FIVE-YEAR REVIEW REPORT

KENNECOTT NORTH ZONE SUPERFUND SITE

APPENDIX K: SITE INSPECTION

OU8 Waste Water Treatment Plant and Sludge Ponds – April 4, 2013

The site inspection consisted of driving to the reclaimed footprints of the WWTP and Sludge Ponds B, C and C+ and observing surface conditions to determine if cover soils are stable. Sludge Pond A was converted into wetland habitat and is referenced as Pond 7 of OU22. Sludge Pond D was converted into wetland habitat and makes up a portion of Pond 6 of OU22. The footprints of Sludge Ponds A and D were observed from a distance while observing the ponds in OU22.

The WWTP footprint is located to the south of a Kennecott access road to Pump Station #4 and the Magna Tailings Impoundments (OU15). The footprint begins near the eastern portion of a dirt staging area. Two-thirds of the footprint is vegetated with grasses and native forbs, while the western one-third remains barren of vegetation as it is used as part of the staging area. Recent development activity includes the excavation and placement of two buried pipelines from the new MAP facility) to Pump Station #4. After construction, the soil cover was re-established over the pipelines.

The footprint of Sludge Pond B is stable and well-vegetated with grasses and forbs, except for the corridor of a recently buried pipeline. Under the Former Sludge Pond B Site Soil Removal Work Plan – Kennecott North Zone Site, June 2011, Kennecott addressed the removal of soils with arsenic concentrations above the industrial land use standard of 261 mg/kg near the center of the former sludge pond. After removal of the soils, the Site was backfilled with tailings. Top soil was brought in to facilitate growth of seed mixture. During the inspection, the sides of an ingress/egress road were showing signs of revegetation, though it will take some time for successful vegetative cover to establish across the whole footprint.

Sludge Ponds C and C+ (or C Extension) appeared to be stable and well-vegetated. Barren soils were observed above the depression of the footprint of these two former sludge ponds. Above the eastern extent of Sludge Pond C+, barren soils were observed sloughing off of the slope down into the footprint of C+. In the central portion of Sludge Pond C, phragmites was observed in two locations. Both locations were localized depressions in the former sludge pond's footprint where water had ponded. The phragmites were voluntarily introduced via aerial dispersion of seed and because the two locations were wet enough, the phragmites were able to grow. A remnant of the western dike of Sludge Pond C remains on the northwestern corner. The dike which is comprised of gravelly unconsolidated fill has been dug into.

The footprints of the WWTP and Sludge Ponds B, C and C+ are owned by Kennecott. The footprints have seen very little construction activity (other than the recent MAP Pipeline construction projects) since the Sites were demolished, cleaned up and reclaimed. The soils are stable and not subject to down gradient migration. No dust was observed during the inspection or is anticipated because of successful vegetation and ongoing revegetation efforts. The site is used to support access corridors to OU15 and utility corridors for the operations in the North Zone.

OU9 Magna Soils – March 15, 2013

The site inspection consisted of a drive through the community to observe conditions that may present an issue. EPA determined a significant human health risk did not exist in the Town of Magna. Thus, the drive through primarily focused on observing recent development activity.

Magna is comprised of residential, commercial, agricultural (i.e., grazing) and recreational (i.e., parks) land use activities. Since 2002, the majority of residential development has taken place in

the eastern and southern sections of town and away from the boundary lines of Kennecott's waste management and milling operations. The older section of town has not undergone redevelopment other than the demolition of the Granite School District's Webster School, development of a new senior center (located at 9228 W 2700 S in Magna, Utah), and the construction of a new Salt Lake County Library – Magna Branch (located at 2675 S 8950 W in Magna, Utah). In southern Magna, a new elementary school was observed at approximately 8613 W 3500 S. Existing road surfaces, residential and commercial yards appeared to be in good condition. No issues were observed (i.e., distressed vegetation, discolored soil, deposits of tailings) during the inspection.

OU13 Smelter and Acid Plants – March 15th and April 4th, 2013

The site inspection consisted of observing the Smelter facility, recent small project sites, integrity of capped facilities, and surrounding land.

The overall Smelter footprint appeared to be in good condition. Established transport corridors were covered with either asphalt or concrete. Some concentrate dust was observed along the edges of some of the roadways, especially near the concentrate storage facilities. The dirt roads behind the smelter were graded and did not have any signs of recent releases. The rail yard located behind the Smelter is mostly used to stage sulfuric acid tank rail cars. Soils between the tracks of the yard are impacted by historical concentrate loading operations and slag from the construction of the rail alignments. Previously removed and reclaimed facilities, which have asphalt covers, were stable.

The Slag Pot Cooling Area and Mill are operational areas. The cooling area is where the slag pots from the Smelter are taken to cool and is covered with asphalt. Immediately north and east of the cooling area, slag from the pots are stockpiled. The mill operations begin where the slag is removed from the pile and fed via conveyor belt to the enclosed mill building. In the mill, slag is crushed, ground and recycled into the smelter circuit as floc for the furnaces. Slag appeared along roadways and along both the northern and eastern boundaries of the Slag Pot Cooling Area. The footprints appeared to be in good shape.

The Smelter's stormwater ponds were full of water and below the height of their embankments. Visible sections of liners appeared to be intact. The process water ponds located in Kessler Canyon were filled with water delivered by Kennecott's Section 17 pipeline. Liners installed in the two ponds appeared to be intact. Two empty concrete impoundments were observed up-gradient of the process water ponds. The function of these two basins was unknown at the time of the inspection.

Areas where recent small projects were completed with asphalt and concrete covers appeared stable. The surface soils along the south side of Hwy-201 appeared to be stable. In 2009-2010, the Utah Department of Transportation expanded the footprint of the east bound lanes of Hwy-201. During this work, Kennecott managed soils that were determined to exceed the industrial land use standards. Excavated surfaces were covered and graded. Kennecott needs to submit a final report documenting the concentrations of metals left in place. The area impacted by the project was observed to ensure the surfaces were stable.

The Black Rock Tailings Pond is located immediately northeast of the Slag Pot Cooling Area, just before Hwy-201. The facility is raised slightly above the localized ground surface. The Black Rock Tailings Pond was used historically as the storage facility for slag tailings from the Slag

Concentrator. At closure it was covered with soil but the thickness is unknown. The fine grain slag has concentrations of arsenic and lead above the unrestricted land use standards. The footprint of the tailings pond is approximately 3,100 feet by 830 feet. The eastern one-third of the footprint is a fenced employee parking lot that has not been used for some time. The middle one-third is partially vegetated with grass and forbs. From a distance, dark colored material was observed on the surface, suggesting the vegetated soil cover has been eroding. The middle one-third has historically been used as a lay down yard. The eastern one-third is currently used as a lay down yard. There are two structures on the eastern end of the footprint. The footprint has a chain link fence around its perimeter.

In 2009, Kennecott had a release at the Acid Tank Farm Loading Station. Kennecott continues to implement a corrective action specific to the GWPP. The wells and extraction trench are in place, though buried under the asphalt parking area of the Praxair oxygen plant. DWQ reported the extraction system is functional and effective (see Appendix D). The surface area around the Praxair facility and directly over the extraction system was observed and found to be covered with asphalt. Two nested sets of intact wells were observed immediately north of the Acid Tank Farm Loading Station.

The property comprising OU13 is owned by Kennecott and is used to support its smelting operations for copper concentrates shipped from the Copperton Concentrator (OU24). Operations include the storage and distribution of process water, stormwater, slag cooling and recycling, acid generating, storage and loading operations.

<u>OU14 Refinery – March 15, 2013</u>

The site inspection consisted of driving around the boundary of the Refinery complex and observing areas where facilities were removed. Generally, the overall facility appeared to be in good condition. The Refinery complex is covered with asphalt, contains foundations of structures, and storm water collects around the facility boundary. The facility structures on site appeared in good condition and structurally sound. No spills from the Tank House or the New Precious Metals Plant were observed on the surrounding surfaces.

Kennecott's Operational Rail Services have a main line, which enters the eastern boundary of the Refinery complex and splits into a number of spurs that can either enter the Refinery's product loading area, rail yard, or turn in/out loop. The rail sidings and lay down yards at the Refinery consist of either raised rail beds or surface rail beds. The rail beds are comprised of slag underlain by local native-borrow material or native surface soils. From the rail yard, two spurs exit to the west to eventually become one line extending to the Smelter complex (OU13). All rail spurs and the yard appeared to be stable.

The engineered cap constructed over the footprint of the historic Precious Metals Plant (located approximately 36 feet west of the southwest quarter of the Tank House) was intact and well vegetated. There are two lysimeters installed through the engineered cap of the historic Precious Metals Plant footprint and surrounded by bollards for protection. An access road and pad were constructed on top of the engineered cap for drilling equipment accessing the middle of the capped footprint. No other surficial improvements or intrusions were observed on the engineered cap covering the footprint of the historic Precious Metals Plant.

The engineered cap constructed over the footprint of the historic Electrolytic Pond (EP) was predominantly intact, well-vegetated and stable. Similar to the engineered cap over the

Precious Metals Plant footprint, an access road and drilling pad was constructed on top of the engineered cap to support the placement of four lysimeters through the center of the EP footprint. The access road, pad and lysimeters were in place and operational at the time of the inspection. Extending northeast from the drilling pad there was a set of tire tracks that Kennecott was requested to repair.

During the inspection, water was observed flowing in a rip-rap drainage channel along the southern boundary of the EP footprint. The channel is used to direct surface water around the EP footprint, into a flat and shallow depression located up-gradient of the EP footprint. The channel is underlain by a clay liner, which extends from the EP footprint cap to the centerline of the channel. The water flows to the new tank constructed on top of the hillside immediately south of the Refinery's product packaging and shipment warehouse. The tank holds culinary water from Kennecott's Section 21 Pipeline and stores the water for process purposes. Upon observance of the discharge, Kennecott was requested to turn off the flow from the tank and determine why the water was directed into the drainage channel. The discharge from the tank resulted from a miscommunication and shortly after the inspection the discharge was turned off. As reported in a subsequent follow-up email (March 19, 2013 from Mr. Larry Elkin to Mr. Douglas Bacon), Kennecott reported that approximately 200,000 gallons of culinary water was discharged into the drainage channel.

The property comprising OU14 is owned by Kennecott and is used for refining the final metal products. Operations at the Refinery include the production of the final copper products, the refining of precious metals from used electrolytic fluid, product packaging and the rail services that support the operations and transport packaged products.

<u>OU15 Mills and Tailings Pond – March 15, 2013 and April 4, 2013</u>

The site inspection consisted of driving around the facilities of OU15 and periodically stopping to inspect surface soils, excavation activities, changes to covers and facilities undergoing demolition.

Established soil covers remain intact and stable and re-vegetation efforts of previously removed sites have been successful. In 2012 the Magna Tailing Water Pond was reconstructed and was found to be operational. Demolition of the remaining structures of the Magna Leaching Facility is proceeding and surrounding soils will be characterized after demolition activities cease. No observable waste storage or spills were apparent during the inspection.

Removal and reclamation of the Arthur Mill was completed in the late 1980s. During this FYR it was noted that the remediation and reclamation data set may not be complete. There are two warehouses to the south of Kennecott's Environmental Laboratory, a rail engine maintenance warehouse near the eastern boundary, the North end Operational Rail Services has two or three main lines running east to west across the northern portion, and there are about a dozen sidings still existing on the facility footprint. Rail beds are constructed of slag underlain by local borrow material. The reclaimed surface of the mill appeared stable and well-vegetated. No run-off channels or rills were observed. Historically, the mill extended all the way to the current boundary with Hwy-201. In addition to the soils underlying the existing infrastructure noted above, there is a tunnel on site which requires characterization. Surfaces around the operational areas (warehouses, engine building, Kennecott Environmental Laboratory, power substation and the rail lines) were either covered with asphalt, concrete or soil. Soil covers also exist over the principle footprint of the historic mill.

The Bonneville Crusher & Grinding facility footprint removal and reclamation was completed in 2009. The facility was located along the ridgeline and in a bowl-shaped depression on the third bench of the Oquirrh Mountain foothills, just north of Little Valley Canyon. The reclaimed surfaces of the overall facility appeared stable and no erosional channels or rills were observed on hillsides. Re-vegetation has been limited due to a relatively high cobble local borrow material with a low topsoil content, and the fact that the facility footprint is located at a higher elevation, ranging from 4,947 to 5,036 feet above sea level. Historically, the facility had a number of rail sidings, which to date have been removed. Kennecott is proceeding with the removal of the Copperton High Line footprint (OU24). The current removal action on the south end of the facility is associated with the cleanup of the raised rail bed of the Copperton High Line that crosses the Little Valley drainage. There was a pile of tire debris observed in the lower portion of the bowl of the Bonneville footprint. Removal of the tire debris is planned along with the soils associated with the Copperton High Line removal project. During the inspection, approximately three to four songbirds were heard from the eastern ridgeline of the bowl located on the footprint.

The Magna Mill footprint removal and reclamation was completed from 2008-2009. There is a warehouse building, a power substation, and some rail sidings of Kennecott's Operational Rail Services that still exist on the footprint. These are located on the bench above the Magna Mill's reclaimed area. The footprint surface soils were stable and the planting rows scarred into the reclamation cover were visible. A fairly cobbled soil was used for reclamation efforts and the revegetation effort has been partially successful. Closer to the frontage road, near the northern portion of the facility, the footprint slopes at a steeper angle and vegetative success is more limited. The lack of topsoil and increased cobble content of the borrow material is suspected to be the reason for the limited vegetation. Two development projects took place in 2012 and 2013 (respectively). A natural gas pipeline to supply the Locomotive Maintenance Shop, and two, 3-4 feet incised rip-rapped drainage channels crossing the southern portion of the facility were installed. The drainage channel collects stormwater and directs it toward the northwest corner of the facility. The channel appeared stable.

As of the inspection on March 15, 2013, 12 reinforced concrete storage vats were still partially present at the Magna Leaching Facility. During the inspection, Kennecott's contractor was demolishing this portion of the remaining facility. Four of the tanks had been reduced to concrete rubble. Some of the soils under the tanks, the sediment discovered in the bottom of the tanks, and the concrete were previously sampled by Kennecott. Kennecott stated that the concentrations of arsenic, cadmium, lead and selenium were assumed to be below the industrial land use standards. Kennecott has to submit their post response action report.. Some elevated lead (above the site industrial land use standard) was found in surficial soils near the base of the hillside located immediately to the south of the leaching vats. Further site characterization is required. Site conditions were stable, no soils were observed mobilizing off site, no dust was observed, and surfaces were relatively moist.

The Magna Process Water Pond has been reconstructed and was found to be in pristine condition. The new reservoir has elevated embankments, which are armored with rip-rap. No evidence of spills or releases was observed.

The South Tailings Impoundment was found to be stable and well-vegetated. The South Tailings Impoundment is being actively de-watered via ongoing wicking and collection of toe ditch water and re-vegetated. Currently, a tailings landfill is located in the north-central portion of the impoundment's top surface. The landfill is being used for the permanent disposal of rail bedding

material removed from the Kennecott Ore Haulage Rail – Copperton High Line. Once the response action along the Copperton High Line is completed, this tailings landfill will be covered. The rest of the surfaces have well-established vegetative cover consisting of grasses and forbs. A few deciduous trees have been planted. Other than established roadways, along the top surfaces and embankments of the impoundment, there was no other evidence of vehicular activity along the reclaimed surfaces. There was no dust observed during the inspection.

The North Tailings Impoundment is the active tailings disposal facility which receives: copper tailings from the Copperton Concentrator (OU24); meteoric contact water from the Bingham Canyon Waste Rock Dumps which is neutralized in the Tailings Slurry Pipeline; reverse osmosis concentrate from Kennecott's Bingham Canyon Water Treatment Plant via the Tailings Slurry Pipeline; acidic core water extracted from the Zone A Plume (OU2, not part of this FYR); other acidic mine waters neutralized in the Tailings Slurry Pipeline; pit water and heap leach pad drain-down from the Barneys Canyon Gold Mine; construction, maintenance and lunchroom trash; ash slurry from the Kennecott Power Plant; treated effluent from Kennecott's sewage treatment plant; slag tailings from the Smelter Slag Concentrator; Smelter process water; and wastewater from the Smelter's Hydrometallurgical Plant. The north slope of the impoundment is being reclaimed as the impoundment increases in height. The outer embankments or dikes of the impoundment are constructed on a drainage blanket comprised on non-leachable slag, and are comprised of coarse tailings distributed by an on-site cyclone separator. The outer embankments appeared stable. The impoundment's southwest and northeast corners were being watered to reduce the potential for dust generation. Water for dust control is drawn by Kennecott from their UPDES Outfall #008. Fine grain tailings are separated and deposited in the interior of the impoundment. The interior area appeared moist with water on the surface near the impoundment's northwest corner. No dust was observed during the inspection.

The Arthur Step-back Repository is the active CERCLA CAMU facility that receives soils and materials such as rail bedding material comprised of slag and soil. During the inspection, no material was being placed into the Repository. The Repository is permanently capped with a high-density polyethylene (HDPE) liner and soil cover on its eastern half. The soil cover over the liner is well vegetated with grasses and forbs that have shallow roots. The western half of the Repository is temporarily capped with an HDPE liner. Ballast from the Copperton Low Line and Copperton High Line removed during 2011 and 2012, was observed on the eastern portion of the western half of the Repository. Rain and snow melt was observed on the lower collection area of the Repository's west end. Ponded water was observed but drained shortly after the inspection as reported by Mr. Tom Nannini, Kennecott, in an email dated April 5, 2013, Appendix D.

The Diving Board Tailings area was not in use at the time of the inspection. The surfaces of the embankments and the interior slopes and base of the impoundment were well-vegetated. Kennecott only uses this facility during upset conditions when water cannot be contained on-site in the Magna Process Water Pond. No signs of spills or releases were observed around the facility.

The Kennecott Power Plant was observed from the Magna Leaching Facility footprint. The Power Plant is operational. Surrounding hillsides of the second bench of the northern Oquirrh Mountains were relatively stable and well-vegetated. The Power Plant has some rail spurs located immediately south of the facility footprint. The Power Plant has a large coal storage yard situated between the rail sidings and the plant itself.

The property comprising OU15 is owned by Kennecott and is used for the disposal of solid mine waste, management of mining influenced water, and power production. The reclaimed mill footprints are used as open space and buffer to active rail and power generation operations.

OU19 Smelter Fallout – February 15th, March 15th, 22nd and April 4th, 2013

The site inspection consisted of driving and/or hiking into the canyons located downwind of the Smelter (OU13) and Refinery (OU14). The communities of northern Tooele County were driven through on February 15, 2013. The communities of northern Tooele County are rural/suburban with a mixture of residential, commercial/industrial, recreational and agricultural land use. No large-scale developments were observed during the drive-by inspection.

The canyons located immediately downwind of the Smelter (OU13) and Refinery (OU14) are in various stages of recovery from the historic deposition of sulfide emissions from the historic smelters.

Little Valley is well-vegetated with grasses and some stands of scrub oak or elm along the valley floor and lower side slopes, and Douglas Fir along the upper slopes, and the surface soils are stable. The Bonneville Crusher and Grinding Facility are north of the Little Valley drainage. Little Valley is crossed by the historic Kennecott Ore Haulage Rail - Copperton High Line (OU24), which is undergoing removal action. The sedimentation/flood control dams located in Little Valley were in good condition, and snow cover was observed at various locations. Wildlife such as turkeys, elk, and deer frequent the canyon floor for both foraging and nesting/bedding. An upper segment of the canyon is periodically used for grazing, although no animals were observed during the inspection. Song birds were heard in the canyon, and a red fox was observed traversing the hillside above the south wall of the canyon. Prior to the September 2002 ROD, borrow material had been extracted from the southern slope of Little Valley Canyon for use in the Kennecott North Zone. The excavated soils and gravels were likely used for bedding and cover purposes. In 2013 Kennecott proposed enlarging the borrow area to extract material for used as bedding and drainage under the proposed new expansion of the Tailings Impoundment Facility. Kennecott implemented a characterization of the borrow areas and needs to submit a post characterization report.

Kessler Canyon is well-vegetated along the canyon floor and lower side slopes with grasses and other forbs like Mormon Tea, and soils are stable. Steeper side slopes and bases in the upper reaches of the canyon are less vegetated and there were signs of erosion. The flood control dams were stable and down gradient slopes were well-vegetated with grasses and forbs. Other than a few song birds, no other wildlife was observed in the canyon. On April 4th, two chukar partridges were observed and numerous others were heard. The surface of the valley floor in the canyon varies, but generally has a downward slope towards the Smelter complex (OU13). No evidence of erosion was observed along the canyon floor. Excavation of borrow material was observed in the middle of Kessler Canyon. This area is a source of borrow material for various projects around the operable units of the North Zone. Extracted borrow material is characterized prior to use.

Black Rock Canyon is well-vegetated along the canyon floor and lower side slopes are stable. Vegetation is mostly grasses and forbs, including Mormon Tea, Rabbit Brush, and Wild Roses. There are some stands of scrub oak and perhaps alpine elm along the southern and western portions of the canyon floor. The scrub oak stands provide bedding habitat for elk, which frequent Black Rock Canyon. Steeper side slopes are relatively void of vegetation, potentially

due to lack of soil or because of the grades of the side slopes. Side slopes in Black Rock are fairly rocky with upturned bedrock surfaces. The peaks above the Black Rock Canyon were still covered with snow, but stands of deciduous and coniferous trees were visible from a distance. The southern portion of the canyon floor and lower side slopes are scarred with drainage channels, which have over time been scoured into incised channels. Surface grades below the channels in the middle and lower portions of the canyon floor are stable and well-vegetated. No running water was observed on the surface of the canyon floor. Two elk were observed in the southern portion of Black Rock and a few individual song birds were heard. Use by elk was clearly evident from numerous piles of excrement around the side slope from where the inspection was performed. Black Rock is one of the principal canyons the elk herd of the Oquirrh Mountain Range frequents.

Little Valley, Kessler and Black Rock canyons are used as open space and wildlife habitat, though upper Little Valley is used for grazing from time to time. The canyons are still owned and controlled by Kennecott. Site personnel may frequent the canyon floors while on break or as a function of their tasks. The public does trespass into the canyons and the Oquirrh Mountain Range, mostly to hunt the resident mega-fauna (deer, elk, coyotes, bobcat, etc.). Bicyclists and horseback riders are reported to trespass, as are local community youth. Three to five individuals are caught each year, but Kennecott suspects that a more realistic number averages 10 to 20.

The canyons of OU19 are not under development right now, and are used as a source of borrow material for various construction and cleanup response actions. Borrow material source areas are evaluated to assess concentrations of the COCs.

<u>OU22 Great Salt Lake, Shoreline Wetlands and OU23 North End Groundwater – March 15th, April 4th, 2013</u>

A site inspection of OU22 consisted of observing areas where in 2009, Ponds 4 and 5 were taken out of service in the Garfield Wetlands. In addition, from the ridgeline above the Smelter complex, the Garfield Wetlands, the South Shoreline of the Great Salt Lake and the Great Salt Lake were observed. In general, the surface areas in OU22 are in use as they were when the remedy was selected.

The Garfield Wetlands were in good condition, with water appearing on the surface of the smaller ponds (4, 6, 7), whereas Ponds 8 and 9 generally hold water year round. No birds were observed in the Garfield Wetland area, which is consistent with the nesting and brooding season (May- July). Pond 4 contained water near its northeast section. The accumulated water was determined to exist because the sump pump was offline and being repaired by Kennecott. Pond 5 did not contain water and thus the response action to convert this pond to riparian habitat was successful. Response actions in Ponds 6 and 7 are still pending. Monitoring of the surface ponds continues, but annual reporting is not required.

The south shoreline of the Great Salt Lake supports recreational activity by the general public. Development of the shoreline is managed by the Utah Division of Forest, Fire and State Lands and no development activity was observed during the inspection. North of the Garfield Wetlands and Interstate highway 80 is the Saltair venue and the State of Utah Great Salt Lake Marina. Also located on the shoreline is Kennecott's North Tailings Impoundment UPDES Outfall #012 and discharge channel. A new response action began in 2010 to assess the ecological risk at a historical dike constructed of copper tails located approximately 0.5 miles east of the Saltair venue. The Agencies are coordinating with Kennecott during this investigation.

The groundwater at OU23 is only visible when it daylights at the various springs located north of the Smelter (OU13) and Refinery (OU14) complexes. During the inspection, Japanese Springs (Pond 10) and the Hansen Springs area were observed from a distance. Both were producing water, which was flowing north. Water in the Garfield Wetland environment (and also from the springs located along the southern boundary of the Garfield Wetlands eventually makes its way to Pond 8. Surface water in Pond 8 can be discharged by Kennecott to the Great Salt Lake via its UPDES Outfall No. 004.