FACT SHEET AND STATEMENT OF BASIS
KENNECOTT UTAH COPPER LLC
RENEWAL PERMIT: DISCHARGE, BIOSOLIDS
UPDES PERMIT NUMBER: UT0000051
UPDES BIOSOLIDS PERMIT NUMBER: UTL-000051
MAJOR INDUSTRIAL

FACILITY CONTACTS

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Facility Name: Kennecott Utah Copper LLC
Mailing Address: 4700 Daybreak Parkway
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DESCRIPTION OF FACILITY

Kennecott Utah Copper LLC (Kennecott) operates an integrated mining and mineral processing facility that includes an open pit copper mine with some underground development, waste rock disposal areas, water collection system, copper cementation plant, concentrator, smelter, refinery, reverse osmosis (RO) groundwater treatment plant, sewage treatment plant, and a tailings impoundment. In addition, Kennecott also provides post-closure management of heap leach rinsing and drain-down water from Barneys Canyon, an open pit gold mine and processing facility. This Permit covers all of Kennecott's outfalls discharging to surface water, excluding storm water discharges, as described herein.

The Bingham Canyon Mine open pit has been in operation since about 1904 and typically mines approximately 450,000 to 600,000 tons of ore and waste rock per day. The ore is sent to the Copperton Concentrator and could include up to 200,000 tons of ore per day. Production includes a froth flotation process to produce copper and molybdenum concentrates. Correspondingly, up to 200,000 tons of tailings from the concentrator could be conveyed, at design, to the tailings impoundment per day.

The smelter processes copper concentrate that originates primarily from the Copperton Concentrator and periodically from other mine and mineral processing facilities, along with flux, coolants, and other reagents in order to produce anode copper, sulfuric acid, and rhenium. In the refinery, the anode copper is electrolytically refined to cathode copper. Gold, silver, selenium, lead carbonate, rhenium, platinum, and palladium are also produced at the refinery.

The primary discharge from the tailings impoundment reports directly to the Transitional Waters and Gilbert Bay of Great Salt Lake via Outfall 012. The sediment pond and Outfall 002 remain in place for the discharge of tailings water to the C-7 Ditch as needed. Outfall 007 for the discharge of seepage and dike runoff water from the tailings impoundment to the C-7 Ditch also remains in place.
Waste rock contact water continues to be collected in the water collection system at the base of the waste rock areas. Kennecott recovers copper from certain waste rock contact waters at a facility in Bingham

Canyon that currently uses copper cementation technology. De-copperized water and waste rock contact water that bypasses the copper recovery circuit is introduced into the tailings line for management and is then discharged to the tailings impoundment.

Groundwater in the alluvial aquifer in the southwest portion of the Salt Lake Valley has been contaminated by historic leach-water management practices. Groundwater cleanup of the Zone A plume is being conducted under a Consent Decree between EPA, State of Utah, and Kennecott, and involves extraction of low pH groundwater from wells and introduction of this water to the tailings line along with waste rock contact water. Under normal operations, excess neutralizing capacity in the tailings line resulting from lime added as a milling reagent and the intrinsic neutralization capacity of the tailings provides adequate treatment of all acidic flows routed to the tailings line. During upsets or other disruptions of normal operation, such as planned or unplanned shutdowns, Kennecott may add lime directly to the tailings line to neutralize the acidic flows.

Kennecott also extracts neutral water with elevated sulfate concentrations from the leading edge of the Zone A plume and treats this water using RO membrane treatment to produce drinking water. Drinking water is provided to the public through the Jordan Valley Water Conservancy District (JVWCD) in partial fulfillment of a settlement with the State of Utah under a Natural Resource Damage claim. RO treatment produces a concentrate wastewater which reports to the tailings line. JVWCD has constructed a separate RO treatment plant to treat other historic mine contaminated groundwater (Zone B plume). This facility is permitted to discharge to the Transitional Waters and Gilbert Bay of Great Salt Lake via a 21-mile pipeline under UPDES Permit No. UT0025836.

Near the smelter and refinery, Kennecott captures spring water and artesian groundwater flows and pumps groundwater wells where groundwater is impacted by historic releases of selenium and arsenic. This groundwater is utilized in Kennecott's process water system. Kennecott undertakes these groundwater management activities pursuant to a Record of Decision issued by EPA and the State of Utah and a pending Consent Decree.

Effluent from the sewage treatment plant (STP) adjacent to the Refinery is piped directly to Pump Station No. 4 and is incorporated into the process water circuit. Pump Station No. 4 directs flow to the Magna Reservoir where it is mixed with recycle water from the tailings impoundment and smelter. Water from the Magna Reservoir is pumped to the Copperton Concentrator where it is used for mineral beneficiation. UPDES effluent limitations for the STP are not required because Kennecott is not authorized to discharge the effluent to waters of the state. Instead, effluent is directly recycled into the process water system.

The Barneys Canyon Mine is located approximately 4 miles north of the Bingham Canyon Pit and about 1.5 miles northwest of the Copperton Concentrator. Five open pits were constructed between 1989 and 2001. Waste rock disposal area reclamation was completed in 2002. Operations included gold extraction by cyanide heap-leach methods with a closed loop process water system. Five leach pads were constructed and operated through 2013. Meteoric water drainage from the heaps is now directed to Kennecott's process water system. Flows from the Barneys Canyon Water Tunnel, located adjacent to one of the mine pits, are piped to the Copperton Concentrator and used in the beneficiation circuit or directed to the tailings lines. Seep and spring water adjacent to waste rock and the leach pads are also routed directly to the tailings lines.

FACILITY
The Bingham Canyon Mine and Water Collection System, Copperton Concentrator, Barneys Canyon Mine, Tailings Impoundment, Copper Cementation Plant, RO plant, Sewage Treatment Plant, Smelter, Refinery, and associated facilities for each of these operational units.

FACILITY LOCATION
The company's active facilities are located in western Salt Lake County. The Bingham Canyon Mine, Water Collection System, Copper Cementation Plant, RO Plant, Barneys Canyon, and Copperton Concentrator are located near Copperton, Utah. The Tailings Impoundment, Sewage Treatment Plant, Smelter, and Refinery are located near Magna, Utah. A combination of concentrate, tailing pipelines, and process water return pipeline connect the Copperton Concentrator with the Tailings Impoundment and the Smelter.

STANDARD INDUSTRIAL CLASSIFICATION (SIC) CODE
The SIC codes are 1021 copper ore mining and milling and 3331 smelting and refining of copper.

DESCRIPTION OF THE PROCESS AND WASTEWATER SYSTEMS
Mine and waste rock contact waters at the Bingham Canyon Mine are collected and managed through a water collection system, the Large Bingham Reservoir, the Small Bingham Reservoir, and various groundwater extraction wells from remediation activities.

The Bingham Canyon Mine water collection system consists of a series of cutoff walls, collection basins, pipes, toe drains, French drains, and lined canals that collect and transport storm water runoff from waste rock. Contact waters from certain sections of the waste rock piles are piped to the copper cementation plant for copper recovery. Tailwater from the copper cementation plant and other waste rock contact waters are typically delivered directly to the tailings line; these waters can also be diverted into the three compartment Large Bingham Reservoirs or Small Bingham Reservoir for temporary storage and later pumped to the tailings line. These reservoirs may also be used to store low-pH mine and waste rock contact waters, certain mine tunnel flows and water from various extraction wells, including the Bingham Canyon Alluvial well, Lark Shaft, Bingham Creek cutoff wall, Curtis Spring, the acid plume wells and the Copperton channel well.

Kennecott has permanently discontinued the use of Outfall 005, originally approved in 1984 for storm water and mine drainage discharge to the Jordan River.

Water is collected and used at the Copperton Concentrator and consists of water collected from tunnels, storm water runoff, extraction well water, and meteoric flows from the mine. Sources of water collected and used at the Copperton Concentrator include:

1) Tailings return water (including smelter process water)
2) Bingham Canyon mine pit water
3) Carr Fork Shaft (Tooele County)
4) Storm water from the Upper Bingham Canyon drainages surrounding the pit
5) Water from the North Ore Shoot (NOS) Shaft
6) Water pumped from the Carr Fork underground workings
7) Bingham Tunnel water
8) Water from deep wells B2G1193, BFG1200, BSG2828 and LTG1 147
9) Water from the Lark Clean Water Well
10) Water from the Lark Shaft
11) Water from the upper Dry Fork clean water well and Mid-Valley clean water well
12) Treated sewage effluent water
13) Barneys Canyon mine pit drainage water, heap leach drain-down water, and some meteoric contact water
14) Permeate and/or concentrate streams from membrane treatment (RO) facilities, associated with the treatment of contaminated groundwater
15) Leachate collection system water (if present) from Arthur Stepback Repository (CERCLA CAMU)
16) Mine and waste rock contact waters

17) Canal water (e.g., Utah and Salt Lake Canal or Jordan Canal) for use in processing
18) Other mine impacted surface waters or ground waters

Water from the NOS, Carr Fork Shaft, Carr Fork Well, upper Dry Fork clean water well, Mid-Valley clean water well, Bingham Tunnel, Lark Well, and Lark Shaft can be routed into the process water reservoir or into the Moly filter water tank. Other waters that are routed into the process water reservoir include overflow from the tailings thickeners and overflow from the clarifier. Mine water is commingled with Copperton Concentrator tailings and piped 13 miles to the tailings impoundment.

Deep wells provide feed water to the Zone A RO plant. Treated water from this plant is delivered to a municipal drinking water purveyor for distribution to the public; RO concentrate reports to the tailings pipeline. On occasion, treated or untreated water from these wells may be directed to the process water system.

The volume of water that may be discharged from the impoundment is consistent with the volume that could have been discharged prior to commingling with any zero-discharge water and includes that volume of water incorporated into Kennecott's process system that is not necessary for process and could have been discharged prior to its integrated management.

Flows to the tailings impoundment include water associated with the Copperton tailings, Smelter Slag Concentrator, and Smelter Hydrometallurgical Plant. Each of these facilities uses reagents specific for the process requirements. In addition, surface water drainage, flows from the Garfield Wells, Well #10, Adamson Springs, and the Riter-North Jordan Canal or the Utah-Salt Lake canal may be diverted into the Tailings water management system as needed to provide freshening or make-up water.

Under normal operating conditions, water is pumped from the tailings impoundment decant pond to a clarification canal and recycled back to the concentrator via the Magna Reservoir. Excess tailings decant water is discharged in accordance with UPDES conditions at the primary discharge point Outfall 012. Water reporting to Outfall 012 is pumped from the tailings impoundment via the floating decant barge pumps. The intake to these pumps has been designed to skim water from just below the surface in order to reduce the potential to suspend solids from the bottom of the decant pond.

A toe ditch has been constructed along the outer north perimeter of the tailings impoundment embankment with a central toe ditch retention pond. Outfall 007 can be used to discharge from the toe ditch retention pond to the C-7 Ditch when Kennecott does not recycle this water for reuse in the concentrator.

Leachate and storm water collected from the Arthur Step-back Repository is occasionally pumped to Pump Station No. 4. Located on the southwest comer of the tailings impoundment, this lined repository provides permanent storage for soil and debris cleaned up during remediation activities.

The smelter has implemented a water management system that incorporates separate systems for smelter process water, acid plant blow-down, slag mill effluent, hydrometallurgical plant effluent, storm water associated with industrial activity, and storm water not associated with industrial areas.

Smelter process water, such as granulation, anode casting, furnace jacket cooling, acid plant cooling, slag pot cooling, and powerhouse are cooled using onsite cooling towers or heat exchangers or air cooled before returning to the process within the smelter for reuse or sent to the lined East and West Process Ponds before pumping to the Copperton Concentrator via Pump Station No. 4 for recycling. Additional process water includes contact waters used to move process materials within the smelter process. Operations at the smelter are designed to reuse process water within the smelter, or recycle to Copperton Concentrator, thereby meeting the zero-discharge effluent limitation.

A hydrometallurgical plant uses the acid plant blow down and related acidic water from the smelter gas cleaning area to process solids from the flash smelter furnace electrostatic precipitator to recover copper and precious metals. In addition, refinery bleed electrolyte, precious metals plant blow-down, and miscellaneous bleed streams are directed to the hydrometallurgical plant for use as a reagent. Gypsum/water slurry from this plant is routed through internal Outfall 104 to the tailings impoundment via the slag concentrator tailings pump system. This flow, from the hydrometallurgical plant, is regulated under the effluent guidelines applicable to acid plant blow down and refinery spent electrolyte with appropriate mass-based limitations. The volume of effluent from the hydrometallurgical plant is monitored using an inline flow meter. Flow data is used both to calculate the mass effluent limitations using concentration data from Outfalls 002, 007, and/or 012 to account for the discharge of an equivalent volume of treated tailings water through Outfalls 002, 007, and/or 012.

The STP was constructed to treat sewage from the north end facilities, which now include the smelter, refinery, Praxair, railroad support, and tailings impoundment support facilities as well as neutralized laboratory wastes from the process and environmental laboratories. The plant includes flow equalization, chlorination, and aerobic digestion of sludge. Discharges from the STP consist of a clarified and chlorinated effluent, which reports directly to Pump Station No. 4 and from there to the concentrators for use as process water. Biosolids produced at the Kennecott STP are transported to a bagging and drying facility on site. The solids are dried and analyzed for heavy metals, to be disposed of annually at the Kennecott permitted solid waste facility on site.

Water from the Tooele, Section 17, Japanese Springs, and noncontact storm water can be discharged at Outfall 004, Outfall 008 or report to the process water return system via the Hazelton Pump and Smelter Return Canal. Surface water flows from wetlands, Jones, Spitz, No-name, and other natural springs and other artesian groundwater flows can be discharged directly through Outfall 008 consistent with applicable discharge limitations or report to the process water return system via the Smelter Return Canal.

SUMMARY OF CHANGES FROM PREVIOUS PERMIT

The Utah Power Plant was decommissioned in 2019 and no longer discharges to the tailings pipeline.

The Storm Water requirements will be removed from the UPDES Individual Permit. Kennecott will be required to apply for coverage under the Multi Sector Storm Water permit within 30 days of the effectiveness of this permit.

Selenium discharges from Outfall 004 and 008 are added to the annual limit of 900 kg/yr previously applicable to Outfall 012 only. Selenium and flow monitoring frequency for Outfalls 004 and 008 were increased to support the annual load estimates.

The requirement that the geometric mean of selenium in eggs is based on 5 to 8 eggs was clarified.

The MSGP coverage applies to construction activities within active mining areas including all support facilities. Storm water discharges from earth-disturbing activities conducted prior to active mining activities, such as expansion of the mine into undeveloped territory, are considered construction activities and must be covered under the Storm Water Construction General Permit. Mine-related facilities upgradient and within the collection zone of the storm water capture systems do not require separate storm water permit coverage and are subject to the discharge requirements of this permit.

DISCHARGE

DESCRIPTION OF DISCHARGE

Kennecott has been reporting self-monitoring results on Discharge Monitoring Reports on a monthly basis and has maintained a good compliance record with its UPDES permit requirements. Additional information on the compliance record for the facility can be found here: https://echo.epa.gov/effluent-charts#UT0000051.

Outfall	Latitude	Longitude	Description of Discharge Point	Receiving Waters and/or Description
002	40° 44'30"	112° 05'15"	C-7 Ditch	Tailing pond outfall to C-7 ditch
004	40° 44'06"	112° 11'49"	I-80 culvert to Great Salt Lake	I-80 Culvert to Great Salt Lake
007	40° 46'15"	112° 07'00"	C-7 Ditch	Toe Ditch Pond to C-7 Ditch
008	40° 44'12"	112° 10'25"	Great Salt Lake	Artesian well water, refinery storm water to the Great Salt Lake
009	40° 32'07"	112° 11'39"	Pine Canyon Creek, Tooele County	Pine Canyon Tunnel, Tooele County
010	40° 29'33"	112° 07'20"	Butterfield Creek	Butterfield Tunnel to Butterfield Creek
011	40° 42'52"	112° 06'57"	Ritter-Utah Salt Lake Canals	Adamson Spring to the Ritter-Utah Salt Lake Canals
012	40° 45'20"	112° 10'02"	Great Salt Lake	Tailing discharge to the Great Salt Lake
104	40° 43'27"	112° 11'50"	Internal discharge, Hydrometallurgical Plant	Internal discharge from Hydrometallurgical Plant

RECEIVING WATERS AND STREAM CLASSIFICATION

The primary receiving water for the tailings impoundment discharge is the Transitional Waters and Gilbert Bay of Great Salt Lake. Collected spring water, and occasional tailings impoundment discharges, flow into the C-7 Ditch which flows into the Lee Creek drainage and from there to Great Salt Lake. Inactive mine tunnels discharge to Butterfield Creek and an ephemeral drainage in Pine Canyon.

Gilbert Bay of Great Salt Lake is classified a Class5A. The Transitional Waters along the Shoreline of Great Salt Lake are classified as 5E. The C-7 Ditch is classified a Class 3E. Butterfield Creek is classified a Class 2B, 3D and 4. Pine Canyon Creek and Lee Creek are not specifically classified and are presumptively classified as Class 2B and 3D (*Utah Administrative Code (UAC) R317-2-6*). According to *UAC R317-2-6*:

Class 2B	Protected for infrequent primary contact recreation. Also protected for secondary contact recreation where there is a low likelihood of ingestion of water or a low degree of bodily contact with the water. Examples include, but are not limited to, wading, hunting, and fishing.
Class 3D	Protected for waterfowl, shore birds and other water-oriented wildlife not included in Classes 3A, 3B, or 3C, including the necessary aquatic organisms in their food chain.
Class 3E	Severely habitat-limited waters. Narrative standards will be applied to protect these waters for aquatic wildlife.

Class 4	Protected for agricultural uses including irrigation of crops and stock watering.
Class 5A	Gilbert Bay Geographical Boundary -- All open waters at or below approximately 4,208-foot elevation south of the Union Pacific Causeway, excluding all of the Farmington Bay south of the Antelope Island Causeway and salt evaporation ponds. Beneficial Uses -- Protected for frequent primary and secondary contact recreation, waterfowl, shore birds and other water-oriented wildlife including their necessary food chain.
Class 5E	Transitional Waters along the Shoreline of the Great Salt Lake Geographical Boundary – Geographical Boundary -- All waters below approximately 4,208-foot elevation to the current lake elevation of the open water of the Great Salt Lake receiving their source water from naturally occurring springs and streams, impounded wetlands, or facilities requiring a UPDES permit. The geographical areas of these transitional waters change corresponding to the fluctuation of open water elevation. Beneficial Uses -- Protected for infrequent primary and secondary contact recreation, waterfowl, shore birds and other water-oriented wildlife including their necessary food chain.

BASIS FOR EFFLUENT LIMITATIONS

Kennecott operations are covered by USEPA Effluent Guidelines for the Ore Mining and Dressing Point Source Category, the Nonferrous Metals Manufacturing Point Source Category, Utah Secondary Treatment Standards, and Utah Water Quality Standards.

An Antidegradation Level II review is not required since the Level I review shows that water quality impacts are minimal. The permittee is expected to be able to comply with these limitations.

Outfall 004, 008 and 012

Kennecott has several outfalls. Great Salt Lake is the ultimate or immediate receiving water for three of these outfalls: 004, 008, and 012. The Level I anti-degradation reviews (protection of existing uses) for these outfalls were conducted in accordance with the Utah Division of Water Quality (DWQ) Interim Methods for Evaluating Use Support for Great Salt Lake Utah Pollution Discharge Elimination System (UPDES) Permits (v. 1.0 January 4, 2016). These methods apply to discharges that are not required to meet Class 3 freshwater numeric aquatic life use criteria prior to discharging to Great Salt Lake. The Level II anti-degradation review is based on the requirements of *UAC R317-2-3.* The whole effluent toxicity (WET) requirements are based on the Utah Pollutant Discharge Elimination System Permit and Enforcement Guidance Document for Whole Effluent Toxicity (DWQ, February, 2018).

Outfall 004. Outfall 004 discharges to the Class 5E Transitional Waters and thence to Great Salt Lake via a culvert beneath I-80.

Class 5E Transitional Waters→Class 5A Gilbert Bay, Great Salt Lake

Outfall 008. Outfall 008 discharges to the C-7 Ditch to the Class 5E Transitional Waters thence to Great Salt Lake. Outfall 008 did not discharge during the last permit cycle.

Class 3E C-7 Ditch→Class 5E Transitional Waters→Class 5A Gilbert Bay, Great Salt Lake

Outfall 012. Outfall 012 discharges to the Class 5E Transitional Waters and thence to Great Salt Lake via a culvert beneath I-80.

Class 5E Transitional Waters→Class 5A Gilbert Bay, Great Salt Lake

The Transitional Waters are mudflats where the discharges create a channel to Gilbert Bay. For Outfall 012, the channel appears to discharge some groundwater as well based on the presence of flow when outfall discharges were absent. The Transitional Waters only exist when GSL is below an elevation of 4208 feet and Lake elevations are currently less than 4192 feet. The Outfall 012 delta in the Transitional Waters currently exceeds one mile.

Outfall 001 from the Jordan Valley Water Conservancy District Southwest Groundwater Treatment Plant (Jordan Valley, UT0025836) discharges next to Kennecott Outfall 012. The effluents from the two outfalls comingle in the Transitional Waters when both are discharging. In general, the Jordan Valley outfall is a continuous discharge whereas the RTKC discharge is intermittent and seasonal.

WET (Whole Effluent Toxicity) Testing
The requirements for acute WET and chronic WET monitoring are consistent with the Utah 2018 WET Guidance and are unchanged from the previous permit. The permit provision that allows for a reduction from a frequency of quarterly was removed because quarterly is the minimum frequency for major industrial dischargers.

Outfall 002, 007 and 012 Tailing Impoundment

The flow from the mines and concentrator are usually greater than 90 percent of the flow to the tailings impoundment. Federal Ore Mining Guidelines for these categories of wastewaters have concentrations-based limitations. The State has concluded and EPA Region VIII has concurred that concentrations limits are appropriate for the discharge of this water from the tailings impoundment because the applicable standards and limitations are expressed in terms of concentration or other units of measurements (with the exception of selenium, limited as further described below). A small amount of discharge to the tailings impoundment is from the hydrometallurgical plant. The flow to the hydrometallurgical plant is from the smelter acid plant, refinery bleed electrolyte, precious metals plant blowdown, and related refinery minor bleed streams. Federal Nonferrous Metals Manufacturing Guidelines for these categories of wastewaters have mass-based limitations. The effluent from the hydrometallurgical plant to the tailings impoundment is mass based and calculated using the flow of this stream to the tailings impoundment and the concentration of applicable constituents in the discharge from the tailings impoundment.

The appropriate Ore Mining Effluent Guideline limitations in 40 CFR 440.102, best practicable technology (BPT), and 40 CFR 440.103, best available technology (BAT), for copper, lead, gold, silver, and molybdenum ores for copper or molybdenum froth flotation are listed in Table 1.

Table 1				
Ore Mining Effluent Guidelines				
Effluent Limitations				
Parameter	**Monthly Average**	**Daily Minimum**	**Daily Maximum**	**Units**
Total Suspended Solids (TSS)	20	-	30	mg/L
Copper (Cu)	0.15	-	0.3	mg/L
Zinc (Zn)	0.5	-	1.0	mg/L
Lead (Pb)	0.3	-	0.6	mg/L
Mercury (Hg)	0.001	-	0.002	mg/L
Cadmium (Cd)	0.05	-	0.1	mg/L
pH	-	6.0	9.0	SU

Table 2
Outfall 002
For Outfall 002, the effluent flow limit is based upon operational history, or estimated by the permittee, utilizing the structural capacities, coupled with operational knowledge. Limitations for TSS and the monthly average for Hg are based on the Ore Mining Effluent Guidelines. The limitations for monthly average Cd, Hg, Zn, Se, and Cyanide, and the daily max for Pb, Hg, and Cyanide are based upon the value in the previous permit, as it is more stringent. The limitations for monthly average As, Cu, and PB, and the daily max for As, Cd, Cu, and Zn are based on the Wasteload. The pH is limited by the Utah Secondary Standards, *UAC R317-1-3.2* to a range of 6.5-9.0 standard units. The oil and grease limitation of 10 mg/L maximum is based on Best Professional Judgment (BPJ).

The US Army Corps of Engineers 404 Permit for the North Expansion contained a selenium limit of 12 ug/L in lower Lee Creek water north of I-80 that is protective of wildlife at the Inland Sea Shorebird Reserve (ISSR). Accordingly, Kennecott has been required to manage discharge from Outfalls 002 and 007 consistent with meeting the historic 404 permit limit for selenium in this water; that requirement has been retained. From the point of discharge to Lee Creek the additional dilutions provided from other sources prior to discharging into Lee Creek were modeled using the available data. Kennecott may elect to conduct additional hydrologic studies to further refine future WLAs.

Parameters of Concern
The potential parameters of concern for the discharge/receiving water identified were dissolved metals, total suspended solids, and pH, as determined in consultation with the UPDES Permit Writer. WQBELs were determined for metals.

Total Maximum Daily Load (TMDL)
According to the Utah Combined 2018/2020 303(d) Water Quality Assessment Report, the receiving water for the Outfall 002 and 007 discharge, Lee Creek from Great Salt Lake to headwaters near 2100 South (UT16020204-036_00), was listed as fully supporting.

Reasonable Potential Analysis
Since January 1, 2016, DWQ has conducted reasonable potential analysis (RP) on all new and renewal applications received after that date. RP for this permit renewal was conducted following DWQ's September 10, 2015 Reasonable Potential Analysis Guidance (RP Guidance). A discharge from Outfall 002 did not occur during the previous permit cycle. Therefore, a full RP was not able to be conducted.

Table 2						
Outfall 002						
Effluent Limitations **Self-Monitoring and Reporting Requirements [a]**						
Parameter	**Maximum Monthly Average**	**Daily Maximum**	**Daily Minimum**	**Frequency**	**Sample Type**	**Units**
Flow	50.0	-	-	Continuous	Recorder	MGD
Total Suspended Solids (TSS)	20	30	-	3 x weekly	Composite	mg/L
Total Arsenic (As)	0.172	0.366	-	3 x weekly	Composite	mg/L
Total Cadmium (Cd)	0.00079	0.008	-	3 x weekly	Composite	mg/L
Total Copper (Cu)	0.0351	0.0557	-	3 x weekly	Composite	mg/L

Total Lead (Pd)	0.0215	0.0532	-	3 x weekly	Composite	mg/L
Total Mercury (Hg)	0.000013	0.002	-	3 x weekly	Grab	mg/L
Total Zinc (Zn)	0.224	0.419	-	3 x weekly	Composite	mg/L
Total Selenium (Se) [b, c]	0.012	-	-	Monthly	Grab	mg/L
Total Cyanide	0.0056	0.0241	-	Monthly	Composite	mg/L
Oil & Grease	-	10	-	[d]	Grab	mg/L
Total Dissolved Solids (TDS)	-	-	-	Monthly	Composite	mg/L
pH	-	9.0	6.5	3 x weekly	Grab	SU

Table 2 References

[a.] Samples collected in compliance with the monitoring requirements specified above shall be collected at the outfall to the C-7 ditch prior to mixing with the receiving water.

[b.] Selenium will be analyzed by EPA Method 200.8 or alternative method approved by the State of Utah Bureau of Laboratory Improvement.

[c.] 0.012 mg/L is consistent with the requirements of the U.S. Army Corps of Engineers 404 Permit #199450301 and shall not be exceeded at the Lower Lee Creek location north of Interstate 80 during a discharge from outfalls 002 and 007.

[d.] Oil & Grease will be sampled when sheen is observed.

End Table 2 References

Table 3

For Outfall 007, the effluent flow limit is based upon operational history, or estimated by the permittee, utilizing the structural capacities, coupled with operational knowledge. Limitations for TSS are based on the Ore Mining Effluent Guidelines. The limitations for monthly average for Cd, Hg, Zn, and Se, and daily max for Hg, Zn, and Cyanide are based upon the value in the previous permit, as it is more stringent. The limitations for monthly average As, Cu, Pb, and Cyanide, and the daily max for As, Cd, Cu, and Pb are based on the Wasteload. The pH is limited by the Utah Secondary Standards, *UAC R317-1-3.2* to a range of 6.5-9.0 standard units. The oil and grease limitation of 10 mg/L maximum is based on Best Professional Judgment (BPJ).

The US Army Corps of Engineers 404 Permit for the North Expansion contained a selenium limit of 12 ug/L in lower Lee Creek water north of I-80 that is protective of wildlife at the Inland Sea Shorebird Reserve (ISSR). Accordingly, Kennecott has been required to manage discharge from Outfalls 002 and 007 consistent with meeting the historic 404 permit limit for selenium in this water; that requirement has been retained. From the point of discharge to Lee Creek the additional dilutions provided from other sources prior to discharging into Lee Creek were modeled using the available data. Kennecott may elect to conduct additional hydrologic studies to further refine future WLAs.

Parameters of Concern

The potential parameters of concern for the discharge/receiving water identified were dissolved metals, total suspended solids, and pH, as determined in consultation with the UPDES Permit Writer. WQBELs were determined for metals.

Total Maximum Daily Load (TMDL)

According to the Utah Combined 2018/2020 303(d) Water Quality Assessment Report, the receiving water for the Outfall 002 and 007 discharge, Lee Creek from Great Salt Lake to headwaters near 2100 South (UT16020204-036_00), was listed as fully supporting.

Reasonable Potential Analysis
A discharge from Outfall 002 did not occur during the previous permit cycle. Therefore, a full RP was not able to be conducted.

Table 3						
Outfall 007						
Effluent Limitations **Self-Monitoring and Reporting Requirements [a]**						
Parameter	**Maximum Monthly Average**	**Daily Maximum**	**Daily Minimum**	**Frequency**	**Sample Type**	**Units**
Flow	15.0	-	-	Continuous	Recorder	MGD
Total Suspended Solids (TSS)	20	30	-	3 x weekly	Composite	mg/L
Total Arsenic (As)	0.222	0.427	-	3 x weekly	Composite	mg/L
Total Cadmium (Cd)	0.00089	0.0093	-	3 x weekly	Composite	mg/L
Total Copper (Cu)	0.0458	0.065	-	3 x weekly	Composite	mg/L
Total Lead (Pd)	0.0284	0.605	-	3 x weekly	Composite	mg/L
Total Mercury (Hg)	0.000015	0.002	-	3 x weekly	Grab	mg/L
Total Zinc (Zn)	0.224	0.5	-	3 x weekly	Composite	mg/L
Total Selenium (Se) [b, c]	0.012	-	-	Monthly	Grab	mg/L
Total Cyanide	0.0056	0.0291	-	Monthly	Composite	mg/L
Oil & Grease	-	10	-	[d]	Grab	mg/L
Total Dissolved Solids (TDS)	-	-	-	Monthly	Composite	mg/L
pH	-	9.0	6.5	3 x weekly	Grab	SU

Table 3 References

a. Samples collected in compliance with the monitoring requirements specified above shall be collected at the outfall to the C-7 ditch prior to mixing with the receiving water.

b. Selenium will be analyzed by EPA Method 200.8 or alternative method approved by the State of Utah Bureau of Laboratory Improvement.

c. 0.012 mg/L is consistent with the requirements of the U.S. Army Corps of Engineers 404 Permit #199450301 and shall not be exceeded at the Lower Lee Creek location north of Interstate 80 during a discharge from outfalls 002 and 007.

d. Oil & Grease will be sampled when sheen is observed.

End Table 3 References

Table 4
Outfall 012
For Outfall 012, the effluent flow limit is based upon operational history, or estimated by the permittee, utilizing the structural capacities, coupled with operational knowledge. Limitations for TSS are based on the Ore Mining Effluent Guidelines. The limitations for monthly average and daily max for As, Cd, Pd, Cu, Hg, Se, Cyanide, Zn, and annual monitoring for Se are based upon the value in the previous permit. The pH is limited by the Utah Secondary Standards, *UAC R317-1-3.2* to a range of 6.5-9.0 standard units. The oil and grease limitation of 10 mg/L maximum is based on Best Professional Judgment (BPJ).

TSS monitoring has been reduced from daily monitoring to monthly monitoring is based on BPJ to ensure

consistent WET monitoring activities even during high wind events.

Reasonable Potential Analysis
Outfall 012 does not have reasonable potential for arsenic. The maximum expected effluent concentration is less than the Class 3D comparison value of 0.15 mg/l and ambient concentrations in Gilbert Bay.

Outfall 012 does not have reasonable potential for cadmium. The maximum expected effluent concentration did not indicate reasonable potential and concentrations were lower than previously concluded to not have reasonable potential based on comparisons of effluent concentrations to the results of toxicity tests (Brix et al. 2006). The EC_{50} concentration of 11.7 mg/l reported by Brix et al. (2006) is orders of magnitude higher than the effluent concentrations.

Outfall 012 does not have reasonable potential for copper. Copper concentrations initially indicate reasonable potential because the effluent concentrations exceed the Class 3D comparison value of 0.030 mg/l and were higher than observed for the previous permit. The maximum 30-day concentration was 0.059 mg/l. As documented in April 29, 2014 Kennecott submittal (DWQ-2014-006141), Brix et al. (2006) reported that the median effective concentration[1] (EC_{50}) for effects on brine shrimp reproduction was 0.068 mg/l (dissolved)[2]. To protect against chronic effects on reproduction, an estimate of the no-observed-effects concentration or EC_{20} as opposed to an EC_{50} was derived by Kennecott. Kennecott obtained the raw data from Brix and calculated an EC_{20} of 0.059 mg/l (dissolved).

Applying the default conversion factor from dissolved to total copper specified in *UAC R317-2-14*, the no-effects concentration for total recoverable copper concentration is 0.061 mg/l. This conversion factor appears to be conservative based on the data reported in Adams et al. (2015). Adams et al. (2015) reported a median Cu translator of 0.79, based on dissolved and total recoverable Cu concentrations in Great Salt Lake water samples. The median is assumed to be a reasonable estimate of the geometric mean recommended for translators by EPA. Applying the translator of 0.79 results in a total recoverable copper concentration of 0.079 mg/l before mixing.

Brine shrimp are not expected to inhabit the Class 5E Transitional Waters, so a dilution of 1.5 was calculated based on discharging to Class 5A Gilbert Bay in accordance with the mixing zone requirements of *UAC R317-2-5* (May 5, 2015 Mixing Analysis Outfall Ditch to Great Salt Lake DWQ-2015-016387). Applying the dilution to the 0.079 mg/l results in a maximum allowable average effluent concentration of 0.118 mg/l (total recoverable). The maximum 30-day average copper concentration was 0.059 mg/l and copper concentrations are concluded to not have reasonable potential. These findings are further supported by recent chronic testing conducted by TRE on brine shrimp. TRE (2020b) report that the IC_{20} for growth was 0.74 mg/l total recoverable copper.

Outfall 012 does not have reasonable potential for mercury. Mercury concentrations in the effluent were measured using a more sensitive analytical method during this permit cycle. The maximum expected concentration was less than the Class 3D screening criteria. With one exception, mercury concentrations were less than the comparison value of 0.000012 mg/l (*UAC R317-2-14)* used to screen for reasonable potential.

Selenium and mercury are potentially bioaccumulative pollutants in RTKC's effluent and are also expected to be in the effluent from Jordan Valley. The two outfalls comingle in a common drainage in the Class 5E Transitional Waters when both are discharging. The potential impacts of the combined effluents were

[1] Concentration at which 50% of the test population was affected
[2] RTKC reports the copper EC_{50} as 69 µg/l in the April 29, 2014 RTKC Submittal but Brix et al. (2006) reports 68 µg/l.

considered for these two potentially bioaccumulative pollutants.

An organic form of mercury, methylmercury (MeHg), is present in Gilbert Bay's water and biota. MeHg has the greater potential for impairing the uses compared to other forms of Hg found in the environment because of greater toxicity and biotransfer potential. The reader is cautioned to discern between MeHg and mercury in the following discussions.

Translators are necessary to determine reasonable potential for bioaccumulative compounds. Translators are simple mathematical models of complex processes. Translators are used to estimate the concentration of a pollutant in one media, for instance, brine shrimp, from the concentration in a different media, for instance, water. When mercury is released to the receiving waters, a portion of the mercury is expected to be methylated by indigenous bacteria (mercury to MeHg translator). A portion of this MeHg is taken up by the lower life forms such as invertebrates and a portion of this MeHg is transferred higher in the food web to other biota (MeHg in water to the lower and higher food web receptors).

Beginning in 2011, monitoring of invertebrates, bird eggs, water and sediment in the transitional and open waters. The results of this monitoring are available in the annual Joint Discharge Area Transitional Monitoring Program reports required by the permit. The organism concentrations reported remain relatively low and based on these data, mercury is concluded to not have reasonable potential.

Outfall 012 does have reasonable potential for selenium relative to the Gilbert Bay and the Transitional Waters and the water quality-based effluent is 0.054 mg/l and an annual loading limit of 900 kg/yr. Selenium concentrations in the effluent exceed the Class 3D comparison value of 0.046 mg/l. The water quality standard for Gilbert Bay for selenium standard is 12.5 mg/kg dry weight (dw) in bird eggs. However, no translator is available to reliably predict the water concentrations that correspond to a bird egg concentration of 12.5 mg/kg dw. Hence the continued reliance on monitoring and other comparison values. Ackerman et al. (2015) reported the selenium and mercury concentrations for over 1,000 eggs collected from Great Salt Lake. These results in addition to the annual egg samples collected by DWQ support that the selenium standard continues to be met in the open waters of Gilbert Bay. Figure 1 shows the selenium concentrations by DWQ for eggs collected from Gilbert Bay. DWQ's data show that egg concentrations and water concentrations (data not shown, <0.001mg/l) remain stable.

As required by the Transitional Waters Monitoring Program in the permit, Kennecott collected and analyzed samples of bird eggs, invertebrates, fish, and water from the outfall delta and Great Salt Lake. Monitoring data are available for every year since 2011. The results are annually submitted to DWQ.

The permit includes required actions (triggers) based on the geometric mean selenium concentration of selenium from at least 5 eggs. Requirements for calculating the geometric mean of egg concentrations from at least 5 eggs were clarified for this permit. As shown on Figure 2, the 5-egg minimum was met only in 2017. One to 4 eggs were collected in 2015, 2016, 2019, and 2020 and no eggs in other years.

Birds were observed in the delta every year. Bird use appears to be correlated with the availability of water from effluent discharges in the delta. Jordan Valley is typically a continuous discharge and commenced discharging to the delta in 2017. Kennecott discharged continuously during the 2015 monitoring period and intermittently or not at all for the other years. Although birds were present every year, nesting was not always observed. Eggs could not be collected the years that no nesting was observed. Other factors preventing eggs from being collected include predation and seiche events resulting in flooding.

The requirements of the Transitional Waters Monitoring Program are unchanged from the previous permit. The permit continues to allow changes to Sampling and Analysis Plan during the permit cycle with Director approval. This flexibility is intended to allow modifications to the monitoring based if warranted based on

changes observed.

The annual reports submitted document an increase in vegetation cover since Kennecott began continuously discharging to the Transitional Waters approximately 3 years ago. These changes to the habitat are expected to affect bird use in this area and could also affect nesting success by reducing predation by increasing vegetation cover. These habitat changes may also affect selenium exposures by affecting bird access to the water or causing shifts in the macroinvertebrate community. An increase in phragmites may also cause the habitat to be less desirable for shorebirds.

The 5 to 8 egg requirement is unchanged. Selenium concentrations in eggs collected often exhibit a high degree of variability as do the eggs from the outfall delta. This is one of the reasons that geometric mean, which is less sensitive to variability than the e.g., an arithmetic mean, is used to characterize egg concentrations. When variability is high, a larger number of samples are needed to achieve a similar level of certainty compared to when variability is low. However, the maximum number of eggs is limited to 8 avoid adversely impacting bird populations. Similar to the selenium standard for Gilbert Bay, a minimum of 5 eggs are required. Requiring a minimum of 5 eggs balances having sufficient confidence in the results to take actions and having a performance standard that can be implemented.

Table 4							
Outfall 012							
Effluent Limitations **Self-Monitoring and Reporting Requirements** [a, b, c, d]							
Parameter	**Maximum Monthly Average**	**Daily Maximum**	**Daily Minimum**	**Annual Max**	**Frequency**	**Sample Type**	**Units**
Flow	-	-	-	6468	Continuous	Recorder	MGY [e]
Total Suspended Solids (TSS)	20	30	-	-	Monthly	Composite	mg/L
Total Arsenic (As)	0.25	0.5	-	-	Daily	Composite	mg/L
Total Cadmium (Cd)	0.05	0.10	-	-	Daily	Composite	mg/L
Total Copper (Cu)	0.15	0.30	-	-	Daily	Composite	mg/L
Total Lead (Pd)	0.30	0.60	-	-	Daily	Composite	mg/L
Total Mercury (Hg) [f]	0.001	0.002	-	-	Monthly	Grab	mg/L
Total Zinc (Zn)	0.224	0.50	-	-	Daily	Composite	mg/L
Total Cyanide	0.1	0.2	-	-	Monthly	Grab	mg/L
Total Selenium (Se) [g]	-	0.054	-	-	Monthly	Composite	mg/L
Total Selenium (Se), load	-	-	-	900 [h]	Monthly	Calculated	Kg
Selenium	-	-	-	-	Annually	See Section I.C.4. of permit UT0000051	
Total Dissolved Solids (TDS)	-	-	-	-	Monthly	Composite	mg/L

Oil & Grease	-	10	-	-	[i]	Grab	mg/L
pH	-	9.0	6.5	-	Daily	Grab	SU
WET Acute Biomonitoring	-	LC_{50} > 100% Effluent	-	-	Quarterly	Composite	-
WET Chronic Biomonitoring	-	$TU_c \leq 1.6$ [i]	-	-	Quarterly	Composite	-

Table 4 References

a. See Definitions, *Part VIII* for definition of terms.

b. Samples taken in compliance with the monitoring requirements specified above shall be taken at the outfall to the Great Salt Lake prior to mixing with the receiving water.

c. There shall be no untreated sanitary wastewater discharged into the tailings impoundment.

d. There shall be no floating solids or visible foam in other than trace amounts.

e. Annual discharge will be limited annually to 6468 million gallons a year (19,850-acre feet/year)

f. The mercury analytical method must be EPA Method 1631 used on grab samples collected from the tailings impoundment barge.

g. Selenium will be analyzed by EPA Method 200.8 or alternative method approved by the State of Utah Bureau of Laboratory Improvement.

h. To ensure continued protection for Gilbert Bay, the contributions of selenium from Outfall 004 and 008 are included in the annual loading limit of 900 kg/yr the previous permit the limit was applicable to Outfall 012 only. To demonstrate the loading, an annual loading report will be required to be submitted annually.

i. Oil & Grease will be sampled when sheen is observed.

j. TUc is calculated by dividing the receiving water effluent concentration determined in accordance with *UAC R317-2-5* by the chronic test IC_{25}. The TUc is an indicator and an exceedance is not used for determining compliance.

End Table 4 References

Joint Discharge Area Transitional Waters Monitoring Program

One of the outcomes of the analyses presented in the *Kennecott Utah Copper 2021 Permit Renewal Fact Sheet Statement of Basis, Level I and II antidegradation reviews for Outfalls 004, 008, and 012* was the recommendation to implement a monitoring program to decrease uncertainty. To confirm compliance with the Narrative Standards, a comprehensive sampling and analysis plan for egg, water, sediment and macro-invertebrates including field and laboratory standard operating procedures and methods was developed in 2011 and approved by the Director. This plan was made available for public review and comment as part of the Director's review process in March 2011. The current Field Sampling Plan (ch2m, 2017) is included as a supporting document for this renewal.

Kennecott is required to annually sample eight (8) bird eggs, if available, but not to exceed 20% of available eggs, during the nesting season, April15 through June 30, for the current permit cycle. The eggs will be collected from bird nests in the joint Jordan Valley outfall 001 and Kennecott 012 affected area. These samples will be subject to the tissue-based selenium water quality standard of 12.5 mg/kg dry weight for Gilbert Bay of Great Salt Lake to demonstrate compliance with the Narrative Standard. Kennecott must notify the Director within 7 business days of becoming aware of any egg concentrations that exceed 9.8 mg/kg. The requirements for calculating the geometric mean selenium concentrations in eggs were clarified but not changed. The permit was clarified that geometric mean selenium concentrations will be based on at

all eggs collected but at minimum, 5 eggs. In addition, total mercury concentrations in the egg tissue samples must also be evaluated and reported by Kennecott.

Kennecott is required to annually collect co-located macro-invertebrate and water samples once between April 15 and June 30 and as close in time as practical to the bird egg collection. All samples will be analyzed for selenium. Biota will also be analyzed for total mercury. Water samples will be analyzed for methyl and total mercury. The co-located macro-invertebrates and water samples will be collected at up to six (6) evenly spaced locations along the discharge watercourse from the discharge point to the water's edge from where Outfall 001 enters standing waters of the Great Salt Lake. Sediment sampling was removed from the Field Sampling Plan and the permit because these data were not informative for evaluating bird exposures.

Kennecott is required to biannually collect co-located brine shrimp and water samples twice per year from the open waters of Gilbert Bay in the vicinity of the outfall. Sample collection is constrained by brine shrimp dynamics in the sampling area as brine shrimp may not always be present when sampling is attempted. The intent is to collect brine shrimp samples as close as available to where the effluent waters enter Gilbert Bay between April 15 and June 30 and in October. The water sample will be analyzed for total and methyl mercury and selenium. The brine shrimp sample will be analyzed for total mercury and selenium.

Kennecott will conduct annual bird surveys approximately every two weeks between April 15 and June 30 (four times per season) to document bird abundance, diversity, and use of the Outfall 001 mud flat habitat, particularly for evidence of feeding and nesting using methodology approved by the Director. These data will be submitted in the Annual Project Operating Report.

DWQ strongly recommends that Kennecott coordinate with other facilities that discharge in the same delta to avoid needless duplication and further impact to avian wildlife in the delta area. Other monitoring requirements may be shared if appropriate. The Director shall be notified as soon as possible, but no later than April 1, if the efforts to coordinate monitoring with other dischargers to the delta area are unsuccessful. The detailed field and laboratory data, analysis and a summary of the results from the bird surveys, egg samples and co-located water, sediment and macro-invertebrates' monitoring must be submitted to the DWQ by February 1, or another agreed upon date, following the end of the calendar year for which the results were obtained as a part of the Annual Project Operating Report.

Annually during the previous permit cycle, representatives of DWQ, JVWCD, Rio Tinto Kennecott Utah Copper and Western Resource Advocates meet to review the monitoring results. Since annual monitoring was begun in 2011, the collection of bird egg samples was only successful in three of the 8 years and 5 eggs were never available. Prior to the 2019 nesting season, the selenium concentrations measured in the limited eggs collected support that the effluent limitations are protective of the bird populations. In 2019, the selenium concentrations in eggs increased compared to previous results. Three eggs were collected and all 3 eggs exceed 9.8 mg/kg Se dw (Jacobs, 2020. UPDES Compliance Monitoring at Great Salt Lake Outfalls 001 and 012. Final January). No additional actions were required by the permit because the 5-egg minimum was not met.

No changes to the Joint Discharge Area Transitional Waters Monitoring Program or the sampling plan were made. The annual reports submitted by Kennecott document an increase in vegetation cover since Kennecott began continuously discharging to the Transitional Waters approximately 3 years ago. This increase in vegetative cover is expected to affect bird use of the delta and may also increase nesting success by reducing predation. These habitat changes may also affect selenium exposures by altering the composition of the bird and macro-invertebrate communities present.

Similar to the selenium standard for Gilbert Bay, a minimum of 5 eggs are required for calculating the geometric mean concentration. The requirement for 5 to 8 eggs for the Transitional Waters Monitoring Program continues to appropriately balance having a sufficient number of eggs to implement the triggers without adversely impacting bird populations by collecting more than 8 eggs. Although 5 eggs were never previously available, the vegetation cover is rapidly changing at the delta and 5 eggs are anticipated to be available during the upcoming permit cycle.

Ackerman et al. (Mercury and selenium contamination in water bird eggs and risk to avian reproduction at Great Salt Lake, Utah, Open File Report 2015-1020) reported the selenium and mercury concentrations for over 1,000 eggs collected from Great Salt Lake. These results, in addition to eggs collected annually by DWQ, support that the selenium standard continues to be met in the open waters of Gilbert Bay.

Basis for Table 10
Outfall 104 Smelter and Refinery Discharge
The discharge from the refinery and smelter are regulated by USEPA Nonferrous Metals Manufacturing Metallurgical Acid Plant, and Spent Refinery Electrolyte point source categories. USEPA regulations require no direct discharge of smelter process wastewater but discharge is allowed from the acid plant. The acid plant is designed to product 7.7 x 10^6 lbs/day of H_2SO^4. The Refinery is designed to produce 2.0 x 10^6 lbs/day average cathode production. The limitations for the smelter acid plant and refinery are mass limitations.

The gypsum/water slurry effluent from the hydrometallurgical plant is regulated by the mass limitations for metallurgical acid plants and spent refinery electrolyte. Refinery casting is not included in the determination of applicable effluent limits after completion of the 1995 smelter, because the refinery casting has been moved to the smelter casting area and there is zero discharge from this area.

The smelter is regulated under new source performance standards (NSPS). Table 5 contains NSPS for the smelter acid plant and hydrometallurgical plant effluents and Table 6 contains the smelter acid plant and hydrometallurgical plant mass discharge limits.

Table 5		
Smelter Acid Plant and Hydrometallurgical Plant Mass Discharge Guidelines 40 CFR 421.94		
Effluent Limitations		
Parameter	**Monthly Maximum lbs/10^6 lbs/day of H_2SO^4**	**Daily Maximum lbs/ 10^6 lbs/day of H_2SO^4**
Total Suspended Solids	30.650	38.310
Arsenic	1.456	3.550
Cadmium	0.204	0.511
Copper	1.558	3.269
Lead	0.332	0.715
Zinc	1.073	2.605
pH	[a]	[a]

Table 6		
Smelter Acid Plant and Hydrometallurgical Plant Mass Discharge Guidelines 40 CFR 421.94		
Effluent Limitations based on H_2SO^4 production of 7.7 x 10^6 lbs/day		
Parameter	**Monthly Maximum lbs/day**	**Daily Maximum lbs/day**
Total Suspended Solids	236	295
Arsenic	11.2	27.3
Cadmium	1..57	3.93

Copper	12	25.2
Lead	2.56	5.51
Zinc	8.26	20.1
pH	[a]	[a]

Table 5 & 6 References

[a.] The pH is limited by the Utah Secondary Standards, *UAC R317-1-3.2* to a range of 6.5-9.0 standard units.

End Table 5 & 6 References

Small flows of spent refinery electrolyte are subject to the Spent Refinery Electrolyte effluent limitation guidelines. Table 7 contains the effluent limitation guidelines for the refinery spent electrolyte effluent and Table 8 contains the refinery mass discharge limits.

Table 7		
Refinery Spent Electrolyte Guidelines 40 CFR 421.54		
Effluent Limitations		
Parameter	**Monthly Maximum lbs/10^6 lbs Cu produced**	**Daily Maximum lbs/10^6 lbs H_2SO^4**
Total Suspended Solids	0.588	0.735
Arsenic	0.0281 [b]	0.068
Copper	0.03	0.063
Nickel	0.018	0.027
pH	[a]	[a]

Table 8		
Refinery Spent Electrolyte Mass Discharge Limits		
Effluent Limitations based on Cu cathode production of 2.0 x 10^6 lbs/day		
Parameter	**Monthly Maximum lbs/day**	**Daily Maximum lbs/day**
Total Suspended Solids	1.18	1.47
Arsenic	0.06	0.14
Copper	0.06	0.13
Nickel	0.04	0.054
pH	[a]	[a]

Table 7 & 8 References

[a.] The pH is limited by the Utah Secondary Standards, *UAC R317-1-3.2* to a range of 6.5-9.0 standard units.

[b.] The arsenic number differs from the effluent limitation guidelines in that is it more stringent and is continued from a previous permit.

End Table 7 & 8 References

In order to calculate the allowable discharge limits from Outfall 104, DWQ added the values in Table 6 and 8 to produce total mass limits in Table 9 applicable to the smelter acid plant, hydrometallurgical plant, and refinery discharge. The discharge is directed to the tailings impoundment where further treatment through precipitation, sedimentations, and clarification occurs in the tailings impoundment decant pond to meet the mass limitations, especially for total suspended solids. Compliance with mass limitations is calculated by

first multiplying the flow from the hydrometallurgical plant by the ratio of tailings impoundment wastewater discharge rate divided by the total wastewater inflow to the tailings impoundment to determine the portion attributable to the hydrometallurgical plant. Finally, this discharge flow rate is multiplied by the tailings impoundment discharge concentrations to determine the mass discharged.

Table 9		
Smelter Acid Plant/Hydrometallurgical Plant/Refinery Mass Discharge Limits Outfall 104		
Effluent Limitations		
Parameter	**Monthly Maximum lbs/day**	**Daily Maximum lbs/day**
Total Suspended Solids	237	296
Arsenic	11.3	27.4
Cadmium	1.57	3.93
Copper	12.1	25.3
Lead	2.56	5.51
Zinc	8.26	20.1

Parameters of Concern
The potential parameters of concern for the discharge/receiving water identified were dissolved metals, total suspended solids, and pH, as determined in consultation with the UPDES Permit Writer. WQBELs were determined for metals.

Reasonable Potential Analysis
RP Analysis for Outfall 104 was conducted on arsenic, zinc, cadmium, lead, and copper. The results indicated RP for each parameter. The limitations in Table 10 satisfy the monitoring requirements.

Table 10					
Outfall 104					
Effluent Limitations **Self-Monitoring and Reporting Requirements [a]**					
Parameter	**Maximum Monthly Average**	**Daily Maximum**	**Frequency**	**Sample Type**	**Units**
Flow	-	-	Continuous	Recorder	MGD
Total Suspended Solids (TSS)	237	296	Weekly	Composite	lb/day
Total Arsenic (As)	11.3	27.4	Weekly	Composite	lb/day
Total Cadmium (Cd)	1.57	3.93	Weekly	Composite	lb/day
Total Copper (Cu)	12.1	25.3	Weekly	Composite	lb/day
Total Lead (Pd)	2.56	5.51	Weekly	Composite	lb/day
Total Zinc (Zn)	8.26	20.1	Weekly	Composite	lb/day

Table 10 References

[a.] See Definitions, *Part VIII* for definition of terms.

End Table 10 References

Outfall 004 Runoff and Artesian Water
Storm water runoff from the drainage behind the smelter through the Kessler drainage channel, the flow from Japanese Springs, excess water from Tooele Spring, surface flows, natural springs and excess Section

17 water which has not been used for process can be discharged at relocated Outfall 004. The discharge will be sampled and reported for the same parameters as Outfall 008. Discharges from outfall 004 are not limited on flow, but will be monitored and reported if a discharge occurs.

Reasonable Potential Analysis

Outfall 004 does not have reasonable potential for arsenic. Arsenic effluent concentrations initially indicate reasonable potential because the concentrations exceed the Class 3D comparison value of 0.15 mg/l and ambient concentrations in Gilbert Bay. The maximum 30-day average effluent concentration was 0. mg/l. The no-effects concentration of 8 mg/l reported by Brix et al. (2003) for arsenic is substantially higher than the effluent concentrations and arsenic is concluded to not have reasonable potential. These findings are further supported by recent chronic toxicity testing conducted by TRE Environmental Solutions (TRE). TRE (2020a) reports an IC20 (inhibitory concentration for 20 percent of the tested organisms) for growth was 19.4 mg/l.

Outfall 004 does not have reasonable potential for cadmium. Cadmium concentrations initially indicate reasonable potential because the maximum expected effluent concentration could exceed the Class 3D comparison. However, effluent cadmium concentrations were lower than previously evaluated and lower than the EC_{50} concentrations for brine shrimp reported by Brix et al. (2006). The EC_{50} is higher than a no-effects concentration but there are over 4 orders of magnitude between the effluent concentrations and the EC_{50} of 11.7 mg/l. Effluent cadmium concentrations were below detectable concentrations in most of the effluent samples collected during the last permit cycle.

Outfall 004 does not have reasonable potential for copper. Copper concentrations initially indicate reasonable potential because the effluent concentrations exceed the Class 3D comparison value of 0.030 mg/l. Copper concentrations were similar to the concentrations concluded to not have reasonable potential for the previous permit. No reasonable potential is concluded because effluent concentrations are lower than the effects levels for brine shrimp reproduction toxicity tests conducted by Brix et al. (2006).

Outfall 004 does not have reasonable potential for mercury. Mercury was not detected in the effluent.

Outfall 004 does not have reasonable potential for selenium in the Transitional Waters. Effluent concentrations of 0.007 mg/l exceed the comparison value of 0.046 mg/l. The higher effluent concentrations evaluated by the Transitional Waters Monitoring Program for Outfall 012 collected prior to Jordan Valley discharging in 2017 (only Kennecott discharged) support that the concentrations and frequency of discharges from Outfall 004 are unlikely to adversely affect the aquatic life. To ensure continued protection for Gilbert Bay, the contributions of selenium from Outfall 004 are included in the annual loading limit of 900 kg/yr currently applicable to Outfall 012 only.

TABLE 11
OUTFALL 008

Outfall 008 consists of water from the Garfield Wells, Section 17, surface flows, Tooele Spring, Jones Spring, Spitz Spring, No-name Spring and other natural springs. Surface water and artesian groundwater with elevated selenium levels with continue to be contained and routed to the process water circuit for treatment and use at the Copperton Concentrator. However, surface water or artesian groundwater meeting discharge limitations can also be discharged through Outfall 008. The discharge is monitored quarterly for the same parameters as Outfall 012 except for cyanide and biomonitoring.

Reasonable Potential Analysis

Outfall 008 does not have reasonable potential for selenium in the Transitional Waters because the maximum expected concentration was less than the Class 3D screening criteria. To ensure continued

protection for Gilbert Bay, the contributions of selenium from Outfall 008 are included in the annual loading limit of 900 kg/yr currently applicable to Outfall 012 only.

Table 11							
Outfall 004							
Effluent Limitations **Self-Monitoring and Reporting Requirements** [a, b, c]							
Parameter	**Maximum Monthly Average**	**Daily Maximum**	**Daily Minimum**	**Annual Max**	**Frequency**	**Sample Type**	**Units**
Flow	-	-	-	-	Quarterly	Measured	MGD
Total Suspended Solids (TSS)	-	-	-	-	Quarterly	Grab	mg/L
Total Arsenic (As)	-	-	-	-	Quarterly	Grab	mg/L
Total Cadmium (Cd)	-	-	-	-	Quarterly	Grab	mg/L
Total Copper (Cu)	-	-	-	-	Quarterly	Grab	mg/L
Total Lead (Pd)	-	-	-	-	Quarterly	Grab	mg/L
Total Mercury (Hg) [d]	-	-	-	-	Quarterly	Grab	mg/L
Total Zinc (Zn)	-	-	-	-	Quarterly	Grab	mg/L
Total Selenium (Se)	-	-	-	-	Quarterly	Grab	mg/L
Total Dissolved Solids (TDS)	-	-	-	-	Quarterly	Grab	mg/L
Total Selenium (Se), load	-	-	-	900 [e]	Monthly	Calculated	Kg
Oil & Grease	-	-	-	-	[f]	Grab	mg/L
pH	-	-	-	-	Quarterly	Grab	SU

Table 11 References

a. See Definitions, *Part VIII* for definition of terms.

b. There shall be no floating solids or visible foam in other than trace amounts.

c. Discharges from outfall 004 are not limited on flow, but will be monitored and reported if a discharge occurs.

d. The mercury analytical method must be EPA Method 1631 used on grab samples collected from the tailings impoundment barge.

e. To ensure continued protection for Gilbert Bay, the contributions of selenium from Outfall 004 and 008 are included in the annual loading limit of 900 kg/yr the previous permit the limit was applicable to Outfall 012 only.

f. Oil & Grease will be sampled when sheen is observed.

End Table 11 References

Table 12							
Outfall 008							
Effluent Limitations **Self-Monitoring and Reporting Requirements [a, b]**							
Parameter	**Maximum Monthly Average**	**Daily Maximum**	**Daily Minimum**	**Annual Max**	**Frequency**	**Sample Type**	**Units**
Flow	5.5	-	-	-	Quarterly	Measured	MGD
Total Suspended Solids (TSS)	20	30	-	-	Quarterly	Grab	mg/L
Total Arsenic (As)	0.25	0.50	-	-	Quarterly	Grab	mg/L
Total Cadmium (Cd)	0.05	0.10	-	-	Quarterly	Grab	mg/L
Total Copper (Cu)	0.15	0.30	-	-	Quarterly	Grab	mg/L
Total Lead (Pd)	0.30	0.60	-	-	Quarterly	Grab	mg/L
Total Mercury (Hg) [c]	0.001	0.002	-	-	Quarterly	Grab	mg/L
Total Zinc (Zn)	0.224	0.50	-	-	Quarterly	Grab	mg/L
Total Selenium (Se)	-	0.054	-	-	Quarterly	Grab	mg/L
Total Dissolved Solids (TDS)	-	-	-	-	Quarterly	Grab	mg/L
Total Selenium (Se), load	-	-	-	900 [d]	Monthly	Calculated	Kg
Oil & Grease	-	10	-		[e]	Grab	mg/L
pH	-	9.0	6.5		Quarterly	Grab	SU

Table 12 References

a. See Definitions, *Part VIII* for definition of terms.

b. There shall be no floating solids or visible foam in other than trace amounts.

c. The mercury analytical method must be EPA Method 1631 used on grab samples collected from the tailings impoundment barge.

d. To ensure continued protection for Gilbert Bay, the contributions of selenium from Outfall 004 and 008 are included in the annual loading limit of 900 kg/yr the previous permit the limit was applicable to Outfall 012 only.

e. Oil & Grease will be sampled when sheen is observed.

End Table 12 References

TABLE 13
OUTFALL 009 PINE CANYON TUNNEL

Outfall 009 consists of up to 0.086 MGD of water from the Pine Canyon Tunnel, a former mine tunnel still in use by Kennecott for water conveyance. The majority of this water seeps into the ground before it reaches the intermittent stream channel. The discharge will be monitored at the portal of the Pine Canyon Tunnel. The permit limits for daily max for As, Hg, and Se and monthly average for As, Pb, Hg, Zn, and Se are the same as in the previous permit. The permit limits for daily Cd, Cu, Pb, Zn, and monthly average for Cd, Cu are from the WLA. Data from the facility indicate that dissolved solids concentrations after mixing with the intermittent stream are characterized by lower consistent concentrations than documented in storm water in this drainage.

Parameters of Concern

The potential parameters of concern for the discharge/receiving water identified were dissolved metals, total suspended solids, and pH, as determined in consultation with the UPDES Permit Writer. WQBELs were determined for metals.

Reasonable Potential Analysis
RP was conducted on Outfall 009 for mercury. Outfall 009 does not have reasonable potential for mercury.

Table 13						
Outfall 009						
Effluent Limitations **Self-Monitoring and Reporting Requirements [a, b]**						
Parameter	**Maximum Monthly Average**	**Daily Maximum**	**Daily Minimum**	**Frequency**	**Sample Type**	**Units**
Flow	0.086	-	-	2 x Yearly	Measured	MGD
Total Suspended Solids (TSS)	20	30	-	2 x Yearly	Grab	mg/L
Total Arsenic (As)	0.25	0.5	-	2 x Yearly	Grab	mg/L
Total Cadmium (Cd)	0.00052	0.00287	-	2 x Yearly	Grab	mg/L
Total Copper (Cu)	0.0108	0.0175	-	2 x Yearly	Grab	mg/L
Total Lead (Pd)	0.001	0.026	-	2 x Yearly	Grab	mg/L
Total Mercury (Hg)	0.001	0.002	-	2 x Yearly	Grab	mg/L
Total Zinc (Zn)	0.224	0.301	-	2 x Yearly	Grab	mg/L
Total Selenium (Se) [c]	0.012	-	-	2 x Yearly	Grab	mg/L
Total Dissolved Solids (TDS)	-	-	-	2 x Yearly	Grab	mg/L
Oil & Grease	-	10	-	[d]	Grab	mg/L
pH	-	9.0	6.5	2 x Yearly	Grab	SU

Table 13 References

a. See Definitions, *Part VIII* for definition of terms.
b. There shall be no floating solids or visible foam in other than trace amounts.
c. Selenium will be analyzed by Method 200.8 or alternative method approved by the State of Utah Bureau of Laboratory Improvement.
d. Oil & Grease will be sampled when sheen is observed.

End Table 13 References

TABLE 14
OUTFALL 010 BUTTERFIELD TUNNEL

Outfall 010 consist of water from the Butterfield Tunnel, a former mine. The discharge will be sampled and reported for the same parameters as the tailings impoundment except for cyanide. The discharge limits are the same as the previous permit limits and have been developed to comply with the most restrictive standard from the Ore Mining guidelines 40 CFR 440.103, Class 3D aquatic life, Class 4 agricultural water quality standards, and the waste load analysis developed water quality based effluent limit listed in Table 13. The agricultural standard is used as a maximum for total dissolved solids, arsenic and lead because the existing quality is significantly better than the calculated effluent limitations.

Parameters of Concern
The parameters of concern identified for the discharge/receiving water were dissolved metals, selenium, TDS, and pH as determined in consultation with the UPDES Permit Writer.

TMDL
Butterfield Creek (UT16020204-024_02) is listed as impaired for total dissolved solids (TDS), Selenium, and *E.* coli according to Utah's Combined 2018/2020 Integrated Report. A TMDL has not been completed for these constituents and this time. Water quality based effluent limits (WQBELs) for these constituents will be set at the applicable water quality standards with no allowance for mixing.

Reasonable Potential Analysis
RP Analysis for Outfall 010 was conducted on arsenic, cadmium, copper, mercury, lead, selenium, and zinc. The results indicated RP for zinc. The limitations in Table 13 satisfy the monitoring requirements.

Table 14

Outfall 010

Effluent Limitations
Self-Monitoring and Reporting Requirements [a, b]

Parameter	Maximum Monthly Average	Daily Maximum	Daily Minimum	Frequency	Sample Type	Units
Flow	0.65	-	-	Quarterly	Measured	MGD
Total Suspended Solids (TSS)	20	30	-	Quarterly	Grab	mg/L
Total Arsenic (As)	-	0.10	-	Quarterly	Grab	mg/L
Total Cadmium (Cd)	0.0013	0.0066	-	Quarterly	Grab	mg/L
Total Copper (Cu)	-	0.038	-	Quarterly	Grab	mg/L
Iron (Fe)	-	1.09				
Total Lead (Pd)	0.023	0.100	-	Quarterly	Grab	mg/L
Total Mercury (Hg) [c]	0.00002	0.00023	-	Quarterly	Grab	mg/L
Total Zinc (Zn)	0.323	0.493	-	Quarterly	Grab	mg/L
Total Selenium (Se) [d]	0.005	0.0184	-	Quarterly	Grab	mg/L
Total Dissolved Solids (TDS)	-	1200	-	Quarterly	Grab	mg/L
Oil & Grease	-	10	-	[e]	Grab	mg/L
pH	-	9.0	6.5	Quarterly	Grab	SU

Table 14 References

a. See Definitions, *Part VIII* for definition of terms.
b. There shall be no floating solids or visible foam in other than trace amounts.
c. Kennecott will voluntarily analyze mercury using a low-level total mercury analysis.
d. Selenium will be analyzed by Method 200.8 or alternative method approved by the State of Utah Bureau of Laboratory Improvement.
e. Oil & Grease will be sampled when sheen is observed.

End Table 14 References

TABLE 15
OUTFALL 011 ADAMSON SPRING

This discharge is a natural spring. However, there is the potential for relatively small amounts of process water to commingle with the spring water. The discharge will be limited for total suspended solids (TSS), and zinc as listed in the Ore Mining Effluent Guideline limitations in 40 CFR 440.102, best practicable technology (BPT), and 40 CFR 440.103, best available technology (BAT). These limitations are more restrictive than the WLA developed for this permit renewal. The pH is limited by the Utah Secondary Standards, *UAC R317-1-3.2* to a range of 6.5-9.0 standard units. Oil and Grease is limited by Best Professional Judgement to 10 mg/L/

A maximum limitation for arsenic is based upon the ground water permit for this spring. This limit has been included in previous permits, and is more restrictive than the 2021 WLA WQBEL developed for arsenic. Daily maximum limits for cadmium and lead were retained as they are more restrictive than 2021 WLA for outfall 011. WQBELs for copper and selenium, are based on the 2021 WLA, which was developed for this discharge point, and are also considered protective of downstream uses (*UAC R317-2-8*) in Lee Creek. From the point of discharge to Lee Creek the additional dilutions provided from other sources prior to discharging into Lee Creek were modeled using the available data. Kennecott may elect to conduct additional hydrologic studies to further refine future WLAs.

Total dissolved Solids (TDS) are to be monitored but not limited because the receiving waters are not classified as Class 4 and the salinity influences from the proximity to Great Salt Lake.

Parameters of Concern
The parameters of concern identified for the discharge/receiving water were dissolved metals, total suspended solids, and pH as determined in consultation with the UPDES Permit Writer.

TMDL
Lee Creek (UT16020204-036_00, Lee Creek from Great Salt Lake to headwaters near 2100 South) is fully supporting all parameters according to Utah's 2018/2020 Combined Integrated Report.

Reasonable Potential Analysis
RP Analysis for Outfall 011 was conducted on arsenic, cadmium, copper, lead, selenium, and zinc. The results indicated Outfall 011 does not have reasonable potential for the above parameters.

Table 15						
Outfall 011						
Effluent Limitations **Self-Monitoring and Reporting Requirements** [a, b, c]						
Parameter	**Maximum Monthly Average**	**Daily Maximum**	**Daily Minimum**	**Frequency**	**Sample Type**	**Units**
Flow	3.9	-	-	Quarterly	Measured	MGD
Total Suspended Solids (TSS)	20	30	-	Quarterly	Grab	mg/L
Total Arsenic (As)	-	0.013	-	Quarterly	Grab	mg/L
Total Cadmium (Cd)	0.0013	0.010	-	Quarterly	Grab	mg/L
Total Copper (Cu)	0.102	0.119	-	Quarterly	Grab	mg/L

Total Lead (Pd)	0.0662	0.010	-	Quarterly	Grab	mg/L
Total Zinc (Zn)	0.224	0.50	-	Quarterly	Grab	mg/L
Total Selenium (Se) [d]	0.0058	0.013	-	Quarterly	Grab	mg/L
Total Dissolved Solids (TDS)	-	-	-	Quarterly	Grab	mg/L
Oil & Grease	-	10	-	[e]	Grab	mg/L
pH	-	9.0	6.5	Quarterly	Grab	SU

Table 15 References

a. See Definitions, *Part VIII* for definition of terms.
b. For intermittent discharges, the duration of the discharge shall be reported.
c. There shall be no floating solids or visible foam in other than trace amounts.
d. Selenium will be analyzed by Method 200.8 or alternative method approved by the State of Utah Bureau of Laboratory Improvement.
e. Oil & Grease will be sampled when sheen is observed.

End Table 15 References

Leach System

The Ore Mining and Dressing Point Source Category, 40 CFR 440.103 (c), requires that there be no discharge of process wastewater to navigable waters from leach operations except under defined circumstances. The zero discharge provisions do not apply to drain down of water from the inactive waste rock leaching operations or other inactive facilities in the process of being closed. In that regard, Kennecott is treating drain down from inactive waste rock leaching operations with the neutralization capacity contained in copper tailings, and discharging the treated drain down to the tailings impoundment. In addition, drain down rinse water from Barneys Canyon historic heap leaching operation will be conveyed to the tailings impoundment.

Treatment of waste rock drain down is expected to continue during the term of this permit. Section 40 CFR 440.131(c) authorizes a discharge of process water if the facility is designed, constructed and maintained to contain the maximum volume from a 10-year 24-hour precipitation event. The capacity of the Small Bingham Reservoir is 79.3 acre-feet and the total combined capacity of the Zone 1 and 2 Large Bingham Reservoir is 1770 acre-feet.

SELF-MONITORING AND REPORTING REQUIREMENTS

The permit will require reports to be submitted monthly, quarterly, and yearly as applicable, on the NetDMR system due 28 days after the end of the monitoring period. Lab sheets for biomonitoring must be attached to the biomonitoring NetDMR submittal.

The Annual Project Operating Report is due by February 1st of the following year.

The Selenium loading for Outfall 004, 008, and 012 will be reported in NetDMR with a combined total.

BIOSOLIDS

For clarification purposes, sewage sludge is considered solids, until treatment or testing shows that the solids are safe, and meet beneficial use standards. After the solids are tested or treated, the solids are then known as biosolids. Class A biosolids, may be used for high public contact sites, such as home lawns and gardens, parks, or playing fields, etc. Class B biosolids may be used for low public contact sites, such as farms, rangeland, or reclamation sites, etc.

DESCRIPTION OF TREATMENT AND DISPOSAL

Biosolids produced at the Kennecott STP are separated from effluent via a screw press and are then transported to a bagging and drying facility on site. The solids are dried and analyzed for heavy metals, to be disposed of annually on site at the Kennecott permitted solid waste facility

SELF-MONITORING REQUIREMENTS

Under *40 CFR 503.16(a)(1),* the self-monitoring requirements are based upon the amount of biosolids disposed per year and shall be monitored according to the chart below.

Minimum Frequency of Monitoring (40 CFR Part 503.16, 503.26. and 503.46)		
Amount of Biosolids Disposed Per Year		Monitoring Frequency
Dry US Tons	Dry Metric Tons	Per Year or Batch
> 0 to < 320	> 0 to < 290	Once Per Year or Batch
> 320 to < 1650	> 290 to < 1,500	Once a Quarter or Four Times
> 1,650 to < 16,500	> 1,500 to < 15,000	Bi-Monthly or Six Times
> 16,500	> 15,000	Monthly or Twelve Times

Kennecott has produced on average 1 DMT of biosolids per year, therefore they would sample once a year. Kennecott disposes of all biosolids they produce in a landfill, and is not required to sample for biosolids requirements.

Landfill Monitoring

Under *40 CFR 258,* the landfill monitoring requirements include a paint filter test. If the biosolids do not pass a paint filter test, the biosolids cannot be disposed in the sanitary landfill *(40 CFR 258.28(c)(1).*

BIOSOLIDS LIMITATIONS

Heavy Metals

Class A Biosolids for Home Lawn and Garden Use

The intent of the heavy metals regulations of Table 3, *40 CFR 503.13* is to ensure the heavy metals do not build up in the soil in home lawn and gardens to the point where the heavy metals become phytotoxic to plants. The permittee will be required to produce an information sheet (see *Part III. C.* of the permit) to made available to all people who are receiving and land applying Class A biosolids to their lawns and gardens. If the instructions of the information sheet are followed to any reasonable degree, the Class A biosolids will be able to be land applied year after year, to the same lawns and garden plots without any deleterious effects to the environment. The information sheet must be provided to the public, because the permittee is not required, nor able to track the quantity of Class A biosolids that are land applied to home lawns and gardens.

Class A Requirements with Regards to Heavy Metals

If the biosolids are to be applied to a lawn or home garden, the biosolids shall not exceed the maximum heavy metals in Table 1 and the monthly average pollutant concentrations in Table 3 (see Table 1 and Table 3 below). If the biosolids do not meet these requirements, the biosolids cannot be sold or given away for applications to home lawns and gardens.

Class B Requirements for Agriculture and Reclamation Sites

The intent of the heavy metals regulations of Tables 1, 2 and 3, of *40 CFR 503.13* is to ensure that heavy metals do not build up in the soil at farms, forest land, and land reclamation sites to the point where the heavy metals become phytotoxic to plants. The permittee will be required to produce an information sheet (see *Part III. C*. of the permit) to be handed out to all people who are receiving and land applying Class B biosolids to farms, ranches, and land reclamation sites (if biosolids are only applied to land owned by the permittee, the information sheet requirements are waived). If the biosolids are land applied according to the regulations of *40 CFR 503.13*, to any reasonable degree, the Class B biosolids will be able to be land applied year after year, to the same farms, ranches, and land reclamation sites without any deleterious effects to the environment.

Class B Requirements with Regards to Heavy Metals

If the biosolids are to be land applied to agricultural land, forest land, a public contact site or a reclamation site it must meet at all times:

The maximum heavy metals listed in 40 CFR Part 503.13(b) Table 1 and the heavy metals loading rates in 40 CFR Part 503.13(b) Table 2; or

The maximum heavy metals in 40 CFR Part 503.13(b) Table 1 and the monthly heavy metals concentrations in 40 CFR Part 503.13(b) Table 3.

Tables 1, 2, and 3 of Heavy Metal Limitations

Pollutant Limits, (40 CFR Part 503.13(b)) Dry Mass Basis				
Heavy Metals	Table 1	Table 2	Table 3	Table 4
	Ceiling Conc. Limits [1], [2], (mg/kg)	CPLR [3], (mg/ha)	Pollutant Conc. Limits [1], [2], (mg/kg)	APLR [4], (mg/ha-yr)
Total Arsenic	75	41	41	2.0
Total Cadmium	85	39	39	1.9
Total Copper	4300	1500	1500	75
Total Lead	840	300	300	15
Total Mercury	57	17	17	0.85
Total Molybdenum	75	N/A	N/A	N/A
Total Nickel	420	420	420	21
Total Selenium	100	100	100	5.0
Total Zinc	7500	2800	2800	140
1, The limitations represent the maximum allowable levels of heavy metals in any biosolids intended for land application.				
2, These limitations represent the maximum allowable levels of heavy metals based on an average of all samples taken during a 30-day period.				

Pollutant Limits, (40 CFR Part 503.13(b)) Dry Mass Basis				
Heavy Metals	Table 1	Table 2	Table 3	Table 4
	Ceiling Conc. Limits [1], [2], (mg/kg)	CPLR [3], (mg/ha)	Pollutant Conc. Limits [1], [2], (mg/kg)	APLR [4], (mg/ha-yr)
3, CPLR - Cumulative Pollutant Loading Rate				
4, APLR – Annual Pollutant Loading Rate				

Any violation of these limitations shall be reported in accordance with the requirements of Part III.F.1. of the permit. If the biosolids do not meet these requirements they cannot be land applied.

Pathogens

The Pathogen Control class listed in the table below must be met;

Pathogen Control Class	
503.32 (a)(1) - (5), (7), -(8), Class A	503.32 (b)(1) - (5), Class B
B Salmonella species –less than three (3) MPN per four (4) grams total solids (DWB) or Fecal Coliforms – less than 1,000 MPN per gram total solids (DWB).	Fecal Coliforms – less than 2,000,000 MPN or CFU per gram total solids (DWB).
503.32 (a)(6) Class A—Alternative 4	
B Salmonella species –less than three (3) MPN per four (4) grams total solids (DWB) or less than 1,000 MPN Fecal Coliforms per gram total solids (DWB), And - Enteric viruses –less than one (1) plaque forming unit per four (4) grams total solids (DWB) And - Viable helminth ova –less than one (1) per four (4) grams total solids (DWB)	
MPN – Most Probable Number	
DWB – Dry Weight Basis.	
CFU – Colony Forming Units	

Class A Requirements for Home Lawn and Garden Use

If biosolids are land applied to home lawns and gardens, the biosolids need to be treated by a specific process to further reduce pathogens (PFRP), and meet a microbiological limit of less than less than 3 most probable number (MPN) of *Salmonella* per 4 grams of total solids (or less than 1,000 most probable number (MPN/g) of fecal coliform per gram of total solids) to be considered Class A biosolids.

Kennecott does not intend to give away biosolids for land application on home lawns or gardens, and will therefore not be required to meet PFRP. If the permittee changes their intentions in the future, they will need to meet a specific PFRP, the Director and the EPA must be informed at least thirty (30) days prior to its use. This change may be made without additional public notice.

The practice of sale or giveaway to the public is an acceptable use of biosolids of this quality as long as the biosolids continue to meet Class A standards with respect to pathogens. If the biosolids do not meet Class A pathogen standards the biosolids cannot be sold or given away to the public, and the permittee will need find another method of beneficial use or disposal.

Pathogens Class B

If biosolids are to be land applied for agriculture or land reclamation the solids need to be treated by a specific process to significantly reduce pathogens (PSRP). Kennecott does not intend to land apply the biosolids and will therefore not be required to meet PSRP. If the permittee intends to land apply in the future, they will need to meet a specific PSRP, the Director and the EPA must be informed at least thirty (30) days prior to its use. This change may be made without additional public notice.

Vector Attraction Reduction (VAR)

If the biosolids are land applied Kennecott will be required to meet VAR through the use of a method of listed under *40 CFR 503.33.* Kennecott does not intend to land apply the biosolids and will therefore not be required to meet VAR. If the permittee intends to land apply in the future, they need to meet one of the listed alternatives in 40 CFR 503.33, the Director and the EPA must be informed at least thirty (30) days prior to its use. This change may be made without additional public notice.

Landfill Monitoring

Under *40 CFR 258,* the landfill monitoring requirements include a paint filter test to determine if the biosolids exhibit free liquid. If the biosolids do not pass a paint filter test, the biosolids cannot be disposed in the sanitary landfill *(40 CFR 258.28(c)(1).*

Record Keeping

The record keeping requirements from *40 CFR 503.17* are included under *Part III.G*. of the permit. The amount of time the records must be maintained are dependent on the quality of the biosolids in regards to the metals concentrations. If the biosolids continue to meet the metals limits of *Table 3* of *40 CFR 503.13*, and are sold or given away the records must be retained for a minimum of five years. If the biosolids are disposed in a landfill the records must retained for a minimum of five years.

Reporting

Kennecott must report annually as required in *40 CFR 503.18*. This report is to include the results of all monitoring performed in accordance with *Part III.B* of the permit, information on management practices, biosolids treatment, and certifications. This report is due no later than February 19 of each year. Each report is for the previous calendar year.

MONITORING DATA

Kennecott landfills the biosolids generated at the facility. As a result, they do not conduct regular monitoring of metals or pathogens. They have reported the results of paint filter testing conducted by the facility. They have passed all paint filter tests conducted.

STORM WATER

Separate storm water permit(s) are be required based on the types of activities occurring on site.

Permit coverage under the Multi Sector General Permit (MSGP) for Storm Water Discharges from Industrial Activities is required based on the Standard Industrial Classification (SIC) code for the facility and the types of industrial activities occurring. If the facility is not already covered, it has 30 days from when this permit is issued to submit the appropriate Notice of Intent (NOI) for the MSGP or exclusion documentation. Previously storm water discharge requirements and coverage were combined in this individual permit. These have been separated to provide consistency among permittees, electronic reporting for storm water discharge monitoring reports, and increase flexibility to changing site conditions.

MSGP coverage applies to construction activities within active mining areas including all support facilities. Storm water discharges from earth-disturbing activities conducted prior to active mining activities are considered construction activities and must be covered under the Storm Water Construction General Permit. Mine-related facilities upgradient and within the collection zone of the storm water capture systems do not require separate storm water permit coverage and are subject to the discharge requirements of this permit.

Information on storm water permit requirements can be found at http://stormwater.utah.gov

PRETREATMENT REQUIREMENTS

This facility does not discharge process wastewater to a sanitary sewer system. Any process wastewater that the facility may discharge to the sanitary sewer, either as a direct discharge or as a hauled waste, is subject to federal, state, and local pretreatment regulations. Pursuant to section 307 of the Clean Water Act, the permittee shall comply with all applicable federal general pretreatment regulations promulgated, found in 40 CFR 403, the state's pretreatment requirements found in *UAC R317-8-8*, and any specific local discharge limitations developed by the Publicly Owned Treatment Works (POTW) accepting the waste.

In addition, in accordance with 40 CFR 403.12(p)(1), the permittee must notify the POTW, the EPA Regional Waste Management Director, and the State hazardous waste authorities, in writing, if they discharge any substance into a POTW which if otherwise disposed of would be considered a hazardous waste under 40 CFR 261. This notification must include the name of the hazardous waste, the EPA hazardous waste number, and the type of discharge (continuous or batch).

BIOMONITORING REQUIREMENTS

A nationwide effort to control toxic discharges where effluent toxicity is an existing or potential concern is regulated in accordance with the Utah Pollutant Discharge Elimination System Permit and Enforcement Guidance Document for Whole Effluent Toxicity Control (biomonitoring), dated February 2018. Authority to require effluent biomonitoring is provided in Permit Conditions, *UAC R317-8-4.2*, Permit Provisions, *UAC R317-8-5.3* and Water Quality Standards, *UAC R317-2-5* and *R317 -2-7.2*.

Since Kennecott is classified as a major industrial discharger, the renewal permit will require both acute and chronic whole effluent toxicity (WET) testing. Whole Effluent Toxicity Testing from Outfall 012 will use *Cryprinodon variegatus*as (sheepshead minnow) as detailed in the permit. The permit will contain the standard requirements for accelerated testing upon failure of a WET test, and a Preliminary Toxicity Investigation (PTI) and Toxicity Reduction Evaluation (TRE) as necessary. The permit will contain a toxicity limitation re-opener provision that allows for modification of the permit should additional information indicate the presence of toxicity in the discharge.

PERMIT DURATION

It is recommended that this permit be effective for a duration of five (5) years.

Drafted and Reviewed by
Sarah Ward, Discharge Permit Writer
Daniel Griffin, Biosolids
Jennifer Robinson, Pretreatment
Lonnie Shull, Biomonitoring
Carl Adams, Storm Water
Sandy Wingert, TMDL/Watershed
Chris Bittner, Chris Shope, and Suzan Tahir, Wasteload Analysis
Utah Division of Water Quality, (801) 536-4300

PUBLIC NOTICE

Began: Month Day, Year
Ended: Month Day, Year

Comments will be received at: 195 North 1950 West
PO Box 144870
Salt Lake City, UT 84114-4870

The Public Notice of the draft permit was published in the (NEWSPAPER OF RECORD FOR AREA).

During the public comment period provided under *UAC R317-8-6.5*, any interested person may submit written comments on the draft permit and may request a public hearing, if no hearing has already been scheduled. A request for a public hearing shall be in writing and shall state the nature of the issues proposed to be raised in the hearing. All comments will be considered in making the final decision and shall be answered as provided in *UAC R317-8-6.12*.

ADDENDUM TO FSSOB

During finalization of the Permit certain dates, spelling edits and minor language corrections were completed. Due to the nature of these changes they were not considered Major and the permit is not required to be re Public Noticed.

RESPONSIVENESS SUMMARY

(Explain any comments received and response sent. Actual letters can be referenced, but not required to be included).

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ATTACHMENT 1

Effluent Monitoring Data

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ATTACHMENT 2

Wasteload Analysis

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ATTACHMENT 3

Reasonable Potential Analysis

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REASONABLE POTENTIAL ANALYSIS

Water Quality has worked to improve our reasonable potential analysis (RP) for the inclusion of limits for parameters in the permit by using an EPA provided model. As a result of the model, more parameters may be included in the renewal permit. A Copy of the Reasonable Potential Analysis Guidance (RP Guide) is available at water Quality. There are four outcomes for the RP Analysis[3]. They are;

Outcome A:	A new effluent limitation will be placed in the permit.
Outcome B:	No new effluent limitation. Routine monitoring requirements will be placed or increased from what they are in the permit,
Outcome C:	No new effluent limitation. Routine monitoring requirements maintained as they are in the permit,
Outcome D:	No limitation or routine monitoring requirements are in the permit.

The Metals Initial Screening Table and RP Outputs Table are included in this attachment.

[3] See Reasonable Potential Analysis Guidance for definitions of terms

RP Procedure Output			
Facility Name:	Kennecott		
Permit Number:	UT0000051		
Outfall Number:	Outfall 004		
Parameter	Arsenic		
Distribution	Lognormal		
Data Units	mg/L		
Reporting Limit	0.005		
Significant Figures	3		
Confidence Interval	99		
Maximum Reported Effluent Conc.	0.2	mg/L	
Coefficient of Variation (CV)	0.867		
RP Multiplier	3.16		
Projected Maximum Effluent Conc. (MEC)	0.632	mg/L	
Acute Criterion	0.1	mg/L	
Chronic Criterion	0.19	mg/L	
Human Health Criterion	0	mg/L	
RP for Acute?	YES		
RP for Chronic?	YES		
RP for Human Health?	N/A		
Effluent Data			
#		#	
1	0.018	11	0.049
2	0.026	12	0.023
3	0.026	13	0.035
4	0.025	14	0.063
5	0.026	15	0.058
6	0.056	16	0.019
7	0.035	17	0.022
8	0.2	18	0.073
9	0.025	19	0.021
10	0.005		

RP Procedure Output			
Facility Name:	Kennecott		
Permit Number:	UT0000051		
Outfall Number:	Outfall 004		
Parameter	Zinc		
Distribution	Lognormal		
Data Units	mg/L		
Reporting Limit	0.01		
Significant Figures	3		
Confidence Interval	99		
Maximum Reported Effluent Conc.	0.025	mg/L	
Coefficient of Variation (CV)	0.338		
RP Multiplier	1.66		
Projected Maximum Effluent Conc. (MEC)	0.0414	mg/L	
Acute Criterion	0.388	mg/L	
Chronic Criterion	0.388	mg/L	
Human Health Criterion	0	mg/L	
RP for Acute?	NO		
RP for Chronic?	NO		
RP for Human Health?	N/A		
Effluent Data			
#		#	
1	0.01	11	0.01
2	0.019	12	0.025
3	0.01	13	0.02
4	0.01	14	0.01
5	0.01	15	0.012
6	0.01	16	0.023
7	0.01	17	0.01
8	0.01	18	0.01
9	0.01	19	0.016
10	0.01		

RP Procedure Output			
Facility Name:	Kennecott		
Permit Number:	UT0000051		
Outfall Number:	Outfall 004		
Parameter	Cadmium		
Distribution	Lognormal		
Data Units	mg/L		
Reporting Limit	0.001		
Significant Figures	2		
Confidence Interval	99		
Maximum Reported Effluent Conc.	0.001	mg/L	
Coefficient of Variation (CV)	0.024		
RP Multiplier	1.0		
Projected Maximum Effluent Conc. (MEC)	0.001	mg/L	
Acute Criterion	0.007	mg/L	
Chronic Criterion	0.003	mg/L	
Human Health Criterion	0	mg/L	
RP for Acute?	NO		
RP for Chronic?	NO		
RP for Human Health?	N/A		
Effluent Data			
#		#	
1	0.001	11	0.001
2	0.001	12	0.001
3	0.001	13	0.001
4	0.001	14	0.001
5	0.001	15	0.001
6	0.001	16	0.001
7	0.001	17	0.001
8	0.001	18	0.001
9	0.001	19	0.0009
10	0.001		

RP Procedure Output			
Facility Name:	Kennecott		
Permit Number:	UT0000051		
Outfall Number:	Outfall 004		
Parameter	Copper		
Distribution	Lognormal		
Data Units	mg/L		
Reporting Limit	0.01		
Significant Figures	2		
Confidence Interval	99		
Maximum Reported Effluent Conc.	0.03	mg/L	
Coefficient of Variation (CV)	0.31		
RP Multiplier	1.6		
Projected Maximum Effluent Conc. (MEC)	0.048	mg/L	
Acute Criterion	0.0517	mg/L	
Chronic Criterion	0.305	mg/L	
Human Health Criterion	0	mg/L	
RP for Acute?	NO		
RP for Chronic?	NO		
RP for Human Health?	N/A		
Effluent Data			
#		#	
1	0.012	11	0.01
2	0.013	12	0.017
3	0.01	13	0.01
4	0.01	14	0.03
5	0.013	15	0.02
6	0.01	16	0.014
7	0.01	17	0.01
8	0.01	18	0.015
9	0.013	19	0.01
10	0.01		

RP Procedure Output			
Facility Name:	Kennecott		
Permit Number:	UT0000051		
Outfall Number:	Outfall 004		
Parameter	Lead		
Distribution	Lognormal		
Data Units	mg/L		
Reporting Limit	0.005		
Significant Figures	3		
Confidence Interval	99		
Maximum Reported Effluent Conc.	0.006	mg/L	
Coefficient of Variation (CV)	0.0389		
RP Multiplier	1.06		
Projected Maximum Effluent Conc. (MEC)	0.00635	mg/L	
Acute Criterion	0.1	mg/L	
Chronic Criterion	0.019	mg/L	
Human Health Criterion	0	mg/L	
RP for Acute?	NO		
RP for Chronic?	NO		
RP for Human Health?	N/A		
Effluent Data			
#		#	
1	0.005	12	0.005
2	0.005	13	0.005
3	0.005	14	0.005
4	0.005	15	0.005
5	0.005	16	0.005
6	0.005	17	0.005
7	0.005	18	0.005
8	0.005	19	0.005
9	0.005	20	0.005
10	0.005	21	0.005
11	0.005	22	0.006

RP Procedure Output			
Facility Name:	Kennecott		
Permit Number:	UT0000051		
Outfall Number:	Outfall 004		
Parameter	Selenium		
Distribution	Lognormal		
Data Units	mg/L		
Reporting Limit	0.002		
Significant Figures	3		
Confidence Interval	99		
Maximum Reported Effluent Conc.	0.007	mg/L	
Coefficient of Variation (CV)	0.277		
RP Multiplier	1.52		
Projected Maximum Effluent Conc. (MEC)	0.0106	mg/L	
Acute Criterion	0.02	mg/L	
Chronic Criterion	0.005	mg/L	
Human Health Criterion	0	mg/L	
RP for Acute?	NO		
RP for Chronic?	YES		
RP for Human Health?	N/A		
Effluent Data			
#		#	
1	0.006	11	0.005
2	0.006	12	0.006
3	0.005	13	0.005
4	0.006	14	0.005
5	0.006	15	0.004
6	0.004	16	0.006
7	0.005	17	0.006
8	0.007	18	0.005
9	0.005	19	0.004
10	0.002		

RP Procedure Output		
Facility Name:	Kennecott	
Permit Number:	UT0000051	
Outfall Number:	Outfall 009	
Parameter	Mercury	
Distribution	Lognormal	
Data Units	mg/L	
Reporting Limit	0.0002	
Significant Figures	3	
Confidence Interval	99	
Maximum Reported Effluent Conc.	0.0002	mg/L
Coefficient of Variation (CV)	0.0000158	
RP Multiplier	1.00	
Projected Maximum Effluent Conc. (MEC)	0.0002	mg/L
Acute Criterion	0.0124	mg/L
Chronic Criterion	0	mg/L
Human Health Criterion	0	mg/L
RP for Acute?	NO	
RP for Chronic?	N/A	
RP for Human Health?	N/A	
Effluent Data		
#		
1	0.0002	
2	0.0002	
3	0.0002	
4	0.0002	
5	0.0002	
6	0.0002	
7	0.0002	
8	0.0002	
9	0.0002	
10	0.00019999	

RP Procedure Output			
Facility Name:	Kennecott		
Permit Number:	UT0000051		
Outfall Number:	Outfall 010		
Parameter	Arsenic		
Distribution	Lognormal		
Data Units	mg/L		
Reporting Limit	0.005		
Significant Figures	2		
Confidence Interval	99		
Maximum Reported Effluent Conc.	0.015	mg/L	
Coefficient of Variation (CV)	0.29		
RP Multiplier	1.5		
Projected Maximum Effluent Conc. (MEC)	0.023	mg/L	
Acute Criterion	0.795	mg/L	
Chronic Criterion	0.547	mg/L	
Human Health Criterion	0	mg/L	
RP for Acute?	NO		
RP for Chronic?	NO		
RP for Human Health?	N/A		
Effluent Data			
#		#	
1	0.007	11	0.005
2	0.007	12	0.006
3	0.006	13	0.007
4	0.007	14	0.005
5	0.007	15	0.009
6	0.005	16	0.012
7	0.005	17	0.015
8	0.006	18	0.005
9	0.007	19	0.007
10	0.006	20	0.006

RP Procedure Output			
Facility Name:	Kennecott		
Permit Number:	UT0000051		
Outfall Number:	Outfall 010		
Parameter	Zinc		
Distribution	Lognormal		
Data Units	mg/L		
Reporting Limit	0.1		
Significant Figures	3		
Confidence Interval	99		
Maximum Reported Effluent Conc.	0.481	mg/L	
Coefficient of Variation (CV)	0.203		
RP Multiplier	1.35		
Projected Maximum Effluent Conc. (MEC)	0.651	mg/L	
Acute Criterion	0.579	mg/L	
Chronic Criterion	0.902	mg/L	
Human Health Criterion	0	mg/L	
RP for Acute?	YES		
RP for Chronic?	NO		
RP for Human Health?	N/A		
Effluent Data			
#		#	
1	0.229	11	0.224
2	0.263	12	0.212
3	0.209	13	0.231
4	0.21	14	0.228
5	0.22	15	0.32
6	0.235	16	0.303
7	0.221	17	0.481
8	0.218	18	0.283
9	0.219	19	0.28
10	0.263	20	0.277

RP Procedure Output			
Facility Name:	Kennecott		
Permit Number:	UT0000051		
Outfall Number:	Outfall 010		
Parameter	Cadmium		
Distribution	Lognormal		
Data Units	mg/L		
Reporting Limit	0.0005		
Significant Figures	3		
Confidence Interval	99		
Maximum Reported Effluent Conc.	0.001	mg/L	
Coefficient of Variation (CV)	0.257		
RP Multiplier	1.46		
Projected Maximum Effluent Conc. (MEC)	0.00146	mg/L	
Acute Criterion	0.00994	mg/L	
Chronic Criterion	0.0044	mg/L	
Human Health Criterion	0	mg/L	
RP for Acute?	NO		
RP for Chronic?	NO		
RP for Human Health?	N/A		
Effluent Data			
#		#	
1	0.001	11	0.0005
2	0.001	12	0.0005
3	0.001	13	0.0005
4	0.0005	14	0.0005
5	0.0005	15	0.0005
6	0.0005	16	0.0006
7	0.0005	17	0.0005
8	0.0005	18	0.0005
9	0.0005	19	0.0005
10	0.0005	20	0.0005

RP Procedure Output			
Facility Name:	Kennecott		
Permit Number:	UT0000051		
Outfall Number:	Outfall 010		
Parameter	Copper		
Distribution	Lognormal		
Data Units	mg/L		
Reporting Limit	0.01		
Significant Figures	2		
Confidence Interval	99		
Maximum Reported Effluent Conc.	0.01	mg/L	
Coefficient of Variation (CV)			
RP Multiplier	1.0		
Projected Maximum Effluent Conc. (MEC)	0.01	mg/L	
Acute Criterion	0.068	mg/L	
Chronic Criterion	0.571	mg/L	
Human Health Criterion	0	mg/L	
RP for Acute?	NO		
RP for Chronic?	NO		
RP for Human Health?	N/A		
Effluent Data			
#		#	
1	0.01	11	0.01
2	0.01	12	0.01
3	0.01	13	0.01
4	0.01	14	0.01
5	0.01	15	0.01
6	0.01	16	0.01
7	0.01	17	0.01
8	0.01	18	0.01
9	0.01	19	0.01
10	0.01	20	0.01

RP Procedure Output			
Facility Name:	Kennecott		
Permit Number:	UT0000051		
Outfall Number:	Outfall 010		
Parameter	Mercury		
Distribution	Lognormal		
Data Units	mg/L		
Reporting Limit	0.000005		
Significant Figures	3		
Confidence Interval	99		
Maximum Reported Effluent Conc.	0.000005	mg/L	
Coefficient of Variation (CV)	0.679		
RP Multiplier	2.84		
Projected Maximum Effluent Conc. (MEC)	0.0000142	mg/L	
Acute Criterion	0.0056	mg/L	
Chronic Criterion	0.00002	mg/L	
Human Health Criterion	0	mg/L	
RP for Acute?			NO
RP for Chronic?			NO
RP for Human Health?			N/A
Effluent Data			
#		#	
1	ND	11	ND
2	0.0000011	12	0.0000021
3	0.000001	13	0.0000008
4	ND	14	0.000001
5	0.0000008	15	0.000002
6	0.0000011	16	0.0000035
7	ND	17	0.000005
8	ND	18	0.0000015
9	0.000001	19	0.0000046
10	0.0000012	20	0.000001

RP Procedure Output			
Facility Name:	Kennecott		
Permit Number:	UT0000051		
Outfall Number:	Outfall 010		
Parameter	Lead		
Distribution	Lognormal		
Data Units	mg/L		
Reporting Limit	0.005		
Significant Figures	3		
Confidence Interval	99		
Maximum Reported Effluent Conc.	0.009	mg/L	
Coefficient of Variation (CV)	0.132		
RP Multiplier	1.22		
Projected Maximum Effluent Conc. (MEC)	0.011	mg/L	
Acute Criterion	0.594	mg/L	
Chronic Criterion	0.031	mg/L	
Human Health Criterion	0	mg/L	
RP for Acute?	NO		
RP for Chronic?	NO		
RP for Human Health?	N/A		
Effluent Data			
#		#	
0	0.005	11	0.005
2	0.005	12	0.005
3	0.005	13	0.005
4	0.005	14	0.005
5	0.005	15	0.005
6	0.005	16	0.005
7	0.005	17	0.009
8	0.005	18	0.005
9	0.005	19	0.005
10	0.005	20	0.005

RP Procedure Output			
Facility Name:	Kennecott		
Permit Number:	UT0000051		
Outfall Number:	Outfall 010		
Parameter	Selenium		
Distribution	Lognormal		
Data Units	mg/L		
Reporting Limit	0.002		
Significant Figures	3		
Confidence Interval	99		
Maximum Reported Effluent Conc.	0.003	mg/L	
Coefficient of Variation (CV)	0.185		
RP Multiplier	1.32		
Projected Maximum Effluent Conc. (MEC)	0.00395	mg/L	
Acute Criterion	0.042	mg/L	
Chronic Criterion	0.0146	mg/L	
Human Health Criterion	0	mg/L	
RP for Acute?	NO		
RP for Chronic?	NO		
RP for Human Health?	N/A		
Effluent Data			
#		#	
1	0.002	11	0.002
2	0.002	12	0.002
3	0.002	13	0.002
4	0.002	14	0.002
5	0.002	15	0.002
6	0.002	16	0.002
7	0.002	17	0.002
8	0.002	18	0.001
9	0.002	19	0.003
10	0.002	20	0.002

Outfall 011

RP Procedure Output			
Facility Name:	Kennecott		
Permit Number:	UT0000051		
Outfall Number:	Outfall 011		
Parameter	Arsenic		
Distribution	Lognormal		
Data Units	mg/L		
Reporting Limit	0.005		
Significant Figures	3		
Confidence Interval	99		
Maximum Reported Effluent Conc.	0.008	mg/L	
Coefficient of Variation (CV)	0.133		
RP Multiplier	1.23		
Projected Maximum Effluent Conc. (MEC)	0.00981	mg/L	
Acute Criterion	0.861	mg/L	
Chronic Criterion	0.581	mg/L	
Human Health Criterion	0	mg/L	
RP for Acute?	NO		
RP for Chronic?	NO		
RP for Human Health?	N/A		
Effluent Data			
#		#	
1	0.005	11	0.005
2	0.005	12	0.005
3	0.005	13	0.005
4	0.005	14	0.005
5	0.007	15	0.005
6	0.005	16	0.005
7	0.005	17	0.005
8	0.005	18	0.008
9	0.005	19	0.006
10	0.005		

RP Procedure Output			
Facility Name:	Kennecott		
Permit Number:	UT0000051		
Outfall Number:	Outfall 011		
Parameter	Zinc		
Distribution	Lognormal		
Data Units	mg/L		
Reporting Limit	0.01		
Significant Figures	2		
Confidence Interval	99		
Maximum Reported Effluent Conc.	0.026	mg/L	
Coefficient of Variation (CV)	0.35		
RP Multiplier	1.7		
Projected Maximum Effluent Conc. (MEC)	0.044	mg/L	
Acute Criterion	0.986	mg/L	
Chronic Criterion	1.585	mg/L	
Human Health Criterion	0	mg/L	
RP for Acute?	NO		
RP for Chronic?	NO		
RP for Human Health?	N/A		
Effluent Data			
#		#	
1	0.026	11	0.011
2	0.01	12	0.01
3	0.01	13	0.01
4	0.01	14	0.01
5	0.01	15	0.01
6	0.01	16	0.018
7	0.01	17	0.01
8	0.022	18	0.01
9	0.01	19	0.026
10	0.01	20	0.01

RP Procedure Output			
Facility Name:	Kennecott		
Permit Number:	UT0000051		
Outfall Number:	Outfall 011		
Parameter	Cadmium		
Distribution	Lognormal		
Data Units	mg/L		
Reporting Limit	0.0005		
Significant Figures	3		
Confidence Interval	99		
Maximum Reported Effluent Conc.	0.001	mg/L	
Coefficient of Variation (CV)	0.258		
RP Multiplier	1.47		
Projected Maximum Effluent Conc. (MEC)	0.00147	mg/L	
Acute Criterion	0.0183	mg/L	
Chronic Criterion	0.0082	mg/L	
Human Health Criterion	0	mg/L	
RP for Acute?	NO		
RP for Chronic?	NO		
RP for Human Health?	N/A		
Effluent Data			
#		#	
1	0.001	11	0.0005
2	0.001	12	0.0005
3	0.001	13	0.0005
4	0.0005	14	0.0005
5	0.0005	15	0.0005
6	0.0005	16	0.0005
7	0.0005	17	0.0005
8	0.0005	18	0.0005
9	0.0005	19	0.0005
10	0.0005	20	0.0005

RP Procedure Output			
Facility Name:	Kennecott		
Permit Number:	UT0000051		
Outfall Number:	Outfall 011		
Parameter	Copper		
Distribution	Lognormal		
Data Units	mg/L		
Reporting Limit	0.01		
Significant Figures	3		
Confidence Interval	99		
Maximum Reported Effluent Conc.	0.013	mg/L	
Coefficient of Variation (CV)	0.0636		
RP Multiplier	1.10		
Projected Maximum Effluent Conc. (MEC)	0.0143	mg/L	
Acute Criterion	0.125	mg/L	
Chronic Criterion	0.108	mg/L	
Human Health Criterion	0	mg/L	
RP for Acute?	NO		
RP for Chronic?	NO		
RP for Human Health?	N/A		
Effluent Data			
#		#	
1	0.01	11	0.01
2	0.01	12	0.01
3	0.01	13	0.01
4	0.01	14	0.01
5	0.01	15	0.01
6	0.013	16	0.01
7	0.01	17	0.01
8	0.01	18	0.01
9	0.01	19	0.011
10	0.01	20	0.011

RP Procedure Output			
Facility Name:	Kennecott		
Permit Number:	UT0000051		
Outfall Number:	Outfall 011		
Parameter	Lead		
Distribution	Lognormal		
Data Units	mg/L		
Reporting Limit	0.005		
Significant Figures	3		
Confidence Interval	99		
Maximum Reported Effluent Conc.	0.005	mg/L	
Coefficient of Variation (CV)			
RP Multiplier	1.00		
Projected Maximum Effluent Conc. (MEC)	0.005	mg/L	
Acute Criterion	0.124	mg/L	
Chronic Criterion	0.07	mg/L	
Human Health Criterion	0	mg/L	
RP for Acute?	NO		
RP for Chronic?	NO		
RP for Human Health?	N/A		
Effluent Data			
#		#	
1	0.005	11	0.005
2	0.005	12	0.005
3	0.005	13	0.005
4	0.005	14	0.005
5	0.005	15	0.005
6	0.005	16	0.005
7	0.005	17	0.005
8	0.005	18	0.005
9	0.005	19	0.005
10	0.005	20	0.005

RP Procedure Output			
Facility Name:	Kennecott		
Permit Number:	UT0000051		
Outfall Number:	Outfall 011		
Parameter	Selenium		
Distribution	Lognormal		
Data Units	mg/L		
Reporting Limit	0.002		
Significant Figures	3		
Confidence Interval	99		
Maximum Reported Effluent Conc.	0.003	mg/L	
Coefficient of Variation (CV)	0.182		
RP Multiplier	1.31		
Projected Maximum Effluent Conc. (MEC)	0.00393	mg/L	
Acute Criterion	0.042	mg/L	
Chronic Criterion	0.00724	mg/L	
Human Health Criterion	0	mg/L	
RP for Acute?	NO		
RP for Chronic?	NO		
RP for Human Health?	N/A		
Effluent Data			
#		#	
1	0.002	11	0.003
2	0.003	12	0.003
3	0.003	13	0.002
4	0.003	14	0.003
5	0.002	15	0.003
6	0.003	16	0.003
7	0.003	17	0.003
8	0.003	18	0.002
9	0.003	19	0.002
10	0.003	20	0.003

RP Procedure Output					
Facility Name:	Kennecott				
Permit Number:	UT0000051				
Outfall Number:	Outfall 012				
Parameter	Arsenic				
Distribution	Lognormal				
Data Units	mg/L				
Reporting Limit	0.007				
Significant Figures	3				
Confidence Interval	99				
Maximum Reported Effluent Conc.	0.038	mg/L			
Coefficient of Variation (CV)	0.486				
RP Multiplier	1.65				
Projected Maximum Effluent Conc. (MEC)	0.0628	mg/L			
Acute Criterion	0.1	mg/L			
Chronic Criterion	0.19	mg/L			
Human Health Criterion	0	mg/L			
RP for Acute?	NO				
RP for Chronic?	NO				
RP for Human Health?	N/A				
Effluent Data					
#		#		#	
1	0.007	16	0.006	31	0.022
2	0.01	17	0.008	32	0.017
3	0.011	18	0.007	33	0.038
4	0.011	19	0.009	34	0.023
5	0.019	20	0.012	35	0.024
6	0.021	21	0.023	36	0.018
7	0.015	22	0.017	37	0.021
8	0.022	23	0.01	38	0.022
9	0.017	24	0.006	39	0.008
10	0.01	25	0.01	40	0.015
11	0.009	26	0.008		
12	0.012	27	0.014		
13	0.016	28	0.015		
14	0.017	29	0.018		
15	0.01	30	0.032		

RP Procedure Output					
Facility Name:	Kennecott				
Permit Number:	UT0000051				
Outfall Number:	Outfall 012				
Parameter	Zinc				
Distribution	Lognormal				
Data Units	mg/L				
Reporting Limit	0.014				
Significant Figures	2				
Confidence Interval	99				
Maximum Reported Effluent Conc.	0.065	mg/L			
Coefficient of Variation (CV)	0.42				
RP Multiplier	1.6				
Projected Maximum Effluent Conc. (MEC)	0.1	mg/L			
Acute Criterion	0.388	mg/L			
Chronic Criterion	0.388	mg/L			
Human Health Criterion	0	mg/L			
RP for Acute?	NO				
RP for Chronic?	NO				
RP for Human Health?	N/A				
Effluent Data					
#		#		#	
1	0.014	16	0.013	31	0.012
2	0.013	17	0.012	32	0.017
3	0.019	18	0.021	33	0.014
4	0.065	19	0.025	34	0.018
5	0.045	20	0.028	35	0.014
6	0.022	21	0.015	36	0.011
7	0.016	22	0.012	37	0.011
8	0.023	23	0.01	38	0.022
9	0.02	24	0.013	39	0.013
10	0.028	25	0.014	40	0.016
11	0.02	26	0.012		
12	0.011	27	0.012		
13	0.012	28	0.011		
14	0.012	29	0.014		
15	0.01	30	0.012		

RP Procedure Output					
Facility Name:	Kennecott				
Permit Number:	UT0000051				
Outfall Number:	Outfall 012				
Parameter	Cadmium				
Distribution	Lognormal				
Data Units	mg/L				
Reporting Limit	0.004				
Significant Figures	2				
Confidence Interval	99				
Maximum Reported Effluent Conc.	0.004	mg/L			
Coefficient of Variation (CV)	0.43				
RP Multiplier	1.6				
Projected Maximum Effluent Conc. (MEC)	0.0063	mg/L			
Acute Criterion	0.007	mg/L			
Chronic Criterion	0.003	mg/L			
Human Health Criterion	0	mg/L			
RP for Acute?	NO				
RP for Chronic?	YES				
RP for Human Health?	N/A				
Effluent Data					
#		#		#	
1	0.002	15	0.001	29	0.001
2	0.002	16	0.001	30	0.001
3	0.002	17	0.001	31	0.001
4	0.004	18	0.001	32	0.001
5	0.004	19	0.001	33	0.001
6	0.001	20	0.001	34	0.001
7	0.002	21	0.001	35	0.001
8	0.003	22	0.001	36	0.001
9	0.002	23	0.001	37	0.001
10	0.002	24	0.001	38	0.001
11	0.002	25	0.001	39	0.001
12	0.001	26	0.001	40	0.001
13	0.001	27	0.001		
14	0.001	28	0.001		

RP Procedure Output					
Facility Name:	Kennecott				
Permit Number:	UT0000051				
Outfall Number:	Outfall 012				
Parameter	Copper				
Distribution	Lognormal				
Data Units	mg/L				
Reporting Limit	0.01				
Significant Figures	2				
Confidence Interval	99				
Maximum Reported Effluent Conc.	0.059	mg/L			
Coefficient of Variation (CV)	0.44				
RP Multiplier	1.6				
Projected Maximum Effluent Conc. (MEC)	0.093	mg/L			
Acute Criterion	0.0517	mg/L			
Chronic Criterion	0.0305	mg/L			
Human Health Criterion	0	mg/L			
RP for Acute?	YES				
RP for Chronic?	YES				
RP for Human Health?	N/A				
Effluent Data					
#		#		#	
1	0.013	15	0.013	29	0.021
2	0.019	16	0.016	30	0.036
3	0.022	17	0.014	31	0.031
4	0.019	18	0.016	32	0.034
5	0.016	19	0.019	33	0.051
6	0.014	20	0.014	34	0.026
7	0.025	21	0.013	35	0.025
8	0.059	22	0.019	36	0.028
9	0.053	23	0.013	37	0.017
10	0.044	24	0.016	38	0.021
11	0.028	25	0.011	39	0.016
12	0.024	26	0.019	40	0.015
13	0.015	27	0.026		
14	0.019	28	0.026		

RP Procedure Output					
Facility Name:	Kennecott				
Permit Number:	UT0000051				
Outfall Number:	Outfall 012				
Parameter	Lead				
Distribution	Lognormal				
Data Units	mg/L				
Reporting Limit	0.005				
Significant Figures	3				
Confidence Interval	99				
Maximum Reported Effluent Conc.		0.006	mg/L		
Coefficient of Variation (CV)		0.0288			
RP Multiplier		1.03			
Projected Maximum Effluent Conc. (MEC)		0.00619	mg/L		
Acute Criterion		0.1	mg/L		
Chronic Criterion		0.019	mg/L		
Human Health Criterion		0	mg/L		
RP for Acute?			NO		
RP for Chronic?			NO		
RP for Human Health?			N/A		
Effluent Data					
#		#		#	
1	0.005	15	0.005	29	0.005
2	0.005	16	0.005	30	0.005
3	0.005	17	0.005	31	0.005
4	0.005	18	0.005	32	0.005
5	0.005	19	0.005	33	0.005
6	0.005	20	0.005	34	0.005
7	0.005	21	0.005	35	0.005
8	0.005	22	0.005	36	0.005
9	0.005	23	0.005	37	0.005
10	0.005	24	0.005	38	0.005
11	0.005	25	0.005	39	0.005
12	0.005	26	0.005	40	0.006
13	0.005	27	0.005		
14	0.005	28	0.005		

RP Procedure Output					
Facility Name:	Kennecott				
Permit Number:	UT0000051				
Outfall Number:	Outfall 104				
Parameter	Arsenic				
Distribution	Lognormal				
Data Units	mg/L				
Reporting Limit	0.002				
Significant Figures	2				
Confidence Interval	99				
Maximum Reported Effluent Conc.	0.108	mg/L			
Coefficient of Variation (CV)	0.65				
RP Multiplier	1.9				
Projected Maximum Effluent Conc. (MEC)	0.21	mg/L			
Acute Criterion	0.34	mg/L			
Chronic Criterion	0.015	mg/L			
Human Health Criterion	0	mg/L			
RP for Acute?	NO				
RP for Chronic?	YES				
RP for Human Health?	N/A				
Effluent Data					
#		#		#	
1	0.022	15	0.013	29	0.045
2	0.021	16	0.013	30	0.026
3	0.036	17	0.009	31	0.015
4	0.029	18	0.013	32	0.057
5	0.104	19	0.011	33	0.023
6	0.025	20	0.013	34	0.013
7	0.02	21	0.036	35	0.015
8	0.108	22	0.044	36	0.015
9	0.033	23	0.019	37	0.027
10	0.016	24	0.013	38	0.013
11	0.021	25	0.009	39	0.029
12	0.019	26	0.023		
13	0.01	27	0.017		
14	0.027	28	0.013		

RP Procedure Output					
Facility Name:	Kennecott				
Permit Number:	UT0000051				
Outfall Number:	Outfall 104				
Parameter	Zinc				
Distribution	Lognormal				
Data Units	mg/L				
Reporting Limit	0.002				
Significant Figures	2				
Confidence Interval	99				
Maximum Reported Effluent Conc.	0.346	mg/L			
Coefficient of Variation (CV)	1.1				
RP Multiplier	2.7				
Projected Maximum Effluent Conc. (MEC)	0.94	mg/L			
Acute Criterion	0.12	mg/L			
Chronic Criterion	0.12	mg/L			
Human Health Criterion	0	mg/L			
RP for Acute?	YES				
RP for Chronic?	YES				
RP for Human Health?	N/A				
Effluent Data					
#		#		#	
1	0.051	15	0.033	29	0.014
2	0.031	16	0.012	30	0.023
3	0.058	17	0.029	31	0.064
4	0.181	18	0.016	32	0.013
5	0.346	19	0.018	33	0.006
6	0.027	20	0.013	34	0.006
7	0.025	21	0.017	35	0.008
8	0.121	22	0.036	36	0.017
9	0.044	23	0.021	37	0.017
10	0.041	24	0.016	38	0.044
11	0.045	25	0.013		
12	0.017	26	0.013		
13	0.006	27	0.009		
14	0.019	28	0.014		

RP Procedure Output					
Facility Name:	Kennecott				
Permit Number:	UT0000051				
Outfall Number:	Outfall 104				
Parameter	Cadmium				
Distribution	Lognormal				
Data Units	mg/L				
Reporting Limit	0.005				
Significant Figures	2				
Confidence Interval	99				
Maximum Reported Effluent Conc.	0.031	mg/L			
Coefficient of Variation (CV)	1.1				
RP Multiplier	2.7				
Projected Maximum Effluent Conc. (MEC)	0.083	mg/L			
Acute Criterion	0.0019	mg/L			
Chronic Criterion	0.00079	mg/L			
Human Health Criterion	0	mg/L			
RP for Acute?	YES				
RP for Chronic?	YES				
RP for Human Health?	N/A				
Effluent Data					
#		#		#	
1	0.008	15	0.002	29	0.001
2	0.004	16	0.002	30	0.001
3	0.005	17	0.001	31	0.001
4	0.01	18	0.001	32	0.002
5	0.031	19	0.001	33	0.001
6	0.002	20	0.001	34	0.001
7	0.003	21	0.001	35	0.001
8	0.016	22	0.002	36	0.001
9	0.005	23	0.001	37	0.001
10	0.004	24	0.001	38	0.001
11	0.005	25	0.001	39	0.002
12	0.002	26	0.001		
13	0.001	27	0.001		
14	0.002	28	0.001		

RP Procedure Output					
Facility Name:	Kennecott				
Permit Number:	UT0000051				
Outfall Number:	Outfall 104				
Parameter	Lead				
Distribution	Lognormal				
Data Units	mg/L				
Reporting Limit	0.002				
Significant Figures	2				
Confidence Interval	99				
Maximum Reported Effluent Conc.	0.035	mg/L			
Coefficient of Variation (CV)	0.71				
RP Multiplier	2.0				
Projected Maximum Effluent Conc. (MEC)	0.071	mg/L			
Acute Criterion	0.0816	mg/L			
Chronic Criterion	0.0032	mg/L			
Human Health Criterion	0	mg/L			
RP for Acute?	NO				
RP for Chronic?	YES				
RP for Human Health?	N/A				
Effluent Data					
#		#		#	
1	0.019	15	0.011	29	0.006
2	0.011	16	0.013	30	0.006
3	0.017	17	0.006	31	0.004
4	0.013	18	0.007	32	0.012
5	0.035	19	0.004	33	0.005
6	0.006	20	0.003	34	0.003
7	0.007	21	0.006	35	0.003
8	0.029	22	0.006	36	0.035
9	0.01	23	0.007	37	0.005
10	0.009	24	0.006	38	0.007
11	0.012	25	0.006	39	0.01
12	0.008	26	0.005		
13	0.003	27	0.006		
14	0.008	28	0.003		

RP Procedure Output					
Facility Name:	Kennecott				
Permit Number:	UT0000051				
Outfall Number:	Outfall 104				
Parameter	Copper				
Distribution	Lognormal				
Data Units	mg/L				
Reporting Limit	0.005				
Significant Figures	2				
Confidence Interval	99				
Maximum Reported Effluent Conc.	0.035	mg/L			
Coefficient of Variation (CV)	0.71				
RP Multiplier	2.0				
Projected Maximum Effluent Conc. (MEC)	0.071	mg/L			
Acute Criterion	0.014	mg/L			
Chronic Criterion	0.0093	mg/L			
Human Health Criterion	0	mg/L			
RP for Acute?	YES				
RP for Chronic?	YES				
RP for Human Health?	N/A				
Effluent Data					
#		#		#	
1	0.019	15	0.011	29	0.006
2	0.011	16	0.013	30	0.006
3	0.017	17	0.006	31	0.004
4	0.013	18	0.007	32	0.012
5	0.035	19	0.004	33	0.005
6	0.006	20	0.003	34	0.003
7	0.007	21	0.006	35	0.003
8	0.029	22	0.006	36	0.035
9	0.01	23	0.007	37	0.005
10	0.009	24	0.006	38	0.007
11	0.012	25	0.006	39	0.01
12	0.008	26	0.005		
13	0.003	27	0.006		
14	0.008	28	0.003		