01-RF-02107

KAISER·HILL
COMPANY

FINAL

2000 Annual Rocky Flats Cleanup Agreement (RFCA) Groundwater Monitoring Report

for the

Rocky Flats Environmental Technology Site

Safe Sites
OF COLORADO, LLC
ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

Volume 2 of 2 (Plates)

ADMIN RECORD

Environmental Media Management
Rocky Flats Environmental Technology Site

Review Exemption: CEX-105-01

November 16, 2001

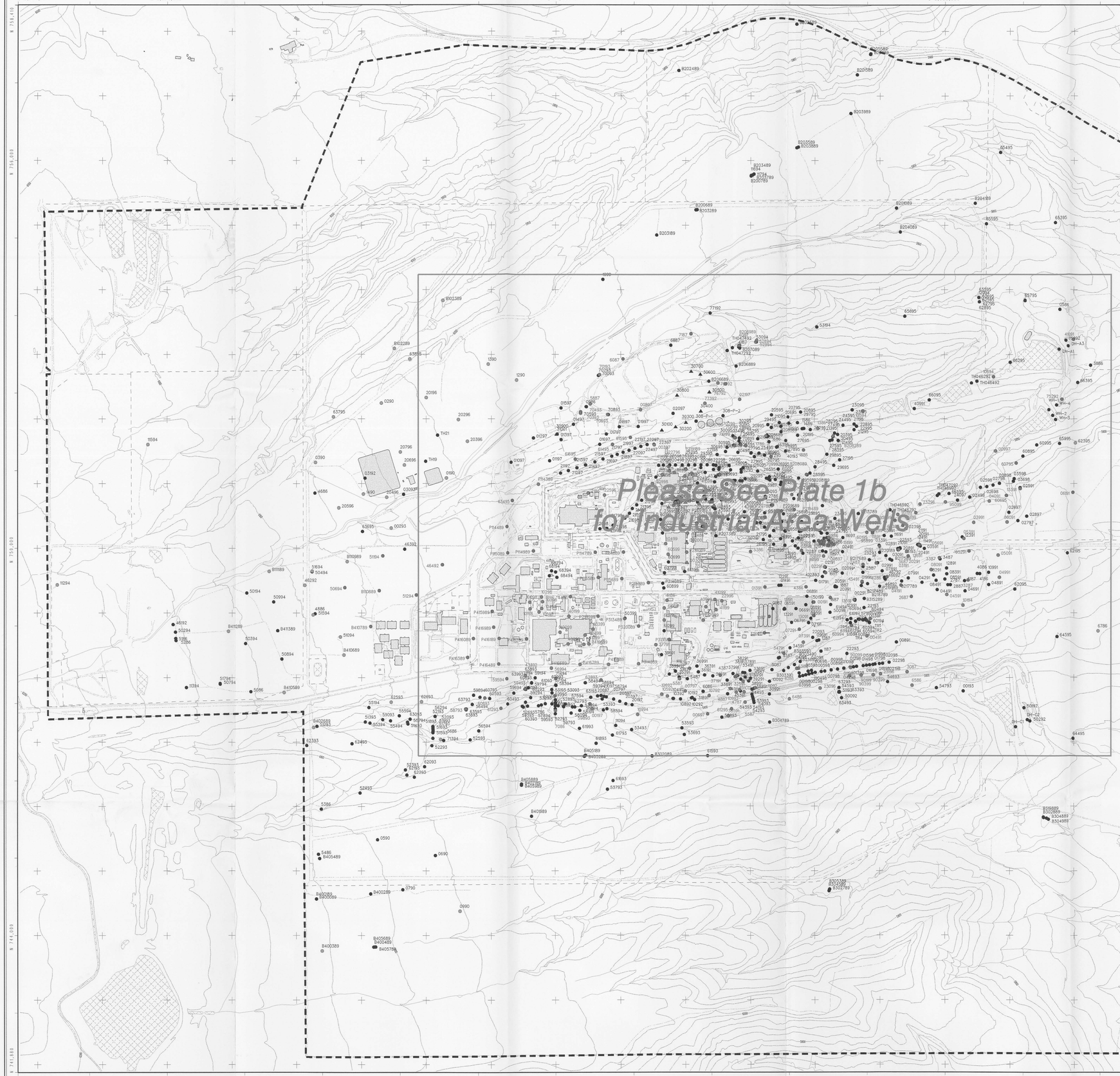
SW-A-004433

SW-A-004483

Plate 1a

IMP Monitoring Well RFETS Location Map

2000 Annual RFCA Groundwater Monitoring Report



IMP Well Type

- Water Quality/Flow Monitoring
- Industrial Area Flow Monitoring
- Background Flow Monitoring
- Non-IMP
- △ 2000 Wells (color denotes IMP well type)

Standard Map Features

- Buildings
- Demolished Buildings
- Lakes and ponds
- Streams, ditches, or other drainage features
- Fences and other barriers
- Contours (20' Intervals)
- Roads
- Rocky Flats Boundary

DATA SOURCE BASE FEATURES:
Buildings, fences, hydrography, roads and other structures from 1994 aerial fly-over data captured by EG&G RSL, Las Vegas. Digitized from the orthophotographs. 1/95

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N

Scale = 1 : 7200
1 inch represents 600 feet

500 0 1000 2000ft

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

GIS Dept. 303-966-7707

Prepared by:
DynCorp
THE ART OF TECHNOLOGY

Prepared for:
KAISER•HILL COMPANY

MAP ID: 01-0833

September 26, 2001

SW-A-004433

Plate 1b
IMP Monitoring Well
IA Location Map

2000 Annual RFCA Groundwater Monitoring Report

IMP Well Type

- Water Quality/Flow Monitoring
- Industrial Area Flow Monitoring
- Background Flow Monitoring
- Non-IMP
- 2000 Wells (color denotes IMP well type)

Standard Map Features

- Buildings
- Demolished buildings
- Lakes and ponds
- Streams, ditches, or other drainage features
- Fences and other barriers
- Contours (20′ Intervals)
- Roads
- Rocky Flats Boundary

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Scale = 1 : 2770
1 inch represents approximately 231 feet

250 0 500 1000ft

State Plane Coordinate Projection
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Prepared for: KAISER•HILL COMPANY

MAP ID: 01-0833

November 08, 2001

SW-A-004933

Plate 2

Potentiometric Surface of Permeable Units of the UHSU Second Quarter 2000

2000 Annual RFCA Groundwater Monitoring Report

- Groundwater Monitoring Well
- Water Level Contour (20′ Interval)
- Dashed where inferred
- Foundation Drain
- Approximate current extent of Unsaturated Alluvium
- Area without Groundwater Elevation Data

Standard Map Features

- Buildings & other structures
- Solar evaporation ponds
- Lakes and ponds
- Streams, ditches, or other drainage features
- Fences and other barriers
- Topographic Contours (20′ Intervals)
- Roads
- Rocky Flats Boundary

DATA SOURCE BASE FEATURES:

Buildings, fences, hydrography, roads and other structures from 1994 aerial fly-over data captured by EG&G RSL, Las Vegas. Digitized from the orthophotographs. 1/95

Scale = 1 : 7200
1 inch represents 600 feet

500 0 1000 2000ft

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

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Prepared for:

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MAP ID: 01-0606

September 21, 2001

SW-A-004438

Plate 3

Potentiometric Surface of Permeable Units of the UHSU Fourth Quarter 2000

2000 Annual RFCA Groundwater Monitoring Report

- Groundwater Monitoring Well
- Water Level Contour (20′ Interval)
- Dashed where inferred
- Foundation Drain
- Approximate current extent of Unsaturated Alluvium
- Area without Groundwater Elevation Data

Standard Map Features

- Buildings & other structures
- Solar evaporation ponds
- Lakes and ponds
- Streams, ditches, or other drainage features
- Fences and other barriers
- Topographic Contours (20′ Intervals)
- Roads
- Rocky Flats Boundary

DATA SOURCE BASE FEATURES:

Buildings, fences, hydrography, roads and other structures from 1994 aerial fly-over data captured by EG&G RSL, Las Vegas. Digitized from the orthophotographs. 1/95

Scale = 1 : 7200
1 inch represents 600 feet

500 0 1000 2000ft

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

U.S. Department of Energy
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Prepared for:

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MAP ID: 01-0606

September 21, 2001

SW-A-004433

E 2,080,400 E 2,082,000 E 2,084,000 E 2,086,000 E 2,086,780

N 752,200 N 750,000 N 747,700 N 748,000 N 750,000 N 747,700

Plate 4

Industrial Area Potentiometric Surface
Permeable Units of the UHSU
Second Quarter 2000
2000 Annual RFCA
Groundwater Monitoring Report

- Groundwater Monitoring Well
- 20-Foot Water Level Contour
- 5-Foot Intermediate Water Level Contour
- Foundation Drain
- Approximate current extent of Unsaturated Alluvium
- Area without Groundwater Elevation Data

Standard Map Features

- Seeps
- Buildings & other structures
- Demolished buildings
- Solar evaporation ponds
- Lakes and ponds
- Streams, ditches, or other drainage features
- Fences and other barriers
- Topographic Contours (20' Intervals)
- Roads
- Rocky Flats Boundary

Scale = 1 : 2400
1 inch represents 200 feet

150 0 300 600ft

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

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September 21, 2001

SWH-004233

Plate 5

Industrial Area Potentiometric Surface
Permeable Units of the UHSU
Fourth Quarter 2000
2000 Annual RFCA
Groundwater Monitoring Report

- Groundwater Monitoring Well
- 20-Foot Water Level Contour
- 5-Foot Intermediate Water Level Contour
- Foundation Drain
- Approximate current extent of Unsaturated Alluvium
- Area without Groundwater Elevation Data

Standard Map Features

- Seeps
- Buildings & other structures
- Demolished buildings
- Solar evaporation ponds
- Lakes and ponds
- Streams, ditches, or other drainage features
- Fences and other barriers
- Topographic Contours (20' Intervals)
- Roads
- Rocky Flats Boundary

Scale = 1 : 2400
1 inch represents 200 feet

150 0 300 600ft

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

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September 21, 2001

SW-A-005433

Plate 6
Radionuclides in Groundwater
RFCA Wells, 2000

2000 Annual RFCA Groundwater Monitoring Report

Well Classifications

- Plume Degradation
- Plume Definition
- Plume Extent
- Performance Monitoring
- Drainage
- Boundary
- RCRA
- D&D

- ○ Alluvial Wells
- △ Bedrock Wells
- ◇ Alluvial/Bedrock Wells
- ☆ Surface Water Monitoring Locations

Standard Map Features

- Buildings and other structures
- Demolished buildings
- Solar Evaporation Ponds (SEPs)
- Lakes and ponds
- Streams, ditches, or other drainage features
- Fences and other barriers
- Topographic Contour (20-Foot)
- Paved roads
- Dirt roads

NOTES:

Wells shown with box plot have at least one Uranium value above 8.0 pCi/L.

NS = Not Sampled
DRY = No Sample Collected
INSW = Insufficient water for full sample suite

All results in picoCuries per liter (pCi/L)

Scale = 1 : 7020
1 inch represents 585 feet

500 0 1000 2000ft

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

U.S. Department of Energy

Rocky Flats Environmental Technology Site

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Prepared for:

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MAP ID: 01-0724

September 26, 2001

SW-A-004433

Plate 7
VOCs in Groundwater
RFCA Wells, 2000

2000 Annual RFCA Groundwater Monitoring Report

Well Classifications

- Plume Degradation
- Plume Definition
- Plume Extent
- Performance Monitoring
- Drainage
- Boundary
- RCRA
- D&D

- ○ Alluvial Wells
- △ Bedrock Wells
- ◇ Alluvial/Bedrock Wells
- ☆ Surface Water Monitoring Locations

Standard Map Features

- Buildings and other structures
- Demolished buildings
- Solar Evaporation Ponds (SEPs)
- Lakes and ponds
- Streams, ditches, or other drainage features
- Fences and other barriers
- Topographic Contour (20-Foot)
- Paved roads
- Dirt roads

NOTES:

Wells shown with box plot have at least one value above Tier II Action Levels.

NS = Not Sampled
DRY = No Sample Collected
BDL = Below Detection Limit

All results in micrograms per liter (μg/L)

Scale = 1 : 4260
1 inch represents 355 feet

250 0 500 1000ft

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

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September 26, 2001

Plate 8
WQP in Groundwater
RFCA Wells, 2000

2000 Annual RFCA Groundwater Monitoring Report

Well Classifications

- Plume Degradation
- Plume Definition
- Plume Extent
- Performance Monitoring
- Drainage
- Boundary
- RCRA
- D&D

- ○ Alluvial Wells
- △ Bedrock Wells
- ◇ Alluvial/Bedrock Wells
- ☆ Surface Water Monitoring Locations

Standard Map Features

- Buildings and other structures
- Demolished buildings
- Solar Evaporation Ponds (SEPs)
- Lakes and ponds
- Streams, ditches, or other drainage features
- Fences and other barriers
- Topographic Contour (20-Foot)
- Paved roads
- Dirt roads

NOTES:

Wells shown with box plot have at least one value above Tier II Action Levels.

NS = Not Sampled
DRY = No Sample Collected
INSW = Insufficient water for full sample suite

All results in milligrams per liter (mg/L)

Scale = 1 : 4260
1 inch represents 355 feet

250 0 500 1000ft

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

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MAP ID: 01-0724

September 26, 2001

Plate 9
Metals in Groundwater
RFCA Wells, 2000

2000 Annual RFCA Groundwater Monitoring Report

Well Classifications

- Plume Degradation
- Plume Definition
- Plume Extent
- Performance Monitoring
- Drainage
- Boundary
- RCRA
- D&D

- ○ Alluvial Wells
- △ Bedrock Wells
- ◇ Alluvial/Bedrock Wells
- ☆ Surface Water Monitoring Locations

Standard Map Features

- Buildings and other structures
- Demolished buildings
- Solar Evaporation Ponds (SEPs)
- Lakes and ponds
- Streams, ditches, or other drainage features
- Fences and other barriers
- Topographic Contour (20-Foot)
- Paved roads
- Dirt roads

NOTES:

Wells shown with box plot have at least one value above Tier II Action Levels.

NS = Not Sampled
DRY = No Sample Collected
INSW = Insufficient water for full sample suite

All results in micrograms per liter (µg/L)

N

Scale = 1 : 7020
1 inch represents 585 feet

500 0 1000 2000ft

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

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September 26, 2001

SW/A-004433

Plate 10
Water Level Change Map
1996 - 2000
Second Quarter 2000

2000 Annual RFCA Groundwater Monitoring Report

EXPLANATION

- Groundwater Monitoring Well (with change in water level)
- Contour depicting Positive Change In Water Level
- Contour depicting Negative Change In Water Level
- Contour depicting Zero Change In Water Level

Standard Map Features

- Buildings and other structures
- Demolished buildings
- Solar Evaporation Ponds (SEPs)
- Lakes and ponds
- Streams, ditches, or other drainage features
- Fences and other barriers
- Topographic Contour (20-Foot)
- Paved roads
- Dirt roads

DATA SOURCE BASE FEATURES:

Buildings, fences, hydrography, roads and other structures from 1994 aerial fly-over data captured by EG&G RSL, Las Vegas. Digitized from the orthophotographs. 1/95

Topographic contours were derived from digital elevation model (DEM) data by Morrison Knudson (MK) using ESRI Arc TIN and LATTICE to process the DEM data to create 5-foot contours. The DEM data was captured by the Remote Sensing Lab, Las Vegas, NV, 1994 Aerial Flyover at ~ 10 meter resolution. DEM post-processing performed by MK, Winter 1997.

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N

Scale = 1 : 7500
1 inch represents 625 feet

250 0 500 1000ft

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

U.S. Department of Energy

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Prepared for:

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MAP ID: 01-0621

November 07, 2001

SW-A-004933

Plate 11
Water Level Change Map
1996 - 2000
Fourth Quarter 2000

2000 Annual RFCA Groundwater Monitoring Report

EXPLANATION

- Groundwater Monitoring Well (with change in water level)
- Contour depicting Positive Change In Water Level
- Contour depicting Negative Change In Water Level
- Contour depicting Zero Change In Water Level

Standard Map Features

- Buildings and other structures
- Demolished buildings
- Solar Evaporation Ponds (SEPs)
- Lakes and ponds
- Streams, ditches, or other drainage features
- Fences and other barriers
- Topographic Contour (20-Foot)
- Paved roads
- Dirt roads

DATA SOURCE BASE FEATURES:

Buildings, fences, hydrography, roads and other structures from 1994 aerial fly-over data captured by EG&G RSL, Las Vegas. Digitized from the orthophotographs. 1/95

Topographic contours were derived from digital elevation model (DEM) data by Morrison Knudson (MK) using ESRI Arc TIN and LATTICE to process the DEM data to create 5-foot contours. The DEM data was captured by the Remote Sensing Lab, Las Vegas, NV, 1994 Aerial Flyover at ~ 10 meter resolution. DEM post-processing performed by MK, Winter 1997.

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N

Scale = 1 : 7500
1 inch represents 625 feet

250 0 500 1000ft

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

U.S. Department of Energy

Rocky Flats Environmental Technology Site

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Prepared for:

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MAP ID: 01-0621

November 07, 2001

Plate 12
VOCs Composite & Nitrate Plumes Map

2000 Annual RFCA Groundwater Monitoring Report

IMP Well Type

- Water Quality Flow Monitoring
- Industrial Area Flow Monitoring
- Background Flow Monitoring
- D&D Monitoring
- Non-IMP
- Collection Trenchs

Composite Plume Key

- Composite VOC Groundwater Plume (100 X MCL)
- Composite VOC Groundwater Plume (concentration equal to MCL)
- 100 x Nitrate Standard (1000 mg/l)
- Nitrate Standard (10 mg/l)

Standard Map Features

- Buildings and other structures
- Demolished buildings
- Solar Evaporation Ponds (SEPs)
- Lakes and ponds
- Streams, ditches, or other drainage features
- Fences and other barriers
- Topographic Contour (20-Foot)
- Paved roads
- Dirt roads

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Scale = 1 : 3020
1 inch represents approximately 252 feet

250 0 500 1000 ft

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

U.S. Department of Energy
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Prepared for:
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MAP ID: 01-0763

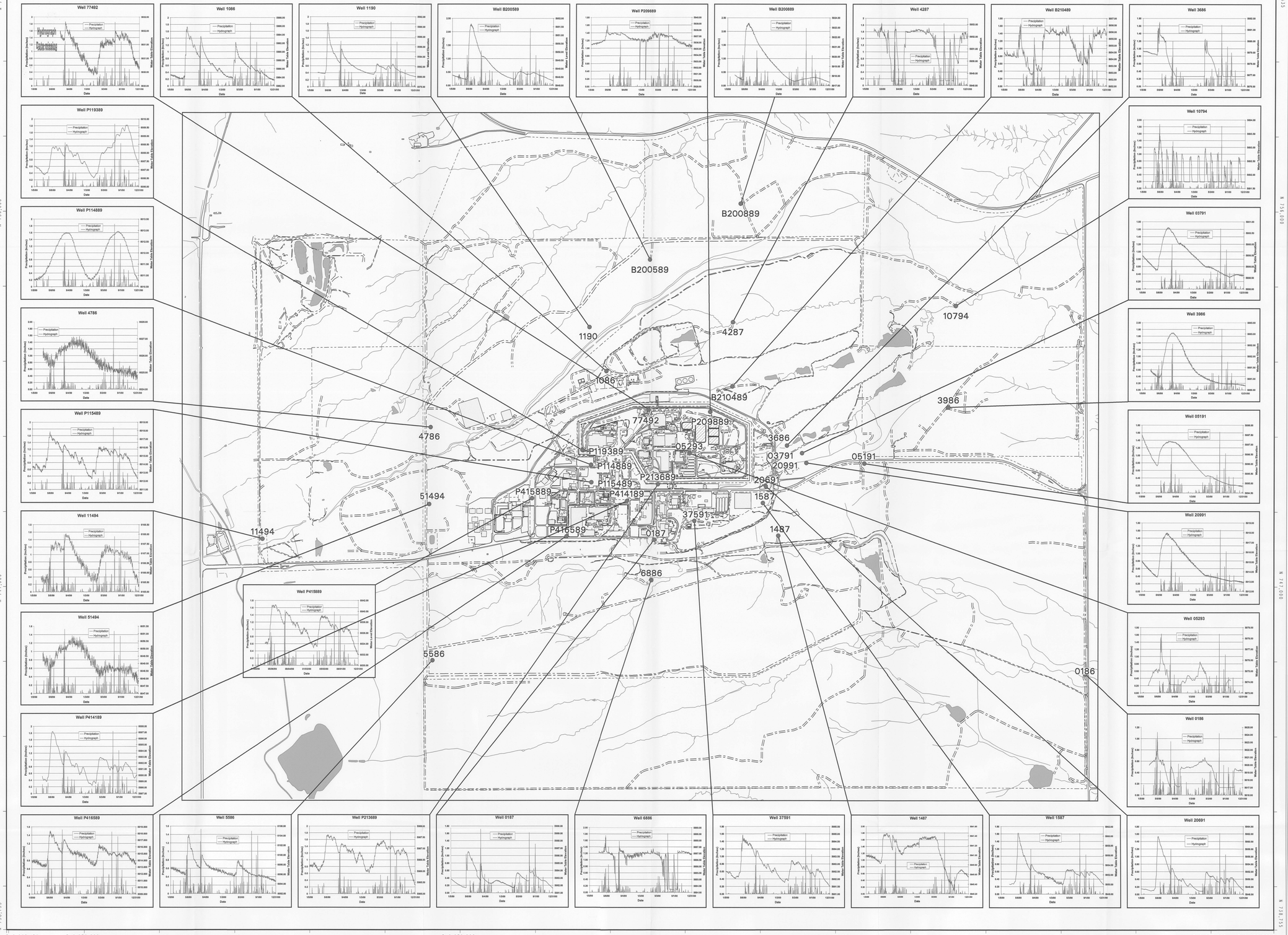
November 07, 2001

SW-A-004483

Plate 13

Real-Time Groundwater Monitoring Location Hydrographs with Precipitation Data

2000 Annual RFCA Groundwater Monitoring Report



EXPLANATION

- Groundwater well with real time water level monitoring

Standard Map Features

- Buildings and other structures
- Solar Evaporation Ponds (SEP)
- Lakes and ponds
- Streams, ditches, or other drainage features
- Fences and other barriers
- Paved roads
- Dirt roads

DATA SOURCE BASE FEATURES:
Buildings, fences, hydrography, roads and other structures from 1994 aerial fly-over data captured by EG&G RSL, Las Vegas. Digitized from the orthophotographs. 1/95

500 0 1000 2000 ft

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

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Prepared for:
KAISER•HILL COMPANY

MAP ID: ***Draft***

July 26, 2001

SW-A-004433

Plate 14

2000 Annual RFCA Groundwater Monitoring Report

Filtered UHSU Uranium in Groundwater, 1991 - 2000

(Sum of Uranium 233,234,235&238 Isotopes)

Sum of Uranium Isotopes Activity Concentration (pCi/L)(1991-2000)

- < 2.847
- 2.847-50
- 50-104.29
- 104.29-284.7
- > 284.7

- ○ Alluvial Wells
- △ Bedrock Wells

Iso-Concentration Contours (Dashed where inferred)

- 2.874 pCi/L (Sum of Isotopic Action Level)
- 50 pCi/L (Sum of Isotopic Intermediate Level)
- 104.29 pCi/L (Sum of Isotopic Background Levels)
- > 287.4 pCi/L (100 Times Sum of Isotopic Action Level)

Standard Map Features

- Buildings and other structures
- Demolished buildings
- Solar Evaporation Ponds (SEPs)
- Lakes and ponds
- Streams, ditches, or other drainage features
- Fences and other barriers
- Topographic Contour (20-Foot)
- Rocky Flats boundary
- Paved roads
- Dirt roads

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Scale = 1 : 7200
1 inch represents 600 feet

250 0 500 1000ft

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

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