

HAZARD ASSESSMENT RATING METHODOLOGY FORM

Name of site: FFTA-1
 Location: North end of base
 Date of Operations: 1958-1970
 Owner/Operator: G. L. Sawyer
 Comments/Descriptions: First FFTA used

Site Rated by: E.K. Snider, S.K. Minicucci, S.J. Tiffany, J. K. Baker

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	0	4	0	12
B. Distance to nearest well	3	10	30	30
C. Land use/zoning within 1 mile radius	2	3	6	9
D. Distance to installation boundary	2	6	12	18
E. Critical environments within 1 mile radius of site	1	10	10	30
F. Water quality of nearest surface water body	1	6	6	18
G. Ground water use of uppermost aquifer	3	9	27	27
H. Population served by surface water supply within 3 miles downstream of site	0	6	0	18
I. Population served by ground-water supply within 3 miles of site	3	6	18	18
Subtotals			109	180
Receptors subcore (100 x factor score subtotal/maximum score subtotal)				<u>61</u>

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

- | | |
|--|---------------|
| 1. Waste quantity (small, medium, or large) | L = large |
| 2. Confidence level (confirmed or suspected) | C = confirmed |
| 3. Hazard rating (low, medium, or high) | H = high |

Factor Subscore A (from 20 to 100 based on factor score matrix) 100

B. Apply persistence factor

Factor Subscore A x Persistence Factor = Subscore B

$$100 \times 0.60 = 60$$

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

$$60 \times 1.00 = 60$$

III. PATHWAYS

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore 0

B. Rate the migration potential for 3 potential pathways: surface water migration, flooding, and ground-water migration. Select the highest rating and proceed to C.

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
1. Surface Water Migration				
Distance to nearest surface water	1	8	8	24
Net precipitation	2	6	12	18
Surface erosion	2	8	16	24
Surface permeability	0	6	0	18
Rainfall intensity	1	8	8	24
Subtotals			44	100
Subscore (100 x factor score subtotal/maximum score subtotal)				41
2. Flooding				
	0	1	0	3
Subscore (100 x factor score/3)				0
3. Ground-water migration				
Depth to ground water	1	8	8	24
Net precipitation	2	6	12	18
Soil permeability	3	8	24	24
Subsurface flow	0	8	0	24
Direct access to ground water	0	8	0	24
Subtotals			44	114
Subscore (100 x factor score subtotal/maximum score subtotal)				39

C. Highest pathway subscore.

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore 41

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	61
Waste Characteristics	80
Pathways	41
Total	181

181 divided by 3 =

60 Gross total score

B. Apply factor for waste containment from waste management practices.

Gross total score x waste management practices factor = final score

60 x 1.00 =

60
FINAL SCORE

HAZARD ASSESSMENT RATING METHODOLOGY FORM

Name of site: FFTA-2

Location: Northeast portion of base, East of primary taxiway

Date of Operations: Early 1970's to Present

Owner/Operator: K. I. Sawyer

Comments/Descriptions: Current FFTA

Site Rated by: E.H. Snider, S.K. Minicucci, E.J. Tiffany, J. N. Baker

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	0	4	0	12
B. Distance to nearest well	3	10	30	30
C. Land use/zoning within 1 mile radius	2	3	6	9
D. Distance to installation boundary	2	6	12	18
E. Critical environments within 1 mile radius of site	1	10	10	30
F. Water quality of nearest surface water body	1	6	6	18
G. Ground water use of uppermost aquifer	3	9	27	27
H. Population served by surface water supply within 3 miles downstream of site	0	6	0	18
I. Population served by ground-water supply within 3 miles of site	3	6	18	18
Subtotal			109	180
Receptors subscore (100 x factor score subtotal/maximum score subtotal)				<u>61</u>

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

- | | |
|--|---------------|
| 1. Waste quantity (small, medium, or large) | L = large |
| 2. Confidence level (confirmed or suspected) | C = confirmed |
| 3. Hazard rating (low, medium, or high) | H = medium |

Factor Subscore A (from 20 to 100 based on factor score matrix) **80**

B. Apply persistence factor

Factor Subscore A x Persistence Factor = Subscore B

$$80 \times 0.80 = 64$$

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

$$64 \times 1.00 = \underline{\underline{64}}$$

III. PATHWAYS

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subcore of 100 points for direct evidence or 50 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore 0

B. Rate the migration potential for 3 potential pathways: surface water migration, flooding, and ground-water migration. Select the highest rating and proceed to C.

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
1. Surface Water Migration				
Distance to nearest surface water	1	8	8	24
Net precipitation	2	6	12	18
Surface erosion	2	8	16	24
Surface permeability	0	6	0	18
Rainfall intensity	1	8	8	24
Subtotals			44	100
Subscore (100 x factor score subtotal/maximum score subtotal)				41
2. Flooding				
	0	1	0	3
Subscore (100 x factor score/3)				0
3. Ground-water migration				
Depth to ground water	1	8	8	24
Net precipitation	2	6	12	18
Soil permeability	3	8	24	24
Subsurface flow	0	8	0	24
Direct access to ground water	0	8	0	24
Subtotals			44	114
Subscore (100 x factor score subtotal/maximum score subtotal)				39

C. Highest pathway subscore.

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore 41

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	61
Waste Characteristics	64
Pathways	41
Total	165

divided by 3 =

55 Gross total score

B. Apply factor for waste containment from waste management practices.

Gross total score x waste management practices factor = final score

55 x 1.00 =

55
FINAL SCORE

HAZARD ASSESSMENT DATA METHODOLOGY FORMName of site: **Hardfill Area No.2**Location: **1300 feet SE of open gatehouse**Date of Operation: **Early 1960's until approx. 1970**Owner/Operator: **K. I. Sawyer**Comments/Description: **Used for storage of PCB transformers**Site Rated by: **E.N. Snider, S.K. Ninicucci, S.J. Tiffany, J. M. Baker****I. FACTORS**

Rating Factor	Factor Rating (0-3)	Multi-plier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	0	4	0	12
B. Distance to nearest well	3	10	30	30
C. Land use/zoning within 1 mile radius	2	3	6	9
D. Distance to installation boundary	3	6	18	18
E. Critical environments within 1 mile radius of site	1	10	10	30
F. Water quality of nearest surface water body	1	6	6	18
G. Ground water use of uppermost aquifer	3	9	27	27
H. Population served by surface water supply within 3 miles downstream of site	0	6	0	18
I. Population served by ground-water supply within 3 miles of site	3	6	18	18
Subtotals			115	180
Receptors subcore (100 = factor score subtotal/maximum score subtotal)				64

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

- | | |
|--|---------------|
| 1. Waste quantity (small, medium, or large) | S = small |
| 2. Confidence level (confirmed or suspected) | C = confirmed |
| 3. Hazard rating (low, medium, or high) | H = high |

Factor Subscore A (from 20 to 100 based on factor score matrix) **60**

B. Apply persistence factor

Factor Subscore A x Persistence Factor = Subscore B

$$60 \times 1.00 = 60$$

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

$$60 \times 1.00 = 60$$

III. PATHWAYS

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore 0

B. Rate the migration potential for 3 potential pathways: surface water migration, flooding, and ground-water migration. Select the highest rating and proceed to C.

Rating Factor	Factor Rating (0-3)	Multi-plier	Factor Score	Maximum Possible Score
1. Surface Water Migration				
Distance to nearest surface water	2	8	16	24
Net precipitation	2	6	12	18
Surface erosion	1	8	8	24
Surface permeability	0	6	0	18
Rainfall intensity	1	8	8	24
Subtotal			44	100
Subscore (100 x factor score subtotal/maximum score subtotal)				41
2. Flooding				
	0	1	0	3
Subscore (100 x factor score/3)				0
3. Ground-water migration				
Depth to ground water	1	8	8	24
Net precipitation	2	6	12	18
Soil permeability	3	8	24	24
Subsurface flow	0	8	0	24
Direct access to ground water	0	8	0	24
Subtotal			44	114
Subscore (100 x factor score subtotal/maximum score subtotal)				39

C. Highest pathway subscore.

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore 41

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	64
Waste Characteristics	60
Pathways	41
Total	165
divided by 3 =	
55	Gross total score

B. Apply factor for waste containment from waste management practices.

Gross total score x waste management practices factor = final score

55 x 1.00 =

55
FINAL SCORE

WASTE MANAGEMENT SITING REGULATORY FORM

Name of site: Landfill No. 4
 Location: East of Tazewell
 Date of Operation: 1975 to Present
 Owner/Operator: L. Sawyer
 Contents/Description: Currently used for land disposal & sludge disposal

Site Rated by: E.M. Bidder, E.M. Nicolson, G.J. Tiffany, J. H. Baker

I. RECEIPTS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	0	4	0	12
B. Distance to nearest well	3	10	30	30
C. Land use/zoning within 1 mile radius	2	3	6	9
D. Distance to installation boundary	2	6	12	18
E. Critical environments within 1 mile radius of site	1	10	10	30
F. Water quality of nearest surface water body	1	6	6	18
G. Ground water use of adjacent aquifer	3	9	27	27
H. Population served by surface water supply within 3 miles downstream of site	0	6	0	18
I. Population served by ground-water supply within 3 miles of site	3	6	18	18
Subtotal			100	180
Receptors estimate (100 = factor score subtotal/maximum score subtotal)				61

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

- 1. Waste quantity (small, medium, or large) S = small
- 2. Confidence level (confirmed or suspected) C = confirmed
- 3. Hazard rating (low, medium, or high) H = high

Factor Score A (from 20 to 100 based on factor score matrix) 60

B. Apply persistence factor

Factor Score A x Persistence Factor = Score B

60 x 1.00 = 60

C. Apply physical state multiplier

Score B x Physical State Multiplier = Waste Characteristics Score

60 x 1.00 = 60

III. POTENTIAL

A. If there is evidence of migration of hazardous constituents, assign maximum factor scores of 100 points for direct evidence or 50 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Scores 0

B. Rate the migration potential for 3 potential pathways: surface water migration, flooding, and ground-water migration. Select the highest rating and proceed to C.

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
1. Surface Water Migration				
Distance to nearest surface water	2	0	16	24
Net precipitation	2	6	12	18
Surface erosion	1	0	0	24
Surface permeability	0	6	0	18
Rainfall intensity	1	0	0	24
Subtotal			44	108
Score (100 x factor score subtotal/maximum score subtotal)				41
2. Flooding				
	0	1	0	3
Score (100 x factor score/3)				0
3. Ground-water migration				
Depth to ground water	1	0	0	24
Net precipitation	2	6	12	18
Soil permeability	3	0	0	24
Subsurface flow	0	0	0	24
Direct access to ground water	0	0	0	24
Subtotal			44	114
Score (100 x factor score subtotal/maximum score subtotal)				39

C. Highest pathway scores.

Enter the highest score value from A, B-1, B-2 or B-3 above.

Pathway Scores 41

IV. WASTE MANAGEMENT PRACTICES

A. Assign the three scores for receptors, waste characteristics, and pathways.

Receptors	41
Waste Characteristics	60
Pathways	41
Total	141
141 divided by 3 =	
50	Over total score

B. Apply factor for waste contained from waste management practices.

Over total score x waste management practices factor = final score

50 x 1.00 =

50
FINAL SCORE

GROUND WATER MONITORING NETWORKS PLANName of site: **Drainage Pit No. 1 (Test Cell)**Location: **Behind Building 414**Date of Operation: **1987- Present**Owner/Operator: **E.I. Soper**Comments/Description: **Drainage pit used by occupants of building.**Site Rated by: **E.H. Sider, G.R. Minionci, G.J. Tiffany, J. R. Baker****I. RECEIVING**

Rating Factor	Factor Rating 0-30	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	2	4	8	12
B. Distance to nearest well	3	10	30	30
C. Land use/cover within 1 mile radius	3	3	9	9
D. Distance to installation boundary	1	6	6	18
E. Critical environments within 1 mile radius of site	1	10	10	30
F. Water quality of nearest surface water body	1	6	6	18
G. Ground water use of adjacent aquifer	3	9	27	27
H. Population served by surface water supply within 3 miles downstream of site	0	6	0	18
I. Population served by ground-water supply within 3 miles of site	3	6	18	18
			Subtotal	114
				100
				Receptors exposure (100 = factor score subtotal/maximum score subtotal)
				63

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

- | | |
|--|---------------|
| 1. Waste quantity (small, medium, or large) | H = medium |
| 2. Confidence level (confirmed or suspected) | C = confirmed |
| 3. Hazard rating (low, medium, or high) | H = high |

Factor Subscore B (from 20 to 100 based on factor score matrix) **50**

B. Apply persistence factor

Factor Subscore B : Persistence Factor = Subscore B

50 : **1.00** = **50**

C. Apply physical state multiplier

Subscore B : Physical State Multiplier = Waste Characteristics Subscore

50 : **1.00** = **50**

III. PATHWAYS

A. If there is evidence of migration of hazardous contaminants, assign various factor subcores of 100 points for direct evidence or 60 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore 0

B. Rate the migration potential for 3 potential pathways: surface water migration, flooding, and ground-water migration. Select the highest rating and proceed to C.

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
1. Surface Water Migration				
Distance to nearest surface water	2	8	16	24
Net precipitation	2	6	12	18
Surface erosion	1	8	8	24
Surface permeability	0	6	0	18
Rainfall intensity	1	8	8	24
			44	108
			Subscore (100 = factor score subtotal/maximum score subtotal) 41	
2. Flooding				
	0	1	0	3
			Subscore (100 = factor score/3) 0	
3. Ground-water migration				
Depth to ground water	2	8	16	24
Net precipitation	2	6	12	18
Soil permeability	3	8	24	24
Subsurface flow	0	8	0	24
Direct access to ground water	0	8	0	24
			52	114
			Subscore (100 = factor score subtotal/maximum score subtotal) 45	

C. Highest pathway subscore.

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore 45

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	63	
Waste Characteristics	59	
Pathways	45	
Total	167	divided by 3 = 53 Gross total score

B. Apply factor for waste containment from waste management practices.

Gross total score x waste management practices factor = final score

53 x 1.00 = 53
FINAL SCORE

HAZARD ASSESSMENT USING NETWORKED PSMName of site: **WFO Yard**Location: **East of RR, West of coal plant.**Date of Operation: **1980-1988**Owner/Operator: **E. I. DuPont**Contents/Description: **Storage of PCB Transformers, Waste Oil Drum**Site Rated by: **E. H. Saylor, S. L. Mancini, S. J. Tiffany, J. H. Sater****I. RATING**

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	2	4	8	12
B. Distance to nearest well	3	10	30	30
C. Land use/zoning within 1 mile radius	3	3	9	9
D. Distance to installation boundary	1	6	6	18
E. Critical environments within 1 mile radius of site	1	10	10	30
F. Water quality of nearest surface water body	1	6	6	18
G. Ground water use of adjacent aquifer	3	9	27	27
H. Population served by surface water supply within 3 miles downstream of site	0	6	0	18
I. Population served by ground-water supply within 3 miles of site	3	6	18	18
Subtotal			114	180
Receipts score (100 x factor score subtotal/maximum score subtotal)				63

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

- | | |
|--|---------------|
| 1. Waste quantity (small, medium, or large) | S = small |
| 2. Confidence level (confirmed or suspected) | S = suspected |
| 3. Hazard rating (low, medium, or high) | H = high |

Factor Score A (from 20 to 100 based on factor score matrix) **40**

B. Apply persistence factor

Factor Score B = Persistence Factor = Score A

40 = **1.00** = **40**

C. Apply physical state multiplier

Score B = Physical State Multiplier = Waste Characteristics Score

40 = **1.00** = **40**

III. SUMMARY

A. If there is evidence of migration of hazardous contaminants, assign various factor subcores of 100 points for direct evidence or 50 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subcore 0

B. Rate the migration potential for 3 potential pathways: surface water migration, flooding, and ground-water migration. Select the highest rating and proceed to C.

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
1. Surface Water Migration				
Distance to nearest surface water	2	0	15	30
Net precipitation	2	6	12	18
Surface erosion	1	0	0	30
Surface permeability	0	6	0	18
Rainfall intensity	1	0	0	30
Subtotal			44	108
Subcore (100 x factor score subtotal/maximum score subtotal)				41
2. Flooding				
	0	1	0	3
Subcore (100 x factor score/3)				0
3. Ground-water migration				
Depth to ground water	2	0	15	30
Net precipitation	2	6	12	18
Soil permeability	3	0	30	30
Subsurface flow	0	0	0	30
Direct access to ground water	0	0	0	30
Subtotal			32	114
Subcore (100 x factor score subtotal/maximum score subtotal)				45

C. Highest pathway subcore.
Enter the highest subcore value from A, B-1, B-2 or B-3 above.

Pathways Subcore 45

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subcores for receptors, waste characteristics, and pathways.

Receptors	63
Waste Characteristics	40
Pathways	45
Total	149

149 divided by 3 =

50 Gross total score

B. Apply factor for waste containment from waste management practices.
Gross total score x waste management practices factor = final score

50 x 1.00 =

 50
FINAL SCORE

APPENDIX I
GLOSSARY OF TERMINOLOGY AND ABBREVIATIONS

APPENDIX I
GLOSSARY OF TERMINOLOGY AND ABBREVIATIONS

ABG: Air Base Group.

ACFT MAINT: Aircraft Maintenance.

ADC: Aerospace Defense Command.

ADTAC: Air Defense Tactical Air Command

AEC: Atomic Energy Commission.

AF: Air Force.

AFB: Air Force Base.

AFCS: Air Force Communications Service.

AFESC: Air Force Engineering and Services Center.

AFFF: Aqueous Film Forming Foam, a fire extinguishing agent. AFFF concentrates include fluorinated surfactants plus foam stabilizers diluted with water to a 3 to 6% solution.

AFR: Air Force Regulation.

AFS: Air Force Station.

AFCC: Air Force Communications Command.

Ag: Chemical symbol for silver.

AGE: Aerospace Ground Equipment.

ALC: Air Logistics Center.

ALLUVIUM: Materials eroded, transported and deposited by streams.

ALLUVIAL FAN: A fan-shaped deposit formed by a stream either where it issues from a narrow mountain valley into a plain or broad valley, or where a tributary stream joins a main stream.

AMS: Avionics Maintenance Squadron.

ANG: Air National Guard.

ANTICLINE: A fold in which layered strata are inclined down and away from the axes.

AROMATIC: Description of organic chemical compounds in which the carbon atoms are arranged into a ring with special electron stability associated. Aromatic compounds are often more reactive than non-aromatics.

APS: Aerial Port Squadron.

ARTESIAN: Ground water contained under hydrostatic pressure.

AQUICLUDE: Poorly permeable formation that impedes ground-water movement and does not yield to a well or spring.

AQUIFER: A geologic formation, group of formations, or part of a formation that is capable of yielding water to a well or spring.

AQUITARD: A geologic unit which impedes ground-water flow.

AREFG: Air Refueling Group.

ASC: Audiovisual Service Center.

ATC: Air Training Command.

ATD: Air Training Detachment

AVGAS: Aviation Gasoline.

Ba: Chemical symbol for barium.

BEDROCK: Any solid rock exposed at the surface of the earth or overlain by unconsolidated material.

BEE: Bioenvironmental Engineer.

BES: Bioenvironmental Engineering Section.

BIOACCUMULATE: Tendency of elements or compounds to accumulate or build up in the tissues of living organisms when they are exposed to these elements in their environments, e.g., heavy metals.

BIODEGRADABLE: The characteristic of a substance to be broken down from complex to simple compounds by microorganisms.

BISS: Base Interservice Surveillance Sets.

BMW: Bombardment Wing.

BOD: Biochemical Oxygen Demand

BOWSER: A portable tank, usually under 200 gallons in capacity.

BX: Base Exchange.

CAMS: Consolidated Aircraft Maintenance Squadron.

CAP: Civilian Air Patrol.

Cd: Chemical symbol for cadmium.

CE: Civil Engineering.

CERCLA: Comprehensive Environmental Response, Compensation and Liability Act.

CES: Civil Engineering Squadron.

CIRCA: About; used to indicate an approximate date.

CLOSURE: The completion of a set of rigidly defined functions for a hazardous waste facility no longer in operation.

CMS: Component Maintenance Squadron.

CN: Chemical symbol for cyanide.

COASTAL PLAINS: Physiographic province of the Eastern United States characterized by a gently seaward sloping surface formed over exposed, unconsolidated, stratified marine fluvial sediments. Typical coastal plain features include low hills and ridges, organic deposits, floodplains and high water tables.

COD: Chemical Oxygen Demand, a measure of amount of oxygen required to oxidize organic and oxidizable inorganic compounds in water.

COE: Corps of Engineers.

COLLUVIUM: Sediments that have moved down slope primarily under the influence of gravity or as periodic, unchanneled flow. It frequently includes large boulders or other fragments which contrast this material to alluvium, material deposited by channelized flow which results in some degree of sorting according to particle size.

CONFINED AQUIFER: An aquifer bounded above and below by impermeable strata or by geologic units of distinctly lower permeability than that of the aquifer itself.

CONTINING UNIT: An aquitard or other poorly permeable layer which restricts the movement of ground water.

CONTAMINATION: The degradation of natural water quality to the extent that its usefulness is impaired; there is no implication of any specific limits since the degree of permissible contamination depends upon the intended end use or uses of the water.

CONUS: Continental United States.

CPM: Counts per minute (alpha radiation measurement).

Cr: Chemical symbol for chromium.

CRS: Component Repair Squadron.

CSG: Combat Support Group.

Cu: Chemical symbol for copper.

CURIE: Unit for measuring radioactivity. One curie is the quantity of any radioactive isotope undergoing 3.7×10^{10} disintegrations per second.

DEQPPM: Defense Environmental Quality Program Policy Memorandum

DET: Detachment.

DIP: The angle measured from the horizontal that a structural feature makes. Structural features may include bedding, folds, faults, etc. Dip is measured in degrees of the vertical plane, normal to strike.

DISPOSAL FACILITY: A facility or part of a facility at which hazardous waste is intentionally placed into or on land or water, and at which waste will remain after closure.

DISPOSAL OF HAZARDOUS WASTE: The discharge, deposit, injection, dumping, spilling, or placing of any hazardous waste into or on land or water so that such waste or any constituent thereof may enter the environment or be emitted into the air or discharged into any waters, including ground water.

DOD: Department of Defense.

DOWNGRADEMENT: In the direction of decreasing hydraulic static head; the direction in which ground water flows.

DP: Discharge Pit.

DPDO: Defense Property Disposal Office, previously included Redistribution and Marketing (R&M) and Salvage.

DQ & A: Diagnostics, Quality and Assurance.

DUMP: An uncovered land disposal site where solid and/or liquid wastes are deposited with little or no regard for pollution control or aesthetics; dumps are susceptible to open burning and are exposed to the elements, disease vectors and scavengers.

EFFLUENT: A liquid waste discharge from a manufacturing or treatment process, in its natural state, or partially or completely treated, that discharges into the environment.

ELECTRICAL RESISTIVITY (ER): Specialized equipment designed to produce an electrical current through subsurface geologic strata. The instrument and the technique permit the operator to examine conditions at specific depths below land surface. Subsurface contrasts indicative of specific geologic or hydrologic conditions may be obtained through correlation of the ER data with known site information such as that provided by test borings or well construction logs.

ELECTROMAGNETIC CONDUCTIVITY: EM

EMCS: Energy Monitor and Counter Systems

EOD: Explosive Ordnance Disposal.

EP: Extraction Procedure, the EPA's standard laboratory procedure for leachate generation.

EPA: U.S. Environmental Protection Agency.

EPHEMERAL AQUIFER: A water-bearing zone typically located near the surface which normally contains water seasonally.

EROSION: The wearing away of land surface by wind, water, or chemical processes.

ES: Engineering-Science, Inc.

ESCARPMENT: A long, usually continuous cliff or relatively steep slope facing one general direction, breaking the continuity of the land by separating two level or gently sloping surfaces; produced by erosion or faulting.

F-106: Type of fighter aircraft.

FAA: Federal Aviation Administration.

FACILITY (As Applied to Hazardous Wastes): Any land and appurtenances thereon and thereto used for the treatment, storage and/or disposal of hazardous wastes.

FAULT: A fracture in rock along which the adjacent rock surfaces are differentially displaced.

Fe: Chemical symbol for iron.

FIS: Fighter Interceptor Squadron.

FLOOD PLAIN: The lowland and relatively flat areas adjoining inland and coastal areas of the mainland and off-shore islands, including, at a minimum, areas subject to a one percent or greater chance of flooding in any given year.

FLOW PATH: The direction or movement of ground water as governed principally by the hydraulic gradient.

FMS: Field Maintenance Squadron.

FPTA: Fire Protection Training Area.

FID: Field Training Detachment.

FTW: Fighter Training Wing.

GATR: Ground to Air Transmitter Receiver Site.

GC/MS: Gas chromatograph/mass spectrophotometer, a laboratory procedure for identifying unknown compounds.

GEOPHYSICS: (Geophysical survey) the use of one or more geophysical instruments or methods to measure specific properties of the earth's subsurface through indirect means. Geophysical equipment may include electrical resistivity, geiger counter, magnetometer, metal detector, electromagnetic conductivity, magnetic susceptibility, etc. Geophysics seeks to provide specific measurements of the earth's magnetic field, the electrical properties of specific geologic strata, radioactivity, etc.

GLACIAL TILL: Unsorted and unstratified drift consisting of clay, sand, gravel and boulders which is deposited by or underneath a glacier.

GLAUCONITIC SAND AND GRAVEL: A mixture of sand, gravel and glauconite, an iron-potassium silicate mineral which imparts a green color to the mixture. Glauconite is geologically significant because it indicates slow sedimentation.

GLIDE-BLOCK: A large section of a geologic unit that has separated from the main portion of the unit due to earthquake/landslide-induced lateral movement.

GROUND WATER: Water beneath the land surface in the saturated zone that is under atmospheric or artesian pressure.

GROUND WATER RESERVOIR: The earth materials and the intervening open spaces that contain ground water.

HALOGEN: The class of chemical elements including fluorine, chlorine, bromine, and iodine.

HARDFILL: Disposal sites receiving construction debris, wood, miscellaneous spoil material.

HARM: Hazard Assessment Rating Methodology.

HAZARDOUS SUBSTANCE: Under CERCLA, the definition of hazardous substance includes:

1. All substances regulated under Paragraphs 311 and 307 of the Clean Water Act (except oil);

2. All substances regulated under Paragraph 3001 of the Solid Waste Disposal Act;
3. All substances regulated under Paragraph 112 of the Clean Air Act;
4. All substances which the Administrator of EPA has acted against under Paragraph 7 of the Toxic Substance Control Act;
5. Additional substances designated under Paragraph 102 of CERCLA.

HAZARDOUS WASTE: As defined in RCRA, a solid waste, or combination of solid wastes, which because of its quantity, concentration, or physical, chemical or infectious characteristics may cause or significantly contribute to an increase in mortality or an increase in serious, irreversible, or incapacitating reversible illness; or pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed.

HAZARDOUS WASTE GENERATION: The act or process of producing a hazardous waste.

HEAVY METALS: Metallic elements, including the transition series, which include many elements required for plant and animal nutrition in trace concentrations but which become toxic at higher concentrations.

Hg: Chemical symbol for mercury.

HQ: Headquarters.

ISIAP: Hazardous Waste Accumulation Point.

HMMP: Hazardous Waste Management Facility.

HYDROCARBONS: Organic chemical compounds composed of hydrogen and carbon atoms chemically bonded. Hydrocarbons may be straight chain, cyclic, branched chain, aromatic, or polycyclic, depending upon arrangement of carbon atoms. Halogenated hydrocarbons are hydrocarbons in which one or more hydrogen atoms has been replaced by a halogen atom.

INCOMPATIBLE WASTE: A waste unsuitable for commingling with another waste or material because the commingling might result in generation of extreme heat or pressure, explosion or violent reaction, fire, formation of substances which are shock sensitive, friction sensitive, or otherwise have the potential for reacting violently, formation of toxic dusts, mists, fumes, and gases, volatilization of ignitable or toxic chemicals due to heat generation in such a manner that the likelihood of contamination of ground water or escape of the substance into the environment is increased, any other reaction which might result in not meeting the air, human health, and environmental standards.

INFILTRATION: The movement of water through the soil surface into the ground.

IRP: Installation Restoration Program.

ISOPACH: Graphic presentation of geologic data, including lines of equal unit thickness that may be based on confirmed (drill hole) data or indirect geophysical measurement.

ISOTOPE: Two or more species of atoms of the same chemical element, with the same atomic number and place in the periodic table, and nearly identical chemical properties, but with different atomic mass numbers and different physical properties; an example may be the radioactive isotope - Carbon (12) and Carbon-14.

ISS: Information Systems Squadron.

JP-4: Jet Propulsion Fuel Number Four; contains both kerosene and gasoline fractions.

JP-5: Jet Propulsion Fuel Number Five; consists of high boiling kerosene fractions.

LANDFILL: A land disposal site used for disposing solid and semi-solid materials. May refer either to a sanitary landfill or dump.

LEACHATE: A solution resulting from the separation or dissolving of soluble or particulate constituents from solid waste or other man-placed medium by percolation of water.

LEACHING: The process by which soluble materials in the soil, such as nutrients, pesticide chemicals or contaminants, are washed into a lower layer of soil or are dissolved and carried away by water.

LENTICULAR: A bed or rock stratum or body that is lens-shaped.

LINER: A continuous layer of natural or man-made materials beneath or on the sides of a surface impoundment, landfill, or landfill cell which restricts the downward or lateral escape of hazardous waste, hazardous waste constituents or leachate.

LITHOLOGY: The description of the physical character of a rock.

LOESS: An essentially unconsolidated unstratified calcareous silt; commonly homogeneous, permeable and buff to gray in color.

LYSIMETER: A vacuum operated sampling device used for extracting pore water samples at various depths within the unsaturated zone.

m: Milli (10^{-3}).

MA-1: Type of aircraft component.

MAC: Military Airlift Command.

MAGNETOMETER (MG): A device capable of measuring localized variations in the earth's magnetic field that may be due to disturbed areas such as

backfilled trenches, buried objects, etc. Measurements may be obtained at points located on a grid pattern so that the data can be contoured, revealing the location, size and intensity of the suspected anomaly.

MAINT: Recording System Maintenance.

MATS: Military Air Transport Service.

MAW: Military Airlift Wing.

MEK: Methyl Ethyl Ketone.

METALS: See "Heavy Metals".

mgd: Million Gallons per Day.

MIBK: Methyl Isobutyl Ketone.

MICRO: μ (10^{-6})

ug/l: Micrograms per liter.

umhos: A unit of electrical conductivity (the reciprocal of ohm). One umho conductance per centimeter cubed with a potential of one volt allows the passage of one ampere current per square centimeter of area.

mg/l: Milligrams per liter.

MMS: Munitions Maintenance Squadron.

MOA: Military Operating Area.

MOGAS: Motor gasoline.

Mn: Chemical symbol for manganese.

MONITORING WELL: A well used to measure ground-water levels and to obtain ground-water samples for water quality analyses. As distinguished from observation wells, monitoring wells are often designed for longer term operations. They are constructed of materials for the site-specific climatic, hydrogeologic and contaminant conditions.

MORaine: An accumulation of glacial drift deposited chiefly by direct glacial action and possessing initial constructional form independent of the floor beneath it.

MSL: Mean Sea Level.

MUNITION ITEMS: Munitions or portions of munitions having an explosive potential.

MUNITIONS RESIDUE: Non-explosive segments of waste munitions (i.e., bomb casings).

MWR: Morale Welfare and Recreation.

NCO: Noncommissioned Officer.

NCOIC: Noncommissioned Officer In-Charge.

NDI: Non-destructive Inspection.

NET PRECIPITATION: The amount of annual precipitation minus annual evaporation.

NGVD: National Geodetic Vertical Datum of 1929. A national datum system, tied to Mean Sea Level, but referenced primarily to land-based benchmarks.

Ni: Chemical symbol for nickel.

NOAA: National Oceanic and Atmospheric Administration.

NON-CALCARBOUS: Not bearing calcium carbonate (CaCO_3) a characteristic mineral of marine paleoenvironment.

NPDES: National Pollutant Discharge Elimination System.

OBC: Off-Base Contract

OBSERVATION WELL: An informally designed cased well, open to a specific geologic unit or formation, designed to allow the measurement of physical ground-water properties within the zone or unit of interest. Observation wells are designed to permit the measurement of water levels and in-situ parameters such as ground-water (flow velocity and flow direction). Not to be confused with a monitoring well, a well designed to permit accurate ground-water quality monitoring. Monitoring wells are constructed of materials compatible with site-specific climatic, hydrogeologic and contaminant conditions. Monitoring well installation and construction is planned to have minimal impacts on apparent ground-water quality and will often be for longer term operation compared with observation wells.

OENL: USAF Occupational and Environmental Health Laboratory.

OIC: Officer-In-Charge.

OMS: Organizational Maintenance Squadron.

OPNS: Operations.

ORGANIC: Being, containing or relating to carbon compounds, especially in which hydrogen is attached to carbon.

OSI: Office of Special Investigations.

OSG: Symbols for oil and grease.

OUTCROP: Zone or area of exposure where a geologic unit or formation occurs at or near land surface. "Outcrop area" is an important factor in hydrogeologic studies as this zone usually corresponds to the point where significant recharge occurs. When this term is used as an intransitive verb: "where the unit crops out....."

OUTWASH: Well-sorted sand and gravel strata deposited in the melt water streams of a retreating glacier.

OXIDIZER: Material necessary to support combustion of fuel.

Pb: Chemical symbol for lead.

PCB: Polychlorinated Biphenyl; liquids used as dielectrics in electrical equipment.

PD-680: Cleaning solvent; petroleum distillate, Stoddard solvent.

PERCHED WATER TABLE: A water table above a relatively impermeable zone underlain by unsaturated rocks of sufficient permeability to allow ground-water movement.

PERCOLATION: Movement of moisture by gravity or hydrostatic pressure through interstices of unsaturated rock or soil.

PERMEABILITY: The relative rate of water flow through a porous medium. The USDA, Soil Conservation Service describes permeability qualitatively as follows:

very slow	<0.06	inches/hour
slow	0.06 to 0.2	inches/hour
moderately slow	0.2 to 0.6	inches/hour
moderate	0.6 to 2.0	inches/hour
moderately rapid	2.0 to 6.0	inches/hour
rapid	6.0 to 20	inches/hour
very rapid	>20	inches/hour

PERSISTENCE: As applied to chemicals, those which are very stable and remain in the environment in their original form for an extended period of time.

PESTICIDE: An agent used to destroy pests. Pesticides include such specialty groups as herbicides, fungicides, insecticides, etc.

pH: Negative logarithm of hydrogen ion concentration.

PIEDMONT: An upland subdivision of the Appalachian Highlands Physiographic Province, extending from Alabama to New York. The zone is characterized by rolling hills and residual ridges formed by dissection of peneplained igneous and metamorphic terrain.

pico: 10^{-12}

Public Law.

PMEL: Precision Measurement Equipment Lab.

POL: Petroleum, Oils and Lubricants.

POLLUTANT: Any introduced gas, liquid or solid that makes a resource unfit for a specific purpose.

POLYCYCLIC COMPOUND: All compounds in which carbon atoms are arranged into two or more rings, usually aromatic in nature.

POTENTIALLY ACTIVE FAULT: A fault along which movement has occurred within the last 2.5-million years.

POTENTIOMETRIC SURFACE: The imaginary surface to which water in an artesian aquifer would rise in tightly screened wells penetrating it.

ppb: Parts per billion by weight.

ppm: Parts per million by weight.

PRECIPITATION: Rainfall.

PROPELLANT: fuels, oxiders and monopropellants.

QUATERNARY MATERIALS: The second period of the Cenozoic geologic era, following the Tertiary, and including the last 2-3 million years.

QAE: Quality Assurance Evaluator.

QUICKTRANS: Automated Terminal Service.

RBC: Rotating Biological Contactors.

RCRA: Resource Conservation and Recovery Act.

RD: Low-level radioactive waste disposal site.

RECEPTORS: The potential impact group or resource for a waste contamination source.

RECHARGE AREA: A surface area in which surface water or precipitation percolates through the unsaturated zone and eventually reaches the zone of saturation. Recharge areas may be natural or manmade.

RECHARGE: The addition of water to the ground-water system by natural or artificial processes.

RECON: Reconnaissance.

RESISTIVITY: See Electrical Resistivity

RM: Resource Management.

RWDS: Radioactive Waste Disposal Site.

SAC: Strategic Air Command.

SACMET: Strategic Air Command Management Engineering Team.

SANITARY LANDFILL: A land disposal site using an engineered method of disposing solid wastes on land in a way that minimizes environmental hazards.

SAPROLITE: A residual soil retaining the physical appearance or former structure of the parent rock.

SATURATED ZONE: That part of the earth's crust in which all voids are filled with water.

SAX'S TOXICITY: A rating method for evaluating the toxicity of chemical materials.

SCS: U.S. Department of Agriculture Soil Conservation Service.

SEISMICITY: Pertaining to earthquakes or earth vibrations.

SLUDGE: The solid residus resulting from a manufacturing or wastewater treatment process which also produces a liquid stream. The residue which accumulates in liquid fuel storage tanks.

SOLE SOURCE: As in aquifer. The only source of potable water supplies of acceptable quality available in adequate quantities for a significant population. Sole source is a legal term which permits use control of the aquifer by designated regulatory authorities.

SMART: Structural Maintenance and Repair Team.

SOLID WASTE: Any garbage, refuse, or sludge from a waste treatment plant, water supply treatment, or air pollution control facility and other discarded material, including solid, liquid, semi-solid, or contained gaseous material resulting from industrial, commercial, mining, or agricultural operations and from community activities, but does not include solid or dissolved materials in domestic sewage; solid or dissolved materials in irrigation return flows; industrial discharges which are point source subject to permits under Section 402 of the Federal Water Pollution Control Act, as amended (86 USC 880); or source, special nuclear, or by-product material as defined by the Atomic Energy Act of 1954 (68 USC 923).

SP: Spill area.

SPS: Security Police Squadron

SPILL: Any unplanned release or discharge of a hazardous waste onto or into the air, land, or water.

SRAM: Short Range Attack Missile

SS: Supply Squadron.

STORAGE OF HAZARDOUS WASTE: Containment, either on a temporary basis or for a longer period, in such a manner as not to constitute disposal of such hazardous waste.

STP: Sewage Treatment Plant.

STRIKE: The compass direction or trend taken by a structural feature, such as bedding, folds, faults, etc. Strike is measured at a point when the specific feature intersects the topographic surface.

SUPS: Supply Squadron.

T: Treatment site method.

T-33: Type of Trainer aircraft

TAC: Tactical Air Command.

TACC: Tactical Air Control Center.

TASS: Tactical Air Support Squadron.

TCA: 1,1,1,-Tetrachloroethane.

TCE: Trichloroethylene, a solvent and suspected carcinogen.

TDS: Total Dissolved Solids.

TECTONIC (ally): Said of or pertaining to the forces and resulting structural or deformational features evident in the earth's crust. Tectonics usually deals with the broad architecture of the earth's outer crust.

TFTS: Tactical Fighter Training Squadron.

TFW: Tactical Fighter Wing.

TIDAL STRIP: Physiographic subdivision commonly associated with (ocean) wave activity. Usually includes berms, beach ridges, tidal flats and related landforms typically produced by coastal erosional and depositional processes.

TILL: Unstratified glacial drift consisting of clay, sand, gravel and boulders intermingled.

TIDE: Test Measurement and Diagnostic Equipment.

TOC: Total Organic Carbon.

TOXICITY: The ability of a material to produce injury or disease upon exposure, ingestion, inhalation, or assimilation by a living organism.

TRANS: Transportation Squadron.

TRANSMISSIVITY: The rate at which water is transmitted through a unit width of aquifer under a unit hydraulic gradient.

TREATMENT OF HAZARDOUS WASTE: Any method, technique, or process including neutralization designed to change the physical, chemical, or biological character or composition of any hazardous waste so as to neutralize the waste or so as to render the waste nonhazardous.

TS: Transportation Squadron.

TSD: Treatment, storage or disposal sites/methods.

UPGRADIENT: In the direction of increasing hydraulic static head; the direction opposite to the prevailing flow of ground-water.

US: United States.

USAF: United States Air Force.

USAFSS: United States Air Force Security Service.

USDA: United States Department of Agriculture.

USFWS: United States Fish and Wildlife Service.

USGS: United States Geological Survey.

WATER TABLE: Surface of a body of unconfined ground water at which the pressure is equal to that of the atmosphere.

WWTP: Wastewater Treatment Plant.

Zn: Chemical symbol for zinc.

Table I-1

GEOLOGICAL TIME SCALE

<i>Era</i>	<i>Period</i>	<i>Epoch</i>	<i>Tentative Absolute Age</i>
Cenozoic	Quaternary	Holocene	11,000 yrs.
		Pleistocene	2 million yrs.
	Tertiary	Pliocene	8
		Miocene	26
		Oligocene	37
		Eocene	53
		Paleocene	70 m.yrs.
		<hr/>	
Mesozoic	Cretaceous	135	
	Jurassic	190	
	Triassic	230 m.yrs.	
Paleozoic	Permian	280	
	Pennsylvanian		
	Mississippian	350	
	Devonian	400	
	Silurian	430	
	Ordovician	500	
	Cambrian	600 m. yrs.	
Precambrian	600-3600 m.yrs.		
----- Lost Interval -----			
Origin of Earth	4600 m.yrs.		

APPENDIX J
REFERENCES

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REFERENCES

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APPENDIX K

INDEX OF REFERENCES TO POTENTIAL CONTAMINATION SITES

AT K. I. SAWYER AFB

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