

QUARTERLY REPORT

FOR JULY THROUGH SEPTEMBER 1994

OPERABLE UNIT 2
IM/IRA SURFACE WATER
FIELD TREATABILITY UNIT

PREPARED BY



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Page 1 of 14
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Table of Contents

	<u>Page</u>
1.0 Introduction	3
2.0 Treatment Facility Performance	3
2.1 Quantity of Water Treated	3
2.2 Chemical Usage	6
2.3 Waste Generation	6
2.4 Operating Costs	7
2.5 Power	10
2.6 Preventative Maintenance	10
2.7 Periods of Non-Collection	10
3.0 Sampling	10
3.1 Sampling Objectives	10
3.2.1 Untreated Influent Water from SW59	11
3.2.2 Surface Water Location SW61	11
3.2.3 Surface Water Location SW132	12
3.3 RS-5 (Treated Effluent from Microfiltration (Prior to GAC))	12
3.4 RS-6 (Lead GAC effluent)	12
3.5 RS-7 (Treated Effluent)	13
3.6 RS-8 (Sludge)	13
4.0 Operations Summary	13
5.0 Environmental Compliance	13
6.0 Reports/Correspondence	13
7.0 Anticipated Operations for Next Quarter	13
8.0 Summary/Conclusions	14

Quarterly Operations Report for July Through September 1994
for the
Operable Unit No. 2 IM/IRA Field Treatability Unit

1.0 INTRODUCTION

This report covers operations at the Operable Unit Number 2 (OU-2) Field Treatability Unit (FTU) for the third quarter of 1994.

The FTU began operations as an Interim Measure/Interim Remedial Action (IM/IRA) under the Plan released by the Department of Energy (DOE) on May 8, 1991. The FTU began operation as Phase I for treatment of surface water from a portion of the South Walnut Creek drainage at OU-2 for removal of volatile organic compounds (VOCs) of concern. The Phase I system consisted of collection facilities at Surface Water locations SW59 and SW61, equalization tankage, bag pre-filters, Granular Activated Carbon (GAC) treatment units and insulated, heat traced transfer piping, pumps, and controls. Phase I was conducted between May 13, 1991 and April 27, 1992, at which time the Radionuclides Removal System (RRS) and collection of SW132 was implemented under the Phase II program. The RRS added provisions for treatment of radionuclides and metals by pH adjustment, chemical precipitation and cross-flow membrane filtration. The RRS replaced bag pre-filters as pretreatment to the GAC system. Detailed descriptions of the FTU and its operation can be found in the IM/IRAP (Interim Measure/Interim Remedial Action Plan), the Sampling and Analysis Plan (SAP), and related documentation. The Field Treatability Study, Phase II (March 1994) for the South Walnut Creek Basin Surface Water Interim Measure/Interim Remedial Action report contains a detailed operating history of the FTU prior to this reporting period. The Environmental Protection Agency (EPA) and Colorado Department of Public Health and the Environment (CDPHE) authorized discontinuation of collection of two of the three surface water stations, SW61 and SW132 on April 24, 1994.

2.0 TREATMENT FACILITY PERFORMANCE

2.1 QUANTITY OF WATER TREATED

A total of 28,100 gallons of water were treated at the FTU during this reporting period.

The FTU was designed to collect surface water from three sources; SW59, SW61, and SW132. Collection occurs twenty four hours per day, 375 days per year, except for periods discussed in Section 2.7. Collected water is stored in a ten thousand gallon double walled equalization tank until enough water is present to justify initiating a batch treatment.

Collection of SW61 and SW132 was discontinued on May 6, 1994, after the EPA and CDPHE concurred with DOE's request to discontinue collection and treatment of these sources. While previous sampling has shown contamination at the two sites below Applicable or Relevant and Appropriate Requirement (ARAR) levels, the two sources will continue to be sampled to verify that no increase in contamination is present. Quarterly sample data for SW61 and SW132 will be presented in this report and future quarterly reports. Table 1 contains ARARs for the OU-2 FTU.

The significant reduction in the volume of treated water at the FTU is presented in Graph 1. Graph 1 also indicates the excess capacity available at the facility since collection and treatment of SW61 and SW132 is no longer required.

GRAPH 1

Treated Water/Month

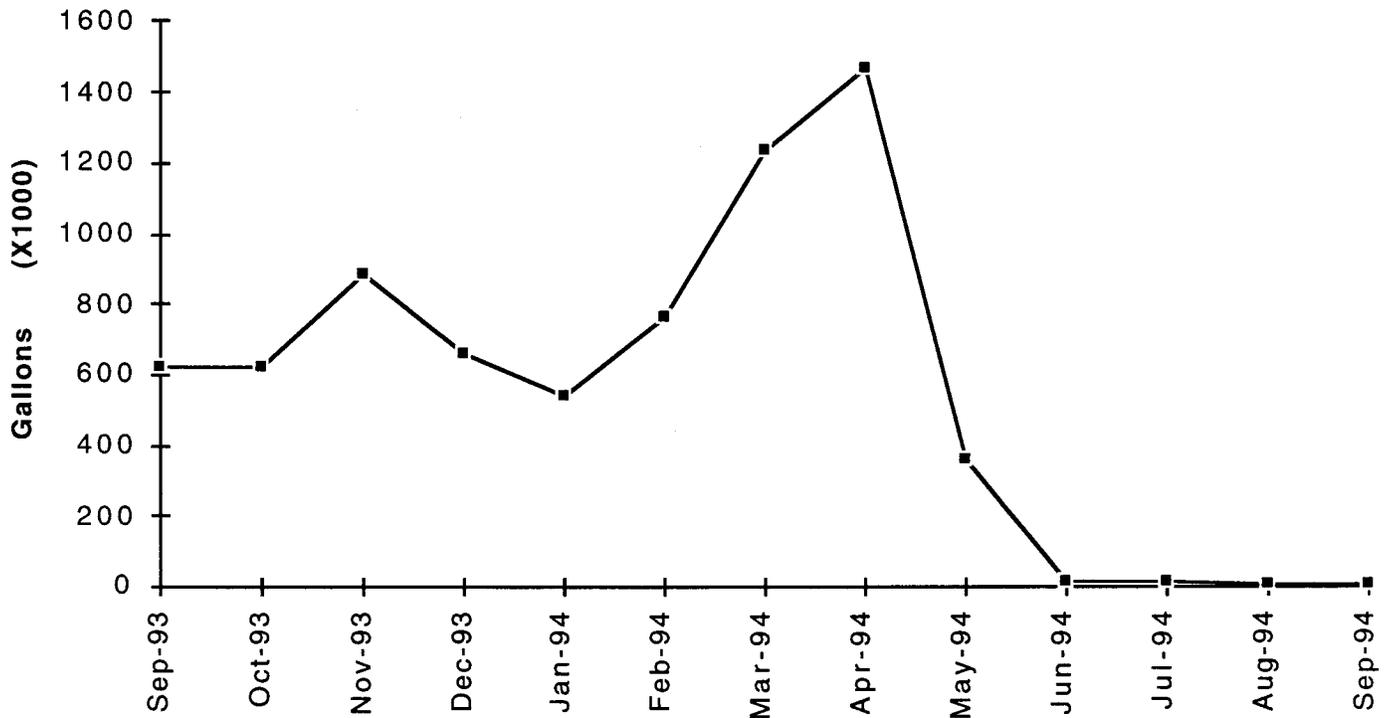


TABLE 1
Surface Water Contaminants
Identified in the South Walnut Creek Basin IM/IRAP^{1,2}

<u>Analyte</u>	<u>Unit</u>	<u>Average Concentration</u>	<u>ARAR</u>
Radionuclides			
Am-241	pCi/l	0.53	0.05
Gross alpha	pCi/l	730.00	11.00
Gross beta	pCi/l	545.00	19.00
PU-239/240	pCi/l	3.28	0.05
U-total	pCi/l	11.69	10.00
VOCs³			
1,1-Dichloroethene	µg/l	142	7.00
Carbon Tetrachloride	µg/l	219	5.00
Chloroform	µg/l	82	1.00
Tetrachloroethene	µg/l	279	1.00
Trichloroethene	µg/l	153	5.00
Vinyl Chloride	µg/l	-	2.00
Metals-Dissolved			
Iron	µg/l	-	300.00
Manganese	µg/l	0.5790	50.00
Metals-Total			
Aluminum	µg/l	25.1214	200.00
Arsenic	µg/l	-	50.00
Barium	µg/l	1.8530	1,000.
Beryllium	µg/l	0.0519	100.00
Cadmium	µg/l	0.0132	5.00
Chromium	µg/l	0.1918	10.00
Copper	µg/l	0.2664	25.00
Iron	µg/l	183.964	1,000.
Lead	µg/l	0.1954	5.00
Manganese	µg/l	3.3068	1,000.
Mercury	µg/l	0.0022	0.20
Nickel	µg/l	0.2239	40.00
Selenium	µg/l	0.0070	10.00
<u>Zinc</u>	<u>µg/l</u>	1.3475	50.00

1 From the IM/IRAP (DOE, 1991).

2 Only analytes with ARARs are presented.

3 Analyzed by EPA Method 524.2.

- Not calculated in the IM/IRAP.

The volume of water collected for treatment during this reporting period was as follows:

	<u>Location</u>	<u>Month Total</u>	<u>Daily Average</u>	<u>Gallons per Min.</u>
July	SW59	12,983 gal	419 gal	0.29
	SW61,132	0 gal	0 gal	0
August	SW59	7,272 gal	235 gal	0.16
	SW61,132	0 gal	0 gal	0
September	SW59	7,845 gal	262 gal	0.18
	SW61,132	0 gal	0 gal	0

2.2 CHEMICAL USAGE

Chemical usage at the FTU was as follows:

<u>Month</u>	<u>Sulfuric Acid</u>	<u>Calcium Hydroxide</u>	<u>Ferric Sulfate</u>	<u>H₂O₂</u>	<u>Sodium Hydrox.</u>
July	0 gallons	25 lbs	0 lbs	30 gallons	0 gallons
August	32 gallons	39 lbs	0 lbs	15 gallons	0 gallons
September	0 gallons	0 lbs	0 lbs	0 gallons	0 gallons

Note: Several chemicals are recorded as 0 gallons or pounds due to the small volume of water processed. These chemicals were used at normal concentrations, but preparation of chemical solutions for treatment was not required during the month.

2.3 WASTE GENERATION

No waste was packaged during this reporting quarter. A small amount of sludge was generated as a result of treating the 28,100 gallons of water, however it was not enough to require waste packaging during this reporting period.

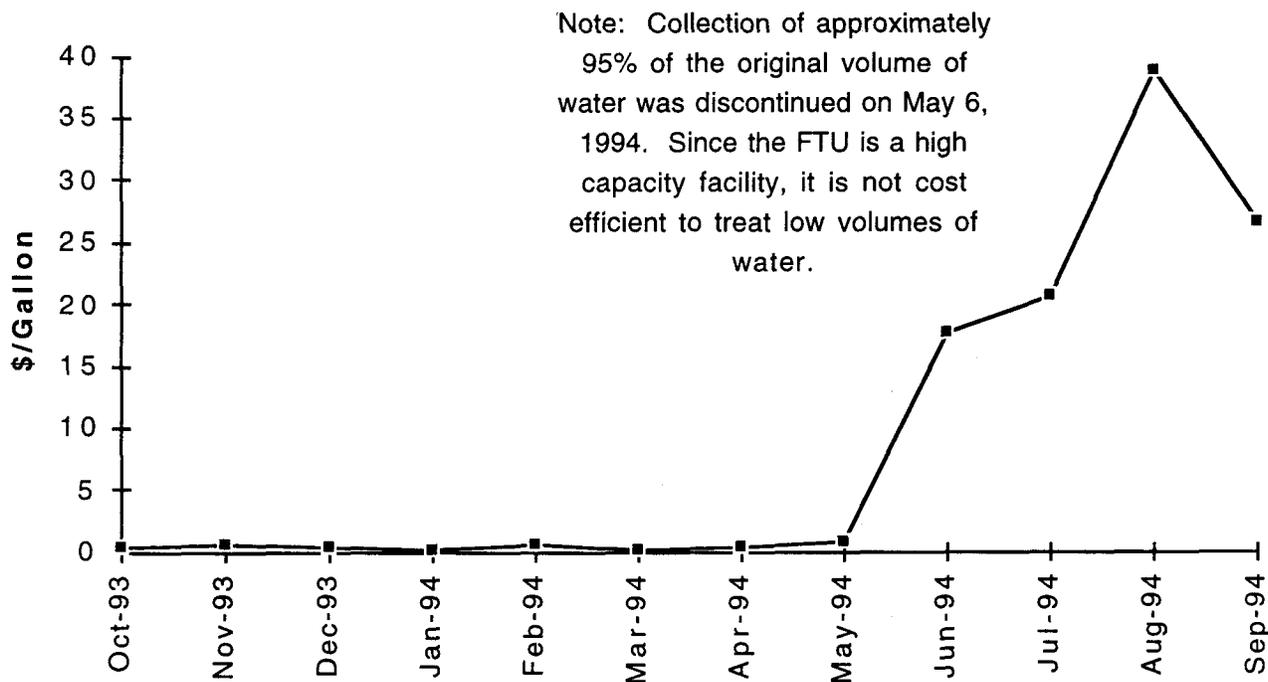
Two 55-gallon bags of used Personnel Protective Equipment (PPE) were generated during this quarter. The PPE is monitored for contaminants, and if determined clean for unrestricted release, sent to the Rocky Flats Plant Landfill for disposal. To date, no PPE has been found to be contaminated.

2.4 OPERATING COSTS

The reduced volume of water that is collected and treated at the FTU has resulted in cost savings for sampling and chemical supplies. Modifications to reduce the subcontract started soon after collection and treatment of SW61 and SW132 was discontinued, and was fully implemented in early October, 1994. Even after further reductions are made, the FTU will still be extremely expensive to operate since it is designed to treat higher volumes of water. The cost/gallon of treated water for the 1994 Fiscal Year at the FTU is presented in Graph 2, below. These costs include subcontract labor and operations costs, capital improvements (permanent power installation), Plant Support, and Project Management. A significant increase in treatment costs/gallon of treated water can be attributed to the reduction in treated water.

GRAPH 2

FTU Cost/Gallon for FY94 (Oct. 93 thru Sept. 94)

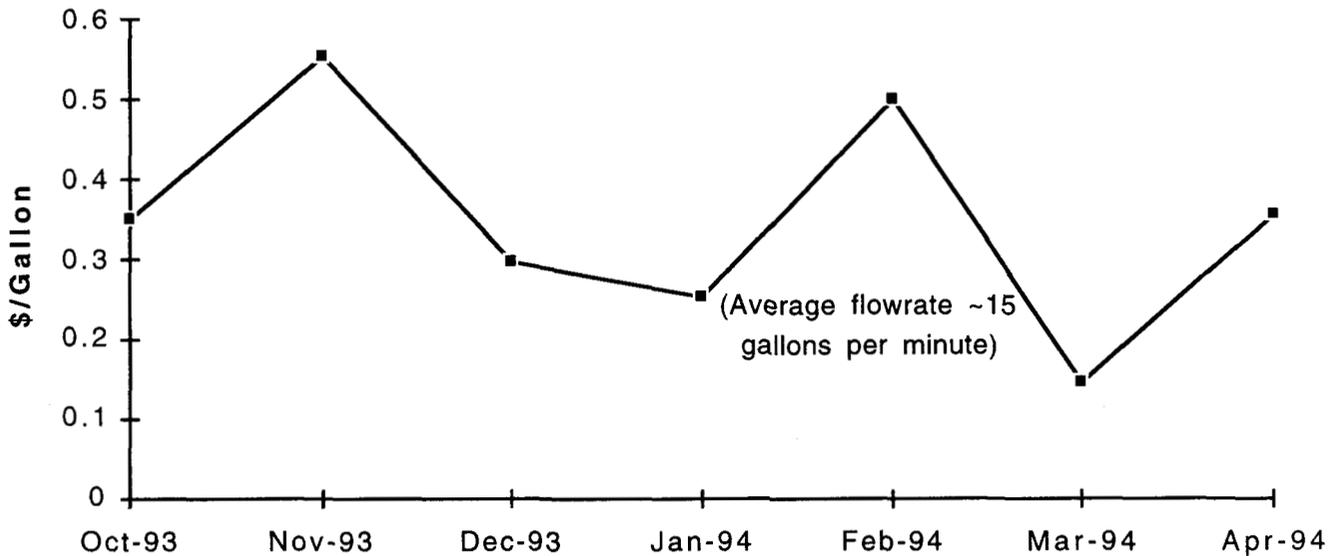


The large increase in treatment cost can be attributed to the reduction of SW61 and SW132. Operations at the FTU are being cut back as much as possible (operations will be reduced from 24 hour/day, 7 days/week, to a 40 hour week), however, the cost/gallon to treat water cannot be reduced to the higher volume treatment costs (see Graph 3, FTU Cost/Gallon to Treat High Water Volumes). Monitoring of the tanks and piping that contain the untreated water cannot be

eliminated, and preventive maintenance must be performed in order to keep the facility operational. Project Management is being reduced by approximately 50% to help reduce operations costs. Graph 4 (next page), FTU Cost/Gallon to Treat Low Water Volumes, details the significant cost/gallon to treat the low flow from SW-59 at the FTU.

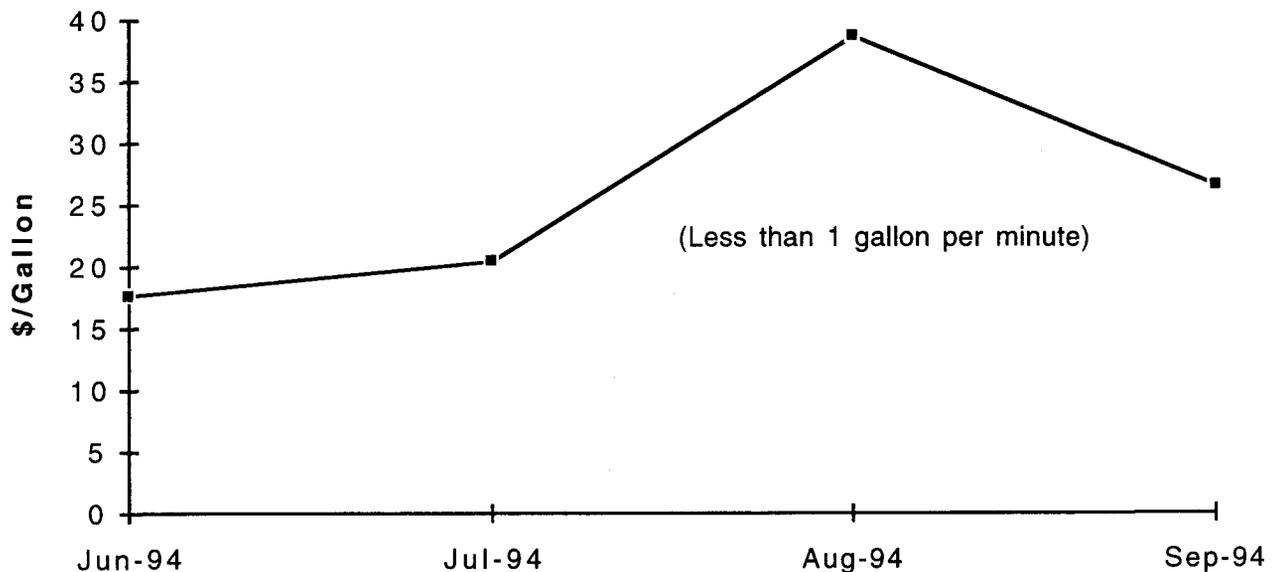
GRAPH 3

**FTU Cost/Gallon to Treat High Water Volumes
(SW59, 61, and 132)**



GRAPH 4

FTU Cost/Gallon to Treat Low Water Volumes (SW59 Only)



Monthly operating costs for *subcontractor labor and supplies* (including chemicals) were as follows:

July:	\$64,746
August:	\$55,150
September:	\$44,755

Total monthly operating costs (burdened support labor, subcontract costs, equipment, and sampling) for the FTU are presented below:

July:	\$267,400
August:	\$282,638
September:	\$209,246

The increased cost per gallon rate (only treating SW59) at the OU-2 FTU justifies treating the water in a different manner. EG&G Rocky Flats has proposed to consolidate the OU-2 FTU and OU-1's Building 891 water treatment facilities. If permission is granted to discontinue collection and treatment of the 881 Footing Drain, OU-1 will have excess capacity and increased treatment costs similar to that of the FTU. By consolidating the two facilities, treatment costs

will be reduced, and secondary waste production will be minimized. SW59 water can be treated at Building 891 without generating any low level mixed waste, unlike the present method being used to treat it (the FTU). Any additional sources of water (non-RCRA) that can be treated at the new facility will help reduce the cost/gallon to treat the water.

2.5 POWER

Permanent overhead power replaced diesel power generation on July 8, 1994.

Backup power is provided to the FTU from a portable diesel generator that is wired into the power grid through a transfer switch. In the event of a power failure, the diesel generator will provide 100% of the power required to operate the facility.

2.6 PREVENTIVE MAINTENANCE

During this reporting period a rigorous preventive maintenance program monitored all process equipment at the FTU. All process equipment at the FTU has been characterized and evaluated for preventive maintenance frequency, spare parts requirements, and impacts on the system from individual equipment failure. A preventive maintenance computer program tracks all planned maintenance activities and helps to assure that all equipment is properly maintained.

All corrective and preventive maintenance items are complete and on schedule.

2.7 PERIODS OF NON-COLLECTION

Periods of non-collection are periods when the collection weir pumps cannot collect surface water (up to 60 gallons per minute) and transfer it to the equalization tank for storage and later treatment.

No periods of non-collection have occurred since collection of SW-61 and SW-132 was discontinued on May 6, 1994.

3.0 SAMPLING

3.1 SAMPLING OBJECTIVES

Sampling at the FTU is performed to characterize the influent surface water, wastes, and effluent water, and to optimize FTU operations to minimize chemical consumption and waste generation. The IM/IRA identified specific contaminants of concern and established possible chemical-specific ARARs as effluent standards for discharge of the treated water (ref. Table 1, page 5).

Sample results contained in this report are unvalidated, and are presented to provide a general scope of the contaminants treated at the facility. Additionally, radionuclide data turnaround time is significantly longer than that of VOC or metals. The radionuclide data that is presented is for July only. August and September radionuclide data was not available during preparation of this report.

Unvalidated sample results showing contaminants exceeding ARARs for this quarter are presented below, as well as contaminants not associated with ARARs that are present in the water stream above detection levels.

Due to the decrease in the volume of collected and treated water, sampling at the FTU has been reduced significantly. Treated effluent (sample location RS-7) is sampled during each treatment cycle.

Surface Water Division continues to characterize the three sampling locations (SW59, SW61, and SW132) associated with the FTU. Analytical results will be presented in quarterly reports for the facility.

3.2.1 UNTREATED INFLUENT WATER FROM SW59

Chemical	Units	High	Average¹	ARAR
VOCs				
1,1-Dichloroethane	ug/l	2	2	-
1,1-Dichloroethene	ug/l	4	3.4	7.00
1,1,1-Trichloroethane	ug/l	8	6.4	-
Carbon Tetrachloride	ug/l	140	118	5.00
Chloroform	ug/l	24	21	1.00
Tetrachloroethene	ug/l	54	44	1.00
Trichloroethene	ug/l	64	50	5.00
cis-1,2-Dichloroethene	ug/l	64	51	-

- indicates no ARAR established for particular chemical.

¹ Average value calculated by taking all values (for non-detect, 1/2 the detection limit was used) and dividing by the number of samples.

Metals	Units	High	Average¹	ARAR
Aluminum	ug/l	4400 (one detection)		200
Iron	ug/l	1930 (one detection)		1000
Zinc	ug/l	282	199	50.0

¹ Average value calculated by taking all values (for non-detect, 1/2 the detection limit was used) and dividing by the number of samples.

Radionuclides

Reported radionuclide data for this quarter represents sample data from July 1994 only. The only radionuclide that exceeded an ARAR at SW59 was on July 21, 1994, when gross alpha was detected at 12 +/- 2 pCi/L. The associated ARAR for gross alpha is 11 pCi/L.

3.2.2 SURFACE WATER LOCATION SW61

The only chemical that exceeded ARAR's at SW61 was vinyl chloride, which was detected at 5 ug/l (ARAR=2 ug/l) on July 14, 1994. While Cis-1,2-Dichloroethene averaged 12.7 ug/l, there is no associated ARAR for this chemical.

<u>Metals</u>	<u>Units</u>	<u>High</u>	<u>Average</u> ¹	<u>ARAR</u>
Aluminum	ug/l	282	147	200
Zinc	ug/l	75.8	(one detection)	50

¹ Average value calculated by taking all values (for non-detect, 1/2 the detection limit was used) and dividing by the number of samples.

Radionuclides

Reported radionuclide data for this quarter represents sample data from July 1994 only. No radionuclide ARARs were exceeded during this time at SW61.

3.2.3 SURFACE WATER LOCATION SW132

No VOCs exceeded ARARs at SW132 during this reporting period. Cis-1,2-Dichloroethene averaged 2 ug/l at SW132. SW132 is directly downstream of SW61, which averaged 12.7 ug/l Cis-1,2-Dichloroethene.

<u>Metals</u>	<u>Units</u>	<u>High</u>	<u>Average</u> ¹	<u>ARAR</u>
Aluminum	ug/l	2000	452	200
Iron	ug/l	1280	(one detection)	1000
Zinc	ug/l	209	90	50

Radionuclides

Reported radionuclide data for this quarter represents sample data from July 1994 only. No radionuclide ARARs were exceeded during this time at SW61.

3.3 RS-5 (TREATED EFFLUENT FROM CHEMICAL PRECIPITATION/MICROFILTRATION PRIOR TO GAC)

Due to the low volume of treated water, no samples were collected from this location.

3.4 RS-6 (LEAD GAC EFFLUENT)

Due to the low volume of treated water, no samples were collected from this location.

3.5 RS-7 (TREATED EFFLUENT)

No ARAR values were exceeded at this location.

3.6 RS-8 (SLUDGE)

No sludge was packaged during this reporting period.

4.0 OPERATIONS SUMMARY

A representative from the Colorado Department of Public Health and Environment collected split samples with the FTU subcontractor at sample location RS-7 (Treated Effluent).

Inspected and tested the freeze protection systems to ensure the facility is ready for winter.

5.0 ENVIRONMENTAL COMPLIANCE

No spills or releases to the atmosphere, secondary containment, or environment occurred during this reporting period.

6.0 REPORTS/CORRESPONDENCE

During this reporting period, the following significant reports and/or documents that pertained to the OU-2 FTU were generated:

- Letter from W. S. Busby (EG&G) to S. R. Grace (DOE/RFFO) dated September 7, 1994, entitled "Operable Unit No. 2 (OU-2) Field Treatability Unit (FTU) Staff and Sampling Reductions". Correspondence No. 94-RF-09280.

7.0 ANTICIPATED OPERATIONS FOR NEXT QUARTER

Normal operations are expected to continue next quarter, with no expected shutdowns or periods of non-collection.

Extracted groundwater from the Soil Vapor Extraction project may be treated at the FTU.

Modifications will be made to the sampling and analysis plan for the FTU. A net reduction in samples, along with onsite analysis of other samples will result in a significant cost savings.

A modification to the current operations and maintenance subcontractor's contract will be made to significantly reduce the operations cost at the facility. Hours of operation will be reduced from 24-hours per day, seven days per week to 40-hours per week. Collection of SW59 will continue 24-hours per day, seven days per week.

Purge water collected from contaminated wells may be treated at the FTU. All purge water will be sampled to determine the best facility to treat the water. Possibilities for treatment include the OU-1 IM/IRA (Bldg. 891), OU-2 IM/IRA FTU, 374 Evaporator, and the Sewage Treatment Plant. Each facility is limited by certain contaminants, so sampling would determine the final destination.

Plans will be made to transport the Phase II spent GAC offsite for reactivation.

Work will begin to consolidate the OU-1 and OU-2 FTU water treatment facilities.

Sludge drums will be inspected and prepared for offsite disposal at Envirocare, a permitted low-level mixed waste disposal facility in Utah.

Sampling and characterization of SW59, SW61, and SW132 will continue.

A double walled storage tank will be installed adjacent to SW59 to allow for storage of water during periods when the site is unattended, and to allow for tanker transfer activities if SW59 is transferred to another site for treatment.

8.0 SUMMARY/CONCLUSIONS

The OU-2 FTU continues to collect and treat contaminated surface water from SW59 24-hours per day, 375-days per year.

Due to the increased treatment costs, alternative treatment methods for SW59 are being investigated.