must be covered fully for new employees. Training for prenatal radiation exposure must be given to all employees.

Response #1: So noted.

Response #2: This question is addressed under Section 5.1, page 206.

Response #3: All references to RWP have been changed to SWP.

Response #4: Clarification has been included on page 209.

Response #5: Clarification has been included on page 209.

Response #6: All references to RWP have been changed or SV/P.

Response #7: Revision noted on page 213.

Response #8: Revision noted on page 215.

Response #9: Section 5.5 has been revised to address these questions.

NUCLEAR REGULATORY COMMISSION Review Comments on HRI/Churchrock Environmental Report Chapter 5 - Operations Review Based Upon the Churchrock Environmental Report, 1988

- Page 289, RSO training: Biennial training must be taken offsite. The words "if available" shall be removed
- Page 295, confusion: Page 295 starts out with point No. 4. what is the topic and where are points 1 through 3?
- Page 296: Yellowcake transportation accidents: Point No. 4, Cleanup of product. Where will HRI get radioactive signs within 500 miles of the facility when responding? A basic response kit should be considered.
- Page 302 and Page 301, education and training. A conflict between the number of years of college that is equivalent to on-the-job training appears to be present for the RSO and somewhat for the Environmental Manager.
- Page 303, Surface Contamination Studies: The staff prefers that lunch areas and all eating areas be surveyed weekly with an action level around 200 dpm/100cm².
- Page 306, Surveys of Personnel: HRI must consider requiring personnel to shower or frisk prior to exiting the restricted area when engaged in yellowcake work.
- Page 318, Dryer: Please verify HRI's proposal to install and operate a dryer, and indicate to where HRI's product is slated for shipment.
- Page 318, Radon: What will HRI do to meet the radon testing level for the new Part 20, effective January 1994?

Response #10: Noted on page 221.

Response #11: Noted.

Response #12: Page 229 has been amended to clarify this item.

Response #13: Section 5.7.2 has been revised to clarify this item.

Response #14: Table 5.7-1 has been amended to recognize this criteria.

Response #15: This item has been addressed on page 236

Response #16: This item was addressed in Section 3.0, page 162.

Response #17: To the extent possible, HRI will comply with the new Part 20 requirements as explained in Section 5.8.3.

NUCLEAR REGULATORY COMMISSION Review Comments on HRI/Churchrock Environmental Report Chapter 5 - Operations Review Based Upon the Churchrock Environmental Report, 1988

 Page 323, Item 1: 20 to 25 feet conflicts with page 296, Item 4, which says 50 feet. Which distance is HRI's correct isolation distance?

 Page 333, Spill cleanup: Please revisit procedures involving Sequeyah Fuels in Oklahoma. Response #18: All references on page 200 have been changed to 50 feet.

Response #19: Section 5.9 has been revised to reflect the fact that the Sequeyah Fuels facility is closed.

NUCLEAR REGULATORY COMMISSION Review Comments on HRI/Churchrock Environmental Report Chapter 6- Restoration Plan Churchrock ER

- Section 6.1 Please provide a more detailed narrative on ground water restoration procedures. Describe the steps involved and the results expected.
- Chapter 6 emphasizes the plant 2. procedures and equipment associated with aquifer restoration, but additional emphasis is needed describing processes which will take place within the aquifer. Specifically, what chemical species typically hamper full restoration? Will naturally occurring organics and clays affect stabilization of metals and radionuclides? What are the predicted time tables and pore volumes associated with mine unit restoration? Finally, what is HRI's proposed stability demonstration plan?
- 3. Chapter 6 needs to be expanded to address not only ground water restoration, but also site reclamation. Please include discussions of topsoil handling procedures, wellfield clearing and reclamation, plant decommissioning, pad removal, waste disposal, radiation surveys, recontouring, and revegetation.
 - Please provide a summary of mining and restoration success achieved at Mobil's Crownpoint pilot project.
 - Either here or in Chapter 2, describe the occurrence of molybdenum in the ore zone, and how restoration difficulties encountered by Mobil will be solved during the proposed project.

Response #1: Section 6.1 has been revised.

Response #2: These questions are addressed throughout Section 6.0 on pages 263 and 280. Timing is discussed within Section 3.0.

Response #3: This item has been addressed in Section 6.7.

Response #4: A report summarizing Mobil's Section 9 Pilot will be transmitted under separate cover.

Response #5: This item will be addressed in the report described in #4 above.

NUCLEAR REGULATORY COMMISSION Review Comments on HRI/Churchrock Environmental Report MILDOSE - AREA Modeling April and October, 1989, submittals

- HRI should run the MILDOS calculation at the maximum design or licensed drying rate per day. HRI used 4,000 lbs/day in their submittal of October 17, 1989, page 5, but stated on page 3 that production would be 8,000 lbs/day.
- A source term of 41,333 pCi/l cited on page 8 is in error. This value was obtained from a Texas operation. The value should be 43,224 pCi/l as specified on page 5.
- Page 8, October 17, 1989: HRI uses 2.43E-7 curies/year as a source term from the yellowcake dryer. Is this based on 4,000 or 8,000 lbs/day production? Please clarify this in the new MILDOS calculation.
- The October 17, 1989, MILDOS calculation used meteorological data from Gallup. Is this the most recent data available?
- HRI should use the most recent population data available. Possibly the 1990 census.

Response #1: Anticipated production at Churchrock will remain at the 4,000 lbs/day leval.

Response #2: The source term used in the revised milldose is 10% of 129610 pC/l, as discussed in the revised Section 7.0.

Response #3: Not response 1 above.

Response #4: Yes.

Response #5: The population data was corrected for the 1990 census numbers or the 2,000 projections, whichever was more conservative.