Official Draft Public Notice Version **August 12, 2024**
The findings, determinations, and assertions contained in this document are not final and subject to change following the public comment period.

STATE OF UTAH
DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF WATER QUALITY
P.O. BOX 144870
SALT LAKE CITY, UTAH 84114-4870

Ground Water Discharge Permit
Permit No. UGW350008

In compliance with the provisions of the Utah Water Quality Act, Title 19, Chapter 5, Utah Code Annotated 1953, as amended, the Act,

Kennecott Utah Copper LLC (KUC)
4700 Daybreak Parkway
South Jordan, Utah 84009

is granted a Ground Water Discharge Permit for the continued operation of the **Smelter** in Salt Lake County, Utah.

The Smelter is located on a tract of land encompassed in Sections 16, 17, 20 and 21 Township 1 South, Range 3 West, Salt Lake Base and Meridian. (112º 11' 47" W. Long. and 40º 43' 27" N. Lat.)

The permit is based on representations made by the Permittee and other information contained in the administrative record. It is the responsibility of the Permittee to read and understand all provisions of this permit.

The facility shall be maintained and operated in accordance with conditions set forth in the permit and the Utah Ground Water Quality Protection Regulations (Utah Admin Code R317-6).

This Ground Water Quality Discharge Permit for the Smelter supersedes all other Ground Water Discharge Permits for this facility previously issued.

This permit shall become effective on _____, 2024.

This permit and the authorization to operate shall expire at midnight _____, 2029.

Signed this _____day of _____, 2024.

_____
John K. Mackey P.E.
Director

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I. SPECIFIC PERMIT CONDITIONS

A. Ground Water Classification

The ground water classification for the uppermost aquifers in the vicinity of the Smelter is generally Class III ground water based on Total Dissolved Solids (TDS) and the presence of contaminants. The shallow and intermediate aquifers have been affected by historical Smelter operations from previous smelter structures and activities. Many site monitoring wells currently exceed one or more Utah Ground Water Quality Standards.

B. Ground Water Protection Levels

Ground Water Protection Levels, based on monitoring wells NES729 and NES2556, are established for the Slag Cooling Area to prevent degradation of existing water quality and are shown in Table 3. Protection levels and compliance limits are based on Utah Admin Code R317-6-4. The permittee shall operate the facility such that the ground water standards and protection levels developed for this permit are not exceeded at the designated compliance monitoring points.

C. Permitted Facilities

The 19 Facilities authorized under this permit are listed in Table 1A column 1. These facilities constitute those, not permitted by rule, where there is potential for release of pollutants to ground water. The 9 facilities listed in Table 1B under the "Permit By Rule" heading are for unit processes not specifically addressed by this permit. However, no discharge of pollutants to ground water from these sites is allowed. All facilities are depicted on Figure 2.

Two new equipment decontamination and material processing pads will be constructed at the facility. These facilities will be constructed to the same containment and construction standards as the existing pads and will be built under the oversight and approval of a construction permit issued by the Division of Water Quality. The basins are used to store, test, and dry soils and sludges excavated at the facility during routine operations and maintenance as well as cleanup actions and equipment decontamination. Once the materials have been characterized and dried they are transported for appropriate disposal. The final location of the new pads is being determined. Once the location for the pads is final a new facility map will be submitted showing the new permitted facilities.

D. Best Available Technology Performance Standard

The administration of this permit is founded on the use of best available technology (BAT), in accordance with the definition in Utah Admin. Code R317-6-1. The enforceable performance standard for this permit to achieve protection of ground

water quality will be no discharge of process fluids to ground water from the permitted facilities listed in column 1 of Table 1A. The permittee is responsible for implementing the BAT noted in column 2 (BAT Description) of Table 1A to prevent discharge of process fluids from the permitted facilities to ground water. Maintenance of this performance standard will be demonstrated by:

1. Operation and maintenance of the leak collection and removal systems as specified in column 3 of Table 1A.

2. Adherence to the performance criteria in Table 1A (column 4).

3. No ground water degradation beyond historical mean values for perimeter monitoring wells listed in Part I E.2., and the greater of protection levels and compliance limits established in Table 3 for unit process wells at the Slag Cooling Area.

4. Implementation of the Best Management Practices (BMP) Plan (Appendix A) to ensure prompt cleanup of any spills and proper handling of cooling and run off waters at the Acid Plant, Hydrometallurgical Plant, Anode Casting Process, the materials storage pads, matte storage area & sump, and equipment decontamination pad & sump.

5. Implementation of Corrective Action Plan for the Kennecott (KUC) Smelter Acid Loading Facility (Appendix D) to contain, control, and reduce level of contamination when the BAT for the Acid Loading Facility fails to prevent discharge of sulfuric acid to ground water.

E. Compliance Monitoring

1. General Provisions

a) *Future Modification of the Monitoring Network* - If at any time the Director determines the monitoring program to be inadequate, KUC shall submit within 30 days of receipt of written notice from the Director a modified monitoring plan that addresses the inadequacies noted by the Director.

b) *Compliance Monitoring Period* - Monitoring shall continue through the term of this permit. For compliance monitoring wells that are installed during the term of this permit, monitoring shall commence upon completion of the well installation and development.

c) *Laboratory Approval* - All water quality analyses shall be performed by a laboratory certified by the State of Utah to perform such analysis.

d) *Water Level Measurement* - In association with each well sampling event, water level measurements shall be made in each monitoring well prior to removal of any water from the well bore. These measurements will be made from a permanent single reference point clearly marked on the top of the well or surface casing. Measurements will be made to the nearest 0.01 foot.

e) *Sampling Protocol* - Water quality samples will be collected, handled, and analyzed in conformance with the currently approved version of the KUC Ground Water Characterization and Monitoring Plan.

f) *Constituents Sampled* - The following analysis shall be performed on all water monitoring samples collected:

i) Field Measurements: pH, specific conductance, temperature.

ii) Laboratory Analysis:

- (TDS);
- chloride, sulfate
- Metals (dissolved): arsenic, barium, cadmium, chromium, copper, lead, selenium, zinc.

2. Compliance Monitoring Wells

KUC shall monitor the following unit process wells adjacent to the Slag Cooling Area: NES729 and NES2556 (Table 3) which contains the protection levels and compliance limits.

KUC shall monitor throughout the term of this permit the following wells to assess BMPs: NES620B, NES621A and B, NES622A and B, NES623A and B, NES693 NES696, NES698A and B, NES700, NES701, NES702, NES703, NES715A and B, NES718, NES725, NES2574, NES2589, NES2590, NES2793B, NES2794 and NES2797A,B, and C. Each of these above listed wells will be monitored for analytical trends but analytical parameter compliance limits are not set. If analytical trends show significant changes in concentration magnitude or trend upward, as determined by the director the Permit may be re-opened and modified by the Director to incorporate compliance limits.

KUC will continue to follow the Corrective Action Plan (CAP) for the Acid Tank Farm as described in Appendix D. Groundwater cleanup targets are listed in Appendix D, Table 1. Compliance

monitoring wells NES1364 and NES1365 will be sampled on a quarterly basis. Target compliance limits are listed for the two compliance wells to track the remedial pumping results. If the pH falls below 5.5, additional reporting is required.

3. Monitoring Frequency

Unit Process wells shall be sampled semi-annually (twice each year at approximately six-month intervals) throughout the duration of this permit. Perimeter monitoring wells shall be sampled semi-annually. For any new compliance monitoring wells that are installed, the permittee shall collect at least eight independent samples at equal time intervals over a two-year period or sooner from each well. The samples shall be analyzed for major ions and the parameters listed in Part I.E.1.f. Compliance wells sampled for Corrective Action Plan (Appendix D) will be sampled on a quarterly basis and the analytical constituents listed above.

4. BMP Plan and BAT Performance Monitoring Plan

a) KUC shall verify the operation of the BAT designated for each facility listed in column 1 of Table 1A with an inspection and maintenance program (referred to as the BMP Plan (Appendix A)). Documentation of compliance with this program shall be maintained on site for review by representatives of the Division of Water Quality (DWQ).

b) KUC shall monitor the performance of each unit process that utilizes a leak collection and removal system in accordance with the BAT Performance Monitoring Plan (Appendix B). The results of this monitoring shall be reported in accordance with the schedule in Part I Section G.

5. Operational Monitoring

a) For this permit, KUC is no longer required by DWQto characterize the fluids utilized in the smelter processes for the unit process sites listed on Table 2.

b) KUC may continue to monitor the operational monitoring sumps and ponds on an as-needed basis.

F. Demonstration of Compliance for BAT

1. Unit Processes with Leak Collection and Removal

a) *Performance Criteria* - KUC shall operate the facilities listed in Table 1A in accordance with the performance criteria noted therein. All instances where a performance criterion is exceeded shall be reported in the semi-annual ground water monitoring report.

b) *Response to a Valid Leak Alarm* - A valid leak alarm is defined as a condition where the leak collection system exceeds the performance criteria outlined in Table 1A Column 4. Upon determination that performance criteria from Table 1A Column 4 have been exceeded, KUC shall immediately:

Remove fluid from the affected leak collection system to a level below the allowable maximum fluid level specified in Table 1A and determine the leakage rate entering the leak collection system. If the cause of the high level or leakage rate can be repaired within 24 hours of detection of the alarm condition, KUC is not obligated to undertake items i through iv of Part I Section F 1.b. Note: This does not imply that there is a leak to the environment, but that there is a leak in the primary liner being captured by the secondary liner (leak collection system). If the cause of the high level or leakage rate cannot be repaired within 24 hours of detection of the alarm condition, KUC shall undertake the following actions:

i) Sample the effluent from the collection system for water quality field and lab constituents noted in Part I Section E 1(f) and submit the analytical results the next semi-annual monitoring report.

ii) Notify the Director in writing within 5 business days that a performance criterion has been exceeded and what the measured leakage rate in the affected leak collection system is.

iii) If the leakage rate is in excess of the maximum rate specified in Table 1A, KUC shall implement the approved Leak Detection and Repair plan (Appendix C).

iv) Remove fluids from any affected leak collection system on a continuous basis to maintain fluid levels less than the specified maximum allowable head in Table 1A.

c) *Non-Compliance Status* - Failure to maintain BAT or exceeding a performance criterion specified in Table 1A Column 4 shall be a violation of permit conditions relating to best available technology.

KUC may affirmatively defend against that action by demonstrating the following:

i) KUC has conformed with the provisions of Part I Section F 1 b of this permit.

ii) The failure of BAT was not intentional nor was it caused by KUC's negligence, either in action or in failure to act.

iii) KUC implements the Leak Detection and Repair Plan within the time frames specified by the plan.

iv) An assessment performed under the Leak Detection and Repair Plan will be reported in the semi-annual reports.

2. Monitoring Wells

a) *General Provisions* - Unit process monitoring wells have been installed adjacent to and downgradient from the Slag Cooling Area to detect releases to ground water. Wells will be monitored in accordance with the compliance monitoring requirements of Part I Section E of this permit. Protection levels and compliance limits for TDS, pH, sulfate, and metals are listed in Table 3. Perimeter wells should be evaluated if constituents show a statistically significant increase above historical background levels of that well. Statistical significance shall be determined using methods described in Statistical Methods for Evaluating Ground Water Monitoring Data from Hazardous Waste Facilities, Vol. 53, No. 196 (Federal Register, Oct. 11, 1988) and provided in UAC R317-6-4.

b) *Probable Out of Compliance* - When water quality sampling of Unit Process Well(s) shows that the compliance limits have been exceeded KUC shall:

i) Immediately re-sample the monitoring well(s) that has exceeded compliance limits, submit analytical results from the re-sampling, and notify the Director of the probable out-of-compliance status within 30 days of initial detection.

ii) Implement a monthly frequency of sampling for the ground water monitoring well(s) in question. The monthly frequency shall continue until the Director notifies KUC that a semi-annual monitoring frequency can be resumed.

c) *Out of Compliance Status* - After completion of the accelerated monitoring results obtained under monthly sampling as per Part I F 2(b), KUC shall determine if statistically higher concentrations of a ground water pollutant have occurred in excess of the compliance

limits. Upon making this determination KUC shall:

i) Notify the Director of the out of compliance status within 24 hours of detection.

ii) Submit a Source Assessment and Compliance Schedule to the Director within 30 days of detection of the out of compliance status that outlines the following:

- Steps of action that will assess the extent of the contamination and identify its source.
- Measures that will be taken to alleviate contribution of any further contamination to the ground water and prevent any recurrence of the non-compliance.
- Actions that will be taken to mitigate and remediate existing contamination from the repository.

iii) Implement the Source Assessment and Compliance Schedule within 120 days of approval by the Director.

3. Unit Processes with BMPs

KUC shall operate the Acid Plant, Hydrometallurgical Plant, the Anode Casting Process, materials storage pads, matte storage area & sump, and the vehicle decontamination pad & sump, in accordance with the BMP specified in Appendix A and Corrective Action Plan applicable to Acid Loading Facility in Appendix D.

4. Process Pond Overflows

When water from process ponds overflow into their respective storm water ponds, KUC shall:

a) Sample the overflow effluent in the storm water pond for water quality field and lab constituents identified in Part I Section E 1 f unless all waters in the storm water pond can be pumped back into the process water pond within 24 hours after start of release. The results of sampling shall be reported in the semi-annual water quality monitoring report.

b) The date and duration of all process water overflows shall be reported in the semi-annual monitoring report.

c) Remove fluids from the storm water ponds and return to the process water system. Storm pond level is considered empty at 5% of total volume.

d) Notify DWQ of any releases from the storm water ponds to the environment. Reporting shall follow the requirements of Part II.I.1,2 and 3 as applicable. Include information about the duration of the event and estimated volume released.

G. Reporting Requirements

1. Reporting

a. *Monitoring Wells* - Water quality sampling results with supporting data shall be submitted semi-annually to the Director as follows:

Quarter Sampled In	Report Due On
January through June	August 15
July through December	February 15

b. *Electronic Filing Requirements* - The Permittee will submit the required ground water monitoring data as follows.

1. Interpretation and laboratory analytical reports are to be submitted in pdf format.
2. Historical and new well construction logs and documents are to be submitted in pdf format.
3. All data collected from monitoring wells, piezometers, sumps, and operational monitoring locations are to be submitted in xlsx format. These data points need to include well identification, latitude, longitude, sample date, and all analyte data.
4. Submission of Data – All reports and data files are required to be submitted through the DWQ web submission portal at: https://deq.utah.gov/water-quality/water-quality-electronic-submissions or designated e-mail address: WQinfodata@utah.gov to get the submission ID.

Failure to submit reports within the time frame due shall be deemed as noncompliance and may result in enforcement action.

H. Compliance Schedule

1. Corrective Action - Within 45 days of notification by the Director that corrective action is not proceeding in a timely fashion, KUC shall submit for approval a Contamination Investigation and Corrective Action Plan. The characterization of pollution shall include a description of the amount, form, concentration, toxicity, environmental fate and transport and other significant characteristics of pollutants present. The Corrective Action Plan shall describe the measures that will be taken to contain, remove or eliminate contamination.

2. If KUC must place more than 50 tons of any material, other than those listed below, on the storage pads for duration greater than one month, the Director shall be notified. The notification will propose a plan for the characterization of these materials for approval by the Director. Materials can be stored in the Smelter area with controls compliant with stormwater and environmental requirements. Allowable materials:

    a. Copper Concentrate
    b. Matte
    c. Flux
    d. Slag (including Flash Smelting, Flash Converter and Anode Slags)
    e. Copper Reverts (Furnace Dusts and Other By-Products)
    f. Process Pond Sediments
    g. Barney's Canyon Ore

3. If any construction should result in the abandonment of monitoring wells listed in Part I.E.2., or make them unsafe to sample, KUC shall pursue one of the following alternatives: replace the wells in a suitable location, recommend existing wells as replacements, or present an alternative plan for monitoring that will assess best management practices for the protection of ground water throughout the term of the permit.

4. Within one year of permit issuance KUC may propose for Director review and approval additional informational wells for compliance that specifically monitor ground water quality near potential source contributions distributed throughout the Smelter footprint.

5. Within 180 days of permit issuance KUC shall submit to the Director for review and approval a map or maps of the facility area including the location of specific facilities, monitoring wells and locations contained in Tables 1A, 1B and 2. If the Facility has not been altered the previous map may be re-submitted.

6. Within 180 days of permit issuance KUC shall submit to the Director for review and approval a series of contour maps of the site-wide facility area that display selenium, arsenic, and chloride concentrations and groundwater elevations. The contour maps provided will include 2009, 2013, 2018, 2022 which coincide with previous permit renewal years so that changes over time can be depicted and as a basis for future groundwater permit renewal packages.

II. MONITORING, RECORDING AND REPORTING REQUIREMENTS

A. Representative Sampling

Samples taken in compliance with the monitoring requirements established under Part I shall be representative of the monitored activity.

B. Analytical Procedures

Water sample analysis must be conducted according to test procedures specified under UAC R317-6-6.3L, unless other test procedures have been specified in this permit.

C. Penalties for Tampering

The Act provides that any person who falsifies, tampers with, or knowingly renders inaccurate, any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than $10,000 per violation, or by imprisonment for not more than six months per violation, or by both.

D. Reporting of Monitoring Results

Monitoring results obtained for each monitoring period specified in the permit, shall be submitted to the DWQ web submission portal at: https://deq.utah.gov/water-quality/water-quality-electronic-submissions or care of the Director, Utah DWQ at the following address no later than 45 days after the end of the monitoring period:

Utah Division of Water Quality
P.O. Box 144870
Salt Lake City, Utah 84114-4870
Attention: Ground Water Protection Section

E. Compliance Schedules

Reports of compliance or noncompliance with any progress reports on interim and final requirements contained in any Compliance Schedule of this permit shall be submitted no later than 14 days following each schedule date.

F. Additional Monitoring by the Permittee

If the Permittee monitors any pollutant more frequently than required by this permit, using approved test procedures as specified in this permit, the results of this monitoring shall be included in the calculation and reporting of the data submitted. Such increased frequency shall also be indicated.

G. Records Contents

Records of monitoring information shall include:

1. The date, exact place, and time of sampling or measurements:
2. The individual(s) who performed the sampling or measurements;

3. The date(s) and time(s) analyses were performed;
4. The individual(s) who performed the analyses;
5. The analytical techniques or methods used; and,
6. The results of such analyses.

H. Retention of Records

The Permittee shall retain records of all monitoring information, including all calibration and maintenance records and copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least three years from the date of the sample, measurement, report or application. This period may be extended by request of the Director at any time.

I. Twenty-four Hour Notice of Noncompliance and Spill Reporting

1. The Permittee shall verbally report any noncompliance, or spills subject to the provisions of UCA 19-5-114, which which states "Any person who spills or discharges any oil or other substance which may cause the pollution of the waters of the state shall immediately notify the director of the spill or discharge, any containment procedures undertaken, and a proposed procedure for cleanup and disposal, in accordance with the rules of the board". Per Utah Admin Code R317-6.15.B.1 the report will be made to the Director of DWQ within 24 hours through the Utah Department of Environmental Quality 24-hour hotline at (801) 536-4123 or to DWQ, Ground Water Protection Section at (801) 536-4300, during normal business hours.

2. A written submission shall also be provided to the Director within five business days of the time that the Permittee becomes aware of the circumstances. The written submission shall contain:

   a. A description of the noncompliance and its cause;

   b. The period of noncompliance, including exact dates and times;

   c. The estimated time noncompliance is expected to continue if it has not been corrected; and

   d. Steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.

3. Reports shall be submitted to the address in Part II.D, Reporting of Monitoring Results.

J. Other Noncompliance Reporting

Instances of noncompliance not required to be reported within 24 hours, shall be reported at the time that monitoring reports for Part II.D are submitted.

K. Inspection and Entry

The Permittee shall allow the Director, or an authorized representative, upon the presentation of credentials and other documents as may be required by law, to:

1. Enter upon the Permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of the permit;

2. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;

3. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and,

4. Sample or monitor at reasonable times, for the purpose of assuring permit compliance or as otherwise authorized by the Act, any substances or parameters at any location.

III. COMPLIANCE RESPONSIBILITIES

A. Duty to Comply

The Permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Act and is grounds for enforcement action; for permit termination, revocation and re-issuance, or modification; or for denial of a permit renewal application. The Permittee shall give advance notice to the Director of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

B. Penalties for Violations of Permit Conditions

The Act provides that any person who violates a permit condition implementing provisions of the Act is subject to a civil penalty not to exceed $10,000 per day of such violation. Any person who willfully or negligently violates permit conditions is subject to a fine not exceeding $25,000 per day of violation. Any person convicted under Section 19-5-115(2) of the Act a second time shall be punished by a fine not exceeding $50,000 per day. Nothing in this permit shall be construed to relieve the Permittee of the civil or criminal penalties for noncompliance.

C. Need to Halt or Reduce Activity not a Defense.

It shall not be a defense for a Permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

D. Duty to Mitigate

The Permittee shall take all reasonable steps to minimize or prevent any discharge in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

E. Proper Operation and Maintenance

The Permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the Permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance also include adequate laboratory controls and quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems which are installed by a Permittee only when the operation is necessary to achieve compliance with the conditions of the permit.

IV. GENERAL REQUIREMENTS

A. Planned Changes

The Permittee shall give notice to the Director as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is required when the alteration or addition could significantly change the nature of the facility or increase the quantity of pollutants discharged.

B. Anticipated Noncompliance

The Permittee shall give advance notice of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

C. Permit Actions

This permit may be modified, revoked and reissued, or terminated for cause. The filing of a request by the Permittee for a permit modification, revocation and re-issuance, or termination, or a notification of planned changes or anticipated noncompliance, does not stay any permit condition.

D. Duty to Reapply

If the Permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the Permittee must apply for and obtain a permit renewal or extension. The application should be submitted at least 180 days before the expiration date of this permit.

E. Duty to Provide Information

The Permittee shall furnish to the Director, within a reasonable time, any information which the Director may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit. The Permittee shall also furnish to the Director, upon request, copies of records required to be kept by this permit.

F. Other Information

When the Permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or any report to the Director, it shall promptly submit such facts or information.

G. Signatory Requirements.

All applications, reports or information submitted to the Director shall be signed and certified.

1. All permit applications shall be signed as follows:

   a. For a corporation: by a responsible corporate officer;

   b. For a partnership or sole proprietorship: by a general partner or the

proprietor, respectively.

c. For a municipality, State, Federal, or other public agency: by either a principal executive officer or ranking elected official.

2. All reports required by the permit and other information requested by the Director shall be signed by a person described above or by a duly authorized representative of that person. A person is a duly authorized representative only if:

a. The authorization is made in writing by a person described above and submitted to the Director; and

b. The authorization specified either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position.)

3. Changes to Authorization. If an authorization under Part IV.G.2 is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of Part IV.G.2 must be submitted to the Director prior to or together with any reports, information, or applications to be signed by an authorized representative.

4. Certification. Any person signing a document under this section shall make the following certification:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

H. Penalties for Falsification of Reports

The Act provides that any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports

of compliance or noncompliance shall, upon conviction be punished by a fine of not more than $10,000 per violation, or by imprisonment for not more than six months per violation, or by both.

I. Availability of Reports

Except for data determined to be confidential by the Permittee, all reports prepared in accordance with the terms of this permit shall be available for public inspection at the offices of the Director. As required by the Act, permit applications, permits, effluent data, and ground water quality data shall not be considered confidential.

J. Property Rights

The issuance of this permit does not convey any property rights of any sort, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations.

K. Severability

The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

L. Transfers

This permit may be automatically transferred to a new Permittee if:

1. The current Permittee notifies the Director at least 30 days in advance of the proposed transfer date;

2. The notice includes a written agreement between the existing and new Permittee containing a specific date for transfer of permit responsibility, coverage, and liability between them; and

3. The Director does not notify the existing Permittee and the proposed new Permittee of his or her intent to modify, or revoke and reissue the permit. If this notice is not received, the transfer is effective on the date specified in the agreement mentioned in paragraph 2 above.

M. State Laws

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the Permittee from any responsibilities, liabilities, penalties established pursuant to any applicable state law or regulation under authority preserved by Section 19-5-117 of the Act.

N. Reopener Provision

This permit may be reopened and modified (following proper administrative procedures) to include the appropriate limitations and compliance schedule, if necessary, if one or more of the following events occurs:

1. If new ground water standards are adopted by the Board, the permit may be reopened and modified to extend the terms of the permit or to include pollutants covered by new standards. The Permittee may apply for a variance under the conditions outlined in R317-6-6.4.D.

2. If alternate concentration limits or compliance mechanisms are required.

3. If water quality of the facility is significantly worse than represented in the permit application.

GROUND WATER DISCHARGE PERMIT UGW350008
STATEMENT OF BASIS

Kennecott Utah LLC; Smelter
Magna, Utah

August 2024

Introduction

The Division of Water Quality (DWQ) under the authority of the Utah Ground Water Quality Protection Rules[1] (Ground Water Rules) issues and renews ground water discharge permits to facilities which have a potential to discharge contaminants to ground water[2]. As defined by the Ground Water Rules, such facilities include mining operations[3]. The Ground Water Rules are based on an anti-degradation strategy for ground water protection as opposed to non-impact; therefore, discharge of contaminants to ground water may be allowed provided that current and future beneficial uses of the ground water are not impaired and the other requirements of Utah Administrative Code 317-6-6.4.A. are met[4]. Following this strategy, ground water is divided into classes based on its quality[5]; and higher-quality ground water is given greater protection[6] due to the greater potential for beneficial uses.

The Director has developed permit conditions consistent with Utah Admin. Code R317-6 and appropriate to the nature of the mined materials, facility operations, maintenance, best available technology[7] (BAT) and the hydrogeologic and climatic conditions of the site, to ensure that the operation would not contaminate ground water.

Basis for Permit Renewal

This Permit is being renewed in accordance with Utah Admin. Code R317-6-6.7. However, a permit may be terminated or a renewal denied if any one of the four items in Utah Admin. Code R317-6-6.8 applies:

A. Noncompliance by the permittee with any condition of the Permit where the permittee has failed to take appropriate action in a timely manner to remedy the Permit violation;

B. The permittee's failure in the application or during the Permit approval process to disclose fully all significant relevant facts at any time;

C. A determination that the permitted facility endangers human health or the environment and can only be regulated to acceptable levels by plan modification or termination; or

D. The permittee requests termination of the Permit.

[1] Utah Admin. Code Rule 317-6
[2] https://deq.utah.gov/ProgramsServices/programs/water/groundwater/docs/2008/08Aug/GWQP_PermitInfo.pdf
[3] Utah Admin Code Rule 317-6-6.1A
[4] Preamble to the Ground Water Quality Protection Regulations of the State of Utah, sec. 2.1, August, 1989
[5] Utah Admin. Code Rule 317-6-3
[6] Utah Admin. Code Rule 317-6-4
[7] Utah Admin. Code Rule 317-6-1(1.3)

Permit Changes and Modifications

Two new equipment decontamination and material processing pads will be constructed at the facility. These facilities will be constructed to the same containment and construction standards as the existing pads and will be built under the oversight and approval of a construction permit issued by the DWQ The basins are used to store, test, and dry soils and sludges excavated at the facility during routine operations and maintenance as well as cleanup actions and equipment decontamination. Once the materials have been characterized and dried they are transported for appropriate disposal. The final location of the new pads is being determined. Once the location for the pads is final a new facility map will be submitted showing the new permitted facilities.

Background

PERMIT HISTORY

The Ground Water Discharge Permit Application for the facility was initially submitted to DWQ in 1991 (Kennecott Utah Copper (KUC), 1991). Permit UGW350008 was subsequently issued to KUC in 1992 in accordance with Utah Admin. Code R317-6-6.4. The Permit was renewed on October 27, 1998, March 9, 2000, October 26, 2003, September 15, 2008, November 20, 2013, and April 29, 2019. Excluding minor permit modifications, this is the seventh renewal of the UGW350008 Permit. To assure adequate ground water quality protection, the facility was designed to employ discharge minimization and control technology with ground water monitoring to prevent any impairment of present and future beneficial uses of the ground water.

Compliance monitoring for this facility is a combination of ground water monitoring and periodic inspections. Ground water monitoring is performed at wells throughout the smelter footprint and downgradient of the smelter facilities along the northern perimeter boundary. Compliance monitoring parameters, ground water quality standards, and protection limits are listed in Table 3 of the Permit. Inspections are conducted at waste process water ponds, cooling tower and repair shop basins, wash stations, sumps, drains, storage pads, cooling pads, and processing pads to verify the condition and operation of the equipment, and identify and correct maintenance issues that could lead to a release of process fluids to the environment. Appendix A of the Permit is the Best Management Practices Plan and describes operations, maintenance, and inspection procedures for the nineteen individual facilities that have BAT criteria associated with them. The document will be utilized for spill prevention, spill cleanup, materials handling, general housekeeping practices, and reporting of spill events. Appendix B is the BAT Performance Monitoring Plan, Appendix C is the Smelter Leak Detection and Repair Plan and Appendix D is the Corrective Action Plan for the Smelter Acid Loading Facility.

DESCRIPTION OF FACILITY

KUC operates a modernized smelter facility located on State Highway 201 between the towns of Lakepoint and Magna. The Smelter is located on a tract of land encompassed in Sections 16, 17, 20 and 21 Township 1 South, Range 3 West, Salt Lake Base and Meridian. (112° 11' 47" W. Long. and 40° 43' 27" N. Lat., USGS 7.5 minute quadrangle Farnsworth Peak, Utah 1972).

The Smelter facilities are comprised of nineteen individual facilities as listed below and described in Table 1A of the Permit:

1) West Process Water Pond;
2) East Process Water Pond;
3) Granulation Cooling Tower Basin;
4) Granulation Pumphouse Sump;
5) Acid Plant Pumphouse Sump;
6) Vehicle Repair Shop Basin;
7) Vehicle Wash Station;
8) Materials Storage Pads;
9) Slag Cooling Area;
10) Acid Plant;
11) Matte Storage Area and Sump;
12) Equipment Decontamination and Materials Processing Pad;
13) Anode Casting Process;
14) Intermediate By-Products Building;
15) Jacket Water Pumphouse Sump;
16) Acid Plant Cooling Water Basin;
17) Power House/Furnace Cooling Water Basin;
18) Power House/Furnace Pumphouse Sump; and
19) Other Sumps and Drains described in Table 2A of the Permit.

Figure 1 in the Permit provides an-overview of the facility and operational sumps listed in Table 2 of the permit. All monitoring locations and facilities described in Tables 1A and 1B are provided in Figure 2.

BACKGROUND INFORMATION

Three different smelters designed to process copper ore concentrates have operated consecutively and continuously at this general location since 1906. The current smelter facility was brought on-line in June 1995 and utilizes Outokumpu flash smelting technology. A major smelter shutdown occurred in the third quarter of 2023 for maintenance; there were no changes in technology or

methodologies. Primarily, the shutdown enabled a rebuild of both furnaces, a replacement-in-kind of a few baghouses, and a refresh of the catalyst in the acid plant.

The ore concentrates are melted in a high-temperature process to burn off sulfur and further separate metals from non-economic minerals. The products produced are copper anodes, precious metals, and sulfuric acid (from the off-gases in the furnaces). By-products produced by the Smelter include slag, flue dusts, As/Cd cake, stack gases, sodium perrhenate and process water. Some of these products are recycled/reclaimed onsite according to waste management regulations in R315.

KUC has incorporated environmental monitoring programs to reflect system changes made to the Smelter and continued remedial operations covered under CERCLA actions, described in detail below. For compliance purposes, this permit utilizes operational monitoring and leak detection systems for process water ponds and sumps, and ground water monitoring wells. The Quarterly Inspection Form is used to document routine inspections, and copies of the records are kept at the Smelter Record Keeping Center. Compliance documents required by this ground water discharge permit are submitted semi-annually to the Utah Division of Water Quality.

HYDROGEOLOGY AND SITE CONDITIONS

The Smelter site is located at the north end of the Oquirrh Mountains. Subsurface soils consist primarily of unconsolidated sediments of Tertiary and Quaternary age. As a result of the historic changes in water levels of Lake Bonneville a complex sequence of deltaic sand and clay, beach sands and gravels, and lake clay have been deposited at this site and comprise the Salt Lake Group. In addition, the soils in the central part of the smelter site, adjacent to Kessler Canyon, are characterized by heterogeneous colluvial sequences apparently in response to major precipitation/runoff events from the Oquirrh Mountains. These soils include mixtures of fine and coarse gravels and cobbles in fine-grained silt and clay matrices. Gravel fractions are typified by limestone and dolomite. Three aquifer systems exist in the vicinity of the Smelter: the bedrock aquifer system associated with the Oquirrh Mountains, the confined deltaic alluvial fan principal aquifer, and the unconfined shallow aquifer.

The limestone and dolomite bedrock aquifer system associated with the Oquirrh Mountains is comprised of highly fractured Paleozoic carbonate rocks. Recharge to this system is primarily from precipitation on the mountains located adjacent to and south of the Smelter. The flow path through this aquifer generally moves from the bedrock system into the principal and shallow aquifers or is discharged as spring water along bedrock contact at the base of the mountains.

The principal aquifer is a confined system that includes a gravel zone and lacustrine deposits. The gravel zone was most likely derived from the local mountains during an extensive low lake cycle. The lacustrine zone consists of clay, silt and interbedded fine sand. The ground water flow direction for this aquifer is northerly toward the Great Salt Lake. Sediments overlying the principal aquifer are relatively low in vertical hydraulic conductivities and created confined conditions in the underlying principal aquifer. Wells completed in the upper portion of the principal aquifer show an upward vertical hydraulic gradient.

The shallow aquifer system consists of interbedded lacustrine Bonneville clay, silt, and fine sand. The exact depth of this system varies but is approximately the upper 35 to 50 feet of saturated sediments. The potentiometric surface for the shallow aquifer system depicts lateral flow in a northerly direction toward the Great Salt Lake.

BACKGROUND GROUND WATER QUALITY

Based on historical operations, limited data are available that can be used to describe background water quality in the vicinity of the Smelter. Water quality of the Oquirrh Mountains fractured carbonate bedrock aquifer system is generally good with total dissolved solids (TDS) values typically less than 2000 mg/L. Water quality in the shallow aquifer is quite variable with concentrations of TDS ranging from 1,280 mg/L to 15,100 mg/L. The chemical makeup of the ground water in the shallow aquifer also varies significantly, with marked differences in concentrations of major ions such as magnesium, calcium, sodium, sulfate, and chloride. There is some evidence of impact to ground water quality from historic smelting operations. Arsenic, cadmium, and selenium values that exceed Utah Ground Water Quality Standards have been observed in the Shallow Aquifer. Water quality in the principal aquifer is similar in some respects to the shallow aquifer in that it is quite variable across the permit area. TDS concentrations vary from 944 to 8,990 mg/L. Concentrations of arsenic, selenium, and cadmium that exceed Utah Ground Water Quality Standards have been observed in the principal aquifer.

CORRECTIVE ACTION CLEAN-UP

The Ground Water Rules require applicants to submit a corrective action plan or other response measures to be taken to remedy any violation of ground water quality standards resulting from discharges occurring prior to issuance of a ground water discharge permit. Throughout the term of the previous permit and at the time of this permit renewal, KUC has been pursuing cleanup of the North Area facilities under a Memorandum of Understanding between the U.S. Environmental Protection Agency (EPA) Region VIII, The State of Utah Department of Environmental Quality, and KUC. In June 2000, KUC completed a revised remedial investigation of copper smelting and refining-related contamination in ground water, surface water, and soils at the northern end of the Oquirrh Mountains. Ground water contaminated with arsenic, selenium, and sulfate has been identified and plume boundaries delineated. The cleanup is proceeding under the auspices of a CERCLA program; most recently the EPA published a 2022 addendum to a 5 year review. Accordingly, Ground Water Quality Discharge Permit UGW350008 does not require corrective action measures in addition to the alternate CERCLA process. This permit has a compliance condition that allows the Director to call for a Contamination Investigation and Corrective Action Plan to be submitted and made a part of this permit should the existing process fail to accomplish appropriate cleanup of existing contamination at the Smelter site.

In November 2010, KUC submitted a Corrective Action Plan (CAP) to DWQ in response to the unintended release of sulfuric acid from a breach in a containment system of the KUC Smelter Acid Loading Facility. In January 2011, DWQ acknowledged and approved this plan. Groundwater cleanup standards for applicable parameters are shown in Table 1 in Appendix D of the permit. The CAP incorporated the reactivation of a groundwater extraction trench used to

contain the sulfuric acid release in 1995. KUC confirmed the functionality and efficiency of the trench through inspection and temporary pump testing to sufficiently induce water table drawdown of the shallow ground water. Full functional restoration of the trench was completed by the end of 2010. Daily monitoring via remote telemetry system, quarterly monitoring inspections and equipment maintenance recommendations for preventive maintenance are conducted by Smelter personnel. Monitoring parameters and target analyte concentrations for the trench will require on-going pumping. Reporting of the CAP is incorporated into the Smelter Semi-Annual reports.

Basis for Specific Permit Conditions

1. *Corrective Action* - Please see the discussion under Corrective Action Cleanup for an explanation of the rationale for this condition.

2. *Materials Storage Pad Characterization* - Most of the material to be stored on the storage pads has been characterized using the toxic characteristic leaching procedure (TCLP) procedure. KUC is required to perform synthetic precipitation leaching procedure (SPLP) analysis on qualifying materials not listed in the Permit under section I.H.2 to provide a more realistic assessment of leaching that may occur from these materials. The SPLP procedure uses a leaching procedure that is more akin to natural precipitation while the TCLP procedure determines if a material is characteristically hazardous or would leach in landfill conditions.

BEST AVAILABLE TECHNOLOGY AND PERFORMANCE MONITORING

Best Available Technology (BAT) is defined in Utah Admin. Code R317-6-1.3 as "... 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." For this Permit, BAT is implemented through a discharge minimization approach with a monitoring component to assess impacts to ground water quality from the operation of the Smelter facilities. This approach is coupled with the use of appropriate containment technology for process waters.

A combination of regular ground water quality monitoring from informational monitoring wells positioned throughout the Smelter site current and operational footprint, compliance monitoring wells, and continuously monitored double-lined leak detection systems provide a spatial distribution of changing ground water quality over time. The ground water quality in several portions of the Smelter facility has been impacted by previous decades of Smelter operations. Thus, determination of impacts from present day releases to ground water becomes quite tenuous without the presence of unaffected background ground water quality. However, using long-term analyte concentrations and variations as a statistical indicator of recent background water quality, will enable KUC and DWQ to better assess potential impacts to ground water quality.

Leak Collection and Removal Systems

Leak Collection and Removal Systems are a BAT control that incorporate leak collection and removal for most major facility components; he proper maintenance of these facilities will be the compliance mechanism for this permit. The BAT design used in the cooling tower basins and vehicle wash and maintenance buildings involves use of a geomembrane under-liner beneath concrete basins or sumps with a leak collection and removal system. The leak collection and removal system is continuously monitored for water level. The performance criteria required for these facilities includes maintaining less than one foot of head on the geomembrane liner. If water levels increase to above one foot, an alarm is automatically transmitted to the Smelter Control Room and corrective measures spelled out in the permit must be followed. Appendix B of the permit is the BAT Performance Monitoring Plan for these structures. This plan requires a quarterly inspection for each leak collection system to verify that the water level alarm is functioning properly.

The BAT design for the two process water ponds includes two 60 mil HDPE liners with a leak collection layer between the liners. A 12-inch thick engineered subgrade with a hydraulic conductivity not to exceed 1 x 10^{-5} cm/sec underlies the double HDPE liner system. Each cell of the process ponds has a continuous water level monitor device as described in the previous paragraph. Appendix C of the permit is the Smelter Leak Detection and Repair Plan. This appendix describes what actions must be undertaken within specified time frames if a liner repair is needed to achieve performance criteria for the ponds. In addition to the performance criteria of maintaining less than one foot of head on the lower HDPE liner, the process ponds also have performance criteria of no more than four gallons per minute allowable leakage rate entering the leak collection layer.

Unit Process Well Monitoring

There is one site where BAT design cannot feasibly include leak collection and removal. The Slag Cooling and Crushing Area is a large sloped pad with drains to collect water used in cooling slag pots. The pad BAT design includes routing of all water off the pad with no standing water allowed for this area. This site is monitored with monitoring wells NES729 and NES2556 to determine if any localized degradation is occurring. Table 3 includes the background water quality and permit limits for the two monitoring wells that will be used for compliance monitoring in this area.

Best Management Practices Sites

The Acid Plant and the Hydrometallurgical Plant are facilities with concrete floors sloped to contain spillage and drainage into sump areas. Acid proof concrete basins and sumps are used where exposure to acid is a potential. Plant equipment and machinery are constructed above grade on the contained concrete surfaces.

The Anode Casting Wheel process involves a large circular concrete facility where molten copper is poured into molds and then cooled with water. The cooling water is contained in a circular concrete trench beneath the casting wheel. Water collected in the trench is pumped to a cooling tower.

These three sites do not represent much likelihood for discharge of fluids to ground water. Any spillage in the Acid Plant and Hydrometallurgical Plant will be contained in floor sumps and drains that will not be allowed to accumulate and hold fluids for more than a few hours while clean up occurs. Similarly, the Anode Casting Process involves use of water for cooling the copper anodes in the molds. This water is circulated to a cooling tower and then returned for use again. Accordingly, the performance criteria for these sites include use of best management practices (BMP) such as prompt cleanup of any spills and adherence to good housekeeping practices. Appendix A of the permit spells out the best management practices that Kennecott will undertake for these three sites. These sites will be inspected to determine if potential discharges to ground water may be occurring. If these sites prove to be problematic, they may be subject to well monitoring requirements similar to the Slag Cooling Area.

Several other sites are included in the BMP group of sites. These include materials storage pads, matte storage area & sump, and the vehicle decontamination pad & sump. The storage pads are used for outdoor storage of copper concentrate, matte copper, blister copper, copper reverts & fines and converter slag. Appendix A has been modified to include the BMP specifics for each of these sites. The pads are designed for total containment of any runoff that does not exceed the 24-hour 25-year storm. The sumps from the matte storage area and the vehicle decontamination pad will be emptied into the process water system to avoid any leakage from these structures.

Operational Monitoring

Characterization of the water quality of process fluids that will result from the operation of the Smelter has been performed on two occasions during previous permit terms. KUC has been required to sample fluids utilized in the Smelter two times during each of these permit terms. However, because of the provenance of the water sampled, these data provide minimal information for regulatory oversight. Therefore, the operational monitoring of the sumps will continue for KUC on an as-needed basis but will not be further required by DWQ. This should offer adequate ongoing characterization of process fluids in case any adjustments in BMPs are needed.

Perimeter Monitoring Wells

The ground water monitoring well network at the northern perimeter of the Smelter provides information on ground water quality but is not used as the formal compliance mechanism in this permit. The monitoring well data will assess use of overall BMP at the Smelter to determine if water quality parameters are improving over time with the implementation of BMP for facilities.

PERMIT-BY-RULE

It should be noted that there are nine facilities within the Smelter Complex that are "permit by rule" facilities. These are listed in Table 1B of the permit to identify the BAT utilized for these structures. KUC is required by the Ground Water Rules and the Utah Water Quality Act to assure that no discharge of pollutants occurs from any of the permit by rule facilities. An example would be that KUC is responsible for conducting proper housekeeping and maintenance of the Smelter

such that storm water runoff from the Smelter to the storm water ponds is not significantly contaminated by Smelter operations.

Compliance Schedule Items

1. Within one year of permit issuance KUC will propose for Director review and approval additional informational wells for compliance that specifically monitor ground water quality near potential source contributions distributed throughout the Smelter footprint.

2. Within 180 days of permit issuance KUC shall submit to the Director for review and approval a map or maps of the facility area including the location of specific facilities, monitoring wells and locations contained in Tables 1A, 1B and 2.

3. Within 180 days of permit issuance KUC shall submit to the Director for review and approval a series of contour maps of the site-wide facility area that display selenium, arsenic, and chloride concentrations and groundwater elevations. The contour maps provided will include 2009, 2013, 2018, 2022 which coincide with previous permit renewal years so that changes over time can be depicted and as a basis for future groundwater permit renewal packages.

Ground Water Discharge Permit
Permit No. UGW350008

Attachments

Figure 1	KUC Smelter Sump Locations
Figure 2	KUC Smelter Monitoring Wells and Permitted or Permit by Rule Facility Locations
Table 1A	KUC Smelter BAT and Performance Criteria Chart
Table 1B	KUC Smelter: Permit by Rule Facilities
Table 2	KUC Operational Monitoring Points (Ponds and Sumps)
Table 3	Kennecott Smelter Permit Compliance Limits
Appendix A	BMP Plan
Appendix B	BAT Monitoring Plan
Appendix C	Smelter Leak Detection and Repair Plan
Appendix D	Corrective Action Plan for KUC Smelter Acid Loading Facility

TABLE 1A. KENNECOTT SMELTER BAT AND PERFORMANCE CRITERIA TABLE

Facility	BAT Description	Inspection and Maintenance	Performance Criteria
West Process Water Pond	Two 60 mil HDPE liners with leak collection layer; pump back system to remove leakage and minimize head; 12-inch engineered subgrade with a hydraulic conductivity of no greater than 1 x 10^{-5} cm/sec; pipe spacing in leak collection system no greater than 10 feet	Continuous water level alarm in leak collection sump; remove fluid from leak collection sump upon detection; flow rates into leak collection measured if leaking	No more than 4 gallons per minute entering leak collection system. Maintain less than 12 inches of fluid above elevation of lower HDPE liner.
East Process Water Pond	Two 60 mil HDPE liners with leak collection layer; pump back system to remove leakage and minimize head; 12-inch engineered subgrade with a hydraulic conductivity of no greater than 1 x 10^{-5} cm/sec; pipe spacing in leak collection system no greater than 10 feet	Continuous water level alarm in leak collection sump; remove fluid from leak collection sump upon detection; flow rates into leak collection measured if leaking	No more than 4 gallons per minute entering leak collection system. Maintain less than 12 inches of fluid above elevation of lower HDPE liner.
Granulation Cooling Tower Basin	Concrete basin with 60 mil HDPE underliner and leak collection and removal; continuous pump back system; pipe spacing in leak collection system no greater than 10 feet	Continuous water level alarm in leak collection sump; remove fluid from leak collection sump upon detection; flow rates into leak collection measured if leaking	No more than 2 gallons per minute entering leak collection system. Maintain less than 12 inches of fluid above elevation of lower HDPE liner.
Granulation Pumphouse Sump	Concrete basin with 60 mil HDPE underliner and leak collection and removal; continuous pump back system; pipe spacing in leak collection system no greater than 10 feet	Continuous water level alarm in leak collection sump; remove fluid from leak collection sump upon detection; flow rates into leak collection measured if leaking	No more than 2 gallons per minute entering leak collection system. Maintain less than 12 inches of fluid above elevation of lower HDPE liner.
Acid Plant Pumphouse Sump	Concrete basin with 60 mil HDPE underliner and leak collection and removal; continuous pump back system; pipe spacing in leak collection system no greater than 10 feet	Continuous water level alarm in leak collection sump; remove fluid from leak collection sump upon detection; flow rates into leak collection measured if leaking	No more than 2 gallons per minute entering leak collection system. Maintain less than 12 inches of fluid above elevation of lower HDPE liner.
Vehicle Repair Shop Basin	Concrete basin with PVC underliner and leak detection and removal	Continuous water level alarm in leak collection sump; remove fluid from leak collection sump upon detection; flow rates into leak collection measured if leaking	No more than 2 gallons per minute entering leak collection system. Maintain less than 12 inches of fluid above elevation of lower HDPE liner.
Vehicle Wash Station	Concrete basin with 60 mil HDPE underliner and leak collection and removal; continuous pump back system; pipe spacing in leak collection system no greater than 10 feet	Continuous water level alarm in leak collection sump; remove fluid from leak collection sump upon detection; flow rates into leak collection measured if leaking	No more than 2 gallons per minute entering leak collection system. Maintain less than 12 inches of fluid above elevation of lower HDPE liner

TABLE 1A. KENNECOTT SMELTER BAT AND PERFORMANCE CRITERIA TABLE

Facility	BAT Description	Inspection and Maintenance	Performance Criteria
Sumps and Drains. See Table 2 for the list of sumps and drains	Sumps, concrete or steel lined, with impervious coatings suited for the liquids handled. Drains are concrete or asphalt lined and those that convey strong acid are lined with acid resistant materials	Annual inspections to verify integrity of the lining.	No detectable leakage
Materials Storage Pads (concentrate, matte, blister copper, pond sludge, copper reverts & fines, converter slag)	Compacted road base overlain with asphalt paving. Perimeter berms three feet high for total containment of all run-off.	Monthly inspections to verify integrity of asphalt. Prompt removal of any accumulated run off waters.	Removal of storm water runoff within **5** days after the end of a storm event. Total containment of all runoff unless storm is greater than a 25 year 24- hour storm.
Slag Cooling Area	Concrete pad with sloping drain channel to remove water to west process pond	Surface inspected quarterly; repaired if needed, drainage channels kept clear	Monitoring Well(s) of Unit Process with permit limits. All runoff contained and routed to West Process Pond.
Acid Plant	Lined basins with acid resistant material in areas with potential for acid spills.	Daily monitoring of plant operations	Prompt clean up of any spills. No process fluids allowed to pond or remain on floor or in sumps. Adherence to Best Management Practices Plan. (see Appendix A and D)
Matte Storage Area with sump	10 inch thick concrete slab with 5% slope to sump	Monthly inspections to verify integrity of concrete. Continuous removal of run-off waters via sump pump to process water circuit.	Removal of storm water runoff within **5** days after the end of a storm event. Total containment of all runoff unless storm is greater than a 25 year 24 hour storm.
Equipment Decontamination and Materials Processing Pad	6 inch thick concrete slab with slope to total containment concrete sump.	Monthly inspections to verify integrity of concrete. Hydrostatic testing of sump annually.	Total containment of all runoff unless storm is greater than a 25 year 24 hour storm.
Anode Casting Process	Sloped concrete floor to concrete collection sump	Visual inspection during scheduled shutdowns for concrete integrity	No discharge of waters used for anode cooling from floor or sump. Adherence to Best Management Practices Plan. (see Appendix A)
Intermediate By-Products Building	Concrete floor with concrete floor sumps lined with HDPE.	Visual inspection of concrete floor and sumps on a quarterly basis.	No detectable leakage

TABLE 1A. KENNECOTT SMELTER BAT AND PERFORMANCE CRITERIA TABLE

Facility	BAT Description	Inspection and Maintenance	Performance Criteria
Jacket Water Pumphouse Sump	Concrete basin with 60 mil HDPE underliner and leak collection and removal; continuous pump back system; pipe spacing in leak collection system no greater than 10 feet	Continuous water level alarm in leak collection sump; remove fluid from leak collection sump upon detection; flow rates into leak collection measured if leaking	No more than 2 gallons per minute entering leak collection system. Maintain less than 12 inches of fluid above elevation of lower HDPE liner.
Acid Plant Cooling Water Basin	Concrete basin with 60 mil HDPE underliner and leak collection and removal; continuous pump back system; pipe spacing in leak collection system no greater than 10 feet	Continuous water level alarm in leak collection sump; remove fluid from leak collection sump upon detection; flow rates into leak collection measured if leaking	No more than 2 gallons per minute entering leak collection system. Maintain less than 12 inches of fluid above elevation of lower HDPE liner.
Power House/ Furnace Cooling Water Basin	Concrete basin with 60 mil HDPE underliner and leak collection and removal; continuous pump back system; pipe spacing in leak collection system no greater than 10 feet	Continuous water level alarm in leak collection sump; remove fluid from leak collection sump upon detection; flow rates into leak collection measured if leaking	No more than 2 gallons per minute entering leak collection system. Maintain less than 12 inches of fluid above elevation of lower HDPE liner.
Power House/ Furnace Pumphouse Sump	Concrete basin with 60 mil HDPE underliner and leak collection and removal; continuous pump back system; pipe spacing in leak collection system no greater than 10 feet	Continuous water level alarm in leak collection sump; remove fluid from leak collection sump upon detection; flow rates into leak collection measured if leaking	No more than 2 gallons per minute entering leak collection system. Maintain less than 12 inches of fluid above elevation of lower HDPE liner.

TABLE 1B. KENNECOTT SMELTER PERMIT BY RULE FACILITIES

Permit by Rule Facilities	Discharge Control Technology	Inspection and Maintenance [1]
West Storm water Pond	12 inch thick clay liner and 60 mil HDPE liner	Monthly inspection to verify if any leaks exist or have occurred, evaluate the integrity of the liner for structural wear or if tears exist, and inspect diked areas for mechanical or erosion issues.
East Storm water Pond	60 mil HDPE liner	Monthly inspection to verify if any leaks exist or have occurred, evaluate the integrity of the liner for structural wear or if tears exist, and inspect diked areas for mechanical or erosion issues.
Surface Storage Tanks [2]	Steel Tanks on concrete	Quarterly inspection to verify if any leaks exist or have occurred, evaluate the integrity of the structure, and inspect concrete and diked areas for mechanical or erosion issues.
Slag Concentrate Thickener	Above ground tank on a concrete pad	Monthly inspection to verify if any leaks exist or have occurred, evaluate the integrity of the structure, and inspect concrete and diked areas for mechanical or erosion issues.
Fresh Water Reservoir	60 mil HDPE liner on top of an engineered base	Monthly inspection to verify if any leaks exist or have occurred, evaluate the integrity of the liner for structural wear or if tears exist, and inspect base material and diked areas for mechanical or erosion issues.
Fire Water Pond	60 mil HDPE liner	Monthly inspection to verify if any leaks exist or have occurred, evaluate the integrity of the liner for structural wear or if tears exist, and inspect diked areas for mechanical or erosion issues.
Acid Storage/Loadout	Steel above ground tanks with cathodic protection, "membrane liner", concrete ringwall, foundation contained in diked area lined with acid resistant asphalt (void and gilsonite coating)	Monthly inspection to verify if any leaks exist or have occurred, evaluate the integrity of the liner for structural wear or if tears exist, and inspect asphalt and diked areas for mechanical or erosion issues.
Granulation Clarifier	Above ground tank	Monthly inspection to verify if any leaks exist or have occurred, evaluate the integrity of the structure, and inspect concrete and diked areas for mechanical or erosion issues.
Granulation Tanks	Above ground tanks	Monthly inspection to verify if any leaks exist or have occurred, evaluate the integrity of the structure, and inspect concrete and diked areas for mechanical or erosion issues.

[1] No performance criteria are applied to these facilities because they are Permit-by-Rule facilities under the Utah Ground Water Quality Protection Program and are not required to obtain a ground water discharge permit provided they do not cause ground water to exceed ground water quality standards or the applicable class TDS limits. If the background concentration for affected ground water exceeds the ground water quality standard, the facility may not cause an increase over background under R317-6-6.2 .

[2] Tanks included in this category are outside of buildings and actively storing hazardous liquids. Tanks storing fuels and oil are covered under SPCC regulations and excluded.

TABLE 2. KENNECOTT OPERATIONAL MONITORING POINTS (PONDS AND SUMPS)

UNIT PROCESS	SAMPLE ID	SAMPLING LOCATION
West storm water pond (East and West)	SMP737E and W	grab sample of pond water
East storm water pond	SMP1337	grab sample of pond water
Fresh water reservoir	SMP1466	grab sample of pond water
Fire water pond	SMP1467	grab sample of pond water
West process water pond (East and West)	SMP1397	grab sample of pond water
East process water pond (North and South)	SMP1399	grab sample of pond water
Granulation cooling tower basin	SMP1463	grab sample of cooling water
Slag cooling area	SMP1464	grab sample of cooling water coming off pad
Granulation clarifier and pumphouse	SMP1461	grab sample of clarifier water
Slag crushing area	SLAG DUMP	grab sample of dust suppression runoff water
Granulation tanks (A,B and C)	SMP1462A, B & C	grab sample of water from tanks
Vehicle wash station	SMP1410	grab sample of water in sump
Anode casting process	SMP1454	grab sample of water used in cooling anodes
Vehicle repair shop basin	SMP1411	grab sample of water in basin
Non-contact cooling water basins	SMP1465	grab sample of water in basin
Material storage pads	By pad name	grab sample of storm water
Matte storage area sump	MATTE STORAGE	grab sample of sump water
Decontamination pad sump	SMTR DECON	grab sample of sump water
Acid Plant Sump	SMP1455	FSG area sump
Acid Plant Sump	SMP1456	FCG area sump
Acid Plant Sump	SMP1457	Strong acid area sump
Acid Plant Sump	SMP1458	ESP area sump
Hydromet Plant/Material Storage Area Sumps	SMP1437	Limestone storage area sump
Hydromet Plant/Material Storage Area Sumps	SMP1438	Lime storage area sump
Hydromet Plant/Material Storage Area Sumps	SMP1439	Copper precipitation area sump
Hydromet Plant/Material Storage Area Sumps	SMP1440	NaHS storage area sump
Hydromet Plant/Material Storage Area Sumps	SMP1441	Acid leach area sump
Hydromet Plant/Material Storage Area Sumps	SMP1442	Bismuth precipitation filter area sump
Hydromet Plant/Material Storage Area Sumps	SMP1443	Bismuth precipitation area thickener sump
Hydromet Plant/Material Storage Area Sumps	SMP1444	copper precipitation filter area sump
Hydromet Plant/Material Storage Area Sumps	SMP1445	Arsenic/cadmium precip thickener sump
Hydromet Plant/Material Storage Area Sumps	SMP1446	Iron precipitation reactor area sump
Hydromet Plant/Material Storage Area Sumps	SMP1447	Refinery bleeds storage area sump
Hydromet Plant/Material Storage Area Sumps	SMP1448	Lime slaking area sump
Hydromet Plant/Material Storage Area Sumps	SMP1449	Lime unloading area sump

Hydromet Plant/Material Storage Area Sumps	SMP1450	Caustic tank area sump
Hydromet Plant/Material Storage Area Sumps	SMP1451	Sulfuric acid unloading area sump
UNIT PROCESS	**SAMPLE ID**	**SAMPLING LOCATION**
Hydromet Plant/Material Storage Area Sumps	SMP1452	NaHS unloading area sump
Hydromet Plant/Material Storage Area Sumps	SMP1453	Sodium bisulfite unloading area sump
West Process Pond Sumps	SMP731	Pump sump L.D. sump
West Process Pond Sumps	SMP732	West cell L.D. sump
West Process Pond Sumps	SMP733	East cell L.D. sump
East Process Pond Sumps	SMP1400	North cell L.D. sump
East Process Pond Sumps	SMP1401	South cell L.D. sump
East Process Pond Sumps	SMP1402	Pump sump L.D. sump
Tanks and Basins (Cooling Towers)	SMP1489	Acid plant cooling tower basin
Leak Detection Sumps	SMP1403	Granulation cooling tower L.D. sump
Leak Detection Sumps	SMP1404	Acid plant cooling tower L.D. sump
Leak Detection Sumps	SMP1405	Power house cooling tower L.D. sump
Leak Detection Sumps	SMP1406	Acid plant pumphouse L.D. sump
Leak Detection Sumps	SMP1407	Power house pumphouse L.D. sump
Leak Detection Sumps	SMP1408	Granulation pumphouse L.D. sump
Leak Detection Sumps	SMP1409	Water jacket pumphouse L.D. sump

TABLE 3
KENNECOTT SMELTER PERMIT COMPLIANCE LIMITS

Parameter	Utah Ground Water Quality Standard (mg/L)	Class III Monitoring Well **NES 729**			Class III Monitoring Well **NES 2556**		
		Background Level (mg/L)		Groundwater Protection Level (mg/L)	Background Level (mg/L)		Groundwater Protection Level (mg/L)
		mean	stdev		mean	stdev	
pH (units)	6.5-8.5	7.45	0.2	6.5 - 8.5	7.27	0.21	6.5 - 8.5
Arsenic	0.05	0.006	0.002	0.05	0.009	0.007	0.05
Barium	2	0.028	0.005	0.042	0.032	0.01	0.05
Cadmium	0.005	nd	n/a	0.005	nd	n/a	0.005
Chromium	0.1	nd	n/a	0.050	nd	n/a	0.050
Copper	1.3	nd	n/a	0.650	0.082	0.16	0.124
Lead	0.015	nd	n/a	0.008	nd	n/a	0.008
Se (hydride)	0.05	0.031	0.01	0.050	0.052	0.015	0.083
Zinc	5	nd	n/a	2.50	0.021	0.018	2.50
Chloride	-	152	39	228	339	139	617
Sulfate	-	225	27	338	303	80	462
TDS	10,000	800	66	1200	1200	303	1810

[1] Utah Ground Water Quality Protection Levels established in accordance with R317-6-4 .
[2] nd = non-detectable concentrations
[3] n/a = not applicable

APPENDIX A

BEST MANAGEMENT PRACTICES PLAN
FOR
ACID PLANT
HYDROMETALLURGICAL PLANT
ANODE CASTING PROCESS
DECONTAMINATION PAD AND SUMP
MATTE STORAGE AREA AND SUMP
MATERIAL STORAGE PADS
INTERMEDIATE BY-PRODUCTS STORAGE BUILDING

INTRODUCTION

The Kennecott Utah Copper (KUC) Smelter has been granted a Ground Water Discharge Permit (Permit No. UGW350008) by the State of Utah. This permit details the construction, operation and monitoring requirements for the facilities at the Smelter that have the potential of releasing fluids to the ground water. The permit specifies that Best Available Technology (BAT) be used in the construction of all facilities and that facilities be operated according to Best Management Practices (BMP).

The permit lists nineteen individual facilities that have BAT criteria associated with them and nine facilities under permit-by-rule (Figure 2). This document addresses the facilities that require a BMP Plan. These facilities are the Acid Plant, Hydrometallurgical Plant, the Anode Casting Process, the matte storage pad and sump, the decontamination pad and several material storage pads. This BMP Plan describes operations and maintenance practices that will be utilized for spill prevention, spill cleanup, materials handling, housekeeping practices and reporting of spill events.[1]

1 The BAT Performance Monitoring Plan for facilities with leak collection systems is provided in Appendix B.

BEST AVAILABLE TECHNOLOGY

Acid Plant

The acid plant is located on the southwestern portion of the modernized Smelter footprint (Figure 2). The plant incorporates lined basins with acid-resistant material in areas where the potential for acid spills exists. Equipment is constructed above-grade. Above- ground acid lines are constructed of corrosion resistant materials.

Hydrometallurgical Plant

The hydrometallurgical plant is located in the northwest corner of the modernized Smelter footprint (Figure 2). All of the process tanks are constructed above-ground on concrete pads. Floor sumps are constructed of acid-resistant materials. Process areas are provided with containment in areas where the potential for spills exists.

Anode Casting Process

The anode casting process is located in the casting building of the modernized Smelter (Figure 2). Molten blister copper is poured from the anode refining furnace directly into an anode mold. The anode is then cooled by water sprays as it is rotated. The anode is stripped from the mold and placed in an above-grade, anode cooling tank. Wash-down water will have a slightly elevated pH and metals concentration due to contact with the anode copper and the barite-coated mold.

The anode casting process area is constructed with a sloped concrete floor which drains to a circular concrete collection sump. Sumps and floor drains in the area flow to the process water recycle system.

Decontamination Pad and Sump

The equipment decontamination and material processing pad is located due west of the modernized Smelter Maintenance/Administration Building (Figure 2). The facility is used to decontaminate equipment and scrap metal via water spray. This facility is also used for processing solutions collected off materials storage pads, out of sumps or containments and from street sweeping equipment. Solutions are collected in a two-cell collection basin which separates solids for recycle and desilted water for introduction back into the process water system.

The decontamination pad is constructed with a sloped concrete floor which drains to a concrete collection basin. Solutions reporting to the basin are designed to gravity flow to the west process water ponds. The collection basin is comprised of two cells. Each cell will be hydrostatically tested twice annually to demonstrate no leakage is occurring as described in the last paragraph on page 5 of this appendix.

Matte Storage Area and Sump

The matte storage area and sump are located due east of the matte dome (Figure 2). This facility is used to store granulated matte generated from the flash smelting process prior to transport for further processing or sale.

The matte storage pad is constructed of a 10-inch thick concrete slab with a 5% slope draining to a collection sump. Solutions reporting to the collection sump are pumped to the granulation clarifier tank.

Material Storage Pads

Six material storage pads (Blending Pad, Green Concentrate Pad, Cherry Bowl, C Slag Pad, East C Slag Pad and Rail Loading Pads) and several smaller pads (and other areas compliant with stormwater and waste management requirements) are located throughout the active smelter footprint (Figure 2). These pads have been constructed to temporarily store concentrate, matte, blister copper, pond sludge, copper reverts and converter slag prior to introducing these materials back into the smelting process.

The pads are constructed of compacted road base overlain with asphalt paving. Perimeter berms provide containment of all run-offs up to a 25 year, 24-hour storm event. The pads are positioned such that no run-on of surface flows is allowed. Pads are either equipped with sump and piping to continuously remove liquids from the pad or vacuum trucks will provide removal of accumulated waters within 5 days following storm events.

INSPECTION AND MAINTENANCE PROCEDURES

General

Operations

Operations at the acid plant, hydrometallurgical plant and anode casting process are monitored on a continuous basis via a distributed control system (DCS). Operators are assigned to monitor the DCS on a twenty-four hour a day basis. Additionally, employees are assigned to each area and are responsible for patrolling areas at least once a day to verify system operations. Operator logs are kept verifying day patrols have been conducted. Any irregularities in operating components are investigated immediately and necessary action taken to correct the problem.

Maintenance

Each area (acid plant, hydrometallurgical plant, matte storage area and sump, decontamination pad and sump and anode casting process area and Intermediate By-Products Storage Building) has been assigned personnel responsible for repair and maintenance of all equipment. Scheduling of maintenance activities is part of a comprehensive preventive and predictive maintenance program (PM). The Smelter maintenance program utilizes computer assisted preventive maintenance scheduling. For each piece of equipment, a PM schedule has been developed.

Tracking of the PM schedule, as well as the PM procedures, is done via a computerized maintenance program. The Smelter utilizes an information management system for scheduling maintenance tasks and compiling equipment, material and supply data. Based on information from the control system, feedback from operator inspections, and preset schedule inputs, the information management system assists maintenance planners in tracking and scheduling PMs. When a PM is due, the computer system triggers the PM process for a specific piece of equipment. The pumps and sumps are included in the information management system.

When a PM is due, the information management system triggers the process of scheduling the PM. Pre-established job procedures are printed out for the PM. Maintenance schedulers then assign an employee the responsibility of completing the PM.

After the PM is completed, the employee returns the signed PM checklist indicating the PM has been completed to the maintenance scheduler. Any items noted during the inspection that require additional repair are noted by the maintenance planner. A work order is then written for any additional repair work and the work will be scheduled. Any repair work not completed will be highlighted on a work order backlog. The work order tracking system should assure that proper and complete implementation of required repairs occur.

As previously mentioned, the pumping system components are included in a scheduled preventative and predictive maintenance (PM) program. Pumping system components include the pump, motor, inlet and outlet piping and pump fittings. The pumping system is inspected and a PM conducted at a minimum of once every three months. The PM procedures for the pumping

systems include changing lubricating fluids as needed, inspecting foundations and mounting assemblies, checking pump for excessive heat, noise, or vibration, inspecting piping for leaking and proper sealing and checking automatic level controls as required. The level controls will be checked manually to ensure the controls activate at the appropriate levels. Piping inspections are done on a visual basis. An example of a PM for a pump is provided as Attachment A.

Sumps in the acid plant, hydrometallurgical plant, anode casting process area, equipment decontamination and material processing pad, matte storage area, and Intermediate By-Products Storage Building are also included in the PM program and are tracked through the information management system. Via the information management system, sumps are scheduled for hydrostatic testing during planned shutdowns (or a minimum of once every three years, except for the decontamination pad which is tested annually). The inspection will consist of filling the sump with fresh water and monitoring the liquid level for a period of two hours (or longer if the equipment down-time allows). If the test indicates leakage, necessary corrective action is taken. An example of a PM for a sump is provided as Attachment A. A list of sumps and pumps in the hydrometallurgical plant, anode casting process area, acid plant, decontamination pad, and matte storage area is provided in Table 1.

PERFORMANCE CRITERIA

Housekeeping

Any spillage within the contained areas is designed to drain to sumps. Sumps that are equipped with automatically controlled pumps, will pump the sump contents to the appropriate location for use as a reagent. Sumps that are not equipped with automatically controlled pumps will activate a high-level alarm. Upon indication of a high level, an operator is dispatched to investigate the problem and take appropriate corrective action.

The plant is designed to facilitate meeting strict housekeeping standards. Appropriately designed floor slopes, drains, and area containments are incorporated into the system. KUC housekeeping standards require prompt cleanup of spilled materials and areas are to be kept reasonably free of excess dirt, grease, and oil.

Spill Prevention/Spill Cleanup

The acid plant, hydrometallurgical plant and anode casting process area are included in the Emergency Response as required. The plans specify procedures to be followed for spill response. Spills are contained and cleaned up as quickly as possible.

Materials Handling

Various chemicals and reagents are used throughout the Smelter operations. The Occupational Safety and Health Administration (OSHA) requirements for Hazard Communications are enforced at the Kennecott Smelter. The purpose of the standard is to ensure that:

- Labels and/or appropriate warning concerning hazardous chemicals, as required by the standard, are in place.
- Material Safety Data Sheets (MSDS) are obtained and distributed such that they are readily available to employees working in areas where hazardous chemicals are used. KUC has developed a computerized MSDS system that expedites retrieval.
- Employees are informed and trained concerning hazardous chemicals and the Hazard Communication program.
- Employees are informed concerning non-routine tasks involving hazardous chemicals.
- Contractor employers are informed concerning hazardous chemicals to which their employees may be exposed while working at the Kennecott Smelter.

Tanks used for chemical storage are provided with secondary containment. Material transfer operations are conducted in such a manner as to minimize the potential for spillage. Through the Hazard Communication program, employees and contractors/vendors are trained to understand the proper methods for handling chemicals.

Chemicals are stored, in compatible containers and tanks. Containers are properly labeled with NFPA stickers. Drums are stored on pallets to minimize the potential for corrosion and to facilitate visual inspections. Storage racks, cabinets and tanks are provided secondary containments.

Housekeeping standards have been established for the principal purpose of ensuring consistent application of housekeeping throughout KUC. KUC facility standards require floors be washed at an interval necessary to keep them in a clean state. In areas where washing is not feasible, vacuum systems have been installed. Floors are kept as dry as possible to minimize potential for slips and falls. Hoses, brooms, squeegees and similar type of equipment are located in strategic areas to facilitate housekeeping. Spills are to be promptly contained and cleaned up.

Each employee at KUC is responsible for maintaining housekeeping standards. As part of the new hire orientation, housekeeping is reviewed with each new employee. Supervisors are responsible for conducting periodic housekeeping inspections and ensuring areas are kept clean.

Spill Reporting

A verbal report of any noncompliance, or spills subject to the provisions of UCA 19-5-114 which states "Any person who spills or discharges any oil or other substance which may cause the pollution of the waters of the state shall immediately notify the director of the spill or discharge, any containment procedures undertaken, and a proposed procedure for cleanup and disposal, in accordance with the rules of the board". Per Utah Admin Code R317-6.15.B.1 the report will be made to the Director of DWQ within 24 hours through the Utah Department of Environmental Quality 24-hour hotline at (801) 536-4123 or to DWQ, Ground Water Protection Section at (801) 536-4300, during normal business hours.

A written report will be provided to the Director within five business days of the time that KUC becomes aware of the incident. The written submission will contain:

a) A description of the noncompliance event and its cause;

b) The period of noncompliance event, including exact dates and times;

c) The estimated time noncompliance is expected to continue if it has not been corrected;

d) Steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance event.

Training

All new employees are given an overview of the KUC housekeeping requirements and spill reporting elements. Supervisors and salaried employees are provided annual training on key environmental and safety policies and procedures including the spill reporting and housekeeping standards.

For the Smelter operations, all personnel have undergone extensive training for the startup of the

facilities. This training has been given to both hourly and salaried personnel.

KUC also encourages employee participation and suggestions in developing ways of improving operations from both safety, environmental and productivity perspectives. This process is part of KUC's ongoing commitment to continuous improvement in all areas of its operations.

Record keeping

Records which document compliance with the elements required in the BMP Plan will be maintained for a minimum of three years. Copies of records are kept at the Smelter Record keeping Center or on a tape backup of the DCS and the information management system files.

TABLE 1
LIST OF EQUIPMENT
HYDROMETALLURGICAL PLANT

PUMP	SUMP	AREA DESCRIPTION
551-PP-715	551-ZM-715	Lime Storage Area
551-PP-716	551-ZM-716	Lime Area
551-PP-767	551-ZM-767	Copper Precipitation Area
551-PP-768	551-ZM-768	NaHS Storage Area
551-PP-791	551-ZM-791	Acid Leach Area
551-PP-792	551-ZM-792	Bismuth Precipitation Filter Area
551-PP-793	551-ZM-793	Bismuth Precipitation Thickener Area
551-PP-794	551-ZM-794	Copper Precipitation Filter Area
551-PP-795	551-ZM-795	Arsenic/Cadmium Precip. Thickener Area
551-PP-796	551-ZM-796	Iron Precipitation Reactor Area
551-PP-797	551-ZM-797	Refinery Bleeds Storage Area
551-PP-799	551-ZM-799	Lime Slaking Area
572-PP-810	572-ZM-810	Lime Unloading Area
572-PP-857	572-ZM-857	Caustic Tank Area

ANODE CASTING AREA

PUMP	SUMP	AREA DESCRIPTION
527-PP-265 & 266	527-TK-261	Anode Cooling Water Area

ACID PLANT

PUMP	SUMP	AREA DESCRIPTION
546-PP-509	546-ZM-509	FSG Area
546-PP-519	546-ZM-519	FCG Area
546-PP-649	546-SU-649	Strong Acid Area
546-PP-531	546-ZM-531	ESP Area
546-PP-672	546-SU-641	Backup Acid Cooling System

PUMP	SUMP	AREA DESCRIPTION
N/A	572-SU-001	Decontamination Pad
572-PP-893	572-SU-893	Matte Storage Pad
N/A	N/A	Material Storage Pads
N/A	572-SU-726	Intermediate By Products Building
N/A	572-SU-724	Intermediate By Products Building
N/A	572-SU-723	Intermediate By Products Building

APPENDIX B

BAT PERFORMANCE MONITORING PLAN FOR SMELTER FACILITIES WITH LEAK COLLECTION AND REMOVAL SYSTEMS

INTRODUCTION

The Kennecott Utah Smelter has been granted a Ground Water Discharge Permit (Permit No. UGW350008) by the State of Utah. This permit details the construction, operation, and monitoring requirements for the facilities at the Smelter that have the potential of releasing fluids to the ground water. The permit specifies that Best Available Technology (BAT) be used in the construction of all facilities and that facilities be operated according to Best Management Practices (BMP).

The permit lists nineteen individual facilities that have BAT criteria associated with them (Figure 2). This monitoring plan addresses the facilities that require leak collection and removal systems. These facilities and their BAT and performance criteria are listed in the table at the end of this section.

Each of the nineteen facilities consists of a concrete or HDPE sump or basin. Under the concrete structure is an HDPE lined sump with drainpipes sloped to a low point. At the low point there is a collection pipe to allow access to measure the level of liquid in the sump and to remove the liquid. The theory of operation is that if the concrete basin leaks, the fluid will be trapped in the drain field on top of the liner. When fluid is detected in the collection pipe, this is an indication that the basin is leaking. In each collection pipe a level detector has been installed. The level detector will signal an alarm in the Smelter central control room. Installations not connected to the Smelter control room will have a local strobe light installed to function as an alarm. Fluid can be removed from the collection pipe with portable pumps to maintain a low head of fluid on the liner. If leakage is discovered, the permit details required response actions.

The permit requires that the Smelter develop and follow a monitoring, inspection and maintenance plan for permitted facilities. In addition, it details what actions must be taken if a leak is detected or a system is out of compliance with the permit. This document describes the procedures required to comply with the Ground Water Discharge Permit for the nineteen facilities with leak collection and removal systems.

MONITORING, INSPECTION AND MAINTENANCE

KUC is responsible for implementing BAT, noted in the preceding Table 1A, to prevent discharge of process fluids from the permitted facilities to ground water. Maintenance of the performance standard will be demonstrated by operation and maintenance of the leak collection and removal systems and adherence to the performance criteria.

BAT Performance Monitoring

Inspection and Maintenance: Each system will be included in the Smelter Preventive Maintenance (PM) Program. The PM program requires that inspections and the PM requirements be performed quarterly.

Attached, under the Record keeping section, are checklist/forms for inspections of each facility and the PM program requirements for the continuous water level alarms.

Monitoring Plan: The primary tool for monitoring the leak collection systems will be the continuous water level alarms in the leak collection sumps. These alarms will be monitored at the Smelter control room. Any alarms will be logged by the operators and the cause of the alarm investigated and documented.

Monitoring results will be documented on an alarm and leak removal form contained in this plan. Records will be kept according to criteria in the Record keeping section of this plan.

A summary of monitoring results will be reported to the Department of Water Quality on a semi-annual basis. This report will be due 45 days following the end of the reporting semester.

Leakage Rate Evaluation: To determine the leakage rate into a leak collection system, flow totalizers will be used to measure the amount of water pumped from the leak collection pipe over a given period of time. If the flow totalizer fails or is unable to be successfully read, the pump will be de-energized, a measurement taken and another measurement taken at a later time. Based upon the diameter of the pipe and quantity of water collected over a specific time period, a leakage rate will be calculated.

LEAK DETECTION AND REMOVAL PROCEDURES

Leak Detection

Leaks into the collection system will be detected by the continuous level alarms or by physical measurements taken during scheduled inspections. When a collection sump alarm is received at the Smelter control room, the operator will log the time on the alarm and dispatch the appropriate person to verify that the level alarm is working correctly and verify the level in the monitoring collection pipe. If the level in the collection pipe is in fact at the alarm level, leak response procedures will be implemented. If the cause of the high-level alarm or leakage rate can be repaired within 24 hours of detection of the alarm condition, KUC is not obligated to undertake the Response of Leak procedures in the following paragraph. If the alarm is not valid, the alarm system will be repaired as soon as possible. Until the alarm is repaired, periodic measurements of the liquid level in the collection pipe will be taken and recorded.

Response to a Leak

Upon determination that the maximum fluid level specified in the permit has been exceeded**, and the cause of the elevated level has not been repaired within 24 hours**, the following actions are required:

- Sample the effluent from the collection system for water quality field and lab constituents. Results must be submitted to the State in the next semiannual report. Sample collection, analysis, and reporting will be the responsibility of the Environmental Department.

- Immediately, remove fluid from the affected leak collection system to a level below the allowable maximum fluid level specified in the permit and determine the leakage rate entering the leak collection system. The fluid removed from the collection pipe should be discharged back into the basin. Plant personnel are responsible for implementing this action.

- Notify the Director in writing within five business days that a performance criterion has been exceeded and what the measured leakage rate in the affected leak collection system is. All communications with the State will be done by the Environmental Department.

- If the leakage rate is in excess of the maximum rate or level specified, Kennecott shall implement the approved leak detection and repair plan.

- Remove fluids from any affected leak collection system on a continuous basis to maintain fluid levels less than the specified maximum.

AREA RESPONSIBILITIES

Completion of the required actions in the permit is the responsibility of the following functional areas:

- The overall responsibility for compliance with the permit and auditing of required actions rests with the Smelter Environmental Facility Engineer and Smelter Management.

- Alarm monitoring is the responsibility of the Smelter Operations - Control Room Supervisor.

- Routine inspections are done by the Environmental Department.

- Compliance with the PM requirements is the responsibility of Smelter Operations and the Maintenance Service Provider.

- Leak response is the responsibility of Smelter Operations and the Maintenance Service Provider.

- Sampling, Analysis, and Reporting is the responsibility of the Environmental Department.

RECORD KEEPING

The KUC Environmental Record keeping Procedures is used for all records. Copies of the records are kept at the Smelter Record keeping Center and at the Environmental Record keeping Center. The following forms and procedures follow this section:

- Quarterly Inspection Form.
  This form is used to document routine inspections of the facilities.

QUARTERLY PM REQUIREMENTS

All inspections and services performed on this equipment shall be done in accordance with accepted safety rules and formal procedures. Visually inspect this equipment for damage or problems which might cause unsafe operation.

Continuous Level Alarm

1) Notify the Control Room and advise that the leak detection system is being inspected. Ask control Room if the system is in alarm on the DCS system

2) Remove the alarm cable

3) Invert the end of the cable, allowing the ball float to drop to the top of the probe.

4) Notify the Control Room to verify the alarm probe on the DCS screen

5) Drop the ball float to the bottom end of the probe.

6) Notify the Control Room to verify a normal mode on the DCS screen.

7) Inspect all mechanical and electrical components for proper operation.

8) Inspect all components for corrosion.

9) Take a flow totalizer reading or measure the water depth and record the reading and time. Note: If water depth is measured, remove pump cord from power source.

10) Take a second reading at least two hours later and record the current time. Note: If a water depth was measured, be sure to re-energize power to the pump.

11) Replace all protective covers

12) Calculate gallons per minute (gpm) and record.

SMELTER PLANT - QUARTERLY INSPECTION
Leak Detection & Removal Systems - Summary Report

Quarter: **Year:** **Date:**

The following checks were made as part of this inspection:
1. Alarm Status was checked first at the EMC DCS consol to confirm "normal" status. Then the function of the alarm was checked by field activation with confirmation acknowleged by the control room.
2. Basin Status was checked by verifying if process materials were present and/or being pumped through the protected facility.
3. Liquid Depth was checked by opening the leak detection pump sump and measuring using Schill IT30 electron depth measure probe.
4. Visual Inspection was conducted to verify the condition and function of leak detection components.
5. Leakage Rate was calculated by verifying a "pump down" condition and then taking a beginning totalizer and time reading during initial inspection, with follow-up reading taken two to six hours later.
6. Wells with a "zero" leakage rate were confirmed by a "no change" manual measurement of well depth.

Leak Detection Facility (location)	DCS ID	Monitor Well No.	Alarm Status	Basin Status	Liquid Depth ft.	Leakage Rate in gpm	Comments (Visual Inspection)	Date Inspected	Inspected By
West Process Ponds									
West Cell (west)	572268	SMP732							
East Cell (east)	572267	SMP733							
Pump Sump (center)	572269	SMP731							
East Process Ponds									
North Cell (west)	572409	SMP1400							
South Cell (east)	572407	SMP1401							
Pump Sump (north)	572413	SMP1402							
Pump House									
Jacket Cooling Water (NW)	529008	SMP1409							
Granulation Water (NE)	529363	SMP1408							
Powerhouse/Furnace (SW)	529469	SMP1407							
Acid Plant (SE)	529414	SMP1406							
Cooling Towers									
Granulation (north)	529361	SMP1403							
Powerhouse (center)	529468	SMP1405							
Acid Plant (south)	529416	SMP1404							
Others									
Vehicle Wash	572176	SMP1410							
Vehicle Repair Wash Bay Sump	572177	SMP1411							

Inspection Report Completed By: _____

APPENDIX C

KENNECOTT UTAH COPPER
SMELTER LEAK DETECTION AND REPAIR PLAN

1. INTRODUCTION

The following procedures reflect the KUC standard protocol for QA/QC and address the elements consistent with quality workmanship and liner integrity of the geomembrane. Should the performance criteria fluid level established in the BAT Performance Monitoring Plan (Appendix B) be exceeded, KUC will immediately remove fluid from the affected leak collection system to a level below the allowable maximum fluid level specified in the permit and determine the leakage rate entering the leak collection system. If the leakage rate is in excess of the maximum rate or level specified, KUC shall within seven (7) days initiate the identification of liner damage. During this time, KUC will remove fluids from any affected leak collection system on a continuous basis to maintain fluid levels less than specified maximum. Repairs will be completed within thirty (30) days, or the pond will be taken out of service until repairs can be made.

2. DEFECTS AND REPAIRS

A. Earthwork

- If damage to the subgrade below the liner is observed, the subgrade will be prepared to specifications suitable for installation of the liner.
- Surfaces to be lined shall be smooth and free of debris, roots, and angular or sharp rocks. All fill material shall be free of trash, organics and other deleterious material that could potentially cause damage to the geomembrane. The upper 6" of subgrade shall not contain material larger than 1/2".
- The subgrade shall be compacted to provide a firm unyielding foundation.

B. Repair Procedures

Any portion of the geomembrane or geomembrane seam showing a flaw, or failing a destructive or non-destructive test in non-compliance shall be repaired. Several procedures exist for repair and the decision as to the appropriate repair procedure shall be made by Kennecott's Project Manager. Options available for repair include the following:

- **Patching** used to repair large holes, tears, and destructive sample locations. All patches shall extend at least three inches (3") beyond the edges of the defect and

all corners of patches shall be rounded.

- **Grinding and Welding** used to repair sections of extruded fillet seams.

- **Spot Welding or Seaming** used to repair small tears, pinholes, or other minor localized flaws.

- **Capping** used to repair lengths of extrusion or fusion welded seams. Extrude overlap along the length of fusion welded seams.

- Removal of a seam and replacement with a strip of new material seamed into place.

C. Verification of Repairs

Every repair shall be non-destructively tested. Testing protocol is based upon the method of repair. The following non-destructive testing procedures may be utilized.

- **Seam Testing.** The welded seam created by the fusion welding process is composed of a primary seam and a secondary track that creates an unleaded channel. The presence of an unleaded channel permits the fusion seams to be tested by inflating the sealed channel with air to a predetermined pressure and observing the stability of the pressurized channel over time.

- **Pressure Testing**

  - Both ends of the seam to be tested will be sealed.

  - An approved pressure feed device will be fed into the sealed channel.

  - The test channel will be inflated and pressure maintained within the range listed below:

Material (Mill)	Min. PSI	Max PSI
40	24	30
60	27	35
80	30	35
100	30	35

  - After 5 minutes, the pressure should be observed and recorded. If the loss of pressure exceeds 4 psi, pressure loss source should be identified and repaired.

- All cuts or needle holes through the liner, as a result of testing, will be repaired by extrusion bead or welding.

- **Vacuum Testing.** This test is used on extrusion welds, or when the geometry of fusion weld makes air pressure testing impractical, or when attempting to locate the precise location of a defect believed to exist after air pressure testing.

  - Trim excess overlap from the seam.

  - Apply a generous amount of strong soapy solution to the area to be tested.

  - Place the vacuum box over the area to be tested and apply downward pressure to seat the seal strip against the liner.

  - Apply a minimum of 5 psi vacuum to the area.

  - For a period of approximately 10 seconds, examine the geomembrane through the viewing window for the presence of soap bubbles.

3. DOCUMENTATION

Repairs which pass the non-destructive test shall be deemed acceptable. Repairs in excess of 150 consecutive feet require destructive testing. Testing of repairs shall be recorded with information regarding the location or repairs, date of testing, time, weather conditions and name of technician performing the tests. Before and after photographs of the repaired liner will be collected.

4. ASSESSMENT OF POTENTIAL LOSSES OF PROCESS WATER TO GROUNDWATER

Complete an assessment of the potential for the loss of process water to ground water and an assessment of the potential impacts.

5. REPORTING

The QA/QC documentation information and the assessment of the potential impacts of the leak will be submitted to DWQ as part of the Ground Water Discharge Permit Semi-Annual Report.

APPENDIX D
CORRECTIVE ACTION PLAN FOR KUC SMELTER ACID LOADING FACILITY

1. INTRODUCTION

The following Corrective Action Plan (CAP) reflects KUC's procedure implemented in response to the unintended release of diluted sulfuric acid from a breach in the containment system of the KUC Smelter Acid Loading facility. The purpose of the CAP is to provide containment for the low pH fluids, inhibit plume migration, avoid groundwater contaminant seepage to downgradient wetlands, and remediation of the soil and groundwater at the Smelter Acid Loading Facility. The CAP was approved by DWQ on January 25, 2011, for implementation to attain cleanup standards as shown in Table 1 below.

2. CORRECTIVE ACTION

KUC investigated the reactivation and use of a shallow groundwater water/vadose zone water capture trench that was installed in 1995, and last operated in 2002, to contain a sulfuric acid spill which occurred in 1991. Water and pump test information available allowed KUC to determine that the capture trench is adequately located to effectively capture contamination from the acid tank loading area breach location.

KUC inspected the capture trench condition and conducted a pump test using temporary power and a portable pump in early October 2010 to verify that drawdown and capture induced from pumping will cause vadose zone water and shallow ground water to report to the trench. The inspection and 48-hour pump test did confirm that the trench was functional and that sufficient water table drawdown was induced for containment.

Restoration of the trench to an operating condition required replacement of the electrical supply components and installation of a new pump and motor control and monitoring equipment. Following the reactivation work, KUC operated and conveyed the extracted water to the KUC process water system. KUC prepared and submitted to DWQ a pumping strategy to maximize the effectiveness of the trench system for plume containment and remediation, which is reviewed annually and adjusted as warranted. KUC will continue extraction from the trench until groundwater cleanup standards are achieved or contaminant levels are reduced to a point that monitored natural attenuation will be protective of downgradient wetlands. KUC must seek and receive approval from DWQ for a transition to a monitored natural attenuation strategy.

KUC initially provided a visual inspection on the extraction trench sump on a weekly basis to evaluate equipment operating condition. Once the remote telemetry system was installed and operable, KUC reduced the visual inspection frequency to quarterly or as needed based on real time data. These inspections include visual inspections and equipment manufacture recommendations for preventative maintenance. KUC will maintain telemetry equipment that will provide notification of high/low sump levels, general fault condition related to electrical interruption and leak alarm status of the primary discharge pipe. Telemetry will be monitored on a daily frequency by personnel in the environmental department. KUC will make a timely response to mechanical or electrical conditions that prevent or restrict operation of the trench performance. The leak alarm system has controls that automatically shut off the pump until alarm status can be investigated and resolved. KUC will operate a totalizing flow meter on the discharge piping of the trench sump and report quantities in the annual report.

3. GROUND WATER CLEANUP STANDARDS

The extraction trench is designed to capture the plume of low pH ground water migrating downgradient from the release site. The groundwater cleanup standards in Table 1 will be applied to monitoring wells NES1364 and NES1365 for compliance and to evaluate the effectiveness of the capture trench. The groundwater cleanup standards in Table 1 are less than or equal to the Utah Ground Water Quality Standards except for pH. A pH standard of 5.5 was established under a Stipulation and Consent Order (No. 9212006) issued on March 1, 1994, by the Utah Solid and Hazardous Waste Control Board for a previous release from this facility.

Table 1
Ground Water Cleanup Standards for the KUC Smelter Acid Loading Facility

Ground Water Parameter	Cleanup Standard[(a)] (mg/L)	GWQS
pH (units)	>5.5	6.5-8.5
Chloride	900	N/A
Sulfate	3,950	N/A
Arsenic-D	0.015	0.005
Barium-D	2.0	2.0
Cadmium-D	0.005	0.005
Chromium-D	0.1	0.1
Copper-D	1.3	1.3
Lead-D	0.005	0.015
Selenium-D	0.025	0.05
Zinc-D	5.0	5.0

(a) Except for pH, standards based on background data measured in 2009 and 2010 in compliance monitoring wells NES1364 and NES1365. No net increase allowed.

D Dissolved
GWQS Ground Water Quality Standards in UAC R317-6-2.1
mg/L Milligrams per liter
N/A Not applicable; no GWQS in UAC R317-6-2.1

4. MONITORING

KUC will monitor groundwater quality and water levels at a network of monitoring wells in the release area. KUC will monitor water quality at the extraction trench. Compliance monitoring wells NES1364 and NES1365 will be sampled on a quarterly basis.

Monitoring wells NES1366 and NES1376 will be sampled at the same frequency as the compliance wells.

Monitoring wells NES691, NES672 and NES675 will be sampled on a quarterly frequency

while pumping is occurring at the capture trench.

Monitoring wells NES2799A and B, NES2800B, NES2801, NES2802, NES2803A and B, NES2804B, and C, NES2805, NES2800A and NES2804A will be sampled on a semi-annual basis. The sampling frequency of NES2800A and NES2804A wells changed from quarterly to semi-annual basis because these wells have generally shown increased pH water with decreased concentrations of TDS and metals since 2022 and 2018, respectively.

KUC's Groundwater Characterization and Monitoring Plan (GCMP), as updated, and associated Standard Operating Procedures (SOPs), as updated, will be followed for all water quality sampling and water level measurements. The GCMP has been approved by the DWQ and is updated on an annual basis. Procedures for documentation and sample handling, equipment maintenance and decontamination, quality control sampling, field measurements, and groundwater sampling are detailed in the SOPs. All water quality analyses will be conducted by KUC Environmental Laboratory or another state-certified environmental laboratory.

5. **REPORTING**

KUC will include reporting of CAP activities and monitoring. All groundwater monitoring information collected as part of the CAP effort will be included in the semi-annul Smelter reports.

If any water sample from a Compliance Well exceeds the >5.5 pH criterion, KUC will notify DWQ in writing of a probable out-of-compliance status within 10 working days of receiving official laboratory analytical results. Informal verbal notification will be provided as soon as practical after KUC becomes aware of the results. KUC will have the opportunity to resample the well within 5 working days of making written notification to DWQ. If the resampling verifies an out-of-compliance situation, KUC will investigate the cause of the condition and provide such results and a proposal for any necessary additional response actions needed under this CAP to DWQ within 30 days of receipt of the resample results.