

**SOUTHWEST JORDAN VALLEY GROUND WATER CLEANUP PROJECT
STATE OF UTAH NATURAL RESOURCE DAMAGE TRUSTEE**

**COMMENT RESPONSE SUMMARY
AUGUST 31, 2004**

*Response to Common Comment No. 7 – Use of Tailings Impoundment for
Disposal of Reverse Osmosis Treatment Plant Concentrates*

A number of comments addressed the use of Kennecott's Tailings Impoundment and related facilities for disposal of concentrates from the reverse osmosis (RO) treatment of contaminated groundwater. Some comments raised concerns related to airborne contaminants from the Tailings Impoundment. Other comments suggested that the Tailings Impoundment should not be used for disposal of any concentrate disposal. And other comments suggested that the Tailings Impoundment should be used for all reverse osmosis concentrates, including those from treatment of water from the shallow aquifer.

The Tailings Impoundment is a suitable repository for concentrates from the RO treatment of the Zone A and Zone B deep (principal) aquifer sulfate contaminate plumes as well as the acid-contaminated water from the Zone A plume that is neutralized in Kennecott's Tailings Pipeline. As described in Response to Common Comment No. 5 above, management of the acid-contaminated water associated with the Zone A Plume is part of the CERCLA remedial response as described in the CERCLA Record of Decision dated December 13, 2000. It is not being evaluated by the Trustee as part of the Joint Proposal. The concentrate streams associated with the RO treatment of the Zone A and Zone B plumes, as described in the Joint Proposal, represent less than four percent of the total volume of material placed in the Tailings Impoundment and can be appropriately managed in the Tailings Impoundment. Kennecott has determined that the Tailings Impoundment is not suitable for discharge of reverse osmosis concentrates generated from treatment of shallow aquifer water.

Suitability

Kennecott performed studies on the wastes to be discharged in the Tailings Impoundment and submitted results to the Technical Review Committee (TRC), including EPA and the DEQ. The studies show that the RO concentrates from the Zone A and Zone B plumes (Table 5.6A of the Joint Proposal), do not exhibit any hazardous characteristics. For perspective, the selenium concentration in the RO concentrate streams will reach an approximate maximum of about 25 ppb, which is one-half of the human health drinking water standard for selenium (50 ppb).

As documented in Appendix A of the Kennecott South Facilities Final Remedial Design, the following determinations support disposal of these wastes at the Tailings Impoundment:

- The groundwater gradient beneath the Tailings Impoundment is upward, indicating that contamination from the Tailings Impoundment would not migrate into the aquifer even if it could penetrate the layer of clay beneath the impoundment.
- The Tailings Impoundment is located over an aquifer that is too salty for use as a source of drinking water.

- The Tailings Impoundment is covered under State and Federal air, surface water, groundwater, and reclamation permits that require long-term monitoring. For example, a Groundwater Discharge Permit issued by the Utah Division of Water Quality for the Tailings Impoundment requires monitoring of operational flows and groundwater in the vicinity of the impoundment, ensuring prompt detection of any environmental degradation.

The EPA, DEQ, and the TRC recognized the need to prevent the North Expansion Impoundment from undergoing acidification. Acidification of the impoundment is currently controlled by the mining operation as a function of both the ore mined from the pit and by the addition of lime to the tailings pipeline when needed. The neutralized slurry (with a pH ranging from 6.5-7.0) exiting the “pipe” at the North Expansion Impoundment contains fine grain deposits of a stable, non-bioavailable compound containing metals, sulfides and other mining related contaminants (Appendices A and C, Final Remedial Design). Section 3.4 of the CERCLA Final Remedial Design (Dec. 2002) covers the management of acidic waters and RO concentrates in Kennecott’s tailings circuit.

Acidification of the proposed, combined pipeline slurry could remobilize these metals providing a mechanism for their potential migration into the north-end groundwater underlying the North Expansion Impoundment. The TRC also recognized that the acidification of the impoundment could hinder Kennecott’s ability to reclaim the impoundment facility as required by the DOGM permit over this facility. As stated in section 3.4.2.1.B of the CERCLA final remedial design, the “system” (tailings pipeline and impoundment) must maintain a fluid pH of 6.7 or greater to ensure that dissolved metals are precipitated and sequestered in the tailings impoundment, as is the current case. The North Splitter Box (sample point MCP2536), located near the Copperton Concentrator, has been established as the compliance point for this maintenance requirement under the CERCLA authority. Other short term and long term monitoring locations have been established along the pipeline circuit, and further points will be considered in the future to assist in understanding and controlling the “tailing-discharge system” (as stated in Section 3.4.2.4 of the CERCLA final remedial design). If this operational requirement falls out of compliance, Kennecott in consultation with the TRC, EPA and DEQ will immediately pursue corrective action.

Airborne Contaminants

Wind blown dust from the Tailings Impoundment is monitored and regulated by the DEQ Division of Air Quality. The table below compares constituents in the tailings to typical human health protection levels for ingestion.

Metal	Average Concentration in Tailings (ppm) *	Typical Human Health Protection Levels (ppm)
Arsenic	30.7	100
Lead	16.5	500
Cadmium	1.11	40
Copper	716	>2000

* Includes treatment plant concentrate streams

As indicated above, wastes that will be deposited in the Tailings Impoundment as a result of the Project represent a fraction of the volume of material being placed there as part of existing mining and ore processing operations. As described below, the neutralized acid water of the Zone A Plume has been deposited in the Tailings Impoundment for several years. The addition of

treatment plant concentrates to the Tailings Impoundment will not significantly alter the chemical nature of the tailings. See Section 5.6 of the Joint Proposal. The wastes will be principally calcium sulfate, commonly known as gypsum. Gypsum is the material used in wallboard for construction of residential houses.

The issue of airborne contaminants was considered by the TRC, by comparing the existing concentrations of metals in tailings with the metal concentrations in the RO concentrate. See Table 5.6A of the Joint Proposal. If the differences had been significant, it would have triggered an investigation by the Risk Assessment Task Force that was established by the TRC. The increases are not significant.

Concentrates from Shallow Aquifer

The contamination in the Zone B plume and the RO concentrates from treatment of the Zone B Plume (Deep Well Concentrates) are associated with historic mining activities and will be comparable to those discharged from the Zone A and mine processing operations. As described in Section 8 of the Project Agreement, Kennecott will accept Deep Well Concentrates from Jordan Valley Water Conservancy District (JVWCD). However, if JVWCD elects to proceed with a RO treatment of water from the shallow aquifer, Kennecott cannot accept that portion of the concentrates. The contamination in the shallow aquifer, in the region where JVWCD will be withdrawing shallow aquifer water, is not associated with historic mining practices. The source of this shallow aquifer water is primarily the Jordan River, either directly or through irrigation return flows. Such water contains nutrient and organic contaminants, namely phosphate and nitrate (nutrients) and humic and fulvic acids, related to agricultural activities in the area. The majority of water reporting to the Tailings Impoundment is recycled to Kennecott's metal processing operations. Kennecott has indicated that the addition of organics to the tailings circuit has been studied and is known to reduce copper recovery. Also, the addition of nutrients to Kennecott's Tailings Impoundment will promote the growth of algae in the Tailings Impoundment, causing total suspended solids (TSS) limits of Kennecott's UPDES permit to be exceeded.