

**QUARTERLY REPORT**  
**CONSOLIDATED WATER TREATMENT FACILITY**  
**FOR JANUARY THROUGH MARCH 1996**  
**INCLUDING OU1/OU2 DATA SUMMARY FOR**  
**OCTOBER THROUGH DECEMBER 1995**

**Rocky Mountain Remediation Services, L.L.C.**

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## 1.0 INTRODUCTION

### 1.1 HISTORICAL PERSPECTIVE - OU1

The Operable Unit No. 1 (OU1) Water Treatment Facility located in Building 891 began operation in April 1992. Building 891 has historically been used to treat the following waters:

- . Groundwater collected from the 881 Hillside area (the French Drain Sump and the Collection Well)
- . Water collected in the Building 881 Footing Drain (collection and treatment of this water was discontinued in September 1994)
- . The majority of the water collected at the Main Decontamination Facility
- . Some groundwater well purge water
- . Rain water/snow melt pumped from the Building 891 Truck Dock and Tank Farm

Water from the French Drain Sump is piped directly to one of the Building 891 influent storage tanks each operating day. The depth of water level in the French Drain Sump typically regenerates from about a 1-foot low (after pumping) to 4-6 feet (over a one day period). The water from the Collection Well is pumped into a trailer-mounted container each operating day, and the container is then transported to Building 891 for off-loading and treatment.

The water from the French Drain Sump and from the Collection Well is temporarily stored in one of two influent collection tanks prior to treatment. The water is then treated with an ultraviolet (UV) light/hydrogen peroxide system for the removal of volatile organic compounds (VOCs), and a four-step ion exchange (IX) system for the removal of uranium, total dissolved solids, hardness, alkalinity, anions, and selected metals.

After treatment, the water is stored in one of three effluent storage tanks until laboratory sample results are received to verify that the water chemistry meets OU1 Applicable or Relevant and Appropriate Requirements (ARARs) and is acceptable for discharge into the South Interceptor Ditch (SID).

### 1.2 HISTORICAL PERSPECTIVE - OU2

The Operable Unit No. 2 (OU2) Field Treatability Unit (FTU) Granular Activated Carbon Treatment Units (located in trailer T-900C) began operation in May, 1991, and the Radionuclides Removal System (located in trailers T-900A and T-900B) began operation in April 1992. The FTU was historically used to treat the following waters:

- . Surface water collected from Surface Water Stations SW-59, SW-61, and SW-132 (collection and treatment of water from SW-61 and SW-132 was discontinued on May 6, 1994)
- . Some of the water collected at the Main Decontamination Facility
- . Some groundwater well purge water
- . Rainwater collected from FTU trailer containments
- . Soil Vapor Extraction condensate water

Collected surface water was pumped directly from the surface water stations to Equalization Tank T-200 via a heat-traced pipeline. However in May 1995, because heavy rains interrupted power at the SW-59 weir and may have compromised the integrity of the pipeline, it became necessary to collect and transport water from SW-59 to T-200 using a trailer-mounted container. The use of the container for collection and transport will be discontinued as soon as construction of the double-walled storage tank adjacent to SW-59 is complete.

Collected surface water was stored in Equalization Tank T-200 until enough water was present to justify initiating a batch treatment. The water was then treated using pH adjustment, chemical precipitation, and cross-flow membrane filtration for the removal of radionuclides and metals, and GAC for the removal of VOCs. No effluent holding tank existed at OU2, and therefore treated effluent from the FTU was discharged directly to South Walnut Creek as it was processed. The last process run for the OU2 FTU trailers at the OU2 location was August 8, 1995, and the final reading on the OU2 FTU totalizer was 24,856,900 gallons of water treated.

### 1.3 CONSOLIDATED WATER TREATMENT FACILITY

During the January through March 1996 period, work continued on the consolidation of the OU1 and OU2 treatment facilities to create the Consolidated Water Treatment Facility (CWTF). The CWTF consists of the following specific unit operations:

- . Chemical precipitation (T-900A/T-900B)
- . Cross-flow membrane microfiltration (T-900A/T-900B)
- . Ultraviolet Light/Hydrogen Peroxide Oxidation (Bldg 891)
- . Granular Activated Carbon (Bldg 891)<sup>1</sup>
- . Ion Exchange (Bldg 891)

Highlights of the construction and subsequent operation of the CWTF are as follows:

- . August 18, 1995: The OU2 trailers T-900A and T-900B were relocated to the south side of Building 891 (the T-900C GAC trailer was not relocated).
- . September 18, 1995: The first day that OU2 SW-059 water, which is transported to the CWTF via trailer-mounted container, was treated in Building 891.
- . October 17, 1995: The OU2 Equalization Tank T-200 was relocated to the southeast corner of Building 891.
- . February 7, 1996: Acceptance at the CWTF of ER Accelerated Action Project water (water from the emptying and cleaning of Tanks T-2 and T-40).
- . February 27, 1996: Installation of the Granular Activated Carbon Unit in Building 891 complete.
- . February 29, 1996: Treatment of T-2 and T-40 water (ER Accelerated Action Project water) through the OU2 trailers chemical precipitation/microfiltration system.

The CWTF is expected to treat contaminated water from the following sources:

- . OU1 groundwater
- . OU2 surface water
- . Decontamination water from the Main Decontamination Facility
- . Decontamination water from the Protected Area Decontamination Facility
- . Other ER waters (e.g., purge water, water pumped from containments, etc.)
- . Waters from ER Accelerated Action Projects

The CWTF flowpath is flexible enough to allow waters to be treated through particular unit processes as necessary, and to allow for re-treatment if necessary. The consolidation of the OU1 and OU2 water treatment facilities has reduced waste generation and significantly reduced direct operating costs.

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<sup>1</sup>It was anticipated that the Consolidated Water Treatment Facility would also include cartridge filtration, however this project was canceled due to budget cuts.

## 2.0 CWTF OPERATIONS (JANUARY, FEBRUARY, MARCH 1996)

### 2.1 QUANTITIES OF WATER COLLECTED AND TREATED

Table 2-1 summarizes the quantities of water treated at the CWTF for the period January through March 1996. During this period the CWTF accepted water from the following sources:

- . OU1 French Drain Sump
- . OU1 Collection Well
- . OU2 Surface Water Station SW-59
- . Water from the emptying and cleaning of Tanks T-2 and T-40 (an ER Accelerated Action Project)
- . Snow melt pumped from CWTF containments.

As can be seen from Table 2-1, a total of approximately 109,886 gallons of water was treated through the Building 891 Ion Exchange Columns. Approximately 12,418 gallons of the total 109,886 gallons was treated through the Building 891 GAC Unit during the January through March 1996 period. In February 1996, approximately 8,220 gallons of water was treated through the OU2 trailers precipitation/microfiltration system. This 8,220 gallons was also part of the total 109,886 gallons treated through the Building 891 Ion Exchange Columns.

Please note that because the CWTF is equipped with three Influent Tanks, the amount of water treated may be less than or greater than the amount of water collected for any given period.

One CWTF Effluent Storage Tank was released to the SID during the January through March 1996 period (refer to Table 3-4 for a listing of the most recent discharges from CWTF Effluent Storage Tanks).

As of the end of March 1996, approximately 3,249,707 gallons of water has been processed through the Building 891 Ion Exchange Columns.

### 2.2 CHEMICAL USAGE

The following chemicals are utilized during wastewater treatment operations at the CWTF:

- . Building 891
  - Hydrogen peroxide (UV oxidation)
  - Hydrochloric acid (ion exchange regeneration and pH adjustment)
  - Sodium hydroxide (ion exchange regeneration)
- . T-900A/T-900B trailers
  - Sulfuric acid (pH adjustment: TK-1 and effluent; filter module chemical cleaning)
  - Calcium hydroxide (precipitation)
  - Ferric sulfate (precipitation)
  - Hydrogen peroxide (chemical cleaning of filter modules)
  - Sodium hydroxide (pH adjustment: TK-2)
  - Sodium hypochlorite (chemical cleaning of filter modules)

Table 2-2 summarizes the quantities of chemicals utilized during the period of January through March 1996.

**TABLE 2-1  
CONSOLIDATED WATER TREATMENT FACILITY  
APPROXIMATE QUANTITIES OF WATER COLLECTED AND PROCESSED a/**

| Month/Year         | Gallons Collected from the OU1 French Drain Sump b/ | Gallons Collected from the OU1 Collection Well b/ | Gallons Accepted at Bldg 891 from the MDF and Other Sources c/ | Gallons Pumped from Bldg. 891 Containments | Gallons Collected from the OU2 SW-59 d/ | Gallons Processed through T900A/T900B e/ | Gallons Processed through GAC at Bldg 891 | Gallons Processed through IX at Bldg 891 |
|--------------------|---|---|--|--|---|--|---|--|
| Jan-96             | 20,590  | 1,400   | 4,500 l/   | 2,421                                      | 5,840                                   | 0  | 0   | 36,925                                   |
| Feb-96             | 21,224  | 1,420   | 8731 g/  | 500  | 5,765                                   | 8,220                                    | 0   | 27,363                                   |
| Mar-96             | 31,864  | 1,730   | 3,321 h/   | 8,046                                      | 5,680                                   | 0  | 12,418                                    | 45,598                                   |
| 1st Quarter Totals | 73,678  | 4,550   | 16,552   | 10,967                                     | 17,285                                  | 8,220                                    | 12,418                                    | 109,886                                  |

- a/ Please note that because the CWTF is equipped with Influent Tanks, the quantity of water collected will not necessarily equate to the quantity of water processed.
- b/ This ground water is collected each operating day (i.e., 5 days per week).
- c/ Other sources may include purge water, ER Accelerated Action Project water, etc.
- d/ This surface water is collected daily (i.e., 7 days per week).
- e/ The OU2 FTU trailers T-900A/T-900B were operated at the CWTF for the first time on February 29, 1996.
- f/ This water was potable water which was used during the tightness testing of CWTF Influent Tank T-200.
- g/ This quantity of water was comprised of approximately 8203 gallons from the emptying and cleaning of T-2 and T-40 (an ER Accelerated Action Project), and 528 gallons of potable water used for OU2 trailer start-up/testing.
- h/ This water was from the emptying and cleaning of Tank T-2.

**TABLE 2-2  
CONSOLIDATED WATER TREATMENT FACILITY  
CHEMICAL USAGE**

| Month/Year         | Building 891                    |                                |                                 |                                |                            | T-900A/T-900B           |                                 |                                |                               |  |
|--------------------|---------------------------------|--------------------------------|---------------------------------|--------------------------------|----------------------------|-------------------------|---------------------------------|--------------------------------|-------------------------------|--|
|                    | Hydrochloric Acid 36% (gallons) | Sodium Hydroxide 50% (gallons) | Hydrogen Peroxide 50% (gallons) | Sulfuric Acid a/ 98% (gallons) | Calcium Hydroxide (pounds) | Ferric Sulfate (pounds) | Hydrogen Peroxide 35% (gallons) | Sodium Hydroxide 50% (gallons) | Sodium Hypochlorite (gallons) |  |
| Jan-96             | 0                               | 16                             | 4                               | 0                              | 0                          | 0                       | 0                               | 0                              | 0                             |  |
| Feb-96             | 0                               | 54                             | 5                               | 17                             | 10                         | 14                      | 0                               | 5                              | 0                             |  |
| Mar-96             | 95                              | 60                             | 4                               | 0                              | 0                          | 0                       | 10                              | 0                              | 0                             |  |
| 1st Quarter Totals | 95                              | 130                            | 13                              | 17                             | 10                         | 14                      | 10                              | 5                              | 0                             |  |

a/ Occasionally a small amount (approx. 1 gallon) of this sulfuric acid is used in Building 891 for effluent pH adjustment.

## 2.3 WASTE GENERATION

The following types of waste are generated during normal wastewater treatment operations at Building 891 and the T-900A/T-900B trailers:

- Building 891
  - used filter socks
  - neutralized ion exchange regenerant
  - personnel protective equipment
  
- T-900A/T-900B trailers
  - filter press sludge cake
  - personnel protective equipment
  - used filter membranes

Table 2-3 summarizes the types and quantities of the waste generated during wastewater treatment operations at Building 891 and the T-900A/T-900B trailers for the first quarter of 1996. One tanker truck load (approximately 4,211 gallons) of neutralized regenerant water from Tank T-210 was sent to the 374 evaporator for processing in March 1996.

TABLE 2-3  
 CONSOLIDATED WATER TREATMENT FACILITY  
 WASTE GENERATION

| Month/Year         | Building 891               |   | T-900A/T-900B         |                                 | Bldg 891/T-900A/T-900B              |   |
|--------------------|----------------------------|---|-----------------------|---------------------------------|-------------------------------------|---|
|                    | Filter Socks (55-gal drum) | Neutralized Regenerant to 374 (gallons) | Spent GAC (pounds) a/ | Sludge Production (55-gal drum) | Used Filter Membranes (55-gal drum) | Personal Protective Equip. (55-gal drum) b/ |
| Jan-96             | --                         | 0                                       | 0                     | 0                               | 0                                   | --  |
| Feb-96             | --                         | 0                                       | 0                     | 0                               | 0                                   | --  |
| Mar-96             | --                         | 4,211                                   | 0                     | 0                               | 0                                   | --  |
| 1st Quarter Totals | 0 c/                       | 4,211                                   | 0                     | 0                               | 0                                   | 2 drums c/d/                                |

a/ A Granular Activated Carbon unit was installed in Building 891 in February 1996.

b/ PPE is monitored for radiological contaminants, and if determined to be acceptable for unrestricted release, is sent to the Rocky Flats landfill for disposal. Until the acceptance water from an ER Accelerated Action Project in February 1996, no PPE from Building 891 or the T-900A/T-900B trailers had been found to be radiologically contaminated.

c/ PPE is collected from water treatment operations, MDF decontamination operations, etc. and is drummed collectively.

d/ These drums are filled gradually, and therefore only quarterly totals are reported.

### 3.0 INFLUENT AND EFFLUENT SAMPLING (OCTOBER, NOVEMBER, DECEMBER 1995)

#### 3.1 881 HILLSIDE GROUNDWATER CHARACTERISTICS

The 1992 French Drain Performance Monitoring Plan (FDPMP) requires monitoring of French Drain performance. The FDPMP requires groundwater level measurements of designated French Drain monitoring wells 4787, 4887, 10092, 10192, 10292, 10392, 10492, 10592, 10692, 10792, 10892, 10992, 11092, 31491, 35691, 39991, 45391<sup>2</sup>. Additionally, quarterly sampling of the wells is required. However, not all locations are sampled for all parameters due to the small quantities of water generated at many of these locations. Also, as noted in the previous quarterly report, 16 wells were removed from the site monitoring program at the beginning of the 1996 fiscal year.

Table 3-1 presents a synopsis of the selected ground water monitoring well data for the following categories of constituents:

- . VOCs
- . Radionuclides
- . Metals
- . Water Quality

All constituents which exceeded OU1 ARARs are included in Table 3-1, however compounds which did not exceed OU1 ARARs are not necessarily included in the table.

As can be seen from Table 3-1, during the October, November, December 1995 period those constituents which did exceed OU1 ARARs include the following:

#### GROUND WATER WELLS

| <u>Compound</u>        | <u>Exceedance Range</u> | <u>Units</u> | <u>OU1 ARAR</u> |
|------------------------|-------------------------|--------------|-----------------|
| Trichlorethene         | 8                       | ug/L         | 5               |
| Gross Alpha            | 20.91 to 31.89          | pCi/L        | 15              |
| Selenium               | 258 to 20.2             | ug/L         | 10              |
| Sulfate                | 308 to 490              | mg/L         | 250             |
| Total Dissolved Solids | 720 to 1524             | mg/L         | 400             |

Note that Bromoform was detected in Well # 10692 at an estimated value of 0.2 ug/L and that trichlorofluoromethane was detected in Well # 31491 at 0.8 ug/L, however neither of these compounds have associated OU1 ARARs.

Figure 3-1 is a water level map that was constructed for the January through March 1996 period. This water level data is taken quarterly, and this map was developed based on water levels taken in January 1996. Note that due to an oversight which has since been corrected, the water levels in 12 routinely monitored wells were not measured during the January through March 1996 quarter.

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<sup>2</sup> Well #39991 was reported as damaged in April 1993 and has been abandoned. Well #'s 4787, 10192, 10392, and 45391 were reported as dry during the January 1996 water level monitoring. Bedrock wells are not used during the development of the ground water level maps.

TABLE 3-1  
 CONSOLIDATED WATER TREATMENT FACILITY  
 COMPARISON OF SELECTED GROUND WATER WELL CONSTITUENTS TO OU1 ARARS  
 OCTOBER, NOVEMBER, DECEMBER 1995

| COMPOUND               | OU1 ARAR | UNITS | GROUND WATER WELLS                  |                                   |                                     |                                    |                                   |                                     |                                     |   |                                     |       |       |
|------------------------|----------|-------|-------------------------------------|-----------------------------------|-------------------------------------|------------------------------------|-----------------------------------|-------------------------------------|-------------------------------------|---|-------------------------------------|-------|-------|
|                        |          |       | WELL 10092<br>Alluvial<br>20-Nov-95 | WELL 10492<br>Bedrock<br>6-Dec-95 | WELL 10592<br>Alluvial<br>12-Dec-95 | WELL 10692<br>Alluvial<br>9-Nov-95 | WELL 10792<br>Bedrock<br>6-Dec-95 | WELL 10992<br>Alluvial<br>27-Nov-95 | WELL 11092<br>Alluvial<br>28-Nov-95 | WELL 31491<br>Alluvial/Bedrock<br>27-Nov-95 | WELL 35691<br>Alluvial<br>29-Nov-95 |       |       |
| 1,1,1 Trichloroethane  | 200      | ug/L  | 1 U a/                              | 1 U                               | 1 U                                 | 0.5 U                              | 1 U                               | 1 U                                 | 0.5 U                               | 0.5 U                                       | 0.5 U                               | 0.5 U | 0.5 U |
| 1,1,2 Trichloroethane  | 5        | ug/L  | 1 U                                 | 1 U                               | 1 U                                 | 0.5 U                              | 1 U                               | 1 U                                 | 0.5 U                               | 0.5 U                                       | 0.5 U                               | 0.5 U | 0.5 U |
| 1,1 Dichloroethane     | 5        | ug/L  | 1 U                                 | 1 U                               | 1 U                                 | 0.5 U                              | 1 U                               | 1 U                                 | 0.5 U                               | 0.5 U                                       | 0.5 U                               | 0.5 U | 0.5 U |
| 1,1 Dichloroethene     | 7        | ug/L  | 1 U                                 | 1 U                               | 1 U                                 | 0.5 U                              | 1 U                               | 1 U                                 | 0.5 U                               | 0.5 U                                       | 0.5 U                               | 0.5 U | 0.5 U |
| 1,2 Dichloroethane     | 5        | ug/L  | 1 U                                 | 1 U                               | 1 U                                 | 0.5 U                              | 1 U                               | 1 U                                 | 0.5 U                               | 0.5 U                                       | 0.5 U                               | 0.5 U | 0.5 U |
| Acetone                | 50       | ug/L  | .. b/                               | ..                                | ..                                  | ..                                 | ..                                | ..                                  | ..                                  | ..  | ..                                  | ..    | ..    |
| Bromoforn              | NA c/    | ug/L  | 1 U                                 | 1 U                               | 1 U                                 | 0.2 U                              | 1 U                               | 1 U                                 | 0.5 U                               | 0.5 U                                       | 0.5 U                               | 0.5 U | 0.5 U |
| Carbon Disulfide       | 5        | ug/L  | ..                                  | ..                                | ..                                  | ..                                 | ..                                | ..                                  | ..                                  | ..  | ..                                  | ..    | ..    |
| Carbon Tetrachloride   | 5        | ug/L  | 1 U                                 | 1 U                               | 1 U                                 | 0.5 U                              | 1 U                               | 1 U                                 | 0.5 U                               | 0.5 U                                       | 0.5 U                               | 0.5 U | 0.5 U |
| Chloroform             | NA       | ug/L  | 1 U                                 | 0.3 U                             | 1 U                                 | 0.5 U                              | 1 U                               | 0.4 B                               | 0.5 U                               | 0.5 U                                       | 0.5 U                               | 0.5 U | 0.5 U |
| Methylene Chloride     | 5        | ug/L  | 1 U                                 | 1 U                               | 1 U                                 | 1 U                                | 1 U                               | 1 U                                 | 1 U                                 | 1 U   | 1 U                                 | 1 U   | 1 U   |
| Tetrachloroethene      | 5        | ug/L  | 1 U                                 | 0.1 U                             | 1 U                                 | 0.5 U                              | 1 U                               | 0.5 U                               | 0.5 U                               | 0.5 U                                       | 0.5 U                               | 0.3 U | 0.5 U |
| Toluene                | 2000     | ug/L  | 1 U                                 | 1 U                               | 1 U                                 | 0.5 U                              | 1 U                               | 0.5 U                               | 0.5 U                               | 0.5 U                                       | 0.5 U                               | 0.5 U | 0.5 U |
| Trichloroethene        | 5        | ug/L  | 1 U                                 | 8                                 | 1 U                                 | 0.5 U                              | 1 U                               | 1 B                                 | 0.5 U                               | 0.5 U                                       | 0.5 U                               | 0.5 U | 0.5 U |
| Trichlorofluoromethane | NA       | ug/L  | 1 U                                 | 1 U                               | 1 U                                 | 0.5 U                              | 1 U*                              | 1 U                                 | 0.5 U                               | 0.5 U                                       | 0.5 U                               | 0.8 U | 0.5 U |
| Gross Alpha d/         | 15       | pCi/L | ..                                  | 21.52                             | 22.13                               | 20.91                              | ..                                | ..                                  | ..                                  | ..  | ..                                  | ..    | 31.89 |
| Gross Beta             | 50       | pCi/L | ..                                  | 13.41                             | 10.57                               | 12.72                              | ..                                | ..                                  | ..                                  | ..  | ..                                  | ..    | 13.83 |
| Uranium (total)        | 40       | pCi/L | ..                                  | 21.43                             | 23.98                               | 20.60                              | ..                                | ..                                  | ..                                  | ..  | ..                                  | ..    | 34.22 |
| Copper (dissolved)     | 200      | ug/L  | ..                                  | ..                                | ..                                  | ..                                 | ..                                | ..                                  | ..                                  | ..  | ..                                  | ..    | ..    |
| Iron (dissolved)       | 300      | ug/L  | ..                                  | ..                                | ..                                  | ..                                 | ..                                | ..                                  | ..                                  | ..  | ..                                  | ..    | ..    |
| Lead (dissolved)       | 50       | ug/L  | ..                                  | ..                                | ..                                  | ..                                 | ..                                | ..                                  | ..                                  | ..  | ..                                  | ..    | ..    |
| Selenium (dissolved)   | 10       | ug/L  | ..                                  | ..                                | 258                                 | 9.5                                | ..                                | ..                                  | ..                                  | ..  | ..                                  | ..    | 20.2  |
| Thallium (dissolved)   | 10       | ug/L  | ..                                  | ..                                | ..                                  | ..                                 | ..                                | ..                                  | ..                                  | ..  | ..                                  | ..    | ..    |
| Nitrate/Nitrite        | 10       | mg/L  | 3.4                                 | 4.9                               | 7.5                                 | 0.541                              | ..                                | 5.2                                 | 24.1                                | 3.8   | 1.83                                | 0.08  | 0.08  |
| Sulfate                | 250      | mg/L  | ..                                  | ..                                | 377                                 | 308                                | ..                                | ..                                  | 121                                 | ..  | ..                                  | ..    | 490   |
| Total Dissolved Solids | 400      | mg/L  | ..                                  | ..                                | 1280                                | 1323                               | ..                                | ..                                  | 720                                 | ..  | ..                                  | ..    | 1524  |

a/ Refer to Appendix A for an explanation of the data qualifiers.  
 b/ "..." = Data not available.  
 c/ "NA" = No ARAR exists for this constituent.  
 d/ Note that this table does not include the error bounds on the radiological data.

### 3.2 OU1 FRENCH DRAIN SUMP AND COLLECTION WELL CHARACTERISTICS

Collection Well water is now collected separately from the French Drain Sump water, and collection and treatment of water from the Building 881 Footing Drain was discontinued in September 1994. Therefore the current French Drain Sump data is representative of only those waters that seep from the groundwater table into the French Drain. For the October, November, December 1995 period, quarterly sampling was performed at the French Drain Sump and the Collection Well.

Table 3-2 presents a synopsis of selected French Drain Sump and Collection Well data for the following categories of constituents:

- . VOCs
- . Radionuclides
- . Metals
- . Water Quality

All constituents which exceeded OU1 ARARs are included in Table 3-2, however compounds which did not exceed OU1 ARARs are not necessarily included in the table.

As can be seen in Table 3-2, samples taken from the French Drain Sump during the October through December 1995 period did not exceed OU1 VOC ARARs. Those constituents which did exceed OU1 ARARs include the following:

#### FRENCH DRAIN SUMP

| <u>Compound</u>        | <u>Exceedance Range</u> | <u>Units</u> | <u>OU1 ARAR</u> |
|------------------------|-------------------------|--------------|-----------------|
| Selenium (dissolved)   | 45.7                    | ug/L         | 10              |
| Total Dissolved Solids | 696                     | mg/L         | 400             |

Tentatively Identified Compounds (TICs) were also identified during French Drain Sump sampling, however these compounds do not have associated OU1 ARARs.

Table 3-2 also presents a synopsis of Collection Well data for the October through December 1995 period. As can be seen in Table 3-2, samples taken from the Collection Well continue to contain elevated levels of VOCs. Those constituents which did exceed OU1 ARARs include the following:

#### COLLECTION WELL

| <u>Compound</u>        | <u>Exceedance Range</u> | <u>Units</u> | <u>OU1 ARAR</u> |
|------------------------|-------------------------|--------------|-----------------|
| 1,1 Dichloroethene     | 12                      | ug/L         | 7               |
| Carbon Tetrachloride   | 20                      | ug/L         | 5               |
| Tetrachloroethene      | 79                      | ug/L         | 5               |
| Trichloroethene        | 690                     | ug/L         | 5               |
| Gross Alpha            | 20.18                   | pCi/L        | 15              |
| Selenium               | 821                     | ug/L         | 10              |
| Sulfate                | 223                     | mg/L         | 250             |
| Total Dissolved Solids | 1136                    | mg/L         | 400             |

TICs, benzene, benzoic acid, and trichlorofluoromethane were also identified during Collection Well sampling, however these compounds do not have associated OU1 ARARs.

TABLE 3-2  
 CONSOLIDATED WATER TREATMENT FACILITY  
 COMPARISON OF SELECTED OU1 INFLUENT SOURCE CONSTITUENTS TO OU1 ARARS  
 OCTOBER, NOVEMBER, DECEMBER 1995

| COMPOUND                             | OU1<br>ARAR | UNITS | FRENCH DRAN SUMP |           | COLLECTION WELL |
|--------------------------------------|-------------|-------|------------------|-----------|-----------------|
|                                      |             |       | 10-Oct-95        | 10-Oct-95 |                 |
| 1,1,1 Trichloroethane                | 200         | ug/L  | 0.5              | U a/      | 4               |
| 1,1,2 Trichloroethane                | 5           | ug/L  | 0.5              | U         | 0.5 U           |
| 1,1 Dichloroethane                   | 5           | ug/L  | 0.5              | U         | 0.5 U           |
| 1,1 Dichloroethane                   | 7           | ug/L  | 0.5              | U         | 12 E            |
| 1,2 Dichloroethane                   | 5           | ug/L  | 0.5              | U         | 0.5 U           |
| Acetone                              | 50          | ug/L  | 1                | U         | 1 U             |
| Benzene                              | NA b/       | ug/L  | 0.5              | U         | 0.3 J           |
| Benzoic Acid                         | NA          | ug/L  | -- c/            |           | 4 JN            |
| Carbon Disulfide                     | 5           | ug/L  | --               |           | --              |
| Carbon Tetrachloride                 | 5           | ug/L  | 0.5              | U         | 20 DJ           |
| Chloroform                           | NA          | ug/L  | 0.5              | U         | 1               |
| Methylene Chloride                   | 5           | ug/L  | 2                | B         | 2 B / 230 BD d/ |
| Tetrachloroethane                    | 5           | ug/L  | 0.6              | U         | 79 b            |
| Toluene                              | 2000        | ug/L  | 0.5              | U         | 0.5 U           |
| Trichloroethane                      | 5           | ug/L  | 0.2              | J         | 590 D           |
| Trichlorofluoromethane               | NA          | ug/L  | 0.5              | U         | 0.4 J           |
| TICs - Volatile                      | NA          | ug/L  | 0.8              | J         | 170 J           |
| TICs - Semivolatile                  | NA          | ug/L  | 7                | J         | 7 J             |
| Gross Alpha e/                       | 15          | pCi/L | 12.61            |           | 20.18           |
| Gross Beta                           | 50          | pCi/L | 8.952            |           | 11.95           |
| Uranium (total)                      | 40          | pCi/L | 13.19            |           | 23.02           |
| Copper (dissolved)                   | 200         | ug/L  | 20.2             | B         | 18.8 B          |
| Iron (dissolved)                     | 300         | ug/L  | 69.1             | B         | 64 B            |
| Lead (dissolved)                     | 50          | ug/L  | 0.8              | U         | 0.8 U           |
| Selenium (dissolved)                 | 10          | ug/L  | 45.7             |           | 82.1            |
| Thallium (dissolved)                 | 10          | ug/L  | 4.1              | U         | 4.1 U           |
| Zinc (dissolved)                     | 2000        | ug/L  | 130              |           | 20.8            |
| Hardness (calculated from Ca and Mg) | NA          | mg/L  | 433              |           | 621             |
| Chloride                             | 250         | mg/L  | 83.3             |           | 197             |
| Nitrite/Nitrate                      | 10          | mg/L  | 1.68             |           | 6.14            |
| Sulfate                              | 250         | mg/L  | 116              |           | 223             |
| Total Dissolved Solids               | 400         | mg/L  | 696              |           | 1136            |

a/ Refer to Appendix A for an explanation of the data qualifiers.

b/ "NA" = No ARAR exists for this constituent.

c/ "--" = Data not available

d/ The result of the first run was 2 B. Because the second run was a 100 times dilution, the blank contamination must be multiplied by 100 - hence the result of 230 BD.

e/ Note that this table does not include the error bound on the radiological data.

### 3.3 OU2 SURFACE WATER CHARACTERISTICS

Surface water is sampled on a quarterly basis from SW-59, SW-61, and SW-132. Although the Environmental Protection Agency and the Colorado Department of Public Health and the Environment authorized the discontinuation of the collection and treatment of SW-61 and SW-132 on April 24, 1994, the two surface water stations continue to be sampled to verify that no increase in contamination is occurring. Collection and treatment for SW-61 and SW-132 was discontinued on May 6, 1994. Presently only SW-59 water is collected and treated.

Table 3-3 presents a synopsis of OU2 Surface Water data for the October through December 1995 period. As can be seen in Table 3-3, those constituents which did exceed OU2 ARARs include the following:

#### SURFACE WATER STATIONS: SW-59, SW-61, and SW-132

| <u>Compound</u>        | <u>Stations</u> | <u>Exceedance Range</u> | <u>Units</u> | <u>OU2 ARAR</u> |
|------------------------|-----------------|-------------------------|--------------|-----------------|
| Carbon Tetrachloride   | SW-59           | 44                      | ug/L         | 5               |
| Chloroform             | SW-59           | 14                      | ug/L         | 1               |
| Tetrachloroethene      | SW-59           | 23                      | ug/L         | 1               |
| Trichloroethene        | SW-59           | 27                      | ug/L         | 5               |
| Vinyl Chloride         | SW-59, SW-61    | 5 to 7                  | ug/L         | 2               |
| Americium              | SW-59           | 0.15                    | pCi/L        | 0.05            |
| Gross Alpha            | SW-59           | 33                      | pCi/L        | 11              |
| Gross Beta             | SW-59           | 20                      | pCi/L        | 19              |
| Plutonium, 238/239/240 | SW-59           | 0.08                    | pCi/L        | 0.05            |
| Aluminum (total)       | SW-59, SW-61    | 1070 to 6750            | ug/L         | 200             |
| Iron (total)           | SW-59, SW-61    | 1360 to 6070            | ug/L         | 1000            |
| Lead (total)           | SW-59           | 12.1                    | ug/L         | 5               |
| Manganese (total)      | SW-59           | 3430                    | ug/L         | 1000            |
| Zinc (total)           | SW-59, SW-61    | 83.9 to 659             | ug/L         | 50              |

Other compounds, such as 1,1,1-Trichloroethane and cis-1,2-Dichloroethene were also identified during the sampling, however these constituents do not have OU2 ARARs.

TABLE 3-3  
 CONSOLIDATED WATER TREATMENT FACILITY  
 COMPARISON OF SELECTED SW-59, SW-61 AND SW-132 CONSTITUENTS TO OU2 ARARS  
 OCTOBER, NOVEMBER, DECEMBER 1995

| COMPOUND   | OU2<br>ARARS | Units | SW-59     |           | SW-61     |           | SW-132    |           |
|--|--------------|-------|-----------|-----------|-----------|-----------|-----------|-----------|
|  |              |       | 13-Dec-95 | 13-Dec-95 | 13-Dec-95 | 13-Dec-95 | 13-Dec-95 | 13-Dec-95 |
| 1,1,1-Trichloroethane                              | NA a/        | ug/L  | 3         | 1.0 U b/  | 1.0 U     | 1.0 U     | 1.0 U     | 1.0 U     |
| 1,1-Dichloroethane                                 | NA           | ug/L  | 1.0 U     | 2         | 1.0 U     | 1.0 U     | 1.0 U     | 1.0 U     |
| 1,1-Dichloroethene                                 | 7            | ug/L  | 2         | 1.0 U     |
| 1,2-Dichloroethane                                 | NA           | ug/L  | 1.0 U     |
| Carbon Tetrachloride                               | 5            | ug/L  | 44        | 1         | 1.0 U     | 1.0 U     | 1.0 U     | 1.0 U     |
| Chloroform   | 1            | ug/L  | 14        | 1.0 U     |
| Methylene Chloride                                 | NA           | ug/L  | 1.0 U     |
| Tetrachloroethene                                  | 1            | ug/L  | 23        | 1.0 U     |
| Trichloroethene                                    | 5            | ug/L  | 27        | 1.0 U     |
| Vinyl Chloride                                     | 2            | ug/L  | 5         | 7         | 1.0 U     | 1.0 U     | 1.0 U     | 1.0 U     |
| cis-1,2-Dichloroethene                             | NA           | ug/L  | 25        | 12        | 1.0 U     | 1.0 U     | 1.0 U     | 1.0 U     |
| Americium c/                                       | 0.05         | pCi/L | 0.15      | 0.02      | 0.02      | 0.01      | 0.01      | 0.01      |
| Gross Alpha  | 11           | pCi/L | 33        | 4         | 4         | 3         | 3         | 3         |
| Gross Beta   | 19           | pCi/L | 20        | 3         | 3         | 2         | 2         | 2         |
| Plutonium-238/239/240 (total)                      | 0.05         | pCi/L | 0.08      | 0.02      | 0.02      | 0.01      | 0.01      | 0.01      |
| Uranium, (total)                                   | 10           | pCi/L | 8.74      | 6.04      | 6.04      | 2.87      | 2.87      | 2.87      |
| Aluminum (total)                                   | 200          | ug/L  | 6750 N    | 1070 N    | 1070 N    | 45.7 BN   | 45.7 BN   | 45.7 BN   |
| Copper (total)                                     | 25           | ug/L  | 13.8 B    | 4.9 B     | 4.9 B     | 6.1 B     | 6.1 B     | 6.1 B     |
| Iron (dissolved)                                   | 300          | ug/L  | -- d/     | --        | --        | --        | --        | --        |
| Iron (total)                                       | 1000         | ug/L  | 6070      | 1360      | 1360      | 163       | 163       | 163       |
| Lead (total)                                       | 5            | ug/L  | 12.1      | 1.3       | 1.3       | 1.0 UW    | 1.0 UW    | 1.0 UW    |
| Manganese (total)                                  | 1000         | ug/L  | 3430      | 77.3      | 77.3      | 13.4 B    | 13.4 B    | 13.4 B    |
| Manganese (dissolved)                              | 50           | ug/L  | --        | --        | --        | --        | --        | --        |
| Selenium (total)                                   | 10           | ug/L  | 1.0 U     | 1.0 U     | 1.0 U     | 1.2       | 1.2       | 1.2       |
| Zinc (total)                                       | 50           | ug/L  | 659       | 83.9      | 83.9      | 29.4      | 29.4      | 29.4      |
| Total Dissolved Solids (TDS)                       | NS           | mg/L  | --        | --        | --        | --        | --        | --        |
| Chloride   | NS           | mg/L  | --        | --        | --        | --        | --        | --        |
| Sulfate  | NS           | mg/L  | --        | --        | --        | --        | --        | --        |
| Hardness (as CaCO3 -<br>calculated from Ca and Mg) | NA           | mg/L  | 480       | 280       | 280       | 128       | 128       | 128       |

a/ "NA" = No ARAR exists for this constituent.

b/ Refer to Appendix A for an explanation of the data qualifiers.

c/ Note that this table does not include the error bounds on the radiological data.

d/ "--" = Data not available.

### 3.4 TREATED EFFLUENT CHARACTERISTICS

Treated effluent from the CWTF is stored in one of three Effluent Storage Tanks prior to discharge. An Effluent Storage Tank is sampled once it is full, and the tank is discharged if the data show that OU1 ARARs have not been exceeded. Table 3-4 presents a synopsis of selected effluent tank data for January through March 1996.

The Effluent Storage Tank discharged in January 1996 contained treated water from OU1 influent sources, purge water, MDF water, and snow melt pumped from CWTF containments<sup>3</sup>. The treated effluent water did not exceed OU1 ARARs (Note that not all analyzed compounds are presented on Table 3-4).

Table 3-4: Synopsis of selected effluent tank data for January through March 1996. The table is extremely faint and contains illegible text and data points. It appears to be a multi-column table with several rows of data, but the content cannot be transcribed accurately due to the low resolution and blurriness of the scan.

<sup>3</sup> The Effluent Storage Tank discharged in January 1996 did not contain any OU2 water. The water in this Effluent Tank was collected and treated prior to the receipt of OU2 water. The full Effluent Tank was sampled on September 19, 1995, and Building 891 did not begin treating OU2 SW-059 water until September 18, 1995.

TABLE 3-4  
 CONSOLIDATED WATER TREATMENT FACILITY  
 COMPARISON OF SELECTED EFFLUENT STORAGE TANK DATA TO OU1 ARARS  
 JANUARY, FEBRUARY, MARCH 1996

| COMPOUND                                 | OU1 ARARs | UNITS | CWTF Effluent Tanks     |   |
|--|-----------|-------|-------------------------|---|
|  |           |       | Tank No. :<br>Sampled : | T-206<br>9/19/95, 12/6/95 a/, b/<br>Discharged :<br>16-Jan-96 |
| Trichloroethane 1,1,1                    | 200       | ug/L  |                         | 0.5 U c/  |
| Trichloroethane 1,1,2                    | 5         | ug/L  |                         | 0.5 U   |
| Dichloroethane 1,1                       | 5         | ug/L  |                         | 0.5 U   |
| Dichloroethane 1,1                       | 7         | ug/L  |                         | 0.5 U   |
| Dichloroethane 1,2                       | 5         | ug/L  |                         | 0.5 U   |
| Acetone                                  | 50        | ug/L  |                         | 1 U   |
| Carbon disulfide                         | 5         | ug/L  |                         | 1 U   |
| Carbon tetrachloride                     | 5         | ug/L  |                         | 0.5 U   |
| Chloroform                               | NA        | ug/L  |                         | 0.5 U   |
| Methylene chloride                       | 5         | ug/L  |                         | 0.8 BU  |
| Tetrachloroethane                        | 5         | ug/L  |                         | 0.5 U   |
| Toluene                                  | 2000      | ug/L  |                         | 0.5 U   |
| Trichloroethene (TCE)                    | 5         | ug/L  |                         | 0.5 U   |
| Vinyl chloride                           | NA        | ug/L  |                         | 1 U   |
| Americium 241 d/                         | 4         | pCi/L |                         | 0.004 J   |
| Gross Alpha                              | 15        | pCi/L |                         | 0.0113 J  |
| Gross Beta                               | 50        | pCi/L |                         | 0.9998 J  |
| Plutonium 238/239/240 (total-calculated) | 15        | pCi/L |                         | 0.014 J   |
| Strontium 89/90                          | 8         | pCi/L |                         | 0.157 J   |
| Tritium                                  | 20000     | pCi/L |                         | 24.05 J   |
| Uranium (total - calculated)             | 40        | pCi/L |                         | 0.06 J  |
| Cadmium (dissolved)                      | 10        | ug/L  |                         | 3.1 U   |
| Chromium (dissolved)                     | 50        | ug/L  |                         | 2.8 U   |
| Copper (dissolved)                       | 200       | ug/L  |                         | 14.2 B  |
| Iron (dissolved)                         | 300       | ug/L  |                         | 54.5 B  |
| Lead (dissolved)                         | 50        | ug/L  |                         | 1.2 U   |
| Selenium (dissolved)                     | 10        | ug/L  |                         | 3.7 B   |
| Zinc (dissolved)                         | 2000      | ug/L  |                         | 20.7  |
| Chloride                                 | 250       | mg/L  |                         | 3.4   |
| Nitrate + Nitrite                        | 10        | mg/L  |                         | 0.232   |
| Sulfate                                  | 250       | mg/L  |                         | 8.06  |
| Total Dissolved Solids (TDS)             | 400       | mg/L  |                         | 78  |
| pH                                       | 6.5-9.0   | S.U.  |                         | 7.52  |

a/ Two samples were taken of this effluent tank (FT10442RG, FT10455RG). The second sample was taken only for organics to determine that carbon disulfide was below the APAR of 5 ug/L.  
 b/ Data presented in this table is taken both from RFEDs and from faxes sent by the laboratory, and includes both original and replicate/duplicate sample data.  
 c/ Refer to Appendix A for an explanation of the data qualifiers.  
 d/ Note that this table does not include the error bound on the radiological data.

#### 4.0 ENVIRONMENTAL COMPLIANCE

On January 18, 1996 a the pipe leading from the French Drain Sump to the CWTF Influent Storage Tanks froze and resulted in the release of contaminated groundwater from an in-line flange. Approximately 2 gallons of water was released to containment and approximately one cup of contaminated water was released to soil located immediately outside of the containment berm. Potentially contaminated soil was hand-excavated, and a sample of the underlying soil was taken to verify adequacy of cleanup. The soil verification sample was analyzed for VOCs, and all VOC constituents were non-detect. All appropriate notifications were made and the situation was immediately corrected.

There were no periods of non-collection at the OU2 SW-59 weir during the January, February, March 1996 period.

#### 5.0 ANTICIPATED OPERATIONS FOR NEXT QUARTER

Collection and treatment of water from the French Drain Sump will continue as normal. Water from the Collection Well will continue to be collected in the OU1 trailer-mounted container and transported to the CWTF for off-loading and treatment. Purge, incidental, and decontamination pad waters will continue to be accepted and treated.

Collection and transport of SW-59 water to the CWTF will continue via the OU2 trailer-mounted container until construction of the above-ground storage tank adjacent to SW-59 is complete, after which SW-59 water will be periodically transferred from the above-ground storage tank to the CWTF using a tanker truck.

It is expected that the CWTF will continue to accept and treat waters from ER Accelerated Action Projects.

The process flowpath for the water to be treated is chosen based upon the influent contaminants and best anticipated method of treatment. Efforts will be made to minimize waste generation during CWTF operations.

## **Appendix A Data Qualifiers and Descriptions**

## Selected Laboratory Data Qualifiers and Descriptions

| <u>Qualifier</u> | <u>Description</u>   |
|------------------|--|
| B                | < method detection limit but >= instrument detection limit (INORGANIC) |
| B                | Analyte found in blank and sample (ORGANIC)                            |
| D                | Compound identified using secondary dilution factor (ORGANIC)          |
| E                | Concentration exceeds calibration range of instrument (ORGANIC)        |
| E                | Estimated due to interference (INORGANIC)                              |
| J                | Estimated value, < sample's detection limit                            |
| N                | Spiked recovery not within control limits (INORGANIC)                  |
| S                | Determined by MSA (INORGANIC)  |
| U                | Undetected, analyzed for but not detected                              |
| W                | Post-digest sample outside of control limit (INORGANIC)                |

## Selected Data Validation Qualifiers and Descriptions

| <u>Qualifier</u> | <u>Description</u>                        |
|------------------|---|
| A                | Data is acceptable, with qualifications   |
| JA               | Estimated, acceptable                     |
| R                | Data is rejected                          |
| V                | Data is valid                             |
| Y                | Analytical results in validation process  |
| Z                | Validation was not requested or performed |

RFETS 881 Hillside January - March 1996 Water Level Map

Figure 3-1

