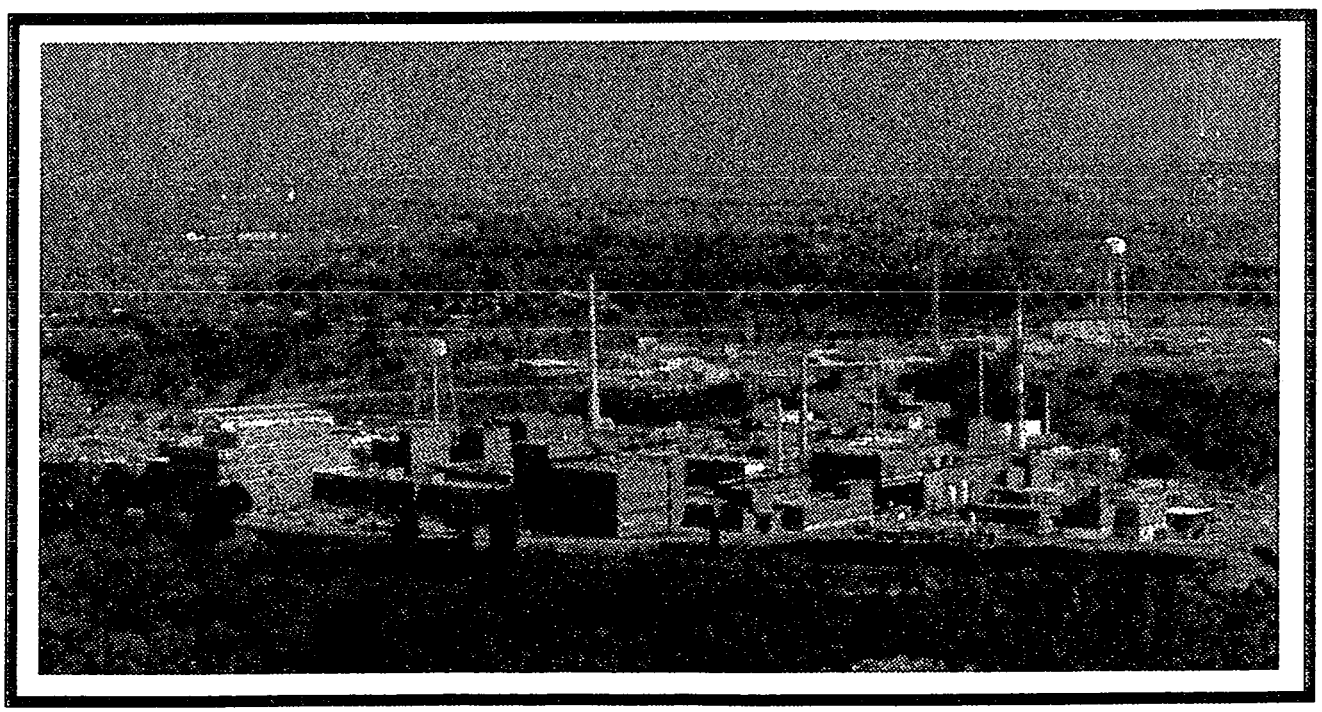
MOUND

Environmental
Restoration
Program


# MOUND PLANT
## Potential Release Site Package
## PRS # 363



| REV | DESCRIPTION | DATE |
|---|---|---|
| **PUBLIC RELEASE**<br>**0** | Available for comment. | **Jan. 14, 1998** |
| **FINAL RELEASE**<br>**1** | Comment period expired. | |
| | | |
| | | |


# MOUND PLANT

## Release Block O

## Potential Release Site

## PRS 363


H
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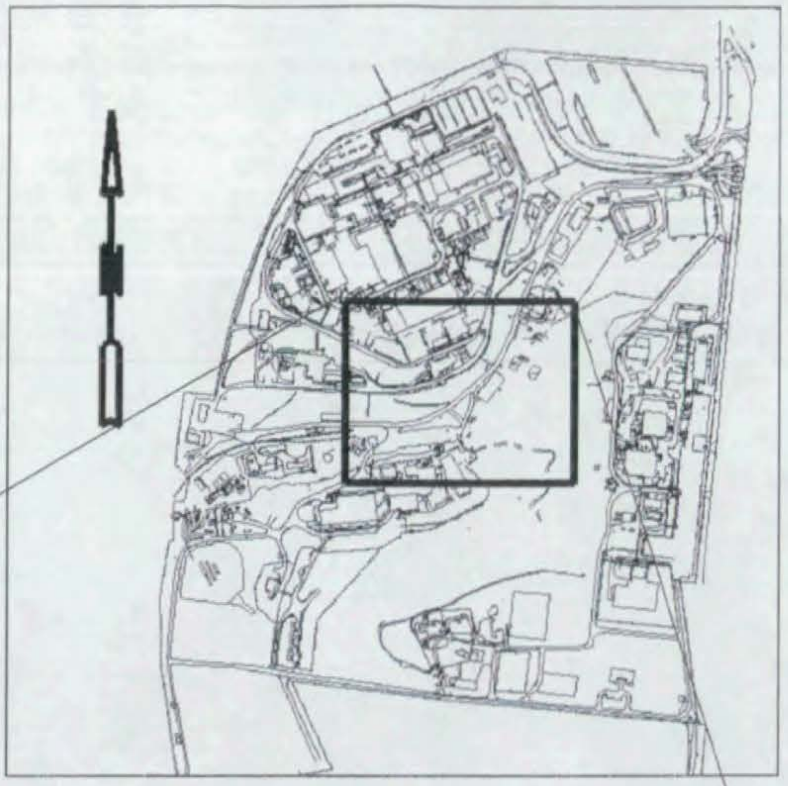
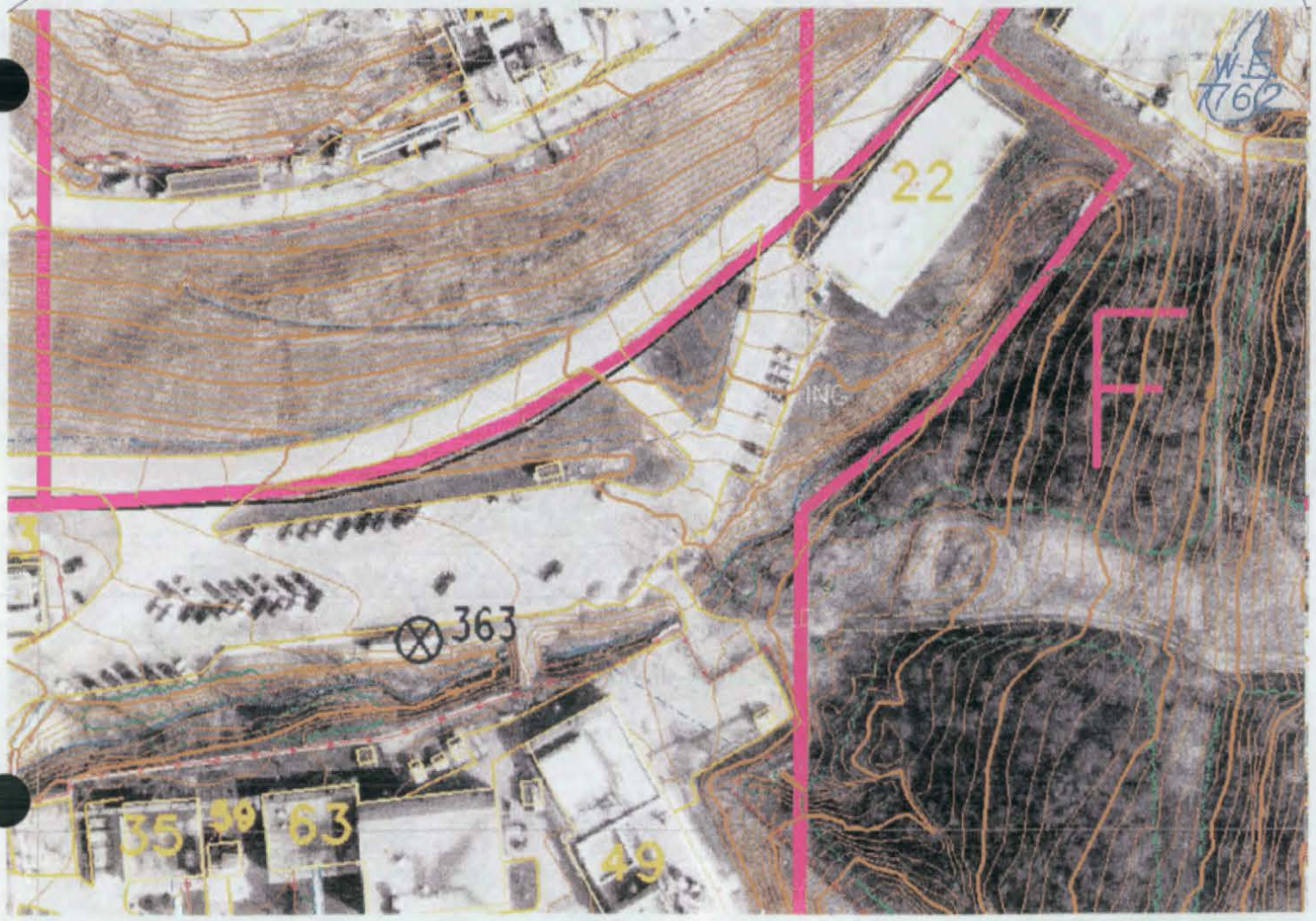
# Mound Plant

# Release Block C

## Potential Release Site

# PRS 363






363

# PRS 363

## PRS HISTORY:

PRS 363 was an isolated Pu-238 hot spot identified during the site survey for the OU5, Non-AOC investigation (June 1994 - October 1994). No radioactive or hazardous waste generating processes are known to have occurred at the location of PRS 363. However, there is a 12-inch concrete storm sewer pipe near PRS 363 which transported a low-risk discharge from SM Building to the site drainage ditch.[2]

## CONTAMINATION:

1) The **OU5 Operational Area Non-AOC Investigation**[1,5] detected surface plutonium-238 at a concentration of 85 pCi/g (Mound soil screening lab) which identified this location as PRS 363. Concentrations of thorium-232 did not exceed 2 pCi/g. The Mound ALARA guideline criteria for plutonium-238 is 25 pCi/g and the regulatory guideline for surface thorium-232 is 5 pCi/g. The **OU5 Operational Area Investigation**[1,5] also investigated hydrocarbons at PRS 363 via a qualitative PETREX soil gas survey. Results of the investigation found no elevated hydrocarbon readings at PRS 363.

2) The **Other Soils Investigation**[4] found plutonium-238 in Mound's drainage ditch (PRS 67) at concentrations from 28 to 81 pCi/g at surface and at depth. These findings were within approximately fifty feet of PRS 363. The Mound ALARA guideline criteria for plutonium-238 is 25 pCi/g.

3) The **Radiological Site Survey**[3] took one surface sample in the vicinity of PRS 363 (sample #0443). Plutonium-238 was detected at 1.16 pCi/g and thorium-238 was detected at less than 2 pCi/g. The Mound ALARA guideline criteria for plutonium-238 is 25 pCi/g and the regulatory guideline for surface thorium-232 is 5 pCi/g.

## READING ROOM REFERENCES:


1) OU5, Operational Area Phase I Investigation Non-AOC Field Report, Volume I, June 1995. (pages 6-9)
2) OU9, Site Scoping Report: Volume 7 - Waste Management, February 1993. (pages 10-11)
3) OU9, Site Scoping Report: Volume 3 - Radiological Site Survey, June 1993. (pages 12-14)
4) Other Soils Investigation - Field Data, March 1995. (pages 15-19)
5) OU5, Operational Area Phase I Investigation Non-AOC Field Report, Volume II-App. A-G, June 1995. (pages 20-25)


## PREPARED BY:


Gary L. Coons, Member of EG&G Technical Staff

# SUPPLEMENTAL DATA
# PRS 363

## HISTORY:

The **OU5, Operational Area Phase I Non-AOC Investigation** investigated the presence of radiological and hydrocarbon contamination in the soil at PRS 363 (see paragraph #1 on the previous page). Results of the investigation showed an elevated detection of plutonium-238.[1,5]

## CONTAMINATION:

In March 1996, the **Soil Gas Confirmation Investigation** [6] was performed in response to an EPA and DOE decision to further assess PRS 363. A soil sample was collected within 50 feet of PRS 363. The sample was collected over a depth of 1 to 3 feet and analyzed for volatiles, semivolatiles, PCBs, pesticides, metals, radionuclides, and explosives. Results of the investigation showed:

All concentrations of volatile, semivolatile, PCBs, pesticides, metals, radionuclides, and explosives, in the soils, were below their respective ALARA, regulatory or $10^{-6}$ Risk Based Guideline Criteria.[6, 7, 8]

## SUPPLEMENTAL DATA REFERENCES:


6) Further Assessment, Soil Gas Confirmation Sampling, May 1996. (pages 26-35)
7) Risk-Based Soil Guidelines, Final, Revision 3, December 1995.
8) Code of Federal Regulations, 40 CFR 192.12 and 40 CFR 192.41.

# MOUND PLANT
# PRS 363
# Soil Contamination

**RECOMMENDATION:**

PRS 363 was an isolated Pu-238 hot spot identified during the site survey for the OU5, Non-AOC investigation (June 1994 - October 1994). No radioactive or hazardous waste generating processes are known to have occurred at the location of PRS 363. However, there is a 12-inch concrete storm sewer pipe near PRS 363, which transported a low-risk wastewater from SM Building to the site drainage ditch.

The Core Team originally recommended Further Assessment for PRS 363. Subsequently, the cost of further investigation versus the cost of removing the potentially contaminated soils was evaluated. Cost estimates indicate that the cost of removal is not significantly greater than the cost of further assessment at PRS 363. Additionally Further Assessment findings may indicate the need for a Response (removal) Action, resulting in costs associated with both Further Assessment and Response Action. Therefore, the Core Team recommends a RESPONSE ACTION as a more cost-effective course of action for PRS 363.

**CONCURRENCE:**

DOE/MEMP: Arthur W. Kleinrath 12/17/97
Arthur W. Kleinrath, Remedial Project Manager (date)

USEPA: Timothy J. Fischer 12/17/97
Timothy J. Fischer, Remedial Project Manager (date)

OEPA: Brian K. Nickel 12/18/97
Brian K. Nickel, Project Manager (date)

**SUMMARY OF COMMENTS AND RESPONSES:**

Comment period from _____ to _____

☐ No comments were received during the comment period.

☐ Comment responses can be found on page _____ of this package.

# REFERENCE MATERIAL
# PRS 363

Environmental Restoration Program

# OPERABLE UNIT 5
# OPERATIONAL AREA PHASE I INVESTIGATION
# NON-AOC FIELD REPORT

**MOUND PLANT**
**MIAMISBURG, OHIO**

**VOLUME I - TEXT**

**June 1995**

**Final (Revision 0)**


**U.S. Department of Energy**
**Ohio Field Office**

EG&G Mound Applied Technologies

Two areas of elevated surface activity were found during the FIDLER survey of Area 61 (see Figure 2.1). Activity in these areas (near grid locations A3 and A4) ranged between 8.5 and 9.0 kcpm using the Out Channel. The Out Channel CC for Area 61 was 8.0 kcpm.

### 2.1.4.2. Surface Soil Screening

Surface soil samples, collected as part of the soil gas survey (see Section 2.2), were analyzed for Pu-238 and Th-232 at the Mound Plant Soil Screening Facility. Concentrations of Th-232 at or exceeding the Mound Plant Soil Screening Facility detection limit of 2.0 pCi/g were detected at six of the 442 sample locations. Figure 2.2 shows the locations where concentrations of Th-232 equal or exceed 2 pCi/g. Concentrations of Pu-238 at or exceeding the Mound Plant Soil Screening Facility detection limit of 25 pCi/g were detected at 51 of the 442 sample locations. This information is summarized in Table II.3.

Plate 3, Volume 1 shows (1) the concentration contours where Pu-238 exists at concentrations from 25-50 pCi/g, and (2) the concentration contours where Pu-238 exists at concentrations greater than 50 pCi/g. The concentration of Pu-238 at the soil surface exceeds 100 pCi/g at one Non-AOC grid location at 16N5 (243 pCi/g).

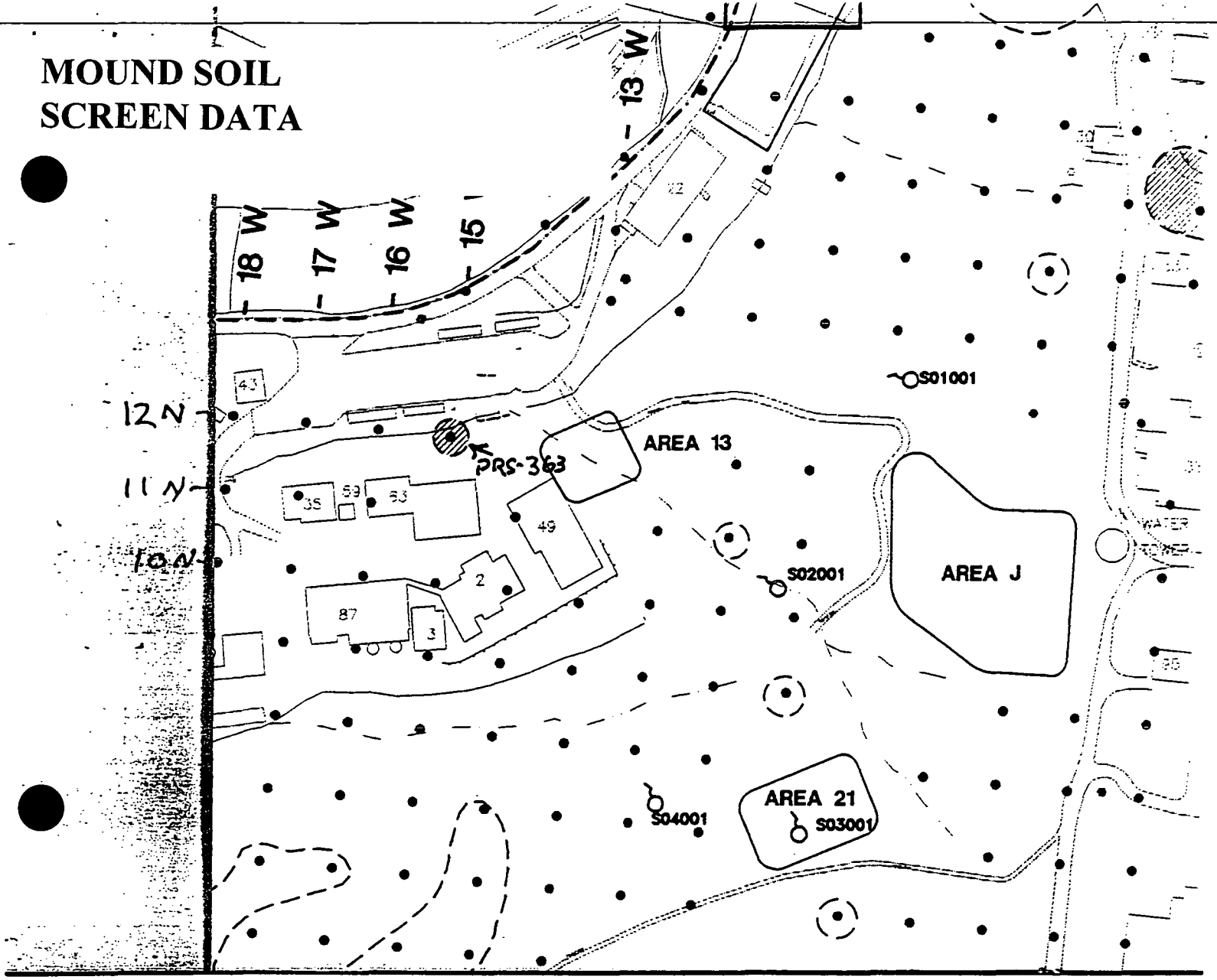
~~The concentrations of Pu-238 do not exceed 25 pCi/g in Area 61. The concentration of Th-232 at the soil surface does not exceed 2 pCi/g in Area 61.~~

## 2.2. SOIL GAS SURVEY

A soil gas survey was performed in the Non-AOC from June 14 to October 11, 1994 and in Area 61 from August 11 to September 6, 1994. The purpose of the soil gas survey was to locate areas within the Non-AOC, including Area 61, which exhibit potential subsurface contamination by VOCs and SVOCs.

The Non-AOC and Area 61 soil gas surveys were completed over grid systems established for each area. The distance between the sample location points within the sampling grid was 100 feet for the Non-AOC and 25 feet for Area 61 (see Plate 1, Volume I). Due to its size, the soil gas survey for the Non-AOC was divided into five sections designated as North, South, West, East, and Area 61 (see Plate 1, Appendix

# MOUND SOIL SCREEN DATA




## ONS OF ELEVATED SURFACE SOIL PU-238 ACTIVITY

Monitoring Well

Piezometer

1 N - Grid Lines
1 W -

Seeps

Contour for Pu-238 Concentrations Between 25 - 50 pCi/g

Contour for Pu-238 Concentrations > 50 pCi/g

Note: Information on Basemap is Derived from the Weston OU9 Site Scoping Report, 1993, & Referenced to the 1927 Ohio State Plane Coordinate System

AREAS OF SPECIAL INTEREST AND ADDITIONAL SAMPLING

Surface Soil Sampling Locations (Area 4 Pyrotechnic Waste Disposal Area and Building 34 Firefighting Training Area

Soil Gas and Soil Screening Facility Radiological Sampling Locations (Fuel Area and Additional Sampling [a])

Soil Screening Facility Radiological Sampling Locations (Additional Sampling [a])

Surface and Subsurface Soil Sampling Locations (Building 24)

a OU5 Discussion Paper (See Appendix B)

Table II.3. Summary of Elevated Surface Soil Radiological Activity
Page 2 of 2

| Grid Location[a] | Mound Soil Screening Facility Data | |
|---|---|---|
| | Plutonium-238 (pCi/g) | Thorium-232 (pCi/g) |
| 6N9 | 33 | ND |
| 6N14 | 30 | ND |
| 6N16 | 29 | ND |
| 6N17 | 25 | ND |
| 6N19 | 39 | ND |
| 7N14 | 27 | ND |
| 7N18 | 26 | ND |
| 7N23 | 25 | 1 |
| 9N10 | 25 | ND |
| 11N11 | 25 | ND |
| 12N15 | 85 | ND |
| 15N7 | 30 | ND |
| 16N4 | 78 | ND |
| 16N5 | 243 | ND |
| 19N7 | 56 | 15.9 |
| 19N8 | 25 | 2.4<br>ND |
| 20N6 | | 2.6 |
| 20N7 | | 14.7 |
| 22N4 | | 2.0 |
| 23N1 | 25 | ND |
| 23N2 | 26 | 1 |
| 23N5 | 25 | ND |
| B18001 (Building 24) | 38 | 6.7 |
| 21.5N2.5 | 25 | ND |

MOUND SOIL SCREEN DATA

[a] See Plate 1 for grid location

ND Radiological contamination not detected above the Mound Plant Soil Screening Facility detection limits of 25 pCi/g for Pu-238 and 2 pCi/g for Th-232

Document Control No. _____

Environmental Restoration Program

EG&G MOUND-29-01 -01 -07 -07 -9502080001

# OPERABLE UNIT 9, SITE SCOPING REPORT: VOLUME 7 - WASTE MANAGEMENT

## MOUND PLANT
## MIAMISBURG, OHIO

February 1993

**FINAL**
**(Revision 0)**

Department of Energy
Albuquerque Field Office

Environmental Restoration Program
EG&G Mound Applied Technologies

equipment sump. A small 8-gallon waste sump in the floor of the equipment room sump collected aqueous wastes that leaked from the equipment or that resulted from spills and maintenance activities. During modifications in 1963, it was discovered that the plumbing of the 8-gallon sump pump was connected directly to the storm sewer. The plumbing was modified to route the sump output back to the low-risk influent tanks.

In addition to the two 1,000-gallon influent tanks, there were also two underground steel tanks along the south wall and near the southwest corner of the SM Building. One tank had a capacity of 3,000 gallons and the other, a capacity of 5,000 gallons. One tank received shower waste from the change room and the other received low-risk waste for subsequent treatment in SM-1. The shower water tank was installed in 1963 (McMannon 1963-1966). Prior to this, shower and perhaps other decontamination water was diluted and discharged to the storm sewer.

Utilities associated with the SM Building included a septic tank and associated leach field for handling sanitary waste. Two storm sewers were used by the SM Building to discharge storm water runoff and the treated effluent from the waste disposal facility (Flanagan 1976, Freeman et al. 1962). The SM-1 low-risk effluent was discharged to a 12-inch-diameter concrete storm sewer pipe, located along the south wall of the building, that extended west down the SM hillside to an outfall near the drainage ditch. The overflow from the two 1,000-gallon low-risk waste tanks drained to the northern line via a 4-inch sewer line that paralleled the north wall of the building and connected to a 24-inch diameter concrete storm sewer. This north storm sewer outfall was located south of Building 30 on the SM hillside, near the sanitary leach field, where it merged with the plant drainage ditch.

The south storm sewer system connecting to the SM-1 waste disposal facility was tested in February 1963 and found to be leaking in an underground section between SM-1 and the building stack (McMannon 1963-1966). No information was developed as to how or when the sewer line leak was repaired. On April 18, 1964, the south storm sewer again developed a leak in the same area. While digging in the area, a black material was encountered that was interpreted to have been activated charcoal used in the treatment of low-risk waste (McMannon 1963-1966). During the third week of April 1964, this same sewer line developed a leak again. No information was developed to indicate the extent of the leak or the corrective action that was taken to effect a repair.

## 4.2. ALPHA WASTE SOLIDIFICATION FACILITIES (HISTORICAL)

High-risk waste generated in the plutonium production operations has generally been packaged for shipment offsite. Beginning with startup of the SM operations, however, the high-risk waste liquids were processed for plutonium recovery. In 1963, Mound began to distinguish between recoverable

ENVIRONMENTAL RESTORATION PROGRAM

# OPERABLE UNIT 9, SITE SCOPING REPORT: VOLUME 3 - RADIOLOGICAL SITE SURVEY

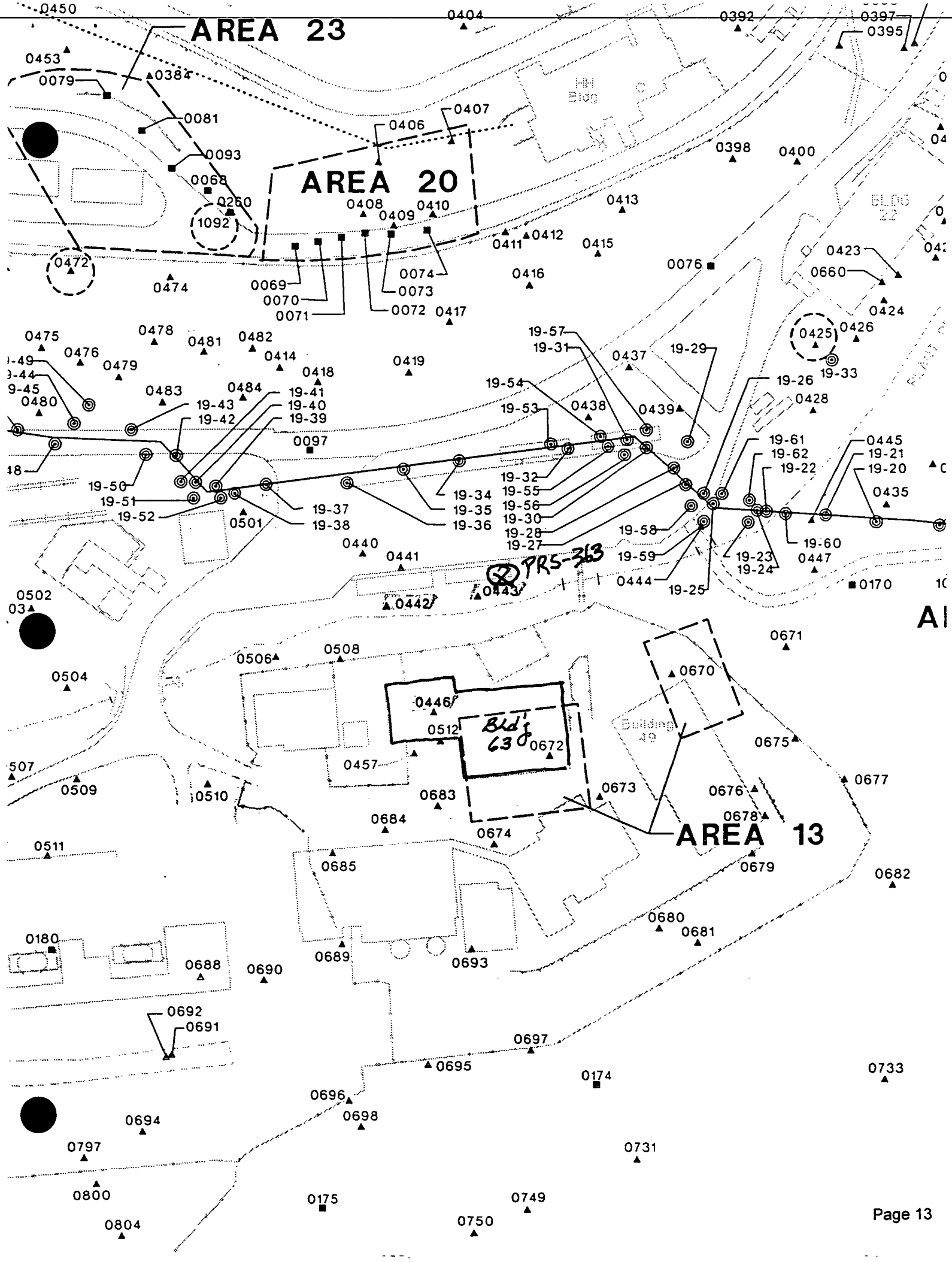
## MOUND PLANT
## MIAMISBURG, OHIO

June 1993

DEPARTMENT OF ENERGY
ALBUQUERQUE FIELD OFFICE

ENVIRONMENTAL RESTORATION PROGRAM
EG&G MOUND APPLIED TECHNOLOGIES

FINAL


AREA 23
AREA 20
AREA 13
Bld'g 63
PR5-363
0450
0404
0392
0397
0395
0453
0384
0079
0081
0406
0407
0093
0398
0400
0068
0260
1092
0408
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19-53
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19-61
19-62
19-22
0445
19-21
19-20
19-50
19-51
19-52
19-37
19-38
0501
19-34
19-35
19-36
19-32
19-55
19-56
19-30
19-28
19-27
0435
19-58
19-60
0440
0441
19-59
19-23
19-24
0447
0444
19-25
0170
0502
0442
0443
0671
0506
0508
0670
0504
0446
0512
0672
0675
0457
0677
0509
0510
0683
0673
0676
0684
0678
0674
0511
0685
0679
0682
0680
0681
0180
0688
0690
0689
0693
0692
0691
0697
0695
0174
0733
0696
0698
0694
0797
0731
0800
0175
0749
0804
0750

| Map Location[a] | Coordinates South | West | MRC ID No. | Mo-Yr | Depth (inch) | Pu-238 (pCi/g) | Thorium[b] (pCi/g) | Tritium (pCi/mL) | Co-60 (pCi/g) | Cs-137 (pCi/g) | Ra-226 (pCi/g) | Am-241 (pCi/g) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S0442 | 2550 | 3375 | 2985 | 10-83 | 0 | 1.49 | b | | | | | |
| S0443 | 2575 | 3300 | 2981 | 10-83 | 0 | 1.16 | b | | | | | |
| S0444 | 2600 | 3100 | 2986 | 10-83 | 0 | 0.79 | b | | | | | |
| S0445 | 2635 | 3010 | 2987 | 10-83 | 0 | 2.18 | b | | | | | |
| S0446 | 2650 | 3375 | 2983 | 10-83 | 0 | 0.47 | b | | | | | |
| S0447 | 2675 | 3025 | 5881 | 07-84 | 0 | 9.57 | b | | | | | |
| S0448 | 1900 | 3455 | 4095 | 10-83 | 0 | 1.02 | b | | | | | |
| S0449 | 1900 | 3530 | 6269 | 08-84 | 0 | 6.21 | b | | | | | |
| S0450 | 1950 | 3430 | 6268 | 08-84 | 0 | 3.57 | b | | | | | |
| C0077 | 1950 | 3680 | 1958 | 05-83 | 18 | 1.45 | b | | | | | |

# RADIOCHEMICAL ANALYSIS

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S0451 | 1975 | 3480 | | | | | | | | | | |
| S0452 | 1975 | 3680 | | | | | | | | | | |
| C0078 | 1975 | 3755 | 1961 | 05-83 | 18 | 1.14 | b | | | | | |
| | | | 1962 | 05-83 | 30 | 0.35 | b | | | | | |
| | | | 1963 | 05-83 | 42 | 0.18 | b | | | | | |
| | | | 1964 | 05-83 | 72 | 0.97 | b | | | | | |
| S0453 | 2000 | 3430 | 6272 | 08-84 | 0 | 19.80 | b | | LDL | LDL | 0.8 | LDL |
| S0454 | 2000 | 3530 | 6270 | 08-84 | 0 | 4.87 | b | | | | | |
| S0455 | 2000 | 3680 | 2425 | 09-82 | 0 | NR | NR | | LDL | LDL | 0.8 | LDL |

# *DRAFT*

# OTHER SOILS CHARACTERIZATION REPORT

MOUND PLANT
MIAMISBURG, OHIO

JANUARY 1996

U.S. DEPARTMENT OF ENERGY
OHIO FIELD OFFICE

DECONTAMINATION AND DECOMMISSIONING PROGRAM
EG&G MOUND APPLIED TECHNOLOGIES

**Field Data** – Other Soils, PRS 363 INVESTIGATION

Examples 6638-5001

66 = Area = Creek (Drainage Ditch)
38 = Sample location 34 (see map)
50 = Soil sample
01 = 0-1 foot sample depth
Where sample depths on this part of the characterization are:
01 = 0 to 0.5 foot (surface)
04 = 0.5 to 4 foot
06 = 4 to 6 foot

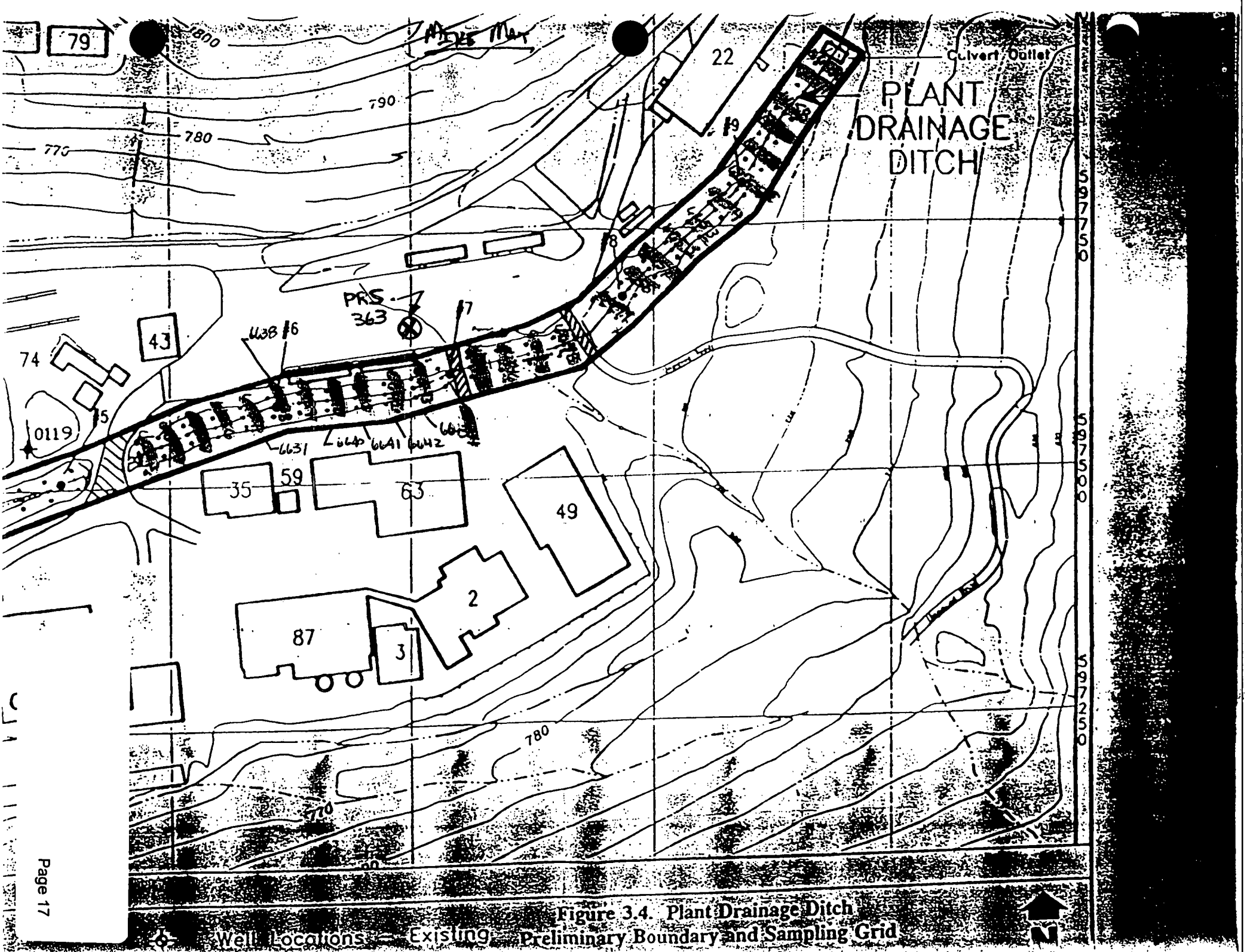



Figure 3.4. Plant Drainage Ditch

Well Locations — Existing — Preliminary Boundary and Sampling Grid

TEST RESULTS - SODIUM IODIDE SOIL SCREEN
( MD-80030, OP. 1355 )
400 SECOND COUNT
PREPARED BY BETTY PETERS -EXT. 4408

| SAMPLER | SAMP TYPE | 88 KEV WINDOW pCi/g | 17 KEV WINDOW pCi/g | MORE ISO-TOPES | GRID LOCATION | WELL |
|---|---|---|---|---|---|---|
| DUNCAN 5892 | CONT | 1.2 | 42 | N | WESTON AREA 66 OTHER SOILS 6638-5001 | A |
| DUNCAN 5892 | CONT | 1.0 | 74 | N | WESTON AREA 66 OTHER SOILS 6638-5004 | C |
| DUNCAN 5892 | CONT | 1.0 | 28 | N | WESTON AREA 66 OTHER SOILS 6638-5006 | C |

# MOUND SOIL SCREEN DATA

TEST RESULTS - SODIUM IODIDE SOIL SCREEN
( MD-80030, OP. 1355 )
400 SECOND COUNT
PREPARED BY BETTY PETERS -EXT. 4408

| SAMPLER | SAMP TYPE | 88 KEV WINDOW | 17 KEV WINDOW | MORE ISO-TOPES | GRID LOCATION | WELL |
|---|---|---|---|---|---|---|
| DUNCAN 5892 | CONT | 0.4 | 19 | N | WESTON AREA 66 OTHER SOILS 6637-5001 | C |
| DUNCAN 5892 | CONT | 0.8 | 537 | N | WESTON AREA 66 OTHER SOILS 6640-5004 | A |
| DUNCAN 5892 | CONT | 1.0 | 20 | N | WESTON AREA 66 OTHER SOILS 6640-5006 | C |
| DUNCAN 5892 | CONT | 1.0 | 38 | N | WESTON AREA 66 OTHER SOILS 6641-5001 | A |
| DUNCAN 5892 | CONT | 1.1 | 42 | N | WESTON AREA 66 OTHER SOILS 6641-5004 | A |
| [illegible]N 5892 | CONT | 1.1 | 8 | N | WESTON AREA 66 OTHER SOILS 6642-5006 | C |
| DUNCAN 5892 | CONT | 0.9 | 33 | N | WESTON AREA 66 OTHER SOILS 6643-5001 | A |
| DUNCAN 5892 | CONT | 0.6 | 81 | N | WESTON AREA 66 OTHER SOILS 6643-5004 | C |

# MOUND SOIL SCREEN DATA

Environmental Restoration Program

# OPERABLE UNIT 5
# OPERATIONAL AREA PHASE I INVESTIGATION
# NON-AOC FIELD REPORT

**MOUND PLANT**
**MIAMISBURG, OHIO**

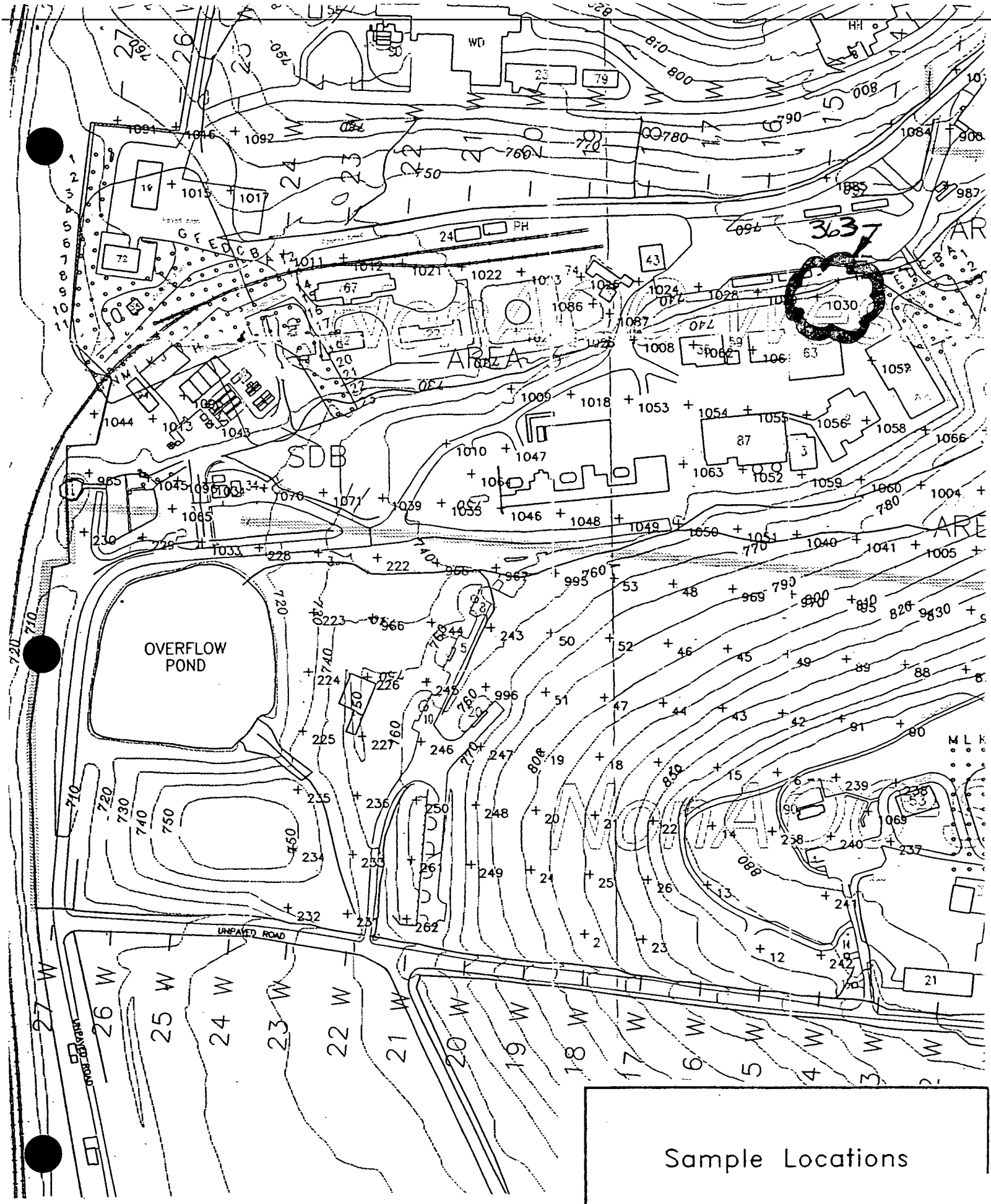
**VOLUME II - APPENDICES A-G**

**June 1995**

**Final (Revision 0)**

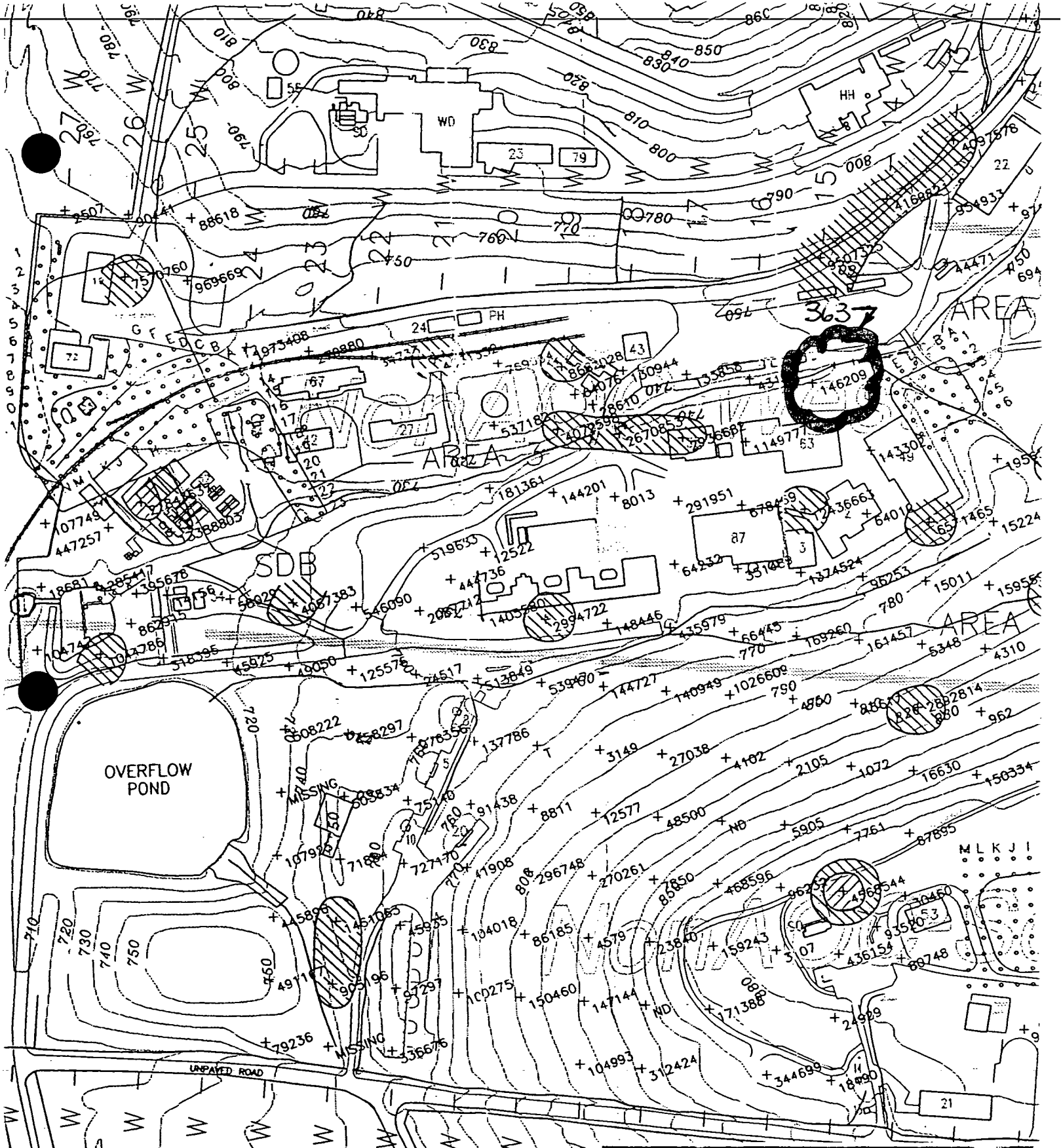
**U.S. Department of Energy**
**Ohio Field Office**

EG&G Mound Applied Technologies




Sample Locations

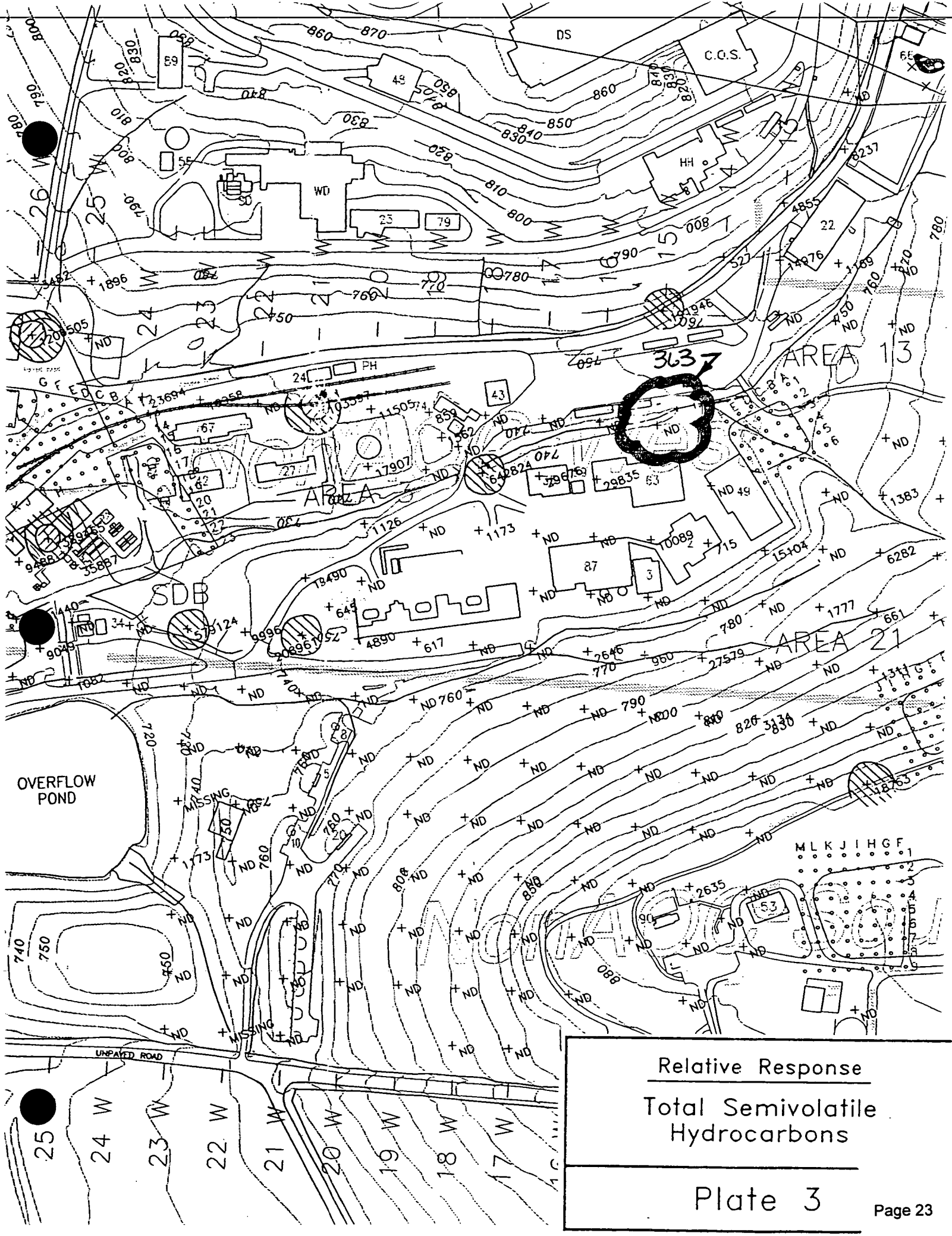
Plate 1




Relative Response

Total Aromatic Hydrocarbons

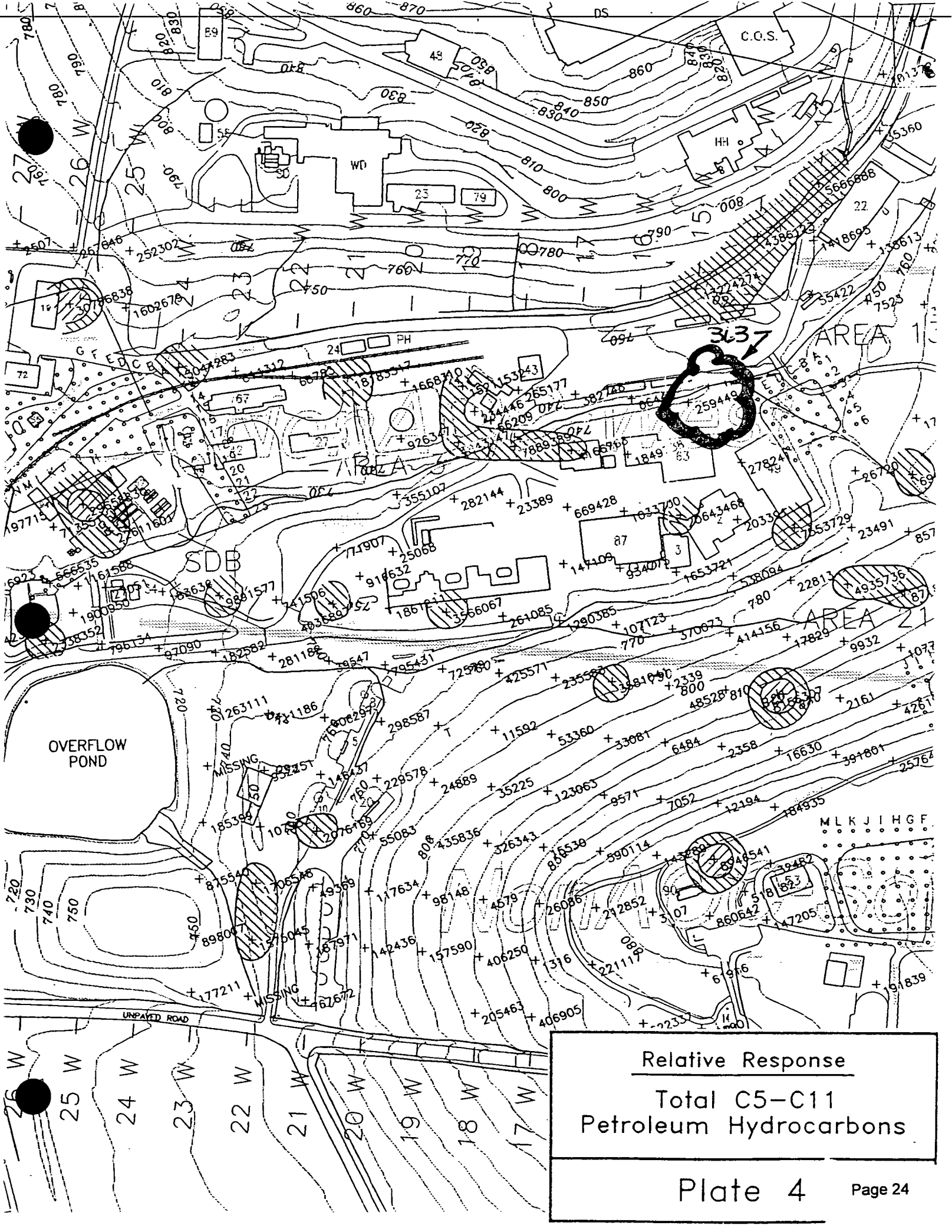
Plate 2




Relative Response

Total Semivolatile Hydrocarbons

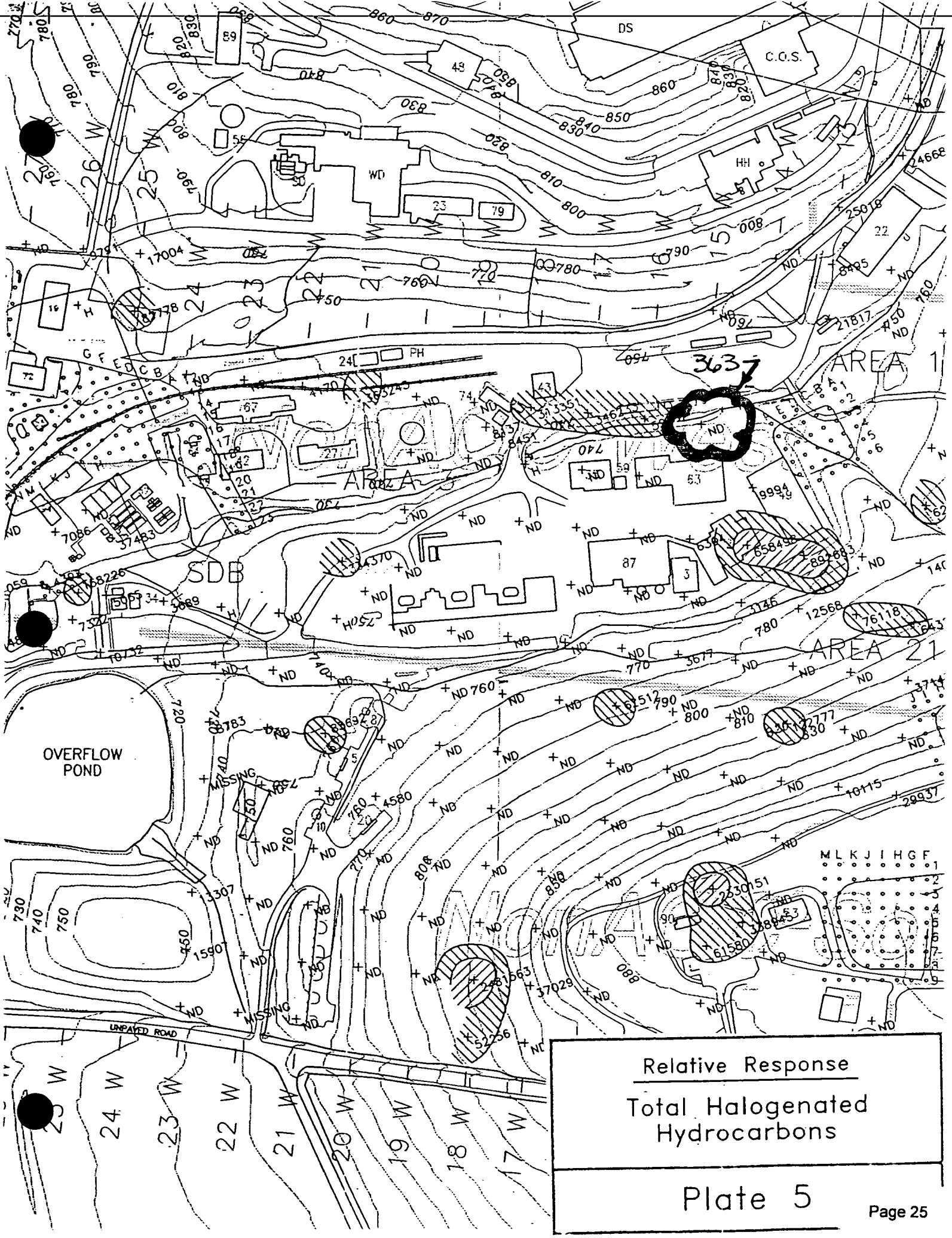
Plate 3




## Relative Response

## Total C5–C11 Petroleum Hydrocarbons

Plate 4


Relative Response
Total Halogenated Hydrocarbons
Plate 5
OVERFLOW POND
UNPAVED ROAD
AREA 1
AREA 2
AREA 3
AREA 21
SDB
C.O.S.
DS
WD
HH
PH
MISSING
ND

MOUND

Environmental
Restoration
Program

# Further Assessment

## Soil Gas Confirmation Sampling

**Mound Plant**
**Miamisburg, Ohio**

**May 1996**

Revision 0

Department of Energy

EG&G Mound Applied Technologies

**Table I.1 Soil Analyte List**

Volatile Organic Compounds

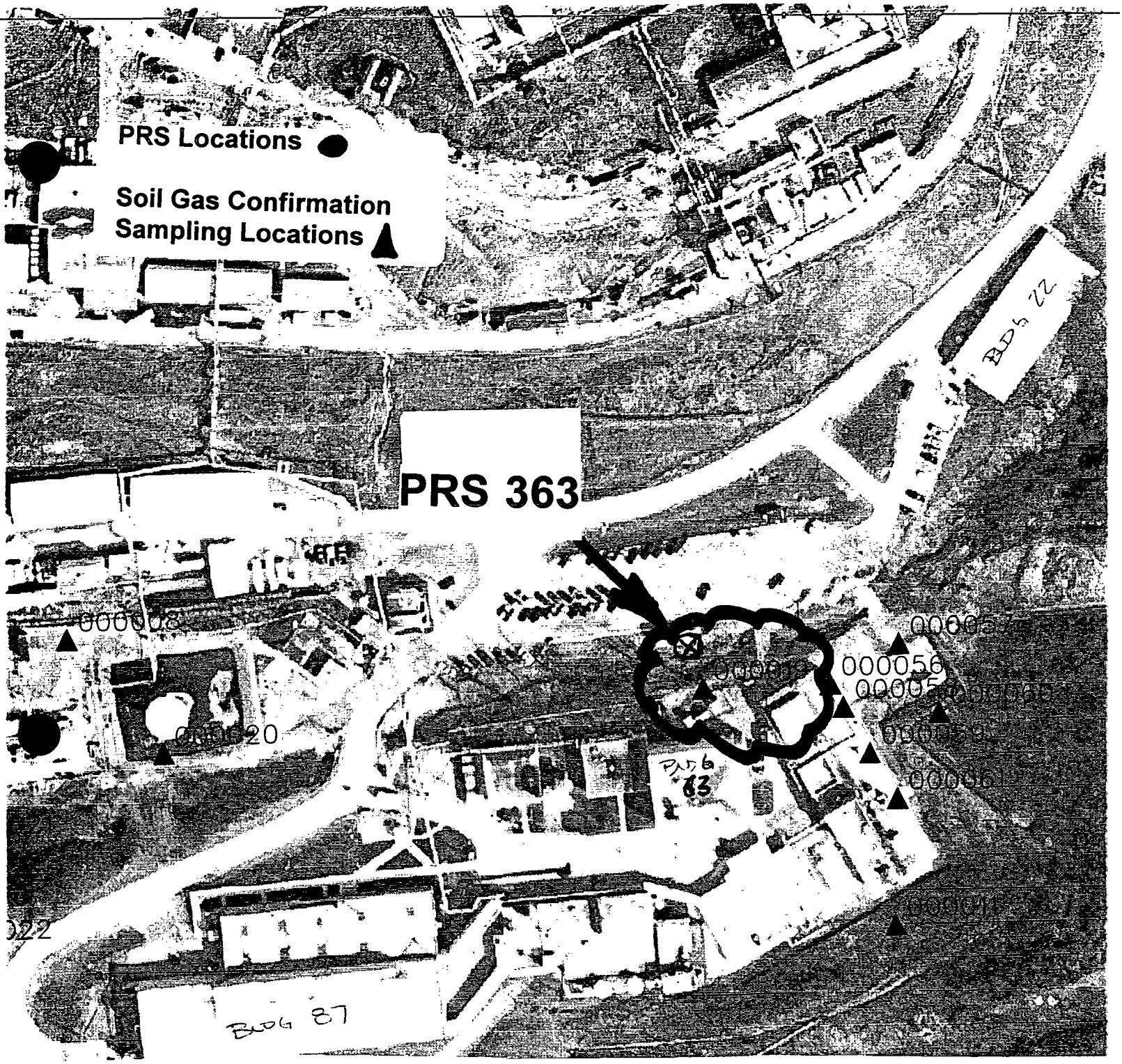
| | | |
|---|---|---|
| Acetone | Dibromochloromethane | 4-Methyl-2-Pentanone |
| Benzene | 1,1-Dichloroethane | Styrene |
| Bromodichloromethane | 1,2-Dichloroethane | 1,1,2,2-Tetrachloroethane |
| Bromoform | 1,1-Dichloroethene | Tetrachloroethene |
| Bromomethane | 1,2-Dichloroethene (total) | 1,1,1-Trichloroethane |
| 2-Butanone | 1,2-Dichloropropane | 1,1,2-Trichloroethane- |
| Carbon Disulfide | cis-1,3-Dichloropropene | Trichloroethene |
| Carbon Tetrachloride | trans-1,3-Dichloropropene | Toluene |
| Chlorobenzene | Ethylbenzene | Vinyl Acetate |
| Chloroethane | 2-Hexanone | Vinyl Chloride |
| Chloroform | Methylene Chloride | Xylenes (total) |
| Chloromethane | | |

Semivolatile Organic Compounds

| | | |
|---|---|---|
| Acenaphthene | Chrysene | Hexachlorobenzene |
| Acenaphthylene | Dibenz(a,h)anthracene | Hexachlorobutadiene |
| Anthracene | Dibenzofuran | Hexachlorocyclopentadiene |
| Benzo(a)anthracene | 1,2-Dichlorobenzene | Hexachloroethane |
| Benzo(a)pyrene | 1,3-Dichlorobenzene | Indeno(1,2,3-cd)pyrene |
| Benzo(b)fluoranthene | 1,4-Dichlorobenzene | Isophorone |
| Benzo(g,h,i)perylene | 3,3-Dichlorobenzidine | 2-Methylnaphthalene |
| Benzo(k)fluoranthene | 2,4-Dichlorophenol | 2-Methylphenol |
| bis(2-Chloroethoxy)methane | Diethylphthalate | 4-Methylphenol |
| bis(2-Chloroethyl)ether | 2,4-Dimethylphenol | Naphthalene |
| bis(2-Ethylhexyl)phthalate | Dimethyphthalate | 2-Nitroaniline |
| 4-Bromophenyl-phenylether | Di-n-butylphthalate | 3-Nitroaniline |
| Butylbenzylphthalate | Di-n-octylphthalate | 4-Nitroaniline |
| Carbazole | 4,6-Dinitro-2-methylphenol | Nitrobenzene |
| 4-Chloroaniline | 2,4-Dinitrophenol | 2-Nitrophenol |
| 4-Chloro-3-methylphenol | 2,4-Dinitrotoluene | 4-Nitrophenol |
| 2-Chloronaphthalene | 2,6-Dinitrotoluene | N-Nitroso-di-n-propylamine |
| 2-Chlorophenol | Fluoranthene | N-Nitroso-diphenylamine |
| 4-Chlorophenyl-phenylether | Fluorene | 2,2-oxybis(1-Chloropropane) |
| Pentachlorophenol | Pyrene | 2,4,5-Trichlorobenzene |
| Phenanthrene | 1,2,4-Trichlorobenzene | 2,4,6-Trichlorobenzene |
| Phenol | | |

**Table I.1 Soil Analyte List (Continued)**

| | | |
|---|---|---|
| Pesticides/PCB's | | |
| Aroclor-1016 | Delta-BHC | Endosulfan II |
| Aroclor-1221 | Gamma-BHC | Endosulfan sulfate |
| Aroclor-1232 | alpha-Chlordane | Endrin |
| Aroclor-1242 | gamma-Chlordane | Endrin aldehyde |
| Aroclor-1248 | 4,4'-DDD | Endrin ketone |
| Aroclor-1254 | 4,4'-DDE | Heptachlor |
| Aroclor-1260 | 4,4'-DDT | Heptachlor epoxide |
| Aldrin | Dieldrin | Methoxychlor |
| Alpha-BHC | Endosulfan I | Toxaphene |
| Beta-BHC | | |
| | | |
| Inorganics | | |
| Aluminum | Copper | Potassium |
| Antimony | Cyanide | Selenium |
| Arsenic | Iron | Silver |
| Barium | Lead | Sodium |
| Beryllium | Lithium | Thallium |
| Bismuth | Magnesium | Tin |
| Cadmium | Manganese | Vanadium |
| Calcium | Mercury | Zinc |
| Chromium | Molybdenum | Nitrate/Nitrite |
| Cobalt | Nickel | Explosives (USATHAMA,PETN) |
| | | |
| Radionuclides | | |
| Americium-241 | Plutonium-238 | Thorium-230 |
| Bismuth-207 | Plutonium-239/240 | Thorium-232 |
| Bismuth-210 | Potassium-40 | Uranium-234 |
| Cesium-137 | Radium-226 | Uranium-235 |
| Cobalt-60 | Thorium-228 | Uranium-238 |




*The following tables contain the Soil Gas Confirmation Sampling results. Sampling was performed for the following categories of contaminants:*

- *Volatiles*
- *Semivolatiles*
- *PCBs/pesticides*
- *Metals*
- *Radionuclides*
- *Explosives*

*If no results are given for the contaminant categories listed above, then no detects were found for that category of contaminants.*

**Table A.1. Soil Gas Confirmation Detected Volatile Organic Compounds (cont.)**

| ANALYTE | SGC NAC 000016 | SGC NAC 000017 | SGC SAN 000018 | SGC NAC 000019 | SGC NAC 000020 | SGC NAC 000022 | Background | $10^{-6}$ Construction Worker Guidelines |
|---|---|---|---|---|---|---|---|---|
| VOLATILES (µg/Kg) | | | | | | | | |
| Acetone | | | | | 36 | | NA | 105000000 |
| 1,2-Dichloroethene (total) | | | | | | | NA | 21500000 |
| 2-Butanone | | | | | 6 J | | NA | 46500000 |
| Benzene | | | | | | | NA | 8900 |
| Carbon Disulfide | | | | | | | NA | 1400000 |
| Chloroform | | | | | | | NA | NA |
| Chloromethane | | | | | | | NA | NA |
| Ethylbenzene | | | | | | | NA | 480 |
| Methylene Chloride | 8 | | 10 | | 17 | 10 | NA | NA |
| Tetrachloroethene | | | | | | | NA | 10500000 |
| Toluene | | 2 J | | 1 J | 2 J | | NA | 1250000 |
| Trichloroethene | | | | 7 | | | NA | 41000 |
| Xylene (total) | | | | | | | NA | 2150000000 |

J - Numerical value is an estimated quantity
NA - Value not available
D - Sample was diluted
C - Estimated due to error in calibration
µg/kg - micrograms per kilogram
B - Detected below required limit of detection, but above instrument detection Limit

## Table A.2. Soil Gas Confirmation Detected Semivolatile Organic Compounds (cont.)

| ANALYTE | SGC NAC 000016 | SGC NAC 000017 | SGC SAN 000018 | SGC NAC 000020 | SGC NAC 000021 | SGC NAC 000024 | Background | $10^{-6}$ Construction Worker Guidelines |
|---|---|---|---|---|---|---|---|---|
| SEMIVOLATILES (µg/Kg) | | | | | | | | |
| Acenaphthene | | | | 21 J | | | NA | NA |
| Acenaphthylene | | | | | 44 J | | NA | NA |
| Anthracene | | | | | 130 J | | NA | 320000000 |
| Benzo(a)anthracene | 47 J | | 48 J | 130 J | 110 J | | NA | 4100 |
| Benzo(a)pyrene | 42 J | | 68 J | 150 J | 130 J | | NA | 410 |
| Benzo(b)fluoranthene | 39 J | | 59 J | 67 J | 88 J | | NA | 4100 |
| Benzo(g,h,i)perylene | 33 J | | 49 J | 100 J | 100 J | | NA | NA |
| Benzo(k)fluoranthene | 46 J | | 62 J | 37 J | | | NA | 41000 |
| Bis(2-ethylhexyl)phthalate | 100 J | | 1000 | | | 26 J | NA | 215000 |
| Butylbenzylphthalate | | | | | | | NA | 215000000 |
| Carbazole | | | | | 21 J | | NA | NA |
| Chrysene | 51 J | | 54 J | 220 J | 170 J | | NA | 410000 |
| Di-n-butyl phthalate | | | | | | | NA | 105000000 |
| Di-n-octyl phthalate | | | | | | 89 J | NA | 21500000 |
| Dibenz(a,h)anthracene | | | 40 J | 24 J | 28 J | | NA | 410 |
| Dibenzofuran | | | | | | | NA | NA |
| Diethyl phthalate | | | | | | | NA | NA |
| Fluoranthene | 100 J | 28 J | 84 J | 180 J | 320 J | | NA | 42500000 |
| Fluorene | | | | | 26 J | | NA | NA |
| Indeno(1,2,3-cd)pyrene | 27 J | | 53 J | 46 J | 73 J | | NA | 4100 |
| 2-Methylnaphthalene | | | | | | | NA | NA |
| Naphthalene | | | | | | | NA | NA |
| Phenanthrene | 63 J | | 27 J | | 220 J | | NA | NA |
| Phenol | | | | | | | NA | 650000000 |
| Pyrene | 87 J | 26 J | 91 J | 1400 | 310 J | | NA | 32000000 |

***NOTE: No detections are recorded for 000019. Therefore, semivolatiles were not found.***

**Table A.3. Soil Gas Confirmation Detected Pesticides/PCB's**

| ANALYTE | SGC NAC 000008 | SGC NAC 000010 | SGC NAC 000031 | SGC A66 000041 | SGC A61 000044 | SGC A13 000060 | Background | $10^{-6}$ Construction Worker Guidelines |
|---|---|---|---|---|---|---|---|---|
| PESTICIDES/PCB (µg/kg) | | | | | | | | |
| Aroclor-1248 | 48 | | | 110 | 98 | | ND | 380 |
| Aroclor-1254 | 43 | | | | 55 | | ND | 21500 |
| Alpha-Chlordane | | | | | | | ND | NA |
| Gamma-Chlordane | | | | | | 3.7 | ND | NA |
| 4,4'-DDT | | | | | | | 13000 | 9000 |
| Dieldrin | | 4.4 | 5• | | | | ND | 185 |
| Endosulfan I | | | | 3.4• | 2.4• | | ND | NA |
| Endosulfan II | | | | | | | NA | NA |
| Endrin | | | 11• | | | | ND | NA |
| Heptachlor | | | | | | 2.9 | ND | NA |

***NOTE: No detects for 000019 are recorded. Therefore, no pesicides nor PCBs were found.***

## Table A.4. Soil Gas Confirmation Detected TAL Inorganics (cont.)

| ANALYTE | SGC NAC 000019 | SGC NAC 000020 | SGC NAC 000021 | SGC NAC 000022 | SGC NAC 000023 | SGC NAC 000024 | Background | $10^{-6}$ Construction Worker Guidelines |
|---|---|---|---|---|---|---|---|---|
| INORGANICS (mg/kg) | | | | | | | | |
| Aluminum | 7820 | 13400 | 7720 | 8030 | 12200 | 5410 | 19000 | NA |
| Antimony | | | | 0.66 B | | | NA | 425 |
| Arsenic | 6.8 | 3 | 4.3 | 13.3 | 2.0 BJ | 0.83 BJ | 8.6 | 320 |
| Barium | 56.1 | 17.9 B | 24.2 B | 65.8 J | 90.3 | 28.4 B | 180 | 75000 |
| Beryllium | 0.22 B | 0.77 | 0.19 B | 0.49 | 0.91 | 0.29 | 1.3 | 0.7 |
| Bismuth | | | | | | | NA | NA |
| Cadmium | 3.4 | | | | | | 2.1 | 1050 |
| Calcium | 76400 | 64400 | 58300 | 42200 | 35400 J | 210000 J | 310000 | NA |
| Chromium | 8.9 | 18.6 | 13.9 | 14.4 J | 16.2 | 7.9 | 20 | 1050000 |
| Cobalt | 8.4 B | 12.9 | 10.3 B | 11.5 B | 13.1 | 5.9 B | 19 | NA |
| Copper | 14.2 | 17.3 | 26.5 | 26.3 J | 18.9 | 8.2 | 26 | NA |
| Cyanide | | | 0.65 B | | | | ND | 21400 |
| Iron | 16000 | 25500 | 20600 | 22300 J | 29300 | 14600 | 35000 | NA |
| Lead | 14.2 | 5.3 | 14 | 14.9 J | 16.4 J | 5.2 J | 48 | NA |
| Lithium | 9.7 B | 39.5 | 25.8 | 15.3 B | 18.8 B | 12.8 B | 26 | NA |
| Magnesium | 29800 | 16300 | 15800 | 22000 J | 4640 | 15700 | 40000 | NA |
| Manganese | 539 | 505 | 577 | 522 J | 1030 J | 393 J | 1400 | 135000 |
| Mercury | | | | | 0.07 BJ | | NC | 320 |
| Molybdenum | 2.2 B | | 0.53 B | 5.7 | 0.87 B | 0.63 B | 27 | NA |
| Nickel | 13.3 | 27.3 | 21.3 | 27.4 | 42.3 | 12.3 | 32 | 21500 |
| Potassium | 1090 B | 3590 | 1300 | 641 B | 1760 | 874 B | 1900 | NA |
| Selenium | | | | | | | NA | NA |
| Silver | | | 0.33 B | | | | 1700 | 5500000 |
| Sodium | 155 B | 383 B | 357 B | 101 BJ | 174 BJ | 172 BJ | 240 | NA |
| Thallium | | | | | | | 460 | NA |
| Tin | 1.3 B | 1.6 B | 1.7 B | 1 B | 0.97 B | | 20 | NA |
| Vanadium | 17.5 | 17.7 | 12.6 B | 22.4 J | 18.0 | 7.3 | 25 | 7500 |
| Zinc | 56.1 | 84.9 | 68.9 | 72.5 J | 66.6 | 28.9 | 140 | 320000 |

## Table A.5. Soil Gas Confirmation Detected Nitrate-Nitrite

| ANALYTE | SGC NAC 000001 | SGC NAC 000002 | SGC NAC 000003 | SGC NAC 000004 | SGC NAC 000005 | SGC NAC 000006 | Background | $10^{-6}$ Construction Worker Guidelines |
|---|---|---|---|---|---|---|---|---|
| GENERAL ANALYTES | | | | | | | | |
| % Solids (%) | 83.9 | 93.8 | 88.5 | 83.3 | 78.4 | 75.0 | NA | NA |
| Nitrate/Nitrite (MG-N/KG) | 2.0 | 1.8 | 1.2 | 2.1 | 7.2 | 4.8 | 26 | NA |

| ANALYTE | SGC NAC 000007 | SGC NAC 000008 | SGC NAC 000009 | SGC NAC 000010 | SGC NAC 000011 | SGC NAC 000012 | Background | $10^{-6}$ Construction Worker Guidelines |
|---|---|---|---|---|---|---|---|---|
| GENERAL ANALYTES | | | | | | | | |
| % Solids (%) | 83.9 | 95.0 | 78.9 | 83.9 | 90.1 | 84.7 | NA | NA |
| Nitrate/Nitrite (MG-N/KG) | 1.6 | 26.5 | 2.2 | 5.9 | 5.3 | 1.8 | 26 | NA |

| ANALYTE | SGC NAC 000013 | SGC NAC 000014 | SGC NAC 000015 | SGC NAC 000016 | SGC NAC 000017 | SGC SAN 000018 | Background | $10^{-6}$ Construction Worker Guidelines |
|---|---|---|---|---|---|---|---|---|
| GENERAL ANALYTES | | | | | | | | |
| % Solids (%) | 81.7 | 80.9 | 74.0 | 85.3 | 72.8 | 84.2 | NA | NA |
| Nitrate/Nitrite (MG-N/KG) | 2.1 | 4.9 | 3.0 | 2.4 | 6.4 | 13.7 | 26 | NA |

| ANALYTE | SGC NAC 000019 | SGC NAC 000020 | SGC NAC 000021 | SGC NAC 000022 | SGC NAC 000023 | SGC NAC 000024 | Background | $10^{-6}$ Construction Worker Guidelines |
|---|---|---|---|---|---|---|---|---|
| GENERAL ANALYTES | | | | | | | | |
| % Solids (%) | 85.3 | 87.6 | 77.4 | 78.3 | 77.5 | 89.5 | NA | NA |
| Nitrate/Nitrite (MG-N/KG) | 6.5 | 2.1 | 6.1 | 2.2 | 11.6 | 2.2 | 26 | NA |

**Table A.6. Soil Gas Confirmation Detected Radionuclides (cont.)**

| ANALYTE | SGC NAC 000015 | SGC NAC 000016 | SGC NAC 000017 | SGC SAN 000018 | SGC NAC 000019 | SGC NAC 000020 | SGC NAC 000021 | Background | $10^{-6}$ Construction Worker Guidelines |
|---|---|---|---|---|---|---|---|---|---|
| RADIONUCLIDES (pCi/g) | | | | | | | | | |
| Americium-241 | | 0.162 | | | | | | ND | 4.95 |
| Bismuth-207 | | 0.0183 | | | | | | ND | 0.175 |
| Bismuth-210 | | -0.00477 | | | | | | ND | NA |
| Cesium-137 | | 0.0763 | 0.582 | | | | 0.193 | 0.42 | 0.46 |
| Cobalt-60 | | 0.0142 | | | | | | NC | 0.1 |
| Plutonium-238 | 0.0118 | 0.253 | 0.200 | 0.684 | 0.121 | 0.721 | 0.772 | 0.13 | 5.5 |
| Plutonium-239/240 | | 0.00413 | 0.0166 | 0.00487 | | | 0.00579 | 0.18 | 5.5 |
| Potassium-40 | 19.2 | 15.2 | 29.1 | 10.1 | 7.90 | 24.7 | 41.8 | 37 | NA |
| Radium-226 | 1.40 | 0.934 | 0.960 | 0.677 | 0.528 | 0.841 | 1.03 | 2 | 0.14 |
| Thorium-228 | 1.37 | 1.04 | 1.10 | 0.465 | 0.378 | 0.892 | 1.19 | 1.5 | 0.85 |
| Thorium-230 | 1.48 | 1.36 | 1.01 | 0.582 | 0.749 | 1.08 | 0.701 | 1.9 | 44 |
| Thorium-232 | 1.43 | 0.894 | 1.26 | 0.508 | 0.375 | 0.843 | 0.970 | 1.4 | 50 |
| Uranium-234 | 1.01 | 0.765 | 0.698 | 0.523 | 0.440 | 0.751 | 0.861 | 1.1 | 37.5 |
| Uranium-235 | 0.0927 | 0.0394 | 0.0403 | | | 0.0362 | 0.0374 | 0.11 | 3.35 |
| Uranium-238 | 0.955 | 0.993 | 0.852 | 0.496 | 0.691 | 0.825 | 0.822 | 1.2 | 11 |