SOUTHWEST JORDAN VALLEY GROUNDWATER CLEANUP PROJECT
STATE OF UTAH NATURAL RESOURCE DAMAGE TRUSTEE

COMMENT RESPONSE SUMMARY
AUGUST 31, 2004

Response to Common Comment No. 2 – Groundwater and Aquifer Characterization in Zone A and Zone B

Comments were received regarding the characterization of the aquifers in the Southwest Jordan Valley. The Trustee believes that sufficient information and understanding of groundwater flow and transport within the Southwest Jordan Valley currently exists to decide a course of action. Additional research may assist the project participants in refining conceptual and numeric models of affected groundwater systems, but it is not likely to alter the fundamental assumptions utilized in designing the remedial project. When the project is operational, review and evaluation of monitoring data and project operations will be used to make modifications and improve the efficiency of the cleanup.

There are over 300 monitoring well locations within and surrounding the Zone A and Zone B groundwater plumes. More than a decade of monitoring data from these wells, which is an extensive database by any standard, was used to characterize groundwater conditions in the area and develop the remedial plan. Monitoring plans, results, groundwater studies, and numeric flow and transport modeling have been reviewed thoroughly by DEQ, EPA, and the Technical Review Committee TRC), which includes groundwater experts from the USGS, Division of Water Rights, and Division of Water Quality among its membership. Extensive monitoring will continue in the future to assess the success of the remedial program and to detect deviations from expected performance of the aquifer cleanup. The data collected from the wells and the groundwater model calibrations suggests that the location and depths of wells within the aquifer are of a sufficient distribution to accurately monitor the containment or migration of the groundwater contamination. Also, groundwater in the affected aquifer moves slowly, it is not likely that contamination will move in an unanticipated direction and be unnoticed.

The work performed during the Remedial Investigations and Feasibility Study (RI/FS) provided an understanding of the groundwater characteristics and behavior in the Affected Area. The 1998 RI/FS and the associated data are available at the Department of Environmental Quality. The groundwater model, used by Kennecott and reviewed by the USGS, allowed Kennecott to analyze flow paths and groundwater velocities and evaluate remedial options for the RI/FS. This study investigated the potential migration of storm and mine waste waters (plume water), by comparing the ground water flow with the ability for particular contaminants to migrate within the pore spaces of the aquifer. The results of the study were presented to the TRC during 1997-1998, culminating in a final report accepted by EPA and DEQ. The study enabled Kennecott to predict its ability to gain containment of the Zone A plume and prevent its further migration, through reduction of the mass of contaminates. This information is discussed in Section 6.0 of the June 11, 2004 draft Joint Proposal and in Appendix D of the same document.

Generally in the Affected Area, groundwater flows west to east, from the Oquirrh Mountain front to the Jordan River. Localized deviations of this flow pattern generally are caused by extraction programs, i.e., municipal well fields, which can change the direction of flow by creating localized elevation changes that can affect the hydraulic gradient of the localized aquifer. It is reported that the average horizontal groundwater velocity is about 550 feet per year. Drawdown in the Zone A area is predicted but necessary to prevent lateral (horizontal) movement of contaminated water that might otherwise adversely affect uncontaminated portions of the aquifer. According to modeling for water quantity in Zone B, small amounts of drawdown are expected.

Upgrades to the current model are ongoing and variables such as aerial recharge are continually reevaluated. The most recent transient calibration included using target data as recent as 2001 and water level declines. Some other improvements include the incorporation of a head-dependent boundary along the western edge of the model that replaced the constant flux boundary used in the original model. Also, the eastern model boundary was expanded from the Jordan River east to the base of the Wasatch Mountains. As part of Kennecott's continued effort, the model is continually undergoing upgrades consistent with changing regional data. Future simulation results with regard to recharge will be investigated via ranges of possible values resulting in being able to assess multiple scenarios. These revisions and upgrades, along with the results of the modeling runs, will be reported to the Technical Review Committee (TRC), EPA, and DEQ, so the project team can best optimize the extraction/containment operation while mitigating drawdown.

Additional research will not necessarily provide a better model but additional data inputted as the data becomes available will assure best results and most accurate representation. The updating or revision of the model information is a common practice and is based upon the principle of providing sound scientific information. As outlined in the December 2000 *Final Design for Remedial Action at South Facilities Groundwater*, sampling and monitoring will continue to be conducted to assess quality and water levels over time as compared with baseline conditions. This information will be used to continually calibrate and update the model to compare actual conditions with projected conditions. This information will be provided to the TRC and made available to the public.