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PHASE I

REMEDIAL INVESTIGATION/ FEASIBILITY STUDY

HAZARD RANKING SYSTEM SCORE

VOLUME I

Prepared for:

NASA Lewis Research Center Cleveland, Ohio

February 2, 1996

Prepared by:

R&R International, Inc.
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Akron, OH 44321

R&R INTERNATIONAL, INC.

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Hazard Ranking System Site Scoring

This document provides the Hazard Ranking System (HRS) Site Scores for the NASA Lewis Research Center. The HRS scoring is based upon the findings of the Phase I RI/FS. Because of the size of the facility and the variable conditions and operations that exist at the facility, separate and distinct HRS scoring has been done for each Project Management Unit (PMU). This document provides the HRS scoring for each PMU as well as the documentation supporting the HRS scores. The following sections discuss the approach used to derive the HRS score for each of the PMUs.

Table 1 lists the areas of concern (AOCs) evaluated as potential sources. These AOCs were selected on the basis of being considered AOCs at the conclusion of the Phase I RI/FS. The AOCs in PMU 2 were grouped as a single source for HRS scoring because they were components of a single system which represents a single source. The AOCs in PMU 4 were grouped as a single source due to their geographic proximity and type of source (contaminated soil). No HRS scoring was conducted for PMUs 6 and 11 because they were deemed as not requiring future consideration by the RI/FS process or are more appropriately addressed under other regulatory avenues.

The sections of this report provide the HRS scoring, documentation, and tabulated analytical data for each PMU. Analytical tables are provided to summarize the rationale for the determination of which compounds detected at each AOC are interpreted to be significant contaminants. The determination of which contaminants are significant was done in accordance with Appendix A to Part-300 of the CERCLA Pollution Contingency Plan (55 Federal Register 51532, December 14, 1990) guidelines. The analytical results for each AOC/source was reviewed to determined the maximum concentrations of the detected compounds for each medium (soil, sediment, surface water, and groundwater). For those compounds which were detected in more than one sample of the same medium, the sample with the highest reported concentration was used.

A detected compound with a concentration greater than the sample quantification limit and greater than three times the background mean concentration for that compound was considered to be a significant contaminant if the contaminant was judged to originate from the source being evaluated. The background data provided by the Phase I RI/FS was used for evaluating soil sample analytical results. The evaluation of groundwater results was done using Maximum Concentration Levels (MCLs) for safe drinking water because of the lack of appropriate background data for groundwater. For compounds without MCLs, any observed release was considered significant if the concentration equalled or exceeded the sample quantification limits (SQLs).

Table 1 Areas of Concern Identified for HRS Scoring

PMU	PMU Description	Area of Concern	AOC Identifier
01	Flood Plain	Firing Range	UPR-01-01
02	Industrial Waste System	IWS Retention Basins	SFI-02-01
02	Industrial Waste System	Oil/Water Separator Pits	UST-02-01
03	Storm Sewer System	Storm Sewer Outfalls	OFL-03-02
04	Rocket Laboratories	Cooling Tower #5, Building 93	UPR-04-04
04	Rocket Laboratories	Building 35 Complex	UPR-04-07
05	South Area	South 40 Landfill	LNF-05-01
05	South Area	Old Landfill	LNF-05-02
05	South Area	1957 Landfill	LNF-05-03
05	South Area	Salvage Area II	UPR-05-08
05	South Area	Buildings 203 and 204	UPR-05-09
05	South Area	Substation A	UPR-05-12
05	South Area	Salvage Area I	UPR-05-13
05	South Area	Coal Storage Area	UPR-05-16
05	South Area	Recycle Bins	UPR-05-54
05	South Area	Building 202	UPR-05-55
07	North Perimeter	Building 21	UPR-07-20
07	North Perimeter	Building 77 Addition	UPR-07-22
07	North Perimeter	Building 77 AST	UPR-07-57
08	North Central	Substation E	UPR-08-24
08	North Central	Building 5	UPR-08-25
08	North Central	Building 64	UPR-08-28

Table 1 Areas of Concern Identified for HRS Scoring

PMU	PMU Description	Area of Concern	AOC Identifier
08	North Central	Building 16	UPR-08-31
08	North Central	Substation B	UPR-08-32
08	North Central	Building 66	UPR-08-34
08	North Central	Building 99 Courtyard	UPR-08-37
08	North Central	Building 12	UST-08-06
09	South Central	Building 49	UPR-09-44
09	South Central	Building 87 Wind Tunnel	UPR-09-45
10	West Area	Building 398	UPR-10-49
10	West Area	Building 301	UPR-10-50
10	West Area	Building 322	UPR-10-52
10	West Area	Duct Bank Road	UPR-10-56

The HRS scores were generated using the software program Prescore (Version 3.0, Office of Emergency and Remedial Response of the USEPA Hazardous Site EvaluationDivision). The HRS score sheets and documentation from Prescore is presented in the enclosed sections. Table 2 summarizes the HRS scores for each PMU.

HRS Scoring Assumptions

Several assumptions were made during the scoring of the PMUs. These assumptions are generally true for each PMU scenario. The following list summarizes the assumptions built into the HRS scores:

- Refuted AOCs were not included in PMU HRS scoring. AOCs not being pursued via CERCLA (e.g. underground fuel storage tanks) were not included in HRS scoring.

- The background values for the surface water segments were based on all available upstream analytical data. The background values for Rocky River were calculated based on upstream samples obtained from Abram Creek and the unnamed tributary as well as the upstream samples collected from Rocky River. The background values for Abram Creek were calculated based on upstream samples from the unnamed tributary as well as upstream samples from Abram Creek.

- Background values for soils were based on the background data obtained during the Phase I RI/FS.

- U.S.E.P.A. maximum contaminant levels (MCLs) for safe drinking water were used to evaluate groundwater because of the absence of groundwater background data.

- Based on the amount and location of analytical data, the hazardous waste quantities for the LeRC AOCs were predominantly evaluated as Tier D. The hazardous waste quantities, therefore, are based on area.

- Seven permitted drinking water wells are located 1.5 to 3 miles south-southeast of LeRC and serve an estimated total population of 50.

- Three of the four City of Cleveland drinking water intakes located in Lake Erie are within the 15 mile target distance limit (TDL). The intakes are assumed to each serve an equal population (estimated at 375,000 per intake).

Table 2 - HRS PMU Scoring Summary

PMU	HRS Pathway Score				HRS Site Score
	Groundwater	Surface Water	Soil	Air	
PMU 1 Flood Plain	0.72	0.78	0.01	2.02	1.14
PMU 2 Industrial Waste System	0.86	1.40	0.00	0.00	0.82
PMU 3 Storm Sewer System	0.11	0.11	0.00	0.00	0.08
PMU 4 Rocket Lab. Area	0.13	0.23	0.60	0.00	0.33
PMU 5 South Area	1.28	11.06	6.56	16.33	10.41
PMU 7 North Perimeter Area	0.00	0.00	3.60	0.00	1.80
PMU 8 North Central Area	0.31	0.31	6.63	3.13	3.67
PMU 9 South Central Area	0.10	0.12	3.63	0.29	1.82
PMU 10 West Area	0.05	0.80	33.74	7.00	17.23

- Lake Erie is a recreation area.

- The annual fish production for the portions of Rocky River within the TDL was estimated to be 3000 pounds per year. The annual fish production for the portions of Lake Erie within the TDL was estimated to be 500,000 pounds per year.

- Rocky River is a seasonal habitat for salmon which is stocked by the Ohio Division of Natural Resources (ODNR), and is Rocky River was classified as a Sensitive Environment.

- Rocky River is considered to be the nearest fishery to the LeRC facility.

Pathway Score Summaries

The scores for all PMUs were highly influenced by the lack of any defined significant contaminants in the surface water pathways adjacent to the LeRC facility. The Rocky River, Abram Creek, and the unnamed tributaries represent the most proximal and susceptible pathways that could impact both human health and the environment.

The likelihood of release of significant contaminants to the groundwater pathway scored relatively high, although the target population for the groundwater pathway kept the overall groundwater pathway scores for all PMUs relatively low. The low target scores resulted from the paucity of groundwater use in the TDL.

The scoring for the overland surface water pathway was controlled primarily by the likelihood of release and targets. Because no observed releases were documented, containment was the driving component of the scoring of the likelihood for release. The main components of containment were the presence or absence of surface cover (asphalt/concrete) and/or the storm water sewer system present at LeRC. The low magnitude of the target scores kept the overall scores for this pathway low for all PMUs. The scenario for the groundwater to surface water pathway is very similar to the overland pathway. The primary difference was the presence of significant contaminants in groundwater seeps in PMU 5 that were in communication with the unnamed tributary. By definition, the groundwater seeps represented an observed release for PMU 5.

The soil pathway is primarily controlled by the target scores. The majority of the AOCs at LeRC are defined as contaminated soil and are thereby confirmed releases. However, the accessibility of the soil to targets is controlled both by surface cover (asphalt/concrete) and facility access (fenced federal facility). None of the AOCs are proximal to fence lines adjacent to residential properties. The Day Care Center in PMU 10 has an on-site target population with

direct access to the impacted soils in the vicinity of the Day Care Center which results in a very high score for the soil pathway for PMU 10.

The scores for the air pathway were primarily controlled by containment. Areas with significant contaminants which were covered with asphalt/concrete, like PMU 7, had low or zero scores. The higher scores for PMUs 5 and 10 are controlled by the lack of soil cover as well as the presence of sparsely vegetated or bare soil at many of the AOCs.

Based on the HRS scores, none of the PMUs at LeRC would be eligible for placement on the National Priority List (NPL). PMU 10 had the highest HRS score at 17.23. The score for PMU 10 was primarily due to the contaminants detected at the Day Care Center (UPR-10-49) and its associated target population. PMU 5 had the second highest score primarily due to the areal extent of the numerous potential sources available for the soil and air pathways as well as the detection of significant contaminants in groundwater seeps that represent a confirmed release to the surface water pathway.

PMU 1

Record Information

1. Site Name: NASA LeRC PMU1 - Flood Plain
   (as entered in CERCLIS)

2. Site CERCLIS Number:

3. Site Reviewer: N/A

4. Date: 09/07/95

5. Site Location: Cleveland/Cuyahoga, OH
   (City/County,State)

6. Congressional District:

7. Site Coordinates: Single

   Latitude: 41 24'45.0" Longitude: 81 52'00.0"

Site Description

1. Setting: Urban

2. Current Owner: Federal

3. Current Site Status: Active

4. Years of Operation: Active Site , from and to dates: since 1941

5. How Initially Identified: Other - Preliminary Assessment

6. Entity Responsible for Waste Generation:

   - Federal Facility
   - Other

7. Site Activities/Waste Deposition:

   - Other - Rifle/Pistol Firing Range

Waste Description

8. Wastes Deposited or Detected Onsite:

   - Metals
   - Lead

Response Actions

9. Response/Removal Actions:

RCRA Information

10. For All Active Facilities, RCRA Site Status:

    - Not Applicable

Demographic Information

11. Workers Present Onsite: Yes

12. Distance to Nearest Non-Worker Individual: > 1/4 - 1/2 Mile

13. Residential Population Within 1 Mile: 4000.0

14. Residential Population Within 4 Miles: 10000.0

Water Use Information

15. Local Drinking Water Supply Source:

    - Ground Water (within 4 mile distance limit)
    - Surface Water (within 15 mile distance limit)

16. Total Population Served by Local Drinking Water Supply Source: 1500000.0

17. Drinking Water Supply System Type for Local Drinking Water Supply Sources:

- Municipal (Services over 25 People)

18. Surface Water Adjacent to/Draining Site:

- Stream

HRS DOCUMENTATION RECORD
NASA LeRC PMU1 - Flood Plain - 12/20/95

1. Site Name: NASA LeRC PMU1 - Flood Plain
   (as entered in CERCLIS)

2. Site CERCLIS Number:

3. Site Reviewer: N/A

4. Date: 09/07/95

5. Site Location: Cleveland/Cuyahoga, OH
   (City/County,State)

6. Congressional District:

7. Site Coordinates: Single

   Latitude: 41 24'45.0" Longitude: 81 52'00.0"

	Score
Ground Water Migration Pathway Score (Sgw)	0.72
Surface Water Migration Pathway Score (Ssw)	0.78
Soil Exposure Pathway Score (Ss)	0.01
Air Migration Pathway Score (Sa)	2.02

Site Score	1.14

NOTE

EPA uses the terms "facility," "site," and "release" interchangeably. The term "facility" is broadly defined in CERCLA to include any area where hazardous substances have "come to be located" (CERCLA Section 109(9)), and the listing process is not intended to define or reflect boundaries of such facilities or releases. Site names, and references to specific parcels or properties, are provided for general identification purposes only. Knowledge regarding the extent of sites will be refined as more information is developed during the RI/FS and even during implementation of the remedy.

GROUND WATER MIGRATION PATHWAY SCORESHEET
NASA LeRC PMU1 - Flood Plain - 12/20/95

GROUND WATER MIGRATION PATHWAY Factor Categories & Factors	Maximum Value	Value Assigned
Likelihood of Release to an Aquifer Aquifer: Shale Bedrock Aquife		
1. Observed Release	550	550
2. Potential to Release		
2a. Containment	10	10
2b. Net Precipitation	10	0
2c. Depth to Aquifer	5	5
2d. Travel Time	35	35
2e. Potential to Release [lines 2a(2b+2c+2d)]	500	400
3. Likelihood of Release	550	550
Waste Characteristics		
4. Toxicity/Mobility	*	1.00E+04
5. Hazardous Waste Quantity	*	10
6. Waste Characteristics	100	18
Targets		
7. Nearest Well	50	5.00E+00
8. Population		
8a. Level I Concentrations	**	0.00E+00
8b. Level II Concentrations	**	0.00E+00
8c. Potential Contamination	**	1.00E+00
8d. Population (lines 8a+8b+8c)	**	1.00E+00
9. Resources	5	0.00E+00
10. Wellhead Protection Area	20	0.00E+00
11. Targets (lines 7+8d+9+10)	**	6.00E+00
12. Targets (including overlaying aquifers)	**	6.00E+00
13. Aquifer Score	100	0.72
GROUND WATER MIGRATION PATHWAY SCORE (Sgw)	100	0.72

* Maximum value applies to waste characteristics category.
** Maximum value not applicable.

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORESHEET
NASA LeRC PMU1 - Flood Plain - 12/20/95

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT Factor Categories & Factors DRINKING WATER THREAT	Maximum Value	Value Assigned
Likelihood of Release		
1. Observed Release	550	0
2. Potential to Release by Overland Flow		
2a. Containment	10	10
2b. Runoff	25	1
2c. Distance to Surface Water	25	25
2d. Potential to Release by Overland Flow [lines 2a(2b+2c)]	500	260
3. Potential to Release by Flood		
3a. Containment (Flood)	10	10
3b. Flood Frequency	50	50
3c. Potential to Release by Flood (lines 3a x 3b)	500	500
4. Potential to Release (lines 2d+3c)	500	500
5. Likelihood of Release	550	500
Waste Characteristics		
6. Toxicity/Persistence	*	1.00E+04
7. Hazardous Waste Quantity	*	10
8. Waste Characteristics	100	18
Targets		
9. Nearest Intake	50	0.00E+00
10. Population		
10a. Level I Concentrations	**	0.00E+00
10b. Level II Concentrations	**	0.00E+00
10c. Potential Contamination	**	2.00E+00
10d. Population (lines 10a+10b+10c)	**	2.00E+00
11. Resources	5	5.00E+00
12. Targets (lines 9+10d+11)	**	7.00E+00
13. DRINKING WATER THREAT SCORE	100	0.76

* Maximum value applies to waste characteristics category.
** Maximum value not applicable.

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORESHEET
NASA LeRC PMU1 - Flood Plain - 12/20/95

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT Factor Categories & Factors HUMAN FOOD CHAIN THREAT	Maximum Value	Value Assigned
Likelihood of Release		
14. Likelihood of Release (same as line 5)	550	500
Waste Characteristics		
15. Toxicity/Persistence/Bioaccumulation	*	5.00E+05
16. Hazardous Waste Quantity	*	10
17. Waste Characteristics	1000	32
Targets		
18. Food Chain Individual	50	0.00E+00
19. Population		
19a. Level I Concentrations	**	0.00E+00
19b. Level II Concentrations	**	0.00E+00
19c. Pot. Human Food Chain Contamination	**	3.31E-03
19d. Population (lines 19a+19b+19c)	**	3.31E-03
20. Targets (lines 18+19d)	**	3.31E-03
21. HUMAN FOOD CHAIN THREAT SCORE	100	0.00

* Maximum value applies to waste characteristics category.
** Maximum value not applicable.

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORESHEET
NASA LeRC PMU1 - Flood Plain - 12/20/95

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT Factor Categories & Factors ENVIRONMENTAL THREAT	Maximum Value	Value Assigned
Likelihood of Release		
22. Likelihood of Release (same as line 5)	550	500
Waste Characteristics		
23. Ecosystem Toxicity/Persistence/Bioacc.	*	5.00E+06
24. Hazardous Waste Quantity	*	10
25. Waste Characteristics	1000	56
Targets		
26. Sensitive Environments		
26a. Level I Concentrations	**	0.00E+00
26b. Level II Concentrations	**	0.00E+00
26c. Potential Contamination	**	5.00E-02
26d. Sensitive Environments (lines 26a+26b+26c)	**	5.00E-02
27. Targets (line 26d)	**	5.00E-02
28. ENVIRONMENTAL THREAT SCORE	60	0.02
29. WATERSHED SCORE	100	0.78
30. SW: OVERLAND/FLOOD COMPONENT SCORE (Sof)	100	0.78

* Maximum value applies to waste characteristics category.
** Maximum value not applicable.

GROUND WATER TO SURFACE WATER MIGRATION COMPONENT SCORESHEET
NASA LeRC PMU1 - Flood Plain - 12/20/95

GROUND WATER TO SURFACE WATER MIGRATION COMPONENT Factor Categories & Factors DRINKING WATER THREAT	Maximum Value	Value Assigned
Likelihood of Release to Aquifer Aquifer: Shale Bedrock Aquife		
1. Observed Release	550	550
2. Potential to Release		
2a. Containment	10	10
2b. Net Precipitation	10	0
2c. Depth to Aquifer	5	5
2d. Travel Time	35	35
2e. Potential to Release [lines 2a(2b+2c+2d)]	500	400
3. Likelihood of Release	550	550
Waste Characteristics		
4. Toxicity/Mobility/Persistence	*	1.00E+04
5. Hazardous Waste Quantity	*	10
6. Waste Characteristics	100	18
Targets		
7. Nearest Intake	50	0.00E+00
8. Population		
8a. Level I Concentrations	**	0.00E+00
8b. Level II Concentrations	**	0.00E+00
8c. Potential Contamination	**	0.00E+00
8d. Population (lines 8a+8b+8c)	**	0.00E+00
9. Resources	5	5.00E+00
10. Targets (lines 7+8d+9)	**	5.00E+00
11. DRINKING WATER THREAT SCORE	100	0.60

* Maximum value applies to waste characteristics category.
** Maximum value not applicable.

GROUND WATER TO SURFACE WATER MIGRATION COMPONENT SCORESHEET
NASA LeRC PMU1 - Flood Plain - 12/20/95

GROUND WATER TO SURFACE WATER MIGRATION COMPONENT Factor Categories & Factors HUMAN FOOD CHAIN THREAT	Maximum Value	Value Assigned
Likelihood of Release		
12. Likelihood of Release (same as line 3)	550	550
Waste Characteristics		
13. Toxicity/Mobility/Persistence/Bioacc.	*	5.00E+03
14. Hazardous Waste Quantity	*	10
15. Waste Characteristics	1000	10
Targets		
16. Food Chain Individual	50	0.00E+00
17. Population		
17a. Level I Concentrations	**	0.00E+00
17b. Level II Concentrations	**	0.00E+00
17c. Pot. Human Food Chain Contamination	**	0.00E+00
17d. Population (lines 17a+17b+17c)	**	0.00E+00
18. Targets (lines 16+17d)	**	0.00E+00
19. HUMAN FOOD CHAIN THREAT SCORE	100	0.00

* Maximum value applies to waste characteristics category.
** Maximum value not applicable.

GROUND WATER TO SURFACE WATER MIGRATION COMPONENT SCORESHEET
NASA LeRC PMU1 - Flood Plain - 12/20/95

GROUND WATER TO SURFACE WATER MIGRATION COMPONENT Factor Categories & Factors ENVIRONMENTAL THREAT	Maximum Value	Value Assigned
Likelihood of Release		
20. Likelihood of Release (same as line 3)	550	550
Waste Characteristics		
21. Ecosystem Tox./Mobility/Persist./Bioacc.	*	5.00E+04
22. Hazardous Waste Quantity	*	10
23. Waste Characteristics	1000	18
Targets		
24. Sensitive Environments		
24a. Level I Concentrations	**	0.00E+00
24b. Level II Concentrations	**	0.00E+00
24c. Potential Contamination	**	0.00E+00
24d. Sensitive Environments (lines 24a+24b+24c)	**	0.00E+00
25. Targets (line 24d)	**	0.00E+00
26. ENVIRONMENTAL THREAT SCORE	60	0.00
27. WATERSHED SCORE	100	0.60
28. SW: GW to SW COMPONENT SCORE (Sgs)	100	0.60

* Maximum value applies to waste characteristics category.
** Maximum value not applicable.

SOIL EXPOSURE PATHWAY SCORESHEET
NASA LeRC PMU1 - Flood Plain - 12/20/95

SOIL EXPOSURE PATHWAY Factor Categories & Factors RESIDENT POPULATION THREAT	Maximum Value	Value Assigned
Likelihood of Exposure		
1. Likelihood of Exposure	550	550
Waste Characteristics		
2. Toxicity	*	1.00E+04
3. Hazardous Waste Quantity	*	10
4. Waste Characteristics	100	18
Targets		
5. Resident Individual	50	0.00E+00
6. Resident Population		
6a. Level I Concentrations	**	0.00E+00
6b. Level II Concentrations	**	0.00E+00
6c. Resident Population (lines 6a+6b)	**	0.00E+00
7. Workers	15	0.00E+00
8. Resources	5	0.00E+00
9. Terrestrial Sensitive Environments	***	0.00E+00
10. Targets (lines 5+6c+7+8+9)	**	0.00E+00
11. RESIDENT POPULATION THREAT SCORE	**	0.00E+00

* Maximum value applies to waste characteristics category.
** Maximum value not applicable.
*** No specific maximum value applies, see HRS for details.

SOIL EXPOSURE PATHWAY SCORESHEET
NASA LeRC PMU1 - Flood Plain - 12/20/95

SOIL EXPOSURE PATHWAY Factor Categories & Factors NEARBY POPULATION THREAT	Maximum Value	Value Assigned
Likelihood of Exposure		
12. Attractiveness/Accessibility	100	5.00E+00
13. Area of Contamination	100	2.00E+01
14. Likelihood of Exposure	500	5.00E+00
Waste Characteristics		
15. Toxicity	*	1.00E+04
16. Hazardous Waste Quantity	*	10
17. Waste Characteristics	100	18
Targets		
18. Nearby Individual	1	1.00E+00
19. Population Within 1 Mile	**	5.00E+00
20. Targets (lines 18+19)	**	6.00E+00
21. NEARBY POPULATION THREAT SCORE	**	5.40E+02
SOIL EXPOSURE PATHWAY SCORE (Ss)	100	0.01

* Maximum value applies to waste characteristics category.
** Maximum value not applicable.

AIR PATHWAY SCORESHEET
NASA LeRC PMU1 - Flood Plain - 12/20/95

AIR MIGRATION PATHWAY Factor Categories & Factors	Maximum Value	Value Assigned
Likelihood of Release		
1. Observed Release	550	0
2. Potential to Release		
2a. Gas Potential to Release	500	0
2b. Particulate Potential to Release	500	280
2c. Potential to Release	500	280
3. Likelihood of Release	550	280
Waste Characteristics		
4. Toxicity/Mobility	*	2.00E+00
5. Hazardous Waste Quantity	*	10
6. Waste Characteristics	100	2
Targets		
7. Nearest Individual	50	2.00E+01
8. Population		
8a. Level I Concentrations	**	0.00E+00
8b. Level II Concentrations	**	0.00E+00
8c. Potential Contamination	**	2.72E+02
8d. Population (lines 8a+8b+8c)	**	2.72E+02
9. Resources	5	5.00E+00
10. Sensitive Environments		
10a. Actual Contamination	***	0.00E+00
10b. Potential Contamination	***	0.00E+00
10c. Sens. Environments(lines 10a+10b)	***	0.00E+00
11. Targets (lines 7+8d+9+10c)	**	2.97E+02
AIR MIGRATION PATHWAY SCORE (Sa)	100	2.02E+00

* Maximum value applies to waste characteristics category.
** Maximum value not applicable.
*** No specific maximum value applies, see HRS for details.

1. WASTESTREAM QUANTITY SUMMARY TABLE, SOURCE: Berm Areas

a. Wastestream ID	Contaminated Soil
b. Hazardous Constituent Quantity (C) (lbs.)	0.00
c. Data Complete?	NO
d. Hazardous Wastestream Quantity (W) (lbs.)	0.00
e. Data Complete?	NO
f. Wastestream Quantity Value (W/5,000)	0.00E+00

Wastestream Constituent Hazardous Substances	Concent.	Units	Liquid	Qualifier
Antimony	4.3E+01	mg/kg	NO	J
Copper	1.6E+02	mg/kg	NO	J
Lead	1.3E+03	mg/kg	NO	J
Magnesium	1.4E+04	mg/kg	NO	

Documentation for Wastestream Quantity:

Mass Unknown

Reference:

2. SOURCE HAZARDOUS WASTE QUANTITY FACTOR TABLE

a. Source ID	Berm Areas	
b. Source Type	Contaminated Soil	
c. Secondary Source Type	N.A.	
d. Source Vol.(yd3/gal) | Source Area (ft2)	0.00	7500.00
e. Source Volume/Area Value	2.21E-01	
f. Source Hazardous Constituent Quantity (HCQ) Value (sum of 1b)	0.00E+00	
g. Data Complete?	NO	
h. Source Hazardous Wastestream Quantity (WSQ) Value (sum of 1f)	0.00E+00	
i. Data Complete?	NO	
k. Source Hazardous Waste Quantity (HWQ) Value (2e, 2f, or 2h)	2.21E-01	

Source Hazardous Substances	Depth (feet)	Liquid	Concent.	Units
Antimony	< 2	NO	4.3E+01	ppm
Copper	< 2	NO	1.6E+02	ppm
Lead	< 2	NO	1.3E+03	ppm
Magnesium	< 2	NO	1.4E+04	ppm

3. SITE HAZARDOUS WASTE QUANTITY SUMMARY

No.	Source ID	Migration Pathways	Vol. or Area Value (2e)	Constituent or Wastestream Value (2f,2h)	Hazardous Waste Qty. Value (2k)
1	Berm Areas	GW-SW-SE-A	2.21E-01	0.00E+00	2.21E-01

4. PATHWAY HAZARDOUS WASTE QUANTITY AND WASTE CHARACTERISTICS SUMMARY TABLE

Migration Pathway	Contaminant Values		HWQVs*	WCVs**
Ground Water	Toxicity/Mobility	1.00E+04	10	18
SW: Overland Flow, DW	Tox./Persistence	1.00E+04	10	18
SW: Overland Flow, HFC	Tox./Persis./Bioacc.	5.00E+05	10	32
SW: Overland Flow, Env	Etox./Persis./Bioacc.	5.00E+06	10	56
SW: GW to SW, DW	Tox./Persistence	1.00E+04	10	18
SW: GW to SW, HFC	Tox./Persis./Bioacc.	5.00E+03	10	10
SW: GW to SW, Env	Etox./Persis./Bioacc.	5.00E+04	10	18
Soil Exposure:Resident	Toxicity	1.00E+04	10	18
Soil Exposure: Nearby	Toxicity	1.00E+04	10	18
Air	Toxicity/Mobility	2.00E+00	10	2

* Hazardous Waste Quantity Factor Values
** Waste Characteristics Factor Category Values

Note: SW = Surface Water
GW = Ground Water
DW = Drinking Water Threat
HFC = Human Food Chain Threat
Env = Environmental Threat

GROUND WATER PATHWAY AQUIFER SUMMARY
NASA LeRC PMU1 - Flood Plain - 12/20/95

No.	Aquifer ID	Type	Overlaying No.	Inter-Connected with	Likelihood of Release	Targets
1	Shale Bedrock Aquife	Non K	0	0	550	6.00E+00

Containment

No.	Source ID	HWQ Value	Containment Value
1	Berm Areas	2.21E-01	10

Containment Factor 10

Net Precipitation

Net Precipitation (inches) 0

Documentation for Net Precipitation:

GW-SW component of surface water migration pathway is considered to be significantly less than the Overland Flow component.

Reference:

GROUND WATER PATHWAY LIKELIHOOD OF RELEASE Shale Bedrock Aquifer AQUIFER
NASA LeRC PMU1 - Flood Plain - 12/20/95

Aquifer: Shale Bedrock Aquifer

Type of Aquifer: Non Karst

Overlaying Aquifer: 0

Interconnected with: 0

OBSERVED RELEASE

No.	Well ID	Well Type	Distance (miles)	Level of Contamination
1	gw021-001	Monitoring Well	0.000	Level I

Well No.	Hazardous Substance	Concent.	MCL	Cancer	RFD	Units
1	Magnesium	1.4E+05	0.0E+00	0.0E+00	0.0E+00	ppb
1	Manganese	2.2E+02	0.0E+00	0.0E+00	1.8E+02	ppb

==========

Observed Release Factor 550

Documentation for Well gw021-001:

Only compds significantly above background and attributable to the source are considered.

Reference:

POTENTIAL TO RELEASE

Containment

Containment Factor	10	

Net Precipitation

Net Precipitation Factor	0	

Depth to Aquifer

A. Depth of Hazardous Substances	0.00	feet
B. Depth to Aquifer from Surface	0.00	feet
C. Depth to Aquifer (B - A)	0.00	feet
Depth to Aquifer Factor	5	

Travel Time

Are All Layers Karst?	NO	
Thickness of Layer(s) with Lowest Conductivity	0.00	feet
Hydraulic Conductivity (cm/sec)	0.0E-00	
Travel Time Factor	35	

==========

Potential to Release Factor 400

Source: 1 Berm Areas

Source Hazardous Waste Quantity Value: 0.22

Hazardous Substance	Toxicity Value	Mobility Value	Toxicity/ Mobility Value
Antimony	10000	1.00E-02	1.00E+02
Copper	100	1.00E-02	1.00E+00
Lead	10000	2.00E-05	2.00E-01
Magnesium	100	2.00E-05	2.00E-03

Hazardous Substances Found in an Observed Release

Well No.	Observed Release Hazardous Substance	Toxicity Value	Mobility Value	Toxicity/ Mobility Value
1	Magnesium	100	1.00E+00	1.00E+02
1	Manganese	10000	1.00E+00	1.00E+04

Toxicity/Mobility Value from Source Hazardous Substances:	1.00E+02
Toxicity/Mobility Value from Observed Release Hazardous Substances:	1.00E+04
Toxicity/Mobility Factor:	1.00E+04
Sum of Source Hazardous Waste Quantity Values:	2.21E-01
Hazardous Waste Quantity Factor:	10
Waste Characteristics Factor Category:	18

Population by Well

No.	Well ID	Sample Type	Distance (miles)	Level of Contamination	Population

- N/A and/or data not specified

Level I Population Factor: 0.00

Level II Population Factor: 0.00

Potential Contamination by Distance Category

Distance Category (miles)	Population	Value
> 0 to 1/4	0.0	0.00E+00
> 1/4 to 1/2	0.0	0.00E+00
> 1/2 to 1	0.0	0.00E+00
> 1 to 2	50.0	1.00E+00
> 2 to 3	0.0	0.00E+00
> 3 to 4	0.0	0.00E+00

Potential Contamination Factor: 1.000

Documentation for Target Population > 0 to 1/4 mile Distance Category:

See Section 3.7 of Reference #3.

Reference: 3

Documentation for Target Population > 1 to 2 miles Distance Category:

Seven permitted DW wells located between 1.5 and 3 mi S-SE of LeRC and serve an estimated 50 individuals.
See Section 3.8.2 of Reference #3.

Reference: 3

Nearest Well

Level of Contamination: Potential
Distance in miles: 1.50

Nearest Well Factor: 5.00E+00

Documentation for Nearest Well:

The closest well on record with ODW is 1/4 mi away on Hopkins Airport property. However, it is inactive. The closest permitted well is 1.5 miles from the site.
See Section 3.3 and 3.8.2 of Reference #3.

Reference: 3, 4

Resources

Resource Use: NO

Resource Factor: 0.00E+00

Wellhead Protection Area

No wellhead protection area

Wellhead Protection Area Factor: 0.00E+00

SURFACE WATER PATHWAY SEGMENT SUMMARY
NASA LeRC PMU1 - Flood Plain - 12/20/95

No.	Segment ID	Segment Type	Water Type	Start Point (mi)	End Point (mi)	Average Flow (cfs)
1	Abram Creek	River	Fresh	0.00	0.72	6
2	Rocky River	River	Fresh	0.72	9.20	113
3	Lake Erie	Moderate D	Fresh	9.20	15.00	N.A.

Documentation for segment: Abram Creek:

See Section 3.8.1 of Reference #3 for distance of Rocky River from Abram Creek.
Flow rate average calculated from Table 3-3 of Reference #3.

Reference: 3

Documentation for segment: Rocky River:

See Section 3.8.1 of Reference #3
Flow rate average calculated from Table 3-3 of Reference #3.

Reference: 3

Documentation for segment: Lake Erie:

end point = TDL

Reference:

SURFACE WATER PATHWAY OVERLAND FLOW/FLOOD COMPONENT LIKELIHOOD OF RELEASE
NASA LeRC PMU1 - Flood Plain - 12/20/95

OBSERVED RELEASE

No.	Sample ID	Sample Type	Distance (miles)	Level of Contamination DW	HFC	Env

- N/A and/or data not specified

==========

Observed Release Factor 0

POTENTIAL TO RELEASE

Potential to Release by Overland Flow

Containment

No.	Source ID	HWQ Value	Containment Value
1	Berm Areas	2.21E-01	10

Containment Factor: 10

Documentation for Overland Flow Containment, Source Berm Areas:

No evidence of haz subs migration from source area and presence of neither maintained engineered cover nor run-on/run-off control/mgt system.

Reference:

Distance to Surface Water

Distance to Surface Water: 0.0 feet

Distance to Surface Water Factor: 25

Documentation for Distance to Surface Water:

Abram creek flows through the source and hence, distance to surface water is 0.

Reference:

Runoff

A. Drainage Area: 5.0 acres

Documentation for Drainage Area:

Maximum drainage area for this source assumed to be 5 acres. It is certainly less than the 50-acre threshold for change in drainage area value.

Reference:

B. 2-year, 24-hour Rainfall: 2.8 inches

Documentation for Rainfall:

See Section 3.5, "Climate," of Reference #3.

Reference: 3

C. Soil Group: C
Moderately-fine textured soils with low infiltration rates

Documentation for Soil Group:

Chagrin silt loam is reported on the flood plains along Abram Creek. The soil has low to moderate permeability (See Section 3.2.1 of Reference #3).

Reference: 3

Runoff Factor: 1

==========

Potential to Release by Overland Flow Factor: 260

Potential to Release by Flood

No.	Source ID	HWQ Value	Flood Containment Value	Flood Frequency Value	Potential to Release by Flood
1	Berm Areas	2.21E-01	10	50	500

==========

Potential to Release by Flood Factor: 500

Documentation for Flood Frequency, Source Berm Areas:

Firing Range located within 100-year floodplain.
See Section 3.4 of Reference #3.

Reference: 3

Source: 1 Berm Areas

Source Hazardous Waste Quantity Value: 0.22

Hazardous Substance	Toxicity Value	Persistence Value	Toxicity/ Persistence Value
Antimony	10000	1.00E+00	1.00E+04
Copper	0	1.00E+00	0.00E+00
Lead	10000	1.00E+00	1.00E+04
Magnesium	0	1.00E+00	0.00E+00

Hazardous Substances Found in an Observed Release

Sample No.	Observed Release Hazardous Substance	Toxicity Value	Persistence Value	Toxicity/ Persistence Value

- N/A and/or data not specified

Toxicity/Persistence Value from Source Hazardous Substances:	1.00E+04
Toxicity/Persistence Value from Observed Release Hazardous Substances:	0.00E+00
Toxicity/Persistence Factor:	1.00E+04
Sum of Source Hazardous Waste Quantity Values:	2.21E-01
Hazardous Waste Quantity Factor:	10
Waste Characteristics Factor Category:	18

Level I Concentrations

- N/A and/or data not specified

Level II Concentrations

- N/A and/or data not specified

Most Distant Level I Sample

- N/A and/or data not specified

Most Distant Level II Sample

- N/A and/or data not specified

Level I Concentrations

Intake	Distance Along the In-water Segment from the Probable Point of Entry (miles)	Population
- N/A and/or data not specified		

==========

Population Served by Level I Intakes: 0.0

Level I Population Factor: 0.00E+00

Level II Concentrations

Intake	Distance Along the In-water Segment from the Probable Point of Entry (miles)	Population
- N/A and/or data not specified		

==========

Population Served by Level II Intakes: 0.0

Level II Population Factor: 0.00E+00

Potential Contamination

Intake ID	Average Annual Flow (cfs)	Population Served
1 Cleve: Crown Crib	0	375000.0
2 Cleve: Division Crb	0	375000.0
3 Cleve: Kirtland Crb	0	375000.0

Documentation for Intake Cleve: Crown Crib:

See Section 3.8.1 of Reference #3.
There are four City of Cleveland ("Cleve") intakes which serve 1.5 million people. The population served by individual intakes is assumed to be split equally. Only 3 of the 4 intakes are within the TDL of 15 miles.

Reference: 3

Type of Surface Water Body	Total Population	Dilution-Weighted Population
Moderate Ocean Zone or Great Lake	1125000.0	16.0

Dilution-Weighted Population Served
by Potentially Contaminated Intakes: 16.0

Potential Contamination Factor: 2.0

Nearest Intake

Location of Nearest Drinking Water Intake: Cleve: Crown Crib
Distance from the Probable Point of Entry: 12.60 miles
Type of Surface Water Body: Moderate D
Dilution Weight: 0.0000100
Highest Level of Contamination: Potential

Nearest Intake Factor: 0.00

Documentation for Cleve: Crown Crib:

See Section 3.8.1 of Reference #3.
There are four City of Cleveland ("Cleve") intakes which serve 1.5 million people. The population served by individual intakes is assumed to be split equally. Only 3 of the 4 intakes are within the TDL of 15 miles.

Reference: 3

Resources

Resource Use: YES

Resource Value: 5.00E+00

Documentation for Resources:

Lake Erie is a water recreation area.

Reference:

SW PATHWAY: OVERLAND/FLOOD HUMAN FOOD CHAIN THREAT WASTE CHARACTERISTICS
NASA LeRC PMU1 - Flood Plain - 12/20/95

Source: 1 Berm Areas

Source Hazardous Waste Quantity Value: 0.22

Hazardous Substance	Toxicity Value	Persistence Value	Bio-accum. Value	Toxicity/ Persistence/ Bioaccum. Value
Antimony	10000	1.00E+00	5.00E-01	5.00E+03
Copper	0	1.00E+00	5.00E+04	0.00E+00
Lead	10000	1.00E+00	5.00E+01	5.00E+05
Magnesium	0	1.00E+00	5.00E-01	0.00E+00
Manganese	10000	1.00E+00	5.00E-01	5.00E+03

Hazardous Substances Found in an Observed Release

Sample No.	Observed Release Hazardous Substance	Toxicity Value	Persistence Value	Bio-accum. Value	Toxicity/ Persistence/ Bioaccum. Value

- N/A and/or data not specified

Toxicity/Persistence/Bioaccumulation Value from Source Hazardous Substances:	5.00E+05
Toxicity/Persistence/Bioaccumulation Value from Observed Release Hazardous Substances:	0.00E+00
Toxicity/Persistence/Bioaccumulation Factor:	5.00E+05
Sum of Source Hazardous Waste Quantity Values:	2.21E-01
Hazardous Waste Quantity Factor:	10
Waste Characteristics Factor Category:	32

Level I Concentrations

- N/A and/or data not specified

Level II Concentrations

- N/A and/or data not specified

Most Distant Level I Sample

- N/A and/or data not specified

Most Distant Level II Sample

- N/A and/or data not specified

Level I Concentrations

Fishery	Annual Production (pounds)	Human Food Chain Population Value
- N/A and/or data not specified		

Sum of Human Food Chain Population Values: 0.00E+00

Level I Concentrations Factor: 0.00E+00

Level II Concentrations

Fishery	Annual Production (pounds)	Human Food Chain Population Value
- N/A and/or data not specified		

Sum of Human Food Chain Population Values: 0.00E+00

Level II Concentrations Factor: 0.00E+00

Potential Contamination

Fishery	Annnual Production (pounds)	Type of Surface Water Body	Average Annual Flow (cfs)	Pop. Value (Pi)	Dilution Weight (Di)	Pi*Di
2 Rocky River	3000.0	River	113	3.0	1.00E-02	3.00E-02
3 Lake Erie	500000.0	Moderate	0	310.0	1.00E-05	3.10E-03

Sum of (Pi*Di): 3.31E-02

Potential Human Food Chain Contamination Factor: 3.31E-03

Documentation for Rocky River Fishery:

Rocky River used for recreational fishing.
fishery production assumed at a conservative rate of 10 lb/day for 300 d/yr.

Reference:

Documentation for Lake Erie Fishery:

Lake Erie is used for commercial fishing (See Section 3.7 of Reference #3).
***fishery production (lb/yr) ficticious

Reference:

Food Chain Individual

Location of Nearest Fishery: Rocky River
Distance from the Probable Point of Entry: 0.72 miles
Type of Surface Water Body: River
Dilution Weight: 0.0100000
Level of Contamination: Potential

Food Chain Individual Factor: 0.00

Documentation for Rocky River:

See Section 3.8.1 of Reference #3
Flow rate average calculated from Table 3-3 of Reference #3.

Reference: 3

Source: 1 Berm Areas

Source Hazardous Waste Quantity Value: 0.22

Hazardous Substance	Eco-toxicity Value	Persistence Value	Bio-accum. Value	Ecotoxicity/ Persistence/ Bioaccum. Value
Antimony	0	1.00E+00	5.00E-01	0.00E+00
Copper	100	1.00E+00	5.00E+04	5.00E+06
Lead	1000	1.00E+00	5.00E+03	5.00E+06
Magnesium	0	1.00E+00	5.00E-01	0.00E+00
Manganese	0	1.00E+00	5.00E+04	0.00E+00

Hazardous Substances Found in an Observed Release

Sample No.	Observed Release Hazardous Substance	Eco-toxicity Value	Persistence Value	Bio-accum. Value	Ecotoxicity/ Persistence/ Bioaccum. Value

- N/A and/or data not specified

Ecotoxicity/Persistence/Bioaccummulation Value from Source Hazardous Substances:	5.00E+06
Ecotoxicity/Persistence/Bioaccummulation Value from Observed Release Hazardous Substances:	0.00E+00
Ecotoxicity/Persistence/Bioaccummulation Factor:	5.00E+06
Sum of Source Hazardous Waste Quantity Values:	2.21E-01
Hazardous Waste Quantity Factor:	10
Waste Characteristics Factor Category:	56

Level I Concentrations

- N/A and/or data not specified

Level II Concentrations

- N/A and/or data not specified

Most Distant Level I Sample

- N/A and/or data not specified

Most Distant Level II Sample

- N/A and/or data not specified

Level I Concentrations

Sensitive Environment	Distance from Probable Point of Entry to Sensitive Env. (miles)	Sensitive Environment Value
- N/A and/or data not specified		

Sum of Sensitive Environments Values: 0

Wetlands

Wetland	Distance from Probable Point of Entry to Wetland (miles)	Wetlands Frontage (miles)
- N/A and/or data not specified		

Total Wetlands Frontage: 0.00 Miles Total Wetlands Value: 0

Sum of Sensitive Environments Value + Wetlands Value: 0.00E+00

Level I Concentrations Factor: 0.00E+00

SW PATHWAY: OVERLAND FLOW/FLOOD COMPONENT ENVIRONMENTAL THREAT TARGETS
NASA LeRC PMU1 - Flood Plain - 12/20/95

Level II Concentrations

Sensitive Environment	Distance from Probable Point of Entry to Sensitive Env. (miles)	Sensitive Environment Value
- N/A and/or data not specified		

Sum of Sensitive Environments Values: 0

Wetlands

Wetland	Distance from Probable Point of Entry to Wetland (miles)	Wetlands Frontage (miles)
- N/A and/or data not specified		

Total Wetlands Frontage: 0.00 Miles Total Wetlands Value: 0

Sum of Sensitive Environments Value + Wetlands Value: 0.00E+00

Level II Concentrations Factor: 0.00E+00

Potential Contamination

Sensitive Environments

Type of Surface Water Body	Sensitive Environment	Sensitive Environment Value
River	1 Rocky Rvr Reservatn	50

Wetlands

Type of Surface Water Body	Sensitive Environment	Wetlands Frontage	Wetlands Value
- N/A and/or data not specified			

Documentation for Sensitive Environment Rocky Rvr Reservatn:

Seasonal habitat for salmon which are stocked by ODNR.
See Section 3.6 of Reference #3.

Reference:

SW PATHWAY: OVERLAND FLOW/FLOOD COMPONENT ENVIRONMENTAL THREAT TARGETS
NASA LeRC PMU1 - Flood Plain - 12/20/95

Type of Surface Water Body	Sum of Sens. Environment Values(Sj)	Sum of Wetland Frontage Values(Wj)	Dilution Weight (Dj)	Dj(Wj+Sj)
Moderate to Large Stream	50	0	1.00E-02	5.00E-01

Sum of Dj(Wj+Sj): 5.00E-01
Sum of Dj(Wj+Sj)/10: 5.00E-02

==========

Potential Contamination Sensitive Environment Factor: 5.00E-02

SURFACE WATER PATHWAY GW TO SW CONTAINMENT SUMMARY
NASA LeRC PMU1 - Flood Plain - 12/20/95

Containment

No.	Source ID	HWQ Value	Containment Value
1	Berm Areas	2.21E-01	10
		Containment Factor	10

Net Precipitation

Net Precipitation (inches)	0.00

Documentation for Net Precipitation:

GW-SW component of surface water migration pathway is considered to be significantly less than the Overland Flow component.

Reference:

Aquifer: Shale Bedrock Aquifer

Type of Aquifer: Non Karst

Overlaying Aquifer: 0

Interconnected with: 0

OBSERVED RELEASE

No.	Well ID	Well Type	Distance (miles)	Level of Contamination
1	gw021-001	Monitoring Well	0.000	Level I

Well No.	Hazardous Substance	Concent.	MCL	Cancer	RFD	Units
1	Magnesium	1.4E+05	0.0E+00	0.0E+00	0.0E+00	ppb
1	Manganese	2.2E+02	0.0E+00	0.0E+00	1.8E+02	ppb

Observed Release Factor 550

Documentation for Well gw021-001:

Only compds significantly above background and attributable to the source are considered.

Reference:

POTENTIAL TO RELEASE

Ground Water to Surface Water Angle

Probable Point of Entry	0.00	miles
Angle Theta	0	

Containment

Containment Factor	10	

Net Precipitation

Net Precipitation Factor	0	

Depth to Aquifer

A. Depth of Hazardous Substances	0.00	feet
B. Depth to Aquifer from Surface	0.00	feet
C. Depth to Aquifer (B - A)	0.00	feet
Depth to Aquifer Factor	5	

Travel Time

Are All Layers Karst?	NO	
Thickness of Layer(s) with Lowest Conductivity	0.00	feet
Hydraulic Conductivity (cm/sec)	0.0E-00	
Travel Time Factor	35	

SURFACE WATER PATHWAY GW TO SW COMPONENT LIKELIHOOD OF RELEASE
NASA LeRC PMU1 - Flood Plain - 12/20/95

==========

Potential to Release Factor 400

SW PATHWAY: GW TO SW COMPONENT DRINKING WATER THREAT WASTE CHARACTERISTICS
NASA LeRC PMU1 - Flood Plain - 12/20/95

Source: 1 Berm Areas

Source Hazardous Waste Quantity Value: 0.22

Hazardous Substance	Toxicity Factor Value	Persist. Value	Mobility Value	Toxicity/ Mobililty/ Persistence
Antimony	10000	1.00E+00	1.00E-02	1.00E+02
Copper	0	1.00E+00	1.00E-02	0.00E+00
Lead	10000	1.00E+00	2.00E-05	2.00E-01
Magnesium	0	1.00E+00	2.00E-05	0.00E+00

Hazardous Substances Found in an Observed Release

Observed Release Hazardous Substance	Toxicity Factor Value	Persist. Value	Toxicity/ Persistence
Magnesium	100	1.00E+00	1.00E+02
Manganese	10000	1.00E+00	1.00E+04

Toxicity/Mobility/Persistence Value from Source Hazardous Substances:	1.00E+02
Toxicity/Mobility/Persistence Value from Observed Release Hazardous Substances:	1.00E+04
Toxicity/Mobility/Persistence Factor:	1.00E+04
Sum of Source Hazardous Waste Quantity Values:	2.21E-01
Hazardous Waste Quantity Factor:	10
Waste Characteristics Factor Category:	18

Level I Concentrations

- N/A and/or data not specified

Level II Concentrations

- N/A and/or data not specified

Most Distant Level I Sample

- N/A and/or data not specified

Most Distant Level II Sample

- N/A and/or data not specified

Level I Concentrations

Intake	Distance Along the In-water Segment from the Probable Point of Entry (miles)	Population

- N/A and/or data not specified

==========

Population Served by Level I Intakes: 0.0

Level I Population Factor: 0.00E+00

Level II Concentrations

Intake	Distance Along the In-water Segment from the Probable Point of Entry (miles)	Population
- N/A and/or data not specified		

==========

Population Served by Level II Intakes: 0.0

Level II Population Factor: 0.00E+00

Potential Contamination

Intake ID	Average Annual Flow (cfs)	Population Served
1 Cleve: Crown Crib	0	375000.0
2 Cleve: Division Crb	0	375000.0
3 Cleve: Kirtland Crb	0	375000.0

Documentation for Intake Cleve: Crown Crib:

See Section 3.8.1 of Reference #3.
There are four City of Cleveland ("Cleve") intakes which serve 1.5 million people. The population served by individual intakes is assumed to be split equally. Only 3 of the 4 intakes are within the TDL of 15 miles.

Reference: 3

Type of Surface Water Body	Total Population	Dilution-Weighted Population
Moderate Ocean Zone or Great Lake	1125000.0	16.0

Dilution-Weighted Population Served
by Potentially Contaminated Intakes: 16.0

Potential Contamination Factor: 0.0

Nearest Intake

Location of Nearest Drinking Water Intake: Cleve: Crown Crib
Distance from the Probable Point of Entry: 12.60 miles
Type of Surface Water Body: Moderate D
Dilution Weight: 0.0000000
Highest Level of Contamination: Potential

Nearest Intake Factor: 0.00

Documentation for Cleve: Crown Crib:

See Section 3.8.1 of Reference #3.
There are four City of Cleveland ("Cleve") intakes which serve 1.5 million people. The population served by individual intakes is assumed to be split equally. Only 3 of the 4 intakes are within the TDL of 15 miles.

Reference: 3

Resources

Resource Use: YES

Resource Value: 5.00E+00

Documentation for Resources:

Lake Erie is a water recreation area.

Reference:

SW PATHWAY: GW TO SW COMPONENT HUMAM FOOD CHAIN THREAT WASTE CHARACTERISTICS
NASA LeRC PMU1 - Flood Plain - 12/20/95

Source: 1 Berm Areas

Source Hazardous Waste Quantity Value: 0.22

Hazardous Substance	Toxicity Value	Persist. Value	Mobility Value	Bio-accum. Value	Tox./Mobil./ Persistence/ Bioaccum. Value
Antimony	10000	1.00E+00	1.00E-02	5.00E-01	5.00E+01
Copper	0	1.00E+00	1.00E-02	5.00E+04	0.00E+00
Lead	10000	1.00E+00	2.00E-05	5.00E+01	1.00E+01
Magnesium	0	1.00E+00	2.00E-05	5.00E-01	0.00E+00
Manganese	10000	1.00E+00	1.00E-02	5.00E-01	5.00E+01

Hazardous Substances Found in an Observed Release

Observed Release Hazardous Substance	Toxicity Value	Persist. Value	Bio-accum. Value	Toxicity/ Persistence Bioaccum. Value
Magnesium	100	1.00E+00	5.00E-01	5.00E+01
Manganese	10000	1.00E+00	5.00E-01	5.00E+03

Toxicity/Mobility/Persistence/Bioaccumulation Value from Source Hazardous Substances:	5.00E+01
Toxicity/Mobility/Persistence/Bioaccumulation Value from Observed Release Hazardous Substances:	5.00E+03
Toxicity/Mobility/Persistence/Bioaccumulation Factor:	5.00E+03
Sum of Source Hazardous Waste Quantity Values:	2.21E-01
Hazardous Waste Quantity Factor:	10
Waste Characteristics Factor Category:	10

Level I Concentrations

- N/A and/or data not specified

Level II Concentrations

- N/A and/or data not specified

Most Distant Level I Sample

- N/A and/or data not specified

Most Distant Level II Sample

- N/A and/or data not specified

Level I Concentrations

Fishery	Annual Production (pounds)	Human Food Chain Population Value
- N/A and/or data not specified		

Sum of Human Food Chain Population Values: 0.00E+00

Level I Concentrations Factor: 0.00E+00

Level II Concentrations

Fishery	Annual Production (pounds)	Human Food Chain Population Value
- N/A and/or data not specified		

Sum of Human Food Chain Population Values: 0.00E+00

Level II Concentrations Factor: 0.00E+00

Potential Contamination

Fishery	Annnual Production (pounds)	Type of Surface Water Body	Average Annual Flow (cfs)	Pop. Value (Pi)	Dilution Weight (Di)	Pi*Di
2 Rocky River	3000.0	River	113	3.0	0.00E+00	0.00E+00
3 Lake Erie	500000.0	Moderate	0	310.0	0.00E+00	0.00E+00

Sum of (Pi*Di): 0.00E+00

Potential Human Food Chain Contamination Factor: 0.00E+00

Documentation for Rocky River Fishery:

Rocky River used for recreational fishing.
fishery production assumed at a conservative rate of 10 lb/day for 300 d/yr.

Reference:

Documentation for Lake Erie Fishery:

Lake Erie is used for commercial fishing (See Section 3.7 of Reference #3).
***fishery production (lb/yr) ficticious

Reference:

Food Chain Individual

Location of Nearest Fishery: Rocky River
Distance from the Probable Point of Entry: 0.72 miles
Type of Surface Water Body: River
Dilution Weight: 0.0000000
Level of Contamination: Potential

Food Chain Individual Factor: 0.00

Documentation for Rocky River:

See Section 3.8.1 of Reference #3
Flow rate average calculated from Table 3-3 of Reference #3.

Reference: 3

Source: 1 Berm Areas

Source Hazardous Waste Quantity Value: 0.22

Hazardous Substance	Eco-toxicity Value	Persist. Value	Mob. Value	Bio-accum. Value	Ecotoxicity/ Mobility/ Persistence/ Bioaccum. Value
Antimony	0	1.00E+00	1.00E-02	5.00E-01	0.00E+00
Copper	100	1.00E+00	1.00E-02	5.00E+04	5.00E+04
Lead	1000	1.00E+00	2.00E-05	5.00E+03	1.00E+02
Magnesium	0	1.00E+00	2.00E-05	5.00E-01	0.00E+00
Manganese	0	1.00E+00	1.00E-02	5.00E+04	0.00E+00

Hazardous Substances Found in an Observed Release

Observed Release Hazardous Substance	Eco-toxicity Value	Persist. Value	Bio-accum. Value	Ecotoxicity/ Persistence/ Bioaccum. Value
Magnesium	100	1.00E+00	5.00E-01	5.00E+01
Manganese	100	1.00E+00	5.00E+04	5.00E+06

Ecotoxicity/Mobility/Persistence/Bioaccummulation Value from Source Substances:	5.00E+04
Ecotoxicity/Mobility/Persistence/Bioaccummulation Value from Observed Hazardous Substances:	0.00E+00
Ecotoxicity/Mobility/Persistence/Bioaccummulation Factor:	5.00E+04
Sum of Source Hazardous Waste Quantity Values:	2.21E-01
Hazardous Waste Quantity Factor:	10
Waste Characteristics Factor Category:	18

Level I Concentrations

- N/A and/or data not specified

Level II Concentrations

- N/A and/or data not specified

Most Distant Level I Sample

- N/A and/or data not specified

Most Distant Level II Sample

- N/A and/or data not specified

Level I Concentrations

Sensitive Environment	Distance from Probable Point of Entry to Sensitive Env. (miles)	Sensitive Environment Value
- N/A and/or data not specified		

Sum of Sensitive Environments Values: 0

Wetlands

Wetland	Distance from Probable Point of Entry to Wetland (miles)	Wetlands Frontage (miles)
- N/A and/or data not specified		

Total Wetlands Frontage: 0.00 Miles Total Wetlands Value: 0

Sum of Sensitive Environments Value + Wetlands Value: 0.00E+00

Level I Concentrations Factor: 0.00E+00

Level II Concentrations

Sensitive Environment	Distance from Probable Point of Entry to Sensitive Env. (miles)	Sensitive Environment Value
- N/A and/or data not specified		

Sum of Sensitive Environments Values: 0

Wetlands

Wetland	Distance from Probable Point of Entry to Wetland (miles)	Wetlands Frontage (miles)
- N/A and/or data not specified		

Total Wetlands Frontage: 0.00 Miles Total Wetlands Value: 0

Sum of Sensitive Environments Value + Wetlands Value: 0.00E+00

Level II Concentrations Factor: 0.00E+00

Potential Contamination

Sensitive Environments

Type of Surface Water Body	Sensitive Environment	Sensitive Environment Value
River	1 Rocky Rvr Reservatn	50

Wetlands

Type of Surface Water Body	Sensitive Environment	Wetlands Frontage	Wetlands Value
- N/A and/or data not specified			

Documentation for Sensitive Environment Rocky Rvr Reservatn:

Seasonal habitat for salmon which are stocked by ODNR.
See Section 3.6 of Reference #3.

Reference:

SW PATHWAY: GW TO SW COMPONENT ENVIRONMENTAL THREAT TARGETS
NASA LeRC PMU1 - Flood Plain - 12/20/95

Type of Surface Water Body	Sum of Sens. Environment Values(Sj)	Sum of Wetland Frontage Values(Wj)	Dilution Weight (Dj)	Dj(Wj+Sj)
Moderate to Large Stream	50	0	0.00E+00	0.00E+00

Sum of Dj(Wj+Sj): 0.00E+00
Sum of Dj(Wj+Sj)/10: 0.00E+00

==========
Potential Contamination Sensitive Environment Factor: 0.00E+00

SOIL EXPOSURE PATHWAY RESIDENT POPULATION THREAT LIKELIHOOD OF EXPOSURE
NASA LeRC PMU1 - Flood Plain - 12/20/95

Likelihood of Exposure

No.	Source ID	Level of Contamination
1	Berm Areas	Level II

Likelihood of Exposure Factor: 550

Source No.	Hazardous Substance	Depth (ft.)	Concent.	Cancer	RFD	Units
1	Antimony	< 2	4.3E+01	0.0E+00	2.3E+02	ppm
1	Copper	< 2	1.6E+02	0.0E+00	0.0E+00	ppm
1	Lead	< 2	1.3E+03	0.0E+00	0.0E+00	ppm
1	Magnesium	< 2	1.4E+04	0.0E+00	0.0E+00	ppm

SOIL EXPOSURE PATHWAY RESIDENT POPULATION THREAT WASTE CHARACTERISTICS
NASA LeRC PMU1 - Flood Plain - 12/20/95

Source: 1 Berm Areas

Source Hazardous Waste Quantity Value: 0.22

Hazardous Substance	Toxicity Value
Antimony	10000
Copper	0
Lead	10000
Magnesium	0

SOIL EXPOSURE PATHWAY RESIDENT POPULATION THREAT WASTE CHARACTERISTICS
NASA LeRC PMU1 - Flood Plain - 12/20/95

Toxicity Factor:	1.00E+04
Sum of Source Hazardous Waste Quantity Values:	2.21E-01
Hazardous Waste Quantity Factor:	10
Waste Characteristics Factor Category:	18

SOIL EXPOSURE PATHWAY RESIDENT POPULATION THREAT TARGETS
NASA LeRC PMU1 - Flood Plain - 12/20/95

Targets

Level I Population:	0.0	Value:	0.00

Documentation for Level I Population:

No presence of resident, student, or daycare population within 200 ft. of contamination

Reference:

Level II Population:	0.0	Value:	0.00
Workers:	0.0	Value:	0.00
Resident Individual:	Potentia	Value:	0.00
Resources:	NO	Value:	0.00

Terrestial Sensitive Environment	Value
- N/A and/or data not specified	

==========

Terrestrial Sensitive Environments Factor: 0.00

SOIL EXPOSURE PATHWAY NEARBY POPULATION THREAT LIKELIHOOD OF EXPOSURE
NASA LeRC PMU1 - Flood Plain - 12/20/95

Likelihood of Exposure

No.	Source ID	Level of Contamination	Attractiveness/ Accessibility	Area of Contam. (sq. feet)
1	Berm Areas	Level II	5	7500

Highest Attractiveness/Accessibility Value: 5
Sum of Eligible Areas Of Contamination (sq. feet): 7500
Area of Contamination Value: 20

Likelihood of Exposure Factor Category: 5

Source No.	Hazardous Substance	Depth (ft.)	Concent.	Cancer	RFD	Units
1	Antimony	< 2	4.3E+01	0.0E+00	2.3E+02	ppm
1	Copper	< 2	1.6E+02	0.0E+00	0.0E+00	ppm
1	Lead	< 2	1.3E+03	0.0E+00	0.0E+00	ppm
1	Magnesium	< 2	1.4E+04	0.0E+00	0.0E+00	ppm

SOIL EXPOSURE PATHWAY NEARBY POPULATION THREAT WASTE CHARACTERISTICS
NASA LeRC PMU1 - Flood Plain - 12/20/95

Source: 1 Berm Areas

Source Hazardous Waste Quantity Value: 0.22

Hazardous Substance	Toxicity Value
Antimony	10000
Copper	0
Lead	10000
Magnesium	0

SOIL EXPOSURE PATHWAY NEARBY POPULATION THREAT WASTE CHARACTERISTICS
NASA LeRC PMU1 - Flood Plain - 12/20/95

Toxicity Factor:	1.00E+04
Sum of Source Hazardous Waste Quantity Values:	2.21E-01
Hazardous Waste Quantity Factor:	10
Waste Characteristics Factor Category:	18

SOIL EXPOSURE PATHWAY NEARBY POPULATION THREAT TARGETS
NASA LeRC PMU1 - Flood Plain - 12/20/95

Nearby Individual

Population within 1/4 mile: 375.0

Nearby Individual Value: 1.0

Population Within 1 Mile

Travel Distance Category	Number of People	Value
> 0 to 1/4 mile	375.0	1.3
> 1/4 to 1/2 mile	775.0	0.7
> 1/2 to 1 mile	4800.0	3.3
	Population Within 1 Mile Factor:	5.0

Documentation for Population > 0 to 1/4 mile Distance Category:

Only resident and school/daycare population counted.
See Section 3.7 of Reference #3.

Reference: 3

OBSERVED RELEASE

No.	Sample ID	Distance (miles)	Level of Contamination

- N/A and/or data not specified

Observed Release Factor: 0

Gas Migration Potential

GAS POTENTIAL TO RELEASE

Source ID	Source Type	Gas Contain. Value (A)	Gas Source Type Value (B)	Gas Migrtn. Potent. Value (C)	Sum (B+C)	Gas Potential to Rel. Value A(B+C)

- N/A and/or data not specified

Gas Potential to Release Factor: 0

Source: Berm Areas

Gaseous Hazardous Substance	Hazardous Substance Gas Migration Potential Value

Average of Gas Migration Potential Value for 3 Hazardous Substances: 0.000

Gas Migration Potential Value From Table 6-7: 0

Particulate Migration Potential

PARTICULATE POTENTIAL TO RELEASE

Source ID	Source Type	Partic. Contain. Value (A)	Partic. Source Type Value (B)	Partic. Migrtn. Potent. Value (C)	Sum (B+C)	Partic. Potential to Rel. Value A(B+C)
Berm Areas	Contaminated Soil	10	22	6	28	280

Particulate Potential to Release Factor: 280

Documentation for Particulate Containment, Source Berm Areas:

Table 6-9 of Reference #1.

Reference: 1

Documentation for Particulate Migration Potential:

Figure 6-2 of Reference #1.

Reference: 1

Source: Berm Areas

Particulate Hazardous Substance
Antimony
Copper
Lead
Magnesium

AIR PATHWAY WASTE CHARACTERISTICS
NASA LeRC PMU1 - Flood Plain - 12/20/95

Source: 1 Berm Areas

Source Hazardous Waste Quantity Value: 0.22

Hazardous Substance	Toxicity Value	Gas Mobility Value	Particulate Mobility Value	Toxicity/ Mobility Value
Antimony	10000	NA	2.00E-04	2.00E+00
Copper	100	NA	2.00E-04	2.00E-02
Lead	10000	NA	2.00E-04	2.00E+00
Magnesium	100	NA	2.00E-04	2.00E-02

Hazardous Substances Found in an Observed Release

Sample ID	Observed Release Hazardous Substance	Particulate Toxicity/ Mobility Value	Gas Toxicity/ Mobility Value

- N/A and/or data not specified

Documentation for Particulate Mobility:

Figure 6-3 of Reference #1.

Reference: 1

Toxicity/Mobility Value from Source Hazardous Substances:	2.00E+00
Toxicity/Mobility Value from Observed Release Hazardous Substances:	0.00E+00
Toxicity/Mobility Factor:	2.00E+00
Sum of Source Hazardous Waste Quantity Values:	2.21E-01
Hazardous Waste Quantity Factor:	10
Waste Characteristics Factor Category:	2

Actual Contamination

No.	Sample ID	Distance (miles)	Level of Contamination

- N/A and/or data not specified

Potential Contamination

Distance Categories Subject to Potential Contamination	Population	Value
Onsite	0.0	0.0000
> 0 to 1/4 mile	5785.0	130.4000
> 1/4 to 1/2 mile	5775.0	28.2000
> 1/2 to 1 mile	19800.0	26.1000
> 1 to 2 miles	58000.0	26.6000
> 2 to 3 miles	164000.0	37.5000
> 3 to 4 miles	188000.0	22.9000
	Potential Contaminantion Factor:	272.0000

Documentation for Population Onsite Distance Category:

There is no resident, student, or worker population at the rifle range site.

Reference:

Documentation for Population > 0 to 1/4 mile Distance Category:

Resident, school/daycare, and bus/indl population included.
See Section 3.7 of Reference #3.

Reference: 3

Documentation for Population > 1 to 2 miles Distance Category:

No estimate available for Bus/Indl population for TDL >1 mi. It is assumed that Bus/Indl population equals resident and school/day care population in the radius ranges.
See Section 3.7 of Reference #3.

Reference: 3

Nearest Individual Factor

Level of Contamination: Potential
Distance in miles: 0 to 1/8

Nearest Individual Value: 20

Documentation for Nearest Individual:

Closest building is Cooling Tower #5, Building 93.

Reference:

Resources

Resource Use: YES

Resource Value: 5

Documentation for Resources:

Rocky River Reservation.

Reference:

Actual Contamination, Sensitive Environments

Sensitive Environment	Distance (miles)	Sensitive Environment Value
- N/A and/or data not specified		

Actual Contamination, Wetlands

Distance Category	Wetland Acreage	Wetland Acreage Value
- N/A and/or data not specified		

==========
Sensitive Environments Actual Contamination Factor: 0.000
(Sum of Sensitive Environments + Wetlands Values)

Potential Contamination, Sensitive Environments

Sensitive Environment	Distance (miles)	Sensitive Environment Value	Distance Weight	Weighted Value/10
	0.000	0	1.0000	0.000

Potential Contamination, Wetlands

Distance Category	Wetland Acreage	Wetland Acreage Value	Distance Weight	Weighted Value/10
- N/A and/or data not specified				

Sensitive Environment Potential Contamination Factor: 0.000

REFERENCES

NASA LeRC PMU1 - Flood Plain - 12/20/95

1. HRS Guidance Manual:40CFR300 Appendix A to Part 300 The Hazard Ranking System 1993 and The Hazard Ranking System Guidance Manual - Interim Final, USEPA, Washington D.C.

2. SCDM

3. "Phase I Remedial Investigation / Feasibility Study," R&R International, Inc., [***final report date]

4. "Preliminary Assessment," SAIC, June 1991.

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SIGNIFICANCE ABOVE BACKGROUND

PMU 1 - FLOOD PLAIN
FIRING RANGE (UPR-01-01)
NASA LEWIS RESEARCH CENTER
PHASE I RI/FS

Compound	Background Sample SQL	Background Sample Conc	Release Sample Sample#	Release Sample SQL	Release Sample Conc	Signif.?	Attrib. to Site?	Comments
SOIL								
VOCs								
Benzene	0.010	0.005	BH075-005		0.023	Y	N	unrelated to activities at this AOC
Toluene	0.010	0.005	BH075-005		0.048	Y	N	unrelated to activities at this AOC
Total Xylenes	0.010	0.005	BH075-005		0 028	Y	N	unrelated to activities at this AOC
SVOCs								
1,4-Dichlorobenzene*	0.330	0.165	SS061-101		0.100	N	n/a	
2-Methylnaphthalene	0.330	0.137	BH075-005		1.300	Y	N	unrelated to activities at this AOC
Acenapthene	0.330	0.157	SS057-001		0 530	Y	N	unrelated to activities at this AOC
Acenaphthalene*	0.330	0.131	SS061-101		0 100	N	n/a	
Anthracene	0.330	0 127	SS057-001		0.720	Y	N	unrelated to activities at this AOC
Benzo(a)pyrene	0.330	0.359	SS057-001		0.860	N	n/a	
Benzo(a)anthracene	0.330	0.327	SS057-001		1.200	Y	N	unrelated to activities at this AOC
Benzo(b)fluoranthene	0.330	0.461	SS057-001		1.400	Y	N	unrelated to activities at this AOC
Benzo(ghi)perylene	0.330	0.412	SS061-101		0.420	N	n/a	
Benzo(k)fluoranthene	0 330	0 244	SS061-101		0 420	Y	N	unrelated to activities at this AOC
Carbazole*	0.330	0.129	SS061-101		0 230	N	n/a	
Chrysene	0.330	0.355	SS057-001		1 200	Y	N	unrelated to activities at this AOC
Di-n-butylphthalate*	0.330	0.165	SS058-001		0 270	N	n/a	
Dibenzo(ah)anthracene*	0 330	0.156	BH075-001		0.065	N	n/a	
Dibenzofuran*	0.330	0.165	SS057-001		0 260	N	n/a	
Fluoranthene	0.330	0.612	SS057-001		2 800	Y	N	unrelated to activities at this AOC
Fluorene	0.330	0.129	SS057-001		0.580	Y	N	unrelated to activities at this AOC
Indeno(123-cd)pyrene	0.330	0.230	SS061-101		0.440	Y	N	unrelated to activities at this AOC
N-nitrosodiphenylamine*	0.330	0.150	SS059-001		0 049	N	n/a	
Naphthalene	0.330	0.149	BH075-005		0.750	Y	N	unrelated to activities at this AOC
Phenanthrene	0 330	0.336	SS057-001		2 600	Y	N	unrelated to activities at this AOC
Pyrene	0.330	0.575	SS057-001		2.100	Y	N	unrelated to activities at this AOC
bis(2-Ethylhexyl)phthalate*	0.330	0.138	BH075-001		0.046	N	n/a	

TABLE 1-1

SIGNIFICANCE ABOVE BACKGROUND

PMU 1 - FLOOD PLAIN
FIRING RANGE (UPR-01-01)
NASA LEWIS RESEARCH CENTER
PHASE I RI/FS

Compound	Background Sample SQL	Background Sample Conc	Release Sample Sample#	Release Sample SQL	Release Sample Conc	Signif.?	Attrib. to Site?	Comments
Metals								
Aluminum		9494	SS-058-001		12500	N	n/a	
Antimony*	12.00	5.793	SS065-001		42.90	Y	Y	potential constituent of spent bullets
Arsenic		13.207	SS060-001		17.60	N	n/a	
Barium		55.013	SS062-001		73.400	N	n/a	
Cadmium		1.043	SS060-001		1.800	N	n/a	
Calcium		4084.8	SS061-001		26800	Y	N	unrelated to activities at this AOC
Chromium		19.48	SS058-001		17.50	N	n/a	
Cobalt		10.833	BH075-005		15.10	N	n/a	
Copper*		28.507	SS066-101		159.00	Y	Y	potential constituent of spent bullets
Iron		23253	SS058-001		28800	N	n/a	
Lead*		34.473	SS066-101		1330	Y	Y	known constituent of spent bullets
Magnesium		3569	SS061-001		13900	Y	Y	potential constituent of spent bullets
Manganese		353.8	SS061-101		498.0	N	n/a	
Mercury	0.1	0.079	BH075-005		0.150	Y	N	facility-wide; @ 10' depth
Nickel		24.147	SS060-001		43.30	N	n/a	
PotaSSium		1418.467	BH075-005		2740	N	n/a	
Selenium	2.00	0.877	SS066-101		1.700	N	n/a	
Vanadium		26.993	SS057-001		45.400	N	n/a	
Zinc		138.18	SS060-001		183.00	N	n/a	

Notes:
mean of background samples collected from shallow flood plain was used as background
all conc's. in ppm nd=0 * J-flagged release sample data blank SQLs imply that Sample Conc. > Sample SQL

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SIGNIFICANCE ABOVE BACKGROUND

PMU 1 - FLOOD PLAIN
FIRING RANGE (UPR-01-01)
NASA LEWIS RESEARCH CENTER
PHASE I RI/FS

Compound	Background Sample SQL	Background Sample Conc	Release Sample Sample#	Release Sample SQL	Release Sample Conc	Signif.?	Attrib. to Site?	Comments
GROUNDWATER								
VOCs								
None Encountered								
SVOCs								
2-Methylnaphthalene*		0.003	GW021-001		0.001	N	n/a	
Phenol*		0.003	GW021-001		0.001	N	n/a	
Metals								
Aluminum, total		24.8	GW021-001		59.9	N	n/a	
Arsenic		0.035	GW021-001		0.04	N	n/a	
Barium, total		0.671	GW021-001		9.350	Y		
Barium, diSSolved		0.338	GW021-001		14.100	Y		
Calcium, total		20.275	GW021-001		398	Y	N	unrelated to activities at this AOC
Calcium, diSSolved		12.848	GW021-001		417	Y	N	unrelated to activities at this AOC
Chromium, total		0.0921	GW021-001		0.126	N	n/a	
Cobalt, total		0.0494	GW021-001		0.0696	N	n/a	
Copper, total		0.1201	GW021-001		0.136	N	n/a	
Iron, total		50.1	GW021-001		105	N	n/a	
Lead, total*		0.0404	GW021-001		0.0752	N	n/a	
Magnesium, total		18.75	GW021-001		139	Y	Y	potential constituent of spent bullets
Magnesium, diSSolved		0	GW021-001		129	Y	Y	potential constituent of spent bullets
Manganese, total*		0.551	GW021-001		0.753	N	n/a	
Manganese, diSSolved		0.053	GW021-001		0.225	Y	Y	potential constituent of spent bullets
Mercury, total*		0.00024	GW021-001		0.00022	N	n/a	
Nickel, total		0.248	GW021-001		0.022	N	n/a	
PotaSSium, total		16.65	GW021-001		54.70	Y		
PotaSSium, diSSolved		6.44	GW021-001		41.90	Y		
Sodium, total		653.3	GW021-001		556.0	N	n/a	
Sodium, diSSolved		603.0	GW021-001		601.0	N	n/a	
Vanadium, total		0.144	GW021-001		0.153	N	n/a	
Zinc		0 289	GW021-001		0.341	N	n/a	

TABLE 1-1

SIGNIFICANCE ABOVE BACKGROUND

PMU 1 - FLOOD PLAIN
FIRING RANGE (UPR-01-01)
NASA LEWIS RESEARCH CENTER
PHASE I RI/FS

Compound	Background Sample		Release Sample			Signif.?	Attrib. to Site?	Comments
	SQL	Conc	Sample#	SQL	Conc			

Notes
average of mk004-001, mk005-001, mk006-001, and mk006-101 was used as background for groundwater data.
all conc's. in ppm nd=0 * J-flagged release sample data blank SQLs imply that Sample Conc > Sample SQL

TA. , 1-1

SIGNIFICANCE ABOVE BACKGROUND

PMU 1 - FLOOD PLAIN
FIRING RANGE (UPR-01-01)
NASA LEWIS RESEARCH CENTER
PHASE I RI/FS

Compound	Background Sample SQL	Background Sample Conc	Release Sample Sample#	Release Sample SQL	Release Sample Conc	Signif.?	Attrib. to Site?	Comments
SURFACE WATER								
VOCs								
None Encountered								
SVOCs								
None Encountered								
Metals								
Iron		0.347	SW051-001		0.341	N	n/a	
Magnesium		13.0	SW051-001		12 80	N	n/a	
Manganese		0.0402	SW051-001		0.0382	N	n/a	
PotaSSium		8.200	SW051-001		8.260	N	n/a	
Sodium		125.000	SW051-001		123 000	N	n/a	

Notes

SW052-001 considered background for surface water data

all conc's. in ppm nd=0 * J-flagged release sample data blank SQLs imply that Sample Conc. > Sample SQL

TABLE 1-1

SIGNIFICANCE ABOVE BACKGROUND

PMU 1 - FLOOD PLAIN
FIRING RANGE (UPR-01-01)
NASA LEWIS RESEARCH CENTER
PHASE I RI/FS

Compound	Background Sample SQL	Background Sample Conc	Release Sample Sample#	Release Sample SQL	Release Sample Conc	Signif.?	Attrib. to Site?	Comments
SEDIMENT								
VOCs								
None Encountered								
SVOCs								
1,4-Dichlorobenzene*		0.110	SD031-001		0.096	N	n/a	
2-Methylnaphthalene*		0.074	SD032-001		0.090	N	n/a	
Benzo(b)fluoranthene		1.100	SD031-001		0.110	N	n/a	
Benzo(ghi)perylene		0.470	SD031-001		0.047	N	n/a	
Chrysene*		0.940	SD031-001		0 110	N	n/a	
Di-n-butylphthalate		1.100	SD031-001		1.200	N	n/a	
Fluoranthene*		1.700	SD031-001		0.270	N	n/a	
Phenanthrene*		0.510	SD031-001		0.130	N	n/a	
Pyrene*		1.400	SD031-001		0.200	N	n/a	
bis(2-Ethylhexyl)phthalate*		0.130	SD031-001		0.110	N	n/a	
Metals								
Aluminum		8240	SD032-001		6720	N	n/a	
Arsenic		12.30	SD031-001		11.60	N	n/a	
Calcium		16600	SD031-001		12100	N	n/a	
Chromium*		15.500	SD031-001		18.100	N	n/a	
Copper		26.70	SD032-001		20.90	N	n/a	
Iron		24800	SD032-001		23600	N	n/a	
Lead		13.20	SD031-001		18.00	N	n/a	
Magnesium*		5530	SD031-001		4370	N	n/a	
Manganese		471	SD032-001		304	N	n/a	
Nickel		30.4	SD031-001		44.6	N	n/a	
PotaSSium		1900	SD031-001		1490	N	n/a	
Vanadium		31.7	SD031-001		26.2	N	n/a	
Zinc		110	SD031-001		103	N	n/a	

Notes

SD033-001 considered background for sediment data

TA 1-1

SIGNIFICANCE ABOVE BACKGROUND

PMU 1 - FLOOD PLAIN
FIRING RANGE (UPR-01-01)
NASA LEWIS RESEARCH CENTER
PHASE I RI/FS

Compound	Background Sample SQL	Background Sample Conc	Release Sample Sample#	Release Sample SQL	Release Sample Conc	Signif.?	Attrib. to Site?	Comments

all conc's. in ppm nd=0 * J-flagged release sample data blank SQLs imply that Sample Conc. > Sample SQL

PMU 2

Record Information

1. Site Name: NASA LeRC PMU 2 - Industrial Waste System
   (as entered in CERCLIS)

2. Site CERCLIS Number:

3. Site Reviewer: K W Valek / R C Callahan / Chilin Sivaprakash

4. Date: 11/20

5. Site Location: Cleveland/Cuyahoga/OH
   (City/County,State)

6. Congressional District:

7. Site Coordinates: Multiple

   Latitude: 41 24'45.0" Longitude: 81

Site Description

1. Setting: Urban

2. Current Owner: Federal

3. Current Site Status: Active

4. Years of Operation: Active Site , from and to dates: Since 1941

5. How Initially Identified: Other - Preliminary Assessment

6. Entity Responsible for Waste Generation:

   - Federal Facility
   - Other

7. Site Activities/Waste Deposition:

   - Surface Impoundment
   - Discharge to Sewer/Surface Water

Waste Description

8. Wastes Deposited or Detected Onsite:

- Organic Chemicals
- Inorganic Chemicals
- Laboratory/Hospital Waste
- Metals

Response Actions

9. Response/Removal Actions:

RCRA Information

10. For All Active Facilities, RCRA Site Status:

- Not Applicable

Demographic Information

11. Workers Present Onsite: Yes

12. Distance to Nearest Non-Worker Individual: > 1/4 - 1/2 Mile

13. Residential Population Within 1 Mile: 4000.0

14. Residential Population Within 4 Miles: 10000.0

Water Use Information

15. Local Drinking Water Supply Source:

- Ground Water (within 4 mile distance limit)
- Surface Water (within 15 mile distance limit)

16. Total Population Served by Local Drinking Water Supply Source: 1500000.

17. Drinking Water Supply System Type for Local Drinking

Water Supply Sources:

- Municipal (Services over 25 People)

18. Surface Water Adjacent to/Draining Site:

- River

HRS DOCUMENTATION RECORD

NASA LeRC PMU 2 - Industrial Waste System - 11/22/95

1. Site Name: NASA LeRC PMU 2 - Industrial Waste System
   (as entered in CERCLIS)

2. Site CERCLIS Number:

3. Site Reviewer: K W Valek / R C Callahan / Chilin Sivaprakash

4. Date: 11/20

5. Site Location: Cleveland/Cuyahoga/OH
   (City/County,State)

6. Congressional District:

7. Site Coordinates: Multiple

   Latitude: 41 24'45.0" Longitude: 81

	Score
Ground Water Migration Pathway Score (Sgw)	0.86
Surface Water Migration Pathway Score (Ssw)	1.40
Soil Exposure Pathway Score (Ss)	0.00
Air Migration Pathway Score (Sa)	0.00

Site Score	0.82

NOTE

EPA uses the terms "facility," "site," and "release" interchangeably. The term "facility" is broadly defined in CERCLA to include any area where hazardous substances have "come to be located" (CERCLA Section 109(9)), and the listing process is not intended to define or reflect boundaries of such facilities or releases. Site names, and references to specific parcels or properties, are provided for general identification purposes only. Knowledge regarding the extent of sites will be refined as more information is developed during the RI/FS and even during implementation of the remedy.

GROUND WATER MIGRATION PATHWAY SCORESHEET
NASA LeRC PMU 2 - Industrial Waste System - 11/22/95

GROUND WATER MIGRATION PATHWAY Factor Categories & Factors	Maximum Value	Value Assigned
Likelihood of Release to an Aquifer Aquifer: Shale Bedrock Aquife		
1. Observed Release	550	0
2. Potential to Release		
2a. Containment	10	10
2b. Net Precipitation	10	3
2c. Depth to Aquifer	5	3
2d. Travel Time	35	15
2e. Potential to Release [lines 2a(2b+2c+2d)]	500	210
3. Likelihood of Release	550	210
Waste Characteristics		
4. Toxicity/Mobility	*	2.00E+03
5. Hazardous Waste Quantity	*	10000
6. Waste Characteristics	100	56
Targets		
7. Nearest Well	50	5.00E+00
8. Population		
8a. Level I Concentrations	**	0.00E+00
8b. Level II Concentrations	**	0.00E+00
8c. Potential Contamination	**	1.00E+00
8d. Population (lines 8a+8b+8c)	**	1.00E+00
9. Resources	5	0.00E+00
10. Wellhead Protection Area	20	0.00E+00
11. Targets (lines 7+8d+9+10)	**	6.00E+00
12. Targets (including overlaying aquifers)	**	6.00E+00
13. Aquifer Score	100	0.86
GROUND WATER MIGRATION PATHWAY SCORE (Sgw)	100	0.86

* Maximum value applies to waste characteristics category.
** Maximum value not applicable.

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORESHEET
NASA LeRC PMU 2 - Industrial Waste System - 11/22/95

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT Factor Categories & Factors DRINKING WATER THREAT	Maximum Value	Value Assigned
Likelihood of Release		
1. Observed Release	550	0
2. Potential to Release by Overland Flow		
2a. Containment	10	9
2b. Runoff	25	1
2c. Distance to Surface Water	25	16
2d. Potential to Release by Overland Flow [lines 2a(2b+2c)]	500	153
3. Potential to Release by Flood		
3a. Containment (Flood)	10	0
3b. Flood Frequency	50	0
3c. Potential to Release by Flood (lines 3a x 3b)	500	0
4. Potential to Release (lines 2d+3c)	500	153
5. Likelihood of Release	550	153
Waste Characteristics		
6. Toxicity/Persistence	*	1.00E+04
7. Hazardous Waste Quantity	*	10000
8. Waste Characteristics	100	100
Targets		
9. Nearest Intake	50	0.00E+00
10. Population		
10a. Level I Concentrations	**	0.00E+00
10b. Level II Concentrations	**	0.00E+00
10c. Potential Contamination	**	2.00E+00
10d. Population (lines 10a+10b+10c)	**	2.00E+00
11. Resources	5	5.00E+00
12. Targets (lines 9+10d+11)	**	7.00E+00
13. DRINKING WATER THREAT SCORE	100	1.30

* Maximum value applies to waste characteristics category.
** Maximum value not applicable.

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORESHEET
NASA LeRC PMU 2 - Industrial Waste System - 11/22/95

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT Factor Categories & Factors HUMAN FOOD CHAIN THREAT	Maximum Value	Value Assigned
Likelihood of Release		
14. Likelihood of Release (same as line 5)	550	153
Waste Characteristics		
15. Toxicity/Persistence/Bioaccumulation	*	5.00E+08
16. Hazardous Waste Quantity	*	10000
17. Waste Characteristics	1000	1000
Targets		
18. Food Chain Individual	50	0.00E+00
19. Population		
19a. Level I Concentrations	**	0.00E+00
19b. Level II Concentrations	**	0.00E+00
19c. Pot. Human Food Chain Contamination	**	3.31E-03
19d. Population (lines 19a+19b+19c)	**	3.31E-03
20. Targets (lines 18+19d)	**	3.31E-03
21. HUMAN FOOD CHAIN THREAT SCORE	100	0.01

* Maximum value applies to waste characteristics category.
** Maximum value not applicable.

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORESHEET
NASA LeRC PMU 2 - Industrial Waste System - 11/22/95

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT Factor Categories & Factors ENVIRONMENTAL THREAT	Maximum Value	Value Assigned
Likelihood of Release		
22. Likelihood of Release (same as line 5)	550	153
Waste Characteristics		
23. Ecosystem Toxicity/Persistence/Bioacc.	*	5.00E+08
24. Hazardous Waste Quantity	*	10000
25. Waste Characteristics	1000	1000
Targets		
26. Sensitive Environments		
26a. Level I Concentrations	**	0.00E+00
26b. Level II Concentrations	**	0.00E+00
26c. Potential Contamination	**	5.00E-02
26d. Sensitive Environments (lines 26a+26b+26c)	**	5.00E-02
27. Targets (line 26d)	**	5.00E-02
28. ENVIRONMENTAL THREAT SCORE	60	0.09
29. WATERSHED SCORE	100	1.40
30. SW: OVERLAND/FLOOD COMPONENT SCORE (Sof)	100	1.40

* Maximum value applies to waste characteristics category.
** Maximum value not applicable.

GROUND WATER TO SURFACE WATER MIGRATION COMPONENT SCORESHEET
NASA LeRC PMU 2 - Industrial Waste System - 11/22/95

GROUND WATER TO SURFACE WATER MIGRATION COMPONENT Factor Categories & Factors DRINKING WATER THREAT	Maximum Value	Value Assigned
Likelihood of Release to Aquifer Aquifer: Shale Bedrock Aquife		
1. Observed Release	550	0
2. Potential to Release		
2a. Containment	10	10
2b. Net Precipitation	10	3
2c. Depth to Aquifer	5	3
2d. Travel Time	35	15
2e. Potential to Release [lines 2a(2b+2c+2d)]	500	210
3. Likelihood of Release	550	210
Waste Characteristics		
4. Toxicity/Mobility/Persistence	*	2.00E+03
5. Hazardous Waste Quantity	*	10000
6. Waste Characteristics	100	56
Targets		
7. Nearest Intake	50	0.00E+00
8. Population		
8a. Level I Concentrations	**	0.00E+00
8b. Level II Concentrations	**	0.00E+00
8c. Potential Contamination	**	0.00E+00
8d. Population (lines 8a+8b+8c)	**	0.00E+00
9. Resources	5	5.00E+00
10. Targets (lines 7+8d+9)	**	5.00E+00
11. DRINKING WATER THREAT SCORE	100	0.71

* Maximum value applies to waste characteristics category.
** Maximum value not applicable.

GROUND WATER TO SURFACE WATER MIGRATION COMPONENT SCORESHEET
NASA LeRC PMU 2 - Industrial Waste System - 11/22/95

GROUND WATER TO SURFACE WATER MIGRATION COMPONENT Factor Categories & Factors HUMAN FOOD CHAIN THREAT	Maximum Value	Value Assigned
Likelihood of Release		
12. Likelihood of Release (same as line 3)	550	210
Waste Characteristics		
13. Toxicity/Mobility/Persistence/Bioacc.	*	1.00E+07
14. Hazardous Waste Quantity	*	10000
15. Waste Characteristics	1000	560
Targets		
16. Food Chain Individual	50	0.00E+00
17. Population		
17a. Level I Concentrations	**	0.00E+00
17b. Level II Concentrations	**	0.00E+00
17c. Pot. Human Food Chain Contamination	**	0.00E+00
17d. Population (lines 17a+17b+17c)	**	0.00E+00
18. Targets (lines 16+17d)	**	0.00E+00
19. HUMAN FOOD CHAIN THREAT SCORE	100	0.00

* Maximum value applies to waste characteristics category.
** Maximum value not applicable.

GROUND WATER TO SURFACE WATER MIGRATION COMPONENT SCORESHEET
NASA LeRC PMU 2 - Industrial Waste System - 11/22/95

GROUND WATER TO SURFACE WATER MIGRATION COMPONENT Factor Categories & Factors ENVIRONMENTAL THREAT	Maximum Value	Value Assigned
Likelihood of Release		
20. Likelihood of Release (same as line 3)	550	210
Waste Characteristics		
21. Ecosystem Tox./Mobility/Persist./Bioacc.	*	1.00E+06
22. Hazardous Waste Quantity	*	10000
23. Waste Characteristics	1000	320
Targets		
24. Sensitive Environments		
24a. Level I Concentrations	**	0.00E+00
24b. Level II Concentrations	**	0.00E+00
24c. Potential Contamination	**	0.00E+00
24d. Sensitive Environments (lines 24a+24b+24c)	**	0.00E+00
25. Targets (line 24d)	**	0.00E+00
26. ENVIRONMENTAL THREAT SCORE	60	0.00
27. WATERSHED SCORE	100	0.71
28. SW: GW to SW COMPONENT SCORE (Sgs)	100	0.71

* Maximum value applies to waste characteristics category.
** Maximum value not applicable.

SOIL EXPOSURE PATHWAY SCORESHEET
NASA LeRC PMU 2 - Industrial Waste System - 11/22/95

SOIL EXPOSURE PATHWAY Factor Categories & Factors RESIDENT POPULATION THREAT	Maximum Value	Value Assigned
Likelihood of Exposure		
1. Likelihood of Exposure	550	0
Waste Characteristics		
2. Toxicity	*	0.00E+00
3. Hazardous Waste Quantity	*	0
4. Waste Characteristics	100	0
Targets		
5. Resident Individual	50	0.00E+00
6. Resident Population		
6a. Level I Concentrations	**	0.00E+00
6b. Level II Concentrations	**	0.00E+00
6c. Resident Population (lines 6a+6b)	**	0.00E+00
7. Workers	15	0.00E+00
8. Resources	5	0.00E+00
9. Terrestrial Sensitive Environments	***	0.00E+00
10. Targets (lines 5+6c+7+8+9)	**	0.00E+00
11. RESIDENT POPULATION THREAT SCORE	**	0.00E+00

* Maximum value applies to waste characteristics category.
** Maximum value not applicable.
*** No specific maximum value applies, see HRS for details.

SOIL EXPOSURE PATHWAY SCORESHEET
NASA LeRC PMU 2 - Industrial Waste System - 11/22/95

SOIL EXPOSURE PATHWAY Factor Categories & Factors NEARBY POPULATION THREAT	Maximum Value	Value Assigned
Likelihood of Exposure		
12. Attractiveness/Accessibility	100	0.00E+00
13. Area of Contamination	100	0.00E+00
14. Likelihood of Exposure	500	0.00E+00
Waste Characteristics		
15. Toxicity	*	0.00E+00
16. Hazardous Waste Quantity	*	0
17. Waste Characteristics	100	0
Targets		
18. Nearby Individual	1	1.00E+00
19. Population Within 1 Mile	**	3.00E+01
20. Targets (lines 18+19)	**	3.10E+01
21. NEARBY POPULATION THREAT SCORE	**	0.00E+00
SOIL EXPOSURE PATHWAY SCORE (Ss)	100	0.00

* Maximum value applies to waste characteristics category.
** Maximum value not applicable.

AIR PATHWAY SCORESHEET

NASA LeRC PMU 2 - Industrial Waste System - 11/22/95

AIR MIGRATION PATHWAY Factor Categories & Factors	Maximum Value	Value Assigned
Likelihood of Release		
1. Observed Release	550	0
2. Potential to Release		
2a. Gas Potential to Release	500	0
2b. Particulate Potential to Release	500	0
2c. Potential to Release	500	0
3. Likelihood of Release	550	0
Waste Characteristics		
4. Toxicity/Mobility	*	0.00E+00
5. Hazardous Waste Quantity	*	0
6. Waste Characteristics	100	0
Targets		
7. Nearest Individual	50	2.00E+01
8. Population		
8a. Level I Concentrations	**	0.00E+00
8b. Level II Concentrations	**	0.00E+00
8c. Potential Contamination	**	7.93E+02
8d. Population (lines 8a+8b+8c)	**	7.93E+02
9. Resources	5	0.00E+00
10. Sensitive Environments		
10a. Actual Contamination	***	0.00E+00
10b. Potential Contamination	***	0.00E+00
10c. Sens. Environments(lines 10a+10b)	***	0.00E+00
11. Targets (lines 7+8d+9+10c)	**	8.13E+02
AIR MIGRATION PATHWAY SCORE (Sa)	100	0.00E+00

* Maximum value applies to waste characteristics category.
** Maximum value not applicable.
*** No specific maximum value applies, see HRS for details.

1. WASTESTREAM QUANTITY SUMMARY TABLE, SOURCE: Ind. Waste System

a. Wastestream ID	Contam Soil
b. Hazardous Constituent Quantity (C) (lbs.)	0.00
c. Data Complete?	NO
d. Hazardous Wastestream Quantity (W) (lbs.)	0.00
e. Data Complete?	NO
f. Wastestream Quantity Value (W/5,000)	0.00E+00

Documentation for Constituents:

No soil samples collected for chemical analysis in vicinity of IWS basins/separator pits.

Reference: 2,3

Documentation for Wastestream Quantity:

No documented contaminated soil attributable to IWS. no soil samples collected for chemical analysis to address IWS.

Reference:

WASTE QUANTITY

NASA LeRC PMU 2 - Industrial Waste System - 11/22/95

a. Wastestream ID	Contam Sediment
b. Hazardous Constituent Quantity (C) (lbs.)	15891.48
c. Data Complete?	NO
d. Hazardous Wastestream Quantity (W) (lbs.)	1362000.00
e. Data Complete?	NO
f. Wastestream Quantity Value (W/5,000)	2.72E+02

Wastestream Constituent Hazardous Substances	Concent.	Units	Liquid	Qualifier
Acenaphthene	8.1E+00	ppm	NO	J
Anthracene	1.4E+01	ppm	NO	J
Antimony	2.6E+01	ppm	NO	J
Benz(a)anthracene	1.1E+02	ppm	NO	J
Benzo(a)pyrene	9.4E+01	ppm	NO	J
Benzo(g,h,i)perylene	4.0E+01	ppm	NO	J
Benzo(j,k)fluorene	3.6E+02	ppm	NO	J
Benzo(k)fluoranthene	7.5E+01	ppm	NO	J
Benzofluoranthene, 3,4-	1.8E+02	ppm	NO	J
Bis (2-ethylhexyl) phthalate	5.7E+01	ppm	NO	J
Cadmium	9.3E+00	ppm	NO	J
Chromium	4.7E+02	ppm	NO	J
Chrysene	1.7E+02	ppm	NO	J
Copper	2.4E+03	ppm	NO	J
Cyanide	3.7E+01	ppm	NO	J
DDE	1.3E-02	ppm	NO	J
DDT	4.7E-03	ppm	NO	J
Dichloroethene, 1,1-	2.6E-01	ppm	NO	
Endrin	3.4E-02	ppm	NO	J
Fluorene	1.3E+01	ppm	NO	J
Heptachlor	2.9E-03	ppm	NO	J
Heptachlor epoxide	6.1E-02	ppm	NO	J
Hexachlorocyclohexane, delta-	2.6E-02	ppm	NO	J
Indeno(1,2,3-CD)pyrene	7.4E+01	ppm	NO	J
Lead	7.6E+02	ppm	NO	J
Mercury	7.1E+01	ppm	NO	J
Methyl Napthalene, 2-	1.4E+01	ppm	NO	J
Methylene chloride	3.7E-02	ppm	NO	J
Nickel	1.3E+02	ppm	NO	J
Phenanthrene	1.9E+02	ppm	NO	J
Pyrene	2.8E+02	ppm	NO	J
Selenium	1.7E+00	ppm	NO	J
Silver	6.8E+02	ppm	NO	J
Toluene	3.1E+00	ppm	NO	J

Trichloroethylene	3.9E-02	ppm	NO	J
Xylene, m-	7.6E-02	ppm	NO	J
Zinc	5.4E+03	ppm	NO	J

Documentation for Constituents:

See Tables 5-11 and 5-13 of the RI/FS Report and Tables 2-1, and 2-2 of the HRS Report.

Reference: 2,3

Documentation for Wastestream Quantity:

Basins = approximately 18,000 sq ft
Assume 1 ft sediment

681 cu yd

Reference:

a. Wastestream ID	Contam waters
b. Hazardous Constituent Quantity (C) (lbs.)	4051.27
c. Data Complete?	NO
d. Hazardous Wastestream Quantity (W) (lbs.)	5060000.00
e. Data Complete?	NO
f. Wastestream Quantity Value (W/5,000)	1.01E+03

Wastestream Constituent Hazardous Substances	Concent.	Units	Liquid	Qualifier
Acenaphthene	7.0E-03	ppm	NO	J
Aluminum	2.6E+01	ppm	NO	
Anthracene	7.0E-03	ppm	NO	J

Benz(a)anthracene	2.5E-02	ppm	NO	J
Benzo(a)pyrene	7.0E-03	ppm	NO	J
Benzo(g,h,i)perylene	3.0E-03	ppm	NO	J
Benzo(k)fluoranthene	1.1E-02	ppm	NO	J
Benzofluoranthene, 3,4-	3.3E-02	ppm	NO	J
Cadmium	1.5E-02	ppm	NO	
Chromium	5.7E-01	ppm	NO	
Cobalt	4.6E-02	ppm	NO	#
Copper	4.1E+00	ppm	NO	
Di-n-butyl phthalate	1.0E-03	ppm	NO	J
Di-n-octyl phthalate	2.0E-03	ppm	NO	J
Dibenz(a,h)anthracene	3.0E-03	ppm	NO	J
Dibenzofuran	5.0E-03	ppm	NO	J
Dibromochloromethane	2.4E-02	ppm	NO	J
Dinitrophenol, 2,4-	2.5E-02	ppm	NO	J
Fluorene	1.1E-02	ppm	NO	J
Indeno(1,2,3-CD)pyrene	4.0E-03	ppm	NO	J
Iron	1.1E+02	ppm	NO	
Lead	4.5E-01	ppm	NO	
Magnesium	3.8E+01	ppm	NO	
Manganese	1.1E+00	ppm	NO	
Mercury	6.0E-03	ppm	NO	
Methyl Napthalene, 2-	2.0E-03	ppm	NO	J
Naphthalene	3.0E-03	ppm	NO	J
Nitrophenol, 4-	2.5E-02	ppm	NO	J
Pentachlorophenol	2.5E-02	ppm	NO	J
Phenanthrene	5.8E-02	ppm	NO	
Pyrene	2.5E-02	ppm	NO	
Silver	6.2E+02	ppm	NO	
Vanadium	5.4E-02	ppm	NO	

Documentation for Constituents:

See Tables 5-9, 5-10, 5-11, and 5-13 of RI/FS Report for analytical data and Tables 2-1, 2-2 for concentrations significantly above background.

Reference: 2,3

Documentation for Wastestream Quantity:

Capacity of the basins range from 800,000 to 1,000,000 gallons. Oil/water separator system have capacities ranging from 535 to 11800 gallons. See sections 4.2.3 and 4.2.4 of the RI/FS Report.

Volume estimated to be 500,000 gallons (IWS Basins) plus the oil water separators with an estimated 6000 gallons.

Reference: 2

2. SOURCE HAZARDOUS WASTE QUANTITY FACTOR TABLE

a. Source ID	Ind. Waste System	
b. Source Type	Surface Impoundment	
c. Secondary Source Type	N.A.	
d. Source Vol.(yd3/gal) | Source Area (ft2)	0.00	36800.00
e. Source Volume/Area Value	2.83E+03	
f. Source Hazardous Constituent Quantity (HCQ) Value (sum of 1b)	1.99E+04	
g. Data Complete?	NO	
h. Source Hazardous Wastestream Quantity (WSQ) Value (sum of 1f)	1.28E+03	
i. Data Complete?	NO	
k. Source Hazardous Waste Quantity (HWQ) Value (2e, 2f, or 2h)	1.99E+04	

Documentation for Source Type:

IWS basins and oil/water separator pits.

Reference:

Documentation for Source Hazardous Substances:

No soil samples collected for chemical analysis in vicinity of IWS.

Reference: 2,3

Documentation for Source Area:

Area measured from Figure 4-1 of the RI/FS Report. Area of IWS basins doubled to account for area of O/W separator pits.

Reference: 2

3. SITE HAZARDOUS WASTE QUANTITY SUMMARY

No.	Source ID	Migration Pathways	Vol. or Area Value (2e)	Constituent or Wastestream Value (2f,2h)	Hazardous Waste Qty. Value (2k)
1	Ind. Waste System	GW-SW	2.83E+03	1.99E+04	1.99E+04

4. PATHWAY HAZARDOUS WASTE QUANTITY AND WASTE CHARACTERISTICS SUMMARY TABLE

Migration Pathway	Contaminant Values		HWQVs*	WCVs**
Ground Water	Toxicity/Mobility	2.00E+03	10000	56
SW: Overland Flow, DW	Tox./Persistence	1.00E+04	10000	100
SW: Overland Flow, HFC	Tox./Persis./Bioacc.	5.00E+08	10000	1000
SW: Overland Flow, Env	Etox./Persis./Bioacc.	5.00E+08	10000	1000
SW: GW to SW, DW	Tox./Persistence	2.00E+03	10000	56
SW: GW to SW, HFC	Tox./Persis./Bioacc.	1.00E+07	10000	560
SW: GW to SW, Env	Etox./Persis./Bioacc.	1.00E+06	10000	320
Soil Exposure:Resident	Toxicity	0.00E+00	0	0
Soil Exposure: Nearby	Toxicity	0.00E+00	0	0
Air	Toxicity/Mobility	0.00E+00	0	0

* Hazardous Waste Quantity Factor Values
** Waste Characteristics Factor Category Values

Note: SW = Surface Water
GW = Ground Water
DW = Drinking Water Threat
HFC = Human Food Chain Threat
Env = Environmental Threat

GROUND WATER PATHWAY AQUIFER SUMMARY

NASA LeRC PMU 2 - Industrial Waste System - 11/22/95

No.	Aquifer ID	Type	Overlaying No.	Inter-Connected with	Likelihood of Release	Targets
1	Shale Bedrock Aquife	Non K	0	0	210	6.00E+00

Containment

No.	Source ID	HWQ Value	Containment Value
1	Ind. Waste System	1.99E+04	10

Containment Factor 10

Documentation for Ground Water Containment, Source Ind. Waste System:

Leakages from system pits and basins are suspected to have occurred. See Section 4.2 of the RI/FS Report

Reference: 2

Net Precipitation

Net Precipitation (inches) N.A.

Aquifer: Shale Bedrock Aquifer

Type of Aquifer: Non Karst

Overlaying Aquifer: 0

Interconnected with: 0

Documentation for Shale Bedrock Aquifer Aquifer:

Lithological information included in the Drilling Logs (Appendix C, of the RI/FS Report) indicate that shale is the bedrock. Other aquifers are perched water zones which are thin, seasonal, and laterally discontinuous and are not significant for HRS Purposes.

Reference: 2

OBSERVED RELEASE

No.	Well ID	Well Type	Distance (miles)	Level of Contamination

- N/A and/or data not specified

==========

Observed Release Factor 0

Documentation for Well 02-MW001:

See Table 2-2 and Figure 4-1 of the RI/FS Report for monitoring well information and location. None of the compounds detected are considered "significant".
Distances are estimated to be within 0.25 mile radius from each other and from contaminatin source

Reference: 2

POTENTIAL TO RELEASE

Containment

Containment Factor	10	

Net Precipitation

Net Precipitation Factor	3	

Depth to Aquifer

A. Depth of Hazardous Substances	10.00	feet

Documentation for Depth of Hazardous Substances:

No actual soil sample data for AOCs.

Reference: 3

B. Depth to Aquifer from Surface	45.00	feet

Documentation for Depth to Aquifer from Surface :

Drilling logs included in Appendix C of the RI/FS Report indicate that bedrock shale occurs at varying depths within this Area, ranging from 22' (bh073) to 50' (bh072), to 64' (bh074). Depth averaged to 45 feet. Soil materials consist of clay and silty clay.

Reference: 2

C. Depth to Aquifer (B - A)	35.00	feet

Depth to Aquifer Factor	3	

Travel Time

Are All Layers Karst?	NO	
Thickness of Layer(s) with Lowest Conductivity	35.00	feet

Documentation for Thickness of Layers with Lowest Conductivity:

Drilling logs included in Appendix C of RI/FS indiate the top layers to be silt, clay, silty clay which extend to varying depths to 22, 50 and 64 feet in the boreholes. Thickness of these layers averaged to 45 feet.

Reference: 2

Hydraulic Conductivity (cm/sec)	1.0E-06

Documentation for Hydraulic Conductivity:

See Table 3-6 of the HRS Guidance Manual.

Reference: 1

Travel Time Factor	15

==========

Potential to Release Factor 210

Source: 1 Ind. Waste System

Source Hazardous Waste Quantity Value: 19942.75

Hazardous Substance	Toxicity Value	Mobility Value	Toxicity/ Mobility Value
Acenaphthene	10	2.00E-03	2.00E-02
Aluminum	100	2.00E-05	2.00E-03
Anthracene	10	2.00E-07	2.00E-06
Antimony	10000	1.00E-02	1.00E+02
Benz(a)anthracene	1000	2.00E-09	2.00E-06
Benzo(a)pyrene	10000	2.00E-09	2.00E-05
Benzo(g,h,i)perylene	100	2.00E-09	2.00E-07
Benzo(j,k)fluorene	100	2.00E-07	2.00E-05
Benzo(k)fluoranthene	100	2.00E-09	2.00E-07
Benzofluoranthene, 3,4-	10000	2.00E-09	2.00E-05
Bis (2-ethylhexyl) phthalate	100	2.00E-07	2.00E-05
Cadmium	10000	2.00E-01	2.00E+03
Chromium	10000	1.00E-02	1.00E+02
Chrysene	100	2.00E-09	2.00E-07
Cobalt	1	1.00E-02	1.00E-02
Copper	100	1.00E-02	1.00E+00
Cyanide	100	2.00E-05	2.00E-03
DDE	100	2.00E-07	2.00E-05
DDT	1000	2.00E-07	2.00E-04
Di-n-butyl phthalate	10	2.00E-03	2.00E-02
Di-n-octyl phthalate	100	2.00E-07	2.00E-05
Dibenz(a,h)anthracene	100	2.00E-09	2.00E-07
Dibenzofuran	100	2.00E-05	2.00E-03
Dibromochloromethane	100	1.00E-02	1.00E+00
Dichloroethene, 1,1-	100	1.00E-02	1.00E+00
Dinitrophenol, 2,4-	1000	1.00E+00	1.00E+03
Endrin	10000	2.00E-03	2.00E+01
Fluorene	100	2.00E-03	2.00E-01
Heptachlor	1000	2.00E-05	2.00E-02
Heptachlor epoxide	10000	2.00E-03	2.00E+01
Hexachlorocyclohexane, delta-	1	2.00E-03	2.00E-03
Indeno(1,2,3-CD)pyrene	100	2.00E-09	2.00E-07
Iron	100	1.00E-02	1.00E+00
Lead	10000	2.00E-05	2.00E-01
Magnesium	100	2.00E-05	2.00E-03
Manganese	10000	1.00E-02	1.00E+02
Mercury	10000	2.00E-05	2.00E-01
Methyl Napthalene, 2-	100	2.00E-03	2.00E-01
Methylene chloride	10	1.00E+00	1.00E+01
Naphthalene	1	2.00E-03	2.00E-03
Nickel	100	2.00E-05	2.00E-03

Nitrophenol, 4-	1	1.00E+00	1.00E+00
Pentachlorophenol	100	1.00E-02	1.00E+00
Phenanthrene	100	2.00E-05	2.00E-03
Pyrene	100	2.00E-09	2.00E-07
Selenium	100	1.00E-02	1.00E+00
Silver	100	2.00E-07	2.00E-05
Toluene	10	1.00E-02	1.00E-01
Trichloroethylene	10	1.00E-02	1.00E-01
Vanadium	100	2.00E-07	2.00E-05
Xylene, m-	1	1.00E-02	1.00E-02
Zinc	10	2.00E-03	2.00E-02

Hazardous Substances Found in an Observed Release

Well No.	Observed Release Hazardous Substance	Toxicity Value	Mobility Value	Toxicity/ Mobility Value

- N/A and/or data not specified

Toxicity/Mobility Value from Source Hazardous Substances:	2.00E+03
Toxicity/Mobility Value from Observed Release Hazardous Substances:	0.00E+00
Toxicity/Mobility Factor:	2.00E+03
Sum of Source Hazardous Waste Quantity Values:	1.99E+04
Hazardous Waste Quantity Factor:	10000
Waste Characteristics Factor Category:	56

Population by Well

No.	Well ID	Sample Type	Distance (miles)	Level of Contamination	Population

- N/A and/or data not specified

Level I Population Factor: 0.00

Level II Population Factor: 0.00

Potential Contamination by Distance Category

Distance Category (miles)	Population	Value
> 0 to 1/4	0.0	0.00E+00
> 1/4 to 1/2	0.0	0.00E+00
> 1/2 to 1	0.0	0.00E+00
> 1 to 2	50.0	1.00E+00
> 2 to 3	0.0	0.00E+00
> 3 to 4	0.0	0.00E+00

Potential Contamination Factor: 1.000

Nearest Well

Level of Contamination: Potential
Distance in miles: 1.50

Nearest Well Factor: 5.00E+00

Documentation for Nearest Well:

The closest water well on record with the Ohio Division of Water is located 1/4 mile west of LeRC site boundary on Cleveland Hopkins International Airport property. This is inactive. Only 7 permitted drinking water wells were identified within 4 miles of LeRC. These wells are located between 1.5 and 3 miles south and southeast of LeRC and serve an estimated 50 individuals. See Section 3.3 and 3.8.2 of RI/FS Report.

Reference: 2

Resources

Resource Use: NO

Resource Factor: 0.00E+00

Documentation for Resources:

Groundwater is not a primary drinking source in this area. See Section 3.3 of the RI/FS Report.

Reference: 2

Wellhead Protection Area

No wellhead protection area

Wellhead Protection Area Factor: 0.00E+00

Documentation for Wellhead Protection Area:

Wellhead criteria specified in Section 3.3.4 of the HRS Guidance Manual does not apply.

Reference: 1

SURFACE WATER PATHWAY SEGMENT SUMMARY

NASA LeRC PMU 2 - Industrial Waste System - 11/22/95

No.	Segment ID	Segment Type	Water Type	Start Point (mi)	End Point (mi)	Average Flow (cfs)
1	Rocky River	River	Fresh	0.00	9.70	112
2	Lake Erie	Moderate D	Fresh	9.70	15.00	N.A.

Documentation for segment: Rocky River:

IWS system has outfall located northwest of IWS basins which discharges into small tributary of Rocky River. Lake Erie is located 9.2 miles from facility boundary. Flow based on average of flow values provided by Table 3-3 of Phase I RI/FS.

Reference:

OBSERVED RELEASE

No.	Sample ID	Sample Type	Distance (miles)	Level of Contamination DW	HFC	Env

- N/A and/or data not specified

==========

Observed Release Factor 0

Documentation for Observed Release, Sample :

No testing of fish tissues conducted.

Reference:

POTENTIAL TO RELEASE

Potential to Release by Overland Flow

Containment

No.	Source ID	HWQ Value	Containment Value
1	Ind. Waste System	1.99E+04	9

Containment Factor: 9

Documentation for Overland Flow Containment, Source Ind. Waste System:

Containment Value assigned from Table 4-2 of the HRS Guidance Manual
No liner.

Reference: 1,2

Distance to Surface Water

Distance to Surface Water:	600.0 feet
Distance to Surface Water Factor:	16

Documentation for Distance to Surface Water:

IWS outfall empties into minor tributary which is in direct contact with Rocky River.

Reference:

Runoff

A. Drainage Area:	0.0 acres

Documentation for Drainage Area:

System not connected to storm drains. Only IWS basins exposed to precipitation, but not drainage.

Reference:

B. 2-year, 24-hour Rainfall:	2.8 inches

Documentation for Rainfall:

See Section 3.5 of the RI/FS Report for precipitation information

Reference: 2

C. Soil Group: D
Fine-textured soils with very low infiltration rates

Documentation for Soil Group:

Drilling logs included in Appendix C indicate the soils to be predominantly fine textured clay and silty clay

Reference: 2

Runoff Factor: 1

==========

Potential to Release by Overland Flow Factor: 153

Potential to Release by Flood

No.	Source ID	HWQ Value	Flood Containment Value	Flood Frequency Value	Potential to Release by Flood

- N/A and/or data not specified

==========

Potential to Release by Flood Factor: 0

Documentation for Flood Containment, Source Ind. Waste System:

See Section 3.4 of Phase I RI/FS Report.

Reference: 2

Documentation for Flood Frequency, Source Ind. Waste System:

See Section 3.4 of the RI/FS Report

Reference:

Source: 1 Ind. Waste System

Source Hazardous Waste Quantity Value: 19942.75

Hazardous Substance	Toxicity Value	Persistence Value	Toxicity/ Persistence Value
Acenaphthene	10	4.00E-01	4.00E+00
Aluminum	0	1.00E+00	0.00E+00
Anthracene	10	4.00E-01	4.00E+00
Antimony	10000	1.00E+00	1.00E+04
Benz(a)anthracene	1000	1.00E+00	1.00E+03
Benzo(a)pyrene	10000	1.00E+00	1.00E+04
Benzo(g,h,i)perylene	0	1.00E+00	0.00E+00
Benzo(j,k)fluorene	100	1.00E+00	1.00E+02
Benzo(k)fluoranthene	0	1.00E+00	0.00E+00
Benzofluoranthene, 3,4-	10000	1.00E+00	1.00E+04
Bis (2-ethylhexyl) phthalate	100	1.00E+00	1.00E+02
Cadmium	10000	1.00E+00	1.00E+04
Chromium	10000	1.00E+00	1.00E+04
Chrysene	0	1.00E+00	0.00E+00
Cobalt	1	1.00E+00	1.00E+00
Copper	0	1.00E+00	0.00E+00
Cyanide	100	4.00E-01	4.00E+01
DDE	100	1.00E+00	1.00E+02
DDT	1000	1.00E+00	1.00E+03
Di-n-butyl phthalate	10	1.00E+00	1.00E+01
Di-n-octyl phthalate	100	1.00E+00	1.00E+02
Dibenz(a,h)anthracene	0	1.00E+00	0.00E+00
Dibenzofuran	0	1.00E+00	0.00E+00
Dibromochloromethane	100	4.00E-01	4.00E+01
Dichloroethene, 1,1-	100	4.00E-01	4.00E+01
Dinitrophenol, 2,4-	1000	1.00E+00	1.00E+03
Endrin	10000	1.00E+00	1.00E+04
Fluorene	100	1.00E+00	1.00E+02
Heptachlor	1000	4.00E-01	4.00E+02
Heptachlor epoxide	10000	1.00E+00	1.00E+04
Hexachlorocyclohexane, delta-	1	1.00E+00	1.00E+00
Indeno(1,2,3-CD)pyrene	0	1.00E+00	0.00E+00
Iron	0	1.00E+00	0.00E+00
Lead	10000	1.00E+00	1.00E+04
Magnesium	0	1.00E+00	0.00E+00
Manganese	10000	1.00E+00	1.00E+04
Mercury	10000	1.00E+00	1.00E+04
Methyl Napthalene, 2-	0	4.00E-01	0.00E+00
Methylene chloride	10	4.00E-01	4.00E+00
Naphthalene	1	4.00E-01	4.00E-01
Nickel	100	1.00E+00	1.00E+02

Nitrophenol, 4-	1	1.00E+00	1.00E+00
Pentachlorophenol	100	1.00E+00	1.00E+02
Phenanthrene	0	4.00E-01	0.00E+00
Pyrene	100	1.00E+00	1.00E+02
Selenium	100	1.00E+00	1.00E+02
Silver	100	1.00E+00	1.00E+02
Toluene	10	4.00E-01	4.00E+00
Trichloroethylene	10	4.00E-01	4.00E+00
Vanadium	100	1.00E+00	1.00E+02
Xylene, m-	1	4.00E-01	4.00E-01
Zinc	10	1.00E+00	1.00E+01

Hazardous Substances Found in an Observed Release

Sample No.	Observed Release Hazardous Substance	Toxicity Value	Persistence Value	Toxicity/ Persistence Value

- N/A and/or data not specified

Toxicity/Persistence Value from Source Hazardous Substances:	1.00E+04
Toxicity/Persistence Value from Observed Release Hazardous Substances:	0.00E+00
Toxicity/Persistence Factor:	1.00E+04
Sum of Source Hazardous Waste Quantity Values:	1.99E+04
Hazardous Waste Quantity Factor:	10000
Waste Characteristics Factor Category:	100

Level I Concentrations

- N/A and/or data not specified

Level II Concentrations

- N/A and/or data not specified

Most Distant Level I Sample

- N/A and/or data not specified

Most Distant Level II Sample

- N/A and/or data not specified

Level I Concentrations

Intake	Distance Along the In-water Segment from the Probable Point of Entry (miles)	Population
- N/A and/or data not specified		

==========

Population Served by Level I Intakes: 0.0

Level I Population Factor: 0.00E+00

Level II Concentrations

Intake	Distance Along the In-water Segment from the Probable Point of Entry (miles)	Population

- N/A and/or data not specified

==========

Population Served by Level II Intakes: 0.0

Level II Population Factor: 0.00E+00

Potential Contamination

Intake ID	Average Annual Flow (cfs)	Population Served
1 Crown Intake	100	375000.0
2 Division Intake	100	375000.0
3 Kirtland Intake	100	375000.0
4 Nottingham Intake	0	375000.0

Documentation for Intake Crown Intake:

See section 3.8.1 of the RI/FS Report. Total population served 1.5 million is divided equally among 4 intakes.

Reference: 2

Type of Surface Water Body	Total Population	Dilution-Weighted Population
Moderate Ocean Zone or Great Lake	1125000.0	16.0

Dilution-Weighted Population Served
by Potentially Contaminated Intakes: 16.0

Potential Contamination Factor: 2.0

Nearest Intake

Location of Nearest Drinking Water Intake: Crown Intake
Distance from the Probable Point of Entry: 12.60 miles
Type of Surface Water Body: Moderate D
Dilution Weight: 0.0000100
Highest Level of Contamination: Potential

Nearest Intake Factor: 0.00

Documentation for Crown Intake:

See section 3.8.1 of the RI/FS Report. Total population served 1.5 million is divided equally among 4 intakes.

Reference: 2

Resources

Resource Use: YES

Resource Value: 5.00E+00

Documentation for Resources:

See Section 3.8.1 of the RI/FS Report.

Reference:

SW PATHWAY: OVERLAND/FLOOD HUMAN FOOD CHAIN THREAT WASTE CHARACTERISTICS
NASA LeRC PMU 2 - Industrial Waste System - 11/22/95

Source: 1 Ind. Waste System

Source Hazardous Waste Quantity Value: 19942.75

Hazardous Substance	Toxicity Value	Persistence Value	Bio-accum. Value	Toxicity/ Persistence/ Bioaccum. Value
Acenaphthene	10	4.00E-01	5.00E+02	2.00E+03
Aluminum	0	1.00E+00	5.00E+01	0.00E+00
Anthracene	10	4.00E-01	5.00E+03	2.00E+04
Antimony	10000	1.00E+00	5.00E-01	5.00E+03
Benz(a)anthracene	1000	1.00E+00	5.00E+04	5.00E+07
Benzo(a)pyrene	10000	1.00E+00	5.00E+04	5.00E+08
Benzo(g,h,i)perylene	0	1.00E+00	5.00E+04	0.00E+00
Benzo(j,k)fluorene	100	1.00E+00	5.00E+03	5.00E+05
Benzo(k)fluoranthene	0	1.00E+00	5.00E+04	0.00E+00
Benzofluoranthene, 3,4-	10000	1.00E+00	5.00E+04	5.00E+08
Bis (2-ethylhexyl) phthalate	100	1.00E+00	5.00E+04	5.00E+06
Cadmium	10000	1.00E+00	5.00E+03	5.00E+07
Chromium	10000	1.00E+00	5.00E+00	5.00E+04
Chrysene	0	1.00E+00	5.00E+02	0.00E+00
Cobalt	1	1.00E+00	5.00E-01	5.00E-01
Copper	0	1.00E+00	5.00E+04	0.00E+00
Cyanide	100	4.00E-01	5.00E-01	2.00E+01
DDE	100	1.00E+00	5.00E+04	5.00E+06
DDT	1000	1.00E+00	5.00E+04	5.00E+07
Di-n-butyl phthalate	10	1.00E+00	5.00E+03	5.00E+04
Di-n-octyl phthalate	100	1.00E+00	5.00E+02	5.00E+04
Dibenz(a,h)anthracene	0	1.00E+00	5.00E+04	0.00E+00
Dibenzofuran	0	1.00E+00	5.00E+02	0.00E+00
Dibromochloromethane	100	4.00E-01	5.00E+01	2.00E+03
Dichloroethene, 1,1-	100	4.00E-01	5.00E+01	2.00E+03
Dinitrophenol, 2,4-	1000	1.00E+00	5.00E+00	5.00E+03
Endrin	10000	1.00E+00	5.00E+03	5.00E+07
Fluorene	100	1.00E+00	5.00E+03	5.00E+05
Heptachlor	1000	4.00E-01	5.00E+03	2.00E+06
Heptachlor epoxide	10000	1.00E+00	5.00E+00	5.00E+04
Hexachlorocyclohexane, delta-	1	1.00E+00	5.00E+02	5.00E+02
Indeno(1,2,3-CD)pyrene	0	1.00E+00	5.00E+04	0.00E+00
Iron	0	1.00E+00	5.00E-01	0.00E+00
Lead	10000	1.00E+00	5.00E+01	5.00E+05
Magnesium	0	1.00E+00	5.00E-01	0.00E+00
Manganese	10000	1.00E+00	5.00E-01	5.00E+03
Mercury	10000	1.00E+00	5.00E+04	5.00E+08
Methyl Napthalene, 2-	0	4.00E-01	5.00E+03	0.00E+00
Methylene chloride	10	4.00E-01	5.00E+00	2.00E+01
Naphthalene	1	4.00E-01	5.00E+02	2.00E+02

Nickel	100	1.00E+00	5.00E-01	5.00E+01
Nitrophenol, 4-	1	1.00E+00	5.00E+00	5.00E+00
Pentachlorophenol	100	1.00E+00	5.00E+02	5.00E+04
Phenanthrene	0	4.00E-01	5.00E+01	0.00E+00
Pyrene	100	1.00E+00	5.00E+01	5.00E+03
Selenium	100	1.00E+00	5.00E+03	5.00E+05
Silver	100	1.00E+00	5.00E+01	5.00E+03
Toluene	10	4.00E-01	5.00E+01	2.00E+02
Trichloroethylene	10	4.00E-01	5.00E+01	2.00E+02
Vanadium	100	1.00E+00	5.00E-01	5.00E+01
Xylene, m-	1	4.00E-01	5.00E+02	2.00E+02
Zinc	10	1.00E+00	5.00E+02	5.00E+03

Hazardous Substances Found in an Observed Release

Sample No.	Observed Release Hazardous Substance	Toxicity Value	Persistence Value	Bio-accum. Value	Toxicity/ Persistence/ Bioaccum. Value

- N/A and/or data not specified

Toxicity/Persistence/Bioaccumulation Value from Source Hazardous Substances:	5.00E+08
Toxicity/Persistence/Bioaccumulation Value from Observed Release Hazardous Substances:	0.00E+00
Toxicity/Persistence/Bioaccumulation Factor:	5.00E+08
Sum of Source Hazardous Waste Quantity Values:	1.99E+04
Hazardous Waste Quantity Factor:	10000
Waste Characteristics Factor Category:	1000

Level I Concentrations

- N/A and/or data not specified

Level II Concentrations

- N/A and/or data not specified

Most Distant Level I Sample

- N/A and/or data not specified

Most Distant Level II Sample

- N/A and/or data not specified

Level I Concentrations

Fishery	Annual Production (pounds)	Human Food Chain Population Value
- N/A and/or data not specified		

Sum of Human Food Chain Population Values: 0.00E+00

Level I Concentrations Factor: 0.00E+00

Level II Concentrations

Fishery	Annual Production (pounds)	Human Food Chain Population Value
- N/A and/or data not specified		

Sum of Human Food Chain Population Values: 0.00E+00

Level II Concentrations Factor: 0.00E+00

SW PATHWAY: OVERLAND FLOW/FLOOD COMPONENT HUMAN FOOD CHAIN THREAT TARGETS
NASA LeRC PMU 2 - Industrial Waste System - 11/22/95

Potential Contamination

Fishery	Annnual Production (pounds)	Type of Surface Water Body	Average Annual Flow (cfs)	Pop. Value (Pi)	Dilution Weight (Di)	Pi*Di
1 Rocky River	3000.0	River	112	3.0	1.00E-02	3.00E-02
2 Lake Erie	500000.0	Moderate	100	310.0	1.00E-05	3.10E-03

Sum of (Pi*Di): 3.31E-02

Potential Human Food Chain Contamination Factor: 3.31E-03

Food Chain Individual

Location of Nearest Fishery: Rocky River
Distance from the Probable Point of Entry: 0.00 miles
Type of Surface Water Body: River
Dilution Weight: 0.0100000
Level of Contamination: Potential

Food Chain Individual Factor: 0.00

Documentation for Rocky River:

IWS system has outfall located northwest of IWS basins which discharges into small tributary of Rocky River. Lake Erie is located 9.2 miles from facility boundary. Flow based on average of flow values provided by Table 3-3 of Phase I RI/FS.

Reference:

Source: 1 Ind. Waste System

Source Hazardous Waste Quantity Value: 19942.75

Hazardous Substance	Eco-toxicity Value	Persistence Value	Bio-accum. Value	Ecotoxicity/ Persistence/ Bioaccum. Value
Acenaphthene	10000	4.00E-01	5.00E+02	2.00E+06
Aluminum	0	1.00E+00	5.00E+01	0.00E+00
Anthracene	10000	4.00E-01	5.00E+03	2.00E+07
Antimony	0	1.00E+00	5.00E-01	0.00E+00
Benz(a)anthracene	10000	1.00E+00	5.00E+04	5.00E+08
Benzo(a)pyrene	10000	1.00E+00	5.00E+04	5.00E+08
Benzo(g,h,i)perylene	0	1.00E+00	5.00E+04	0.00E+00
Benzo(j,k)fluorene	10000	1.00E+00	5.00E+03	5.00E+07
Benzo(k)fluoranthene	0	1.00E+00	5.00E+04	0.00E+00
Benzofluoranthene, 3,4-	0	1.00E+00	5.00E+04	0.00E+00
Bis (2-ethylhexyl) phthalate	1000	1.00E+00	5.00E+04	5.00E+07
Cadmium	1000	1.00E+00	5.00E+03	5.00E+06
Chromium	10000	1.00E+00	5.00E+00	5.00E+04
Chrysene	1000	1.00E+00	5.00E+03	5.00E+06
Cobalt	0	1.00E+00	5.00E+03	0.00E+00
Copper	100	1.00E+00	5.00E+04	5.00E+06
Cyanide	1000	4.00E-01	5.00E-01	2.00E+02
DDE	10000	1.00E+00	5.00E+04	5.00E+08
DDT	10000	1.00E+00	5.00E+04	5.00E+08
Di-n-butyl phthalate	1000	1.00E+00	5.00E+03	5.00E+06
Di-n-octyl phthalate	0	1.00E+00	5.00E+02	0.00E+00
Dibenz(a,h)anthracene	0	1.00E+00	5.00E+04	0.00E+00
Dibenzofuran	100	1.00E+00	5.00E+02	5.00E+04
Dibromochloromethane	0	4.00E-01	5.00E+01	0.00E+00
Dichloroethene, 1,1-	10	4.00E-01	5.00E+01	2.00E+02
Dinitrophenol, 2,4-	10000	1.00E+00	5.00E+00	5.00E+04
Endrin	10000	1.00E+00	5.00E+04	5.00E+08
Fluorene	1000	1.00E+00	5.00E+03	5.00E+06
Heptachlor	10000	4.00E-01	5.00E+04	2.00E+08
Heptachlor epoxide	10000	1.00E+00	5.00E+04	5.00E+08
Hexachlorocyclohexane, delta-	0	1.00E+00	5.00E+02	0.00E+00
Indeno(1,2,3-CD)pyrene	0	1.00E+00	5.00E+04	0.00E+00
Iron	10	1.00E+00	5.00E-01	5.00E+00
Lead	1000	1.00E+00	5.00E+03	5.00E+06
Magnesium	0	1.00E+00	5.00E-01	0.00E+00
Manganese	0	1.00E+00	5.00E+04	0.00E+00
Mercury	10000	1.00E+00	5.00E+04	5.00E+08
Methyl Napthalene, 2-	1000	4.00E-01	5.00E+03	2.00E+06
Methylene chloride	1	4.00E-01	5.00E+00	2.00E+00
Naphthalene	1000	4.00E-01	5.00E+02	2.00E+05
Nickel	10	1.00E+00	5.00E+02	5.00E+03

Nitrophenol, 4-	100	1.00E+00	5.00E+02	5.00E+04
Pentachlorophenol	100	1.00E+00	5.00E+03	5.00E+05
Phenanthrene	1000	4.00E-01	5.00E+03	2.00E+06
Pyrene	0	1.00E+00	5.00E+01	0.00E+00
Selenium	100	1.00E+00	5.00E+03	5.00E+05
Silver	10000	1.00E+00	5.00E+01	5.00E+05
Toluene	100	4.00E-01	5.00E+01	2.00E+03
Trichloroethylene	100	4.00E-01	5.00E+01	2.00E+03
Vanadium	0	1.00E+00	5.00E-01	0.00E+00
Xylene, m-	100	4.00E-01	5.00E+02	2.00E+04
Zinc	10	1.00E+00	5.00E+02	5.00E+03

Hazardous Substances Found in an Observed Release

Sample No.	Observed Release Hazardous Substance	Eco-toxicity Value	Persistence Value	Bio-accum. Value	Ecotoxicity/ Persistence/ Bioaccum. Value

- N/A and/or data not specified

Ecotoxicity/Persistence/Bioaccummulation Value from Source Hazardous Substances:	5.00E+08
Ecotoxicity/Persistence/Bioaccummulation Value from Observed Release Hazardous Substances:	0.00E+00
Ecotoxicity/Persistence/Bioaccummulation Factor:	5.00E+08
Sum of Source Hazardous Waste Quantity Values:	1.99E+04
Hazardous Waste Quantity Factor:	10000
Waste Characteristics Factor Category:	1000

Level I Concentrations

- N/A and/or data not specified

Level II Concentrations

- N/A and/or data not specified

Most Distant Level I Sample

- N/A and/or data not specified

Most Distant Level II Sample

- N/A and/or data not specified

Level I Concentrations

Sensitive Environment	Distance from Probable Point of Entry to Sensitive Env. (miles)	Sensitive Environment Value
- N/A and/or data not specified		

Sum of Sensitive Environments Values: 0

Wetlands

Wetland	Distance from Probable Point of Entry to Wetland (miles)	Wetlands Frontage (miles)
- N/A and/or data not specified		

Total Wetlands Frontage: 0.00 Miles Total Wetlands Value: 0

Sum of Sensitive Environments Value + Wetlands Value: 0.00E+00

Level I Concentrations Factor: 0.00E+00

Level II Concentrations

Sensitive Environment	Distance from Probable Point of Entry to Sensitive Env. (miles)	Sensitive Environment Value
- N/A and/or data not specified		

Sum of Sensitive Environments Values: 0

Wetlands

Wetland	Distance from Probable Point of Entry to Wetland (miles)	Wetlands Frontage (miles)
- N/A and/or data not specified		

Total Wetlands Frontage: 0.00 Miles Total Wetlands Value: 0

Sum of Sensitive Environments Value + Wetlands Value: 0.00E+00

Level II Concentrations Factor: 0.00E+00

Potential Contamination

Sensitive Environments

Type of Surface Water Body	Sensitive Environment	Sensitive Environment Value
River	1 Rokcy River	50

Wetlands

Type of Surface Water Body	Sensitive Environment	Wetlands Frontage	Wetlands Value
- N/A and/or data not specified			

Documentation for Sensitive Environment Rokcy River:

Value assigned based on 4-23 of the HRS. Rocky River is classified as a seasonal habitat for salmon which are stocked by the Ohio Department of natural Resources. See Section 3.6 of the RI/FS Report.

Reference: 2

SW PATHWAY: OVERLAND FLOW/FLOOD COMPONENT ENVIRONMENTAL THREAT TARGETS
NASA LeRC PMU 2 - Industrial Waste System - 11/22/95

Type of Surface Water Body	Sum of Sens. Environment Values(Sj)	Sum of Wetland Frontage Values(Wj)	Dilution Weight (Dj)	Dj(Wj+Sj)
Moderate to Large Stream	50	0	1.00E-02	5.00E-01

Sum of Dj(Wj+Sj): 5.00E-01
Sum of Dj(Wj+Sj)/10: 5.00E-02

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Potential Contamination Sensitive Environment Factor: 5.00E-02

SURFACE WATER PATHWAY GW TO SW CONTAINMENT SUMMARY
NASA LeRC PMU 2 - Industrial Waste System - 11/22/95

Containment

No.	Source ID	HWQ Value	Containment Value
1	Ind. Waste System	1.99E+04	10

==========
Containment Factor 10

Documentation for Ground Water Containment, Source Ind. Waste System:

Leakages from system pits and basins are suspected to have occurred. See Section 4.2 of the RI/FS Report

Reference: 2

Net Precipitation

Net Precipitation (inches) 0.00

Aquifer: Shale Bedrock Aquifer

Type of Aquifer: Non Karst

Overlaying Aquifer: 0

Interconnected with: 0

Documentation for Shale Bedrock Aquifer Aquifer:

Lithological information included in the Drilling Logs (Appendix C, of the RI/FS Report) indicate that shale is the bedrock. Other aquifers are perched water zones which are thin, seasonal, and laterally discontinuous and are not significant for HRS Purposes.

Reference: 2

OBSERVED RELEASE

No.	Well ID	Well Type	Distance (miles)	Level of Contamination
- N/A and/or data not specified				

==========

Observed Release Factor 0

Documentation for Well 02-MW001:

See Table 2-2 and Figure 4-1 of the RI/FS Report for monitoring well information and location. None of the compounds detected are considered "significant".
Distances are estimated to be within 0.25 mile radius from each other and from contaminatin source

Reference: 2

SURFACE WATER PATHWAY GW TO SW COMPONENT LIKELIHOOD OF RELEASE
NASA LeRC PMU 2 - Industrial Waste System - 11/22/95

POTENTIAL TO RELEASE

Ground Water to Surface Water Angle

Probable Point of Entry	0.10	miles
Angle Theta	0	

Containment

Containment Factor	10

Net Precipitation

Net Precipitation Factor	3

Depth to Aquifer

A. Depth of Hazardous Substances	10.00	feet

Documentation for Depth of Hazardous Substances:

No actual soil sample data for AOCs.

Reference: 3

B. Depth to Aquifer from Surface	45.00	feet

Documentation for Depth to Aquifer from Surface :

Drilling logs included in Appendix C of the RI/FS Report indicate that bedrock shale occurs at varying depths within this Area, ranging from 22' (bh073) to 50' (bh072), to 64' (bh074). Depth averaged to 45 feet. Soil materials consist of clay and silty clay.

Reference: 2

C. Depth to Aquifer (B - A)	35.00	feet
Depth to Aquifer Factor	3	

Travel Time

Are All Layers Karst?	NO	
Thickness of Layer(s) with Lowest Conductivity	35.00	feet

Documentation for Thickness of Layers with Lowest Conductivity:

Drilling logs included in Appendix C of RI/FS indiate the top layers to be silt, clay, silty clay which extend to varying depths to 22, 50 and 64 feet in the boreholes. Thickness of these layers averaged to 45 feet.

Reference: 2

Hydraulic Conductivity (cm/sec)	1.0E-06

Documentation for Hydraulic Conductivity:

See Table 3-6 of the HRS Guidance Manual.

Reference: 1

Travel Time Factor	15

==========

Potential to Release Factor	210

Source: 1 Ind. Waste System

Source Hazardous Waste Quantity Value: 19942.75

Hazardous Substance	Toxicity Factor Value	Persist. Value	Mobility Value	Toxicity/ Mobililty/ Persistence
Acenaphthene	10	4.00E-01	2.00E-03	8.00E-03
Aluminum	0	1.00E+00	2.00E-05	0.00E+00
Anthracene	10	4.00E-01	2.00E-07	8.00E-07
Antimony	10000	1.00E+00	1.00E-02	1.00E+02
Benz(a)anthracene	1000	1.00E+00	2.00E-09	2.00E-06
Benzo(a)pyrene	10000	1.00E+00	2.00E-09	2.00E-05
Benzo(g,h,i)perylene	0	1.00E+00	2.00E-09	0.00E+00
Benzo(j,k)fluorene	100	1.00E+00	2.00E-07	2.00E-05
Benzo(k)fluoranthene	0	1.00E+00	2.00E-09	0.00E+00
Benzofluoranthene, 3,4-	10000	1.00E+00	2.00E-09	2.00E-05
Bis (2-ethylhexyl) phthalate	100	1.00E+00	2.00E-07	2.00E-05
Cadmium	10000	1.00E+00	2.00E-01	2.00E+03
Chromium	10000	1.00E+00	1.00E-02	1.00E+02
Chrysene	0	1.00E+00	2.00E-09	0.00E+00
Cobalt	1	1.00E+00	1.00E-02	1.00E-02
Copper	0	1.00E+00	1.00E-02	0.00E+00
Cyanide	100	4.00E-01	2.00E-05	8.00E-04
DDE	100	1.00E+00	2.00E-07	2.00E-05
DDT	1000	1.00E+00	2.00E-07	2.00E-04
Di-n-butyl phthalate	10	1.00E+00	2.00E-03	2.00E-02
Di-n-octyl phthalate	100	1.00E+00	2.00E-07	2.00E-05
Dibenz(a,h)anthracene	0	1.00E+00	2.00E-09	0.00E+00
Dibenzofuran	0	1.00E+00	2.00E-05	0.00E+00
Dibromochloromethane	100	4.00E-01	1.00E-02	4.00E-01
Dichloroethene, 1,1-	100	4.00E-01	1.00E-02	4.00E-01
Dinitrophenol, 2,4-	1000	1.00E+00	1.00E+00	1.00E+03
Endrin	10000	1.00E+00	2.00E-03	2.00E+01
Fluorene	100	1.00E+00	2.00E-03	2.00E-01
Heptachlor	1000	4.00E-01	2.00E-05	8.00E-03
Heptachlor epoxide	10000	1.00E+00	2.00E-03	2.00E+01
Hexachlorocyclohexane, delta-	1	1.00E+00	2.00E-03	2.00E-03
Indeno(1,2,3-CD)pyrene	0	1.00E+00	2.00E-09	0.00E+00
Iron	0	1.00E+00	1.00E-02	0.00E+00
Lead	10000	1.00E+00	2.00E-05	2.00E-01
Magnesium	0	1.00E+00	2.00E-05	0.00E+00
Manganese	10000	1.00E+00	1.00E-02	1.00E+02
Mercury	10000	1.00E+00	2.00E-05	2.00E-01
Methyl Napthalene, 2-	0	4.00E-01	2.00E-03	0.00E+00
Methylene chloride	10	4.00E-01	1.00E+00	4.00E+00
Naphthalene	1	4.00E-01	2.00E-03	8.00E-04
Nickel	100	1.00E+00	2.00E-05	2.00E-03

Nitrophenol, 4-	1	1.00E+00	1.00E+00	1.00E+00
Pentachlorophenol	100	1.00E+00	1.00E-02	1.00E+00
Phenanthrene	0	4.00E-01	2.00E-05	0.00E+00
Pyrene	100	1.00E+00	2.00E-09	2.00E-07
Selenium	100	1.00E+00	1.00E-02	1.00E+00
Silver	100	1.00E+00	2.00E-07	2.00E-05
Toluene	10	4.00E-01	1.00E-02	4.00E-02
Trichloroethylene	10	4.00E-01	1.00E-02	4.00E-02
Vanadium	100	1.00E+00	2.00E-07	2.00E-05
Xylene, m-	1	4.00E-01	1.00E-02	4.00E-03
Zinc	10	1.00E+00	2.00E-03	2.00E-02

Hazardous Substances Found in an Observed Release

Observed Release Hazardous Substance	Toxicity Factor Value	Persist. Value	Toxicity/ Persistence

- N/A and/or data not specified

Toxicity/Mobility/Persistence Value from Source Hazardous Substances:	2.00E+03
Toxicity/Mobility/Persistence Value from Observed Release Hazardous Substances:	0.00E+00
Toxicity/Mobility/Persistence Factor:	2.00E+03
Sum of Source Hazardous Waste Quantity Values:	1.99E+04
Hazardous Waste Quantity Factor:	10000
Waste Characteristics Factor Category:	56

Level I Concentrations

- N/A and/or data not specified

Level II Concentrations

- N/A and/or data not specified

Most Distant Level I Sample

- N/A and/or data not specified

Most Distant Level II Sample

- N/A and/or data not specified

Level I Concentrations

Intake	Distance Along the In-water Segment from the Probable Point of Entry (miles)	Population
- N/A and/or data not specified		

==========

Population Served by Level I Intakes: 0.0

Level I Population Factor: 0.00E+00

Level II Concentrations

Intake	Distance Along the In-water Segment from the Probable Point of Entry (miles)	Population
- N/A and/or data not specified		

==========

Population Served by Level II Intakes: 0.0

Level II Population Factor: 0.00E+00

Potential Contamination

Intake ID	Average Annual Flow (cfs)	Population Served
1 Crown Intake	100	375000.0
2 Division Intake	100	375000.0
3 Kirtland Intake	100	375000.0
4 Nottingham Intake	0	375000.0

Documentation for Intake Crown Intake:

See section 3.8.1 of the RI/FS Report. Total population served 1.5 million is divided equally among 4 intakes.

Reference: 2

Type of Surface Water Body	Total Population	Dilution-Weighted Population
Moderate Ocean Zone or Great Lake	1125000.0	16.0

Dilution-Weighted Population Served
by Potentially Contaminated Intakes: 16.0

Potential Contamination Factor: 0.0

Nearest Intake

Location of Nearest Drinking Water Intake: Crown Intake
Distance from the Probable Point of Entry: 12.60 miles
Type of Surface Water Body: Moderate D
Dilution Weight: 0.0000000
Highest Level of Contamination: Potential

Nearest Intake Factor: 0.00

Documentation for Crown Intake:

See section 3.8.1 of the RI/FS Report. Total population served 1.5 million is divided equally among 4 intakes.

Reference: 2

Resources

Resource Use: YES

Resource Value: 5.00E+00

Documentation for Resources:

See Section 3.8.1 of the RI/FS Report.

Reference:

Source: 1 Ind. Waste System

Source Hazardous Waste Quantity Value: 19942.75

Hazardous Substance	Toxicity Value	Persist. Value	Mobility Value	Bio-accum. Value	Tox./Mobil./ Persistence/ Bioaccum. Value
Acenaphthene	10	4.00E-01	2.00E-03	5.00E+02	4.00E+00
Aluminum	0	1.00E+00	2.00E-05	5.00E+01	0.00E+00
Anthracene	10	4.00E-01	2.00E-07	5.00E+03	4.00E-03
Antimony	10000	1.00E+00	1.00E-02	5.00E-01	5.00E+01
Benz(a)anthracene	1000	1.00E+00	2.00E-09	5.00E+04	1.00E-01
Benzo(a)pyrene	10000	1.00E+00	2.00E-09	5.00E+04	1.00E+00
Benzo(g,h,i)perylene	0	1.00E+00	2.00E-09	5.00E+04	0.00E+00
Benzo(j,k)fluorene	100	1.00E+00	2.00E-07	5.00E+03	1.00E-01
Benzo(k)fluoranthene	0	1.00E+00	2.00E-09	5.00E+04	0.00E+00
Benzofluoranthene, 3,4-	10000	1.00E+00	2.00E-09	5.00E+04	1.00E+00
Bis (2-ethylhexyl) phthalate	100	1.00E+00	2.00E-07	5.00E+04	1.00E+00
Cadmium	10000	1.00E+00	2.00E-01	5.00E+03	1.00E+07
Chromium	10000	1.00E+00	1.00E-02	5.00E+00	5.00E+02
Chrysene	0	1.00E+00	2.00E-09	5.00E+02	0.00E+00
Cobalt	1	1.00E+00	1.00E-02	5.00E-01	5.00E-03
Copper	0	1.00E+00	1.00E-02	5.00E+04	0.00E+00
Cyanide	100	4.00E-01	2.00E-05	5.00E-01	4.00E-04
DDE	100	1.00E+00	2.00E-07	5.00E+04	1.00E+00
DDT	1000	1.00E+00	2.00E-07	5.00E+04	1.00E+01
Di-n-butyl phthalate	10	1.00E+00	2.00E-03	5.00E+03	1.00E+02
Di-n-octyl phthalate	100	1.00E+00	2.00E-07	5.00E+02	1.00E-02
Dibenz(a,h)anthracene	0	1.00E+00	2.00E-09	5.00E+04	0.00E+00
Dibenzofuran	0	1.00E+00	2.00E-05	5.00E+02	0.00E+00
Dibromochloromethane	100	4.00E-01	1.00E-02	5.00E+01	2.00E+01
Dichloroethene, 1,1-	100	4.00E-01	1.00E-02	5.00E+01	2.00E+01
Dinitrophenol, 2,4-	1000	1.00E+00	1.00E+00	5.00E+00	5.00E+03
Endrin	10000	1.00E+00	2.00E-03	5.00E+03	1.00E+05
Fluorene	100	1.00E+00	2.00E-03	5.00E+03	1.00E+03
Heptachlor	1000	4.00E-01	2.00E-05	5.00E+03	4.00E+01
Heptachlor epoxide	10000	1.00E+00	2.00E-03	5.00E+00	1.00E+02
Hexachlorocyclohexane, delta-	1	1.00E+00	2.00E-03	5.00E+02	1.00E+00
Indeno(1,2,3-CD)pyrene	0	1.00E+00	2.00E-09	5.00E+04	0.00E+00
Iron	0	1.00E+00	1.00E-02	5.00E-01	0.00E+00
Lead	10000	1.00E+00	2.00E-05	5.00E+01	1.00E+01
Magnesium	0	1.00E+00	2.00E-05	5.00E-01	0.00E+00
Manganese	10000	1.00E+00	1.00E-02	5.00E-01	5.00E+01
Mercury	10000	1.00E+00	2.00E-05	5.00E+04	1.00E+04
Methyl Napthalene, 2-	0	4.00E-01	2.00E-03	5.00E+03	0.00E+00
Methylene chloride	10	4.00E-01	1.00E+00	5.00E+00	2.00E+01
Naphthalene	1	4.00E-01	2.00E-03	5.00E+02	4.00E-01
Nickel	100	1.00E+00	2.00E-05	5.00E-01	1.00E-03

Nitrophenol, 4-	1	1.00E+00	1.00E+00	5.00E+00	5.00E+00
Pentachlorophenol	100	1.00E+00	1.00E-02	5.00E+02	5.00E+02
Phenanthrene	0	4.00E-01	2.00E-05	5.00E+01	0.00E+00
Pyrene	100	1.00E+00	2.00E-09	5.00E+01	1.00E-05
Selenium	100	1.00E+00	1.00E-02	5.00E+03	5.00E+03
Silver	100	1.00E+00	2.00E-07	5.00E+01	1.00E-03
Toluene	10	4.00E-01	1.00E-02	5.00E+01	2.00E+00
Trichloroethylene	10	4.00E-01	1.00E-02	5.00E+01	2.00E+00
Vanadium	100	1.00E+00	2.00E-07	5.00E-01	1.00E-05
Xylene, m-	1	4.00E-01	1.00E-02	5.00E+02	2.00E+00
Zinc	10	1.00E+00	2.00E-03	5.00E+02	1.00E+01

Hazardous Substances Found in an Observed Release

Observed Release Hazardous Substance	Toxicity Value	Persist. Value	Bio-accum. Value	Toxicity/ Persistence Bioaccum. Value

- N/A and/or data not specified

Toxicity/Mobility/Persistence/Bioaccumulation Value from Source Hazardous Substances:	1.00E+07
Toxicity/Mobility/Persistence/Bioaccumulation Value from Observed Release Hazardous Substances:	0.00E+00
Toxicity/Mobility/Persistence/Bioaccumulation Factor:	1.00E+07
Sum of Source Hazardous Waste Quantity Values:	1.99E+04
Hazardous Waste Quantity Factor:	10000
Waste Characteristics Factor Category:	560

Level I Concentrations

- N/A and/or data not specified

Level II Concentrations

- N/A and/or data not specified

Most Distant Level I Sample

- N/A and/or data not specified

Most Distant Level II Sample

- N/A and/or data not specified

Level I Concentrations

Fishery	Annual Production (pounds)	Human Food Chain Population Value
- N/A and/or data not specified		

Sum of Human Food Chain Population Values: 0.00E+00

Level I Concentrations Factor: 0.00E+00

Level II Concentrations

Fishery	Annual Production (pounds)	Human Food Chain Population Value
- N/A and/or data not specified		

Sum of Human Food Chain Population Values: 0.00E+00

Level II Concentrations Factor: 0.00E+00

Potential Contamination

Fishery	Annnual Production (pounds)	Type of Surface Water Body	Average Annual Flow (cfs)	Pop. Value (Pi)	Dilution Weight (Di)	Pi*Di
2 Lake Erie	500000.0	Moderate	100	310.0	0.00E+00	0.00E+00

Sum of (Pi*Di): 0.00E+00

Potential Human Food Chain Contamination Factor: 0.00E+00

Food Chain Individual

Location of Nearest Fishery: Lake Erie
Distance from the Probable Point of Entry: 9.70 miles
Type of Surface Water Body: Moderate Depth
Dilution Weight: 0.0000000
Level of Contamination: Potential

Food Chain Individual Factor: 0.00

Source: 1 Ind. Waste System

Source Hazardous Waste Quantity Value: 19942.75

Hazardous Substance	Eco-toxicity Value	Persist. Value	Mob. Value	Bio-accum. Value	Ecotoxicity/ Mobility/ Persistence/ Bioaccum. Value
Acenaphthene	10000	4.00E-01	2.00E-03	5.00E+02	4.00E+03
Aluminum	0	1.00E+00	2.00E-05	5.00E+01	0.00E+00
Anthracene	10000	4.00E-01	2.00E-07	5.00E+03	4.00E+00
Antimony	0	1.00E+00	1.00E-02	5.00E-01	0.00E+00
Benz(a)anthracene	10000	1.00E+00	2.00E-09	5.00E+04	1.00E+00
Benzo(a)pyrene	10000	1.00E+00	2.00E-09	5.00E+04	1.00E+00
Benzo(g,h,i)perylene	0	1.00E+00	2.00E-09	5.00E+04	0.00E+00
Benzo(j,k)fluorene	10000	1.00E+00	2.00E-07	5.00E+03	1.00E+01
Benzo(k)fluoranthene	0	1.00E+00	2.00E-09	5.00E+04	0.00E+00
Benzofluoranthene, 3,4-	0	1.00E+00	2.00E-09	5.00E+04	0.00E+00
Bis (2-ethylhexyl) phthalate	1000	1.00E+00	2.00E-07	5.00E+04	1.00E+01
Cadmium	1000	1.00E+00	2.00E-01	5.00E+03	1.00E+06
Chromium	10000	1.00E+00	1.00E-02	5.00E+00	5.00E+02
Chrysene	1000	1.00E+00	2.00E-09	5.00E+03	1.00E-02
Cobalt	0	1.00E+00	1.00E-02	5.00E+03	0.00E+00
Copper	100	1.00E+00	1.00E-02	5.00E+04	5.00E+04
Cyanide	1000	4.00E-01	2.00E-05	5.00E-01	4.00E-03
DDE	10000	1.00E+00	2.00E-07	5.00E+04	1.00E+02
DDT	10000	1.00E+00	2.00E-07	5.00E+04	1.00E+02
Di-n-butyl phthalate	1000	1.00E+00	2.00E-03	5.00E+03	1.00E+04
Di-n-octyl phthalate	0	1.00E+00	2.00E-07	5.00E+02	0.00E+00
Dibenz(a,h)anthracene	0	1.00E+00	2.00E-09	5.00E+04	0.00E+00
Dibenzofuran	100	1.00E+00	2.00E-05	5.00E+02	1.00E+00
Dibromochloromethane	0	4.00E-01	1.00E-02	5.00E+01	0.00E+00
Dichloroethene, 1,1-	10	4.00E-01	1.00E-02	5.00E+01	2.00E+00
Dinitrophenol, 2,4-	10000	1.00E+00	1.00E+00	5.00E+00	5.00E+04
Endrin	10000	1.00E+00	2.00E-03	5.00E+04	1.00E+06
Fluorene	1000	1.00E+00	2.00E-03	5.00E+03	1.00E+04
Heptachlor	10000	4.00E-01	2.00E-05	5.00E+04	4.00E+03
Heptachlor epoxide	10000	1.00E+00	2.00E-03	5.00E+04	1.00E+06
Hexachlorocyclohexane, delta-	0	1.00E+00	2.00E-03	5.00E+02	0.00E+00
Indeno(1,2,3-CD)pyrene	0	1.00E+00	2.00E-09	5.00E+04	0.00E+00
Iron	10	1.00E+00	1.00E-02	5.00E-01	5.00E-02
Lead	1000	1.00E+00	2.00E-05	5.00E+03	1.00E+02
Magnesium	0	1.00E+00	2.00E-05	5.00E-01	0.00E+00
Manganese	0	1.00E+00	1.00E-02	5.00E+04	0.00E+00
Mercury	10000	1.00E+00	2.00E-05	5.00E+04	1.00E+04
Methyl Napthalene, 2-	1000	4.00E-01	2.00E-03	5.00E+03	4.00E+03
Methylene chloride	1	4.00E-01	1.00E+00	5.00E+00	2.00E+00
Naphthalene	1000	4.00E-01	2.00E-03	5.00E+02	4.00E+02

Nickel	10	1.00E+00	2.00E-05	5.00E+02	1.00E-01
Nitrophenol, 4-	100	1.00E+00	1.00E+00	5.00E+02	5.00E+04
Pentachlorophenol	100	1.00E+00	1.00E-02	5.00E+03	5.00E+03
Phenanthrene	1000	4.00E-01	2.00E-05	5.00E+03	4.00E+01
Pyrene	0	1.00E+00	2.00E-09	5.00E+01	0.00E+00
Selenium	100	1.00E+00	1.00E-02	5.00E+03	5.00E+03
Silver	10000	1.00E+00	2.00E-07	5.00E+01	1.00E-01
Toluene	100	4.00E-01	1.00E-02	5.00E+01	2.00E+01
Trichloroethylene	100	4.00E-01	1.00E-02	5.00E+01	2.00E+01
Vanadium	0	1.00E+00	2.00E-07	5.00E-01	0.00E+00
Xylene, m-	100	4.00E-01	1.00E-02	5.00E+02	2.00E+02
Zinc	10	1.00E+00	2.00E-03	5.00E+02	1.00E+01

Hazardous Substances Found in an Observed Release

Observed Release Hazardous Substance	Eco-toxicity Value	Persist. Value	Bio-accum. Value	Ecotoxicity/ Persistence/ Bioaccum. Value

- N/A and/or data not specified

Ecotoxicity/Mobility/Persistence/Bioaccummulation Value from Source Substances:	1.00E+06
Ecotoxicity/Mobility/Persistence/Bioaccummulation Value from Observed Hazardous Substances:	0.00E+00
Ecotoxicity/Mobility/Persistence/Bioaccummulation Factor:	1.00E+06
Sum of Source Hazardous Waste Quantity Values:	1.99E+04
Hazardous Waste Quantity Factor:	10000
Waste Characteristics Factor Category:	320

Level I Concentrations

- N/A and/or data not specified

Level II Concentrations

- N/A and/or data not specified

Most Distant Level I Sample

- N/A and/or data not specified

Most Distant Level II Sample

- N/A and/or data not specified

Level I Concentrations

Sensitive Environment	Distance from Probable Point of Entry to Sensitive Env. (miles)	Sensitive Environment Value
- N/A and/or data not specified		

Sum of Sensitive Environments Values: 0

Wetlands

Wetland	Distance from Probable Point of Entry to Wetland (miles)	Wetlands Frontage (miles)
- N/A and/or data not specified		

Total Wetlands Frontage: 0.00 Miles Total Wetlands Value: 0

Sum of Sensitive Environments Value + Wetlands Value: 0.00E+00

Level I Concentrations Factor: 0.00E+00

Level II Concentrations

Sensitive Environment	Distance from Probable Point of Entry to Sensitive Env. (miles)	Sensitive Environment Value
- N/A and/or data not specified		

Sum of Sensitive Environments Values: 0

Wetlands

Wetland	Distance from Probable Point of Entry to Wetland (miles)	Wetlands Frontage (miles)
- N/A and/or data not specified		

Total Wetlands Frontage: 0.00 Miles Total Wetlands Value: 0

Sum of Sensitive Environments Value + Wetlands Value: 0.00E+00

Level II Concentrations Factor: 0.00E+00

Potential Contamination

Sensitive Environments

Type of Surface Water Body	Sensitive Environment	Sensitive Environment Value

Wetlands

Type of Surface Water Body	Sensitive Environment	Wetlands Frontage	Wetlands Value

- N/A and/or data not specified

SW PATHWAY: GW TO SW COMPONENT ENVIRONMENTAL THREAT TARGETS
NASA LeRC PMU 2 - Industrial Waste System - 11/22/95

Type of Surface Water Body	Sum of Sens. Environment Values(Sj)	Sum of Wetland Frontage Values(Wj)	Dilution Weight (Dj)	Dj(Wj+Sj)

- N/A and/or data not specified

Sum of Dj(Wj+Sj): 0.00E+00
Sum of Dj(Wj+Sj)/10: 0.00E+00

==========

Potential Contamination Sensitive Environment Factor: 0.00E+00

Likelihood of Exposure

No.	Source ID	Level of Contamination
- N/A and/or data not specified		

Likelihood of Exposure Factor: 0

Source: 0 (null)

Source Hazardous Waste Quantity Value: 0.00

Hazardous Substance	Toxicity Value
* P |G - -Y N	8224

Sum of Source Hazardous Waste Quantity Values: 0.00E+00

Documentation for Level I Population:

- o Resident, school or daycare workers within 200 feet contamination.

Reference: 2

Waste Characteristics Factor Category: 0

Targets

Level I Population: 15.0 Value: 0.00

Documentation for Workers:

Potential workers doing routine maintanance on IWS.

Reference:

Level II Population: 0.0 Value: 0.00

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Resident Individual: (null) Value: 0.00

Terrestial Sensitive Environment Value

- N/A and/or data not specified

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Terrestrial Sensitive Environments Factor: 1.30485992031043747000000000000

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SOIL EXPOSURE PATHWAY NEARBY POPULATION THREAT LIKELIHOOD OF EXPOSURE

Likelihood of Exposure

No.	Source ID	Level of Contamination	Attractiveness/ Accessibility	Area of Contam. (sq. feet)
0	^P |G -	bI	9504	774910509

0	(null)	*	P6.0E-154	1.7E-76	9.7E+246	Dist

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SOIL EXPOSURE PATHWAY NEARBY POPULATION THREAT WASTE CHARACTERISTICS

Source: 0 $ -

Source Hazardous Waste Quantity Value: 1.00

Hazardous Substance	Toxicity Value
(null)	-3328

Toxicity Factor:	5.78E+03
Sum of Source Hazardous Waste Quantity Values:	1.98E+04
Hazardous Waste Quantity Factor:	0

Documentation for Population > 0 to 1/4 mile Distance Category:

See Table 3-5 of the RI/FS Report for Summary of Demographic Estimates.

Reference: 2

OBSERVED RELEASE

No.	Sample ID	Distance (miles)	Level of Contamination

- N/A and/or data not specified

Observed Release Factor: 0

Gas Migration Potential

GAS POTENTIAL TO RELEASE

Source ID	Source Type	Gas Contain. Value (A)	Gas Source Type Value (B)	Gas Migrtn. Potent. Value (C)	Sum (B+C)	Gas Potential to Rel. Value A(B+C)
- N/A and/or data not specified						

Gas Potential to Release Factor: 0

Documentation for Gas Containment, Source Ind. Waste System:

HRS Table 6-3. Uncontaminated soil > 3 ft with little exposed soil. Maintained cover on O/W separators.

Reference: 2

Documentation for Source Type, Source Ind. Waste System:

IWS basins and oil/water separator pits.

Reference:

Source: Ind. Waste System

Gaseous Hazardous Substance	Hazardous Substance Gas Migration Potential Value
Acenaphthene	11
Anthracene	6
Benz(a)anthracene	6
Benzo(a)pyrene	6
Benzo(j,k)fluorene	6
Benzo(k)fluoranthene	6
Benzofluoranthene, 3,4-	6
Bis (2-ethylhexyl) phthalate	6
Chrysene	6
DDE	6
DDT	6
Di-n-butyl phthalate	6
Di-n-octyl phthalate	6
Dibenzofuran	11
Dibromochloromethane	11
Dichloroethene, 1,1-	17
Dinitrophenol, 2,4-	11
Endrin	6
Fluorene	11
Heptachlor	11
Heptachlor epoxide	11
Hexachlorocyclohexane, delta-	6
Mercury	11
Methyl Napthalene, 2-	11
Methylene chloride	17
Naphthalene	11
Nitrophenol, 4-	6
Pentachlorophenol	6
Phenanthrene	11
Pyrene	6
Toluene	17
Trichloroethylene	17
Xylene, m-	17

Average of Gas Migration Potential Value for 3 Hazardous Substances: 17.000

Gas Migration Potential Value From Table 6-7: 17

Particulate Migration Potential

PARTICULATE POTENTIAL TO RELEASE

Source ID	Source Type	Partic. Contain. Value (A)	Partic. Source Type Value (B)	Partic. Migrtn. Potent. Value (C)	Sum (B+C)	Partic. Potential to Rel. Value A(B+C)
- N/A and/or data not specified						

Particulate Potential to Release Factor: 0

Documentation for Particulate Containment, Source Ind. Waste System:

Soil cover has moderate vegetation. Sewer system is contained within the pipes underground. Solids/sludge within open IWS basins covered by fluids.

Reference:

Documentation for Source Type, Source Ind. Waste System:

IWS basins and oil/water separator pits.

Reference:

Documentation for Particulate Migration Potential:

HRS Figure 6-2

Reference:

Source: Ind. Waste System

Particulate Hazardous Substance
Acenaphthene
Aluminum
Anthracene
Antimony
Benz(a)anthracene
Benzo(a)pyrene
Benzo(g,h,i)perylene
Benzo(j,k)fluorene
Benzo(k)fluoranthene
Benzofluoranthene, 3,4-
Bis (2-ethylhexyl) phthalate
Cadmium
Chromium
Chrysene
Cobalt
Copper
Cyanide
DDE
DDT
Di-n-butyl phthalate
Di-n-octyl phthalate
Dibenz(a,h)anthracene
Dibenzofuran
Dinitrophenol, 2,4-
Endrin
Fluorene
Heptachlor
Heptachlor epoxide
Hexachlorocyclohexane, delta-
Indeno(1,2,3-CD)pyrene
Iron
Lead
Magnesium
Manganese
Mercury
Methyl Napthalene, 2-
Naphthalene
Nickel
Nitrophenol, 4-
Pentachlorophenol
Phenanthrene
Pyrene
Selenium
Silver
Vanadium
Zinc

AIR PATHWAY WASTE CHARACTERISTICS

NASA LeRC PMU 2 - Industrial Waste System - 11/22/95

Hazardous Substance	Toxicity Value	Gas Mobility Value	Particulate Mobility Value	Toxicity/ Mobility Value

Hazardous Substances Found in an Observed Release

Sample ID	Observed Release Hazardous Substance	Particulate Toxicity/ Mobility Value	Gas Toxicity/ Mobility Value

- N/A and/or data not specified

- N/A and/or data not specified

Documentation for Particulate Mobility:

HRS Figure 6-3

Reference:

Toxicity/Mobility Value from Observed Release Hazardous Substances:	0.00E+00
Toxicity/Mobility Factor:	0.00E+00
Sum of Source Hazardous Waste Quantity Values:	0.00E+00
Hazardous Waste Quantity Factor:	0
Waste Characteristics Factor Category:	0

AIR PATHWAY TARGETS

NASA LeRC PMU 2 - Industrial Waste System - 11/22/95

Actual Contamination

No.	Sample ID	Distance (miles)	Level of Contamination

- N/A and/or data not specified

Potential Contamination

Distance Categories Subject to Potential Contamination	Population	Value
	Potential Contaminantion Factor:	0.0000
	Potential Contaminantion Factor:	0.0000
	Potential Contaminantion Factor:	0.0000
	Potential Contaminantion Factor:	0.0000
	Potential Contaminantion Factor:	0.0000
	Potential Contaminantion Factor:	0.0000
	Potential Contaminantion Factor:	0.0000

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Nearest Individual Factor

Documentation for Population Onsite Distance Category:

table 3-5 of Phase I RI/FS

Reference:

Distance in miles: Potentia

Nearest Individual Value: 4.935386679159933720000000000000000000000e+257

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Resources

Resource Value: 4.935386679149290500000000000000000000000e+257

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Actual Contamination, Sensitive Environments

Sensitive Environment	Distance (miles)	Sensitive Environment Value

- N/A and/or data not specified

Actual Contamination, Wetlands

Distance Category	Wetland Acreage	Wetland Acreage Value

- N/A and/or data not specified

==========
(Sum of Sensitive Environments + Wetlands Values)

Potential Contamination, Sensitive Environments

Sensitive Environment	Distance (miles)	Sensitive Environment Value	Distance Weight	Weighted Value/10
(null)	4.935385843404746150000000000000000000000e+257			

Sum of Sensitive Environments Weighted Values/10: 0.000

Potential Contamination, Wetlands

Distance Category	Wetland Acreage	Wetland Acreage Value	Distance Weight	Weighted Value/10

- N/A and/or data not specified

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REFERENCES

NASA LeRC PMU 2 - Industrial Waste System - 11/22/95

1. HRS Guidance Manual:40CFR300 Appendix A to Part 300 The Hazard Ranking System 1993 and The Hazard Ranking System Guidance Manual - Interim Final, USEPA, Washington D.C.

2. Phase I Remedial Investigation/Feasibility Study Report. Prepared by R&R International Inc. for NASA Lewis Research Center, Cleveland, OH. October 1995.

3. HRS Report. Prepared by R&R International Inc. for NASA Lewis Research Center, Cleveland, OH. October 1995.

TABLE 2-1
SIGNIFICANCE ABOVE BACKGROUND

PMU 2 - INDUSTRIAL WASTE SYSTEM
IWS BASINS (UPR-02-01)
NASA LEWIS RESEARCH CENTER
PHASE I RI/FS

Compound	Background Sample SQL	Background Sample Conc	Release Sample Sample#	Release Sample SQL	Release Sample Conc	Signif.?	Attrib. to Site?	Comments
SEDIMENT								
SVOCs								
Acenaphthene	0.330	0.165	SD027-001	*	2.200	Y	Y	Suspected local release
Anthracene	0.330	0 152	SD027-001	*	2.200	Y	Y	Suspected local release
Benzo(a)Pyrene	0 330	0.158	SD027-001	*	2.300	Y	Y	Suspected local release
Benzo(a)anthracene	0.330	0.164	SD027-001	*	9.400	Y	Y	Suspected local release
Benzo(b)floranthene	0.330	0.175	SD027-001	*	13.000	Y	Y	Suspected local release
Benzo(k)fluoranthene	0.330	0.146	SD027-001	*	4.900	Y	Y	Suspected local release
Butyl Benzyl Phthalate	0.330	0 184	SD027-001	*	1.500	Y	Y	Suspected local release
Carbazole	0.330	0.150	SD027-001	*	2 600	Y	Y	Suspected local release
Chrysene	0.330	0.171	SD027-001	*	10.000	Y	Y	Suspected local release
Di-n-Butyl Phthalate	0.330	0.137	SD027-201	*	0.002	N	n/a	
Dibenzofuran	0.330	0.165	SD027-001	*	1.500	Y	Y	Suspected local release
Fluoranthene	0.330	0 204	SD027-001	*	24.000	Y	Y	Suspected local release
Fluorene	0.330	0.157	SD027-001	*	3.200	Y	Y	Suspected local release
Ideno(1,2,3-cd)pyrene	0.330	0.160	SD027-001	*	2.400	Y	Y	Suspected local release
Naphthalene	0.330	0 165	SD027-001	*	0.930	Y	Y	Suspected local release
Phenanthrene	0.330	0.188	SD027-001	*	20.000	Y	Y	Suspected local release
Pyrene	0.330	0.188	SD027-001	*	10.000	Y	Y	Suspected local release
bis(2-Ethylhexyl)Phthalate	0.330	0.123	SD027-001	*	5.900	Y	Y	Suspected local release
Pesticides / PCBs								
Aroclor-1254			SD027-001	*	0.360000	N	n/a	

TABLE 2-1
SIGNIFICANCE ABOVE BACKGROUND

PMU 2 - INDUSTRIAL WASTE SYSTEM
IWS BASINS (UPR-02-01)
NASA LEWIS RESEARCH CENTER
PHASE I RI/FS

Compound	Background Sample SQL	Background Sample Conc	Release Sample Sample#	Release Sample SQL	Release Sample Conc	Signif.?	Attrib. to Site?	Comments
Metals								
Aluminum		12820	SD027-001	*	9370.0	N	n/a	
Antimony		5.28	SD027-001	*	9.90	N	n/a	
Arsenic		12.040	SD027-001	*	15.10	N	n/a	
Barium		78.26	SD027-001		225 0	N	n/a	
Beryllium		0.72	SD027-001	#	0.7600	N	n/a	
Cadmium		0.51	SD027-001	*	8.700	Y	Y	Suspected local release
Calcium		17475.33	SD027-001	#	346.0	N	n/a	
Chromium		17.78	SD027-201	*	659.00	Y	Y	Suspected local release
Cobalt		13.56	SD027-001	#	19.800	N	n/a	
Copper		23.07	SD027-001		2450.00	Y	Y	Suspected local release
Iron		26100	SD027-001		57100.000	N	n/a	
Lead		17.12	SD027-001		756.000	Y	Y	Suspected local release
Magnesium		5576	SD027-001		11100.000	N	n/a	
Manganese		423.53	SD027-001		620.0	N	n/a	
Mercury		0.05	SD027-001		71.2	Y	Y	Suspected local release
Nickel		28.87	SD027-001		131.00	Y	Y	Suspected local release
Potassium		1621.27	SD027-001	#*	957.00	N	n/a	
Selenium		0.23	SD027-001	#*	1.70	Y	Y	Suspected local release
Silver		1.0	SD027-001		222.00	Y	Y	Suspected local release
Sodium		145.0	SD027-001	#	491.000	Y	Y	Suspected local release
Vanadium		24.14	SD027-001	#*	14.600	N	n/a	
Zinc		75.01	SD027-001	#*	5420.0000	Y	Y	Suspected local release

TABLE 2-1
SIGNIFICANCE ABOVE BACKGROUND

PMU 2 - INDUSTRIAL WASTE SYSTEM
IWS BASINS (UPR-02-01)
NASA LEWIS RESEARCH CENTER
PHASE I RI/FS

Compound	Background Sample SQL	Background Sample Conc	Release Sample Sample#	Release Sample SQL	Release Sample Conc	Signif.?	Attrib. to Site?	Comments
Radioactivity								
Alpha Particle Radioactivity			SD027-001		18	N	n/a	
Beta Particle Radioactivity			SD027-001		28	N	n/a	

Notes:
mean of background samples collected from shallow upland was used as background
all conc's. in ppm * J-flagged release sample data blank SQLs imply that Sample Conc. > Sample SQL

TABLE 2-1
SIGNIFICANCE ABOVE BACKGROUND

PMU 2 - INDUSTRIAL WASTE SYSTEM
IWS BASINS (UPR-02-01)
NASA LEWIS RESEARCH CENTER
PHASE I RI/FS

Compound	Background Sample SQL	Background Sample Conc	Release Sample Sample#	Release Sample SQL	Release Sample Conc	Signif.?	Attrib. to Site?	Comments
SURFACE WATER								
VOCs								
2-Butanone			SW021-001	*	0.010	N	n/a	
Benzene		0.005	SW021-001	*	0.002	N	n/a	
Bromodichloromethane		0.1	SW021-001	*	0.005	N	n/a	
Chloroform		0.1	SW021-001	*	0.001	N	n/a	
Dibromochloromethane			SW021-001		0.024	Y	Y	Suspected local release
SVOCs								
2-Methylnaphthalene			SW021-001	*	0.002	Y	Y	Suspected local release
2-Nitroaniline			SW021-201	*	0.025	Y	Y	Suspected local release
4-Nitrophenol			SW021-201	*	0.025	Y	Y	Suspected local release
Acenphthene			SW021-001	*	0.007	Y	Y	Suspected local release
Anthracene			SW021-001	*	0.007	Y	Y	Suspected local release
Benzo(a)Pyrene		0.0002	SW021-101	*	0.007	Y	Y	Suspected local release
Benzo(a)anthracene		0.0001	SW021-001	*	0.025	Y	Y	Suspected local release
Benzo(b)floranthene		0.0002	SW021-001	*	0.033	Y	Y	Suspected local release
Benzo(g,h,i)Perylene			SW021-101	*	0.003	Y	Y	Suspected local release
Benzo(k)fluoranthene		0.0002	SW021-001	*	0.011	Y	Y	Suspected local release
Butyl Benzyl Phthalate		0.1	SW021-001	*	0.004	N	n/a	
Carbazole			SW021-001	*	0.007	Y	Y	Suspected local release
Chrysene		0.0002	SW021-001	*	0.027	Y	Y	Suspected local release
Di-n-Butyl Phthalate			SW021-101	*	0.001	Y	Y	Suspected local release
Di-n-Octylphthalate			SW021-101	*	0.002	Y	Y	Suspected local release
Dibenzo(a,h)anthracene			SW021-101	*	0.003	Y	Y	Suspected local release
Dibenzofuran			SW021-001	*	0.005	Y	Y	Suspected local release

TABLE 2-1
SIGNIFICANCE ABOVE BACKGROUND

PMU 2 - INDUSTRIAL WASTE SYSTEM
IWS BASINS (UPR-02-01)
NASA LEWIS RESEARCH CENTER
PHASE I RI/FS

Compound	Background Sample SQL	Background Sample Conc	Release Sample Sample#	Release Sample SQL	Release Sample Conc	Signif.?	Attrib. to Site?	Comments
Fluorene			SW021-001	*	0.011	Y	Y	Suspected local release
Ideno(1,2,3-cd)pyrene		0.000	SW021-001	*	0.004	Y	Y	Suspected local release
Naphthalene			SW021-001	*	0.003	Y	Y	Suspected local release
Pentachlorophenol		0.001	SW021-201	*	0.025	Y	Y	Suspected local release
Phenanthrene			SW021-001	*	0.058	Y	Y	Suspected local release
Pyrene			SW021-001	*	0.025	Y	Y	Suspected local release
bis(2-Ethylhexyl)Phthalate		0.006	SW021-001	*	0.016	N	n/a	
Pesticides / PCBs								
None Detected						N	n/a	
Metals								
Aluminum		0.21	SW021-101		26	Y	Y	Suspected local release
Arsenic		0 050	SW021-001		0.02	N	n/a	
Barium		2	SW021-001		0.412	N	n/a	
Beryllium		0.004	SW021-001	#	0.0017	N	n/a	
Cadmium		0.005	SW021-001		0 015	Y	Y	Suspected local release
Calcium			SW021-001		162.0	Y	Y	Suspected local release
Chromium		0.1	SW021-001		0.57	Y	Y	Suspected local release
Cobalt			SW021-001	#	0.046	Y	Y	Suspected local release
Copper		1.3	SW021-001		4.09	Y	Y	Suspected local release
Cyanide		0.2	SW021-101		0.01	N	n/a	
Iron		0.3	SW021-001		108.000	Y	Y	Suspected local release
Lead		0.015	SW021-001		0.4520	Y	Y	Suspected local release
Magnesium			SW021-001		37 800	Y	Y	Suspected local release
Manganese		0.05	SW021-001		1.130	Y	Y	Suspected local release
Mercury		0.002	SW021-001		0.0060	Y	Y	Suspected local release

TABLE 2-1
SIGNIFICANCE ABOVE BACKGROUND

PMU 2 - INDUSTRIAL WASTE SYSTEM
IWS BASINS (UPR-02-01)
NASA LEWIS RESEARCH CENTER
PHASE I RI/FS

Compound	Background Sample SQL	Background Sample Conc	Release Sample Sample#	Release Sample SQL	Release Sample Conc	Signif.?	Attrib. to Site?	Comments
Nickel		0.10	SW021-001		0.2920	N	n/a	
Potassium			SW021-201	#	0.6210	Y	Y	Suspected local release
Selenium		0.05	SW021-001	#	0.00160	N	n/a	
Silver		0.10	SW021-001		623.00	Y	Y	Suspected local release
Sodium		20.0	SW021-001		1050.000	Y	Y	Suspected local release
Vanadium			SW021-101		0.054	Y	Y	Suspected local release
Zinc		5.0	SW021-001		11.800	N	n/a	
Radioactivity								
Alpha Particle Radioactivity			SW021-001		34	Y	Y	Suspected local release
Beta Particle Radioactivity			SW021-101		223.00	N	n/a	

TABLE 2-1
SIGNIFICANCE ABOVE BACKGROUND

PMU 2 - INDUSTRIAL WASTE SYSTEM
IWS BASINS (UPR-02-01)
NASA LEWIS RESEARCH CENTER
PHASE I RI/FS

Compound	Background Sample SQL	Background Sample Conc	Release Sample Sample#	Release Sample SQL	Release Sample Conc	Signif.?	Attrib. to Site?	Comments
General Chemistry								
Ammonia			SW021-001		0.50	Y	Y	Suspected local release
Bromide			SW021-001		4.00	Y	Y	Suspected local release
Chemical Oxygen Demand			SW021-101		720.00	Y	Y	Suspected local release
Chloride		250	SW021-001		51.00	N	Y	Suspected local release
Fluoride		4	SW021-001		1.40	N	n/a	
MBAs		0.5	SW021-101		0.090	N	n/a	
Nitrate / Nitrite		10	SW021-101		0.40	N	n/a	
Oil and Grease			SW021-001		94.00	Y	Y	Suspected local release
Total Phosphorous			SW021-101	*	15.00	Y	Y	Suspected local release
Sulfate		250	SW021-101		47.00	N	n/a	
Total Dissolved Solids		500	SW021-101		290.00	N	n/a	
Total Suspended Solids			SW021-101		260.00	Y	Y	Suspected local release

Notes:
mean of background samples collected from shallow upland was used as background
all conc's in ppm nd=0 * J-flagged release sample data blank SQLs imply that Sample Conc. > Sample SQL

TABLE 2-1
SIGNIFICANCE ABOVE BACKGROUND

PMU 2 - INDUSTRIAL WASTE SYSTEM
IWS BASINS (UPR-02-01)
NASA LEWIS RESEARCH CENTER
PHASE I RI/FS

Compound	Background Sample SQL	Background Sample Conc	Release Sample Sample#	Release Sample SQL	Release Sample Conc	Signif.?	Attrib. to Site?	Comments
GROUNDWATER								
VOCs								
Benzene			GW020-001	*	0.003	N	n/a	
Ethylbenzene			GW020-001	*	0.001	N	n/a	
Toluene			GW020-001	*	0.006	N	n/a	
Total Xylenes			GW020-001	*	0.003	N	n/a	
SVOCs								
2-Methylnaphthalene			GW012-001	*	0.002	N	n/a	
Di-n-Butyl Phthalate			GW012-001	*	0.001	N	n/a	
Naphthalene			GW020-001	*	0.001	N	n/a	
bis(2-Ethylhexyl)Phthalate			GW012-001		0.015	N	n/a	
Pesticides / PCBs								
						N	n/a	
THP & Hydrazine								
TPH - Diesel Range			GW012-001		1.10	N	n/a	
TPH - Gasoline Range			GW020-001		0.1050	N	n/a	
Metals								
Aluminum			GW001-001		61.800	N	n/a	
Antimony			GW001-001		0.02470	N	n/a	
Arsenic			GW001-001		0.0350	N	n/a	
Barium			GW012-001		0.2990	N	n/a	
Beryllium			GW012-001		570.0000	N	n/a	
Cadmium			GW012-001		0.08260	N	n/a	
Calcium			GW001-001		383.00	N	n/a	
Chromium			GW001-001		0.153	N	n/a	

TABLE 2-1
SIGNIFICANCE ABOVE BACKGROUND

PMU 2 - INDUSTRIAL WASTE SYSTEM
IWS BASINS (UPR-02-01)
NASA LEWIS RESEARCH CENTER
PHASE I RI/FS

Compound	Background Sample SQL	Background Sample Conc	Release Sample Sample#	Release Sample SQL	Release Sample Conc	Signif.?	Attrib. to Site?	Comments
Cobalt			GW012-001		0.1160	N	n/a	
Copper			GW001-001		0.1170	N	n/a	
Iron			GW001-001		318.000	N	n/a	
Lead			GW001-001		0.80200	N	n/a	
Magnesium			GW001-001		129.000	N	n/a	
Manganese			GW001-001		12.200	N	n/a	
Mercury			GW001-001		0.000260	N	n/a	
Nickel			GW012-001		0.6100	N	n/a	
Potassium			GW001-001		22.800	N	n/a	
Selenium			GW012-001	#	0.00220	N	n/a	
Sodium			GW001-001		91.000	N	n/a	
Thallium			GW001-001	#*	0.00180	N	n/a	
Vanadium			GW012-001		0.27800	N	n/a	
Zinc			GW012-001		3.1000	N	n/a	
Radioactivity								
					16	N	n/a	
General Chemistry								
Bromide			GW012-001		6.00	N	n/a	
Chloride			GW001-001		530.00	N	n/a	
Fluoride			GW001-001		0.10	N	n/a	
Nitrate / Nitrite			GW012-001		0.04	N	n/a	
Sulfate			GW020-001		300 00	N	n/a	
Total Dissolved Solids			GW001-001		1800.00	N	n/a	

Notes.
MCLs for water used as background

TABLE 2-2
SIGNIFICANCE ABOVE BACKGROUND

PMU 2 - INDUSTRIAL WASTE SYSTEM
OIL / WATER SEPARATOR PITS (UST-02-01)
NASA LEWIS RESEARCH CENTER
PHASE I RI/FS

Compound	Background Sample SQL	Background Sample Conc	Release Sample Sample#	Release Sample SQL	Release Sample Conc	Signif.?	Attrib. to Site?	Comments
SEDIMENT								
VOCs								
1,1-Dichloroethane	0.010	0.005	SD030-001		0.260	Y	Y	
Methylene Chloride	0.010	0 005	SD030-001	*	0.037	Y	Y	
Toluene	0.010	0.005	SD028-001	*	3.100	Y	Y	
Total Xylenes	0.010	0.005	SD030-001	*	0.076	Y	Y	
Trichloroethene	0.010	0.005	SD030-001	*	0.039	Y	Y	
SVOCs								
2-Methylnaphthalene	0.330	0 165	SD030-001	*	14.000	Y	Y	
Acenaphthene	0.330	0.165	SD030-001	*	8.100	Y	Y	
Anthracene	0.330	0.152	SD030-001	*	14.000	Y	Y	
Benzo(a)Pyrene	0.330	0.158	SD030-001	*	94.000	Y	Y	
Benzo(a)anthracene	0.330	0.164	SD030-001	*	110.000	Y	Y	
Benzo(b)fluoranthene	0.330	0.175	SD030-001	*	180.000	Y	Y	
Benzo(g,h,i)Perylene	0.330	0.167	SD030-001	*	40.000	Y	Y	
Benzo(k)fluoranthene	0.330	0.146	SD030-001	*	75.000	Y	Y	
Carbazole	0.330	0.15	SD030-001	*	46.000	Y	Y	
Chrysene	0.330	0.171	SD030-001	*	170.000	Y	Y	
Fluoranthene	0.330	0.204	SD030-001	*	360.000	Y	Y	
Fluorene	0.330	0.157	SD030-001	*	13.000	Y	Y	
Ideno(1,2,3-cd)pyrene	0.330	0.16	SD030-001	*	74 000	Y	Y	
Phenanthrene	0.330	0 188	SD030-001	*	190.000	Y	Y	
Pyrene	0 330	0.188	SD030-001	*	280.000	Y	Y	
bis(2-Ethylhexyl)Phthalate	0.330	0.123	SD030-001	*	57.000	Y	Y	

TABLE 2-2
SIGNIFICANCE ABOVE BACKGROUND

PMU 2 - INDUSTRIAL WASTE SYSTEM
OIL / WATER SEPARATOR PITS (UST-02-01)
NASA LEWIS RESEARCH CENTER
PHASE I RI/FS

Compound	Background Sample SQL	Background Sample Conc	Release Sample Sample#	Release Sample SQL	Release Sample Conc	Signif.?	Attrib. to Site?	Comments
Pesticides / PCBs								
4,4'-DDE	0.0033	0.00165	SD028-001	*	0.013000	Y	Y	
4,4'DDT	0.0033	0.00265	SD028-001	*	0.004700	Y	Y	
Endrin	0.0017	0.00165	SD029-001	*	0.034000	Y	Y	
Heptachlor	0.0017	0.00085	SD028-001	*	0.002900	Y	Y	
Heptachlor Epoxide	0.0017	0.00152	SD029-001	*	0 061000	Y	Y	
Methoxychlor	0.0017	0.0085	SD030-001	*	0.023000	N	n/a	
delta-BHC	0.0017	0.00085	SD029-001	*	0.026000	Y	Y	
Herbs								
2-4-D			SD030-001		0.250000	N	n/a	
TPH								
TPH - Diesel Range			SD029-001	*	530000	N	n/a	
TPH - Gasoline Range			SD029-001		137.000	N	n/a	
Metals								
Aluminum		12820	SD029-001	*	6410.0	N	n/a	
Antimony	12	5.28	SD029-001	#*	25.90	Y	Y	
Arsenic		12.040	SD029-001	*	13.30	N	n/a	
Barium		78.26	SD028-001		196.00	N	n/a	
Cadmium	1	0.51	SD029-001	*	9.3000	Y	Y	
Calcium		17475.33	SD029-001	*	12700 0	N	n/a	
Chromium		17.78	SD029-001	*	473.00	Y	Y	
Cobalt		13.56	SD029-001	#*	14.100	N	n/a	
Copper		23.07	SD028-001	*	1810 00	Y	Y	
Cyanide	0.5	0.25	SD028-001	*	37.40	Y	Y	
Iron		26100	SD029-001	*	71900.000	N	n/a	

TABLE 2-2
SIGNIFICANCE ABOVE BACKGROUND

PMU 2 - INDUSTRIAL WASTE SYSTEM
OIL / WATER SEPARATOR PITS (UST-02-01)
NASA LEWIS RESEARCH CENTER
PHASE I RI/FS

Compound	Background Sample SQL	Background Sample Conc	Release Sample Sample#	Release Sample SQL	Release Sample Conc	Signif.?	Attrib. to Site?	Comments
Lead		17.12	SD028-001	*	345.000	Y	Y	
Magnesium		5576	SD029-001	*#	2610.000	N	n/a	
Manganese		423.53	SD029-001	*	467.0	N	n/a	
Mercury	1	0.05	SD028-001	*	22.5	Y	Y	
Nickel		28.87	SD029-001	*	94.90	Y	Y	
Potassium		1621.27	SD029-001	#*	951.00	N	n/a	
Selenium		0.23	SD028-001	#*	1.700	Y	Y	
Silver	2	1	SD028-001	*	680.000	Y	Y	
Sodium		145	SD030-001	*#	525.000	Y	Y	
Thallium	2.00	0.39	SD028-001	*	0.730	N	n/a	
Vanadium		24.14	SD029-001	#*	8.600	N	n/a	
Zinc		75.01	SD029-001	*	4040.0000	Y	Y	
Radioactivity								
Alpha Particle Radioactivity			SD030-001		55	N	n/a	
Beta Particle Radioactivity			SD030-001		67	N	n/a	
General Chemistry								

Notes:
mean of background samples collected from shallow upland was used as background
all conc's. in ppm * J-flagged release sample data blank SQLs imply that Sample Conc. > Sample SQL

TABLE 2-2
SIGNIFICANCE ABOVE BACKGROUND

PMU 2 - INDUSTRIAL WASTE SYSTEM
OIL / WATER SEPARATOR PITS (UST-02-01)
NASA LEWIS RESEARCH CENTER
PHASE I RI/FS

Compound	Background Sample SQL	Background Sample Conc	Release Sample Sample#	Release Sample SQL	Release Sample Conc	Signif.?	Attrib. to Site?	Comments
SURFACE WATER								
VOCs								
1,1,1-Trichloroethane		0.2	SW024-001		0.058	N	n/a	
1,1-Dichloroethane		0.007	SW024-001		0.018	N	n/a	
2-Butanone			SW023-001	*	0.010	Y	Y	
Bromodichloromethane		0.1	SW023-001	*	0.006	N	n/a	
Bromoform		0.1	SW023-001		0.012	N	n/a	
Chloroform		0.1	SW023-001	*	0.007	N	n/a	
Dibromochloromethane			SW023-001	*	0.006	Y	Y	
Methylene Chloride		0.005	SW024-001	*	0.006	N	n/a	
Trichloroethene		0.005	SW024-001	*	0.005	N	n/a	
SVOCs								
2-Nitroaniline			SW023-001	*	0.025	Y	Y	
4-Nitrophenol			SW023-001	*	0.025	Y	Y	
Di-n-Butyl Phthalate			SW024-001	*	0.002	Y	Y	
Pentachlorophenol		0.001	SW023-001	*	0.025	Y	Y	
Pyrene			SW024-001	*	0.001	Y	Y	
bis(2-Ethylhexyl)Phthalate		0.006	SW024-001	*	0.004	N	n/a	
Metals								
Aluminum		0.21	SW022-001		3.6	Y	Y	
Antimony		0.006	SW022-001	#	0.02	N	n/a	
Arsenic		0.050	SW022-001	#	0.01	N	n/a	
Barium		2	SW022-001		0.94	N	n/a	
Cadmium		0.005	SW022-001		0.0267	Y	Y	
Calcium			SW023-001		56 0	Y	Y	

TABLE 2-2
SIGNIFICANCE ABOVE BACKGROUND

PMU 2 - INDUSTRIAL WASTE SYSTEM
OIL / WATER SEPARATOR PITS (UST-02-01)
NASA LEWIS RESEARCH CENTER
PHASE I RI/FS

Compound	Background Sample SQL	Background Sample Conc	Release Sample Sample#	Release Sample SQL	Release Sample Conc	Signif.?	Attrib. to Site?	Comments
Chromium		0.1	SW022-001		0.18	N	n/a	
Cobalt			SW022-001	#	0.007	Y	Y	
Copper		1.3	SW022-001		15.90	Y	Y	
Iron		0.3	SW022-001		30.100	Y	Y	
Lead		0.015	SW022-001		0.855	Y	Y	
Magnesium			SW023-001		15.200	Y	Y	
Manganese		0.05	SW022-001		0.1	N	n/a	
Mercury		0.002	SW022-001		0.0	N	n/a	
Nickel		0.1	SW022-001		0.05	N	n/a	
Potassium			SW024-001		6.34	Y	Y	
Silver		0.1	SW022-001		2.670	Y	Y	
Sodium		20	SW022-001		32.000	N	n/a	
Vanadium			SW022-001	#	0.008	Y	Y	
Zinc		5	SW022-001		10.3000	N	n/a	
Radioactivity								
Alpha Particle Radioactivity			SW023-001		10	Y	Y	
Beta Particle Radioactivity			SW024-001		12	Y	Y	
General Chemistry								
Ammonia			SW022-001		1.00	Y	Y	
Bromide			SW023-001		4.00	Y	Y	
Chemical Oxygen Demand			SW022-001		15000.00	Y	Y	
Chloride		250	SW022-001		65.00	N	n/a	
Fluoride		40	SW023-001		1.70	N	n/a	
MBAs		0.5	SW022-001		0.2690	N	n/a	
Nitrate / Nitrite		10	SW023-001		1.50	N	n/a	

TABLE 2-2
SIGNIFICANCE ABOVE BACKGROUND

PMU 2 - INDUSTRIAL WASTE SYSTEM
OIL / WATER SEPARATOR PITS (UST-02-01)
NASA LEWIS RESEARCH CENTER
PHASE I RI/FS

Compound	Background Sample SQL	Background Sample Conc	Release Sample Sample#	Release Sample SQL	Release Sample Conc	Signif.?	Attrib. to Site?	Comments
Oil and Grease			SW022-001		14000.00	Y	Y	
Total Phosphorous			SW022-001		1.50	Y	Y	
Sulfate		250	SW022-001		50.00	N	n/a	
Total Dissolved Solids		500	SW022-001		750.00	N	n/a	
Total Suspended Solids			SW022-001		1400.00	Y	Y	

Notes:
MCLs for water used as background

PMU 3

Record Information

1. Site Name: NASA LeRC PMU3 - Storm Sewer System
   (as entered in CERCLIS)

2. Site CERCLIS Number:

3. Site Reviewer: KW Valek / RC Callahan / C Sivaprakash

4. Date: 11/22/95

5. Site Location: Cleveland/Cuyahoga/Ohio
   (City/County,State)

6. Congressional District:

7. Site Coordinates: Single

   Latitude: 41 24'45.0" Longitude: 81

Site Description

1. Setting: Urban

2. Current Owner: Federal

3. Current Site Status: Active

4. Years of Operation: Active Site , from and to dates: Since 1941

5. How Initially Identified: Other - Preliminary Assessment

6. Entity Responsible for Waste Generation:

   - Federal Facility
   - Other

7. Site Activities/Waste Deposition:

   - Discharge to Sewer/Surface Water
   - Spill

Waste Description

8. Wastes Deposited or Detected Onsite:

- Organic Chemicals
- Inorganic Chemicals
- Solvents
- Metals
- Oily Waste
- PCBs

Response Actions

9. Response/Removal Actions:

RCRA Information

10. For All Active Facilities, RCRA Site Status:

- Not Applicable

Demographic Information

11. Workers Present Onsite: Yes

12. Distance to Nearest Non-Worker Individual: > 1/4 - 1/2 Mile

13. Residential Population Within 1 Mile: 4000.0

14. Residential Population Within 4 Miles: 10000.0

Water Use Information

15. Local Drinking Water Supply Source:

- Ground Water (within 4 mile distance limit)
- Surface Water (within 15 mile distance limit)

16. Total Population Served by Local Drinking Water Supply Source: 1500000.0

17. Drinking Water Supply System Type for Local Drinking Water Supply Sources:

    - Municipal (Services over 25 People)

18. Surface Water Adjacent to/Draining Site:

    - Stream
    - River

HRS DOCUMENTATION RECORD

NASA LeRC PMU3 - Storm Sewer System - 11/22/95

1. Site Name: NASA LeRC PMU3 - Storm Sewer System
   (as entered in CERCLIS)

2. Site CERCLIS Number:

3. Site Reviewer: KW Valek / RC Callahan / C Sivaprakash

4. Date: 11/22/95

5. Site Location: Cleveland/Cuyahoga/Ohio
   (City/County,State)

6. Congressional District:

7. Site Coordinates: Single

   Latitude: 41 24'45.0" Longitude: 81

	Score
Ground Water Migration Pathway Score (Sgw)	0.11
Surface Water Migration Pathway Score (Ssw)	0.11
Soil Exposure Pathway Score (Ss)	0.00
Air Migration Pathway Score (Sa)	0.00

Site Score	0.08

NOTE

EPA uses the terms "facility," "site," and "release" interchangeably. The term "facility" is broadly defined in CERCLA to include any area where hazardous substances have "come to be located" (CERCLA Section 109(9)), and the listing process is not intended to define or reflect boundaries of such facilities or releases. Site names, and references to specific parcels or properties, are provided for general identification purposes only. Knowledge regarding the extent of sites will be refined as more information is developed during the RI/FS and even during implementation of the remedy.

GROUND WATER MIGRATION PATHWAY SCORESHEET
NASA LeRC PMU3 - Storm Sewer System - 11/22/95

GROUND WATER MIGRATION PATHWAY Factor Categories & Factors	Maximum Value	Value Assigned
Likelihood of Release to an Aquifer Aquifer: Shale Bedrock Aquife		
1. Observed Release	550	0
2. Potential to Release		
2a. Containment	10	7
2b. Net Precipitation	10	3
2c. Depth to Aquifer	5	3
2d. Travel Time	35	15
2e. Potential to Release [lines 2a(2b+2c+2d)]	500	147
3. Likelihood of Release	550	147
Waste Characteristics		
4. Toxicity/Mobility	*	2.00E+03
5. Hazardous Waste Quantity	*	10
6. Waste Characteristics	100	10
Targets		
7. Nearest Well	50	5.00E+00
8. Population		
8a. Level I Concentrations	**	0.00E+00
8b. Level II Concentrations	**	0.00E+00
8c. Potential Contamination	**	1.00E+00
8d. Population (lines 8a+8b+8c)	**	1.00E+00
9. Resources	5	0.00E+00
10. Wellhead Protection Area	20	0.00E+00
11. Targets (lines 7+8d+9+10)	**	6.00E+00
12. Targets (including overlaying aquifers)	**	6.00E+00
13. Aquifer Score	100	0.11
GROUND WATER MIGRATION PATHWAY SCORE (Sgw)	100	0.11

* Maximum value applies to waste characteristics category.
** Maximum value not applicable.

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORESHEET
NASA LeRC PMU3 - Storm Sewer System - 11/22/95

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT Factor Categories & Factors DRINKING WATER THREAT	Maximum Value	Value Assigned
Likelihood of Release		
1. Observed Release	550	0
2. Potential to Release by Overland Flow		
2a. Containment	10	0
2b. Runoff	25	7
2c. Distance to Surface Water	25	25
2d. Potential to Release by Overland Flow [lines 2a(2b+2c)]	500	0
3. Potential to Release by Flood		
3a. Containment (Flood)	10	0
3b. Flood Frequency	50	0
3c. Potential to Release by Flood (lines 3a x 3b)	500	0
4. Potential to Release (lines 2d+3c)	500	0
5. Likelihood of Release	550	0
Waste Characteristics		
6. Toxicity/Persistence	*	0.00E+00
7. Hazardous Waste Quantity	*	0
8. Waste Characteristics	100	0
Targets		
9. Nearest Intake	50	0.00E+00
10. Population		
10a. Level I Concentrations	**	0.00E+00
10b. Level II Concentrations	**	0.00E+00
10c. Potential Contamination	**	2.00E+00
10d. Population (lines 10a+10b+10c)	**	2.00E+00
11. Resources	5	5.00E+00
12. Targets (lines 9+10d+11)	**	7.00E+00
13. DRINKING WATER THREAT SCORE	100	0.00

* Maximum value applies to waste characteristics category.
** Maximum value not applicable.

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORESHEET
NASA LeRC PMU3 - Storm Sewer System - 11/22/95

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT Factor Categories & Factors HUMAN FOOD CHAIN THREAT	Maximum Value	Value Assigned
Likelihood of Release		
14. Likelihood of Release (same as line 5)	550	0
Waste Characteristics		
15. Toxicity/Persistence/Bioaccumulation	*	0.00E+00
16. Hazardous Waste Quantity	*	0
17. Waste Characteristics	1000	0
Targets		
18. Food Chain Individual	50	0.00E+00
19. Population		
19a. Level I Concentrations	**	0.00E+00
19b. Level II Concentrations	**	0.00E+00
19c. Pot. Human Food Chain Contamination	**	3.31E-03
19d. Population (lines 19a+19b+19c)	**	3.31E-03
20. Targets (lines 18+19d)	**	3.31E-03
21. HUMAN FOOD CHAIN THREAT SCORE	100	0.00

* Maximum value applies to waste characteristics category.
** Maximum value not applicable.

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORESHEET
NASA LeRC PMU3 - Storm Sewer System - 11/22/95

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT Factor Categories & Factors ENVIRONMENTAL THREAT	Maximum Value	Value Assigned
Likelihood of Release		
22. Likelihood of Release (same as line 5)	550	0
Waste Characteristics		
23. Ecosystem Toxicity/Persistence/Bioacc.	*	0.00E+00
24. Hazardous Waste Quantity	*	0
25. Waste Characteristics	1000	0
Targets		
26. Sensitive Environments		
26a. Level I Concentrations	**	0.00E+00
26b. Level II Concentrations	**	0.00E+00
26c. Potential Contamination	**	0.00E+00
26d. Sensitive Environments (lines 26a+26b+26c)	**	0.00E+00
27. Targets (line 26d)	**	0.00E+00
28. ENVIRONMENTAL THREAT SCORE	60	0.00
29. WATERSHED SCORE	100	0.00
30. SW: OVERLAND/FLOOD COMPONENT SCORE (Sof)	100	0.00

* Maximum value applies to waste characteristics category.
** Maximum value not applicable.

GROUND WATER TO SURFACE WATER MIGRATION COMPONENT SCORESHEET
NASA LeRC PMU3 - Storm Sewer System - 11/22/95

GROUND WATER TO SURFACE WATER MIGRATION COMPONENT Factor Categories & Factors DRINKING WATER THREAT	Maximum Value	Value Assigned
Likelihood of Release to Aquifer Aquifer: Shale Bedrock Aquife		
1. Observed Release	550	0
2. Potential to Release		
2a. Containment	10	7
2b. Net Precipitation	10	3
2c. Depth to Aquifer	5	3
2d. Travel Time	35	15
2e. Potential to Release [lines 2a(2b+2c+2d)]	500	147
3. Likelihood of Release	550	147
Waste Characteristics		
4. Toxicity/Mobility/Persistence	*	2.00E+03
5. Hazardous Waste Quantity	*	10
6. Waste Characteristics	100	10
Targets		
7. Nearest Intake	50	0.00E+00
8. Population		
8a. Level I Concentrations	**	0.00E+00
8b. Level II Concentrations	**	0.00E+00
8c. Potential Contamination	**	1.00E+00
8d. Population (lines 8a+8b+8c)	**	1.00E+00
9. Resources	5	5.00E+00
10. Targets (lines 7+8d+9)	**	6.00E+00
11. DRINKING WATER THREAT SCORE	100	0.11

* Maximum value applies to waste characteristics category.
** Maximum value not applicable.

GROUND WATER TO SURFACE WATER MIGRATION COMPONENT SCORESHEET
NASA LeRC PMU3 - Storm Sewer System - 11/22/95

GROUND WATER TO SURFACE WATER MIGRATION COMPONENT Factor Categories & Factors HUMAN FOOD CHAIN THREAT	Maximum Value	Value Assigned
Likelihood of Release		
12. Likelihood of Release (same as line 3)	550	147
Waste Characteristics		
13. Toxicity/Mobility/Persistence/Bioacc.	*	1.00E+07
14. Hazardous Waste Quantity	*	10
15. Waste Characteristics	1000	100
Targets		
16. Food Chain Individual	50	0.00E+00
17. Population		
17a. Level I Concentrations	**	0.00E+00
17b. Level II Concentrations	**	0.00E+00
17c. Pot. Human Food Chain Contamination	**	2.32E-03
17d. Population (lines 17a+17b+17c)	**	2.32E-03
18. Targets (lines 16+17d)	**	2.32E-03
19. HUMAN FOOD CHAIN THREAT SCORE	100	0.00

* Maximum value applies to waste characteristics category.
** Maximum value not applicable.

GROUND WATER TO SURFACE WATER MIGRATION COMPONENT SCORESHEET
NASA LeRC PMU3 - Storm Sewer System - 11/22/95

GROUND WATER TO SURFACE WATER MIGRATION COMPONENT Factor Categories & Factors ENVIRONMENTAL THREAT	Maximum Value	Value Assigned
Likelihood of Release		
20. Likelihood of Release (same as line 3)	550	147
Waste Characteristics		
21. Ecosystem Tox./Mobility/Persist./Bioacc.	*	1.00E+06
22. Hazardous Waste Quantity	*	10
23. Waste Characteristics	1000	56
Targets		
24. Sensitive Environments		
24a. Level I Concentrations	**	0.00E+00
24b. Level II Concentrations	**	0.00E+00
24c. Potential Contamination	**	0.00E+00
24d. Sensitive Environments (lines 24a+24b+24c)	**	0.00E+00
25. Targets (line 24d)	**	0.00E+00
26. ENVIRONMENTAL THREAT SCORE	60	0.00
27. WATERSHED SCORE	100	0.11
28. SW: GW to SW COMPONENT SCORE (Sgs)	100	0.11

* Maximum value applies to waste characteristics category.
** Maximum value not applicable.

SOIL EXPOSURE PATHWAY SCORESHEET
NASA LeRC PMU3 - Storm Sewer System - 11/22/95

SOIL EXPOSURE PATHWAY Factor Categories & Factors RESIDENT POPULATION THREAT	Maximum Value	Value Assigned
Likelihood of Exposure		
1. Likelihood of Exposure	550	0
Waste Characteristics		
2. Toxicity	*	0.00E+00
3. Hazardous Waste Quantity	*	0
4. Waste Characteristics	100	0
Targets		
5. Resident Individual	50	0.00E+00
6. Resident Population		
6a. Level I Concentrations	**	0.00E+00
6b. Level II Concentrations	**	0.00E+00
6c. Resident Population (lines 6a+6b)	**	0.00E+00
7. Workers	15	0.00E+00
8. Resources	5	0.00E+00
9. Terrestrial Sensitive Environments	***	0.00E+00
10. Targets (lines 5+6c+7+8+9)	**	0.00E+00
11. RESIDENT POPULATION THREAT SCORE	**	0.00E+00

* Maximum value applies to waste characteristics category.
** Maximum value not applicable.
*** No specific maximum value applies, see HRS for details.

SOIL EXPOSURE PATHWAY SCORESHEET
NASA LeRC PMU3 - Storm Sewer System - 11/22/95

SOIL EXPOSURE PATHWAY Factor Categories & Factors NEARBY POPULATION THREAT	Maximum Value	Value Assigned
Likelihood of Exposure		
12. Attractiveness/Accessibility	100	0.00E+00
13. Area of Contamination	100	0.00E+00
14. Likelihood of Exposure	500	0.00E+00
Waste Characteristics		
15. Toxicity	*	0.00E+00
16. Hazardous Waste Quantity	*	0
17. Waste Characteristics	100	0
Targets		
18. Nearby Individual	1	1.00E+00
19. Population Within 1 Mile	**	3.00E+01
20. Targets (lines 18+19)	**	3.10E+01
21. NEARBY POPULATION THREAT SCORE	**	0.00E+00
SOIL EXPOSURE PATHWAY SCORE (Ss)	100	0.00

* Maximum value applies to waste characteristics category.
** Maximum value not applicable.

AIR PATHWAY SCORESHEET

NASA LeRC PMU3 - Storm Sewer System - 11/22/95

AIR MIGRATION PATHWAY Factor Categories & Factors	Maximum Value	Value Assigned
Likelihood of Release		
1. Observed Release	550	0
2. Potential to Release		
2a. Gas Potential to Release	500	0
2b. Particulate Potential to Release	500	0
2c. Potential to Release	500	0
3. Likelihood of Release	550	0
Waste Characteristics		
4. Toxicity/Mobility	*	0.00E+00
5. Hazardous Waste Quantity	*	0
6. Waste Characteristics	100	0
Targets		
7. Nearest Individual	50	7.00E+00
8. Population		
8a. Level I Concentrations	**	0.00E+00
8b. Level II Concentrations	**	0.00E+00
8c. Potential Contamination	**	2.72E+02
8d. Population (lines 8a+8b+8c)	**	2.72E+02
9. Resources	5	0.00E+00
10. Sensitive Environments		
10a. Actual Contamination	***	0.00E+00
10b. Potential Contamination	***	0.00E+00
10c. Sens. Environments(lines 10a+10b)	***	0.00E+00
11. Targets (lines 7+8d+9+10c)	**	2.79E+02
AIR MIGRATION PATHWAY SCORE (Sa)	100	0.00E+00

* Maximum value applies to waste characteristics category.
** Maximum value not applicable.
*** No specific maximum value applies, see HRS for details.

1. WASTESTREAM QUANTITY SUMMARY TABLE, SOURCE: Storm Sewer Syst

a. Wastestream ID	Contam. Water
b. Hazardous Constituent Quantity (C) (lbs.)	0.12
c. Data Complete?	NO
d. Hazardous Wastestream Quantity (W) (lbs.)	1000.00
e. Data Complete?	NO
f. Wastestream Quantity Value (W/5,000)	2.00E-01

Wastestream Constituent Hazardous Substances	Concent.	Units	Liquid	Qualifier
Acetone	2.3E+00	ppm	NO	
Aluminum	1.0E+00	ppm	NO	
Benzofluoranthene, 3,4-	1.0E-03	ppm	NO	J
Bis (2-ethylhexyl) phthalate	2.2E-02	ppm	NO	J
Cadmium	3.3E-03	ppm	NO	#
Chloromethane	1.0E-02	ppm	NO	J
Chrysene	1.0E-03	ppm	NO	J
Cobalt	2.6E-03	ppm	NO	#
Di-n-butyl phthalate	2.0E-03	ppm	NO	J
Dibromochloromethane	2.0E-03	ppm	NO	J
Iron	3.4E+00	ppm	NO	
Magnesium	1.1E+02	ppm	NO	
Manganese	7.1E-01	ppm	NO	
Naphthalene	3.0E-03	ppm	NO	J
Nickel	1.1E-02	ppm	NO	#
Nitrophenol, 4-	2.5E-02	ppm	NO	J
Pentachlorophenol	2.5E-02	ppm	NO	J
Phenanthrene	1.0E-03	ppm	NO	J
Phenol	2.0E-03	ppm	NO	J
Pyrene	2.0E-03	ppm	NO	J
Trichloroethane, 1,1,1-	1.0E-03	ppm	NO	J
Trichlorophenol, 2,3,5-	2.0E-03	ppm	NO	J
Vanadium	4.4E-03	ppm	NO	#
Vinyl chloride	1.0E-02	ppm	NO	J

Documentation for Constituents:

See Table 5-14 of the RI/FS Report for analytical data and Table 3-1 of the HRS Report for the concentrations significantly above background. MCL's for water used as background. Where background values are not available any detected concentrations are considered significant.

Reference: 2,3

Documentation for Wastestream Quantity:

Total contribution to volume of flow in stream is considered to be less than 1%. See section 3.4.1 Phase I RI/FS.

Reference:

2. SOURCE HAZARDOUS WASTE QUANTITY FACTOR TABLE

a. Source ID	Storm Sewer Syst	
b. Source Type	Other	
c. Secondary Source Type	N.A.	
d. Source Vol.(yd3/gal) | Source Area (ft2)	0.00	0.00
e. Source Volume/Area Value	0.00E+00	
f. Source Hazardous Constituent Quantity (HCQ) Value (sum of 1b)	1.18E-01	
g. Data Complete?	NO	
h. Source Hazardous Wastestream Quantity (WSQ) Value (sum of 1f)	2.00E-01	
i. Data Complete?	NO	
k. Source Hazardous Waste Quantity (HWQ) Value (2e, 2f, or 2h)	2.00E-01	

Documentation for Source Hazardous Substances:

Storm sewer system is deeper than two feet in soil.

Reference: 2,3

3. SITE HAZARDOUS WASTE QUANTITY SUMMARY

No.	Source ID	Migration Pathways	Vol. or Area Value (2e)	Constituent or Wastestream Value (2f,2h)	Hazardous Waste Qty. Value (2k)
1	Storm Sewer Syst	GW	0.00E+00	2.00E-01	2.00E-01

4. PATHWAY HAZARDOUS WASTE QUANTITY AND WASTE CHARACTERISTICS SUMMARY TABLE

Migration Pathway	Contaminant Values		HWQVs*	WCVs**
Ground Water	Toxicity/Mobility	2.00E+03	10	10
SW: Overland Flow, DW	Tox./Persistence	0.00E+00	0	0
SW: Overland Flow, HFC	Tox./Persis./Bioacc.	0.00E+00	0	0
SW: Overland Flow, Env	Etox./Persis./Bioacc.	0.00E+00	0	0
SW: GW to SW, DW	Tox./Persistence	2.00E+03	10	10
SW: GW to SW, HFC	Tox./Persis./Bioacc.	1.00E+07	10	100
SW: GW to SW, Env	Etox./Persis./Bioacc.	1.00E+06	10	56
Soil Exposure:Resident	Toxicity	0.00E+00	0	0
Soil Exposure: Nearby	Toxicity	0.00E+00	0	0
Air	Toxicity/Mobility	0.00E+00	0	0

* Hazardous Waste Quantity Factor Values
** Waste Characteristics Factor Category Values

Note: SW = Surface Water
GW = Ground Water
DW = Drinking Water Threat
HFC = Human Food Chain Threat
Env = Environmental Threat

GROUND WATER PATHWAY AQUIFER SUMMARY
NASA LeRC PMU3 - Storm Sewer System - 11/22/95

No.	Aquifer ID	Type	Overlaying No.	Inter-Connected with	Likelihood of Release	Targets
1	Shale Bedrock Aquife	Non K	0	0	147	6.00E+00

Containment

No.	Source ID	HWQ Value	Containment Value
1	Storm Sewer Syst	2.00E-01	7

Containment Factor 7

Documentation for Ground Water Containment, Source Storm Sewer Syst:

No containment is reported. Unplanned releases have been suspected. See Section 4.3 of the RI/FS Report. Storm water system assumed to have maintained engineered cover and run-on/run-off control as per HRS Table 3-2.

Reference: 2

Net Precipitation

Net Precipitation (inches) N.A.

Aquifer: Shale Bedrock Aquifer

Type of Aquifer: Non Karst

Overlaying Aquifer: 0

Interconnected with: 0

Documentation for Shale Bedrock Aquifer Aquifer:

Drilling logs included in Appendix C of the RI/FS Report indicate the bedrock to be shale. Other water bearing zones are reported to be perched water zones which are laterally discontinuous and are not significant for HRS purposes.

Reference: 2

OBSERVED RELEASE

No.	Well ID	Well Type	Distance (miles)	Level of Contamination

- N/A and/or data not specified

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Observed Release Factor 0

Documentation for Well :

No significant compounds detected in groundwater were detected at significant levels in outfall samples.

Reference:

POTENTIAL TO RELEASE

Containment

Containment Factor	7	

Net Precipitation

Net Precipitation Factor	3	

Depth to Aquifer

A. Depth of Hazardous Substances	0.00	feet
B. Depth to Aquifer from Surface	30.00	feet

Documentation for Depth to Aquifer from Surface :

Average depth to bedrock as per Phase i RI/FS.

Reference:

C. Depth to Aquifer (B - A)	30.00	feet
Depth to Aquifer Factor	3	

Travel Time

Are All Layers Karst?	NO	
Thickness of Layer(s) with Lowest Conductivity	30.00	feet

Documentation for Thickness of Layers with Lowest Conductivity:

Soil from surface to bedrock consists primarily of clay and silty clays.

Reference:

Hydraulic Conductivity (cm/sec)	1.0E-06

Documentation for Hydraulic Conductivity:

HRS Table 3-6

Reference:

Travel Time Factor	15

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Potential to Release Factor 147

Source: 1 Storm Sewer Syst

Source Hazardous Waste Quantity Value: 0.20

Hazardous Substance	Toxicity Value	Mobility Value	Toxicity/ Mobility Value
Acetone	10	1.00E+00	1.00E+01
Aluminum	100	2.00E-05	2.00E-03
Benzofluoranthene, 3,4-	10000	2.00E-09	2.00E-05
Bis (2-ethylhexyl) phthalate	100	2.00E-07	2.00E-05
Cadmium	10000	2.00E-01	2.00E+03
Chloromethane	10	1.00E+00	1.00E+01
Chrysene	100	2.00E-09	2.00E-07
Cobalt	1	1.00E-02	1.00E-02
Di-n-butyl phthalate	10	2.00E-03	2.00E-02
Dibromochloromethane	100	1.00E-02	1.00E+00
Iron	100	1.00E-02	1.00E+00
Magnesium	100	2.00E-05	2.00E-03
Manganese	10000	1.00E-02	1.00E+02
Naphthalene	1	2.00E-03	2.00E-03
Nickel	100	2.00E-05	2.00E-03
Nitrophenol, 4-	1	1.00E+00	1.00E+00
Pentachlorophenol	100	1.00E-02	1.00E+00
Phenanthrene	100	2.00E-05	2.00E-03
Phenol	1	1.00E+00	1.00E+00
Pyrene	100	2.00E-09	2.00E-07
Trichloroethane, 1,1,1-	1	1.00E-02	1.00E-02
Trichlorophenol, 2,3,5-	100	2.00E-05	2.00E-03
Vanadium	100	2.00E-07	2.00E-05
Vinyl chloride	10000	1.00E-02	1.00E+02

Hazardous Substances Found in an Observed Release

Well No.	Observed Release Hazardous Substance	Toxicity Value	Mobility Value	Toxicity/ Mobility Value

- N/A and/or data not specified

Toxicity/Mobility Value from Source Hazardous Substances:	2.00E+03
Toxicity/Mobility Value from Observed Release Hazardous Substances:	0.00E+00
Toxicity/Mobility Factor:	2.00E+03
Sum of Source Hazardous Waste Quantity Values:	2.00E-01
Hazardous Waste Quantity Factor:	10
Waste Characteristics Factor Category:	10

Population by Well

No.	Well ID	Sample Type	Distance (miles)	Level of Contamination	Population

- N/A and/or data not specified

Level I Population Factor: 0.00

Level II Population Factor: 0.00

Potential Contamination by Distance Category

Distance Category (miles)	Population	Value
> 0 to 1/4	0.0	0.00E+00
> 1/4 to 1/2	0.0	0.00E+00
> 1/2 to 1	0.0	0.00E+00
> 1 to 2	50.0	1.00E+00
> 2 to 3	0.0	0.00E+00
> 3 to 4	0.0	0.00E+00

Potential Contamination Factor: 1.000

Nearest Well

Level of Contamination: Potential
Distance in miles: 1.50

Nearest Well Factor: 5.00E+00

Documentation for Nearest Well:

The closest water well on record with the Ohio Division of Water is located 1/4 miles west of the LeRC site boundary on Cleveland Hopkins International Airport property. This is inactive. Only 7 permitted drinking water wells were identified within 4 miles of LeRC. These wells are located between 1.5 and 3 miles south and southeast of LeRC and serve an estimated 50 individuals. See section 3.3 and 3.8.2 of the RI/FS Report.

Reference: 2

Resources

Resource Use: NO

Resource Factor: 0.00E+00

Documentation for Resources:

Groundwater is not a primary drinking source in this area. See section 3.3 of the RI/FS Report.

Reference: 2

Wellhead Protection Area

No wellhead protection area

Wellhead Protection Area Factor: 0.00E+00

Documentation for Wellhead Protection Area:

Criteria specified in Section 3.3.4 of the HRS Guidance Manual does not apply.

Reference: 1

SURFACE WATER PATHWAY SEGMENT SUMMARY
NASA LeRC PMU3 - Storm Sewer System - 11/22/95

No.	Segment ID	Segment Type	Water Type	Start Point (mi)	End Point (mi)	Average Flow (cfs)
1	Unnamed Tributary	River	Fresh	0.00	0.28	1
2	Abram Creek	River	Fresh	0.28	1.47	12
3	Rocky River	River	Fresh	1.47	9.76	112
4	Lake Erie	Moderate D	Fresh	9.76	15.00	N.A.

Documentation for segment: Unnamed Tributary:

Table 3-3 flow measurements; Phase I RI/FS

Reference:

Documentation for segment: Abram Creek:

Table 3-3 flow measurements; Phase I RI/FS

Reference:

Documentation for segment: Rocky River:

Table 3-3 flow measurements; Phase I RI/FS

Reference:

SURFACE WATER PATHWAY OVERLAND FLOW/FLOOD COMPONENT LIKELIHOOD OF RELEASE

NASA LeRC PMU3 - Storm Sewer System - 11/22/95

OBSERVED RELEASE

No.	Sample ID	Sample Type	Distance (miles)	Level of Contamination DW	HFC	Env

- N/A and/or data not specified

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Observed Release Factor 0

POTENTIAL TO RELEASE

Potential to Release by Overland Flow

Containment

No.	Source ID	HWQ Value	Containment Value

- N/A and/or data not specified

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Containment Factor: 0

Documentation for Overland Flow Containment, Source Storm Sewer Syst:

Storm sewer system collects stormwater from surface water runoff. Most of the surface water discharges from outfalls along Abram Creek and Rocky River. See section 3.4 of the RI/FS Report

Reference: 2

Distance to Surface Water

Distance to Surface Water: 0.0 feet

Distance to Surface Water Factor: 25

Runoff

A. Drainage Area: 350.0 acres

Documentation for Drainage Area:

Facility's entire acreage, Section 3.0 Phase I RI/FS. Worst case scenario

Reference:

B. 2-year, 24-hour Rainfall: 2.8 inches

Documentation for Rainfall:

See Section 3.5 of the RI/FS Report for the precipitation information.

Reference: 2

C. Soil Group: D
Fine-textured soils with very low infiltration rates

Runoff Factor: 7

==========

SURFACE WATER PATHWAY OVERLAND FLOW/FLOOD COMPONENT LIKELIHOOD OF RELEASE

NASA LeRC PMU3 - Storm Sewer System - 11/22/95

Potential to Release by Overland Flow Factor: 0

Potential to Release by Flood

No.	Source ID	HWQ Value	Flood Containment Value	Flood Frequency Value	Potential to Release by Flood

- N/A and/or data not specified

==========

Potential to Release by Flood Factor: 0

Documentation for Flood Containment, Source Storm Sewer Syst:

See Section 3.4 of the RI/FS Report.

Reference: 2

Documentation for Flood Frequency, Source Storm Sewer Syst:

See Section 3.4 of the RI/FS Report.

Reference: 2

Hazardous Substance	Toxicity Value	Persistence Value	Toxicity/ Persistence Value

Hazardous Substances Found in an Observed Release

Sample No.	Observed Release Hazardous Substance	Toxicity Value	Persistence Value	Toxicity/ Persistence Value

- N/A and/or data not specified

- N/A and/or data not specified

Toxicity/Persistence Value from Observed Release Hazardous Substances:	0.00E+00
Toxicity/Persistence Factor:	0.00E+00
Sum of Source Hazardous Waste Quantity Values:	0.00E+00
Hazardous Waste Quantity Factor:	0
Waste Characteristics Factor Category:	0

SW PATHWAY: OVERLAND FLOW/FLOOD COMPONENT DRINKING WATER THREAT TARGETS

Level I Concentrations

- N/A and/or data not specified

Level II Concentrations

- N/A and/or data not specified

Most Distant Level I Sample

- N/A and/or data not specified

Most Distant Level II Sample

- N/A and/or data not specified

NASA LeRC PMU3 - Storm Sewer System - 11/22/95

Level I Concentrations

Intake	Distance Along the In-water Segment from the Probable Point of Entry (miles)	Population
- N/A and/or data not specified		

Population Served by Level I Intakes: 0.0

Level I Population Factor: 0.00E+00

NASA LeRC PMU3 - Storm Sewer System - 11/22/95

Level II Concentrations

Intake	Distance Along the In-water Segment from the Probable Point of Entry (miles)	Population

- N/A and/or data not specified

==========

Population Served by Level II Intakes: 0.0

Level II Population Factor: 0.00E+00

NASA LeRC PMU3 - Storm Sewer System - 11/22/95

Potential Contamination

Intake ID	Average Annual Flow (cfs)	Population Served
1 Crown Intake	0	375000.0
2 Division Intake	0	375000.0
3 Kirtland Intake	0	375000.0
4 Nottingham Intake	0	375000.0

Documentation for Intake Crown Intake:

See Section 3.8.1 of the RI/FS Report.Total population served 1.5 million divided equally among 4 intakes.

Reference: 2

Type of Surface Water Body	Total Population	Dilution-Weighted Population
Moderate Ocean Zone or Great Lake	1125000.0	16.0

Dilution-Weighted Population Served
by Potentially Contaminated Intakes: 16.0

Potential Contamination Factor: 2.0

Nearest Intake

Location of Nearest Drinking Water Intake: Crown Intake
Distance from the Probable Point of Entry: 12.60 miles
Type of Surface Water Body: Moderate D
Dilution Weight: 0.0000100
Highest Level of Contamination: Potential

Nearest Intake Factor: 0.00

Documentation for Crown Intake:

See Section 3.8.1 of the RI/FS Report.Total population served 1.5 million divided equally among 4 intakes.

Reference: 2

Resources

Resource Use: YES

Resource Value: 5.00E+00

SW PATHWAY: OVERLAND/FLOOD HUMAN FOOD CHAIN THREAT WASTE CHARACTERISTICS
NASA LeRC PMU3 - Storm Sewer System - 11/22/95

Hazardous Substance	Toxicity Value	Persistence Value	Bio-accum. Value	Toxicity/ Persistence/ Bioaccum. Value

Hazardous Substances Found in an Observed Release

Sample No.	Observed Release Hazardous Substance	Toxicity Value	Persistence Value	Bio-accum. Value	Toxicity/ Persistence/ Bioaccum. Value

- N/A and/or data not specified

Toxicity/Persistence/Bioaccumulation Value from Source Hazardous
- N/A and/or data not specified

Toxicity/Persistence/Bioaccumulation Value from Observed Release Hazardous Substances:	0.00E+00
Toxicity/Persistence/Bioaccumulation Factor:	0.00E+00
Sum of Source Hazardous Waste Quantity Values:	0.00E+00
Hazardous Waste Quantity Factor:	0
Waste Characteristics Factor Category:	0

SW PATHWAY: OVERLAND FLOW/FLOOD COMPONENT HUMAN FOOD CHAIN THREAT TARGETS

Level I Concentrations

- N/A and/or data not specified

Level II Concentrations

- N/A and/or data not specified

Most Distant Level I Sample

- N/A and/or data not specified

Most Distant Level II Sample

- N/A and/or data not specified

NASA LeRC PMU3 - Storm Sewer System - 11/22/95

Level I Concentrations

Fishery	Annual Production (pounds)	Human Food Chain Population Value
- N/A and/or data not specified		

Sum of Human Food Chain Population Values: 0.00E+00

Level I Concentrations Factor: 0.00E+00

NASA LeRC PMU3 - Storm Sewer System - 11/22/95

Level II Concentrations

Fishery	Annual Production (pounds)	Human Food Chain Population Value
- N/A and/or data not specified		

Sum of Human Food Chain Population Values: 0.00E+00

Level II Concentrations Factor: 0.00E+00

NASA LeRC PMU3 - Storm Sewer System - 11/22/95

Potential Contamination

Fishery	Annnual Production (pounds)	Type of Surface Water Body	Average Annual Flow (cfs)	Pop. Value (Pi)	Dilution Weight (Di)	Pi*Di
3 Rocky River	3000.0	River	112	3.0	1.00E-02	3.00E-02
4 Lake Erie	500000.0	Moderate	0	310.0	1.00E-05	3.10E-03

Sum of (Pi*Di): 3.31E-02

Potential Human Food Chain Contamination Factor: 3.31E-03

Food Chain Individual

Location of Nearest Fishery: Rocky River
Distance from the Probable Point of Entry: 1.47 miles
Type of Surface Water Body: River
Dilution Weight: 0.0100000
Level of Contamination: Potential

Food Chain Individual Factor: 0.00

Documentation for Rocky River:

Table 3-3 flow measurements; Phase I RI/FS

Reference:

Hazardous Substance	Eco-toxicity Value	Persistence Value	Bio-accum. Value	Ecotoxicity/ Persistence/ Bioaccum. Value

Hazardous Substances Found in an Observed Release

Sample No.	Observed Release Hazardous Substance	Eco-toxicity Value	Persistence Value	Bio-accum. Value	Ecotoxicity/ Persistence/ Bioaccum. Value

- N/A and/or data not specified

SW PATHWAY: OVERLAND FLOW/FLOOD ENVIRONMENTAL THREAT WASTE CHARACTERISTICS

NASA LeRC PMU3 - Storm Sewer System - 11/22/95

Ecotoxicity/Persistence/Bioaccummulation Value from Source
- N/A and/or data not specified

Ecotoxicity/Persistence/Bioaccummulation Value from Observed Release Hazardous Substances:	0.00E+00
Ecotoxicity/Persistence/Bioaccummulation Factor:	0.00E+00
Sum of Source Hazardous Waste Quantity Values:	0.00E+00
Hazardous Waste Quantity Factor:	0
Waste Characteristics Factor Category:	0

SW PATHWAY: OVERLAND FLOW/FLOOD COMPONENT ENVIRONMENTAL THREAT TARGETS

Level I Concentrations

- N/A and/or data not specified

Level II Concentrations

- N/A and/or data not specified

Most Distant Level I Sample

- N/A and/or data not specified

Most Distant Level II Sample

- N/A and/or data not specified

NASA LeRC PMU3 - Storm Sewer System - 11/22/95

Level I Concentrations

Sensitive Environment	Distance from Probable Point of Entry to Sensitive Env. (miles)	Sensitive Environment Value
- N/A and/or data not specified		

Sum of Sensitive Environments Values: 0

Wetlands

Wetland	Distance from Probable Point of Entry to Wetland (miles)	Wetlands Frontage (miles)
- N/A and/or data not specified		

Total Wetlands Frontage: 0.00 Miles Total Wetlands Value: 0

Sum of Sensitive Environments Value + Wetlands Value: 0.00E+00

Level I Concentrations Factor: 0.00E+00

NASA LeRC PMU3 - Storm Sewer System - 11/22/95

Level II Concentrations

Sensitive Environment	Distance from Probable Point of Entry to Sensitive Env. (miles)	Sensitive Environment Value
- N/A and/or data not specified		

Sum of Sensitive Environments Values: 0

Wetlands

Wetland	Distance from Probable Point of Entry to Wetland (miles)	Wetlands Frontage (miles)
- N/A and/or data not specified		

Total Wetlands Frontage: 0.00 Miles Total Wetlands Value: 0

Sum of Sensitive Environments Value + Wetlands Value: 0.00E+00

Level II Concentrations Factor: 0.00E+00

Potential Contamination

Sensitive Environments

Type of Surface Water Body	Sensitive Environment	Sensitive Environment Value

Wetlands

Type of Surface Water Body	Sensitive Environment	Wetlands Frontage	Wetlands Value

- N/A and/or data not specified

NASA LeRC PMU3 - Storm Sewer System - 11/22/95

Type of Surface Water Body	Sum of Sens. Environment Values(Sj)	Sum of Wetland Frontage Values(Wj)	Dilution Weight (Dj)	Dj(Wj+Sj)
- N/A and/or data not specified				

Sum of Dj(Wj+Sj): 0.00E+00
Sum of Dj(Wj+Sj)/10: 0.00E+00

==========

Potential Contamination Sensitive Environment Factor: 0.00E+00

SURFACE WATER PATHWAY GW TO SW CONTAINMENT SUMMARY
NASA LeRC PMU3 - Storm Sewer System - 11/22/95

Containment

No.	Source ID	HWQ Value	Containment Value
1	Storm Sewer Syst	2.00E-01	7

==========
Containment Factor 7

Documentation for Ground Water Containment, Source Storm Sewer Syst:

No containment is reported. Unplanned releases have been suspected. See Section 4.3 of the RI/FS Report. Storm water system assumed to have maintained engineered cover and run-on/run-off control as per HRS Table 3-2.

Reference: 2

Net Precipitation

Net Precipitation (inches) 0.00

Aquifer: Shale Bedrock Aquifer

Type of Aquifer: Non Karst

Overlaying Aquifer: 0

Interconnected with: 0

Documentation for Shale Bedrock Aquifer Aquifer:

Drilling logs included in Appendix C of the RI/FS Report indicate the bedrock to be shale. Other water bearing zones are reported to be perched water zones which are laterally discontinuous and are not significant for HRS purposes.

Reference: 2

OBSERVED RELEASE

No.	Well ID	Well Type	Distance (miles)	Level of Contamination
- N/A and/or data not specified				

==========

Observed Release Factor 0

Documentation for Well :

No significant compounds detected in groundwater were detected at significant levels in outfall samples.

Reference:

POTENTIAL TO RELEASE

Ground Water to Surface Water Angle

Probable Point of Entry	0.00	miles
Angle Theta	270	

Containment

Containment Factor	7

Net Precipitation

Net Precipitation Factor	3

Depth to Aquifer

A. Depth of Hazardous Substances	0.00	feet
B. Depth to Aquifer from Surface	30.00	feet

Documentation for Depth to Aquifer from Surface :

Average depth to bedrock as per Phase i RI/FS.

Reference:

C. Depth to Aquifer (B - A)	30.00	feet
Depth to Aquifer Factor	3	

Travel Time

Are All Layers Karst?	NO	
Thickness of Layer(s) with Lowest Conductivity	30.00	feet

Documentation for Thickness of Layers with Lowest Conductivity:

Soil from surface to bedrock consists primarily of clay and silty clays.

Reference:

Hydraulic Conductivity (cm/sec)	1.0E-06

Documentation for Hydraulic Conductivity:

HRS Table 3-6

Reference:

Travel Time Factor	15

==========

Potential to Release Factor 147

SW PATHWAY: GW TO SW COMPONENT DRINKING WATER THREAT WASTE CHARACTERISTICS
NASA LeRC PMU3 - Storm Sewer System - 11/22/95

Source: 1 Storm Sewer Syst

Source Hazardous Waste Quantity Value: 0.20

Hazardous Substance	Toxicity Factor Value	Persist. Value	Mobility Value	Toxicity/ Mobililty/ Persistence
Acetone	10	7.00E-04	1.00E+00	7.00E-03
Aluminum	0	1.00E+00	2.00E-05	0.00E+00
Benzofluoranthene, 3,4-	10000	1.00E+00	2.00E-09	2.00E-05
Bis (2-ethylhexyl) phthalate	100	1.00E+00	2.00E-07	2.00E-05
Cadmium	10000	1.00E+00	2.00E-01	2.00E+03
Chloromethane	10	7.00E-04	1.00E+00	7.00E-03
Chrysene	0	1.00E+00	2.00E-09	0.00E+00
Cobalt	1	1.00E+00	1.00E-02	1.00E-02
Di-n-butyl phthalate	10	1.00E+00	2.00E-03	2.00E-02
Dibromochloromethane	100	4.00E-01	1.00E-02	4.00E-01
Iron	0	1.00E+00	1.00E-02	0.00E+00
Magnesium	0	1.00E+00	2.00E-05	0.00E+00
Manganese	10000	1.00E+00	1.00E-02	1.00E+02
Naphthalene	1	4.00E-01	2.00E-03	8.00E-04
Nickel	100	1.00E+00	2.00E-05	2.00E-03
Nitrophenol, 4-	1	1.00E+00	1.00E+00	1.00E+00
Pentachlorophenol	100	1.00E+00	1.00E-02	1.00E+00
Phenanthrene	0	4.00E-01	2.00E-05	0.00E+00
Phenol	1	1.00E+00	1.00E+00	1.00E+00
Pyrene	100	1.00E+00	2.00E-09	2.00E-07
Trichloroethane, 1,1,1-	1	4.00E-01	1.00E-02	4.00E-03
Trichlorophenol, 2,3,5-	0	1.00E+00	2.00E-05	0.00E+00
Vanadium	100	1.00E+00	2.00E-07	2.00E-05
Vinyl chloride	10000	7.00E-04	1.00E-02	7.00E-02

Hazardous Substances Found in an Observed Release

Observed Release Hazardous Substance	Toxicity Factor Value	Persist. Value	Toxicity/ Persistence

- N/A and/or data not specified

Toxicity/Mobility/Persistence Value from Source Hazardous Substances:	2.00E+03
Toxicity/Mobility/Persistence Value from Observed Release Hazardous Substances:	0.00E+00
Toxicity/Mobility/Persistence Factor:	2.00E+03
Sum of Source Hazardous Waste Quantity Values:	0.00E+00
Hazardous Waste Quantity Factor:	10
Waste Characteristics Factor Category:	10

Level I Concentrations

- N/A and/or data not specified

Level II Concentrations

- N/A and/or data not specified

Most Distant Level I Sample

- N/A and/or data not specified

Most Distant Level II Sample

- N/A and/or data not specified

Level I Concentrations

Intake	Distance Along the In-water Segment from the Probable Point of Entry (miles)	Population

- N/A and/or data not specified

==========

Population Served by Level I Intakes: 0.0

Level I Population Factor: 0.00E+00

Level II Concentrations

Intake	Distance Along the In-water Segment from the Probable Point of Entry (miles)	Population
- N/A and/or data not specified		

==========

Population Served by Level II Intakes: 0.0

Level II Population Factor: 0.00E+00

Potential Contamination

Intake ID	Average Annual Flow (cfs)	Population Served
1 Crown Intake	0	375000.0
2 Division Intake	0	375000.0
3 Kirtland Intake	0	375000.0
4 Nottingham Intake	0	375000.0

Documentation for Intake Crown Intake:

See Section 3.8.1 of the RI/FS Report.Total population served 1.5 million divided equally among 4 intakes.

Reference: 2

Type of Surface Water Body	Total Population	Dilution-Weighted Population
Moderate Ocean Zone or Great Lake	1125000.0	16.0

Dilution-Weighted Population Served
by Potentially Contaminated Intakes: 16.0

Potential Contamination Factor: 1.0

Nearest Intake

Location of Nearest Drinking Water Intake: Crown Intake
Distance from the Probable Point of Entry: 12.60 miles
Type of Surface Water Body: Moderate D
Dilution Weight: 0.0000070
Highest Level of Contamination: Potential

Nearest Intake Factor: 0.00

Documentation for Crown Intake:

See Section 3.8.1 of the RI/FS Report.Total population served 1.5 million divided equally among 4 intakes.

Reference: 2

Resources

Resource Use: YES

Resource Value: 5.00E+00

SW PATHWAY: GW TO SW COMPONENT HUMAM FOOD CHAIN THREAT WASTE CHARACTERISTICS
NASA LeRC PMU3 - Storm Sewer System - 11/22/95

Source: 1 Storm Sewer Syst

Source Hazardous Waste Quantity Value: 0.20

Hazardous Substance	Toxicity Value	Persist. Value	Mobility Value	Bio-accum. Value	Tox./Mobil./ Persistence/ Bioaccum. Value
Acetone	10	7.00E-04	1.00E+00	5.00E-01	3.50E-03
Aluminum	0	1.00E+00	2.00E-05	5.00E+01	0.00E+00
Benzofluoranthene, 3,4-	10000	1.00E+00	2.00E-09	5.00E+04	1.00E+00
Bis (2-ethylhexyl) phthalate	100	1.00E+00	2.00E-07	5.00E+04	1.00E+00
Cadmium	10000	1.00E+00	2.00E-01	5.00E+03	1.00E+07
Chloromethane	10	7.00E-04	1.00E+00	5.00E+00	3.50E-02
Chrysene	0	1.00E+00	2.00E-09	5.00E+02	0.00E+00
Cobalt	1	1.00E+00	1.00E-02	5.00E-01	5.00E-03
Di-n-butyl phthalate	10	1.00E+00	2.00E-03	5.00E+03	1.00E+02
Dibromochloromethane	100	4.00E-01	1.00E-02	5.00E+01	2.00E+01
Iron	0	1.00E+00	1.00E-02	5.00E-01	0.00E+00
Magnesium	0	1.00E+00	2.00E-05	5.00E-01	0.00E+00
Manganese	10000	1.00E+00	1.00E-02	5.00E-01	5.00E+01
Naphthalene	1	4.00E-01	2.00E-03	5.00E+02	4.00E-01
Nickel	100	1.00E+00	2.00E-05	5.00E-01	1.00E-03
Nitrophenol, 4-	1	1.00E+00	1.00E+00	5.00E+00	5.00E+00
Pentachlorophenol	100	1.00E+00	1.00E-02	5.00E+02	5.00E+02
Phenanthrene	0	4.00E-01	2.00E-05	5.00E+01	0.00E+00
Phenol	1	1.00E+00	1.00E+00	5.00E+00	5.00E+00
Pyrene	100	1.00E+00	2.00E-09	5.00E+01	1.00E-05
Trichloroethane, 1,1,1-	1	4.00E-01	1.00E-02	5.00E+00	2.00E-02
Trichlorophenol, 2,3,5-	0	1.00E+00	2.00E-05	5.00E+03	0.00E+00
Vanadium	100	1.00E+00	2.00E-07	5.00E-01	1.00E-05
Vinyl chloride	10000	7.00E-04	1.00E-02	5.00E+00	3.50E-01

Hazardous Substances Found in an Observed Release

Observed Release Hazardous Substance	Toxicity Value	Persist. Value	Bio-accum. Value	Toxicity/ Persistence Bioaccum. Value

- N/A and/or data not specified

Toxicity/Mobility/Persistence/Bioaccumulation Value from Source Hazardous Substances:	1.00E+07
Toxicity/Mobility/Persistence/Bioaccumulation Value from Observed Release Hazardous Substances:	0.00E+00
Toxicity/Mobility/Persistence/Bioaccumulation Factor:	1.00E+07
Sum of Source Hazardous Waste Quantity Values:	0.00E+00
Hazardous Waste Quantity Factor:	10
Waste Characteristics Factor Category:	100

Level I Concentrations

- N/A and/or data not specified

Level II Concentrations

- N/A and/or data not specified

Most Distant Level I Sample

- N/A and/or data not specified

Most Distant Level II Sample

- N/A and/or data not specified

Level I Concentrations

Fishery	Annual Production (pounds)	Human Food Chain Population Value
- N/A and/or data not specified		

Sum of Human Food Chain Population Values: 0.00E+00

Level I Concentrations Factor: 0.00E+00

Level II Concentrations

Fishery	Annual Production (pounds)	Human Food Chain Population Value
- N/A and/or data not specified		

Sum of Human Food Chain Population Values: 0.00E+00

Level II Concentrations Factor: 0.00E+00

Potential Contamination

Fishery	Annnual Production (pounds)	Type of Surface Water Body	Average Annual Flow (cfs)	Pop. Value (Pi)	Dilution Weight (Di)	Pi*Di
3 Rocky River	3000.0	River	112	3.0	7.00E-03	2.10E-02
4 Lake Erie	500000.0	Moderate	0	310.0	7.00E-06	2.17E-03

Sum of (Pi*Di): 2.32E-02

Potential Human Food Chain Contamination Factor: 2.32E-03

Food Chain Individual

Location of Nearest Fishery: Rocky River
Distance from the Probable Point of Entry: 1.47 miles
Type of Surface Water Body: River
Dilution Weight: 0.0070000
Level of Contamination: Potential

Food Chain Individual Factor: 0.00

Documentation for Rocky River:

Table 3-3 flow measurements; Phase I RI/FS

Reference:

Source: 1 Storm Sewer Syst

Source Hazardous Waste Quantity Value: 0.20

Hazardous Substance	Eco-toxicity Value	Persist. Value	Mob. Value	Bio-accum. Value	Ecotoxicity/ Mobility/ Persistence/ Bioaccum. Value
Acetone	100	7.00E-04	1.00E+00	5.00E-01	3.50E-02
Aluminum	0	1.00E+00	2.00E-05	5.00E+01	0.00E+00
Benzofluoranthene, 3,4-	0	1.00E+00	2.00E-09	5.00E+04	0.00E+00
Bis (2-ethylhexyl) phthalate	1000	1.00E+00	2.00E-07	5.00E+04	1.00E+01
Cadmium	1000	1.00E+00	2.00E-01	5.00E+03	1.00E+06
Chloromethane	1	7.00E-04	1.00E+00	5.00E+00	3.50E-03
Chrysene	1000	1.00E+00	2.00E-09	5.00E+03	1.00E-02
Cobalt	0	1.00E+00	1.00E-02	5.00E+03	0.00E+00
Di-n-butyl phthalate	1000	1.00E+00	2.00E-03	5.00E+03	1.00E+04
Dibromochloromethane	0	4.00E-01	1.00E-02	5.00E+01	0.00E+00
Iron	10	1.00E+00	1.00E-02	5.00E-01	5.00E-02
Magnesium	0	1.00E+00	2.00E-05	5.00E-01	0.00E+00
Manganese	0	1.00E+00	1.00E-02	5.00E+04	0.00E+00
Naphthalene	1000	4.00E-01	2.00E-03	5.00E+02	4.00E+02
Nickel	10	1.00E+00	2.00E-05	5.00E+02	1.00E-01
Nitrophenol, 4-	100	1.00E+00	1.00E+00	5.00E+02	5.00E+04
Pentachlorophenol	100	1.00E+00	1.00E-02	5.00E+03	5.00E+03
Phenanthrene	1000	4.00E-01	2.00E-05	5.00E+03	4.00E+01
Phenol	10000	1.00E+00	1.00E+00	5.00E+00	5.00E+04
Pyrene	0	1.00E+00	2.00E-09	5.00E+01	0.00E+00
Trichloroethane, 1,1,1-	10	4.00E-01	1.00E-02	5.00E+00	2.00E-01
Trichlorophenol, 2,3,5-	0	1.00E+00	2.00E-05	5.00E+03	0.00E+00
Vanadium	0	1.00E+00	2.00E-07	5.00E-01	0.00E+00
Vinyl chloride	0	7.00E-04	1.00E-02	5.00E+00	0.00E+00

Hazardous Substances Found in an Observed Release

Observed Release Hazardous Substance	Eco-toxicity Value	Persist. Value	Bio-accum. Value	Ecotoxicity/ Persistence/ Bioaccum. Value

- N/A and/or data not specified

Ecotoxicity/Mobility/Persistence/Bioaccummulation Value from Source Substances:	1.00E+06
Ecotoxicity/Mobility/Persistence/Bioaccummulation Value from Observed Hazardous Substances:	0.00E+00
Ecotoxicity/Mobility/Persistence/Bioaccummulation Factor:	1.00E+06
Sum of Source Hazardous Waste Quantity Values:	0.00E+00
Hazardous Waste Quantity Factor:	10
Waste Characteristics Factor Category:	56

Level I Concentrations

- N/A and/or data not specified

Level II Concentrations

- N/A and/or data not specified

Most Distant Level I Sample

- N/A and/or data not specified

Most Distant Level II Sample

- N/A and/or data not specified

Level I Concentrations

Sensitive Environment	Distance from Probable Point of Entry to Sensitive Env. (miles)	Sensitive Environment Value
- N/A and/or data not specified		

Sum of Sensitive Environments Values: 0

Wetlands

Wetland	Distance from Probable Point of Entry to Wetland (miles)	Wetlands Frontage (miles)
- N/A and/or data not specified		

Total Wetlands Frontage: 0.00 Miles Total Wetlands Value: 0

Sum of Sensitive Environments Value + Wetlands Value: 0.00E+00

Level I Concentrations Factor: 0.00E+00

Level II Concentrations

Sensitive Environment	Distance from Probable Point of Entry to Sensitive Env. (miles)	Sensitive Environment Value
- N/A and/or data not specified		

Sum of Sensitive Environments Values: 0

Wetlands

Wetland	Distance from Probable Point of Entry to Wetland (miles)	Wetlands Frontage (miles)
- N/A and/or data not specified		

Total Wetlands Frontage: 0.00 Miles Total Wetlands Value: 0

Sum of Sensitive Environments Value + Wetlands Value: 0.00E+00

Level II Concentrations Factor: 0.00E+00

Potential Contamination

Sensitive Environments

Type of Surface Water Body	Sensitive Environment	Sensitive Environment Value

Wetlands

Type of Surface Water Body	Sensitive Environment	Wetlands Frontage	Wetlands Value

- N/A and/or data not specified

SW PATHWAY: GW TO SW COMPONENT ENVIRONMENTAL THREAT TARGETS
NASA LeRC PMU3 - Storm Sewer System - 11/22/95

Type of Surface Water Body	Sum of Sens. Environment Values(Sj)	Sum of Wetland Frontage Values(Wj)	Dilution Weight (Dj)	Dj(Wj+Sj)

- N/A and/or data not specified

Sum of Dj(Wj+Sj): 0.00E+00
Sum of Dj(Wj+Sj)/10: 0.00E+00

Potential Contamination Sensitive Environment Factor: 0.00E+00

Likelihood of Exposure

No.	Source ID	Level of Contamination
- N/A and/or data not specified		

Likelihood of Exposure Factor: 0

Source: 0 (null)

Source Hazardous Waste Quantity Value: 0.00

Hazardous Substance	Toxicity Value
= * P |G - -Y 9 N	8224

Sum of Source Hazardous Waste Quantity Values: 0.00E+00

Documentation for Level I Population:

No resident individual, student or daycare population on property within 200 feet of the contamination

Reference:

Waste Characteristics Factor Category: 0

Documentation for Level II Population:

No resident, school, or daycare population within 200 feet of contamination

Reference:

Targets

Level I Population: 10.0 Value: 0.00

Documentation for Workers:

Maintenance worker, NPDES monitoring employess; estimate

Reference:

Level II Population: 0.0 Value: 0.00

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Resident Individual: (null) Value: 0.00

Documentation for Terrestrial Environment State Lands:

See table 5-5 of the HRS Guidance Manual. See Section 3.6 of the RI/FS Report. Rocky River is classified as a seasonal habitat for salmon.

Reference: 1,2

Terrestial Sensitive Environment	Value
- N/A and/or data not specified	

==========

Terrestrial Sensitive Environments Factor: 1.30485992031043747000000000000000

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SOIL EXPOSURE PATHWAY NEARBY POPULATION THREAT LIKELIHOOD OF EXPOSURE

Likelihood of Exposure

No.	Source ID	Level of Contamination	Attractiveness/ Accessibility	Area of Contam. (sq. feet)
0	^P |G -	bI	9504	774910509

0	(null)	=	*	P6.0E-154	1.7E-76	9.7E+246	Dist

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SOIL EXPOSURE PATHWAY NEARBY POPULATION THREAT WASTE CHARACTERISTICS

NASA LeRC PMU3 - Storm Sewer System - 11/22/95

Source: 0 $ -

Source Hazardous Waste Quantity Value: 1.00

Hazardous Substance	Toxicity Value
(null)	-3328

Toxicity Factor:	5.78E+03
Sum of Source Hazardous Waste Quantity Values:	1.98E+04
Hazardous Waste Quantity Factor:	0

Documentation for Population > 0 to 1/4 mile Distance Category:

ee Table 3-5 of the RI/FS Report for demographic information.

Reference: 2

OBSERVED RELEASE

No.	Sample ID	Distance (miles)	Level of Contamination

- N/A and/or data not specified

==========

Observed Release Factor: 0

Gas Migration Potential

GAS POTENTIAL TO RELEASE

Source ID	Source Type	Gas Contain. Value (A)	Gas Source Type Value (B)	Gas Migrtn. Potent. Value (C)	Sum (B+C)	Gas Potential to Rel. Value A(B+C)
- N/A and/or data not specified						

Gas Potential to Release Factor: 0

Documentation for Gas Containment, Source Storm Sewer Syst:

Source substantially covered and no other containment specifically described in Table 6-3 of HRS Guidance Manual applies. Source consists of aqueous media only; no sediment encountered in storm water system. Totally enclosed in underground system; effective wind break.

Reference: 1

Source: Storm Sewer Syst

Gaseous Hazardous Substance	Hazardous Substance Gas Migration Potential Value
Acetone	17
Benzofluoranthene, 3,4-	6
Bis (2-ethylhexyl) phthalate	6
Chloromethane	17
Chrysene	6
Di-n-butyl phthalate	6
Dibromochloromethane	11
Naphthalene	11
Nitrophenol, 4-	6
Pentachlorophenol	6
Phenanthrene	11
Phenol	11
Pyrene	6
Trichloroethane, 1,1,1-	17
Trichlorophenol, 2,3,5-	6
Vinyl chloride	17

Average of Gas Migration Potential Value for 3 Hazardous Substances: 17.000

Gas Migration Potential Value From Table 6-7: 17

Particulate Migration Potential

PARTICULATE POTENTIAL TO RELEASE

Source ID	Source Type	Partic. Contain. Value (A)	Partic. Source Type Value (B)	Partic. Migrtn. Potent. Value (C)	Sum (B+C)	Partic. Potential to Rel. Value A(B+C)
- N/A and/or data not specified						

Particulate Potential to Release Factor: 0

Documentation for Particulate Containment, Source Storm Sewer Syst:

No solid media encountered in storm water system.

Reference:

Source: Storm Sewer Syst

Particulate Hazardous Substance
Aluminum
Benzofluoranthene, 3,4-
Bis (2-ethylhexyl) phthalate
Cadmium
Chrysene
Cobalt
Di-n-butyl phthalate
Iron
Magnesium
Manganese
Naphthalene
Nickel
Nitrophenol, 4-
Pentachlorophenol
Phenanthrene
Pyrene
Trichlorophenol, 2,3,5-
Vanadium

AIR PATHWAY WASTE CHARACTERISTICS

NASA LeRC PMU3 - Storm Sewer System - 11/22/95

Hazardous Substance	Toxicity Value	Gas Mobility Value	Particulate Mobility Value	Toxicity/ Mobility Value

Hazardous Substances Found in an Observed Release

Sample ID	Observed Release Hazardous Substance	Particulate Toxicity/ Mobility Value	Gas Toxicity/ Mobility Value
- N/A and/or data not specified			

- N/A and/or data not specified

Toxicity/Mobility Value from Observed Release Hazardous Substances:	0.00E+00
Toxicity/Mobility Factor:	0.00E+00
Sum of Source Hazardous Waste Quantity Values:	0.00E+00
Hazardous Waste Quantity Factor:	0
Waste Characteristics Factor Category:	0

AIR PATHWAY TARGETS

NASA LeRC PMU3 - Storm Sewer System - 11/22/95

Actual Contamination

No.	Sample ID	Distance (miles)	Level of Contamination

- N/A and/or data not specified

Potential Contamination

Distance Categories Subject to Potential Contamination	Population	Value
	Potential Contaminantion Factor:	0.0000
	Potential Contaminantion Factor:	0.0000
	Potential Contaminantion Factor:	0.0000
	Potential Contaminantion Factor:	0.0000
	Potential Contaminantion Factor:	0.0000
	Potential Contaminantion Factor:	0.0000
	Potential Contaminantion Factor:	0.0000

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Nearest Individual Factor

Documentation for Population > 0 to 1/4 mile Distance Category:

See Table 3-5 of the RI/FS Report for summary of demographic estimates.

Reference: 2

Distance in miles: Potentia

Nearest Individual Value: 4.9353866791599091800000000000000000000000e+257

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Resources

Resource Value: 4.9353866791492905000000000000000000000000e+257

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Actual Contamination, Sensitive Environments

Sensitive Environment	Distance (miles)	Sensitive Environment Value

- N/A and/or data not specified

Actual Contamination, Wetlands

Distance Category	Wetland Acreage	Wetland Acreage Value

- N/A and/or data not specified

==========
(Sum of Sensitive Environments + Wetlands Values)

Potential Contamination, Sensitive Environments

Sensitive Environment	Distance (miles)	Sensitive Environment Value	Distance Weight	Weighted Value/10
(null)	4.9353858434047461500000000000000000000000e+257			

Sum of Sensitive Environments Weighted Values/10: 0.000

Potential Contamination, Wetlands

Distance Category	Wetland Acreage	Wetland Acreage Value	Distance Weight	Weighted Value/10

- N/A and/or data not specified

==========

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REFERENCES

NASA LeRC PMU3 - Storm Sewer System - 11/22/95

1. HRS Guidance Manual: 40 CFR300 Appendix A to Part 300 The Hazard Ranking System 1993 and The Hazard Ranking System Guidance Manual - Interim Final, USEPA, Washington D.C.

2. Phase I Remedial Investigation/Feasibility Study Report - Prepared by R&R International Inc. for NASA Lewis Research Center, Cleveland, OH. October 1995

3. HRS Report Prepared by R&R International Inc. for NASA Lewis Research Center, OH. October 1995.

TABLE 3-1
SIGNIFICANCE ABOVE BACKGROUND

PMU 3 - STORM SEWER SYSTEM
STORM SEWER SYSTEM (OFL-03-02)
NASA LEWIS RESEARCH CENTER
PHASE I RI/FS

Compound	Background Sample SQL	Background Sample Conc	Release Sample Sample#	Release Sample SQL	Release Sample Conc	Signif.?	Attrib. to Site?	Comments
SOIL								
VOCs								
1,1,1-Trichloroethane		0.2	SW044-001	*	0.005	N	n/a	
1,2-Dichloroethane		0.005	SW027-301	*	0.010	N	n/a	
2-Butanone			SW043-001	*	0.200	N	n/a	
Acetone			SW043-001		2.300	N	n/a	
Bromodichloromethane		0.1	SW027-001	*	0.003	N	n/a	
Bromoform		0.1	SW034-001	*	0.004	N	n/a	
Chloroform		0.1	SW027-001	*	0.008	N	n/a	
Chloromethane			SW039-001	*	0.010	N	n/a	
Trichloroethene		0.005	SW042-001	*	0.001	N	n/a	
Dibromochloromethane			SW034-001	*	0.002	N	n/a	
Trichloroethene			SW042-001	*	0.001	N	n/a	
Vinyl Chloride		0.002	SW027-301	*	0.010	Y	Y	
SVOCs								
2-Nitroaniline			SW038-001	*	0.025	N	n/a	
2-Nitrophenol			SW043-001	*	0.023	N	n/a	
2,4,5-Trichlorophenol			SW044-001	*	0.002	N	n/a	
4-Methylphenol			SW028-001	*	0.002	N	n/a	
4-Nitroaniline			SW036-001	*	0.050	N	n/a	
4-Nitrophenol			SW034-001	*	0.025	N	n/a	
Benzo(b)fluoranthene		0.0002	SW036-001	*	0.001	Y	Y	
Chrysene		0.0002	SW036-001	*	0.001	Y	Y	
Di-n-Butyl Phthalate			SW026-001	*	0.002	N	n/a	
Hexachlorocyclopentadiene		0.05	SW036-001	*	0 020	N	n/a	

TABLE 3-1
SIGNIFICANCE ABOVE BACKGROUND

PMU 3 - STORM SEWER SYSTEM
STORM SEWER SYSTEM (OFL-03-02)
NASA LEWIS RESEARCH CENTER
PHASE I RI/FS

Compound	Background Sample SQL	Background Sample Conc	Release Sample Sample#	Release Sample SQL	Release Sample Conc	Signif.?	Attrib. to Site?	Comments
Naphthalene			SW026-001	*	0.003	N	n/a	
Pentachlorophenol		0.001	SW034-001	*	0.025	Y	Y	
Phenanthrene			SW036-001	*	0.001	N	n/a	
Phenol			SW028-001	*	0.002	N	n/a	
Pyrene			SW036-001	*	0.002	N	n/a	
bis(2-Ethylhexyl)Phthalate		0.006	SW027-001	?	0.022	Y	Y	
Metals								
Aluminum		0.21	SW037-001		1	Y	Y	
Arsenic		0.050	SW026-001	#	0.0490	N	n/a	
Barium		2	SW033-001	#	0.110	N	n/a	
Cadmium			SW042-001	#	0.00330	N	n/a	
Calcium			SW037-001		269.0000	N	n/a	
Chromium		0.1	SW048-001		0.02270	N	n/a	
Cobalt			SW043-001	#	0.00260	N	n/a	
Copper		1.3	SW034-001		0.09	N	n/a	
Cyanide		0.2	SW043-001		0.14100	N	n/a	
Iron		0.3	SW040-001		3 37000	Y	Y	
Lead		0.015	SW037-001		0.02950	N	n/a	
Magnesium			SW030-001		114.90000	N	n/a	
Manganese		0.05	SW039-001		0.71300	Y	Y	
Nickel		0.002	SW032-001	#	0.01130	Y	Y	
Potassium		0.1	SW043-001		32.20000	Y	Y	
Selenium		0.05	SW025-001	#	0 002	N	n/a	
Sodium		20	SW037-001		1220.0000	Y	Y	
Thallium		0 002	SW026-001	*	0.00200	N	n/a	

TABLE 3-1
SIGNIFICANCE ABOVE BACKGROUND

PMU 3 - STORM SEWER SYSTEM
STORM SEWER SYSTEM (OFL-03-02)
NASA LEWIS RESEARCH CENTER
PHASE I RI/FS

Compound	Background Sample SQL	Background Sample Conc	Release Sample Sample#	Release Sample SQL	Release Sample Conc	Signif.?	Attrib. to Site?	Comments
Vanadium			SW040-001		# 0.00440	N	n/a	
Zinc		5.0	SW048-001		* 1 04000	N	n/a	
General Chemistry								
Ammonia			SW043-001		200.0000	N	n/a	
Bromide			SW047-001		4.0000	N	n/a	
Chemical Oxygen Demand			SW043-001		1700.0000	N	n/a	
Chloride		250	SW037-001		2200.0000	Y	Y	
Fluoride		4.0	SW048-001		4 4000	N	n/a	
MBAs		0.5	SW026-001		1.5000	Y	Y	
Nitrate / Nitrite		10	SW025-001		27.0000	N	n/a	
Oil and Grease			SW041-001		58.0000	N	n/a	
Total Phosphorous			SW048-001		0.9400	N	n/a	
Sulfate		250	SW046-001		380.0000	N	n/a	
Total Dissolved Solids		500	SW039-001		4500.0000	Y	Y	
Total Suspended Soids			SW039-001		410.0000	N	n/a	

Notes:
mean of background samples collected from shallow upland was used as background
all conc's. in ppm * J-flagged release sample data blank SQLs imply that Sample Conc. > Sample SQL

PMU 4

Record Information

1. Site Name: NASA LeRC PMU4 - Rocket Laboratories
   (as entered in CERCLIS)

2. Site CERCLIS Number:

3. Site Reviewer: KW Valek / RC Callahan / C Sivaprakash

4. Date: 11/21/95

5. Site Location: Cleveland/Cuyahoga/OH
   (City/County,State)

6. Congressional District:

7. Site Coordinates: Single

   Latitude: 41 24'45.0" Longitude: 81

Site Description

1. Setting: Urban

2. Current Owner: Federal

3. Current Site Status: Active

4. Years of Operation: Active Site , from and to dates: Since 1941

5. How Initially Identified: Other - Preliminary Assessment

6. Entity Responsible for Waste Generation:

   - Federal Facility
   - Other

7. Site Activities/Waste Deposition:

   - Other - Former fire pit, decon
   - Waste Piles

Waste Description

8. Wastes Deposited or Detected Onsite:

- Organic Chemicals
- Inorganic Chemicals
- Metals
- Radioactive Waste

Response Actions

9. Response/Removal Actions:

- Site Access Has Been Restricted
- Other Removal Action Has Occurred

RCRA Information

10. For All Active Facilities, RCRA Site Status:

- Other - Bldg 109 RCRA Closure

Demographic Information

11. Workers Present Onsite: Yes

12. Distance to Nearest Non-Worker Individual: > 10 Feet - 1/4 Mile

13. Residential Population Within 1 Mile: 4000.0

14. Residential Population Within 4 Miles: 10000.0

Water Use Information

15. Local Drinking Water Supply Source:

- Ground Water (within 4 mile distance limit)
- Surface Water (within 15 mile distance limit)

16. Total Population Served by Local Drinking Water Supply Source: 1500000.0

17. Drinking Water Supply System Type for Local Drinking Water Supply Sources:

    - Municipal (Services over 25 People)

18. Surface Water Adjacent to/Draining Site:

    - Other - Abram Creek
    - Stream

1. Site Name: NASA LeRC PMU4 - Rocket Laboratories (as entered in CERCLIS)

2. Site CERCLIS Number:

3. Site Reviewer: KW Valek / RC Callahan / C Sivaprakash

4. Date: 11/21/95

5. Site Location: Cleveland/Cuyahoga/OH (City/County,State)

6. Congressional District:

7. Site Coordinates: Single

   Latitude: 41 24'45.0" Longitude: 81

	Score
Ground Water Migration Pathway Score (Sgw)	0.13
Surface Water Migration Pathway Score (Ssw)	0.23
Soil Exposure Pathway Score (Ss)	0.60
Air Migration Pathway Score (Sa)	0.00

Site Score	0.33

NOTE

EPA uses the terms "facility," "site," and "release" interchangeably. The term "facility" is broadly defined in CERCLA to include any area where hazardous substances have "come to be

located" (CERCLA Section 109(9)), and the listing process is not intended to define or reflect boundaries of such facilities or releases. Site names, and references to specific parcels or properties, are provided for general identification purposes only. Knowledge regarding the extent of sites will be refined as more information is developed during the RI/FS and even during implementation of the remedy.

GROUND WATER MIGRATION PATHWAY SCORESHEET
NASA LeRC PMU4 - Rocket Laboratories - 11/27/95

GROUND WATER MIGRATION PATHWAY Factor Categories & Factors	Maximum Value	Value Assigned
Likelihood of Release to an Aquifer Aquifer: Shale Bedrock Aquife		
1. Observed Release	550	0
2. Potential to Release		
2a. Containment	10	7
2b. Net Precipitation	10	3
2c. Depth to Aquifer	5	5
2d. Travel Time	35	35
2e. Potential to Release [lines 2a(2b+2c+2d)]	500	301
3. Likelihood of Release	550	301
Waste Characteristics		
4. Toxicity/Mobility	*	1.00E+02
5. Hazardous Waste Quantity	*	10
6. Waste Characteristics	100	6
Targets		
7. Nearest Well	50	5.00E+00
8. Population		
8a. Level I Concentrations	**	0.00E+00
8b. Level II Concentrations	**	0.00E+00
8c. Potential Contamination	**	1.00E+00
8d. Population (lines 8a+8b+8c)	**	1.00E+00
9. Resources	5	0.00E+00
10. Wellhead Protection Area	20	0.00E+00
11. Targets (lines 7+8d+9+10)	**	6.00E+00
12. Targets (including overlaying aquifers)	**	6.00E+00
13. Aquifer Score	100	0.13
GROUND WATER MIGRATION PATHWAY SCORE (Sgw)	100	0.13

* Maximum value applies to waste characteristics category.
** Maximum value not applicable.

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORESHEET
NASA LeRC PMU4 - Rocket Laboratories - 11/27/95

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT Factor Categories & Factors DRINKING WATER THREAT	Maximum Value	Value Assigned
Likelihood of Release		
1. Observed Release	550	0
2. Potential to Release by Overland Flow		
2a. Containment	10	7
2b. Runoff	25	1
2c. Distance to Surface Water	25	20
2d. Potential to Release by Overland Flow [lines 2a(2b+2c)]	500	147
3. Potential to Release by Flood		
3a. Containment (Flood)	10	0
3b. Flood Frequency	50	0
3c. Potential to Release by Flood (lines 3a x 3b)	500	0
4. Potential to Release (lines 2d+3c)	500	147
5. Likelihood of Release	550	147
Waste Characteristics		
6. Toxicity/Persistence	*	1.00E+04
7. Hazardous Waste Quantity	*	10
8. Waste Characteristics	100	18
Targets		
9. Nearest Intake	50	0.00E+00
10. Population		
10a. Level I Concentrations	**	0.00E+00
10b. Level II Concentrations	**	0.00E+00
10c. Potential Contamination	**	2.00E+00
10d. Population (lines 10a+10b+10c)	**	2.00E+00
11. Resources	5	5.00E+00
12. Targets (lines 9+10d+11)	**	7.00E+00
13. DRINKING WATER THREAT SCORE	100	0.22

* Maximum value applies to waste characteristics category.
** Maximum value not applicable.

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORESHEET
NASA LeRC PMU4 - Rocket Laboratories - 11/27/95

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT Factor Categories & Factors HUMAN FOOD CHAIN THREAT	Maximum Value	Value Assigned
Likelihood of Release		
14. Likelihood of Release (same as line 5)	550	147
Waste Characteristics		
15. Toxicity/Persistence/Bioaccumulation	*	5.00E+08
16. Hazardous Waste Quantity	*	10
17. Waste Characteristics	1000	180
Targets		
18. Food Chain Individual	50	0.00E+00
19. Population		
19a. Level I Concentrations	**	0.00E+00
19b. Level II Concentrations	**	0.00E+00
19c. Pot. Human Food Chain Contamination	**	3.31E-03
19d. Population (lines 19a+19b+19c)	**	3.31E-03
20. Targets (lines 18+19d)	**	3.31E-03
21. HUMAN FOOD CHAIN THREAT SCORE	100	0.00

* Maximum value applies to waste characteristics category.
** Maximum value not applicable.

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORESHEET
NASA LeRC PMU4 - Rocket Laboratories - 11/27/95

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT Factor Categories & Factors ENVIRONMENTAL THREAT	Maximum Value	Value Assigned
Likelihood of Release		
22. Likelihood of Release (same as line 5)	550	147
Waste Characteristics		
23. Ecosystem Toxicity/Persistence/Bioacc.	*	5.00E+08
24. Hazardous Waste Quantity	*	10
25. Waste Characteristics	1000	180
Targets		
26. Sensitive Environments		
26a. Level I Concentrations	**	0.00E+00
26b. Level II Concentrations	**	0.00E+00
26c. Potential Contamination	**	2.50E-02
26d. Sensitive Environments (lines 26a+26b+26c)	**	2.50E-02
27. Targets (line 26d)	**	2.50E-02
28. ENVIRONMENTAL THREAT SCORE	60	0.01
29. WATERSHED SCORE	100	0.23
30. SW: OVERLAND/FLOOD COMPONENT SCORE (Sof)	100	0.23

* Maximum value applies to waste characteristics category.
** Maximum value not applicable.

GROUND WATER TO SURFACE WATER MIGRATION COMPONENT SCORESHEET
NASA LeRC PMU4 - Rocket Laboratories - 11/27/95

GROUND WATER TO SURFACE WATER MIGRATION COMPONENT Factor Categories & Factors DRINKING WATER THREAT	Maximum Value	Value Assigned
Likelihood of Release to Aquifer Aquifer: Shale Bedrock Aquife		
1. Observed Release	550	0
2. Potential to Release		
2a. Containment	10	7
2b. Net Precipitation	10	3
2c. Depth to Aquifer	5	5
2d. Travel Time	35	35
2e. Potential to Release [lines 2a(2b+2c+2d)]	500	301
3. Likelihood of Release	550	301
Waste Characteristics		
4. Toxicity/Mobility/Persistence	*	1.00E+02
5. Hazardous Waste Quantity	*	10
6. Waste Characteristics	100	6
Targets		
7. Nearest Intake	50	0.00E+00
8. Population		
8a. Level I Concentrations	**	0.00E+00
8b. Level II Concentrations	**	0.00E+00
8c. Potential Contamination	**	0.00E+00
8d. Population (lines 8a+8b+8c)	**	0.00E+00
9. Resources	5	5.00E+00
10. Targets (lines 7+8d+9)	**	5.00E+00
11. DRINKING WATER THREAT SCORE	100	0.11

* Maximum value applies to waste characteristics category.
** Maximum value not applicable.

GROUND WATER TO SURFACE WATER MIGRATION COMPONENT SCORESHEET
NASA LeRC PMU4 - Rocket Laboratories - 11/27/95

GROUND WATER TO SURFACE WATER MIGRATION COMPONENT Factor Categories & Factors HUMAN FOOD CHAIN THREAT	Maximum Value	Value Assigned
Likelihood of Release		
12. Likelihood of Release (same as line 3)	550	301
Waste Characteristics		
13. Toxicity/Mobility/Persistence/Bioacc.	*	5.00E+04
14. Hazardous Waste Quantity	*	10
15. Waste Characteristics	1000	18
Targets		
16. Food Chain Individual	50	0.00E+00
17. Population		
17a. Level I Concentrations	**	0.00E+00
17b. Level II Concentrations	**	0.00E+00
17c. Pot. Human Food Chain Contamination	**	0.00E+00
17d. Population (lines 17a+17b+17c)	**	0.00E+00
18. Targets (lines 16+17d)	**	0.00E+00
19. HUMAN FOOD CHAIN THREAT SCORE	100	0.00

* Maximum value applies to waste characteristics category.
** Maximum value not applicable.

GROUND WATER TO SURFACE WATER MIGRATION COMPONENT SCORESHEET
NASA LeRC PMU4 - Rocket Laboratories - 11/27/95

GROUND WATER TO SURFACE WATER MIGRATION COMPONENT Factor Categories & Factors ENVIRONMENTAL THREAT	Maximum Value	Value Assigned
Likelihood of Release		
20. Likelihood of Release (same as line 3)	550	301
Waste Characteristics		
21. Ecosystem Tox./Mobility/Persist./Bioacc.	*	1.00E+05
22. Hazardous Waste Quantity	*	10
23. Waste Characteristics	1000	32
Targets		
24. Sensitive Environments		
24a. Level I Concentrations	**	0.00E+00
24b. Level II Concentrations	**	0.00E+00
24c. Potential Contamination	**	0.00E+00
24d. Sensitive Environments (lines 24a+24b+24c)	**	0.00E+00
25. Targets (line 24d)	**	0.00E+00
26. ENVIRONMENTAL THREAT SCORE	60	0.00
27. WATERSHED SCORE	100	0.11
28. SW: GW to SW COMPONENT SCORE (Sgs)	100	0.11

* Maximum value applies to waste characteristics category.
** Maximum value not applicable.

SOIL EXPOSURE PATHWAY SCORESHEET
NASA LeRC PMU4 - Rocket Laboratories - 11/27/95

SOIL EXPOSURE PATHWAY Factor Categories & Factors RESIDENT POPULATION THREAT	Maximum Value	Value Assigned
Likelihood of Exposure		
1. Likelihood of Exposure	550	550
Waste Characteristics		
2. Toxicity	*	1.00E+04
3. Hazardous Waste Quantity	*	10
4. Waste Characteristics	100	18
Targets		
5. Resident Individual	50	0.00E+00
6. Resident Population		
6a. Level I Concentrations	**	0.00E+00
6b. Level II Concentrations	**	0.00E+00
6c. Resident Population (lines 6a+6b)	**	0.00E+00
7. Workers	15	5.00E+00
8. Resources	5	0.00E+00
9. Terrestrial Sensitive Environments	***	0.00E+00
10. Targets (lines 5+6c+7+8+9)	**	5.00E+00
11. RESIDENT POPULATION THREAT SCORE	**	4.95E+04

* Maximum value applies to waste characteristics category.
** Maximum value not applicable.
*** No specific maximum value applies, see HRS for details.

SOIL EXPOSURE PATHWAY SCORESHEET
NASA LeRC PMU4 - Rocket Laboratories - 11/27/95

SOIL EXPOSURE PATHWAY Factor Categories & Factors NEARBY POPULATION THREAT	Maximum Value	Value Assigned
Likelihood of Exposure		
12. Attractiveness/Accessibility	100	0.00E+00
13. Area of Contamination	100	0.00E+00
14. Likelihood of Exposure	500	0.00E+00
Waste Characteristics		
15. Toxicity	*	0.00E+00
16. Hazardous Waste Quantity	*	0
17. Waste Characteristics	100	0
Targets		
18. Nearby Individual	1	1.00E+00
19. Population Within 1 Mile	**	3.00E+01
20. Targets (lines 18+19)	**	3.10E+01
21. NEARBY POPULATION THREAT SCORE	**	0.00E+00
SOIL EXPOSURE PATHWAY SCORE (Ss)	100	0.60

* Maximum value applies to waste characteristics category.
** Maximum value not applicable.

AIR PATHWAY SCORESHEET

NASA LeRC PMU4 - Rocket Laboratories - 11/27/95

AIR MIGRATION PATHWAY Factor Categories & Factors	Maximum Value	Value Assigned
Likelihood of Release		
1. Observed Release	550	0
2. Potential to Release		
2a. Gas Potential to Release	500	0
2b. Particulate Potential to Release	500	0
2c. Potential to Release	500	0
3. Likelihood of Release	550	0
Waste Characteristics		
4. Toxicity/Mobility	*	0.00E+00
5. Hazardous Waste Quantity	*	0
6. Waste Characteristics	100	0
Targets		
7. Nearest Individual	50	2.00E+01
8. Population		
8a. Level I Concentrations	**	0.00E+00
8b. Level II Concentrations	**	0.00E+00
8c. Potential Contamination	**	2.83E+02
8d. Population (lines 8a+8b+8c)	**	2.83E+02
9. Resources	5	5.00E+00
10. Sensitive Environments		
10a. Actual Contamination	***	0.00E+00
10b. Potential Contamination	***	1.35E-01
10c. Sens. Environments(lines 10a+10b)	***	1.35E-01
11. Targets (lines 7+8d+9+10c)	**	3.08E+02
AIR MIGRATION PATHWAY SCORE (Sa)	100	0.00E+00

* Maximum value applies to waste characteristics category.
** Maximum value not applicable.
*** No specific maximum value applies, see HRS for details.

1. WASTESTREAM QUANTITY SUMMARY TABLE, SOURCE: Rocket Laboratories

a. Wastestream ID	Contam Soil
b. Hazardous Constituent Quantity (C) (lbs.)	0.00
c. Data Complete?	NO
d. Hazardous Wastestream Quantity (W) (lbs.)	0.00
e. Data Complete?	NO
f. Wastestream Quantity Value (W/5,000)	0.00E+00

Documentation for Constituents:

Mass of CERCLA hazardous waste cannot be determined

Reference: 2,3

Documentation for Wastestream Quantity:

mass of hazardous waste stream cannot be determined

Reference: 2,3

WASTE QUANTITY

NASA LeRC PMU4 - Rocket Laboratories - 11/27/95

a. Wastestream ID	Groundwater
b. Hazardous Constituent Quantity (C) (lbs.)	0.00
c. Data Complete?	NO
d. Hazardous Wastestream Quantity (W) (lbs.)	0.00
e. Data Complete?	NO
f. Wastestream Quantity Value (W/5,000)	0.00E+00

Wastestream Constituent Hazardous Substances	Concent.	Units	Liquid	Qualifier
Aluminum	1.4E+01	ppm	NO	
Chromium	3.1E-01	ppm	NO	
Cobalt	1.7E-01	ppm	NO	
Iron	3.4E+02	ppm	NO	
Lead	1.5E-01	ppm	NO	
Magnesium	8.7E+01	ppm	NO	
Manganese	3.2E+00	ppm	NO	
Nickel	6.5E-01	ppm	NO	
Selenium	3.4E+03	ppm	NO	J
Vanadium	5.8E-01	ppm	NO	

a. Wastestream ID	
b. Hazardous Constituent Quantity (C) (lbs.)	0.00
c. Data Complete?	NO
d. Hazardous Wastestream Quantity (W) (lbs.)	0.00
e. Data Complete?	NO
f. Wastestream Quantity Value (W/5,000)	0.00E+00

2. SOURCE HAZARDOUS WASTE QUANTITY FACTOR TABLE

a. Source ID	Rocket Laboratories
b. Source Type	Contaminated Soil
c. Secondary Source Type	N.A.
d. Source Vol.(yd3/gal) | Source Area (ft2)	0.00 | 240000.00
e. Source Volume/Area Value	7.06E+00
f. Source Hazardous Constituent Quantity (HCQ) Value (sum of 1b)	0.00E+00
g. Data Complete?	NO
h. Source Hazardous Wastestream Quantity (WSQ) Value (sum of 1f)	0.00E+00
i. Data Complete?	NO
k. Source Hazardous Waste Quantity (HWQ) Value (2e, 2f, or 2h)	7.06E+00

Source Hazardous Substances	Depth (feet)	Liquid	Concent.	Units
Acetone	> 2	NO	1.8E-02	ppm
Benzo(j,k)fluorene	< 2	NO	7.4E-01	ppm
Benzofluoranthene, 3,4-	< 2	NO	3.4E-01	ppm
Di-n-butyl phthalate	< 2	NO	4.2E-01	ppm
Magnesium	< 2	NO	3.9E+04	ppm
Mercury	< 2	NO	1.7E-01	ppm
Methyl Napthalene, 2-	> 2	NO	8.2E-01	ppm
Methylene chloride	> 2	NO	1.7E-01	ppm
Naphthalene	< 2	NO	3.9E-01	ppm
Phenanthrene	< 2	NO	4.5E-01	ppm
Pyrene	< 2	NO	6.0E-01	ppm
Selenium	< 2	NO	4.8E+00	ppm
Thallium	> 2	NO	2.9E+00	ppm
Trichloroethane, 1,1,1-	< 2	NO	3.6E-02	ppm
Vanadium	< 2	NO	8.5E+01	ppm

Documentation for Source Hazardous Substances:

See RI/FS Report for analytical data and Tables 4-1 and 4-2 of the HRS Report for concentrations significantly above background.

Reference: 2,3

Documentation for Source Area:

Area measured from Figure 4-1 of the RI/FS Report. 240,000 sq ft:

Reference: 2

3. SITE HAZARDOUS WASTE QUANTITY SUMMARY

No.	Source ID	Migration Pathways	Vol. or Area Value (2e)	Constituent or Wastestream Value (2f,2h)	Hazardous Waste Qty. Value (2k)
1	Rocket Laboratories	GW-SW	7.06E+00	0.00E+00	7.06E+00

4. PATHWAY HAZARDOUS WASTE QUANTITY AND WASTE CHARACTERISTICS SUMMARY TABLE

Migration Pathway	Contaminant Values		HWQVs*	WCVs**
Ground Water	Toxicity/Mobility	1.00E+02	10	6
SW: Overland Flow, DW	Tox./Persistence	1.00E+04	10	18
SW: Overland Flow, HFC	Tox./Persis./Bioacc.	5.00E+08	10	180
SW: Overland Flow, Env	Etox./Persis./Bioacc.	5.00E+08	10	180
SW: GW to SW, DW	Tox./Persistence	1.00E+02	10	6
SW: GW to SW, HFC	Tox./Persis./Bioacc.	5.00E+04	10	18
SW: GW to SW, Env	Etox./Persis./Bioacc.	1.00E+05	10	32
Soil Exposure:Resident	Toxicity	1.00E+04	10	18
Soil Exposure: Nearby	Toxicity	0.00E+00	0	0
Air	Toxicity/Mobility	0.00E+00	0	0

* Hazardous Waste Quantity Factor Values
** Waste Characteristics Factor Category Values

Note: SW = Surface Water
GW = Ground Water
DW = Drinking Water Threat
HFC = Human Food Chain Threat
Env = Environmental Threat

GROUND WATER PATHWAY AQUIFER SUMMARY
NASA LeRC PMU4 - Rocket Laboratories - 11/27/95

No.	Aquifer ID	Type	Overlaying No.	Inter-Connected with	Likelihood of Release	Targets
1	Shale Bedrock Aquife	Non K	0	0	301	6.00E+00

Containment

No.	Source ID	HWQ Value	Containment Value
1	Rocket Laboratories	7.06E+00	7

Containment Factor 7

Documentation for Ground Water Containment, Source Rocket Laboratories:

PMU is predominantly covered by asphalt/concrete and is serviced by stormwater sewer system.

Reference: 2

Net Precipitation

Net Precipitation (inches) N.A.

Aquifer: Shale Bedrock Aquifer

Type of Aquifer: Non Karst

Overlaying Aquifer: 0

Interconnected with: 0

Documentation for Shale Bedrock Aquifer Aquifer:

Information derived from the drilling logs included in Appendix C of the RI/FS Report indicate the bedrock to be shale.

Reference: 2

OBSERVED RELEASE

No.	Well ID	Well Type	Distance (miles)	Level of Contamination

- N/A and/or data not specified

Observed Release Factor 0

Documentation for Well 04-MW013:

See Figure 4-1 and Table 2-2 of the RI/FS Report for the location of Monitoring Wells.

Reference: 2

Documentation for Well 04-MW022:

See Figure 4-1 and Table 2-2 of the RI/FS Report.

Reference: 2

Documentation for Well 04-MW023:

See Figure 4-1 and Table 2-2 of the RI/FS Report.

Reference: 2

POTENTIAL TO RELEASE

Containment

Containment Factor	7

Net Precipitation

Net Precipitation Factor	3

Depth to Aquifer

A. Depth of Hazardous Substances	40.00	feet

Documentation for Depth of Hazardous Substances:

Deepest level of contamination encountered in sample bh008-020 (See Table PMU4-3 of the HRS Report) at 40 feet level.

Reference: 3

B. Depth to Aquifer from Surface	40.00	feet

Documentation for Depth to Aquifer from Surface :

Drilling logs included in Appendix C indicate shale bedrock encountered at 40 feet (bh008). Deepest contamination also found at 40 feet. Hence the depth to bedrock is 0 feet

Reference: 2

C. Depth to Aquifer (B - A)	0.00	feet

Depth to Aquifer Factor 5

Travel Time

Are All Layers Karst? NO

Thickness of Layer(s) with Lowest Conductivity 0.00 feet

Documentation for Thickness of Layers with Lowest Conductivity:

Drilling logs in Appendix C indicate clay and silty clay layers extending to a maximum depth of 40 feet.

Reference: 2

Hydraulic Conductivity (cm/sec) 1.0E-06

Documentation for Hydraulic Conductivity:

See Table 3-6 of the HRS Guidance Manual.

Reference: 1

Travel Time Factor 35

==========

Potential to Release Factor 301

Source: 1 Rocket Laboratories

Source Hazardous Waste Quantity Value: 7.06

Hazardous Substance	Toxicity Value	Mobility Value	Toxicity/ Mobility Value
Acetone	10	1.00E+00	1.00E+01
Aluminum	100	2.00E-05	2.00E-03
Benzo(j,k)fluorene	100	2.00E-07	2.00E-05
Benzofluoranthene, 3,4-	10000	2.00E-09	2.00E-05
Chromium	10000	1.00E-02	1.00E+02
Cobalt	1	1.00E-02	1.00E-02
Di-n-butyl phthalate	10	2.00E-03	2.00E-02
Iron	100	1.00E-02	1.00E+00
Lead	10000	2.00E-05	2.00E-01
Magnesium	100	2.00E-05	2.00E-03
Manganese	10000	1.00E-02	1.00E+02
Mercury	10000	2.00E-05	2.00E-01
Methyl Napthalene, 2-	100	2.00E-03	2.00E-01
Methylene chloride	10	1.00E+00	1.00E+01
Naphthalene	1	2.00E-03	2.00E-03
Nickel	100	2.00E-05	2.00E-03
Phenanthrene	100	2.00E-05	2.00E-03
Pyrene	100	2.00E-09	2.00E-07
Selenium	100	1.00E-02	1.00E+00
Thallium	1000	1.00E-04	1.00E-01
Trichloroethane, 1,1,1-	1	1.00E-02	1.00E-02
Vanadium	100	2.00E-07	2.00E-05

Hazardous Substances Found in an Observed Release

Well No.	Observed Release Hazardous Substance	Toxicity Value	Mobility Value	Toxicity/ Mobility Value

- N/A and/or data not specified

Toxicity/Mobility Value from Source Hazardous Substances:	1.00E+02
Toxicity/Mobility Value from Observed Release Hazardous Substances:	0.00E+00
Toxicity/Mobility Factor:	1.00E+02
Sum of Source Hazardous Waste Quantity Values:	7.06E+00
Hazardous Waste Quantity Factor:	10
Waste Characteristics Factor Category:	6

Population by Well

No.	Well ID	Sample Type	Distance (miles)	Level of Contamination	Population

- N/A and/or data not specified

Level I Population Factor: 0.00

Level II Population Factor: 0.00

Potential Contamination by Distance Category

Distance Category (miles)	Population	Value
> 0 to 1/4	0.0	0.00E+00
> 1/4 to 1/2	0.0	0.00E+00
> 1/2 to 1	0.0	0.00E+00
> 1 to 2	50.0	1.00E+00
> 2 to 3	0.0	0.00E+00
> 3 to 4	0.0	0.00E+00

Potential Contamination Factor: 1.000

Nearest Well

Level of Contamination: Potential
Distance in miles: 1.50

Nearest Well Factor: 5.00E+00

Documentation for Nearest Well:

The closest water well on record with the Ohio Division of Water is located 1/4 mile west of LeRC site boundary on Cleveland Hopkins International Airport property. This is inactive. Only 7 permitted drinking water wells were identified within 4 miles of LeRC. These wells are located between 1.5 and 3 miles south and southeast of LeRC and serve an estimated 50 individuals. See Section 3.3 and 3.8.2 of RI/FS Report.

Reference: 2

Resources

Resource Use: NO

Resource Factor: 0.00E+00

Documentation for Resources:

Groundwater is not a primary drinking source in this area. See Section 3.3 of the RI/FS Report.

Reference: 2

Wellhead Protection Area

No wellhead protection area

Wellhead Protection Area Factor: 0.00E+00

Documentation for Wellhead Protection Area:

Criteria specified in Section 3.3.4 of the HRS Guidance Manual does not apply.

Reference: 1

SURFACE WATER PATHWAY SEGMENT SUMMARY
NASA LeRC PMU4 - Rocket Laboratories - 11/27/95

No.	Segment ID	Segment Type	Water Type	Start Point (mi)	End Point (mi)	Average Flow (cfs)
1	Abram Creek	River	Fresh	0.00	0.20	6
2	Rocky River	River	Fresh	0.20	9.40	113
3	Lake Erie	Moderate D	Fresh	9.40	15.00	N.A.

Documentation for segment: Abram Creek:

See section 3.8.1 of the RI/FS Report. Flow calculated from data in Table 3-3 of the RI/FS Report.

Reference: 2

Documentation for segment: Rocky River:

See Section 3.8.1 and Table 3-3 of the RI/FS Report.

Reference: 2

OBSERVED RELEASE

No.	Sample ID	Sample Type	Distance (miles)	Level of Contamination DW	HFC	Env

- N/A and/or data not specified

==========

Observed Release Factor 0

POTENTIAL TO RELEASE

Potential to Release by Overland Flow

Containment

No.	Source ID	HWQ Value	Containment Value
1	Rocket Laboratories	7.06E+00	7

Containment Factor: 7

Documentation for Overland Flow Containment, Source Rocket Laboratories:

See Section 3.4 of the RI/FS Report. The storm sewer system at LeRC collects stormwater from surface water runoff. Most of the surface water runoff from PMU4 area is collected by natural swales and the storm sewer system is diverted to outfalls along Abram Creek. PMU 4 is predominantly covered with asphalt/concrete.

Reference: 2

Distance to Surface Water

Distance to Surface Water:	200.0 feet
Distance to Surface Water Factor:	20

Documentation for Distance to Surface Water:

Average distance from midpoint of PMU to Abram Creek.

Reference:

Runoff

A. Drainage Area:	5.5 acres

Documentation for Drainage Area:

Runoff at facility controlled by storm sewer system; drainage area equal to areas of concern used

Reference:

B. 2-year, 24-hour Rainfall:	2.8 inches

Documentation for Rainfall:

See Section 3.5 of the RI/FS Report for the precipitation information.

Reference: 2

C. Soil Group: D
Fine-textured soils with very low infiltration rates

Documentation for Soil Group:

Drilling logs included in Appendix C indicate most of the soils to be silty clay and clay

Reference: 2

Runoff Factor: 1

==========

Potential to Release by Overland Flow Factor: 147

Potential to Release by Flood

No.	Source ID	HWQ Value	Flood Containment Value	Flood Frequency Value	Potential to Release by Flood

- N/A and/or data not specified

==========

Potential to Release by Flood Factor: 0

Documentation for Flood Containment, Source Rocket Laboratories:

See Section 3.4 of the RI/FS Report.

Reference: 2

Documentation for Flood Frequency, Source Rocket Laboratories:

See Section 3.4 of the RI/FS Report.

Reference: 2

Source: 1 Rocket Laboratories

Source Hazardous Waste Quantity Value: 7.06

Hazardous Substance	Toxicity Value	Persistence Value	Toxicity/ Persistence Value
Acetone	10	7.00E-04	7.00E-03
Aluminum	0	1.00E+00	0.00E+00
Benzo(j,k)fluorene	100	1.00E+00	1.00E+02
Benzofluoranthene, 3,4-	10000	1.00E+00	1.00E+04
Chromium	10000	1.00E+00	1.00E+04
Cobalt	1	1.00E+00	1.00E+00
Di-n-butyl phthalate	10	1.00E+00	1.00E+01
Iron	0	1.00E+00	0.00E+00
Lead	10000	1.00E+00	1.00E+04
Magnesium	0	1.00E+00	0.00E+00
Manganese	10000	1.00E+00	1.00E+04
Mercury	10000	1.00E+00	1.00E+04
Methyl Napthalene, 2-	0	4.00E-01	0.00E+00
Methylene chloride	10	4.00E-01	4.00E+00
Naphthalene	1	4.00E-01	4.00E-01
Nickel	100	1.00E+00	1.00E+02
Phenanthrene	0	4.00E-01	0.00E+00
Pyrene	100	1.00E+00	1.00E+02
Selenium	100	1.00E+00	1.00E+02
Thallium	1000	1.00E+00	1.00E+03
Trichloroethane, 1,1,1-	1	4.00E-01	4.00E-01
Vanadium	100	1.00E+00	1.00E+02

Hazardous Substances Found in an Observed Release

Sample No.	Observed Release Hazardous Substance	Toxicity Value	Persistence Value	Toxicity/ Persistence Value

- N/A and/or data not specified

Toxicity/Persistence Value from Source Hazardous Substances:	1.00E+04
Toxicity/Persistence Value from Observed Release Hazardous Substances:	0.00E+00
Toxicity/Persistence Factor:	1.00E+04
Sum of Source Hazardous Waste Quantity Values:	7.06E+00
Hazardous Waste Quantity Factor:	10
Waste Characteristics Factor Category:	18

Level I Concentrations

- N/A and/or data not specified

Level II Concentrations

- N/A and/or data not specified

Most Distant Level I Sample

- N/A and/or data not specified

Most Distant Level II Sample

- N/A and/or data not specified

Level I Concentrations

Intake	Distance Along the In-water Segment from the Probable Point of Entry (miles)	Population

- N/A and/or data not specified

==========

Population Served by Level I Intakes: 0.0

Level I Population Factor: 0.00E+00

Level II Concentrations

Intake	Distance Along the In-water Segment from the Probable Point of Entry (miles)	Population
- N/A and/or data not specified		

==========

Population Served by Level II Intakes: 0.0

Level II Population Factor: 0.00E+00

Potential Contamination

Intake ID	Average Annual Flow (cfs)	Population Served
1 Crown Intake Crib	0	375000.0
2 Division Intake Cri	0	375000.0
3 Kirtland Intake C	0	375000.0
4 Nottingham Intake C	0	375000.0

Documentation for Intake Crown Intake Crib:

See Section 3.8.1 of the RI/FS Report. Total population served is 1.5 million divided equally among 4 intakes.

Reference: 2

Type of Surface Water Body	Total Population	Dilution-Weighted Population
Moderate Ocean Zone or Great Lake	1125000.0	16.0

Dilution-Weighted Population Served
by Potentially Contaminated Intakes: 16.0

Potential Contamination Factor: 2.0

Nearest Intake

Location of Nearest Drinking Water Intake: Crown Intake Crib
Distance from the Probable Point of Entry: 12.60 miles
Type of Surface Water Body: Moderate D
Dilution Weight: 0.0000100
Highest Level of Contamination: Potential

Nearest Intake Factor: 0.00

Documentation for Crown Intake Crib:

See Section 3.8.1 of the RI/FS Report. Total population served is 1.5 million divided equally among 4 intakes.

Reference: 2

Resources

Resource Use: YES

Resource Value: 5.00E+00

Documentation for Resources:

See Section 3.8.1 of the RI/FS Report

Reference: 2

Source: 1 Rocket Laboratories

Source Hazardous Waste Quantity Value: 7.06

Hazardous Substance	Toxicity Value	Persistence Value	Bio-accum. Value	Toxicity/ Persistence/ Bioaccum. Value
Acetone	10	7.00E-04	5.00E-01	3.50E-03
Aluminum	0	1.00E+00	5.00E+01	0.00E+00
Benzo(j,k)fluorene	100	1.00E+00	5.00E+03	5.00E+05
Benzofluoranthene, 3,4-	10000	1.00E+00	5.00E+04	5.00E+08
Chromium	10000	1.00E+00	5.00E+00	5.00E+04
Cobalt	1	1.00E+00	5.00E-01	5.00E-01
Di-n-butyl phthalate	10	1.00E+00	5.00E+03	5.00E+04
Iron	0	1.00E+00	5.00E-01	0.00E+00
Lead	10000	1.00E+00	5.00E+01	5.00E+05
Magnesium	0	1.00E+00	5.00E-01	0.00E+00
Manganese	10000	1.00E+00	5.00E-01	5.00E+03
Mercury	10000	1.00E+00	5.00E+04	5.00E+08
Methyl Napthalene, 2-	0	4.00E-01	5.00E+03	0.00E+00
Methylene chloride	10	4.00E-01	5.00E+00	2.00E+01
Naphthalene	1	4.00E-01	5.00E+02	2.00E+02
Nickel	100	1.00E+00	5.00E-01	5.00E+01
Phenanthrene	0	4.00E-01	5.00E+01	0.00E+00
Pyrene	100	1.00E+00	5.00E+01	5.00E+03
Selenium	100	1.00E+00	5.00E+03	5.00E+05
Thallium	1000	1.00E+00	5.00E+02	5.00E+05
Trichloroethane, 1,1,1-	1	4.00E-01	5.00E+00	2.00E+00
Vanadium	100	1.00E+00	5.00E-01	5.00E+01

Hazardous Substances Found in an Observed Release

Sample No.	Observed Release Hazardous Substance	Toxicity Value	Persistence Value	Bio-accum. Value	Toxicity/ Persistence/ Bioaccum. Value

- N/A and/or data not specified

Toxicity/Persistence/Bioaccumulation Value from Source Hazardous Substances:	5.00E+08
Toxicity/Persistence/Bioaccumulation Value from Observed Release Hazardous Substances:	0.00E+00
Toxicity/Persistence/Bioaccumulation Factor:	5.00E+08
Sum of Source Hazardous Waste Quantity Values:	7.06E+00
Hazardous Waste Quantity Factor:	10
Waste Characteristics Factor Category:	180

Level I Concentrations

- N/A and/or data not specified

Level II Concentrations

- N/A and/or data not specified

Most Distant Level I Sample

- N/A and/or data not specified

Most Distant Level II Sample

- N/A and/or data not specified

Level I Concentrations

Fishery	Annual Production (pounds)	Human Food Chain Population Value
- N/A and/or data not specified		

Sum of Human Food Chain Population Values: 0.00E+00

Level I Concentrations Factor: 0.00E+00

Level II Concentrations

Fishery	Annual Production (pounds)	Human Food Chain Population Value
- N/A and/or data not specified		

Sum of Human Food Chain Population Values: 0.00E+00

Level II Concentrations Factor: 0.00E+00

Potential Contamination

Fishery	Annnual Production (pounds)	Type of Surface Water Body	Average Annual Flow (cfs)	Pop. Value (Pi)	Dilution Weight (Di)	Pi*Di
2 Rocky River	3000.0	River	113	3.0	1.00E-02	3.00E-02
3 Lake Erie	500000.0	Moderate	0	310.0	1.00E-05	3.10E-03

Sum of (Pi*Di): 3.31E-02

Potential Human Food Chain Contamination Factor: 3.31E-03

Documentation for Rocky River Fishery:

Reference:

Food Chain Individual

Location of Nearest Fishery: Rocky River
Distance from the Probable Point of Entry: 0.20 miles
Type of Surface Water Body: River
Dilution Weight: 0.0100000
Level of Contamination: Potential

Food Chain Individual Factor: 0.00

Documentation for Rocky River:

See Section 3.8.1 and Table 3-3 of the RI/FS Report.

Reference: 2

Source: 1 Rocket Laboratories

Source Hazardous Waste Quantity Value: 7.06

Hazardous Substance	Eco-toxicity Value	Persistence Value	Bio-accum. Value	Ecotoxicity/ Persistence/ Bioaccum. Value
Acetone	100	7.00E-04	5.00E-01	3.50E-02
Aluminum	0	1.00E+00	5.00E+01	0.00E+00
Benzo(j,k)fluorene	10000	1.00E+00	5.00E+03	5.00E+07
Benzofluoranthene, 3,4-	0	1.00E+00	5.00E+04	0.00E+00
Chromium	10000	1.00E+00	5.00E+00	5.00E+04
Cobalt	0	1.00E+00	5.00E+03	0.00E+00
Di-n-butyl phthalate	1000	1.00E+00	5.00E+03	5.00E+06
Iron	10	1.00E+00	5.00E-01	5.00E+00
Lead	1000	1.00E+00	5.00E+03	5.00E+06
Magnesium	0	1.00E+00	5.00E-01	0.00E+00
Manganese	0	1.00E+00	5.00E+04	0.00E+00
Mercury	10000	1.00E+00	5.00E+04	5.00E+08
Methyl Napthalene, 2-	1000	4.00E-01	5.00E+03	2.00E+06
Methylene chloride	1	4.00E-01	5.00E+00	2.00E+00
Naphthalene	1000	4.00E-01	5.00E+02	2.00E+05
Nickel	10	1.00E+00	5.00E+02	5.00E+03
Phenanthrene	1000	4.00E-01	5.00E+03	2.00E+06
Pyrene	0	1.00E+00	5.00E+01	0.00E+00
Selenium	100	1.00E+00	5.00E+03	5.00E+05
Thallium	0	1.00E+00	5.00E+02	0.00E+00
Trichloroethane, 1,1,1-	10	4.00E-01	5.00E+00	2.00E+01
Vanadium	0	1.00E+00	5.00E-01	0.00E+00

Hazardous Substances Found in an Observed Release

Sample No.	Observed Release Hazardous Substance	Eco-toxicity Value	Persistence Value	Bio-accum. Value	Ecotoxicity/ Persistence/ Bioaccum. Value

- N/A and/or data not specified

Ecotoxicity/Persistence/Bioaccummulation Value from Source Hazardous Substances:	5.00E+08
Ecotoxicity/Persistence/Bioaccummulation Value from Observed Release Hazardous Substances:	0.00E+00
Ecotoxicity/Persistence/Bioaccummulation Factor:	5.00E+08
Sum of Source Hazardous Waste Quantity Values:	7.06E+00
Hazardous Waste Quantity Factor:	10
Waste Characteristics Factor Category:	180

Level I Concentrations

- N/A and/or data not specified

Level II Concentrations

- N/A and/or data not specified

Most Distant Level I Sample

- N/A and/or data not specified

Most Distant Level II Sample

- N/A and/or data not specified

Level I Concentrations

Sensitive Environment	Distance from Probable Point of Entry to Sensitive Env. (miles)	Sensitive Environment Value
- N/A and/or data not specified		

Sum of Sensitive Environments Values: 0

Wetlands

Wetland	Distance from Probable Point of Entry to Wetland (miles)	Wetlands Frontage (miles)
- N/A and/or data not specified		

Total Wetlands Frontage: 0.00 Miles Total Wetlands Value: 0

Sum of Sensitive Environments Value + Wetlands Value: 0.00E+00

Level I Concentrations Factor: 0.00E+00

Level II Concentrations

Sensitive Environment	Distance from Probable Point of Entry to Sensitive Env. (miles)	Sensitive Environment Value
- N/A and/or data not specified		

Sum of Sensitive Environments Values: 0

Wetlands

Wetland	Distance from Probable Point of Entry to Wetland (miles)	Wetlands Frontage (miles)
- N/A and/or data not specified		

Total Wetlands Frontage: 0.00 Miles Total Wetlands Value: 0

Sum of Sensitive Environments Value + Wetlands Value: 0.00E+00

Level II Concentrations Factor: 0.00E+00

Potential Contamination

Sensitive Environments

Type of Surface Water Body	Sensitive Environment	Sensitive Environment Value
River	1 State design area	25

Wetlands

Type of Surface Water Body	Sensitive Environment	Wetlands Frontage	Wetlands Value

- N/A and/or data not specified

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Type of Surface Water Body	Sum of Sens. Environment Values(Sj)	Sum of Wetland Frontage Values(Wj)	Dilution Weight (Dj)	Dj(Wj+Sj)
Moderate to Large Stream	25	0	1.00E-02	2.50E-01

Sum of Dj(Wj+Sj): 2.50E-01

Sum of Dj(Wj+Sj)/10: 2.50E-02

==========

Potential Contamination Sensitive Environment Factor: 2.50E-02

Containment

No.	Source ID	HWQ Value	Containment Value
1	Rocket Laboratories	7.06E+00	7

Containment Factor 7

Documentation for Ground Water Containment, Source Rocket Laboratories:

PMU is predominantly covered by asphalt/concrete and is serviced by stormwater sewer system.

Reference: 2

Net Precipitation

Net Precipitation (inches) 0.00

Aquifer: Shale Bedrock Aquifer

Type of Aquifer: Non Karst

Overlaying Aquifer: 0

Interconnected with: 0

Documentation for Shale Bedrock Aquifer Aquifer:

Information derived from the drilling logs included in Appendix C of the RI/FS Report indicate the bedrock to be shale.

Reference: 2

OBSERVED RELEASE

No.	Well ID	Well Type	Distance (miles)	Level of Contamination

- N/A and/or data not specified

Observed Release Factor 0

Documentation for Well 04-MW013:

See Figure 4-1 and Table 2-2 of the RI/FS Report for the location of Monitoring Wells.

Reference: 2

Documentation for Well 04-MW022:

See Figure 4-1 and Table 2-2 of the RI/FS Report.

Reference: 2

Documentation for Well 04-MW023:

See Figure 4-1 and Table 2-2 of the RI/FS Report.

Reference: 2

POTENTIAL TO RELEASE

Ground Water to Surface Water Angle

Probable Point of Entry	200.00	miles
Angle Theta	120	

Containment

Containment Factor	7

Net Precipitation

Net Precipitation Factor	3

Depth to Aquifer

A. Depth of Hazardous Substances	40.00	feet

Documentation for Depth of Hazardous Substances:

Deepest level of contamination encountered in sample bh008-020 (See Table PMU4-3 of the HRS Report) at 40 feet level.

Reference: 3

B. Depth to Aquifer from Surface	40.00	feet

Documentation for Depth to Aquifer from Surface :

Drilling logs included in Appendix C indicate shale bedrock encountered at 40 feet (bh008). Deepest contamination also found at 40 feet. Hence the depth to bedrock is 0 feet

Reference: 2

C. Depth to Aquifer (B - A)	0.00	feet
Depth to Aquifer Factor	5	

Travel Time

Are All Layers Karst?	NO	
Thickness of Layer(s) with Lowest Conductivity	0.00	feet

Documentation for Thickness of Layers with Lowest Conductivity:

Drilling logs in Appendix C indicate clay and silty clay layers extending to a maximum depth of 40 feet.

Reference: 2

Hydraulic Conductivity (cm/sec)	1.0E-06

Documentation for Hydraulic Conductivity:

See Table 3-6 of the HRS Guidance Manual.

Reference: 1

Travel Time Factor	35

==========

Potential to Release Factor 301

Source: 1 Rocket Laboratories

Source Hazardous Waste Quantity Value: 7.06

Hazardous Substance	Toxicity Factor Value	Persist. Value	Mobility Value	Toxicity/ Mobililty/ Persistence
Acetone	10	7.00E-04	1.00E+00	7.00E-03
Aluminum	0	1.00E+00	2.00E-05	0.00E+00
Benzo(j,k)fluorene	100	1.00E+00	2.00E-07	2.00E-05
Benzofluoranthene, 3,4-	10000	1.00E+00	2.00E-09	2.00E-05
Chromium	10000	1.00E+00	1.00E-02	1.00E+02
Cobalt	1	1.00E+00	1.00E-02	1.00E-02
Di-n-butyl phthalate	10	1.00E+00	2.00E-03	2.00E-02
Iron	0	1.00E+00	1.00E-02	0.00E+00
Lead	10000	1.00E+00	2.00E-05	2.00E-01
Magnesium	0	1.00E+00	2.00E-05	0.00E+00
Manganese	10000	1.00E+00	1.00E-02	1.00E+02
Mercury	10000	1.00E+00	2.00E-05	2.00E-01
Methyl Napthalene, 2-	0	4.00E-01	2.00E-03	0.00E+00
Methylene chloride	10	4.00E-01	1.00E+00	4.00E+00
Naphthalene	1	4.00E-01	2.00E-03	8.00E-04
Nickel	100	1.00E+00	2.00E-05	2.00E-03
Phenanthrene	0	4.00E-01	2.00E-05	0.00E+00
Pyrene	100	1.00E+00	2.00E-09	2.00E-07
Selenium	100	1.00E+00	1.00E-02	1.00E+00
Thallium	1000	1.00E+00	1.00E-04	1.00E-01
Trichloroethane, 1,1,1-	1	4.00E-01	1.00E-02	4.00E-03
Vanadium	100	1.00E+00	2.00E-07	2.00E-05

Hazardous Substances Found in an Observed Release

Observed Release Hazardous Substance	Toxicity Factor Value	Persist. Value	Toxicity/ Persistence

- N/A and/or data not specified

Toxicity/Mobility/Persistence Value from Source Hazardous Substances:	1.00E+02
Toxicity/Mobility/Persistence Value from Observed Release Hazardous Substances:	0.00E+00
Toxicity/Mobility/Persistence Factor:	1.00E+02
Sum of Source Hazardous Waste Quantity Values:	7.06E+00
Hazardous Waste Quantity Factor:	10
Waste Characteristics Factor Category:	6

Level I Concentrations

- N/A and/or data not specified

Level II Concentrations

- N/A and/or data not specified

Most Distant Level I Sample

- N/A and/or data not specified

Most Distant Level II Sample

- N/A and/or data not specified

Level I Concentrations

Intake	Distance Along the In-water Segment from the Probable Point of Entry (miles)	Population
- N/A and/or data not specified		

==========

Population Served by Level I Intakes: 0.0

Level I Population Factor: 0.00E+00

Level II Concentrations

Intake	Distance Along the In-water Segment from the Probable Point of Entry (miles)	Population
- N/A and/or data not specified		

==========

Population Served by Level II Intakes: 0.0

Level II Population Factor: 0.00E+00

Potential Contamination

Intake ID	Average Annual Flow (cfs)	Population Served
1 Crown Intake Crib	0	375000.0
2 Division Intake Cri	0	375000.0
3 Kirtland Intake C	0	375000.0
4 Nottingham Intake C	0	375000.0

Documentation for Intake Crown Intake Crib:

See Section 3.8.1 of the RI/FS Report. Total population served is 1.5 million divided equally among 4 intakes.

Reference: 2

Type of Surface Water Body	Total Population	Dilution-Weighted Population
Moderate Ocean Zone or Great Lake	1125000.0	16.0

Dilution-Weighted Population Served
by Potentially Contaminated Intakes: 16.0

Potential Contamination Factor: 0.0

Nearest Intake

Location of Nearest Drinking Water Intake: N.A.

Nearest Intake Factor: 0.00

Resources

Resource Use: YES

Resource Value: 5.00E+00

Documentation for Resources:

See Section 3.8.1 of the RI/FS Report

Reference: 2

Source: 1 Rocket Laboratories

Source Hazardous Waste Quantity Value: 7.06

Hazardous Substance	Toxicity Value	Persist. Value	Mobility Value	Bio-accum. Value	Tox./Mobil./ Persistence/ Bioaccum. Value
Acetone	10	7.00E-04	1.00E+00	5.00E-01	3.50E-03
Aluminum	0	1.00E+00	2.00E-05	5.00E+01	0.00E+00
Benzo(j,k)fluorene	100	1.00E+00	2.00E-07	5.00E+03	1.00E-01
Benzofluoranthene, 3,4-	10000	1.00E+00	2.00E-09	5.00E+04	1.00E+00
Chromium	10000	1.00E+00	1.00E-02	5.00E+02	5.00E+04
Cobalt	1	1.00E+00	1.00E-02	5.00E-01	5.00E-03
Di-n-butyl phthalate	10	1.00E+00	2.00E-03	5.00E+03	1.00E+02
Iron	0	1.00E+00	1.00E-02	5.00E-01	0.00E+00
Lead	10000	1.00E+00	2.00E-05	5.00E+03	1.00E+03
Magnesium	0	1.00E+00	2.00E-05	5.00E-01	0.00E+00
Manganese	10000	1.00E+00	1.00E-02	5.00E-01	5.00E+01
Mercury	10000	1.00E+00	2.00E-05	5.00E+04	1.00E+04
Methyl Napthalene, 2-	0	4.00E-01	2.00E-03	5.00E+03	0.00E+00
Methylene chloride	10	4.00E-01	1.00E+00	5.00E+00	2.00E+01
Naphthalene	1	4.00E-01	2.00E-03	5.00E+00	4.00E-03
Nickel	100	1.00E+00	2.00E-05	5.00E+02	1.00E+00
Phenanthrene	0	4.00E-01	2.00E-05	5.00E+01	0.00E+00
Pyrene	100	1.00E+00	2.00E-09	5.00E+01	1.00E-05
Selenium	100	1.00E+00	1.00E-02	5.00E+01	5.00E+01
Thallium	1000	1.00E+00	1.00E-04	5.00E+01	5.00E+00
Trichloroethane, 1,1,1-	1	4.00E-01	1.00E-02	5.00E+00	2.00E-02
Vanadium	100	1.00E+00	2.00E-07	5.00E-01	1.00E-05

Hazardous Substances Found in an Observed Release

Observed Release Hazardous Substance	Toxicity Value	Persist. Value	Bio-accum. Value	Toxicity/ Persistence Bioaccum. Value

- N/A and/or data not specified

Toxicity/Mobility/Persistence/Bioaccumulation Value from Source Hazardous Substances:	5.00E+04
Toxicity/Mobility/Persistence/Bioaccumulation Value from Observed Release Hazardous Substances:	0.00E+00
Toxicity/Mobility/Persistence/Bioaccumulation Factor:	5.00E+04
Sum of Source Hazardous Waste Quantity Values:	7.06E+00
Hazardous Waste Quantity Factor:	10
Waste Characteristics Factor Category:	18

Level I Concentrations

- N/A and/or data not specified

Level II Concentrations

- N/A and/or data not specified

Most Distant Level I Sample

- N/A and/or data not specified

Most Distant Level II Sample

- N/A and/or data not specified

Level I Concentrations

Fishery	Annual Production (pounds)	Human Food Chain Population Value
- N/A and/or data not specified		

Sum of Human Food Chain Population Values: 0.00E+00

Level I Concentrations Factor: 0.00E+00

Level II Concentrations

Fishery	Annual Production (pounds)	Human Food Chain Population Value
- N/A and/or data not specified		

Sum of Human Food Chain Population Values: 0.00E+00

Level II Concentrations Factor: 0.00E+00

Potential Contamination

Fishery	Annnual Production (pounds)	Type of Surface Water Body	Average Annual Flow (cfs)	Pop. Value (Pi)	Dilution Weight (Di)	Pi*Di
- N/A and/or data not specified						

Sum of (Pi*Di): 0.00E+00

Potential Human Food Chain Contamination Factor: 0.00E+00

Documentation for Rocky River Fishery:

Reference:

Food Chain Individual

Location of Nearest Fishery: N.A.

Food Chain Individual Factor: 0.00

Source: 1 Rocket Laboratories

Source Hazardous Waste Quantity Value: 7.06

Hazardous Substance	Eco-toxicity Value	Persist. Value	Mob. Value	Bio-accum. Value	Ecotoxicity/ Mobility/ Persistence/ Bioaccum. Value
Acetone	1	7.00E-04	1.00E+00	5.00E-01	3.50E-04
Aluminum	0	1.00E+00	2.00E-05	5.00E+01	0.00E+00
Benzo(j,k)fluorene	1000	1.00E+00	2.00E-07	5.00E+03	1.00E+00
Benzofluoranthene, 3,4-	0	1.00E+00	2.00E-09	5.00E+04	0.00E+00
Chromium	10000	1.00E+00	1.00E-02	5.00E+02	5.00E+04
Cobalt	0	1.00E+00	1.00E-02	5.00E+03	0.00E+00
Di-n-butyl phthalate	10000	1.00E+00	2.00E-03	5.00E+03	1.00E+05
Iron	10	1.00E+00	1.00E-02	5.00E-01	5.00E-02
Lead	1000	1.00E+00	2.00E-05	5.00E+03	1.00E+02
Magnesium	0	1.00E+00	2.00E-05	5.00E-01	0.00E+00
Manganese	0	1.00E+00	1.00E-02	5.00E+04	0.00E+00
Mercury	10000	1.00E+00	2.00E-05	5.00E+04	1.00E+04
Methyl Napthalene, 2-	1000	4.00E-01	2.00E-03	5.00E+03	4.00E+03
Methylene chloride	10	4.00E-01	1.00E+00	5.00E+00	2.00E+01
Naphthalene	1000	4.00E-01	2.00E-03	5.00E+03	4.00E+03
Nickel	1000	1.00E+00	2.00E-05	5.00E+02	1.00E+01
Phenanthrene	1000	4.00E-01	2.00E-05	5.00E+01	4.00E-01
Pyrene	0	1.00E+00	2.00E-09	5.00E+01	0.00E+00
Selenium	100	1.00E+00	1.00E-02	5.00E+01	5.00E+01
Thallium	0	1.00E+00	1.00E-04	5.00E+01	0.00E+00
Trichloroethane, 1,1,1-	10	4.00E-01	1.00E-02	5.00E+00	2.00E-01
Vanadium	0	1.00E+00	2.00E-07	5.00E-01	0.00E+00

Hazardous Substances Found in an Observed Release

Observed Release Hazardous Substance	Eco-toxicity Value	Persist. Value	Bio-accum. Value	Ecotoxicity/ Persistence/ Bioaccum. Value

- N/A and/or data not specified

Ecotoxicity/Mobility/Persistence/Bioaccummulation Value from Source Substances:	1.00E+05
Ecotoxicity/Mobility/Persistence/Bioaccummulation Value from Observed Hazardous Substances:	0.00E+00
Ecotoxicity/Mobility/Persistence/Bioaccummulation Factor:	1.00E+05
Sum of Source Hazardous Waste Quantity Values:	7.06E+00
Hazardous Waste Quantity Factor:	10
Waste Characteristics Factor Category:	32

Level I Concentrations

- N/A and/or data not specified

Level II Concentrations

- N/A and/or data not specified

Most Distant Level I Sample

- N/A and/or data not specified

Most Distant Level II Sample

- N/A and/or data not specified

Level I Concentrations

Sensitive Environment	Distance from Probable Point of Entry to Sensitive Env. (miles)	Sensitive Environment Value
- N/A and/or data not specified		

Sum of Sensitive Environments Values: 0

Wetlands

Wetland	Distance from Probable Point of Entry to Wetland (miles)	Wetlands Frontage (miles)
- N/A and/or data not specified		

Total Wetlands Frontage: 0.00 Miles Total Wetlands Value: 0

Sum of Sensitive Environments Value + Wetlands Value: 0.00E+00

Level I Concentrations Factor: 0.00E+00

Level II Concentrations

Sensitive Environment	Distance from Probable Point of Entry to Sensitive Env. (miles)	Sensitive Environment Value
- N/A and/or data not specified		

Sum of Sensitive Environments Values: 0

Wetlands

Wetland	Distance from Probable Point of Entry to Wetland (miles)	Wetlands Frontage (miles)
- N/A and/or data not specified		

Total Wetlands Frontage: 0.00 Miles Total Wetlands Value: 0

Sum of Sensitive Environments Value + Wetlands Value: 0.00E+00

Level II Concentrations Factor: 0.00E+00

Potential Contamination

Sensitive Environments

Type of Surface Water Body	Sensitive Environment	Sensitive Environment Value

Wetlands

Type of Surface Water Body	Sensitive Environment	Wetlands Frontage	Wetlands Value

- N/A and/or data not specified

SW PATHWAY: GW TO SW COMPONENT ENVIRONMENTAL THREAT TARGETS
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Type of Surface Water Body	Sum of Sens. Environment Values(Sj)	Sum of Wetland Frontage Values(Wj)	Dilution Weight (Dj)	Dj(Wj+Sj)

- N/A and/or data not specified

Sum of Dj(Wj+Sj): 0.00E+00
Sum of Dj(Wj+Sj)/10: 0.00E+00

==========

Potential Contamination Sensitive Environment Factor: 0.00E+00

Likelihood of Exposure

No.	Source ID	Level of Contamination
1	Rocket Laboratories	Level II

Likelihood of Exposure Factor: 550

Documentation for Area of Contamination, Source Rocket Laboratories:

Area obtained from the map in Figure 4-1 of the RI/FS Report.
Building 35 Complex: 400'x500' = 200000 sq.ft
Building 93 Cooling Tower: 300'x140'= 42000 sq. ft
Total Area for this source: 242000 sq. ft

Reference: 2

Source No.	Hazardous Substance	Depth (ft.)	Concent.	Cancer	RFD	Units
1	Acetone	> 2	1.8E-02	0.0E+00	0.0E+00	ppm
1	Benzo(j,k)fluorene	< 2	7.4E-01	0.0E+00	2.3E+04	ppm
1	Benzofluoranthene, 3,4-	< 2	3.4E-01	0.0E+00	0.0E+00	ppm
1	Di-n-butyl phthalate	< 2	4.2E-01	0.0E+00	5.8E+04	ppm
1	Magnesium	< 2	3.9E+04	0.0E+00	0.0E+00	ppm
1	Mercury	< 2	1.7E-01	0.0E+00	1.7E+02	ppm
1	Methyl Napthalene, 2-	> 2	8.2E-01	0.0E+00	0.0E+00	ppm
1	Methylene chloride	> 2	1.7E-01	0.0E+00	0.0E+00	ppm
1	Naphthalene	< 2	3.9E-01	0.0E+00	0.0E+00	ppm
1	Phenanthrene	< 2	4.5E-01	0.0E+00	0.0E+00	ppm
1	Pyrene	< 2	6.0E-01	0.0E+00	1.7E+04	ppm
1	Selenium	< 2	4.8E+00	0.0E+00	2.9E+03	ppm
1	Thallium	> 2	2.9E+00	0.0E+00	0.0E+00	ppm
1	Trichloroethane, 1,1,1-	< 2	3.6E-02	0.0E+00	0.0E+00	ppm
1	Vanadium	< 2	8.5E+01	0.0E+00	4.1E+03	ppm

Documentation for Source Rocket Laboratories, Contaminants:

See RI/FS Report for analytical data and Tables 4-1 and 4-2 of the HRS Report for concentrations significantly above background.

Reference: 2,3

Source: 1 Rocket Laboratories

Source Hazardous Waste Quantity Value: 7.06

Hazardous Substance	Toxicity Value
Benzo(j,k)fluorene	100
Benzofluoranthene, 3,4-	10000
Di-n-butyl phthalate	10
Magnesium	0
Mercury	10000
Naphthalene	1
Phenanthrene	0
Pyrene	100
Selenium	100
Trichloroethane, 1,1,1-	1
Vanadium	100

SOIL EXPOSURE PATHWAY RESIDENT POPULATION THREAT WASTE CHARACTERISTICS

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Toxicity Factor:	1.00E+04
Sum of Source Hazardous Waste Quantity Values:	7.06E+00
Hazardous Waste Quantity Factor:	10
Waste Characteristics Factor Category:	18

Targets

Level I Population:	0.0	Value:	0.00
Level II Population:	0.0	Value:	0.00

Documentation for Level II Population:

No residents, students, daycare within 200 ft.

Reference:

Workers:	50.0	Value:	5.00

Documentation for Workers:

Reference:

Resident Individual:	Potentia	Value:	0.00
Resources:	NO	Value:	0.00

Terrestial Sensitive Environment Value

- N/A and/or data not specified

==========

Terrestrial Sensitive Environments Factor: 0.00

SOIL EXPOSURE PATHWAY NEARBY POPULATION THREAT LIKELIHOOD OF EXPOSURE
NASA LeRC PMU4 - Rocket Laboratories - 11/27/95

Likelihood of Exposure

No.	Source ID	Level of Contamination	Attractiveness/ Accessibility	Area of Contam. (sq. feet)
- N/A and/or data not specified				

Highest Attractiveness/Accessibility Value: 0
Sum of Eligible Areas Of Contamination (sq. feet): 0
Area of Contamination Value: 0

Likelihood of Exposure Factor Category: 0

Source: 1 Rocket Laboratories

Source Hazardous Waste Quantity Value: 7.06

Hazardous Substance	Toxicity Value
Benzo(j,k)fluorene	100
Benzofluoranthene, 3,4-	10000
Di-n-butyl phthalate	10
Magnesium	0
Mercury	10000
Naphthalene	1
Phenanthrene	0
Pyrene	100
Selenium	100
Trichloroethane, 1,1,1-	1
Vanadium	100

Toxicity Factor:	0.00E+00
Sum of Source Hazardous Waste Quantity Values:	0.00E+00
Hazardous Waste Quantity Factor:	0
Waste Characteristics Factor Category:	0

Targets

Level I Population: 5875.0 Value: 5.8082047553480231800000

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Level II Population: 5875.0 Value: 13.00

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Workers: 19800.0 Value: 10.20

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Documentation for Population > 0 to 1/4 mile Distance Category:

See Table 3-5 of the RI/FS Report for demographic information

Reference: 2

OBSERVED RELEASE

No.	Sample ID	Distance (miles)	Level of Contamination

- N/A and/or data not specified

==========

Observed Release Factor: 0

Gas Migration Potential

GAS POTENTIAL TO RELEASE

Source ID	Source Type	Gas Contain. Value (A)	Gas Source Type Value (B)	Gas Migrtn. Potent. Value (C)	Sum (B+C)	Gas Potential to Rel. Value A(B+C)
- N/A and/or data not specified						

Gas Potential to Release Factor: 0

Documentation for Gas Containment, Source Rocket Laboratories:

Observed soil contamination beneath asphalt/concrete. Fine grained soils.

Reference:

Source: Rocket Laboratories

Gaseous Hazardous Substance	Hazardous Substance Gas Migration Potential Value
Acetone	17
Benzo(j,k)fluorene	6
Benzofluoranthene, 3,4-	6
Di-n-butyl phthalate	6
Mercury	11
Methyl Napthalene, 2-	11
Methylene chloride	17
Naphthalene	11
Phenanthrene	11
Pyrene	6
Trichloroethane, 1,1,1-	17

Average of Gas Migration Potential Value for 3 Hazardous Substances: 17.000

Gas Migration Potential Value From Table 6-7: 17

Particulate Migration Potential

PARTICULATE POTENTIAL TO RELEASE

Source ID	Source Type	Partic. Contain. Value (A)	Partic. Source Type Value (B)	Partic. Migrtn. Potent. Value (C)	Sum (B+C)	Partic. Potential to Rel. Value A(B+C)
- N/A and/or data not specified						

Particulate Potential to Release Factor: 0

Documentation for Particulate Containment, Source Rocket Laboratories:

Observed soil contamination beneath asphalt/concrete.

Reference:

Source: Rocket Laboratories

Particulate Hazardous Substance
Aluminum
Benzo(j,k)fluorene
Benzofluoranthene, 3,4-
Chromium
Cobalt
Di-n-butyl phthalate
Iron
Lead
Magnesium
Manganese
Mercury
Methyl Napthalene, 2-
Naphthalene
Nickel
Phenanthrene
Pyrene
Selenium
Thallium
Vanadium

AIR PATHWAY WASTE CHARACTERISTICS

NASA LeRC PMU4 - Rocket Laboratories - 11/27/95

Hazardous Substance	Toxicity Value	Gas Mobility Value	Particulate Mobility Value	Toxicity/ Mobility Value

Hazardous Substances Found in an Observed Release

Sample ID	Observed Release Hazardous Substance	Particulate Toxicity/ Mobility Value	Gas Toxicity/ Mobility Value
- N/A and/or data not specified			

- N/A and/or data not specified

Toxicity/Mobility Value from Observed Release Hazardous Substances:	0.00E+00
Toxicity/Mobility Factor:	0.00E+00
Sum of Source Hazardous Waste Quantity Values:	0.00E+00
Hazardous Waste Quantity Factor:	0
Waste Characteristics Factor Category:	0

AIR PATHWAY TARGETS

NASA LeRC PMU4 - Rocket Laboratories - 11/27/95

Actual Contamination

No.	Sample ID	Distance (miles)	Level of Contamination

- N/A and/or data not specified

Potential Contamination

Distance Categories Subject to Potential Contamination	Population	Value
	Potential Contaminantion Factor:	0.0000
	Potential Contaminantion Factor:	0.0000
	Potential Contaminantion Factor:	0.0000
	Potential Contaminantion Factor:	0.0000
	Potential Contaminantion Factor:	0.0000
	Potential Contaminantion Factor:	0.0000
	Potential Contaminantion Factor:	0.0000

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Nearest Individual Factor

Documentation for Population Onsite Distance Category:

Table 3-5 Summary of Demographic Estimates, Phase I RI/FS Report

Reference:

Distance in miles: Potentia

Nearest Individual Value: 4.9353866790200953200000000000000000000000e+257

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Resources

Resource Value: 4.9353866790094563700000000000000000000000e+257

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Actual Contamination, Sensitive Environments

Sensitive Environment	Distance (miles)	Sensitive Environment Value

Documentation for Resources:

Rocky River Reservation is located within the proximity of the site.

Reference:

- N/A and/or data not specified

Actual Contamination, Wetlands

Distance Category	Wetland Acreage	Wetland Acreage Value

- N/A and/or data not specified

==========
(Sum of Sensitive Environments + Wetlands Values)

Potential Contamination, Sensitive Environments

Sensitive Environment	Distance (miles)	Sensitive Environment Value	Distance Weight	Weighted Value/10
(null)	4.935385843404746150000000000000000000000e+257			

Sum of Sensitive Environments Weighted Values/10: 0.000

Potential Contamination, Wetlands

Distance Category	Wetland Acreage	Wetland Acreage Value	Distance Weight	Weighted Value/10
;F ~ t F	4.935386984575570640000000000000000000000e+257			249

- N/A and/or data not specified

==========

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Documentation for Sensitive Environment Rocky River:

Rocky River a seasonal salmon habitat as per Section 3.6 Phase I RI/FS. Based on facility maps, Rocky River .5 miles downstream of site.

Reference:

REFERENCES

NASA LeRC PMU4 - Rocket Laboratories - 11/27/95

1. HRS Guidance Manual: 40CFR300 Appendix A to Part 300 The Hazard Ranking System 1993 and The Hazard Ranking System Guidance Manual - Interim Final, USEPA, Washington D.C.

2. Phase I Remedial Investigation/Feasibility Study Report. Prepared by R&R International Inc. for NASA Lewis Research Center, Cleveland, OH. October 1995

3. HRS Report. Prepared by R&R International Inc. for NASA Lewis Research Center, Cleveland, OH.

TABLE 4-1
SIGNIFICANCE ABOVE BACKGROUND

PMU 4 - ROCKET LABORATORY AREA
BUILDING 93 - COOLING TOWER (UPR-04-04)
NASA LEWIS RESEARCH CENTER
PHASE I RI/FS

Compound	Background Sample SQL	Background Sample Conc	Release Sample Sample#	Release Sample SQL	Release Sample Conc	Signif.?	Attrib. to Site?	Comments
SOIL								
VOCs								
1,1,1-Trichloroethane	0.010	0.005	SS006-001		0.036	Y	Y	
1,1-Dichloroethane	0.010	0.005	SS006-001	*	0.010	N	n/a	
Tetrachloroethene	0.010	0.005	SS004-001	*	0.007	N	n/a	
SVOCs								
1,4-Dichlorobenzene	0.330	0.165	SS004-101	*	0.120	N	n/a	
Acenaphthene	0.330	0.165	SS004-001	*	0.057	N	n/a	
Anthracene	0.330	0.152	SS004-001	*	0.110	N	n/a	
Benzo(a)Pyrene	0.330	0.158	SS005-001	*	0.240	N	n/a	
benzo(a)anthracene	0.330	0.164	SS005-001	*	0.340	N	n/a	
Benzo(b)fluoranthene	0.330	0.175	SS005-001	*	0.340	Y	Y	
Benzo(g,h,i)Perylene	0.330	0.167	SS005-001	*	0.091	N	n/a	
Benzo(k)fluoranthene	0.330	0.146	SS005-001	*	0.100	N	n/a	
Carbazole	0.330	0.15	SS005-001	*	0.100	N	n/a	
Chrysene	0.330	0.171	SS005-001	*	0.250	N	n/a	
Di-n-Butyl Phthalate	0.330	0.137	SS004-001		0.420	Y	Y	
Fluoranthene	0.330	0.204	SS005-001		0.740	Y	Y	
Fluorene	0.330	0.157	SS004-001	*	0.051	N	n/a	
Ideno(1,2,3-cd)pyrene	0.330	0.16	SS005-001	*	0.120	N	n/a	
Pentachlorophenol	0 330	0.4	SS006-001	*	0.460	N	n/a	
Phenanthrene	0.330	0.188	SS005-001	*	0.450	Y	Y	
Pyrene	0.330	0.188	SS005-001		0.600	Y	Y	
bis(2-Ethylhexyl)Phthalate	0 330	0.123	SS004-001	*	0.170	N	n/a	
Metals								

TABLE 4-1
SIGNIFICANCE ABOVE BACKGROUND

PMU 4 - ROCKET LABORATORY AREA
BUILDING 93 - COOLING TOWER (UPR-04-04)
NASA LEWIS RESEARCH CENTER
PHASE I RI/FS

Compound	Background Sample SQL	Background Sample Conc	Release Sample Sample#	Release Sample SQL	Release Sample Conc	Signif.?	Attrib. to Site?	Comments
Aluminum		12820	SS004-001	*	14000	N	n/a	
Antimony	12	5.28	SS004-101	*	4	N	n/a	
Arsenic		12.040	SS004-001	*	13.8000	N	n/a	
Barium		78.26	SS006-001		91.800	N	n/a	
Beryllium		0.72	SS004-001	#	0.660	N	n/a	
Calcium		17475.33	SS004-101		32600.000	N	n/a	
Chromium		17.78	SS004-001		23.80000	N	n/a	
Cobalt		13.56	SS004-001		16.60000	N	n/a	
Copper		23.07	SS004-001		30.30	N	n/a	
Iron		26100	SS006-001		40100.000	N	n/a	
Lead		17.12	SS004-001	*	18.50000	N	n/a	
Magnesium		5576	SS004-001		7270.0000	N	n/a	
Manganese		423.53	SS006-001		1170.0000	N	n/a	
Mercury	0.1	0.05	SS005-001		0.17000	Y	Y	
Nickel		28.87	SS006-001		49.60000	N	n/a	
PotaSSium		164.27	SS004-001		2580.0000	Y	n/a	
Sodium		145	SS004-001	#	124.0000	N	n/a	
Thallium	2.00	0.39	SS004-001	#	0.44000	N	n/a	
Vanadium		24.14	SS004-001		26 80000	N	n/a	
Zinc		75.01	SS004-001	*	104.00000	N	n/a	

Notes:
mean of background samples collected from shallow upland was used as background
all conc's. in ppm * J-flagged release sample data blank SQLs imply that Sample Conc. > Sample SQL

TABLE 4-2
SIGNIFICANCE ABOVE BACKGROUND

PMU 4 - ROCKET LABORATORY AREA
BUILDING 35 COMPLEX (UPR-04-07)
NASA LEWIS RESEARCH CENTER
PHASE I RI/FS

Compound	Background Sample SQL	Background Sample Conc	Release Sample Sample#	Release Sample SQL	Release Sample Conc	Signif.?	Attrib. to Site?	Comments
SOIL								
VOCs								
2-Butanone	0.01	0.005	BH008-020	*	0.009	N	n/a	
Acetone	0.01	0.004	BH006-003		0.018	Y	Y	
Methylene Chloride	0.01	0.004	BH007-008		0.170	Y	Y	
Toluene	0.01	0.005	BH008-020	*	0.003	N	n/a	
Total Xylenes	0.01	0.005	BH008-020	*	0.005	N	n/a	
SVOCs								
1,4-Dichlorobenzene	0.330	0.165	BH008-020	*	0.086	N	n/a	
2,4-Dinitrophenol	0.330	0.4	BH008-007	*	0.880	N	n/a	
2-Methylnaphthalene	0.330	0.139	BH008-020		0.820	Y	Y	
4-Nitrophenol	0.330	0.4	BH008-007	*	0.880	N	n/a	
Benzo(b)fluoranthene	0.330	0.175	BH006-001	*	0 044	N	n/a	
Di-n-Butyl Phthalate	0.330	0.137	BH008-002	*	0.240	N	n/a	
Fluoranthene	0.330	0.204	BH006-001	*	0.071	N	n/a	
Fluorene	0.330	0.157	BH006-001	*	0 078	N	n/a	
Naphthalene	0.330	0.139	BH008-020		0.390	Y	Y	
Phenanthrene	0.330	0.188	BH006-001	*	0.190	N	n/a	
Pyrene	0.330	0.188	BH006-001	*	0.071	N	n/a	
bis(2-Ethylhexyl)Phthalate	0.330	0.123	BH008-002	*	0.063	N	n/a	
Metals								
Aluminum		12820	BH008-002		12600	N	n/a	
Antimony	12	4 453	BH007-010	#	3.10	N	n/a	
Arsenic		16.240	BH008-020	*	21.6000	N	n/a	
Barium		51.37	BH006-010		100.000	N	n/a	

TABLE 4-2
SIGNIFICANCE ABOVE BACKGROUND

PMU 4 - ROCKET LABORATORY AREA
BUILDING 35 COMPLEX (UPR-04-07)
NASA LEWIS RESEARCH CENTER
PHASE I RI/FS

Compound	Background Sample SQL	Background Sample Conc	Release Sample Sample#	Release Sample SQL	Release Sample Conc	Signif.?	Attrib. to Site?	Comments
Beryllium		0.601	BH006010	#	0.720	N	n/a	
Cadmium	1	0.737	BH008-020	*	0.630	N	n/a	
Calcium		20450	BH008-002		48400.000	N	n/a	
Chromium		16.15	BH008-020		19.50000	N	n/a	
Cobalt		13.56	BH007-001		15.20000	N	n/a	
Copper		26.13	BH008-020		40.30	N	n/a	
Iron		26100	BH007-001	*	29000.000	N	n/a	
Lead		17.12	BH006-010		23.10	N	n/a	
Magnesium		5576	BH006-001	*	39000.00	Y	Y	
Manganese		423.53	BH006-003	*	507.00	N	n/a	
Nickel		35.37	BH008-020		67.20	N	n/a	
Selenium		0.6	BH008-020		4.80	Y	Y	
Potassium		2574	BH008-020		3050.00	N	n/a	
Sodium		212.7	BH008-020	#	381.00	N	n/a	
Thallium		0.612	BH008-020	*	2.90	Y	Y	
Vanadium		20.04	BH008-020	*	85.40	Y	Y	
Zinc		92.07	BH008-020		190.00	N	n/a	

Notes:
mean of background samples collected from shallow upland was used as background
all conc's. in ppm * J-flagged release sample data blank SQLs imply that Sample Conc. > Sample SQL

TABLE 4-2
SIGNIFICANCE ABOVE BACKGROUND

PMU 4 - ROCKET LABORATORY AREA
BUILDING 35 COMPLEX (UPR-04-07)
NASA LEWIS RESEARCH CENTER
PHASE I RI/FS

Compound	Background Sample SQL	Background Sample Conc	Release Sample Sample#	Release Sample SQL	Release Sample Conc	Signif.?	Attrib. to Site?	Comments
GROUNDWATER								
VOCs								
None Detected						N	n/a	
SVOCs								
None Detected						N	n/a	
Metals								
Aluminum		0.21	GW023-001		14	Y	Y	
Arsenic		0.050	GW023-001	*	0.08680	N	n/a	
Barium		2	GW023-001		0.61100	N	n/a	
Beryllium		0.004	GW023-001		0.00770	N	n/a	
Cadmium	1	0.005	GW023-001		0.01700	N	n/a	
Calcium			GW023-001		0.01700	Y	Y	
Chromium		0.1	GW023-001		0.307	Y	Y	
Cobalt			GW023-001		0.17400	Y	Y	
Copper		1.3	GW023-001		0.41300	N	n/a	
Iron		0.3	GW023-001		338.00000	Y	Y	
Lead		0.015	GW023-001		0 15100	Y	Y	
Magnesium			GW023-001		86.90000	Y	Y	
Manganese		0.05	GW023-001		3.18000	Y	Y	
Mercury		0.002	GW023-001		0.00066	N	n/a	
Nickel		0 1	GW023-001		0.64800	Y	Y	
Potassium			GW023-001		61.10000	Y	Y	
Selenium		0.05	GW023-001	*	3400 000	Y	Y	
Sodium		20	GW023-001	*	211.0000	Y	Y	
Vanadium			GW023-001		0.58500	Y	Y	

TABLE 4-2
SIGNIFICANCE ABOVE BACKGROUND

PMU 4 - ROCKET LABORATORY AREA
BUILDING 35 COMPLEX (UPR-04-07)
NASA LEWIS RESEARCH CENTER
PHASE I RI/FS

Compound	Background Sample SQL	Background Sample Conc	Release Sample Sample#	Release Sample SQL	Release Sample Conc	Signif.?	Attrib. to Site?	Comments
Zinc		5	GW023-001		1.21000	N	n/a	

Notes:
mean of background samples collected from shallow upland was used as background for shallow samples
and deep upland was used for deep samples (10 feet and more)
all conc's. in ppm * J-flagged release sample data blank SQLs imply that Sample Conc. > Sample SQL
MCLs for water used as background

PMU 5

Record Information

1. Site Name: NASA LeRC PMU5 - South Area
   (as entered in CERCLIS)

2. Site CERCLIS Number:

3. Site Reviewer: N/A

4. Date: 09/07/95

5. Site Location: Cleveland/Cuyahoga, OH
   (City/County,State)

6. Congressional District:

7. Site Coordinates: Single

   Latitude: 41 24'45.0" Longitude: 81 52'00.0"

Site Description

1. Setting: Urban

2. Current Owner: Federal

3. Current Site Status: Active

4. Years of Operation: Active Site , from and to dates: since 1941

5. How Initially Identified: Other - Preliminary Assessment

6. Entity Responsible for Waste Generation:

   - Federal Facility
   - Other

7. Site Activities/Waste Deposition:

   - Other - Fire Training Pit
   - Surface Impoundment
   - Waste Piles
   - Industrial Landfill
   - Drum/Container Storage
   - Tanks - Below Ground

Waste Description

8. Wastes Deposited or Detected Onsite:

- Organic Chemicals
- Inorganic Chemicals
- Solvents
- Laboratory/Hospital Waste
- Pesticides/Herbicides
- Metals
- Radioactive Waste
- Construction Waste
- Lead
- PCBs

Response Actions

9. Response/Removal Actions:

RCRA Information

10. For All Active Facilities, RCRA Site Status:

- Not Applicable

Demographic Information

11. Workers Present Onsite: Yes

12. Distance to Nearest Non-Worker Individual: > 1/4 - 1/2 Mile

13. Residential Population Within 1 Mile: 4000.0

14. Residential Population Within 4 Miles: 10000.0

Water Use Information

15. Local Drinking Water Supply Source:

- Ground Water (within 4 mile distance limit)
- Surface Water (within 15 mile distance limit)

16. Total Population Served by Local Drinking Water Supply Source: 1500000.0

17. Drinking Water Supply System Type for Local Drinking Water Supply Sources:

    - Municipal (Services over 25 People)

18. Surface Water Adjacent to/Draining Site:

    - Stream

HRS DOCUMENTATION RECORD
NASA LeRC PMU5 - South Area - 12/15/95

1. Site Name: NASA LeRC PMU5 - South Area
   (as entered in CERCLIS)

2. Site CERCLIS Number:

3. Site Reviewer: N/A

4. Date: 09/07/95

5. Site Location: Cleveland/Cuyahoga, OH
   (City/County,State)

6. Congressional District:

7. Site Coordinates: Single

   Latitude: 41 24'45.0" Longitude: 81 52'00.0"

	Score
Ground Water Migration Pathway Score (Sgw)	1.28
Surface Water Migration Pathway Score (Ssw)	11.06
Soil Exposure Pathway Score (Ss)	6.56
Air Migration Pathway Score (Sa)	16.33

Site Score	10.41

NOTE

EPA uses the terms "facility," "site," and "release" interchangeably. The term "facility" is broadly defined in CERCLA to include any area where hazardous substances have "come to be located" (CERCLA Section 109(9)), and the listing process is not intended to define or reflect boundaries of such facilities or releases. Site names, and references to specific parcels or properties, are provided for general identification purposes only. Knowledge regarding the extent of sites will be refined as more information is developed during the RI/FS and even during implementation of the remedy.

GROUND WATER MIGRATION PATHWAY SCORESHEET
NASA LeRC PMU5 - South Area - 12/15/95

GROUND WATER MIGRATION PATHWAY Factor Categories & Factors	Maximum Value	Value Assigned
Likelihood of Release to an Aquifer Aquifer: Shale Bedrock Aquife		
1. Observed Release	550	550
2. Potential to Release		
2a. Containment	10	10
2b. Net Precipitation	10	3
2c. Depth to Aquifer	5	5
2d. Travel Time	35	35
2e. Potential to Release [lines 2a(2b+2c+2d)]	500	430
3. Likelihood of Release	550	550
Waste Characteristics		
4. Toxicity/Mobility	*	1.00E+04
5. Hazardous Waste Quantity	*	100
6. Waste Characteristics	100	32
Targets		
7. Nearest Well	50	5.00E+00
8. Population		
8a. Level I Concentrations	**	0.00E+00
8b. Level II Concentrations	**	0.00E+00
8c. Potential Contamination	**	1.00E+00
8d. Population (lines 8a+8b+8c)	**	1.00E+00
9. Resources	5	0.00E+00
10. Wellhead Protection Area	20	0.00E+00
11. Targets (lines 7+8d+9+10)	**	6.00E+00
12. Targets (including overlaying aquifers)	**	6.00E+00
13. Aquifer Score	100	1.28
GROUND WATER MIGRATION PATHWAY SCORE (Sgw)	100	1.28

* Maximum value applies to waste characteristics category.
** Maximum value not applicable.

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORESHEET
NASA LeRC PMU5 - South Area - 12/15/95

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT Factor Categories & Factors DRINKING WATER THREAT	Maximum Value	Value Assigned
Likelihood of Release		
1. Observed Release	550	0
2. Potential to Release by Overland Flow		
2a. Containment	10	10
2b. Runoff	25	1
2c. Distance to Surface Water	25	25
2d. Potential to Release by Overland Flow [lines 2a(2b+2c)]	500	260
3. Potential to Release by Flood		
3a. Containment (Flood)	10	10
3b. Flood Frequency	50	50
3c. Potential to Release by Flood (lines 3a x 3b)	500	500
4. Potential to Release (lines 2d+3c)	500	500
5. Likelihood of Release	550	500
Waste Characteristics		
6. Toxicity/Persistence	*	1.00E+04
7. Hazardous Waste Quantity	*	100
8. Waste Characteristics	100	32
Targets		
9. Nearest Intake	50	0.00E+00
10. Population		
10a. Level I Concentrations	**	0.00E+00
10b. Level II Concentrations	**	0.00E+00
10c. Potential Contamination	**	2.00E+00
10d. Population (lines 10a+10b+10c)	**	2.00E+00
11. Resources	5	5.00E+00
12. Targets (lines 9+10d+11)	**	7.00E+00
13. DRINKING WATER THREAT SCORE	100	1.36

* Maximum value applies to waste characteristics category.
** Maximum value not applicable.

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORESHEET
NASA LeRC PMU5 - South Area - 12/15/95

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT Factor Categories & Factors HUMAN FOOD CHAIN THREAT	Maximum Value	Value Assigned
Likelihood of Release		
14. Likelihood of Release (same as line 5)	550	500
Waste Characteristics		
15. Toxicity/Persistence/Bioaccumulation	*	5.00E+08
16. Hazardous Waste Quantity	*	100
17. Waste Characteristics	1000	320
Targets		
18. Food Chain Individual	50	0.00E+00
19. Population		
19a. Level I Concentrations	**	0.00E+00
19b. Level II Concentrations	**	0.00E+00
19c. Pot. Human Food Chain Contamination	**	3.31E-03
19d. Population (lines 19a+19b+19c)	**	3.31E-03
20. Targets (lines 18+19d)	**	3.31E-03
21. HUMAN FOOD CHAIN THREAT SCORE	100	0.01

* Maximum value applies to waste characteristics category.
** Maximum value not applicable.

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORESHEET
NASA LeRC PMU5 - South Area - 12/15/95

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT Factor Categories & Factors ENVIRONMENTAL THREAT	Maximum Value	Value Assigned
Likelihood of Release		
22. Likelihood of Release (same as line 5)	550	500
Waste Characteristics		
23. Ecosystem Toxicity/Persistence/Bioacc.	*	5.00E+08
24. Hazardous Waste Quantity	*	100
25. Waste Characteristics	1000	320
Targets		
26. Sensitive Environments		
26a. Level I Concentrations	**	0.00E+00
26b. Level II Concentrations	**	0.00E+00
26c. Potential Contamination	**	5.00E+00
26d. Sensitive Environments (lines 26a+26b+26c)	**	5.00E+00
27. Targets (line 26d)	**	5.00E+00
28. ENVIRONMENTAL THREAT SCORE	60	9.70
29. WATERSHED SCORE	100	11.06
30. SW: OVERLAND/FLOOD COMPONENT SCORE (Sof)	100	11.06

* Maximum value applies to waste characteristics category.
** Maximum value not applicable.

GROUND WATER TO SURFACE WATER MIGRATION COMPONENT SCORESHEET
NASA LeRC PMU5 - South Area - 12/15/95

GROUND WATER TO SURFACE WATER MIGRATION COMPONENT Factor Categories & Factors DRINKING WATER THREAT	Maximum Value	Value Assigned
Likelihood of Release to Aquifer Aquifer: Shale Bedrock Aquife		
1. Observed Release	550	550
2. Potential to Release		
2a. Containment	10	10
2b. Net Precipitation	10	3
2c. Depth to Aquifer	5	5
2d. Travel Time	35	35
2e. Potential to Release [lines 2a(2b+2c+2d)]	500	430
3. Likelihood of Release	550	550
Waste Characteristics		
4. Toxicity/Mobility/Persistence	*	1.00E+04
5. Hazardous Waste Quantity	*	100
6. Waste Characteristics	100	32
Targets		
7. Nearest Intake	50	0.00E+00
8. Population		
8a. Level I Concentrations	**	0.00E+00
8b. Level II Concentrations	**	0.00E+00
8c. Potential Contamination	**	8.00E-01
8d. Population (lines 8a+8b+8c)	**	8.00E-01
9. Resources	5	5.00E+00
10. Targets (lines 7+8d+9)	**	5.80E+00
11. DRINKING WATER THREAT SCORE	100	1.24

* Maximum value applies to waste characteristics category.
** Maximum value not applicable.

GROUND WATER TO SURFACE WATER MIGRATION COMPONENT SCORESHEET
NASA LeRC PMU5 - South Area - 12/15/95

GROUND WATER TO SURFACE WATER MIGRATION COMPONENT Factor Categories & Factors HUMAN FOOD CHAIN THREAT	Maximum Value	Value Assigned
Likelihood of Release		
12. Likelihood of Release (same as line 3)	550	550
Waste Characteristics		
13. Toxicity/Mobility/Persistence/Bioacc.	*	5.00E+07
14. Hazardous Waste Quantity	*	100
15. Waste Characteristics	1000	180
Targets		
16. Food Chain Individual	50	0.00E+00
17. Population		
17a. Level I Concentrations	**	0.00E+00
17b. Level II Concentrations	**	0.00E+00
17c. Pot. Human Food Chain Contamination	**	1.66E-03
17d. Population (lines 17a+17b+17c)	**	1.66E-03
18. Targets (lines 16+17d)	**	1.66E-03
19. HUMAN FOOD CHAIN THREAT SCORE	100	0.00

* Maximum value applies to waste characteristics category.
** Maximum value not applicable.

GROUND WATER TO SURFACE WATER MIGRATION COMPONENT SCORESHEET
NASA LeRC PMU5 - South Area - 12/15/95

GROUND WATER TO SURFACE WATER MIGRATION COMPONENT Factor Categories & Factors ENVIRONMENTAL THREAT	Maximum Value	Value Assigned
Likelihood of Release		
20. Likelihood of Release (same as line 3)	550	550
Waste Characteristics		
21. Ecosystem Tox./Mobility/Persist./Bioacc.	*	5.00E+06
22. Hazardous Waste Quantity	*	100
23. Waste Characteristics	1000	100
Targets		
24. Sensitive Environments		
24a. Level I Concentrations	**	0.00E+00
24b. Level II Concentrations	**	0.00E+00
24c. Potential Contamination	**	3.00E+00
24d. Sensitive Environments (lines 24a+24b+24c)	**	3.00E+00
25. Targets (line 24d)	**	3.00E+00
26. ENVIRONMENTAL THREAT SCORE	60	2.00
27. WATERSHED SCORE	100	3.24
28. SW: GW to SW COMPONENT SCORE (Sgs)	100	3.24

* Maximum value applies to waste characteristics category.
** Maximum value not applicable.

SOIL EXPOSURE PATHWAY SCORESHEET
NASA LeRC PMU5 - South Area - 12/15/95

SOIL EXPOSURE PATHWAY Factor Categories & Factors RESIDENT POPULATION THREAT	Maximum Value	Value Assigned
Likelihood of Exposure		
1. Likelihood of Exposure	550	550
Waste Characteristics		
2. Toxicity	*	1.00E+04
3. Hazardous Waste Quantity	*	100
4. Waste Characteristics	100	32
Targets		
5. Resident Individual	50	0.00E+00
6. Resident Population		
6a. Level I Concentrations	**	0.00E+00
6b. Level II Concentrations	**	0.00E+00
6c. Resident Population (lines 6a+6b)	**	0.00E+00
7. Workers	15	5.00E+00
8. Resources	5	0.00E+00
9. Terrestrial Sensitive Environments	***	2.50E+01
10. Targets (lines 5+6c+7+8+9)	**	3.00E+01
11. RESIDENT POPULATION THREAT SCORE	**	5.28E+05

* Maximum value applies to waste characteristics category.
** Maximum value not applicable.
*** No specific maximum value applies, see HRS for details.

SOIL EXPOSURE PATHWAY SCORESHEET
NASA LeRC PMU5 - South Area - 12/15/95

SOIL EXPOSURE PATHWAY Factor Categories & Factors NEARBY POPULATION THREAT	Maximum Value	Value Assigned
Likelihood of Exposure		
12. Attractiveness/Accessibility	100	1.00E+01
13. Area of Contamination	100	1.00E+02
14. Likelihood of Exposure	500	1.25E+02
Waste Characteristics		
15. Toxicity	*	1.00E+04
16. Hazardous Waste Quantity	*	10
17. Waste Characteristics	100	18
Targets		
18. Nearby Individual	1	1.00E+00
19. Population Within 1 Mile	**	5.00E+00
20. Targets (lines 18+19)	**	6.00E+00
21. NEARBY POPULATION THREAT SCORE	**	1.35E+04
SOIL EXPOSURE PATHWAY SCORE (Ss)	100	6.56

* Maximum value applies to waste characteristics category.
** Maximum value not applicable.

AIR PATHWAY SCORESHEET
NASA LeRC PMU5 - South Area - 12/15/95

AIR MIGRATION PATHWAY Factor Categories & Factors	Maximum Value	Value Assigned
Likelihood of Release		
1. Observed Release	550	0
2. Potential to Release		
2a. Gas Potential to Release	500	252
2b. Particulate Potential to Release	500	196
2c. Potential to Release	500	252
3. Likelihood of Release	550	252
Waste Characteristics		
4. Toxicity/Mobility	*	2.00E+03
5. Hazardous Waste Quantity	*	100
6. Waste Characteristics	100	18
Targets		
7. Nearest Individual	50	2.00E+01
8. Population		
8a. Level I Concentrations	**	0.00E+00
8b. Level II Concentrations	**	0.00E+00
8c. Potential Contamination	**	2.72E+02
8d. Population (lines 8a+8b+8c)	**	2.72E+02
9. Resources	5	5.00E+00
10. Sensitive Environments		
10a. Actual Contamination	***	0.00E+00
10b. Potential Contamination	***	0.00E+00
10c. Sens. Environments(lines 10a+10b)	***	0.00E+00
11. Targets (lines 7+8d+9+10c)	**	2.97E+02
AIR MIGRATION PATHWAY SCORE (Sa)	100	1.63E+01

* Maximum value applies to waste characteristics category.
** Maximum value not applicable.
*** No specific maximum value applies, see HRS for details.

1. WASTESTREAM QUANTITY SUMMARY TABLE, SOURCE: Landfill Areas

a. Wastestream ID	Contam Soil
b. Hazardous Constituent Quantity (C) (lbs.)	0.00
c. Data Complete?	NO
d. Hazardous Wastestream Quantity (W) (lbs.)	0.00
e. Data Complete?	NO
f. Wastestream Quantity Value (W/5,000)	0.00E+00

Documentation for Constituents:

Contaminants from nonsource specific borehole samples are also included.
See Tables PMU5-1 through PMU5-6 of the HRS Report for concentrations significantly above background

Reference: 5

Documentation for Wastestream Quantity:

Contamination in all cases confirmed upto 2' level and hence volume calculated upto 2' level.

South 40 Landfill: area	261360	sq. ft	x 2 =	522720	cubic feet
Old Landfill:	217800	sq ft	x 2 =	435600	
1957 landfill:	40000	sq ft	x 2 =	80000	
Fire Training Pit:	1800	sq ft	x 2 =	3600	
BD Pond:	10000	sq ft	x 2 =	20000	
Pest Storage	10000	sq ft	x 2 =	20000	

Total 1081920 cubic feet /27 = 40071 cu yds

Reference:

WASTE QUANTITY

NASA LeRC PMU5 - South Area - 12/15/95

a. Wastestream ID	Groundseeps
b. Hazardous Constituent Quantity (C) (lbs.)	21.98
c. Data Complete?	NO
d. Hazardous Wastestream Quantity (W) (lbs.)	10000.00
e. Data Complete?	NO
f. Wastestream Quantity Value (W/5,000)	2.00E+00

Wastestream Constituent Hazardous Substances	Concent.	Units	Liquid	Qualifier
Aluminum	5.9E+02	mg/kg	YES	
Antimony	1.5E-01	mg/kg	YES	J
Beryllium	3.0E-02	mg/kg	YES	
Bis (2-ethylhexyl) phthalate	2.5E-02	mg/kg	YES	
Cadmium	3.3E-02	mg/kg	YES	J
Chromium	1.1E+00	mg/kg	YES	
Dichloroethane, 1,1-	4.6E-02	mg/kg	YES	J
Iron	1.6E+03	mg/kg	YES	
Lead	9.8E-01	mg/kg	YES	
Manganese	3.9E+00	mg/kg	YES	
Nickel	2.1E+00	mg/kg	YES	

Documentation for Constituents:

Groundseeps and nonsource specific groundwater samples considered. Contaminants presumed to have originated from the landfill areas. Background for water samples taken from MCL's in Table 9-2 of the RI/FS Report.

Reference: 3

2. SOURCE HAZARDOUS WASTE QUANTITY FACTOR TABLE

a. Source ID	Landfill Areas
b. Source Type	Landfill
c. Secondary Source Type	Burn Pit
d. Source Vol.(yd3/gal) | Source Area (ft2)	0.00 | 540960.00
e. Source Volume/Area Value	1.59E+02
f. Source Hazardous Constituent Quantity (HCQ) Value (sum of 1b)	2.20E+01
g. Data Complete?	NO
h. Source Hazardous Wastestream Quantity (WSQ) Value (sum of 1f)	2.00E+00
i. Data Complete?	NO
k. Source Hazardous Waste Quantity (HWQ) Value (2e, 2f, or 2h)	1.59E+02

Source Hazardous Substances	Depth (feet)	Liquid	Concent.	Units
Acenaphthylene	< 2	NO	1.7E+00	ppm
Aluminum	< 2	YES	5.9E+02	ppm
Antimony	< 2	YES	2.0E-02	ppm
Barium	< 2	NO	7.0E+02	ppm
Benz(a)anthracene	< 2	NO	1.6E+00	ppm
Benzo(a)pyrene	< 2	NO	1.7E+00	ppm
Benzo(g,h,i)perylene	< 2	NO	1.2E+00	ppm
Benzo(k)fluoranthene	< 2	NO	1.0E+00	ppm
Benzofluoranthene, 3,4-	< 2	NO	1.6E+00	ppm
Beryllium	< 2	NO	2.9E+00	ppm
Bis (2-ethylhexyl) phthalate	< 2	YES	2.5E-02	ppm
Cadmium	> 2	NO	1.1E+01	ppm
Carbon Tetrachloride	< 2	NO	6.7E-02	ppm
Chlordane	< 2	NO	3.6E-03	ppm
Chloroform	< 2	NO	1.3E-01	ppm
Chromium	< 2	YES	1.1E+00	ppm
Chrysene	< 2	NO	2.3E+00	ppm
Copper	< 2	NO	1.4E+02	ppm
DDE	< 2	NO	4.2E-03	ppm
DDT	< 2	NO	9.9E-03	ppm
Di-n-butyl phthalate	< 2	NO	9.9E-01	ppm

Dieldrin	< 2	NO	6.3E-02	ppm
Endrin	< 2	NO	7.4E-03	ppm
Ethyl benzene	> 2	NO	6.0E-02	ppm
Fluorene	< 2	NO	3.2E+00	ppm
Indeno(1,2,3-CD)pyrene	< 2	NO	1.1E+00	ppm
Iron	< 2	YES	1.6E+03	ppm
Lead	< 2	NO	1.1E+02	ppm
Magnesium	< 2	NO	6.2E+04	ppm
Manganese	< 2	YES	3.9E+00	ppm
Mercury	< 2	NO	1.7E+01	ppm
Methylene chloride	< 2	NO	2.4E-02	ppm
Nickel	< 2	YES	2.1E+00	ppm
Pentachlorophenol	< 2	NO	9.6E-01	ppm
Phenanthrene	< 2	NO	2.0E+00	ppm
Pyrene	< 2	NO	2.1E+00	ppm
Toluene	> 2	NO	8.6E-02	ppm
Vanadium	> 2	NO	6.4E+01	ppm
Xylene, m-	< 2	NO	1.4E-02	ppm
Zinc	< 2	NO	3.6E+02	ppm

Documentation for Source Type:

This source includes 3 landfill areas where solid wastes were deposited.

See Sections 4.5.1, 4.5.2, and 4.5.3 of Reference #3.

Reference: 3

Documentation for Secondary Source Type:

Fire Training Pit (SFI-05-02) is within South 40 Landfill and hence, is considered secondary source to the landfill areas. The fire training pit is now buried and is practically indistinguishable from the landfill area.
Also, Pesticide Storage Area (UPR-05-10) is indistinguishable from South 40 Landfill because all operations that generated pesticide related wastes have been stopped and no visible or other indications are present. It is thus aggregated with the "Landfill Areas" source.
Similar reasoning is used to aggregate Buried Disposal Pond with this source.
See Section 4.0 of Reference #3.

Reference: 3

Documentation for Source Volume:

South 40 landfill:	261360 sq ft
Old landfill:	217800
1957 lf:	40000
Fire Training Pit	1800
BD Pond	10000
Pest Storage	10000
Total area	540960 sq ft

See Sections 4.5.1, 4.5.2, and 4.5.3 of Reference #3.

Reference: 3

Documentation for Source Area:

See area calculation in the documentation under Volume

Reference:

1. WASTESTREAM QUANTITY SUMMARY TABLE, SOURCE: Salvage Areas I, II

a. Wastestream ID	Contam Soil
b. Hazardous Constituent Quantity (C) (lbs.)	0.00
c. Data Complete?	NO
d. Hazardous Wastestream Quantity (W) (lbs.)	0.00
e. Data Complete?	NO
f. Wastestream Quantity Value (W/5,000)	0.00E+00

Documentation for Constituents:

See Tables PMU5-8 and PMU5-9 for concentrations significantly above background.

Reference: 5

Documentation for Wastestream Quantity:

Total Area 130000 sq ft multiplied by 2' (deepest contamination confirmed) = 260000/27 = 9630 cu yds.

Reference:

2. SOURCE HAZARDOUS WASTE QUANTITY FACTOR TABLE

a. Source ID	Salvage Areas I, II
b. Source Type	Waste Pile
c. Secondary Source Type	N.A.
d. Source Vol.(yd3/gal) | Source Area (ft2)	0.00 | 130000.00
e. Source Volume/Area Value	1.00E+04
f. Source Hazardous Constituent Quantity (HCQ) Value (sum of 1b)	0.00E+00
g. Data Complete?	NO
h. Source Hazardous Wastestream Quantity (WSQ) Value (sum of 1f)	0.00E+00
i. Data Complete?	NO
k. Source Hazardous Waste Quantity (HWQ) Value (2e, 2f, or 2h)	1.00E+04

Source Hazardous Substances	Depth (feet)	Liquid	Concent.	Units
Acetone	< 2	NO	1.3E-02	ppm
Benzo(a)pyrene	< 2	NO	4.7E-01	ppm
Benzofluoranthene, 3,4-	< 2	NO	6.0E-01	ppm
Cadmium	< 2	NO	2.4E+00	ppm
Copper	< 2	NO	1.7E+03	ppm
DDE	< 2	NO	3.4E-03	ppm
Di-n-butyl phthalate	< 2	NO	3.5E-01	ppm
Dichloroethene, 1,1-	< 2	NO	7.1E-02	ppm
Endosulfan (I or II)	< 2	NO	1.1E-02	ppm
Lead	< 2	NO	1.8E+02	ppm
Mercury	< 2	NO	3.3E+00	ppm
Methyl Napthalene, 2-	< 2	NO	5.2E-01	ppm
Methylene chloride	< 2	NO	2.4E-02	ppm
Pyrene	< 2	NO	4.1E-01	ppm
Tetrachloroethene	< 2	NO	3.6E-02	ppm
Toluene	< 2	NO	6.7E-02	ppm
Trichloroethane, 1,1,1-	< 2	NO	9.5E-01	ppm
Zinc	< 2	NO	3.4E+02	ppm

Documentation for Source Type:

Storage area for construction materials and scrap metals. Type of Waste Pile classified as "Other Waste Piles" instead of "Scrap Metal or Junk Pile" because the area was used for a variety of construction materials and not just for scrap metal/junk. See Section 4.5.7 of Reference #3.

Reference: 3

Documentation for Source Area:

Salvage Area II: 150 ft x 200 ft ==> 30,000 s.f.
Salvage Area I: 200 ft x 500 ft ==> 100,000 s.f.
See Sections 4.5.7 and 4.5.12 of Reference #3.

Reference: 3

1. WASTESTREAM QUANTITY SUMMARY TABLE, SOURCE: Coal Storage Area

a. Wastestream ID	
b. Hazardous Constituent Quantity (C) (lbs.)	0.00
c. Data Complete?	NO
d. Hazardous Wastestream Quantity (W) (lbs.)	0.00
e. Data Complete?	NO
f. Wastestream Quantity Value (W/5,000)	0.00E+00

2. SOURCE HAZARDOUS WASTE QUANTITY FACTOR TABLE

a. Source ID	Coal Storage Area	
b. Source Type	Waste Pile	
c. Secondary Source Type	N.A.	
d. Source Vol.(yd3/gal) | Source Area (ft2)	0.00	2400.00
e. Source Volume/Area Value	1.85E+02	
f. Source Hazardous Constituent Quantity (HCQ) Value (sum of 1b)	0.00E+00	
g. Data Complete?	NO	
h. Source Hazardous Wastestream Quantity (WSQ) Value (sum of 1f)	0.00E+00	
i. Data Complete?	NO	
k. Source Hazardous Waste Quantity (HWQ) Value (2e, 2f, or 2h)	1.85E+02	

Documentation for Source Type:

The storage area is classified as a "Waste Pile" and subclassified as "Other Waste Piles." Although the stored coal is not a waste material, the method of storage as a pile is more appropriate in selecting the source type.
See Section 4.5.15 of Reference #3.

Reference: 3

Documentation for Source Volume:

This was a former Coal Pile. Coal from area has been removed.
See Section 4.5.15 of Reference #3.

Reference: 3

Documentation for Source Area:

Site dimensions are 40 ft x 60 ft.
See Section 4.5.15 of Reference #3.

Reference: 3

1. WASTESTREAM QUANTITY SUMMARY TABLE, SOURCE: Buildings 203 & 204

a. Wastestream ID	Contam Soil
b. Hazardous Constituent Quantity (C) (lbs.)	0.00
c. Data Complete?	NO
d. Hazardous Wastestream Quantity (W) (lbs.)	0.00
e. Data Complete?	NO
f. Wastestream Quantity Value (W/5,000)	0.00E+00

Documentation for Constituents:

See Table PMU5-12 of the HRS Report for concentrations significantly above background

Reference: 5

Documentation for Wastestream Quantity:

Total area 240000 sq ft multiplied by 2' (deepest contamination confirmed) = 480000 cubic feet /27 = 17778 cu yds

Reference:

2. SOURCE HAZARDOUS WASTE QUANTITY FACTOR TABLE

a. Source ID	Buildings 203 & 204
b. Source Type	Contaminated Soil
c. Secondary Source Type	N.A.
d. Source Vol.(yd3/gal) | Source Area (ft2)	0.00 | 240000.00
e. Source Volume/Area Value	7.06E+00
f. Source Hazardous Constituent Quantity (HCQ) Value (sum of 1b)	0.00E+00
g. Data Complete?	NO
h. Source Hazardous Wastestream Quantity (WSQ) Value (sum of 1f)	0.00E+00
i. Data Complete?	NO
k. Source Hazardous Waste Quantity (HWQ) Value (2e, 2f, or 2h)	7.06E+00

Source Hazardous Substances	Depth (feet)	Liquid	Concent.	Units
Acetone	< 2	NO	1.7E-02	ppm
Barium	< 2	NO	3.0E+02	ppm
Benz(a)anthracene	< 2	NO	6.2E-01	ppm
Benzo(a)pyrene	< 2	NO	4.4E-01	ppm
Benzo(k)fluoranthene	< 2	NO	3.4E-01	ppm
Benzofluoranthene, 3,4-	< 2	NO	6.8E-01	ppm
Beryllium	< 2	NO	2.8E+00	ppm
Butylbenzyl phthalate	< 2	NO	3.6E-01	ppm
Chrysene	< 2	NO	3.9E-01	ppm
Di-n-butyl phthalate	< 2	NO	9.0E-01	ppm
Di-n-octyl phthalate	< 2	NO	3.9E-01	ppm
Dichlorobenzidine, 3,3-	< 2	NO	3.9E-01	ppm
Hexachlorocyclopentadiene	< 2	NO	3.9E-01	ppm
Magnesium	< 2	NO	1.8E+04	ppm
Manganese	< 2	NO	2.4E+03	ppm
Mercury	< 2	NO	4.0E-01	ppm
Methylene chloride	< 2	NO	2.4E-02	ppm
Pentachlorophenol	< 2	NO	9.4E-01	ppm
Phenanthrene	< 2	NO	9.2E-01	ppm
Pyrene	< 2	NO	1.2E+00	ppm
Selenium	< 2	NO	1.0E+00	ppm

Documentation for Source Type:

See Section 5 of Reference #3.

Reference: 3

Documentation for Source Area:

Dimensions of the source area available. See Section 4.5 of the RI/FS Report

Reference: 3

1. WASTESTREAM QUANTITY SUMMARY TABLE, SOURCE: Recycle Bins

a. Wastestream ID	
b. Hazardous Constituent Quantity (C) (lbs.)	0.00
c. Data Complete?	NO
d. Hazardous Wastestream Quantity (W) (lbs.)	0.00
e. Data Complete?	NO
f. Wastestream Quantity Value (W/5,000)	0.00E+00

2. SOURCE HAZARDOUS WASTE QUANTITY FACTOR TABLE

a. Source ID	Recycle Bins
b. Source Type	Contaminated Soil
c. Secondary Source Type	N.A.
d. Source Vol.(yd3/gal) | Source Area (ft2)	0.00 | 3000.00
e. Source Volume/Area Value	8.82E-02
f. Source Hazardous Constituent Quantity (HCQ) Value (sum of 1b)	0.00E+00
g. Data Complete?	NO
h. Source Hazardous Wastestream Quantity (WSQ) Value (sum of 1f)	0.00E+00
i. Data Complete?	NO
k. Source Hazardous Waste Quantity (HWQ) Value (2e, 2f, or 2h)	8.82E-02

Source Hazardous Substances	Depth (feet)	Liquid	Concent.	Units
Mercury	< 2	NO	1.0E+00	ppm

1. WASTESTREAM QUANTITY SUMMARY TABLE, SOURCE: Building 202

a. Wastestream ID	
b. Hazardous Constituent Quantity (C) (lbs.)	0.00
c. Data Complete?	NO
d. Hazardous Wastestream Quantity (W) (lbs.)	0.00
e. Data Complete?	NO
f. Wastestream Quantity Value (W/5,000)	0.00E+00

2. SOURCE HAZARDOUS WASTE QUANTITY FACTOR TABLE

a. Source ID	Building 202	
b. Source Type	Radioactive	
c. Secondary Source Type	N.A.	
d. Source Vol.(yd3/gal) | Source Area (ft2)	0.00	0.00
e. Source Volume/Area Value	0.00E+00	
f. Source Hazardous Constituent Quantity (HCQ) Value (sum of 1b)	0.00E+00	
g. Data Complete?	NO	
h. Source Hazardous Wastestream Quantity (WSQ) Value (sum of 1f)	0.00E+00	
i. Data Complete?	NO	
k. Source Hazardous Waste Quantity (HWQ) Value (2e, 2f, or 2h)	0.00E+00	

Documentation for Source Type:

See Section 5 of Reference #3.

Reference: 3

1. WASTESTREAM QUANTITY SUMMARY TABLE, SOURCE: Substation A

a. Wastestream ID	Contam Soil
b. Hazardous Constituent Quantity (C) (lbs.)	0.00
c. Data Complete?	NO
d. Hazardous Wastestream Quantity (W) (lbs.)	0.00
e. Data Complete?	NO
f. Wastestream Quantity Value (W/5,000)	0.00E+00

Documentation for Constituents:

See Table PMU5-13 of the HRS Report for concentrations significantly above background

Reference: 5

Documentation for Wastestream Quantity:

Area 160000 sq ft multiplied by 2'(deepest contamination confirmed) = 320000 cubic feet /27 = 11852 cu yds

Reference:

2. SOURCE HAZARDOUS WASTE QUANTITY FACTOR TABLE

a. Source ID	Substation A	
b. Source Type	Contaminated Soil	
c. Secondary Source Type	N.A.	
d. Source Vol.(yd3/gal) | Source Area (ft2)	0.00	160000.00
e. Source Volume/Area Value	4.71E+00	
f. Source Hazardous Constituent Quantity (HCQ) Value (sum of 1b)	0.00E+00	
g. Data Complete?	NO	
h. Source Hazardous Wastestream Quantity (WSQ) Value (sum of 1f)	0.00E+00	
i. Data Complete?	NO	
k. Source Hazardous Waste Quantity (HWQ) Value (2e, 2f, or 2h)	4.71E+00	

Source Hazardous Substances	Depth (feet)	Liquid	Concent.	Units
Mercury	< 2	NO	1.8E+00	ppm

Documentation for Source Type:

Only PCB problem.
See Section 4.5.11 of Reference #3.

Reference: 3

Documentation for Source Area:

Dimensions of the area available. See Section 4.5 of the RI/FS Report.

Reference: 3

3. SITE HAZARDOUS WASTE QUANTITY SUMMARY

No.	Source ID	Migration Pathways	Vol. or Area Value (2e)	Constituent or Wastestream Value (2f,2h)	Hazardous Waste Qty. Value (2k)
1	Landfill Areas	GW-SW-SE-A	1.59E+02	2.20E+01	1.59E+02
2	Salvage Areas I, II		1.00E+04	0.00E+00	1.00E+04
3	Coal Storage Area	GW-SW-SE-A	1.85E+02	0.00E+00	1.85E+02
4	Buildings 203 & 204	GW-SW-SE-A	7.06E+00	0.00E+00	7.06E+00
5	Recycle Bins	GW-SW-SE-A	8.82E-02	0.00E+00	8.82E-02
6	Building 202	GW-SW-SE-A	RAD-N.A.	0.00E+00	0.00E+00
7	Substation A	GW-SW-SE-A	4.71E+00	0.00E+00	4.71E+00

4. PATHWAY HAZARDOUS WASTE QUANTITY AND WASTE CHARACTERISTICS SUMMARY TABLE

Migration Pathway	Contaminant Values		HWQVs*	WCVs**
Ground Water	Toxicity/Mobility	1.00E+04	100	32
SW: Overland Flow, DW	Tox./Persistence	1.00E+04	100	32
SW: Overland Flow, HFC	Tox./Persis./Bioacc.	5.00E+08	100	320
SW: Overland Flow, Env	Etox./Persis./Bioacc.	5.00E+08	100	320
SW: GW to SW, DW	Tox./Persistence	1.00E+04	100	32
SW: GW to SW, HFC	Tox./Persis./Bioacc.	5.00E+07	100	180
SW: GW to SW, Env	Etox./Persis./Bioacc.	5.00E+06	100	100
Soil Exposure:Resident	Toxicity	1.00E+04	100	32
Soil Exposure: Nearby	Toxicity	1.00E+04	10	18
Air	Toxicity/Mobility	2.00E+03	100	18

* Hazardous Waste Quantity Factor Values
** Waste Characteristics Factor Category Values

Note: SW = Surface Water
GW = Ground Water
DW = Drinking Water Threat
HFC = Human Food Chain Threat
Env = Environmental Threat

GROUND WATER PATHWAY AQUIFER SUMMARY
NASA LeRC PMU5 - South Area - 12/15/95

No.	Aquifer ID	Type	Overlaying No.	Inter-Connected with	Likelihood of Release	Targets
1	Shale Bedrock Aquife	Non K	0	0	550	6.00E+00

Containment

No.	Source ID	HWQ Value	Containment Value
1	Landfill Areas	1.59E+02	10
3	Coal Storage Area	1.85E+02	7
4	Buildings 203 & 204	7.06E+00	9
5	Recycle Bins	8.82E-02	10
6	Building 202	0.00E+00	10
7	Substation A	4.71E+00	10

Containment Factor 10

Documentation for Ground Water Containment, Source Landfill Areas:

No maintained engineered cover or run-on control system and runoff management system exists at the landfill sites.

Reference:

Documentation for Ground Water Containment, Source Salvage Areas I, II:

Contaminated soil located beneath concrete/asphalt

Reference:

Documentation for Ground Water Containment, Source Coal Storage Area:

Area reported to have liner, run-off collection system, and leachate control/removal system

Reference:

Documentation for Ground Water Containment, Source Buildings 203 & 204:

Storm sewer system present portion of site

Reference:

Net Precipitation

Net Precipitation (inches)	N.A.

Documentation for Net Precipitation:

GW-SW component of surface water migration pathway is considered to be significantly less than the Overland Flow component.

Reference:

Aquifer: Shale Bedrock Aquifer

Type of Aquifer: Non Karst

Overlaying Aquifer: 0

Interconnected with: 0

OBSERVED RELEASE

No.	Well ID	Well Type	Distance (miles)	Level of Contamination
4	Groundwater Seeps	Monitoring Well	0.000	Level II

Well No.	Hazardous Substance	Concent.	MCL	Cancer	RFD	Units
4	Radium	1.0E+00	0.0E+00	0.0E+00	0.0E+00	ppb
4	Thorium	1.0E+00	0.0E+00	0.0E+00	0.0E+00	ppb
4	Uranium	1.0E+00	0.0E+00	0.0E+00	0.0E+00	ppb

Observed Release Factor 550

Documentation for Well gw005:

Only compds significantly above background and attributable to the source are considered.

Reference:

Documentation for Well Groundwater Seeps:

Groundwater seep along unnamed tributary was reported with elevated concentrations of gross alpha and beta. The suspected potential radionuclides at NASA include thorium 232, radium 226, uranium 238

Reference:

POTENTIAL TO RELEASE

Containment

Containment Factor	10	

Net Precipitation

Net Precipitation Factor	3	

Depth to Aquifer

A. Depth of Hazardous Substances	42.00	feet

Documentation for Depth of Hazardous Substances:

Significant contaminant detected in termination depth sample (at bedrock) at depth of 42 feet; PMU 5 Table 5-13

Reference:

B. Depth to Aquifer from Surface	35.40	feet

Documentation for Depth to Aquifer from Surface :

Based on the three borings, average depth to bedrock (aquifer) was 35.4 ft.

Reference:

C. Depth to Aquifer (B - A)	0.00	feet
Depth to Aquifer Factor	5	

Travel Time

Are All Layers Karst?	NO	
Thickness of Layer(s) with Lowest Conductivity	0.00	feet

Documentation for Thickness of Layers with Lowest Conductivity:

Available data from entire PMU is based on 0-2 ft shallow soil samples. Only 3 borings, although some compounds detected in termina tion depth sample (at bedrock/aquifer).

Reference:

Hydraulic Conductivity (cm/sec)	1.0E-09
Travel Time Factor	35

==========

Potential to Release Factor 430

Source: 1 Landfill Areas

Source Hazardous Waste Quantity Value: 159.11

Hazardous Substance	Toxicity Value	Mobility Value	Toxicity/ Mobility Value
Acenaphthylene	100	2.00E-03	2.00E-01
Aluminum	100	1.00E+00	1.00E+02
Antimony	10000	1.00E-02	1.00E+02
Barium	10000	1.00E-02	1.00E+02
Benz(a)anthracene	1000	2.00E-09	2.00E-06
Benzo(a)pyrene	10000	2.00E-09	2.00E-05
Benzo(g,h,i)perylene	100	2.00E-09	2.00E-07
Benzo(k)fluoranthene	100	2.00E-09	2.00E-07
Benzofluoranthene, 3,4-	10000	2.00E-09	2.00E-05
Beryllium	10000	1.00E-02	1.00E+02
Bis (2-ethylhexyl) phthalate	100	1.00E-04	1.00E-02
Cadmium	10000	1.00E+00	1.00E+04
Carbon Tetrachloride	1000	1.00E-02	1.00E+01
Chlordane	10000	2.00E-07	2.00E-03
Chloroform	100	1.00E+00	1.00E+02
Chromium	10000	1.00E-02	1.00E+02
Chrysene	100	2.00E-09	2.00E-07
Copper	100	1.00E-02	1.00E+00
DDE	100	2.00E-07	2.00E-05
DDT	1000	2.00E-07	2.00E-04
Di-n-butyl phthalate	10	2.00E-03	2.00E-02
Dichloroethane, 1,1-	10	1.00E+00	1.00E+01
Dieldrin	10000	2.00E-07	2.00E-03
Endrin	10000	2.00E-03	2.00E+01
Ethyl benzene	10	1.00E-02	1.00E-01
Fluorene	100	2.00E-03	2.00E-01
Indeno(1,2,3-CD)pyrene	100	2.00E-09	2.00E-07
Iron	100	1.00E-02	1.00E+00
Lead	10000	1.00E-02	1.00E+02
Magnesium	100	2.00E-05	2.00E-03
Manganese	10000	1.00E-02	1.00E+02
Mercury	10000	2.00E-05	2.00E-01
Methylene chloride	10	1.00E+00	1.00E+01
Nickel	100	1.00E-02	1.00E+00
Pentachlorophenol	100	1.00E-02	1.00E+00
Phenanthrene	100	2.00E-05	2.00E-03
Pyrene	100	2.00E-09	2.00E-07
Toluene	10	1.00E-02	1.00E-01
Vanadium	100	2.00E-07	2.00E-05
Xylene, m-	1	1.00E-02	1.00E-02
Zinc	10	2.00E-03	2.00E-02

Source: 3 Coal Storage Area

Source Hazardous Waste Quantity Value: 184.62

Hazardous Substance	Toxicity Value	Mobility Value	Toxicity/ Mobility Value

Source: 4 Buildings 203 & 204

Source Hazardous Waste Quantity Value: 7.06

Hazardous Substance	Toxicity Value	Mobility Value	Toxicity/ Mobility Value
Acetone	10	1.00E+00	1.00E+01
Barium	10000	1.00E-02	1.00E+02
Benz(a)anthracene	1000	2.00E-09	2.00E-06
Benzo(a)pyrene	10000	2.00E-09	2.00E-05
Benzo(k)fluoranthene	100	2.00E-09	2.00E-07
Benzofluoranthene, 3,4-	10000	2.00E-09	2.00E-05
Beryllium	10000	1.00E-02	1.00E+02
Butylbenzyl phthalate	10	2.00E-05	2.00E-04
Chrysene	100	2.00E-09	2.00E-07
Di-n-butyl phthalate	10	2.00E-03	2.00E-02
Di-n-octyl phthalate	100	2.00E-07	2.00E-05
Dichlorobenzidine, 3,3-	100	2.00E-05	2.00E-03
Hexachlorocyclopentadiene	10000	2.00E-03	2.00E+01
Magnesium	100	2.00E-05	2.00E-03
Manganese	10000	1.00E-02	1.00E+02
Mercury	10000	2.00E-05	2.00E-01
Methylene chloride	10	1.00E+00	1.00E+01
Pentachlorophenol	100	1.00E-02	1.00E+00
Phenanthrene	100	2.00E-05	2.00E-03
Pyrene	100	2.00E-09	2.00E-07
Selenium	100	1.00E-02	1.00E+00

Source: 5 Recycle Bins

Source Hazardous Waste Quantity Value: 0.09

Hazardous Substance	Toxicity Value	Mobility Value	Toxicity/ Mobility Value
Mercury	10000	2.00E-05	2.00E-01

Source: 6 Building 202

Source Hazardous Waste Quantity Value: 0.00

Hazardous Substance	Toxicity Value	Mobility Value	Toxicity/ Mobility Value

Source: 7 Substation A

Source Hazardous Waste Quantity Value: 4.71

Hazardous Substance	Toxicity Value	Mobility Value	Toxicity/ Mobility Value
Mercury	10000	2.00E-05	2.00E-01

Hazardous Substances Found in an Observed Release

Well No.	Observed Release Hazardous Substance	Toxicity Value	Mobility Value	Toxicity/ Mobility Value
4	Radium	100	1.00E+00	1.00E+02
4	Thorium	100	1.00E+00	1.00E+02
4	Uranium	100	1.00E+00	1.00E+02

Toxicity/Mobility Value from Source Hazardous Substances:	1.00E+04
Toxicity/Mobility Value from Observed Release Hazardous Substances:	0.00E+00
Toxicity/Mobility Factor:	1.00E+04
Sum of Source Hazardous Waste Quantity Values:	3.56E+02
Hazardous Waste Quantity Factor:	100
Waste Characteristics Factor Category:	32

Population by Well

No.	Well ID	Sample Type	Distance (miles)	Level of Contamination	Population

- N/A and/or data not specified

Level I Population Factor: 0.00

Level II Population Factor: 0.00

Potential Contamination by Distance Category

Distance Category (miles)	Population	Value
> 0 to 1/4	0.0	0.00E+00
> 1/4 to 1/2	0.0	0.00E+00
> 1/2 to 1	0.0	0.00E+00
> 1 to 2	50.0	1.00E+00
> 2 to 3	0.0	0.00E+00
> 3 to 4	0.0	0.00E+00

Potential Contamination Factor: 1.000

Documentation for Target Population > 0 to 1/4 mile Distance Category:

See Section 3.7 of Reference #3.

Reference: 3

Documentation for Target Population > 1 to 2 miles Distance Category:

Seven permitted DW wells located between 1.5 and 3 mi S-SE of LeRC and serve an estimated 50 individuals.
See Section 3.8.2 of Reference #3.

Reference: 3

Nearest Well

Level of Contamination: Potential
Distance in miles: 1.50

Nearest Well Factor: 5.00E+00

Documentation for Nearest Well:

The closest well on record with ODW is 1/4 mi away on Hopkins Airport property. However, it is inactive. The closest permitted well is 1.5 miles from the site.
See Section 3.3 and 3.8.2 of Reference #3.

Reference: 3, 4

Resources

Resource Use: NO

Resource Factor: 0.00E+00

Wellhead Protection Area

No wellhead protection area

Wellhead Protection Area Factor: 0.00E+00

SURFACE WATER PATHWAY SEGMENT SUMMARY
NASA LeRC PMU5 - South Area - 12/15/95

No.	Segment ID	Segment Type	Water Type	Start Point (mi)	End Point (mi)	Average Flow (cfs)
1	Unnamed Tributary	River	Fresh	0.00	0.30	1
2	Abram Creek	River	Fresh	0.30	1.10	6
3	Rocky River	River	Fresh	1.10	9.70	113
4	Lake Erie	Moderate D	Fresh	9.70	15.00	N.A.

Documentation for segment: Unnamed Tributary:

See Section 3.8.1 of Reference #3 for distance of Rocky River from Abram Creek.
Flow rate average calculated from Table 3-3 of Reference #3.

Reference: 3

Documentation for segment: Abram Creek:

See Section 3.8.1 of Reference #3
Flow rate average calculated from Table 3-3 of Reference #3.

Reference: 3

Documentation for segment: Rocky River:

end point = TDL

Reference:

SURFACE WATER PATHWAY OVERLAND FLOW/FLOOD COMPONENT LIKELIHOOD OF RELEASE
NASA LeRC PMU5 - South Area - 12/15/95

OBSERVED RELEASE

No.	Sample ID	Sample Type	Distance (miles)	Level of Contamination DW	HFC	Env

- N/A and/or data not specified

==========

Observed Release Factor 0

Documentation for Observed Release, Sample Groundwater Seeps:

Gross Alpha/Beta; See Table 5-14 in HRS report
Sample SW019 with concentrations of 1910 ppm gross alpha
2440 gross beta

Based on discussions with NASA, most likely radionuclides at NASA
are thorium-232, radium-226, and/or uranium-238

Gross alpha/beta not included in
chemical list; used as an
indicator of possible radionuclides

Reference:

POTENTIAL TO RELEASE

Potential to Release by Overland Flow

Containment

No.	Source ID	HWQ Value	Containment Value
1	Landfill Areas	1.59E+02	10
3	Coal Storage Area	1.85E+02	9
4	Buildings 203 & 204	7.06E+00	10
5	Recycle Bins	8.82E-02	10
6	Building 202	0.00E+00	10
7	Substation A	4.71E+00	10

==========

Containment Factor: 10

Documentation for Overland Flow Containment, Source Salvage Areas I, II:

Contaminated soil located beneath concrete/asphalt

Reference:

Documentation for Overland Flow Containment, Source Coal Storage Area:

run-off collection system reportedly present

Reference:

Distance to Surface Water

Distance to Surface Water:	0.0 feet
Distance to Surface Water Factor:	25

Documentation for Distance to Surface Water:

Unnamed tributary creek flows adjacent to the source and hence, distance to surface water is 0.

Reference:

Runoff

A. Drainage Area:	5.0 acres

Documentation for Drainage Area:

Maximum drainage area for this source assumed to be 5 acres. It is certainly less than the 50-acre threshold for change in drainage area value.

Reference:

B. 2-year, 24-hour Rainfall:	2.8 inches

Documentation for Rainfall:

See Section 3.5, "Climate," of Reference #3.

Reference: 3

C. Soil Group: D
Fine-textured soils with very low infiltration rates

Documentation for Soil Group:

Chagrin silt loam is reported on the flood plains along Abram Creek. The soil has low to moderate permeability (See Section 3.2.1 of Reference #3).

Reference: 3

Runoff Factor: 1

==========

Potential to Release by Overland Flow Factor: 260

SURFACE WATER PATHWAY OVERLAND FLOW/FLOOD COMPONENT LIKELIHOOD OF RELEASE
NASA LeRC PMU5 - South Area - 12/15/95

Potential to Release by Flood

No.	Source ID	HWQ Value	Flood Containment Value	Flood Frequency Value	Potential to Release by Flood
1	Landfill Areas	1.59E+02	10	50	500
6	Building 202	0.00E+00	10	25	250

Potential to Release by Flood Factor: 500

Documentation for Flood Containment, Source Landfill Areas:

Western extent of South 40 landfill and Old Landfill form eastern bank of unnamed tributary/Abram Creek

Reference:

Documentation for Flood Frequency, Source Landfill Areas:

Western extent of south 40 and old landfill located on east bank of unnamed tributary and Abram Creek (in contact with stream even during low flow conditions)

Reference:

Source: 1 Landfill Areas

Source Hazardous Waste Quantity Value: 159.11

Hazardous Substance	Toxicity Value	Persistence Value	Toxicity/ Persistence Value
Acenaphthylene	0	1.00E+00	0.00E+00
Aluminum	0	1.00E+00	0.00E+00
Antimony	10000	1.00E+00	1.00E+04
Barium	10000	1.00E+00	1.00E+04
Benz(a)anthracene	1000	1.00E+00	1.00E+03
Benzo(a)pyrene	10000	1.00E+00	1.00E+04
Benzo(g,h,i)perylene	0	1.00E+00	0.00E+00
Benzo(k)fluoranthene	0	1.00E+00	0.00E+00
Benzofluoranthene, 3,4-	10000	1.00E+00	1.00E+04
Beryllium	10000	1.00E+00	1.00E+04
Bis (2-ethylhexyl) phthalate	100	1.00E+00	1.00E+02
Cadmium	10000	1.00E+00	1.00E+04
Carbon Tetrachloride	1000	4.00E-01	4.00E+02
Chlordane	10000	1.00E+00	1.00E+04
Chloroform	100	4.00E-01	4.00E+01
Chromium	10000	1.00E+00	1.00E+04
Chrysene	0	1.00E+00	0.00E+00
Copper	0	1.00E+00	0.00E+00
DDE	100	1.00E+00	1.00E+02
DDT	1000	1.00E+00	1.00E+03
Di-n-butyl phthalate	10	1.00E+00	1.00E+01
Dichloroethane, 1,1-	10	4.00E-01	4.00E+00
Dieldrin	10000	1.00E+00	1.00E+04
Endrin	10000	1.00E+00	1.00E+04
Ethyl benzene	10	4.00E-01	4.00E+00
Fluorene	100	1.00E+00	1.00E+02
Indeno(1,2,3-CD)pyrene	0	1.00E+00	0.00E+00
Iron	0	1.00E+00	0.00E+00
Lead	10000	1.00E+00	1.00E+04
Magnesium	0	1.00E+00	0.00E+00
Manganese	10000	1.00E+00	1.00E+04
Mercury	10000	1.00E+00	1.00E+04
Methylene chloride	10	4.00E-01	4.00E+00
Nickel	100	1.00E+00	1.00E+02
Pentachlorophenol	100	1.00E+00	1.00E+02
Phenanthrene	0	4.00E-01	0.00E+00
Pyrene	100	1.00E+00	1.00E+02
Toluene	10	4.00E-01	4.00E+00
Vanadium	100	1.00E+00	1.00E+02
Xylene, m-	1	4.00E-01	4.00E-01
Zinc	10	1.00E+00	1.00E+01

Source: 3 Coal Storage Area

Source Hazardous Waste Quantity Value: 184.62

Hazardous Substance	Toxicity Value	Persistence Value	Toxicity/ Persistence Value

Source: 4 Buildings 203 & 204

Source Hazardous Waste Quantity Value: 7.06

Hazardous Substance	Toxicity Value	Persistence Value	Toxicity/ Persistence Value
Acetone	10	7.00E-04	7.00E-03
Barium	10000	1.00E+00	1.00E+04
Benz(a)anthracene	1000	1.00E+00	1.00E+03
Benzo(a)pyrene	10000	1.00E+00	1.00E+04
Benzo(k)fluoranthene	0	1.00E+00	0.00E+00
Benzofluoranthene, 3,4-	10000	1.00E+00	1.00E+04
Beryllium	10000	1.00E+00	1.00E+04
Butylbenzyl phthalate	10	1.00E+00	1.00E+01
Chrysene	0	1.00E+00	0.00E+00
Di-n-butyl phthalate	10	1.00E+00	1.00E+01
Di-n-octyl phthalate	100	1.00E+00	1.00E+02
Dichlorobenzidine, 3,3-	100	1.00E+00	1.00E+02
Hexachlorocyclopentadiene	10000	1.00E+00	1.00E+04
Magnesium	0	1.00E+00	0.00E+00
Manganese	10000	1.00E+00	1.00E+04
Mercury	10000	1.00E+00	1.00E+04
Methylene chloride	10	4.00E-01	4.00E+00
Pentachlorophenol	100	1.00E+00	1.00E+02
Phenanthrene	0	4.00E-01	0.00E+00
Pyrene	100	1.00E+00	1.00E+02
Selenium	100	1.00E+00	1.00E+02

Source: 5 Recycle Bins

Source Hazardous Waste Quantity Value: 0.09

Hazardous Substance	Toxicity Value	Persistence Value	Toxicity/ Persistence Value
Mercury	10000	1.00E+00	1.00E+04

SW PATHWAY: OVERLAND/FLOOD DRINKING WATER THREAT WASTE CHARACTERISTICS
NASA LeRC PMU5 - South Area - 12/15/95

Source: 6 Building 202

Source Hazardous Waste Quantity Value: 0.00

Hazardous Substance	Toxicity Value	Persistence Value	Toxicity/ Persistence Value

Source: 7 Substation A

Source Hazardous Waste Quantity Value: 4.71

Hazardous Substance	Toxicity Value	Persistence Value	Toxicity/ Persistence Value
Mercury	10000	1.00E+00	1.00E+04

Hazardous Substances Found in an Observed Release

Sample No.	Observed Release Hazardous Substance	Toxicity Value	Persistence Value	Toxicity/ Persistence Value

- N/A and/or data not specified

Toxicity/Persistence Value from Source Hazardous Substances:	1.00E+04
Toxicity/Persistence Value from Observed Release Hazardous Substances:	0.00E+00
Toxicity/Persistence Factor:	1.00E+04
Sum of Source Hazardous Waste Quantity Values:	3.56E+02
Hazardous Waste Quantity Factor:	100
Waste Characteristics Factor Category:	32

Level I Concentrations

- N/A and/or data not specified

Level II Concentrations

- N/A and/or data not specified

Most Distant Level I Sample

- N/A and/or data not specified

Most Distant Level II Sample

- N/A and/or data not specified

Level I Concentrations

Intake	Distance Along the In-water Segment from the Probable Point of Entry (miles)	Population
- N/A and/or data not specified		

==========

Population Served by Level I Intakes: 0.0

Level I Population Factor: 0.00E+00

Level II Concentrations

Intake	Distance Along the In-water Segment from the Probable Point of Entry (miles)	Population
- N/A and/or data not specified		

==========

Population Served by Level II Intakes: 0.0

Level II Population Factor: 0.00E+00

Potential Contamination

Intake ID	Average Annual Flow (cfs)	Population Served
1 Cleve: Crown Crib	0	375000.0
2 Cleve: Division Crb	0	375000.0
3 Cleve: Kirtland Crb	0	375000.0
4 Nottingham Intake C	0	375000.0

Documentation for Intake Cleve: Crown Crib:

See Section 3.8.1 of Reference #3.
There are four City of Cleveland ("Cleve") intakes which serve 1.5 million people. The population served by individual intakes is assumed to be split equally. Only 3 of the 4 intakes are within the TDL of 15 miles.

Reference: 3

Type of Surface Water Body	Total Population	Dilution-Weighted Population
Moderate Ocean Zone or Great Lake	1125000.0	16.0

Dilution-Weighted Population Served
by Potentially Contaminated Intakes: 16.0

Potential Contamination Factor: 2.0

Nearest Intake

Location of Nearest Drinking Water Intake: Cleve: Crown Crib
Distance from the Probable Point of Entry: 12.60 miles
Type of Surface Water Body: Moderate D
Dilution Weight: 0.0000100
Highest Level of Contamination: Potential

Nearest Intake Factor: 0.00

Documentation for Cleve: Crown Crib:

See Section 3.8.1 of Reference #3.
There are four City of Cleveland ("Cleve") intakes which serve 1.5 million people. The population served by individual intakes is assumed to be split equally. Only 3 of the 4 intakes are within the TDL of 15 miles.

Reference: 3

Resources

Resource Use: YES

Resource Value: 5.00E+00

Documentation for Resources:

Lake Erie is a water recreation area.

Reference:

Source: 1 Landfill Areas

Source Hazardous Waste Quantity Value: 159.11

Hazardous Substance	Toxicity Value	Persistence Value	Bio-accum. Value	Toxicity/ Persistence/ Bioaccum. Value
Acenaphthylene	0	1.00E+00	5.00E+02	0.00E+00
Aluminum	0	1.00E+00	5.00E+01	0.00E+00
Antimony	10000	1.00E+00	5.00E-01	5.00E+03
Barium	10000	1.00E+00	5.00E-01	5.00E+03
Benz(a)anthracene	1000	1.00E+00	5.00E+04	5.00E+07
Benzo(a)pyrene	10000	1.00E+00	5.00E+04	5.00E+08
Benzo(g,h,i)perylene	0	1.00E+00	5.00E+04	0.00E+00
Benzo(k)fluoranthene	0	1.00E+00	5.00E+04	0.00E+00
Benzofluoranthene, 3,4-	10000	1.00E+00	5.00E+04	5.00E+08
Beryllium	10000	1.00E+00	5.00E+01	5.00E+05
Bis (2-ethylhexyl) phthalate	100	1.00E+00	5.00E+04	5.00E+06
Cadmium	10000	1.00E+00	5.00E+03	5.00E+07
Carbon Tetrachloride	1000	4.00E-01	5.00E+01	2.00E+04
Chlordane	10000	1.00E+00	5.00E+04	5.00E+08
Chloroform	100	4.00E-01	5.00E+00	2.00E+02
Chromium	10000	1.00E+00	5.00E+00	5.00E+04
Chrysene	0	1.00E+00	5.00E+02	0.00E+00
Copper	0	1.00E+00	5.00E+04	0.00E+00
DDE	100	1.00E+00	5.00E+04	5.00E+06
DDT	1000	1.00E+00	5.00E+04	5.00E+07
Di-n-butyl phthalate	10	1.00E+00	5.00E+03	5.00E+04
Dichloroethane, 1,1-	10	4.00E-01	5.00E+00	2.00E+01
Dieldrin	10000	1.00E+00	5.00E+04	5.00E+08
Endrin	10000	1.00E+00	5.00E+03	5.00E+07
Ethyl benzene	10	4.00E-01	5.00E+01	2.00E+02
Fluorene	100	1.00E+00	5.00E+03	5.00E+05
Indeno(1,2,3-CD)pyrene	0	1.00E+00	5.00E+04	0.00E+00
Iron	0	1.00E+00	5.00E-01	0.00E+00
Lead	10000	1.00E+00	5.00E+01	5.00E+05
Magnesium	0	1.00E+00	5.00E-01	0.00E+00
Manganese	10000	1.00E+00	5.00E-01	5.00E+03
Mercury	10000	1.00E+00	5.00E+04	5.00E+08
Methylene chloride	10	4.00E-01	5.00E+00	2.00E+01
Nickel	100	1.00E+00	5.00E-01	5.00E+01
Pentachlorophenol	100	1.00E+00	5.00E+02	5.00E+04
Phenanthrene	0	4.00E-01	5.00E+01	0.00E+00
Pyrene	100	1.00E+00	5.00E+01	5.00E+03
Radium	0	1.00E+00	5.00E-01	0.00E+00
Thorium	0	1.00E+00	5.00E-01	0.00E+00
Toluene	10	4.00E-01	5.00E+01	2.00E+02

Uranium	0	1.00E+00	5.00E-01	0.00E+00
Vanadium	100	1.00E+00	5.00E-01	5.00E+01
Xylene, m-	1	4.00E-01	5.00E+02	2.00E+02
Zinc	10	1.00E+00	5.00E+02	5.00E+03

Source: 3 Coal Storage Area

Source Hazardous Waste Quantity Value: 184.62

Hazardous Substance	Toxicity Value	Persistence Value	Bio-accum. Value	Toxicity/ Persistence/ Bioaccum. Value

SW PATHWAY: OVERLAND/FLOOD HUMAN FOOD CHAIN THREAT WASTE CHARACTERISTICS
NASA LeRC PMU5 - South Area - 12/15/95

Source: 4 Buildings 203 & 204

Source Hazardous Waste Quantity Value: 7.06

Hazardous Substance	Toxicity Value	Persistence Value	Bio-accum. Value	Toxicity/ Persistence/ Bioaccum. Value
Acetone	10	7.00E-04	5.00E-01	3.50E-03
Barium	10000	1.00E+00	5.00E-01	5.00E+03
Benz(a)anthracene	1000	1.00E+00	5.00E+04	5.00E+07
Benzo(a)pyrene	10000	1.00E+00	5.00E+04	5.00E+08
Benzo(k)fluoranthene	0	1.00E+00	5.00E+04	0.00E+00
Benzofluoranthene, 3,4-	10000	1.00E+00	5.00E+04	5.00E+08
Beryllium	10000	1.00E+00	5.00E+01	5.00E+05
Butylbenzyl phthalate	10	1.00E+00	5.00E+02	5.00E+03
Chrysene	0	1.00E+00	5.00E+02	0.00E+00
Di-n-butyl phthalate	10	1.00E+00	5.00E+03	5.00E+04
Di-n-octyl phthalate	100	1.00E+00	5.00E+02	5.00E+04
Dichlorobenzidine, 3,3-	100	1.00E+00	5.00E+02	5.00E+04
Hexachlorocyclopentadiene	10000	1.00E+00	5.00E+03	5.00E+07
Magnesium	0	1.00E+00	5.00E-01	0.00E+00
Manganese	10000	1.00E+00	5.00E-01	5.00E+03
Mercury	10000	1.00E+00	5.00E+04	5.00E+08
Methylene chloride	10	4.00E-01	5.00E+00	2.00E+01
Pentachlorophenol	100	1.00E+00	5.00E+02	5.00E+04
Phenanthrene	0	4.00E-01	5.00E+01	0.00E+00
Pyrene	100	1.00E+00	5.00E+01	5.00E+03
Selenium	100	1.00E+00	5.00E+03	5.00E+05

Source: 5 Recycle Bins

Source Hazardous Waste Quantity Value: 0.09

Hazardous Substance	Toxicity Value	Persistence Value	Bio-accum. Value	Toxicity/ Persistence/ Bioaccum. Value
Mercury	10000	1.00E+00	5.00E+04	5.00E+08

SW PATHWAY: OVERLAND/FLOOD HUMAN FOOD CHAIN THREAT WASTE CHARACTERISTICS
NASA LeRC PMU5 - South Area - 12/15/95

Source: 6 Building 202

Source Hazardous Waste Quantity Value: 0.00

Hazardous Substance	Toxicity Value	Persistence Value	Bio-accum. Value	Toxicity/ Persistence/ Bioaccum. Value

Source: 7 Substation A

Source Hazardous Waste Quantity Value: 4.71

Hazardous Substance	Toxicity Value	Persistence Value	Bio-accum. Value	Toxicity/ Persistence/ Bioaccum. Value
Mercury	10000	1.00E+00	5.00E+04	5.00E+08

Hazardous Substances Found in an Observed Release

Sample No.	Observed Release Hazardous Substance	Toxicity Value	Persistence Value	Bio-accum. Value	Toxicity/ Persistence/ Bioaccum. Value

- N/A and/or data not specified

Toxicity/Persistence/Bioaccumulation Value from Source Hazardous Substances:	5.00E+08
Toxicity/Persistence/Bioaccumulation Value from Observed Release Hazardous Substances:	0.00E+00
Toxicity/Persistence/Bioaccumulation Factor:	5.00E+08
Sum of Source Hazardous Waste Quantity Values:	3.56E+02
Hazardous Waste Quantity Factor:	100
Waste Characteristics Factor Category:	320

Level I Concentrations

- N/A and/or data not specified

Level II Concentrations

- N/A and/or data not specified

Most Distant Level I Sample

- N/A and/or data not specified

Most Distant Level II Sample

- N/A and/or data not specified

Level I Concentrations

Fishery	Annual Production (pounds)	Human Food Chain Population Value
- N/A and/or data not specified		

Sum of Human Food Chain Population Values: 0.00E+00

Level I Concentrations Factor: 0.00E+00

Level II Concentrations

Fishery	Annual Production (pounds)	Human Food Chain Population Value
- N/A and/or data not specified		

Sum of Human Food Chain Population Values: 0.00E+00

Level II Concentrations Factor: 0.00E+00

Potential Contamination

Fishery	Annnual Production (pounds)	Type of Surface Water Body	Average Annual Flow (cfs)	Pop. Value (Pi)	Dilution Weight (Di)	Pi*Di
3 Rocky River	3000.0	River	113	3.0	1.00E-02	3.00E-02
4 Lake Erie	500000.0	Moderate	0	310.0	1.00E-05	3.10E-03

Sum of (Pi*Di): 3.31E-02

Potential Human Food Chain Contamination Factor: 3.31E-03

Documentation for Abram Creek Fishery:

Rocky River used for recreational fishing.
fishery production assumed at a conservative rate of 10 lb/day for 300 d/yr.

Reference:

Documentation for Rocky River Fishery:

Lake Erie is used for commercial fishing (See Section 3.7 of Reference #3).
***fishery production (lb/yr) ficticious

Reference:

Food Chain Individual

Location of Nearest Fishery: Rocky River
Distance from the Probable Point of Entry: 1.10 miles
Type of Surface Water Body: River
Dilution Weight: 0.0100000
Level of Contamination: Potential

Food Chain Individual Factor: 0.00

Documentation for Rocky River:

end point = TDL

Reference:

Source: 1 Landfill Areas

Source Hazardous Waste Quantity Value: 159.11

Hazardous Substance	Eco-toxicity Value	Persistence Value	Bio-accum. Value	Ecotoxicity/ Persistence/ Bioaccum. Value
Acenaphthylene	0	1.00E+00	5.00E+02	0.00E+00
Aluminum	0	1.00E+00	5.00E+01	0.00E+00
Antimony	0	1.00E+00	5.00E-01	0.00E+00
Barium	1	1.00E+00	5.00E-01	5.00E-01
Benz(a)anthracene	10000	1.00E+00	5.00E+04	5.00E+08
Benzo(a)pyrene	10000	1.00E+00	5.00E+04	5.00E+08
Benzo(g,h,i)perylene	0	1.00E+00	5.00E+04	0.00E+00
Benzo(k)fluoranthene	0	1.00E+00	5.00E+04	0.00E+00
Benzofluoranthene, 3,4-	0	1.00E+00	5.00E+04	0.00E+00
Beryllium	0	1.00E+00	5.00E+01	0.00E+00
Bis (2-ethylhexyl) phthalate	1000	1.00E+00	5.00E+04	5.00E+07
Cadmium	1000	1.00E+00	5.00E+03	5.00E+06
Carbon Tetrachloride	100	4.00E-01	5.00E+01	2.00E+03
Chlordane	10000	1.00E+00	5.00E+04	5.00E+08
Chloroform	10	4.00E-01	5.00E+00	2.00E+01
Chromium	10000	1.00E+00	5.00E+00	5.00E+04
Chrysene	1000	1.00E+00	5.00E+03	5.00E+06
Copper	100	1.00E+00	5.00E+04	5.00E+06
DDE	10000	1.00E+00	5.00E+04	5.00E+08
DDT	10000	1.00E+00	5.00E+04	5.00E+08
Di-n-butyl phthalate	1000	1.00E+00	5.00E+03	5.00E+06
Dichloroethane, 1,1-	0	4.00E-01	5.00E+00	0.00E+00
Dieldrin	10000	1.00E+00	5.00E+04	5.00E+08
Endrin	10000	1.00E+00	5.00E+04	5.00E+08
Ethyl benzene	100	4.00E-01	5.00E+01	2.00E+03
Fluorene	1000	1.00E+00	5.00E+03	5.00E+06
Indeno(1,2,3-CD)pyrene	0	1.00E+00	5.00E+04	0.00E+00
Iron	10	1.00E+00	5.00E-01	5.00E+00
Lead	1000	1.00E+00	5.00E+03	5.00E+06
Magnesium	0	1.00E+00	5.00E-01	0.00E+00
Manganese	0	1.00E+00	5.00E+04	0.00E+00
Mercury	10000	1.00E+00	5.00E+04	5.00E+08
Methylene chloride	1	4.00E-01	5.00E+00	2.00E+00
Nickel	10	1.00E+00	5.00E+02	5.00E+03
Pentachlorophenol	100	1.00E+00	5.00E+03	5.00E+05
Phenanthrene	1000	4.00E-01	5.00E+03	2.00E+06
Pyrene	0	1.00E+00	5.00E+01	0.00E+00
Radium	0	1.00E+00	5.00E-01	0.00E+00
Thorium	0	1.00E+00	5.00E-01	0.00E+00
Toluene	100	4.00E-01	5.00E+01	2.00E+03
Uranium	0	1.00E+00	5.00E-01	0.00E+00

Vanadium	0	1.00E+00	5.00E-01	0.00E+00
Xylene, m-	100	4.00E-01	5.00E+02	2.00E+04
Zinc	10	1.00E+00	5.00E+02	5.00E+03

Source: 3 Coal Storage Area

Source Hazardous Waste Quantity Value: 184.62

Hazardous Substance	Eco-toxicity Value	Persistence Value	Bio-accum. Value	Ecotoxicity/ Persistence/ Bioaccum. Value

Source: 4 Buildings 203 & 204

Source Hazardous Waste Quantity Value: 7.06

Hazardous Substance	Eco-toxicity Value	Persistence Value	Bio-accum. Value	Ecotoxicity/ Persistence/ Bioaccum. Value
Acetone	100	7.00E-04	5.00E-01	3.50E-02
Barium	1	1.00E+00	5.00E-01	5.00E-01
Benz(a)anthracene	10000	1.00E+00	5.00E+04	5.00E+08
Benzo(a)pyrene	10000	1.00E+00	5.00E+04	5.00E+08
Benzo(k)fluoranthene	0	1.00E+00	5.00E+04	0.00E+00
Benzofluoranthene, 3,4-	0	1.00E+00	5.00E+04	0.00E+00
Beryllium	0	1.00E+00	5.00E+01	0.00E+00
Butylbenzyl phthalate	100	1.00E+00	5.00E+02	5.00E+04
Chrysene	1000	1.00E+00	5.00E+03	5.00E+06
Di-n-butyl phthalate	1000	1.00E+00	5.00E+03	5.00E+06
Di-n-octyl phthalate	0	1.00E+00	5.00E+02	0.00E+00
Dichlorobenzidine, 3,3-	0	1.00E+00	5.00E+02	0.00E+00
Hexachlorocyclopentadiene	10000	1.00E+00	5.00E+01	5.00E+05
Magnesium	0	1.00E+00	5.00E-01	0.00E+00
Manganese	0	1.00E+00	5.00E+04	0.00E+00
Mercury	10000	1.00E+00	5.00E+04	5.00E+08
Methylene chloride	1	4.00E-01	5.00E+00	2.00E+00
Pentachlorophenol	100	1.00E+00	5.00E+03	5.00E+05
Phenanthrene	1000	4.00E-01	5.00E+03	2.00E+06
Pyrene	0	1.00E+00	5.00E+01	0.00E+00
Selenium	100	1.00E+00	5.00E+03	5.00E+05

Source: 5 Recycle Bins

Source Hazardous Waste Quantity Value: 0.09

Hazardous Substance	Eco-toxicity Value	Persistence Value	Bio-accum. Value	Ecotoxicity/ Persistence/ Bioaccum. Value
Mercury	10000	1.00E+00	5.00E+04	5.00E+08

Source: 6 Building 202

Source Hazardous Waste Quantity Value: 0.00

Hazardous Substance	Eco-toxicity Value	Persistence Value	Bio-accum. Value	Ecotoxicity/ Persistence/ Bioaccum. Value

Source: 7 Substation A

Source Hazardous Waste Quantity Value: 4.71

Hazardous Substance	Eco-toxicity Value	Persistence Value	Bio-accum. Value	Ecotoxicity/ Persistence/ Bioaccum. Value
Mercury	10000	1.00E+00	5.00E+04	5.00E+08

Hazardous Substances Found in an Observed Release

Sample No.	Observed Release Hazardous Substance	Eco-toxicity Value	Persistence Value	Bio-accum. Value	Ecotoxicity/ Persistence/ Bioaccum. Value

- N/A and/or data not specified

Ecotoxicity/Persistence/Bioaccummulation Value from Source Hazardous Substances:	5.00E+08
Ecotoxicity/Persistence/Bioaccummulation Value from Observed Release Hazardous Substances:	0.00E+00
Ecotoxicity/Persistence/Bioaccummulation Factor:	5.00E+08
Sum of Source Hazardous Waste Quantity Values:	3.56E+02
Hazardous Waste Quantity Factor:	100
Waste Characteristics Factor Category:	320

Level I Concentrations

- N/A and/or data not specified

Level II Concentrations

- N/A and/or data not specified

Most Distant Level I Sample

- N/A and/or data not specified

Most Distant Level II Sample

- N/A and/or data not specified

Level I Concentrations

Sensitive Environment	Distance from Probable Point of Entry to Sensitive Env. (miles)	Sensitive Environment Value
- N/A and/or data not specified		

Sum of Sensitive Environments Values: 0

Wetlands

Wetland	Distance from Probable Point of Entry to Wetland (miles)	Wetlands Frontage (miles)
- N/A and/or data not specified		

Total Wetlands Frontage: 0.00 Miles Total Wetlands Value: 0

Sum of Sensitive Environments Value + Wetlands Value: 0.00E+00

Level I Concentrations Factor: 0.00E+00

Level II Concentrations

Sensitive Environment	Distance from Probable Point of Entry to Sensitive Env. (miles)	Sensitive Environment Value
- N/A and/or data not specified		

Sum of Sensitive Environments Values: 0

Wetlands

Wetland	Distance from Probable Point of Entry to Wetland (miles)	Wetlands Frontage (miles)
- N/A and/or data not specified		

Total Wetlands Frontage: 0.00 Miles Total Wetlands Value: 0

Sum of Sensitive Environments Value + Wetlands Value: 0.00E+00

Level II Concentrations Factor: 0.00E+00

Potential Contamination

Sensitive Environments

Type of Surface Water Body	Sensitive Environment	Sensitive Environment Value
River	1 Rocky Rvr Reservatn	50

Wetlands

Type of Surface Water Body	Sensitive Environment	Wetlands Frontage	Wetlands Value
- N/A and/or data not specified			

Documentation for Sensitive Environment Rocky Rvr Reservatn:

Seasonal habitat for salmon which are stocked by ODNR.
See Section 3.6 of Reference #3.

Reference:

SW PATHWAY: OVERLAND FLOW/FLOOD COMPONENT ENVIRONMENTAL THREAT TARGETS
NASA LeRC PMU5 - South Area - 12/15/95

Type of Surface Water Body	Sum of Sens. Environment Values(Sj)	Sum of Wetland Frontage Values(Wj)	Dilution Weight (Dj)	Dj(Wj+Sj)
Minimal Stream	50	0	1.00E+00	5.00E+01

Sum of Dj(Wj+Sj): 5.00E+01
Sum of Dj(Wj+Sj)/10: 5.00E+00

==========

Potential Contamination Sensitive Environment Factor: 5.00E+00

Containment

No.	Source ID	HWQ Value	Containment Value
1	Landfill Areas	1.59E+02	10
3	Coal Storage Area	1.85E+02	7
4	Buildings 203 & 204	7.06E+00	9
5	Recycle Bins	8.82E-02	10
6	Building 202	0.00E+00	10
7	Substation A	4.71E+00	10

Containment Factor 10

Documentation for Ground Water Containment, Source Landfill Areas:

No maintained engineered cover or run-on control system and runoff management system exists at the landfill sites.

Reference:

Documentation for Ground Water Containment, Source Salvage Areas I, II:

Contaminated soil located beneath concrete/asphalt

Reference:

Documentation for Ground Water Containment, Source Coal Storage Area:

Area reported to have liner, run-off collection system, and leachate control/removal system

Reference:

Documentation for Ground Water Containment, Source Buildings 203 & 204:

Storm sewer system present portion of site

Reference:

Net Precipitation

Net Precipitation (inches)	0.00

Documentation for Net Precipitation:

GW-SW component of surface water migration pathway is considered to be significantly less than the Overland Flow component.

Reference:

SURFACE WATER PATHWAY GW TO SW COMPONENT LIKELIHOOD OF RELEASE
NASA LeRC PMU5 - South Area - 12/15/95

Aquifer: Shale Bedrock Aquifer

Type of Aquifer: Non Karst

Overlaying Aquifer: 0

Interconnected with: 0

OBSERVED RELEASE

No.	Well ID	Well Type	Distance (miles)	Level of Contamination
4	Groundwater Seeps	Monitoring Well	0.000	Level II

Well No.	Hazardous Substance	Concent.	MCL	Cancer	RFD	Units
4	Radium	1.0E+00	0.0E+00	0.0E+00	0.0E+00	ppb
4	Thorium	1.0E+00	0.0E+00	0.0E+00	0.0E+00	ppb
4	Uranium	1.0E+00	0.0E+00	0.0E+00	0.0E+00	ppb

Observed Release Factor 550

Documentation for Well gw005:

Only compds significantly above background and attributable to the source are considered.

Reference:

Documentation for Well Groundwater Seeps:

Groundwater seep along unnamed tributary was reported with elevated concentrations of gross alpha and beta. The suspected potential radionuclides at NASA include thorium 232, radium 226, uranium 238

Reference:

SURFACE WATER PATHWAY GW TO SW COMPONENT LIKELIHOOD OF RELEASE
NASA LeRC PMU5 - South Area - 12/15/95

POTENTIAL TO RELEASE

Ground Water to Surface Water Angle

Probable Point of Entry	0.00	miles
Angle Theta	180	

Containment

Containment Factor	10

Net Precipitation

Net Precipitation Factor	3

Depth to Aquifer

A. Depth of Hazardous Substances	42.00	feet

Documentation for Depth of Hazardous Substances:

Significant contaminant detected in termination depth sample (at bedrock) at depth of 42 feet; PMU 5 Table 5-13

Reference:

B. Depth to Aquifer from Surface	35.40	feet

Documentation for Depth to Aquifer from Surface :

Based on the three borings, average depth to bedrock (aquifer) was 35.4 ft.

Reference:

C. Depth to Aquifer (B - A)	0.00	feet
Depth to Aquifer Factor	5	

Travel Time

Are All Layers Karst?	NO	
Thickness of Layer(s) with Lowest Conductivity	0.00	feet

Documentation for Thickness of Layers with Lowest Conductivity:

Available data from entire PMU is based on 0-2 ft shallow soil samples. Only 3 borings, although some compounds detected in termina tion depth sample (at bedrock/aquifer).

Reference:

Hydraulic Conductivity (cm/sec)	1.0E-09
Travel Time Factor	35

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Potential to Release Factor 430

SW PATHWAY: GW TO SW COMPONENT DRINKING WATER THREAT WASTE CHARACTERISTICS
NASA LeRC PMU5 - South Area - 12/15/95

Source: 1 Landfill Areas

Source Hazardous Waste Quantity Value: 159.11

Hazardous Substance	Toxicity Factor Value	Persist. Value	Mobility Value	Toxicity/ Mobililty/ Persistence
Acenaphthylene	0	1.00E+00	2.00E-03	0.00E+00
Aluminum	0	1.00E+00	1.00E+00	0.00E+00
Antimony	10000	1.00E+00	1.00E-02	1.00E+02
Barium	10000	1.00E+00	1.00E-02	1.00E+02
Benz(a)anthracene	1000	1.00E+00	2.00E-09	2.00E-06
Benzo(a)pyrene	10000	1.00E+00	2.00E-09	2.00E-05
Benzo(g,h,i)perylene	0	1.00E+00	2.00E-09	0.00E+00
Benzo(k)fluoranthene	0	1.00E+00	2.00E-09	0.00E+00
Benzofluoranthene, 3,4-	10000	1.00E+00	2.00E-09	2.00E-05
Beryllium	10000	1.00E+00	1.00E-02	1.00E+02
Bis (2-ethylhexyl) phthalate	100	1.00E+00	1.00E-04	1.00E-02
Cadmium	10000	1.00E+00	1.00E+00	1.00E+04
Carbon Tetrachloride	1000	4.00E-01	1.00E-02	4.00E+00
Chlordane	10000	1.00E+00	2.00E-07	2.00E-03
Chloroform	100	4.00E-01	1.00E+00	4.00E+01
Chromium	10000	1.00E+00	1.00E-02	1.00E+02
Chrysene	0	1.00E+00	2.00E-09	0.00E+00
Copper	0	1.00E+00	1.00E-02	0.00E+00
DDE	100	1.00E+00	2.00E-07	2.00E-05
DDT	1000	1.00E+00	2.00E-07	2.00E-04
Di-n-butyl phthalate	10	1.00E+00	2.00E-03	2.00E-02
Dichloroethane, 1,1-	10	4.00E-01	1.00E+00	4.00E+00
Dieldrin	10000	1.00E+00	2.00E-07	2.00E-03
Endrin	10000	1.00E+00	2.00E-03	2.00E+01
Ethyl benzene	10	4.00E-01	1.00E-02	4.00E-02
Fluorene	100	1.00E+00	2.00E-03	2.00E-01
Indeno(1,2,3-CD)pyrene	0	1.00E+00	2.00E-09	0.00E+00
Iron	0	1.00E+00	1.00E-02	0.00E+00
Lead	10000	1.00E+00	1.00E-02	1.00E+02
Magnesium	0	1.00E+00	2.00E-05	0.00E+00
Manganese	10000	1.00E+00	1.00E-02	1.00E+02
Mercury	10000	1.00E+00	2.00E-05	2.00E-01
Methylene chloride	10	4.00E-01	1.00E+00	4.00E+00
Nickel	100	1.00E+00	1.00E-02	1.00E+00
Pentachlorophenol	100	1.00E+00	1.00E-02	1.00E+00
Phenanthrene	0	4.00E-01	2.00E-05	0.00E+00
Pyrene	100	1.00E+00	2.00E-09	2.00E-07
Toluene	10	4.00E-01	1.00E-02	4.00E-02
Vanadium	100	1.00E+00	2.00E-07	2.00E-05
Xylene, m-	1	4.00E-01	1.00E-02	4.00E-03
Zinc	10	1.00E+00	2.00E-03	2.00E-02

SW PATHWAY: GW TO SW COMPONENT DRINKING WATER THREAT WASTE CHARACTERISTICS
NASA LeRC PMU5 - South Area - 12/15/95

Source: 3 Coal Storage Area

Source Hazardous Waste Quantity Value: 184.62

Hazardous Substance	Toxicity Factor Value	Persist. Value	Mobility Value	Toxicity/ Mobililty/ Persistence

Source: 4 Buildings 203 & 204

Source Hazardous Waste Quantity Value: 7.06

Hazardous Substance	Toxicity Factor Value	Persist. Value	Mobility Value	Toxicity/ Mobililty/ Persistence
Acetone	10	7.00E-04	1.00E+00	7.00E-03
Barium	10000	1.00E+00	1.00E-02	1.00E+02
Benz(a)anthracene	1000	1.00E+00	2.00E-09	2.00E-06
Benzo(a)pyrene	10000	1.00E+00	2.00E-09	2.00E-05
Benzo(k)fluoranthene	0	1.00E+00	2.00E-09	0.00E+00
Benzofluoranthene, 3,4-	10000	1.00E+00	2.00E-09	2.00E-05
Beryllium	10000	1.00E+00	1.00E-02	1.00E+02
Butylbenzyl phthalate	10	1.00E+00	2.00E-05	2.00E-04
Chrysene	0	1.00E+00	2.00E-09	0.00E+00
Di-n-butyl phthalate	10	1.00E+00	2.00E-03	2.00E-02
Di-n-octyl phthalate	100	1.00E+00	2.00E-07	2.00E-05
Dichlorobenzidine, 3,3-	100	1.00E+00	2.00E-05	2.00E-03
Hexachlorocyclopentadiene	10000	1.00E+00	2.00E-03	2.00E+01
Magnesium	0	1.00E+00	2.00E-05	0.00E+00
Manganese	10000	1.00E+00	1.00E-02	1.00E+02
Mercury	10000	1.00E+00	2.00E-05	2.00E-01
Methylene chloride	10	4.00E-01	1.00E+00	4.00E+00
Pentachlorophenol	100	1.00E+00	1.00E-02	1.00E+00
Phenanthrene	0	4.00E-01	2.00E-05	0.00E+00
Pyrene	100	1.00E+00	2.00E-09	2.00E-07
Selenium	100	1.00E+00	1.00E-02	1.00E+00

SW PATHWAY: GW TO SW COMPONENT DRINKING WATER THREAT WASTE CHARACTERISTICS
NASA LeRC PMU5 - South Area - 12/15/95

Source: 5 Recycle Bins

Source Hazardous Waste Quantity Value: 0.09

Hazardous Substance	Toxicity Factor Value	Persist. Value	Mobility Value	Toxicity/ Mobililty/ Persistence
Mercury	10000	1.00E+00	2.00E-05	2.00E-01

SW PATHWAY: GW TO SW COMPONENT DRINKING WATER THREAT WASTE CHARACTERISTICS
NASA LeRC PMU5 - South Area - 12/15/95

Source: 6 Building 202

Source Hazardous Waste Quantity Value: 0.00

Hazardous Substance	Toxicity Factor Value	Persist. Value	Mobility Value	Toxicity/ Mobililty/ Persistence

SW PATHWAY: GW TO SW COMPONENT DRINKING WATER THREAT WASTE CHARACTERISTICS
NASA LeRC PMU5 - South Area - 12/15/95

Source: 7 Substation A

Source Hazardous Waste Quantity Value: 4.71

Hazardous Substance	Toxicity Factor Value	Persist. Value	Mobility Value	Toxicity/ Mobililty/ Persistence
Mercury	10000	1.00E+00	2.00E-05	2.00E-01

Hazardous Substances Found in an Observed Release

Observed Release Hazardous Substance	Toxicity Factor Value	Persist. Value	Toxicity/ Persistence
Radium	100	1.00E+00	1.00E+02
Thorium	100	1.00E+00	1.00E+02
Uranium	100	1.00E+00	1.00E+02

SW PATHWAY: GW TO SW COMPONENT DRINKING WATER THREAT WASTE CHARACTERISTICS

NASA LeRC PMU5 - South Area - 12/15/95

Toxicity/Mobility/Persistence Value from Source Hazardous Substances:	1.00E+04
Toxicity/Mobility/Persistence Value from Observed Release Hazardous Substances:	0.00E+00
Toxicity/Mobility/Persistence Factor:	1.00E+04
Sum of Source Hazardous Waste Quantity Values:	3.56E+02
Hazardous Waste Quantity Factor:	100
Waste Characteristics Factor Category:	32

Level I Concentrations

- N/A and/or data not specified

Level II Concentrations

- N/A and/or data not specified

Most Distant Level I Sample

- N/A and/or data not specified

Most Distant Level II Sample

- N/A and/or data not specified

Level I Concentrations

Intake	Distance Along the In-water Segment from the Probable Point of Entry (miles)	Population
- N/A and/or data not specified		

Population Served by Level I Intakes: 0.0

Level I Population Factor: 0.00E+00

Level II Concentrations

Intake	Distance Along the In-water Segment from the Probable Point of Entry (miles)	Population
- N/A and/or data not specified		

==========

Population Served by Level II Intakes: 0.0

Level II Population Factor: 0.00E+00

Potential Contamination

Intake ID	Average Annual Flow (cfs)	Population Served
1 Cleve: Crown Crib	0	375000.0
2 Cleve: Division Crb	0	375000.0
3 Cleve: Kirtland Crb	0	375000.0
4 Nottingham Intake C	0	375000.0

Documentation for Intake Cleve: Crown Crib:

See Section 3.8.1 of Reference #3.
There are four City of Cleveland ("Cleve") intakes which serve 1.5 million people. The population served by individual intakes is assumed to be split equally. Only 3 of the 4 intakes are within the TDL of 15 miles.

Reference: 3

Type of Surface Water Body	Total Population	Dilution-Weighted Population
Moderate Ocean Zone or Great Lake	1125000.0	16.0

Dilution-Weighted Population Served
by Potentially Contaminated Intakes: 16.0

Potential Contamination Factor: 0.8

Nearest Intake

Location of Nearest Drinking Water Intake: Cleve: Crown Crib
Distance from the Probable Point of Entry: 12.60 miles
Type of Surface Water Body: Moderate D
Dilution Weight: 0.0000050
Highest Level of Contamination: Potential

Nearest Intake Factor: 0.00

Documentation for Cleve: Crown Crib:

See Section 3.8.1 of Reference #3.
There are four City of Cleveland ("Cleve") intakes which serve 1.5 million people. The population served by individual intakes is assumed to be split equally. Only 3 of the 4 intakes are within the TDL of 15 miles.

Reference: 3

Resources

Resource Use: YES

Resource Value: 5.00E+00

Documentation for Resources:

Lake Erie is a water recreation area.

Reference:

Source: 1 Landfill Areas

Source Hazardous Waste Quantity Value: 159.11

Hazardous Substance	Toxicity Value	Persist. Value	Mobility Value	Bio-accum. Value	Tox./Mobil./ Persistence/ Bioaccum. Value
Acenaphthylene	0	1.00E+00	2.00E-03	5.00E+02	0.00E+00
Aluminum	0	1.00E+00	1.00E+00	5.00E+01	0.00E+00
Antimony	10000	1.00E+00	1.00E-02	5.00E-01	5.00E+01
Barium	10000	1.00E+00	1.00E-02	5.00E-01	5.00E+01
Benz(a)anthracene	1000	1.00E+00	2.00E-09	5.00E+04	1.00E-01
Benzo(a)pyrene	10000	1.00E+00	2.00E-09	5.00E+04	1.00E+00
Benzo(g,h,i)perylene	0	1.00E+00	2.00E-09	5.00E+04	0.00E+00
Benzo(k)fluoranthene	0	1.00E+00	2.00E-09	5.00E+04	0.00E+00
Benzofluoranthene, 3,4-	10000	1.00E+00	2.00E-09	5.00E+04	1.00E+00
Beryllium	10000	1.00E+00	1.00E-02	5.00E+01	5.00E+03
Bis (2-ethylhexyl) phthalate	100	1.00E+00	1.00E-04	5.00E+04	5.00E+02
Cadmium	10000	1.00E+00	1.00E+00	5.00E+03	5.00E+07
Carbon Tetrachloride	1000	4.00E-01	1.00E-02	5.00E+01	2.00E+02
Chlordane	10000	1.00E+00	2.00E-07	5.00E+04	1.00E+02
Chloroform	100	4.00E-01	1.00E+00	5.00E+00	2.00E+02
Chromium	10000	1.00E+00	1.00E-02	5.00E+00	5.00E+02
Chrysene	0	1.00E+00	2.00E-09	5.00E+02	0.00E+00
Copper	0	1.00E+00	1.00E-02	5.00E+04	0.00E+00
DDE	100	1.00E+00	2.00E-07	5.00E+04	1.00E+00
DDT	1000	1.00E+00	2.00E-07	5.00E+04	1.00E+01
Di-n-butyl phthalate	10	1.00E+00	2.00E-03	5.00E+03	1.00E+02
Dichloroethane, 1,1-	10	4.00E-01	1.00E+00	5.00E+00	2.00E+01
Dieldrin	10000	1.00E+00	2.00E-07	5.00E+04	1.00E+02
Endrin	10000	1.00E+00	2.00E-03	5.00E+03	1.00E+05
Ethyl benzene	10	4.00E-01	1.00E-02	5.00E+01	2.00E+00
Fluorene	100	1.00E+00	2.00E-03	5.00E+03	1.00E+03
Indeno(1,2,3-CD)pyrene	0	1.00E+00	2.00E-09	5.00E+04	0.00E+00
Iron	0	1.00E+00	1.00E-02	5.00E-01	0.00E+00
Lead	10000	1.00E+00	1.00E-02	5.00E+01	5.00E+03
Magnesium	0	1.00E+00	2.00E-05	5.00E-01	0.00E+00
Manganese	10000	1.00E+00	1.00E-02	5.00E-01	5.00E+01
Mercury	10000	1.00E+00	2.00E-05	5.00E+04	1.00E+04
Methylene chloride	10	4.00E-01	1.00E+00	5.00E+00	2.00E+01
Nickel	100	1.00E+00	1.00E-02	5.00E-01	5.00E-01
Pentachlorophenol	100	1.00E+00	1.00E-02	5.00E+02	5.00E+02
Phenanthrene	0	4.00E-01	2.00E-05	5.00E+01	0.00E+00
Pyrene	100	1.00E+00	2.00E-09	5.00E+01	1.00E-05
Radium	0	1.00E+00	2.00E-07	5.00E-01	0.00E+00
Thorium	0	1.00E+00	2.00E-09	5.00E-01	0.00E+00
Toluene	10	4.00E-01	1.00E-02	5.00E+01	2.00E+00
Uranium	0	1.00E+00	2.00E-07	5.00E-01	0.00E+00

Vanadium	100	1.00E+00	2.00E-07	5.00E-01	1.00E-05
Xylene, m-	1	4.00E-01	1.00E-02	5.00E+02	2.00E+00
Zinc	10	1.00E+00	2.00E-03	5.00E+02	1.00E+01

SW PATHWAY: GW TO SW COMPONENT HUMAM FOOD CHAIN THREAT WASTE CHARACTERISTICS
NASA LeRC PMU5 - South Area - 12/15/95

Source: 3 Coal Storage Area

Source Hazardous Waste Quantity Value: 184.62

Hazardous Substance	Toxicity Value	Persist. Value	Mobility Value	Bio-accum. Value	Tox./Mobil./ Persistence/ Bioaccum. Value

SW PATHWAY: GW TO SW COMPONENT HUMAM FOOD CHAIN THREAT WASTE CHARACTERISTICS
NASA LeRC PMU5 - South Area - 12/15/95

Source: 4 Buildings 203 & 204

Source Hazardous Waste Quantity Value: 7.06

Hazardous Substance	Toxicity Value	Persist. Value	Mobility Value	Bio-accum. Value	Tox./Mobil./ Persistence/ Bioaccum. Value
Acetone	10	7.00E-04	1.00E+00	5.00E-01	3.50E-03
Barium	10000	1.00E+00	1.00E-02	5.00E-01	5.00E+01
Benz(a)anthracene	1000	1.00E+00	2.00E-09	5.00E+04	1.00E-01
Benzo(a)pyrene	10000	1.00E+00	2.00E-09	5.00E+04	1.00E+00
Benzo(k)fluoranthene	0	1.00E+00	2.00E-09	5.00E+04	0.00E+00
Benzofluoranthene, 3,4-	10000	1.00E+00	2.00E-09	5.00E+04	1.00E+00
Beryllium	10000	1.00E+00	1.00E-02	5.00E+01	5.00E+03
Butylbenzyl phthalate	10	1.00E+00	2.00E-05	5.00E+02	1.00E-01
Chrysene	0	1.00E+00	2.00E-09	5.00E+02	0.00E+00
Di-n-butyl phthalate	10	1.00E+00	2.00E-03	5.00E+03	1.00E+02
Di-n-octyl phthalate	100	1.00E+00	2.00E-07	5.00E+02	1.00E-02
Dichlorobenzidine, 3,3-	100	1.00E+00	2.00E-05	5.00E+02	1.00E+00
Hexachlorocyclopentadiene	10000	1.00E+00	2.00E-03	5.00E+03	1.00E+05
Magnesium	0	1.00E+00	2.00E-05	5.00E-01	0.00E+00
Manganese	10000	1.00E+00	1.00E-02	5.00E-01	5.00E+01
Mercury	10000	1.00E+00	2.00E-05	5.00E+04	1.00E+04
Methylene chloride	10	4.00E-01	1.00E+00	5.00E+00	2.00E+01
Pentachlorophenol	100	1.00E+00	1.00E-02	5.00E+02	5.00E+02
Phenanthrene	0	4.00E-01	2.00E-05	5.00E+01	0.00E+00
Pyrene	100	1.00E+00	2.00E-09	5.00E+01	1.00E-05
Selenium	100	1.00E+00	1.00E-02	5.00E+03	5.00E+03

Source: 5 Recycle Bins

Source Hazardous Waste Quantity Value: 0.09

Hazardous Substance	Toxicity Value	Persist. Value	Mobility Value	Bio-accum. Value	Tox./Mobil./ Persistence/ Bioaccum. Value
Mercury	10000	1.00E+00	2.00E-05	5.00E+04	1.00E+04

Source: 6 Building 202

Source Hazardous Waste Quantity Value: 0.00

Hazardous Substance	Toxicity Value	Persist. Value	Mobility Value	Bio-accum. Value	Tox./Mobil./ Persistence/ Bioaccum. Value

Source: 7 Substation A

Source Hazardous Waste Quantity Value: 4.71

Hazardous Substance	Toxicity Value	Persist. Value	Mobility Value	Bio-accum. Value	Tox./Mobil./ Persistence/ Bioaccum. Value
Mercury	10000	1.00E+00	2.00E-05	5.00E+04	1.00E+04

Hazardous Substances Found in an Observed Release

Observed Release Hazardous Substance	Toxicity Value	Persist. Value	Bio-accum. Value	Toxicity/ Persistence Bioaccum. Value
Radium	100	1.00E+00	5.00E-01	5.00E+01
Thorium	100	1.00E+00	5.00E-01	5.00E+01
Uranium	100	1.00E+00	5.00E-01	5.00E+01

Toxicity/Mobility/Persistence/Bioaccumulation Value from Source Hazardous Substances:	5.00E+07
Toxicity/Mobility/Persistence/Bioaccumulation Value from Observed Release Hazardous Substances:	0.00E+00
Toxicity/Mobility/Persistence/Bioaccumulation Factor:	5.00E+07
Sum of Source Hazardous Waste Quantity Values:	3.56E+02
Hazardous Waste Quantity Factor:	100
Waste Characteristics Factor Category:	180

Level I Concentrations

- N/A and/or data not specified

Level II Concentrations

- N/A and/or data not specified

Most Distant Level I Sample

- N/A and/or data not specified

Most Distant Level II Sample

- N/A and/or data not specified

Level I Concentrations

Fishery	Annual Production (pounds)	Human Food Chain Population Value
- N/A and/or data not specified		

Sum of Human Food Chain Population Values: 0.00E+00

Level I Concentrations Factor: 0.00E+00

Level II Concentrations

Fishery	Annual Production (pounds)	Human Food Chain Population Value
- N/A and/or data not specified		

Sum of Human Food Chain Population Values: 0.00E+00

Level II Concentrations Factor: 0.00E+00

Potential Contamination

Fishery	Annnual Production (pounds)	Type of Surface Water Body	Average Annual Flow (cfs)	Pop. Value (Pi)	Dilution Weight (Di)	Pi*Di
3 Rocky River	3000.0	River	113	3.0	5.00E-03	1.50E-02
4 Lake Erie	500000.0	Moderate	0	310.0	5.00E-06	1.55E-03

Sum of (Pi*Di): 1.65E-02

Potential Human Food Chain Contamination Factor: 1.66E-03

Documentation for Abram Creek Fishery:

Rocky River used for recreational fishing.
fishery production assumed at a conservative rate of 10 lb/day for 300 d/yr.

Reference:

Documentation for Rocky River Fishery:

Lake Erie is used for commercial fishing (See Section 3.7 of Reference #3).
***fishery production (lb/yr) ficticious

Reference:

Food Chain Individual

Location of Nearest Fishery: Rocky River
Distance from the Probable Point of Entry: 1.10 miles
Type of Surface Water Body: River
Dilution Weight: 0.0050000
Level of Contamination: Potential

Food Chain Individual Factor: 0.00

Documentation for Rocky River:

end point = TDL

Reference:

SW PATHWAY: GW TO SW COMPONENT ENVIRONMENTAL THREAT WASTE CHARACTERISTICS
NASA LeRC PMU5 - South Area - 12/15/95

Source: 1 Landfill Areas

Source Hazardous Waste Quantity Value: 159.11

Hazardous Substance	Eco-toxicity Value	Persist. Value	Mob. Value	Bio-accum. Value	Ecotoxicity/ Mobility/ Persistence/ Bioaccum. Value
Acenaphthylene	0	1.00E+00	2.00E-03	5.00E+02	0.00E+00
Aluminum	0	1.00E+00	1.00E+00	5.00E+01	0.00E+00
Antimony	0	1.00E+00	1.00E-02	5.00E-01	0.00E+00
Barium	1	1.00E+00	1.00E-02	5.00E-01	5.00E-03
Benz(a)anthracene	10000	1.00E+00	2.00E-09	5.00E+04	1.00E+00
Benzo(a)pyrene	10000	1.00E+00	2.00E-09	5.00E+04	1.00E+00
Benzo(g,h,i)perylene	0	1.00E+00	2.00E-09	5.00E+04	0.00E+00
Benzo(k)fluoranthene	0	1.00E+00	2.00E-09	5.00E+04	0.00E+00
Benzofluoranthene, 3,4-	0	1.00E+00	2.00E-09	5.00E+04	0.00E+00
Beryllium	0	1.00E+00	1.00E-02	5.00E+01	0.00E+00
Bis (2-ethylhexyl) phthalate	1000	1.00E+00	1.00E-04	5.00E+04	5.00E+03
Cadmium	1000	1.00E+00	1.00E+00	5.00E+03	5.00E+06
Carbon Tetrachloride	100	4.00E-01	1.00E-02	5.00E+01	2.00E+01
Chlordane	10000	1.00E+00	2.00E-07	5.00E+04	1.00E+02
Chloroform	10	4.00E-01	1.00E+00	5.00E+00	2.00E+01
Chromium	10000	1.00E+00	1.00E-02	5.00E+00	5.00E+02
Chrysene	1000	1.00E+00	2.00E-09	5.00E+03	1.00E-02
Copper	100	1.00E+00	1.00E-02	5.00E+04	5.00E+04
DDE	10000	1.00E+00	2.00E-07	5.00E+04	1.00E+02
DDT	10000	1.00E+00	2.00E-07	5.00E+04	1.00E+02
Di-n-butyl phthalate	1000	1.00E+00	2.00E-03	5.00E+03	1.00E+04
Dichloroethane, 1,1-	0	4.00E-01	1.00E+00	5.00E+00	0.00E+00
Dieldrin	10000	1.00E+00	2.00E-07	5.00E+04	1.00E+02
Endrin	10000	1.00E+00	2.00E-03	5.00E+04	1.00E+06
Ethyl benzene	100	4.00E-01	1.00E-02	5.00E+01	2.00E+01
Fluorene	1000	1.00E+00	2.00E-03	5.00E+03	1.00E+04
Indeno(1,2,3-CD)pyrene	0	1.00E+00	2.00E-09	5.00E+04	0.00E+00
Iron	10	1.00E+00	1.00E-02	5.00E-01	5.00E-02
Lead	1000	1.00E+00	1.00E-02	5.00E+03	5.00E+04
Magnesium	0	1.00E+00	2.00E-05	5.00E-01	0.00E+00
Manganese	0	1.00E+00	1.00E-02	5.00E+04	0.00E+00
Mercury	10000	1.00E+00	2.00E-05	5.00E+04	1.00E+04
Methylene chloride	1	4.00E-01	1.00E+00	5.00E+00	2.00E+00
Nickel	10	1.00E+00	1.00E-02	5.00E+02	5.00E+01
Pentachlorophenol	100	1.00E+00	1.00E-02	5.00E+03	5.00E+03
Phenanthrene	1000	4.00E-01	2.00E-05	5.00E+03	4.00E+01
Pyrene	0	1.00E+00	2.00E-09	5.00E+01	0.00E+00
Radium	0	1.00E+00	2.00E-07	5.00E-01	0.00E+00
Thorium	0	1.00E+00	2.00E-09	5.00E-01	0.00E+00
Toluene	100	4.00E-01	1.00E-02	5.00E+01	2.00E+01

Uranium	0	1.00E+00	2.00E-07	5.00E-01	0.00E+00
Vanadium	0	1.00E+00	2.00E-07	5.00E-01	0.00E+00
Xylene, m-	100	4.00E-01	1.00E-02	5.00E+02	2.00E+02
Zinc	10	1.00E+00	2.00E-03	5.00E+02	1.00E+01

SW PATHWAY: GW TO SW COMPONENT ENVIRONMENTAL THREAT WASTE CHARACTERISTICS
NASA LeRC PMU5 - South Area - 12/15/95

Source: 3 Coal Storage Area

Source Hazardous Waste Quantity Value: 184.62

Hazardous Substance	Eco-toxicity Value	Persist. Value	Mob. Value	Bio-accum. Value	Ecotoxicity/ Mobility/ Persistence/ Bioaccum. Value

SW PATHWAY: GW TO SW COMPONENT ENVIRONMENTAL THREAT WASTE CHARACTERISTICS
NASA LeRC PMU5 - South Area - 12/15/95

Source: 4 Buildings 203 & 204

Source Hazardous Waste Quantity Value: 7.06

Hazardous Substance	Eco-toxicity Value	Persist. Value	Mob. Value	Bio-accum. Value	Ecotoxicity/ Mobility/ Persistence/ Bioaccum. Value
Acetone	100	7.00E-04	1.00E+00	5.00E-01	3.50E-02
Barium	1	1.00E+00	1.00E-02	5.00E-01	5.00E-03
Benz(a)anthracene	10000	1.00E+00	2.00E-09	5.00E+04	1.00E+00
Benzo(a)pyrene	10000	1.00E+00	2.00E-09	5.00E+04	1.00E+00
Benzo(k)fluoranthene	0	1.00E+00	2.00E-09	5.00E+04	0.00E+00
Benzofluoranthene, 3,4-	0	1.00E+00	2.00E-09	5.00E+04	0.00E+00
Beryllium	0	1.00E+00	1.00E-02	5.00E+01	0.00E+00
Butylbenzyl phthalate	100	1.00E+00	2.00E-05	5.00E+02	1.00E+00
Chrysene	1000	1.00E+00	2.00E-09	5.00E+03	1.00E-02
Di-n-butyl phthalate	1000	1.00E+00	2.00E-03	5.00E+03	1.00E+04
Di-n-octyl phthalate	0	1.00E+00	2.00E-07	5.00E+02	0.00E+00
Dichlorobenzidine, 3,3-	0	1.00E+00	2.00E-05	5.00E+02	0.00E+00
Hexachlorocyclopentadiene	10000	1.00E+00	2.00E-03	5.00E+01	1.00E+03
Magnesium	0	1.00E+00	2.00E-05	5.00E-01	0.00E+00
Manganese	0	1.00E+00	1.00E-02	5.00E+04	0.00E+00
Mercury	10000	1.00E+00	2.00E-05	5.00E+04	1.00E+04
Methylene chloride	1	4.00E-01	1.00E+00	5.00E+00	2.00E+00
Pentachlorophenol	100	1.00E+00	1.00E-02	5.00E+03	5.00E+03
Phenanthrene	1000	4.00E-01	2.00E-05	5.00E+03	4.00E+01
Pyrene	0	1.00E+00	2.00E-09	5.00E+01	0.00E+00
Selenium	100	1.00E+00	1.00E-02	5.00E+03	5.00E+03

Source: 5 Recycle Bins

Source Hazardous Waste Quantity Value: 0.09

Hazardous Substance	Eco-toxicity Value	Persist. Value	Mob. Value	Bio-accum. Value	Ecotoxicity/ Mobility/ Persistence/ Bioaccum. Value
Mercury	10000	1.00E+00	2.00E-05	5.00E+04	1.00E+04

Source: 6 Building 202

Source Hazardous Waste Quantity Value: 0.00

Hazardous Substance	Eco-toxicity Value	Persist. Value	Mob. Value	Bio-accum. Value	Ecotoxicity/ Mobility/ Persistence/ Bioaccum. Value

Source: 7 Substation A

Source Hazardous Waste Quantity Value: 4.71

Hazardous Substance	Eco-toxicity Value	Persist. Value	Mob. Value	Bio-accum. Value	Ecotoxicity/ Mobility/ Persistence/ Bioaccum. Value
Mercury	10000	1.00E+00	2.00E-05	5.00E+04	1.00E+04

Hazardous Substances Found in an Observed Release

Observed Release Hazardous Substance	Eco-toxicity Value	Persist. Value	Bio-accum. Value	Ecotoxicity/ Persistence/ Bioaccum. Value
Radium	100	1.00E+00	5.00E-01	5.00E+01
Thorium	100	1.00E+00	5.00E-01	5.00E+01
Uranium	100	1.00E+00	5.00E-01	5.00E+01

SW PATHWAY: GW TO SW COMPONENT ENVIRONMENTAL THREAT WASTE CHARACTERISTICS
NASA LeRC PMU5 - South Area - 12/15/95

Ecotoxicity/Mobility/Persistence/Bioaccummulation Value from Source Substances:	5.00E+06
Ecotoxicity/Mobility/Persistence/Bioaccummulation Value from Observed Hazardous Substances:	0.00E+00
Ecotoxicity/Mobility/Persistence/Bioaccummulation Factor:	5.00E+06
Sum of Source Hazardous Waste Quantity Values:	3.56E+02
Hazardous Waste Quantity Factor:	100
Waste Characteristics Factor Category:	100

Level I Concentrations

- N/A and/or data not specified

Level II Concentrations

- N/A and/or data not specified

Most Distant Level I Sample

- N/A and/or data not specified

Most Distant Level II Sample

- N/A and/or data not specified

Level I Concentrations

Sensitive Environment	Distance from Probable Point of Entry to Sensitive Env. (miles)	Sensitive Environment Value
- N/A and/or data not specified		

Sum of Sensitive Environments Values: 0

Wetlands

Wetland	Distance from Probable Point of Entry to Wetland (miles)	Wetlands Frontage (miles)
- N/A and/or data not specified		

Total Wetlands Frontage: 0.00 Miles Total Wetlands Value: 0

Sum of Sensitive Environments Value + Wetlands Value: 0.00E+00

Level I Concentrations Factor: 0.00E+00

Level II Concentrations

Sensitive Environment	Distance from Probable Point of Entry to Sensitive Env. (miles)	Sensitive Environment Value
- N/A and/or data not specified		

Sum of Sensitive Environments Values: 0

Wetlands

Wetland	Distance from Probable Point of Entry to Wetland (miles)	Wetlands Frontage (miles)
- N/A and/or data not specified		

Total Wetlands Frontage: 0.00 Miles Total Wetlands Value: 0

Sum of Sensitive Environments Value + Wetlands Value: 0.00E+00

Level II Concentrations Factor: 0.00E+00

Potential Contamination

Sensitive Environments

Type of Surface Water Body	Sensitive Environment	Sensitive Environment Value
River	1 Rocky Rvr Reservatn	50

Wetlands

Type of Surface Water Body	Sensitive Environment	Wetlands Frontage	Wetlands Value
- N/A and/or data not specified			

Documentation for Sensitive Environment Rocky Rvr Reservatn:

Seasonal habitat for salmon which are stocked by ODNR.
See Section 3.6 of Reference #3.

Reference:

SW PATHWAY: GW TO SW COMPONENT ENVIRONMENTAL THREAT TARGETS
NASA LeRC PMU5 - South Area - 12/15/95

Type of Surface Water Body	Sum of Sens. Environment Values(Sj)	Sum of Wetland Frontage Values(Wj)	Dilution Weight (Dj)	Dj(Wj+Sj)
Minimal Stream	50	0	5.00E-01	2.50E+01

Sum of Dj(Wj+Sj): 2.50E+01
Sum of Dj(Wj+Sj)/10: 2.50E+00

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Potential Contamination Sensitive Environment Factor: 3.00E+00

SOIL EXPOSURE PATHWAY RESIDENT POPULATION THREAT LIKELIHOOD OF EXPOSURE
NASA LeRC PMU5 - South Area - 12/15/95

Likelihood of Exposure

No.	Source ID	Level of Contamination
1	Landfill Areas	Level I
2	Salvage Areas I, II	Level I
4	Buildings 203 & 204	Level I
5	Recycle Bins	Level II
6	Building 202	Level I
7	Substation A	Level II

Likelihood of Exposure Factor: 550

Documentation for Area of Contamination, Source Landfill Areas:

Boundaries of the Area of Concern have been delineated. See Section 4 of the Volume 1 of the RI/FS Report for dimensions of the Areas of Concern

Reference: 3

Documentation for Area of Contamination, Source Salvage Areas I, II:

Dimensions of the Source Area are available. See Section 4.5 of the RI/FS Report.

Reference: 3

Documentation for Area of Contamination, Source Coal Storage Area:

Dimensions of the Source Area are available. See Section 4.5 of the RI/FS Report.

Reference: 3

Documentation for Area of Contamination, Source Buildings 203 & 204:

Dimensions of the Source Area are available. See Section 4.5 of the RI/FS Report.

Reference: 3

Documentation for Area of Contamination, Source Recycle Bins:

Dimensions of the Source Area area available. See Section 4.5 of the RI/FS Report.

Reference: 3

Documentation for Area of Contamination, Source Building 202:

Dimensions of the Source Area are available. See Section 4.5 of the RI/FS Report.

Reference: 3

Documentation for Area of Contamination, Source Substation A:

Dimensions of the Source Area are available. See Section 4.5 of the RI/FS Report.

Reference: 3

Source No.	Hazardous Substance	Depth (ft.)	Concent.	Cancer	RFD	Units
1	Acenaphthylene	< 2	1.7E+00	0.0E+00	0.0E+00	ppm
1	Aluminum	< 2	5.9E+02	0.0E+00	0.0E+00	ppm

SOIL EXPOSURE PATHWAY RESIDENT POPULATION THREAT LIKELIHOOD OF EXPOSURE
NASA LeRC PMU5 - South Area - 12/15/95

1	Antimony	< 2	2.0E-02	0.0E+00	2.3E+02	ppm
1	Barium	< 2	7.0E+02	0.0E+00	4.1E+04	ppm
1	Benz(a)anthracene	< 2	1.6E+00	0.0E+00	0.0E+00	ppm
1	Benzo(a)pyrene	< 2	1.7E+00	8.0E-02	0.0E+00	ppm
1	Benzo(g,h,i)perylene	< 2	1.2E+00	0.0E+00	0.0E+00	ppm
1	Benzo(k)fluoranthene	< 2	1.0E+00	0.0E+00	0.0E+00	ppm
1	Benzofluoranthene, 3,4-	< 2	1.6E+00	0.0E+00	0.0E+00	ppm
1	Beryllium	< 2	2.9E+00	1.4E-01	2.9E+03	ppm
1	Bis (2-ethylhexyl) phthalate	< 2	2.5E-02	4.2E+01	1.2E+04	ppm
1	Cadmium	> 2	1.1E+01	0.0E+00	0.0E+00	ppm
1	Carbon Tetrachloride	< 2	6.7E-02	4.5E+00	4.1E+02	ppm
1	Chlordane	< 2	3.6E-03	4.5E-01	3.5E+01	ppm
1	Chloroform	< 2	1.3E-01	9.6E+01	5.8E+03	ppm
1	Chromium	< 2	1.1E+00	0.0E+00	2.9E+03	ppm
1	Chrysene	< 2	2.3E+00	0.0E+00	0.0E+00	ppm
1	Copper	< 2	1.4E+02	0.0E+00	0.0E+00	ppm
1	DDE	< 2	4.2E-03	1.7E+00	0.0E+00	ppm
1	DDT	< 2	9.9E-03	1.7E+00	2.9E+02	ppm
1	Di-n-butyl phthalate	< 2	9.9E-01	0.0E+00	5.8E+04	ppm
1	Dieldrin	< 2	6.3E-02	3.6E-02	2.9E+01	ppm
1	Endrin	< 2	7.4E-03	0.0E+00	1.7E+02	ppm
1	Ethyl benzene	> 2	6.0E-02	0.0E+00	0.0E+00	ppm
1	Fluorene	< 2	3.2E+00	0.0E+00	2.3E+04	ppm
1	Indeno(1,2,3-CD)pyrene	< 2	1.1E+00	0.0E+00	0.0E+00	ppm
1	Iron	< 2	1.6E+03	0.0E+00	0.0E+00	ppm
1	Lead	< 2	1.1E+02	0.0E+00	0.0E+00	ppm
1	Magnesium	< 2	6.2E+04	0.0E+00	0.0E+00	ppm
1	Manganese	< 2	3.9E+00	0.0E+00	2.9E+03	ppm
1	Mercury	< 2	1.7E+01	0.0E+00	1.7E+02	ppm
1	Methylene chloride	< 2	2.4E-02	7.8E+01	3.5E+04	ppm
1	Nickel	< 2	2.1E+00	0.0E+00	1.2E+04	ppm
1	Pentachlorophenol	< 2	9.6E-01	4.9E+00	1.7E+04	ppm
1	Phenanthrene	< 2	2.0E+00	0.0E+00	0.0E+00	ppm
1	Pyrene	< 2	2.1E+00	0.0E+00	1.7E+04	ppm
1	Toluene	> 2	8.6E-02	0.0E+00	0.0E+00	ppm
1	Vanadium	> 2	6.4E+01	0.0E+00	0.0E+00	ppm
1	Xylene, m-	< 2	1.4E-02	0.0E+00	1.2E+06	ppm
1	Zinc	< 2	3.6E+02	0.0E+00	1.7E+05	ppm
2	Acetone	< 2	1.3E-02	0.0E+00	5.8E+04	ppm
2	Benzo(a)pyrene	< 2	4.7E-01	8.0E-02	0.0E+00	ppm
2	Benzofluoranthene, 3,4-	< 2	6.0E-01	0.0E+00	0.0E+00	ppm
2	Cadmium	< 2	2.4E+00	0.0E+00	2.9E+02	ppm
2	Copper	< 2	1.7E+03	0.0E+00	0.0E+00	ppm
2	DDE	< 2	3.4E-03	1.7E+00	0.0E+00	ppm
2	Di-n-butyl phthalate	< 2	3.5E-01	0.0E+00	5.8E+04	ppm
2	Dichloroethene, 1,1-	< 2	7.1E-02	9.7E-01	5.2E+03	ppm
2	Endosulfan (I or II)	< 2	1.1E-02	0.0E+00	3.5E+03	ppm
2	Lead	< 2	1.8E+02	0.0E+00	0.0E+00	ppm
2	Mercury	< 2	3.3E+00	0.0E+00	1.7E+02	ppm
2	Methyl Napthalene, 2-	< 2	5.2E-01	0.0E+00	0.0E+00	ppm
2	Methylene chloride	< 2	2.4E-02	7.8E+01	3.5E+04	ppm

2	Pyrene	< 2	4.1E-01	0.0E+00	1.7E+04	ppm
2	Tetrachloroethene	< 2	3.6E-02	1.1E+01	5.8E+03	ppm
2	Toluene	< 2	6.7E-02	0.0E+00	1.2E+05	ppm
2	Trichloroethane, 1,1,1-	< 2	9.5E-01	0.0E+00	0.0E+00	ppm
2	Zinc	< 2	3.4E+02	0.0E+00	1.7E+05	ppm
4	Acetone	< 2	1.7E-02	0.0E+00	5.8E+04	ppm
4	Barium	< 2	3.0E+02	0.0E+00	4.1E+04	ppm
4	Benz(a)anthracene	< 2	6.2E-01	0.0E+00	0.0E+00	ppm
4	Benzo(a)pyrene	< 2	4.4E-01	8.0E-02	0.0E+00	ppm
4	Benzo(k)fluoranthene	< 2	3.4E-01	0.0E+00	0.0E+00	ppm
4	Benzofluoranthene, 3,4-	< 2	6.8E-01	0.0E+00	0.0E+00	ppm
4	Beryllium	< 2	2.8E+00	1.4E-01	2.9E+03	ppm
4	Butylbenzyl phthalate	< 2	3.6E-01	0.0E+00	1.2E+05	ppm
4	Chrysene	< 2	3.9E-01	0.0E+00	0.0E+00	ppm
4	Di-n-butyl phthalate	< 2	9.0E-01	0.0E+00	5.8E+04	ppm
4	Di-n-octyl phthalate	< 2	3.9E-01	0.0E+00	1.2E+04	ppm
4	Dichlorobenzidine, 3,3-	< 2	3.9E-01	1.3E+00	0.0E+00	ppm
4	Hexachlorocyclopentadiene	< 2	3.9E-01	0.0E+00	4.1E+03	ppm
4	Magnesium	< 2	1.8E+04	0.0E+00	0.0E+00	ppm
4	Manganese	< 2	2.4E+03	0.0E+00	2.9E+03	ppm
4	Mercury	< 2	4.0E-01	0.0E+00	1.7E+02	ppm
4	Methylene chloride	< 2	2.4E-02	7.8E+01	3.5E+04	ppm
4	Pentachlorophenol	< 2	9.4E-01	4.9E+00	1.7E+04	ppm
4	Phenanthrene	< 2	9.2E-01	0.0E+00	0.0E+00	ppm
4	Pyrene	< 2	1.2E+00	0.0E+00	1.7E+04	ppm
4	Selenium	< 2	1.0E+00	0.0E+00	2.9E+03	ppm
5	Mercury	< 2	1.0E+00	0.0E+00	1.7E+02	ppm
7	Mercury	< 2	1.8E+00	0.0E+00	1.7E+02	ppm

SOIL EXPOSURE PATHWAY RESIDENT POPULATION THREAT WASTE CHARACTERISTICS
NASA LeRC PMU5 - South Area - 12/15/95

Source: 1 Landfill Areas

Source Hazardous Waste Quantity Value: 21.98

Hazardous Substance	Toxicity Value
Acenaphthylene	0
Aluminum	0
Antimony	10000
Barium	10000
Benz(a)anthracene	1000
Benzo(a)pyrene	10000
Benzo(g,h,i)perylene	0
Benzo(k)fluoranthene	0
Benzofluoranthene, 3,4-	10000
Beryllium	10000
Bis (2-ethylhexyl) phthalate	100
Carbon Tetrachloride	1000
Chlordane	10000
Chloroform	100
Chromium	10000
Chrysene	0
Copper	0
DDE	100
DDT	1000
Di-n-butyl phthalate	10
Dieldrin	10000
Endrin	10000
Fluorene	100
Indeno(1,2,3-CD)pyrene	0
Iron	0
Lead	10000
Magnesium	0
Manganese	10000
Mercury	10000
Methylene chloride	10
Nickel	100
Pentachlorophenol	100
Phenanthrene	0
Pyrene	100
Xylene, m-	1
Zinc	10

SOIL EXPOSURE PATHWAY RESIDENT POPULATION THREAT WASTE CHARACTERISTICS
NASA LeRC PMU5 - South Area - 12/15/95

Source: 2 Salvage Areas I, II

Source Hazardous Waste Quantity Value: 3823.53

Hazardous Substance	Toxicity Value
Acetone	10
Benzo(a)pyrene	10000
Benzofluoranthene, 3,4-	10000
Cadmium	10000
Copper	0
DDE	100
Di-n-butyl phthalate	10
Dichloroethene, 1,1-	100
Endosulfan (I or II)	100
Lead	10000
Mercury	10000
Methyl Napthalene, 2-	0
Methylene chloride	10
Pyrene	100
Tetrachloroethene	100
Toluene	10
Trichloroethane, 1,1,1-	1
Zinc	10

SOIL EXPOSURE PATHWAY RESIDENT POPULATION THREAT WASTE CHARACTERISTICS
NASA LeRC PMU5 - South Area - 12/15/95

Source: 4 Buildings 203 & 204

Source Hazardous Waste Quantity Value: 7.06

Hazardous Substance	Toxicity Value
Acetone	10
Barium	10000
Benz(a)anthracene	1000
Benzo(a)pyrene	10000
Benzo(k)fluoranthene	0
Benzofluoranthene, 3,4-	10000
Beryllium	10000
Butylbenzyl phthalate	10
Chrysene	0
Di-n-butyl phthalate	10
Di-n-octyl phthalate	100
Dichlorobenzidine, 3,3-	100
Hexachlorocyclopentadiene	10000
Magnesium	0
Manganese	10000
Mercury	10000
Methylene chloride	10
Pentachlorophenol	100
Phenanthrene	0
Pyrene	100
Selenium	100

Source: 5 Recycle Bins

Source Hazardous Waste Quantity Value: 0.09

Hazardous Substance	Toxicity Value
Mercury	10000

SOIL EXPOSURE PATHWAY RESIDENT POPULATION THREAT WASTE CHARACTERISTICS
NASA LeRC PMU5 - South Area - 12/15/95

Source: 6 Building 202

Source Hazardous Waste Quantity Value: 0.00

Hazardous Substance	Toxicity Value

SOIL EXPOSURE PATHWAY RESIDENT POPULATION THREAT WASTE CHARACTERISTICS
NASA LeRC PMU5 - South Area - 12/15/95

Source: 7 Substation A

Source Hazardous Waste Quantity Value: 4.71

Hazardous Substance	Toxicity Value
Mercury	10000

SOIL EXPOSURE PATHWAY RESIDENT POPULATION THREAT WASTE CHARACTERISTICS
NASA LeRC PMU5 - South Area - 12/15/95

Toxicity Factor:	1.00E+04
Sum of Source Hazardous Waste Quantity Values:	3.86E+03
Hazardous Waste Quantity Factor:	100
Waste Characteristics Factor Category:	32

Targets

Level I Population:	0.0	Value:	0.00

Documentation for Level I Population:

No presence of resident, student, or daycare population within 200 ft. of contamination

Reference:

Level II Population:	0.0	Value:	0.00
Workers:	50.0	Value:	5.00
Resident Individual:	Potentia	Value:	0.00
Resources:	NO	Value:	0.00

Terrestial Sensitive Environment	Value
State lands	25

Terrestrial Sensitive Environments Factor: 25.00

SOIL EXPOSURE PATHWAY NEARBY POPULATION THREAT LIKELIHOOD OF EXPOSURE
NASA LeRC PMU5 - South Area - 12/15/95

Likelihood of Exposure

No.	Source ID	Level of Contamination	Attractiveness/ Accessibility	Area of Contam. (sq. feet)
1	Landfill Areas	Level I	10	1000000
4	Buildings 203 & 204	Level I	5	240000
5	Recycle Bins	Level II	5	80000
6	Building 202	Level I	10	80000
7	Substation A	Level II	5	160000

Highest Attractiveness/Accessibility Value: 10
Sum of Eligible Areas Of Contamination (sq. feet): 1560000
Area of Contamination Value: 100

Likelihood of Exposure Factor Category: 125

Documentation for Attractiveness/Accessibility, Source Salvage Areas I, II:

Fenced area; soil contamination beneath asphalt, concrete

Reference:

Documentation for Attractiveness/Accessibility, Source Coal Storage Area:

South area restricted to NASA employees

Reference:

Source No.	Hazardous Substance	Depth (ft.)	Concent.	Cancer	RFD	Units
1	Acenaphthylene	< 2	1.7E+00	0.0E+00	0.0E+00	ppm
1	Aluminum	< 2	5.9E+02	0.0E+00	0.0E+00	ppm
1	Antimony	< 2	2.0E-02	0.0E+00	2.3E+02	ppm
1	Barium	< 2	7.0E+02	0.0E+00	4.1E+04	ppm
1	Benz(a)anthracene	< 2	1.6E+00	0.0E+00	0.0E+00	ppm
1	Benzo(a)pyrene	< 2	1.7E+00	8.0E-02	0.0E+00	ppm

1	Benzo(g,h,i)perylene	< 2	1.2E+00	0.0E+00	0.0E+00	ppm
1	Benzo(k)fluoranthene	< 2	1.0E+00	0.0E+00	0.0E+00	ppm
1	Benzofluoranthene, 3,4-	< 2	1.6E+00	0.0E+00	0.0E+00	ppm
1	Beryllium	< 2	2.9E+00	1.4E-01	2.9E+03	ppm
1	Bis (2-ethylhexyl) phthalate	< 2	2.5E-02	4.2E+01	1.2E+04	ppm
1	Cadmium	> 2	1.1E+01	0.0E+00	0.0E+00	ppm
1	Carbon Tetrachloride	< 2	6.7E-02	4.5E+00	4.1E+02	ppm
1	Chlordane	< 2	3.6E-03	4.5E-01	3.5E+01	ppm
1	Chloroform	< 2	1.3E-01	9.6E+01	5.8E+03	ppm
1	Chromium	< 2	1.1E+00	0.0E+00	2.9E+03	ppm
1	Chrysene	< 2	2.3E+00	0.0E+00	0.0E+00	ppm
1	Copper	< 2	1.4E+02	0.0E+00	0.0E+00	ppm
1	DDE	< 2	4.2E-03	1.7E+00	0.0E+00	ppm
1	DDT	< 2	9.9E-03	1.7E+00	2.9E+02	ppm
1	Di-n-butyl phthalate	< 2	9.9E-01	0.0E+00	5.8E+04	ppm
1	Dieldrin	< 2	6.3E-02	3.6E-02	2.9E+01	ppm
1	Endrin	< 2	7.4E-03	0.0E+00	1.7E+02	ppm
1	Ethyl benzene	> 2	6.0E-02	0.0E+00	0.0E+00	ppm
1	Fluorene	< 2	3.2E+00	0.0E+00	2.3E+04	ppm
1	Indeno(1,2,3-CD)pyrene	< 2	1.1E+00	0.0E+00	0.0E+00	ppm
1	Iron	< 2	1.6E+03	0.0E+00	0.0E+00	ppm
1	Lead	< 2	1.1E+02	0.0E+00	0.0E+00	ppm
1	Magnesium	< 2	6.2E+04	0.0E+00	0.0E+00	ppm
1	Manganese	< 2	3.9E+00	0.0E+00	2.9E+03	ppm
1	Mercury	< 2	1.7E+01	0.0E+00	1.7E+02	ppm
1	Methylene chloride	< 2	2.4E-02	7.8E+01	3.5E+04	ppm
1	Nickel	< 2	2.1E+00	0.0E+00	1.2E+04	ppm
1	Pentachlorophenol	< 2	9.6E-01	4.9E+00	1.7E+04	ppm
1	Phenanthrene	< 2	2.0E+00	0.0E+00	0.0E+00	ppm
1	Pyrene	< 2	2.1E+00	0.0E+00	1.7E+04	ppm
1	Toluene	> 2	8.6E-02	0.0E+00	0.0E+00	ppm
1	Vanadium	> 2	6.4E+01	0.0E+00	0.0E+00	ppm
1	Xylene, m-	< 2	1.4E-02	0.0E+00	1.2E+06	ppm
1	Zinc	< 2	3.6E+02	0.0E+00	1.7E+05	ppm
4	Acetone	< 2	1.7E-02	0.0E+00	5.8E+04	ppm
4	Barium	< 2	3.0E+02	0.0E+00	4.1E+04	ppm
4	Benz(a)anthracene	< 2	6.2E-01	0.0E+00	0.0E+00	ppm
4	Benzo(a)pyrene	< 2	4.4E-01	8.0E-02	0.0E+00	ppm
4	Benzo(k)fluoranthene	< 2	3.4E-01	0.0E+00	0.0E+00	ppm
4	Benzofluoranthene, 3,4-	< 2	6.8E-01	0.0E+00	0.0E+00	ppm
4	Beryllium	< 2	2.8E+00	1.4E-01	2.9E+03	ppm
4	Butylbenzyl phthalate	< 2	3.6E-01	0.0E+00	1.2E+05	ppm
4	Chrysene	< 2	3.9E-01	0.0E+00	0.0E+00	ppm
4	Di-n-butyl phthalate	< 2	9.0E-01	0.0E+00	5.8E+04	ppm
4	Di-n-octyl phthalate	< 2	3.9E-01	0.0E+00	1.2E+04	ppm
4	Dichlorobenzidine, 3,3-	< 2	3.9E-01	1.3E+00	0.0E+00	ppm
4	Hexachlorocyclopentadiene	< 2	3.9E-01	0.0E+00	4.1E+03	ppm
4	Magnesium	< 2	1.8E+04	0.0E+00	0.0E+00	ppm
4	Manganese	< 2	2.4E+03	0.0E+00	2.9E+03	ppm
4	Mercury	< 2	4.0E-01	0.0E+00	1.7E+02	ppm
4	Methylene chloride	< 2	2.4E-02	7.8E+01	3.5E+04	ppm

4	Pentachlorophenol	< 2	9.4E-01	4.9E+00	1.7E+04	ppm
4	Phenanthrene	< 2	9.2E-01	0.0E+00	0.0E+00	ppm
4	Pyrene	< 2	1.2E+00	0.0E+00	1.7E+04	ppm
4	Selenium	< 2	1.0E+00	0.0E+00	2.9E+03	ppm
5	Mercury	< 2	1.0E+00	0.0E+00	1.7E+02	ppm
7	Mercury	< 2	1.8E+00	0.0E+00	1.7E+02	ppm

SOIL EXPOSURE PATHWAY NEARBY POPULATION THREAT WASTE CHARACTERISTICS
NASA LeRC PMU5 - South Area - 12/15/95

Source: 1 Landfill Areas

Source Hazardous Waste Quantity Value: 21.98

Hazardous Substance	Toxicity Value
Acenaphthylene	0
Aluminum	0
Antimony	10000
Barium	10000
Benz(a)anthracene	1000
Benzo(a)pyrene	10000
Benzo(g,h,i)perylene	0
Benzo(k)fluoranthene	0
Benzofluoranthene, 3,4-	10000
Beryllium	10000
Bis (2-ethylhexyl) phthalate	100
Carbon Tetrachloride	1000
Chlordane	10000
Chloroform	100
Chromium	10000
Chrysene	0
Copper	0
DDE	100
DDT	1000
Di-n-butyl phthalate	10
Dieldrin	10000
Endrin	10000
Fluorene	100
Indeno(1,2,3-CD)pyrene	0
Iron	0
Lead	10000
Magnesium	0
Manganese	10000
Mercury	10000
Methylene chloride	10
Nickel	100
Pentachlorophenol	100
Phenanthrene	0
Pyrene	100
Xylene, m-	1
Zinc	10

SOIL EXPOSURE PATHWAY NEARBY POPULATION THREAT WASTE CHARACTERISTICS
NASA LeRC PMU5 - South Area - 12/15/95

Source: 2 Salvage Areas I, II

Source Hazardous Waste Quantity Value: 3823.53

Hazardous Substance	Toxicity Value
Acetone	10
Benzo(a)pyrene	10000
Benzofluoranthene, 3,4-	10000
Cadmium	10000
Copper	0
DDE	100
Di-n-butyl phthalate	10
Dichloroethene, 1,1-	100
Endosulfan (I or II)	100
Lead	10000
Mercury	10000
Methyl Napthalene, 2-	0
Methylene chloride	10
Pyrene	100
Tetrachloroethene	100
Toluene	10
Trichloroethane, 1,1,1-	1
Zinc	10

SOIL EXPOSURE PATHWAY NEARBY POPULATION THREAT WASTE CHARACTERISTICS
NASA LeRC PMU5 - South Area - 12/15/95

Source: 4 Buildings 203 & 204

Source Hazardous Waste Quantity Value: 7.06

Hazardous Substance	Toxicity Value
Acetone	10
Barium	10000
Benz(a)anthracene	1000
Benzo(a)pyrene	10000
Benzo(k)fluoranthene	0
Benzofluoranthene, 3,4-	10000
Beryllium	10000
Butylbenzyl phthalate	10
Chrysene	0
Di-n-butyl phthalate	10
Di-n-octyl phthalate	100
Dichlorobenzidine, 3,3-	100
Hexachlorocyclopentadiene	10000
Magnesium	0
Manganese	10000
Mercury	10000
Methylene chloride	10
Pentachlorophenol	100
Phenanthrene	0
Pyrene	100
Selenium	100

Source: 5 Recycle Bins

Source Hazardous Waste Quantity Value: 0.09

Hazardous Substance	Toxicity Value
Mercury	10000

SOIL EXPOSURE PATHWAY NEARBY POPULATION THREAT WASTE CHARACTERISTICS
NASA LeRC PMU5 - South Area - 12/15/95

Source: 6 Building 202

Source Hazardous Waste Quantity Value: 0.00

Hazardous Substance	Toxicity Value

SOIL EXPOSURE PATHWAY NEARBY POPULATION THREAT WASTE CHARACTERISTICS
NASA LeRC PMU5 - South Area - 12/15/95

Source: 7 Substation A

Source Hazardous Waste Quantity Value: 4.71

Hazardous Substance	Toxicity Value
Mercury	10000

SOIL EXPOSURE PATHWAY NEARBY POPULATION THREAT WASTE CHARACTERISTICS
NASA LeRC PMU5 - South Area - 12/15/95

Toxicity Factor:	1.00E+04
Sum of Source Hazardous Waste Quantity Values:	3.38E+01
Hazardous Waste Quantity Factor:	10
Waste Characteristics Factor Category:	18

SOIL EXPOSURE PATHWAY NEARBY POPULATION THREAT TARGETS
NASA LeRC PMU5 - South Area - 12/15/95

Nearby Individual

Population within 1/4 mile: 375.0

Nearby Individual Value: 1.0

Population Within 1 Mile

Travel Distance Category	Number of People	Value
> 0 to 1/4 mile	375.0	1.3
> 1/4 to 1/2 mile	775.0	0.7
> 1/2 to 1 mile	4800.0	3.3
	Population Within 1 Mile Factor:	5.0

Documentation for Population > 0 to 1/4 mile Distance Category:

Only resident and school/daycare population counted.
See Section 3.7 of Reference #3.

Reference: 3

OBSERVED RELEASE

No.	Sample ID	Distance (miles)	Level of Contamination

- N/A and/or data not specified

==========

Observed Release Factor: 0

Gas Migration Potential

GAS POTENTIAL TO RELEASE

Source ID	Source Type	Gas Contain. Value (A)	Gas Source Type Value (B)	Gas Migrtn. Potent. Value (C)	Sum (B+C)	Gas Potential to Rel. Value A(B+C)
Landfill Areas	Landfill	7	19	17	36	252
Buildings 203 & 204	Contaminated Soil	7	19	17	36	252
Substation A	Contaminated Soil	3	19	11	30	90

Gas Potential to Release Factor: 252

Documentation for Gas Containment, Source Landfill Areas:

Uncontaminated soil cover < 1 ft, resistant to gas migration as per Section 3 Phase I RI/FS

Reference:

Documentation for Source Type, Source Landfill Areas:

This source includes 3 landfill areas where solid wastes were deposited.

See Sections 4.5.1, 4.5.2, and 4.5.3 of Reference #3.

Reference: 3

Documentation for Secondary Source Type, Landfill Areas:

Fire Training Pit (SFI-05-02) is within South 40 Landfill and hence, is considered secondary source to the landfill areas. The fire training pit is now buried and is practically indistinguishable from the landfill area.
Also, Pesticide Storage Area (UPR-05-10) is indistinguishable from South 40 Landfill because all operations that generated pesticide related wastes have been stopped and no visible or other indications are present. It is thus aggregated with the "Landfill Areas" source.
Similar reasoning is used to aggregate Buried Disposal Pond with this source.
See Section 4.0 of Reference #3.

Reference: 3

Documentation for Gas Containment, Source Salvage Areas I, II:

Contaminated soil beneath concrete/asphalt

Reference: 3

Documentation for Source Type, Source Salvage Areas I, II:

Storage area for construction materials and scrap metals. Type of Waste Pile classified as "Other Waste Piles" instead of "Scrap Metal or Junk Pile" because the area was used for a variety of construction materials and not just for scrap metal/junk.
See Section 4.5.7 of Reference #3.

Reference: 3

Documentation for Gas Containment, Source Coal Storage Area:

fine grained soil; assume less 1 ft uncontaminated soil (no chemical data)

Reference:

Documentation for Source Type, Source Coal Storage Area:

The storage area is classified as a "Waste Pile" and subclassified as "Other Waste Piles." Although the stored coal is not a waste material, the method of storage as a pile is more appropriate in selecting the source type.
See Section 4.5.15 of Reference #3.

Reference: 3

Documentation for Gas Containment, Source Buildings 203 & 204:

fine grained uncontaminated soil cover less 1 ft,

Reference:

Documentation for Source Type, Source Buildings 203 & 204:

See Section 5 of Reference #3.

Reference: 3

Documentation for Source Type, Source Building 202:

See Section 5 of Reference #3.

Reference: 3

Documentation for Source Type, Source Substation A:

Only PCB problem.
See Section 4.5.11 of Reference #3.

Reference: 3

Source: Landfill Areas

Gaseous Hazardous Substance	Hazardous Substance Gas Migration Potential Value
Acenaphthylene	11
Benz(a)anthracene	6
Benzo(a)pyrene	6
Benzo(k)fluoranthene	6
Benzofluoranthene, 3,4-	6
Bis (2-ethylhexyl) phthalate	6
Carbon Tetrachloride	17
Chlordane	6
Chloroform	17
Chrysene	6
DDE	6
DDT	6
Di-n-butyl phthalate	6
Dichloroethane, 1,1-	17
Dieldrin	6
Endrin	6
Ethyl benzene	17
Fluorene	11
Mercury	11
Methylene chloride	17
Pentachlorophenol	6
Phenanthrene	11
Pyrene	6
Toluene	17
Xylene, m-	17

Average of Gas Migration Potential Value for 3 Hazardous Substances: 17.000

Gas Migration Potential Value From Table 6-7: 17

Source: Salvage Areas I, II

Gaseous Hazardous Substance	Hazardous Substance Gas Migration Potential Value
Acetone	17
Benzo(a)pyrene	6
Benzofluoranthene, 3,4-	6
DDE	6
Di-n-butyl phthalate	6
Dichloroethene, 1,1-	17
Endosulfan (I or II)	11
Mercury	11
Methyl Napthalene, 2-	11
Methylene chloride	17
Pyrene	6
Tetrachloroethene	17
Toluene	17
Trichloroethane, 1,1,1-	17

Average of Gas Migration Potential Value for 3 Hazardous Substances: 17.000

Gas Migration Potential Value From Table 6-7: 17

Source: Coal Storage Area

Gaseous Hazardous Substance	Hazardous Substance Gas Migration Potential Value

Average of Gas Migration Potential Value for 3 Hazardous Substances: 0.000

Gas Migration Potential Value From Table 6-7: 0

Source: Buildings 203 & 204

Gaseous Hazardous Substance	Hazardous Substance Gas Migration Potential Value
Acetone	17
Benz(a)anthracene	6
Benzo(a)pyrene	6
Benzo(k)fluoranthene	6
Benzofluoranthene, 3,4-	6
Butylbenzyl phthalate	6
Chrysene	6
Di-n-butyl phthalate	6
Di-n-octyl phthalate	6
Dichlorobenzidine, 3,3-	0
Hexachlorocyclopentadiene	17
Mercury	11
Methylene chloride	17
Pentachlorophenol	6
Phenanthrene	11
Pyrene	6

Average of Gas Migration Potential Value for 3 Hazardous Substances: 17.000

Gas Migration Potential Value From Table 6-7: 17

Source: Recycle Bins

Gaseous Hazardous Substance	Hazardous Substance Gas Migration Potential Value
Mercury	11

Average of Gas Migration Potential Value for 3 Hazardous Substances: 11.000

Gas Migration Potential Value From Table 6-7: 11

Source: Building 202

Gaseous Hazardous Substance	Hazardous Substance Gas Migration Potential Value

Average of Gas Migration Potential Value for 3 Hazardous Substances: 0.000

Gas Migration Potential Value From Table 6-7: 0

Source: Substation A

Gaseous Hazardous Substance	Hazardous Substance Gas Migration Potential Value
Mercury	11

Average of Gas Migration Potential Value for 3 Hazardous Substances: 11.000

Gas Migration Potential Value From Table 6-7: 11

AIR PATHWAY LIKELIHOOD OF RELEASE
NASA LeRC PMU5 - South Area - 12/15/95

Particulate Migration Potential

PARTICULATE POTENTIAL TO RELEASE

Source ID	Source Type	Partic. Contain. Value (A)	Partic. Source Type Value (B)	Partic. Migrtn. Potent. Value (C)	Sum (B+C)	Partic. Potential to Rel. Value A(B+C)
Landfill Areas	Landfill	7	22	6	28	196
Buildings 203 & 204	Contaminated Soil	7	22	6	28	196
Recycle Bins	Contaminated Soil	7	0	6	6	42
Substation A	Contaminated Soil	3	22	6	28	84

Particulate Potential to Release Factor: 196

Documentation for Particulate Containment, Source Landfill Areas:

Uncontaminated soil cover less 1 ft thick, resistant gas migration

Reference:

Documentation for Source Type, Source Landfill Areas:

This source includes 3 landfill areas where solid wastes were deposited.

See Sections 4.5.1, 4.5.2, and 4.5.3 of Reference #3.

Reference: 3

Documentation for Secondary Source Type, Landfill Areas:

Fire Training Pit (SFI-05-02) is within South 40 Landfill and hence, is considered secondary source to the landfill areas. The fire training pit is now buried and is practically indistinguishable from the landfill area.
Also, Pesticide Storage Area (UPR-05-10) is indistinguishable from South 40 Landfill because all operations that generated pesticide related wastes have been stopped and no visible or other indications are present. It is thus aggregated with the "Landfill Areas" source.
Similar reasoning is used to aggregate Buried Disposal Pond with this source.
See Section 4.0 of Reference #3.

Reference: 3

Documentation for Particulate Containment, Source Salvage Areas I, II:

Soil contamination beneath concrete/asphalt

Reference: 3

Documentation for Source Type, Source Salvage Areas I, II:

Storage area for construction materials and scrap metals. Type of Waste Pile classified as "Other Waste Piles" instead of "Scrap Metal or Junk Pile" because the area was used for a variety of construction materials and not just for scrap metal/junk.
See Section 4.5.7 of Reference #3.

Reference: 3

Documentation for Particulate Containment, Source Coal Storage Area:

Uncontaminated fine grained soil less 1 ft thick

Reference:

Documentation for Source Type, Source Coal Storage Area:

The storage area is classified as a "Waste Pile" and subclassified as "Other Waste Piles." Although the stored coal is not a waste material, the method of storage as a pile is more appropriate in selecting the source type.
See Section 4.5.15 of Reference #3.

Reference: 3

Documentation for Particulate Containment, Source Buildings 203 & 204:

fine grained uncontaminated soil less 1 ft thick

Reference:

Documentation for Source Type, Source Buildings 203 & 204:

See Section 5 of Reference #3.

Reference: 3

Documentation for Particulate Containment, Source Recycle Bins:

fine grained uncontaminated soil less 1 ft

Reference:

Documentation for Particulate Containment, Source Building 202:

Fine grained uncontaminated soil less 1 ft thick

Reference:

Documentation for Source Type, Source Building 202:

See Section 5 of Reference #3.

Reference: 3

Documentation for Source Type, Source Substation A:

Only PCB problem.
See Section 4.5.11 of Reference #3.

Reference: 3

Documentation for Particulate Migration Potential:

Figure 6-2 of Reference #1.

Reference: 1

Source: Landfill Areas

Particulate Hazardous Substance
Acenaphthylene
Aluminum
Antimony
Barium
Benz(a)anthracene
Benzo(a)pyrene
Benzo(g,h,i)perylene
Benzo(k)fluoranthene
Benzofluoranthene, 3,4-
Beryllium
Bis (2-ethylhexyl) phthalate
Cadmium
Chlordane
Chromium
Chrysene
Copper
DDE
DDT
Di-n-butyl phthalate
Dieldrin
Endrin
Fluorene
Indeno(1,2,3-CD)pyrene
Iron
Lead
Magnesium
Manganese
Mercury
Nickel
Pentachlorophenol
Phenanthrene
Pyrene
Vanadium
Zinc

Source: Salvage Areas I, II

Particulate Hazardous Substance
Benzo(a)pyrene
Benzofluoranthene, 3,4-
Cadmium
Copper
DDE
Di-n-butyl phthalate
Endosulfan (I or II)
Lead
Mercury
Methyl Napthalene, 2-
Pyrene
Zinc

Source: Coal Storage Area

Particulate Hazardous Substance

Source: Buildings 203 & 204

Particulate Hazardous Substance
Barium
Benz(a)anthracene
Benzo(a)pyrene
Benzo(k)fluoranthene
Benzofluoranthene, 3,4-
Beryllium
Butylbenzyl phthalate
Chrysene
Di-n-butyl phthalate
Di-n-octyl phthalate
Dichlorobenzidine, 3,3-
Hexachlorocyclopentadiene
Magnesium
Manganese
Mercury
Pentachlorophenol
Phenanthrene
Pyrene
Selenium

Source: Recycle Bins

Particulate Hazardous Substance
Mercury

Source: Building 202

Particulate Hazardous Substance

Source: Substation A

Particulate Hazardous Substance

Mercury

Source: 1 Landfill Areas

Source Hazardous Waste Quantity Value: 159.11

Hazardous Substance	Toxicity Value	Gas Mobility Value	Particulate Mobility Value	Toxicity/ Mobility Value
Acenaphthylene	100	2.00E-02	2.00E-04	2.00E+00
Aluminum	100	NA	2.00E-04	2.00E-02
Antimony	10000	NA	2.00E-04	2.00E+00
Barium	10000	NA	2.00E-04	2.00E+00
Benz(a)anthracene	1000	2.00E-04	2.00E-04	2.00E-01
Benzo(a)pyrene	10000	2.00E-04	2.00E-04	2.00E+00
Benzo(g,h,i)perylene	100	NA	2.00E-04	2.00E-02
Benzo(k)fluoranthene	100	2.00E-04	2.00E-04	2.00E-02
Benzofluoranthene, 3,4-	10000	2.00E-03	2.00E-04	2.00E+01
Beryllium	10000	NA	2.00E-04	2.00E+00
Bis (2-ethylhexyl) phthalate	100	2.00E-03	2.00E-04	2.00E-01
Cadmium	10000	NA	2.00E-04	2.00E+00
Carbon Tetrachloride	1000	1.00E+00	NA	1.00E+03
Chlordane	10000	2.00E-03	2.00E-04	2.00E+01
Chloroform	100	1.00E+00	NA	1.00E+02
Chromium	10000	NA	2.00E-04	2.00E+00
Chrysene	100	2.00E-04	2.00E-04	2.00E-02
Copper	100	NA	2.00E-04	2.00E-02
DDE	100	2.00E-03	2.00E-04	2.00E-01
DDT	1000	2.00E-03	2.00E-04	2.00E+00
Di-n-butyl phthalate	10	2.00E-02	2.00E-04	2.00E-01
Dichloroethane, 1,1-	10	1.00E+00	NA	1.00E+01
Dieldrin	10000	2.00E-03	2.00E-04	2.00E+01
Endrin	10000	2.00E-03	2.00E-04	2.00E+01
Ethyl benzene	10	1.00E+00	NA	1.00E+01
Fluorene	100	2.00E-01	2.00E-04	2.00E+01
Indeno(1,2,3-CD)pyrene	100	NA	2.00E-04	2.00E-02
Iron	100	NA	2.00E-04	2.00E-02
Lead	10000	NA	2.00E-04	2.00E+00
Magnesium	100	NA	2.00E-04	2.00E-02
Manganese	10000	NA	2.00E-04	2.00E+00
Mercury	10000	2.00E-01	2.00E-04	2.00E+03
Methylene chloride	10	1.00E+00	NA	1.00E+01
Nickel	100	NA	2.00E-04	2.00E-02
Pentachlorophenol	100	2.00E-02	2.00E-04	2.00E+00
Phenanthrene	100	2.00E-02	2.00E-04	2.00E+00
Pyrene	100	2.00E-03	2.00E-04	2.00E-01
Toluene	10	1.00E+00	NA	1.00E+01
Vanadium	100	NA	2.00E-04	2.00E-02
Xylene, m-	1	1.00E+00	NA	1.00E+00
Zinc	10	NA	2.00E-04	2.00E-03

AIR PATHWAY WASTE CHARACTERISTICS
NASA LeRC PMU5 - South Area - 12/15/95

Source: 3 Coal Storage Area

Source Hazardous Waste Quantity Value: 184.62

Hazardous Substance	Toxicity Value	Gas Mobility Value	Particulate Mobility Value	Toxicity/ Mobility Value

Source: 4 Buildings 203 & 204

Source Hazardous Waste Quantity Value: 7.06

Hazardous Substance	Toxicity Value	Gas Mobility Value	Particulate Mobility Value	Toxicity/ Mobility Value
Acetone	10	1.00E+00	NA	1.00E+01
Barium	10000	NA	2.00E-04	2.00E+00
Benz(a)anthracene	1000	2.00E-04	2.00E-04	2.00E-01
Benzo(a)pyrene	10000	2.00E-04	2.00E-04	2.00E+00
Benzo(k)fluoranthene	100	2.00E-04	2.00E-04	2.00E-02
Benzofluoranthene, 3,4-	10000	2.00E-03	2.00E-04	2.00E+01
Beryllium	10000	NA	2.00E-04	2.00E+00
Butylbenzyl phthalate	10	2.00E-03	2.00E-04	2.00E-02
Chrysene	100	2.00E-04	2.00E-04	2.00E-02
Di-n-butyl phthalate	10	2.00E-02	2.00E-04	2.00E-01
Di-n-octyl phthalate	100	2.00E-03	2.00E-04	2.00E-01
Dichlorobenzidine, 3,3-	100	2.00E-04	2.00E-04	2.00E-02
Hexachlorocyclopentadiene	10000	2.00E-01	2.00E-04	2.00E+03
Magnesium	100	NA	2.00E-04	2.00E-02
Manganese	10000	NA	2.00E-04	2.00E+00
Mercury	10000	2.00E-01	2.00E-04	2.00E+03
Methylene chloride	10	1.00E+00	NA	1.00E+01
Pentachlorophenol	100	2.00E-02	2.00E-04	2.00E+00
Phenanthrene	100	2.00E-02	2.00E-04	2.00E+00
Pyrene	100	2.00E-03	2.00E-04	2.00E-01
Selenium	100	NA	2.00E-04	2.00E-02

AIR PATHWAY WASTE CHARACTERISTICS
NASA LeRC PMU5 - South Area - 12/15/95

Source: 5 Recycle Bins

Source Hazardous Waste Quantity Value: 0.09

Hazardous Substance	Toxicity Value	Gas Mobility Value	Particulate Mobility Value	Toxicity/ Mobility Value
Mercury	10000	NA	2.00E-04	2.00E+00

Source: 6 Building 202

Source Hazardous Waste Quantity Value: 0.00

Hazardous Substance	Toxicity Value	Gas Mobility Value	Particulate Mobility Value	Toxicity/ Mobility Value

AIR PATHWAY WASTE CHARACTERISTICS
NASA LeRC PMU5 - South Area - 12/15/95

Source: 7 Substation A

Source Hazardous Waste Quantity Value: 4.71

Hazardous Substance	Toxicity Value	Gas Mobility Value	Particulate Mobility Value	Toxicity/ Mobility Value
Mercury	10000	2.00E-01	2.00E-04	2.00E+03

Hazardous Substances Found in an Observed Release

Sample ID	Observed Release Hazardous Substance	Particulate Toxicity/ Mobility Value	Gas Toxicity/ Mobility Value

- N/A and/or data not specified

Documentation for Particulate Mobility:

Figure 6-3 of Reference #1.

Reference: 1

AIR PATHWAY WASTE CHARACTERISTICS
NASA LeRC PMU5 - South Area - 12/15/95

Toxicity/Mobility Value from Source Hazardous Substances:	2.00E+03
Toxicity/Mobility Value from Observed Release Hazardous Substances:	0.00E+00
Toxicity/Mobility Factor:	2.00E+03
Sum of Source Hazardous Waste Quantity Values:	3.56E+02
Hazardous Waste Quantity Factor:	100
Waste Characteristics Factor Category:	18

Actual Contamination

No.	Sample ID	Distance (miles)	Level of Contamination

- N/A and/or data not specified

Potential Contamination

Distance Categories Subject to Potential Contamination	Population	Value
Onsite	0.0	0.0000
> 0 to 1/4 mile	5785.0	130.4000
> 1/4 to 1/2 mile	5775.0	28.2000
> 1/2 to 1 mile	19800.0	26.1000
> 1 to 2 miles	58000.0	26.6000
> 2 to 3 miles	164000.0	37.5000
> 3 to 4 miles	188000.0	22.9000
	Potential Contaminantion Factor:	272.0000

Documentation for Population Onsite Distance Category:

There is no resident, student, or worker population at the rifle range site.

Reference:

Documentation for Population > 0 to 1/4 mile Distance Category:

Resident, school/daycare, and bus/indl population included.
See Section 3.7 of Reference #3.

Reference: 3

Documentation for Population > 1 to 2 miles Distance Category:

No estimate available for Bus/Indl population for TDL >1 mi. It is assumed that Bus/Indl population equals resident and school/day care population in the radius ranges.
See Section 3.7 of Reference #3.

Reference: 3

Nearest Individual Factor

Level of Contamination: Potential
Distance in miles: 0 to 1/8

Nearest Individual Value: 20

Documentation for Nearest Individual:

There are buildings in less than half-a mile radius to each Area of Concern. See Figure 4-1 of the RI/FS Report.

Reference: 2

Resources

Resource Use: YES

Resource Value: 5

Documentation for Resources:

Rocky River Reservation.

Reference:

Actual Contamination, Sensitive Environments

Sensitive Environment	Distance (miles)	Sensitive Environment Value
- N/A and/or data not specified		

Actual Contamination, Wetlands

Distance Category	Wetland Acreage	Wetland Acreage Value
- N/A and/or data not specified		

==========
Sensitive Environments Actual Contamination Factor: 0.000
(Sum of Sensitive Environments + Wetlands Values)

Potential Contamination, Sensitive Environments

Sensitive Environment	Distance (miles)	Sensitive Environment Value	Distance Weight	Weighted Value/10
	0.000	0	1.0000	0.000

Potential Contamination, Wetlands

Distance Category	Wetland Acreage	Wetland Acreage Value	Distance Weight	Weighted Value/10
- N/A and/or data not specified				

Sensitive Environment Potential Contamination Factor: 0.000

REFERENCES

NASA LeRC PMU5 - South Area - 12/15/95

1. HRS Guidance Manual: 40CFR300 Appendix A to Part 300 The Hazard Ranking System 1993 and The Hazard Ranking System Guidance Manual - Interim Final, USEPA, Washington DC.

2. SCDM

3. "Phase I Remedial Investigation / Feasibility Study," R&R International, Inc. October 1995

4. "Preliminary Assessment," SAIC, June 1991.

5. HRS Report - Prepared by R&R International Inc. for NASA LeRC, Cleveland, OH. October 1995

TABLE 5-1

SIGNIFICANCE ABOVE BACKGROUND

PMU 5 - SOUTH AREA
SOUTH 40 LANDFILL (LNF-05-01)
NASA LEWIS RESEARCH CENTER
PHASE I RI/FS

Compound	Background Sample SQL	Background Sample Conc	Release Sample Sample#	Release Sample SQL	Release Sample Conc	Signif.?	Attrib. to Site?	Comments
SOIL								
VOCs								
Acetone	0.010	0.004	SS044-001	*	0.008	N	n/a	
Methylene Chloride	0.010	0.005	SS047-001		0.024	Y	Y	suspected disposal of HCs
Toluene	0.010	0.005	SS014-001	*	0.002	N	n/a	
SVOCs								
1,4-Dichlorobenzene	0.330	0.165	SS014-001	*	0.042	N	n/a	
Acenapthene	0.330	0.165	SS048-001	*	0.120	N	n/a	
Acenaphthalene	0.330	0.165	SS047-001	*	0.200	N	n/a	
Anthracene	0.330	0.152	SS048-001	*	0.220	N	n/a	
Benzo(a)pyrene	0.330	0.158	SS047-001		0.770	Y	Y	suspected disposal of HCs
Benzo(a)anthracene	0.330	0.164	SS048-001		0.760	Y	Y	suspected disposal of HCs
Benzo(b)fluoranthene	0.330	0.175	SS047-001		1.300	Y	Y	suspected disposal of HCs
Benzo(g,h,i)Perylene	0.330	0.167	SS047-001	*	0.510	Y	Y	suspected disposal of HCs
Benzo(k)fluoranthene	0.330	0.146	SS048-001		0.440	Y	Y	suspected disposal of HCs
Butylbenzylphthalate	0.330	0.184	SS047-001	*	0.270	N	n/a	
Carbazole	0.330	0.150	SS048-001	*	0.150	N	n/a	
Chrysene	0.330	0.171	SS048-001		0.770	Y	Y	suspected disposal of HCs
Di-n-butylphthalate	0.330	0.137	SS014-001		0.990	Y	Y	suspected disposal of HCs
Dibenzofuran	0.330	0.165	SS048-001	*	0.062	N	n/a	
Fluoranthene	0.330	0.204	SS048-001		1.300	Y	Y	suspected disposal of HCs
Fluorene	0.330	0.157	SS048-001	*	0.150	N	n/a	
Indeno(123-cd)pyrene	0.330	0.160	SS047-001	*	0.500	Y	Y	suspected disposal of HCs

TABLE 5-1

SIGNIFICANCE ABOVE BACKGROUND

PMU 5 - SOUTH AREA
SOUTH 40 LANDFILL (LNF-05-01)
NASA LEWIS RESEARCH CENTER
PHASE I RI/FS

Compound	Background Sample SQL	Background Sample Conc	Release Sample Sample#	Release Sample SQL	Release Sample Conc	Signif.?	Attrib. to Site?	Comments
Phenanthrene	0.330	0.188	SS048-001		1.000	Y	Y	suspected disposal of HCs
Pyrene	0.330	0.188	SS048-001		1.200	Y	Y	suspected disposal of HCs
bis(2-Ethylhexyl)phthalate	0.330	0.123	SS044-001	*	0.100	N	n/a	
Pesticides / PCBs								
4,4'-DDD	0.0033	0.00177	SS045-001	*	0.0022	N	n/a	
4,4'-DDT	0.0033	0.00265	SS048-001	*	0.0098	Y	Y	suspected disposal of wastes
Arochlor-1248			SS046-001	*	0.082	N	n/a	conc. not higher than TSCA level
Arochlor-1254			SS045-001		0.230	N	n/a	conc. not higher than TSCA level
Dieldrin	0.0033	0.00763	SS047-001		0.063	Y	Y	suspected disposal of wastes
Endrin	0.0033	0.00165	SS047-001	*	0.0026	N	n/a	
Endrin Ketone	0.0033	0.00165	SS048-001	*	0.0024	N	n/a	
Methoxychlor	0.017	0.0085	SS046-001	*	0.0024	N	n/a	
alpha-Chlordane	0.0017	0.00493	SS047-001	*	0.0038	N	n/a	
gamma-Chlordane	0.0017	0.00085	SS047-001	*	0.0036	Y	Y	suspected disposal of wastes
Metals								
Aluminum		12820	SS046-001		10700	N	n/a	
Arsenic		12.040	SS048-001	*	11.90	N	n/a	
Barium		78.26	SS046-001		166.0	N	n/a	
Calcium		17475.33	SS014-001		130000	Y	Y	suspected disposal of wastes
Chromium		19.48	SS046-001		22.50	N	n/a	
Cobalt		13.56	SS046-001		11.20	N	n/a	
Copper		23.07	SS046-001	*	139.00	Y	Y	suspected disposal of wastes
Iron		26100	SS044-001		24500	N	n/a	
Lead		17.12	SS048-001	*	111	Y	Y	suspected disposal of wastes

TABLE 5-1

SIGNIFICANCE ABOVE BACKGROUND

PMU 5 - SOUTH AREA
SOUTH 40 LANDFILL (LNF-05-01)
NASA LEWIS RESEARCH CENTER
PHASE I RI/FS

Compound	Background Sample SQL	Background Sample Conc	Release Sample Sample#	Release Sample SQL	Release Sample Conc	Signif.?	Attrib. to Site?	Comments
Magnesium		5576	SS014-001	*	62000	Y	Y	
Manganese		423.53	SS047-001		872.0	N	n/a	
Mercury	0.1	0.05	SS047-001		17.400	Y	Y	suspected disposal of wastes
Nickel		28.87	SS046-001		26.30	N	n/a	
PotaSSium		1621.27	SS046-001		1230	N	n/a	
Selenium	2.00	0.23	SS047-001	*	0.750	N	n/a	
Vanadium		24.14	SS044-001		26.600	N	n/a	
Zinc		75.01	SS046-001		282.00	Y	n/a	suspected disposal of wastes
Radioactivity								
Alpha Particle Radioactivity			SS014-001		21 4			
Beta Particle Radioactivity			SS046-001		29.30			

Notes:
mean of background samples collected from shallow upland was used as background
all concentrations in ppm except for radioactivi tivity which is in pCi/g-flagged release sample da blank SQLs imply that Sample Conc. > Sample SQL

TABLE 5-2
SIGNIFICANCE ABOVE BACKGROUND

PMU 5 - SOUTH AREA
OLD LANDFILL (LNF-05-02)
NASA LEWIS RESEARCH CENTER
PHASE I RI/FS

Compound	Background Sample SQL	Background Sample Conc	Release Sample Sample#	Release Sample SQL	Release Sample Conc	Signif.?	Attrib. to Site?	Comments
SOIL								
VOCs								
Acetone	0.010	0.004	SS050-001		0.016	Y	Y	suspected disposal of wastes
Methylene Chloride	0.010	0.005	SS051-001		0.024	Y	Y	suspected disposal of wastes
SVOCs								
2-Methylnaphthalene			SS051-001	*	0.190	N	n/a	
Acenapthene	0.330	0.165	SS051-001	*	0.079	N	n/a	
Acenaphthalene	0.330	0.165	SS051-001	*	0.094	N	n/a	
Anthracene	0.330	0.152	SS051-001	*	0.270	N	n/a	
Benzo(a)pyrene	0.330	0.158	SS051-001		1.100	Y	Y	suspected disposal of wastes
Benzo(a)anthracene	0.330	0.164	SS051-001		1.400	Y	Y	suspected disposal of wastes
Benzo(b)fluoranthene	0.330	0.175	SS051-001		1.600	Y	Y	suspected disposal of wastes
Benzo(g,h,i)Perylene	0.330	0.167	SS051-001	*	0.450	Y	Y	suspected disposal of wastes
Benzo(k)fluoranthene	0.330	0.146	SS051-001	*	0.690	Y	Y	suspected disposal of wastes
Carbazole	0.330	0.150	SS051-001	*	0.210	N	n/a	
Chrysene	0.330	0.171	SS051-001		1.300	Y	Y	suspected disposal of wastes
Di-n-butylphthalate	0.330	0.137	SS050-001	*	0.390	Y	Y	suspected disposal of wastes
Dibenzofuran	0.330	0.165	SS051-001	*	0.097	N	n/a	
Fluoranthene	0.330	0.204	SS051-001		2.600	Y	Y	suspected disposal of wastes
Indeno(123-cd)pyrene	0.330	0.160	SS051-001	*	0.510	Y	Y	suspected disposal of wastes
Naphthalene	0.330	0.165	SS051-001	*	0.150	N	n/a	
Phenanthrene	0.330	0.188	SS051-001		1.500	Y	Y	suspected disposal of wastes
Pyrene	0.330	0.188	SS051-001		2.100	Y	Y	suspected disposal of wastes
Pesticides / PCBs								
4,4' DDE	0.0033	0 00165	SS051-001	*	0.0042	Y	Y	suspected disposal of wastes

TABLE 5-2
SIGNIFICANCE ABOVE BACKGROUND

PMU 5 - SOUTH AREA
OLD LANDFILL (LNF-05-02)
NASA LEWIS RESEARCH CENTER
PHASE I RI/FS

Compound	Background Sample SQL	Background Sample Conc	Release Sample Sample#	Release Sample SQL		Release Sample Conc	Signif.?	Attrib. to Site?	Comments
4,4' DDT	0.0033	0.00265	SS051-001		*	0.0099	Y	Y	suspected disposal of wastes
Arochlor-1260			SS051-001		*	0.130	N	n/a	Does not exceed TSCA level
Dieldrin	0.0033	0.00763	SS051-001			0.030	Y	Y	suspected disposal of wastes
Endrin	0.0033	0.00165	SS051-001		*	0.0014	N	n/a	
Metals									
Aluminum		12820	SS051-001			11100	N	n/a	
Arsenic		12.040	SS051-001		*	11.30	N	n/a	
Barium		78.26	SS051-001			702.000	Y	Y	suspected disposal of wastes
Beryllium		0.72	SS051-001			1.200	N	n/a	
Cadmium		0.51	SS051-001		#	0.670	N	n/a	
Calcium		17475.33	SS051-001			49900	N	n/a	
Chromium		19.48	SS051-001			13.80	N	n/a	
Cobalt		13.56	SS050-001			11.80	N	n/a	
Copper		23.07	SS051-001			35.50	N	n/a	
Iron		26100	SS050-001			27300	N	n/a	
Lead		17.12	SS051-001		*	51	N	n/a	
Magnesium		5576	SS051-001			13600	N	n/a	
Manganese		423.53	SS051-001			992.0	N	n/a	
Mercury	0.1	0.05	SS051-001			1.800	Y	N	facility-wide; @ 10' depth
Nickel		28.87	SS051-001			26.00	N	n/a	
PotaSSium		1621.27	SS051-001			1310	N	n/a	
Selenium	2.00	0.23	SS051-001		#	0.680	N	n/a	
Sodium		145	SS050-001		#	332.000	N	n/a	
Vanadium		24.14	SS050-001			17.800	N	n/a	
Zinc		75.01	SS051-001			101.0000	N	n/a	

TABLE 5-2
SIGNIFICANCE ABOVE BACKGROUND

PMU 5 - SOUTH AREA
OLD LANDFILL (LNF-05-02)
NASA LEWIS RESEARCH CENTER
PHASE I RI/FS

Compound	Background Sample SQL	Background Sample Conc	Release Sample Sample#	Release Sample SQL	Release Sample Conc	Signif.?	Attrib. to Site?	Comments
Radioactivity								
Alpha Particle Radioactivity			SS051-001		17.4			
Beta Particle Radioactivity			SS051-001		30.70			

Notes:
mean of background samples collected from shallow upland was used as background
all conc's in ppm except for alpha and beta radioactivity units in pCi/g.
nd=0
* J-flagged release sample data
blank SQLs imply that Sample Conc. > Sample SQL

TABLE 5-3
SIGNIFICANCE ABOVE BACKGROUND

PMU 5 - SOUTH AREA
1957 LANDFILL (LNF-05-03)
NASA LEWIS RESEARCH CENTER
PHASE I RI/FS

Compound	Background Sample SQL	Background Sample Conc	Release Sample Sample#	Release Sample SQL	Release Sample Conc	Signif.?	Attrib. to Site?	Comments
SOIL								
VOCs								
None Encountered								
SVOCs								
bis(2-Ethylhexyl)phthalate	0.330	0.123	SS018-001	*	0.051	N	n/a	
Pesticides / PCBs								
Dieldrin	0.0033	0.00763	SS018-001	*	0.011	N	n/a	
Metals								
Aluminum		12820	SS051-001		15600	N	n/a	
Antimony			SS018-001	#	5.00	N	n/a	
Arsenic		12.040	SS018-001	*	13.40	N	n/a	
Barium		78.26	SS018-001		121.000	N	n/a	
Beryllium		0.72	SS018-001	#	0.780	N	n/a	
Calcium		17475.33	SS018-001		17100	N	n/a	
Chromium		19.48	SS018-001		19.70	N	n/a	
Cobalt		13.56	SS018-001		13.10	N	n/a	
Copper		23.07	SS018-001		26.00	N	n/a	
Iron		26100	SS018-001		28200	N	n/a	
Lead		17.12	SS018-001	*	16	N	n/a	
Magnesium		5576	SS018-001		6830	N	n/a	
Manganese		423.53	SS018-001	*	468.0	N	n/a	
Nickel		28.87	SS018-001		30.20	N	n/a	
PotaSSium		1621.27	SS018-001		1950	N	n/a	
Sodium		145	SS018-001	#	149.000	N	n/a	
Thallium	2.00	0.39	SS018-001	#	0.290	N	n/a	

TABLE 5-3
SIGNIFICANCE ABOVE BACKGROUND

PMU 5 - SOUTH AREA
1957 LANDFILL (LNF-05-03)
NASA LEWIS RESEARCH CENTER
PHASE I RI/FS

Compound	Background Sample SQL	Background Sample Conc	Release Sample Sample#	Release Sample SQL	Release Sample Conc	Signif.?	Attrib. to Site?	Comments
Vanadium		24.14	SS018-001		27.000	N	n/a	
Zinc		75.01	SS018-001		72.20	N	n/a	
Radioactivity								
Alpha Particle Radioactivity			SS018-001		11.600			
Beta Particle Radioactivity			SS018-001		24.80			

Notes:
mean of background samples collected from shallow upland was used as background
all conc's. in ppm nd=0 * J-flagged release sample data blank SQLs imply that Sample Conc. > Sample SQL

TABLE 5-4
SIGNIFICANCE ABOVE BACKGROUND

PMU 5 - SOUTH AREA
FIRE TRAINING PIT (SFI-05-02)
NASA LEWIS RESEARCH CENTER
PHASE I RI/FS

Compound	Background Sample SQL	Background Sample Conc	Release Sample Sample#	Release Sample SQL	Release Sample Conc	Signif.?	Attrib. to Site?	Comments
SOIL								
VOCs								
Acetone	0.010	0.004	SS015-001	*	0.007	N	n/a	
2-Butanone	0.010	0.006	SS015-001	*	0.005	N	n/a	
Carbon Tetrachloride	0.010	0.005	SS015-101		0.067	Y	Y	suspected burning of wastes
Tetrachloroethane	0.010	0.005	SS015-001	*	0.008	N	n/a	
Ethylbenzene	0.010	0.005	SS015-001	*	0.007	N	n/a	
Chloroform	0.010	0.005	SS015-001		0.13	Y	Y	suspected burning of wastes
Total Xylenes	0.010	0.005	SS015-001	*	0.014	Y	Y	suspected burning of wastes
Toluene	0.010	0.005	SS015-001		0.005	N	n/a	
SVOCs								
1,4-Dichlorobenzene	0.330	0.165	SS015-001	*	0.039	N	n/a	
Acenaphthalene	0.330	0.165	SS015-001	*	0.084	N	n/a	
Anthracene	0.330	0.152	SS015-001	*	0.100	N	n/a	
Benzo(a)pyrene	0.330	0.158	SS015-001	*	0.300	N	n/a	
Benzo(a)anthracene	0.330	0.164	SS015-001		0.410	Y	Y	suspected burning of wastes
Benzo(b)fluoranthene	0.330	0.175	SS015-001		0.620	Y	Y	suspected burning of wastes
Benzo(g,h,i)Perylene	0.330	0.167	SS015-001	*	0.100	N	n/a	
Benzo(k)fluoranthene	0.330	0.146	SS015-001	*	0.240	N	n/a	
Carbazole	0.330	0.150	SS015-001	*	0.079	N	n/a	
Chrysene	0.330	0.171	SS015-001		0.480	Y	Y	suspected burning of wastes
Di-n-butylphthalate	0.330	0.137	SS015-001	*	0.800	Y	Y	suspected burning of wastes
Fluoranthene	0.330	0.204	SS015-001		0 770	Y	Y	suspected burning of wastes
Hexachloroethane	0.330	0.495	SS015-001	*	0.120	N	n/a	
Indeno(123-cd)pyrene	0.330	0.160	SS015-001	*	0.240	N	n/a	

TABLE 5-4
SIGNIFICANCE ABOVE BACKGROUND

PMU 5 - SOUTH AREA
FIRE TRAINING PIT (SFI-05-02)
NASA LEWIS RESEARCH CENTER
PHASE I RI/FS

Compound	Background Sample SQL	Background Sample Conc	Release Sample Sample#	Release Sample SQL		Release Sample Conc	Signif.?	Attrib. to Site?	Comments
Phenanthrene	0.330	0.188	SS015-001		*	0.380	Y	Y	suspected burning of wastes
bis(2-Ethylhexyl)Phthalate	0.330	0.123	SS015-001		*	0.062	N	n/a	
Pyrene	0.330	0.188	SS015-001			0.620	Y	Y	suspected burning of wastes
Pesticides / PCBs									
Endrin Ketone	0.0033	0.00165	SS015-101		*	0.0074	Y	Y	suspected burning of wastes
Methoxychlor	0.017	0.0085	SS015-001		*	0.0140	N	n/a	
Dieldrin	0.0033	0.00763	SS015-101		*	0.005	N	n/a	
Endrin	0.0033	0.00165	SS015-001		*	0.0008	N	n/a	
Metals									
Aluminum		12820	SS015-001			19700	N	n/a	
Arsenic		12.040	SS015-001			10.50	N	n/a	
Barium		78.26	SS015-101		*	250.000	Y	Y	suspected burning of wastes
Beryllium		0.72	SS015-101			2.900	Y	Y	suspected burning of wastes
Calcium		17475.33	SS015-101			106000	Y	Y	suspected burning of wastes
Chromium		19.48	SS015-101		*	40.70	N	n/a	
Cobalt		13.56	SS015-001		#	9.30	N	n/a	
Copper		23.07	SS015-001			29.20	N	n/a	
Iron		26100	SS015-001			26400	N	n/a	
Lead		17.12	SS015-001		*	26	N	n/a	
Magnesium		5576	SS015-101		*	21500	Y	Y	suspected burning of wastes
Manganese		423.53	SS015-101			2220.0	Y	n/a	
Mercury	0.1	0.05	SS015-101		*	1 400	Y	N	facility-wide, @ 10' depth
Nickel		28.87	SS015-101			23.90	N	n/a	
PotaSSium		1621.27	SS015-001			2080	N	n/a	
Selenium	2.00	0.23	SS015-001		#	0.560	N	n/a	

TABLE 5-4
SIGNIFICANCE ABOVE BACKGROUND

PMU 5 - SOUTH AREA
FIRE TRAINING PIT (SFI-05-02)
NASA LEWIS RESEARCH CENTER
PHASE I RI/FS

Compound	Background Sample SQL	Background Sample Conc	Release Sample Sample#	Release Sample SQL		Release Sample Conc	Signif.?	Attrib. to Site?	Comments
Sodium		145	SS015-101		#	682.000	Y	Y	suspected burning of wastes
Thallium	2.00	0.39	SS015-001		#	0.400	N	n/a	
Vanadium		24.14	SS015-001			30.800	N	n/a	
Zinc		75.01	SS015-101			74.20	N	n/a	
Radioactivity									
Alpha Particle Radioactivity			SS015-001			16.0			
Beta Particle Radioactivity			SS015-001			25.50			

Notes:
mean of background samples collected from shallow upland was used as background
all conc's. in ppm nd=0 * J-flagged release sample data blank SQLs imply that Sample Conc. > Sample SQL

TABLE 5-5
SIGNIFICANCE ABOVE BACKGROUND

PMU 5 - SOUTH AREA
BUILDING 209 RETENTION BASIN (SFI-05-03)
NASA LEWIS RESEARCH CENTER
PHASE I RI/FS

Compound	Background Sample SQL	Background Sample Conc	Release Sample Sample#	Release Sample SQL	Release Sample Conc	Signif.?	Attrib. to Site?	Comments
SOIL								
VOCs								
Methylene Chloride	0.010	0.005	SS010-001	*	0.002	N	n/a	
Chloroform	0.010	0.005	SS010-001	*	0.002	N	n/a	
Toluene	0.010	0.005	SS010-001	*	0.001	N	n/a	
SVOCs								
1,4-Dichlorobenzene	0.330	0.165	SS009-001	*	0 160	N	n/a	
3,3'-Dichlorobenzidine	0.330	0.165	SS010-001	*	0.400	Y	Y	suspected handling/storage of wastes
Anthracene	0.330	0.152	SS009-001	*	0.082	N	n/a	
Benzo(a)pyrene	0.330	0.158	SS009-001	*	0.200	N	n/a	
Benzo(a)anthracene	0.330	0.164	SS009-001	*	0.260	N	n/a	
Benzo(b)fluoranthene	0.330	0.175	SS009-001	*	0.340	Y	Y	suspected handling/storage of wastes
Benzo(g,h,i)Perylene	0.330	0.167	SS009-001	*	0.092	N	n/a	
Benzo(k)fluoranthene	0.330	0.146	SS009-001	*	0.130	N	n/a	
Carbazole	0.330	0.150	SS010-001	*	0.400	Y	Y	suspected handling/storage of wastes
Chrysene	0.330	0.171	SS009-001	*	0.270	N	n/a	
Di-n-butylphthalate	0.330	0.137	SS009-001	*	0.780	Y	Y	suspected handling/storage of wastes
Di-n-Octylphthalate	0.330	0.165	SS010-001	*	0 400	Y	Y	suspected handling/storage of wastes
Fluoranthene	0.330	0.204	SS009-001	*	0.510	Y	Y	suspected handling/storage of wastes
Hexachloroethane	0.330	0.495	SS015-001	*	0.120	N	n/a	
Hexachlorocyclopentadiene	0.330	0.165	SS010-001	*	0.400	Y	Y	suspected handling/storage of wastes
Indeno(123-cd)pyrene	0.330	0.160	SS009-001	*	0.140	N	n/a	
Pentachlorophenol	0.800	0.400	SS010-001	*	0.960	Y	Y	suspected handling/storage of wastes
Phenanthrene	0.330	0.188	SS010-001	*	0.090	N	n/a	
Pyrene	0 330	0.188	SS009-001	*	0 400	Y	Y	suspected handling/storage of wastes

TABLE 5-5
SIGNIFICANCE ABOVE BACKGROUND

PMU 5 - SOUTH AREA
BUILDING 209 RETENTION BASIN (SFI-05-03)
NASA LEWIS RESEARCH CENTER
PHASE I RI/FS

Compound	Background Sample SQL	Background Sample Conc	Release Sample Sample#	Release Sample SQL	Release Sample Conc	Signif.?	Attrib. to Site?	Comments
Pesticides / PCBs								
Arochlor-1248			SS009-001	*	1.0000	N	n/a	conc. not higher than TSCA level
4,4'DDT	0.0033	0.00265	SS009-001	*	0.0017	N	n/a	
Endosulfan II	0.0033	0.00165	SS009-001	*	0.0089	Y	Y	suspected handling/storage of wastes
Dieldrin	0.0033	0.00763	SS009-001	*	0.040	Y	Y	suspected handling/storage of wastes
alpha-Chlordane	0.0017	0.00493	SS009-001	*	0.001	N	n/a	
gamma-Chlordane	0.0017	0.00085	SS009-001	*	0.002	Y	Y	suspected handling/storage of wastes
delta-BHC	0.0017	0.00085	SS009-001	*	0.002	Y	Y	suspected handling/storage of wastes
Endrin	0.0033	0.00165	SS009-001	*	0.0024	N	n/a	
Metals								
Aluminum		12820	SS010-001		18400	N	n/a	
Antimony	12.0	5.28	SS010-001	*	3	N	n/a	
Arsenic		12.040	SS009-001		15.90	N	n/a	
Barium		78.26	SS009-001	*	87.600	N	n/a	
Beryllium		0.72	SS009-001	*	1.100	N	n/a	
Calcium		17475.33	SS009-001		27000	N	n/a	
Chromium		19.48	SS010-001	*	21.20	N	n/a	
Cobalt		13.56	SS010-001		12.90	N	n/a	
Copper		23.07	SS009-001		29.90	N	n/a	
Iron		26100	SS010-001		31100	N	n/a	
Lead		17.12	SS009-001		27	N	n/a	
Magnesium		5576	SS009-001	*	8310	N	n/a	
Manganese		423.53	SS009-001		789.0	N	n/a	
Mercury	0.1	0.05	SS009-001	*	0.330	Y	N	facility-wide; @ 10' depth
Nickel		28.87	SS010-001		32.10	N	n/a	

TABLE 5-5
SIGNIFICANCE ABOVE BACKGROUND

PMU 5 - SOUTH AREA
BUILDING 209 RETENTION BASIN (SFI-05-03)
NASA LEWIS RESEARCH CENTER
PHASE I RI/FS

Compound	Background Sample SQL	Background Sample Conc	Release Sample Sample#	Release Sample SQL		Release Sample Conc	Signif.?	Attrib. to Site?	Comments
PotaSSium		1621.27	SS009-001			2220	N	n/a	
Selenium	2.00	0.23	SS009-001		#	0.860	N	n/a	
Sodium		145	SS010-001		#	765.000	Y	Y	suspected handling/storage of wastes
Thallium	2.00	0.39	SS009-001		#	0.520	N	n/a	
Vanadium		24.14	SS009-001			29.700	N	n/a	
Zinc		75.01	SS009-001			118.00	N	n/a	
Radioactivity									
Alpha Particle Radioactivity			SS009-001			17.0			
Beta Particle Radioactivity			SS009-001			28.80			

Notes:
mean of background samples collected from shallow upland was used as background
all conc's. in ppm nd=0 * J-flagged release sample data blank SQLs imply that Sample Conc. > Sample SQL

TABLE 5-6
SIGNIFICANCE ABOVE BACKGROUND

PMU 5 - SOUTH AREA
BURIED DISPOSAL POND (SFI-05-04)
NASA LEWIS RESEARCH CENTER
PHASE I RI/FS

Compound	Background Sample SQL	Background Sample Conc	Release Sample Sample#	Release Sample SQL	Release Sample Conc	Signif.?	Attrib. to Site?	Comments
SOIL								
VOCs								
Not detected								
SVOCs								
1,4-Dichlorobenzene	0.330	0.165	SS011-001	*	0.110	N	n/a	
Acenaphthene	0.330	0.165	SS011-001	*	0.053	N	n/a	
Anthracene	0.330	0.152	SS011-001	*	0.150	N	n/a	
Benzo(a)pyrene	0.330	0.158	SS011-001		0.490	Y	Y	suspected disposal of wastes
Benzo(a)anthracene	0.330	0.164	SS011-001		0.570	Y	Y	
Benzo(b)fluoranthene	0.330	0.175	SS011-001		0.850	Y	Y	suspected disposal of wastes
Benzo(g,h,i)Perylene	0.330	0.167	SS011-001	*	0.220	N	n/a	
Benzo(k)fluoranthene	0.330	0.146	SS011-001	*	0.340	Y	Y	suspected disposal of wastes
Carbazole	0.330	0.150	SS011-001	*	0.120	N	n/a	
Chrysene	0.330	0.171	SS011-001		0.660	Y	Y	suspected disposal of wastes
Di-n-butylphthalate	0.330	0.137	SS011-001	*	0.780	Y	Y	suspected disposal of wastes
Fluoranthene	0.330	0.204	SS011-001		1.300	Y	Y	suspected disposal of wastes
Fluorene	0.330	0.157	SS011-001	*	0.060	N	n/a	
Indeno(123-cd)pyrene	0.330	0.160	SS011-001	*	0.340	Y	Y	suspected disposal of wastes
Pentachlorophenol	0.800	0.400	SS010-001	*	0.960	Y	Y	suspected disposal of wastes
Phenanthrene	0.330	0.188	SS011-001		0.730	Y	Y	suspected disposal of wastes
bis(2-Ethylhexyl)Phthalate	0.330	0.123	SS011-001	*	0.042	N	n/a	
Pyrene	0.330	0.188	SS011-001		1.000	Y	Y	suspected disposal of wastes
Pesticides / PCBs								
Arochlor-1248			SS011-001	*	0.2000	N	n/a	
Dieldrin	0.0033	0.00763	SS011-001		0.015	N	n/a	

TABLE 5-6
SIGNIFICANCE ABOVE BACKGROUND

PMU 5 - SOUTH AREA
BURIED DISPOSAL POND (SFI-05-04)
NASA LEWIS RESEARCH CENTER
PHASE I RI/FS

Compound	Background Sample SQL	Background Sample Conc	Release Sample Sample#	Release Sample SQL	Release Sample Conc	Signif.?	Attrib. to Site?	Comments
Heptachlor	0.0017	0.00085	SS011-001	*	0.001	N	n/a	
Methoxychlor	0.017	0.0085	SS011-001	*	0.006	N	n/a	
Endrin	0.0033	0.00165	SS011-001	*	0.0007	N	n/a	
Metals								
Aluminum		12820	SS011-001	*	11800	N	n/a	
Antimony	12	5.28	SS011-001	#	3	N	n/a	
Arsenic		12.040	SS011-001	*	15.70	N	n/a	
Barium		78.26	SS011-001		77.200	N	n/a	
Beryllium		0.72	SS011-001	#	0.760	N	n/a	
Calcium		17475.33	SS011-001	*	25000	N	n/a	
Chromium		19.48	SS011-001	*	22.60	N	n/a	
Cobalt		13.56	SS011-001	#	11.20	N	n/a	
Copper		23.07	SS011-001	*	32.50	N	n/a	
Iron		26100	SS011-001		24300	N	n/a	
Lead		17.12	SS011-001	*	23	N	n/a	
Magnesium		5576	SS011-001	*	85	N	n/a	
Manganese		423.53	SS011-001		641.0	N	n/a	
Nickel		28.87	SS010-001	*	26.60	N	n/a	
PotaSSium		1621.27	SS011-001		1710	N	n/a	
Selenium	2.00	0.23	SS011-001	#	0.550	N	n/a	
Sodium		145	SS011-001	#	304.000	N	n/a	
Thallium	2.00	0.39	SS011-001	#	0.570	N	n/a	
Vanadium		24.14	SS011-001		21.900	N	n/a	
Zinc		75.01	SS011-001	*	98.20	N	n/a	
Radioactivity								

TABLE 5-6
SIGNIFICANCE ABOVE BACKGROUND

PMU 5 - SOUTH AREA
BURIED DISPOSAL POND (SFI-05-04)
NASA LEWIS RESEARCH CENTER
PHASE I RI/FS

Compound	Background Sample SQL	Background Sample Conc	Release Sample Sample#	Release Sample SQL	Release Sample Conc	Signif.?	Attrib. to Site?	Comments
Alpha Particle Radioactivity			SS011-001		15.2			
Beta Particle Radioactivity			SS011-001		25.70			

Notes:
mean of background samples collected from shallow upland was used as background
all conc's. in ppm nd=0 * J-flagged release sample data blank SQLs imply that Sample Conc. > Sample SQL

TABLE 5-7
SIGNIFICANCE ABOVE BACKGROUND

PMU 5 - SOUTH AREA
SALVAGE AREA II (UPR-05-08)
NASA LEWIS RESEARCH CENTER
PHASE I RI/FS

Compound	Background Sample SQL	Background Sample Conc	Release Sample Sample#	Release Sample SQL	Release Sample Conc	Signif.?	Attrib. to Site?	Comments
SOIL								
VOCs								
1,1-Dichloroethane	0.010	0.005	SS053-001	*	0.071	Y	Y	suspected storage of chemicals
1,1,1-Trichloroethane	0.010	0.005	SS053-001	*	0.030	Y	Y	suspected storage of chemicals
Acetone	0.010	0.004	SS053-001	*	0.013	Y	Y	suspected storage of chemicals
Benzene	0.010	0.005	SS053-001	*	0.009	N	n/a	
Ethylbenzene	0.010	0.005	SS053-001	*	0.001	N	n/a	
Methylene Chloride	0.010	0.005	SS053-001	*	0.014	Y	Y	suspected storage of chemicals
Tetrachloroethane	0.010	0.005	SS053-001	*	0.036	Y	Y	suspected storage of chemicals
Toluene	0.010	0.005	SS053-001	*	0.067	Y	Y	suspected storage of chemicals
Total Xylenes	0.010	0.005	SS053-001	*	0.007	N	n/a	
Trichloroethane	0.010	0.005	SS053-001	*	0.950	Y	Y	suspected storage of chemicals
SVOCs								
2-Methylnaphthalene	0 330	0.165	SS053-001		0.520	Y	Y	suspected storage of chemicals
Di-n-butylphthalate	0.330	0.137	SS053-001	*	0.340	Y	Y	suspected storage of chemicals
Fluorene	0.330	0.157	SS053-001	*	0.099	N	n/a	
Naphthalene	0.330	0.165	SS053-001	*	0.096	N	n/a	
Phenanthrene	0.330	0.188	SS053-001		0.110	N	n/a	
bis(2-Ethylhexyl)Phthalate	0.330	0.165	SS053-001	*	0.062	N	n/a	
Pesticides / PCBs								
Arochlor-1254			SS053-001	*	0.0600	N	n/a	does not exceed TSCA level
Endosulfan II	0.0033	0.00165	SS053-001	*	0.003	Y	Y	suspected storage of chemicals
delta-BHC	0.0017	0.00085	SS053-001	*	0.001	N	n/a	
Endrin	0.0033	0.00165	SS053-001	*	0.0006	N	n/a	
Metals								

TABLE 5-7
SIGNIFICANCE ABOVE BACKGROUND

PMU 5 - SOUTH AREA
SALVAGE AREA II (UPR-05-08)
NASA LEWIS RESEARCH CENTER
PHASE I RI/FS

Compound	Background Sample SQL	Background Sample Conc	Release Sample Sample#	Release Sample SQL	Release Sample Conc	Signif.?	Attrib. to Site?	Comments
Aluminum		12820	SS053-001		10500	N	n/a	
Arsenic		12.040	SS053-001	*	13.60	N	n/a	
Barium		78.26	SS053-001		65.500	N	n/a	
Beryllium		0.72	SS053-001	#	0.930	N	n/a	
Calcium		17475.33	SS053-001		3050	N	n/a	
Chromium		19.48	SS053-001		13.60	N	n/a	
Cobalt		13.56	SS053-001		14.50	N	n/a	
Copper		23.07	SS053-001		32.50	N	n/a	
Iron		26100	SS053-001		48300	N	n/a	
Lead		17.12	SS053-001	*	13	N	n/a	
Magnesium		5576	SS053-001		3050	N	n/a	
Manganese		423.53	SS053-001		735.0	N	n/a	
Nickel		28.87	SS053-001		31.00	N	n/a	
PotaSSium		1621.27	SS053-001	#	938	N	n/a	
Sodium		145	SS053-001	#	838.000	Y	Y	suspected storage of chemicals
Vanadium		24.14	SS053-001		21.100	N	n/a	
Zinc		75.01	SS053-001	*	81.60	N	n/a	
Radioactivity								
Alpha Particle Radioactivity			SS053-001		27			
Beta Particle Radioactivity			SS053-001		30.10			

Notes:
mean of background samples collected from shallow upland was used as background
all conc's. in ppm nd=0 * J-flagged release sample data blank SQLs imply that Sample Conc. > Sample SQL

TABLE 5-8
SIGNIFICANCE ABOVE BACKGROUND

PMU 5 - SOUTH AREA
BUILDINGS 203 & 204 (UPR-05-09)
NASA LEWIS RESEARCH CENTER
PHASE I RI/FS

Compound	Background Sample SQL	Background Sample Conc	Release Sample Sample#	Release Sample SQL	Release Sample Conc	Signif.?	Attrib. to Site?	Comments
SOIL								
VOCs								
1,2-Dichloroethane	0.010	0.005	SS017-101	*	0.003	N	n/a	
2-Butanone	0.010	0.005	SS017-101	*	0.005	N	n/a	
Acetone	0.010	0.004	SS017-201	*	0.017	Y	Y	suspected burial of debris/wastes
Methylene Chloride	0.010	0.005	SS052-001	*	0 024	Y	Y	suspected burial of debris/wastes
SVOCs								
2-Methylnaphthalene	0 330	0.165	SS019-001	*	0.052	N	n/a	
1,4'-Dichlorobenzene	0.330	0.165	SS017-001	*	0.084	N	n/a	
3,3'-Dichlorobenzidine	0.330	0 165	SS017-001	*	0.390	Y	Y	suspected burial of debris/wastes
Acenaphthene	0.330	0.165	SS019-001	*	0.081	N	n/a	
Acenaphthylene	0.330	0.495	SS019-001	*	0.052	N	n/a	
Anthracene	0.330	0.152	SS019-001	*	0.220	N	n/a	
Benzo(a)Pyrene	0.330	0.158	SS019-001		0.440	Y	Y	suspected burial of debris/wastes
Benzo(a)anthracene	0.330	0.164	SS052-001		0.620	Y	Y	suspected burial of debris/wastes
Benzo(b)fluoranthene	0.330	0.175	SS019-001		0.680	Y	Y	suspected burial of debris/wastes
Benzo(g,h,i)Perylene	0.330	0.167	SS019-001	*	0.260	N	n/a	
Butyl Benzyl Phthalate	0.330	0.184	SS052-001	*	0.360	Y	Y	suspected burial of debris/wastes
Benzo(k)fluoranthene	0.330	0.146	SS052-001	*	0.340	Y	Y	suspected burial of debris/wastes
Carbazole	0.330	0.15	SS017-001	*	0.390	Y	Y	suspected burial of debris/wastes
Chrysene	0.330	0.171	SS052-001		0.640	Y	Y	suspected burial of debris/wastes
Di-n-Butyl Phthalate	0.330	0.137	SS017-001	*	0.900	Y	Y	suspected burial of debris/wastes
Di-n-Octyl Phthalate	0.330	0.165	SS017-001	*	0.390	Y	Y	suspected burial of debris/wastes
Dibenzofuran	0.330	0.165	SS019-001	*	0.070	N	n/a	
Fluoranthene	0 330	0.204	SS052-001		1.300	Y	Y	suspected burial of debris/wastes

TABLE 5-8
SIGNIFICANCE ABOVE BACKGROUND

PMU 5 - SOUTH AREA
BUILDINGS 203 & 204 (UPR-05-09)
NASA LEWIS RESEARCH CENTER
PHASE I RI/FS

Compound	Background Sample SQL	Background Sample Conc	Release Sample Sample#	Release Sample SQL	Release Sample Conc	Signif.?	Attrib. to Site?	Comments
Fluorene	0.330	0.157	SS019-001	*	0.019	N	n/a	
Hexachlorocyclopentadiene	0.330	0.165	SS017-001	*	0.390	Y	Y	suspected burial of debris/wastes
Ideno(1,2,3-cd)pyrene	0 330	0.16	SS019-001	*	0.280	N	n/a	
Naphthalene	0.330	0.165	SS019-001	*	0.047	N	n/a	
Pentachlorophenol	0.800	0.4	SS017-001	*	0.940	Y	Y	suspected burial of debris/wastes
Phenanthrene	0.330	0.188	SS019-001		0.920	Y	Y	suspected burial of debris/wastes
Pyrene	0.330	0.188	SS052-001		1.200	Y	Y	suspected burial of debris/wastes
bis(2-Ethylhexyl)Phthalate	0.330	0.123	SS052-001	*	0.094	N	n/a	
Pesticides / PCBs								
Arochlor-1260			SS052-001	*	0.077	N	n/a	does not exceed TSCA level
4,4'-DDT	0.003	0.00265	SS019-001	*	0.003	N	n/a	
Dieldrin	0.003	0.00763	SS017-001	*	0.003	N	n/a	
Endrin Ketone	0.003	0.00165	SS052-001	*	0.003	N	n/a	
Endrin	0.003	0.00165	SS052-001	*	0.001	N	n/a	
Metals								
Aluminum		12820	SS052-001		23300.000	N	n/a	
Antimony	12.000	5.28	SS017-101	*	3.700	N	n/a	
Arsenic		12.04	SS017-101	*	11.600	N	n/a	
Barium		78.26	SS052-001		304.000	Y	n/a	
Beryllium		0.72	SS052-001		2.800	Y	n/a	
Calcium		17475.33	SS052-001		102000.000	Y	Y	suspected burial of debris/wastes
Chromium		19.48	SS019-001		18.100	N	n/a	
Cobalt		13.56	SS017-101	#	11.300	N	n/a	
Copper*		23.07	SS052-001		35.000	N	n/a	
Iron		26100	SS017-101		24300.000	N	n/a	

TABLE 5-8
SIGNIFICANCE ABOVE BACKGROUND

PMU 5 - SOUTH AREA
BUILDINGS 203 & 204 (UPR-05-09)
NASA LEWIS RESEARCH CENTER
PHASE I RI/FS

Compound	Background Sample SQL	Background Sample Conc	Release Sample Sample#	Release Sample SQL	Release Sample Conc	Signif.?	Attrib. to Site?	Comments
Lead*		17.12	SS019-001		20.200	N	n/a	
Magnesium		5576	SS052-001		17900.000	Y	Y	suspected burial of debris/wastes
Manganese		423.53	SS052-001		2430.000	Y	y	suspected burial of debris/wastes
Mercury	0.100	0.05	SS017-001		0.400	Y	Y	suspected burial of debris/wastes
Nickel		28.87	SS017-101		26.800	N	n/a	
PotaSSium		1621.27	SS017-101	*	2080.000	N	n/a	
Selenium	0.100	0.23	SS052-001		1.300	Y	Y	suspected burial of debris/wastes
Sodium		145	SS052-001	#	661.000	Y	Y	suspected burial of debris/wastes
Thallium	2.000	0.39	SS019-001	#	0.330	N	n/a	
Vanadium		24 14	SS017-001		22.400	N	n/a	
Zinc		75.01	SS017-001	*	75.700	N	n/a	
Radioactivity								
Alpha Particle Radioactivity			SS052-001		21 500	N	n/a	
Beta Particle Radioactivity			SS052-001		36.10	N	n/a	

Notes:
mean of background samples collected from shallow upland was used as background
all conc's. in ppm nd=0 * J-flagged release sample data blank SQLs imply that Sample Conc. > Sample SQL

TABLE 5-9
SIGNIFICANCE ABOVE BACKGROUND

PMU 5 - SOUTH AREA
SALT STORAGE AREA (UPR-05-11)
NASA LEWIS RESEARCH CENTER
PHASE I RI/FS

Compound	Background Sample SQL	Background Sample Conc	Release Sample Sample#	Release Sample SQL	Release Sample Conc	Signif.?	Attrib. to Site?	Comments
SOIL								
VOCs								
Methylene Chloride	0.010	0.005	SS013-001	*	0.003	N	n/a	
SVOCs								
1,4-Dichlorobenzene	0.330	0.165	SS013-001	*	0.110	N	n/a	
Acenapthene	0.330	0.165	SS013-001	*	0.059	N	n/a	
Anthracene	0.330	0.152	SS013-001	*	0.057	N	n/a	
Benzo(a)pyrene	0.330	0.158	SS013-001	*	0.370	Y	Y	suspected handling of wastes
Benzo(a)anthracene	0.330	0.164	SS013-001	*	0.260	N	n/a	
Benzo(b)fluoranthene	0.330	0.175	SS013-001		0.580	Y	Y	suspected handling of wastes
Benzo(g,h,i)Perylene	0.330	0.167	SS013-001	*	0.160	N	n/a	
Benzo(k)fluoranthene	0.330	0.146	SS013-001	*	0.230	N	n/a	
Chrysene	0.330	0.171	SS013-001	*	0.350	Y	Y	suspected handling of wastes
Di-n-butylphthalate	0.330	0.137	SS013-001	*	0.280	N	n/a	
Fluoranthene	0.330	0.204	SS013-001		0.600	Y	Y	suspected handling of wastes
Indeno(123-cd)pyrene	0.330	0.160	SS013-001	*	0.160	N	n/a	
Phenanthrene	0.330	0.188	SS013-001	*	0.240	N	n/a	
Pyrene	0.330	0.188	SS013-001		0.530	Y	Y	suspected handling of wastes
Pesticides / PCBs								
4,4' DDE	0.0033	0.00165	SS013-001	*	0.0016	N	n/a	
Aldrin	0.0033	0.00265	SS013-001	*	0.0039	Y	Y	suspected handling of wastes
Arochlor-1248			SS013-001	*	0.042	N	n/a	does not exceed TSCA level
Dieldrin	0.0033	0.00763	SS013-001		0.085	Y	Y	suspected handling of wastes
Metals								
Aluminum		12820	SS013-001	*	13200	N	n/a	

TABLE 5-9
SIGNIFICANCE ABOVE BACKGROUND

PMU 5 - SOUTH AREA
SALT STORAGE AREA (UPR-05-11)
NASA LEWIS RESEARCH CENTER
PHASE I RI/FS

Compound	Background Sample SQL	Background Sample Conc	Release Sample Sample#	Release Sample SQL	Release Sample Conc	Signif.?	Attrib. to Site?	Comments
Arsenic		12.040	SS013-001	*	13.10	N	n/a	
Barium		78.26	SS013-001	*	209.000	N	n/a	
Beryllium		0.72	SS013-001		1.400	N	n/a	
Calcium		17475.33	SS013-001	*	51200	N	N	
Chromium		19.48	SS013-001		14.30	N	n/a	
Cobalt		13.56	SS013-001	#	9.50	N	n/a	
Copper		23.07	SS013-001		21.60	N	n/a	
Iron		26100	SS013-001	*	18600	N	n/a	
Lead		17.12	SS013-001	*	18	N	n/a	
Magnesium		5576	SS013-001		12800	N	n/a	
Manganese		423.53	SS013-001		1430.0	Y	Y	suspected handling of wastes
Mercury	0.1	0.05	SS013-001		0.130	Y	N	facility-wide; @ 10' depth
Nickel		28.87	SS013-001		20.80	N	n/a	
PotaSSium		1621.27	SS013-001		1590	N	n/a	
Selenium	2.00	0.23	SS013-001	#	0.590	N	n/a	
Sodium		145	SS013-001	#	307.000	N	n/a	
Thallium	2.00	0.39	SS013-001	#	0.500	N	n/a	
Vanadium		24.14	SS013-001		17.000	N	n/a	
Zinc		75.01	SS013-001	*	73.7000	N	n/a	
Radioactivity								
Alpha Particle Radioactivity			SS013-001		17			
Beta Particle Radioactivity			SS013-001		27.40			

Notes:
mean of background samples collected from shallow upland was used as background

TABLE 5-9
SIGNIFICANCE ABOVE BACKGROUND

PMU 5 - SOUTH AREA
SALT STORAGE AREA (UPR-05-11)
NASA LEWIS RESEARCH CENTER
PHASE I RI/FS

Compound	Background Sample SQL	Background Sample Conc	Release Sample Sample#	Release Sample SQL	Release Sample Conc	Signif.?	Attrib. to Site?	Comments
all conc's. in ppm	nd=0	* J-flagged release sample data				blank SQLs imply that Sample Conc. > Sample SQL		

TABLE 5-10
SIGNIFICANCE ABOVE BACKGROUND

PMU 5 - SOUTH AREA
SUBSTATION A (UPR-05-12)
NASA LEWIS RESEARCH CENTER
PHASE I RI/FS

Compound	Background Sample SQL	Background Sample Conc	Release Sample Sample#	Release Sample SQL	Release Sample Conc	Signif.?	Attrib. to Site?	Comments
SOIL								
VOCs								
None detected						N	n/a	
SVOCs								
1,4-Dichlorobenzene	0.330	0.165	SS008-001	*	0.058	N	n/a	
Di-n-Butyl Phthalate	0.330	0.165	SS008-001	*	0.220	N	n/a	
Pesticides / PCBs								
beta-BHC	0.0017	0.00085	SS008-001	*	0.0007	N	n/a	
Metals								
Aluminum		12820	SS008-001		15500	N	n/a	
Arsenic		12.040	SS008-001		11.40	N	n/a	
Barium		78.26	SS008-001	*	90.800	N	n/a	
Beryllium		0.72	SS008-001	#	0.780	N	n/a	
Calcium		17475.33	SS008-001		2570	N	n/a	
Chromium		19.48	SS008-001	*	17.70	N	n/a	
Cobalt		13.56	SS008-001		12.50	N	n/a	
Copper		23.07	SS008-001		28.00	N	n/a	
Iron		26100	SS008-001		26000	N	n/a	
Lead		17.12	SS008-001		16.3	N	n/a	
Magnesium		5576	SS008-001	*	3490	N	n/a	
Manganese		423.53	SS008-001		316.0	N	n/a	
Mercury	0.1	0.05	SS008-001		1.800	Y	N	facility-wide, @ 10' depth
Nickel		28.87	SS008-001		27.30	N	n/a	
PotaSSium		1621.27	SS008-001	#	1120	N	n/a	
Sodium		145	SS008-001	#	71	N	n/a	

TABLE 5-10
SIGNIFICANCE ABOVE BACKGROUND

PMU 5 - SOUTH AREA
SUBSTATION A (UPR-05-12)
NASA LEWIS RESEARCH CENTER
PHASE I RI/FS

Compound	Background Sample SQL	Background Sample Conc	Release Sample Sample#	Release Sample SQL	Release Sample Conc	Signif.?	Attrib. to Site?	Comments
Thallium	2	0.39	SS008-001	#	0	N	n/a	
Vanadium		24.14	SS008-001		28.200	N	n/a	
Zinc		75.01	SS008-001		65.9000	N	n/a	
Radioactivity								
Alpha Particle Radioactivity			SS008-001		14.2			
Beta Particle Radioactivity			SS008-001		24.30			

Notes:
mean of background samples collected from shallow upland was used as background
all conc's. in ppm nd=0 * J-flagged release sample data blank SQLs imply that Sample Conc. > Sample SQL

TABLE 5-11
SIGNIFICANCE ABOVE BACKGROUND

PMU 5 - SOUTH AREA
SALVAGE AREA I (UPR-05-13)
NASA LEWIS RESEARCH CENTER
PHASE I RI/FS

Compound	Background Sample SQL	Background Sample Conc	Release Sample Sample#	Release Sample SQL	Release Sample Conc	Signif.?	Attrib. to Site?	Comments
SOIL								
VOCs								
Acetone	0.010	0.004	SS054-001		0.011	Y	Y	suspected disposal of wastes
Methylene Chloride	0.010	0.005	SS049-001		0.024	Y	Y	suspected disposal of wastes
SVOCs								
2-Methylnaphthalene	0.330	0.165	SS007-001	*	0.084	N	n/a	
1,4-Dichlorobenzene	0.330	0.165	SS049-001	*	0.048	N	n/a	
Anthracene	0.330	0.152	SS007-001	*	0.046	N	n/a	
Benzo(a)pyrene	0.330	0.158	SS049-001		0.470	Y	Y	suspected disposal of wastes
Benzo(a)anthracene	0.330	0.164	SS049-001	*	0.270	N	n/a	
Benzo(b)fluoranthene	0.330	0.175	SS049-001		0.600	Y	Y	suspected disposal of wastes
Benzo(g,h,i)Perylene	0.330	0.167	SS049-001	*	0.240	N	n/a	
Benzo(k)fluoranthene	0.330	0.146	SS049-001		0.260	N	n/a	
Butyl Benzyl Phthalate	0.330	0.150	SS007-001	*	0.290	N	n/a	
Chrysene	0.330	0.171	SS007-001	*	0 290	N	n/a	
Di-n-Butyl Phthalate	0.330	0.137	SS007-001	*	0.350	Y	Y	suspected disposal of wastes
Fluoranthene	0.330	0.204	SS049-001		0 500	Y	Y	suspected disposal of wastes
Indeno(123-cd)pyrene	0.330	0.160	SS049-001	*	0.290	N	n/a	
Naphthalene	0.330	0.165	SS007-001	*	0.056	N	n/a	
bis(2-Ethylhexyl)Phthalate	0.330	0.123	SS007-001	*	0.074	N	n/a	
Phenanthrene	0.330	0.188	SS007-001	*	0.230	N	n/a	
Pyrene	0.330	0.188	SS007-001		0.410	Y	Y	suspected disposal of wastes
Pesticides / PCBs								
4,4' DDE	0.0033	0.00165	SS007-001	*	0.0034	Y	Y	suspected disposal of wastes
4,4' DDT	0.0033	0.00265	SS049-001	*	0.0011	N	n/a	

TABLE 5-11
SIGNIFICANCE ABOVE BACKGROUND

PMU 5 - SOUTH AREA
SALVAGE AREA I (UPR-05-13)
NASA LEWIS RESEARCH CENTER
PHASE I RI/FS

Compound	Background Sample SQL	Background Sample Conc	Release Sample Sample#	Release Sample SQL		Release Sample Conc	Signif.?	Attrib. to Site?	Comments
Arochlor-1254			SS049-001			0.200	N	n/a	does not exceed TSCA level
Methoxychlor	0.017	0.0085	SS007-001			0.0024	N	n/a	
Endosulfan II	0.0033	0.00165	SS049-001			0.011	Y	Y	suspected disposal of wastes
Endrin	0.0033	0.00165	SS049-001		*	0.0018	N	n/a	
Metals									
Aluminum		12820	SS054-001			16100	N	n/a	
Antimony	12	5.28	SS007-001		#	3.4	N	n/a	
Arsenic		12.040	SS049-001		*	13.90	N	n/a	
Barium		78.26	SS007-001		*	133.000	N	n/a	
Beryllium		0.72	SS049-001		#	1.100	N	n/a	
Cadmium		0.51	SS049-001			2.400	Y	Y	suspected disposal of wastes
Calcium		17475.33	SS049-001			46300	N	n/a	
Chromium		19.48	SS049-001			21.80	N	n/a	
Cobalt		13.56	SS049-001			13.70	N	n/a	
Copper		23.07	SS049-001			1670.00	Y	Y	suspected disposal of wastes
Iron		26100	SS054-001			30200	N	n/a	
Lead		17.12	SS049-001		*	180	Y	Y	suspected disposal of wastes
Magnesium		5576	SS049-001			8410	N	n/a	
Manganese		423.53	SS049-001			871.0	N	n/a	
Mercury	0.1	0.05	SS049-001			3.300	Y	N	facility-wide; @ 10' depth
Nickel		28.87	SS049-001			33.70	N	n/a	
PotaSSium		1621.27	SS049-001		#	1130	N	n/a	
Selenium	2.00	0.23	SS049-001		#	0.710	N	n/a	
Sodium		145	SS049-001		#	350.000	N	n/a	
Thallium	2.00	0.39	SS049-001		#	0.450	N	n/a	

TABLE 5-11
SIGNIFICANCE ABOVE BACKGROUND

PMU 5 - SOUTH AREA
SALVAGE AREA I (UPR-05-13)
NASA LEWIS RESEARCH CENTER
PHASE I RI/FS

Compound	Background Sample SQL	Background Sample Conc	Release Sample Sample#	Release Sample SQL	Release Sample Conc	Signif.?	Attrib. to Site?	Comments
Vanadium		24.14	SS054-001		26.000	N	n/a	
Zinc		75.01	SS049-001		339.0000	Y	Y	suspected disposal of wastes
Radioactivity								
Alpha Particle Radioactivity			SS049-001		16.4			
Beta Particle Radioactivity			SS049-001		30.20			

Notes:
mean of background samples collected from shallow upland was used as background
all conc's. in ppm nd=0 * J-flagged release sample data blank SQLs imply that Sample Conc. > Sample SQL

TABLE 5-12
SIGNIFICANCE ABOVE BACKGROUND

PMU 5 - SOUTH AREA
BUILDING 208 (UPR-05-17)
NASA LEWIS RESEARCH CENTER
PHASE I RI/FS

Compound	Background Sample SQL	Background Sample Conc	Release Sample Sample#	Release Sample SQL	Release Sample Conc	Signif.?	Attrib. to Site?	Comments
SOIL								
VOCs								
None confirmed						N	n/a	
SVOCs								
Anthracene	0.330	0.152	SS012-001	*	0.044	N	n/a	
Benzo(a)pyrene	0.330	0.158	SS012-001	*	0.110	N	n/a	
Benzo(a)anthracene	0.330	0.164	SS012-001	*	0.150	N	n/a	
Benzo(b)fluoranthene	0.330	0.175	SS012-001	*	0.200	N	n/a	
Benzo(g,h,i)Perylene	0.330	0.167	SS012-001	*	0.053	N	n/a	
Benzo(k)fluoranthene	0.330	0.146	SS012-001	*	0 052	N	n/a	
Chrysene	0.330	0.171	SS012-001	*	0.150	N	n/a	
Di-n-butylphthalate	0.330	0.137	SS012-001	*	0.190	N	n/a	
Fluoranthene	0.330	0.204	SS012-001	*	0.360	Y	Y	suspected disposal of wastes
Indeno(123-cd)pyrene	0.330	0.160	SS012-001	*	0.071	N	n/a	
Phenanthrene	0.330	0.188	SS012-001	*	0.230	N	n/a	
bis(2-Ethylhexyl)Phthalate	0.330	0.165	SS012-201	*	0.006	N	n/a	
Pyrene	0.330	0.188	SS012-001	*	0.270	N	n/a	
Pesticides / PCBs								
Arochlor-1254			SS012-001	*	0 016	N	n/a	
Dieldrin	0.0033	0 00763	SS012-001		0.013	N	n/a	
Metals								
Aluminum		12820	SS012-001	*	10900	N	n/a	
Antimony	12	5.28	SS012-001	#	4	N	n/a	
Arsenic		12.040	SS012-001	*	12.80	N	n/a	
Barium		78 26	SS012-001	*	59.600	N	n/a	

TABLE 5-12
SIGNIFICANCE ABOVE BACKGROUND

PMU 5 - SOUTH AREA
BUILDING 208 (UPR-05-17)
NASA LEWIS RESEARCH CENTER
PHASE I RI/FS

Compound	Background Sample SQL	Background Sample Conc	Release Sample Sample#	Release Sample SQL	Release Sample Conc	Signif.?	Attrib. to Site?	Comments
Beryllium		0.72	SS012-001	#	0.640	N	n/a	
Calcium		17475.33	SS012-001	*	26100	N	n/a	
Chromium		19.48	SS012-001		15.00	N	n/a	
Cobalt		13.56	SS012-001		12.80	N	n/a	
Copper*		23.07	SS012-001		29.00	N	n/a	
Iron		26100	SS012-001	*	25000	N	n/a	
Lead*		17.12	SS012-001	*	17	N	n/a	
Magnesium		5576	SS012-001		10500	N	n/a	
Manganese		423.53	SS012-001		418.0	N	n/a	
Mercury	0.1	0.05	SS012-001		0.330	Y	N	facility-wide; @ 10' depth
Nickel		28.87	SS012-001		29.60	N	n/a	
PotaSSium		1621.27	SS012-001		1700	N	n/a	
Sodium		145	SS012-001		2750.000	Y	Y	suspected disposal of wastes
Thallium	2.00	0.39	SS012-001	#	0.540	N	n/a	
Vanadium		24.14	SS012-001		19.200	N	n/a	
Zinc		75.01	SS012-001	*	91.8000	N	n/a	
Radioactivity								
Alpha Particle Radioactivity			SS012-001		11			
Beta Particle Radioactivity			SS012-001		25.70			

Notes:
mean of background samples collected from shallow upland was used as background
all conc's. in ppm nd=0 * J-flagged release sample data blank SQLs imply that Sample Conc. > Sample SQL

TABLE 5-13
SIGNIFICANCE ABOVE BACKGROUND

PMU 5 - SOUTH AREA
NON-SOURCE SPECIFIC (SUBSURFACE SOIL / GROUNDWATER)
NASA LEWIS RESEARCH CENTER
PHASE I RI/FS

Compound	Background Sample SQL	Background Sample Conc	Release Sample Sample#	Release Sample SQL	Release Sample Conc	Signif.?	Attrib. to Site?	Comments
SOIL								
VOCs								
1,1-Dichloroethane	0.010	0.007	BH038-015	*	0.002	N	n/a	
1,2-Dichloroethane	0.010	0.005	BH038-012		0.002	N	n/a	
2-Butanone	0.010	0.005	BH038-015	*	0.011	Y		
Acetone	0.010	0.007	BH038-015		0.039	Y		
Chloroform	0.010	0.005	BH038-012	*	0.003	N	n/a	
Methylene Chloride	0.010	0.004	BH038-012	*	0.35	Y		
Benzene	0.010	0.005	BH038-012	*	0.023	Y		
Ethylbenzene	0.010	0.005	BH038-012	*	0.016	Y		
Toluene	0.010	0.005	BH038-012	*	0.086	Y		
Total Xylenes	0.010	0.005	BH038-012	*	0.056	Y		
SVOCs								
1,4-Dichlorobenzene	0.330	0.165	BH040-021	*	0.980	Y		
2-Methylnaphthalene	0.330	0.139	BH038-012	*	0.150	N		
3-Nitroaniline	0.800	0.4	BH040-021	*	0.880	Y		
4-Nitroaniline	0.800	0.4	BH040-0231	*	0.880	Y		
Anthracene	0.330	0.152	BH040-001	*	0.064	N		
Benzo(a)pyrene	0.330	0.158	BH040-001	*	0.120	N		
Benzo(a)anthracene	0.330	0.164	BH040-001	*	0.170	N		unrelated to activities at this AOC
Benzo(b)fluoranthene	0.330	0.175	BH040-001	*	0.220	N		unrelated to activities at this AOC
Benzo(k)fluoranthene	0.330	0.146	BH040-001	*	0.059	N		unrelated to activities at this AOC
Butyl Benzyl Phthalate	0.330	0.241	BH038-012	*	0.042	N		
Chrysene	0.330	0.171	BH040-001	*	0.160	N		unrelated to activities at this AOC
Di-n-butylphthalate	0.330	0.137	BH038-001	*	0.200	N		
Fluoranthene	0.330	0 153	BH038-012	*	0.055	N		unrelated to activities at this AOC

TABLE 5-13
SIGNIFICANCE ABOVE BACKGROUND

PMU 5 - SOUTH AREA
NON-SOURCE SPECIFIC (SUBSURFACE SOIL / GROUNDWATER)
NASA LEWIS RESEARCH CENTER
PHASE I RI/FS

Compound	Background Sample SQL	Background Sample Conc	Release Sample Sample#	Release Sample SQL	Release Sample Conc	Signif.?	Attrib. to Site?	Comments
Indeno(123-cd)pyrene	0.330	0.160	ss051-001	*	0.510	Y		unrelated to activities at this AOC
Naphthalene	0.330	0.139	BH039-018	*	0.083	N		
Phenanthrene	0.330	0.188	BH040-001	*	0.240	N		unrelated to activities at this AOC
Pyrene	0.330	0.188	BH040-001	*	0.300	N		unrelated to activities at this AOC
Pesticides / PCBs								
Dieldrin	0.0033	0.00763	BH040-001		0.061	Y		
Methoxychlor	0.0033	0.0085	BH040-001	*	0.0130	N		
Metals								
Aluminum		12820	BH039-001		13500	N	n/a	
Antimony		5.28	BH038-001	*	4	N		
Arsenic		16.240	BH039-018	*	24.70	N	n/a	
Barium		78.26	BH040-001		107.000	N	n/a	
Beryllium		0.72	BH039-001	#	0.940	N		
Cadmium		0.737	BH039-018		11.200	Y	n/a	
Calcium		20450	BH039-110	*	47100	N	N	
Chromium		17.78	BH040-001		16.30	N	n/a	
Cobalt		13.56	BH039-001		16.40	N	n/a	
Copper		26.13	BH039-018		43.70	N	Y	
Iron		26100	BH038-001		28000	N	n/a	
Lead		17.12	BH040-001	*	18	N	Y	
Magnesium		5576	BH040-001		12400	N	Y	
Manganese		423.53	BH039-001	*	729.0	N	n/a	
Mercury		0.05	BH040-001		0.2	Y		
Nickel		35.37	BH039-018		82.40	N	n/a	
Potassium		2574	BH040-015		2480	N	n/a	

TABLE 5-13
SIGNIFICANCE ABOVE BACKGROUND

PMU 5 - SOUTH AREA
NON-SOURCE SPECIFIC (SUBSURFACE SOIL / GROUNDWATER)
NASA LEWIS RESEARCH CENTER
PHASE I RI/FS

Compound	Background Sample SQL	Background Sample Conc	Release Sample Sample#	Release Sample SQL		Release Sample Conc	Signif.?	Attrib. to Site?	Comments
Selenium	2.00	0.23	BH038-001			1.500	N	n/a	
Sodium		145	BH039-001		#	387.000	N		
Thallium		0.612	BH039-018		*	3 900	Y		
Vanadium		20.04	BH039-018			64.300	Y	n/a	
Zinc		92.07	BH039-018		J	355.0000	Y	n/a	
Radioactivity									
Alpha Particle Radioactivity			BH040-021			20			
Beta Particle Radioactivity			BH040-021			40.80			

Notes:
mean of background collected from deep upland samples used as background
all conc's. in ppm nd=0 * J-flagged release sample data blank SQLs imply that Sample Conc. > Sample SQL

TABLE 5-13
SIGNIFICANCE ABOVE BACKGROUND

PMU 5 - SOUTH AREA
NON-SOURCE SPECIFIC (SUBSURFACE SOIL / GROUNDWATER)
NASA LEWIS RESEARCH CENTER
PHASE I RI/FS

Compound	Background Sample SQL	Background Sample Conc	Release Sample Sample#	Release Sample SQL	Release Sample Conc	Signif.?	Attrib. to Site?	Comments
GROUNDWATER								
VOCs								
1,1-Dichloroethane		0.007	GW008-001	*	0.046	Y		
1,1,1-Trichloroethane		0.2	GW008-101	*	0.011	N		
Acetone			GW011-028		0.039	N		
Benzene		0.005	GW011-001	*	0.006	N		
Toluene		1	GW011-101	*	0.006	N		
Total Xylenes		10	GW011-001	*	0.002	N		
SVOCs								
2-Methylnaphthalene			GW011-001	*	0.001	N		
Naphthalene			GW011-001	*	0.001	N		
bis(2-Ethylhexyl)Phthalate		0.006	GW011-101	*	0.011	N		unrelated to activities at this AOC
Pesticides / PCBs								
Metals								
Aluminum		0.21	GW011-101		38	Y	n/a	
Antimony		0.006	GW011-101	#	0.02	Y		
Arsenic		0.050	GW011-101	*	0.024	N	n/a	
Barium		2	GW011-101		1.020	N	n/a	
Beryllium		0.004	GW011-101	#	0.004	N	n/a	
Cadmium		0.005	GW011-101		0.019	Y		
Calcium			GW011-001	*	242	N	n/a	
Chromium		0.1	GW011-101		0.12	N	n/a	
Cobalt			GW011-101	#	0 05	N	n/a	
Copper		1.3	GW008-101		0.12	N	n/a	
Iron		0.3	GW011-101	*	87.3	Y	n/a	

TABLE 5-13
SIGNIFICANCE ABOVE BACKGROUND

PMU 5 - SOUTH AREA
NON-SOURCE SPECIFIC (SUBSURFACE SOIL / GROUNDWATER)
NASA LEWIS RESEARCH CENTER
PHASE I RI/FS

Compound	Background Sample SQL	Background Sample Conc	Release Sample Sample#	Release Sample SQL		Release Sample Conc	Signif.?	Attrib. to Site?	Comments
Lead		0.015	GW011-101		*	0.03	N	n/a	
Magnesium			GW008-101			61.7	N	n/a	
Manganese		0.05	GW008-101		*	3.9	Y		
Nickel		0.1	GW011-101			0.167	N	n/a	
Potassium			GW011-101			88.9	N	n/a	
Selenium	2.00	0.05	GW011-101		*	0.650	N	n/a	
Sodium		20	GW005-001			122.000	Y		
Thallium		0.002	GW008-101		#	0.003	N	n/a	
Vanadium			GW011-101			0.319	N	n/a	
Zinc		5	GW011-101		#	0.9860	N	n/a	

Notes:
mean of background collected from deep upland samples used as background
all conc's. in ppm
MCLs used for groundwater background

TABLE 5-14
SIGNIFICANCE ABOVE BACKGROUND

PMU 5 - SOUTH AREA
NON-SOURCE SPECIFIC (GROUNDWATER SEEPS)
NASA LEWIS RESEARCH CENTER
PHASE I RI/FS

Compound	Background Sample SQL	Background Sample Conc	Release Sample Sample#	Release Sample SQL	Release Sample Conc	Signif.?	Attrib. to Site?	Comments
SURFACE WATER								
VOCs								
1,1-Dichloroethane			SW016-001	*	0.004	N	n/a	
SVOCs								
Di-n-butylphthalate			SW017-001	*	0.001	N	n/a	
bis(2-Ethylhexyl)Phthalate		0.006	SW019-001	*	0.025	Y		
Pesticides / PCBs								
Dieldrin			SW017-001	*	0.000031	N	n/a	
Metals								
Aluminum		0.21	SW019-001		592	Y	n/a	
Antimony		0.006	SW019-001	*	0.154	Y		
Arsenic		0.050	SW016-001	*	0.0369	N	n/a	
Barium		2	SW019-001		2.720	N	n/a	
Beryllium		0.004	SW019-001		0.0304	Y		
Cadmium		0.005	SW019-001	*	0.033	Y		
Calcium			SW019-001		1130	N	n/a	
Chromium		0.1	SW019-001		1.07	Y		
Cobalt			SW019-001		0.714	N	n/a	
Copper		1.3	SW019-001		2.17	N	n/a	
Cyanide		0.2	SW019-001		0.0877	N	n/a	
Iron		0.3	SW019-001		1650.0000	Y		
Lead		0.015	SW019-001		0.978	Y		
Magnesium			SW019-001		375.000	N	n/a	
Manganese		0.05	SW019-001	*	26.0	Y		
Mercury		0.002	SW017-001	*	0.00034	N	n/a	

TABLE 5-14
SIGNIFICANCE ABOVE BACKGROUND

PMU 5 - SOUTH AREA
NON-SOURCE SPECIFIC (GROUNDWATER SEEPS)
NASA LEWIS RESEARCH CENTER
PHASE I RI/FS

Compound	Background Sample SQL	Background Sample Conc	Release Sample Sample#	Release Sample SQL	Release Sample Conc	Signif.?	Attrib. to Site?	Comments
Nickel		0.1	SW019-001		2.09	Y		
Potassium			SW019-001	*	78.80	N	n/a	
Sodium		20	SW017-001	#	147.000	Y		
Vanadium			SW019-001		0.920	N	n/a	
Zinc		5	SW019-001		6.3100	N	n/a	
Radioactivity								
Alpha Particle Radioactivity			SW019-001		1910			
Beta Particle Radioactivity			SW019-001		2440.00			
General Chemistry								
Ammonia			SW019-001		17.0	Y	n/a	
Bromide			SW017-001		5.00	Y	n/a	
Chemical Oxygen Demand			SW016-001		340.000	Y		
Chloride		250.000	SW019-001		250.000	N		
Fluoride		4	SW017-001		2	N	N	
MBAs		0.500	SW017-001		0	N	N	
Nitrate/Nitrite		10.0000	SW019-001		12.000	N	n/a	
Oil and Grease		0.0494	SW015-001		34.0000	Y	n/a	
Total Phosphorus			SW016-001		2.400	Y	n/a	
Sulfate		250.0	SW019-001		18	N	n/a	
Total Dissolved Solids		500	SW016-001		1600.0000	Y	n/a	
Total Suspended Solids			SW019-001		83000	Y	Y	

Note
MCL's for water used as background conc.
all conc's. in ppm nd=0 * J-flagged release sample data blank SQLs imply that Sample Conc. > Sample SQL

TABLE 5-15
SIGNIFICANCE ABOVE BACKGROUND

PMU 5 - SOUTH AREA
PESTICIDE STORAGE AREA (UPR-05-10)
NASA LEWIS RESEARCH CENTER
PHASE I RI/FS

Compound	Background Sample SQL	Background Sample Conc	Release Sample Sample#	Release Sample SQL	Release Sample Conc	Signif.?	Attrib. to Site?	Comments
SOIL								
VOCs								
None detected								
SVOCs								
1,4-Dichlorobenzene	0.330	0.165	SS016-101	*	0.170	N	n/a	
Acenapthene	0.330	0.165	SS016-101	*	0.150	N	n/a	
Acenaphthalene	0.330	0.165	SS016-101	*	1.700	Y	Y	suspected storage of chemicals
Anthracene	0.330	0.152	SS016-101	*	0.270	N	n/a	
Benzo(a)pyrene	0.330	0.158	SS016-101	*	1.700	Y	Y	suspected storage of chemicals
Benzo(a)anthracene	0.330	0.164	SS016-101	*	1.600	Y	Y	suspected storage of chemicals
Benzo(b)fluoranthene	0.330	0.175	SS016-101	*	2.800	Y	Y	suspected storage of chemicals
Benzo(g,h,i)Perylene	0.330	0.167	SS016-101	*	1.200	Y	Y	suspected storage of chemicals
Benzo(k)fluoranthene	0.330	0.146	SS016-101	*	1.000	Y	Y	suspected storage of chemicals
Carbazole	0.330	0.150	SS016-101	*	0.310	N	n/a	
Chrysene	0.330	0.171	SS016-101	*	2.300	Y	Y	suspected storage of chemicals
Di-n-butylphthalate	0.330	0.137	SS016-001		0.870	Y	Y	suspected storage of chemicals
Dibenzofuran(a,h)anthracene	0.330	0.165	SS051-101	*	0.099	N	n/a	
Fluoranthene	0.330	0.204	SS016-101		2.600	Y	Y	suspected storage of chemicals
Fluorene	0.330	0.157	SS016-101	*	3.200	Y	Y	suspected storage of chemicals
Indeno(123-cd)pyrene	0.330	0.160	SS016-101	*	1.100	Y	Y	suspected storage of chemicals
Phenanthrene	0.330	0.188	SS016-101	*	2.000	Y	Y	suspected storage of chemicals
bis(2-Ethylhexyl)Phthalate	0.330	0.123	SS016-101	*	0.081	N	n/a	
Pyrene	0.330	0.188	SS016-101	*	2.000	Y	Y	suspected storage of chemicals
Pesticides / PCBs								
4,4' DDT	0.0033	0 00265	SS016-101	*	0.0013	N	n/a	

TABLE 5-15
SIGNIFICANCE ABOVE BACKGROUND

PMU 5 - SOUTH AREA
PESTICIDE STORAGE AREA (UPR-05-10)
NASA LEWIS RESEARCH CENTER
PHASE I RI/FS

Compound	Background Sample SQL	Background Sample Conc	Release Sample Sample#	Release Sample SQL	Release Sample Conc	Signif.?	Attrib. to Site?	Comments
Arochlor-1260			SS016-001		0.092	N	n/a	Does not exceed TSCA level
Dieldrin	0.0033	0.00763	SS016-001		0.046	Y	Y	suspected storage of chemicals
alpha-Chlordane	0.0017	0.00493	SS016-001		0.002	N	n/a	
gamma-Chlordane	0.0017	0.00085	SS016-001		0.003	Y	Y	suspected storage of chemicals
Endrin	0.0033	0.00165	SS016-001		0.0019	N	n/a	
Metals								
Aluminum		12820	SS016-001		14600	N	n/a	
Arsenic		12.040	SS016-101		9.60	N	n/a	
Barium		78.26	SS016-101	*	225.000	N	n/a	
Beryllium		0.72	SS016-001		1.400	N	n/a	
Calcium		17475.33	SS016-001		90600	Y	N	
Chromium		19.48	SS016-001	*	27.30	N	n/a	
Cobalt		13.56	SS016-101		11.90	N	n/a	
Copper		23.07	SS016-101		31.60	N	Y	suspected storage of chemicals
Iron		26100	SS016-101		30200	N	n/a	
Lead		17.12	SS016-001		55	Y	Y	suspected storage of chemicals
Magnesium		5576	SS016-101	*	9170	N	Y	suspected storage of chemicals
Manganese		423.53	SS016-001		787.0	N	n/a	
Mercury	0.1	0.05	SS016-001	*	11.200	Y	N	facility-wide; @ 10' depth
Nickel		28.87	SS016-101		28.30	N	n/a	
Potassium		1621.27	SS016-101		1940	N	n/a	
Selenium	2.00	0.23	SS016-101	#	0.570	N	n/a	
Sodium		145	SS016-001	#	283.000	N	n/a	
Vanadium		24.14	SS016-101		31.700	N	n/a	
Thallium	2.00	0.39	SS016-001	#	0.320	N	n/a	

TABLE 5-15
SIGNIFICANCE ABOVE BACKGROUND

PMU 5 - SOUTH AREA
PESTICIDE STORAGE AREA (UPR-05-10)
NASA LEWIS RESEARCH CENTER
PHASE I RI/FS

Compound	Background Sample SQL	Background Sample Conc	Release Sample Sample#	Release Sample SQL	Release Sample Conc	Signif.?	Attrib. to Site?	Comments
Zinc		75.01	SS016-101		133.0000	N	n/a	
Radioactivity								
Alpha Particle Radioactivity			SS016-101		15			
Beta Particle Radioactivity			SS016-001		24.40			

Notes:
mean of background samples collected from shallow upland was used as background
all conc's. in ppm nd=0 * J-flagged release sample data blank SQLs imply that Sample Conc > Sample SQL

WW ENGINEERING & SCIENCE
A Summit Company
5555 Glenwood Hills Parkway, S.E.
Grand Rapids, MI 49588-0874
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FAX (66)942-6499

MEMORANDUM

Date: January 18, 1993

To: Laura Ripley, U.S. EPA RPM

From: Theodore A. Lietzke, WWES SPM

Re: Initial Site Visit
NASA Lewis Research Center, Cleveland , Ohio
June 2 - 3, 1993. Project #04015.20

Three staff professionals from WW Engineering & Science, Inc. (WWES) (Ted Lietzke, Liz "Uhl" Bartz, and Jeff Arp) and Ken Tindall and Laura Ripley, representing the U.S. Environmental Protection Agency Region 5, visited NASA Lewis Research Center on June 2nd and 3rd of 1993. The group was given an escorted tour of the NASA research facilities located north-northwest of Cleveland Hopkins International Airport, Cleveland, Ohio on June 2, 1993. Following the tour, on the morning of June 3, 1993, a formal meeting was held including representatives of NASA Lewis Research Center (LeRC), Science Applications International Corporation (SAIC), U.S. EPA, and WWES.

The following sections of this memorandum will be divided into two parts. Part 1 will describe locations visited during the escorted tour of the NASA research facilities and Part 2 will outline the items discussed at the formal meeting held following the site tour.

TOUR OF NASA LEWIS RESEARCH CENTER

Initially the tour group including Ken Tindall, Laura Ripley, Ted Lietzke, Liz Uhl and Jeff Arp registered at the LeRC security office prior to entering the facility. From this point, we were escorted on the remainder of the tour by Don Easterling, representing NASA. The first stop was the Rocket Testing Laboratory (Building number 35-7) within the SAIC designated project management unit number 4 (PMU-4). Primarily, this building housed rocket engine testing areas and support facilities. Engine testing involved actual ignition of miniature scale rocket engines. Our guide indicated that the duration of engine burn was approximately 6 seconds and that these tests occur 2-3 times per week.

We then drove past Buildings 49, 109, and 136, also located in PMU-4. In the past, these buildings housed materials used in the cyclotron, were used for the decontamination of paint and mercury impacted components, and served as storage areas for the used decontamination solvents, respectively. Buildings 109 and 136 were in the process of

closure and Building 49 was located under a mound of earth at the time of our visit.

The tour group then visited the old coal storage area within PMU-5. This area stored soft and high sulfur coals within clay and limestone lined pits. We then drove to Building 202 located in the southwestern section of PMU-5 at the upper water shed of Abram Creek (PMU-1). This area is northwest (down-gradient?) of the South 40 landfill and fire training pond. According to our escort, seeps have been observed in the past in this area of PMU-1.

After leaving Building 202, we visited Building 212, the 1957 Landfill, the Salvage Yard, the Old Landfill, the South 40 Landfill, and the Fire Training Pond. Building 212 was being utilized as a chemical management area where acids, oil solvents, and surfactants were stored. The 1957 Landfill, located east of Buildings 201 and 204, contained flyash and construction materials according to the available records, although no visible evidence of the construction materials was noted. The salvage yard, located along the western property boundary, is used as a storage area for scrap machinery and metal components. The old landfill, the South 40 Landfill, and the Fire Training Pond are located west of the salvage yards. Available information indicates that the two landfills were operated between 1940 and 1950, accepting flyash, construction debris, as well as many other items used at LeRC. The fire training pond was used for fire training. Miscellaneous items were put in the area, saturated with various flammable substances, set ablaze, and then extinguished by the fire department as a training exercise.

The tour then proceeded to Building 415, located on Creek Road next to Abram Creek in PMU-1. We were informed that this building was utilized for hazardous waste and chemical storage and was in the process of being torn down. Also, a rifle range was still in use directly north of the building. It was noted that Abram Creek periodically forms a white sudsy foam in this vicinity. Our guide attributed the suds to de-icing agents used by the airport.

The West Area, PMU-10, was visited following Building 415. This is the least developed area on site. It contains the day care center, recreational facilities, and several research buildings. Research in this PMU is limited to solar power and high efficiency batteries. We stopped behind Building 319 overlooking Abram Creek and building 415. At this locality, we observed a storm water outfall and an exposure of the site's geology. The strata exposed in the Abram Creek valley walls were comprised of surficial unconsolidated sediments and "oil" rich shale bedrock.

The group then drove past the Industrial Waste System (IWS) Retention Basins, PMU-2, located south of the confluence of Abram Creek and the Rocky River on the way to lunch. We were informed that the approximately 3 miles of sewer pipe, the numerous oil/water separator pits (OWS), the two retention basins, and outfall 001 had been in continuous operation since 1958. Black carbon staining and repaired cracks were evident on the walls

of both retention basins.

Following Lunch, the group walked down Moffett Road to Building 6 where we were to meet our guide for the second half of the tour. On our way to Building 6, the group observed two USTs being replaced at Site #17. Our new guide, a representative of SAIC, took us to our first stop behind Buildings 64, 65, and 66. At this location, he presented two of the oil/water separator pits included in PMU-2. It was noted by the group that access to these pits for sampling purposes was going to be difficult.

We then drove to the North Area (PMU-11) and observed a storm water outfall and a hydrocarbon spill site located behind Building 500. The outfall was a large concrete and steel culvert located in the valley wall of the Rocky River. Access to the outfall was via stairs from the parking lot/driveway. After viewing the outfall, the group walked to the vicinity of the hydrocarbon spill. We were informed that approximately 300 gallons of fuel was accidentally released to the ground from a temporary storage tank. The guide tried to illustrate that the terrain, which was very steep, would not allow infiltration of the released fuel. He explained that due to the steepness of the terrain and the close proximity of the Rocky River, it was unlikely that any of the fuel remained from the spill.

The tour then proceeded to an overlook of the Rocky River located on Underpass Road under the Route 17 bridge. At this locality, we observed the steepness of the Rocky River valley. We also inspected a storm sewer outfall located on the valley wall where access for sampling was nearly impossible. Our guide explained that this was typical of the majority of the outfalls.

The groups next stop was a stormwater outfall (NPDES #018) located near the main entrance. The discharge from this storm sewer had a strong ammonia type odor and was significantly discolored. Our guide informed us that this outfall is fed by lines which drain the airport property and the discoloration and odor are suspected to be due to de-icing compounds (primarily urea) used by the airport.

We then visited the IWS retention ponds again. We were informed that the two large retention basins hold approximately 1,000,000 gallons each. The IWS effluent is pumped from the retention basins into a storm sewer where it discharged to the Rocky River through an outfall located just north of the basins. Also, the occurrence of the black carbon like staining present on the walls of the basin was explained to the group. Apparently, the staining was due to an accidental discharge of a compound to the IWS by a senior research scientist.

The remainder of the tour included visits to outfalls located south of the retention basins followed by a brief informal meeting in Don Easterling's (NASA) office. A time was set for the formal meeting the next day and the tour was concluded.

FORMAL MEETING

On June 3, 1993 representatives from WWES participated in a formal meeting to discuss comments relating to the Site Investigation (SI) work plan and the Field Sampling Plan (FSP) as part of the Environmental Remediation Program Plan for NASA Lewis Research Center. Included among the participants were representatives from the U.S. EPA (Region 5), NASA, WWES and SAIC.

The participants of the meeting agreed to follow the specific order of comments and responses in order to efficiently cover all areas of concern. The primary areas of concern include: potential airborne transport of contaminated particulates, techniques for collecting geologic data, location and number of monitoring wells, and overall organization of the SI work plan.

Air Pathways

The significance of air pathways as a source of contaminant migration was discussed. It was concluded that air pathways analysis should be supported within the framework of the SI. For example, if surface soil data indicates significant contamination, then the role of the air pathways as a potential source of contaminant transport should be evaluated.

Geology / Hydrogeology

Several comments were addressed concerning the lack of geologic and hydrogeologic information available and actions required to correct this situation. Essentially, we reached an agreement that only limited background data exist for the site and that any additional data sources would be incorporated into the work plan.

Monitor Wells

Considerable attention was given to the ground water pathway during the meeting. It was suggested that the importance of ground water as a potential pathway be increased. Also, some concern was voiced about the number, location, and construction of the monitor wells and piezometers.

The group agreed that the south area had the highest potential for impact to the ground water due to the numerous landfills and the fire training pond. SAIC was hesitant about installing additional wells. However, since the group was essentially in agreement that the number of wells at the site was adequate for this phase of the program. It was suggested that two piezometers be deleted from the West Area and then two additional monitor wells would be installed in the south area. No other changes in location or number were discussed.

The U.S. EPA suggested that all the piezometers and monitor wells be constructed of stainless steel. This was agreeable to all parties.

SI Organization

The U.S. EPA suggested that the organization of the work plan be revised in order to clarify the objectives and scope of work. SAIC was hesitant to restructure the FSP. The implementation of the work plan was going to be performed by R&R International. The possibility of external oversight was suggested and discussed. No final conclusions were reached due to budgetary concerns. However, SAIC said they would clarify procedures in the FSP.

cc: Jeff Arp, WWES, Columbus
Liz Bartz, WWES
04015.20, 32

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MEMORANDUM

Date: January 14, 1993

To: Laura Ripley, U.S. EPA RPM

From: Theodore A. Lietzke, WWES SPM

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NASA Lewis Research Center, Cleveland , Ohio
June 2 - 3, 1993.

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We then drove to the North Area (PMU-11) and observed a storm water outfall and a hydrocarbon spill site located behind Building 500. The outfall was a large concrete and steel culvert located in the valley wall of the Rocky River. Access to the outfall was via stairs from the parking lot/driveway. After viewing the outfall, the group walked to the vicinity of the hydrocarbon spill. We were informed that approximately 300 gallons of fuel was accidentally released to the ground from a temporary storage tank.

The guide tried to illustrate that the terrain, which was very steep, would not allow infiltration of the released fuel. He explained that due to the steepness of the terrain and the close proximity of the Rocky River, it was unlikely that any of the fuel remained from the spill.

The tour then proceeded to an overlook of the Rocky River located on Underpass Road under the Route 17 bridge. At this locality, we observed the steepness of the Rocky River valley. We also inspected a storm sewer outfall located on the valley wall where access for sampling was nearly impossible. Our guide explained that this was typical of the majority of the outfalls.

The groups next stop was a stormwater outfall (NPDES #018) located near the main entrance. The discharge from this storm sewer had a strong ammonia type odor and was significantly discolored. Our guide informed us that this outfall is fed by lines which drain the airport property and the discoloration and odor are suspected to be due to de-icing compounds used by the airport.

We then visited the IWS retention ponds again. We were informed that the two large retention basins hold approximately 1,000,000 gallons each. The IWS effluent is pumped from the retention basins into a storm sewer where it discharged to the Rocky River through an outfall located just north of the basins. Also, the occurrence of the black carbon like staining present on the walls of the basin was explained to the group. Apparently, the staining was due to an accidental discharge of a compound to the IWS by a senior research scientist.

The remainder of the tour included visits to outfalls located south of the retention basins followed by a brief informal meeting in Don Easterling's (NASA) office. A time was set for the formal meeting the next day and the tour was concluded.

FORMAL MEETING

On June 3, 1993 representatives from WWES participated in a formal meeting to discuss comments relating to the Site Investigation (SI) work plan and the Field Sampling Plan (FSP) as part of the Environmental Remediation Program Plan for NASA Lewis Research Center. Included among the participants were representatives from the U.S. EPA (Region 5), NASA, WWES and SAIC.

The participants of the meeting agreed to follow the specific order of comments and responses in order to efficiently cover all areas of concern. The primary areas of concern include: potential airborne transport of contaminated particulates, techniques for collecting geologic data, location and number of monitoring wells, and overall organization of the SI work plan.

Air Pathways

The significance of air pathways as a source of contaminant migration was discussed. It was concluded that air pathways analysis should be supported within the framework of the SI. For example, if surface soil data indicates significant contamination, then the role of the air pathways as a potential source of contaminant transport should be evaluated.

Geology / Hydrogeology

Several comments were addressed concerning the lack of geologic and hydrogeologic information available and actions required to correct this situation. Essentially, we reached an agreement that only limited background data exist for the site and that any additional data sources would be incorporated into the work plan.

Monitor Wells

Considerable attention was given to the ground water pathway during the meeting. It was suggested that the importance of ground water as a potential pathway be increased. Also, some concern was voiced about the number, location, and construction of the monitor wells and piezometers.

The group agreed that the south area had the highest potential for impact to the ground water due to the numerous landfills and the fire training pond. SAIC was hesitant about installing additional wells. However, since the group was essentially in agreement that the number of wells at the site was adequate for this phase of the program. It was suggested that two piezometers be deleted from the West Area and then two additional monitor wells would be installed in the south area. No other changes in location or number were discussed.

The U.S. EPA suggested that all the piezometers and monitor wells be constructed of stainless steel. This was agreeable to all parties.

SI Organization

The U.S. EPA suggested that the organization of the work plan be revised in order to clarify the objectives and scope of work. SAIC was hesitant to restructure the FSP. However, it was illustrated that clarification was necessary to assure that proper prosedures were adhered to since SAIC personnel was not implementing the field work. The implementation of the this work plan was going to be performed by R&R International. The possibility of external oversight was then suggested and discussed. No final conclusions were reached due to budgetary concerns. However, SAIC said they would clarify procedures in the FSP.

National Aeronautics and
Space Administration

Lewis Research Center
Cleveland, Ohio
44135

NASA

Reply to Attn of 7020

July 24, 1991

Mr. William Messenger
Chief, Pre-Remedial Unit
U.S. Environmental Protection Agency
230 South Dearborn Street
Chicago, Illinois 60604

Dear Mr. Messenger:

This is in response to your letter of February 19, 1991, which requested additional information regarding the Preliminary Assessments for the NASA Lewis Research Center (Cleveland and Plum Brook sites).

Enclosed please find Preliminary Assessments for these sites. We are confident that these now contain all the required information. We have discussed with Jeanne Griffin our need for additional time to complete these extensive reports.

We would be glad to meet with you to answer any questions you may have, and we look forward to receiving the results of your review of these reports.

Sincerely,

Peter W. McCallum

Peter W. McCallum
Chief, Office of Environmental Programs

Enclosures

cc:
OEPA/W. Skowronski
NASA/HQ/NX/J. A. Jatko

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
230 SOUTH DEARBORN ST.
CHICAGO, ILLINOIS 60604

REPLY TO THE ATTENTION OF

TELEPHONE MEMO

Date: May 10, 1990

Subject: NASA Lewis Center

From: Tony Holoska

To : Dan Watson, NASA 216 433-3015

I called Dan to get an update on his A106 entries. He said that mercury contamination throughout the installation is widespread due to the fact that it ~~is~~ has gotten into the sewers and plumbing. There are a number of projects listed in the A106 report. I told Dan that I wanted to visit the installation to fully update the A106 report and to discuss other topics such as Pollution Prevention and NEPA compliance. Tentatively, I will be visiting the NASA Lewis Center during the last week of May.

cc:Franz

March 5, 1990

SUBJECT: Planned ORD Meetings

FROM: Calvin O. Lawrence
Director, CERI

TO: Assistant Administrator, ORD
ORD Office Directors
ORD Lab Directors
Regional Administrators
TIMs/TIPMs

Attached is the March listing of planned ORD Workshops, Seminars, Conferences and Symposia.

If you have any questions regarding this report or a specific meeting, contact me at FTS 684-7391 or the ORD individual identified for that meeting.

Attachments

March 15-16, 1990 - Seminar
"Wastewater Treatment Plant Toxicity
Evaluation, Reduction and Control"
Dallas, TX
Orville Macomber (CERI - 684-7347)

March 20-23, 1990 - Symposium
"Eighth Symposium on the Transfer and
Utilization of Particulate Control Technology"
San Diego, CA
Geddes M. Ramsey (AEERL/RTP - 629-7963)

April 3-5, 1990 - Symposium
"RREL Sixteenth Annual Hazardous
Waste Research Symposium"
Cincinnati, OH
Marta K. Richards (RREL - 684-7881)

April 18-20, 1990 - Conference
"AWMA Specialty Conference on Waste Combustion in Boilers and Industrial Furnaces"
Kansas City, MO
William P. Linak (AEERL-RTP & RREL-Ci 629-5792)

April 25-26, 1990 - Seminar
"Physical/Chemical Treatment of Hazardous Wastes"
San Francisco, CA
Fran Kremer (CERI - 684-7346)

April 30 - May 3, 1990 - Symposium
"1990 EPA/AWMA Int'l Symposium on Measurements of Toxics and Related Air Pollutants"
Raleigh, NC
Bruce W. Gay, Jr. (AREAL-RTP - 629-2830)

May 1-3, 1990 - Seminar
"Incineration and Alternative Treatment of Energetic Compounds to Minimize Effects to Air, Soil & Water Supplies"
Dallas, TX
Justice Manning (CERI - 684-7349) ***new***

May 7-8, 1990 - Seminar
"Physical/Chemical Treatment of Hazardous Wastes"
Atlanta, GA
Fran Kremer (CERI - 684-7346)

May 7-10, 1990 - Symposium
"1990 SO2 Control Symposium"
New Orleans, LA
Charles Sedman (AEERL - 629-7700)

May 8-10, 1990 - Workshop
"Large-Scale Reforestation: What are the Ecological and Operational Considerations Needed for Planning and Success?"
Corvallis, OR
Jack K. Winjum (ERL-Corvallis - 420-4666) ***new***

May 9-10, 1990 - Seminar
"Physical/Chemical Treatment of Hazardous Wastes"
Denver, CO
Fran Kremer (CERI - 684-7346)

May 14-18, 1990 - Conference
"1990 Incineration Conference"
San Diego, CA
Clyde Dempsey (RREL - 684-7504)

May 23-24, 1990 - Seminar
"Physical/Chemical Treatment of Hazardous Wastes"
New York, NY
Fran Kremer (CERI - 684-7346)

May 24-25, 1990 - Seminar
"Wastewater Treatment Plant Toxicity
Evaluation, Reduction and Control"
Boston, MA
Daniel Murray (CERI - 684-7347)

June 5-7, 1990 - Seminar
"Incineration and Alternative Treatment of
Energetic Compounds to Minimize Effects to
Air, Soil & Water Supplies"
Seattle, WA
Justice Manning (CERI - 684-7349) ***new***

June 7-8, 1990 - Seminar
"Physical/Chemical Treatment of Hazardous Wastes"
Chicago, IL
Fran Kremer (CERI - 684-7346)

June 7-8, 1990 - Seminar
"Wastewater Treatment Plant Toxicity
Evaluation, Reduction and Control"
Charlotte, NC
Dan Murray (CERI - 684-7347)

June 10-13, 1990 - Conference
"Int'l Conference on Pollution Prevention:
Clean Technologies and Clean Products"
Washington, DC
Kenneth R. Stone (RREL - 684-7474)

June 19-21, 1990 - Seminar
"Incineration and Alternative Treatment of
Energetic Compounds to Minimize Effects to
Air, Soil & Water Supplies"
Chicago, IL
Justice Manning (CERI - 684-7349) ***new***

June 21-22, 1990 - Seminar
"Wastewater Treatment Plant Toxicity
Evaluation, Reduction and Control"
Trenton, NJ
Dan Murray (CERI - 684-7347)

June 26-28, 1990 - Seminar
"Incineration and Alternative Treatment of
Energetic Compounds to Minimize Effects to
Air, Soil & Water Supplies"
Kansas City, MO
Justice Manning (CERI - 684-7349) ***new***

June 28-29, 1990 - Workshop
"Assessment, Management and Communication
of Drinking Water Contamination"
Charlotte, NC
Dr. James E. Smith (CERI - 684-7355) ***new***

July 17-19, 1990 - Seminar
"Incineration and Alternative Treatment of
Energetic Compounds to Minimize Effects to
Air, Soil & Water Supplies"
Edison, NJ
Justice Manning (CERI - 684-7349) ***new***

July 19-20, 1990 - Seminar
"Wastewater Treatment Plant Toxicity
Evaluation, Reduction and Control"
Baltimore, MD
Dan Murray (CERI - 684-7347)

July 24-26, 1990 - Seminar
"Incineration and Alternative Treatment of
Energetic Compounds to Minimize Effects to
Air, Soil & Water Supplies"
Edison, NJ
Justice Manning (CERI - 684-7349) ***new***

September 4-6, 1990 - Seminar
"Incineration and Alternative Treatment of
Energetic Compounds to Minimize Effects to
Air, Soil & Water Supplies"
Philadelphia, PA
Justice Manning (CERI - 684-7349) ***new***

September 11-13, 1990 - Seminar
"Incineration and Alternative Treatment of Energetic Compounds to Minimize Effects to Air, Soil & Water Supplies"
Atlanta, GA
Justice Manning (CERI - 684-7349) ***new***

September 24-27, 1990 - Seminar
"Incineration and Alternative Treatment of Energetic Compounds to Minimize Effects to Air, Soil & Water Supplies"
Denver, CO
Justice Manning (CERI - 684-7349) ***new***

October 1-4, 1990 - Conference
"Transport and Mass Exchange Process in Sand and Gravel Aquifers: Field & Modelling Studies"
Ottawa, Canada
Barbara Levinson (OEPER - 382-5983) ***new***