

**UTAH DIVISION OF RADIATION CONTROL**

**PLATEAU RESOURCES, LTD.**

**SHOOTARING CANYON URANIUM PROCESSING FACILITY**

**REQUEST TO RESUME OPERATIONS**

**INTERROGATORIES – FIRST ROUND**

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## ACRONYMS AND ABBREVIATIONS

ALARA	As Low As Reasonably Achievable
BAT	Best Available Technology
CCQAP	Construction Control Quality Assurance Plan
CFR	Code of Federal Regulations
COD	Chemical Oxygen Demand
DOT	US Department of Transportation
DQO	Data Quality Objectives
EPCRA	Emergency Planning and Community Right-to-Know Act of 1986
EPPC	Evaporation and Process Pond Cell
FML	Flexible Membrane Liner
GPD	Gallons per Day
GPM	Gallons per Minute
HDPE	High Density Polyethylene
LCRS	Leachate Collection and Removal System
MARSSIM	Multi-Agency Radiation Survey and Site Investigation Manual
mg/l	Milligram per liter
MHGA	Maximum Predicted Horizontal Ground Acceleration
NBS	National Bureau of Standards
pCi/g	Picocurie per gram
PE	Potential Evaporation
PET	Potential Evapotranspiration
QAP	Quality Assurance Plan
QAPP	Quality Assurance Project Plan
SARA	Superfund Amendments and Reauthorization Act
SDR	Standard Dimension Ratio
SOP	Standard Operating Procedures

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TEDE	Total Effective Dose Equivalent
TMP	Tailings Management Plan
TRDP	Tailings Reclamation and Decommissioning Plan
TSS	Total Suspended Solids
URCR	Utah Radiation Control Rules

## **SUMMARY OF REQUESTED ITEMS**

Please note information previously submitted to DRC may be provided by reference. However, each reference should be clear and specific or focused, i.e., the reference should include the title, author, date, page, and paragraph that included the information referenced, and how the reference is pertinent. Please refer to the interrogatories for the context of the item requests.

1. The radiation protection program including implementing procedures.
2. Plans and implementing procedures addressing inspection, receipt, training, manifest preparation, and shipment preparation/product packaging of yellow cake.
3. Revised MILDOS-AREA input parameters and the respective results.
4. Daily inspection of waste tailings and documentation procedures.
5. Procedures for maintaining and storing records for receipt, transfer and disposal.
6. Notification of releases that exceed regulatory limits and could result in exposures.
7. A demonstration that a member of the public will not receive a dose that exceeds one rem effective dose equivalent or five rems to the thyroid at the closest point to the facility (at the fence line)
8. A site emergency plan (if prepared).
9. Site soil background level determination in support of final site decommissioning.
10. Data quality objectives for the Building Contamination Survey and Sampling Plan.
11. Additional detail for exterior site radiological surveys for site decommissioning.
12. Soil sampling plan for the final status survey during site decommissioning.
13. Final status survey that includes pipes, ducts, and drain lines during site decommissioning.
14. Material flow diagram for milling operations that provides material quantities and material balance starting from the ore pile and ending in the tailings waste cell.
15. A Radiation survey report to demonstrate that the existing subgrade for the cells has radiation levels and contamination levels that are acceptable.
16. Additional information in support of the maximum predicted horizontal ground acceleration for the site that is consistent with the seismic hazard for the site.
17. Additional data in support of the rock cover to be used on the cells.
18. Additional information on the proposed surface water drainage around the final cell cover systems.

19. A revised Construction Quality Assurance Plan that clarifies responsibilities and criteria for acceptance of work and required actions, timelines and procedures for identifying and responding to non-conformances.
20. Field hydraulic conductivity requirements and testing for the clay liner should be included in the CQAP.
21. Leachate chemical and physical characterization data as well as information and data that demonstrates that the liner system will not degrade due to long-term exposure to the leachate.
22. Additional data and evaluations supporting the liner design and installation. These include (but are not limited to) anchor trench design, liner component interface stability, and environmental forces such as wind uplift, UV degradation, wetting and freeze/thaw cycles, and temperature fluctuations.
23. An evaluation of the anticipated settlement of the liner along the bottom and side slopes under the final closed cell condition.
24. Additional information in support of the drainage layer and pipe design for the leachate collection and detection systems.
25. Additional information and/or analysis of the stability of the cell dikes.
26. A Leachate Monitoring, Operations, Maintenance, and Reporting Plan that includes an estimation of anticipated flow rates and maximum capacity in both the leachate collection and detection systems.
27. The Action Leakage Rates for the EPPC, Cell 1, and Cell 2 systems.
28. Leachate collection and detection pipe strength calculations that provide a basis for their design.
29. Complete Cell liner system plans and installation specifications.
30. A Liner Maintenance and Inspection Plan.
31. Additional information in support of the cover system design and the resultant infiltration through the cover.
32. Revised infiltration modeling of the cells that included contaminant transport modeling.
33. A complete Groundwater Sampling and Analysis Monitoring Plan.
34. An estimate of the potential discharge of the leachate in the cell through the liner system and into the underlying soil (if any).
35. Additional information on the site surface water controls to be implemented.
36. Additional geologic, hydrologic, and agricultural descriptions and well as current plot map showing all existing water wells and related information.

37. Missing figures K-2 through K-6 in Appendix K.
38. An updated Groundwater Monitoring Quality Assurance Plan that includes the new proposed wells, information requested by the DRC in their February 15, 2006 correspondence, and additional details on assessing data accuracy and comparability.
39. Post closure drainage and erosion controls and post closure maintenance requirements.
40. Additional information on the assumptions and methodology used in the radon modeling through the final cell cover.
41. Sampling and analysis procedures in support of the environmental monitoring program.
42. Clarifications on the cost estimate for mill site decommissioning.
43. Long-term site surveillance costs after closure.



## **INTERROGATORY R313-24-1(3)-01/01: RADIATION PROTECTION PROGRAM**

### **PRELIMINARY FINDING:**

*Refer to R313-24-1(3) [R313-15-101]: Each licensee or registrant shall develop, document, and implement a radiation protection program sufficient to ensure compliance with the provisions of Rule R313-15. See Section R313-15-1102 for record keeping requirements relating to these programs.*

### **INTERROGATORY STATEMENT:**

*Please submit the radiation protection program, including implementing procedures and examples of each form used for each item described in Appendix I of the "Tailings Reclamation and Decommissioning Plan." Please ensure the unique radiological issues related to reconstruction of operational facilities and of the tailings areas are addressed in addition to planned, routine operations. If any of the documents are over 12 months old, please provide evidence that they were reviewed annually, each year between issuance and submittal to DRC in response to this interrogatory.*

### **BASIS FOR INTERROGATORY:**

*The radiation protection program, implementing procedures and forms were not available for review. The radiation protection program, implementing procedures and forms will be evaluated against R313-15, inclusive, as applicable, with attention to occupation worker topics, soluble uranium, survey techniques, effluents, postings, ALARA committee, annual reviews, waste disposal and respiratory protection.*

### **REFERENCES:**

*Plateau Resources, Ltd., "Tailings Reclamation and Decommissioning Plan for Shootaring Canyon Uranium Project", Dated December 2005.*

*Plateau Resources, Ltd., "Shootaring Canyon Uranium Processing Facility Environmental Report, Source Material License No. UT0900480", Dated January 2006.*

## **INTERROGATORY R313-24-1(3)-02/01: SUMMARY OF REGULATORY REQUIREMENTS**

### **PRELIMINARY FINDING:**

*Refer to R313-24-1(3): The requirements of Rule R313-24 are in addition to, and not substitution for, the other applicable requirements of Title R313. In particular, the provisions of Rules R313-12, R313-15, R313-18, R313-19, R313-21, R313-22, and R313-70 apply to applicants and licensees subject to Rule R313-24.*

### **INTERROGATORY STATEMENT:**

*Please provide the following revisions and clarifications in Section 2.0 of the Tailings Management Plan:*

- 1. Reference should be made to the sections in the plan (or other documents) that addresses the specific requirements presented in this section.*
- 2. Section 2.1.1 has a reference to 10 CFR 40 Appendix A, Criteria 1, which also needs to address siting as it relates to isolation and minimizing disturbance and dispersion. This includes remoteness from populated areas, hydrologic and other natural conditions that contribute to immobilization and isolation of contamination from groundwater sources, potential for minimizing erosion, disturbance, and dispersion by natural forces.*
- 3. 10 CFR 40 Appendix A Criterion 3 should be addressed. This should include a summary of the evaluation of alternative sites and disposal methods. The "prime option" for disposal of tailings is below grade. However, this should be justified given the site physical conditions (hydrology, geologic, groundwater, etc.).*
- 4. Section 2.1.2.1 that addresses 10 CFR 40 Appendix A Criterion 4; erosion protection...; should also address the tailings pile cover (vegetative and/or rock).*
- 5. Section 2.1.2.2 – Groundwater protection:*
  - a. The groundwater protections standards to reference are the State of Utah standards as included in R317-6 (not Appendix A, 40 CFR 192, etc.)*
  - b. Remove reference to 40 CFR 264. The requirement for a double liner leachate collection and detection system is per R317-6 (6.4.A.3) of the Utah regulations that require the use of Best Available Technology (BAT) to minimize the discharge of any pollutant.*
  - c. Include that the liner must be constructed of materials that have the appropriate chemical and physical properties to prevent failure per Criterion 5(a)(2)(a).*
  - d. Include that the liner must be placed on a competent foundation or base per Criterion 5(a)(2)(b).*
  - e. Include that the liner must be installed to cover all surrounding earth likely to come in contact with wastes or leachate. (per Criterion 5(a)(2)(c)).*

- f. *Include that the dikes must be designed, constructed and maintained with sufficient structural integrity to prevent massive failure per Criterion 5(a)(5).*
  - g. *Need to address specific requirements of R313-6. These are, (and will be) covered by the Groundwater Quality Discharge Permit. However, should be summarized here, as well as how compliance is met.*
  - h. *Remove reference to Appendix A Criterion 5E, per R313-24-4, it is replaced by R313-6 and the BAT requirement in R313-6.*
6. *Section 2.1.2.3 – Closure; Reference to NRC STP and guidance is useful. However, reference to 40 CFR 264 should be removed (again, this is covered under R313-6 BAT requirements). Also, 10 CFR 40 Appendix A criterion 6 though 10 should be presented and how they apply and are being met.*

**BASIS FOR INTERROGATORY:**

*Section 2 of the Tailings Management Plan appears to be a summary of the regulatory requirements and how the proposed tailings management will meet these regulations. This could be a useful summary. However, to make section 2 complete, there needs to be numerous clarifications and revisions. The revisions and/or clarifications identified are presented in the Interrogatory Statement above.*

**REFERENCES:**

*Plateau Resources, Ltd., “Tailings Management Plan for Shootaring Canyon Uranium Processing Facility” Amended December, 2005.*

## **INTERROGATORY R313-24-1(3)-03/01: SHIPMENT PREPARATION**

### **PRELIMINARY FINDING:**

*Refer to R313-24-1(3) [R313-19-100(3)(a)]: Each licensee who transports licensed material outside the site of usage, as specified in the license, or where transport is on public highways, or who delivers licensed material to a carrier for transport, shall comply with the applicable requirements of the U.S. Department of Transportation (DOT) regulations in 49 CFR 170 through 189 (2002) appropriate to the mode of transport.*

*(i) The licensee shall particularly note DOT regulations in the following areas:*

*(A) Packaging--49 CFR 173.1 through 173.13, 173.21 through 173.40, and 173.401 through 173.476;*

*(B) Marking and labeling--49 CFR 172.300 through 172.338, 172.400 through 172.407, 172.436 through 172.440, and 172.400 through 172.450;*

*(C) Placarding--49 CFR 172.500 through 172.560 and Appendices B and C;*

*(D) Accident reporting--49 CFR 171.15 and 171.16;*

*(E) Shipping papers and emergency information--49 CFR 172.200 through 172.205 and 172.600 through 172.606;*

*(F) Hazardous material employee training--49 CFR 172.700 through 172.704; and*

*(G) Hazardous material shipper/carrier registration--49 CFR 107.601 through 107.620.*

### **INTERROGATORY STATEMENT:**

*Please submit plans and implementing procedures addressing the inspection, receipt, training, manifest preparation and shipment preparation/product packaging of yellow cake during planned operations.*

### **BASIS FOR INTERROGATORY:**

*The transportation implementing procedures addressing training, receipt and shipment of yellow cake was not available for review. While Plateau Resources may not be providing freight services for packaged product, by delivering licensed material to a carrier for transport, it must meet applicable hazardous materials transportation requirements such as for inspection, receipt, training, manifest preparation, shipment preparation and product packaging.*

### **REFERENCES**

*Plateau Resources, Ltd., "Shootaring Canyon Uranium Processing Facility Environmental Report, Source Material License No. UT0900480", Dated January 2006.*

## **INTERROGATORY R313-24-3(1)(A)-04/01: RADIOLOGICAL AND NONRADIOLOGICAL IMPACTS**

### **PRELIMINARY FINDING:**

*Refer to R-313-24-3(1)(a): An assessment of the radiological and nonradiological impacts to the public health from the activities to be conducted pursuant to the license or amendment.*

### **INTERROGATORY STATEMENT:**

*Please revise and submit MILDOS-AREA input data to reflect the impacts of the proposed operations.*

- 1. Please provide a written commitment to use the current year's meteorological data for future reports during operations (i.e., use of 2007 meteorological data for MILDOS-AREA calculations presented in the 2007 environmental report.)*
- 2. The MILDOS-AREA output appears to use ore at a 0.15% concentration, while proposed operations will use ore at a 0.25% concentration. Please clarify this discrepancy, and provide a revised assessment using the anticipated ore concentration.*

*Please provide a description of nonradiological impacts to the public health from renewed normal operations. These impacts may be included in Section 6.1 of the environmental report, and may consider increases in noise, traffic, power generation, housing, public services (medical, emergency response. Describe nonradiological components of routine operational effluents, including solvents and vapors, and their concentrations and annual volumes.*

*Please provide a description of nonradiological impacts to the public health from an accident during renewed normal operations. Section 6.2.5 addresses specific hazards from an ammonia release. Expand the discussion to address other nonradiological impacts from accidents, including possibly having to limit grazing or access to Bureau of Land Management property following a radiological or non-radiological release.*

### **BASIS FOR INTERROGATORY:**

*The evaluation in Appendix A in the Environmental Report used weather data from 1979-1980 with a disclaimer in the environmental report, Section 6.1.1, paragraph two that "...meteorological data are assumed to represent current conditions." The ore concentration used in the MILDOS-AREA calculation appears to be lower than the ore concentration for proposed operations.*

*Nonradiological impacts to the public health are not limited to bulk products, such as ammonia or fuel and include quantifiable items including variations of noise, traffic, and public service usage.*

### **REFERENCES:**

*Plateau Resources, Ltd., "Shootaring Canyon Uranium Processing Facility Environmental Report, Source Material License No. UT0900480", Dated January 2006.*

## **INTERROGATORY R313-24-4-05/01: DAILY INSPECTIONS OF WASTE TAILINGS**

### **PRELIMINARY FINDING:**

*Refer to R313-24-4, 10 CFR 40.26(c)(2): The documentation of daily inspections of tailing or waste retention systems and the immediate notification of the Executive Secretary, of any failure in a tailing or waste retention system that results in a release of tailings or waste into unrestricted areas, or of any unusual conditions (conditions not contemplated in the design of the retention system) that if not corrected could lead to a failure of the system and result in a release of tailings or waste into unrestricted areas; and any additional requirements the Executive Secretary may by order deem necessary. The licensee shall retain this documentation of each daily inspection as a record for three years after each inspection is documented.*

*Refer to R313-24-4, 10 CFR 40 Appendix A(8)(a): Daily inspections of tailings or waste retention systems must be conducted by a qualified engineer or scientist and documented. The licensee shall retain the documentation for each daily inspection as a record for three years after the documentation is made. The Executive Secretary, must be immediately notified of any failure in a tailings or waste retention system that results in a release of tailings or waste into unrestricted areas, or of any unusual conditions (conditions not contemplated in the design of the retention system) that is not corrected could indicate the potential or lead to failure of the system and result in a release of tailings or waste into unrestricted areas.*

*Refer to R317-6-6.3 (O): Unless otherwise determined by the Executive Secretary, applicant for a groundwater discharge permit ...shall include the following information: O. Methods and procedures for inspections of the facility operations and for detecting failure of the system.*

### **INTERROGATORY STATEMENT:**

*Section 5.3 of the Tailings Management Plan identifies SOP HP-21 for main tailings dam inspection program. Appendix I of the Tailings Reclamation and Decommissioning Plan identifies SOP HP-21 as "Function Check of Equipment for Radiation Surveys".*

*Please explain this discrepancy and provide an SOP or Section in the report that details documentation of daily inspections of the tailings and waste retention system. Also included in this information should be a commitment to notify the Executive Secretary of any failure of the systems that would result in a release of tailings or waste into unrestricted areas or of any unusual conditions that if not corrected could lead to a failure of the system. Provide a commitment to preserve documentation for a three-year period after each inspection.*

*The inspections to be performed on the tailings site include but are not limited to:*

- *Decant systems*
- *Effluent from under drain pipes*
- *Pond water elevation*
- *Slurry transport system inspection*
- *Retention dam inspection*

- *Diversion and storm water channel inspection*
- *Embankment Settlement*
- *Embankment Slope Conditions*
- *Seepage*
- *Slope Protection*
- *Emergency discharge Facility*
- *Safety and Performance Instrumentation*
- *Operation and Maintenance Features*
- *Postconstruction Changes*
- *Inspections following significant earthquakes, tornadoes, floods, intense rainfalls, or other unusual events.*
- *Groundwater Monitoring systems*
- *Tailings piles*

*Documentation should include the completed inspection reports, engineering data compilation, general project data, as-built drawings and photographs, hydrologic and hydraulic data, test results, applicable correspondence, the name of the inspector and responsible supervisor. This documentation should be included in the annual BAT Report for the facility.*

*Inspections and evaluations should be planned and conducted under the direction of an experienced professional who is thoroughly familiar with the investigation, design, construction, and operations of the Facility with reports prepared to present the results of each technical evaluation and the inspection data accumulated since the last report.*

**BASIS FOR INTERROGATORY:**

*The Division requires written documentation of daily inspections and immediate notification of potential breaches to waste retention systems.*

**REFERENCES:**

*Plateau Resources, Ltd., "Tailings Reclamation and Decommissioning Plan for Shootaring Canyon Uranium Project", Dated December, 2005.*

*Plateau Resources, Ltd., "Tailings Management Plan for Shootaring Canyon Uranium Processing Facility" Amended December, 2005.*

*Plateau Resources, Ltd., "Shootaring Canyon Uranium Processing Facility Environmental Report, Source Material License No. UT0900480", Dated January 2006.*

*NRC. Regulatory Guide 3.11, "Design, Construction, and Inspection of Embankment Retention Systems for Uranium Mills." Washington DC. NRC December 1977.*

*NRC. Regulatory Guide 3.11.1, "Operational Inspection and Surveillance of Embankment Retention Systems for Uranium Mills." Washington DC. NRC October 1980.*

## **INTERROGATORY R313-24-4-06/01: MAINTAINING RECORDS**

### **PRELIMINARY FINDING:**

*Refer to R313-12-51 (1); “licensee or registrant shall maintain records showing the receipt, transfer, and disposal of all sources of radiation”, and 10 CFR 40.61(a); “Each person who receives source or byproduct material pursuant to a license issued pursuant to the regulations in 10 CFR 40 shall keep records showing the receipt, transfer, and disposal of this source or byproduct material as follows: ...”.- See requirements under 10 CFR 40.61(a)(1) through (4).*

*Refer to R313-22; Persons licensed under Rule R313-22 shall keep records of information important to the decommissioning of a facility in an identified location until the site is released for unrestricted use. Before licensed activities are transferred or assigned in accordance with Subsection R313-19-34(2), licensees shall transfer all records described in Subsections R313-22-35(7)(a) through (d) to the new licensee. In this case, the new licensee will be responsible for maintaining these records until the license is terminated. If records important to the decommissioning of a facility are kept for other purposes, reference to these records and their locations may be used.*

### **INTERROGATORY STATEMENT:**

*Please provide procedures for maintaining records (and examples of such records) for receipt, transfer, and disposal in accordance with R313-12-51 (1).*

*Please provide the location, and an inventory of records, stored in accordance with R313-22-35 (7), in anticipation of ultimate closure.*

### **BASIS FOR INTERROGATORY:**

*Inspections, documentation, and reporting is required per R313-24-4 (R313-12-51, 313-19-100, 313-22-35), 10 CFR 40.26(c)(2), 10 CFR 40.61, and the R313-17 (groundwater quality regulations). However, it is not discussed in these documents. Reference is made to the previous submittals and SOPs that are included in these previous submittals, but these SOPs are not provided for review.*

### **REFERENCES:**

*Plateau Resources, Ltd., “Shootaring Canyon Uranium Processing Facility Environmental Report, Source Material License No. UT0900480”, Dated January 2006.*

*Plateau Resources, Ltd., “Tailings Management Plan for Shootaring Canyon Uranium Processing Facility” Amended December 2005.*

*Plateau Resources, Ltd., “Tailings Reclamation and Decommissioning Plan for Shootaring Canyon Uranium Project”, Dated December 2005.*



## **INTERROGATORY R313-24-4-07/01: NOTIFICATION REQUIREMENTS**

### **PRELIMINARY FINDING:**

*Refer to R313-24-4, R313-19-50: Licensees shall notify the Executive Secretary as soon as possible but not later than four hours after the discovery of an event that prevents immediate protective actions necessary to avoid exposures to radiation or radioactive materials that could exceed regulatory limits or releases of licensed material that could exceed regulatory limits. Events may include fires, explosions, toxic gas releases, etc.*

*(2) The following events involving licensed material require notification of the Executive Secretary by the licensee within 24 hours:*

*(a) an unplanned contamination event that:*

*(i) requires access to the contamination area, by workers or the public, to be restricted for more than 24 hours by imposing additional radiological controls or by prohibiting entry into the area;*

*(ii) involves a quantity of material greater than five times the lowest annual limit on intake specified in Appendix B of 10 CFR 20.1001 through 20.2402 (2000), which is incorporated by reference, for the material; and*

*(iii) has access to the area restricted for a reason other than to allow radionuclides with a half-life of less than 24 hours to decay prior to decontamination; or*

*(b) an event in which equipment is disabled or fails to function as designed when:*

*(i) the equipment is required by rule or license condition to prevent releases exceeding regulatory limits, to prevent exposures to radiation and radioactive materials exceeding regulatory limits, or to mitigate the consequences of an accident;*

*(ii) the equipment is required by rule or license condition to be available and operable; and*

*(iii) no redundant equipment is available and operable to perform the required safety function; or*

*(c) an event that requires unplanned medical treatment at a medical facility of an individual with spreadable radioactive contamination on the individual's clothing or body; or*

*(d) an unplanned fire or explosion damaging licensed material or a device, container, or equipment containing licensed material when:*

*(i) the quantity of material involved is greater than five times the lowest annual limit on intake specified in Appendix B of 10 CFR 20.1001 through 20.2402 (2000), which is incorporated by reference, for the material; and*

*(ii) the damage affects the integrity of the licensed material or its container.*

*(3) Preparation and submission of reports. Reports made by licensees in response to the requirements of Section R313-19-50 must be made as follows:*

(a) licensees shall make reports required by Subsections R313-19-50(1) and (2) by telephone to the Executive Secretary. To the extent that the information is available at the time of notification, the information provided in these reports must include:

- (i) the caller's name and call back telephone number;
- (ii) a description of the event, including date and time;
- (iii) the exact location of the event;
- (iv) the radionuclides, quantities, and chemical and physical form of the licensed material involved; and
- (v) available personnel radiation exposure data.

(b) Written report. A licensee who makes a report required by Subsections R313-19-50(1) or (2) shall submit a written follow-up report within 30 days of the initial report. Written reports prepared pursuant to other rules may be submitted to fulfill this requirement if the reports contain all of the necessary information and the appropriate distribution is made. These written reports shall be sent to the Executive Secretary. The report shall include the following:

- (i) A description of the event, including the probable cause and the manufacturer and model number, if applicable, of equipment that failed or malfunctioned;
- (ii) the exact location of the event;
- (iii) the radionuclides, quantities, and chemical and physical form of the licensed material involved;
- (iv) date and time of the event;
- (v) corrective actions taken or planned and results of evaluations or assessments; and
- (vi) the extent of exposure of individuals to radiation or radioactive materials without identification of individuals by name.

**INTERROGATORY STATEMENT:**

*Please describe how Plateau will comply with the regulation requirements cited above. Please provide all documentation generated to date in compliance with these requirements.*

**BASIS FOR INTERROGATORY:**

*The Division requires a written commitment that notification to the Executive Secretary will be given in a timely manner followed by written notification when any of the above cited exposures or accidents occur. It is important that the inspection and maintenance plan is developed so as to include the identification of the items listed above and the respective reporting requirements.*

**REFERENCES:**

*Plateau Resources, Ltd., "Tailings Reclamation and Decommissioning Plan for Shootaring Canyon Uranium Project", Dated December, 2005.*

*Plateau Resources, Ltd., "Tailings Management Plan for Shootaring Canyon Uranium Processing Facility" Amended December, 2005.*

*Plateau Resources, Ltd., "Shootaring Canyon Uranium Processing Facility Environmental Report, Source Material License No. UT0900480", Dated January 2006.*

*NRC. Regulatory Guide 3.11, "Design, Construction, and Inspection of Embankment Retention Systems for Uranium Mills." Washington DC. NRC December 1977.*

*NRC. Regulatory Guide 3.11.1, "Operational Inspection and Surveillance of Embankment Retention Systems for Uranium Mills." Washington DC. NRC October 1980.*

## **INTERROGATORY R313-24-1-08/01: EMERGENCY PLAN**

### **PRELIMINARY FINDING:**

*Refer to R313-24-1(3) [R313-22-32(8)(a)]: Applications to possess radioactive materials in unsealed form, on foils or plated sources, or sealed in glass in excess of the quantities in Section R313-22-90, "Quantities of Radioactive Materials Requiring Consideration of the Need for an Emergency Plan for Responding to a Release", shall contain either:*

- (i) An evaluation showing that the maximum dose to a individual off-site due to a release of radioactive materials would not exceed one rem effective dose equivalent or five rems to the thyroid; or*
- (ii) An emergency plan for responding to a release of radioactive material.*

### **INTERROGATORY STATEMENT:**

*Please submit the emergency plan and implementing procedures and forms, if prepared.*

*Please demonstrate (including relevant calculations) accident dose rates to a member of the public located at the fenceline (off-site side – the nearest point to the facility a member of the public might approach without admittance) will not exceed one rem effective dose equivalent. Please determine the location(s) at the fenceline that would have the greatest dose to a member of the public following each conceivable accident described in the environmental report. For small releases, this is expected to be an insignificant value.*

*This may be in addition or in lieu of dose rates in Ticaboo. Section 6.2.3 of the environmental report describes evaluation of a tornado accident scenario using MILDOS-AREA. The MILDOS-AREA output for the accident scenario was not provided. Please provide the MILDOS-AREA output for this accident scenario, including the Table 6.1-1 data and Appendix A's increased population and workforce, with modification of the ore quality. Table 6.1-1 refers to an ore quality of 0.15%, while Section 2, paragraph 1 refers to incoming ore estimated to average 0.25% uranium oxide.*

*If the dose rates will exceed one rem effective dose equivalent or five rems to the thyroid per R313-22-32(8)(a)(i), then submit an emergency plan in accordance with R313-22-32(8)(c).*

### **BASIS FOR INTERROGATORY:**

*The environmental report provides in Section 6.2.3 a conceivable accident releasing a large quantity of radioactive materials. The applicant provided a total effective dose commitment to a Ticaboo resident of 38 mrem with a Ticaboo occupancy factor of 1 (100% occupancy), but did not provide a dose rate to a member of the public at the fenceline, or the MILDOS-AREA output for the scenario. Please state a public occupancy factor for the fenceline.*

*The location and residency of "a individual off-site" is not defined in DRC regulations. This could be broadly interpreted as a resident of Ticaboo located in Ticaboo, a curious member of the public approaching the site following an accident, or a recreational outdoorsman. The most conservative measure may be a fenceline evaluation. Dose rates for workers during the accident*

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*scenario were not provided, so a gradient of the dose rate between the facility and Ticaboo could not be estimated. The possibility of a public access point having the potential for a dose of greater than one rem cannot be eliminated.*

**REFERENCES:**

*Plateau Resources, Ltd., "Shootaring Canyon Uranium Processing Facility Environmental Report, Source Material License No. UT0900480", Dated January 2006.*

## **INTERROGATORY R313-24-4-09/01: BACKGROUND SAMPLE RESULTS AND DETERMINATION IN SUPPORT OF SITE DECOMMISSIONING**

### **PRELIMINARY FINDING:**

*Refer to R313-22-24/ 10 CFR 40 Appendix A Criterion 6(6) The design requirements in this criterion for longevity and control of radon releases apply to any portion of a licensed and/or disposal site unless such portion contains a concentration of radium in land, averaged over areas of 100 square meters, which, as a result of byproduct material, does not exceed the background level by more than: (i) 5 picocuries per gram (pCi/g) of radium-226, or, in the case of thorium byproduct material, radium-228, averaged over the first 15 centimeters (cm) below the surface, and (ii) 15 pCi/g of radium-226, or, in the case of thorium byproduct material, radium-228, averaged over 15-cm thick layers more than 15 cm below the surface.*

### **INTERROGATORY STATEMENT:**

*Please provide background data for radium-226 in the first 15 cm of soil as a 15 cm layer, and for radium-226 in soils over 15 cm, provided as a 15 cm layer.*

*In lieu of providing background radium-226 data that corresponds to the evaluations of Criterion 6(6), the Applicant can state an intention to implement a direct comparison between the 5/15 standard for Ra-226 and the survey unit soil data during future remediation efforts using the Sign test.*

### **BASIS FOR INTERROGATORY:**

*Soil samples collected and reported as part of the Pre-Operational Radiological Environmental Operating Program were collected at a depth of 5 cm (pg 5-1). The arithmetic means of Ra-226, U-nat and Th-230 values (0.34, 0.51 and 0.54 pCi/g) are proposed as site background values in Appendix F of the Tailing Reclamation Plan (pg F-8). The analytical methods used and data analysis techniques are not in question.*

*It can reasonably be expected that the Ra-226 concentrations will vary between a 5 cm sample and a corresponding 15 cm sample due to weathering and/or leaching. Plateau Resources' facility does not have a 30 cm soil layer present in all places, and has exposed sandstone throughout the property.*

*The soil samples were collected prior to the implementation of the 5/15 Ra-226 standard published in 50 FR 41862 on October 18, 1985 and incorporated as Criterion 6(6) of 10 CFR 40 Appendix A. Their collection parameter of 5 cm deep does not mesh with the current standard of data comparison to 15 cm-thick layers. The Ra-226 average data provided by Plateau Resources is less than 5% of the 5/15 regulatory limit.*

*The applicant states in the Environmental Report (pg F-7) that Type I and Type II error rates cannot be developed for the background data. This statement reduces the number of statistical options for deploying the data as part of a MARSSIM-based decommissioning and final status survey.*

*The results presented by Plateau Resources is below the nationwide average concentration of in surface soil of 1.1 pCi/g of Ra-226 determined by Myrick, et al, at uranium mills and sites formerly utilized during Manhattan Engineer District and early Atomic Energy Commission projects.*

*A complete evaluation of MARSSIM implementation during remediation is premature at this time. Assuming the Derived Concentration Guideline Levels (DCGL) for average concentrations over a wide area (DCGL<sub>w</sub>) will be set at 5 pCi/gm of Ra-226 for the first 15 cm of soil and 15 pCi/gm of Ra-226 for each underlying 15 cm layer of soil, MARSSIM provides the following guidance in Section 4.5:*

*If the radionuclide contaminants of interest do not occur in background, or the background levels are known to be a small fraction of the DCGL<sub>w</sub> (e.g., <10%), the survey unit radiological conditions may be compared directly to the specified DCGL and reference area background surveys are not necessary. If the background is not well defined at a site, and the decision maker is willing to accept the increased probability of incorrectly failing to release a survey unit (Type II error), the reference area measurements can be eliminated and a one-sample statistical test performed as described in Section 8.3.*

*MARSSIM Section 8.3.1 provides information about the one-sample statistical test:*

*The Sign test is designed to detect uniform failure of remedial action throughout the survey unit. This test does not assume that the data follow any particular distribution, such as normal or lognormal.*

## **REFERENCES:**

*Abelquist 2001. "Decommissioning Health Physics: A Handbook for MARSSIM Users," Institute of Physics Publishing, Bristol, UK.*

*Plateau Resources 2005b.*

*Multi-Agency Radiation Survey and Site Investigation Manual 2000. US Nuclear Regulatory Commission, NUREG-1575, Washington, DC, August, as amended.*

*Myrick, T. E.; Berven, B. A.; Haywood, F. F. 1983. "Determination of Concentrations of Selected Radionuclides in Surface Soil in the U.S." Health Physics, Vol 45(3):631-642, September.*

*Woodward Clyde Consultants 1980. "Interim Report 1979-1980 Pre-Operational Radiological Environmental Operating Program: Shootaring Canyon Uranium Project, Garfield County, UT, NRC Docket 40-8693." San Francisco, CA, November.*

## **INTERROGATORY R313-24-4-10/01: DATA QUALITY OBJECTIVES FOR SITE DECOMMISSIONING**

### **PRELIMINARY FINDING:**

*Refer to R313-22-32(2): The Executive Secretary may, after the filing of the original application, and before the expiration of the license, require further statements in order to enable the Executive Secretary to determine whether the application should be granted or denied or whether a license should be modified or revoked.*

### **INTERROGATORY STATEMENT:**

*Please supplement the Building Contamination Survey and Sampling Plan by adding a documented Data Quality Objectives (DQO) process and a corresponding Quality Assurance Project Plan (QAPP).*

### **BASIS FOR INTERROGATORY:**

*The DQO process and generation of QAPP are recommended steps in the MARSSIM process. Pacific Northwest National Laboratory provides extensive resources for the DQO program and sampling frequency determination, including Visual Sample Plan and DQO outlines. They are available for use outside of Department of Energy programs, and incorporate EPA "QA-G" series guidance.*

*The DQO process works to ensure the data collected will be defensible and meet the requirements and expectations of DRC prior to commencement of work.*

### **REFERENCES:**

*Abelquist, E. W. 2002. "Decommissioning Health Physics: A Handbook for MARSSIM Users," ISBN 0750307617.*

*Environmental Protection Agency 2006. "Agency-wide System Quality Assurance Documents." Available at [http://www.epa.gov/quality/qa\\_docs.html](http://www.epa.gov/quality/qa_docs.html)*

*Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM), NUREG-1575, Rev. 1, Appendix D.*

*Pacific Northwest National Laboratory 2006a. Data Quality Objectives homepage. Available at <http://dgo.pnl.gov/dqohome.htm>*

*Pacific Northwest National Laboratory 2006b. Visual Sample Plan Version 4.4. Available at <http://dgo.pnl.gov/>*

*Plateau Resources, Ltd., "Tailings Reclamation and Decommissioning Plan for Shootaring Canyon Uranium Project", Dated December, 2005.*



## **INTERROGATORY R313-24-4-11/01: EXTERIOR SURVEY FOR SITE DECOMMISSIONING**

### **PRELIMINARY FINDING:**

*Refer to R313-22-32(2): The Executive Secretary may, after the filing of the original application, and before the expiration of the license, require further statements in order to enable the Executive Secretary to determine whether the application should be granted or denied or whether a license should be modified or revoked.*

### **INTERROGATORY STATEMENT:**

*While Appendix H provides a broad overview of Class 1, 2 and 3 classifications of interior structures, it does not directly address classification and surveys of building exteriors, roofs, paved and unpaved areas. If the Applicant proposes not including exterior areas in the Class 3 units, at a minimum, provide a detailed justification for excluding the physical areas located between the various Class 1, 2 and 3 areas described in Section 8, Table 8-2 of the Tailings Reclamation and Decommissioning Plan.*

*For exterior concrete and paved areas, clearly define if the intention is to use surficial survey techniques for release. Please address the survey mechanism that will be used, and the anticipated statistical tests. If they will correspond to the methodology of Appendix H, please state this.*

### **BASIS FOR INTERROGATORY:**

*The exterior of the buildings should be considered for survey, along with walking and driving surfaces. In most cases, based upon information provided by the applicant, these areas are expected to be identified as Class 3 areas.*

### **REFERENCES:**

*Abelquist, E. W. 2002. "Decommissioning Health Physics: A Handbook for MARSSIM Users," ISBN 0750307617.*

*Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM), NUREG-1575, Rev.1.*

*Plateau Resources, Ltd., "Tailings Reclamation and Decommissioning Plan for Shootaring Canyon Uranium Project", Dated December, 2005.*

## **INTERROGATORY R313-24-4-12/01: SOIL FINAL STATUS SURVEY FOR SITE DECOMMISSIONING**

### **PRELIMINARY FINDING:**

*Refer to R313-22-32(2): The Executive Secretary may, after the filing of the original application, and before the expiration of the license, require further statements in order to enable the Executive Secretary to determine whether the application should be granted or denied or whether a license should be modified or revoked.*

### **INTERROGATORY STATEMENT:**

*Appendix E provides a clear identification of soil cleanup criteria. It does not include planned MARSSIM classifications for surface soils outside of the tailings area at the Shootaring Canyon facility. Please provide a map identifying possible MARSSIM classifications for surface across the property under control of Plateau Resources, Ltd.*

*Please provide a soil sampling plan, similar to Appendix H, that incorporates the DQO process and a Quality Assurance Plan that will improve the Tailings Reclamation and Decommissioning Plan.*

*Please describe potential techniques for identifying sampling locations.*

### **BASIS FOR INTERROGATORY:**

*A survey plan for surface soils was not incorporated into the Tailings Reclamation and Decommissioning Plan while a survey plan for buildings was included.*

*Visual Sample Plan provides a simplified method for identifying sampling points across a survey area.*

### **REFERENCES:**

*Abelquist, E. W. 2002. "Decommissioning Health Physics: A Handbook for MARSSIM Users," ISBN 0750307617.*

*Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM), NUREG-1575, Rev. 1, Appendix D.*

*Pacific Northwest National Laboratory 2006b. Visual Sample Plan Version 4.4. Available at <http://dgo.pnl.gov/>*

*Plateau Resources, Ltd., "Tailings Reclamation and Decommissioning Plan for Shootaring Canyon Uranium Project", Dated December, 2005.*

## **INTERROGATORY R313-24-4-13/01: PIPES, TRAPS, DUCTS AND DRAINLINES FOR SITE DECOMMISSIONING**

### **PRELIMINARY FINDING:**

*Refer to R313-22-32(2): The Executive Secretary may, after the filing of the original application, and before the expiration of the license, require further statements in order to enable the Executive Secretary to determine whether the application should be granted or denied or whether a license should be modified or revoked.*

### **INTERROGATORY STATEMENT:**

*Please identify areas (traps, pipes, drain lines, ductwork, etc) for consideration of judgment sampling locations. The Guideline is not in conflict with MARSSIM regarding structural surveys.*

*Please identify any equipment or installations that may be “of such size, construction, or location as to make the surface inaccessible for purposes of measurement” that are intended for unrestricted release. If no equipment or installations are inaccessible to survey that will be remaining after decommissioning, please state that there is no equipment or installations that will be inaccessible for survey by either the Guideline or by MARSSIM.*

### **BASIS FOR INTERROGATORY:**

*Refer to “Guidelines for Decontamination and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct, Source or Special Nuclear Material,” dated April 1993, paragraph 3: The radioactivity on the interior surfaces of pipes, tanks, drain lines or ductwork shall be determined by making measurements **at all traps, and other appropriate access points** [emphasis added], provided that contamination at these locations is likely to be representative of contamination on the interior of the pipes, drain lines or ductwork. Surfaces of premises, equipment, or scrap, which are likely to be contaminated but are of such size, construction, or location as to make the surface inaccessible for purposes of measurement shall be presumed to be contaminated in excess of the limits.*

*The applicant states in Section 8.3.1 that tools and equipment will be surveyed to meet the Guideline referenced above. Appendix H does not include provisions for judgment measurements in addition to the statistically determined minimum sample totals for appropriate access points to remaining pipes, drain lines or ductwork, etc. The addition of judgment measurements is supported by MARSSIM. MARSSIM Section 5.3.3.1 “Structure Surveys,” paragraph 5 of states in part:*

*“Judgment direct measurements are performed at locations of elevated direct radiation, as identified by surface scans, to provide data on upper ranges of residual contamination levels. Judgment measurements may also be performed in sewers, air ducts, storage tanks, septic systems and on roofs of buildings, if necessary.”*

### **REFERENCES:**

Abelquist, E. W. 2002. "Decommissioning Health Physics: A Handbook for MARSSIM Users," ISBN 0750307617.

Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM), NUREG-1575, Rev. 1, Section 5.3.3.1.

Pacific Northwest National Laboratory 2006b. Visual Sample Plan Version 4.4. Available at <http://dgo.pnl.gov/>

Plateau Resources, Ltd., "Tailings Reclamation and Decommissioning Plan for Shootaring Canyon Uranium Project", Dated December, 2005.

U.S. Nuclear Regulatory Commission. April 1993, Guidelines for Decontamination and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct, Source or Special Nuclear Material.

## **INTERROGATORY R313-24-1-14/01: MILLING OPERATIONS**

### **PRELIMINARY FINDING:**

*Refer to 313-24-4; 10 CFR 40.31(h); An application for a license to receive, possess, and use source material for uranium or thorium milling or byproduct material, as defined in this part, at sites formerly associated with such milling shall contain proposed written specifications relating to milling operations and the disposition of the byproduct material to achieve the requirements and objectives set forth in appendix A of this part. Each application must clearly demonstrate how the requirements and objectives set forth in appendix A of this part have been addressed. Failure to clearly demonstrate how the requirements and objectives in appendix A have been addressed shall be grounds for refusing to accept an application.*

### **INTERROGATORY STATEMENT:**

*In order to understand the handling and processing of the waste tailings and related solution please provide a complete material/production flow diagram that includes production rates and the properties of the product generated, liquids generated, waste generated, reagents used, losses, etc., starting at the ore pile and ending up in the tailings pile, and evaporation pond.*

*Please provide the details of the tailings dewatering and tailing placement process. This includes:*

- 1. Design criteria for the dewatering process and tailings placement into the cell.*
- 2. Proposed location and layout of the dewatering equipment and transfer piping.*
- 3. Detailed equipment and operational specifications and drawings of the dewatering and related tailings process equipment. This includes (but is not limited to) transfer piping to and from the equipment, the dewatering equipment, dewatered tailing placement equipment and methods, and secondary containment measures for tailings transfer and processing operations.*
- 4. Quality control and assurance measures to be used to ensure tailings dewatering and placement meet design criteria and specifications.*
- 5. Rate and make up of the slurry transferred to the dewatering area.*
- 6. Rate and feed method into the press for dewatering.*
- 7. Feed staging and contingency plans when the dewatering system is out of service. It is stated that if the dewatering press cannot accept the slurry it will be placed into the cell. How will this impact the material in the cell (water content, stability, etc.)? Will it be removed again and dewatered?*
- 8. Storm water management details for the water collected in the cell and dewatering area.*

*Please provide the anticipated engineering properties of the tailings such as classification (gradation), moisture content, density, unconfined compressive strength, shear strength, permeability, cohesion, and angle of internal friction. These properties are important in evaluating stability and long-term performance of the tailings cell.*

**BASIS FOR INTERROGATORY:**

*It would be helpful to see a material flow diagram that includes the production rates and the properties of the product generated, liquids generated, tailings generated, reagents used, losses, etc., starting at the ore pile and ending up in the tailings pile, and evaporation pond. Figure 3.1-1 in the Environmental Report is very useful. However, the same type of diagram with material balance information (e.g., % solids, pH, flow rate, etc.) is needed.*

*What are the anticipated engineering properties of the tailings such as classification (gradation), moisture content, density, unconfined compressive strength, shear strength, permeability, cohesion, and angle of internal friction? These properties are important in evaluating stability and long-term performance of the tailings cell. Also, the Tailings Management Plan states that the dewatering system may be bypassed if it cannot accept the slurry. This could have a negative impact on the dewatered tailings already in the cell. A contingency plan needs to be developed for the case when the dewatering equipment cannot accept the slurry that does not impact the integrity of the tailings in the cell.*

*Details on the dewatering process were not provided.*

**REFERENCES:**

*Plateau Resources, Ltd., "Shootaring Canyon Uranium Processing Facility Environmental Report, Source Material License No. UT0900480", Dated January 2006.*

*Plateau Resources, Ltd., "Tailings Management Plan for Shootaring Canyon Uranium Processing Facility" Amended December, 2005.*

## **INTERROGATORY R313-24-4-15/01: RADIATION SURVEY**

### **PRELIMINARY FINDING:**

*Refer to R313-24-1(3), R313-24-4, R313-15-501, R313-15-406, and 10 CFR 40 Appendix A, Criterion 5A(1); DRC rules require that a radiation survey be performed to demonstrate that the requirements of R313-15 are met, including the magnitude and extent of radiation levels and concentrations or quantities of radioactive material (see R313-15-501). DRC rules also require the licensee to describe "... how facility design and procedures for operation will minimize, to the extent practicable, contamination of the facility and the environment, ..." (see R313-15-406). R313-24-4 and 10 CFR 40 Appendix A, Criterion 5A(1) require that for uranium tailings impoundments where wastes have migrated into the liner during the active life of the facility, that closure of said impoundment must include "...removal or decontamination of all waste residues, contaminated containment system components (liners, etc.), contaminated subsoils, and structures and equipment contaminated with waste and leachate."*

*Also refer to R317-6-6.4(A). The licensee must provide information that allows the Executive Secretary to determine: "...3. the applicant is using best available technology to minimize the discharge of any pollutant; ..."*

### **INTERROGATORY STATEMENT:**

*Please provide an evaluation that demonstrates that the existing soil subgrade for both Cell 1 and Cell 2 have radiation and contamination levels that are acceptable. One possible scenario to minimize contamination and meet Best Available Technology (BAT) requirements is to base the design of the liner system for the cells on a clean and stable subgrade. Another scenario is to demonstrate that the levels of any soil contamination left under the new liner design will have no adverse impact on local groundwater quality or the environment. In either case, it is Plateau's burden to demonstrate and justify that any soil concentration level proposed as a cleanup standard has both technical and regulatory justification. Consequently, it is imperative that this evaluation be submitted to the DRC and is approved prior to issuance of a Construction Permit.. Also, if the implementation of the plan results in modifications to the proposed subgrade and liner system, the respective modifications will need to be submitted to the DRC for review and concurrence prior to liner construction.*

### **BASIS FOR INTERROGATORY:**

*It is our understanding that a radiation survey is to be performed for the downstream area near the dam where a spill had once occurred, and in the area of the proposed cell where tailings are now stored. The plan and the respective results associated with this survey needs to be provided to the DRC for review.*

### **REFERENCES:**

*Plateau Resources, Ltd., "Shootaring Canyon Uranium Processing Facility Environmental Report, Source Material License No. UT0900480", Dated January 2006.*

*Plateau Resources, Ltd.*

*URS 39400147*

*June 2006*



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*Plateau Resources, Ltd., "Tailings Management Plan for Shootaring Canyon Uranium Processing Facility" Amended December, 2005.*



## **INTERROGATORY R313-24-4-16/01: SEISMIC HAZARD CHARACTERIZATION**

### **PRELIMINARY FINDING:**

*Refer to Criterion 1 of 40 CFR Part 40, Appendix A, Criterion 1”... In the selection of disposal sites, primary emphasis must be given to isolation of tailings or wastes, a matter having long-term impacts, as opposed to consideration only of short-term convenience or benefits, such as minimization of transportation or land acquisition costs. While isolation of tailings will be a function of both site and engineering design, overriding consideration must be given to siting features given the long-term nature of the tailings hazards”;*

*Refer to Criterion 4 of 40 CFR Part 40, Appendix A, Criterion 4 (e)...The impoundment may not be located near a capable fault that could cause a maximum credible earthquake larger than that which the impoundment could reasonably be expected to withstand.”*

*Refer to Criterion 1 of 40 CFR Part 40, Appendix A, Criterion 6(1): ...[Uranium mill tailings disposal shall be] “in accordance with a design that provides reasonable assurance of control of radiological hazards to be effective for 1,000 years, to the extent reasonably achievable, but in any case for at least 200 years...” ;*

### **INTERROGATORY STATEMENT:**

*Please provide additional information to support the determination of an appropriate and consistent maximum predicted horizontal ground acceleration (MHGA) for the site. Please include sufficient information regarding historical seismicity and deterministic or probabilistic methodologies used to derive the estimated MHGA value, and to demonstrate that the proposed MHGA value reflects the most current information available regarding predicted seismic hazard levels in eastern/southeastern Utah and the area including the site. Seismic stability analyses should be based on this MHGA value.*

### **BASIS FOR INTERROGATORY:**

*Additional information needs to be provided to justify that selection of the specified MHGA value of 0.19 g is appropriate for the site and that the stated value reflects the best information currently available for southeastern Utah/the project site. The only information provided in “Exhibit C – Seismic Hazard Analysis” to support determination of the 0.19 g value is page 91 from a referenced report (“June 26, 1994 Seismic Hazard Analysis of Title II Reclamation Plans”, Lawrence Livermore National Laboratory). Some of the information on that page is illegible (e.g., the exponent in the cited Hazard Level values); also, information items referenced on that page, including hazard curves, a methodology section, and Fault 2, Fault 3 locations are not provided for review. The 0.19 g value was used for a seismic stability analysis for the Shootaring Canyon Dam performed in 1997 (January 9, 1997 letter report by Inberg-Miller Engineers).*

*Newmark Analyses conducted in 1999 for the Shootaring Canyon Dam and Cross Valley Berm used a peak ground acceleration of 0.33 g based on a magnitude 6.5 earthquake (January 29 and June 14, 1999 letter reports by Inberg-Miller Engineers).*

**REFERENCES:**

*Plateau Resources, Ltd., "Tailings Management Plan for Shootaring Canyon Uranium Processing Facility" Amended December, 2005.*

## **INTERROGATORY R313-24-4-17/01: ROCK COVER**

### **PRELIMINARY FINDING:**

*Refer to R313-24-4, 10 CFR 40 Appendix A(4)(d): A full self-sustaining vegetative cover must be established or rock cover employed to reduce wind and water erosion to negligible levels. The following factors must be considered in establishing the final rock cover design to avoid displacement of rock particles by human and animal traffic or by natural process, and to preclude undercutting and piping: Shape, size, composition, and gradation of rock particles (excepting bedding material average particles size must be at least cobble size or greater); Rock cover thickness and zoning of particles by size.*

*Individual rock fragments must be dense, sound, and resistant to abrasion, and must be free from cracks, seams, and other defects that would tend to unduly increase their destruction by water and frost actions. Weak, friable, or laminated aggregate may not be used.*

### **INTERROGATORY STATEMENT:**

- 1. Please provide information that indicates what percentage of over sizing is anticipated for the rock mulch cover. Is the 'over sizing' and 'over thickening' for the rock mulch cover to be accomplished at 40% or 33 (or 46%)? All percentages are indicated in sections 6.4.1 and 6.4.2 (TRDP). Please provide additional references and discussion of material property studies to demonstrate compliance with NRC Guidelines (Johnson 2002).*
- 2. Please provide information on the site geologic characteristics and specific rock types present at the proposed rock borrow source.*
- 3. The application proposes at least three different types of rock for possible utilization in the rock cover and rock cover mulch without establishing which rock type or combination thereof will be used in construction. Please justify the use of the smaller than recommended average rock particle size.*
- 4. The applicant has not provided definitive information about the gradation of the final rock cover or a description of particle zoning by size. Please provide this information. Please provide gradation information and particle zoning for the final rock cover.*
- 5. Please demonstrate that the quality of the rock to be used of the final cover, in terms of cracks, seams, or other defects is sufficient and will not tend to unduly increase their destruction by water and frost action.*
- 6. Please provide an analysis that discusses the long-term performance of the cover system and associated erosion controls following closure. Section 6.0 of the Tailings Reclamation and Decommissioning Plan (Hydro-Engineering, L.L.C. 2005) discusses the design of the drainage and erosion control systems for reclamation, however, the section does not appear to address post-closure performance required to demonstrate with reasonable assurance that the integrity of the cover system will be maintained and will control radiological and non-radiological hazards for a minimum of 200 years, and to extent achievable, for 1,000 years.*

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**BASIS FOR INTERROGATORY:**

*The information provided in sections 6.4.1 and 6.4.2 of the TRDP addresses the sizing of rock cover but does not provide adequate detail to demonstrate compliance with this requirement.*

1. *Information regarding the over sizing and over thickening of the rock mulch cover is not adequately presented. Methods, results, and justification of compliance of material properties for rock cover is not clearly described or referenced.*
2. *While the applicant has conducted gradations, durability analyses, and a petrographic analysis of site rock samples that may be used in the final rock mulch cover, the type of rock (mulch) to be utilized in the final cover is not clearly established in the application. In order to verify that the gradations, durability analyses, and petrographic analysis are applicable, the applicant needs to specify what type or types of rock mulch will be used in construction. This information is needed to support an affirmative statement that the rock cover will not be displaced by erosional processes.*
3. *Information regarding the geological characteristics at the site is not adequately presented.*
4. *Since the final rock material type to be utilized on the cover has not been established, the final gradation and other parameters are not clearly established in the application (section 6 and Appendix C, TRDP).*
5. *The applicant has indicated that 4-inches of rock mulch underlain by 24-inches of rocky soil will be utilized for the final reclamation cover (Figures 5-1-Cell-1, 5-1-Cell-2, 9-5-Cell-1, and 9-5-Cell-2, TRDP). The application does not currently include information on the gradation and zoning of particles with the final rock cover. This information is needed so that the requirements of the regulation can be met and assurance made that the cover will resist human/animal disturbance and natural processes.*
6. *Neither section 6.4 (TRDP) nor the petrographic analysis (Appendix C, TRDP) provides definitive conclusions about the presence of cracks, seams, or other weaknesses within the rock. This information is needed so that the requirements of the regulation can be met and assure that the cover rock is sound and of sufficient quality (expressed in terms of various parameters stated above) to resist natural degradation processes.*

*The licensee should demonstrate that the cover system and other closure design control features will remain effective for 1000 years, to the extent achievable, and for a minimum of 200 years and require minimal maintenance following closure without posing risks due to the release of radiological and potentially hazardous constituents.*

**REFERENCES:**

*Plateau Resources, Ltd., "Tailings Reclamation and Decommissioning Plan for Shootaring Canyon Uranium Project", Dated December, 2005.*

*Plateau Resources, Ltd.*

*URS 39400147*

*June 2006*



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*T. L. Johnson, U.S. Nuclear Regulatory Commission, "Design of Erosion Protection of Long-Term Stabilization (NUREG-1623)," September 2002.*

## **INTERROGATORY R313-24-4-18/01: SURFACE RUN-OFF & INSTABILITY**

### **PRELIMINARY FINDING:**

*Refer to R313-24-4, 10 CFR 40 Appendix A(4)(d): All impoundment surfaces must be contoured to avoid areas of concentrated surface runoff or abrupt or sharp changes in slope gradient. In addition to rock cover on slopes, areas toward which surface runoff might be directed must be well protected with substantial rock cover (rip rap). In addition to providing for stability of the impoundment system itself, overall stability, erosion potential, and geomorphology of surrounding terrain must be evaluated to assure that there are not ongoing or potential processes, such as gully erosion, which would lead to impoundment instability.*

### **INTERROGATORY STATEMENT:**

*In support of the proposed storm water drainage of and around the tailings cells please provide:*

- 1. A more complete drawing that shows the proposed surface contours in the upland areas, the North Drainage Diversion Ditch, surface water flow directions, proposed drainage basins, surface water erosion controls, and surface water flow directions.*
- 2. A drawing (or drawings) that addresses just the storm water flow areas and channels for the proposed cells. It should include surface water and channel flow paths and directions, and the cross sections/profiles that illustrate the respective channel geometry and construction.*
- 3. A justification and clarification for not including a drainage channel along the western edge of the Cells and a description of what will happen to the storm water directed to this area.*
- 4. Confirmation (and a basis for this confirmation) that the storm water flow down the final cell slopes will not promote erosion and that interceptor ditches that act to intercept surface runoff from the cover part way down the slope are not needed.*
- 5. Confirmation (and a basis for the confirmation) that the general slope of the swale between Cell 1 and the EPPC (0.0026 ft/ft) is adequate and will not silt up and hinder water flow and promote ponding.*
- 6. A clarification and further justification of the statement made in Section 6.2 of the TRDP that natural deposition would be exploited. What is the basis for this statement? Is there natural deposition now? How is this demonstrated?*
- 7. The hydrologic sections referred to in Section 6.4.2 of the TRDP (on drawings 6-9-Cell-1 and 6-9-Cell-2).*

### **BASIS FOR INTERROGATORY:**

*The potential for erosion (sheet and gully) appears to be mitigated through the use of riprap and rock mulch in channel areas and across the surface of the final reclamation cover. The applicant utilized the methods within NUREG-1623 to size the rock mulch for the cover and the channels to resist water erosion (Appendix K, TRDP).*

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*Section 6.1 of the TRDP discusses the tailings dispersal by erosion. As part of this discussion, it presents the upland drainage diversion around the tailings piles. However, the proposed upland drainage diversion around the tailings piles is not clear. A more complete drawing that shows the proposed surface contours in the upland areas, the North Drainage Diversion Ditch, surface water flow directions, proposed drainage basins, surface water erosion controls, and surface water flow directions is needed.*

*Also in support of Section 6.1 of the TRDP, a drawing (or drawings) that addresses just the storm water flow areas and channels for the proposed cells would be useful. It should include surface water and channel flow paths and directions, and the cross sections/profiles that illustrate the respective channel geometry and construction.*

*Is the intent to allow drainage from the western portion of the cell pond in low areas to the west and then infiltrate or evaporate and not flow away from the site? If these areas fill with debris from the bluff, would a natural channel form with time that could compromise the integrity of the cover toe? In addition, were interceptor ditches that act to intercept surface runoff from the cover part way down the slope thus limiting the sheet flow and velocities down the cover considered?*

*The general slope of the swale between Cell 1 and the EPPC is 0.0026 ft/ft. This slope is too gentle and has the potential to silt up and hinder water flow and promote ponding.*

*In Section 6.2 of the TRDP it states that natural deposition will be exploited. What is the basis for this statement? Is there natural deposition now? How is this demonstrated?*

*Section 6.4.2 of the TRDP mentions that 6-9-Cell-1 and 6-9-Cell-2 present hydrologic channel sections. However, these are plan views with no sections.*

#### **REFERENCES:**

*Plateau Resources, Ltd., "Tailings Reclamation and Decommissioning Plan for Shootaring Canyon Uranium Project", Dated December, 2005.*

*T. L. Johnson, U.S. Nuclear Regulatory Commission, "Design of Erosion Protection of Long-Term Stabilization(NUREG-1623)," September 2002.*

## **INTERROGATORY R313-24-4-19/01: DOUBLE LINER SYSTEM CQAP PLAN AND SPECIFICATIONS**

### **PRELIMINARY FINDING:**

*Refer to R313-24-4, 10 CFR 40 Appendix A(5)(a)(1): Surface impoundments must have a liner that is designed, constructed, and installed to prevent any migration of wastes out of the impoundment to the adjacent subsurface soil, ground water, or surface water at any time during the active life (including the closure period) of the impoundment. The liner may be constructed of materials that may allow wastes to migrate into the liner (but not into the adjacent subsurface soil, ground water, or surface water) during the active life of the facility, provided that impoundment closure includes removal or decontamination of all waste residues, contaminated containment system components (liners, etc.), contaminated subsoils, and structures and equipment contaminated with waste and leachate. For impoundments that will be closed with the liner material left in place, the liner must be constructed of materials that can prevent wastes from migrating into the liner during the active life of the facility.*

*Refer to R317-3-1(1.7). 1.7. Construction Supervision. The applicant must demonstrate that adequate and competent inspection will be provided during construction. It is the responsibility of the applicant to provide frequent and comprehensive inspection of the project.*

*Refer to R317-3-10(4)(E). E. Construction Quality Control and Assurance. A construction quality control and assurance plan showing frequency and type of testing for materials used in construction shall be submitted with the design for review and approval. Results of such testing, gradation, compaction, field permeability, etc., shall be submitted to the executive secretary.*

### **INTERROGATORY STATEMENT:**

*Please revise the CQAP:*

- *So it includes sufficient detail to indicate who is responsible (between the Construction Manager, CQA Officer, and others) for, or when acceptance of the liner system construction work identified will occur. This shall include the lines of authority and communication and protocols for identifying and rectifying deficiencies. Limited information is included in Section 5.0 however, a clear and concise description of the lines of authority and communication as well as the protocols for identifying and rectifying deficiencies is needed.*
- *So it clearly identifies responsibility assignments or procedures for when there is non-conformance, how they are addressed and corrected, and the timely implementation and documentation of the corrective measure.*
- *So it clearly states that the CQA Officer and the engineer of record (licensed in the State of Utah) are independent parties who will certify the CQA report by both direct field observations, testing, and document review.*
- *To include testing to demonstrate that the clay used for the bottom liner meets the  $1 \times 10^{-7}$  cm/s field hydraulic conductivity requirement.*



**BASIS FOR INTERROGATORY:**

*The applicant proposes to use a double liner with leak detection in order to prevent migration of wastes out of the impoundment (section 4 & 5, TMP). The liners will be constructed of 60 mil High-Density Polyethylene (HDPE) with material properties as shown in Appendix C (TMP). The applicant indicates that the double liner with the leak detection system design is the Best Available Technology (BAT) and comparable to similar facilities in the industry. The application of HDPE flexible membrane liner appears to be in concurrence with the current regulations and BAT. The applicant also proposes to install storm water controls and a final cover that are to address long term stability of the site both during and after closure. However, there is insufficient information provided in the Construction Control Quality Assurance Plan (CCQAP) and only limited detailed plans and specification are provided for the construction of Cell 1 and 2. The deficiencies in the CCQAP are addressed in this interrogatory, while the deficiencies in the plans and specifications are addressed in a separate interrogatory.*

*The review of the CCQA revealed a few items that were not clear. The Appendix (C, TMP) does not contain sufficient detail to indicate acceptance of non-conforming work and procedures/documentation for retesting control. Also, no technical specifications were located within the application.*

*Section 7.4.1 does include the requirement that for every 10,000 cubic yards of clay placed, clay liner composite samples of the placed clay shall be collected and tested for hydraulic conductivity. However, the method used for this testing is not provided. Also, Appendix F includes test data on the proposed material to be used for the clay liner. However, no test method or laboratory results on the hydraulic conductivity is provided, only a statement in a transmittal letter that test results indicated hydraulic conductivity on the order of  $1 \times 10^{-8}$  cm/s or less.*

*The requirement for the hydraulic conductivity of the clay liner is an in place field hydraulic conductivity of  $1 \times 10^{-7}$  cm/s or less. Plateau needs to provide a demonstration that the clay used for the bottom liner meets this requirement. Laboratory hydraulic conductivity testing is typically found to be less than demonstrated for the same compacted clay in the field.*

**REFERENCES:**

*Plateau Resources, Ltd., "Tailings Reclamation and Decommissioning Plan for Shootaring Canyon Uranium Project", Dated December, 2005.*

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## INTERROGATORY R313-24-4-20/01: LINER STRENGTH & COMPATIBILITY

### PRELIMINARY FINDING:

*Refer to R313-24-4, 10 CFR 40 Appendix A(5)(a)(2)(a): The liner must be constructed of materials that have appropriate chemical properties and sufficient strength and thickness to prevent failure due to pressure gradients (including static head and external hydrogeologic forces), physical contact with the waste or leachate to which they are exposed, climatic conditions, the stress of installation, and the stress of daily operation;*

*Refer to R317-6-1 (1.3): "Best Available Technology (BAT)" means the application of design, equipment, work practice, operation standard or combination thereof at a facility to effect the maximum reduction of a pollutant achievable by available processes and methods taking into account energy, public health, environmental and economic impacts and other costs;*

*Refer to R317-6-6 (6.4): ["ISSUANCE OF DISCHARGE PERMIT - The Executive Secretary, may issue a ground water discharge permit for a new facility if the Executive Secretary determines, after reviewing the information provided under R317-6-6.3, that: ... (A.3) the applicant is best available technology to minimize the discharge of any pollutant... "];*

### INTERROGATORY STATEMENT:

*To meet the regulatory requirements referenced for the cell liner system the following evaluations or calculations need to be provided: Liner system material (HDPE, clay, geonet, fabric, granular material, piping, extraction and monitoring equipment, etc.) to be compatible with leachate so as not to compromise the integrity of the system. Please provide site-specific information, test data, and/or studies on the anticipated chemical and physical characteristics of the leachate and the ability of all of the liner system materials and equipment to resist long-term damage/degradation due to exposure to leachate and residual process liquids.*

*Please provide an evaluation that demonstrates that the proposed lining system will remain stable during cell operations; this includes:*

- 1. Anchor trench calculations that provide the basis for the anchor trench design.*
- 2. An evaluation of the impact of stress imposed by equipment, tailings and liquid during placement on the liner system side slopes that could result in movement and degradation of the liner system.*
- 3. Information to demonstrate the stability of the lining system interfaces, particularly the HDPE liner interfaces, on the cell side slopes during lining system installation and cell operation. Include information assessing the stability of the lining system in the event of a possible failure of anchoring of the lining system at the anchor trench as a result of cell loading during operations (such as from equipment), during unusually severe wind uplift conditions that might occur prior to or during the operational period, etc.*
- 4. An evaluation of the impacts of wind uplift forces, ballasting for wind uplift, UV degradation, wetting/drying cycles, freeze-thaw cycles, and temperature fluctuations on the liner system while exposed to these forces.*

5. *A calculation demonstrating that the synthetic liner will not be punctured by the proposed drainage filter materials (e.g., by Entrada sands on the cell floors and side slopes and by sand and gravel filter layer materials on cell side slopes) - i.e. provide information demonstrating whether or not any cushion geotextiles are needed atop the upper synthetic liner at locations where the liner contacts these drainage filter media.*
6. *Information regarding the proposed upper geomembrane liner (e.g. standard all-black 60-mil HDPE vs. black/white HDPE geomembrane; textured vs. smooth) and additional information supporting the technical suitability of the proposed geomembrane for the site conditions (e.g. HDPE geomembrane vs. other type of geomembranes that may be more tolerant to long-term UV radiation and higher temperature effects).*

**BASIS FOR INTERROGATORY:**

*The Applicant's submission does not include sufficient information to allow a complete review of adequacy of the lining system design for meeting the requirements of 10 CFR 40, Appendix A, Criterion 5 A(2) which addresses cell liner requirements, or for meeting the criteria identified in R317-6-1, 1.3 for BAT, for double liner systems. 10 CFR 40 Appendix A, p. 651, Criterion 5 A(2) states that "the liner must be--constructed of materials that have appropriate chemical properties and sufficient strength and thickness to prevent failure due to pressure gradients (including static head and external hydrogeologic forces), physical contact with the waste or leachate to which they are exposed, climatic conditions, the stress of installation, and the stress of daily operation". The liner system description and schematics provided in the stated reports describe some aspects of the lining system design but supporting information, evaluations, and calculations providing a basis for the design are lacking. No specifications are provided regarding the properties of the upper geomembrane liner (other than what is provided in the CQAP). The extent to which the liner materials could be subject to dimpling/puncture by the proposed drainage filter materials has not been quantified. Sand bags are specified to hold down the geomembrane liner during installation; however, no specifications are provided regarding the size or spacing of such sand bags required. No calculations are provided to evaluate the potential for wind uplift of the geomembrane liner. No specifications are provided regarding the depth and width of anchor trenches required for anchorage of the liner system or for the thickness of additional anchorage soil material, if any, required on the anchor trench berm to support the liner system stability. No calculations are provided to evaluate the potential deleterious effects of different particle sizes in potential anchor trench backfill materials on the geomembrane liner buried in the anchor trenches. The evaluations or calculations listed above should be included to fulfill these information gaps.*

**REFERENCES:**

*Plateau Resources, Ltd., "Tailings Reclamation and Decommissioning Plan for Shootaring Canyon Uranium Project", Dated December, 2005.*

*Plateau Resources, Ltd., "Tailings Management Plan for Shootaring Canyon Uranium Processing Facility" Amended December, 2005.*

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Valero, S.N., and Austin, D.N., 1999. "Simplified Design Charts for Geomembrane Cushions", in *Geosynthetics '99*, Boston, Mass. Available at:

<http://www.sedimentremediation.com/TechRef/Dredge/GPD-SM-116.pdf>

Giroud, J.P., Gleason, M.H., and Zornberg, J.G., 1999. *Design of Geomembrane Anchorage Against Wind Action*", in *Geosynthetics International*, Vol. 6, No. 6, 1999, pp. 481-507.

Hsuan, Y.G., Lord, A.E., and Koerner, R.M., 1991. "Effects of Outdoor Exposure on a High Density Polyethylene Geomembrane", in *Geosynthetics '91*, Atlanta, GA, pp. 287-302.

Koerner, R.M., Hsuan, Y.G., and Koerner, G.R., 2005. "Geomembrane Lifetime Prediction: Unexposed and Exposed Conditions", *Geosynthetic Institute White Paper #6*, June 7, 2005.

## **INTERROGATORY R313-24-4-21/01: LINER SETTLEMENT**

### **PRELIMINARY FINDING:**

*Refer to R313-24-4, 10 CFR 40 Appendix A(5)(a)(2)(b): The liner must be placed upon a foundation or base capable of providing support to the liner and resistance to pressure gradients above and below the liner to prevent failure of the liner due to settlement, compression, or uplift.*

### **INTERROGATORY STATEMENT:**

*Please indicate the extent of settlement, differential settlement, and distortion in the cover that are allowed, on the bottom and side slopes under the liner system at the time of final closure. Demonstrate that allowable settlement, differential settlement, and distortion resulting from the anticipated loads during operation will not damage the final liner system. A justification of the respective design criteria used needs to be included.*

### **BASIS FOR INTERROGATORY:**

*The liner system will be placed on one-foot minimum of compacted clay (section 4 & 5, TMP). A quality control plan/procedure for construction of the clay liner is presented in Appendix C (TMP). However, the license applicant has not provided calculations of settlement on the bottom or side slopes of the liner due to anticipated loads during operations and after closure. The applicant did not provide these details for review.*

### **REFERENCES:**

*Plateau Resources, Ltd., "Tailings Management Plan for Shootaring Canyon Uranium Processing Facility" Amended December, 2005.*

## **INTERROGATORY R313-24-4-22/01: LEACHATE COLLECTION AND DETECTION SYSTEM DESIGN**

### **PRELIMINARY FINDINGS:**

*Refer to R313-24-4(2)(J)(ii): Clarifications or Exceptions. "Utah Administrative Code, Rule R317-6, Ground Water Quality Protection" for ground water standards in "Environmental Protection Agency in 40 CFR part 192, subparts D and E" as found in the Introduction, paragraph 4; or "Environmental Protection Agency in 40 CFR part 192, subparts D and E (48 FR 45926; October 7, 1983)" as found in Criterion 5;*

*Refer to R317-6-1 (1.3): "Best Available Technology (BAT)" means the application of design, equipment, work practice, operation standard or combination thereof at a facility to effect the maximum reduction of a pollutant achievable by available processes and methods taking into account energy, public health, environmental and economic impacts and other costs.*

*Refer to R317-6-6 (6.4): ["ISSUANCE OF DISCHARGE PERMIT - The Executive Secretary, may issue a ground water discharge permit for a new facility if the Executive Secretary determines, after reviewing the information provided under R317-6-6.3, that: ... (A.3) the applicant is best available technology to minimize the discharge of any pollutant..."]*

*Refer to Refer to 10 CFR Part 40 Appendix A, Criterion 5 (A)(4): ... " a surface impoundment must be designed, constructed, maintained, and operated to prevent overtopping resulting from normal or abnormal operations, overfilling, wind and wave actions, rainfall, or run-on; from malfunctions of level controllers, alarms, and other equipment; and from human error..."*

### **INTERROGATORY STATEMENT:**

*Please provide additional information to demonstrate that:*

- 1. The proposed "drainage sock" surrounding the perforated leachate collection drain pipe will not clog or become bio-fouled with residues, fine particles, inorganic precipitates, etc... following construction, that such clogging will not interfere with effective leachate flow into the leachate collection system, and that the sock would not interfere with future flushing of the leachate collection system lines, if required.*
- 2. The diameter of the pipe perforations is appropriately sized to prevent invasion of particles from the granular backfill materials overlying and surrounding the perforated drain pipe to ensure that the perforated drain pipe will not become clogged with sediments and such clogging will not interfere with effective leachate flow through the leachate collection and detection systems.*
- 3. The design of the geotextile filter and granular drainage medium surrounding the leachate collection and detection system drainpipe has included an adequate factor of safety against long-term clogging.*
- 4. Clean outs should be included to enable effective pipe cleaning as needed.*

5. *The leachate collection and detection system drainpipes are sufficiently strong to withstand damage due to pipe loading (pipe wall buckling and crushing and pipe deflection calculations) under anticipated loads from the overlying tailings and cover.*

#### **BASIS FOR INTERROGATORY:**

*BAT requires that leachate collection and detection systems be designed to resist clogging during the active life and post-closure period. Published reports and case studies indicate that filter socks surrounding leachate collection system drain pipes are susceptible to clogging and therefore this design does not meet criteria identified in R317-6-1, 1.3 for Best Available Technology for leachate collection drain pipes. If perforations in leachate drainpipes are improperly sized, this can lead to clogging and interfere with flow of leachate into/through leachate collection and detection system drainpipes. If leachate collection and/or detection drain pipes become crushed or experience excessive deflection due to construction, operational, or closure construction loading forces, their performance could be compromised. Most landfill designers recommend periodic flushing (e.g., jetting; back-flushing) of leachate collection pipes to clear pipe perforation or pipes to maintain efficient leachate flow rates. Most designers typically recommend use of either 6 or 8-inch-diameter LCRS drain pipes with appropriate SDRs (Standard Dimensional Ratios) and Moduli of Elasticity in order to withstand loading-induced damage (ring deflection, wall crushing, wall buckling) and use of gravel backfill around perforated (vs. slotted) pipes to permit effective back flushing. Clean out are also included to facilitate effective cleaning.*

#### **REFERENCES:**

- Plateau Resources, Ltd., "Tailings Reclamation and Decommissioning Plan for Shootaring Canyon Uranium Project", Dated December, 2005.*
- Plateau Resources, Ltd., "Tailings Management Plan for Shootaring Canyon Uranium Processing Facility" Amended December, 2005.*
- Koerner, G.R, Koerner, R.M., and Martin, J.P. 1993. "Field Performance of Leachate Collection Systems and Design Implications". Solid Waste Association of North America: 31<sup>st</sup> Annual International Solid Waste Exposition, pp. 365-380.*
- Reinhart, D.R. et al. 1998. Assessment of Leachate Collection System Clogging at Florida Municipal Landfills. Report # 98-5. Florida Center for Solid and Hazardous Waste Management, Gainesville, FL. October 30, 1998.*
- Rowe, R.K. 2005. Long Term Performance of Containment Barrier Systems, Geotechnique, 55, No. 9, pp. 631-678.*
- R313-24. Uranium Mills and Source Material Mill Tailings Disposal Facility Requirements.*
- R317-6. Ground Water Quality Protection.*
- 10 CFR Part 40. Domestic Licensing of Source Materials.*
- Title 40, Chapter 1, Part 264, Subpart K, Sec 264.221*
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## **INTERROGATORY R313-24-4-23/01: DIKE INTEGRITY**

### **PRELIMINARY FINDING:**

*Refer to R313-24-4, 10 CFR 40 Appendix A(5)(a)(5): When dikes are used to form the surface impoundment, the dikes must be designed, constructed, and maintained with sufficient structural integrity to prevent massive failure of the dikes. In ensuring structural integrity, it must not be presumed that the liner system will function without leakage during the active life of the impoundment.*

### **INTERROGATORY STATEMENT:**

*The elevations that were used in the slope stability analysis for the Cross Valley Berm appear to have changed compared to elevations on drawings in the TMP (section 5, Figure 5-3) and TRDP (section 9 and Figures). Please indicate if these elevations will change and if the slope stability analysis is still valid. Submit revised slope stability analysis if necessary. Also confirm if this berm is to be reshaped during Cell 1 construction. If the berm is to be reshaped, revise the slope stability analysis to reflect proposed elevations, geometry and soil conditions. Also confirm that all critical slopes have been evaluated or are represented by the evaluation of the most critical slope. This evaluation is to include and/or consider the dikes between Cell 1 and Cell 2 and between Cell 1 and the Evaporation and Process Pond Cell (EPPC) and the conditions where the liner has failed and the cell contains it's maximum amount of liquid (e.g., worst case scenario).*

### **BASIS FOR INTERROGATORY:**

*Seismic and slope stability analyses were conducted by the applicant for the Shootaring Canyon Dam and the Cross Valley Berm (section 3 & Appendix A, TMP). The reference documents within the application do not address piping, however this may not be wholly applicable since the cells have double layers (liners) technology. The documents do contain a slope stability analysis for the Cross Valley Berm.*

*Correct slope information, from current elevation data, should be utilized in the slope stability analysis. It appears that information and evaluations performed to support previous submittals were included in the current TMP and TRDP and they may contain inconsistencies that were never updated to reflect proposed cell construction. For example, the slope stability evaluation of the Cross Valley Berm included recommendations for improving the stability of the slope. Were these recommendations implemented? Also, it states in section 3.0 of the Tailings Management Plan that the Cross Valley Berm is to be reshaped to a 3H:1V configuration. This reshaped slope needs to be evaluated for stability.*

*Alternately, provide conclusive statements as to the applicability of the existing slope stability analysis. Special conditions may exist between Cell 1 and Cell 2 and between Cell 1 and the EPPC in terms of dike and liner system integrity. This information is needed to demonstrate the long-term stability of the final cover.*



**REFERENCES:**

*Plateau Resources, Ltd., "Tailings Reclamation and Decommissioning Plan for Shootaring Canyon Uranium Project", Dated December, 2005.*

*Plateau Resources, Ltd., "Tailings Management Plan for Shootaring Canyon Uranium Processing Facility" Amended December, 2005.*

## **INTERROGATORY R313-24-4-24/01: BEST AVAILABLE TECHNOLOGY**

### **PRELIMINARY FINDING:**

*Refer to R313-24-4, R317-6-1 (1.3): "Best Available Technology (BAT)" means the application of design, equipment, work practice, operation standard or combination thereof at a facility to effect the maximum reduction of a pollutant achievable by available processes and methods taking into account energy, public health, environmental and economic impacts and other costs.*

*Refer to R317-6-6 (6.4): ["ISSUANCE OF DISCHARGE PERMIT - The Executive Secretary, may issue a ground water discharge permit for a new facility if the Executive Secretary determines, after reviewing the information provided under R317-6-6.3, that: ...(A.3) the applicant is best available technology to minimize the discharge of any pollutant..."]*

### **INTERROGATORY STATEMENT:**

*Please provide:*

- 1. A Leachate Monitoring, Operations, Maintenance, and Reporting Plan that includes an estimation of anticipated flow rates and maximum capacity in both the leachate collection and detection systems.*
- 2. The Action Leakage Rates for the EPPC, Cell 1, and Cell 2 systems. They should be included as part of the Leachate Monitoring, Operations, Maintenance, and Reporting Plan.*
- 3. Leachate collection and detection pipe strength calculations that provide a basis for their design.*
- 4. Complete Cell liner system plans and installation specifications. These are addressed for the cover system, but are not included for the liner system. Provide drawings (plans) and specifications in sufficient detail so they can be used in construction. They are to be certified by a qualified Professional Engineer licensed in the State of Utah. The drawings shall include, but not be limited to, cell liner, leachate collection, leak detection, dewatering operations, tailings transfer and management, and stormwater control layouts, cross sections, details, and profiles. They shall include proposed elevations and horizontal coordinates at all key locations. The specifications shall cover (but not limited to) all proposed components and materials, their respective material and equipment and installation requirements.*
- 5. Since the means for ensuring the integrity of the liner system through time is through maintenance and inspection, Plateau should provide a Liner Maintenance and Inspection Plan at this time.*

### **BASIS FOR INTERROGATORY:**

*For waste cell liner systems as proposed for Cell 1 and 2, the State of Utah considers BAT to be a double liner with leachate collection/detection systems. For the EPPC, Cell 1, and Cell 2, this means:*

- *Leachate collection layer and removal system above a primary liner consisting of appropriately designed collection pipes, granular filter bed, and sump type extraction system. The leachate collection system shall have the ability to remove liquid from the cell in practical and timely manner while maintaining a minimal head on the primary liner with a maximum allowable head of three (3) feet.*
- *Primary HDPE Liner that is at least sixty (60)-mil thick.*
- *A rapid reporting leak detection layer and removal system between the primary and secondary liner consisting of appropriately designed collection pipes, geonet and/or granular filter bed, and sump type extraction system. The leachate detection system shall operate so as to maintain a minimal head on the secondary liner with a maximum allowable head of one (1) foot under anticipated impacts from siltation and clogging, rib layover and creep of synthetic components of the system, overburden pressures, etc.*
- *A composite secondary liner that consists of a HDPE liner that is at least sixty (60)-mil thick over at least twelve (12) inches of compacted clay with a maximum field permeability of  $1 \times 10^{-7}$  centimeters per second.*
- *Bedding layer and/or appropriately prepared clean subgrade.*
- *Maximum side slopes of 3-horizontal to 1-vertical*
- *Leachate Monitoring, Operations, Maintenance and Reporting Plan (that addressees both the leachate collection and detection system)*
- *Ground Water Monitoring system (per the facility Ground Water Quality Discharge Permit)*
- *Ground Water Monitoring Plan (per the facility Ground Water Quality Discharge Permit)*
- *Liner Maintenance and Inspection Plan*

*Per BAT for leachate collection and detection systems the Leachate Monitoring, Operations, Maintenance, and Reporting Plan needs to include an estimation of anticipated flow rates that include the flow rate under 3-feet of head on the primary liner for the leachate collection layer and the maximum capacity (flow rates) in both of these layers to demonstrate compliance with the above listed respective requirements.*

*The Action Leakage Rate, which is defined as the maximum design flow rate that the leak detection system can rapidly remove without the fluid head on the liner exceeding one (1) foot, needs to be determined. The action leakage rate must include an adequate safety margin to allow for uncertainties in the design (e.g., slope, hydraulic conductivity, thickness of drainage material), construction, operation, and location of the system, waste and leachate characteristics, likelihood and amounts of other sources of liquids, considerations for rapid reporting when it is exceeded, and proposed response actions (e.g., the action leakage rate must consider decreases in the flow capacity of the system over time resulting from siltation and clogging, rib layover and creep of synthetic components of the system, overburden pressures, etc.). The development of the action leakage rate includes a reasonable and defensible estimation of an allowable leakage rate through the primary liner into the leak detection system.*

*Note that the allowable leakage rate needs to consider that the maximum allowable head on the primary liner is 3-feet. Guidance can be found in 40 CFR 264.302, the EPA document Action Leakage Rates For Leak Detection Systems; January 1992, and in Geosynthetics International, Special Issue on Liquid Migration Control Using Geosynthetic Liner Systems, 1997, Vol. 4 (that includes an article on page 215 by GeoSyntec Consultants on this topic).*

**REFERENCES:**

*EPA 1992. "Action Leakage Rates for Leak Detection Systems: Supplemental Background Document for the Final Double Liners and Leak Detection Systems Rule for Hazardous Waste Landfills, Waste Piles, and Surface Impoundments," Office of Solid Waste, EPA-530-R92-004, January 1992.*

*Giroud, J.P., B.A. Gross, R. Bonaparte and J.A. McKelvey, "Leachate Flow In Leakage Collection Layers Due To Defects In Geomembrane Liners", Geosynthetics International, Special Issue on Liquid Migration Control Using Geosynthetic Liner Systems, 1997, Vol. 4. Available at [http://www.geosyntheticssociety.org/GI\\_SourceFiles/V4I34/GI-V4-N3&4-Paper1.pdf](http://www.geosyntheticssociety.org/GI_SourceFiles/V4I34/GI-V4-N3&4-Paper1.pdf)*

*Plateau Resources, Ltd., "Tailings Reclamation and Decommissioning Plan for Shootaring Canyon Uranium Project", Dated December, 2005.*

*Plateau Resources, Ltd., "Tailings Management Plan for Shootaring Canyon Uranium Processing Facility" Amended December, 2005.*

*Plateau Resources, Ltd., "Shootaring Canyon Uranium Processing Facility Environmental Report, Source Material License No. UT0900480", Dated January 2006.*

## **INTERROGATORY R313-24-4-25/01: COVER SYSTEM DESIGN AND CELL INFILTRATION**

### **PRELEMINARY FINDINGS:**

*Refer to R313-24-4(ii) "Utah Administrative Code, Rule R317-6, Ground Water Quality Protection" for ground water standards in "Environmental Protection Agency in 40 CFR part 192, subparts D and E" as found in the Introduction, paragraph 4; or "Environmental Protection Agency in 40 CFR part 192, subparts D and E (48 FR 45926; October 7, 1983)" as found in Criterion 5;*

*Refer to R317-6-6.3 (G) Information which shows that the discharge can be controlled and will not migrate into or adversely affect the quality of any other waters of the state, including the applicable surface water quality standards, that the discharge is compatible with the receiving ground water, and that the discharge will comply with the applicable class TDS limits, ground water quality standards, class protection levels or an alternate concentration limit proposed by the facility.*

*Refer to R317-6-1 (1.3): "Best Available Technology" means the application of design, equipment, work practice, operation standard or combination thereof at a facility to effect the maximum reduction of a pollutant achievable by available processes and methods taking into account energy, public health, environmental and economic impacts and other costs.*

*Per 10 CFR 40 Appendix A (6)(1); In disposing of waste byproduct material, licensees shall place an earthen cover (or approved alternative) over tailings or wastes at the end of milling operations and shall close the waste disposal area in accordance with a design which provides reasonable assurance of control of radiological hazards to (i) be effective for 1,000 years, to the extent reasonably achievable, and, in any case, for at least 200 years,...*

### **INTERROGATORY STATEMENT:**

*Please provide additional analyses and justification to support the proposed design of the final cover system design for this facility. For example, the proposed final cover design does not incorporate a geomembrane liner. In terms of long-term stability of the closed impoundment, justify the lack of the geomembrane liner in the cover system as a deviation from design guidance or revise the design to incorporate a geomembrane. Published regulatory guidance pertaining to the design of cover systems for landfills or waste impoundment facilities that specify that such facilities, if constructed with synthetic liners and leachate collection and leak detection systems, have a final cover system that is no more permeable or less permeable than the liner system.*

### **BASIS FOR INTERROGATORY:**

*Final cover systems for facilities of this type, which have a double synthetic liner and leachate collection and leak detection system and has a minimum design life of 200 to 1,000 years, are typically designed with a cover design consisting of multi-layers of protection and typically include a geomembrane liner (e.g., EPA 2004, Chapter 2, Section 2.8 and Figure 2-19; EPA 2006, Figure 4). The concern exists for long-term "bathtubbing" of leachate within the closed impoundment cell due to long-term percolation rates through a potentially partially degraded*

cover system. If such bathtubbing were to occur, this condition could compromise the long-term stability of the closed impoundment and could necessitate active maintenance measures which would be contrary to the concept of minimal maintenance. If a geomembrane liner is not considered for inclusion in the final cover system, a detailed demonstration needs to be provided as to why it is not needed.

**REFERENCES:**

EPA 2006. *Joint NRC-EPA Guidance on a Conceptual Design Approach for Commercial Mixed Low-Level Radioactive and Hazardous Waste Disposal Facilities, Issued in 1987. Website last updated March 8, 2006; accessed on May 9, 2006:*

[http://www.epa.gov/radiation/mixed-waste/mw\\_pg26.htm](http://www.epa.gov/radiation/mixed-waste/mw_pg26.htm).

Epa 2004. “draft technical guidance for rcra/cercla final covers”, usepa - usace superfund partnership program policy, guidance, and activities, chapter 2.  
[Http://hq.environmental.usace.army.mil/epasuperfund/geotech/](http://hq.environmental.usace.army.mil/epasuperfund/geotech/)

Plateau Resources, Ltd., “Tailings Reclamation and Decommissioning Plan for Shootaring Canyon Uranium Project”, Dated December, 2005.

Plateau Resources, Ltd., “Tailings Management Plan for Shootaring Canyon Uranium Processing Facility” Amended December, 2005.

Plateau Resources, Ltd., “Shootaring Canyon Uranium Processing Facility Environmental Report, Source Material License No. UT0900480”, Dated January 2006.

## **INTERROGATORY R313-24-4-26/01: INFILTRATION AND CONTAMINANT TRANSPORT MODELING**

### **PRELIMINARY FINDINGS:**

*Refer to R313-24-4(2)(J)(ii): Clarifications or Exceptions. "Utah Administrative Code, Rule R317-6, Ground Water Quality Protection" for ground water standards in "Environmental Protection Agency in 40 CFR part 192, subparts D and E" as found in the Introduction, paragraph 4; or "Environmental Protection Agency in 40 CFR part 192, subparts D and E (48 FR 45926; October 7, 1983)" as found in Criterion 5;*

*Refer to R317-6-1 (1.3): "Best Available Technology" means the application of design, equipment, work practice, operation standard or combination thereof at a facility to effect the maximum reduction of a pollutant achievable by available processes and methods taking into account energy, public health, environmental and economic impacts and other costs.*

*Refer to R317-6-6.3: ["APPLICATION REQUIREMENTS FOR A GROUND WATER DISCHARGE PERMIT - Unless otherwise determined by the Executive Secretary, the application for a permit to discharge wastes or pollutants to ground water shall include the following complete information: (G) Information which shows that the discharge can be controlled and will not migrate into or adversely affect the quality of any other waters of the state, including the applicable surface water quality standards, that the discharge is compatible with the receiving ground water, and that the discharge will comply with the applicable class TDS limits, ground water quality standards, class protection levels or an alternate concentration limit proposed by the facility".*

*Refer to 10 CFR, Part 40, Appendix A, Criterion 6(1), which requires that the impoundment design "provide reasonable assurance of control of radiological hazards to be effective for 1,000 years to the extent reasonably achievable, and in any case, for at least 200 years".*

### **INTERROGATORY STATEMENT:**

*Please provide additional information for the following:*

- *Rationale used for selecting the HYDRUS –2D<sup>®</sup> Model for use in infiltration modeling simulations, including a discussion of the suitability of the model for use at the Shootaring Canyon facility. Include a more detailed discussion/analysis of data deficiencies and potential sources of error with the HYDRUS-2D Model used for conducting the simulations, e.g., as compared to other available groundwater (infiltration) models, and compared to other versions of HYDRUS that are available;*
- *The methodology used for developing or selecting model input and disposal cell parameters that were used in the HYDRUS-2D infiltration modeling simulations. Include information regarding items such as, but not limited to the following: (i) the method of converting pan evaporation to estimates of potential evapotranspiration (PET) or potential evaporation (PE) for use in this analysis; (ii) methods for incorporating runoff and lateral drainage into the HYDRUS-2D modeling; (iii) soil moisture characteristics; and (iv) soil permeability.*

- *Sensitivity analysis to clarify the effect of parameter variation on HYDRUS-2D output results. Where applicable, please consider providing results of infiltration modeling simulations derived from simulations using other codes such as the HELP® Model, Soil Cover®, or other available codes, for the same disposal cell geometry, in order to facilitate evaluation of the reliability of the HYDRUS –2D® Model results.*
- *Additional information regarding rationale used for determining bounding assumptions used in the analyses and additional information to demonstrate that the model simulations adequately bound uncertainties associated with selection of input parameters (e.g. average annual precipitation rates and precipitation extremes; effects of effects of degradation processes on cover system layer properties) and adequately addresses uncertainties related to the reliability of the model output results.*

*Please provide a contaminant transport modeling report for demonstrating compliance of the tailings cell engineering design and specifications with the minimum performance requirements contained in R317-6-6.3, and with the requirement that the closed tailings management cell design will ensure that Groundwater Quality Standards will not be exceeded during a minimum regulatory time period of 200 years.*

*Provide information on the versions of the models utilized and provide output data from the model simulations to support the conclusions presented in Appendix D of the Tailings Reclamation and Decommissioning Plan. Please include a description of any numerical errors found associated with the models used.*

*Information demonstrating that calculated annual dose equivalents resulting from potential releases from the facility through the groundwater pathway would not exceed the criteria contained in R 317-6-2.1.*

#### **BASIS FOR INTERROGATORY:**

*(1) Additional information needs to be provided to evaluate the suitability of input parameters developed or selected for use in the HYDRUS –2D Model simulations and to allow evaluation of the appropriateness of the HYDRUS-2D model simulation results in order to assess whether the cell design meets the groundwater standards identified in R317-6-1.3 for Best Available Technology for cover systems. The relationship between information presented in the text of Appendix D, Infiltration Modeling, of the Tailings Reclamation And Decommissioning Plan For Shootaring Canyon Uranium Project regarding modeled evaporation and modeled precipitation depths and information presented in Figure D-1 of that Appendix is not clear. Inputs taken from the HELP® Model and used in the HYDRUS –2D Model runs should be itemized and justification provided for their selection for use in HYDRUS-2D. An average annual precipitation rate of 7 inches per year was assumed in the simulations; however, this value is apparently not sufficiently conservative, considering that measured precipitation at the site during 2005 was 9.9 inches (Hydro-Engineering L.L.C. 2006). Simulation results obtained using another infiltration model, if provided, would allow better evaluation of the reliability of the HYDRUS -2D model.*

*(2) The statement made in Appendix D, “Infiltration Modeling, of the Tailings Reclamation And Decommissioning Plan For Shootaring Canyon Uranium Project” that “HYDRUS - 2D appeared to provide reasonable predictions of the infiltration through the cover system”*



requires additional information to support the stated conclusion. For example, published studies (e.g., Scanlon et. al. 2002) suggest that it is unclear as to the extent to which the HYDRUS-2D code may overestimate evaporation and underestimate changes in water storage in the cover, especially when daily or 15-minute precipitation input are used in the model. Evaluation of the reliability of the HYDRUS-2D model simulation results would be improved by comparing those results to results obtained from a different code and/or through the use of additional sensitivity analysis simulations using HYDRUS-2D to assess the sensitivity of the modeling results to changes in input parameters (e.g., initial moisture content, saturated water content, etc...) to address uncertainties associated with those parameter values. In Appendix D, Section D.2.3 it also is unclear as to the method that was used to convert the recorded values of pan evaporation to values of potential evapotranspiration (PET) or potential evaporation (PE) in this analysis. Also, it is unclear as to the version of the models (HYDRUS-2D and HELP<sup>®</sup>) that were utilized. Certain numerical errors have been reported with the version of the HYDRUS model that was reviewed in an EPA document dated 2002 (EPA, 2002 – Section 7). Model version and model output data need to be provided.

(3) In Appendix D, Infiltration Modeling, of the Tailings Reclamation And Decommissioning Plan For Shootaring Canyon Uranium Project, Section D.1.1, HYDRUS-2D Model Description, it states “The methods for incorporating runoff and lateral drainage into the HYDRUS-2D modeling are discussed in a later section.” The location of the section where these methods for incorporating runoff and lateral drainage into the HYDRUS-2D model and a discussion of these methods could not be found.

(4) ASTM Standard D- 5447, Section 6.3.2 indicates that an analysis of data deficiencies and potential sources of error associated with conceptual groundwater flow models should be provided and that such conceptual models usually contains areas of uncertainty due to the lack of field data. The Standard indicates that these areas, and their significance to the conceptual model, should be evaluated with respect to project objectives, and that “in cases where the system may be conceptualized in more than one way, these alternative conceptual models should be described and evaluated.” Additional rationale should be provided to clarify the reasons for selecting the HYDRUS-2D model, e.g., over alternative available models, to be consistent with the guidance provided in ASTM Standard D-5447, Section 6.4.1. Additional information also needs to be provided regarding existing known limitations or deficiencies of the HYDRUS-2D model, as compared to other available models, to allow evaluation of compliance of the model use with the Best Available Technology requirements identified in R317-6-1.3 for Best Available Technology for both models and use of such a model for predicting infiltration rates through the proposed cover system.

(5) Additional information needs to be provided to indicate how the cover system infiltration simulations address the possible long-term effects of degradation processes on the cover system (i.e. cover system layer properties) so that an evaluation can be completed regarding compliance with criteria contained in 10 CFR, Part 40, Appendix A, Criterion 6(1), which requires that the impoundment design “provide reasonable assurance of control of radiological hazards to be effective for 1,000 years to the extent reasonably achievable, and in any case, for at least 200 years”. The analysis described in Appendix D predicts an infiltration rate through the bottom of the cover system of 0.02 in/yr, which is only about 0.28 % of the stated value of

average annual precipitation (7") at the site. This estimate was based on an assumed (long-term) hydraulic conductivity of the compacted clay layer in the cover of  $1 \times 10^{-7}$  cm/sec. The estimate should be based on cover material properties that are likely to be more representative of long-term conditions. For example, the value of compacted clay layer hydraulic conductivity used for modeling long-term infiltration rates through the cover should be developed after considering data obtained from studies of other sites, including studies such as those conducted on a similar final cover system previously installed at the Shiprock, New Mexico uranium mill tailings reclamation site (DOE 2001). At that site, a wide range of in situ saturated hydraulic conductivity values ( $4.8 \times 10^{-8}$  to  $1.2 \times 10^{-4}$  cm/sec, mean value =  $4.4 \times 10^{-5}$  cm/sec) were found to exist within the compacted clay soil layer in the cover after only about 20 years following the time of cover system construction (where the design value was  $1.0 \times 10^{-7}$  cm/sec).

(6) An infiltration and contaminant transport modeling report and estimates of both water travel times and contaminant transport times should be provided. The infiltration and contaminant transport modeling report should detail how the cover system at the tailings cell and subsurface flow and transport of potential contaminants would be expected to perform so as to demonstrate that the proposed cover and double liner and leachate collection and leak detection system will be capable of meeting requirements such as: minimizing infiltration of precipitation, ensuring groundwater quality complies with the Ground Water Quality Standards, and preventing accumulation of leachate head within the waste tailings layer. The report should address how the information generated through contaminant transport modeling would be used for evaluating/estimating annual dose equivalents for compliance with the dose limits prescribed in R317-6-2.1.

#### REFERENCES:

- ASTM (American Society for Testing and Materials) D 5447-93. "Standard Guide for Application of a Ground-Water Flow Model to a Site-Specific Problem". ASTM, West Conshohocken, PA.
- DOE 2001. Disposal Cell Cover Moisture Content and Hydraulic Conductivity, Long-Term Surveillance and Maintenance Program Shiprock, New Mexico, Site, Grand Junction, Colorado. May 2001.
- EPA 2002. "Simulating Radionuclide Fate and Transport in the Unsaturated Zone: Evaluation and Sensitivity Analyses of Select Computer Models". EPA/600/R-02/082. 2002.
- Hydro-Engineering, L.L.C. 2006. Ground-Water Monitoring of Shootaring Canyon Tailings Site - 2005.
- National Committee on Radiation Protection, National Bureau of Standards(NBS) Handbook 69 (1959), "Maximum Permissible Body Burdens and Maximum Permissible Concentration of Radionuclides in Air or Water for Occupational Exposure," Superintendent of Documents, U.S. Department of Commerce, U.S. Government Printing Office, Washington, D.C., June 5, 1959.
- Plateau Resources, Ltd., "Tailings Reclamation and Decommissioning Plan for Shootaring Canyon Uranium Project", Dated December, 2005.

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*Scanlon, B.R., Christman, M., Reedy, R.C., Porro, I., Simunek, J., and Flerchinger, G.N., 2002. "Intercode Comparison for Simulating Water Balance of Surficial Sediments in Semiarid Regions", in Water Resources Research, Vol. 38, No. 12, p. 59-1 through 59-16.*

## **INTERROGATORY R317-6-2.1-27/01: GROUNDWATER MONITORING**

### **PRELIMINARY FINDING:**

*Refer to R317-6-2.1: The Ground Water Quality Standards (GWQSs) as listed in Table 1 are adopted for protection of ground water quality (refer to Table 1 in the standard), however, this list is not required for analysis per the current January 2004 GWQDP.*

*Refer to R317-6-6.3.I: [“APPLICATION REQUIREMENTS FOR A GROUND WATER DISCHARGE PERMIT - Unless otherwise determined by the Executive Secretary, the application for a permit to discharge wastes or pollutants to ground water shall include the following complete information: (I) A proposed sampling and analysis monitoring plan which conforms to EPA Guidance for Quality Assurance Project Plans, EPA QA (EPA/600/R-98/018, February 1998) and includes the following...1. ground-water monitoring to determine ground water flow direction and gradient, background quality at the site, and the quality of groundwater at the compliance monitoring point...”*

### **INTERROGATORY STATEMENT:**

*Please provide a proposed Groundwater Sampling and Analysis Monitoring Plan that includes information and rationale supporting the proposed groundwater monitoring program for the facility. It shall include (but not limited to):*

- 1. Locations of proposed monitoring wells, including proposed phasing of well locations during operations of both Cell 1 and Cell 2 to facilitate timely detection of potential releases from these tailings management cells.*
  - 2. Parameters selected for sampling and analysis, including parameters to be used as key indicators of performance, with reasons for their selection.*
  - 3. Proposed Background Concentrations and proposed Protection Levels for monitoring parameters, including parameters such as selenium, for which available data indicated concentrations in excess of an established interim threshold level.*
  - 4. Proposed groundwater sampling frequency.*
  - 5. Rationale to support not specifying requirements for analysis of any parameters (e.g., Radium-228 and gross alpha) identified in R317-6-2.1, as applicable.*
  - 6. Information regarding statistical approaches to be used for:*
    - Determining background groundwater quality characteristics and (background) groundwater quality compliance limits.*
    - Determining the occurrence of statistically significant temporal trends in groundwater quality at the compliance monitoring wells.*
  - 7. Please also provide a description of the methods to be used for identifying data outliers and for verifying data characteristics (e.g. Normal, log-normal, etc...).*
  - 8. Please discuss how Plateau Resources will ensure that these parameters do not exceed the GWQS per Table 1 in R317-6-2.1.*
-

**BASIS FOR INTERROGATORY:**

*A complete and concise plan that includes the details of the proposed groundwater monitoring to be done at the site is needed. It should include rationale for monitoring locations, frequency, parameters, sampling and analysis methodology, evaluation of results, reporting and documentation, and parameters limits.*

*Information needs to be provided detailing the statistical methods that will be used for establishing background water quality limits and for determining statistically significant trends in groundwater quality. NRC 2003, Section 4.2.3, and American Society for Testing and Materials Standard D 6312, provide guidelines regarding statistical analysis methods that can be used for determining background concentrations for constituents of concern and for evaluating potential groundwater quality trends.*

*Data reported in the “Ground-Water Monitoring Report of Shootaring Canyon Tailings Site – (Hydro-Engineering, L.L.C., February 2006) indicate selenium concentrations in water from Well RM 20 that exceed the currently-specified selenium threshold value (0.022 mg/L). If the licensee desires to have alternate concentration limits included in the GWQDP, as proposed in the 2005 Ground Water Monitoring Report, then the licensee should provide the data and associated analysis including a clear statistical basis for the proposed alternate concentration limits. Also, please clearly state the methodology and statistical basis that will be used to determine the (background) selenium concentration limit.*

*Plateau Resources must demonstrate that the GWQs are not exceeded per R317-6-2.1. This should be demonstrated via sampling and analysis and background determination of the constituents in Table 1 in R317-6-2.1 as appropriate. The GWQDP does not currently specify the requirement for analysis of Radium-228 and gross alpha per R317-6-2.1.*

**REFERENCES:**

*ASTM D 6312. “Standard Guide for Developing Appropriate Statistical Approaches for Ground-Water Detection Monitoring Programs”. ASTM, West Conshohocken, PA.*

*Hydro-Engineering, LLC. Ground Water Monitoring of Shootaring Canyon Tailings Site – 2005. February 2006.*

*NRC 2003. NUREG-1620, Rev. 1, “Standard Review Plan for the Review of a Reclamation Plan for Mill Tailings Sites Under Title II of the Uranium Mill Tailings Radiation Control Act of 1978.” Washington, DC: NRC 2003.*

*Utah Department of Environmental Quality. Ground Water Quality Discharge Permit. Permit #UGW170003, issued January 14, 2004.*

*Utah Department of Environmental Quality. Division of Radiation Control. Radioactive Material License UT 0900480, Amendment # 2.*

## **INTERROGATORY R317-6-6.3F-28/01: INFORMATION ON EFFLUENT DISCHARGE RATES**

### **PRELIMINARY FINDING:**

*Refer to R317-6-6.3F: Unless otherwise determined by the Executive Secretary, the application for a permit to discharge wastes or pollutants to ground water shall include the following complete information:*

*F. The type, source, and chemical, physical, radiological, and toxic characteristics of the effluent or leachate to be discharged; the average and maximum daily amount of effluent or leachate discharged (gpd), the discharge rate (gpm), and the expected concentrations of any pollutant (mg/l) in each discharge or combination of discharges. If more than one discharge point is used, information for each point must be given separately.*

### **INTERROGATORY STATEMENT:**

*Please provide the maximum daily leachate (gpd) and discharge rate (gpm) in each discharge or combination of discharges. This information should include any discharge that may result from leakage through the tailings cells liner systems, the ore pad liner, and the Evaporation and Process Pond Cell. Please provide the appropriate calculations for each discharge or include a statement of basis for not providing the information. Also, please state the expected concentrations of pollutants in each discharge and the basis for the determination.*

### **BASIS FOR INTERROGATORY:**

*Plateau Resources must provide the above requested information on all discharges of pollutants that impact or have the potential to impact ground water. This information must include all discharges or potential discharges associated with effluent discharge, storage, and liner systems.*

### **REFERENCES:**

*Plateau Resources, Ltd., "Tailings Management Plan for Shootaring Canyon Uranium Processing Facility" Amended December, 2005.*

## **INTERROGATORY PR R317-6-6.3G-29/01: SURFACE WATER CONTROLS**

### **PRELIMINARY FINDING:**

*Refer to R317-6-6.3G.: Unless otherwise determined by the Executive Secretary, the application for a permit to discharge wastes or pollutants to ground water shall include the following complete information:*

*G. Information which shows that the discharge can be controlled and will not migrate into or adversely affect the quality of any other waters of the state, including the applicable surface water quality standards, that the discharge is compatible with the receiving ground water, and that the discharge will comply with the applicable class TDS limits, ground water quality standards, class protection levels or an alternate concentration limit proposed by the facility.*

### **INTERROGATORY STATEMENT:**

*Please provide information on how surface water run-on and run-off controls will be applied to control the migration of contaminants from the site and associated operations. Section 8.3 of the Tailings Management Plan (Hydro-Engineering, 2005) states that "Excess solution or run-off water captured within the tailings disposal cells will be transferred to the Storage/Evaporation Pond if possible." How will this water be controlled? How and when will the water be "...distributed over the tailings cell surface..."?*

### **BASIS FOR INTERROGATORY:**

*Plateau Resources must provide the above requested information on all discharges of pollutants that impact or have the potential to impact surface water, ground water, and associated water quality standards.*

### **REFERENCES:**

*Plateau Resources, Ltd., "Tailings Management Plan for Shootaring Canyon Uranium Processing Facility" Amended December, 2005.*

## **INTERROGATORY R313-24-4-30/01: GEOLOGIC, HYDROLOGIC, AND AGRICULTURAL DESCRIPTION**

### **PRELIMINARY FINDINGS:**

*Refer to R313-24-4(2)(J)(ii): "Utah Administrative Code, Rule R317-6, Ground Water Quality Protection" for ground water standards in "Environmental Protection Agency in 40 CFR part 192, subparts D and E" as found in the Introduction, paragraph 4; or "Environmental Protection Agency in 40 CFR part 192, subparts D and E (48 FR 45926; October 7, 1983)" as found in Criterion 5;*

*Refer to R317-6-6.3: ["APPLICATION REQUIREMENTS FOR A GROUND WATER DISCHARGE PERMIT - Unless otherwise determined by the Executive Secretary, the application for a permit to discharge wastes or pollutants to ground water shall include the following complete information...: D. A plat map showing all water wells, including the status and use of each well, Drinking Water source protection zones, topography, springs, water bodies, drainages, and man-made structures within a one-mile radius of the discharge. The plat map must also show the location and depth of existing or proposed wells to be used for monitoring ground water quality. Identify any applicable Drinking Water source protection ordinances and their impacts on the proposed permit;.*

*Refer to R317-6-6.3: ["APPLICATION REQUIREMENTS FOR A GROUND WATER DISCHARGE PERMIT - Unless otherwise determined by the Executive Secretary, the application for a permit to discharge wastes or pollutants to ground water shall include the following complete information... E. Geologic, hydrologic, and agricultural description of the geographic area within a one-mile radius of the point of discharge, including soil types, aquifers, ground water flow direction, ground water quality, aquifer material, and well logs."*

### **INTERROGATORY STATEMENT:**

*Please provide, in a readily accessible format, the hydrologic information specified under the stated requirements. Please also provide a current plat map showing all existing water wells, including the status and use of each well, Drinking Water source protection zones, topography, springs, water bodies, drainages, and man-made structures within a one-mile radius of the discharge (or other information demonstrating that such features do not exist).*

### **BASIS FOR INTERROGATORY:**

*A plat map showing all existing water wells, including the status and use of each well, Drinking Water source protection zones, topography, springs, water bodies, drainages, and man-made structures within a one-mile radius of the discharge (or other information demonstrating that such features do not exist) required in accordance to R317-6-6.3D is not provided. The hydrologic description of the geographic area within a one-mile radius of the point of discharge as stated in R317-6-6.3E is not provided/not readily available. Please present the requested information in a manner that is easily accessible in the document.*



**REFERENCES:**

*Plateau Resources, Ltd., “Tailings Reclamation and Decommissioning Plan for Shootaring Canyon Uranium Project”, Dated December, 2005.*

*Plateau Resources, Ltd., “Tailings Management Plan for Shootaring Canyon Uranium Processing Facility” Amended December, 2005.*

*Plateau Resources, Ltd., “Shootaring Canyon Uranium Processing Facility Environmental Report, Source Material License No. UT0900480”, Dated January 2006.*

## **INTERROGATORY R313-24-4-31/01: HYDRAULIC ANALYSIS METHODS AND DETAILS**

### **PRELIMINARY FINDING:**

*Refer to R313-24-4(2)(J)(ii): Clarifications or Exceptions. "Utah Administrative Code, Rule R317-6, Ground Water Quality Protection" for ground water standards in "Environmental Protection Agency in 40 CFR part 192, subparts D and E" as found in the Introduction, paragraph 4; or "Environmental Protection Agency in 40 CFR part 192, subparts D and E (48 FR 45926; October 7, 1983)" as found in Criterion 5;*

*Refer to Criterion 1 of 40 CFR Part 40, Appendix A, Criterion 6(1): ...[Uranium mill tailings disposal shall be] "in accordance with a design that provides reasonable assurance of control of radiological hazards to be effective for 1,000 years, to the extent reasonably achievable, but in any case for at least 200 years..."*

### **INTERROGATORY STATEMENT:**

*Please provide missing details and cross sections to support the discussion in Appendix K of the Tailings Reclamation and Decommissioning Plan for Shootaring Canyon Uranium Project, dated December 2005 (Hydro-Engineering, L.L.C. 2005) addressing hydraulic analysis methods and details. Please provide Figures K-2 through K-6.*

### **BASIS FOR INTERROGATORY:**

*Figures K-2 through K-6, referenced in the subject appendix, are missing.*

### **REFERENCES:**

*Plateau Resources, Ltd., "Tailings Management Plan for Shootaring Canyon Uranium Processing Facility" Amended December, 2005.*

## **INTERROGATORY R313-24-4-32/01: GROUND WATER MONITORING QUALITY ASSURANCE PLAN**

### **PRELIMINARY FINDINGS:**

*Refer to R313-24-4(2)(J)(ii): Clarifications or Exceptions. "Utah Administrative Code, Rule R317-6, Ground Water Quality Protection" for ground water standards in "Environmental Protection Agency in 40 CFR part 192, subparts D and E" as found in the Introduction, paragraph 4; or "Environmental Protection Agency in 40 CFR part 192, subparts D and E (48 FR 45926; October 7, 1983)" as found in Criterion 5.*

*Refer to R317-6-6.3.I: ["APPLICATION REQUIREMENTS FOR A GROUND WATER DISCHARGE PERMIT - Unless otherwise determined by the Executive Secretary, the application for a permit to discharge wastes or pollutants to ground water shall include the following complete information: (I) A proposed sampling and analysis monitoring plan which conforms to EPA Guidance for Quality Assurance Project Plans, EPA QA (EPA/600/R-98/018, February 1998) and includes ...quality assurance and control provisions for monitoring data."]*

### **INTERROGATORY STATEMENT:**

*Please provide the information requested below. This information can be provided as part of an updated Groundwater Monitoring Quality Assurance Plan:*

- (1) The new monitoring wells proposed in the Hydro-Engineering, L.L.C. Ground-Water Hydrology of the Shootaring Tailings Site, 2005 document need to be included in the Groundwater Monitoring Quality Assurance Plan.*
- (2) Information requested in the February 15, 2006 letter from the State of Utah Department of Environmental Quality need to be addressed.*
- (3) Please provide the following additional information:*
  - In reference to Section 2.3 of the Groundwater Monitoring Quality Assurance Plan, Accuracy, please describe the methods that will be used to assess false positive or high biased field sample results (e.g., use of field blanks, trip blanks, etc...).*
  - In reference to Section 2.3, please provide more detailed information regarding methods and criteria that will be used to assess data comparability. Please consider: (i) similar detection capabilities for instrumentation used; (ii) similar QA procedures used for evaluating all data sets; (iii) use of a similar number of observations at each sampling point, etc...*

### **BASIS FOR INTERROGATORY:**

*(1) The information received for review is outdated and new or updated information needs to be included in the Groundwater Monitoring Quality Assurance Plan. Please update the*

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*Groundwater Monitoring Quality Assurance Plan, Utah Ground Water Quality Discharge Permit UGW170003 with the new monitoring wells proposed in the 2005 Ground-Water Hydrology of the Shootaring Tailings Site document.*

*(2) The Request for Additional Information in Groundwater Monitoring Quality Assurance Plan (QAP) from the State of Utah Department of Environmental Quality dated February 15, 2006, needs to be addressed and resolved. Also, additional information should be provided for Section 2.3, Accuracy and Comparability to ensure that all applicable and appropriate accuracy and comparability criteria are included.*

**REFERENCES:**

*Groundwater Quality Discharge Permit No. UGW17003, Part I. B., I.C., I.E., and I.H.*

## **INTERROGATORY R313-24-4-33/01: POST-CLOSURE DRAINAGE AND EROSION CONTROLS AND POSTCLOSURE MAINTENANCE**

### **PRELIMINARY FINDING:**

*Refer to R313-24-4 (10 CFR 40, Appendix A, Criterion 6 (1), (7)): In disposing of waste byproduct material, licensees shall place an earthen cover (or approved alternative) over tailings or wastes at the end of milling operations and shall close the waste disposal area in accordance with a design which provides reasonable assurance of control of radiological hazards to (i) be effective for 1,000 years, to the extent reasonably achievable, and, in any case, for at least 200 years, and (ii) limit releases of radon-222 from uranium byproduct materials, and radon-220 from thorium byproduct materials, to the atmosphere so as not to exceed an average release rate of 20 picocuries per square meter per second (pCi/m<sup>2</sup>s) to the extent practicable throughout the effective design life determined pursuant to (1)(i) of this Criterion. In computing required tailings cover thicknesses, moisture in soils in excess of amounts found normally in similar soils in similar circumstances may not be considered. Direct gamma exposure from the tailings or wastes should be reduced to background levels. The effects of any thin synthetic layer may not be taken into account in determining the calculated radon exhalation level. If non-soil materials are proposed as cover materials, it must be demonstrated that these materials will not crack or degrade by differential settlement, weathering, or other mechanism, over long-term intervals.*

*Refer to R313-24-4 (10 CFR 40, Appendix A, Criterion 6 (7)): The licensee shall also address the nonradiological hazards associated with the wastes in planning and implementing closure. The licensee shall ensure that disposal areas are closed in a manner that minimizes the need for further maintenance. To the extent necessary to prevent threats to human health and the environment, the licensee shall control, minimize, or eliminate post-closure escape of nonradiological hazardous constituents, leachate, contaminated rainwater, or waste decomposition products to the ground or surface waters or to the atmosphere.*

*Refer to R317-6-6.3.S.: Unless otherwise determined by the Executive Secretary, applicant for a groundwater discharge permit ..shall include the following information: S. A closure and postclosure maintenance plan demonstrating the measures to prevent ground water contamination during the closure and postclosure phases of operation.*

### **INTERROGATORY STATEMENT:**

*Please provide a discussion of post-closure maintenance requirements and include measures that will be taken to prevent ground water contamination during the closure and postclosure phases of the operation and to minimize the need for active maintenance following closure. Maintenance of the cover and erosion control systems should be addressed. Estimated costs for implementing the full suite of postclosure maintenance plan procedures also needs to be included.*

**BASIS FOR INTERROGATORY:**

*The licensee must ensure that disposal areas are closed in a manner that minimizes the need for post-closure maintenance.*

*The licensee also needs to provide an estimate of postclosure maintenance plan implementation costs in order to allow an assessment of facility-specific financial surety requirements.*

**REFERENCES:**

*Plateau Resources, Ltd., "Tailings Reclamation and Decommissioning Plan for Shootaring Canyon Uranium Project", Dated December, 2005.*

*Plateau Resources, Ltd., "Tailings Management Plan for Shootaring Canyon Uranium Processing Facility" Amended December, 2005.*

## **INTERROGATORY R313-24-4-34/01: RADON RELEASE MODELING**

### **PRELIMINARY FINDINGS:**

*Refer to R313-24-4(2)(J)(ii): Clarifications or Exceptions. "Utah Administrative Code, Rule R317-6, Ground Water Quality Protection" for ground water standards in "Environmental Protection Agency in 40 CFR part 192, subparts D and E" as found in the Introduction, paragraph 4; or "Environmental Protection Agency in 40 CFR part 192, subparts D and E (48 FR 45926; October 7, 1983)" as found in Criterion 5;*

*Refer to R313-24-4 and 10 CFR Part 40, Appendix A, Criterion 6(1): "In disposing of waste byproduct material, licensees shall place an earthen cover (or approved alternative) over tailings or wastes at the end of milling operations and shall close the waste disposal area in accordance with a design which provides reasonable assurance of control of radiological hazards to (i) be effective for 1,000 years, to the extent reasonably achievable, and, in any case, for at least 200 years, and (ii) limit releases of radon-222 from uranium byproduct materials, and radon-220 from thorium byproduct materials, to the atmosphere so as not to exceed an average release rate of 20 picocuries per square meter per second (pCi/m<sup>2</sup>s) to the extent practicable throughout the effective design life determined pursuant to (1)(i) of this Criterion. In computing required tailings cover thicknesses, moisture in soils in excess of amounts found normally in similar soils in similar circumstances may not be considered. Direct gamma exposure from the tailings or wastes should be reduced to background levels. The effects of any thin synthetic layer may not be taken into account in determining the calculated radon exhalation level. If non-soil materials are proposed as cover materials, it must be demonstrated that these materials will not crack or degrade by differential settlement, weathering, or other mechanism, over long-term intervals."*

*Refer to R313-24-4 [10 CFR 40 Appendix A(6)(6)]: The design requirements in this criterion for longevity and control of radon releases apply to any portion of a licensed and/or disposal site unless such portion contains a concentration of radium in land, averaged over areas of 100 square meters, which, as a result of byproduct material, does not exceed the background level by more than: (i) 5 picocuries per gram (pCi/g) of radium-226, or, in the case of thorium byproduct material, radium-228, averaged over the first 15 centimeters (cm) below the surface, and (ii) 15 pCi/g of radium-226, or, in the case of thorium byproduct material, radium-228, averaged over 15-cm thick layers more than 15 cm below the surface. Byproduct material containing concentrations of radionuclides other than radium in soil, and surface activity on remaining structures, must not result in a total effective dose equivalent (TEDE) exceeding the dose from cleanup of radium contaminated soil to the above standard (benchmark dose), and must be at levels which are as low as is reasonably achievable.*

### **INTERROGATORY STATEMENT:**

*Please provide additional information regarding assumptions and methodologies that were used to develop estimates of the long-term moisture content, field permeability, and dry density for the compacted clay (radon barrier) cover layer in modeling radon release (see Table 5-3 of the Tailings Reclamation and Decommissioning Plan For Shootaring Canyon Uranium Project,*

*Hydro-Engineering, L.L.C., December 2005). Additional information needs to be provided to demonstrate that the values used are sufficiently conservative to bound the range of long-term in-situ moisture contents and dry densities that could exist within the final cover system during the design life of the facility.*

*Please provide data that shows the level of radioactivity for the materials proposed for construction of the site cover relative to background soils and associated locations. Please indicate how the proposed cover system design meets the requirements of the above referenced regulations, in terms of surface materials without waste, or provide a design that meets the regulations.*

*Please submit the radiological performance assessment (including relevant calculations) of the proposed cover of reconstructed tailings area.*

#### **BASIS FOR INTERROGATORY:**

*Additional information needs to be provided to justify that selection of the specified moisture content values (24 percent) and dry density (90 percent for Shootaring Canyon Dam-derived clay materials and 86 percent for alternate clay source-derived clay materials) assumed for the compacted clay (radon barrier) cover layer for use in the radon release modeling simulations appropriately captures (bounds) the range of upper and lower bounds of long-term in-situ moisture and dry density conditions that might occur in this layer during its design life.*

*Variations in the moisture content and dry density of the compacted clay cover layer could likely occur over its design life and such variations need to be considered in evaluations performed to estimate long-term radon emission rates through the cover system (DOE 1989, Section 7.1; EPA 2004, Section 2.3.2.2.8).*

*Data on the natural background concentrations of radionuclides from 62 soil samples around the site is presented in Appendix F (TRDP). However, this appendix does not contain information that shows the correlation of these sample locations to potential stockpile materials (and types) for use in construction of the final tailings cover. The applicant did not provide data on the radioactivity of material proposed for use in the final cover relative to background soil or a justification in cover soil thickness as indicated in the regulation.*

*The proposed near surface cover materials for Cell 1, shown in Figure 9-5-Cell-1 (TRDP), appear to contain some tailings in the lower portion of the top three meters. An explanation is needed as to how this proposed cover design meets the regulations.*

*The performance assessment of the proposed cover of the reconstructed tailings area was not available for review.*

#### **REFERENCES:**

*Plateau Resources, Ltd., "Tailings Reclamation and Decommissioning Plan for Shootaring Canyon Uranium Project", Dated December, 2005.*

*DOE, 1989, "Technical Approach Document," Uranium Mill Tailings Remedial Action Project, Rev. II, Section 7.1, "Design of the Radon Barrier". U.S. Department of Energy, UMTRA-DOE/AL 050425.0002. Albuquerque, New Mexico. December 1989.*



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EPA 2004. "Draft Technical Guidance for RCRA/CERCLA Final Covers", USEPA - USACE Superfund Partnership Program Policy, Guidance, and Activities, Chapter 2. <http://hq.environmental.usace.army.mil/epasuperfund/geotech/>

## **INTERROGATORY R313-24-4-35/01: SITE ENVIRONMENTAL MONITORING PROGRAM**

### **PRELIMINARY FINDING:**

*10 CFR 40 Appendix A(7): Throughout the construction and operating phases of the mill, an operational monitoring program must be conducted to measure or evaluate compliance with applicable standards and regulations; to evaluate performance of control systems and procedures; to evaluate environmental impacts of operation; and to detect potential long-term effects.*

### **INTERROGATORY STATEMENT:**

*Please provide the specific sampling and analysis procedures to be used in the Radiological Environmental Monitoring Program under operational conditions. Also include a drawing that shows the locations for sample collection (as appropriate).*

### **BASIS FOR INTERROGATORY:**

*Section 7 of the Tailings Management Plan includes a description of the environmental monitoring to be performed for the site, and Appendix D includes tables that summarize the type of monitoring, media, general location, and frequency. However, details on the sampling and analysis methods, and a site drawing showing the monitoring locations is not included.*

### **REFERENCES:**

*Plateau Resources, Ltd., "Tailings Management Plan for Shootaring Canyon Uranium Processing Facility" Amended December, 2005.*

## **INTERROGATORY R313-24-4-36/01: OPERATIONAL DUST CONTROL**

### **PRELIMINARY FINDING:**

*Refer to R313-24-4, 10 CFR 40 Appendix A(8): To control dusting from tailings, that portion not covered by standing liquids must be wetted or chemically stabilized to prevent or minimize blowing and dusting to the maximum extent reasonably achievable. This requirement may be relaxed if tailings are effectively sheltered from wind, such as may be the case where they are disposed of below grade and the tailings surface is not exposed to wind. Consideration must be given in planning tailings disposal programs to methods which would allow phased covering and reclamation of tailings impoundments because this will help in controlling particulate and radon emissions during operation. To control dusting from diffuse sources, such as tailings and ore pads where automatic controls do not apply, operators shall develop written operating procedures specifying the methods of control which will be utilized.*

### **INTERROGATORY STATEMENT:**

*Section 3.2.4, Countercurrent Decantation Thickening Effluents, discusses dust suppression over the surface areas of the tailings. Please provide more detail on dust suppression methods to be used on the tailings. Provide specifications on the reagent to be used, its application on interim covering a portion of a cell when not working in the area, and discuss the impact it will have the engineering properties of the tailings (long and short term). Also, provide ALARA evaluations performed for dust suppression to assure that airborne effluent releases are reduced to levels as low as reasonably achievable.*

### **BASIS FOR INTERROGATORY:**

*The Division requires a consideration of airborne effluent releases to assure they are ALARA.*

### **REFERENCES:**

*Plateau Resources, Ltd., "Shootaring Canyon Uranium Processing Facility Environmental Report, Source Material License No. UT0900480", Dated January 2006.*

*Regulatory Guide 3.56, "General Guidance for Designing, Testing, Operating, and Maintaining Emission Control Devices at Uranium Mills," Task CE 309-4, USNRC, May, 1986.*

## **INTERROGATORY R313-24-4-37/01: COST ESTIMATE FOR MILL SITE DECOMMISSIONING**

### **PRELIMINARY FINDING:**

*Referring to R313-24-4: Financial surety arrangements must be established by each mill operator prior to the commencement of operations to assure that sufficient funds will be available to carry out the decontamination and decommissioning of the mill and site and for the reclamation of any tailings or waste disposal areas. The amount of funds to be ensured by such surety arrangements must be based on Executive Secretary-approved cost estimates in a Executive Secretary-approved plan for (1) decontamination and decommissioning of mill buildings and the milling site to levels which allow unrestricted use of these areas upon decommissioning, and (2) the reclamation of tailings and/or waste areas in accordance with technical criteria delineated in Section I of this Appendix. The licensee shall submit this plan in conjunction with an environmental report that addresses the expected environmental impacts of the milling operation, decommissioning and tailings reclamation, and evaluates alternatives for mitigating these impacts.*

### **INTERROGATORY STATEMENT:**

*Please provide clarifications of Section 11.0 Shootaring Canyon Tailings Reclamation and Decommissioning Plan 2006 as described in the following Basis For Interrogatory.*

### **BASIS FOR INTERROGATORY:**

*Section 11.0 – Cost Analysis for Mill Decommissioning and Tailings Reclamation: The labor rate for the Laborers (\$12/hour) is very low compared to the RS Means Heavy Construction Cost Data 2002 rate (\$23.45/hour), even when localized ( $\$23.45/\text{hour} \times 0.89 = \$20.87/\text{hour}$ ). Please provide clarification on how the labor rates were determined.*

*Refer to Section 11.1 – Cost Estimation for Mill Site Decommissioning: Upon review of the Schedule of Reclamation Activity at the Shootaring Canyon Site for Cell 1 Reclamation (Figure 10-1), Plateau may want to consider adding more resources. This is due to the concurrency of these tasks (i.e. the same equipment will be needed in separate places at the same time). Any changes made to the list of on-site equipment will require changes in Mobilization & Demobilization (section 11.1.19). If additional resources are not needed, please clarify how this work would be accomplished with the resources stated.*

*Section 11.1.0 – There are no costs listed associated with the dismantling and decontamination of process equipment for salvage. Please provide justification for this since it may affect the cost analysis, mobilization, and scheduling.*

*Section 11.1.1.4 – Ore Hopper Demo; Will dust be generated with this operation? If so, please provide provisions and associated costs for dust control.*

*Section 11.1.6 – CCD Circuit Demo; The duration listed for this task is 12 days, but all of the resources are estimated for 80 hours. Will the task last 12 days (96 hours) or 80 hours?*

*Section 11.1.7 – Mill Demo;*

- *The subtotal for this section adds up to \$103,270 (not \$99,430), please correct.*
- *The 2 Laborers are estimated to be needed for a total of 640 hours, but the task is only estimated to last 160 hours. Will 4 Laborers be needed for this task or will the 2 Laborers be needed for a total of 320 hours? Please clarify.*

*Section 11.1.9 – Tanks and Foundations E. of Mill; Is more than one Laborer needed for this task? The total duration for this task is 24 hours, but the Laborer is estimated to be used for 120 hours. Please clarify*

*Section 11.1.10 – Sodium Chloride Tank, Found. Demo; Please provide the basis of the estimate for the cost of neutralization.*

*Section 11.1.13 – Removal of Contaminated Soils From Around the Buildings; The Water Wagon and Misc. Hand Tools are estimated to be used for 40 hour on this task, but the other resources are estimated to be used for 20 hour per unit. Does this task require that multiple Water Wagons or Misc. Hand Tools to be used? If so, please update quantities. If not, please update hours.*

*Section 11.1.14 – Removal of Contaminated Soils From Ore Pad Area; The two Laborers are estimated to be used of total of 60 hours, but the total duration of the task is 80 hours. Will the Laborers only be needed for 30 hours of the total 80 hours of the task? Please clarify.*

*11.1.16 – Soil Verification; The Soil Verification task has two Radiation Technicians working for a total of 48 hours. The estimated duration of the task is 36 hours. Since they are the only labor resource used, please update the duration of the task or the number of hours required for the Radiation Technicians. The duration of this task seems very short for performing a MARSSIM release survey and to take samples with only two people, please provide justification and approach for this estimate.*

*Section 11.1.18 – The duration listed for the Management, Reporting, Testing, and Monitoring is 103 days. The task description lists twenty-six weeks, which is almost a month longer than the 103 days. Please update the task duration or task description is the correct duration.*

*Section 11.2 – The Cost Analysis for Tailings Cell 1 Reclamation does not provide any estimates for the cost of services of a Land Surveyor or Compaction Testing for the landfill. Please include these costs in this estimate.*

*Section 11.2.1 – Mill Demo Disposal; The hours of work forecasted for the Water Wagon is half of that for the Compactor and a fifth of that of the Crawlers. Will multiple Crawlers and Compactors be required? If so, please update the quantities needed for these resources and/or clarify.*

*Section 11.2.4 – Sandy Interim/Grading Material; There is sand royalty fee listed for the sand to be used for the Sandy Interim/Grading Material. Why are there no royalty fees listed for the Clay Cover Material (section 11.2.5) or Rocky Soil Cover Material (section 11.2.6)? Please update these sections if a royalty fee is require and clarify.*

*Section 11.2.7 – Rock Cover Materials;*

- *The Rock Cover Materials section has a total cost per hour for labor and equipment of \$1751 per hour. Adding all of the labor and equipment costs per hour yields \$2047 per hours. Please correct and/or clarify.*

- *The Rocky Cover Materials section has a duration of 60 days. Using the production rate listed (1920 CY per day) and the total amount of material required (36,150 CY), the time required for the task is just under 19 days (36,150 CY / 1920 CY per day). Please revise the cost estimate for this task, the current estimate is based upon the haul rate of the trucks and does not take into account the time required for the placement of materials.*

*Section 11.2.8 – Monitoring Well Abandonment;*

- *The Monitoring Well Abandonment task has a lump sum cost of grout. Please provide a basis for this estimate.*
- *The Monitoring Well Abandonment task provides an estimate for the cost of abandoning wells. Please provide a cost estimate for the provisions of installation and maintenance of long-term monitoring wells.*

*Section 11.2.9 – The Management, Reporting, Testing, and Monitoring task for Cell 1 has a scheduled duration of 299 days, which is far short of the seventy weeks that is mentioned in the task description and the 14 months that is listed for the labor schedule. Please revise the scheduled duration to what is described for this task.*

*Section 11.3.1 – Mill Demo Disposal;*

- *The time required for the Crawlers and Compactors is much greater than what is listed for the Water Wagon. If multiple Crawlers and Compactors are to be used, please update these quantities in the crew size.*
- *The equipment utilization is very low (52 hours) when compared to the task duration (632 hours). Please update the equipment utilization to match the task duration.*

*Section 11.3.3 – Drainage System Grading; The Water Wagon estimated cost is incorrect (\$55 per hour x 360 hours = \$19,000). Please revise estimate and/or clarify.*

*Section 11.3.4 – Sandy Interim/Grading Material; The estimated cost of the two Laborers is incorrect (\$85 per hour x 1920 hours = \$163,200). Please revise estimate.*

*Section 11.3.6 – Clay Cover Material;*

- *It is estimated that the two Crawler Dozers will be used for 1920 hours. Based on the duration of this task (60 days = 480 hours) and number of Crawlers to be used, this utilization should be 480 hours X 2 = 960 hours. Please revise estimate and/or clarify.*
- *The two Compactors estimated cost is incorrect (\$55 X 288 = \$15,840). Please revise estimate.*

*Section 11.3.7 – Rock Cover Materials:*

- *The duration for this task is the same as the duration provided for Section 11.2.7 (Cell 1 Rock Cover Materials). The volume of cover material and surface area to be covered is greater than that of Cell 1 only. Please revise this estimate account for the additional work required.*
- *The Rocky Cover Materials section has duration of 60 days. Using the production rate listed (1920 CY per day) and the total amount of material required (57,808CY), the time*

*required for the task is just over 30 days (57,808 CY / 1920 CY per day). Please revise the cost estimate for this task, the current estimate is based upon the haul rate of the trucks and does not take into account the time required for the placement of materials.*

*Section 11.3.8 – Monitoring Well Abandonment;*

- *The Monitoring Well Abandonment task lists a lump sum cost for grout. Please provide a basis or justification for this estimate.*
- *The Monitoring Well Abandonment task does not provide any costs for the installation and maintenance of long-term monitoring wells. Please provide a cost estimate for the long-term monitoring well installation and maintenance.*

*Section 11.3.9 – The Cells 1 and 2 Management, Reporting, Testing, Monitoring task list a task duration of 479 days, which is much longer than the 70 weeks listed in the task description. Please revise the task description is to match the task duration and/or clarify.*

*In addition, it is important to note that changes to the proposed decommissioning design and approach that may impact the respective costs need to be reflected in a revised cost estimate for mill site decommissioning.*

**REFERENCES:**

*Plateau Resources, Ltd., “Tailings Reclamation and Decommissioning Plan for Shootaring Canyon Uranium Project”, Dated December 2005.*

*RS Means® Heavy Construction Cost Data 16th Annual Edition 2002*

## **INTERROGATORY R313-24-4-38/01: LONG TERM SURVEILLANCE COSTS**

### **PRELIMINARY FINDING:**

*Refer to R313-24-4, 10 CFR 40 Appendix A(9); The surety must also cover the payment of the charge for long-term surveillance and control required by Criterion 10. In establishing specific surety arrangements, the licensee's cost estimates must take into account total costs that would be incurred if an independent contractor were hired to perform the decommissioning and reclamation work. In order to avoid unnecessary duplication and expense, the Executive Secretary may accept financial sureties that have been consolidated with financial or surety arrangements established to meet requirements of other Federal or state agencies and/or local governing bodies for such decommissioning, decontamination, reclamation, and long-term site surveillance and control, provided such arrangements are considered adequate to satisfy these requirements and that the portion of the surety which covers the decommissioning and reclamation of the mill, mill tailings site and associated areas, and the long-term funding charge is clearly identified and committed for use in accomplishing these activities.*

### **INTERROGATORY STATEMENT:**

*Please provide a detailed scope and estimated costs covering the long term surveillance of the site after successful completion of site closure. Also include provisions for establishing site specific surety arrangements to cover these costs.*

### **BASIS FOR INTERROGATORY:**

*No scope, estimated costs, or surety arrangements for long-term surveillance were provided.*

### **REFERENCES:**

*Plateau Resources, Ltd., "Shootaring Canyon Uranium Processing Facility Environmental Report, Source Material License No. UT0900480", Dated January 2006.*