# NOTICE

**All drawings located at the end of the document.**

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# Modified Proposed Action Memorandum Passive Seep Collection and Treatment Operable Unit 7

Final


July 1995





1/31

## EXECUTIVE SUMMARY

This revised Seep Interception and Treatment Proposed Action Memorandum presents the U.S. Department of Energy's accelerated action to address the seep flowing from the Present Landfill into the East Landfill Pond, Operable Unit No. 7 at the Rocky Flats Environmental Technology Site. The overall objective of the interception system is to eliminate discharge of F039 listed waste contained in the seep water to a surface water body.

Compliance with potential applicable or relevant and appropriate requirements for seep water will be addressed, to the extent possible, through interception and treatment of the seep to reduce concentrations of volatile organic compounds, semi-volatile organic compounds, and metals.

Water will be collected at the seep with an intercept system consisting of perforated pipe in a gravel layer. The perforated pipe directs seep water to a concrete manhole which acts as a flow and head equalizing basin. From the manhole, a pipe discharges to the bottom of the reactor tank. Water moves upward through carbon-based granular media. The treated water from the top of the reactor tank flows to a concrete weir box and is discharged directly to the East Landfill Pond. East Landfill Pond water will then be discharged to the A-series ponds, as necessary, to maintain the pond at an acceptable level for system operation.

The interception system is designed to be compatible with source containment as a presumptive remedy for final closure of the landfill in July 1997.

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# 1. PURPOSE

The purpose of this modified Passive Seep Interception and Treatment Proposed Action Memorandum (PAM) is to present the U.S. Department of Energy's (DOE's) accelerated action for the interception and treatment of water seeping from the Present Landfill into the East Landfill Pond, Operable Unit (OU) No. 7 at the Rocky Flats Environmental Technology Site (RFETS) located in Jefferson County, Colorado, as show n in Figure 1-1. This document is the second iteration of the first of two response action documents planned for OU 7. The second document, the Landfill Closure Interim Measure/Interim Remedial Action (IM/IRA) Decision Document, will focus on landfill closure using the presumptive remedy approach (EPA, 1993), and remediation, if necessary, of environmental media outside of the source area to expand the IM/IRA Decision Document to a comprehensive remedial action.

The overall objective of the accelerated action is to eliminate discharge of F039 listed waste contained in the seep water to a surface water body. The accelerated action will address, to the extent possible, potential applicable or relevant and appropriate requirements (ARARs), and achieve protective standards, to the extent possible, for seep water through interception and treatment to reduce contaminant loading.

Environmental Restoration activities at RFETS are pursuant to an Inter-agency Agreement (IAG) signed by the DOE, RFFO, the U.S. Environmental Protection Agency (EPA), and the State of Colorado Department of Public Health and Environment (CDPHE) dated January 22, 1991 (DOE, 1991). CDPHE is the lead regulatory agency for the IAG program at OU 7.

## 2. BACKGROUND AND DESCRIPTION

The location and mission of RFETS, location and history of remedial actions at OU 7, characteristics of the seep, and other actions to date are described in the following sections.

### 2.1 Rocky Flats Environmental Technology Site

The RFETS is located at the foot of the Rocky Mountains in northern Jefferson County, Colorado. The site is approximately 16 miles northwest of Denver in Sections 1 through 4 and 9 through 15 of Township 2 south, Range 70 west. It is near the suburban communities of Westminster, Broomfield, and Arvada. The site covers approximately 6,550 acres. Approximately 400 acres were used for industrial activities.

The primary mission of RFETS has been the production of components for nuclear weapons. Operations at the plant began in 1952. In 1989, many of the production functions at the plant were suspended. In January 1992, the decision was made not to resume plutonium parts production. The site is currently in transition from a weapons production site to a materials management, environmental restoration, and waste management site.

More detailed site background information is presented in the OU 7 Final Work Plan Technical Memorandum (OU 7 Final Work Plan) (DOE, 1994a).

### 2.2 OU 7 Site Description

OU 7 is located north of the industrial area at the western end of No Name Gulch. For the purpose of selecting remedial actions, OU 7 is divided into the following areas:

- Present Landfill (Individual Hazardous Substance Site [IHSS] 114)
- Inactive Hazardous Waste Storage Area (IHSS 203)
- East Landfill Pond
- Spray evaporation areas adjacent to the East Landfill Pond (IHSS 167.2 and IHSS 167.3)

Each of these areas is shown in Figure 2-1 and described in detail in the OU 7 Final Work Plan (DOE, 1994a).

The seep addressed in this report is located near the base of the east face of the Present Landfill (IHSS 114). Operation of the landfill was initiated in 1968 to provide for disposal of nonradioactive solid wastes and will continue until the landfill is closed in 1997. The Present Landfill covers an area of approximately 27 acres. In 1973, tritium

was detected in water seeping from the landfill. In response, monitoring of waste for radionuclides prior to burial was initiated to prevent further disposal of radioactive material, and interim response measures were developed to control the generation and migration of the landfill leachate. Locations of the landfill structures (surface-water diversion ditch, subsurface drainage control, and slurry walls) constructed as interim response measures that still exist are shown in Figure 2-1 and described in detail in the OU 7 Final Work Plan (DOE, 1994a).

Records indicate that some hazardous waste was disposed at the landfill; disposal of hazardous waste was discontinued in 1986.

## 2.3 Characteristics of the Seep at SW097

The existing leachate interception system, which is part of the subsurface drainage control system at the landfill, is only partially effective. Between 1977 and 1981, portions of the leachate interception system were buried during landfill expansion. Although the intercept trench is effective in keeping leachate within the northern, southern, and western limits of the landfill, there is a seep along the eastern boundary of the landfill just above the pond.

Surface water sampling station SW097 is located where the water seeps from the landfill into the pond. The physical area of the seepage face is believed to vary over the course of the year. Based on visual observations, however, the maximum seep width is estimated at 8 feet.

Historical data presented in Table 2-1 were used to estimate an average flow rate at the seep. Specific information on the method of measurement and the relationship to storm events for most of these data is not available. Thus, disregarding measurements believed to be erroneous, the average flow at the seep is estimated to be 3.6 gallons per minute (gpm). The water surfacing at the seep (SW097) is composed of surface water and groundwater mixed with leachate from the waste. A waste determination of the seep was made based on historical data detailing wastes disposed in the landfill. According to the 1986 Waste Stream Identification Characterization (Rockwell International, 1986) report, multiple waste streams believed to contain Resource Conservation and Recovery Act (RCRA) listed hazardous wastes were disposed in the Present Sanitary Landfill prior to 1986. From a RCRA perspective, the surface water/groundwater containing F039 hazardous waste constituents is a "contained-in" waste. This waste must be handled as a RCRA regulated hazardous waste, with the EPA waste code F039, when the seep water is actively managed.

**Table 2-1**
**Historical Seep Flow Rates at SW097**

| Date of Measurement | Flow Rate (gpm) | Flow Rate (cfs) |
|---|---|---|
| 06/16/88 | 2.2 | 0.005 |
| 04/06/89 | 26.9[1] | 0.06[1] |
| 05/19/89 | 0.0 | 0.0 |
| 06/20/89 | 0.0 | 0.0 |
| 07/07/89 | 3.6 | 0.008 |
| 08/02/89 | 4.0 | 0.009 |
| 09/06/89 | 2.2 | 0.005 |
| 10/09/89 | 24.7[1] | 0.05[1] |
| 11/07/89 | 1.8 | 0.004 |
| 12/05/89 | 1.8 | 0.004 |
| 08/29/90 | 6.7[2] | 0.015[2] |
| 12/17/92 | 4.48 | 0.01 |
| 01/25/93 | 4.48 | 0.01 |
| 02/26/93 | 10.32 | 0.023 |
| 03/24/93 | 4.48 | 0.01 |
| 03/29/93 | 4.48 | 0.01 |
| **Average** | **3.61** | --- |

[1] Believed to be an erroneous flow measurement. Not included in calculation of average flow.

[2] Measured using a Palmer-Bowlus flume.

**Definitions:**

cfs: cubic feet per second

gpm: gallons per minute

Chemicals in the seep that exhibit concentrations above background include total and dissolved metals, radionuclides, volatile organic compounds (VOCs), and semi-volatile organic compounds (SVOCs) (DOE, 1994a) and are shown in Table 2-2. Those chemicals whose mean values exceed the protective standard, are highlighted, and will be treated.

Margins of the East Landfill Pond exhibits typical wetland vegetation as discussed in the ARARs section (Section 3.6) of this PAM.

## 2.4 Other Actions To Date

A Phase I RCRA Facility Investigation/Remedial Investigation (RFI/RI) was conducted at OU 7 in 1992 and 1993 to characterize the site features, describe contaminant sources, and determine the nature and extent of contamination. Prior to the completion of Phase I, the focus of the investigations changed as a result of the adoption of a presumptive remedy strategy. The Phase II RCRA RFI/RI was conducted in 1994 and 1995 to support the remedial design.

This PAM and the forthcoming IM/IRA for OU 7 are based on use of presumptive remedies as a method to streamline site investigation and remedial action selection based on historical data from successful remedial actions at similar sites. Source containment is the designated presumptive remedy for Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) municipal landfills (EPA, 1993). The containment presumptive remedy consists of the following elements:

- institutional controls
- landfill cap
- landfill gas control (and treatment if necessary)
- source area groundwater control to contain plume
- leachate collection and treatment

This accelerated action, interception and treatment of seep water, is compatible with source containment as a presumptive remedy for the landfill.

**Table 2-2 Comparison of Contaminant Concentration To ARAR/TBC standards**

| Analyte | Detection Limit Range | Detection Frequency | Detections Exceeding ARARs | Minimum Result | Maximum Detection | Qualifier for Maximum Detection | Validation for Maximum Detection | Mean Result | ARAR/TBC | Units |
|---|---|---|---|---|---|---|---|---|---|---|
| **METALS** | | | | | | | | | | |
| ALUMINUM | 200 - 50000 | 16/19 | 14 | 29 | 26900 | BLANK | BLANK | 2629 | 87 | UG/L |
| ANTIMONY | 0.05 - 60 | 4/18 | 0 | 14 | 60.4 | BLANK | A | 20 | 300 | UG/L |
| ARSENIC | 0.7 - 10 | 8/16 | 0 | 1.4 | 3 | B | BLANK | 3 | 50 | UG/L |
| BARIUM | 0.02 - 50000 | 19/19 | 1 | 297 | 1550 | BLANK | BLANK | 645 | 1000 | UG/L |
| BERYLLIUM | 0.2 - 5 | 2/18 | 0 | 0.2 | 1.4 | BLANK | JA | 1 | 4 | UG/L |
| CADMIUM | 0.1 - 15.5 | 4/18 | 2 | 1 | 7.6 | BLANK | BLANK | 3 | TVS (1.5) | UG/L |
| CHROMIUM | 2.4 - 27.5 | 7/18 | 0 | 2 | 29.6 | BLANK | BLANK | 9 | 50 | UG/L |
| COBALT | 0.02 - 50 | 10/18 | 2 | 2.7 | 19.1 | B | BLANK | 11 | 50 | UG/L |
| COPPER | 2.4 - 25 | 8/18 | 0 | 2 | 94.9 | BLANK | BLANK | 12 | TVS (16) | UG/L |
| LEAD | 0.8 - 2000 | 14/18 | 0 | 1.5 | 11 | BLANK | V | 5 | TVS (6.46) | UG/L |
| LITHIUM | 2 - 2000 | 15/19 | 0 | 34 | 107 | BLANK | V | 48 | 2500 | UG/L |
| MANGANESE | 1 - 10000 | 19/19 | 19 | 1320 | 2490 | BLANK | BLANK | 1623 | 50 | UG/L |
| MERCURY | 0.02 - 0.2 | 1/18 | 0 | 0.1 | 0.28 | BLANK | BLANK | 0.1 | 10 | UG/L |
| MOLYBDENUM | 5.7 - 200 | 6/18 | 0 | 4 | 28.5 | B | BLANK | 21 | | UG/L |
| NICKEL | 0.02 - 40 | 5/18 | 0 | 5 | 31 | BLANK | V | 12 | 125 | UG/L |
| SELENIUM | 1.1 - 5 | 2/18 | 0 | 1.1 | 7 | W | BLANK | 2 | 17 | UG/L |
| SILVER | 2.6 - 25 | 8/18 | 0 | 2.7 | 16.7 | BLANK | BLANK | 5 | 50 | UG/L |
| STRONTIUM | 3.5 - 10000 | 17/19 | 0 | 814 | 1370 | BLANK | BLANK | 920 | | UG/L |
| TIN | 10 - 200 | 8/18 | 0 | 11 | 243 | BLANK | BLANK | 48 | 8000 | UG/L |
| VANADIUM | 3.2 - 10000 | 12/19 | 1 | 3.1 | 211 | BLANK | BLANK | 25 | 100 | UG/L |
| ZINC | 1.8 - 10000 | 19/19 | 16 | 857 | 16000 | BLANK | BLANK | 2974 | 2000 | UG/L |
| **PESTICIDES** | | | | | | | | | | |
| alpha-BHC | 0.05 - 0.28 | 1/3 | 0 | 0 | 0 | I | BLANK | 0.06 | | UG/L |
| **RADIONUCLIDES** | | | | | | | | | | |
| AMERICIUM-241 | 0 - 0.013 | 16/16 | 0 | -0.000404 | 0.02121 | BLANK | V | 0.007 | 30 | PCI/L |
| CESIUM-137 | 0.47 - 1 | 14/14 | 0 | -0.21 | 0.6057 | J | BLANK | 0.15 | 3000 | PCI/L |
| PLUTONIUM-238 | 0.01 - 0.01 | 2/2 | 0 | -0.000465 | 0.00222 | J | A | 0.00088 | 30 | PCI/L |
| PLUTONIUM-239 | 0.003 - 0.003 | 1/1 | 0 | 0.009 | 0.009 | BLANK | BLANK | 0.009 | 30 | PCI/L |
| PLUTONIUM-239/240 | 0 - 0.013 | 16/16 | 0 | 0.001 | 0.01606 | BLANK | A | 0.007 | 30 | PCI/L |
| RADIUM-226 | 0.03 - 0.03 | 1/1 | 0 | 0.58 | 0.58 | BLANK | A | 0.58 | 100 | PCI/L |
| STRONTIUM-89,90 | 0.21 - 1 | 9/9 | 0 | 0.66 | 4.06 | BLANK | V | 1.35 | 60 | PCI/L |
| STRONTIUM-90 | 0.2 - 0.59 | 3/3 | 0 | 0.5442 | 1.1 | BLANK | BLANK | 0.7 | | PCI/L |
| TRITIUM | 155 - 450 | 19/19 | 0 | 185.4 | 1500 | BLANK | A | 393 | 1000 | PCI/L |
| URANIUM-233,-234 | 0.1 - 0.6 | 12/12 | 0 | -0.0238 | 4.2 | B | A | 0.8 | 500 | PCI/L |
| URANIUM-235 | 0 - 0.6 | 12/12 | 0 | -0.012 | 0.084 | J | A | 0.03 | 600 | PCI/L |
| URANIUM-238 | 0.086 - 0.6 | 12/12 | 0 | 0.03914 | 3.76 | BLANK | A | 1 | 600 | PCI/L |
| **SEMIVOLATILE ORGANICS** | | | | | | | | | | |
| 2,4-DIMETHYLPHENOL | 10 - 10 | 1/5 | 0 | 3 | 3 | J | A | 5 | 36 | UG/L |
| 2-METHYLNAPHTHALENE | 10 - 10 | 5/5 | 5 | 12 | 23 | BLANK | V | 16 | [3] | UG/L |

## Table 2-2 Comparison of Contaminant Concentration To ARAR/TBC standards

| Analyte | Detection Limit Range | Detection Frequency | Detections Exceeding ARARs | Minimum Result | Maximum Detection | Qualifier for Maximum Detection | Validation for Maximum Detection | Mean Result | ARAR/TBC | Units |
|---|---|---|---|---|---|---|---|---|---|---|
| 4-METHYLPHENOL | 10 - 10 | 3/5 | 0 | 2 | 4 | J | BLANK | 4 | [3] | UG/L |
| ACENAPHTHENE | 10 - 10 | 5/5 | 0 | 2 | 3 | J | A | 3 | 520 | UG/L |
| BIS(2-ETHYLHEXYL)PHTHALATE | 10 - 12 | 1/5 | 0 | 2 | 2 | J | A | 5 | 10 | UG/L |
| DIBENZOFURAN | 10 - 10 | 5/5 | 0 | 1 | 2 | J | A | 1 | [3] | UG/L |
| DIETHYL PHTHALATE | 10 - 10 | 4/5 | 0 | 1 | 3 | J | A | 3 | 200 | UG/L |
| FLUORENE | 10 - 10 | 5/5 | 0 | 2 | 3 | J | A | 2 | 10 | UG/L |
| NAPHTHALENE | 10 - 10 | 5/5 | 5 | 14 | 22 | BLANK | V | 18 | 10 | UG/L |
| PHENANTHRENE | 10 - 10 | 5/5 | 0 | 4 | 5 | J | A | 4 | 10 | UG/L |
| **VOLATILE ORGANICS** | | | | | | | | | | |
| 1,1-DICHLOROETHANE | 5 - 5 | 17/20 | 17 | 2 | 10 | BLANK | V | 6 | 59 | UG/L |
| 1,2-DICHLOROETHENE | 5 - 5 | 10/20 | 0 | 2 | 14 | BLANK | V | 4 | 70 | UG/L |
| 2-BUTANONE | 10 - 10 | 6/19 | 4 | 6 | 76 | BLANK | V | 12 | 280 | UG/L |
| 2-HEXANONE | 10 - 10 | 1/20 | 0 | 1 | 10 | BLANK | V | 5 | 50 | UG/L |
| 4-METHYL-2-PENTANONE | 10 - 10 | 5/20 | 1 | 10 | 87 | J | A | 11 | 140 | UG/L |
| ACETONE | 10 - 10 | 10/20 | 2 | 10 | 220 | BLANK | A | 34 | 280 | UG/L |
| BENZENE | 5 - 5 | 11/20 | 4 | 1 | 2 | J | BLANK | 2 | 1 | UG/L |
| CARBON DISULFIDE | 5 - 5 | 1/20 | 0 | 5 | 6 | BLANK | BLANK | 3 | | UG/L |
| CHLOROETHANE | 10 - 10 | 15/20 | 15 | 10 | 57 | BLANK | V | 22 | 5 | UG/L |
| CHLOROMETHANE | 10 - 10 | 2/20 | 1 | 4 | 7 | J | A | 5 | 5.7 | UG/L |
| ETHYLBENZENE | 5 - 5 | 19/20 | 0 | 1 | 18 | BLANK | BLANK | 13 | 57 | UG/L |
| METHYLENE CHLORIDE | 5 - 5 | 9/20 | 5 | 3 | 190 | B | BLANK | 14 | 4.7 | UG/L |
| o-XYLENE | 5 - 5 | 3/4 | 0 | 5 | 8 | BLANK | BLANK | 6 | | UG/L |
| TETRACHLOROETHENE | 5 - 5 | 2/20 | 0 | 1 | 1 | J | BLANK | 2 | 1 | UG/L |
| TOLUENE | 5 - 5 | 19/20 | 0 | 5 | 88 | BLANK | BLANK | 38 | 1000 | UG/L |
| TOTAL XYLENES | 5 - 5 | 19/20 | 0 | 1 | 25 | J | A | 14 | 10000 | UG/L |
| TRICHLOROETHENE | 5 - 5 | 11/20 | 1 | 1 | 4 | J | BLANK | 2 | 2.7 | UG/L |
| VINYL ACETATE | 10 - 10 | 1/19 | 1 | 10 | 49 | BLANK | BLANK | 7 | 5 | UG/L |
| VINYL CHLORIDE | 10 - 10 | 5/20 | 5 | 3 | 11 | BLANK | V | 5 | 2 | UG/L |
| **WATER QUALITY PARAMETERS** | | | | | | | | | | |
| BICARBONATE AS CACO3 | 1000 - 10000 | 15/15 | 0 | 554000 | 705000 | BLANK | V | 595800 | | UG/L |
| CARBONATE AS CACO3 | 1000 - 10000 | 2/9 | 0 | 0 | 0 | BLANK | BLANK | 3889 | | UG/L |
| CHLORIDE | 100.0 - 50000 | 14/14 | 0 | 1800.0 | 66300.0 | BLANK | V | 53650 | | UG/L |
| CYANIDE | 10 - 20 | 1/14 | 0 | 1.5 | 36.8 | BLANK | BLANK | 9 | 200 | UG/L |
| DISSOLVED ORGANIC CARBON | 1000 - 1000 | 4/4 | 0 | 14000 | 27000 | BLANK | JA | 18750 | | UG/L |
| FLUORIDE | 100.0 - 200.0 | 12/12 | 0 | 390.00 | 540.00 | BLANK | V | 469.2 | 2000 | UG/L |
| NITRATE/NITRITE | 20.00 - 200.0 | 6/10 | 0 | 20.00 | 870.00 | BLANK | V | 263 | 10000 | UG/L |
| NITRITE | 20.00 - 20.00 | 6/9 | 0 | 20.00 | 63.000 | BLANK | V | 30.33 | 500 | UG/L |
| OIL AND GREASE | 200.0 - 11100.0 | 4/12 | 0 | 800.0 | 42100.0 | BLANK | V | 7013 | | UG/L |
| ORTHOPHOSPHATE | 10.00 - 200.0 | 3/10 | 0 | 50.00 | 150.00 | BLANK | BLANK | 60.9 | | UG/L |
| pH | | 5/5 | 0 | 6.8 | 7.3 | BLANK | BLANK | 7 | | PH |
| PHOSPHORUS | 50.00 - 1000 | 9/9 | 0 | 95.000 | 1380 | BLANK | BLANK | 387 | | UG/L |
| SILICA | 400.0 - 2000 | 3/3 | 0 | 7400.0 | 43000 | BLANK | BLANK | 19567 | | UG/L |

| Analyte | Detection Limit Range | Detection Frequency | Detections Exceeding ARARs | Minimum Result | Maximum Detection | Qualifier for Maximum Detection | Validation for Maximum Detection | Mean Result | ARAR/TBC | Units |
|---|---|---|---|---|---|---|---|---|---|---|
| SILICON | 7.3 - 2000 | 13/13 | 0 | 7060 | 44000 | BLANK | BLANK | 13547 | | UG/L |
| SOLIDS, NONVOLATILE SUSPENDE | 5000 - 5000 | 6/6 | 0 | 10000 | 199000 | BLANK | BLANK | 83167 | | UG/L |
| SULFATE | 200.0 - 25000 | 5/14 | 0 | 200.0 | 29600.0 | BLANK | V | 5084 | 250000 | UG/L |
| TOTAL DISSOLVED SOLIDS | 10000 - 10000 | 15/15 | 0 | 470000 | 870000 | BLANK | BLANK | 729333 | | UG/L |
| TOTAL ORGANIC CARBON | 1000 - 1000 | 3/3 | 0 | 19000 | 24500.0 | BLANK | V | 20833 | | UG/L |
| TOTAL SUSPENDED SOLIDS | 4000 - 5000 | 12/12 | 0 | 10000 | 250000 | BLANK | BLANK | 144667 | | UG/L |

Shaded analytes indicate mean result exceeds ARAR.
All analytes are total analytes unless otherwise noted.
Analytes with zero detections are not reported.
For non-detects, one-half the detection limit is used in calculating the mean result.
[1] For tetrachloroethene, the maximum detection equals the ARAR; the mean exceeds the ARAR because one-half detection limit for non-detects exceeds the ARAR.
[2] For vinyl acetate, one detection out of nineteen causes mean to exceed ARAR; suggests that one detection is outlier and should be discarded.
[3] Not listed in 40 CFR 302.4 or 6 CCR 1007-3, Part 261 - Appendix VII and therefore are not required to be addressed under a CERCLA Remedial Action..

**Data Qualifiers**
BLANK = data qualifier field in database is blank.
B = for inorganics, reported value is < CRDL but > IDL (estimated value).
B = for organics, analyte is also detected in blank;
for common lab contaminants include as detection if blank result > 10 times detection limit;
for all other organics include if blank result > 5 times detection limit.
B = for radionuclides, constituent also detected in blank whose concentration was > minimum detectable activity.
I = organics, interference with target peak (estimated value)
J = for organics, MS data indicate presence of compound but below detection limit (estimated value).
U = for inorganics and organics, analyte analyzed but not detected at the quantitation limit.

**Data Validation Codes**
BLANK = data validation field in database is blank.
A = acceptable result.
JA = acceptable result (for estimated value).
V = valid result.
TVS = table value standard, hardness dependent, 5 CCR 1002-8

**Table 2-2 Comparison of Contaminant Concentration To ARAR/TBC standards**

# 3. ACCELERATED ACTION

A description of the accelerated action is presented in this section. Waste management considerations, consistency with long-term actions, and ARARs are also discussed.

## 3.1 Description

The seep interception system, shown in Figure 3-1, will consist of a temporary seep interception and treatment system. This system is not intended to collect all flows from the landfill and entering the pond. The system is designed for an average flow situation and some seepage may bypass or overflow the interception system during unusual flow periods.

The interception system consists of a 4-inch perforated polyvinyl chloride (PVC) pipe in a 2 foot gravel layer over a 60-millimeter high density polyethylene (HDPE) liner. The pipe directs seep water to a 4-foot diameter concrete manhole. The manhole acts as a flow and head equalizing basin. From the concrete manhole, a 4-inch double-contained solid PVC pipe discharges to the bottom of the reactor tank, which is an 8-foot diameter by 7-foot high cylindrical double-contained PVC tank. Water moves through the tank in an upward manner to minimize short-circuiting and distribute the flow evenly throughout the tank. From the bottom, the tank is filled with one foot of drain rock with 4-inch perforated PVC inflow piping, filter fabric, three feet of carbon-based granular media, filter fabric, and one foot of drain rock with 4-inch perforated PVC outflow piping. The additional height of the tank allows a minimum of two feet of soil cover to be placed over the piping to reduce the possibility of freezing. The outflow pipe is 4-inch solid PVC and discharges to a concrete box with a 6-inch metal V-notch weir for flow measurement (Figure 3-2).

Treated water is discharged from the concrete box directly to the East Landfill Pond. Water from the pond will be discharged to the A-series ponds, as necessary, to maintain the pond at an acceptable level. The outlet is at approximately 5919.5 feet elevation. To accommodate system operation, the pond will be kept at 5919 feet or lower, which is a storage volume of approximately 23 acre-feet.

A temporary diversion dike consisting of hay bales, liner material, and riprap will be placed upstream of the seep to prevent surface water runoff and sediments from entering the seep interception system (Figure 3-3).

The following assumptions are incorporated into the development of the PAM:

- Drainage of the pond, as necessary, to accommodate construction will occur during the site preparation phase of construction of the passive seep interception and treatment system.
- Design flows are 3.6 gpm average and 6.7 gpm maximum.

## 3.2 Design

The Title II (95%) design for the OU 7 seep interception system includes detailed drawings and technical specifications of the temporary seep interception and treatment system.

## 3.3 Waste Management Considerations

Approximately five cubic yards of soil excavated during construction will be disposed at the Present Landfill. Although minimal dewatering will be required as part of this action, any water from dewatering during construction will be pumped to the East Landfill Pond. All expired carbon-based media will be disposed at the Present Landfill after a waste determination is made.

## 3.4 Consistency with Long-Term Actions

The components of this alternative are low cost or can be removed easily prior to capping for reuse during the IM/IRA.

## 3.5 Potential **ARARs/TBCs**

ARARs/TBCs for OU 7 are discussed in detail in *Potential Applicable or Relevant and Appropriate Requirements for Operable Unit No. 7* (EG&G, 1994b) and a summary of pertinent ARARs/TBCs information is presented in Appendix A.

Chemical-Specific ARARs

Chemical-specific ARARs set concentration limits for specific pollutants. EPA guidance directs that cleanup actions presume that groundwater be considered a potential source of drinking water unless site-specific factors indicate otherwise. Therefore, federal and state chemical-specific water standards have been listed as potential ARARs for OU 7. They include the following:

- Safe Drinking Water Act maximum contaminant levels (MCLs)
- RCRA groundwater protection standards
- Colorado Water Quality Control Act surface-water standards (general and segment-specific)

- Colorado Water Quality Control Act statewide groundwater standards
- Colorado primary drinking water regulations
- Treatment Standards for Hazardous Wastes (40 CFR 268.40)

Location Specific ARARs

Location-specific ARARs are regulations that set restrictions on activities or contaminant levels based on unique characteristics of the site. The area along the shoreline of the East Landfill Pond has been designated as a wetland by the U.S. Army Corps of Engineers (COE, 1994). Tall marsh occurs on the edge of the pond; short marsh occurs north and south of the pond throughout the spray evaporation areas. Consequently, the Clean Water Act Section 404 permitting requirements and 10 CFR 1022 have been identified as potential location-specific ARARs.

This accelerated action is not required to comply with the Floodplain Environmental Review Requirements in 10 CFR 1022, because the floodplains at RFETS do not meet the definition in the regulation (DOE, 1994b).

The Endangered Species Act; Bald and Golden Eagle Protection Act; and the Colorado Nongame, Endangered or Threatened Species Conservation Act have all been identified as potential ARARs because of the existence of regulated species under those acts in and around RFETS. No studies address the presence of wildlife at OU 7; however, studies measuring the presence of plant and animal life at RFETS indicate that several regulated species are located at the site. OU 7 has been identified as potential habitat for Preble's Meadow Jumping Mouse, which is a candidate for listing. Neither RFETS nor OU 7 has been identified as critical habitat for any regulated species (DOE, 1994a).

Action-Specific ARARs

Action-specific ARARs set controls or restrictions on particular kinds of activities related to management of hazardous substances or pollutants. Regulations 1 and 3 the Colorado Air Quality Control Commission and 6 CCR 1007-3, section 264.192 have been identified as action-specific ARARs.

No other requirements are applicable.

# 4. ENVIRONMENTAL IMPACTS

The potential environmental impacts of the accelerated action are discussed in the following sections.

## 4.1 Air Quality

There are two possible air quality impacts as a result of the accelerated action: potential VOC releases during interception and treatment of the seep water and fugitive dusts as a result of excavation and construction activities. The passive seep interception and treatment system will have a minimum impact on air quality. Emissions would be controlled during construction by use of appropriate dust suppression methods as specified in the Technical Specifications.

## 4.2 Water Quality

The accelerated action will reduce the contaminant loading to the East Landfill Pond. The seep is believed to be the source of the radionuclides, VOCs, and SVOCs present in East Landfill Pond sediments (DOE, 1994a). In addition, collected waters will be treated to meet ARAR/TBC standards, to the extent possible. Although construction activities may temporarily increase erosion, the stormwater diversion dike is designed to minimize erosion at the interception system.

## 4.3 Terrestrial Impacts

Plant and animal life may be negatively impacted by the accelerated action. As discussed in Section 3.6, wetlands have been identified along the shoreline of the East Landfill Pond. Approximately 75 square feet of wetlands will be impacted by the accelerated action. However, replacement of damaged wetlands will be addressed under the Landfill Closure IM/IRA Decision Document, resulting in no net impact.

OU 7 has been identified as potential habitat for Preble's Meadow Jumping Mouse, which is a candidate for listing. However, neither RFETS nor OU 7 has been identified as critical habitat for any regulated species (DOE, 1994a).

Prior to construction of the seep interception system, DOE will ensure the protection of plant and wildlife species of concern by evaluation of proposed field activities using procedure 1-DO6-ERP-END.03, "Identification and Protection of Threatened, Endangered, and Special-Concern Species."

## 4.4 Archaeology and Historic Sites

No archaeological or historic sites have been identified at OU 7.

## 4.5 Short- and Long-Term Productivity

Land adjacent to the seep is presently an operating landfill. The landfill will operate until it is closed in 1997. The area will be capped as part of landfill closure. The accelerated action will not affect present or future use of the site. In addition, equipment and materials will be reused to support final closure wherever possible.

## 4.6 Exposure Pathways

The accelerated action treats the seep water that may be a source of contamination for both surface water and groundwater thus eliminating potential pathways for further migration. Potential exposures by RFETS workers during construction and operation will be mitigated by following the Health and Safety requirements in the technical specifications.

## 4.7 Commitment of Resources

The scope of the accelerated action is small, and the material and human resources necessary for construction and operation are likewise relatively small. No significant commitments of valuable resources are involved.

## 4.8 Transportation Impacts

The impacts on health from transportation during the accelerated action include the potential for pollution and accident-related impacts. Transportation of construction materials will likely be limited to a 50-mile radius. Transportation impacts are minimal.

## 4.9 Cumulative Impacts

Because of the small scope and interim nature of the accelerated action, the cumulative negative impacts are limited. Factors specified in the National Contingency Plan (NCP) Section 300.415(b)(2) indicate that an accelerated action is appropriate for the OU 7 seep to address potential threats to public health and welfare and the environment.

## 5. PROJECT SCHEDULE

The Passive Seep Interception and Treatment System will be fully operational within six months of approval of this Revised Proposed Action Memorandum in accordance with Section I.B.10.b of the Inter-agency Agreement (IAG).

The Revised Proposed Action Memorandum was approved by the Colorado Department of Public Heath and Environment, with concurrence of EPA, on June 27, 1995. The approval letter is included as Appendix B.

## 6. REFERENCES

COE. 1994. U.S. Corps of Engineers, Omaha District, Wetlands Mapping and Resource Study. August.

DOE. 1991. Federal Facility Agreement and Consent Order (Interagency Agreement [IAG]: U.S. DOE, U.S. EPA, and CDH), U.S. Department of Energy, Washington D.C. January.

DOE. 1994a. Final Work Plan Technical Memorandum for Operable Unit No. 7 Rocky Flats Plant, Golden, Colorado. September.

DOE. 1994b. Memorandum. Guidance on the Application of Floodplains Regulations to Rocky Flats Plant. From Shirley J. Olinger, Acting Assistant Manager Environment, Safety and Health. To T.G. Hedahl, Associate General Manager EG&G. May 3, 1994.

EG&G 1994a. Technology Literature Research Operable Unit No. 7, Rocky Flats, Golden, Colorado. April.

EG&G. 1994b. Potential Applicable or Relevant and Appropriate Requirements for Operable Unit No. 7 - Present Landfill (IHSS 114) and Inactive Hazardous Waste Storage Area (IHSS 203). EG&G Rocky Flats, Inc., Golden, Colorado.

EPA. 1993. Presumptive Remedy for CERCLA Municipal Landfill Sites. EPA/540/F-93/035. September.

Rockwell International. 1986. Waste Stream Identification Characterization, Rocky Flats Plant, Areas 1-4. W.O. 2029-13-04-0001. Rockwell International, Rocky Flats Plant, Golden, CO.

# Appendix A

| Potential Contaminant of Concern | ARAR/TBC | Units | Citation |
|---|---|---|---|
| **Metals** | | | |
| Aluminum | 0.087 | mg/L | Colorado Water Quality Standards (5 CCR 1002-8,3.1.11), Aquatic-Chronic |
| Antimony | 0.3 | mg/L | Practical Quanitation Limit |
| Arsenic | 0.05 | mg/L | SDWA MCL (40 CFR 141) |
| Barium | 1 | mg/L | RCRA MCL (40 CFR 264.94) |
| Beryllium | 0.004 | mg/L | Segment 4 & 5 Standard (Standard is 1-day average) |
| Cadmium | TVS (0.0015) | mg/L | Segment 4 & 5 Standard |
| Chromium | 0.05 | mg/L | RCRA MCL (40 CFR 264.94) |
| Cobalt | 0.05 | mg/L | Colorado Water Quality Standards (5 CCR 1002-8,3.1.12), Agricultural |
| Copper | TVS (0.16) | mg/L | Segment 4 & 5 Standard |
| Lead | TVS (0.00646) | mg/L | Segment 4 & 5 Standard |
| Lithium | 2.5 | mg/L | Colorado Water Quality Standards (5 CCR 1002-8,3.1.12), Agricultural |
| Manganese | 0.05 | mg/L | Colorado Water Quality Standards (5 CCR 1002-8,3.1.11) |
| Mercury | 0.01 | mg/L | Segment 4 & 5 Standard |
| Molybdenum | | | |
| Nickel | 0.125 | mg/L | Segment 4 & 5 Standard |
| Selenium | 0.017 | mg/L | Colorado Water Quality Standards (5 CCR 1002-8,3.1.11) |
| Silver | 0.05 | mg/L | RCRA MCL (40 CFR 264.94) |
| Strontium | | | |
| Tin | 8 | mg/L | Practical Quanitation Limit |
| Vanadium | 0.1 | mg/L | Colorado Water Quality Standards (5 CCR 1002-8,3.1.12), Agricultural |
| Zinc | 2 | mg/L | Colorado Water Quality Standards (5 CCR 1002-8,3.1.11), Agricultural |
| **Radionuclides** | | | |
| Americium-241 | 30 | pCi/L | DOE Order 5400.5, Derived Concentration Guide |
| Cesium 137 | 3000 | pCi/L | DOE Order 5400.5, Derived Concentration Guide |
| Plutonium 238 | 30 | pCi/L | DOE Order 5400.5, Derived Concentration Guide |
| Plutonium 239 | 30 | pCi/L | DOE Order 5400.5, Derived Concentration Guide |
| Plutonium 239, 240 | 30 | pCi/L | DOE Order 5400.5, Derived Concentration Guide |
| Radium 226 | 100 | pCi/L | DOE Order 5400.5, Derived Concentration Guide |
| Strontium 89,90 | 60 | pCi/L | Segment 4 & 5 Standard |
| Strontium 90 | | | |
| Tritium | 1000 | pCi/L | DOE Order 5400.5, Derived Concentration Guide |
| Uranium 233,234 | 500 | pCi/L | DOE Order 5400.5, Derived Concentration Guide |
| Uranium 235 | 600 | pCi/L | DOE Order 5400.5, Derived Concentration Guide |
| Uranium 238 | 600 | pCi/L | DOE Order 5400.5, Derived Concentration Guide |

| Water Quality Parameters | | | |
|---|---|---|---|
| Bicarbonate as CaCO3 | | | |
| Carbonate as CaCO3 | | | |
| Chloride | | | |
| Cyanide | 0.2 | mg/L | SDWA MCL (40 CFR 141) |
| Dissolved Organic Carbon | | | |
| Fluoride | 2 | mg/L | Colorado Water Quality Standards (5 CCR 1002-8,3.1.11), Drinking Water |
| Nitrate/Nitrite | 10 | mg/L | SDWA MCL (40 CFR 141) |
| Nitrite | 0.5 | mg/L | Segment 4 & 5 Standard (Standard is 1-day average) |
| Oil and Grease | | | |
| Orthophosphate | | | |
| pH | | | |
| Phosphorus | | | |
| Silica | | | |
| Silicon | | | |
| Solids, Nonvolatile Suspended | | | |
| Sulfate | 250 | mg/L | Colorado Water Quality Standards (5 CCR 1002-8,3.1.11), Drinking Water |
| Total Dissolved Solids | | | |
| Total Organic Carbon | | | |
| Total Suspended Solids | | | |
| **Volatile Organic Compounds** | | | |
| 1,1-Dichloroethane | 0.059 | mg/L | 6 CCR 1007-3, Section 268.43 |
| 1,2-Dichloroethene | 0.07 | mg/L | SDWA MCL (40 CFR 141) |
| 2-Butanone | 0.28 | mg/L | 6 CCR 1007-3, Section 268.43 |
| 2-Hexanone | 0.05 | mg/L | Practical Quanitation Limit |
| 4-Methyl-2-pentanone | 0.14 | mg/L | 6 CCR 1007-3, Section 268.43 |
| Acetone | 0.28 | mg/L | 6 CCR 1007-3, Section 268.43 |
| Benzene | 0.001 | mg/L | Colorado Water Quality Standards (5 CCR 1002-8,3.1.11), Human Health, Drinking Water and Fish |
| Carbon Disulfide | | | |
| Chloromethane | 0.0057 | mg/L | Colorado Water Quality Standards (5 CCR 1002-8,3.1.11), Drinking Water and Fish |
| Ethylbenzene | 0.057 | mg/L | Treatment Standards for Hazardous Wastes (40 CFR 268.40) |
| Methylene Chloride | 0.0047 | mg/L | Colorado Water Quality Standards (5 CCR 1002-8,3.1.11), Human Health, Drinking Water and Fish |
| o-Xylene | | | |
| Tetrachloroethene | 0.001 | mg/L | Practical Quanitation Limit (5 CCR 1002-8, 3.1.11) |

| | | | |
|---|---|---|---|
| Toluene | 1 | mg/L | SDWA MCL (40 CFR 141) |
| Total Xylenes | 10 | mg/L | SDWA MCL (40 CFR 141) |
| Trichloroethene | 0.0027 | mg/L | Colorado Water Quality Standards (5 CCR 1002-8,3.1.11), Human Health, Drinking Water and Fish |
| Vinyl Acetate | 0.005 | mg/L | Practical Quanitation Limit |
| Vinyl Chloride | 0.002 | mg/L | SDWA MCL (40 CFR 141) |
| **Semivolatile Organic Compounds** | | | |
| 2,4-Dimethylphenol | 0.036 | mg/L | Treatment Standards for Hazardous Wastes (40 CFR 268.40) |
| 2-Methylnaphthalene | 0.01 | mg/L | Practical Quanitation Limit |
| 4-Methylphenol | | | |
| Acenapthene | 0.52 | mg/L | Colorado Water Quality Standards (5 CCR 1002-8,3.1.11), Aquatic-Chronic |
| Bis(2-ethylhexyl)phthalate | 0.01 | mg/L | Practical Quanitation Limit (5 CCR 1002-8, 3.1.11) |
| Dibenzofuran | 0.01 | mg/L | Practical Quanitation Limit |
| Diethyl phthalate | 0.2 | mg/L | Treatment Standards for Hazardous Wastes (40 CFR 268.40) |
| Fluorene | 0.01 | mg/L | Practical Quanitation Limit (5 CCR 1002-8, 3.1.11) |
| Napthalene | 0.01 | mg/L | Practical Quanitation Limit (5 CCR 1002-8, 3.1.11) |
| Phenanthrene | 0.01 | mg/L | Practical Quanitation Limit (5 CCR 1002-8, 3.1.11) |
| **Pesticides** | | | |
| alpha-BHC | | | |
| | | | |
| Shaded areas mean no ARAR found. | | | |
| TVS = table value standard, hardness-dependent from 5 CCR 1002-8. | | | |

# Appendix B

# STATE OF COLORADO

Roy Romer, Governor
Patti Shwayder, Acting Executive Director

*Dedicated to protecting and improving the health and environment of the people of Colorado*

**HAZARDOUS MATERIALS AND WASTE MANAGEMENT DIVISION**

4300 Cherry Creek Dr. S.
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Phone (303) 692-3300
Fax (303) 759-5355

222 S. 6th Street, Room 232
Grand Junction, Colorado 81501-2768
Phone (303) 248-7164
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Colorado Department
of Public Health
and Environment

June 27, 1995

Steve Slaten
IAG Project Coordinator-ER
Department of Energy
Rocky Flats Office
P.O. Box 928
Golden CO 80402-0928

**RE: Modified OU 7 Passive Seep Collection and Treatment PAM**

Dear Mr. Slaten:

The Colorado Department of Public Health and Environment, Hazardous Materials and Waste Management Division (the Division) and the Environmental Protection Agency (EPA) have reviewed DOE's draft Modified Seep Collection and Treatment PAM for OU 7. The Division, as lead agency and with the concurrence of EPA, approves this document. The objectives of the original PAM are satisfied by this revised PAM which proposes methods which are more consistent with landfill closure. Therefore, an additional public comment period will not be necessary.

The milestone "Begin Seep Collection" scheduled for August 16, 1995 in the original PAM is annulled. Construction must, however, proceed so that the seep collection system is operational within six months of this approval date.

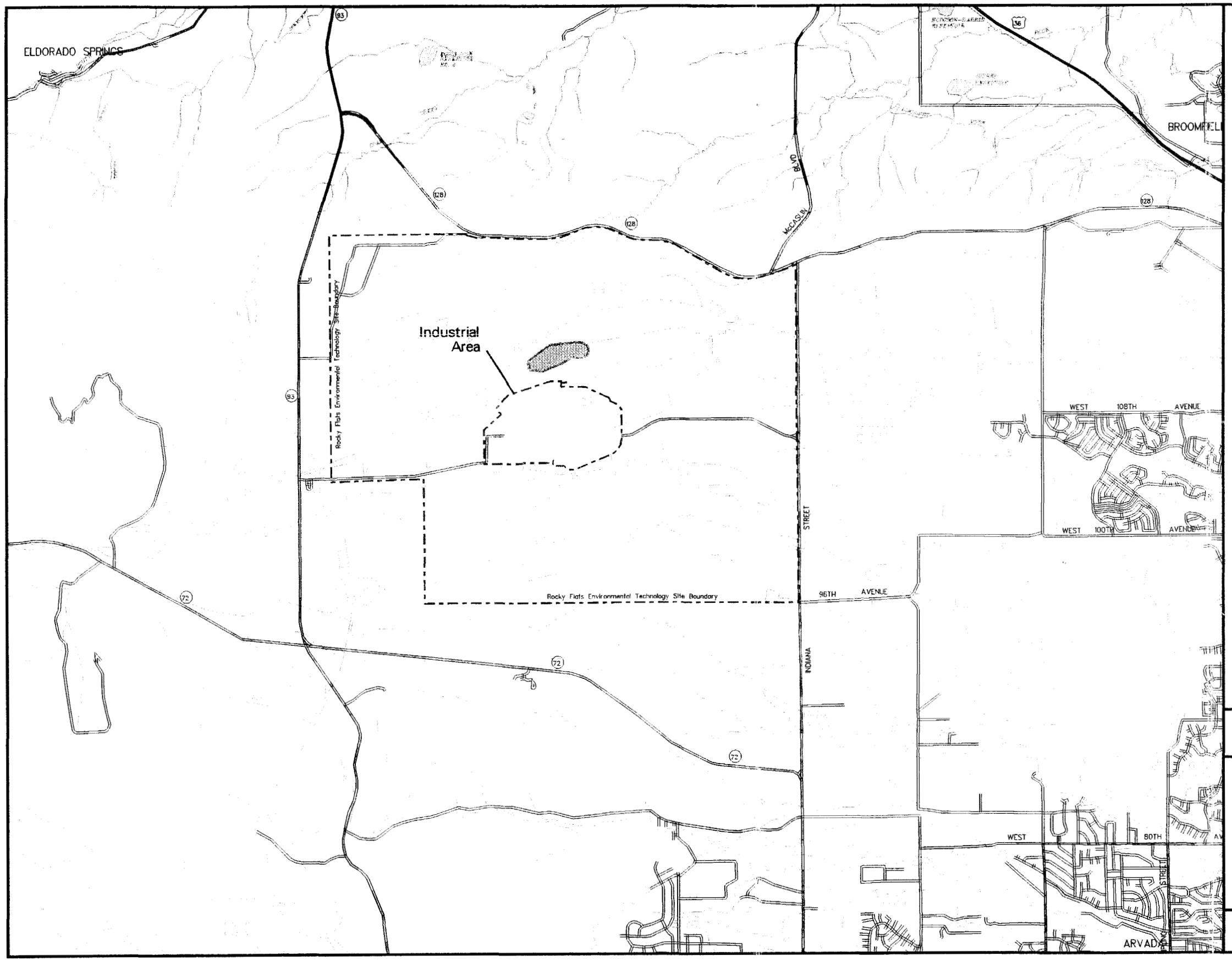
If you have any questions regarding these matters, please contact Carl Spreng at 692-3358.

Sincerely,

Joe Schieffelin
Rocky Flats Unit Leader
Hazardous Waste Control Program

cc: Peg Witherill, DOE
Laurie Peterson-Wright, EG&G
Martin Hestmark, EPA
Bill Fraser, EPA
Laura Perrault, AGO
Steve Tarlton, RFPU

3131




## EXPLANATION

- Streams
- Rocky Flats Environmental Technology Site Boundary
- Primary Roads
- Secondary Roads
- Light--Duty Roads
- OU 7

N

0 Miles 1 2

0 Feet 4500 9000

Scale: 1 inch = 4500 feet

U.S. DEPARTMENT OF ENERGY
Rocky Flats Environmental Technology Site, Golden, Colorado

# Location Map of OU 7, Rocky Flats Environmental Technology Site and Vicinity

Proposed Action Memorandum

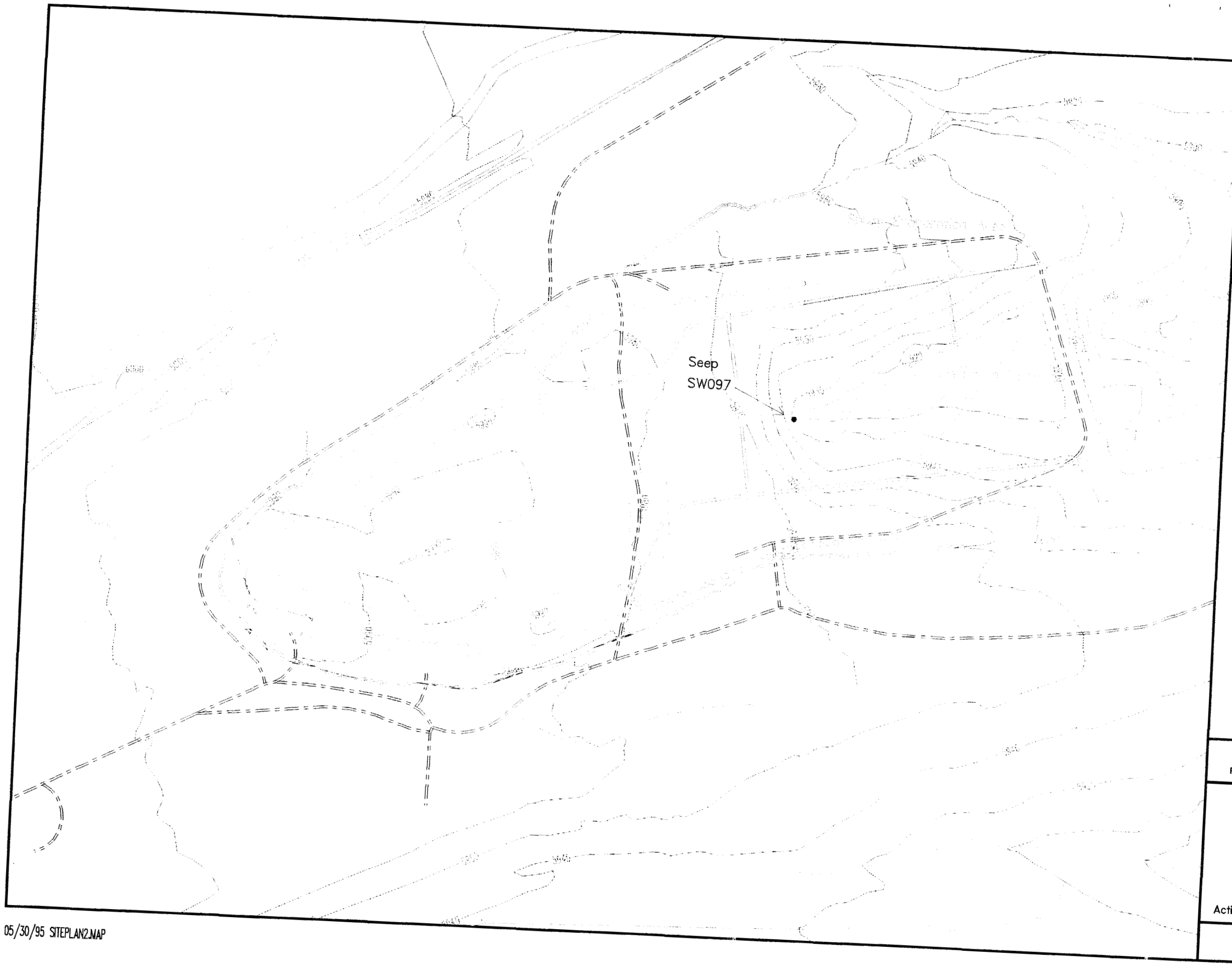
Operable Unit No. 7

June 1995

Figure 1-1

05/30/95 VICNITY2.MAP

1




## EXPLANATION

- OU 7 IHSS Boundary
- Spray Evaporation Area
- Ditch and Drainage Feature
- Intermittent Stream
- Dirt Road
- Existing Surface-Water Diversion Ditch
- Existing Slurry Wall
- Groundwater Intercept System
  - (perforated)
  - (non-perforated)
- Leachate Collection System
- Approximate Extent of Asbestos Disposal

0 Feet 250 500

Topographic Contour Interval = 20 Feet

U.S. DEPARTMENT OF ENERGY
Rocky Flats Environmental Technology Site, Golden, Colorado

# Remedial Action Areas and Engineering Controls

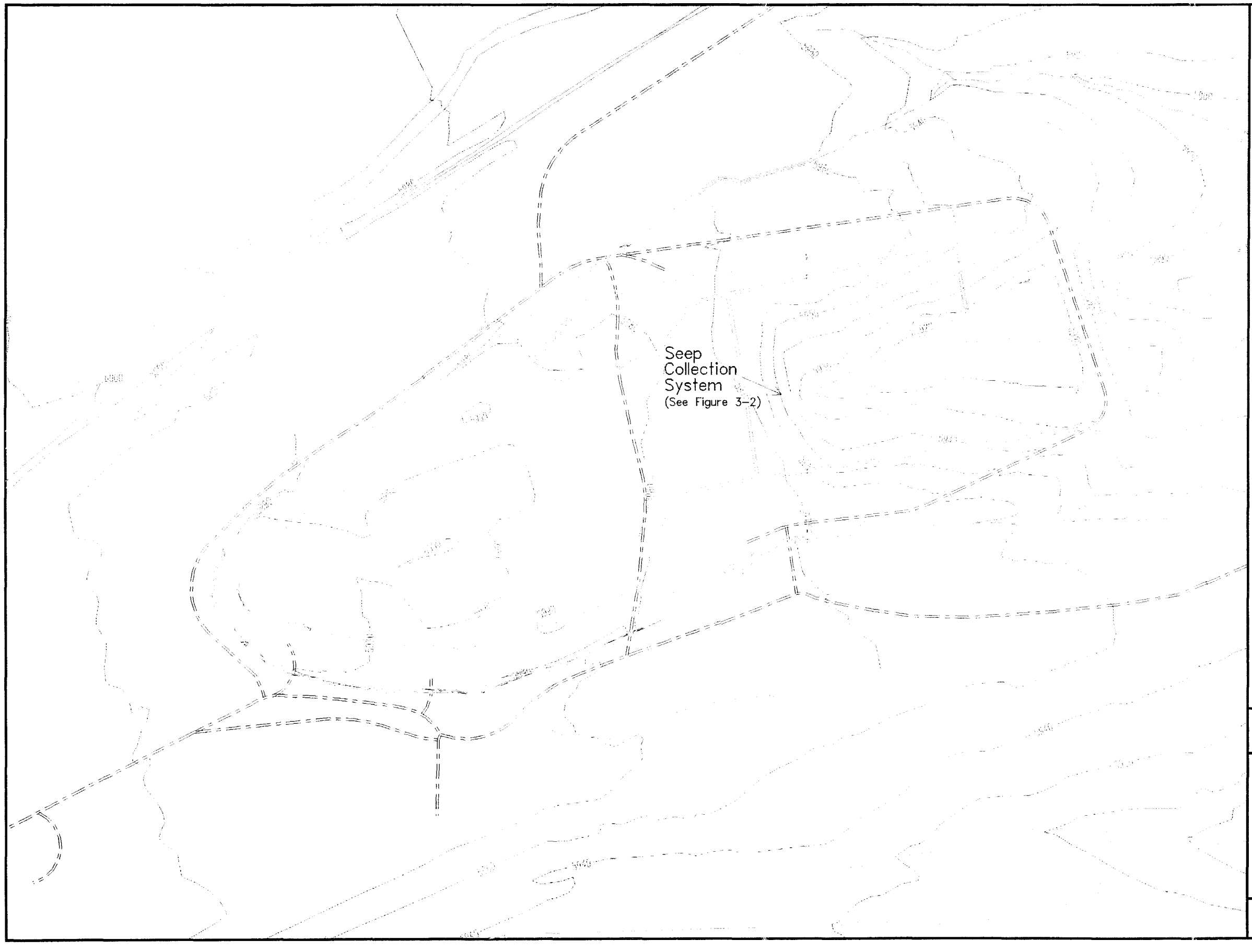
Proposed Action Memorandum

Operable Unit No. 7

June 1995

Figure 2-1

05/30/95 SITEPLAN2.MAP




## EXPLANATION

OU 7 IHSS Boundary

Ditch and Drainage Feature

Intermittent Stream

Dirt Road

Existing Surface-Water Diversion Ditch

Existing Slurry Wall

Perforated Subsurface Drainage Control System

Non-perforated Subsurface Drainage Control System

Seep Collection System

N

0 Feet 250 500

Topographic Contour Interval = 20 Feet

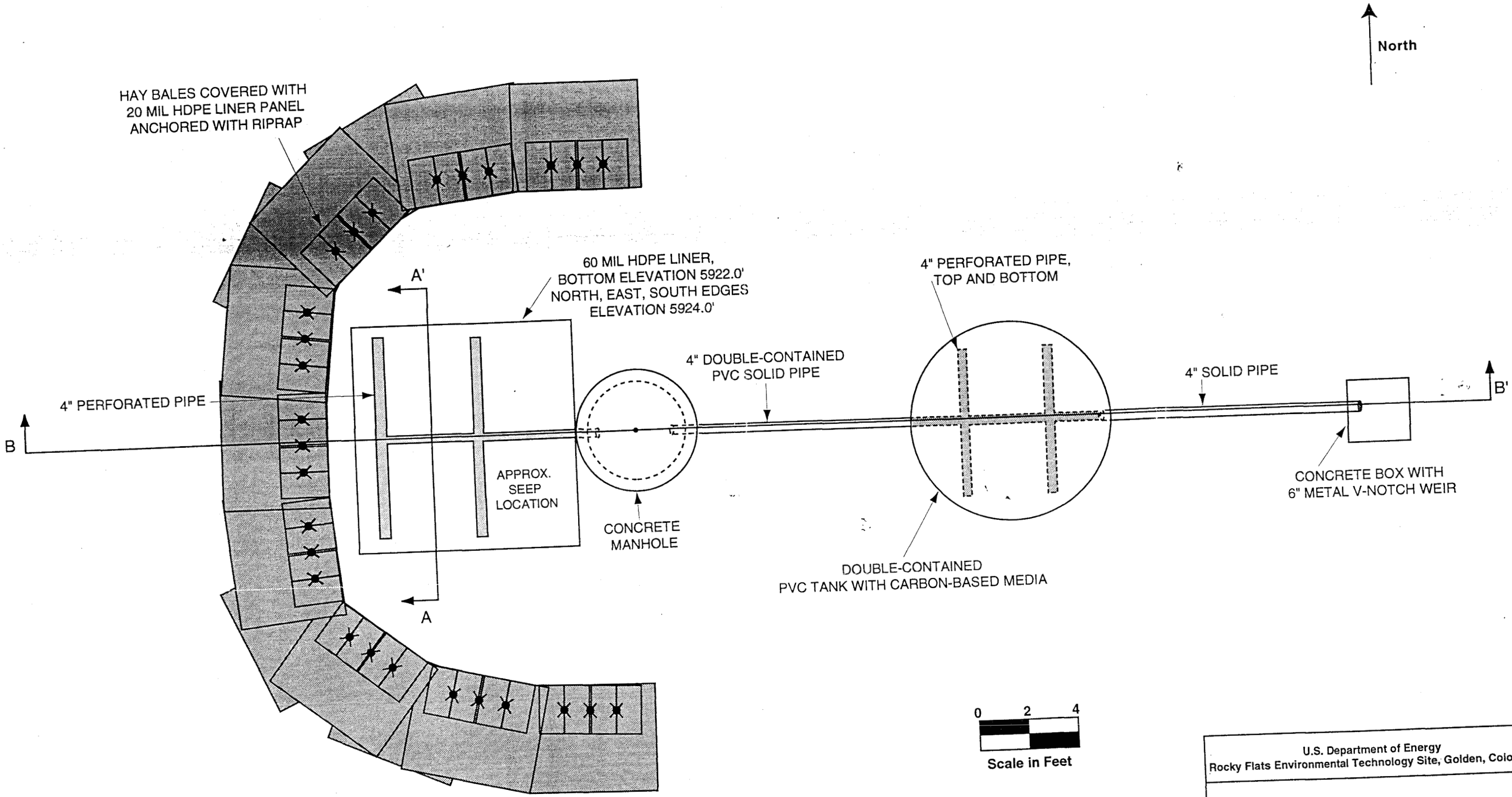
U.S. DEPARTMENT OF ENERGY
Rocky Flats Environmental Technology Site, Golden, Colorado

# Seep Collection Facility Plan View

Proposed Action Memorandum | Operable Unit No. 7

June 1995 | Figure 3-1

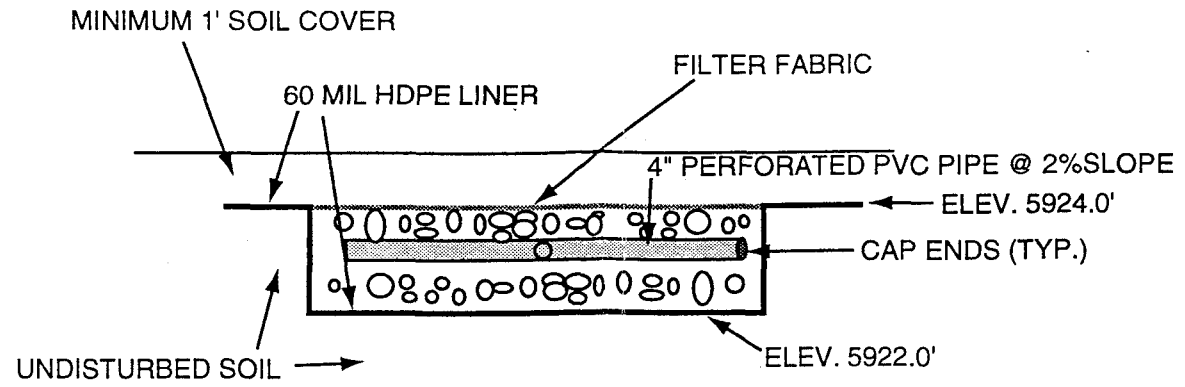
05/30/95 SEEPFACIL.MAP



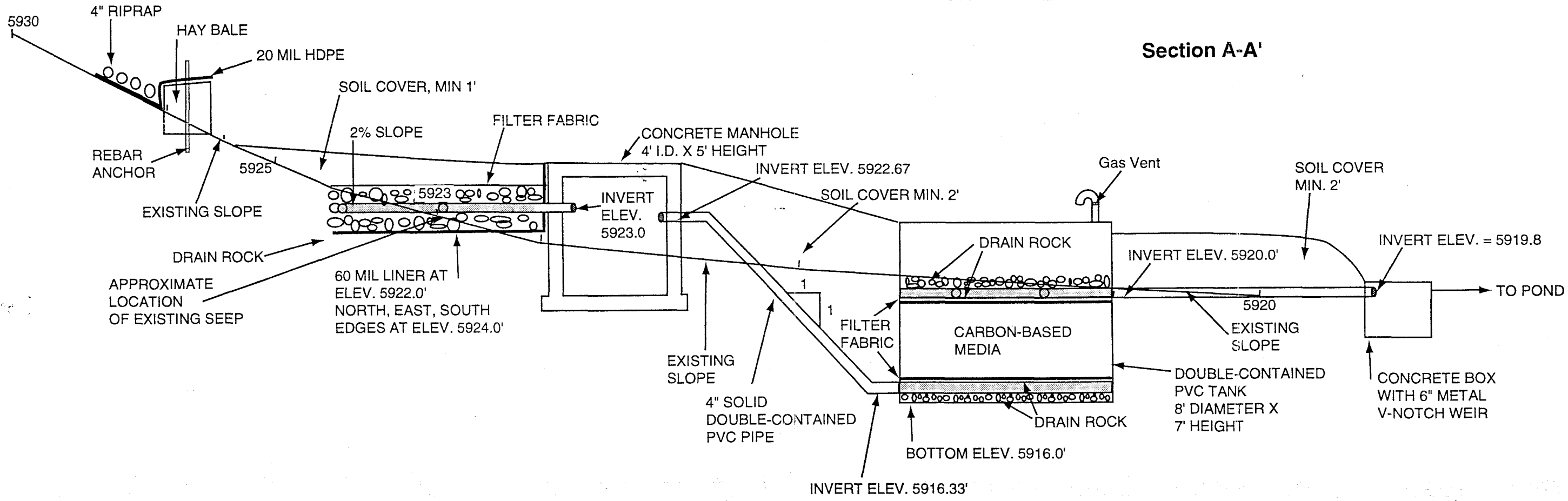

**PLAN VIEW**

| | |
|---|---|
| U.S. Department of Energy<br>Rocky Flats Environmental Technology Site, Golden, Colorado | |
| Passive Collection<br>and Treatment System<br><br>Plan View | |
| Proposed Action Memorandum | Operable Unit No. 7 |
| June 1995 | Figure 3-2 |

95\es\Passive Trtmt 1.ill




**Section A-A'**




**Section B-B'**

0 2 4

**Scale in Feet**

| U.S. Department of Energy<br>Rocky Flats Environmental Technology Site, Golden, Colorado | |
|---|---|
| **Passive Collection and Treatment System**<br>**Cross Sections** | |
| Proposed Action Memorandum | Operable Unit No. 7 |
| June 1995 | Figure 3-3 |

95\es\Passive Trtmt 2.ill