

## Tailings and Slimes Drain Sampling Program

The sampling of the Tailings and Slimes Drain Systems at the White Mesa Mill facility will require the use of the following equipment:

- 1) Masterflex L/S variable flow rate peristaltic pump.
- 2) Inert Tygon™ Tubing suitable for use with the peristaltic pump
- 3) Sample collection bottles for Inorganic, Volatile and Semi-Volatile Organic Compounds (as provided by an independent laboratory)

Information will be gathered during the event and recorded on a Tailings and Slimes Drain Field Sheet, Attachment 2.

Field related parameters will be analyzed by the outside independent laboratory. These parameters will include pH and specific conductance.

### 1) Tailing Cell Sampling

The following locations shall be sampled on an annual basis:

- 1) Cell #1 – samples will be collected off of the pumping raft (southeast corner of tailings cell)
- 2) Cell #3 – samples will be collected off of the pumping raft (south side of tailings cell)
- 3) Cell #4A – samples will be collected off of the pumping raft (southwest corner of tailings cell)

An Environmental Technician (or whomever the RSO assigns to conduct the sampling) will proceed to the tailings cell(s) and collect the needed samples at predetermined locations as indicated in Attachment 1. The samples will be collected by extending the collection tubing approximately 6 ft. from the edge of the sampling station. The tubing will be attached to a horizontal rod with sufficient tubing attached to lower the suction end of the tubing to approximately 1/3 of the distance up from the underlying solids and the water surface. This distance will be confirmed by sounding prior to sample collection. Once the appropriate sample volume has been collected, the technician will discard the tubing utilized for that sample site and replace it with clean (un-used) tubing prior to collecting the next sample. Because the peristaltic pump (by virtue of its design) does not contact the water sampled, and because inert and un-used tubing will be used at each individual sampling station, equipment rinsing will not be required and attendant rinsate sampling will be unnecessary. Clean sample containers utilized for this sampling effort will be provided by the contracted analytical laboratory. Samples collected from this effort will be submitted to an outside independent laboratory for analysis as required by the Ground Water Discharge Permit (GWDP) with the State of Utah. Tailings sample locations are depicted on Attachment A to this procedure.

Samples collected for inorganic analyses will be stored in plastic sample containers which could be subject to damage due to off-gassing of samples collected from tailings cells. Accordingly, these samples will be provided with a one inch head space and will be stored at  $\leq 6^{\circ}$  C prior to analyses as a means of precluding off-gas damage or loss of sample contents. With regard to the samples collected for Volatile and Semi-Volatile Organic Compounds (VOC and SVOC), these containers are glass and will not be subject to potential damage from off-gassing. For this reason, and because VOC and Semi-VOC samples cannot be exposed to air during storage, these containers will be filled in such a manner as to fulfill the zero headspace requirement attendant to this analytical regimen. However, just as for the inorganic samples, VOC and Semi-VOC samples will be stored at  $\leq 6^{\circ}$  C prior to analyses. All volatile compounds will be analyzed by EPA method 8260B and Semi-Volatile compounds will be analyzed by means of EPA method 8270.

## 2) Slimes Drain Sampling

The following are Slimes Drain locations:

- 1) Cell #2 – located midway on the south section of cell
- 2) Cell #3 – located midway on the south section of cell
- 3) Cell #4A – located at the southwest corner of cell

Once a tailings cell has started de-watering procedures, a sample should be collected from the slimes drain system. At this time Cell 2 is the only Slimes Drain that should be sampled. The location of the slime drain for Cell 2 is depicted on Attachment A. While Cell 3 and Cell 4a are equipped with a slimes drain sample access locations, the Cells are still active and the slimes drain will not be equipped with submersible pumping equipment until dewatering operations are underway, and pumping at this time may in fact jeopardize the long term effectiveness of the slimes drain system. Because dewatering in Cell 2 is ongoing and pumping equipment is in place to properly purge the system and obtain a representative sample, this cell will be included in the annual sampling effort. The sampling of the Cell 2 slimes drain will consist of a dedicated sampling ladle and rope to lower the ladle into the drain. This ladle will be labeled with the corresponding reference information on the handle. The ladle will be stored in a plastic bag to prevent outside contamination in between sampling events. Prior to a sampling event, the ladle and any other sampling equipment used will follow decontamination procedures as outlined in Section 6.2.5 of the Groundwater Quality Assurance Plan (QAP) and the runoff will be captured and analyzed for the parameters measured in the collected samples.

The Cell 2 slimes drain will be sampled such that representative fluids are collected. Accordingly, samples will only be collected from this location when the pump has been operating in accordance with the approved operating plan for a minimum of 48 hours prior to sampling in order to assure that the system is purged and is producing representative fluids. The ladle will be lowered into the drain until the sample cup is filled with solution. The sampling personnel must take care not to disturb the sediment in the bottom of the drain. The ladle will then be raised and the contents placed into a clean

sample collection bottle as provided by an outside laboratory. Once enough sample has been collected, the ladle and any other sampling equipment will follow decontamination procedures as outlined in Section 6.2.5 of the (QAP) and then returned to the plastic bag and placed into the locked environmental storage container outside the administration building.

3) Leak Detection Systems

The following are Leak Detection Systems locations:

- 1) Cell #1 – located along the south dike, near the southeast corner of cell
- 2) Cell #2 – located along the south dike, midway of cell
- 3) Cell #3 – located along the south dike, midway of cell
- 4) Cell #4A – located in the southwest corner of cell

In Cells 1, 2 and 3 the leak detection system is measured by use of a pipe that is removed from the system which will indicate the presence and depth of solutions in the LDS system: 1) The pipe will be long enough to verify the distance between the top of the access pipe (water level measurement point) to the bottom of the LDS sump and, 2) the pipe will be calibrated to the nearest 0.1 ft in order to measure the presence and depth of solutions in the LDS system.

The distances from the top of the access pipe to the bottom of the LDS sump for each of the cells is as follows:

- Cell 1- 69.18 ft
- Cell 2- 35.87 ft
- Cell 3- 139.42 ft
- Cell 4A- 125.00 ft

If any solutions are detected in the Leak Detection Systems (LDS), then steps must be taken to be able to collect samples as well as obtain information regarding levels, flow rates, and gallons pumped.

Whenever solutions are detected in Cells 1, 2 or 3 a pump and line will be installed onto the angled drisco line within 45 days after fluids are first detected. This pump will be a dedicated piece of equipment and will remain in at its installation location and, due to its dedicated status at the sampling location, no decontamination will be required prior to sampling. On the discharge line, a sample port (valve) must be installed for the collection of samples as required by the GWDP. Regarding Cell 4A, this Cell is equipped with a submersible pump, pump controller water level indicator and flow meter. The water level meter and flow meter are utilized to monitor head conditions and flow-rate in accordance with the *White Mesa Mill Tailings Cell 4A Monitoring Operations and Maintenance Plan*. Samples from the Cell 4A LDS will be collected by means of the dedicated submersible pump installed in Cell 4A. All samples collected from LDS

systems will be placed into clean sample containers as provided by an independent laboratory.

4) QA/QC

The QA/QC process for the event will consist of a blind duplicate and (for slimes drain ladles) equipment rinsate samples prior to the sample event. The equipment rinsate samples will be collected in conformance with Section 4.3.2 of the QAP. These samples will be collected for each tailings cell or slimes drain being sampled.

The blind duplicate sample will be collected by collecting additional sample volume from one cell or location and combining all materials into one container. A split will then be taken from that vessel and submitted to an outside laboratory.

The objectives for measuring data quality outlined in Section 3 of the QAP are applicable to sampling activities conducted under this Plan. If upon review of the data by the Quality Assurance Manager it is discovered that sampling results and QA/QC data are non-conforming with regard to QAP parameters, the corrective actions outlined in Section 10 of the QAP will be followed.

5) Laboratory Analyses

Samples of tailings and slimes drain material will be analyzed at an offsite contract laboratory and subjected to the analytical parameters included in Table 2 and general inorganics listed in Part I.E.1(d)(2)(ii) of the Ground Water Discharge Permit (No. UGW370004). The procedures utilized to conduct these analyses will be those utilized for groundwater sampling and as shown in Section 8.2 in the Ground Water Monitoring Quality Assurance Plan (QAP). The laboratory will be notified prior to sending the samples that the samples are from the tailing cell in order that appropriate dilution steps can be applied during analyses.

The contracted laboratory will be certified by the State of Utah in accordance with Utah Administrative Code (UAC) R317-6-6.12A.

6) Additional Sampling and Plan Modification (Cell 4A)

Once constructed, and as-built systems are in place, Cell #4a will be subjected to annual samplings of the slimes drain and leak detection system access pipes. These sample locations will be added to Attachment 1 and the plan will be amended to reflect the additional sampling locations. As with the other tailings cell samplings, the Cell #4a sampling event will include the preparation and analysis of blind duplicate and equipment rinsate samples.

7) Reporting

A Tailings Cells Wastewater Quality Sampling Report will be included with the 3<sup>rd</sup> Quarter Groundwater Monitoring Report, due each year on December 1<sup>st</sup>.

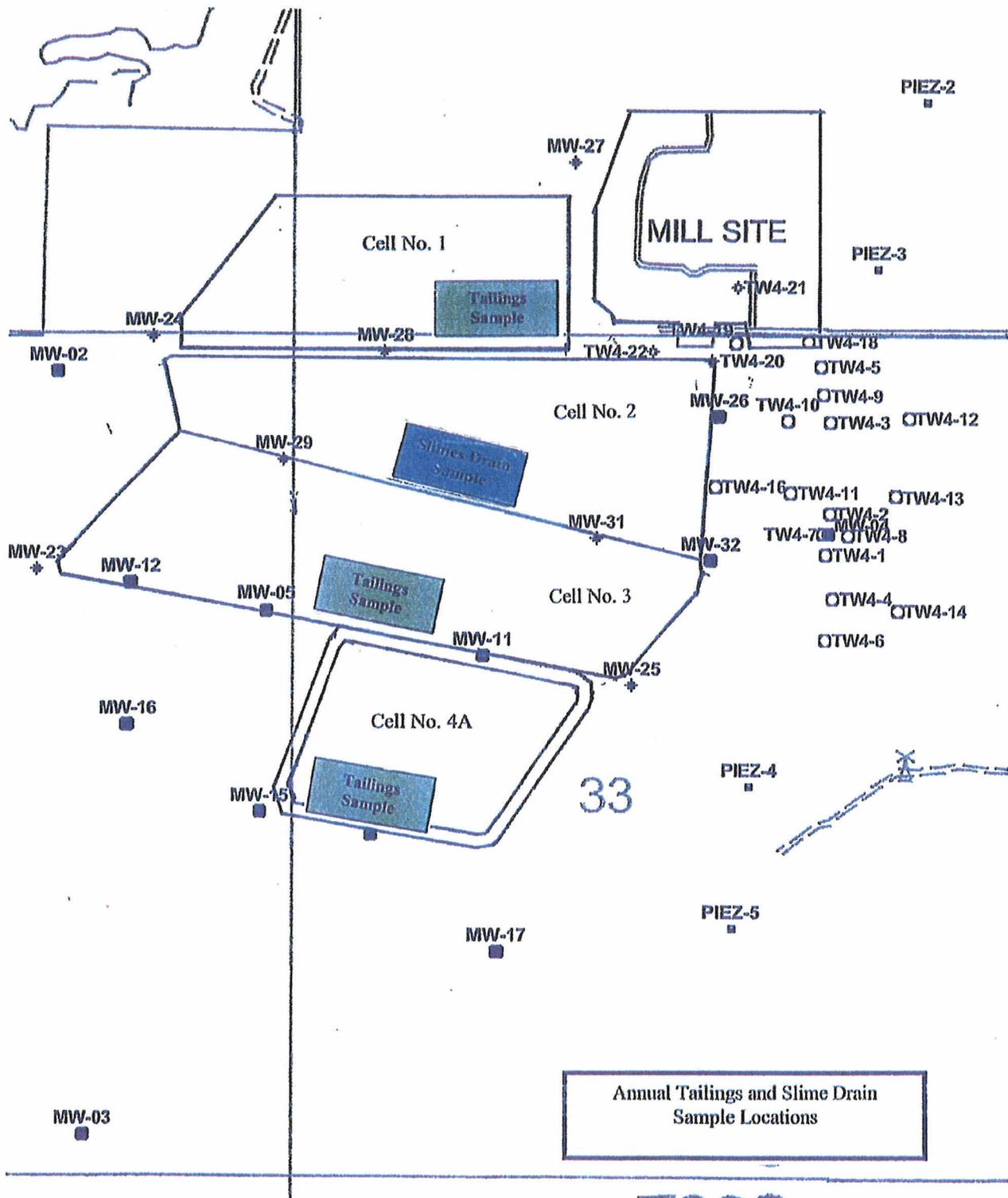
Each Tailings Cell Wastewater Sampling Report will include the following information:

- Introduction,
- a description of sampling methodology, equipment and decontamination procedures identify all quality assurance samples, e.g. trip blanks, equipment blanks, duplicate samples,
- analytical data interpretation for each tailing cell, slimes drain, and leak detection system sample,
- a written summary and conclusions of analytical results,
- a table summarizing historic analytical results,
- a quality assurance evaluation,
- all field data sheets accompanying the sampling event,
- copies of the laboratory reports, and
- a "Tailings and Slime Drains System Sample Locations Map".

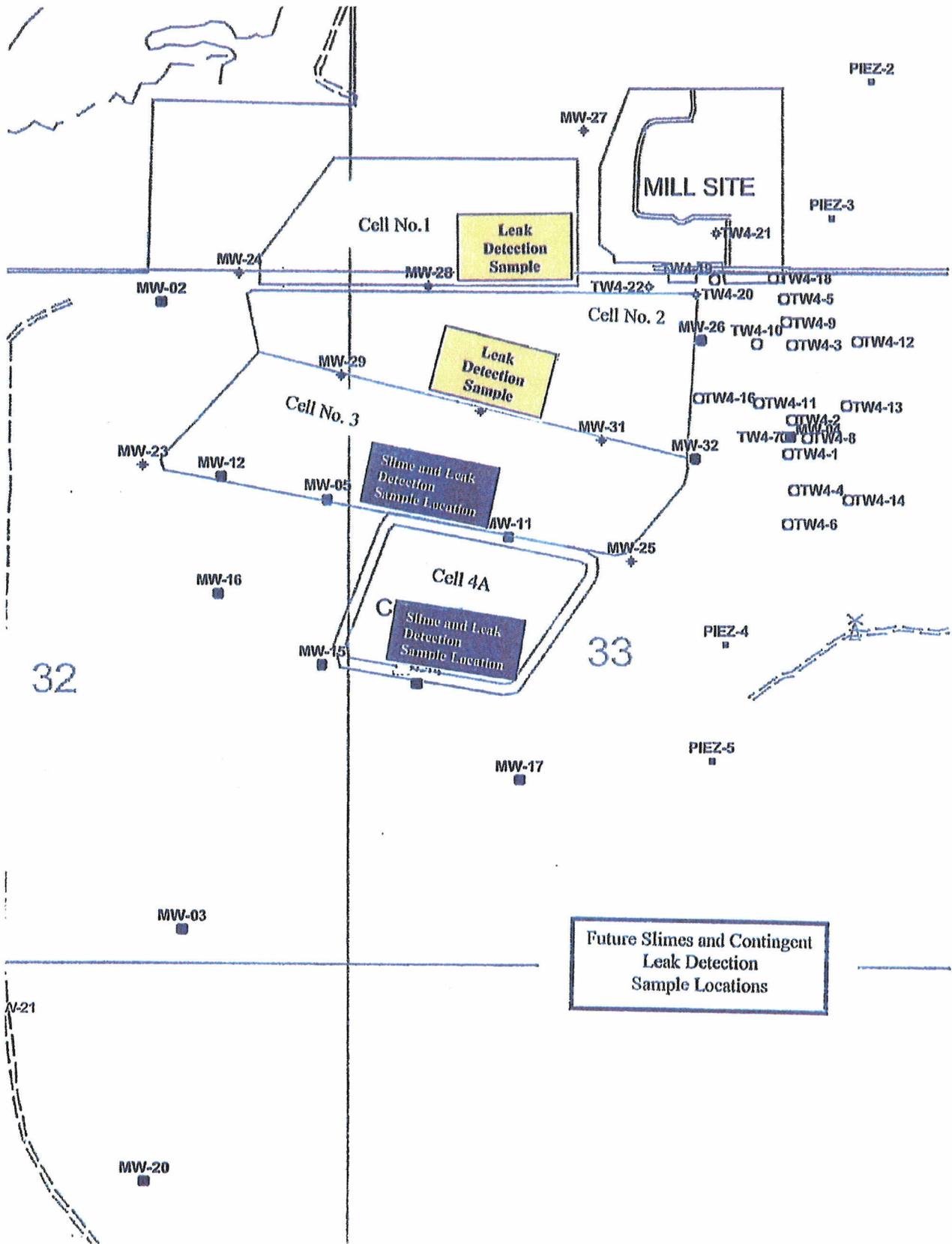
8) Agency Notification

At least 30 days advanced notice will be given to UDEQ prior to sampling activities described under this *Tailings and Slimes Drain Sampling Program* in order to allow the Executive Secretary to collect split samples of all tailing cell wastewater sources.

**Attachment 1**



Annual Tailings and Slime Drain  
Sample Locations



**Attachment 2**

Tailings and Slimes Drain Field Sheet

Denison Mines (USA) Corp.  
White Mesa Mill

Location \_\_\_\_\_ Date \_\_\_\_\_

Samplers Name and Initials \_\_\_\_\_

Time of Sampling Event \_\_\_\_\_

Weather Conditions during Event \_\_\_\_\_

Sampling Equipment Used (other than dedicated) \_\_\_\_\_

Where Samples Collected? Y or N (circle)

Indicated volume of sample collected \_\_\_\_\_

Name of Certified Analytical Laboratory if Other Than Energy Labs \_\_\_\_\_

Comments:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_