U.S. Department of Energy
2597 B ¾ Road
Grand Junction, CO 81503

March 25, 2004

Mr. John Lusher
U.S. Nuclear Regulatory Commission
Fuel Cycle Facilities Branch, NMSS
11545 Rockville Pike, 2 White Flint North
MS: T8 A33
Rockville, MD 20852

Subject: *2003 Annual Inspection Report for the Salt Lake City, Utah UMTRCA Title I Processing Site* - WM-41

Dear Mr. Lusher:

Enclosed is a copy of the annual inspection report for the Salt Lake City Processing Site. The site was inspected and sampled in December 2003. The site was in excellent condition with no violations of institutional controls. Ground water level measurements indicate that an upward hydraulic gradient continues to exist between the lower confined uncontaminated aquifer and the shallow unconfined contaminated aquifer. Uranium concentrations were below the maximum concentration limit (MCL) in all the ground water and surface water samples, and molybdenum exceeded the MCL in one ground water sample.

This report is submitted in compliance with the reporting requirements of the ground water compliance action plan for the site. If you have any comments or questions about this report, please call me at (970) 248-6004.

Sincerely,

Michael K Tucker

Michael K. Tucker
Program Management Support

Enclosure

cc w/enclosure:
B. Hamos, UDEQ

cc w/o enclosure:
R. Johnson, Stoller
Project File SLC 535.10 (A. Temple)

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NMSS08

2003 Annual Inspection Report for the Salt Lake City, Utah, UMTRCA Title I Processing Site

Summary

The Salt Lake City Processing Site, inspected on December 2 and 3, 2003, is in excellent condition. There was no evidence of construction activities that would encounter contaminated soils. The property manager verified that no unauthorized ground water withdrawal or construction occurred during the past year. Ground water level data and ground water and surface water samples were collected in conjunction with the inspection. Water level measurements indicate that an upward hydraulic gradient continues to exist, which prevents contaminants in the shallow unconfined aquifer from migrating downward into the lower uncontaminated confined aquifer. Water quality results indicate that uranium and molybdenum concentrations are below their respective maximum concentration limits (MCL) at all but one of the ground water and surface water locations. The molybdenum concentration has varied at monitor well MW–0144, and was above the MCL this year. No cause for maintenance or a follow-up inspection was identified.

1.0 Introduction

This report presents the results of the annual U.S. Department of Energy (DOE) inspection and sampling of the Uranium Mill Tailings Radiation Control Act (UMTRCA) Title I Processing Site at Salt Lake City, Utah. R. Johnson (Chief Inspector) and D. Traub (Assistant Inspector), both of S.M. Stoller Corporation, the DOE Legacy Management Contractor at Grand Junction, conducted the inspection on December 2 and 3, 2003. The inspection was conducted in accordance with the *Long-Term Management Plan* [LTMP] *for the Salt Lake City, Utah, UMTRA Project Processing Site* (GJO-2002-307-TAR, January 2002).

The purposes of the annual inspection and ground water and surface water monitoring were to confirm compliance with the *Ground Water Compliance Action Plan* [GCAP] *for the Salt Lake City, Utah, UMTRA Project Site* (Document Number U0039502, May, 2000), confirm the integrity of visible features at the site, identify changes in conditions that may affect site protectiveness, and determine the need, if any, for maintenance or additional inspections and monitoring.

2.0 Final Site Conditions

A shallow unconfined aquifer contains two constituents of potential concern—uranium and molybdenum—as a result of historic uranium processing operations. This aquifer throughout the region also has widespread arsenic contamination resulting from former lead, copper, silver, and gold processing activities (molybdenum was a byproduct of these processing activities also). Useable ground water exists in a deeper, confined aquifer. An upward hydraulic gradient within the lower aquifer prevents degradation by the overlying contaminated aquifer.

The shallow aquifer is not a current or potential source of drinking water due to the widespread arsenic contamination and cannot be cleaned up using treatment methods reasonably employed in

public water supply systems. Therefore, supplemental standards were applied to the contaminated ground water with U.S. Nuclear Regulatory (NRC) concurrence.

Ground water is expressed in four shallow ponds constructed on the golf course. The pond water, which is used only for irrigating the golf course, contains elevated concentrations of uranium. A health risk assessment (LTMP, Appendix E) indicated that there is no unacceptable risk from incidental exposure to the pond water.

Long-term monitoring of ground water and surface water is not normally required under a supplemental standards compliance strategy; however, NRC and the Utah Division of Radiation Control (UT-DRC) stipulated limited monitoring requirements as part of the GCAP. Monitoring will continue for a minimum period of 5 years (through 2004). At the end of this period, the monitoring results will be evaluated, and a recommendation for continuing or terminating the monitoring will be made in consultation with NRC and UT-DRC. Criteria for terminating the monitoring are:

1) No reversal of the ground water hydraulic gradient;

2) A decrease in uranium and molybdenum concentrations in the ground water; and

3) No unacceptable risks related to current pumping from the shallow aquifer at the site (for dewatering purposes).

Soils contaminated with residual radioactive materials were left in place at several locations on the original property, as shown on Figure 1. NRC concurred that these materials pose no unacceptable risk to human health or the environment. Institutional controls governing soil excavation and construction of structures in areas of contaminated soil were established jointly by DOE, UT-DRC, and the Central Valley Water Reclamation Facility (CVWRF).

3.0 Results of Inspection

Features discussed in this report are shown on Figure 1. Attached photographs that support specific observations are identified in the text and on Figure 1 by photograph location (PL) numbers.

3.1 Facility Access

The former processing site is owned by the CVWRF and has been redeveloped as a regional wastewater treatment facility, a golf course, and a solid waste transfer facility. Inspectors must check in at the Administration Building of the CVWRF before accessing the site and some of the sampling locations.

Access to portions of the wastewater treatment facility is restricted by security fences and locked gates. After-hours access to the golf course also is restricted. Access to the solid waste transfer station is unrestricted but personnel should check in with facility staff before entering the facility.

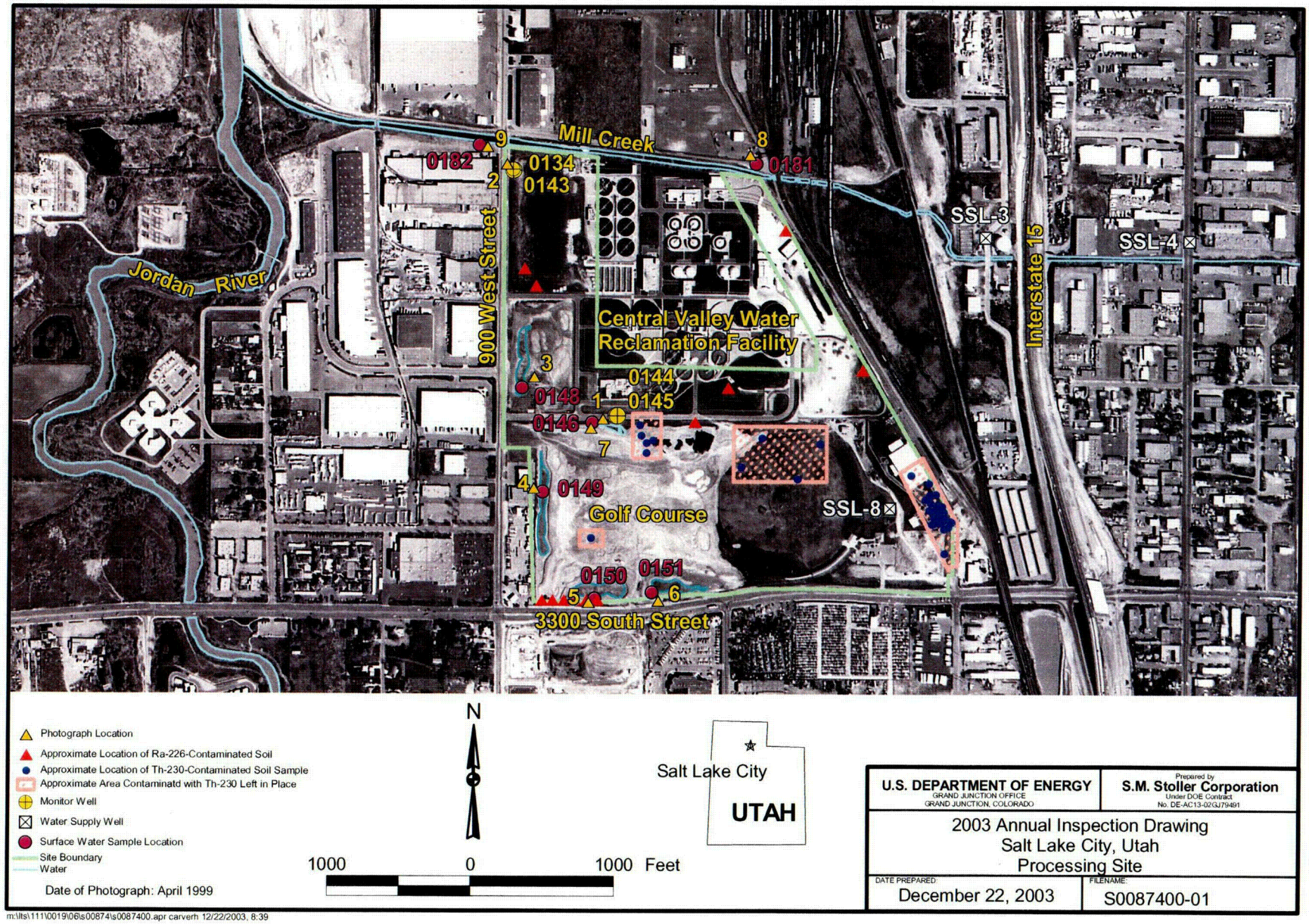

Figure 1. Salt Lake City, Utah, Processing Site

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3.2 Signs, Site Markers, and Survey Monuments

DOE does not maintain signs, markers, or survey monuments at the Salt Lake City Processing Site.

3.3 Monitor Wells

Four DOE-owned ground water monitor wells remain at the Salt Lake City Processing Site. The wells are located in pairs. In each pair, one well is completed in the shallow unconfined aquifer and the other is completed in the deeper confined aquifer. Two flush-mounted wells (MW–0144 and MW–0145) are located in a grass-covered area south of the Administration Building (PL–1). The other two wells (MW–0134 and MW–0143), located downgradient of the first pair, are in the northwest corner of the site (PL–2). All wells were secure and in good condition.

4.0 Ground Water Monitoring

Water level monitoring is required to confirm that an upward hydraulic gradient continues to exist, thus preventing the contaminated ground water in the shallow aquifer from migrating to the lower confined aquifer. Concentrations of uranium and molybdenum will be monitored in the shallow aquifer annually at least through 2004, and will be monitored in the confined aquifer if the hydraulic gradient reverses.

Water level dataloggers in the shallow wells were downloaded (continuous measurements) and the water levels were measured in the deep wells. In each well pair the water level was higher in the deep wells than in the shallow wells (Figure 2). This condition demonstrates the upward hydraulic gradient that prevents contaminated ground water from flowing from the contaminated shallow aquifer into the deeper aquifer.

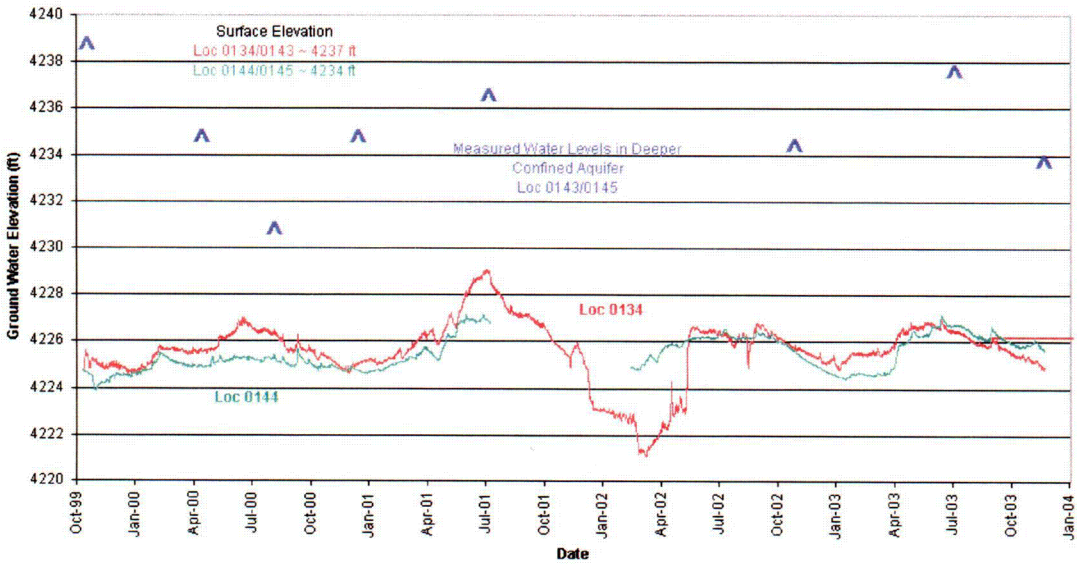

Figure 2. Ground Water Level Measurements at the Salt Lake City Processing Site

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Ground water samples were collected from the two shallow wells (MW–0134 and MW–0144). Uranium concentrations in both wells continue to be substantially below the MCL of 0.044 milligrams per liter (mg/L), as shown on Figure 3. The molybdenum concentration in MW–0134 continues to be well below the MCL of 0.10 mg/L; however, the concentration in MW–0144 has varied above and below the MCL, and was 0.215 mg/L this year (Figure 4). No trend for molybdenum in MW–0144 can be determined at this time.

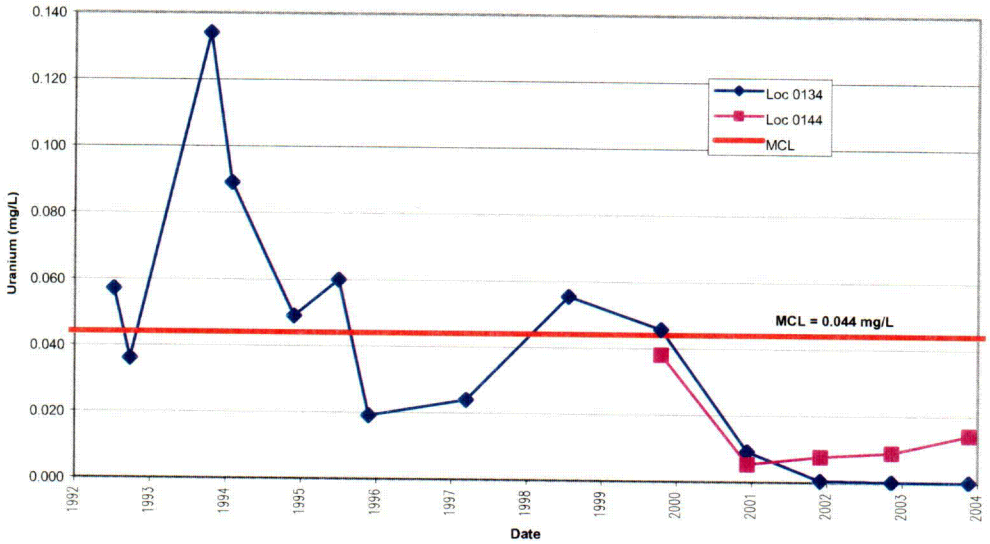

Figure 3. Shallow Aquifer Uranium Concentrations at the Salt Lake City Processing Site

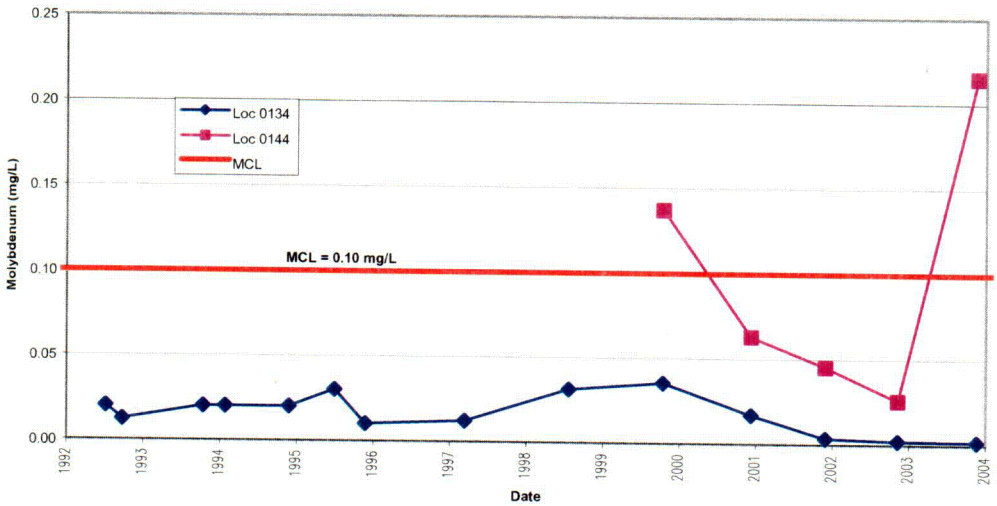

Figure 4. Shallow Aquifer Molybdenum Concentrations at the Salt Lake City Processing Site

5.0 Surface Water Monitoring

The shallow aquifer is periodically pumped by CVWRF from two dewatering wells for construction and maintenance purposes and is run through the treatment plant and ultimately discharged to Mill Creek. The aquifer also has surface expressions at four golf course ponds and a drainage ditch. Mill Creek is sampled upstream and downstream of the plant's discharge point to evaluate the effect of the treated ground water on Mill Creek water quality.

Seven surface water samples were collected during the inspection (PL–3 through PL–9): four from the currently existing golf course ponds (SW–0148 through SW–0151); one from a golf drainage ditch (SW–0146); and two from Mill Creek—upstream (SW–0181) and downstream (SW–0182) of the CVWRF treated water discharge point. Uranium concentrations are below the MCL at all locations, with the highest concentration of 0.0183 mg/L at SW–0146 (Figure 5). Molybdenum concentrations also are below the MCL, with the highest concentration of 0.0460 mg/L at SW–0146 (Figure 6).

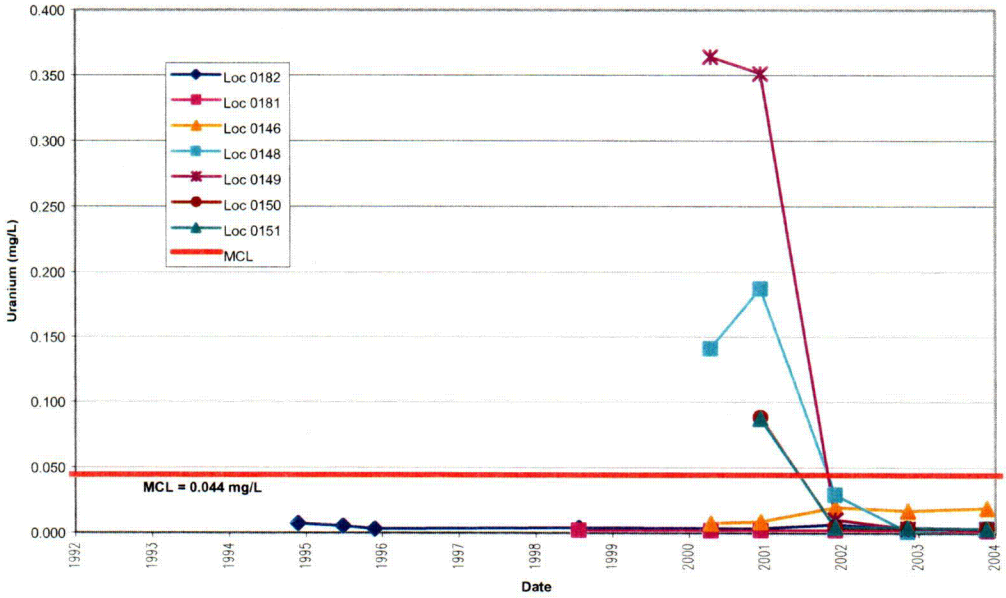

Figure 5. Surface Water Uranium Concentrations at the Salt Lake City Processing Site

6.0 Effectiveness of Ground Water Compliance Strategy

The ground water compliance strategy for the site is no remediation and application of supplemental standards based on limited use ground water. Ground water from the shallow aquifer is not a current or potential source of drinking water, and there was no evidence of unauthorized ground water use in 2003. Ground water level measurements confirm that an upward hydraulic gradient continues to exist, which prevents constituents of potential concern (uranium and molybdenum) in the shallow unconfined aquifer from migrating downward into the lower confined aquifer that contains potable water. Therefore, the compliance strategy for ensuring that the upper aquifer is not used for drinking water and that the lower aquifer continues to be unaffected by the upper aquifer remains effective.

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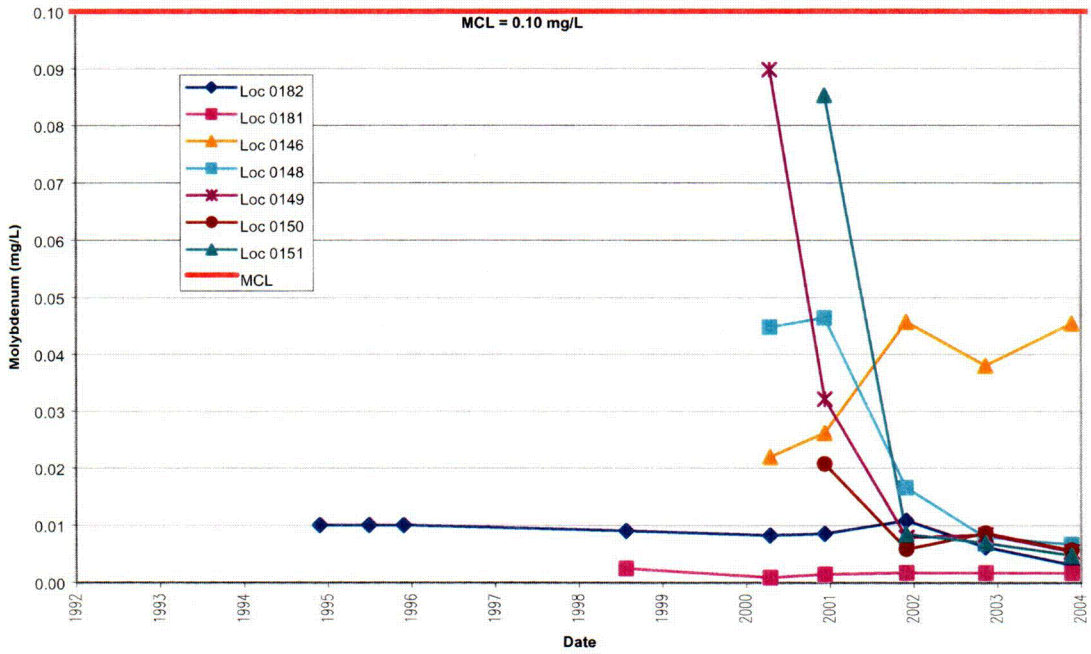

Figure 6. Surface Water Molybdenum Concentrations at the Salt Lake City Processing Site

7.0 Institutional Controls

There was no evidence of soil excavation activities at locations of remaining soil contamination. Mr. Reed Fisher, manager of CVWRF, confirmed that he is aware of the institutional control requirements associated with the locations of the contaminated soils, and indicated that no activities had occurred on the property in the past year that might encounter the contamination.

8.0 Recommendations

1. Constituents of potential concern (uranium and molybdenum) in the upper aquifer are not to migrate to the lower aquifer (page 6).

   Recommendation: Monitor ground water level data to verify that an upward hydraulic gradient exists between the lower and upper aquifers. Evaluate ground water level and quality data after the 2004 sampling event to develop a recommendation on whether or not to continue or modify ground water monitoring requirements.

2. Effective institutional controls associated with the locations of contaminated soil must be maintained (page 7).

   Recommendation: Annually verify the effectiveness of institutional controls by visually inspecting the site and interviewing the manager of CVWRF.

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9.0 Photographs

Photo Location Number	Azimuth	Description
PL–1	90	Sampling monitor well MW–0144 (MW–0145 is behind the sampler).
PL–2	120	Monitor wells MW–0143 (left, deep aquifer) and MW–0134 (right, shallow aquifer).
PL–3	315	Golf course pond sampling location SW–0148.
PL–4	135	Golf course pond sampling location SW–0149.
PL–5	85	Golf course pond sampling location SW–0150.
PL–6	340	Golf course pond sampling location SW–0151.
PL–7	250	Golf course drainage ditch sampling location SW–0146.
PL–8	150	Mill Creek sampling location SW–0181, upstream of the treated water discharge point.
PL–9	50	Mill Creek sampling location SW–0182, downstream of the treated water discharge point.

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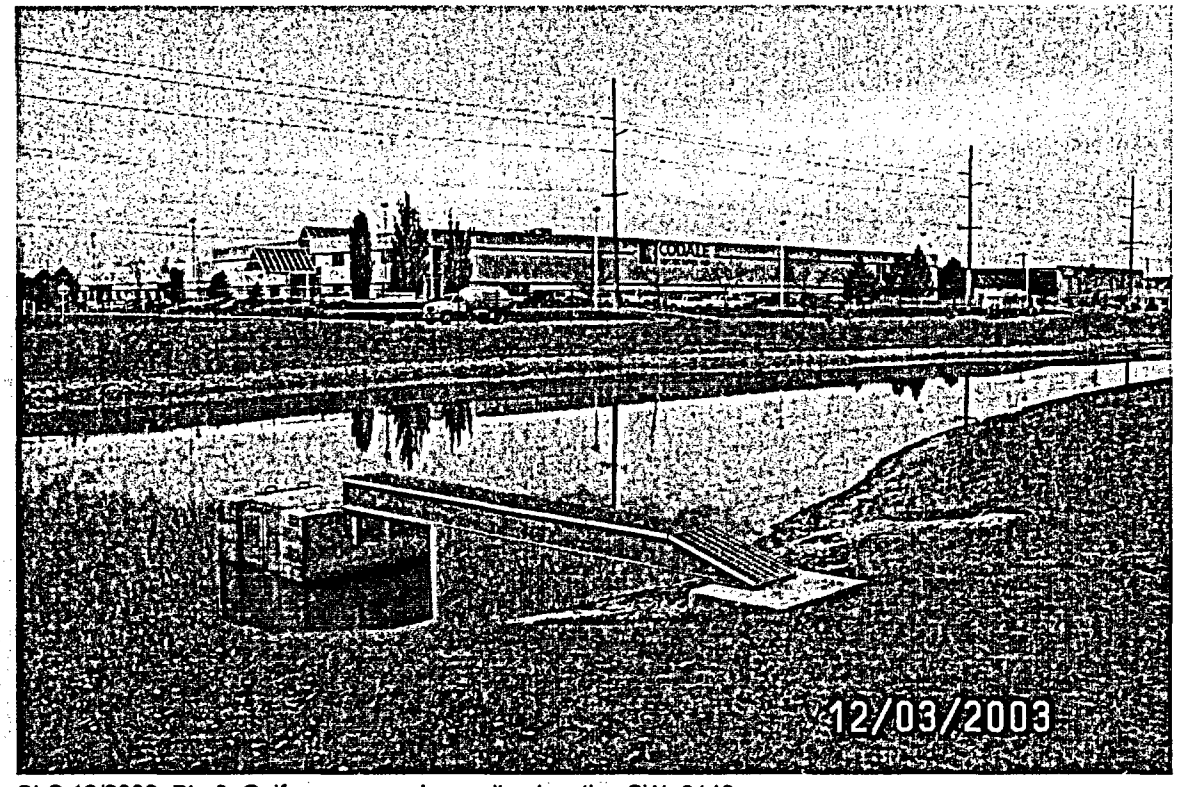
SLC 12/2003. PL–1. Sampling monitor well MW–0144 (MW–0145 is behind the sampler).

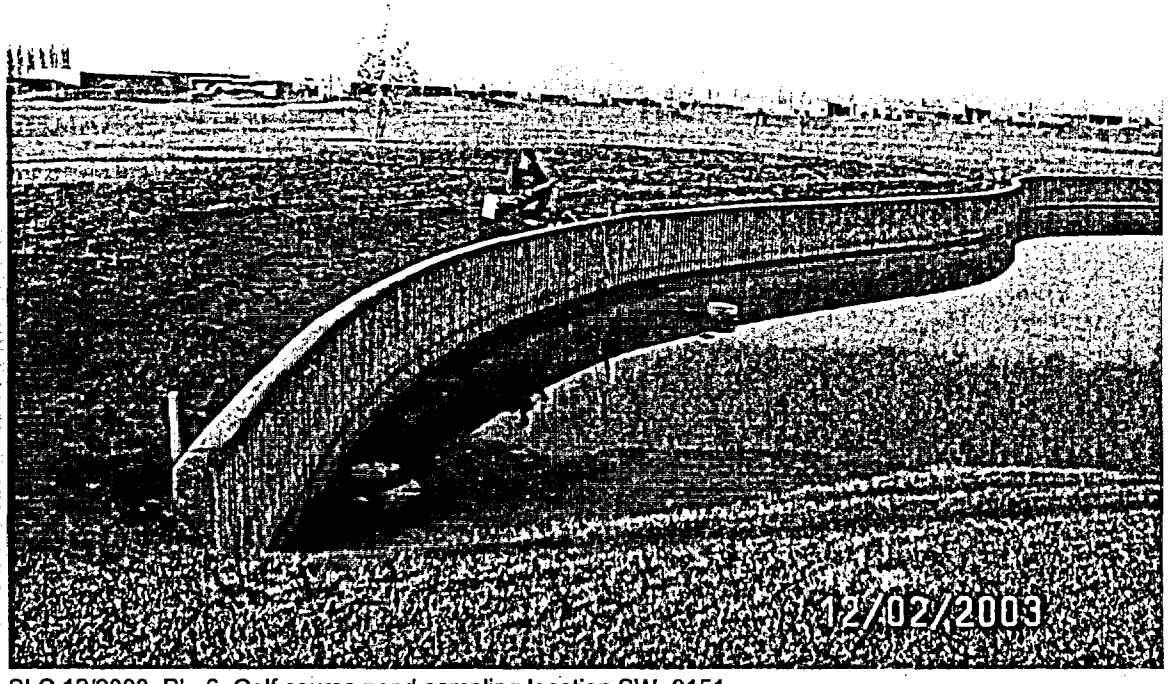
SLC 12/2003. PL–2. Monitor wells MW–0143 (left, deep aquifer) and MW–0134 (right, shallow aquifer).



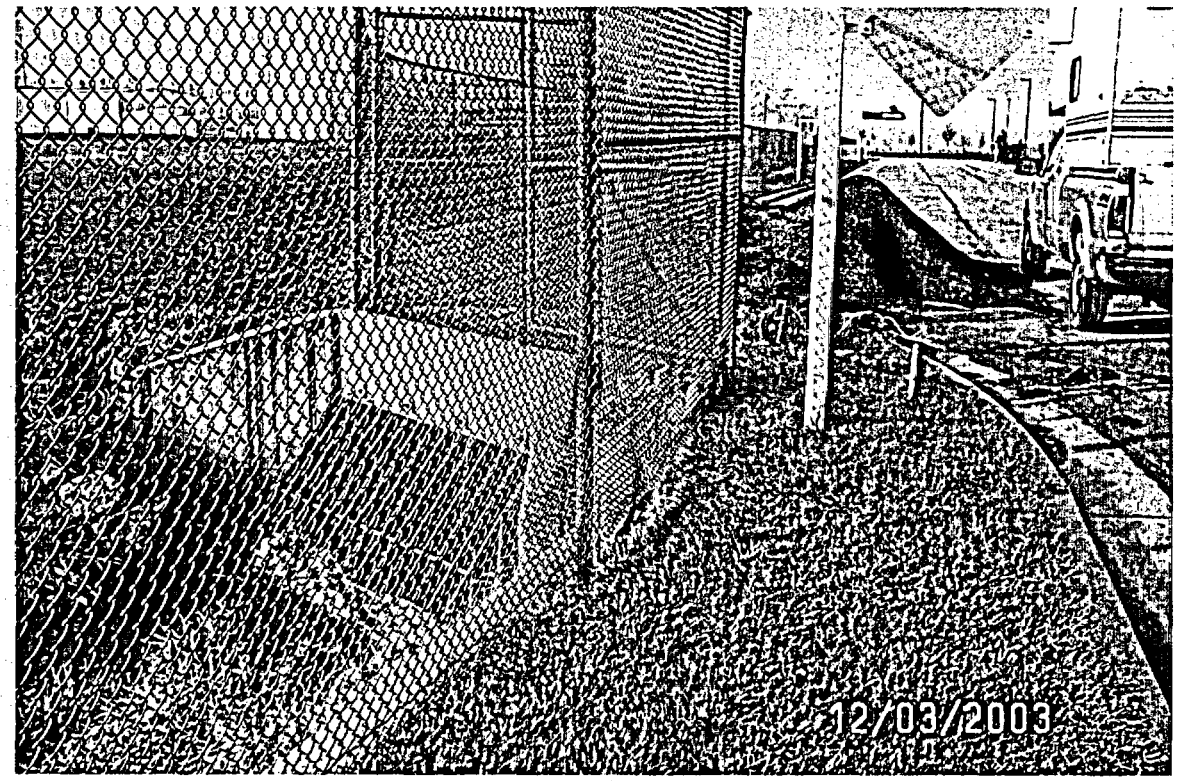
SLC 12/2003. PL–3. Golf course pond sampling location SW–0148.

SLC 12/2003. PL–4. Golf course pond sampling location SW–0149.

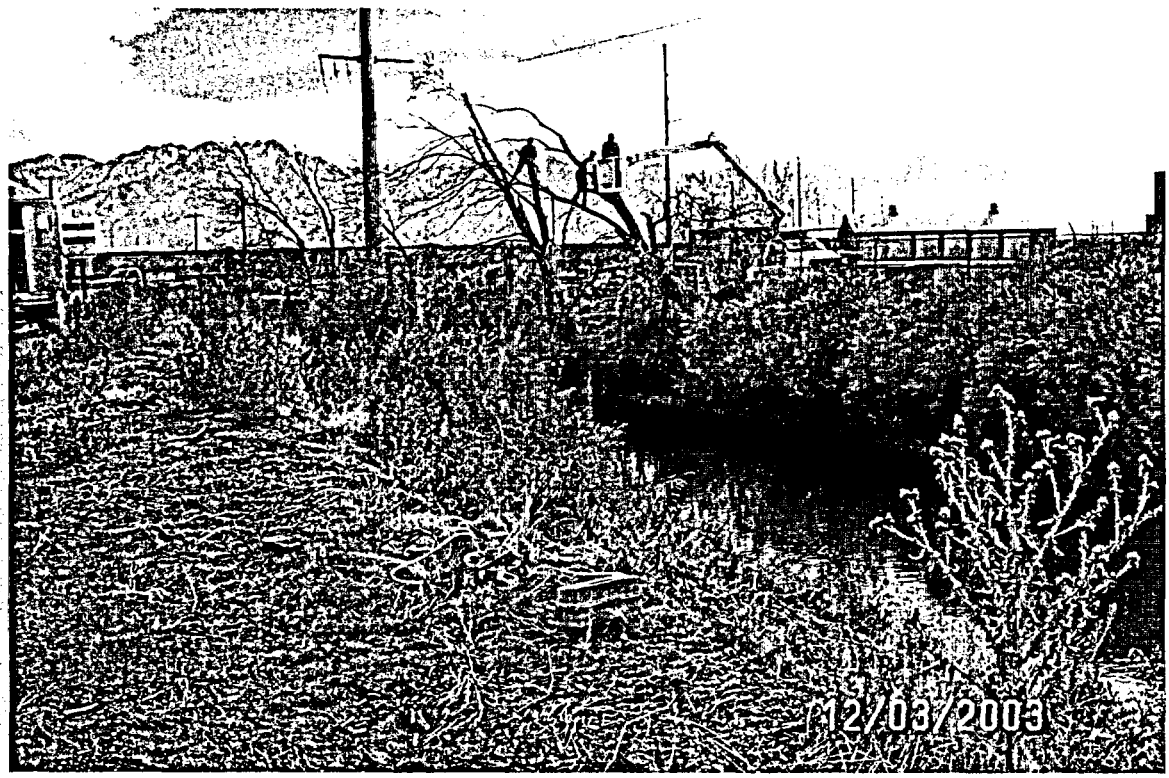
SLC 12/2003. PL–5. Golf course pond sampling location SW–0150.



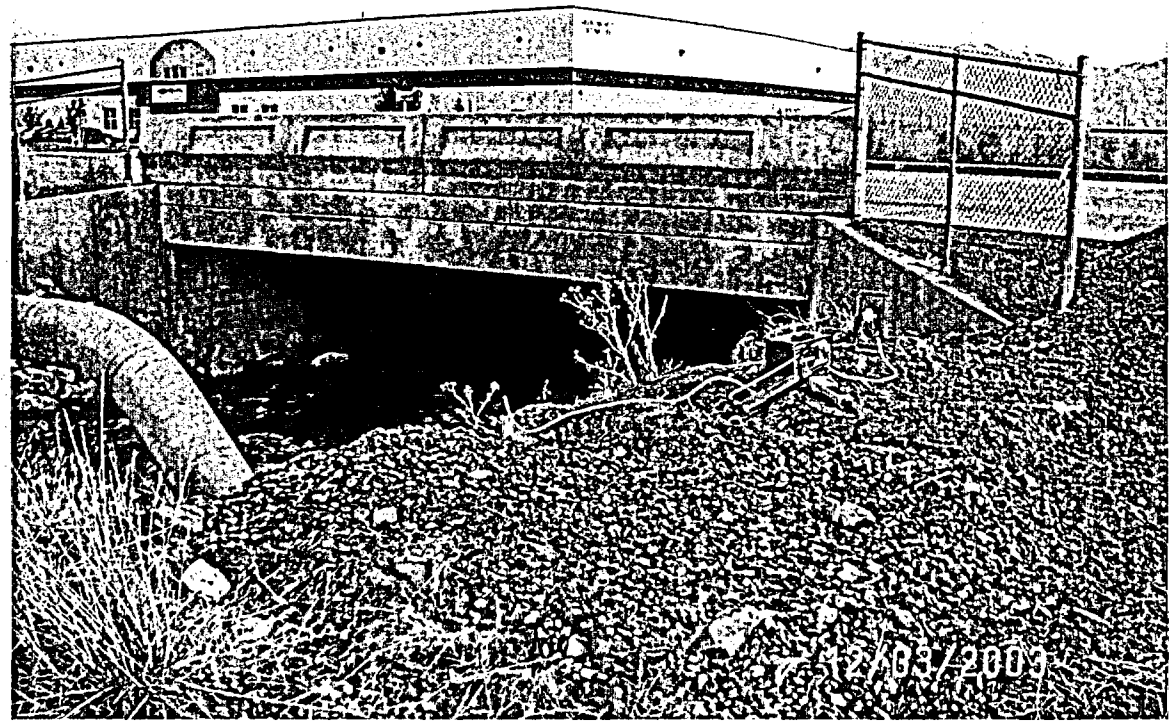
SLC 12/2003. PL–6. Golf course pond sampling location SW–0151.



SLC 12/2003. PL–7. Golf course drainage ditch sampling location SW–0146.



SCL 12/2003. PL–8. Mill Creek sampling location SW–0181, upstream of the treated water discharge point.



SLC 12/2003. PL–9. Mill Creek sampling location SW–0182, downstream of the treated water discharge point.