

## 4. HAZARD RANKING SYSTEM

This section presents the results of the Hazard Ranking System (HRS) scoring for Former Landfill #3 at Fort McClellan. A background discussion of the scoring system methodology and a summary of the assumptions and limitations inherent to the scoring is provided in Sections 4.1 through 4.3. The results of the HRS scoring are presented in Section 4.4 and Appendix G.

### 4.1 HAZARD RANKING SYSTEM SUMMARY

The primary objective of the HRS is to accurately assess the relative degree of risk to human health and the environment posed by uncontrolled hazardous waste sites and facilities under review through the migration pathways of groundwater, surface water, soil, and air. The HRS score is the primary criterion that the U.S. Environmental Protection Agency (EPA) uses to determine whether a site should be placed on the National Priorities List (NPL). While not as in-depth as a risk assessment, the HRS provides a measure of relative risk among the potential NPL sites and is used as a screening tool to identify those sites that represent the highest priority for further investigation and possible cleanup under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

The HRS is a numeric scoring system that uses site information from available preliminary assessment (PA) reports, initial site investigations (SIs), and field investigation activities conducted at the site. The system evaluates four separate pathways: air migration, groundwater migration, surface water migration, and soil exposure. Each pathway evaluates three factor categories: the likelihood of release of hazardous substances, waste characteristics, and receptor targets. These categories are used multiplicatively to generate a pathway score. Each factor category has a maximum score of 100, which is generated by the individual pathway scores calculated from site information. Scores are first calculated for the individual pathways and then combined for the site using the root-mean-square of all pathway scores to determine the overall HRS site score, which ranges from 0 to 100.

The groundwater migration pathway evaluates threats to the nearest well, population, natural resources, and wellhead protection areas. The surface water migration pathway evaluates

three threats: drinking water, human food chain, and environment by considering the overland/flow component and groundwater to surface water components. The likelihood of release of both hazardous gases and particulates is evaluated in the air migration pathway. The soil exposure pathway surveys both resident population and nearby population threats.

EPA has established an overall score of 28.5 to use as a management tool for screening sites that are candidates for the NPL (40 CFR Part 300, December 1990). Because the HRS is intended to be a screening system, the cutoff score is not considered a significant indicator of a specific level of risk from a site, nor is the cutoff intended to reflect a point below which no risk exists.

The original HRS, adopted in 1982, evaluated the relative threat of a site over five pathways, including groundwater, surface water, air, direct contact, and fire/explosion. The revised HRS (HRS2) (USEPA 1991) retains the same structure, cutoff score, and basic approach as the original HRS, but incorporates Superfund Amendments and Reauthorization Act (SARA) requirements as well as improvements identified as necessary by EPA and the public. HRS2 retains the groundwater, surface water, and air pathways, deletes the direct contact and fire/explosion pathways, and adds soil exposure as the fourth pathway.

HRS2 is more comprehensive than the original HRS because it:

- Evaluates new exposure pathways to assess direct contact of people with contaminated soils, and contamination of the aquatic food chain
- Expands the toxicity evaluation, considering not only acute health effects, but both carcinogenic and chronic noncarcinogenic effects
- Increases the sensitive environments by giving greater weight in all pathways to those exposed to documented contamination from the site than those potentially exposed and to those exposed to contamination above health-based benchmarks or ecologically based benchmarks
- Increases the number of sensitive environments evaluated and the weights given to them in the surface water, air, and soil exposure pathways
- Evaluates the potential for air to be contaminated and for contaminated groundwater to enter surface water.

Other revisions of HRS2 include:

- Using concentration data to determine the quantity of waste at a site
- Assigning higher scores when the population is exposed to contamination versus potential exposure
- Assigning higher scores to potentially exposed populations and sensitive environments closest to a site, with scores decreasing with distance from a site.

To assist with HRS scoring and report documentation, EPA has developed an automated scoring system, the Preliminary Ranking Evaluation score (PREscore). This automated system provides an accurate, efficient, and convenient means of scoring sites using the HRS. PREscore performs HRS calculations from raw data, calculates values from hazardous substance information, and calculates site scores. The program generates HRS scoresheets, an HRS documentation record, and EPA's NPL Characteristics Data Collection Form. This information is presented in Appendix G.

#### **4.2 HRS2 SCORING OVERVIEW - FORMER LANDFILL #3**

Former Landfill #3 was identified from the 17 investigated SI sites to pose the greatest threat to human health and the environment and was selected for evaluation using HRS2 and PREscore. Former Landfill #3 was operated as the installation sanitary landfill from 1946 to 1967 using the trench and fill method. The landfill covers approximately 22 acres and is located adjacent to the currently operating landfill on the Main Post. Ponding of surface water was noted during the field investigation activities and a segment of the landfill is within an identified wetland. Ten monitoring wells are currently in place at Former Landfill #3. Five wells, OLF-1 through OLF-5, were installed by the U.S. Army Environmental Hygiene Agency (USAEHA) in 1986, and the remaining five wells, OLF-6 through OLF-10, were installed by Science Applications International Corporation (SAIC) in 1992. Sampling data for these wells are provided in Section 3. Water level measurements indicate that the groundwater flow direction is to the west and northwest to areas outside Fort McClellan and the landfill. Unnamed tributaries run through the landfill and flow westward into Cave Creek, which eventually flows off Post into Cane Creek.

The HRS2 score for Former Landfill #3 was calculated from available site records, including the *Preliminary Site Inspection Report of Fort McClellan Military Reservation* prepared by Advanced Sciences, Inc. (ASI 1991), and the *Enhanced Preliminary Assessment, Fort McClellan, Alabama* prepared by Roy F. Weston, Inc., in 1990. Information regarding facility characteristics, regulatory history, process and waste disposal history, and remedial/removal actions was incorporated from these documents into the HRS2 NPL Characteristics Data Collection Form (Appendix G). Population and migration pathway data and, in some instances, source to target distance data, were calculated using 7.5 minute U.S. Geological Survey (USGS) topographic maps of Anniston, Alabama. Other site-related information, including sampling data, waste quantities, and waste characteristics, was compiled after SI activities had been completed at Fort McClellan and incorporated into the four pathways of the HRS2 (air, groundwater, surface water, and soil).

#### **4.2.1 Groundwater Migration Pathway**

An evaluation of the groundwater pathway at Fort McClellan yielded a score of 32.16 out of 100, as shown in Table 4-1. The pathway consists of evaluating the likelihood of release of hazardous substances into the groundwater, the waste characteristics of potential contaminants, and the potential human and environmental targets within a 4-mile radius of the source.

Source and waste characterization was the first category evaluated for the HRS2 score of Former Landfill #3. A source is defined as any area where hazardous substances have been deposited, stored, disposed of, or placed, in addition to those soils that have become contaminated from migration of a hazardous substance (U.S. EPA 1990). Sources do not include those volumes of air, groundwater, surface water, or surface water sediments that have become contaminated by migration, except in cases of groundwater plumes or contaminated surface water and sediments for which a source has not been identified. In these instances, the plume or contaminated sediments may be considered a source. Based on laboratory analyses, Former Landfill #3 was characterized as a source of contamination.

The likelihood of release at the site is evaluated as either "Observed Release" or "Potential to Release" for the groundwater, surface water, soil exposure, and air migration

**Table 4-1. HRS Pathway Summary Scoresheet for Former Landfill #3,  
Fort McClellan, Anniston, Alabama**

PATHWAY SUMMARY SCORESHEET	
Groundwater Migration Pathway Score ( $S_{gw}$ )	32.16
Surface Water Migration Pathway Score ( $S_{sw}$ )	0.6
Soil Exposure Pathway Score ( $S_s$ )	0
Air Migration Pathway Score ( $S_a$ )	0
$(S_{gw}^2 + S_{sw}^2 + S_s^2 + S_a^2)$ =	593
$(S_{gw}^2 + S_{sw}^2 + S_s^2 + S_a^2)/4$ =	148
$[(S_{gw}^2 + S_{sw}^2 + S_s^2 + S_a^2)/4]^{0.5}$ =	16.08

pathways. Using previously collected groundwater data and information obtained during the SI at Former Landfill #3, observed contaminant releases into groundwater were found at the site. The aquifer directly underlying the site of the observed release is the water table aquifer in the Cambrian Rome Formation. Previous sampling data indicated a release of tetrachloroethene (PCE) to the groundwater at levels above the EPA Maximum Contaminant Level (MCL) of 5  $\mu\text{g/L}$  for drinking water standards (well OLF-5, 110  $\mu\text{g/L}$ ; well OLF-4, 12  $\mu\text{g/L}$ ; well OLF-3, 50  $\mu\text{g/L}$ ). Five additional organic compounds were detected by this analysis, including methylene chloride (9  $\mu\text{g/L}$ ), 1,1-dichloroethane (18  $\mu\text{g/L}$ ), trans-1,2-dichloroethene (24  $\mu\text{g/L}$ ), and benzene (4  $\mu\text{g/L}$ ) at OLF-4; and bis(2-ethylhexyl) phthalate at wells OLF-1 (20  $\mu\text{g/L}$ ), OLF-2 (40  $\mu\text{g/L}$ ), and OLF-3 (10  $\mu\text{g/L}$ ). Current sampling data indicated additional contaminant releases into the groundwater. These results, which produced an observed release of 550, are presented in Table 4-2.

Evaluation of the potential targets is based on four factors: the nearest drinking water well, population, recreational and/or irrigation resources, and the presence of a wellhead protection area. Residents on the installation at Fort McClellan receive water from the public water system of the city of Anniston. The city of Weaver receives its water supply from two water supply wells located approximately 1.68 miles (No. 2) and 2.06 miles (No. 3) northwest of former Landfill #3. These wells supply an approximate population of 6,650 (City of Weaver, personal communication). In addition, individuals visiting the camping area at Lake Reilly

Table 4-2. Data Summary: Groundwater - Former Landfill #3, Ft. McClellan, Anniston, Alabama

SAIC ID Number	Depth BLS	Collection Date	Associated Field QC Sample	Parameter	Units	CRL	UCR	OLF-G01 (15.10) 6/09/92 TB-0013,14 FMP003 RB-008	OLF-G02 (12.20) 6/10/92 TB-0015 FMP003 RB-009	OLF-G03 (11.70) 6/10/92 TB-0015 FMP003 RB-009	OLF-G03D (11.70) 6/10/92 TB-0015 FMP003 RB-009
<b>Method AX8 (As in Water)</b>											
Arsenic	µg/L	2.35	121	**	**	0.309	2.00	**	1.02	2.79	7.87
<b>Method CC8 (Hg in Water)</b>											
Mercury	µg/L	0.100	2.00	0.309	1.02	0.842	1.14	0.842	0.842	0.842	1.14
<b>Method SS12 (ICP Metals in Water)</b>											
Aluminum	µg/L	112	125,000	7040	240000	7320	18300	240000	7320	7320	18300
Barium	µg/L	2.82	12,000	42.1	775	172	196	775	172	172	196
Calcium	µg/L	105	200,000	916	250000	19100	20500	250000	19100	19100	20500
Chromium	µg/L	16.8	1,000	**	271	**	26.6	**	**	**	**
Cobalt	µg/L	25.0	10,000	**	120	**	**	**	**	**	**
Copper	µg/L	18.8	10,000	**	252	88.5	162	**	88.5	88.5	162
Iron	µg/L	77.5	500,000	5320	271000	17400	48400	271000	17400	17400	48400
Magnesium	µg/L	135	250,000	2700	280000	12700	20800	280000	12700	12700	20800
Manganese	µg/L	9.67	10,000	210	3820	686	831	3820	686	686	831
Nickel	µg/L	32.1	20,000	**	239	47.8	65.4	**	47.8	47.8	65.4
Silver	µg/L	10.0	2,000	**	**	**	**	**	**	**	**
Vanadium	µg/L	27.6	10,000	**	390	**	32	**	**	**	32
Zinc	µg/L	18.0	10,000	27.6	576	91.8	139	576	91.8	91.8	139
Lead	µg/L	43.4	10,000	**	1470	**	**	**	**	**	**
<b>Method UM21 (VOCs in Water)</b>											
1,1-Dichloroethane	µg/L	1	150	**	**	**	**	**	**	**	**
Benzene	µg/L	1	150	**	**	**	**	**	**	**	**
Methylisobutylketone	µg/L	1.4	100	**	**	**	**	**	**	**	**
1,1,2,2-Tetrachloroethane	µg/L	1.5	150	**	**	**	**	**	**	**	**
Tetrachloroethene	µg/L	1	150	**	**	**	1.7	**	1.7	1.7	4.3
Trichloroethene	µg/L	1	150	**	**	**	**	**	**	**	**
Unknown	µg/L	--	--	0 (0)	100 (1)	0 (0)	20 (1)	100 (1)	0 (0)	0 (0)	20 (1)

Table 4-2. Data Summary: Groundwater - Former Landfill #3, Ft. McClellan, Anniston, Alabama (Continued)

SAIC ID Number	Depth BLS	Collection Date	Associated Field QC Sample	Parameter	Units	CRL	UCR	OLF-G01 (15.10) 6/09/92 TB-0013,14 FMP003 RB-008	OLF-G02 (12.20) 6/10/92 TB-0015 FMP003 RB-009	OLF-G03 (11.70) 6/10/92 TB-0015 FMP003 RB-009	OLF-G03D (11.70) 6/10/92 TB-0015 FMP003 RB-009	
<b>Method UM25 (SVOCs in Water)</b>												
bis(2-Ethylhexyl)phthalate				μg/L	7.7	200		**	**	**	**	
Unknown				μg/L	--	--		**	**	**	**	
<b>Method UW25 (Explosives in Water)</b>												
1,3,5-Trinitrobenzene				μg/L	0.210	20		**	**	**	**	
2,4-Dinitrotoluene				μg/L	0.397	20		**	**	**	**	
<b>Method UII20 (Organochlorine Pesticides in Water)</b>												
alpha-Hexachlorocyclohexane				μg/L	0.0025	0.500		**	0.0128	U	**	
Endosulfan I				μg/L	0.0025	0.500		**	**	**	**	
Aldrin				μg/L	0.0074	0.500		**	0.0344	U	**	
Endosulfan II				μg/L	0.0077	0.500		**	0.00996	U	**	
delta-BHC				μg/L	0.0034	0.500		**	0.0117	U	**	
Dieldrin				μg/L	0.0074	0.500		**	0.0271	C	**	
Endrin				μg/L	0.0176	0.500		**	0.0356	U	**	
Heptachlor				μg/L	0.0025	0.250		**	0.00546	C	**	
Heptachlor epoxide				μg/L	0.0063	0.184		0.00692	U	**	**	
Isodrin				μg/L	0.0025	0.500		0.00967	U	0.00778	U	
Lindane				μg/L	0.0025	0.500		**	**	**	0.0145	
p,p'-DDD				μg/L	0.0081	0.572		**	0.0312	U	0.00318	
p,p'-DDE				μg/L	0.0039	0.537		**	**	**	**	
p,p'-DDT				μg/L	0.0025	0.250		**	**	**	0.0057	

-- The certification of these analytes will be submitted at a later date

CRL - Certified Reporting Limit

UCR - Upper Certified Range

\*\* indicates non-detected analytes

C - analysis is confirmed

U - analysis is unconfirmed

Unknown - The following tentatively identified compounds were identified for sample:

OLF-G02 - UNK037 100 S μg/L

Table 4-2. Data Summary: Groundwater - Former Landfill #3, Ft. McClellan, Anniston, Alabama (Continued)

SAIC ID Number	Depth BLS	Collection Date	Associated Field QC Sample	Parameter	Units	CRL	UCR	OLF-G04 (39.40) 6/10/92 TB-0015 FMP003 RB-009	OLF-G05 (30.70) 6/07/92 TB-0010 FMP003 RB-008	OLF-G06 (64.40) 6/09/92 TB-0013,14 FMP003 RB-008	OLF-G07 (41.30) 6/07/92 TB-0010 FMP003 RB-008
<b>Method AX8 (As in Water)</b>											
Arsenic		µg/L	2.35	121	**	**	**	**	**	**	**
<b>Method CC8 (Hg in Water)</b>											
Mercury		µg/L	0.100	2.00	1.49	D	**	**	**	**	**
<b>Method SS12 (ICP Metals in Water)</b>											
Aluminum		µg/L	112	125,000	1570		2310	1730	1350		
Barium		µg/L	2.82	12,000	84.8		36.1	12.9	55.4		
Calcium		µg/L	105	200,000	1000		4920	614	13100		
Chromium		µg/L	16.8	1,000	**		18.3	**	**		
Cobalt		µg/L	25.0	10,000	**		**	**	**		
Copper		µg/L	18.8	10,000	**		**	**	**		
Iron		µg/L	77.5	500,000	1620		5870	1940	1030		
Magnesium		µg/L	135	250,000	6420		3390	499	7050		
Manganese		µg/L	9.67	10,000	354		257	39.5	414		
Nickel		µg/L	32.1	20,000	**		**	**	**		
Silver		µg/L	10.0	2,000	**		**	**	**		
Vanadium		µg/L	27.6	10,000	**		**	**	**		
Zinc		µg/L	18.0	10,000	**		35.8	**	**		
Lead		µg/L	43.4	10,000	**		**	**	**		
<b>Method UM21 (VOCs in Water)</b>											
1,1-Dichloroethane		µg/L	1	150	9.6		**	**	**		
Benzene		µg/L	1	150	1.9		**	**	**		
Methylisobutylketone		µg/L	1.4	100	**		3	**	**		
1,1,2,2-Tetrachloroethane		µg/L	1.5	150	**		**	**	**		17
Tetrachloroethene		µg/L	1	150	**		**	**	**		**
Trichloroethene		µg/L	1	150	**		**	**	**		3.8
Unknown		µg/L	--	--	300 (1)		300 (1)	**	**		**

Table 4-2. Data Summary: Groundwater - Former Landfill #3, Ft. McClellan, Anniston, Alabama (Continued)

SAIC ID Number	OLF-G04	OLF-G05	OLF-G06	OLF-G07
Depth BLS	(39.40)	(30.70)	(64.40)	(41.30)
Collection Date	6/10/92	6/07/92	6/09/92	6/07/92
Associated Field QC Sample	TB-0015	TB-0010	TB-0013,14	TB-0010
Parameter	FMP003 RB-009	FMP003 RB-008	FMP003 RB-008	FMP003 RB-008

Units	CRL	UCR
<b>Method UM25 (SVOCs in Water) (Continued)</b>		
bis(2-Ethylhexyl)phthalate	7.7	200
Unknown	--	--
<b>Method UW25 (Explosives in Water)</b>		
1,3,5-Trinitrobenzene	0.210	20
2,4-Dinitrotoluene	0.397	20
<b>Method UII20 (Organochlorine Pesticides in Water)</b>		
alpha-Hexachlorocyclohexane	0.0025	0.500
Endosulfan I	0.0025	0.500
Aldrin	0.0074	0.500
Endosulfan II	0.0077	0.500
delta-BHC	0.0034	0.500
Dieldrin	0.0074	0.500
Endrin	0.0176	0.500
Heptachlor	0.0025	0.250
Heptachlor epoxide	0.0063	0.184
Isodrin	0.0025	0.500
Lindane	0.0025	0.500
p,p'-DDD	0.0081	0.572
p,p'-DDE	0.0039	0.537
p,p'-DDT	0.0025	0.250

-- The certification of these analytes will be submitted at a later date

CRL -- Certified Reporting Limit

UCR -- Upper Certified Range

\*\* indicates non-detected analytes

C -- analysis is confirmed

D -- duplicate sample

U -- analysis is unconfirmed

Unknown -- The following tentatively identified compounds were identified for sample:

OLF-G04 - UNK037 300 S µg/L, UNK588 20 S µg/L

Table 4-2. Data Summary: Groundwater - Former Landfill #3, Ft. McClellan, Anniston, Alabama (Continued)

SAIC ID Number	Depth BLS	Collection Date	Associated Field OC Sample	Parameter	Units	CRL	UCR	OLF-G07D (41.30) 6/07/92 TB-0010 FMP003 RB-008	OLF-G08 (29.34) 6/07/92 TB-0010 FMP003 RB-008	OLF-G09 (20.10) 6/08/92 TB-0011 FMP003 RB-008	OLF-G10 (16.42) 6/11/92 TB-0015 FMP003 RB-009
<b>Method AX8 (As in Water)</b>											
Arsenic		μg/L	2.35	121	**	**	**	**	**	**	**
<b>Method CC8 (Hg in Water)</b>											
Mercury		μg/L	0.100	2.00	**	**	0.191	**	**	**	**
<b>Method SS12 (ICP Metals in Water)</b>											
Aluminum		μg/L	112	125,000	1430	D	566	318	566	318	23600
Barium		μg/L	2.82	12,000	55.1	D	25.7	9.8	25.7	9.8	122
Calcium		μg/L	105	200,000	9740	D	8080	564	8080	564	4950
Chromium		μg/L	16.8	1,000	**	D	**	**	**	**	**
Cobalt		μg/L	25.0	10,000	**	D	**	**	**	**	**
Copper		μg/L	18.8	10,000	**	D	**	**	**	**	**
Iron		μg/L	77.5	500,000	919	D	1390	849	1390	849	18300
Magnesium		μg/L	135	250,000	4980	D	4440	823	4440	823	8260
Manganese		μg/L	9.67	10,000	305	D	53.7	12.3	53.7	12.3	354
Nickel		μg/L	32.1	20,000	32.1	D	**	**	**	**	**
Silver		μg/L	10.0	2,000	**	D	**	**	**	**	**
Vanadium		μg/L	27.6	10,000	**	D	**	**	**	**	**
Zinc		μg/L	18.0	10,000	32	D	35.5	19.6	35.5	19.6	93.5
Lead		μg/L	43.4	10,000	**	D	**	**	**	**	**
<b>Method UM21 (VOCs in Water)</b>											
1,1-Dichloroethane		μg/L	1	150	**	D	**	**	**	**	**
Benzene		μg/L	1	150	**	D	**	**	**	**	**
Methylisobutylketone		μg/L	1.4	100	**	D	**	**	**	**	**
1,1,2,2-Tetrachloroethane		μg/L	1.5	150	22.1	D	**	**	**	**	**
Tetrachloroethene		μg/L	1	150	**	D	**	**	**	**	**
Trichloroethene		μg/L	1	150	6.3	D	**	**	**	**	**
Unknown		μg/L	--	--	**	D	**	30 (1)	**	**	50 (1)

Table 4-2. Data Summary: Groundwater - Former Landfill #3, Ft. McClellan, Anniston, Alabama (Continued)

SAIC ID Number	Depth BLS	Collection Date	Associated Field QC Sample	Parameter	Units	CRL	UCR	OLF-G07D (41.30) 6/07/92 TB-0010 FMP003 RB-008	OLF-G08 (29.34) 6/07/92 TB-0010 FMP003 RB-008	OLF-G09 (20.10) 6/08/92 TB-0011 FMP003 RB-008	OLF-G10 (16.42) 6/11/92 TB-0015 FMP003 RB-009
<b>Method UM25 (SVOCs in Water) (Continued)</b>											
bis(2-Ethylhexyl)phthalate		7.7	200		μg/L			17	D	36	**
Unknown		--	--		μg/L			**		**	**
<b>Method UW25 (Explosives in Water)</b>											
1,3,5-Trinitrobenzene		0.210	20		μg/L			**		**	1.7
2,4-Dinitrotoluene		0.397	20		μg/L			**		**	0.773
<b>Method UI120 (Organochlorine Pesticides in Water)</b>											
alpha-Hexachlorocyclohexane		0.0025	0.500		μg/L			**		**	**
Endosulfan I		0.0025	0.500		μg/L			**		**	**
Aldrin		0.0074	0.500		μg/L			**		**	**
Endosulfan II		0.0077	0.500		μg/L			**		**	**
delta-BHC		0.0034	0.500		μg/L			**		**	**
Dieldrin		0.0074	0.500		μg/L			**		**	**
Endrin		0.0176	0.500		μg/L			**		**	**
Heptachlor		0.0025	0.250		μg/L			**		**	**
Heptachlor epoxide		0.0063	0.184		μg/L			**		**	**
Isodrin		0.0025	0.500		μg/L			0.189	U	0.0025	U
Lindane		0.0025	0.500		μg/L			**		0.00839	U
p,p'-DDD		0.0081	0.572		μg/L			**		**	**
p,p'-DDE		0.0039	0.537		μg/L			**		**	**
p,p'-DDT		0.0025	0.250		μg/L			0.0675	C	0.00654	U

-- The certification of these analytes will be submitted at a later date

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\*\* indicates non-detected analytes

C -- analysis is confirmed

D -- duplicate sample

U -- analysis is unconfirmed

Unknown -- The following tentatively identified compounds were identified for sample:

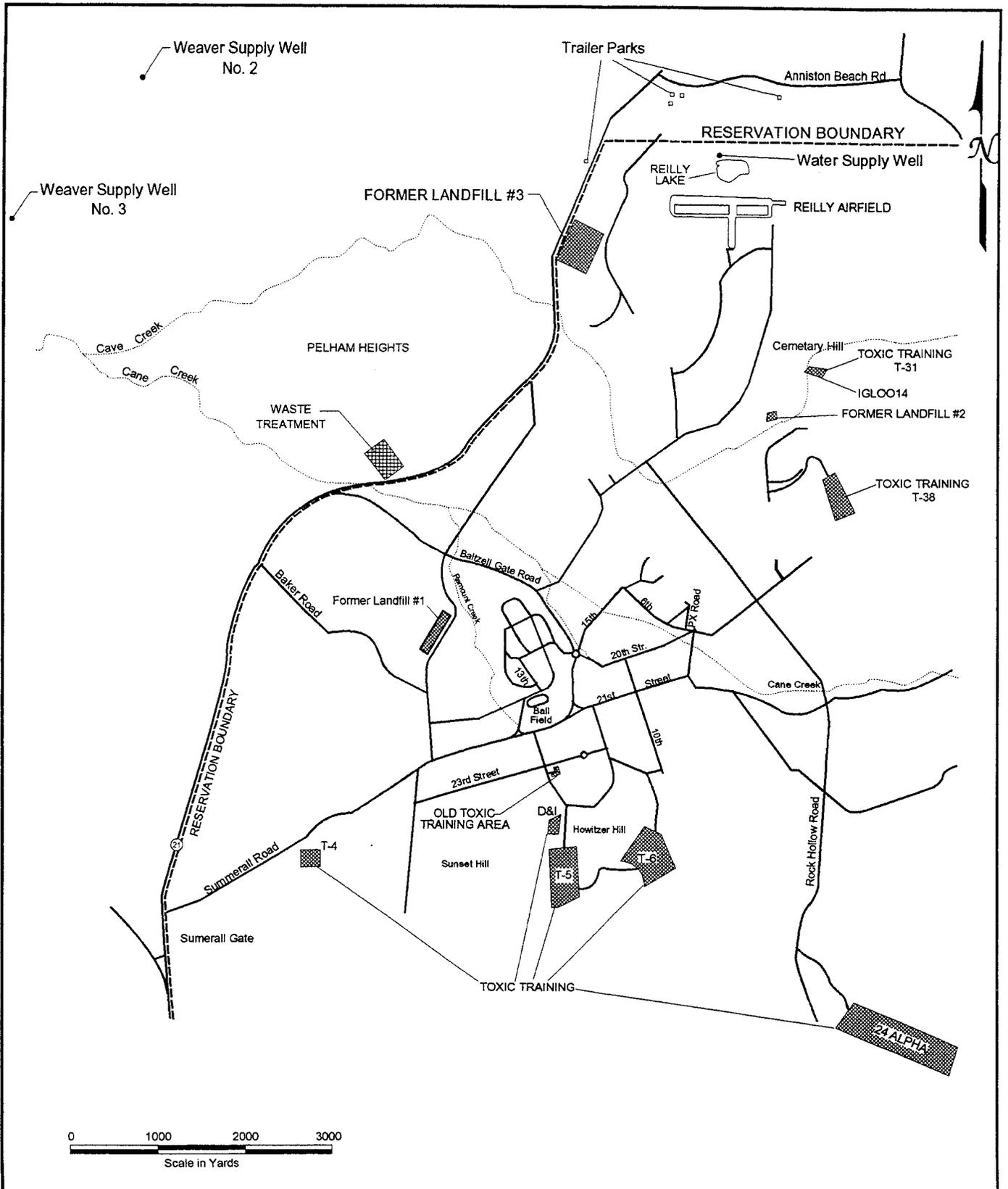
OLF-G09 - UNK038 30 S μg/L

obtain water from a drinking water well located approximately 2,370 feet from Well OLF-3 at Former Landfill #3. The Weaver Supply Wells (No. 2 and 3) and the drinking well at Lake Reilly are shown in Figure 4-1. The wells supplying the City of Weaver (No. 2 and 3) are tested for organics on a three-year cycle and no detections have been recorded (City of Weaver, personal communication). In addition, both wells are greater than 100 feet below land surface. Well No. 2 is approximately 413 feet in depth and Well No. 3 is approximately 125 feet in depth. Recent (March 26, 1992) inorganics data provided by the city of Weaver for wells 2 and 3 did not indicate the presence of deleterious metals concentrations in the groundwater. The Weaver data is provided in Appendix L. Although contamination has not been detected in either well, the HRS score is based on the proximity of the wells to the source of contamination and the population that receives the drinking water. The population factor received a value of 254 for the potential exposure of the population to contaminants released from the landfill. The score is based on available data regarding the surrounding public water systems and the target populations at 1/4, 1/2, 1, 2, 3, and 4 mile radial intervals surrounding Former Landfill #3. The resource category received a score of 5.0 because Lake Reilly was identified as a resource. Wellhead protection areas were not identified in the influence area of the landfill. The targets category received a resulting score of 268.

Based on the observed release and assessment of hazardous substances, a PRescore of 45.84 out of 100 was calculated for the toxicity/mobility/hazardous waste quantity and targets.

#### ***4.2.2 Surface Water Migration Pathway***

The surface water migration pathway was evaluated because observations of ponding were noted during the SI field activities at Former Landfill #3. Unnamed tributaries of Cave Creek located on the landfill also were identified. The tributaries flow into Cave Creek, which leaves the installation on the western boundary south of the identified landfill area. Surface water within the study area is used for recreational activities, including swimming and fishing. Lake Reilly is the nearest surface water body to the landfill (approximately .4 miles northeast of Well OLF-3) used for these activities. Residents of the study area also receive potable water from groundwater and surface water sources located within the target population area (4 miles)



**GROUNDWATER SUPPLY WELLS  
IN VICINITY OF MAIN POST  
FORT McCLELLAN, ALABAMA**

Prepared for:  
U.S. Army Environmental Center  
Aberdeen Proving Ground, Maryland



Figure 4-1

(ASI 1991). The population served by Lake Reilly (approximately 200) was used in determining the HRS target factor (5.00) for surface water (Appendix G).

Contaminant releases were identified in the surface water from sampling data obtained during the SI field investigation activities at Former Landfill #3. One surface water sample (OLF-W01) was collected from an unnamed tributary at the southern end of Former Landfill #3. These results are presented in Table 4-3. A score of 0.6 out of 100 was calculated for the surface water migration pathway (Table 4-1).

### 4.3 HRS2 SCORING LIMITATIONS

As noted previously, HRS2 assigns higher scores to potentially exposed populations and sensitive environments that are nearest to a site, with scores decreasing with distance from a site. Source to target distance data for the population and migration distance of groundwater and surface water was calculated using a compass and 7.5 minute USGS topographic maps of Anniston, Alabama (1972). Population was determined by measuring 1/4, 1/2, 1, 2, and 3 to 4 mile radial target distance limits from the center of Former Landfill #3. In estimating residential population, the value was based on the number of residences multiplied by the average number of persons per residence for the county in which the residence is located (3.8 persons per dwelling, EPA 1990). A trailer park was observed northwest of Former Landfill #3 during the SI field activities. Other trailer parks also were noted on a 7.5 minute topographic map (see Figure 4-1). It was estimated that 20 trailers reside in each park. This estimation also was included in the target population value calculation. The population of the city of Anniston is 26,623 (1990 census) based on the 1990 census (Calhoun County, personal communication). However, the majority of this population is outside the 4-mile radius of Former Landfill #3.

The groundwater migration pathway of the HRS does not take into consideration groundwater flow direction; therefore, the population was calculated from the 4-mile radius surrounding Former Landfill #3 and not in the area of the northwesterly groundwater flow. Soil and air pathways were not evaluated because of a lack of data for these media. The air pathway is not estimated to have a significant impact on the site scoring.

Table 4-3. Data Summary: Surface Water - Former Landfill #3, Ft. McClellan, Anniston, Alabama

SAIC ID Number	OLF- W01		
Depth BLS	(1.0)		
Collection Date	6/09/92		
Associated Field QC Sample	TB-0013,14		
Parameter	Units	CRL	UCR
			FMP003
			RB-008

**Method SS12 (ICP Metals in Water)**

Aluminum	µg/L	112	125,000	1420
Barium	µg/L	2.82	12,000	30.3
Boron	µg/L	230	10,000	250
Calcium	µg/L	105	200,000	19300
Iron	µg/L	77.5	500,000	1720
Magnesium	µg/L	135	250,000	7250
Manganese	µg/L	9.67	10,000	36
Potassium	µg/L	1240	250,000	2080
Sodium	µg/L	279	50,000	4320
Zinc	µg/L	18.0	10,000	19

**Method UH20 (OrganochlorinePesticides in Water)**

alpha-Hexachlorocyclohexane	µg/L	0.0025	0.500	0.00498	C
Isodrin	µg/L	0.0025	0.500	0.163	U

CRL - Certified Reporting Limit

UCR - Upper Certified Range

C - analysis is confirmed

U - analysis is unconfirmed

The surface water migration pathway data information was limited due to low sample quantities. One surface water sample was collected at a southern point of the Former Landfill #3 boundary (OLF-W01).

During the HRS evaluation the following metals were identified as not being provided in the HRS database: calcium, magnesium, potassium, and vanadium. In addition, three organic compounds (isodrin,  $\alpha$ -BHC, and  $\Delta$ -BHC) were not provided in the database. These metals and organics were identified as contaminants, but could not be evaluated by the HRS.

#### 4.4 SUMMARY AND CONCLUSIONS

The HRS2 evaluation of Former Landfill #3 resulted in a score of 16.08, which is less than the 28.5 minimum required for consideration on the NPL. This evaluation was based solely on the calculation of the groundwater and surface water pathways. An evaluation of the soil exposure pathway and the air migration pathway was not presented at this time due to insufficient data.

Additional surface water and sediment samples should be taken for further evaluation in the HRS scoring. More detailed geologic and hydrogeologic characterization of the subsurface formation is also recommended to more clearly define the risk of contaminant migration.

Based on the SI field activities and water level monitoring of the installed wells, the direction of groundwater flow beneath Former Landfill #3 is northwesterly. The water supply wells for the town of Weaver are located within the 4-mile radius study area northwest of Former Landfill #3 (ASI 1992). It is recommended that these wells be monitored for contaminants of concern.

In addition, further investigation into the current census of the population surrounding Former Landfill #3 at 1/4, 1/2, 1, 2, and 3 to 4 mile radii should be conducted to more accurately evaluate the HRS2 scoring of the groundwater migration pathway.