

MODULE III – POST-CLOSURE GROUNDWATER MONITORING AT THE HWI

III.A POST-CLOSURE GROUNDWATER MONITORING

- III.A.1 During the compliance period defined in Condition IV.A.8, USS shall monitor groundwater in the uppermost aquifer as described below and in a manner that will detect the release of hazardous constituents from the units outlined below in compliance with R315-8-11.9 and R315-8-6.
- III.A.1.a Acid Sludge Impoundment;
- III.A.1.b Tar Decanter Sludge Impoundment; and
- III.A.1.c Miscellaneous Waste Impoundment.
- III.A.2 USS shall follow all of the provisions of R315-8-6, Groundwater Protection, and the conditions of this Permit. The present HWI and Compliance Point wells are presented in Attachment 3 (Facility Maps).
- III.A.3 The Point of Compliance is a vertical surface located at the hydraulically downgradient boundary of the CHWI as defined in R315-8-6.6.
- III.A.4 USS shall maintain the groundwater monitoring system to continue to demonstrate background groundwater conditions. Monitoring Well # MW-1 shall represent the upgradient background condition in the shallow, uppermost aquifer and # MW-19 shall serve as the deep upgradient background well. If any of the monitoring wells are found to be inadequate, USS shall, upon notification by the Executive Secretary, install acceptable new monitoring wells.
- III.A.5 USS shall maintain the downgradient compliance groundwater monitoring well system shown in Attachment 3 (Facility Maps) consisting of the following wells: MW-17D, MW-21, MW-22, MW-23, and MW-24.

III.B DETECTION MONITORING

- III.B.1 Upon termination of any corrective action under R315-8-6.11 at the HWI, USS shall institute and maintain a detection monitoring program under R315-8-6.9.

III.C GROUNDWATER PROTECTION STANDARD

- III.C.1 USS shall monitor the groundwater according to the frequency outlined in Attachment 6, Table 1, at the HWI to determine compliance with the groundwater protection standard under R315-8-6.3. The following hazardous waste constituents and their concentration limits, and in addition to standards under R315-8-6.3 shall

comprise the groundwater protection standards, unless USS has applied for and the Executive Secretary has approved Alternative Concentration Limits.

III.C.2 The following Groundwater Protection Standards only apply to the monitoring wells identified in III.A.5.

Compound	Method	Concentration Limit (µg/l)
VOLATILES		
Benzene	8260B	5
Toluene	8260B	5
Ethylbenzene	8260B	5
Xylenes	8260B	5
SEMI-VOLATILES		
2,4-dimethylphenol	8270C	10
2-picoline	8270C	10
Acenaphthylene	8270C	10
Naphthalene	8270C	10
o-cresol (2-methylphenol)	8270C	10
p-cresol (4-methylphenol)	8270C	10
Phenol	8270C	10
Pyridine	8270C	10
METALS		
Arsenic	6010B	50
Barium	6010B	1000
Chromium	6010B	50
Lead	6010B	50
Nickel	6010B	50
GENERAL PARAMETERS		
Cyanide	335.2	40
Nitrate	353.4	NR
Sulfate	375.2	NR
pH	Field Measurement	NR
Specific conductance	Field Measurement	NR
Total Organic Carbon (TOC)	415.1	NR

Total Organic Halogen (TOX)

9020

NR

NR = None required

III.D GROUNDWATER MONITORING REQUIREMENTS

- III.D.1 USS shall comply with the following general requirements for groundwater monitoring at the HWI:
- III.D.1.a The groundwater monitoring system shall consist of a sufficient number of wells installed at appropriate locations and depths to yield groundwater samples from the uppermost aquifer that:
- III.D.1.a.i Represent the quality of background water that has not been affected by leakage from the Impoundments; and
- III.D.1.a.ii Represent the quality of groundwater passing the compliance point as defined in Condition III.A.3.
- III.D.1.b USS shall construct all monitoring wells in accordance with the provisions in R315-8-6.8(c) and Condition III.D.2.
- III.D.1.c USS shall follow the sampling and analysis procedures defined in Attachment 4 and R315-8-6.8(d) and (e) for the groundwater monitoring program.
- III.D.1.d USS shall follow the requirements for measurement of the groundwater surface elevation in R315-8-6.8(f).
- III.D.1.e USS shall survey once in every three years the top surface apron elevation and top of casing elevation of all existing groundwater monitoring wells.
- III.D.1.f USS shall notify the Executive Secretary at least ten calendar days prior to any sampling event required under this Permit
- III.D.2 USS shall install and maintain a groundwater monitoring system in consideration of the results of the statistical analysis performed as specified below:
- III.D.2.a Well construction shall follow the techniques described in the *Technical Enforcement Guidance Document (TEGD), OSWER-9950.1*, (current edition). All monitoring wells shall be cased in a manner that maintains the integrity of the monitoring well bore hole. This casing shall be screened or perforated and packed with gravel or sand where necessary, to enable collection of groundwater samples. The annular space, the space between the bore hole and well casing above the

sampling depth must be sealed to prevent contamination of samples and the groundwater.

- III.D.2.b USS shall construct and maintain new monitoring wells in accordance with plans and specifications approved by the Executive Secretary.
- III.D.2.c USS shall install additional groundwater monitoring wells to maintain compliance if subsurface conditions significantly change or as required by the Executive Secretary. Such changes may include, but are not limited to, water level elevation or apparent flow direction changes, or detection of organic constituents in a well. If at any time hazardous waste constituents exceeding the groundwater protection standard concentration limits, as defined in Condition III.C. are detected in the furthest most hydraulically downgradient monitoring well(s), USS shall install additional groundwater monitoring wells further downgradient so that there is always at least one well beyond, but in the path of, the plume.
- III.D.2.d If new information or unforeseen circumstances reveal a need for additional monitoring to protect human health and the environment, USS may be required to install and sample additional wells at any time during post-closure or compliance periods.
- III.D.2.e USS shall submit monitoring well completion reports which include boring logs, sieve analysis (grain size), standard penetration tests, analytical tests performed on soils (Atterberg limits, etc.), water level elevations, groundwater contour maps, well development results including recharge rates, and cross sections or fence diagrams within 90 calendar days after completion of any new well installation.
- III.D.2.f USS shall maintain monitoring wells in a fully operational condition for the duration of this Permit. USS shall notify the Executive Secretary within fifteen (15) working days when a well is no longer properly functioning (including a marked change in pumping rate, presence of sandy or silty materials, and cracked or broken casings) or when USS intends to close one or more wells associated with the HWI. The Executive Secretary shall approve the conditions for replacement or correction of improperly operating wells.
- III.D.2.g USS shall determine on an annual basis the depth to the bottom of all groundwater monitoring wells. This information shall be recorded on well purging volume calculation sheets as required. If a problem is observed, USS shall follow the procedures described above in Condition III.D.2.f regarding notification and corrective procedures.
- III.D.2.h All wells deleted from the monitoring program shall be plugged and abandoned in such a manner as to prevent vertical movement of water within the borehole and to prevent the annular space surrounding the well casing from becoming a conduit for possible contamination of the groundwater supply. Well abandonment shall be

accomplished in accordance with R655-4-12 and 13 of the Utah Administrative Code.

III.D.3 Sampling and Analysis Procedures.

III.D.3.a USS shall include and maintain consistent sampling and analysis procedures in the groundwater monitoring program that are designed to ensure reliable monitoring results of groundwater quality below the Impoundments. As required by Attachment 4 and R315-8-6.8(d), the program shall include procedures and techniques for:

III.D.3.a.i Sample collection;

III.D.3.a.ii Sample preservation and shipment;

III.D.3.a.iii Analytical procedures;

III.D.3.a.iv Chain-of-custody control; and

III.D.3.a.v Quality assurance and control.

III.D.3.b The sampling and analytical methods shall be appropriate for groundwater sampling and shall accurately measure hazardous waste constituents in groundwater samples, as required by R315-8-6.8(e).

III.D.3.c USS shall use the following techniques and procedures when obtaining samples and analyzing samples from the groundwater monitoring wells:

III.D.3.c.i USS shall collect groundwater samples by the technique described in Attachment 4 and as required by R315-8-6.8(e).

III.D.3.c.ii USS shall preserve and transport groundwater samples in accordance with the procedures specified in Attachment 4 and as required by R315-8-6.8(d).

III.D.3.c.iii Samples shall be analyzed according to SW-846, using methods delineated in Condition III.C. or an equivalent EPA-approved method that has been pre-approved as per Condition I.P.3, and the procedures specified in Attachment 4. In addition, USS shall comply with the following requirements:

III.D.3.c.iii.A The use of quality control sample data shall be explained in full detail, except that USS shall provide at least one field blank, one equipment blank, one set of replicates representing 10% of the total number of samples, and one trip blank for analysis at each sampling event performed under the groundwater monitoring program. Any field, trip, or equipment blanks exceeding a value equal to three (3) times the method detection limit for any organic parameter may result in rejection of the data for that parameter. This may require resampling of all wells sampled during that particular sampling event that are associated with the affected blank,

for the specified compounds. Qualifiers shall be indicated on all organic laboratory reports when blanks indicate contamination above the method detection level.

III.D.3.c.iii.B The Executive Secretary may request at any time all laboratory QA/QC documentation and supporting data on any sampling episode. The laboratory QA/QC documentation shall be retained at Anderson Geneva throughout the Post-Closure Care Period.

III.D.3.c.iii.C Samples shall be tracked and controlled using the chain-of-custody procedures specified in Attachment 4 and as required by R315-8-6.8(d).

III.D.3.c.iii.D In the case of sample breakage (e.g. during shipping), resampling shall take place within fifteen (15) working days of USS being notified of such breakage. Notification in accordance with Condition III.D.1.f is not required for this type of resampling event.

III.D.4 Groundwater Elevation.

III.D.4.a USS shall determine the groundwater surface elevation in all groundwater wells and piezometers each time the groundwater is sampled as required by R315-8-6.8(f).

III.D.4.b USS shall determine the groundwater flow rate and direction in the uppermost aquifer based on groundwater surface elevation measurements and on re-surveyed well apron elevations. An updated groundwater contour map shall be submitted to the Executive Secretary not later than September 30th of each year in which the groundwater wells are resurveyed.

III.E MONITORING PROGRAM

III.E.1 USS shall determine groundwater quality at the HWI as follows:

III.E.1.a USS shall collect, preserve, and analyze groundwater samples pursuant to Condition III.D.

III.E.1.b USS shall determine the flow rate and direction in the uppermost aquifer pursuant to Condition III.D.4.

III.E.1.c USS shall analyze samples from all groundwater monitoring wells at the HWI in accordance with Table I of Attachment 6, which lists the parameters, analytical methods, and monitoring frequency applicable to each well. The data gathered and generated during each sampling event shall be submitted to the Executive Secretary in accordance with Condition III.F.

III.F REPORTING AND RECORDKEEPING

III.F.1 USS shall enter all monitoring, testing and analytical data obtained pursuant to Condition III.D.3 in the HWI operating record.

III.F.2 USS shall submit to the Executive Secretary the analytical results required by Condition III.E.1.c, and in accordance with the following schedule:

	Sampling Events	Results Due To The Executive Secretary
-		
	December - May	July 15
-		
	June - November	January 15