



DRAFT

Corrective Action Decision/ Record of Decision

OU11: West Spray Field

**The Rocky Flats Environmental Technology Site
Golden, Colorado**

**September
1995**

ADMIN RECORD

A-OU11-000173

**CORRECTIVE ACTION DECISION/RECORD OF DECISION
DECLARATION**

Site Name and Location

Rocky Flats Environmental Technology Site Operable Unit 11 West Spray Field, Jefferson County, Colorado

Statement of Basis and Purpose

This decision document presents the selected remedial action/corrective action for the Rocky Flats Environmental Technology Site Operable Unit (OU) 11 West Spray Field, located near Golden, Colorado. The selected remedial action was chosen in accordance with the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980, as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986, the Colorado Hazardous Waste Act (CHWA) and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). The Resource Conservation Recovery Act (RCRA) is administered through the CHWA by the Colorado Department of Public Health and the Environment (CDPHE). OU 11 was investigated and a remedial alternative was selected in compliance with the Federal Facility Agreement and Consent Order Inter-Agency Agreement (IAG) signed by the U.S. Department of Energy (DOE), the State of Colorado, and the U.S. Environmental Protection Agency (EPA) on January 22, 1991.

Description of the Selected Remedy

OU 11 West Spray Field is composed of one Individual Hazardous Substance Site (IHSS), IHSS 168. The preferred alternative for OU 11 consists of "No action". The No Action decision for OU 11 is based upon the NCP, which provides for the selection of a No Action alternative when a site or OU is in a protective state, i.e., poses no current or potential threat to human health or the environment. The risk evaluation performed in the RCRA Facilities Investigation/CERCLA Remedial Investigation (RFI/RI) Report determined that OU 11 was in a protective state.

Declaration Statement

DOE has determined that no remedial action is necessary to be protective of human health and the environment at Rocky Flats Environmental Technology Site Operable Unit 11 West Spray Field. Because the remedy will not result in hazardous substances, pollutants, or contaminants remaining onsite above levels that allow for unlimited use and unrestricted exposure, five-year reviews per Section 121 of CERCLA are not required.

Mark N. Silverman, Manager
U.S. Department of Energy, Rocky Flats Field Office

Date

Jack W. McGraw
Deputy Regional Administrator, Region VIII
U.S. Environmental Protection Agency

Date

Thomas P. Looby, Director, Office of Environment,
Colorado Department of Public Health and Environment

Date

DECISION SUMMARY

Site Name, Location, and Description

Rocky Flats Environmental Technology Site (Rocky Flats) is located north of the City of Golden, south of the City of Boulder, and west of the Cities of Arvada and Westminster in northern Jefferson County, Colorado. A site location map is attached (See Figure 1). Most Rocky Flats structures are located within the industrialized area of Rocky Flats, which occupies approximately 400 acres. Rocky Flats is surrounded by a buffer zone of approximately 6,150 acres (See Figure 2). OU 11 occupies 105 acres within the western buffer zone.

Rocky Flats is located along the eastern edge of the southern Rocky Mountain region, immediately east of the Colorado Front Range. The site is located on a broad, eastward-sloping pediment that is capped by alluvial deposits of Quaternary age (i.e., Rocky Flats Alluvium). The tops of alluvial-covered pediments are nearly flat but slope eastward at 50 to 200 feet per mile (EC&G, 1992). The topography of OU 11 is relatively level with an approximately 2% eastward slope, contrasting dramatically with the foothills to the west and the incised drainages to the east. The elevation of OU 11 ranges from approximately 6,140 feet above mean sea level (msl) on the west to approximately 6,080 feet above msl on the east.

At Rocky Flats, the alluvial-covered pediment surface is dissected by a series of east-northeast trending stream-cut valleys. The valley floors containing Rock Creek, North and South Walnut Creeks, and Woman Creek lie 50 to 200 feet below the elevation of the older pediment surface. These valleys incise into the bedrock underlying alluvial deposits, but most bedrock is concealed beneath colluvial material accumulated along the gentle valley slopes. Rock Creek, North and South Walnut Creeks, and Woman Creek are intermittent streams that flow generally from west to east and drain excessive water collected at Rocky Flats. Retention ponds are located in each of the creeks downstream of the main site. Rock Creek surface water flows northeast to the Rock Creek confluence with Coal Creek. Surface water within North and South Walnut Creeks, which is not retained within retention ponds used for spill control, flows to Great Western Reservoir. Surface water within Woman Creek, which is not diverted to Mower Reservoir, currently flows to Standley Lake. OU 11 is located between the Woman Creek and Walnut Creek drainages but is not dissected by either creek. No surface water bodies exist within OU 11. Surface water impoundments located nearby are the clay pits to the west, the Raw Water Pond to the southeast and impoundments to the northeast associated with McKay and Church ditches. However, none of these impoundments directly contribute to surface flow at OU 11 or collect surface flow from OU 11.

The population, economics, and land use of areas surrounding Rocky Flats are described in a 1989 Rocky Flats vicinity demographics report prepared by the Department of Energy (DOE) (U.S. DOE, 1991a). Land use within 0 to 10 miles of Rocky Flats has been divided within the demographics report into residential, commercial, industrial, parks and open space, agricultural and vacant, and institutional classifications. Most residential use within five miles of Rocky Flats is located immediately northeast, east, and southeast of Rocky Flats. Commercial development is concentrated near residential developments north and southwest of Standley Lake and around Jefferson County Airport, located approximately three miles northeast of Rocky Flats. Industrial land use within five miles of the site is limited to quarrying and mining operations. Natural resources associated with the quarrying and mining activities include sand, gravel and coal. Open-space lands are located around many surrounding cities including Arvada, Broomfield, Golden, and Westminster. The west, north, and east sides of Standley Lake are surrounded by open-space irrigated and nonirrigated croplands, producing primarily wheat and barley, are located north and northeast of Rocky Flats near the cities of Broomfield, Lafayette, Louisville, and Boulder and in scattered parcels adjacent to the east boundary of the site. Several horse operations and small hay fields are located south of Rocky Flats. The demographic report characterizes much of the vacant land adjacent to Rocky Flats as rangeland. OU 11 is undeveloped and unused.

Site History and Enforcement Activities

Rocky Flats is a government-owned, contractor-operated facility, which is a part of the nationwide nuclear weapons complex. The site was operated for the U.S. Atomic Energy Commission (AEC) from its inception during 1951 until the AEC was dissolved during 1975. Responsibility for Rocky Flats was assigned to the Energy Research and Development Administration (ERDA), which was succeeded by DOE during 1977. Previous operations at Rocky Flats consisted of fabrication of nuclear weapons components from plutonium, uranium, and nonradioactive metals (i.e., stainless steel and beryllium).

Between April 1982 and October 1985, OU 11 was used for periodic spray application of excess liquids pumped from Solar Evaporation Ponds 207-B North and 207-B Center as a means of evaporating waste water. When the storage capacity of one of these ponds was reached, the liquids were pumped to OU 11 via an aboveground pipeline for spray application. The sources of waste water stored in the Solar Evaporation Ponds and sprayed at OU 11 included effluents from the Sewage Treatment Plant and water collected in the Interceptor Trench System. Approximately, 66 million gallons from the Solar Evaporation Ponds were sprayed at OU 11. The pond liquids contained elevated levels of nitrates, metals, radionuclides, volatile organic compounds and semivolatile compounds.

Various studies were conducted at Rocky Flats to characterize environmental media and to assess the extent of radiological and chemical contaminant releases to the environment. The investigations performed before 1986 were summarized by Rockwell International (1986a). During 1986, two investigations were completed at the site. The first was the DOE Comprehensive Environmental Assessment and Response Program (CEARP) Phase I Installation Assessment (*U.S. DOE, 1986*). A number of sites that could potentially have adverse impacts on the environment were identified and designated as Solid Waste Management Units (SWMUs) within the CEARP of Rocky Flats. A result of this investigation was that OU 11 was identified as a SWMU because of spray application of liquids from the Solar Evaporation Ponds. The second investigation involved a hydrogeologic and hydrochemical characterization of Rocky Flats (Rockwell International, 1986b).

On January 22, 1991, a Federal Facility Agreement and Consent Order (i.e., the Interagency Agreement (IAG)) was signed by DOE, EPA Region VIII, and the State of Colorado. Within the IAG, the SWMUs were changed to IHSSs and one IHSS was assigned to OU 11, IHSS 168. The boundaries of OU 11 and IHSS 168 coincide. As per the IAG, draft and final Work Plans, and draft and final RCRA Facility Investigation/Remedial Investigation (RFI/RI) Reports were prepared and submitted to the regulatory agencies. The RFI/RI Report for OU 11 was defined by the Statement of Work (Attachment 2 of the IAG) to fulfill the IAG requirements for submittal of documentation and data necessary to determine if the risk from OU 11 warrants the need for remedial action.

The IAG scope of work was incorporated in its entirety within the Colorado Hazardous Waste Permit (CHWP) for Rocky Flats. Upon signature of the Corrective Action Decision/Record of Decision (CAD/ROD) by DOE, EPA, and the State of Colorado, the State shall modify the CHWP for Rocky Flats to incorporate the signed CAD/ROD for OU 11.

Highlights of Community Participation

Results of the Combined Phases RFI/RI for OU 11 were presented to the public at the Rocky Flats Technical Review Group meeting on May 11, 1995. A public comment period was held concurrently for the *Proposed Plan and Draft Modification of CHWP for Rocky Flats OU 11 West Spray Field (IHSS 168)*. The public comment period was held from June 28, 1995 to August 28, 1995. At a public hearing conducted on July 19, 1995, public questions regarding the *Proposed Plan and Draft Modification of CHWP for Rocky Flats OU 11 West Spray Field (IHSS 168)* for OU 11 were answered but no formal public comments were made at this hearing. Written comments and comment responses on the *Proposed Plan and Draft Modification of CHWP for Rocky Flats OU 11 West Spray Field (IHSS 168)* are located in the

Responsiveness Summary section of this CAD/ROD

Scope and Role of Operable Unit 11 within Site Strategy

The scope, defined for OU 11 within Table 5 of the IAG, includes submittal of documentation and data required to close the regulated unit in accordance with the IAG. The RFI/RI work plans and reports were completed and submitted in accordance with the requirements specified within Table 5 and Table 6 of the IAG. No remedial action is required for OU 11 because the RFI/RI performed and documented in the Operable Unit 11 Combined Phases RFI/RI Report, determined that OU 11 is in a protective state.

Site Characteristics

The uppermost water bearing unit at Rocky Flats is unconfined and consists of surficial deposits (i.e., Rocky Flats Alluvium, colluvium, valley-fill alluvium, fill material, and disturbed ground), weathered bedrock units, and subcrops of the Arapahoe and Laramie Formations. The bedrock underlying OU 11 can be considered an aquitard. The direction of ground water flow within the surficial deposits is generally from west to east beneath OU 11. Recharge to the surficial water-bearing unit occurs primarily from precipitation. Discharge from the surficial water-bearing unit occurs primarily at minor seeps at Rocky Flats, however, these seeps are not located within the OU 11 boundary. Seeps occur in colluvial deposits that cover the contact between the alluvium and bedrock along the edges of the valleys. Discharge also occurs through seepage into other surficial and weathered geologic formations and through evapotranspiration.

The spray application of Solar Evaporation Pond liquids between April 1982 and October 1985, is the only known or suspected source of contamination at OU 11. The RFI/RI conducted in 1994, identified nitrate/nitrite, tritium, plutonium-239/240 and americium-241 as Contaminants of Concern (COCs) in soils. No COCs were identified in ground water. Rocky Flats Programmatic Preliminary Remediation Goals (PPRGs) served as the basis for toxicity and/or carcinogenicity evaluations of the COCs. The PPRGs are based on a one in one million carcinogenic risk and a non-carcinogenic hazard index of one under a residential use scenario. A comparison of the background value, the maximum OU 11 value, and the PPRG for each COC is presented in the following table (mg/kg - milligrams per kilogram, pCi/g - picocuries per gram)

<u>COC</u>	<u>Background</u>	<u>OU 11 Maximum</u>	<u>PPRG</u>
Nitrate/Nitrite	2.3 mg/kg	37 mg/kg	439,000 mg/kg
Tritium	0.1294 pCi/g	3.4 pCi/g	14,700 pCi/g
Plutonium-239/240	0.05 pCi/g	2.2 pCi/g	3.42 pCi/g
Americium-241	0.019 pCi/g	0.43 pCi/g	2.37 pCi/g

In each case the maximum concentration of the COC is less than the corresponding PPRG. This information was used to quantify the site risk as described in detail in the following section.

Surficial soils and subsurface geologic materials are the media hosting COCs and represent the principal pathways for contaminant migration at OU 11. Physical and chemical characteristics of the OU 11 soils, and the chemical characteristics of the COCs determine the mobility of the COCs. The chemical characteristics of nitrate support a two-fold fate for the compound. The first fate involves the relatively fast migration of nitrate/nitrite through ground water due to its high solubility in water. The second fate involves the uptake of nitrate/nitrite by nitrogen fixing plants in the area. The higher than normal plant biomass and lack of elevated levels of nitrate/nitrite in ground water indicates that much of the nitrate/nitrite from spray application was bound in surficial soils and associated vegetation before deep infiltration or downward migration could occur. Tritium would be expected to be mobilized via ground water. However, tritium was not identified as a contaminant in ground water and there is no spatial correlation between tritium in ground water and subsurface geologic materials. The radionuclides

americium and plutonium appear to have readily adsorbed to soil particles and have exhibited little migration since the termination of spray activities. Thus, the potential for migration of the OU 11 COCs appears to be extremely limited.

An Applicable or Relevant and Appropriate Requirements (ARARs) evaluation was not performed because no COCs were identified in ground water, thus there were no applicable requirements for OU 11. In this case, the results of the CDPHE screen were determined to be the best indication that no action was necessary for the site.

Summary of Site Risks

The risks to human health and the environment associated with OU 11 were characterized through the Combined Phases RFI/RI, which was completed in accordance with the requirements presented in the IAG and specifically identified in the Final Phase I RFI/RI Work Plan for OU 11. The Operable Unit 11 Combined Phases RFI/RI Report documents the results of the investigation including an evaluation of risks at the site in detail.

Human health risks at the site have been quantified using the CDPHE Conservative Screen process. At OU 11, four COCs were identified in soils, and no COCs were identified in other media. The four COCs in soil were nitrate/nitrite, tritium, plutonium-239/240 and americium-241. The concentration of these COCs at OU 11 are very low resulting in a CDPHE Conservative Screen ratio sum of less than one and a corresponding risk of less than one in one million. The ratio sum of less than one resulted in identification of OU 11 as a low-hazard site, requiring No Action under a residential use scenario.

The screening level ecological risk assessment concluded that past operations at OU 11 have had no significant adverse ecological effects. No negative effects to critical habitats, wetlands, or endangered species were identified. Trends in the ecological data are consistent with effects of supplemental watering and fertilizing in a semiarid grassland. While this may have caused effects to vegetation such as increased biomass and litter, the effects are not detrimental to the grassland ecosystem.

Explanation of Significant Changes

No changes in the selected remedy have been made since the release of the *Final Proposed Plan and Draft Modification of Colorado Hazardous Waste Permit for Rocky Flats Environmental Technical Site Operable Unit 11 West Spray Field (IHSS 168)*.

RESPONSIVENESS SUMMARY

Proposed Plan/Draft Modification of the Colorado Hazardous Waste Permit for Rocky Flats Oper- ble Unit 11 West Spray Field

Commenter 1 had the following comment on the Proposed Plan:

Comment 1

Comment It takes a great leap of faith to believe that OU 11 is not grossly contaminated. It is more logical to believe DOE desperately needs some positive action, but this is no way to get it. This field represents over 100 acres of otherwise beautiful landscape that has been contaminated for years by millions of gallons of toxic waste water containing high levels of nitrates, metals, radionuclides, volatile organic compounds, and semi-volatile organic compounds. The organic compounds will be assimilated with time. The nitrates may help grass to grow and reduce wind dispersion of the metals and radionuclides, but the radionuclides and some metals will be there awaiting dispersion for thousands of years.

Given the proximity of this site to the Metro Denver Area and development potential, I suggest that DOE provide more evidence of the alleged benign risks to human health. I request a copy of the Final Combined Phases RFI/RI Report and other data that may support DOE's proposal.

As you may know, the RFCC is a completely independent organization dedicated to the safe and expedient cleanup of RFETS. It is authorized under Superfund to assess technical documents regarding the cleanup of the RFETS superfund site, as in this case. Our main problem is timely notice of the preliminary design data and a copy of the final document. We would appreciate your help. Thanks for your consideration.

Response The Operable Unit 11 Final Combined Phases RFI/RI Report provides a comprehensive discussion of the OU 11 field investigation, site physical characteristics, nature and extent of contamination, contaminant fate and transport, and risk assessment for human health and the environment. This report has been available for review at public reading rooms since June 26, 1995. The commenter has been provided with a copy of the report.

Commenter 2 asked a series of questions relative to the OU 11 closure.

Question 1

Question When did the site first be considered contaminated?

Response The West Spray Field was identified as a hazardous waste management unit regulated by the Resource Conservation and Recovery Act (RCRA) in 1986 because it was known to have received water containing hazardous constituents from the Solar Evaporation Ponds. This designation was made soon after the termination of spray operations in October 1985.

Question 2

Question Was site considered contaminated prior to this report?

Response Yes The site has been recognized as potentially contaminated since its designation as a hazardous waste management unit under RCRA in 1986

Question 3

Question Was the contaminated site the full 105 acres prior to the report?

Response The OU 11 boundary was established as part of the identification of the West Spray Field as a hazardous waste management unit under RCRA in 1986 Based on the operational history of the site the OU 11 boundary was established to encompass all spray areas, but not all areas within the OU 11 boundary received direct spray application

Question 4

Question This report concludes that the site is within acceptable levels of contamination for a residential use for a 30 year estimate Does this mean the property can be used for commercial mining for the underlying mineral owners, as was previously approved and permitted?

Response OU 11 has met the criteria for No Action under the Colorado Department of Public Health and Environment (CDPHE) Conservative Risk Screen using a residential use scenario, as documented in the Final RFI/RI Report The CDPHE Screen is designed so that any site meeting the No Action criteria is open for unrestricted use The residential use scenario integrated into the CDPHE Screen utilizes more conservative exposure criteria than a mining scenario, and therefore, risk under a mining scenario would be less than presented within the Final RFI/RI Report Thus, commercial mining of the site would not be affected with regard to OU 11

Question 5

Question Will any restrictions be placed on the site for future development?

Response As stated in more detail in the response to Question 4, the CDPHE Screen has determined that the site is open for unrestricted use with regard to OU 11

Question 6

Question What is planned on being done to correct the public's perception that this area is still contaminated?

Response The Final Combined Phases RFI/RI Report, Final Proposed Plan, and Final CAD/ROD are all documents available for public review Newspaper advertisements have been published in the Denver Post and Rocky Mountain News notifying the public of the remedial alternative selected for OU 11 Additional newspaper advertisements will inform the public as to the final closure of OU 11 as documented in the Corrective Action Decision/Record of Decision (CAD/ROD)

Question 7

Question With regard to the conclusion that there is very localized perching of ground water, will the excavation of minerals from the site affect the ground water or the saturation zone?

Response This question cannot be accurately answered without knowledge of the design details of the possible mining operation. In addition this is not a DOE concern with respect to past operations at OU 11

Question 8

Question With regard to the conclusion that current conditions are unlikely to result in releases to the environment, would mining operations, which are not a current condition, result in such a release?

Response The CDPHE Screen has shown that there is no significant source at OU 11 for a release. Therefore, a change in current conditions, such as the initiation of mining activities, could not result in the release of chemicals that constitute a threat to human health and the environment.

Question 9

Question. With regard to the statement that there is no current or imminent threat under present or projected land uses, do projected land uses include mining?

Response As stated in more detail in the response to Question 4, the residential scenario integrated into the CDPHE Screen is more conservative than a mining scenario. Therefore, there is no current or imminent threat under present or projected land uses, including mining, with regard to OU 11.

Question 10

Question Does the conclusion that there is minimal risk from dermal exposure include an assumption that mining may occur in the future and employees from a mining company may be on site excavating, etc on a daily basis?

Response As stated in more detail in the response to Question 4, the residential scenario integrated into the CDPHE Screen is more conservative than a mining scenario. Therefore, the risk from dermal exposure risk during mining would be less than the dermal exposure risk presented in the Final RFI/RI Report.

Question 11

Question Does the closure plan assume that mining activities could occur? The report does not address this.

Response As stated in more detail in the response to Question 4, the residential scenario integrated into the CDPHE is more conservative than a mining scenario. Additionally, Clean Closure under RCRA and the No Action decision under CERCLA implies no restrictions are necessary to be protective of human health and the environment, including commercial mining restrictions.

Commenter 3 questions the results of the RFI/RI Report as follows:

Comment 2

Comment The McKays believe that the Final Report is inadequate. The Final Report (June 1995) concerning Operable Unit 11 concludes that "OU 11 poses minimal health risks, assuming long term residential exposure." However, the Final Report fails to discuss at all let alone address the McKay's mineral interests or the fact that mining has been permitted. The Final Report therefore does not address whether the use of this property for the mining of gravel, clay, sand, and the like will pose any hazards to the human health or the environment. These issues need to be specifically addressed particularly as the Final Report does indicate the presence of Americium-241, Plutonium-239, 240, Tritium, and Nitrate/Nitrite in the surficial and subsurface soils. Identically, the effect of mining on the localized perched ground water noted in the Report must be specifically addressed. Finally, the Final Report does not address what remediation activities will be necessary to permit full use of the property or the time table for such remediation activities.

Response The Final RFI/RI Report does not specifically include references to mining. However, the residential scenario integrated in the CDPHE Screen is more conservative than a mining scenario. Therefore, mining of this site would not pose significant risk to human health or the environment with regard to OU 11. Furthermore, RCRA Clean Closure and the No Action decision under CERCLA imply that no restrictions, including mining restrictions, are necessary to be protective of human health and the environment. All collected data is presented in the RFI/RI Report for review.

Appendix A - References

EG&G, 1992 EG&G Rocky Flats, Inc , Phase I Geologic Characterization Data Acquisition - Surface Geologic Mapping of the Rocky Flats Plant and Vicinity, Jefferson and Boulder Counties, Final Report Golden, Colorado, March 1992

EG&G, 1995 EG&G Rocky Flats, Inc , Operable Unit 11 Combined Phases RFI/RI Report for the Rocky Flats Environmental Technology Site, Golden, Colorado, June, 1995

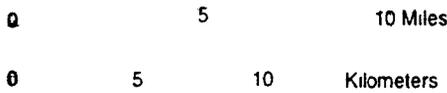
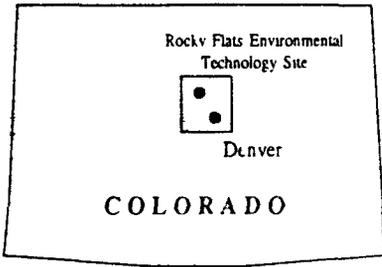
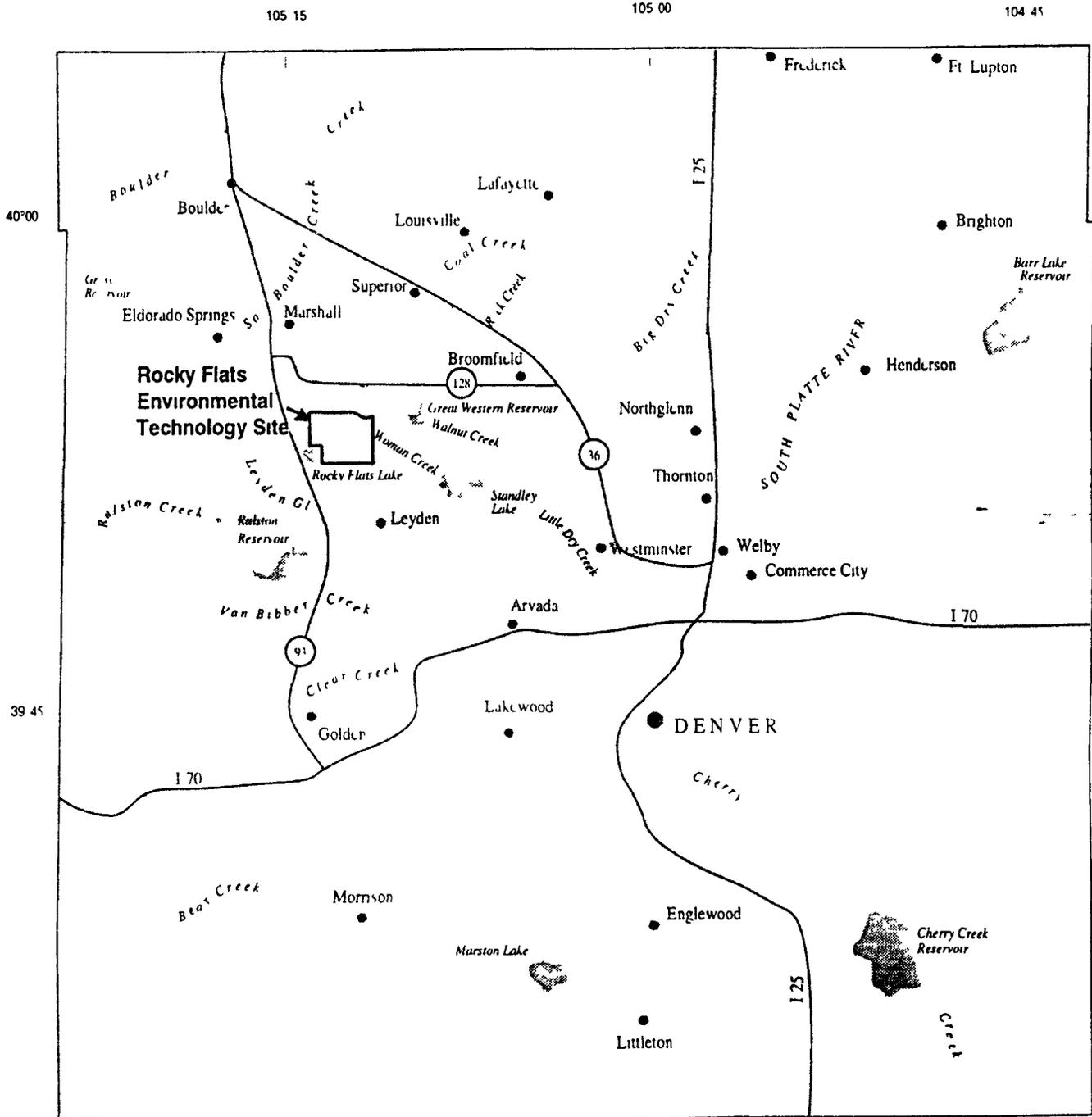
Rockwell International, 1986a Rockwell International, Annual Environmental Monitoring Report, January-December 1985, Golden, Colorado Rockwell International, Rocky Flats Plant, Report RFP-ENV-85, 1986

Rockwell International, 1986b Rockwell International, Resource Conservation and Recovery Act Part B - Post Closure Care Permit Application for U.S. Department of Energy, Rocky Flats Plant, Hazardous and Radioactive Mixed Wastes, U S Department of Energy, unnumbered report, 1986

U S DOE, 1986 U S Department of Energy, Comprehensive Environmental Assessment and Response Program Phase I, Draft Installation Assessment, Rocky Flats Plant, Washington, D C , DOE unnumbered draft report, 1986

U S DOE, 1991a. U S Department of Energy, 1989 Population, Economic, and Land Use Data Base for the Rocky Flats Plant, Golden, Colorado, Washington, D C , DOE, in press, 1991

U S DOE, 1991b U S Department of Energy, Federal Facility Agreement and Consent Order (Interagency Agreement [IAG], DOE, EPA, and CDH), Washington, D C , January 22, 1991



U S Department of Energy
 Rocky Flats Environmental Technology Site
 Golden Colorado

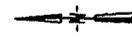
Location of the
 Rocky Flats Environmental
 Technology Site

Operable Unit 11

Figure 1

EXPLANATION

- Interceptor Trench System
- Streams and Drainages
- Paved Roads
- Dirt Roads
- Security Fences
- Rocky Flats Boundary
- OU 11 (IHSS 168)
- Lakes and Ponds
- Buildings and Trailers (130 Complex)



Scale = 1 19200
 1 inch = 1600 feet



State Plane Coordinate Projection
 Colorado Central Zone
 Datum NAD27

U S Department of Energy
 Rocky Flats Environmental Technology Site
 Golden, Colorado

OU 11 Location Map

Operable Unit 11

Figure 2

