A Report Prepared for

Van Waters & Rogers Inc.
6100 Carillon Point
Kirkland, Washington 98033

QUARTERLY PROGRESS REPORT
JULY-SEPTEMBER 1993
BOISE, IDAHO

HLA Project No. 22947 03

by

S. Michelle Beekman
Senior Geologist

Christopher R. Smith, P.G. 736
Principal Hydrogeologist

Harding Lawson Associates
7655 Redwood Boulevard
P.O. Box 578
Novato, California 94948
415/892-0821

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EXECUTIVE SUMMARY

This progress report presents data collected and summarizes activities performed in association with ongoing investigations in Boise, Idaho, from June 26 through September 20, 1993. Activities to be conducted during the next reporting period are also presented.

Activities conducted under the Water Supply Order during the reporting period include:

- Following up on VW&R's offer to hook up residences to the Boise Water Corporation (BWC) water system
- Conducting quarterly sampling.

Work planned for the next reporting period includes:

- Resampling wells with tetrachloroethylene (perc) concentrations above the analytical detection limit but below 5 micrograms per liter (μg/l)
- Continuing water line connections as authorizations are received and reimbursement for 1 year of BWC utility costs.

Activities conducted under the PSA Order during the reporting period include:

- Submitting a revised draft Soil Boring Sampling and Analysis Plan (SAP)
- Submitting a final Soil Boring SAP
- Sampling the South Slough surface water in accordance with the Groundwater and Surface Water SAP
- Submitting a letter to the Department presenting the results of the South Slough surface water sampling.

Activities to be conducted under the PSA Order during the next reporting period include:

- Installing wells in accordance with the Soil Boring SAP
- Submitting a Geophysical SAP approximately two weeks after completion of the soil boring field program.

Work conducted under the Mall Order during the reporting period included:

- Submitting a final Monitoring Well SAP
- Submitting a letter responding to Department comments on the Asymptotic Protocol originally submitted on June 17, 1993
- Conducting a conference call with the Department to further discuss the Asymptotic Protocol
- Obtaining approval from two approved disposal facilities to accept spent carbon
- Monitoring the soil vapor extraction system.

Work planned for the next reporting period in association with the Mall Order includes:

- Finalizing the Asymptotic Protocol
- Installing wells in accordance with the Monitoring Well SAP
- Monitoring the soil vapor extraction system.

1.0 INTRODUCTION

This progress report has been prepared by Harding Lawson Associates (HLA) for Van Waters & Rogers Inc. (VW&R). It presents data collected and summarizes activities performed in association with ongoing investigations in Boise, Idaho, from June 26 through September 20, 1993.

This report has been prepared to meet the requirements of the Consent Orders dated October 9, 1992 (Boise Mall and Preliminary Study Area [PSA] Orders), between VW&R and the Idaho Department of Health and Welfare, Division of Environmental Quality (Department). The scope of work for this report was originally outlined in *Exhibit 3, Work Plan, Boise Towne Square Mall Supplemental Investigation and Final Remediation, Boise, Idaho* (*HLA, 1992a*). This report presents a summary of activities conducted during the reporting period and activities to be conducted during the next reporting period associated with the Water Supply Order dated January 3, 1992, and the PSA and Boise Mall Orders.

2.0 WATER SUPPLY ORDER

2.1 Work Conducted During the Reporting Period

Activities conducted under the Water Supply Order during the reporting period included:

- Following up with homeowners who have not responded to VW&R's offer to connect residences to Boise Water Corporation (BWC) water system
- Conducting quarterly sampling of wells containing tetrachloroethylene (perc) above the analytical detection limit but below the EPA's maximum contaminant level (MCL) of 5 micrograms per liter (μg/l).

2.1.1 Quarterly Sampling

In accordance with requirements of the Water Supply Order, wells containing perc concentrations above the analytical detection limit but below the MCL of 5 μg/l were sampled to monitor the dissolved perc concentration in groundwater. Groundwater sampling was conducted on August 17, 1993. Prior to sampling, authorization was obtained from well owners to collect samples from their wells. Sample collection activities were performed in accordance with the Quality Assurance Project Plan (QAPP) and are described in the following sections (*HLA, 1992b*). In addition to wells sampled as part of the regular quarterly program, authorization was obtained from two property owners whose properties are located near the downgradient edge of the Affected Area as defined by HLA's letter dated March 24, 1993 (*HLA, 1993b*). The purpose of sampling these additional wells was to monitor dissolved perc concentrations in groundwater near the downgradient edge of the Affected Area.

The sampling method used to collect groundwater samples from the private wells was a function of well construction and access. In general, wells were purged with their installed pumps for a minimum of 5 minutes and until the pH, temperature, and conductivity readings stabilized. Following purging activities, groundwater samples were

collected from the discharge line at the access point closest to each well. All samples were placed in sample containers appropriate for the required analysis. All samples were placed in a cooler that was chilled to a temperature of approximately at 4 degrees Celsius and sent under chain of custody via overnight courier to Analytical Technologies, Inc. (ATI), Renton, Washington.

Duplicate samples were collected from two wells and laboratory-prepared trip blanks were shipped in the coolers along with the well samples to the analytical laboratory.

All samples were analyzed by ATI for halogenated volatile organic compounds (VOCs) using EPA Test Method 8010. Specific analytical results obtained from private well samples are confidential. In general, perc was detected in 11 of the 14 samples at concentrations ranging from 0.4 to 150 μg/l. Three samples contained perc at concentrations greater than the EPA's MCL of 5 μg/l. Eight samples contained perc at concentrations above the detection limit but below the MCL. Trichloroethene (TCE) was detected in two well samples at a concentration of 0.4 μg/l. Trichlorofluormethane, a common refrigerant, was detected in two well samples at concentrations of 0.7 and 0.9 μg/l. Halogenated VOCs were not detected in the trip blank.

Evaluation of quality assurance/quality control data indicated that the data are accurate and precise (Table 1). The data also met the method-specified holding times. Overall completeness was 100 percent and exceeds the goals specified in the QAPP (*HLA, 1992b*).

The individual results of the sample analyses have been provided under separate cover to each of the respective well owners.

2.2 Work Planned for Next Reporting Period

Wells with concentrations of perc above the analytical detection limit but below the MCL of 5 μg/l will be sampled on a quarterly basis. Sampling activities for the fourth quarter of 1993 are currently scheduled for November 16, 1993.

Connections to water mains will continue during the next reporting period until all connections are completed for properties whose owners have provided written authorization to VW&R. Phone enquiries will be made to property owners whose property is located within the Affected Area but have not responded to VW&R's offer to connect them to the BWC water system. Reimbursement for one year of BWC water utility costs continues for west Boise residents as requests are received by VW&R.

3.0 PRELIMINARY STUDY AREA ORDER

3.1 Work Conducted During the Reporting Period

3.1.1 Soil Boring SAP

A revised draft Soil Boring SAP was submitted to the Department on July 22, 1993 (*HLA, 1993f*). The Soil Boring SAP described the soil boring and well installation activities planned in the Affected Area. The purpose of the proposed soil boring activities is to gather data to assist in the characterization of hydrogeologic conditions at the distal end of the Affected Area and to provide information about the vertical distribution of perc. The scope of work includes: (1) drilling a pilot boring and collecting groundwater samples to evaluate the vertical distribution of perc at the northwest (downgradient) end of the Affected Area, (2) completing the boring as a monitoring/extraction well, (3) using the data from the pilot boring to assist in installation of an additional nearby monitoring/extraction well, (4) drilling a boring between the Affected Area and the Bali Hai community well, and collecting groundwater samples from the boring to evaluate the vertical distribution of perc, (5) completing the boring as a monitoring well, (6) collecting groundwater samples from the wells, and (7) evaluating the data.

In a letter to the Department dated August 5, 1993, VW&R stated that the monitoring well construction details would be revised in the final Soil Boring SAP such that a 4-inch diameter monitoring well would be constructed (*VW&R, 1993*). The final depth of the well and the screened interval will be determined in the field based on results of chemical profiling. Grab water samples will be collected at 10-foot intervals during drilling of the borehole and analyzed for halogenated VOCs on an expedited turnaround basis.

A final Soil Boring SAP incorporating all changes was submitted to the Department on August 13, 1993 (*HLA, 1993i*). The Department approved the final Soil Boring SAP in a letter to VW&R, dated September 1, 1993 (*Department, 1993c*).

3.1.2 South Slough Sampling

The South Slough sampling was conducted on July 1, 1993, by HLA and VW&R. The scope of work for the surface water sampling was originally presented in the *Groundwater and Surface Water Sampling and Analysis Plan, Preliminary Study Area, Boise, Idaho* dated January 4, 1993 (GW/SW SAP). The scope consisted of measuring slough flow rates, calculating water volumes, and collecting and analyzing water samples from seven stations located along the South Slough (Table 2). These stations correspond to sampling points identified in the GW/SW SAP (*HLA, 1993a*). Water samples were collected from mid-stream at each station, upgradient of the Westpark discharge pipe (upgradient of Station 1) and from the Ridenbaugh Canal at the South Slough. Samples were transported via overnight courier to ATI and analyzed for halogenated VOCs using EPA Test Method 8010. The results of the sampling were submitted to the Department in a letter dated August 3, 1993 (*HLA, 1993g*).

Flow volumes calculated for each station using both the July 1993 and April 1992 data are presented in Table 2. As shown in Table 2, July 1993 data indicates that the total discharge at each measurement station along the slough increased from the most upgradient station (Station 1) to the farthest downgradient station (Station 7), thus indicating a gaining slough throughout the length measured. The increased discharge along the length of the slough was likely due to contributions from surface water bodies such as the Ridenbaugh Canal in the vicinity of Station 3, other surface water sources along the South Slough, and groundwater discharge to the slough. The April 1992 data

shows much lower flow rates, as would be expected during the winter/spring prior to commencement of the irrigation season. The April 1992 data shows that the slough is losing water between Stations 4 and 5, 6 and 7, and 7 and 8.

The analytical results for the water samples collected during April 1992 and analytical results collected during the July 1993 sampling events are presented in Table 1. Analytical results for July 1993 indicated that perc was detected in samples collected from every station identified in the GW/SW SAP at concentrations ranging from 0.8 to 4.8 μg/l. Halogenated VOCs (including perc) were not detected in the samples collected upgradient of Station 1 and from the Ridenbaugh Canal. The highest concentration of perc was detected in the sample collected from Station 3, directly downgradient of the South Slough intersection with the Ridenbaugh Canal. Concentrations generally decreased downgradient of Station 3. The sample collected from Station 1 (at the Westpark air stripper discharge) contained 1.5 μg/l perc. The water sample collected from the groundwater seep (Station 2) contained perc at a concentration of 0.8 μg/l. Perc concentrations detected in samples collected during April 1992 were similar to those collected in July 1993.

Based on data collected during the surface water sampling activities during both April 1992 and July 1993, it appears that water containing low levels of dissolved perc is entering the slough via Westpark's air stripper discharge pipe and groundwater between Stations 2 and 4.

3.2 Work Planned for the Next Reporting Period

The soil boring program will commence during the Fall of 1993 and is dependent on subcontractor availability and access negotiations with property owners. Following

completion of the soil boring program, a Geophysical SAP is scheduled to be submitted to the Department.

4.0 BOISE MALL ORDER

4.1 Work Conducted During the Reporting Period

The following activities were conducted during the reporting period:

- Submitting a final Monitoring Well SAP
- Submitting a letter responding to the Department comments on the Asymptotic Protocol originally submitted on June 17, 1993
- Conducting a conference call with the Department to further discuss the Asymptotic Protocol
- Obtaining approval from two approved disposal facilities to accept spent carbon
- Collecting air quality samples from the soil vapor extraction system influent, effluent, and three vapor monitoring wells
- Monitoring the soil vapor extraction system.

4.1.1 Monitoring Well SAP

A draft Monitoring Well SAP was submitted to the Department on June 17, 1993, (*HLA. 1993c*). The SAP described monitoring/extraction well installation activities planned at the Mall. The purpose of the planned investigation is to provide hydrogeologic data for the Site and to confirm that the vertical distribution of perc and perc compounds is limited to the upper 70 feet of the shallow aquifer. The Department responded in a letter dated July 9, 1993 (*Department, 1993a*) that granted approval for the installation of the upgradient monitoring well and one monitoring/extraction well at the former perc tank location at the Pier 1 Imports store. The rationale was that an aquifer test would be conducted so that site specific hydrogeologic data can be used for optimal placement of other proposed monitoring/extraction wells. A final Monitoring Well SAP dated July 20, 1993, was subsequently submitted to the Department (*HLA. 1993e*). One monitoring/extraction well is proposed for installation at the former perc tank location. Initially, this well will be used for monitoring purposes but will be

constructed such that it can be converted to a groundwater extraction well for evaluation of aquifer parameters and/or interim remedial actions, if warranted. Additionally, one upgradient, offsite monitoring well is proposed.

4.1.2 Asymptotic Protocol

A draft Asymptotic Protocol was submitted to the Department on June 17, 1993 (*HLA, 1993*d). The Asymptotic Protocol describes the statistical approach proposed for identifying and calculating when an asymptotic limit for regulated chemicals has been attained in groundwater during groundwater remediation at the Mall. Comments on the Asymptotic Protocol were received from the Department in a letter dated July 15, 1993 (*Department 1993b*). HLA and VW&R responded to the Department's comments in a letter dated August 9, 1993 (*HLA, 1993h*). On September 8, 1993, a conference call was held between HLA, VW&R, and the Department to discuss outstanding issues regarding the Asymptotic Protocol. In the conference call it was agreed that the protocol would be revised to reflect that (1) the Mann-Kendall approach is appropriate to determine the presence of an initial trend, (2) a Remedial Action Implementation and Monitoring Plan will be developed that describes data collection methodologies and frequencies adequate to support either a parametric or nonparametric approach, and (3) a review of the analytical data collected during groundwater remedial activities will be conducted to ascertain if a parametric or nonparametric approach is more suited for evaluation of the occurrence of an asymptote. Further discussion will be held with the Department upon completion of the data review.

4.1.3 Soil Vapor Extraction System

The soil vapor extraction system was temporarily shut down on May 26, 1993, because the carbon disposal facility informed VW&R that it could not accept additional

shipments of spent carbon. VW&R immediately initiated investigative activities to identify a facility capable of handling the spent carbon. Approval has been obtained from two disposal facilities, a primary facility and a secondary facility, to accept spent carbon. The SVE system was restarted in September 1993. To date, over 1,200 pounds of perc have been removed from the subsurface.

Air quality samples were collected from the soil vapor extraction system influent, effluent, and the three vapor monitoring wells on August 31, 1993. The samples were submitted to Data Chem Laboratory, Salt Lake City, Utah. Results will be submitted to the Department upon receipt of the analytical data from the laboratory. Daily readings of the influent, effluent, mid-stream, and the three vapor monitoring wells continue to be made while the system is operating.

4.2 Work Planned for the Next Reporting Period

The Asymptotic Protocol is scheduled to be finalized and submitted to the Department by October 8, 1993. The monitoring/extraction wells will be installed during the fall of 1993; the exact schedule is dependent on subcontractor availability and access negotiations. The SVE system will be operated as designed and as specified in the operating permit.

5.0 SCHEDULE

A schedule for the Mall and PSA Order activities is shown in Table 3. Activities to be conducted next quarter are highlighted.

6.0 REFERENCES

Harding Lawson Associates, 1992a. *Exhibit 3, Work Plan, Boise Towne Square Mall Supplemental Investigation and Final Remediation, Boise, Idaho.* September 8.

_____, 1992b. *Quality Assurance Project Plan, Boise Mall and Preliminary Study Area Work Plans, Boise, Idaho.* November 2.

_____, 1993a. *Groundwater and Surface Water Sampling and Analysis Plan, Preliminary Study Area, Boise, Idaho.* January 4.

_____, 1993b. *Affected Area, Boise Idaho.* Letter to Ron Lane, Idaho Department of Health and Welfare Division of Environmental Quality. March 24.

_____, 1993c. *Draft Monitoring Well Sampling and Analysis Plan, Boise Towne Square Mall Order, Boise, Idaho.* June 16.

_____, 1993d. *Statistical Approach, Boise Mall Order, Boise, Idaho.* Letter to Ron Lane, Idaho Department of Health and Welfare Division of Environmental Quality. June 17.

_____, 1993e. *Monitoring Well Sampling and Analysis Plan, Boise Towne Square Mall Order, Boise, Idaho.* July 20.

_____, 1993f. *Revised Draft Soil Boring Sampling and Analysis Plan, Preliminary Study Area Order, Boise, Idaho.* July 22.

_____, 1993g. *South Slough Seepage Study and Sampling, Preliminary Study Area, Boise, Idaho.* Letter to Ron Lane, Idaho Department of Health and Welfare, Division of Environmental Quality. August 3.

_____, 1993h. Response to Comments Letter to Ron Lane, Idaho Department of Health and Welfare, Division of Environmental Quality. August 9.

_____, 1993i. *Soil Boring Sampling and Analysis Plan, Preliminary Study Area, Boise, Idaho.* August 13.

Idaho Department of Health and Welfare Division of Environmental Quality (Department), 1993a. Letter to Mike Gaudette, VW&R. July 9.

_____, 1993b. Letter to Michelle Beekman, Harding Lawson Associates. July 15.

_____, 1993c. Letter to Mike Gaudette, Van Water & Rogers Inc. September 1.

Van Waters & Rogers Inc., 1993. Letter to Ron Lane, Idaho Department of Health and Welfare, Division of Environmental Quality. August 5.

TABLES

Table 1. Quality Assurance Summary
Quarterly Sampling
Quarterly Progress Report, July-September 1993
Boise, Idaho

Quality Control Sample	Acceptance Criterion[1]	Number of Analyses	Number of Analyses within Acceptance Criterion	Percent of Analyses Within Acceptance
FIELD				
Field blank	No compounds detected	--	--	--
Trip blank	No compounds detected	29	29	100%
Field duplicate	≤100% RPD	58	58	100%
LABORATORY				
Method Blank	No compounds detected	58	58	100%
Matrix Spike	60-150%	12	12	100%
Matrix Spike duplicate	60-150%	6	6	100%
Surrogate Spike recovery	70-130%	20	20	100%
Surrogate Spike recovery duplicate	70-130%	2	2	100%

Overall Completeness: $\frac{185}{185} \times 100 = 100\%$

1 Acceptance criterion specified in the QAPP (*HLA. 1992b*)

Table 2. South Slough Sampling Results
July - September 1993 Quarterly Progress Report
Boise, Idaho

Station Number	Location	Sample Date	Sample Number	Perc Concen-tration (ug/l)	Total Discharge (cfs)	Comments
1	Downgradient of Westpark discharge	4/7/92	SS-11	1.85	0.28	
		7/1/93	93070101	1.5	0.83	
2	South Slough at Emerald	4/7/92	SS-9	0.67	0.36	Gaining
		7/1/93	93070103	0.8	1.02	Gaining
3	South Slough at Ridenbaugh Canal	4/7/92	SS-5	6.89	0.39	Gaining
		7/1/93	93070104	4.8	11.07	Gaining
4	South Slough at Maple Grove	4/7/92	SS-4	6.29	0.6	Gaining
		7/1/93	93070106	3.5	14.55	Gaining
5	South Slough at Irving	4/7/92	SS-3	4.11	0.14	Losing
		7/1/93	93070107	1.1	48.47	Gaining
6	South Slough at Kimball	4/7/92	SS-2	1.39	0.26	Gaining
		7/1/93	93070108	1.0	51.1	Gaining
7	South Slough at Mitchell	4/7/92	SS-1	0.81	0.2	Losing
		7/1/93	93070109	1.0	55.44	Gaining
8	South Slough at Fairview	4/7/92	SS-12	0.35	0.13	Losing
		7/1/93	NS	NS	NM	
NA	Upgradient of Westpark discharge	7/1/93	93070102	<0.2	NM	
NA	Ridenbaugh Canal at S. Slough	7/1/93	93070105	<0.2	NM	
NA	Trip Blank	4/7/92	SS-8	ND	NA	
		7/1/93	93070110	<0.2	NA	

ug/l = micrograms per liter
NA = Not applicable
NM = Not measured
NS = Not sampled
cfs = cubic feet per second
ND = Not detected (unspecified detection limit)

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BOISE, IDAHO
September 16, 1993

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