



Memorandum

SUBJECT: Evaluation of Alternatives for Disposal of Zone B Reverse Osmosis Byproduct to KUCC Facilities

TO: Mark Atencio and Stakeholders' Forum Members

COPIES: Richard Bay, JWCD
Douglas Bacon, UDEQ

FROM: Paula Doughty, KUCC
Director, Environmental Affairs

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BACKGROUND

Mining and other activities in the southwestern Salt Lake Valley have created groundwater contamination with elevated sulfate concentrations. Under the federal Superfund Law, the State of Utah, through a designated Trustee, brought an action against Kennecott Utah Copper Corporation (KUCC) for injuries to groundwater in the area. The Trustee's claims were resolved in a 1995 Consent Decree approved by the Federal District Court for Utah. The Consent Decree established a Trust Fund to be used to restore, replace or acquire the equivalent of the injured groundwater.

In accordance with the terms of the Consent Decree, the Jordan Valley Water Conservancy District (JWCD) and KUCC have submitted a Joint Proposal to develop and construct a groundwater extraction and treatment project with groundwater remedial functions that will provide treated, municipal quality water to the public in the southwestern Jordan Valley. KUCC and JWCD are asking the Trustee to fund a portion of the Joint Proposal from the Trust Fund established under the Consent Decree. The Joint Proposal involves one reverse osmosis (RO) treatment plant constructed, owned and operated by KUCC to treat mining contaminated Zone A deep groundwater (the Zone A Plant), and one RO plant constructed, owned and operated by JWCD to treat mining contaminated Zone B deep groundwater (the Zone B Facilities) and shallow agricultural contaminated groundwater (the Lost Use Facilities). The Trustee held a public information and public comment period on the Joint Proposal during September through November 2003.

As a result of comments, JWCD withdrew its Zone B/Lost Use RO byproduct water discharge permit to the Jordan River and renewed efforts to find an alternative disposal location for byproduct waters to be produced from its treatment process. The Trustee established a Stakeholders' Forum for groundwater remediation issues in early 2004. JWCD is seeking input from the Stakeholders' Forum as it considers various alternatives for disposal of Zone B/Lost Use RO byproduct water.

Zone B/Lost Use byproduct water is projected to have the following characteristics among others:

	Flow Rate	TDS Concentration	Selenium Concentration
	(cfs)	(mg/L)	(µg/L)
Zone B	1.24	8,300	25
Lost Use	0.51	8,200	47
Total	1.75		
Weighted Average		8,270	32

PURPOSE

JVWCD has asked KUCC to provide information regarding the following three evaluation criteria established by the Stakeholders' Forum to facilitate review of the Zone B/Lost Use byproduct disposal alternatives that involve KUCC facilities:

- Allow Organizations to Meet Objectives
- Allow for Perpetual Water Treatment
- Environmentally Sound

In response to that request, this Technical Memorandum reviews each of the stated criteria for each of three alternatives that involve utilization of some aspect of KUCC operational facilities. This Technical Memorandum is based on information that is presently available to KUCC.

EXECUTIVE SUMMARY

As described in the Joint Proposal, if JVWCD elects to deliver to KUCC the byproduct stream from the Zone B Facilities, KUCC has committed to accept such byproduct stream into its water management system for the forty-year operational period described in the Consent Decree. The byproduct from the Zone B Facilities will be chemically similar to the byproduct from the Zone A Plant that will be owned and operated by KUCC.

Contaminants in the shallow groundwater aquifer (Lost Use water source) are not related to historic mining operations. Additionally, at JVWCD's request KUCC has evaluated the chemistry of the Lost Use byproduct. The byproduct stream from the treatment of water pumped from the shallow aquifer is different from the deep groundwater that will be treated in the Zone A and Zone B facilities. Test work indicates that even in very small quantities organics similar to those found in the Lost Use byproduct stream could adversely affect KUCC operations. Under the Joint Proposal, JVWCD is responsible for the Lost Use byproduct stream.

Each alternative presents operational and other issues and uncertainties for KUCC, some of which KUCC will undertake with appropriate safeguards or limitations. As stated in the Joint Proposal, KUCC will undertake many of the issues and uncertainties associated with disposal of Zone B byproduct streams for the forty-year operational period. It is not possible to take the Lost Use byproduct stream into KUCC's water management system. However, assuming appropriate safeguards and following management review and approval, KUCC may be willing to undertake the issues and uncertainties associated with JVWCD's disposal of Lost Use byproduct streams under a separate UPDES permit that utilizes KUCC's Outfall Pipeline for the forty-year operational period. The issues and uncertainties with commitments associated with byproduct disposal extending beyond forty years cannot be undertaken at this time.

KUCC'S WATER MANAGEMENT SYSTEM

KUCC operates a slurry pipeline for transporting tailings (Tailings Slurry Pipeline) from the Copperton Concentrator to a tailings disposal impoundment (Tailings Impoundment) located adjacent to the Great Salt Lake. Water is recycled from the Tailings Impoundment back to the Copperton Concentrator. Any excess water that accumulates seasonally at the Tailings Impoundment is discharged, under a UPDES permit, to the Great Salt Lake via KUCC's pipeline (Outfall Pipeline).

ALTERNATIVES FOR RECEIVING ZONE B BYPRODUCTS

In the discussions by the Stakeholders' Forum, several options are being evaluated for discharge of Zone B byproduct stream into KUCC's water management system. Possible discharge points include:

- 1) The Tailings Slurry Pipeline at approximately 7800 South,
- 2) The Tailings Impoundment near 2100 South, or
- 3) Directly into KUCC's Outfall Pipeline to the Great Salt Lake (bypassing the Tailings Impoundment and process water recycling circuit).

Under the first two alternatives, the Zone B byproducts are handled within KUCC's system. The management of RO byproduct in the Tailings Impoundment was specifically contemplated during development of KUCC's UPDES permit and the South End Groundwater Record of Decision (ROD) issued by EPA, and is believed by KUCC to be covered by the terms and conditions in the existing UPDES permit. The Division of Water Quality (DWQ) is specifically reviewing this assessment. These two alternatives, which entail Zone B byproduct reporting to the Tailings Impoundment at different locations, are addressed collectively below.

Under the third alternative, KUCC would retain its UPDES permit, and JVVCD would obtain a separate UPDES permit for both Zone B and Lost Use byproduct waters. Both permits would discharge from KUCC's Outfall Pipeline.

DISCHARGES REPORTING TO THE TAILINGS IMPOUNDMENT

1. Impact on KUCC's Operational Objectives:

Preliminary assessments indicate that the Zone B byproduct can be handled in KUCC's Tailings Slurry Pipeline and Tailings Impoundment. As a result, and assuming appropriate safeguards, KUCC has indicated it will bear the additional cost of managing the Zone B byproducts and handle those byproducts within its system for the forty-year operational period.

Following mine closure, it is anticipated that the Tailings Slurry Pipeline and Tailings Impoundment would continue to operate for a period of time to address KUCC's ongoing water management needs. However, following closure, the Tailings Impoundment would not be available for disposal of JVVCD treatment byproduct. As described in the Joint Proposal, KUCC and JVVCD anticipate that after impoundment closure, the Zone A byproducts and Zone B byproducts (if delivered to KUCC) would be discharged to the Great Salt Lake (as contemplated by the ROD) or into an alternative system, either of which may utilize all or part of the existing Tailings Slurry Pipeline.

2. Environmental Soundness:

KUCC has discussed the impact of introducing the Zone B byproducts into its water management system with the DWQ to assure that the impact will not adversely affect KUCC's UPDES permit. KUCC believes that the Zone B byproducts will have minimal adverse affect on the material delivered to the Tailings Impoundment or the limits established by the UPDES permit. Since the KUCC permit was drafted anticipating disposal of treatment byproduct into the Tailings Impoundment, KUCC does not expect the discharge of the Zone B byproducts to the impoundment to impact KUCC's discharge of excess water to the Great Salt Lake under its existing UPDES permit.

3. Perpetual Water Treatment:

The Consent Decree outlines the terms under which KUCC and others may utilize the Trust Fund for projects such as the one KUCC and JWCD have proposed. One requirement is that the municipal quality water to be delivered must be a sustainable water supply of 40 years or more. As a result of this provision, the Joint Proposal outlines a forty-year project. KUCC and JWCD have used the costs associated with a forty-year project to assess the feasibility of the project and obtain management approval. The terms and conditions for the period after the forty years would need to be negotiated in the future.

It is projected that the vast majority of the Zone B mining contaminated groundwater will be remediated within the forty-year operational period for the Zone B Facilities. The uncertainties (costs, permits, operations) associated with perpetual management of JWCD treatment byproducts are beyond the scope of the NRD project and cannot be undertaken at this time. For this reason, KUCC requires that the terms of an arrangement after the initial forty years be left open for future negotiation.

DISCHARGE AT THE OUTFALL PIPELINE COMMINGLED WITH KUCC DISCHARGE TO THE GSL

1. Impact on KUCC's Operational Objectives:

This alternative introduces Zone B and Lost Use byproduct into KUCC's water management system at the last point in the system before KUCC discharges into the Great Salt Lake under its UPDES permit. Due to the location in the system and the separate permit JWCD proposes to obtain, at this time little adverse impact on KUCC's operations is anticipated. KUCC's discharge in the Outfall Pipeline will be discontinued from time to time, and will change over time as mining operations cease.

KUCC's assessment is based on the condition that JWCD's discharge is limited to the byproducts generated by the Zone B Facilities and Lost Use Facilities outlined in the Joint Proposal. Expansion plans that JWCD has for its RO plant present uncertainties that are difficult to assess at this time.

2. Environmental Soundness:

Under this alternative, JWCD would obtain a separate UPDES discharge permit for the Zone B and/or Lost Use byproducts. KUCC will maintain its current permit to discharge to the GSL during mining operations and undertake permitting for the post-mining operation. Each entity would conduct compliance sampling upstream of the co-mingling point. Uncertainties in the permitting environment exist over the forty-year period, and as such, KUCC must assure that its operations and use of the Outfall Pipeline are not adversely affected if JWCD discharges at this point.

3. Perpetual Water Treatment:

See discussion under Discharges Reporting to the Tailings Impoundment above. KUCC's operation of the Outfall Pipeline beyond the forty-year remediation project is uncertain; however, the possibility of continued use or operation by JWCD could be negotiated at a future time.