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United States Department Of Energy

# CHEMICAL CHARACTERIZATION REPORT IRA #13 ARMY RESERVE PROPERTY VICINITY PROPERTIES NO. 1, 2, 3 AND 7

REV. 0

DECEMBER 2, 1987

WELDON SPRING SITE REMEDIAL ACTION PROJECT

# CHEMICAL CHARACTERIZATION REPORT

## IRA #13

## ARMY RESERVE PROPERTY VICINITY PROPERTIES

## NO. 1, 2, 3 AND 7

PREPARED FOR:

U.S. DEPARTMENT OF ENERGY

OAK RIDGE OPERATIONS OFFICE

UNDER CONTRACT NO. DE-AC05-860R21548

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## 1.0 INTRODUCTION

This report presents the analytical results of chemical sampling from radiologically contaminated areas on the U.S. Army Weldon Spring Training Area. The sampling was designed to supply chemical constituent information for these properties so remedial action plans could be addressed. A brief summary is provided for background knowledge of site conditions.

The Weldon Spring Site (WSS) is located on State Highway 94, southwest of St. Charles, Missouri. Adjacent to this site is the U.S. Army Reserve Property now referred to as the Weldon Spring Training Area (WSTA). This is a fenced area covering approximately 746 hectares (Ha). Portions of the WSTA are cleared and easily accessible, while other sections are wooded or overgrown with heavy brush. An extensive system of drainage ditches exists on the property. The site contains numerous paved and unpaved roads, several inactive rail lines, a few ponds, and numerous small buildings. Remnants of rail lines and buildings, previously associated with ordnance manufacturing operations, remain on the WSTA.

During World War II, the U.S. Army acquired approximately 17000 acres of the Weldon Spring Area for the production of explosives. Up to twenty production lines were operated at the Weldon Spring Ordnance Works (WSOW) during this period. The WSOW was declared surplus after World War II and 15000 of the

original 17000 acres were conveyed as surplus property to various parties. Two hundred and five (205) acres were transferred to the U.S. Atomic Energy Commission (AEC) for use as an Uranium Feed Materials Plant. The AEC plant operated from 1957 to 1967.

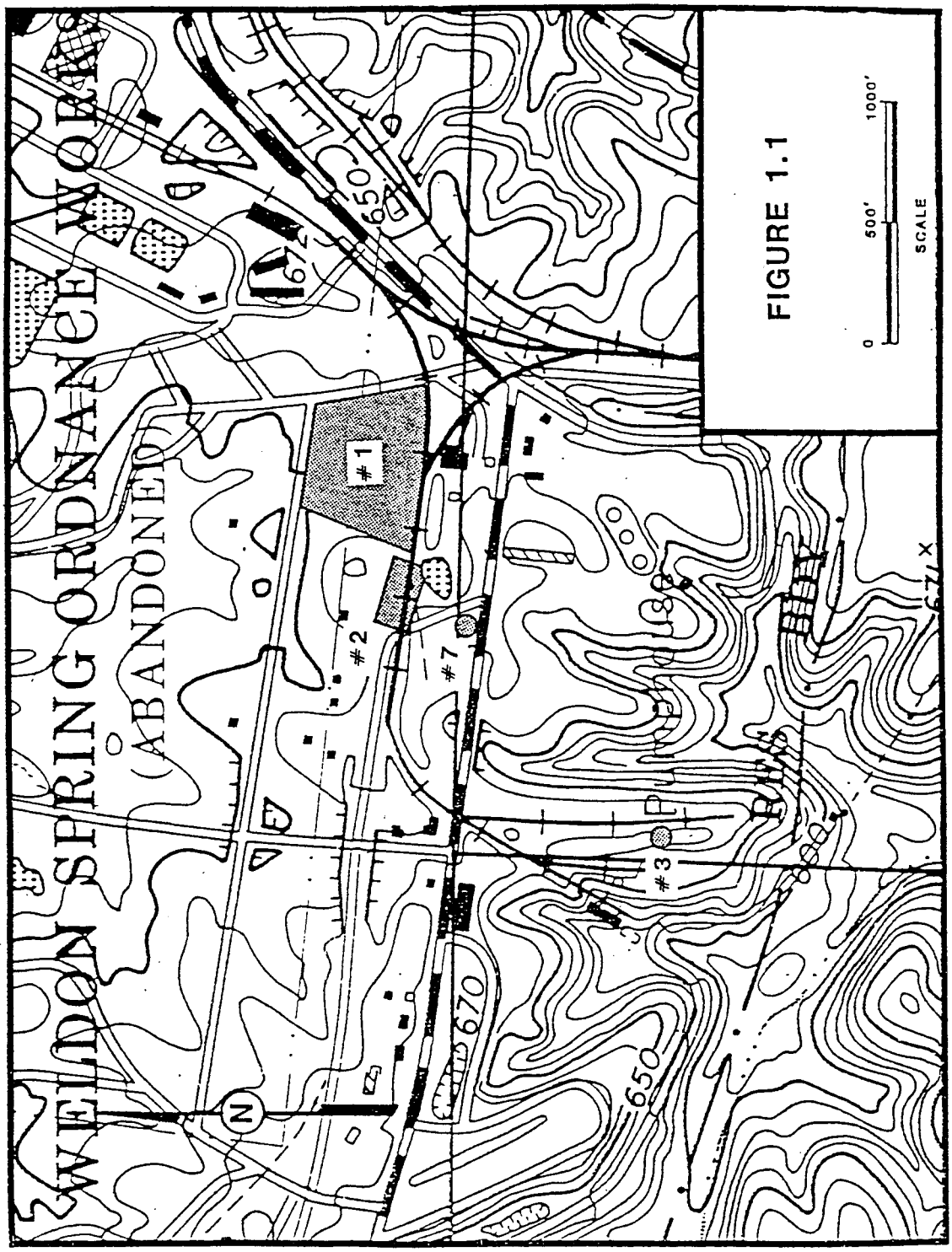
In 1967, the AEC closed the plant. The AEC transferred the property back to the Army which placed the facility in a caretaker mode until 1985. Custody was transferred back to the Department of Energy, the successor to the AEC, and the Weldon Spring Site Remedial Action Project (WSSRAP) was designated to remediate and dispose of the waste associated with the Feed Materials Plant.

A radiological survey of the WSTA was performed by Oak Ridge Associated Universities (ORAU) during March - July, 1985. The methods and procedures utilized in that survey are presented in a report prepared by ORAU (ORAU, 1986). The ORAU report identified seven (7) locations, hereinafter referred to as vicinity properties, on the WSTA. These seven (7) vicinity properties were identified by the presence of uranium, radium, and thorium contamination from former uranium processing operations at the Weldon Spring Site (WSS). This report addresses Vicinity Properties No. 1, 2, 3, and 7.

In June - August, 1987 these vicinity properties were resurveyed for the WSSRAP to determine the extent of radiological

contamination and to delineate excavation depths. This second survey was performed in order to determine the appropriate remedial action effort necessary to remove the radiological contaminants associated with the former uranium processing plant from the vicinity properties. In addition, soil samples were collected for subsequent chemical analyses.

Section 3.0 of this report lists the analytical parameters for each Vicinity Property sample. The analytical parameters were chosen based on contaminants that exist or could potentially exist due to the WSS operational history. This analytical information will be used to determine the level of personnel protection required during remedial action and to obtain chemical constituent information about the radiologically contaminated material. The location of each Vicinity Property addressed in this report is shown in Figure 1.1. A detailed description of the history of operations at the WSS can be found in a report published by the Atomic Energy Commission (U.S.A.E.C., 1960).




LOCATION OF VICINITY PROPERTIES 1, 2, 3, AND 7

## 2.0 DESCRIPTION OF SAMPLES

Each of six composite samples were analyzed for various parameters which exist or have the potential to exist as contaminants from the WSOW or AEC operations. The samples were collected in areas where radiological contamination is known to be present. The purpose was to obtain chemical constituent information about the radiologically contaminated material that will be excavated and transported to the WSS for temporary storage. In addition, radiometric analyses for thorium-230 were performed to determine if this contaminant was present at levels affecting the quantities of material identified as above the residual soil guidelines for U-238 and Ra-226. Details concerning the boundaries and extent of radiological contamination are presented in separate reports prepared for each vicinity property (Ref. 2-5).

At Vicinity Property No.1, three (3) samples were analyzed. The three samples were equally weighted composites of aliquots from soil samples representing three zones of contamination. The zones of contamination were identified with respect to depth and location of radioactive contaminants. Samples used to form the composites were selected from different locations and depths within each zone. These three zones are identified as tracks, outer zone, and perimeter mixes.

The "tracks" sample is a composite of four (4) samples which were collected near a mound of radiologically contaminated soil and metal debris near the abandoned railroad tracks. The "outer zone" sample is a composite of six (6) samples, collected from an area outside the mound. The "perimeter" sample is a composite of five (5) samples, collected near the outer boundary of the radiologically contaminated region.

At Vicinity Property No. 2, one composite sample was analyzed from six (6) samples collected within the area of radiological contamination. Equally weighted aliquots of those six samples were composited into one representative sample for the volume of radiologically contaminated material which requires remedial action.

At Vicinity Property No. 3, one composite sample was analyzed from four (4) samples collected within the radiologically contaminated area. Equally weighted aliquots of those four samples were composited into one representative sample for the volume of radiologically contaminated material which requires remedial action.

Only thirty-five (35) square feet of material is radiologically contaminated at Vicinity Property No. 7, therefore only one soil sample location was analyzed representing the entire Vicinity Property.

## 3.0 RESULTS OF ANALYSES

All six samples were analyzed by an offsite independent laboratory subcontracted by the WSSRAP. All analyses for metals, PCB's and semi-volatiles were performed according to the Environmental Protection Agency - Contract Laboratory Program (EPA-CLP) Methods. Specific procedure details can be found in the EPA Contract Laboratory Program Test Methods Manual. All nitroaromatics were analyzed by procedures developed for the U.S. Army Toxic and Hazardous Materials Agency (USATHAMA) and are referred to as the USATHAMA Method. Thorium-230 was analyzed by alpha spectroscopy according to methods developed by the EPA Eastern Environmental Radiation Facility (EERF 00/07). Individual results for each Vicinity Property location are found in Appendix A.

Concentrations of EPA-CLP Metals in soil have been studied for the environmental and geographical characteristics of this area. Elevated concentrations of some metals in soil are normal for this area and do not necessarily reflect contamination from WSOW or AEC operations. However, detectable quantities of PCB's, semi-volatiles, or nitroaromatics would be associated with those operations mentioned above and would be considered as contamination. A summary of the chemical contamination found are described below:

Vicinity Property No. 1: Tracks

The soil composite was analyzed for CLP-metals and nitroaromatics. The only elevated constituent above background concentrations was barium in the CLP-metals analysis. All other metals and nitroaromatics were at background concentrations or not detected. Radiometric results for thorium-230 were less than 1 pCi/g.

Vicinity Property No. 1: Outer Zone Mix

The soil composite was analyzed for CLP-metals, nitroaromatics, semi-volatiles, and PCB's. The only elevated constituent above background concentration was barium in the CLP-metals analysis. All other metals, nitroaromatics, semi-volatiles, and PCB's were at background concentrations or not detected. Radiometric results for thorium-230 were less than 1.0 pCi/g.

Vicinity Property No. 1: Perimeter

The soil composite was analyzed for CLP-metals and nitroaromatics. The constituents above background concentrations are barium, cobalt, and lead in the CLP-metal analysis. All other metals and nitroaromatics were at background concentrations or not detected. Radiometric results for thorium-230 were 2.4 pCi/g.

Vicinity Property No. 2

The soil composite was analyzed for CLP-metals, nitroaromatics, semi-volatiles, and PCB's. The constituents above background concentrations were barium, chromium, cobalt, lead, vanadium in the CLP-metals and 1,3-Dinitrobenzene in the nitroaromatics analysis. All other metals, nitroaromatics, semi-volatiles, and PCB's were at background concentrations or not detected. Radiometric results for thorium-230 were 2.9 pCi/g.

Vicinity Property No. 3

The soil composite was analyzed for CLP-metals and nitroaromatics. The only constituent above background concentration was lead in the CLP metals analysis. All other metals and nitroaromatics were at background concentrations or not detected. Radiometric results for thorium-230 were 2.2 pCi/g.

Vicinity Property No. 7

The soil composite was analyzed for CLP-metals, nitroaromatics, nitrates, sulfates, chlorides, and fluorides. The constituents above background concentrations were barium and lead in the CLP-metals analysis. All other metals, nitroaromatics, nitrates, sulfates, chlorides, and fluorides were at background concentrations or not detected. Radiometric results for

thorium-230 were 12 pCi/g, which is about the same magnitude as Radium-226 concentrations. However, this concentration of Th-230 is not expected to affect the volume of material which requires remedial action.

## 4.0 CONCLUSION

The results of analyses indicated that a few select metals were above background concentrations at all locations. At Vicinity Property No. 2, one nitroaromatic compound was present. The analytical results from all four properties will be used by site personnel for informational purposes during excavation but are not expected to cause any significant environmental impact.

The results of these analyses were also intended to be used in determining if any additional personnel protection would be required during excavation. Results indicate that no additional protective measures are needed beyond those required for normal radiological protection.

## 5.0 REFERENCES

1. Oak Ridge Associated Universities (ORAU) 1986, E.J. Deming, "Radiological Survey U.S. Army Reserve Property Weldon Spring Site, St. Charles County, Missouri", prepared by Radiological Site Assessment Program, ORAU, Oak Ridge, Tennessee for the U.S. Department of Energy as part of the

Formerly Utilized Sites Remedial Action Program (FUSRAP).

2. MK-Ferguson Company and Jacobs Engineering Group Inc. 1987, "Report on Radiological Findings and Recommendations Regarding Army Reserve Property Vicinity Property No. 1, prepared by Environmental Safety and Health Department, for the U.S. Department of Energy as part of the Weldon Spring Site Remedial Action Program (WSSRAP).

3. MK-Ferguson Company and Jacobs Engineering Group Inc. 1987, "Report on Radiological Findings and Recommendations Regarding Army Reserve Property Vicinity Property No. 2, prepared by Environmental Safety and Health Department, for the U.S. Department of Energy as part of the Weldon Spring Site Remedial Action Program (WSSRAP).

4. MK-Ferguson Company and Jacobs Engineering Group Inc. 1987, "Report on Radiological Findings and Recommendations Regarding Army Reserve Property Vicinity Property No. 3, prepared by Environmental Safety and Health Department, for the U.S. Department of Energy as part of the Weldon Spring Site Remedial Action Program (WSSRAP).

5. MK-Ferguson Company and Jacobs Engineering Group Inc. 1987, "Report on Radiological Findings and Recommendations Regarding Army Reserve Property Vicinity Property No. 7, prepared by Environmental Safety and Health Department, for

the U.S. Department of Energy as part of the Weldon Spring Site Remedial Action Program (WSSRAP).

6. United States Atomic Energy Commission, 1960, Office of Technical Information. Expansion Program at St. Louis Area - Project No. 224-5066A. Department of Commerce, Washington 25 D.C.

# APPENDIX
# RESULTS OF INDIVIDUAL CHEMICAL ANALYSES

# VICINITY PROPERTY NO. 1: TRACKS

| METALS EPA CLP METHOD | CONCENTRATION UG/G |
|---|---|
| Aluminum | 18278 |
| Antimony | (5.4) |
| Arsenic | 12 |
| Barium | 210 |
| Beryllium | 1.04 |
| Cadmium | 3 |
| Calcium | 5764 |
| Chromium | 29 |
| Cobalt | 16 |
| Copper | 24 |
| Iron | 22451 |
| Lead | 29 |
| Lithium | 12 |
| Magnesium | 3116 |
| Manganese | 645 |
| Mercury | 0.1U |
| Nickel | 25 |
| Potassium | 945 |
| Selenium | 0.6U |
| Silver | 2.5 |
| Sodium | (192) |
| Thallium | 1U |
| Vanadium | 47 |
| Zinc | 83 |

| Nitroaromatics USATHAMA METHOD | CONCENTRATION UG/G |
|---|---|
| DATE EXTRACTED :08/19/87 | |
| DATE ANALYZED :09/18/87 | |
| 2,4,6-TNT | 1.56 |
| 2,4 DNT | 0.975 |
| 2,6 DNT | 1.83 |
| Nitrobenzene | 1.87 |
| 1,3,5-Trinitrobenzene | 0.741 |
| 1,3-Dinitrobenzene | 1.17 |

| MISCELLANEOUS | PERCENT |
|---|---|
| Percent Moisture | 23.1 |

| Radiochemical | Activity +/- Error (pCi/G) |
|---|---|
| Thorium-230 EPA 00.07 | <1 |

## VICINITY PROPERTY NO. 1: OUTER ZONE

| METALS EPA CLP METHOD | CONCENTRATION UG/G |
|---|---|
| Aluminum | 10535 |
| Antimony | (4.0) |
| Arsenic | 15.7 |
| Barium | 222 |
| Beryllium | 0.8 |
| Cadmium | 2.5 |
| Calcium | 2043 |
| Chromium | 18.9 |
| Cobalt | 14 |
| Copper | 13 |
| Iron | 1928 |
| Lead | 29.2 |
| Lithium | 6U |
| Magnesium | 1632 |
| Manganese | 1268 |
| Mercury | 0.1U |
| Nickel | 14 |
| Potassium | 726 |
| Selenium | 0.6U |
| Silver | 1.5 |
| Sodium | (429) |
| Thallium | 1U |
| Vanadium | 39 |
| Zinc | 43 |

| Nitroaromatics USATHAMA METHOD | CONCENTRATION UG/G |
|---|---|
| DATE EXTRACTED :08/19/87 | |
| DATE ANALYZED :09/18/87 | |
| 2,4.6-TNT | 1.41 |
| 2,4 DNT | 0.880 |
| 2.6 DNT | 1.65 |
| Nitrobenzene | 1.69 |
| 1,3.5-Trinitrobenzene | 0.670 |
| 1,3-Dinitrobenzene | 1.06 |

| MISCELLANEOUS | PERCENT |
|---|---|
| Percent Moisture | 14.9 |

## VICINITY PROPERTY NO. 1: OUTER ZONE

SEMI-VOLATILES EPA CLP METHOD

DATE EXTRACTED: 08/18/87
DATE ANALYZED: 09/03/87

| | CONCENTRATION UG/KG |
|---|---|
| Phenol | 388 U |
| bis(2-Chloroethyl) ether | 388 U |
| 2-Chlorophenol | 388 U |
| 1,3-Dichlorobenzene | 388 U |
| 1,4-Dichlorobenzene | 388 U |
| Benzyl Alcohol | 388 U |
| 1,2-Dichlorobenzene | 388 U |
| 2-Methylphenol | 388 U |
| bis(2-Chloroisopropyl) ether | 388 U |
| 4-Methylphenol | 388 U |
| N-Nitroso-Dipropylamine | 388 U |
| Hexachloroethane | 388 U |
| Nitrobenzene | 388 U |
| Isophorone | 388 U |
| 2-Nitrophenol | 388 U |
| 2,4-Dimethyphenol | 388 U |
| Benzoic Acid | 1879 U |
| bis(2-Chloroethoxy) methane | 388 U |
| 2,4-Dichlorophenol | 388 U |
| 1,2,4-Trichlorobenzene | 388 U |
| Naphthalene | 388 U |
| 4-Chloroaniline | 388 U |
| Hexachlorobutadiene | 388 U |
| 4-Chloro-3-methylphenol (para-chloro-meta-cresol) | 388 U |
| 2-Methylnaphthalene | 388 U |
| Hexachlorocyclopentadiene | 388 U |
| 2,4,6-Trichlorophenol | 388 U |
| 2,4,5-Trichlorophenol | 1879 U |
| 2-Chloronaphthalene | 388 U |
| 2-Nitroaniline | 1879 U |
| Dimethyl Phthalate | 388 U |
| Acenaphthylene | 388 U |
| 2,6-Dinitrotoluene | 388 U |
| 3-Nitroaniline | 1879 U |
| Acenaphthene | 388 U |
| 2,4-Dinitrophenol | 1879 U |
| 4-Nitrophenol | 1879 U |
| Dibenzofuran | 388 U |
| 2,4-Dinitrotoluene | 388 U |
| Diethylphthalate | 388 U |
| 4-Chlorophenyl Phenyl Ether | 388 U |
| Fluorene | 388 U |
| 4-Nitroaniline | 1879 U |

## VICINITY PROPERTY NO. 1: OUTER ZONE

| | |
|---|---|
| 4,6-Dinitro-2-methylphenol | 1879 U |
| N-nitrosodiphenylamine | 388 U |
| 4-Bromophenyl Phenyl ether | 388 U |
| Hexachlorobenzene | 388 U |
| Pentachlorophenol | 1879 U |
| Phenanthrene | 388 U |
| Anthracene | 388 U |
| Di-n-butylphthalate | 670 |
| Fluoranthene | 388 U |
| Pyrene | 388 U |
| Butyl Benzyl Phthalate | 388 U |
| 3,3'-Dichlorobenzidine | 775 U |
| Benzo(a)anthracene | 388 U |
| Chrysene | 388 U |
| bis(2-ethylhexyl)phthalate | 388 U |
| Di-n-octyl Phthalate | 388 U |
| Benzo(b)fluoranthene | 388 U |
| Benzo(k)fluoranthene | 388 U |
| Benzo(a)pyrene | 388 U |
| Indeno(1,2,3-cd)pyrene | 388 U |
| Dibenzo(a,h)anthracene | 388 U |
| Benzo(g,h,i)pervlene | 388 U |

| PCB'S EPA CLP METHOD | CONCENTRATION UG/G |
|---|---|
| DATE ANALYZED :08/30/87 | |
| Aroclor-1016 | <10 |
| Aroclor-1221 | <10 |
| Aroclor-1232 | <10 |
| Aroclor-1242 | <10 |
| Aroclor-1248 | <10 |
| Aroclor-1254 | <10 |
| Aroclor-1260 | <10 |

| Radiochemical | Activity +/- Error (pCi/G) |
|---|---|
| Thorium-230 EPA 00.07 | <1 |

## VICINITY PROPERTY NO. 1: PERIMETER

| METALS EPA CLP METHOD | CONCENTRATION UG/G |
|---|---|
| Aluminum | 13243 |
| Antimony | (5.4) |
| Arsenic | 19.2 |
| Barium | 310 |
| Beryllium | 1.01 |
| Cadmium | 3.8 |
| Calcium | 3869 |
| Chromium | 31 |
| Cobalt | 53 |
| Copper | 60.4 |
| Iron | 23408 |
| Lead | 76 |
| Lithium | 8.4 |
| Magnesium | 2943 |
| Manganese | 2044 |
| Mercury | 0.1U |
| Nickel | 36.6 |
| Potassium | 907 |
| Selenium | 0.5U |
| Silver | 3.8 |
| Sodium | (408) |
| Thallium | 1U |
| Vanadium | 44.3 |
| Zinc | 116 |

| Nitroaromatics USATHAMA METHOD | CONCENTRATION UG/G |
|---|---|
| DATE EXTRACTED :08/19/87 | |
| DATE ANALYZED :09/18/87 | |
| 2,4,6-TNT | 1.35 |
| 2,4 DNT | 0.842 |
| 2,6 DNT | 1.58 |
| Nitrobenzene | 1.62 |
| 1,3,5-Trinitrobenzene | 0.640 |
| 1,3-Dinitrobenzene | 1.01 |

| MISCELLANEOUS | PERCENT |
|---|---|
| Percent Moisture | 11.0 |

| Radiochemical | Activity +/- Error (pCi/G) |
|---|---|
| Thorium-230 EPA 00.07 | 2.4 +/- 0.4 |

# VICINITY PROPERTY NO. 2

| METALS EPA CLP METHOD | CONCENTRATION UG/G |
|---|---|
| Aluminum | 9441 |
| Antimony | 24.5 |
| Arsenic | 18 |
| Barium | 187 |
| Beryllium | 1.2 |
| Cadmium | 25.7 |
| Calcium | 16306 |
| Chromium | 585 |
| Cobalt | 30.6 |
| Copper | 252 |
| Iron | 67660 |
| Lead | 104 |
| Lithium | 16 |
| Magnesium | 2768 |
| Manganese | 818 |
| Mercury | 0.1U |
| Nickel | 91 |
| Potassium | 817 |
| Selenium | 0.5U |
| Silver | 6.5 |
| Sodium | (425) |
| Thallium | 1U |
| Vanadium | 89 |
| Zinc | 39 |

| Nitroaromatics USATHAMA METHOD | CONCENTRATION UG/G |
|---|---|
| DATE EXTRACTED :08/19/87 | |
| DATE ANALYZED :09/18/87 | |
| 2,4,6-TNT | 1.26 |
| 2,4 DNT | 0.787 |
| 2,6 DNT | 1.48 |
| Nitrobenzene | 1.51 |
| 1,3,5-Trinitrobenzene | 0.600 |
| 1,3-Dinitrobenzene | 9.44 |

| Miscellaneous | PERCENT |
|---|---|
| Percent Moisture | 4.7 |

# VICINITY PROPERTY NO. 2

SEMI-VOLATILES EPA CLP METHOD

DATE EXTRACTED: 08/18/87
DATE ANALYZED: 09/03/87

| | CONCENTRATION UG/KG |
|---|---|
| Phenol | 346 U |
| bis(2-Chloroethyl) ether | 346 U |
| 2-Chlorophenol | 346 U |
| 1,3-Dichlorobenzene | 346 U |
| 1,4-Dichlorobenzene | 346 U |
| Benzyl Alcohol | 346 U |
| 1,2-Dichlorobenzene | 346 U |
| 2-Methylphenol | 346 U |
| bis(2-Chloroisopropyl) ether | 346 U |
| 4-Methylphenol | 346 U |
| N-Nitroso-Dipropylamine | 346 U |
| Hexachloroethane | 346 U |
| Nitrobenzene | 346 U |
| Isophorone | 346 U |
| 2-Nitrophenol | 346 U |
| 2,4-Dimethyphenol | 346 U |
| Benzoic Acid | 1679 U |
| bis(2-Chloroethoxy) methane | 346 U |
| 2,4-Dichlorophenol | 346 U |
| 1,2,4-Trichlorobenzene | 346 U |
| Naphthalene | 346 U |
| 4-Chloroaniline | 346 U |
| Hexachlorobutadiene | 346 U |
| 4-Chloro-3-methylphenol (para-chloro-meta-cresol) | 346 U |
| 2-Methylnaphthalene | 346 U |
| Hexachlorocyclopentadiene | 346 U |
| 2,4,6-Trichlorophenol | 346 U |
| 2,4,5-Trichlorophenol | 1679 U |
| 2-Chloronaphthalene | 346 U |
| 2-Nitroaniline | 1679 U |
| Dimethyl Phthalate | 346 U |
| Acenaphthylene | 346 U |
| 2,6-Dinitrotoluene | 346 U |
| 3-Nitroaniline | 1679 U |
| Acenaphthene | 346 U |
| 2,4-Dinitrophenol | 1679 U |
| 4-Nitrophenol | 1679 U |
| Dibenzofuran | 346 U |
| 2,4-Dinitrotoluene | 346 U |
| Diethylphthalate | 346 U |
| 4-Chlorophenyl Phenyl Ether | 346 U |
| Fluorene | 346 U |
| 4-Nitroaniline | 1679 U |

## VICINITY PROPERTY NO. 2

| | |
|---|---|
| 4,6-Dinitro-2-methylphenol | 1679 U |
| N-nitrosodiphenylamine | 346 U |
| 4-Bromophenyl Phenyl ether | 346 U |
| Hexachlorobenzene | 346 U |
| Pentachlorophenol | 1679 U |
| Phenanthrene | 346 U |
| Anthracene | 346 U |
| Di-n-butylphthalate | 750 U |
| Fluoranthene | 346 U |
| Pyrene | 346 U |
| Butyl Benzyl Phthalate | 346 U |
| 3,3'-Dichlorobenzidine | 693 U |
| Benzo(a)anthracene | 346 U |
| Chrysene | 280 U |
| bis(2-ethylhexyl)phthalate | 346 U |
| Di-n-octyl Phthalate | 346 U |
| Benzo(b)fluoranthene | 346 U |
| Benzo(k)fluoranthene | 110 U |
| Benzo(a)pyrene | 346 U |
| Indeno(1,2,3-cd)pyrene | 346 U |
| Dibenzo(a,h)anthracene | 346 U |
| Benzo(g,h,i)perylene | 220 U |

| PCB'S EPA CLP METHOD | CONCENTRATION UG/G |
|---|---|
| DATE ANALYZED :08/30/87 | |
| Aroclor-1016 | <10 |
| Aroclor-1221 | <10 |
| Aroclor-1232 | <10 |
| Aroclor-1242 | <10 |
| Aroclor-1248 | <10 |
| Aroclor-1254 | <10 |
| Aroclor-1260 | <10 |

| Radiochemical | Activity +/- Error (pCi/G) |
|---|---|
| Thorium-230 EPA 00.07 | 2.9 +/- 0.5 |

## VICINITY PROPERTY NO. 3

| METALS EPA CLP METHOD | CONCENTRATION UG/G |
|---|---|
| Aluminum | 1355 |
| Antimony | 12.4 |
| Arsenic | 6.7 |
| Barium | 54 |
| Beryllium | 1.1 |
| Cadmium | 5.8 |
| Calcium | 39721 |
| Chromium | 42 |
| Cobalt | 16 |
| Copper | 201 |
| Iron | 34924 |
| Lead | 226 |
| Lithium | 5U |
| Magnesium | (496) |
| Manganese | 298 |
| Mercury | 0.1U |
| Nickel | 66 |
| Potassium | 634 |
| Selenium | 0.5U |
| Silver | 3.9 |
| Sodium | (532) |
| Thallium | 1U |
| Vanadium | 23 |
| Zinc | 235 |

| Nitroaromatics USATHAMA METHOD | CONCENTRATION UG/G |
|---|---|
| DATE EXTRACTED :08/19/87 | |
| DATE ANALYZED :09/18/87 | |
| 2,4.6-TNT | 1.37 |
| 2,4 DNT | 0.854 |
| 2.6 DNT | 1.61 |
| Nitrobenzene | 1.64 |
| 1,3.5-Trinitrobenzene | 0.650 |
| 1,3-Dinitrobenzene | 1.02 |

| MISCELLANEOUS | PERCENT |
|---|---|
| Percent Moisture | 12.2 |

| Radiochemical | Activity +/- Error (pCi/G) |
|---|---|
| Thorium-230 EPA 00.07 | 2.2 +/- 0.4 |

# VICINITY PROPERTY NO. 7

| METALS | CONCENTRATION MG/KG |
|---|---|
| Aluminum | 9446 |
| Antimony | 14.8 |
| Arsenic | 6.0 |
| Barium | 103 |
| Beryllium | 0.9 |
| Cadmium | 3.4 |
| Calcium | 39202 |
| Chromium | 28 |
| Cobalt | 11 |
| Copper | 61 |
| Iron | 13599 |
| Lead | 87 |
| Lithium | 5U |
| Magnesium | 5603 |
| Manganese | 486 |
| Mercury | 0.29 |
| Nickel | 16 |
| Potassium | 498 |
| Selenium | 0.5UN |
| Silver | 4.5 |
| Sodium | 595 |
| Thallium | 1U |
| Vanadium | 38 |
| Zinc | 69 |

| Nitroaromatics | CONCENTRATION UG/G | |
|---|---|---|
| DATE EXTRACTED :07/17/87<br>DATE ANALYZED :07/24/87 | DETECTION LIMIT | RESULTS |
| 2,4,6-TNT | 1.33 | ND |
| 2,4 DNT | 0.83 | ND |
| 2,6 DNT | 1.56 | ND |
| Nitrobenzene | 1.59 | ND |
| 1,3,5-Trinitrobenzene | 0.63 | ND |
| 1,3-Dinitrobenzene | 0.99 | ND |

| Miscellaneous | CONCENTRATION MG/KG |
|---|---|
| Nitrate | 13.7 |
| Sulfate | 33.0 |
| Choride | 18.9 |
| Fluoride | 5.9 |
| % Moisture | |

| Radiochemical | ACTIVITY +/- ERROR (pCi/LITER) |
|---|---|
| Thorium 230 | 12 +/- 2 |