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State of Utah

Department of
Environmental Quality

Richard W. Sprott
Acting Executive Director

DIVISION OF RADIATION
CONTROL
Dane L. Finerfrock
Director

June 25, 2007

Ron F. Hochstein
President and C.O.O.
Denison Mines (USA) Corp. (DUSA)
1050 17th Street, Suite 950
Denver, CO 80265

Dear Mr. Hochstein:

SUBJECT: White Mesa Uranium Mill, Blanding, Utah
Cell 4A Relining Project
Design Approval

On June 22, 2007 we received a final submittal from Mr. Harold Roberts of DUSA via email regarding the above project. The submittal was a revision to all the project drawings. These drawings also incorporated an earlier drawing submittal made June 19, 2007 of an acceptable sandbag filter design, to be used for covering the strip drains at the bottom of cell.

The initial Cell 4A Lining System Design Report was submitted by letter to the Division dated January 31, 2006. A completeness review of this initial report was performed by the Division, through its consultant, URS Corp. Thereafter, seven separate interrogatory documents to DUSA regarding the project were identified and similarly developed.

The plans, specifications and other documents for the project were in most cases prepared by Geosyntec Consultants for DUSA. A summary of the current relevant design documents for the project are listed in the enclosed table dated June 25, 2007 provided by URS Corp.

The final plans, specifications and other applicable documents as submitted, appear to comply with the Utah Radiation Control Rules (R313, *Utah Administrative Code*). A **design approval** for these facilities is issued subject to the conditions stated below:

1. Any substantive revisions or modifications to the approved plans and specifications, relevant design documents referenced in the attachment, construction procedures or equipment, including those necessary to meet future Ground Water Discharge Permit

requirements, must be submitted for review and Executive Secretary approval, before the construction or implementation thereof.

2. The new facilities may not be placed in service, until after:
   a. The current Ground Water Discharge Permit has been modified, opened to public comment, comments resolved, then re-issued.
   b. An updated surety cost estimate for reclamation and decommissioning for the new facilities, including necessary environmental closure monitoring during the reclamation and decommissioning of Cell 4A, has been submitted and approved.
   c. A corresponding amount for the above has been added to the surety financial instrument and approved by the Division of Radiation Control (DRC).
   d. The Division has made a final inspection, and has authorized in writing to place the constructed facilities in service.

3. Prior to final DRC inspection, an operation and maintenance (O&M) manual for the new facilities must be submitted and approved. The manual must include, but not be limited to:
   a. Essential operation and maintenance procedures for the new facilities. This shall include, e.g. important operational sequences, transporting methods, equipment operation, maintenance, safety, and emergency procedures.
   b. The proper operation, monitoring, and evaluation of:
      (1). the leak detection system,
      (2). the slimes drainage system, and
      (3). the freeboard limits on the dikes.
   c. Actions for successful prevention of pond overflow. Planned effort must be made to properly manage and apply volume inventory controls to prevent overflow events from occurring. These efforts must be described in the operations and maintenance manual.

4. As discussed in the DRC letter to DUSA dated May 2, 2007, DUSA must complete the GCL hydration demonstration project. DUSA may not begin the use of the cell until the new liner GCL hydration level is at a minimum of 140 percent.

5. DUSA acknowledges that constructing any facilities under this design approval without first receiving a Ground Water Discharge Permit presents a risk, as the permit could require additional modifications to the facilities constructed under this approval.

6. DUSA will provide the design, construction, quality assurance/quality control, and all other project management or supervision to ensure compliance with the approved plans and specifications. Prior to final DRC inspection, DUSA will submit a final As-Built Report. The report will include a set of record drawings of the completed construction as well as a written certification by a Registered Professional Engineer licensed to practice in the state of Utah, attesting that the newly constructed facilities meet the requirements of the approved plans and specifications.

7. This Design Approval will expire one year from the issue date above, unless substantial progress is made in constructing the approved facilities, or plans and specifications are submitted and this Approval is reissued. This provision allows the Division to administer the re-issuance of approvals based on the current best available technology (BAT). This Approval does not constitute any waiver to comply with other applicable local requirements.

General Project Description:
This project is for relining former existing tailings Cell No. 4A, at the White Mesa Uranium Mill. The mill is located in south central San Juan County, approximately six miles south of Blanding, Utah, on U.S. Highway 191. The newly relined cell is to receive processed milled tailings from the White Mesa Uranium Mill.

The primary design criteria for this project is *Utah Administrative Code,* Rule R313-24, titled *Uranium Mills and Source Material Mill Tailings Disposal Facility Requirements,* which includes by reference appropriate sections of 10 CFR 40, titled, *Domestic Licensing of Source Material,* and 10 CFR 40 Appendix A titled, *Criteria Relating to the Operation of Uranium Mills and the Disposition of Tailings or Wastes Produced by the Extraction or Concentration of Source Material from Ores Processed Primarily for their Source Material Content*.

Detailed review of the various items in the above design criteria can be found in the electronic record of exchanges of interrogatories, comments and responses between the Division and DUSA. The goal of the referenced design criteria above is to have long term facility features designed to be reliably functional for 200 to 1,000-years. Some of this criteria specifically addressed in the exchanges above include the cell's protection from precipitation, floods, wind, and earthquake stability.

The cell has dikes above existing adjacent exterior ground on all four sides, and is roughly 46-feet in depth from the top of the dike to the lowest point on the bottom. The bottom of the cell varies in depth below the original grade between roughly 25 and 35 feet. The bottom area is about 28 acres. The cell is shaped at the top and bottom as nearly concentric quadrilaterals of varying side dimensions. According to company estimates, the volumetric capacity of the new cell is roughly 1.6 million cubic yards with a 3-foot freeboard. The bottom of the cell is graded to the southwest, which is the lowest point in the cell.

The cell lining system consists of, beginning at the bottom, a compacted soil cover over existing subgrade soils or covering the bedrock, a manufactured geosynthetic clay liner (GCL) which is 0.2-inch bentonite soil centered and stitched between two geotextile layers. The GCL has a hydraulic conductivity of 1×10^{-9} cm/second and is routinely estimated at 10-foot depth equivalent to 2-feet of compacted clay liner at 1×10^{-7} cm/second. The GCL is to be hydrated to a minimum of 140%, as that level of hydration and above gives the subsurface maximum protection from acidic water infiltration through a GCL.

As mentioned earlier, in a condition for this approval, a separate demonstration project is required for the GCL liner. This test is in the bottom of the cell. A specified separate GCL test pad is to be installed to determine the duration the GCL needs to attain acceptable hydration. The GCL must attain at least 140% hydration prior to bringing the cell into operational status. The GCL is covered by a 60-mil smooth HDPE liner. Above this liner there will be a geonet grid layer, and finally, the geonet is covered by another 60-mil smooth HDPE liner.

A leak detection system (LDS) is incorporated into this design by use of a geonet. The geonet layer will be contiguous throughout the entire cell and anchorage trench. The geonet allows any leakage through the uppermost liner a flow path to drain down to a sump and leakage monitoring structure in the southwest corner of the cell.

Slimes drain (SD) collection system. Placed on the top liner, a pipe-like collection system for conveying drainage from the tailings is to be laid out in a herringbone design on the cell bottom. SD laterals will connect to a SD 4-inch diameter PVC diagonal header. The laterals are to be installed at 50-foot centers throughout the cell bottom. These laterals are specified to be "Multi-Flow Drainage Systems strip-drains." The strip-drains are a prefabricated two-part geo-composite drain with a polymer drainage strip core surrounded by non-woven filter fabric. These type drains are used for subsurface water collection. These drains will be ballasted from movement, and protected from fines plugging by sandbags covering them continuously along the drains. The sand specified for the bags is specifically designed to filter out fine particles from plugging the strip drain fabric.

The strip-drains manifold into a central SD header, as the spine of the herringbone design. The header system consists of a geotextile as a cushion placed on the upper liner then a 4-inch PVC header pipe surrounded by drain gravel in a triangular window, 2-feet deep and 2-feet wide. The gravel will be covered by a woven geotextile. The upper geotextile will be ballasted by gravel bags at 10-feet on-center, both sides.

Both the LDS and SD systems are to convey drainage to a dual, but separate sump system at the southwest corner of the pond. Each system will have an 18-inch perforated pipe placed horizontally at the bottom of each sump, surrounded by drainage gravel. Both systems will have an 18-inch observation pipe or port, rising from the sump pipes at the slope of the embankment to above the top of the dike in the southwest corner of the cell. The SD sump will have the top of gravel covered by geo-textile, and the complete lining system below it, whereas the LDS sump will have the GCL and the lower HDPE below the pipe, and the remaining lining system enclosed above the sump.

Three 20-foot wide splash pads will be constructed on the north dike, to allow filling of the cell with tailings in slurry, without damaging the uppermost HDPE membrane. These pads will consist of an additional layer of 60-mil HDPE membrane. The pads will extend from the top of the dike, under the inlet pipe along the top, down the embankment, then five-feet beyond the toe

of the slope over the upper geomembrane. These splash pads are to protect the upper geomembrane from scouring by inflowing tailings.

An emergency spillway will be constructed between cell 3 and 4A. The spillway will be constructed of 6-inch thick reinforced concrete slabs. The spillway will be a 4-foot deep trapezoidal channel, with 32-foot tapering length on each side of a 20-foot center section. The spillway is designed to carry the Probable Maximum Precipitation related flood event. The spillway is to protect cell 3 from overtopping, during maximum a flood event.

An approved set of the final approved plans, specifications and construction quality assurance plan should be kept on-site and available for examination and inspections to be conducted by the Division, or for resolution of any conflicts or discrepancies that may arise during construction or installation.

DUSA must advise us when the construction begins.

If you have any questions on the above, please contact Mr. Dave Rupp of our staff.

Sincerely,

UTAH RADIATION CONTROL BOARD

Dane L. Finerfrock
Executive Secretary

DLF:LBM:DAR:dr

Enclosure: Summary of Documents

Cc: Greg Cocoran, P.E., GeoSyntec Consulting Engineers
Britt Quinby, P.E., URS Corp.
Southeast Utah District Health Dept.
David Ariotti, DEQ District Engineer, Price, UT