

# Closure and Post Closure Plan for Kennecott Utah Copper Corporation Smelter Refuse Landfill

## 1.0 INTRODUCTION

Kennecott Utah Copper Corporation (KUCC) is submitting the enclosed Closure and Post-Closure Plan in accordance with Salt Lake City-County Health Department's (SLCHD) Health Regulation #1 (Reg #1), for the Smelter Refuse Landfill (SRL). It is KUCC's intention to satisfy both SLCHD's Reg #1 and the State of Utah, Division of Solid and Hazardous Waste's (DSHW) R315-304-5 rules with this document. Citations for DSHW requirements are cross-referenced where plausible, while following the outlined requirements of SLCHD Reg #1. DSHW's October 1, 1998 rules and proposed rule changes are used as the cross-referenced bases.

## 2.0 SITE DESCRIPTION AND BACKGROUND

The SRL is an industrial solid waste landfill, not accessible to the public, and accepts only non-hazardous industrial, onsite, solid waste. This facility is located to the South of the main smelter facilities and near the mouth of Kessler Canyon. The SRL is not located on public land nor located near a public drinking water supply. The current and continued lateral expansion of the SRL is not located in a subsidence area, flood zone, near designated wetlands, or above an underground mine. Topographical features in the immediate area include the northern toe of the Oquirrh Mountains to the south, and the Great Salt Lake to the north. There are no surface bodies of water, residential dwellings, or incompatible structures within 1/4 mile of the landfill site. Groundwater flow is to the north toward the Great Salt Lake. The historical high ground water level at the SRL site, measured by the surrounding groundwater monitoring wells is over 200 feet below ground surface (R315-304-4((2))). The closest geological feature of concern is the Black Rock Thrust Fault located approximately 5000 feet to the South. The coordinates of the final SRL are as follows:

Section	21	Northing	7430500 - 7431700
Township	1 South	Easting	1448100 - 1447100
Range	3 West	Latitude:	40 ° 43' 27"
		Longitude:	112 ° 11' 47"

The SRL has been owned continuously by KUCC for an estimated 37 years (verbal confirmation). The "area method" for landfilling is employed at the SRL; solid waste is deposited on the downslope of existing or constructed berms in approximately 5 yard lifts. The

SRL receives waste incidental to the operation at the Smelter and Refinery complex. This waste includes demolition, maintenance, and construction debris; lunchroom trash; office trash; and other minimal putrescible material. White trash (i.e. appliances), liquid wastes, high organic wastes are not disposed in the SRL. This facility is classified by the DSHW as an Existing Class IIIb Landfill (R315-304-4(5)). The KUCC Landfill Permit Application (Section 6.3) was submitted and approved. The SRL/SM Landfill operates under Salt lake City-County Health Department's Permit to Operate (R315-304-5(7)).

### **(a) Statement of Closure Plan**

Section 6.9 of Reg #1 requires KUCC to submit closure and post-Closure Plans (R315-302-3(2)) in a way that "minimizes the need for further maintenance and minimizes the post-closure formation and releases of leachate and explosive gases to the air, groundwater or surface water to the extent necessary to protect the public health and welfare and prevent any nuisance." This document represents KUCC's compliance with Section 6.9 of the SLCHD Reg#1.

### **(b) Closure Plan**

The following Closure Plan will be part of the overall SLCHD's Site Plan for the Smelter Refuse Landfill (R315-302-3(3)). The Closure Plan will describe the monitoring, routine maintenance, and other steps necessary to the extent required to protect the public health and welfare and prevent any foreseeable nuisance. The following plan describes the methods, procedures, and processes for:

1. Maintenance and Control,
2. Final Facility Topography,
3. Drainage Plan,
4. Composition of Cover Material,
5. Specific Engineering for Onsite Structures,
6. Description of Monitoring and Maintenance,
7. Contact Personnel for Landfill Activity, and
8. Planned Uses.

In addition, the Closure Plan estimates to the extent possible the:

1. Maximum Portion of Landfill Operation,
2. Maximum Inventory of Refuse Located on Site,
3. Remaining Life, and
4. Schedule for Completion.

The Closure Plan concludes with a submittal statement and a schedule for notification to the appropriate authorities and personnel. Section (f) of this plan addresses the Post-Closure Plan.

**(1) Methods, Procedures, and Processes**

All materials disposed of within the existing Class IIIb landfill have been and will continue to be within the acceptable waste constituents of an industrial non-hazardous landfill. These materials include non-hazardous waste generated by maintenance activities; construction and demolition waste; and office, packaging, and lunch room wastes (see Table 1). On average, approximately 150 cubic yards per day of this waste is disposed in the SRL. This rate will likely decrease by approximately 50 percent after the completion of the Noranda Smelter demolition. Demolition of the Noranda Smelter is scheduled for completion in year 2000.

**Table 1**

<b>Waste Type</b>	<b>% of Total</b>
Wood, Cardboard, and Paper	69
Construction and Demolition Debris	20
Asphalt	7
Soils	3
Branches and Brush	1430
Railroad Ties	125
Non-ACM Insulation	0.5
Limestone	0.3

**(1a) Maintenance and Control**

All SRL waste requires and will continue to require an approved waste profile. Waste manifests are generated from the waste profile. All waste shipments to the SRL require a waste manifest (see Attachment #1)[R315-302-2(3)(a)]. Area method of land filling will be used until capacity is reached for each subdivision cell. A minimum depth of 6 inches of compacted cover material is and will be placed on top of all waste deposited in the SRL (daily cover)[R315-305-5(5)(b)]. Lifts that will not have additional waste deposited for 30 days have and will receive an additional 6 inches of compacted cover material. The daily cover, plus the additional 30 day- 6-inch cover constitutes an intermediate

cover. Cells will continue to be developed in a manner that keeps to a minimum the exposed surface area of the working face of the landfill.

After cessation of operations and application of the full intermediate cover, a complete inspection of the surface will be performed for each subdivision cell. Cleanup of the site will be performed concurrent with the application of the final intermediate cover. All remaining visible litter and debris in the immediate vicinity will be placed in the final lift of the landfill unit. A thorough closure inspection shall consist of observations for erosion, sloping, drainage, surface leachate, and run-on. Areas requiring repairs/modifications will be documented on the Landfill Inspection Form (see Attachment #2). Necessary modifications will be made using appropriate materials and compacted, as required.

Access to the facility is restricted through plant security and property fencing. Wind dispersal of landfill litter is minimized by the application of daily cover.

**i. Escape of Air Pollutants/Gases (R315-305-5(3))**

Vector, dust, and odors will be effectively controlled so they are not a nuisance or hazard to health, safety or property. No open burning has been or will be allowed. Potential fire hazards will be minimized by application of periodic cover to exposed wood and paper products.

The contents of this industrial waste landfill have minimal amounts of putrescible materials and the decomposition of the organic wastes are minimal. The U.S. EPA reports that methane is generated from "municipal" solid waste only when the moisture content exceeds 40% (U.S. EPA, 1994). Due to the limited moisture at the site and minimal putrescible wastes contained in the heap, methane gas generation is not anticipated.

**ii. Control of Run-off (R315-303-3(1)(c))**

The SRL is located upgradient from the Kennecott Smelter facility. The SRL run-off will not be contaminated by foreseeable solid waste or leachate. Any storm water that does flow off the final cover system will be routed by collector ditches. These collector ditches report to an existing drainage channel that is incorporated into the comprehensive Smelter Drainage Plan. A series of man-made drainage channels and earthen berms control storm water run-off from impacting the general landfill areas. Storm water resulting from the Kessler Canyon drainage ultimately discharges into the storm water/ process water collection system or into the Kessler Canyon drainage. In the event that large amounts of water dam up the process water drainage system, excess water can be directed into the Kessler Canyon drainage system.

Runoff from the SRL area is not expected to cause significant erosion of the cover soils because of the following factors:

- 1) absorption and evapotranspiration by the vegetation layer
- 2) the small surface area,
- 3) the use of appropriate grade and side slope design,
- 4) the absence of any appreciable run-on, and
- 5) the low intensity of precipitation events

The Hydrologic Evaluation of Landfill Performance (HELP), version 3.07, model uses site specific 5 year precipitation, evapotranspiration, and temperature to model the landfill characteristicness. The summary page in Attachment #4 shows a 5 year summary of average annual totals, peak daily values, and final water storage for the SRL. Two computer models were run to show the hydrological characteristics of the closed facility. The first was performed using a "good stand of vegetation" and the second used a "fair" vegetation layer. Moisture content of the landfill heap was set to steady state.

Once the vegetation layer growth is established, most storm events will not result in significant direct run-off from the landfill surface area. Nonetheless, significant percolation through the cover layer is unlikely, thus leachate or seepage from the heap is minimal. With an average 16.1 inches of precipitation per year, the model predicts the average change in the heap pile's water storage decreases and direct runoff averages 0.558 inches per year. Attachment # 4 shows the modeled SRL hydrological parameters of the closed landfill.

#### **(1b) Final Facility Topography**

Attachment #3- Landfill Closure Plan Final Facility Topography, plots the final landfill facility topography. Applicable design and closure topography criteria outlined in Sections 6.5 (c), (n), and (t) have been applied to this design [R315-305-5(5)(b), R315-304-5(2)(b), and (3)]. Slopes, drainage channels, run-on and run-off are described in this document.

#### **(1c) Drainage Plan**

The final facility topography for the SRL is shown on Attachment #3. Suitable channeling structures such as, collector ditches, diversion channels, swales and culverts will route storm water to existing drainage culverts located east of the SRL. Run-on is prevented by the 20 foot road embankment, diversion channels and earthen berms located south of the SRL. Any SRL run-off will be controlled, channeled, and incorporated into the comprehensive Smelter Drainage Plan system.

**(1d) Composition of Cover**

The final cover system will be made of the intermediate compacted cover, compacted soil layer, and vegetation layer. The material used for final cover will be placed on the graded, compacted, intermediate cover layer (6 -inches of daily cover, 6-inches of intermediate cover). The soil layer material will be compacted and will be composed of clayey silt-sand mixture with a low permeability. The soil layer will be no less than 12 inches (300 mm) of compacted SC and will come from onsite sources. These two layers total 18 inches of compacted soil which will serve to minimize infiltration. Above these two layers will be placed a vegetation layer of no less than 6 inches (150 mm). The vegetation layer will be of an organic composition that will support native or compatible plant life (R307-305-5(5)(b)). Figure 1 shows the cross section of the final cover system.

**i. Sloping (R315-303-3(4)(a)(iii))**

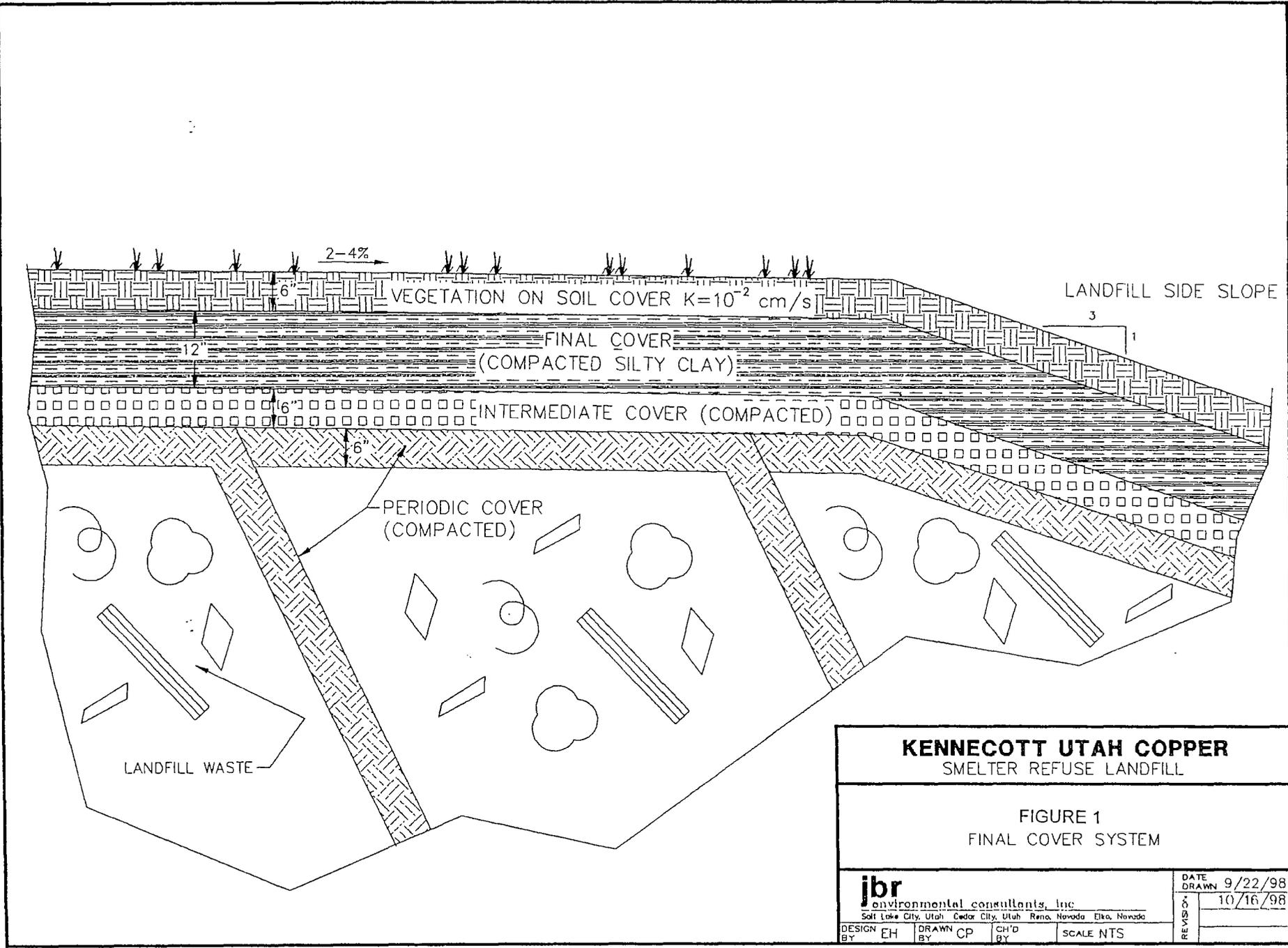
The slopes of the final cover is shown on Attachment #2. Cell #1 is the subdivision cell area West of the overhead utility power lines. Cell #2 is the subdivision cell located East of the utility lines. The topography of the landfill is of standard slope design, with Cell 1's top surface area having slope ranging from greater than 2.0 to 4.0 percent. Cell #2 has a minimum slope of 3.0 percent. The area below the utility power lines will serve as the central collector ditch (channel) and will have a slope averaging 6.5 percent. Both cell's side slopes conform to the 3 horizontal(h) : 1 vertical(v) slope criteria.

**ii. Landscaping (R315-305-5(5)(a) & R315-303-3(4)(a)(iii))**

The waste will be leveled to the extent practicable, covered with a minimum of two feet of soil and the cover contoured as described in Section (D) (i). The south end of the landfill is protected from run-on from the existing Kessler Canyon drainage system. No vegetation, other than indigenous native grasses and flowers identified in this plan will be placed on the SRL.

**iii. Vegetation (R315-305(5)(d))**

The vegetation layer provides the base for native plants to grow. The layer will be of sufficient organic content and volume ( no less than 6 inches thick ) such that, the Smelter area's approved seed mixes will have the ability to prosper. Seed mix, fertilizer, mulch and tackifier will be applied to of the SRL cover's vegetation layer. Approved seed mixes for the smelter area include:



Crested Wheatgrass	Tall Wheatgrass	Streambank Wheatgrass
Cicer Milkvetch	Sand Dropseed	Rocky Mountain Beeplant
California Poppy	Yellow Sweetclover	Small Burnet Alfalfa

The final seed mixes will be a combination of the above mentioned seeds, and planted by the broadcast method. Approximately 13 acres will be seeded during closure at a density of approximately 15 pounds per acre.

**(1e) Specific Engineering Procedures for Onsite Structures (R315-302-3(6)(iv))**

Structures in and around the SRL consist of a landfill/storm water sump, the upper and lower service roads, and overhead power lines. The existing landfill/storm sump will be permanently sealed during closure activities or when the side slopes are graded back to the required 3 h:1 v slope.

The utility power line supports do not interfere with the landfill site. Power lines that traverse the central collector ditch, as designed, have and will have a minimum clearance of 30 feet from final grade. Power lines, essential to operations of the facility, will be maintained and operational throughout the active and post-closure life of the SRL. The current service roads will remain in place during and after closure.

**(1f) Description of Monitoring and Maintenance (R315-302-3(6)(iv))**

Qualified personnel will be located near or around the landfill to supervise continued activities during hours of operation and closure. The closure of the landfill will be concurrent with the landfill's development. Landfill operations will proceed in a manner that will minimize the working area of the landfill and conform to the requirements listed in Section 6.9 (d) through (i). Once the final intermediate cover is placed and graded, landfill inspections will commence. The Post-Closure Landfill Inspection Form (see Attachment # 2) will be used for the final closure inspection.

**(1g) Contact Personnel**

The following positions and personnel represent the KUCC contact list of responsible officials as they pertain to the SRL. Titles, as opposed to surnames, are listed to aid regulators in contacting the appropriate personnel.

**Landfill Owner:** Kennecott Utah Copper Corporation  
**Operator:** Kennecott Utah Smelter  
  
**Address:** 12000 West, 2100 South  
Magna, Utah

*Mailing Address*  
P.O. Box 6001  
Magna, Utah 84044

**Smelter Landfill Manager:**                      **Facility Maintenance Engineer**  
Telephone Number:                                      (801) 569-6416

**Qualified Personnel:**                              **Smelter Facility Environmental Engineer**  
(trained in proper handling of hazardous and non-hazardous waste)  
Telephone Number:                                      (801) 569-6466

**Contact Person:**                                      **Facility Maintenance Engineer**  
(during closure and post activity)  
Telephone Number:                                      (801) 569-6416

Mailing addresses are the same for all listed personnel. Communication in case of an emergency situation shall be to contact the above personnel. If after hours, the Smelter Shift Superintendent shall be notified via smelter security at (801) 569-6498.

**(1h.) Planned Uses**

There are no foreseeable planned functions for the SRL facility after closure and post-closure activities. Maintaining the closed facility integrity and proprosperation of native plant growth are the only planned uses (R315-302-3(6)(v)).

**(2) Maximum Portion of Operation**

The area method of land filling inherently has large open faces of operation. However, the working face will be limited to the smallest area practical in order to confine the amount of exposed waste without interfering with effective operation. The maximum working face (surface area) open at any one time will be approximately 556 square yards (0.11 acres ); a total maximum height of 40 feet and horizontal spatial distance of 125 feet. Daily periodic cover and phased lift operations will prevent the total horizontal face (350 feet) from being exposed at any given time.

**(3) Maximum Inventory and Estimated Life**

Based on the final closure design, original topography, and volume of the final cover, the maximum inventory for the SRL will be approximately 336,000 cubic yards. The total volume (including final cover) was estimated to be 388,520 cubic yards. The average volume loading of waste to the SRL is approximately 27,500 cubic yards per year, with a maximum

of 31,000 cubic yards per year. The estimated life of the SRL, based on the above volumes and an existing waste volume of 115,460 cubic yards, is approximately 10.5 years from the time of this submittal. If volume loading decreases by 50 percent (see Section (1)) after year 2000, the extended life will be a maximum of 20.5 years based on these volumes.

#### **(4) Schedule for Completion (R315-302-2(2))**

The SRL is segregated into 2 cells (subdivision cells). Cell #1 extends from the west service road to the overhead power lines (see Attachment #3). The landfill heap is progressing steadily in an eastwardly direction. The northern face and slope will be graded and completed as the cell reaches capacity. The central collector ditch, located beneath the utility power lines, provides adequate drainage between Cell #1 and Cell #2. An intermediate cover will be placed 30 days after loading ceases for a specific cell. The final cover layer to Cell # 1 will be placed after reaching the prescribed capacity. Compaction, grading, and inspection of the intermediate cover will be performed prior to the placement of the final soil layer. The placement of the final cover will commenced according to the regulatory notification schedule. Subdivision Cell #1 has an estimated life 7 to 13 years, depending on the loading characteristics after year 2000.

Cell #2 will extends from the central collector ditch in an eastward direction toward the central Kessler Canyon drainage. The linear width and length of Cell #2 will be approximately 400 feet. Loading of Cell # 2 will start after the capacity of Cell #1 is obtained. Cell # 2 will be the final cell closed and will be phased as described for Cell #1. Cell #2's estimated completion date ranges from 10.5 to 20.5 years, depending on loading volumes.

The collector ditch's western slope and channel will be developed during closure of Cell #1. The collector ditch's eastern slope will be developed during the initial loading of Cell #2. After prescribed sloping, compaction, and inspection of the intermediate cover and side slopes, the final cover and vegetation layers will be placed.

#### **(c) Submittal Statement**

The Closure Plan, Post-Closure Plan, and other necessary documents were prepared and submitted to the Salt Lake County Health Department. This submittal date, as required by Health Regulation #1, was determined by SLCHD to be October 20, 1998.

No subsequent modification to the closure and post-Closure Plan will be made without the approval of the Director of the SLCHD. KUCC reserves the right to petition to amend the Post-Closure Plan (R315-302-3(6)(d)).

KUCC will keep a copy of the most recent approved Closure Plan and Post-Closure Plan at the Smelter Plant Recordkeeping Center (PRC), Smelter Environmental Monitoring Center (EMC), and Environmental Affairs building at Arbor Park, Magna, Utah (R315-302-3(3)(b)).

**(d) Notification and Review**

The **Facility Environmental Engineer** will provide written closure notification ( intent to close) to the Director of the SLCHD no later than 90 days prior to closure and no later than 60 days prior to final receipt of waste to the Executive Secretary of the DSHW (R315-302-3(4)(a)). Thirty days before final closure the **Facility Environmental Engineer** will provide written notice to all users, divisions, and departments within KUCC. Posted notice of the SRL closure will be placed in several conspicuous locations and at the service road entrance to the SRL (R315-303-3(6)(d)). No later than 60 days after certification of closure, KUCC will submit plats and statement of fact concerning the location of any disposal site to the county recorder to be recorded as part of the record of title (R315-302-2(6)(a)). KUCC will submit proof of record of title filing to the Executive Secretary of the DSHW.

**(e) Closure Activity Notification**

KUCC will begin closure activities of each landfill unit in accordance with the approved Closure Plan no later than 30 days following the final receipt of waste at the landfill (R315-302-3(4)).

Closure activities shall be completed within 180 days from their starting time, however, KUCC reserves the right for extensions of the deadline for beginning and concluding closure activity. The Director and Executive Secretary will be given written justification for any extension requests.

If necessary, fences will be erected to limit service and signs will be posted at conspicuous locations indicating closure activities have begun (R315-303-3(6)(a)). Alternative disposal site locations will be indicated on the closure notice signs.

**(f) Post-Closure Plan (R315-302-3(6))**

After the Closure Plan has been executed, completed, and certified, the following post-closure and end use plan will be implemented. Following closure of each landfill unit, KUCC will conduct the appropriate industrial landfill post-closure care (R315-302-2(3)(b)(vi)).

**(1) Maintenance of Final Cover (R315-302-6(b))**

Facility maintenance and monitoring of applicable gases, land, and water constituents will be conducted for a period of 30 years after closure. The landfill cover and surrounding areas will be inspected and repaired by KUCC or KUCC contractor on a quarterly basis for the

first year, then semi-annually for 29 years thereafter. The Post-Closure Inspection Form is shown in Attachment #2.

**(1a) Repairs**

During landfill inspections, if any settlements, subsidence or erosion areas are found on the cover, they will be promptly backfilled with onsite compatible (similar permeability) soil. After final grading, the area will be re-vegetated with native the prescribed native grass seed mix. If there are areas of inherent erosion due to run-on or run-off, it will be documented on the Landfill Inspection Form and addressed by re-grading and placement of appropriate cover material.

To prevent integrity breaks in the cover due to mechanical agitation, notices will be posted and access will be limited to inspection, maintenance, and monitoring personnel.

Repairs will be made promptly with the appropriate soil, rip rap, or other necessary materials that will be compatible to the immediate environmental factors that cause breaches in the cover integrity.

**(1b) Prevention of Run-On and Run-Off**

A series of diversion dams above the site prevent surface run-off from impacting the SRL landfill site. As shown in Attachment #3, run-off from the SRL is diverted to man made drainage channels which ultimately discharge into designated process water collection systems. Run-off of storm water is not expected to be significant (see Attachment #4). The final cover drainage system described in the Closure Plan will prevent significant leachate or seepage discharge. Run-off will be further prevented by the inspection and repair procedures outlined in this section.

**(1c) Maintenance and Operation of Leachate Collection System**

As approved in the Section 6.3 application/permit, a facility leachate collection system is not required.

**(1d) Monitoring of Surface and Groundwater**

KUCC routinely monitors the groundwater and surface water north of the SRL. This monitoring is performed in accordance with the approved Smelter areas's monitoring program. Monitoring will be expanded for a period of 8 sampling events in compliance with the methods and suite of analyses listed in EPA SW-846. Notification will be given by KUCC to the SLCHD prior to any landfill designated sampling. Measurements, samples, and anaylses listed in Appendix A, of SLCHD Reg #1 will be performed twice a

year. If results from the first 8 sampling events are favorable, KUCC will petition SLCHD to reduce monitoring frequency of the suite of analyses listed in Appendix A (Reg #1) to once every two years. The schedule for sampling will be concurrent with the existing Smelter Remediation Monitoring program. The location of the existing groundwater wells relative to the SRL are shown in Attachment #2. These existing wells include: NES701, NES702, NES706 and NES728.

Groundwater monitoring for Class IIIb landfills are exempt by R315-304-5(4)(c). Surface water monitoring in the Kessler Canyon drainage area is not required (see KUCC's UPDES Permit # 0000051).

**(1e) Monitoring of Gases**

Because of low moisture content and minimal putrescible waste, generation of gases is not expected, and thus monitoring of gases is not applicable.

**(g) Post-Closure Care Statement**

KUCC will conduct post-closure monitoring and maintenance care as necessary or as directed by the Director of the SLCHD for a period of 30 years from date of closure. Reduction or extension of the 30 year monitoring and maintenance care period may be negotiated between the SLCHD's Director and KUCC management.

**(h) Post-Closure Use Statement**

KUCC will obtain prior approval from the Director prior to excavating any closed portion of the landfill or removing any waste or waste residues or contaminated soils. Post-Closure planned use of the SRL site will not compromise the integrity of the final cover or any other component of the containment system. Post-Closure use will not increase the foreseeable threat to public health.

**(i) Post-Closure Certification**

KUCC will submit written verification following the closure of a landfill unit and following the completion of post-closure care of a landfill unit. This verification will state the completed activities are in accordance with the SLCHD approved closure and post-Closure Plans as directed by Health Regulation #1, Solid Waste Management and Permitting, Section 6.9, February 5, 1998. This certification will be completed by the Director or an independent registered Professional Engineer.

**Attachment #1**

Landfill Manifest Form

# LANDFILL MANIFEST

Kennecott Utah Copper Corporation

Smelter Landfill    Smelter Concrete Monofill    Tailings Landfill    Trans-Jordan Landfill

Delivery Date: \_\_\_\_\_ Time: \_\_\_\_\_ Estimated Volume: \_\_\_\_\_ yds<sup>3</sup>

Driver's Name (print): \_\_\_\_\_ Company: \_\_\_\_\_

Point of Origin of Waste (be specific): \_\_\_\_\_

The following materials are NOT authorized for disposal in landfills:

Tires	Hazardous Wastes	Liquid Wastes
Friable Asbestos	Metal Drums	Solvents
Batteries	Acids/Caustics	Closed Cylinders

NOTE: Empty plastic containers placed in the Tailings Impoundment must be crushed or cut in half

Description of Materials in Load: \_\_\_\_\_

Generators Name (printed): \_\_\_\_\_

Generators Name (signed): \_\_\_\_\_

To be filled out by Driver:

To be filled out by Load Inspector/Recorder:

Multiple Load Counts:		
Load:	Time:	Yards <sup>3</sup> :
①	_____	_____
②	_____	_____
③	_____	_____
④	_____	_____
⑤	_____	_____
⑥	_____	22
⑦	_____	_____
⑧	_____	_____
⑨	_____	_____
⑩	_____	_____
Total:	_____	_____ Yds <sup>3</sup>

Mark total amount in "Estimated Volume" heading at the top of the form.

<input type="checkbox"/> Load Approved	<input type="checkbox"/> Load Rejected (Note Reason)
Reason(s) Load Rejected:	
<input type="checkbox"/> Unauthorized Items: _____	
<input type="checkbox"/> Landfill Closed	
<input type="checkbox"/> Manifest Incomplete	
<input type="checkbox"/> Other: _____	
_____	
Load Inspected and Approved/Rejected By:	
Inspector/Recorder (print):	_____
Inspector/Recorder (signed):	_____
Inspector/Recorder (Company/Title):	_____
Date: _____	Time: _____

**Attachment #2**

Post-Closure Landfill Inspection Form

# KUCC Smelter Post Closure Inspection Form

Version No \_\_\_\_\_



**Refuse Landfill**



**Monofill**

## 1) General Information

Date:                    /   /   /

Time:                    \_\_\_\_\_

Inspector :             \_\_\_\_\_

Position:                \_\_\_\_\_

Check all Applicable Inspection Boxes:

- |                     |  |  |
|---------------------|--|--|
| Type of Inspection: | <input type="checkbox"/> Quarterly       | <input type="checkbox"/> Annual              |
|                     | <input type="checkbox"/> Scheduled       | <input type="checkbox"/> Post-Rainfall event |
|                     | <input type="checkbox"/> Full Inspection | <input type="checkbox"/> Post-Repair         |

## 2) Inspection Survey \*

a) Is there evidence of post-closure dumping of waste ?                      Yes                      No  
 If Yes, what measures will be taken to stop further such action : \_\_\_\_\_

### b) Final Cover

	Good/Yes	Fair	Poor/No
Vegetation Cover: 1. Prosperation of Native Plant Growth	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Absence of Stress Vegetation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Absence of Animal Vector Impact	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cover Integrity 4. Has the Integrity of the Cover Been Maintained ?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Has the Cover Remained free of Mechanical Impact ?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Has the Slope Prevented Unwanted Channeling ?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Are Collector Ditches in Good Condition ?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Is the Cover Absent of Unanticipated Settling ?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Are the Side Slopes in Good Condition ?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

If Poor/No, what measures will be taken to mitigate or repair : \_\_\_\_\_

### b) Non-Cover Drainage Ditches,

- Is There:
1. Evidence of Unwanted Channeling or Erosion
  2. Evidence of Damage due to Facility Operations
  5. Evidence of Seepage or Leachate from Heap
  6. Evidence of Unanticipated Run-on ?
  7. Are Pre- or Post Channels in good conditions ?
  8. Has a major rainfall event occurred since last inspection ?

Yes	No

## 3) Comments: List any Action /Observations that are Significant to the Landfill's Post-Closure Function

\_\_\_\_\_

\*The opposite side of this form contains a landfill foot print. The location of any "Poor/No" responses should be marked with the appropriate ID. [i.e. "a 6" -channeling]

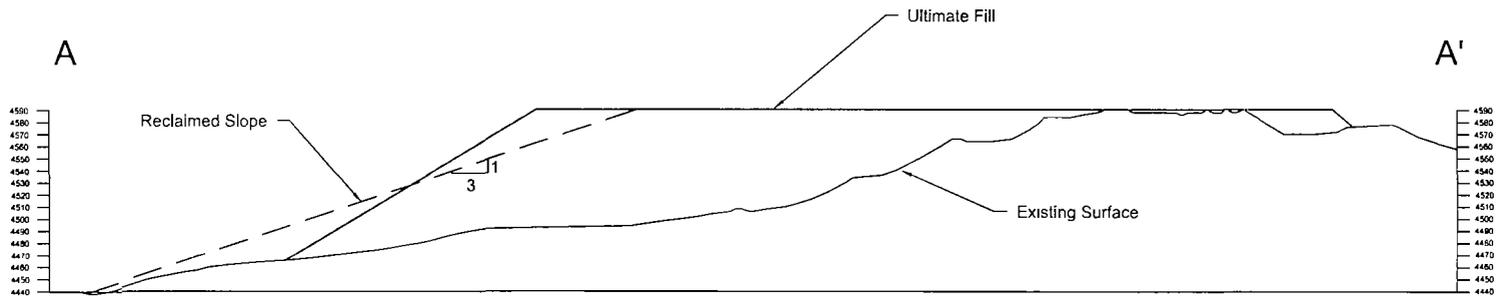
**Attachment #3**

Landfill Closure Plan, Final Facility Topography

d:\drawing\Kennecott Landfill Closure\Fig2\_Smelter Landfill\_Plan.dwg



drawings\Kennecott Landfill Closure\Fig3\_Smelter\_Landfill\_Cross\_Section.dwg



100 0 100 Feet  
Scale 1"=100' (no vertical exaggeration)

KENNECOTT UTAH COPPER CORP. LANDFILL CLOSURE PLAN			
Attachment 3 CROSS SECTION A-A' SMELTER LANDFILL			
<b>jbr</b> environmental consultants, inc.		DATE DRAWN 03/24/09	LAST REVISION DATE
DESIGN BY WF	DRAWN BY CP	SCALE 1"=100'	

Note (a)	The KUCC Reclamation supervision submits that they currently are experiencing a \$1,162 per acre cost for mulching, seeding, and fertilizing								
	Cost/Acre	\$	1,162						
Note (b)	Cover Volumetrics								
		area (acres)	sq yds	depth (in)	depth (yd)	cu yds			
	final cover	22	106480	36	1	106480			
	top cover	22	106480	36	1	106480			
Note (c)	Site Inspection and Record Keeping								
		hrs/inspect	inspect/year	#yrs inspect	Total hours	\$/hr-labor	\$/hr-truck	\$/hr total	
		12	2	30	720	40.63	73.00	113.63	
	Labor rate for Field Engineer Means 2016 01 31 13 20.0140								
	Flasher truck rate - Means 2017 32 01 2970.0650								
Note (d)	Soil Replacement								
	Assume 25% of total acreage at a depth of 3' would have to be replaced								
	area (acres)	sq yds	% replaced	depth (in)	depth (yd)	cu yds			
	22	106480	0.25	36	1	26620			
Note (e)	Vegetation Reseeding								
	Assume 25% of total acreage would have to be reseeded								
				area (acres)	% reseeded	acres reseeded			
				22	0.25	5.5			

COST ESTIMATE FOR POST-CLOSURE OF SMELTER LANDFILL - Kennecott Utah Copper							
Note: Numbering format follows the DSHW "Preparation of Closure - Post Closure Cost Estimate Guidance"							
The numbered items in the guidance document not shown in this estimate denote they are not applicable.							
	Item	Unit Measure	Cost/Unit	No. Units	Total Cost	Source	Note
1.0	Engineering Costs						
1.2	Site Inspection and Record Keeping	Hours	\$ 113.63	720	\$ 81,814		See Note (c)
2.0	Maintenance Costs						
2.1.1	Soil Replacement	cu yd	\$ 4.23	26620	\$ 112,603	Means 2016 - 31 23 16.50 2100	Scrapper costs
2.1.2	Vegetation Reseeding	acres	\$1,162.00	5.5	\$ 6,391		See Notes (a) & (e)
	Subtotal				\$ 200,807		
	10% Contingency				\$ 20,081		
	Post-Closure Care Total				\$ 220,888		
<b>TOTAL CLOSURE AND POST-CLOSURE COSTS</b>							
	Total Closure Costs				\$ 1,650,856		
	Total Post-Closure Costs				\$ 220,888		
	Total Cost				\$ 1,871,744		

COST ESTIMATE FOR POST-CLOSURE OF SMELTER LANDFILL - Kennecott Utah Copper							
Note: Numbering format follows the DSHW "Preparation of Closure - Post Closure Cost Estimate Guidance"							
The numbered items in the guidance document not shown in this estimate denote they are not applicable.							
	Item	Unit Measure	Cost/Unit	No. Units	Total Cost	Source	Note
1.0	Engineering & Preliminary Site Work						
1.1	Topographic Survey	acre	418.25	22	\$ 9,202	Means2016 - 02 21 13.09 0020	
1.4	Development of Plans						see below Subtotal
1.5	Contract Administration						see below Subtotal
1.6	Administrative costs for final cover certification & closure notice						see below Subtotal
1.7	Project Management						see below Subtotal
	Subtotal				\$ 9,202		
	10% Contingency				\$ 920		
	Engineering Subtotal				\$ 10,122		
	Item	Unit Measure	Cost/Unit	No. Units	Total Cost	Source	Note
2.0	Construction						
2.1	Final Cover System						
2.1.1a	Soil Placement	cu yd	1.29	106480	\$ 137,359	Means2016 - 31 23 16.46 5000	dozer costs-note (b)
2.1.1e	Soil Transportation	cu yd	4.23	106480	\$ 450,410	Means2016 - 31 23 16.50 2100	scraper costs -note (b)
2.2	Completion of Top Cover						
2.2.1	Infiltration Layer						
2.2.1a	Soil Placement	cu yd	1.29	106480	\$ 137,359	Means2016 - 31 23 16.46 5000	dozer costs-note (b)

2.2.1e	Soil Transportation	cu yd	4.23	106480	\$ 450,410	Means2016 - 31 23 16.50 2100	scraper costs -note (b)
2.4	Revegetation						
2.4.1,2,3	Seeding, Fertilize, Mulch	acre	1162	22	\$ 25,564	KUCC mine reclaim costs	see note (a) calcs tab
	Subtotal				\$ 1,201,103		
	10% Contingency				\$ 120,110		
	Construction Subtotal				\$ 1,321,214		

CALCULATION OF TOTAL CLOSURE COSTS					
	Engineering Total				\$ 10,122
	Construction Total				\$ 1,321,214
	SUBTOTAL				\$ 1,331,335
	Development of Plans	2.5 % of Subtotal	2.5%		\$ 33,283
	Contract Administration	3.5 % of Subtotal	3.5%		\$ 46,597
	Administrative Costs for final cover certification & closure notice	3.5% of Subtotal	3.5%		\$ 46,597
	Project Management	3.5% of Subtotal	3.5%		\$ 46,597
	Performance Bond	1.0% of Subtotal	1.0%		\$ 13,313
	Legal Fees	10% of Subtotal	10.0%		\$ 133,134
GRAND TOTAL CLOSURE COSTS					\$ 1,650,856



November 15, 2010

Glenn M. Eurick  
Senior Engineer - Permitting  
Kennecott Utah Copper, LLC

Subject: Surety Bond for a Solid Waste Management Facility

Dear Mr. Eurick:

Attached to this document are 2 copies of the following:

Copy of Surety Bond No. 016-039-646 dated November 8, 2010, Liberty Mutual Insurance Company, surety, in the amount of \$1,614,769.00.

Copy of Surety Bond No. 016-039-647 dated November 8, 2010, Liberty Mutual Insurance Company, surety, in the amount of \$142,765.00.

Please sign the following, assuring that you have received all of the above documents.

  
\_\_\_\_\_  
Glenn M. Eurick  
Kennecott Utah Copper, LLC

2010.11.19  
\_\_\_\_\_  
Date

  
\_\_\_\_\_  
Eric Peterson  
Enforcement Coordinator  
Environmental Division

11-18-10  
\_\_\_\_\_  
Date

HE10389

Bond #016-039-0467

**BOND AGREEMENT FOR OPERATION**  
**OF A**  
**SOLID WASTE MANAGEMENT FACILITY**  
(Surety Form)

**KNOW ALL MEN BY THESE PRESENTS:**

That we, Kennecott Utah Copper LLC, a Utah limited liability company, as PRINCIPAL, and Liberty Mutual Insurance Company, as SURETY, are jointly and severally held and firmly bound unto Salt Lake County for its Salt Lake Valley Health Department, Division of Environmental Health (hereinafter "COUNTY"), in the sum of \$1,614,769.00 (One Million Six Hundred Fourteen Thousand Seven Hundred Sixty-Nine Dollars), lawful money of the United States, for which payment well and truly to be made, we and each of us bind ourselves and each of our successors and assigns, jointly and severally, by these presents:

Signed and Sealed this 8<sup>th</sup> day of November, 2010.<sup>1</sup> SURETY has caused these presents to be signed by its duly authorized officer and its corporate seal to be affixed hereto.

**WHEREAS**, PRINCIPAL has applied for and is desirous of obtaining a permit for a solid waste management facility (Smelter Refuse Landfill, Permit No. 35-0011807), located at 12000 West 2100 South, Magna, in Salt Lake County, Utah; and

**WHEREAS**, the Salt Lake Valley Health Department (the "Health Department") regulates solid waste management facilities under Health Regulation No. 1, Solid Waste Management and

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<sup>1</sup> Leave date blank. Effective date will be the date of approval by the Salt Lake County Mayor, at which time the date will be filled in.

Permitting Regulation, adopted by the Salt Lake Valley Board of Health on September 7, 1989, and last amended on December 3, 2009, ("Health Regulation No. 1"), available at: <http://www.slvhealth.org/envRegs/pdf/01SolidWasteMgmt100209.pdf>; and

**WHEREAS**, such facilities are classified as solid waste facilities and must have a permit to operate; and

**WHEREAS**, a bond must be posted with the COUNTY in an amount provided for under Regulation No. 1, Sections 4.1.1(iii), 4.1.1(v), and 5.6 ensuring the proper operation, maintenance, closure and post-closure of the facility in accordance with the Health Department's rules and regulations as a condition of obtaining an operating permit.

**NOW, THEREFORE**, in consideration of the premises, the parties hereby agree as follows:

1. PRINCIPAL hereby agrees to ensure the proper operation, maintenance, closure and post-closure of its facility in accordance with Health Regulation No. 1, incorporated by reference herein. PRINCIPAL agrees that the responsibility for the operation, maintenance, closure and post-closure care of the facility remains with the PRINCIPAL until the same have been finally accepted by the COUNTY.

2. If PRINCIPAL's facility has been operated, maintained, closed and the post-closure care period satisfied in accordance with Regulation No. 1, as determined by the Health Department, the SURETY shall be released by the COUNTY.

3. If PRINCIPAL fails to comply with the requirements contained in Regulation No. 1, SURETY shall, within ten (10) days after receipt of a notice from the COUNTY that PRINCIPAL has failed to comply with the Salt Lake Valley Health Department's rules governing the proper operation, maintenance, closure and post-closure care, thereupon pay COUNTY the sum

of \$1,614,769.00 (One Million Six Hundred Fourteen Thousand Seven Hundred Sixty-Nine Dollars). The COUNTY shall use the funds to properly close the facility and perform post-closure maintenance, including reimbursement to COUNTY of such incidental construction, administrative, engineering, and legal costs as may be incurred by COUNTY.

4. If the SURETY shall so elect, this bond may be canceled by giving COUNTY written notice forty-five (45) business days prior to the cancellation date, whereupon PRINCIPAL is required to provide a substitute bond within the forty-five business days and prior to the cancellation.

5. If SURETY's name is removed from the United States Department of the Treasury Listing of Approved Sureties, Dept. Circular 570, PRINCIPAL shall cease operation of the facility within three (3) days written notice from the COUNTY until PRINCIPAL provides a substitute bond approved by the COUNTY.

6. It is expressly understood, covenanted and agreed between the parties, however, that the filing by PRINCIPAL and acceptance by the COUNTY of this surety agreement shall not constitute a waiver or estoppel by or against COUNTY and shall not relieve PRINCIPAL from the obligation to comply with Health Department regulations regardless of whether the bonded amount is adequate to pay for the satisfactory compliance with the Health Department's regulations.

**IN WITNESS WHEREOF**, said PRINCIPAL has signed these presents and said SURETY has caused these presents to be signed by its duly authorized officers and its corporate seal to be affixed hereto the day and year first hereinabove set forth.

ATTEST:

*[Handwritten Signature]*  
SECRETARY

PRINCIPAL: Kennecott Utah Copper LLC

By: *[Signature]*  
Name: Treasurer - Bernd Beyer  
Title: Treasurer  
Address: 1188 Shearbrooke Street West  
Montréal QC H3A 3G2

Province of Quebec, Canada )  
:SS  
Judicial Districts MONTREAL, QUEBEC

On this 6<sup>th</sup> day of October, 2010, personally appeared before me  
Bernd Beyer, who being first duly sworn did state that he/she is the  
Treasurer of Kennecott Utah Copper LLC, a Utah limited liability  
company, and that the foregoing Bond Agreement was signed on behalf of said limited liability  
company by authority of its Manager as evidenced by the Secretary's Certificate and that said limited  
liability company executed the same.

*[Signature]*  
COMMISSIONER OF OATHS  
Residing at:

My Commission Expires:  
May 28 2011





APPROVED:

SALT LAKE COUNTY:

By *[Signature]*  
Mayor Peter Corroon or designee

STATE OF UTAH )  
                                  :SS  
County of Salt Lake )

On this 8 day of November, 2010, personally appeared before me  
*Doag Willmore*, who being duly sworn did say that he/she is the  
*Chief Administrative Officer* of Salt Lake County, Office of Mayor, and that the  
foregoing instrument was signed on behalf of Salt Lake County by authority of law.

*Karen R. Lowe*  
NOTARY PUBLIC  
Residing in Salt Lake County

My Commission Expires:  
\_\_\_\_\_



Approved by:

SALT LAKE VALLEY  
HEALTH DEPARTMENT

By *Brian W. Bennion*  
Brian W. Bennion, M.P.A.  
Deputy Director

Dated: 11/4, 2010

Approved as to Form:

SALT LAKE COUNTY  
DISTRICT ATTORNEY

By *Paula K. Smith*  
Paula K. Smith  
Deputy District Attorney

Dated: 11/2, 2010  
C16ai.word

THIS POWER OF ATTORNEY IS NOT VALID UNLESS IT IS PRINTED ON RED BACKGROUND.

This Power of Attorney limits the acts of those named herein, and they have no authority to bind the Company except in the manner and to the extent herein stated.

LIBERTY MUTUAL INSURANCE COMPANY  
BOSTON, MASSACHUSETTS  
POWER OF ATTORNEY

KNOW ALL PERSONS BY THESE PRESENTS: That Liberty Mutual Insurance Company (the "Company"), a Massachusetts stock insurance company, pursuant to and by authority of the By-law and Authorization hereinafter set forth, does hereby name, constitute and appoint **BARBARA A. THOMPSON, CAROLYN E. WHEELER, NOVETTA M. ANDERSON, KELLIE A. MCKINNEY, LESLIE M. PATTERSON, LORETTA M. JONES, ALL OF THE CITY OF KNOXVILLE, STATE OF TENNESSEE** .....

..... each individually if there be more than one named, its true and lawful attorney-in-fact to make, execute, seal, acknowledge and deliver, for and on its behalf as surety and as its act and deed, any and all undertakings, bonds, recognizances and other surety obligations in the penal sum not exceeding **FIFTY MILLION AND 00/100**..... DOLLARS (\$ **50,000,000.00**.....) each, and the execution of such undertakings, bonds, recognizances and other surety obligations, in pursuance of these presents, shall be as binding upon the Company as if they had been duly signed by the president and attested by the secretary of the Company in their own proper persons.

That this power is made and executed pursuant to and by authority of the following By-law and Authorization:

ARTICLE XIII - Execution of Contracts: Section 5. Surety Bonds and Undertakings.

Any officer of the Company authorized for that purpose in writing by the chairman or the president, and subject to such limitations as the chairman or the president may prescribe, shall appoint such attorneys-in-fact, as may be necessary to act in behalf of the Company to make, execute, seal, acknowledge and deliver as surety any and all undertakings, bonds, recognizances and other surety obligations. Such attorneys-in-fact, subject to the limitations set forth in their respective powers of attorney, shall have full power to bind the Company by their signature and execution of any such instruments and to attach thereto the seal of the Company. When so executed such instruments shall be as binding as if signed by the president and attested by the secretary.

By the following instrument the chairman or the president has authorized the officer or other official named therein to appoint attorneys-in-fact:

Pursuant to Article XIII, Section 5 of the By-Laws, Garnet W. Elliott, Assistant Secretary of Liberty Mutual Insurance Company, is hereby authorized to appoint such attorneys-in-fact as may be necessary to act in behalf of the Company to make, execute, seal, acknowledge and deliver as surety any and all undertakings, bonds, recognizances and other surety obligations.

That the By-law and the Authorization set forth above are true copies thereof and are now in full force and effect.

IN WITNESS WHEREOF, this Power of Attorney has been subscribed by an authorized officer or official of the Company and the corporate seal of Liberty Mutual Insurance Company has been affixed thereto in Plymouth Meeting, Pennsylvania this 23rd day of March, 2010.

LIBERTY MUTUAL INSURANCE COMPANY

By Garnet W. Elliott  
Garnet W. Elliott, Assistant Secretary

COMMONWEALTH OF PENNSYLVANIA ss  
COUNTY OF MONTGOMERY

On this 23rd day of March, 2010, before me, a Notary Public, personally came Garnet W. Elliott, to me known, and acknowledged that he is an Assistant Secretary of Liberty Mutual Insurance Company; that he knows the seal of said corporation; and that he executed the above Power of Attorney and affixed the corporate seal of Liberty Mutual Insurance Company thereto with the authority and at the direction of said corporation.

IN TESTIMONY WHEREOF, I have hereunto subscribed my name and affixed my notarial seal at Plymouth Meeting, Pennsylvania, on the day and year first above written.



COMMONWEALTH OF PENNSYLVANIA  
Notarial Seal  
Teresa Pastella, Notary Public  
Plymouth Twp., Montgomery County  
My Commission Expires March 28, 2013  
Member, Pennsylvania Association of Notaries

By Teresa Pastella  
Teresa Pastella, Notary Public

CERTIFICATE

I, the undersigned, Assistant Secretary of Liberty Mutual Insurance Company, do hereby certify that the original power of attorney of which the foregoing is a full, true and correct copy, is in full force and effect on the date of this certificate; and I do further certify that the officer or official who executed the said power of attorney is an Assistant Secretary specially authorized by the chairman or the president to appoint attorneys-in-fact as provided in Article XIII, Section 5 of the By-laws of Liberty Mutual Insurance Company.

This certificate and the above power of attorney may be signed by facsimile or mechanically reproduced signatures under and by authority of the following vote of the board of directors of Liberty Mutual Insurance Company at a meeting duly called and held on the 12th day of March, 1980.

VOTED that the facsimile or mechanically reproduced signature of any assistant secretary of the company, wherever appearing upon a certified copy of any power of attorney issued by the company in connection with surety bonds, shall be valid and binding upon the company with the same force and effect as though manually affixed.

IN TESTIMONY WHEREOF, I have hereunto subscribed my name and affixed the corporate seal of the said company, this 12th day of October, 2010.



By David M. Carey  
David M. Carey, Assistant Secretary

Not valid for mortgage, note, loan, letter of credit, bank deposit, currency rate, interest rate or residual value guarantees.

To confirm the validity of this Power of Attorney call 1-610-832-8240 between 9:00 am and 4:30 pm EST on any business day.

**KENNECOTT UTAH COPPER LLC**

**SECRETARY'S CERTIFICATE**

As Secretary of Kennecott Utah Copper LLC, a Utah limited liability company, I certify the following is a true copy of resolutions adopted by the Company's Manager on 11 June 2009, which resolutions have not been amended and remain effective on this date:

**ADOPTION OF BANKING RESOLUTIONS:**

**IT IS RESOLVED** that the Treasurer and the Assistant Treasurer are, and any one of them acting singly is, authorized to:

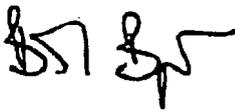
- (i) establish and close bank accounts, brokerage accounts and lines of credit in the name of the Company;
- (ii) designate the officers, employees or agents of the Company (including themselves) who are authorized to sign checks, drafts or transfers drawn on any accounts opened in the name of the Company and to revoke such authority, which authorized signatures may be affixed to any check or other instrument for the payment of money by printing, facsimile stamp or any other mechanical device, and the bank is hereby authorized to rely upon and accept as genuine any such printed, facsimile stamp or mechanical signature without any duty to determine the genuineness thereof or whether the affixing thereof has been authorized by the Company or the officer, employee or agent whose name is affixed;
- (iii) make and direct investments of funds including specifically, but not limited to, the establishment and maintenance of accounts for the purchase and sale of commodity futures, commodity options (on futures or physicals), foreign futures and options, commodity forward contracts and physical commodities (including currencies) and the closure of such accounts;
- (iv) designate the officers, employees or agents of the Company (including themselves) who are authorized to transact business, enter buy or sell orders, trade and invest or sell investments with respect to any accounts opened in the name of the Company and to revoke such authority;

- (v) execute, in the name of the Company, such bonds, guarantees and other types of indemnification agreements as they deem advisable; and
- (vi) contract for the issuance of letters of credit and execute such contracts, instruments and evidences of indebtedness as may be advisable or required in connection with the issuance, including without limitation, any modifications, renewals and/or extensions of such letters of credit;

and it is further

**RESOLVED** that the above resolutions shall supersede all other banking resolutions previously adopted on behalf of the Company or its predecessor, Kennecott Utah Copper Corporation.

I further certify that (1) each of the persons listed below has been appointed and is presently serving in the position set forth to the right of his or name; and (2) to the right of such position is his or her genuine specimen signature.

NAME OF OFFICER	POSITION	SIGNATURE
Bernd Beyer	Treasurer	
Franck Bertoux	Assistant Treasurer	
Oliver Wolfensberger	Assistant Treasurer	

**DATED AND SEALED** this 19<sup>th</sup> day of October 2010.

  
 SHANNON S. CROMPTON

