ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

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RESULTS OF THE OPERABLE UNIT 3 REMEDIAL INVESTIGATION

Rocky Flats Local Impacts Initiative

January 10, 1996

ADMIN RECORD

A-OU03-000568

Y/34

RI Goals and Objectives

Characterize physical features

Define sources of contamination

Characterize the nature and extent of contamination in each media of each IHSS

Describe contaminant fate and transport

Collect data to establish baseline risk for OU 3

RI Results and Conclusions

Contaminant plume is result of wind dispersion from 903 pad and trends west to east

Maximum concentrations/activities immediately east of RFETS east gate

Maximum Rad values identified

- —Pu 6.47 pCi/g
- —Am .52 pCi/g

RI Results and Conclusions (cont.)

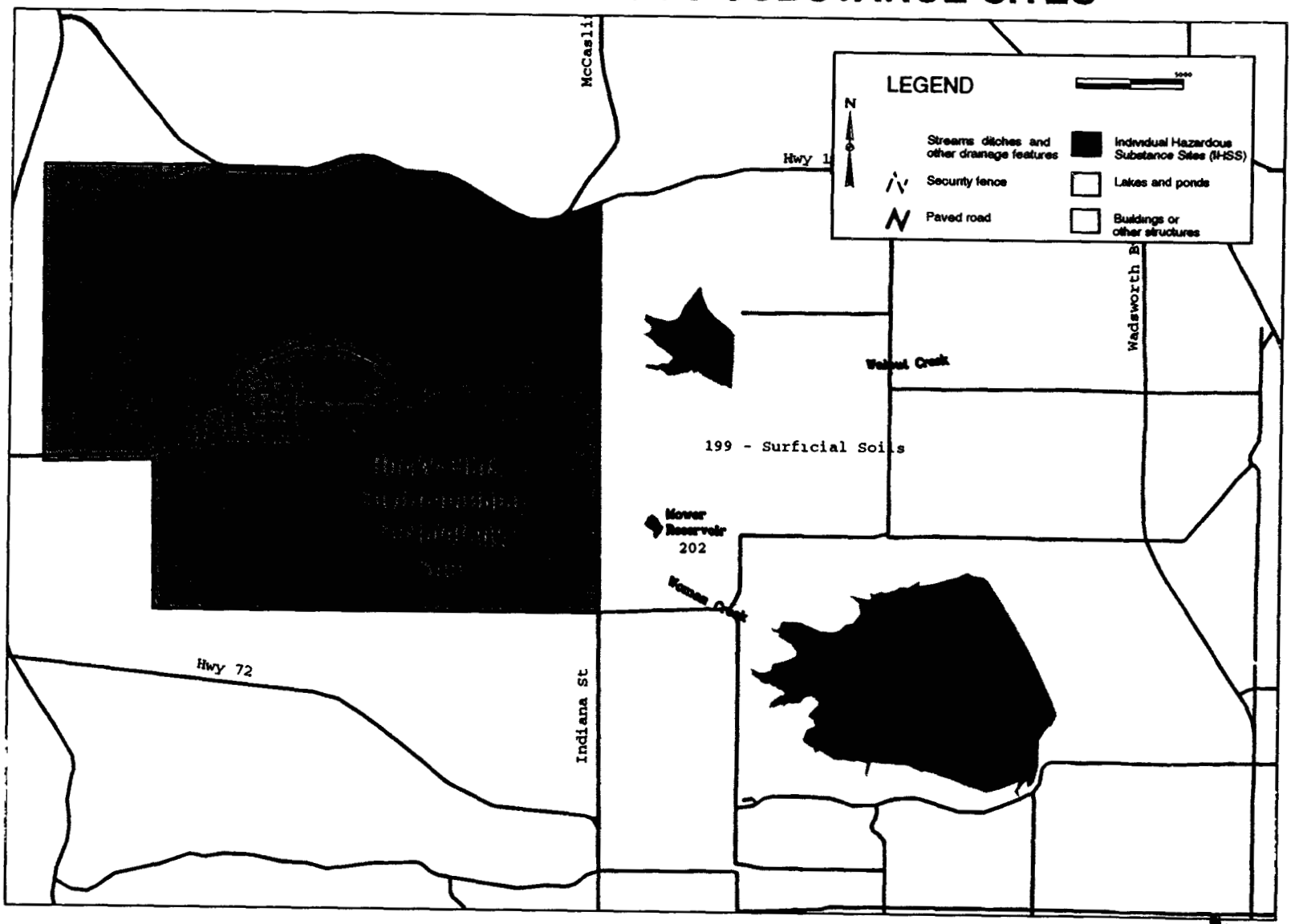
No vertical migration in soils or sediments

Analytes in surface water are within background levels

Analytes in reservoir sediments are highest in GWR, maximum values are buried beneath 18 inches of sediment

No migration from sediments to ground water

OPERABLE UNIT 3
INDIVIDUAL HAZARDOUS SUBSTANCE SITES



March, 1995

Rocky Flats Environmental Restoration

5

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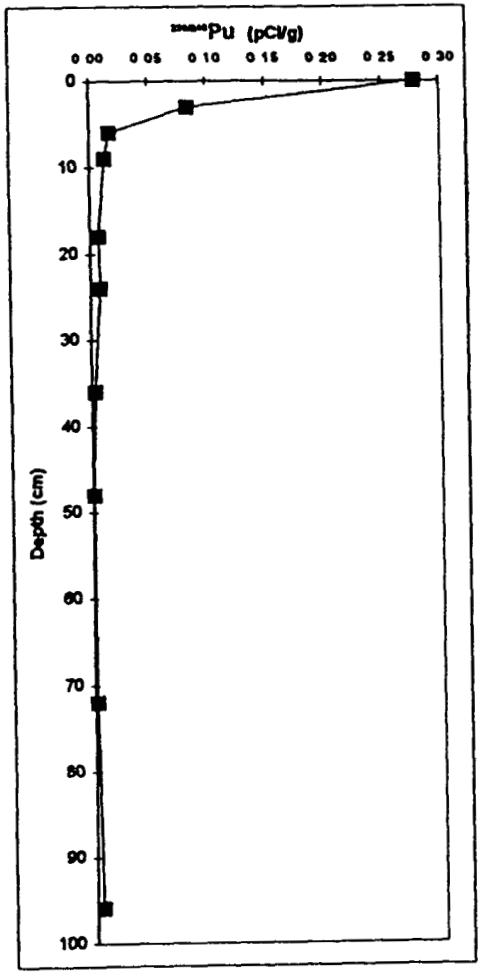
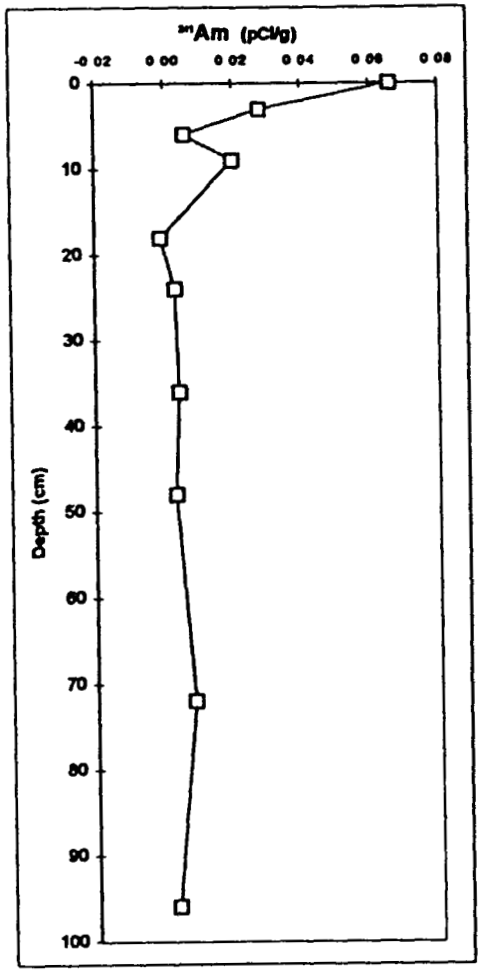
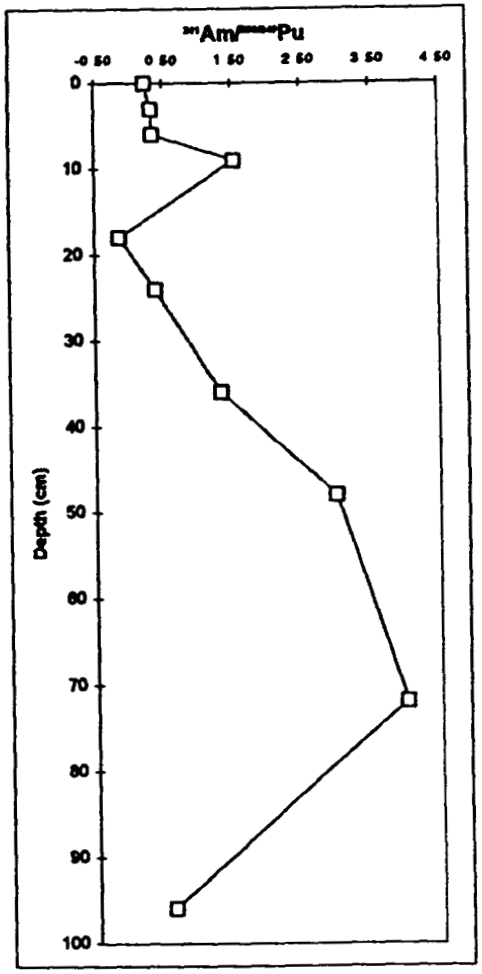
Trench 02892







Rocky Flats Environmental Restoration

9

12/11/95

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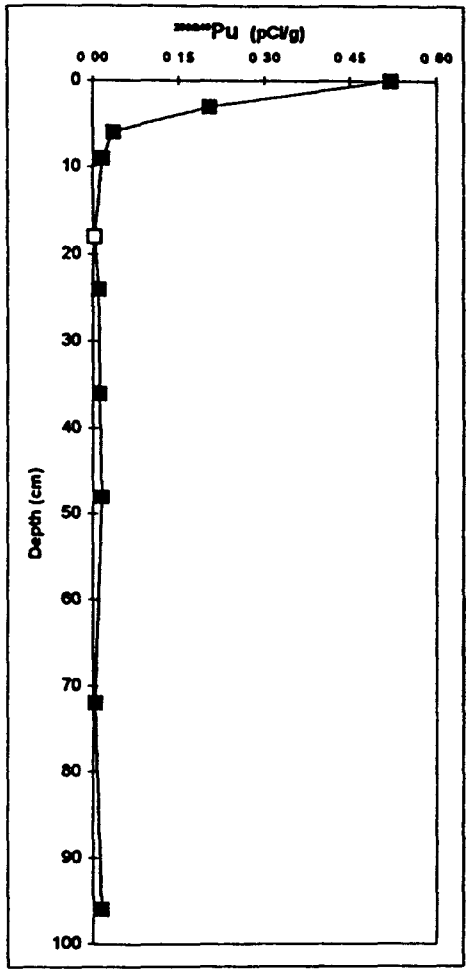
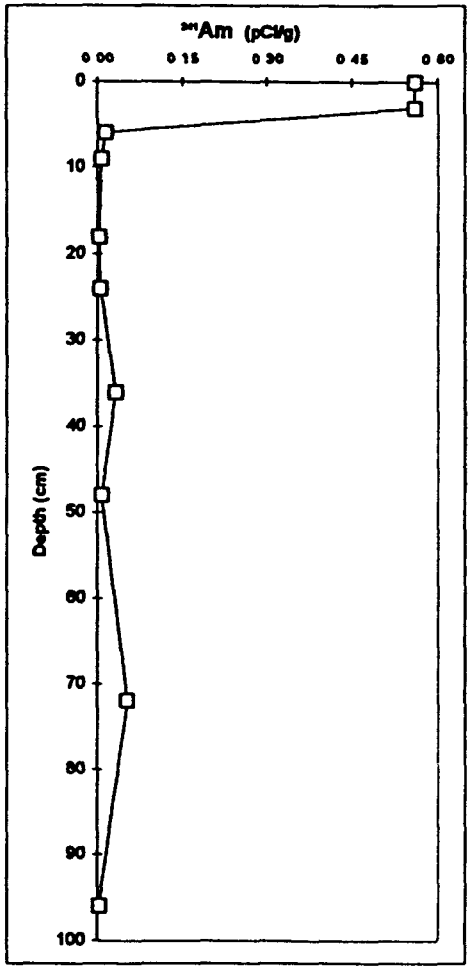
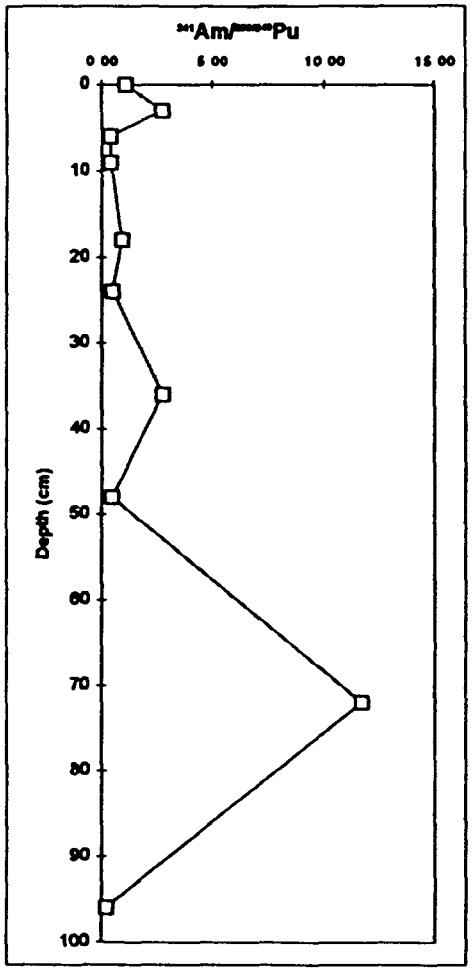
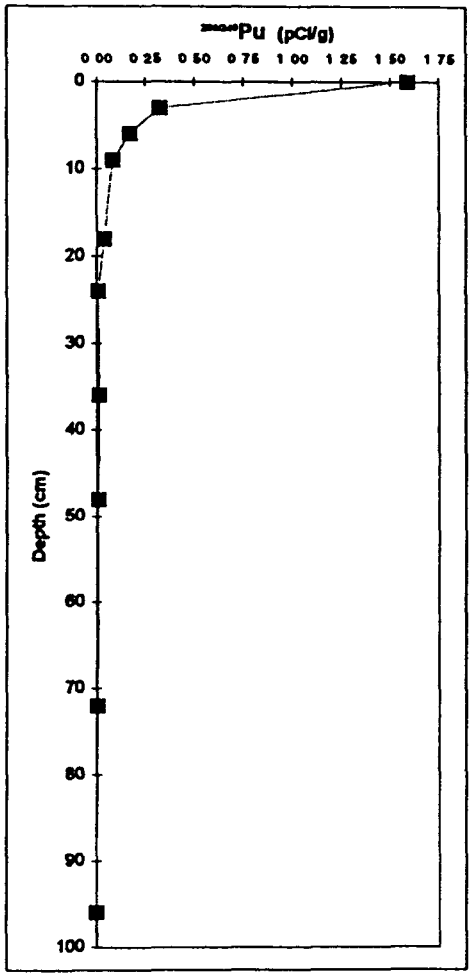


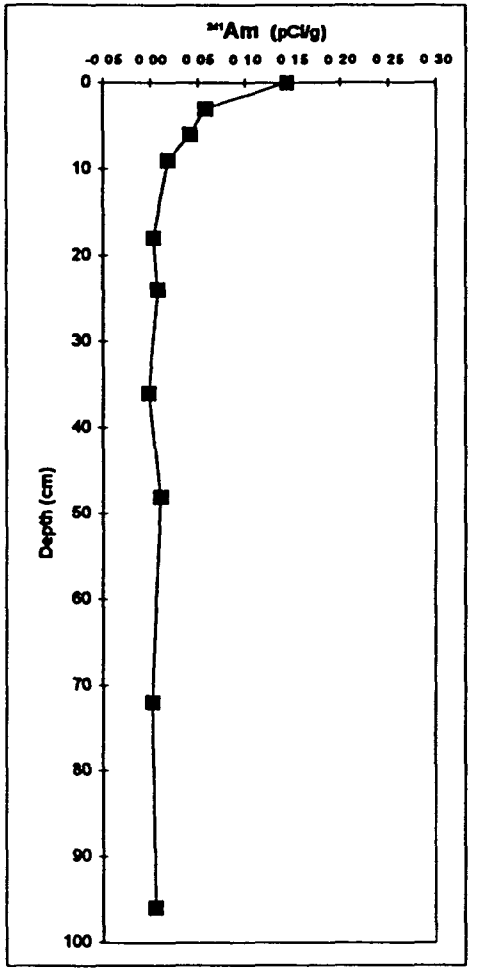


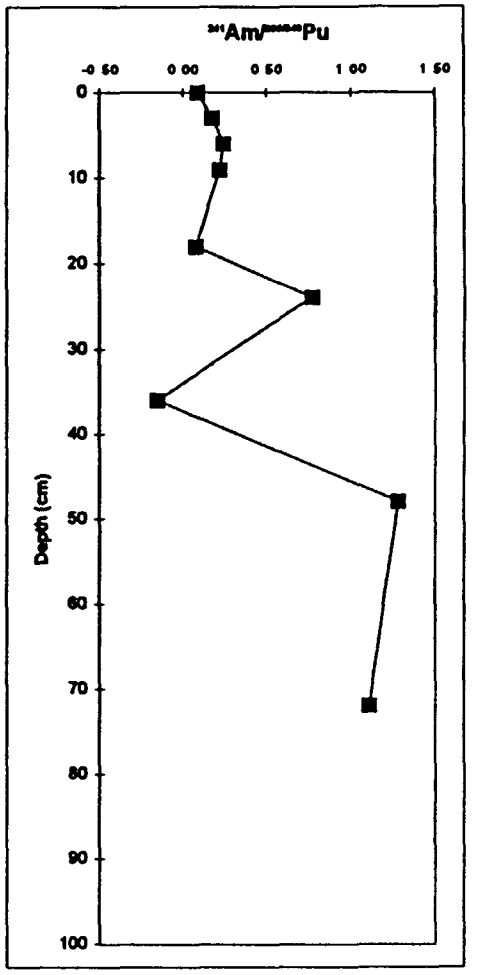


Rocky Flats Environmental Restoration

Trench 03492







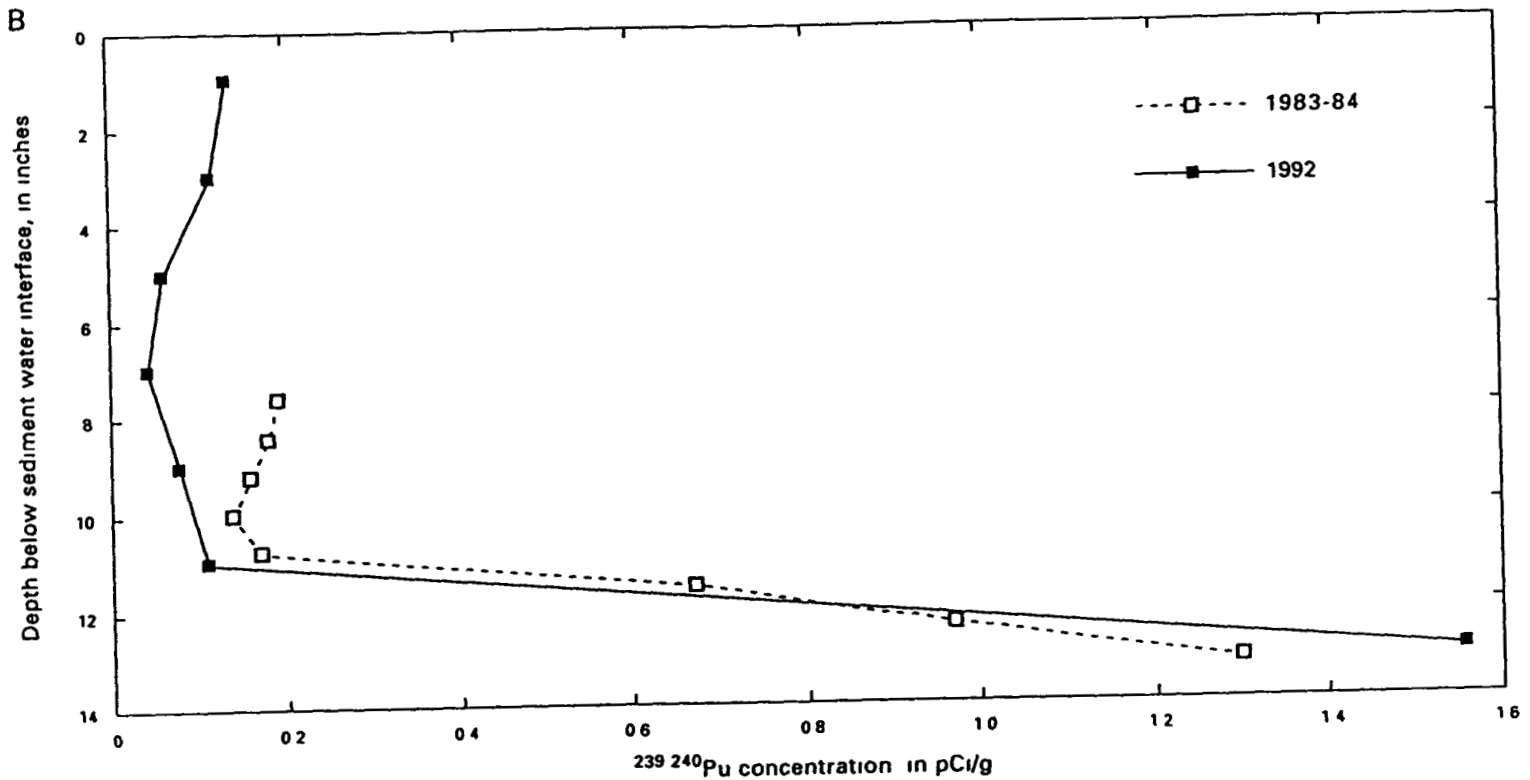


Figure 15B Relation of concentrations of $^{239,240}Pu$ to depth at lake-bottom-sediment site SED08392 collected from Standley Lake in 1983–84 and 1992

C

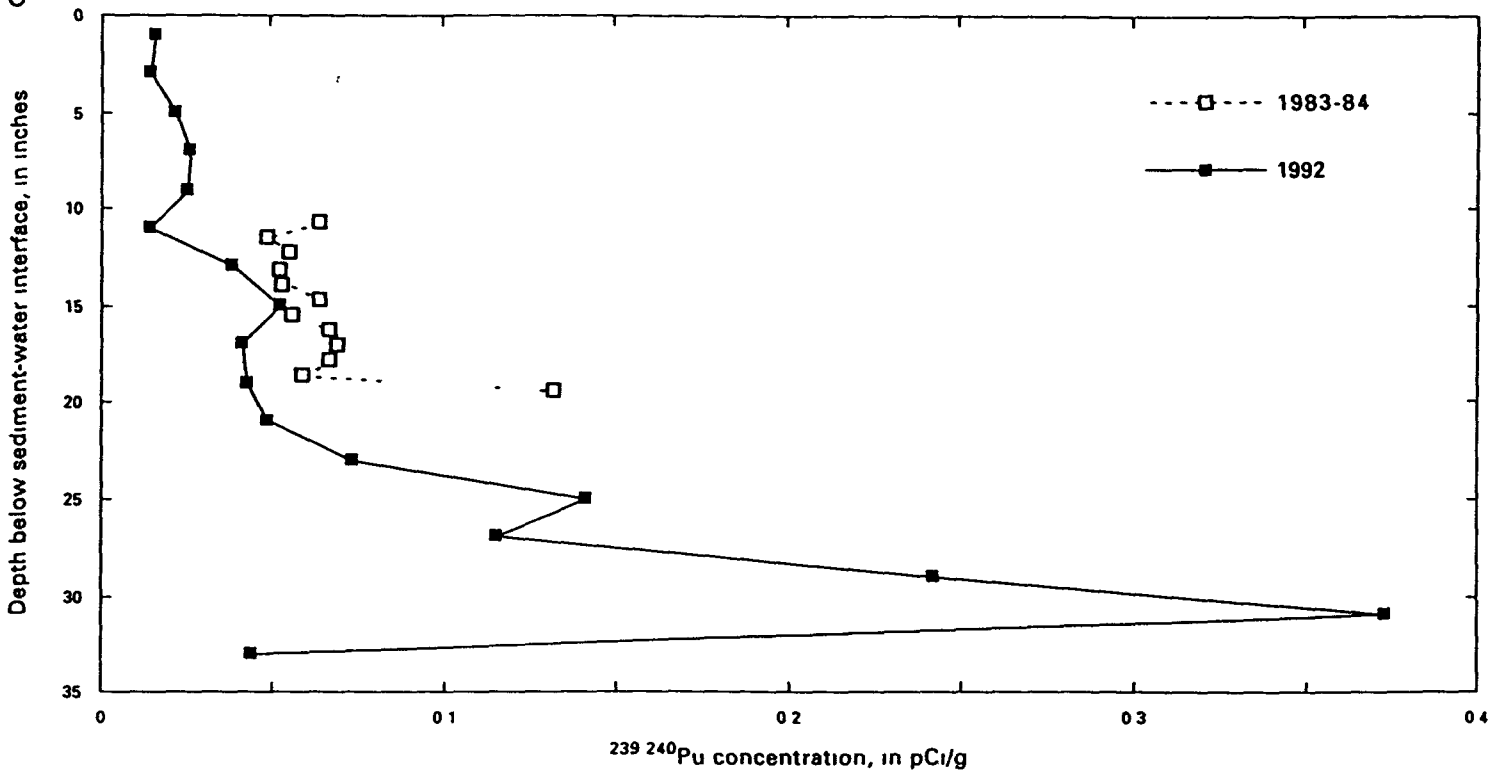


Figure 15C Relation of concentrations of $^{239,240}Pu$ to depth at lake-bottom-sediment site SED09192 collected from Great Western Reservoir in 1983–84 and 1992

D

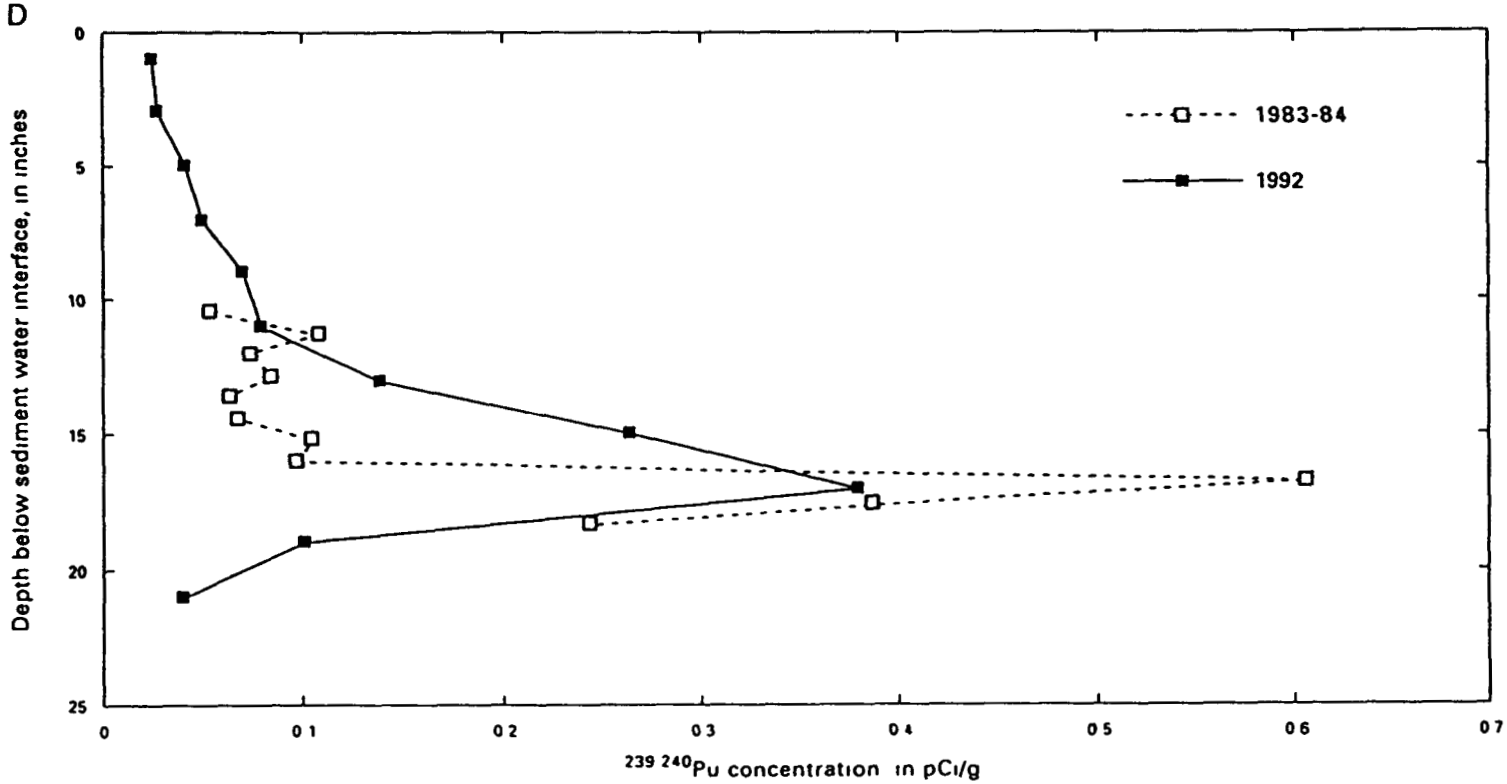


Figure 15D Relation of concentrations of $^{239,240}Pu$ to depth at lake-bottom sediment site SED08592 collected from Great Western Reservoir in 1983–84 and 1992

RI Results and Conclusions (cont.)

Ecological sampling revealed no significant uptake, no adverse effects, no calculated risk levels

Wind tunnel study shows that resuspension at undisturbed terrestrial locations is extremely low

Human Health Risk Assessment

Chemicals of Concern

Exposure Scenarios

Radiation Risk Characterization

Radiation Dose Characterization

Human Health Risk Assessment (cont.)

Chemicals of Concern (COCs)

- —Pu-239/240 in Surface Sediments at GWR
- —No other COCs present in Standley Lake or Mower Reservoir Sediments
- —No COCs present in surface water
- —Pu-239/240 and Am-241 in Soils
- —No other COCs present in Soils

Human Health Risk Assessment (cont.)

Exposure Scenarios

—Residential (most conservative)

—Recreational Open Space (current and most likely future use)

Major pathways assessment

—Ingestion, Inhalation, & External Exposure

Exposure scenarios bound potential exposure situations

Human Health Risk Assessment (cont.)

Radiation Risk Characterization

—Soils

- For Residential Exposure, Risk = 3 in 1,000,000
- For Recreational Exposure, Risk = 0.05 in 1,000,000

—GWR Sediments

- For Residential Exposure, Risk = 0.9 in 1,000,000
- For Recreational Exposure, Risk = 0.01 in 1,000,000

Human Health Risk Assessment (cont.)

EPA Risk Guidelines

—1 to 100 in 1,000,000 considered by EPA to be protective of human health

Conclusion

—All Risks are within the EPA guidelines

—Under the most conservative exposure assumptions, OU 3 risks are very low and do not warrant further action

Human Health Risk Assessment (cont.)

Radiation Dose Characterization

—Soils

- For Residential Exposure, Dose = 0.190 millirem
- For Recreational Exposure, Dose = 0.006 millirem

—GWR Sediments

- For Residential Exposure, Dose = 0.011 millirem
- For Recreational Exposure, Dose = 0.0001 millirem

Human Health Risk Assessment (cont.)

EPA Dose Guidelines

—15 millirem dose proposed by EPA for radiation site clean up standard

Conclusion

—All doses are within EPA Standard

—No Further Action at OU3 is supported by radiation dose assessment

Ecological Risk Assessment

ERA Process

- —Used PCOCs from HHRA
- —Screened against literature benchmark values to determine potential effects
- —No risk or effects were identified within terrestrial & aquatic ecosystems in OU3

Proposed Plan

Presents preferred alternative for remedial actions to the regulatory agencies and the Public

Serves as the basis for the CAD/ROD

Incorporates a formal Public Involvement Program

Schedule

—Draft PP submitted to DOE for transmittal to the Regulatory Agencies on December 6, 1995

Proposed Plan (cont)

—Final PP scheduled for submittal in April 1996

—Conclusions

- Proposed Plan summarizes the OU 3 risks and proposes a No Action Alternative

Corrective Action Decision/ Record of Decision

Describes the final remedy action selection made by EPA, CDPHE, and DOE

Includes a summary of responses to Public and Regulatory Agency Comments on the Proposed Plan - Responsiveness Summary (RS)

Corrective Action Decision/ Record of Decision (cont.)

Schedule

- —Draft CAD/ROD scheduled for submittal in July 1996
- —Draft RS scheduled for submittal in September 1996
- —Final CAD/ROD scheduled for submittal in November 1996
- —Agency Approval & Release to the Public - December 1996

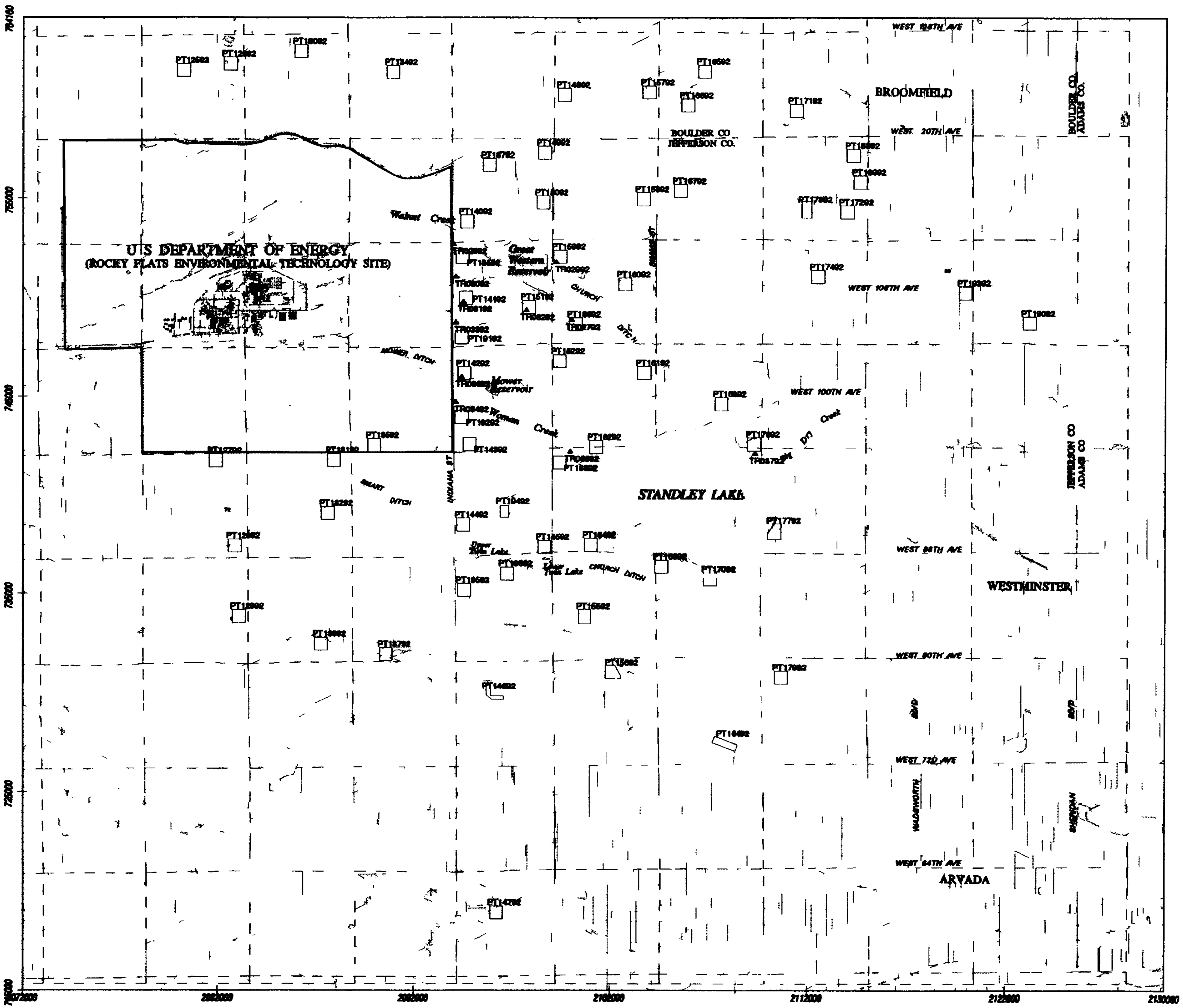


Figure 2-1

Surface Soil Sample Locations
Operable Unit 3
IHSS 199 Surface Soils Sampling Area

ROCKY FLATS
ENVIRONMENTAL TECHNOLOGY SITE
U S Department of Energy

Best Available Copy

☐ Surface Soil Plot

Trench Sample Locations

DRAFT

Mapping Sources:
Jefferson County Mapping Dept.
EG&G Rocky Flats
U S Geological Survey

Scale 1:63360
1 inch = 1 mile

0 0 5 1 2
MILES

N

Polyconic projection 1927 North American datum
Colorado central zone state plane coordinate system.

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DRAWN BY D Moreno
APPROVED BY
September 22, 1995
Draft RI Report
Fig 2 1

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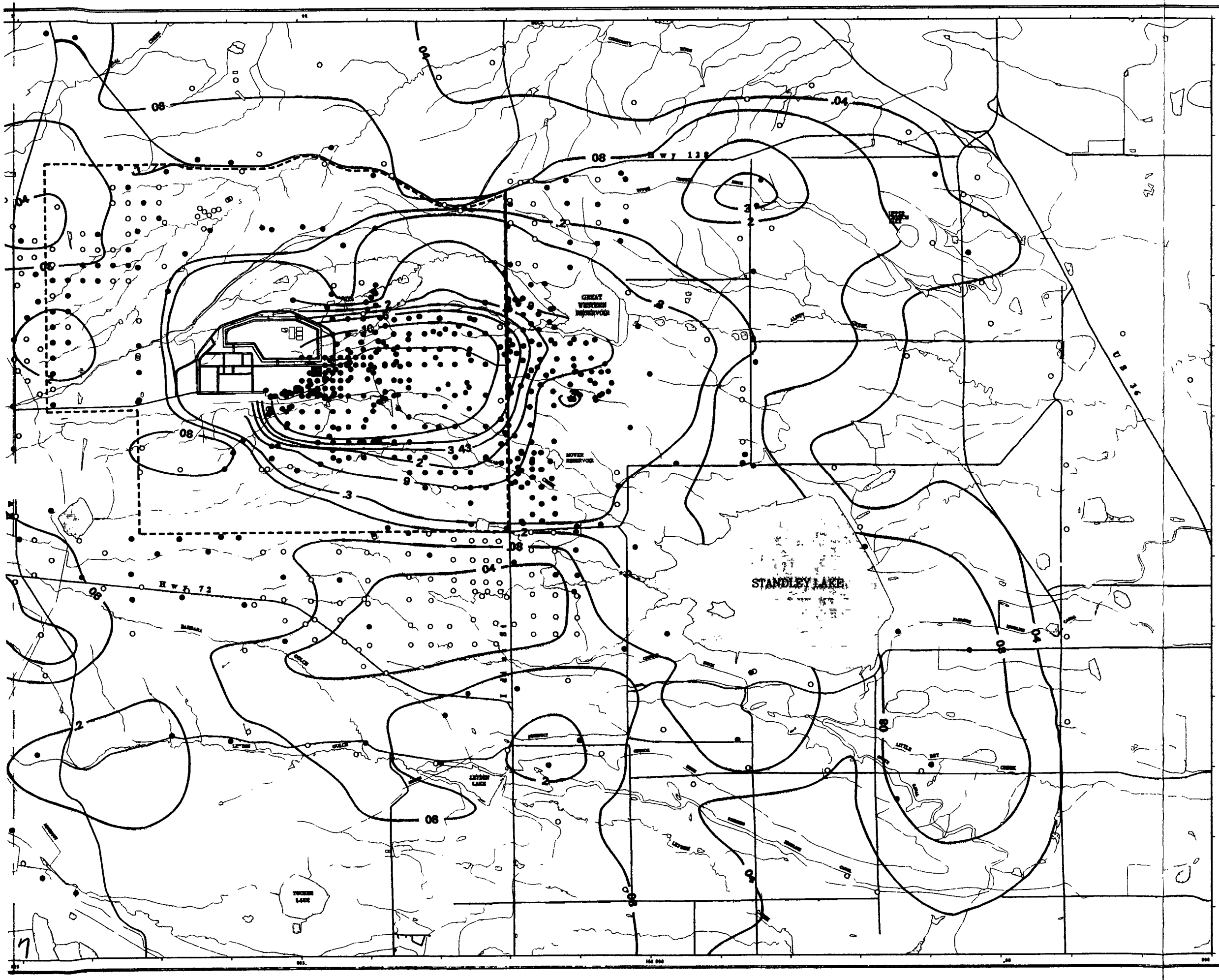

Figure 4-6A

Pu 239+240 (pci/g) Isoplot with Exhaustive Surface Soil Sampling Locations
(E-Type Estimate)

ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE
U.S Department of Energy

Concentration Levels (pci/g)

- < 0.08
- 0.08 0.29
- 0.30 0.89
- 0.90 1.99
- 2.00 4.99
- 5.00 9.99
- > 10.00

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Standard Features

- Isoplot Lines
- 903 Pad
- Lakes and ponds
- Streams, ditches, or other drainage features
- Fences
- Rocky Flats boundary
- Major Roads
- Secondary Roads
- RFETS Roads

DATA SOURCE:
Buildings, roads, and fences provided by Facilities Engr., EG&G Rocky Flats, Inc. 1991.
Hydrology provided by USGS (date unknown)

The contours for this map were created in Dynamic Graphics using Kriged data file from M. Iggy Litzer, EG&G Geosciences Jan. 1995.

Scale 1 46600
1 inch represents approximately 3883.33 feet

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

MAP ID: PUTOTALE

October 08, 1995

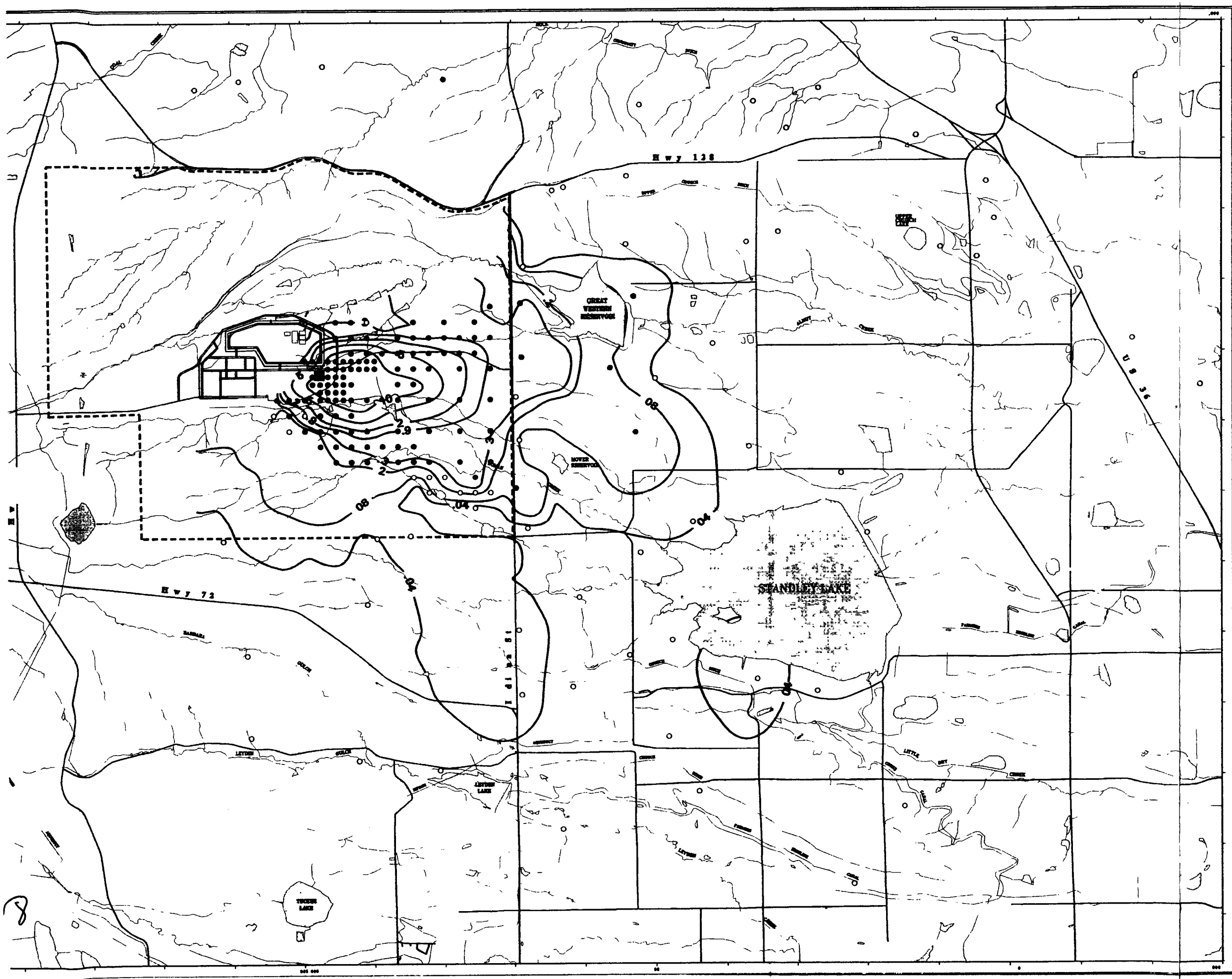

Figure 4-6B

Am 241 (pci/g) Isoplot with Exhaustive Surface Soil Sampling Locations
(E-Type Estimate)

ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE
U.S Department of Energy

Concentration Levels (pci/g)

- < 0.08
- 0.08 0.29
- 0.30 0.89
- 0.90 1.99
- 2.00 4.99
- 5.00 9.99
- > 10.00

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Best Available Copy

Standard Features

- Isoplot Lines
- 903 Pad
- Lakes and ponds
- Streams, ditches, or other drainage features
- Fences
- Rocky Flats boundary
- Major Roads
- Secondary Roads
- RFETS Roads

DATA SOURCE:
Buildings, roads, and fences provided by Facilities Engr., EG&G Rocky Flats, Inc. 1991.
Hydrology provided by USGS (date unknown)

The contours for this map were created in Dynamic Graphics using Kriged data file from M. Iggy Litaor, EG&G Geosciences Jan. 1995.

N

Scale 46600
Inch represents approximately 3883.33 feet

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

MAP ID: AM241E

October 08, 995

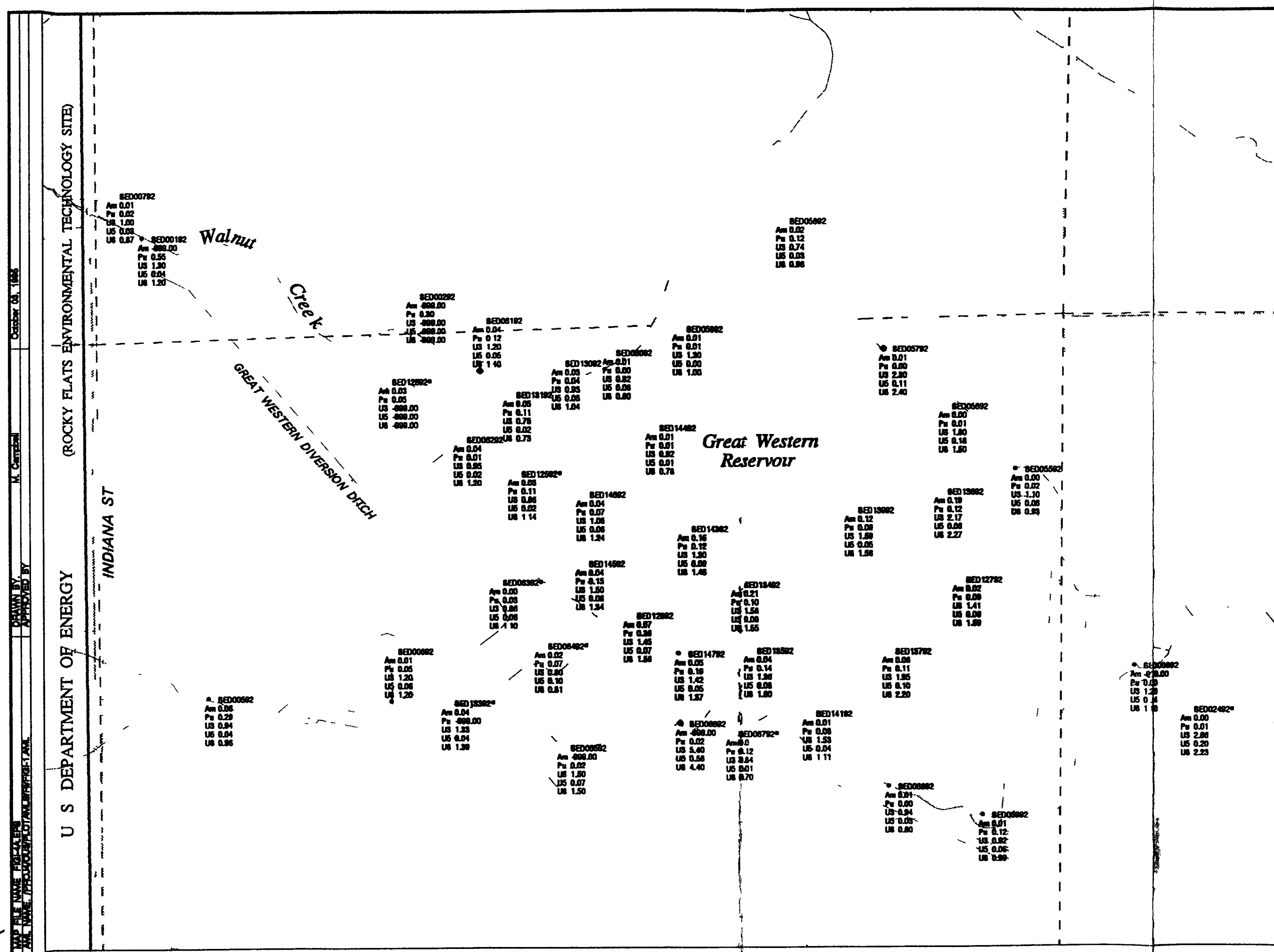

Figure I-4A

Analytical Results of Selected Radionuclides for Sediment Samples

Operable Unit 3

IHSS 200

Great Western Reservoir

ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

U S. Department of Energy

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Analyte Symbols:
Am Americium-241
Pu Plutonium-239/240
U3 Uranium-233/234
U5 Uranium-235
U8 Uranium-238

Units are pCi/g

• 1992 Grab/Core samples

1992 Sediment grab sample

Note Data shown are for grab locations only

Values of -999 indicate rejected data.

DRAFT

Mapping Sources
Jefferson County Mapping Dept.
EG&G Rocky Flats
U S Geological Survey

Scale 1 6000
1 inch = 500 ft

0 250 500 1000
SCALE IN FEET

Polyconic projection 1927 North American datum. Colorado central zone state plane coordinate system

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DRAWN BY: M. Campbell
APPROVED BY
October 03, 1995

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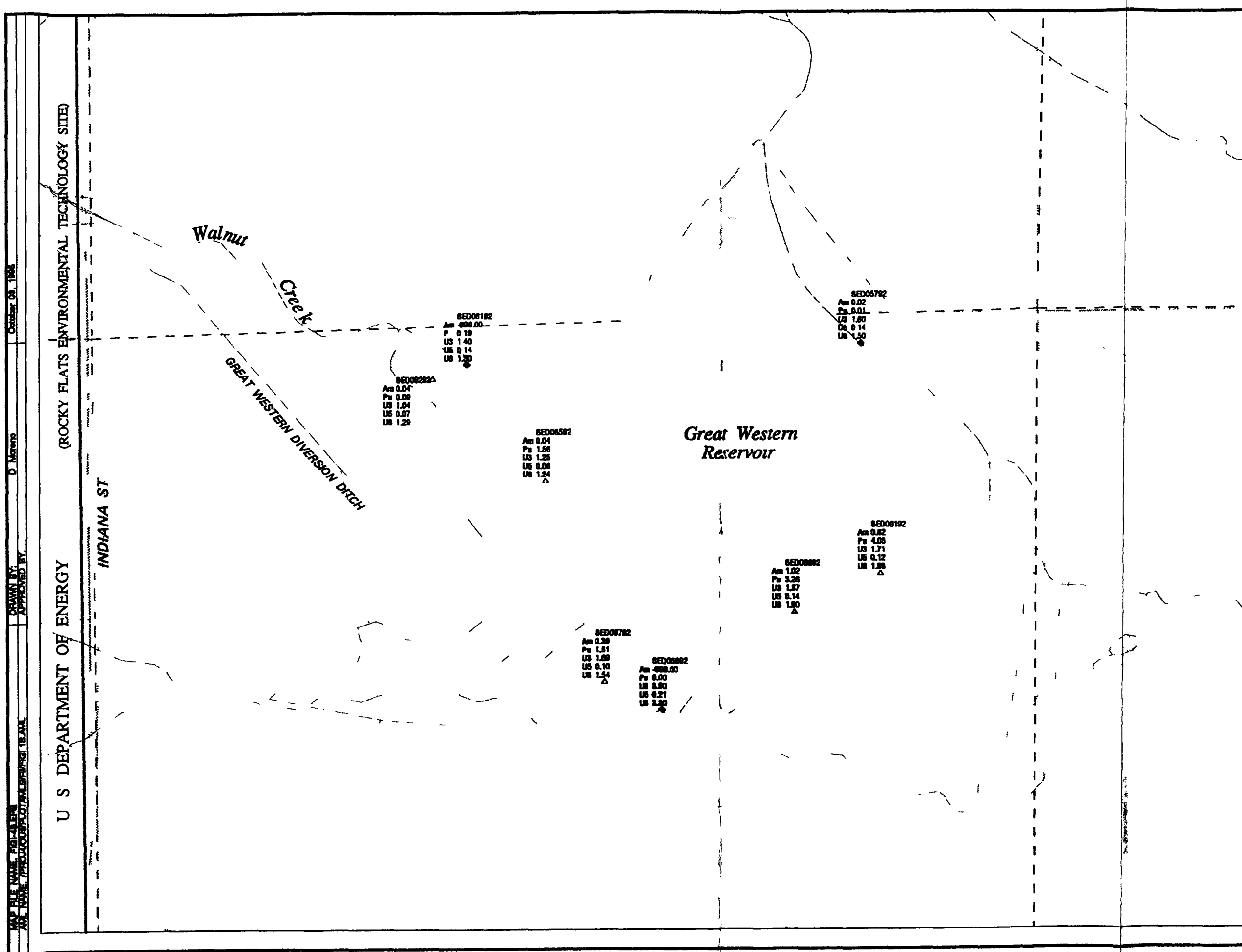

Figure I-4B

Analytical Results of Selected Radionuclides for Sediment Samples

Operable Unit 3

IHSS 200

Great Western Reservoir

ROCKY FLATS

ENVIRONMENTAL TECHNOLOGY SITE

U S Department of Energy

Analyte Symbols:
Am Americium-241
Pu Plutonium-239/240
U3 Uranium-233/234
U5 Uranium-235
U8 Uranium-238

Units are pCi/g

◆ 1992 Grab/Core samples

△ 1992 Sediment Core sample

Note Data shown are maximum values for core locations only

Values of -999 indicate rejected data.

Best Available Copy

DRAFT

Mapping Sources.
Jefferson County Mapping Dept.
EG&G Rocky Flats
U S Geological Survey

Scale 1 6000
1 inch = 500 ft

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SCALE IN FEET

Polyconic projection 1927 North American datum. Colorado central zone state plane coordinate system.

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DRAWN BY: D Moreno
APPROVED BY:
October 03, 1995

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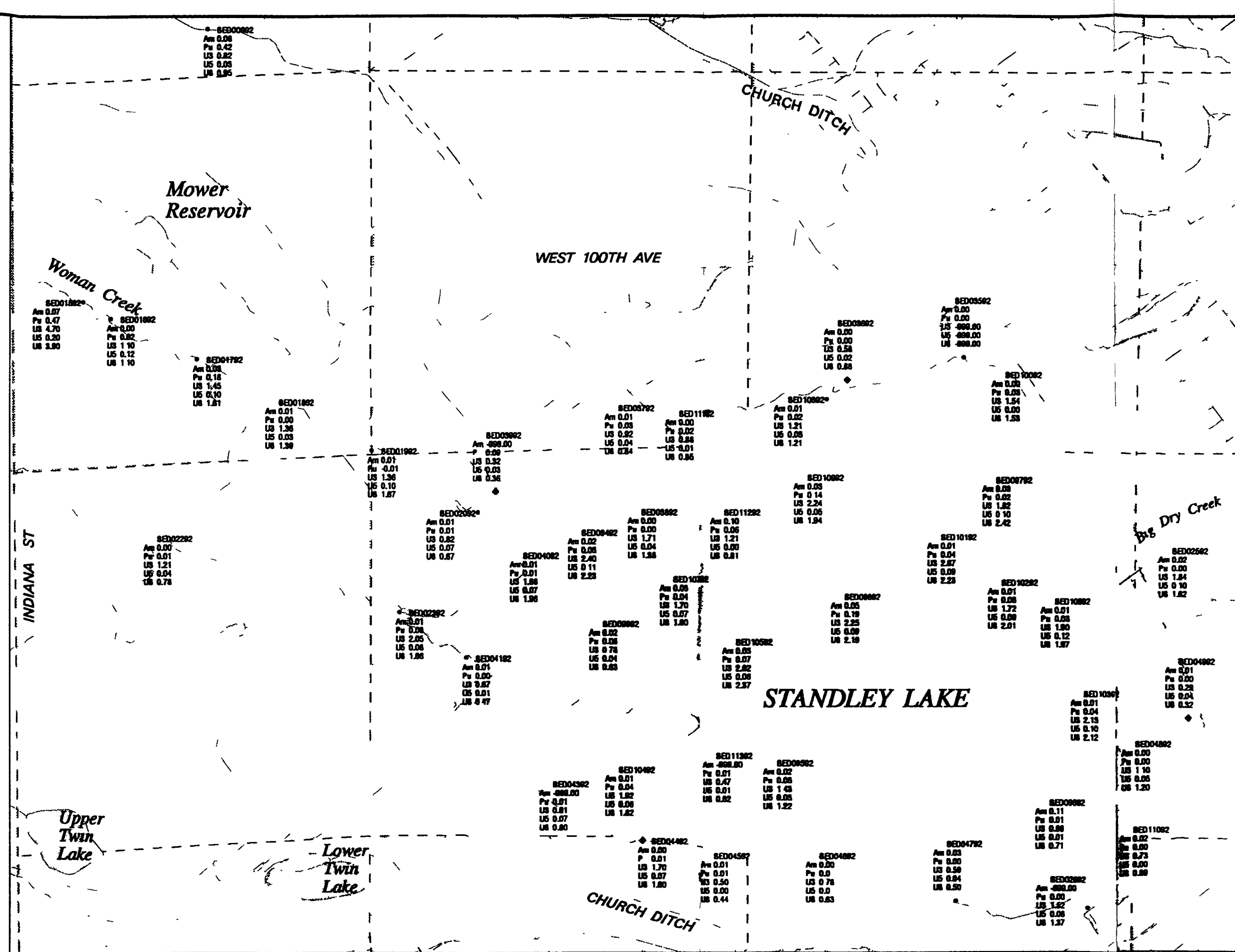

Figure I-5A

Analytical Results of Selected Radionuclides for Sediment Samples

Operable Unit 3

IHSS 201

Standley Lake

ROCKY FLATS

ENVIRONMENTAL TECHNOLOGY SITE

U S Department of Energy

Analyte Symbols
Am Americium-241
Pu Plutonium-239/240
U3 Uranium-233/234
U5 Uranium-235
U8 Uranium 238

Units are pCi/g

1992 Grab/Core samples

1992 Sediment grab sample

Note Data shown are for grab locations only

Values of -999 indicate rejected data.

Best Available Copy

DRAFT

Mapping Sources
Jefferson County Mapping Dept.
EG&G Rocky Flats
U S Geological Survey

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1 inch = 1320 ft or 0 25 mi

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SCALE FEET

Polyconic projection 1927 North American datum. Colorado central zone state plane coordinate system

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DRAWN BY M. Campbell
APPROVED BY
October 03, 1995

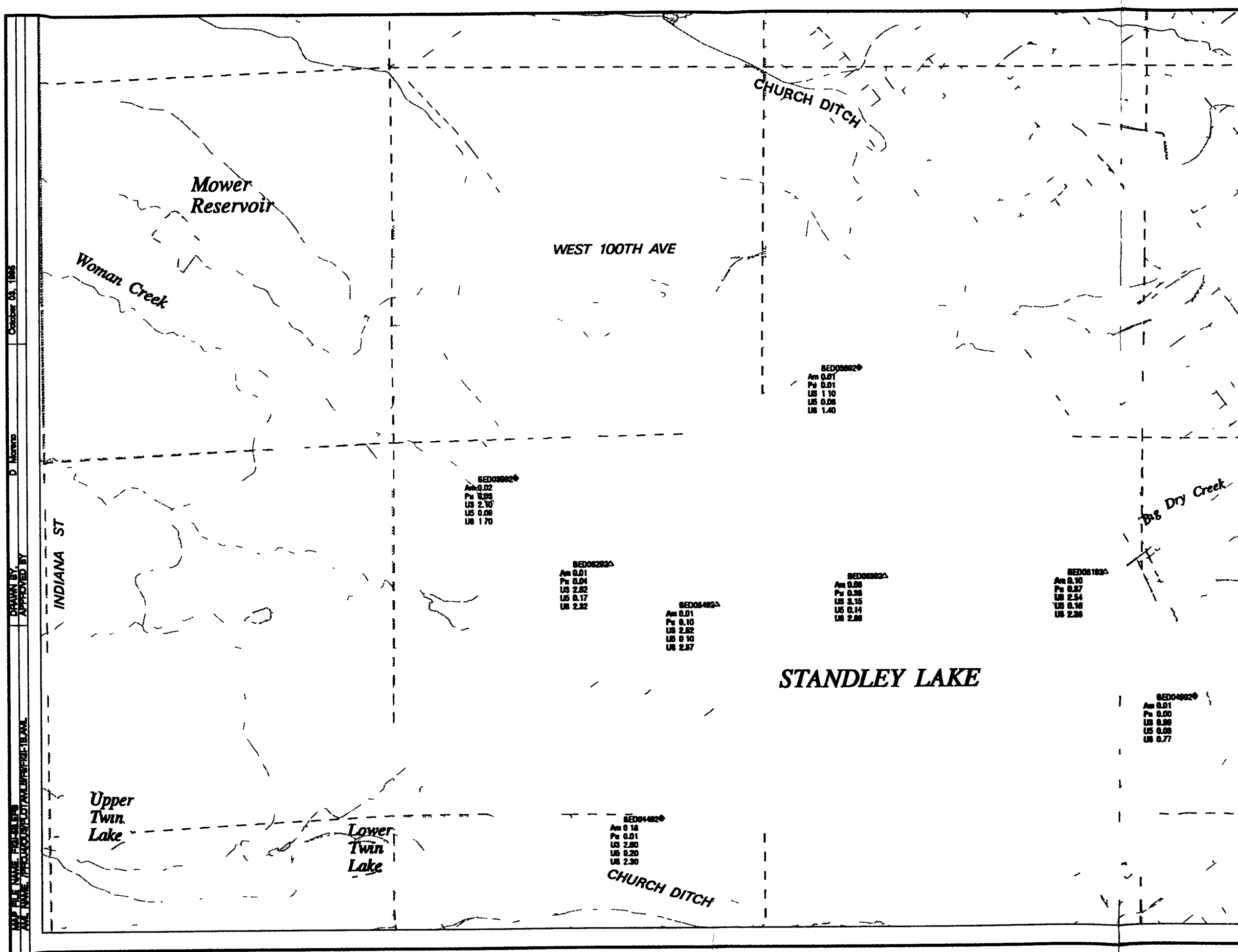

Figure I-5B

Analytical Results of Selected Radionuclides for Sediment Samples

Operable Unit 3

IHSS 201

Standley Lake

ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

U S Department of Energy

Analyte Symbols:
Am Americium-241
Pu Plutonium-239/240
U3 Uranium-233/234
U5 Uranium-235
U8 Uranium-238

Units are pCi/g

◆ 1992 Grab/Core samples

△ 1992 Sediment Core sample

Note Data shown are maximum values for core locations only

Values of -999 indicate rejected data.

Best Available Copy

DRAFT

Mapping Sources
Jefferson County Mapping Dept.
EG&G Rocky Flats
U S Geological Survey

Scale 1 15840
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SCALE IN FEET

Polyconic projection. 1927 North American datum. Colorado central zone state plane coordinate system

DRAWN BY D Moreno
APPROVED BY
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October 03, 1996

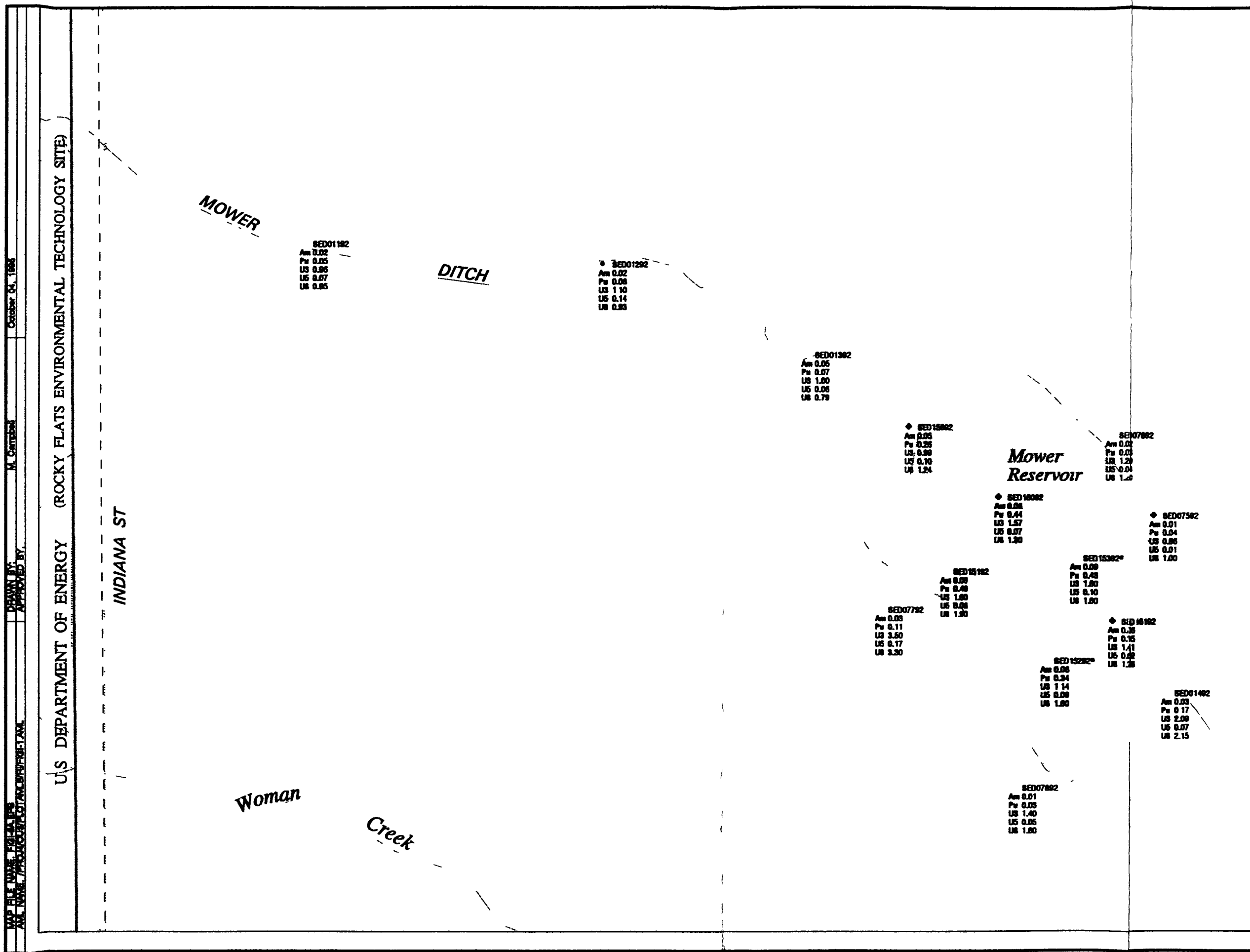

Figure I-6A

Analytical Results of Selected Radionuclides for Sediment Samples

Operable Unit 3
IHSS 202
Mower Reservoir

ROCKY FLATS
ENVIRONMENTAL TECHNOLOGY SITE
U S. Department of Energy

Analyte Symbols:
Am Americium-241
Pu Plutonium-239/240
U3 Uranium-233/234
U5 Uranium-235
U8 Uranium-238

Units are pCi/g

◆ 1992 Grab/Core samples
1992 Sediment Grab sample

Note Data shown are for grab locations only
Values of -999 indicate rejected data.

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Mapping Sources:
Jefferson County Mapping Dept.
EG&G Rocky Flats
U S Geological Survey

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1 inch = 200 ft

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SCALE IN FEET

Polyconic projection. 1927 North American datum. Colorado central zone state plane coordinate system.

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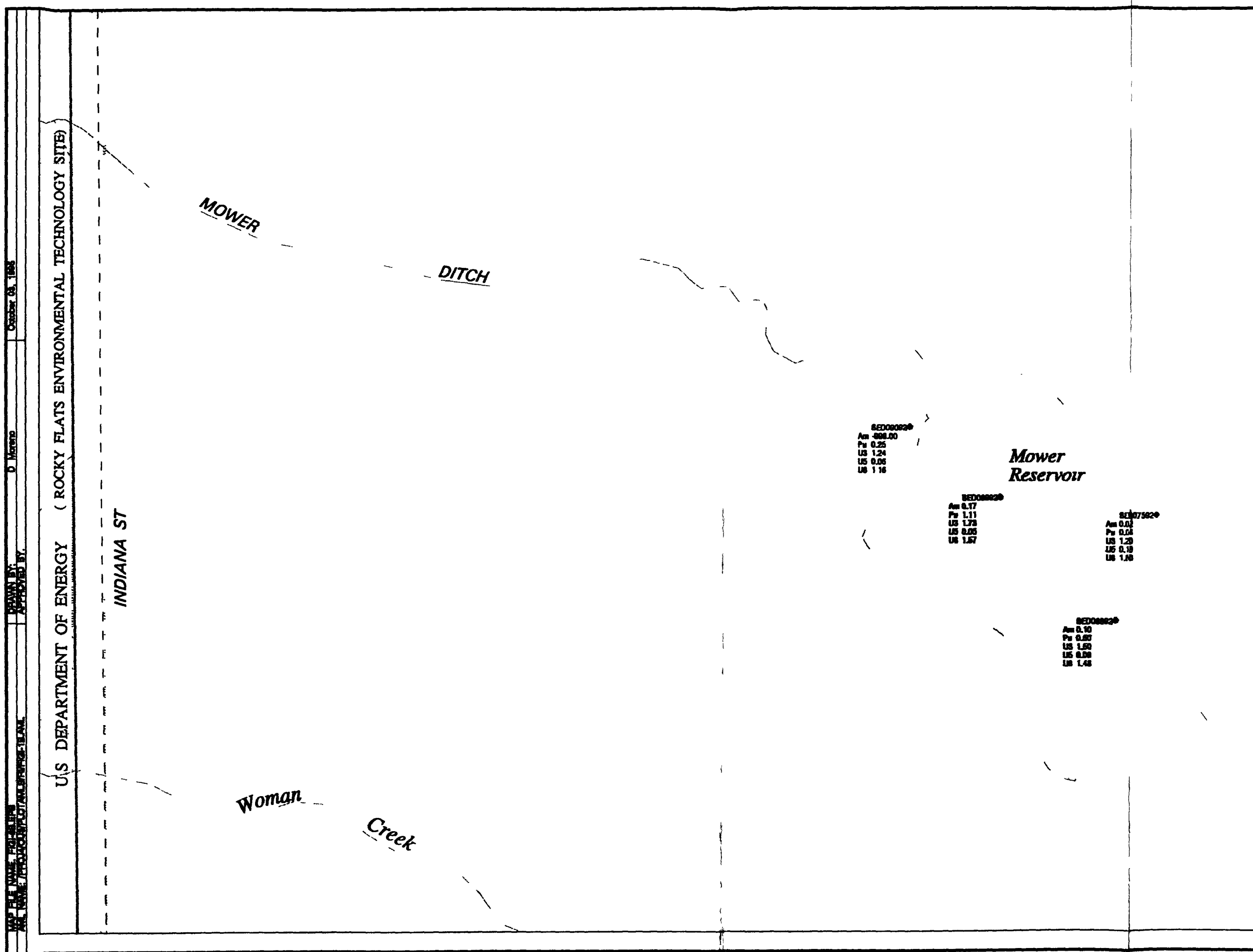

Figure I-6B

Analytical Results of Selected Radionuclides for Sediment Samples

Operable Unit 3

IHSS 202

Mower Reservoir

ROCKY FLATS

ENVIRONMENTAL TECHNOLOGY SITE

U.S. Department of Energy

Analyte Symbols:
Am Americium-241
Pu Plutonium-239/240
U3 Uranium-233/234
U5 Uranium-235
U8 Uranium-238

Units are pCi/g

◆ 1992 Grab/Core samples

△ 1992 Sediment Core sample

Note. Data shown are maximum values for core locations only

Values of -999 indicate rejected data.

Best Available Copy

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Mapping Sources
Jefferson County Mapping Dept.
EG&G Rocky Flats
U S Geological Survey

Scale 1 2400
1 inch = 200 ft

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SCALE IN FEET

Polyconic projection 1927 North American datum. Colorado central zone state plane coordinate system

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APPROVED BY:
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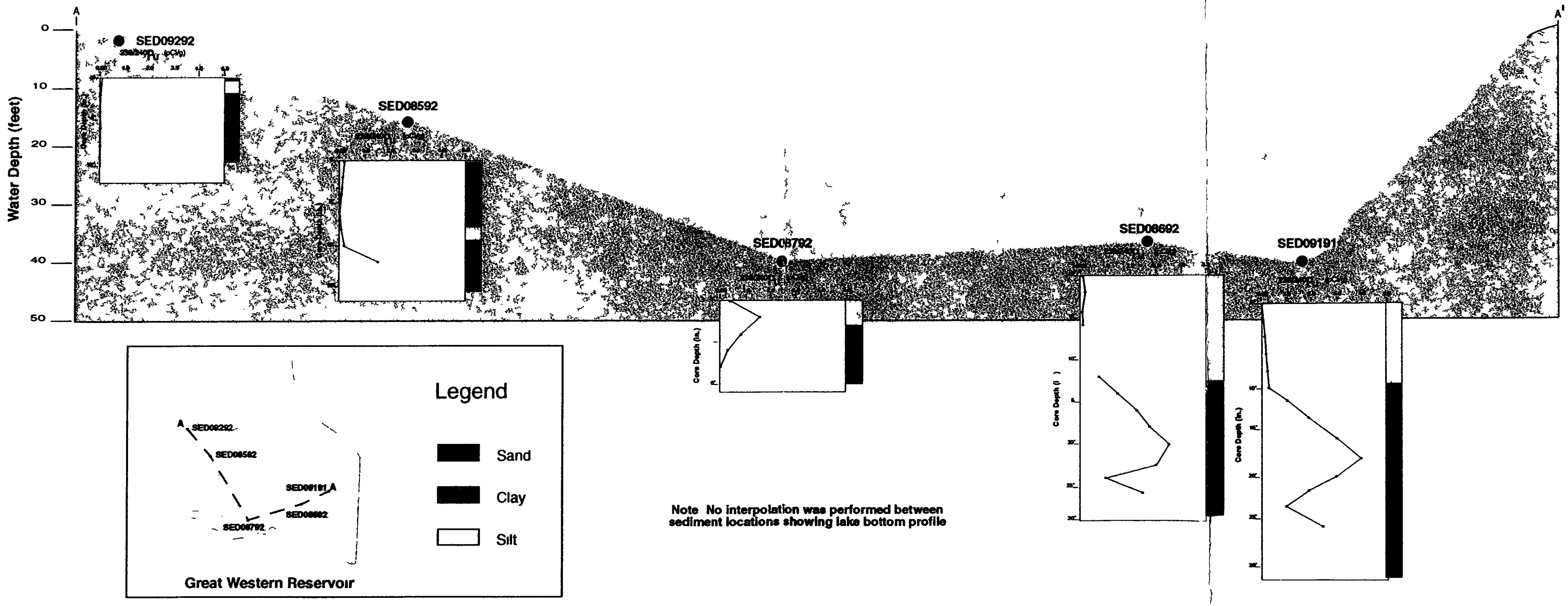

Figure 4-9

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Pu DEPTH PROFILES FOR GREAT WESTERN RESERVOIR

Operable Unit 3

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