Jordan Valley Water Conservancy District

TECHNICAL MEMORANDUM

MEMO No: 2

SUBJECT: **Secondary Water Deliveries Alternative**
Zone B/Lost Use Reverse Osmosis By-Product Disposal Alternatives Southwest Jordan Valley Groundwater Remediation Project Stakeholders Forum

TO: Dr. Dianne R. Nielson, NRD Trustee

COPIES: Mark Atencio, JVWCD
Paula Doughty, KUCC
Douglas Bacon, UDEQ

FROM: Richard Bay, JVWCD

DATE: April 8, 2004

EXECUTIVE SUMMARY

A secondary water delivery usage of the extracted Zone B groundwater has been proposed. A comparison with the Consent Decree and with the Joint Proposal indicates four areas of conflict:

1. The Consent Decree contemplates producing municipal quality water through treatment of extracted, contaminated groundwater.

2. The Consent Decree defines municipal quality water as having total dissolved solids (TDS) concentrations not exceeding 500 – 800 mg/L The Zone B groundwater has TDS concentrations of about 1600 mg/L.

3. An important Utah water quality standard for irrigation uses is TDS not exceeding 1200 mg/L. The Zone B groundwater exceeds this standard.

4. Applying extracted, contaminated groundwater for irrigation uses would create contaminated return flows which could accelerate the spread of aquifer contamination into new areas.

BACKGROUND:

Mining activities in southwestern Salt Lake Valley have created groundwater contamination, with elevated sulfate concentrations. A 1995 federal Consent Decree negotiated by Jordan Valley Water Conservancy District (JVWCD), Kennecott Utah Copper Corporation (KUCC) and Utah Department of Environmental Quality (UDEQ), established a natural resource damage Trust Fund which was paid by KUCC. The Consent Decree established purposes for use of the Trust Fund as:

- remediating the aquifer
- containing the contamination plumes; and
- restoring the beneficial by producing municipal quality water through treatment.

Dr. Dianne R. Nielson, Executive Director of UDEQ, has been appointed as Trustee of the Trust Fund and of projects to accomplish the Consent Decree purposes.

JVWCD and KUCC have submitted a Joint Proposal project to the Trustee to accomplish the Consent Decree purposes. The Joint Proposal involves one reverse osmosis (RO) treatment plant and facilities to treat western Zone A deep groundwater; and one RO plant to treat eastern Zone B deep groundwater and Lost Use shallow groundwater. The Trustee held a public information and public comment period during August through November 2003.

As a result of the public comments, JVWCD withdrew its Zone B/Lost Use RO by-product water discharge permit to the Jordan River and renewed efforts to find a better disposal alternative. The Trustee established a Stakeholder Forum for southwest groundwater remediation issues in early 2004. JVWCD has sought input from the Stakeholders Forum as it considers various alternatives for disposal of Zone B/Lost Use RO by-product water.

Zone B/Lost Use by-product water is projected to have the following characteristics:

Component	**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**		
Common Range		**8,240**	**38 - 47**

CREDENTIALS, EXPERTISE AND EXPERIENCE OF AUTHOR

I am a registered professional engineer with a BS degree in civil engineering from the University of Utah. I am employed as the Chief Engineer and Assistant General Manager of the Jordan Valley Water Conservancy District. I have been involved with southwest groundwater treatment issues since 1990, and have served on the EPA Technical Review Committee. I assisted in negotiating the 1995 Consent Decree and have familiarity with that document.

PURPOSE

During the second Stakeholders Forum meeting, Bruce Waddell (U. S. Fish and Wildlife Service) proposed that extracted groundwater be used for secondary water system deliveries, instead of RO treatment for municipal deliveries. Although this agenda was to consider alternatives for disposal of RO by-product water, the Forum asked that I meet with Bruce to further consider this alternative.

DISCUSSION OF SECONDARY WATER CONCEPT

I met with Bruce Waddell on April 2, 2004, together with Paula Doughty and Kelly Payne (KUCC) and Mark Atencio (JVWCD). We further explored the concept Bruce had suggested. Bruce suggested that the water extracted from Zone B be delivered as secondary water supplies to the Affected Municipalities. In making the secondary deliveries, Bruce explained, other municipal water supplies would be postponed and offset, to be available later for deliveries to the public.

ANALYSIS OF SECONDARY WATER CONCEPT

After discussing the concept with Bruce and the others in attendance, I evaluated the secondary water concept in comparison with the 1995 Consent Decree and with the JVWCD / KUCC Joint Proposal. I have concluded that the secondary water concept is in conflict with purposes, requirements and expectations of the Consent Decree and of the Joint Proposal. Those conflicts are explained in the following paragraphs.

1. MUNICIPAL QUALITY WATER PRODUCTION

The secondary water concept conflicts with the Consent Decree requirement and expectation that municipal quality be produced. Section IV.D.2.b requires that in using the trust fund, and specifically the letter of credit, "…at the option of the Trustee, be converted to cash which shall be used by the Trustee to restore, replace, or acquire the equivalent of the natural resource for the benefit of the public in the Affected Area…" The equivalent of the natural resource is a municipal water supply from the underground aquifer.

The Consent Decree provides the ability for Kennecott to propose a project under which it provides municipal quality water, and gains reductions against the letter of credit when it constructs a project. Section IV.D.2.b. of the Consent Decree allows for this system "if Kennecott provides and delivers municipal quality water through treatment of contaminated water to a system of a purveyor of municipal and industrial (M&I) water in a manner acceptable to the Trustee…"

2. MUNICIPAL WATER QUALITY STANDARD

Section I.D.defines: "Municipal quality water means water with chemical concentrations at or below 250 mg/Lsulfate and 500 mg/L TDS for the area west of the Welby Canal or 250 mg/L sulfate and 800 mg/L TDS for the area east of the Welby Canal and which otherwise meets primary drinking water standards for other contaminants."

The proposal for secondary water deliveries would suggest Zone B groundwater, with TDS concentrations of about 1600 mg/L be delivered for irrigation of large outdoor areas. As can be seen above, this is in conflict with the defined term for municipal quality water.

3. STANDARD FOR IRRIGATION AND SECONDARY USES

The Utah water quality standard for irrigation purposes is a TDS concentration of 1200 mg/L. This is the standard to which the District is held for the Jordan River and storm drain systems which discharge to canals are the Jordan River. Therefore, the Zone B groundwater with a TDS concentration of 1600 mg/L is in conflict with this important standard.

4. PREVENT OR REDUCE SPREAD OF AQUIFER CONTAMINATION

An important requirement of the Consent Decree, when utilizing the irrevocable letter of credit for a project to treat contaminated groundwater for producing M&I water is to prevent or reduce the spread of aquifer contamination. This standard is explained in Section IV.D.2.b.ii). The proposal for secondary use would simply reapply much of the untreated, contaminated groundwater to the land surface, with return flows back to the groundwater system. The use of the secondary water would be uncontrolled throughout areas that could then lead to spreading the contamination into uncontaminated areas. This appears to be in direct conflict with an important standard of the Consent Decree.