7. SWMU 19 – BUILDING 533 FOUNDATION (EMPTY DRUM STORAGE AREA)

This section presents the results of the Phase II Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) conducted at solid waste management unit (SWMU) 19 – Building 533 Foundation (Empty Drum Storage Area). The site geologic and hydrologic features are presented and are followed by the Phase I and II investigation methodology, results, and nature and extent of identified contamination. The results of the human health and ecological risk assessments associated with the chemicals of potential concern (COPCs) also are presented.

7.1 SWMU 19 DESCRIPTION/CURRENT SITE CONDITIONS

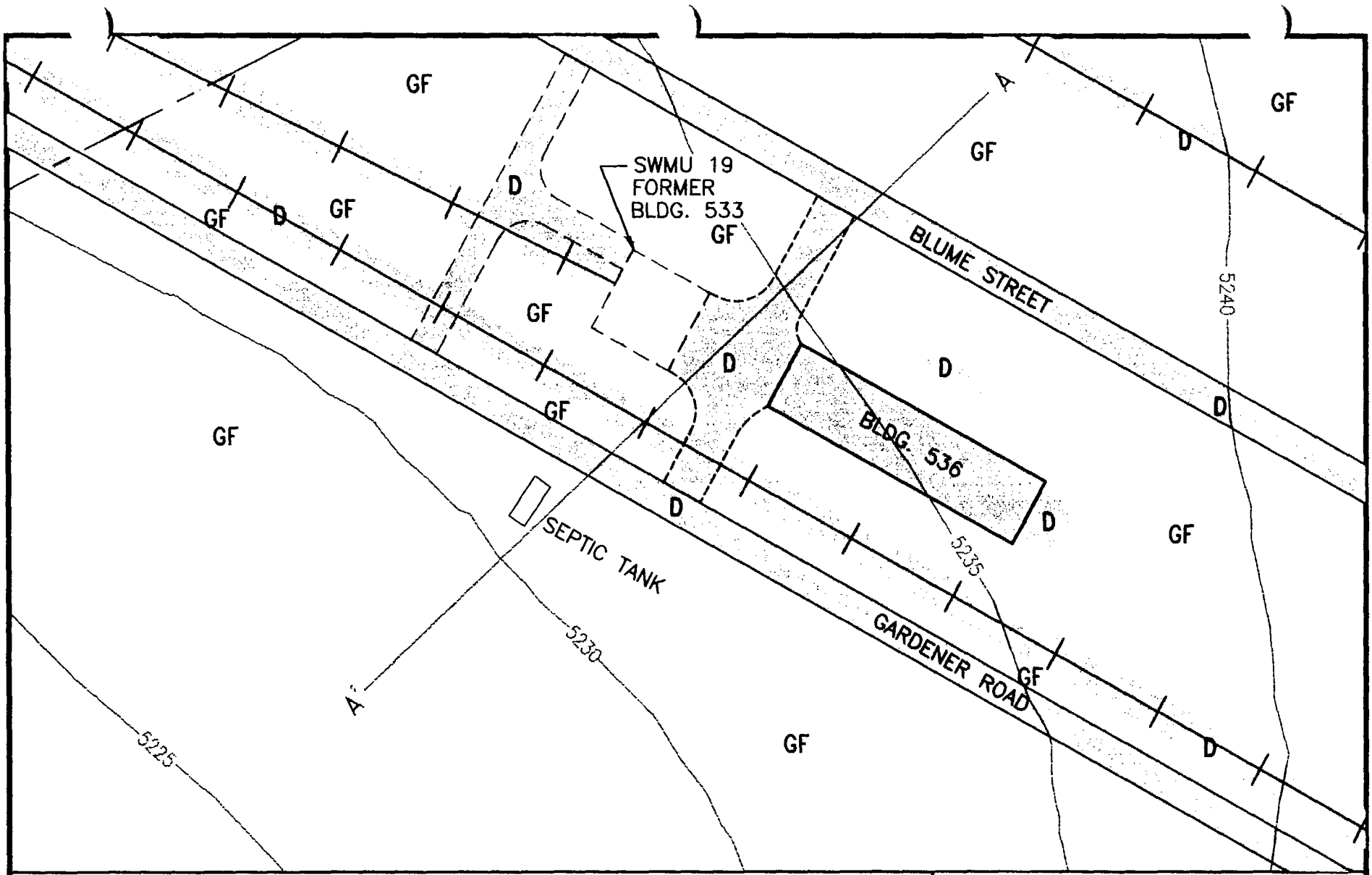
SWMU 19 – Building 533 Foundation (Empty Drum Storage Area) is a concrete foundation of former Building 533, which the Army demolished in early 1992. The remnant foundation is located between Blume Street and Gardener Road in the north-central portion of DCD. The Deactivation Furnace – Mercury Contamination Area (SWMU 17), a known release SWMU, is located adjacent to the west side of the Building 533 foundation; SWMU 33 – Building 536 borders the eastern boundary of SWMU 19 (see Figure 7-1).

Building 533 formerly was used for railroad car maintenance (USAEHA 1986), but was used primarily for empty drum storage (discussed as SWMU 35 by NUS 1987) before its demolition in 1992 (EBASCO 1993a). Although limited information is available on the wastes that were stored in Building 533, trash, wood, empty brass shell casings, 5-gallon paint containers, and unidentified drums were observed during a site inspection (NUS 1987). ERTEC (1982) also listed phosphoric acid, chromates, and titanates as compounds used at this site, although the source of this information is unknown. During the Phase I RFI conducted by EBASCO, empty drums were observed and a strong fuel odor was noted in Building 533 (EBASCO 1993a).

7.2 SWMU 19 SPECIFIC GEOLOGY AND HYDROGEOLOGY

SWMU 19 is located on slightly southwest-sloping topography at approximately 5,225 feet above mean sea level (msl). The site is underlain by Quaternary alluvial deposits of silt, sand, and clay. Surficial soil is composed of light grayish brown, silty gravel with some sand and a trace of clay. Subsurface soil is composed of brown to dark grayish-brown, silty and gravelly clay with some sand. In January 2000, the static water level at the SWMU 19 monitoring wells ranged from approximately 106 to 123 feet below land surface (BLS).

SWMU 19 is located within an alluvial fan depositional plain that is composed primarily of Paleozoic sedimentary rocks that were eroded and fluvially transported from the Oquirrh Mountain Range located north of the site. During the 1994-95 Phase II investigation at SWMU 19, four groundwater monitoring wells and seven soil borings were drilled. One well north of the site (S-116-94) and three wells southwest of the site (S-113-94, S-114-94, and S-115-94) were screened in the first or uppermost water-bearing zone that was encountered. Well depths ranged from 135 feet BLS in S-114-94 to 219 feet BLS in S-116-94. Soil samples were collected for geologic characterization during well drilling at each 10-foot interval or at a change in lithology. The seven



LEGEND:

- SWMU LOCATIONS
- RAILROAD
- EXIST. WATER LINES
- ABANDONED ROADS
- GRAVEL DRIVE
- ELEVATION CONTOUR
- A — A' GEOLOGICAL CROSS SECTION

VEGETATION TYPES:

- D ..... DISTURBED AREAS–NO VEGETATION
- GF ..... BUNCHGRASSES/ANNUAL FORBS

NOTES:

1.) BASE MAP INFO. WAS SCANNED AND IS ACCURATE TO 1:1000.

N

0 50 100

SCALE: 1" = 100'

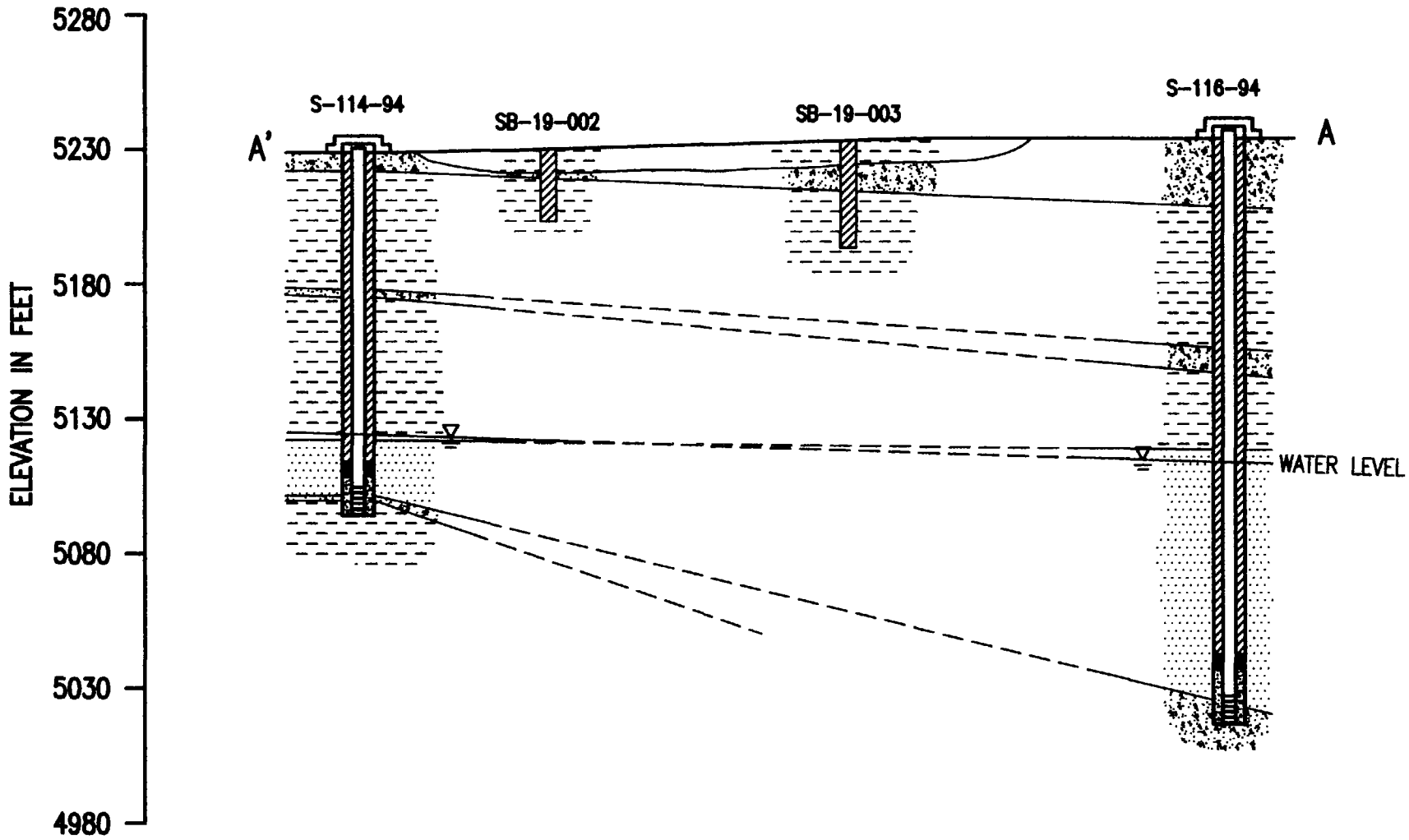
AREA 1 | AREA 2 | AREA 3
AREA 4 | AREA 5 | AREA 6

KEY MAP
NOT TO SCALE

Deseret Chemical Depot
Tooele, Utah

SWMU 19 – BUILDING 533 FOUNDATION
(EMPTY DRUM STORAGE AREA)

Figure:	Project:	File:	Date:
7-1	01-0827-03-6523-042	7109/RFISMU19	NOV. 2000



LEGEND:

- CEMENT/BENTONITE GROUT
- BENTONITE SEAL
- SAND FILTER PACK
- GRAVEL
- SANDY CLAY SILT
- SILTY CLAY TO CLAYEY SILT

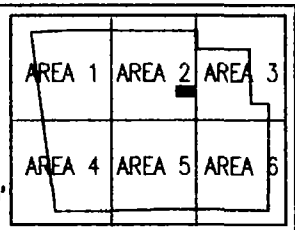
NOTES:

1.) BASE MAP INFO. WAS SCANNED AND IS ACCURATE TO 1:1000.

2.) WATER ELEVATIONS COLLECTED JANUARY 2000. (▽ = WATER LEVEL)

0 30 60
VERTICAL SCALE: 1" = 60'

0 50 100
HORZONTAL SCALE: 1" = 100'



KEY MAP
NOT TO SCALE

Deseret Chemical Depot
Tooele, Utah

SWMU 19 - GEOLOGIC CROSS SECTION

Figure:	Project:	File:	Date:
7-2	01-0827-03-6523-042	7109/RFI-19CS	NOV. 2000

soil borings were drilled to depths ranging from 22 feet BLS (SB-19-01 and SB-19-02) to 35 to 40 feet BLS (SB-19-03 through SB-19-07) with lithologic logs continuously recorded. Appendix C presents the detailed lithologic logs and well construction summaries.

The soil samples collected from the borings indicate that the upper 40 feet at the site consists of fluvially deposited silt, sand, and gravel characteristic of an alluvial fan environment. Three prominent strata of soils were identified during the soil boring drilling. The soils from the surface to approximately 7 to 10 feet BLS consisted of gravely, sandy silt. These soils were underlain by a 7- to 10-foot layer of an unconsolidated sandy gravel overlying a horizon of silty clay of undetermined depth. Visually obvious contacts between each soil horizon were observed during the soil boring drilling activities. Subsurface data gathered during monitoring well drilling were based on visual observations and indicated that sediments in the area ranged from clay to gravel with abrupt vertical and lateral changes in sorting and mean grain size.

The well boring at location S-116-94 was drilled approximately 65 feet deeper than anticipated due to the presence of an unusually thick layer of silty clay. The silty clay layer extended from 120 to 209 feet BLS and contained only minor variations in composition. Sand and gravel stringers or sustainable water-bearing zones were not encountered in this lithologic unit. Silty clay layers of this thickness were not identified in the other monitoring well borings at SWMU 19. The water-bearing strata that was screened in well S-116-94 was located at 209 feet BLS and consisted of a 4-foot layer of poorly sorted sandy gravel. The static water level measured in the well after drilling was approximately 130 feet BLS. No sustainable water-bearing zone was identified in the silty clay layer.

The variation in the thickness of the clay layers identified in monitoring well S-116-94 versus the lack of this layer in the three monitoring wells southwest of the site (S-113-94, S-114-94, and S-115-94) suggests that S-116-94 may have been located on the distal edge of the Ophir Creek alluvial fan. This fan did not extend across the entire SWMU area. This would account for the observed lateral lithologic discontinuity. It is possible that the distal edge of the fan in this site area may have graded into other depositional environments (i.e., a river or lacustrine environment). The presence of a former river system flowing through the valley also may have eroded portions of the fan, creating sediment-filled channels of varied depths and widths. This scenario would yield a complex depositional and erosional inter-fingering of the alluvial fan and the alluvial plain facies. Such fan sequences generally consist of mixtures of stream flow, debris-flow, and landslide deposits (i.e., silts, sands, and gravels), all of which were identified at the site. Figure 7-2 presents a geologic cross-section of the SWMU area based on the monitoring well and boring logs.

Though differing from S-116-94, stratigraphic conditions identified in monitoring wells S-113-94, S-114-94, and S-115-94 were similar. Direct stratigraphic correlations could be made between the water-bearing zones in each of the three wells. A sustainable water-bearing zone of a 2- to 3-foot layer of poorly sorted sandy gravels was identified at 127 feet BLS in S-113-94, 127.5 feet BLS in S-114-94, and 129 feet BLS in S-115-94. Static water levels measured after drilling wells S-113-94, S-114-94, and S-115-94 were 107, 108, and 110 feet BLS, respectively.

The general groundwater flow direction in the northwestern portion of Deseret Chemical Depot (DCD) has been reported to flow to the southwest (Kleinfelder 2000b). However, prior to

Phase II activities at SWMU 19, no monitoring wells had been located in the northwestern area of DCD to confirm this southwesterly trend. The groundwater elevations measured in January 2000 from the SWMU 19 wells showed the groundwater flow direction as having a northerly trend. As previously indicated, SWMU 19 is located within an alluvial fan depositional environment that may be extensively channelized. The characteristics of this type of depositional environment can create local variations in flow directions and are likely responsible for the identified groundwater flow direction at SWMU 19. Figure 7-3 presents a potentiometric contour map of SWMU 19 based on groundwater elevations recorded in January 2000. The measured groundwater elevations showed a general groundwater flow to the north. Table 7-1 presents the groundwater elevation data recorded during various times from September 1994 through January 2000.

The distinct differences and contrasts of the subsurface geology associated with an alluvial fan depositional environment is exhibited at SWMU 19 in the inconsistent water-bearing zone identified to the southwest and the north of the site and the 65-foot clay layer identified in well S-116-94. A sustainable water-bearing zone was found at approximately the same depth in the three wells southwest of the site, yet was not identified north of the site. The complexity of the alluvial fan depositional environment at this site would lend itself to local variations in the groundwater flow direction.

Rising head hydraulic conductivity tests were conducted on all four monitoring wells (S-113-94, S-114-94, S-115-94, and S-116-94) installed at SWMU 19 during the Phase II field activities in 1994. The hydraulic conductivity tests were conducted to determine characteristics of the aquifer underlying the site. These tests recorded the recovery of groundwater in the wells, and the results were used to calculate the hydraulic conductivity (K) values for each sample point. Original permeability test data, their associated graphical plots, and a discussion of the data evaluation methods used are presented in Appendix F. The calculated coefficients of hydraulic conductivity for the SWMU 19 wells ranged from 8.84×10^{-3} to 3.45×10^{-5} cm/sec, with a geometric average of 3.83×10^{-4} cm/sec.

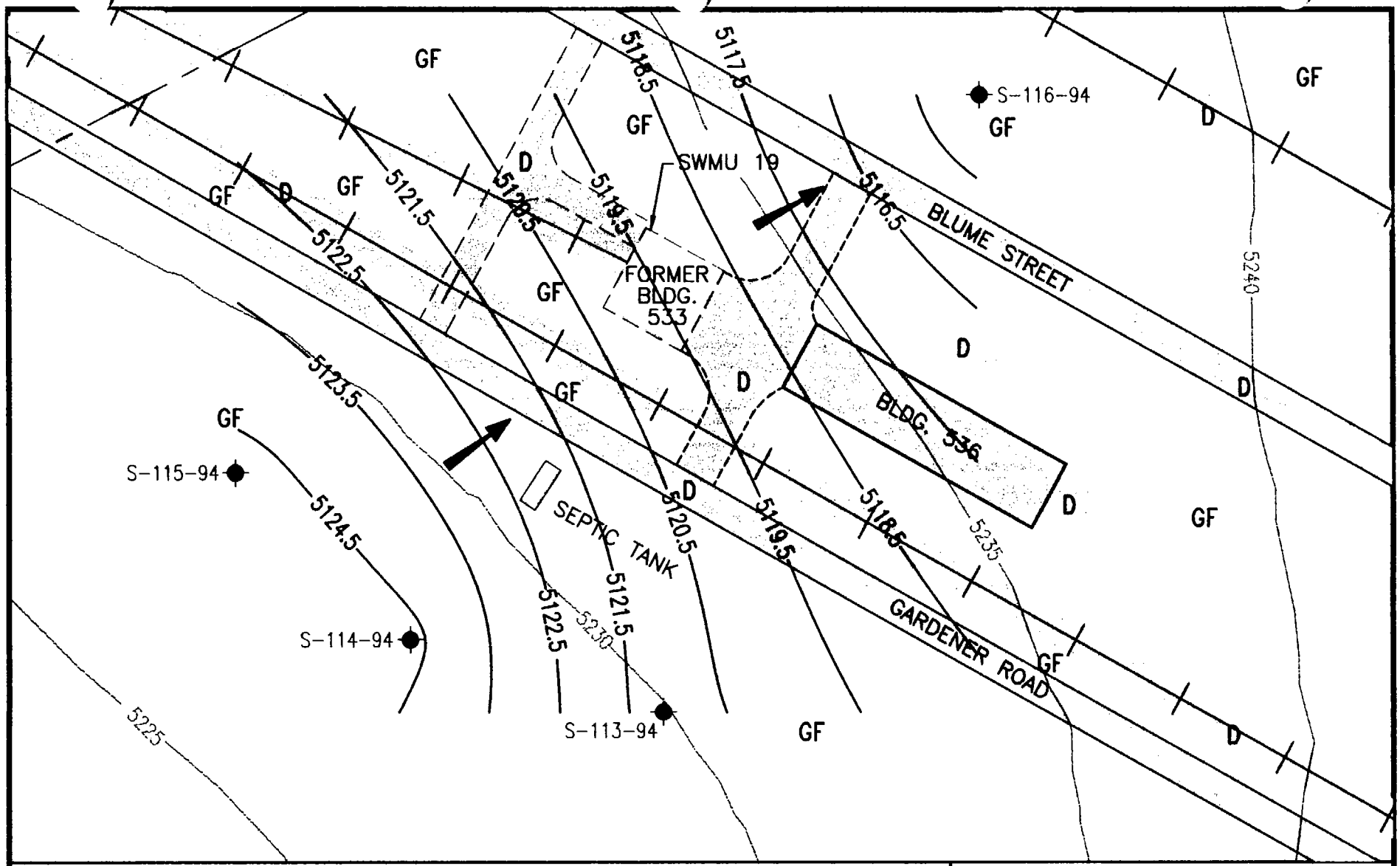
Hydraulic gradient (i) was calculated for the area of SWMU 19 based on the groundwater elevations recorded in January 2000. An average value of 0.019 ft/ft, or 100 ft/mile, was calculated as the hydraulic gradient for the SWMU 19 area. Appendix F summarizes the results and methods used for calculating the hydraulic gradient.

The groundwater flow rate for SWMU 19 was determined using the hydraulic conductivity values obtained during the permeability tests, the average hydraulic gradient values calculated from the January 2000 groundwater elevations, and a range of porosity values. The calculations are summarized in Appendix F. The groundwater flow rate for the SWMU 19 area ranged from 30 ft/ year (n = 0.25) to 19 ft/yr (n = 0.40), as calculated by the Darcy Flow equation:

$$v = Ki/n$$

where:

K = Hydraulic conductivity
i = Hydraulic gradient (dim)
n = Porosity (0.25 to 0.4; representative of a sand media [Driscoll 1986]).



LEGEND:

- SWMU LOCATIONS
- RAILROAD
- EXIST. WATER LINES
- ABANDONED ROADS
- GRAVEL DRIVE
- ELEVATION CONTOUR
- POTENTIOMETRIC CONTOUR
- MONITORING WELL LOCATION
- GENERAL GROUNDWATER FLOW DIRECTION (JANUARY 2000)

VEGETATION TYPES:

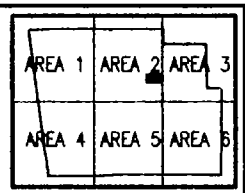
D .....DISTURBED AREAS–NO VEGETATION
GF .....BUNCHGRASSES/ANNUAL FORBS

NOTES:

1.) BASE MAP INFO. WAS SCANNED AND IS ACCURATE TO 1:1000.

N

0 50 100
SCALE: 1" = 100'



KEY MAP
NOT TO SCALE

Deseret Chemical Depot
Tooele, Utah

SWMU 19 – POTENTIOMETRIC CONTOUR MAP
JANUARY 2000

Figure:	Project:	File:	Date:
7-3	01-0827-03-6523-042	7109/RFI19PCM	NOV. 2000

Table 7-1. SWMU 19 Groundwater Elevation Data
Deseret Chemical Depot, Tooele, Utah

Site ID	Measurement Date	Elevation TOC (msl; ft)	Water Level (BTOC; ft)	Water Level (msl; ft)	Northing	Easting
S-113-94	10/22/94	5231.00	109.98	5121.02	2219784.42	428919.48
	12/12/94	5231.00	109.59	5121.41		
	05/05/95	5231.00	109.32	5121.68		
	04/23/98	5231.00	108.21	5122.79		
	K 09/30/97	5234.96	110.43	5124.53		
	05/20/98	5231.00	108.99	5122.01		
	07/23/98	5231.00	107.82	5123.18		
	11/13/98	5231.00	106.89	5124.11		
	02/17/99	5231.00	106.39	5124.61		
	05/05/99	5231.00	106.72	5124.28		
	01/27/00	5231.00	106.44	5124.56		
S-114-94	10/22/94	5230.81	109.85	5120.96	2219807.33	428893.36
	12/12/94	5230.81	109.33	5121.48		
	05/05/95	5230.81	109.02	5121.79		
	04/23/98	5230.81	107.90	5122.91		
	K 09/30/97	5234.76	109.76	5125.00		
	05/20/98	5230.81	107.88	5122.93		
	07/23/98	5230.81	107.47	5123.34		
	11/13/98	5230.81	106.51	5124.30		
	02/17/99	5230.81	106.03	5124.78		
	05/05/99	5230.81	106.37	5124.44		
	01/27/00	5230.81	106.10	5124.71		
S-115-94	10/22/94	5232.66	111.65	5121.01	2219830.58	428867.18
	12/12/94	5232.66	111.13	5121.53		
	05/05/95	5232.66	110.98	5121.68		
	04/23/98	5232.66	109.69	5122.97		
	K 09/30/97	5236.60	111.20	5125.40		
	05/20/98	5232.66	109.66	5123.00		
	07/23/98	5232.66	109.23	5123.43		
	11/13/98	5232.66	108.20	5124.46		
	02/17/99	5232.66	107.75	5124.91		
	05/05/99	5232.66	108.08	5124.58		
	01/27/00	5232.66	107.81	5124.85		
S-116-94	10/23/98	5238.08	133.78	5104.30	2219901.79	429015.01
	12/12/94	5238.08	133.64	5104.44		
	05/5/95	5238.08	134.06	5104.02		
	04/23/98	5238.08	130.97	5107.11		
	K 09/30/97	5238.08	115.84	5122.24		
	05/20/98	5238.08	129.81	5108.27		
	07/23/98	5238.08	123.44	5114.64		
	11/13/98	5238.08	123.47	5114.61		
	02/17/99	5238.08	123.14	5114.94		
	05/05/99	5238.08	123.46	5114.62		
	01/27/00	5238.08	123.27	5114.81		

BTOC – Below Top of Casing
TOC – Top of Casing
K – Data recorded by Kleinfelder Associates
msl – Mean Sea Level

Fourteen soil samples from the monitoring wells and soil borings drilled at SWMU 19 were collected for geotechnical analysis. Seven samples were collected from the monitoring wells and seven samples were collected from the soil borings at lithologically representative sample depths. Where physically possible (i.e., adequate sample recovery), samples for geotechnical analysis were collected from the monitoring well boreholes at depths that would represent the soil types located near water-bearing zones. In addition, geotechnical sample locations in monitoring well borings were chosen based upon significant changes in lithology and samples from the soil borings were selected to represent the soil types encountered (i.e., a sample from each type of soil type). Geotechnical samples were analyzed for moisture content, Atterberg limits, grain size, and Unified Soil Classification System (USCS) soil classification. Table 7-2 presents the results of the geotechnical analyses.

Table 7-2. Geotechnical Soil Analysis Results
Deseret Chemical Depot, Tooele, Utah

Geotechnical Soil Analysis						
Boring Number	**Depth from Surface (feet)**	**LL[1]**	**PL[2]**	**PI[3]**	**Moisture Content[4]**	**USCS Class**
S-113-94	39–40.5	NP[5]	NP	NP	10.6	ML
S-113-94	129–130.5	NP	NP	NP	10.0	GW-GM
S-114-94	79–80.5	29.5	15.5	13.8	14.2	GW-GC
S-115-94	119–120	39.2	16.2	23.0	18.3	CL
S-115-94	129–130	24.2	17.9	6.3	2.1	GC
S-116-94	49–50.5	30.0	22.5	7.5	17.2	CL
S-116-94	149–150.5	42.7	19.1	23.6	19.3	CL
SB-19-003	26–28	22.8	15.9	7.1	13.2	SC-GC
SB-19-003	33–35	26.0	12.0	14.0	9.8	CL
SB-19-004	29–31	NP	NP	NP	7.5	SM
SB-19-005	15–16	26.0	12.0	14.0	4.7	CL
SB-19-005	25–27	NP	NP	NP	6.2	ML
SB-19-006	25–27	29.4	21.5	7.9	5.7	CL
SB-19-007	15–17	40.0	21.6	18.4	23.6	CL

[1] Liquid Limit by ASTM Method D-4318
[2] Plastic Limit by ASTM Method D-4318
[3] Plasticity Index by ASTM Method D-4318
[4] Moisture Content by ASTM Method D-2216-80
[5] NP = Non-plastic

CL – clay
GC – clayey gravels
GM – silty gravels
GW – well-graded gravels
ML – silt, very fine sand
SC – clayey sands
SM – silty sands

Seven of the samples were classified as sandy clay; the remaining samples were classified as either clayey gravel, silty sand, sandy silt, or sandy gravel. Moisture content in the samples ranged from 2.1 to 23.6 percent. The plasticity indices for the samples ranged from 7.3 to 23.6, indicating the range of water content over which the soils will behave plastically. Four of the samples were considered nonplastic. Appendix E contains the complete geotechnical analysis report.

7.3 SWMU 19 PREVIOUS INVESTIGATION RESULTS

The Phase I RFI field investigation, conducted from 1990 through 1992, included the first sampling activities at SWMU 19 and occurred during two sampling rounds (EBASCO 1993a). The first round, conducted in 1990, included collecting soil organic vapor (SOV) and soil samples. The SOV samples were collected from six locations and were analyzed for benzene, toluene, xylene, dichloroethylene (DCE), tetrachloroethylene (PCE), and trichloroethylene (TCE). The soil samples were collected from two site-specific and one background location immediately north of the site across Blume Street. The site-specific samples were analyzed for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), total petroleum hydrocarbons (TPH), and metals; the background sample was analyzed for metals. The second round, conducted in 1992, included collecting seven soil samples and one sediment sample. The soil samples were collected from within and below the sumps and between the railroad tracks. The soil samples were analyzed for VOCs and polychlorinated biphenyls (PCBs). The sediment sample was collected from the former sump and analyzed for VOCs and PCBs. Table 7-3 summarizes the previous investigation activities and results.

Table 7-3. SWMU 19 Previous Investigation Activities and Results
Deseret Chemical Depot, Tooele, Utah

Phase	Previous Activity	Result
Phase I (Round 1, 1990)	• Collected SOV samples from six locations; analyzed samples for benzene, toluene, xylene, DCE, PCE, and TCE.	• COPCs: VOCs and chlorinated solvents.
	• Collected two soil samples; analyzed samples for VOCs, SVOCs, TPH, and metals.	• COPCs: Acetone, 1,1,2,2-tetrachloroethane, and TCE.
	• Collected one soil sample from a background location; analyzed sample for metals.	• COPCs: None detected.
Phase I (Round 2, 1992)	• Collected seven soil samples from within and below sumps and between railroad tracks; analyzed samples for PCBs and VOCs.	• COPCs: TCE detected in all soil samples below the dry sump. Carbon tetrachloride, chloroform, and 1,1,1-TCA detected in samples adjacent to the sump.
	• Collected one sediment sample from the former sump; analyzed sample for VOCs and PCBs.	• COPCs: Chlorobenzene and PCBs.

The Phase I Round 1 RFI SOV investigation indicated the presence of fuel-related VOCs and chlorinated solvents at SWMU 19. Acetone, 1,1,2,2-tetrachloroethane (1,1,2,2-PCA), and TCE also were detected in the initial soil samples. The SOV results, strong fuel and/or solvent odors noted by the Phase I field crew, and findings of an expanded inspection of the waste lines and sumps of Building 533 provided the impetus to collect additional samples.

TCE was detected in all soil samples collected below the dry sump during the Phase I Round 2 investigation. In addition, carbon tetrachloride, chloroform, and 1,1,1-trichloroethane (1,1,1-TCA) were detected in soil samples associated with the sump. Chlorobenzene and PCB Aroclor 1260 were detected in a sediment sample collected from the building's former sump.

7.4 SWMU 19 PHASE II RFI FIELD INVESTIGATION APPROACH

The Phase II activities at SWMU 19 were conducted to confirm and determine the horizontal and vertical extent of contamination at the Building 533 foundation, determine if contamination had migrated to groundwater, and collect samples in the area of the septic tank southwest of the Building 533 foundation. Activities conducted to accomplish these objectives included conducting an explosive risk and SOV survey, drilling and sampling soil borings, sampling sludge from the septic tank, and installing and sampling three groundwater monitoring wells.

Phase II field activities at SWMU 19 were conducted in 1994-95 (Phase II) and 1998 (Phase IIA). During the 1994-95 Phase II field activities, the samples were analyzed for VOCs, SVOCs, and PCBs. Additional groundwater sampling was required because of the inconsistent results between the two sampling rounds during the 1994-95 Phase II field investigation. In 1998, additional groundwater samples were collected as part of the Phase IIA field investigation. The planned activities and any deviations from the planned activities are provided in Table 7-4. Appendix N presents representative photographs of sampling activities.

7.5 SWMU 19 PHASE II RFI RESULTS

The following sections summarize the Phase II investigation results for the activities conducted at SWMU 19. Discussions on the explosive risk, an evaluation of the SOV survey, soil and groundwater sampling results, and the nature and extent of identified contamination are included.

7.5.1 SWMU 19 Explosive Risk Evaluation

Prior to any intrusive activities, an unexploded ordnance (UXO) evaluation was conducted that included a review of historical records, a visual surface inspection, and a surficial magnetometer survey of the SWMU area. The review of the site history and past storage practices revealed that ordnance had not been stored within the site area. The surface magnetometer survey did not indicate the presence of any items that would be considered UXO. Based on the UXO evaluation and survey, it was determined that no explosive risk exists at this SWMU.

Table 7-4. SWMU 19 Phase II Planned Versus Actual Field Activities Deseret Chemical Depot, Tooele, Utah

Phase	Planned Activities	Rationale for Planned Activities	Deviations from Planned Activities	Rationale for Deviations
Phase II (1994 -95)	Conduct UXO survey.	Fulfill RCRA permit requirement; evaluate potential presence of UXO.	None; activities implemented as planned.	N/A
	Install four groundwater monitoring wells to 155 feet BLS and conduct two rounds of samples from each well; analyze for VOCs, SVOCs, and PCBs.	Determine if site contaminants have migrated into the groundwater.	Three wells installed to a depth of between 135 and 140 feet BLS; well S-116-94 installed to 220 feet BLS; schedule 80 PVC used in well S-116-94.	Water table was shallower than anticipated in three wells and 65 feet deeper than anticipated in well S-116-94; thicker PVC was required to maintain well integrity due to deeper depth.
	Conduct aquifer recharge testing on all four monitoring wells at SWMU 19.	Evaluate the aquifer characteristics in the area of SWMU 19.	None; activities implemented as planned.	N/A
	Collect soil gas samples from 25 locations at eight 5-foot intervals up to 40 feet BLS (200 samples total); analyze for VOCs.	Preliminary screening to define extent of organic contamination and focus confirmatory soil sampling locations.	Soil gas samples collected from 28 locations with 162 total samples.	Additional locations necessary to further delineate areal extent; fewer total samples because after three consecutive intervals with nondetects, deeper sampling was discontinued.
	Drill two 20-foot-deep soil borings and collect three samples from each; analyze for VOCs, PCBs, and SVOCs.	Determine extent of contamination.	Three samples collected from one boring and four collected from the other boring.	Additional sample collected from one boring so that samples were collected from surface, depth, and above and below the caliche layer.
	Drill five 40-foot-deep soil borings and collect one surface sample and two subsurface samples from each; analyze for VOCs, SVOCs, and PCBs.	Determine extent of contamination.	None; activities implemented as planned.	N/A
	Collect one sludge and one liquid sample from the septic tank; analyze for VOCs, SVOCs, and PCBs.	Determine if contaminants were discharged from the former building into the septic system; confirm Phase I results.	Only the sludge sample was collected.	No liquid was in the septic tank to sample.

Table 7-4. SWMU 19 Phase II Planned Versus Actual Field Activities Deseret Chemical Depot, Tooele, Utah (Continued)

Phase	Planned Activities	Rationale for Planned Activities	Deviations from Planned Activities	Rationale for Deviations
Phase IIA (1998-99)	Sample four existing groundwater monitoring wells: S-113-94, S-114-94, S-115-94, and S-116-94. Conduct sampling using low-flow (minimal drawdown) sampling procedures (EPA 1996a). Analyze for VOCs, SVOCs, PCBs, and water quality parameters.	Inconsistent results between first two sampling events. Recommendations made in Phase II RFI Report (SAIC 1995b).	None; activities implemented as planned.	N/A
	Identify the location and delineation of vegetation within 500 feet of the SWMU.	Responding to UDEQ comments to identify habitat types surrounding SWMU under investigation.	None; activities implemented as planned.	N/A

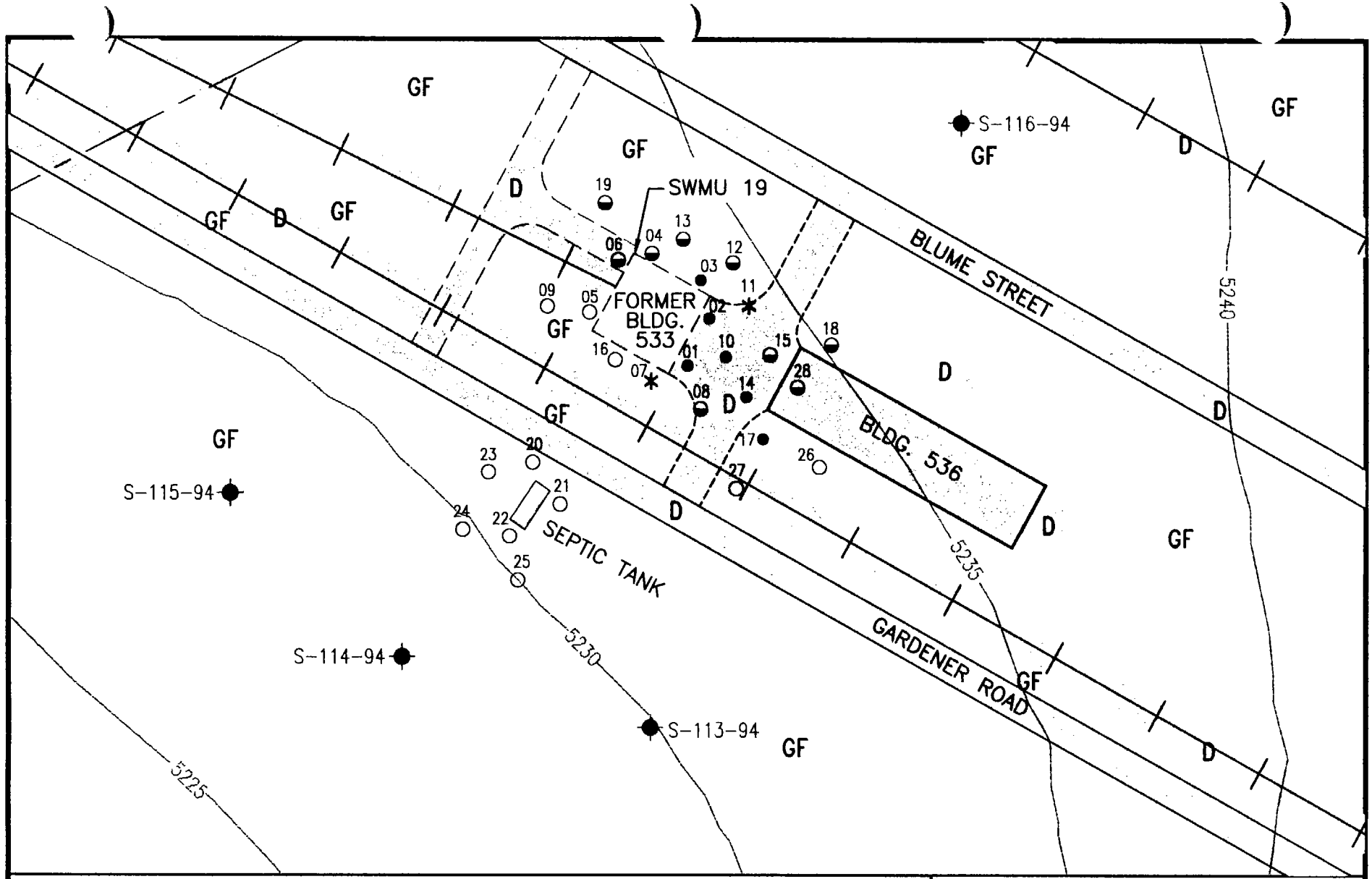
N/A – Not Applicable

7.5.2 SWMU 19 SOV Results

The initial field investigation activity conducted at SWMU 19 included an SOV survey. The SOV survey was conducted prior to any intrusive sampling activities at the SWMU so that the results could be used to locate soil sampling points. The SOV survey also was used to help define the horizontal and vertical extent of organic contamination. All samples were analyzed for aromatic hydrocarbons, chlorinated hydrocarbons, and TPH.

Twenty-two SOV locations were sampled around the foundation of former Building 533, as shown in Figure 7-4. SOV samples were collected at each point at 5-foot intervals beginning at 5 feet BLS to depths of up to 50 feet BLS. Sampling ceased when either no VOCs were detected in samples collected from three successive depths or a combination of nondetects and low levels of detects were measured in samples collected from three successive depths. SOV sampling ceased at 40 feet BLS if diminishing concentration trends were leading toward low levels or nondetect. Sample locations were selected in an iterative process to define the horizontal extent of contamination. If results from a location were elevated, additional SOV sampling points or soil borings were placed around these locations.

Six SOV points were sampled around the septic tank located southwest of former Building 533. Samples were collected at 5 and 10 feet BLS. An impenetrable subsurface layer, possibly caliche, prevented SOV sampling below 10 feet BLS.



LEGEND:

- SWMU LOCATIONS
- RAILROAD
- EXIST. WATER LINES
- ABANDONED ROADS
- GRAVEL DRIVE
- ELEVATION CONTOUR
- MONITORING WELL LOCATION
- SOIL GAS POINT REQUIRED ADDITIONAL CHARACTERIZATION
- SOIL GAS POINT: ALL SAMPLES ND
- SOIL GAS POINT: 3 CONSECUTIVE NDs
- SOIL GAS POINT: 3 CONSECUTIVE NDs OR LOW LEVEL DETECTS

VEGETATION TYPES:

- D ..... DISTURBED AREAS–NO VEGETATION
- GF ..... BUNCHGRASSES/ANNUAL FORBS

NOTES:

1.) BASE MAP INFO. WAS SCANNED AND IS ACCURATE TO 1:1000.

N

0 50 100

SCALE: 1" = 100'

AREA 1 | AREA 2 | AREA 3
AREA 4 | AREA 5 | AREA 6

KEY MAP
NOT TO SCALE

Deseret Chemical Depot
Tooele, Utah

SWMU 19 – PHASE II SOV RESULTS

Figure:	Project:	File:	Date:
7-4	01-0827-03-6523-042	7109/RFI19SGR	NOV. 2000

Aromatic hydrocarbons were not detected in any SOV samples collected at SWMU 19. Six chlorinated hydrocarbons were detected in various samples at varying depths. These compounds include carbon tetrachloride, chloroform, 1,1-dichloroethene (1,1-DCE), 1,2-dichloropropane, TCE, and 1,1,1-TCA. In addition, TPH was detected in several samples. The results of the SOV survey are summarized in Tables 7-5 and 7-6 and illustrated in Figure 7-4. Appendix B presents the complete SOV survey report.

Figure 7-4 illustrates the SOV and soil boring locations and results. As the figure depicts, only six locations were considered contaminated. The six contaminated locations (i.e., 01, 02, 03, 10, 14, and 17) are located in or near the region between former Building 533 and Building 536. All six contaminated locations either were surrounded by clean soil gas points or identified for additional subsurface soil sampling.

7.5.3 SWMU 19 Sampling Results

Based on the history of the SWMU and the results of previous sampling activities, soil samples collected at SWMU 19 were analyzed for VOCs, SVOCs, and PCBs. Samples collected from SWMU 19 during Phase II were not analyzed for inorganic chemicals (i.e., metals) because these parameters were not deemed to be a concern at this SWMU. All organic substances identified as part of the SWMU-specific Phase I and II sampling program are considered chemicals of potential concern (COPCs) because background concentrations of organic substances are assumed to be zero. Soil samples were collected from borings SB-19-001 through SB-19-007 at locations determined from the SOV survey results, as shown in Figure 7-5. Samples were collected from the surface and the subsurface. In addition, a sediment sample was collected from the septic tank located south of the Building 533 foundation across Gardener Road.

Groundwater samples were collected from four groundwater monitoring wells installed at SWMU 19 during the Phase II activities (S-113-94, S-114-94, S-115-94, and S-116-94). Samples were collected from each well in October 1994 (Round 1), January 1995 (Round 2), and November 1998 (Round 3) and analyzed for VOCs, SVOCs, and PCBs.

7.5.3.1 SWMU 19 Soil Sampling Results

Soil borings SB-19-001 and SB-19-002 were located adjacent to the SWMU 19 septic tank. Subsurface soil samples (20 feet BLS) were collected to verify the premise that contaminants were unable to migrate through the impenetrable layer at 10 feet BLS in the area of the septic tank that was identified during the SOV survey. Soil borings (SB-19-003 through SB-19-007) were located in the area of the former building foundation and used in combination with SOV results to define the horizontal and vertical extent of contamination in this area. Soil borings SB-19-004, SB-19-005, SB-19-006, and SB-19-007 were located to confirm the horizontal extent of contamination that had been defined by the SOV survey. Subsurface soil samples were collected at 26 feet BLS from SB-19-003 to verify the elevated readings of the deeper SOV sample locations 01, 10, and 14. The depths of subsurface soil samples at SB-19-004 were selected because of the high VOC concentrations detected in SOV sample location 03.

Table 7-5. SWMU 19 Building 533 Foundation SOV Results
Deseret Chemical Depot, Tooele, Utah

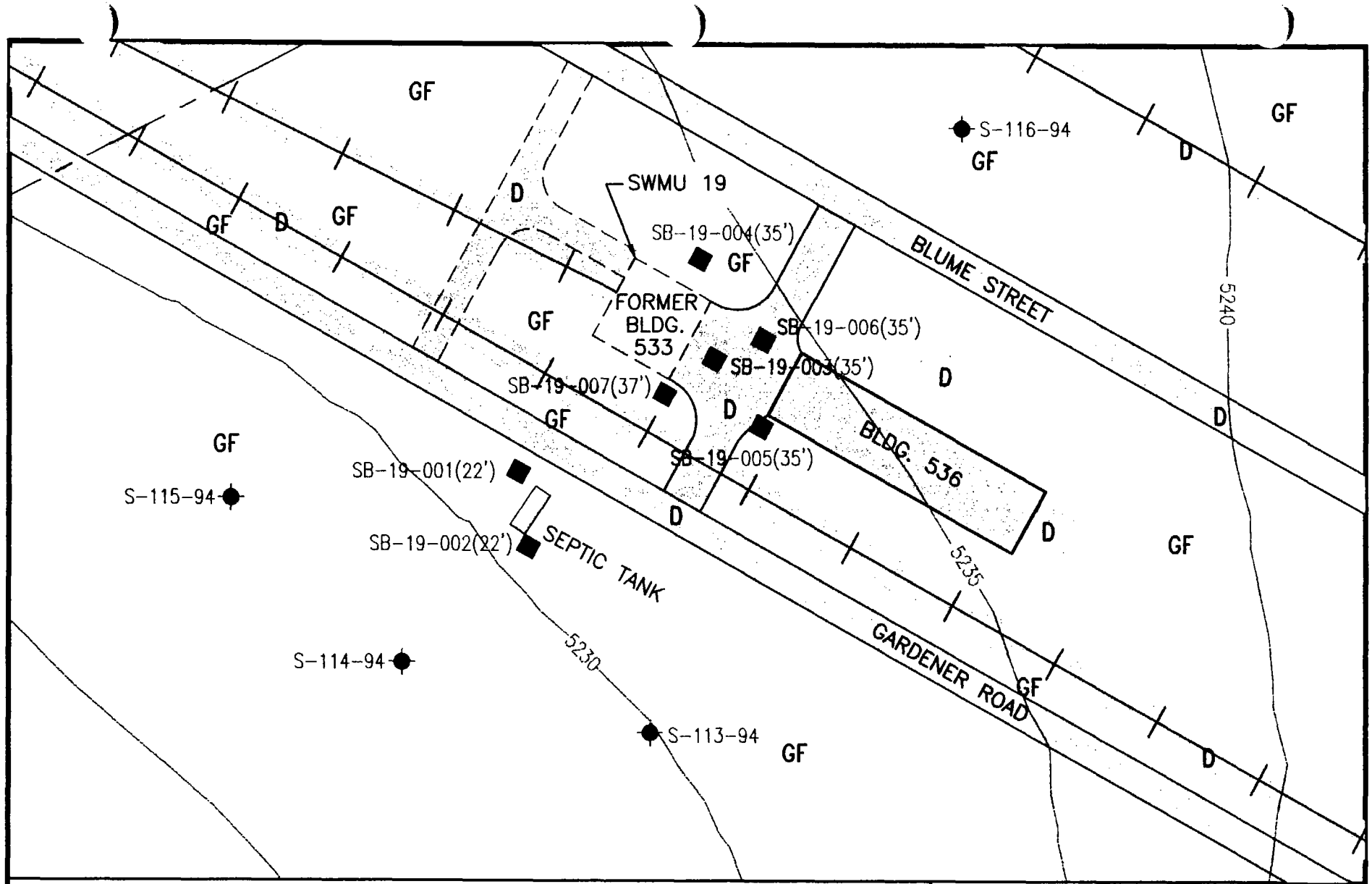
Analytes Detected	Depth	SOV SAMPLE LOCATIONS - BUILDING FOUNDATIONS																					
	BLS	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1926	1927	1928
	5					ND		ND		ND			ND				ND		ND	ND	ND	ND	ND
1,1,1-Trichloroethane		14.8	7.2	22	--	--	--	--	4.6	--	1.6	--	--	--	--	--	--	--	--	--	--	--	--
Carbon Tetrachloride		15.1	10.1	30	1.3	--	2.4	--	--	--	5.9	3.1	--	3.8	24.8	5.8	--	--	--	--	--	--	--
Trichloroethylene		6	--	--	--	--	--	--	41.3	--	8.5	--	--	--	14.3	--	--	33.2	--	--	--	--	--
TPH		--	--	12.8	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	10					ND				ND			ND				ND		ND	ND	ND	ND	ND
1,1,1-Trichloroethane		29.9	11.4	7.5	3.1	--	--	--	5.3	--	19.7	11.8	--	--	6.4	17.2	--	--	--	--	--	--	--
Carbon Tetrachloride		30.6	16	26.4	20.7	--	14.8	8.5	14.8	--	27.6	29	--	4.1	21.3	--	--	--	--	--	--	--	--
Trichloroethylene		5.9	--	--	--	--	--	--	31.1	--	8.2	--	--	--	10.6	--	--	89.2	--	--	--	--	--
1,2-Dichloropropane		--	--	--	--	--	--	--	--	--	--	--	--	22.2	--	--	--	--	--	--	--	--	--
	15					ND				ND		ND		NA	ND		ND			ND	ND	ND	
1,1-Dichloroethene		7.3	--	--	--	--	--	--	--	--	--	--	--		--	--	--	--	--	--	--	--	--
1,1,1-Trichloroethane		>134.9	18.1	--	53.2	--	2.5	--	4.9	--	--	--	--		--	--	--	--	--	--	--	--	--
Carbon Tetrachloride		>132.2	19.3	9.9	103.3	--	12	6.9	17.8	--	3.5	--	4.6		--	19.4	--	--	9.1	--	--	--	3.07
Trichloroethylene		14.5	--	--	--	--	--	--	49.6	--	--	--	--		--	--	--	5.7	--	--	--	--	7.27
	20					ND				ND		ND		NA		ND	ND			ND	ND	ND	
1,1-Dichloroethene		7.4	--	--	--	--	--	--	--	--	--	--	--		--	--	--	--	--	--	--	--	9.37
1,1,1-Trichloroethane		>77.8	--	--	7.7	--	22.3	--	--	--	4.1	--	6.4		38.8	--	--	--	--	--	--	--	13.75
Carbon Tetrachloride		>91.1	2.9	3.3	25.4	--	46	2.9	9.4	--	16.8	--	37.1		84.6	--	--	--	1.9	--	--	--	--
Chloroform		1.5	--	--	--	--	--	--	22.4	--	4	--	--		17.5	--	--	--	--	--	--	--	--
Trichloroethylene		14.3	--	--	--	--	--	--	--	--	--	--	--		--	--	--	30.3	--	--	--	--	--
	25					ND			ND	ND		ND		NA		ND	ND		ND		ND	ND	
1,1-Dichloroethene		14.9	--	--	--	--	--	--	--	--	--	--	--		--	--	--	--	--	17.8	--	--	7.55
1,1,1-Trichloroethane		>165.0	2.9	80	55.7	--	31.3	--	--	--	56	--	10.8		60.5	--	--	--	--	--	--	--	21.19
Carbon Tetrachloride		>177.2	4.8	120	114.7	--	75.4	--	--	--	89.3	--	36.1		150.5	--	--	--	--	--	--	--	--
Trichloroethylene		20.3	--	--	--	--	--	--	--	--	21.5	--	--		42.3	--	--	425.5	--	--	--	--	--
TPH		--	--	--	--	--	--	--	--	--	--	--	--		--	--	--	13.81	--	--	--	--	--
	30					NA		ND	ND	NA		ND		NA			NA		ND		NA	NA	
1,1-Dichloroethene		19.9	13.3	--	--		--	--	--		--	--	--		--	--		--	--	--			--
1,1,1-Trichloroethane		>86.5	>157.42	206	87.5		38.6	--	--		114	--	--		43.1	--		--	--	3.3			--
Carbon Tetrachloride		>123.7	>159.59	264	166.3		81.2	--	--		162.2	--	2.8		104.7	3.8		--	2	23.6			6.95
Chloroform		1.7	2.7	--	--		--	--	--		--	--	--		--	--		--	--	--			--
Trichloroethylene		23.9	3.5	--	--		--	--	--		36.7	--	--		31.8	--		356	--	--			12.85
	35	ND			NA	NA	ND	NA		NA		NA		NA			NA	NA	ND		NA	NA	
1,1-Dichloroethene		--	17.6	--			--		--		17.2		--		--	--			--	--			3.33
1,1,1-Trichloroethane		--	>88.71	117.7			--		--		89.3		--		--	--			--	--			--
Carbon Tetrachloride		--	>108.7	184.8			--		--		132.8		2.6		31	22.3			--	2.1			--
Chloroform		--	4.2	--			--		--		--		--		--	--			--	--			--
Trichloroethylene		--	2.4	--			--		--		41.5		--		14.3	7.8			--	--			--
TPH		--	--	--			--		7.1		--		--		--	--			--	--			--
	40					NA		ND	NA	NA		NA	ND	NA			NA	NA			NA	NA	
1,1-Dichloroethene		--	8.8	--	--		--	--			--		--		--	--			--	--			--
1,1,1-Trichloroethane		11.5	--	--	3		4.1	--			145.7		--		55.9	--			--	3.1			--
Carbon Tetrachloride		14.4	>123.0	--	22.7		19.1	--			208.2		--		141.3	4.4			7.8	23.4			--
Trichloroethylene		1.8	>116.8	--	--		--	--			70		--		70.7	--			40.8	--			20.62
	45	NA	NA			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1,1-Trichloroethane				62.4	6.5																		
Carbon Tetrachloride				109.1	23.2																		
	50	NA	NA			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1-Dichloroethene				33.9	--																		
1,1,1-Trichloroethane				285.1	3.4																		
Carbon Tetrachloride				427.8	17.6																		

SOV results are reported in µg contaminant/L vapor
NA - SOV sample was not collected from the referenced depth horizon
ND - SOV sample was collected, but no analytes were detected
-- Analyte not detected

Table 7-6. SWMU 19 Septic Tank SOV Results
Deseret Chemical Depot, Tooele, Utah

Analytes Detected	Depth BLS	SOV SAMPLE LOCATIONS - SEPTIC TANK					
		1920	1921	1922	1923	1924	1925
	5	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane		--	--	--	--	--	--
Carbon Tetrachloride		--	--	--	--	--	--
Trichloroethylene		--	--	--	--	--	--
TPH		--	--	--	--	--	--
	10	ND	ND	ND	NA	ND	ND
1,1,1-Trichloroethane		--	--	--		--	--
Carbon Tetrachloride		--	--	--		--	--
Trichloroethylene		--	--	--		--	--
1,2-Dichloropropane		--	--	--		--	--
	15	NA	NA	NA	NA	NA	NA
1,1-Dichloroethene							
1,1,1-Trichloroethane							
Carbon Tetrachloride							
Trichloroethylene							
	20	NA	NA	NA	NA	NA	NA
1,1-Dichloroethene							
1,1,1-Trichloroethane							
Carbon Tetrachloride							
Chloroform							
Trichloroethylene							
	25	NA	NA	NA	NA	NA	NA
1,1-Dichloroethene							
1,1,1-Trichloroethane							
Carbon Tetrachloride							
Trichloroethylene							
TPH							
	30	NA	NA	NA	NA	NA	NA
1,1-Dichloroethene							
1,1,1-Trichloroethane							
Carbon Tetrachloride							
Chloroform							
Trichloroethylene							
	35	NA	NA	NA	NA	NA	NA
1,1-Dichloroethene							
1,1,1-Trichloroethane							
Carbon Tetrachloride							
Chloroform							
Trichloroethylene							
TPH							
	40	NA	NA	NA	NA	NA	NA
1,1-Dichloroethene							
1,1,1-Trichloroethane							
Carbon Tetrachloride							
Trichloroethylene							
	45	NA	NA	NA	NA	NA	NA
1,1,1-Trichloroethane							
Carbon Tetrachloride							
	50	NA	NA	NA	NA	NA	NA
1,1-Dichloroethene							
1,1,1-Trichloroethane							
Carbon Tetrachloride							

SOV results are reported in µg contaminant/L vapor
NA - SOV sample was not collected from the referenced depth horizon
ND - SOV sample was collected, but no analytes were detected
-- Analyte not detected



LEGEND:

- SWMU LOCATIONS
- RAILROAD
- EXIST. WATER LINES
- ABANDONED ROADS
- ELEVATION CONTOUR
- MONITORING WELL LOCATION
- SOIL BORING LOCATION
- (22') BORING DEPTH IN FEET BLS

VEGETATION TYPES:

- D ..... DISTURBED AREAS–NO VEGETATION
- GF ..... BUNCHGRASSES/ANNUAL FORBS

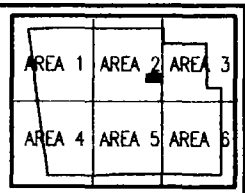
NOTES:

1.) BASE MAP INFO. WAS SCANNED AND IS ACCURATE TO 1:1000.

N

0 50 100

SCALE: 1" = 100'



KEY MAP
NOT TO SCALE

Deseret Chemical Depot
Tooele, Utah

SWMU 19 – PHASE II SAMPLE LOCATIONS

Figure:	Project:	File:	Date:
7-5	01-0827-03-6523-042	7109/RFI-19SL	NOV. 2000

Figure 7-5 shows the locations of the soil borings around the former Building 533 foundation. The following summarizes the surface and subsurface sampling results and the sediment results for the sample collected from the septic tank. All of the data and statistical summary tables for SWMU 19 are presented at the end of Section 7.

SWMU 19 Surface Soil Sampling Results—Surface soil samples (i.e., samples collected from 0 to 0.5 feet BLS) were collected from the soil borings drilled in the vicinity of the foundation of former Building 533 and the associated septic tank at SWMU 19. The boring locations were based on the results of the SOV survey discussed in Section 7.5.2. Table 7-7 summarizes the results of the laboratory analyses. Table 7-8 presents a statistical summary of chemicals detected in surface soils at SWMU 19, including the range of detected compounds and the location of the maximum detected value. Comprehensive data tables are presented in Appendix I. Figure 7-6 shows the results and distribution of the compounds detected in the surface soils.

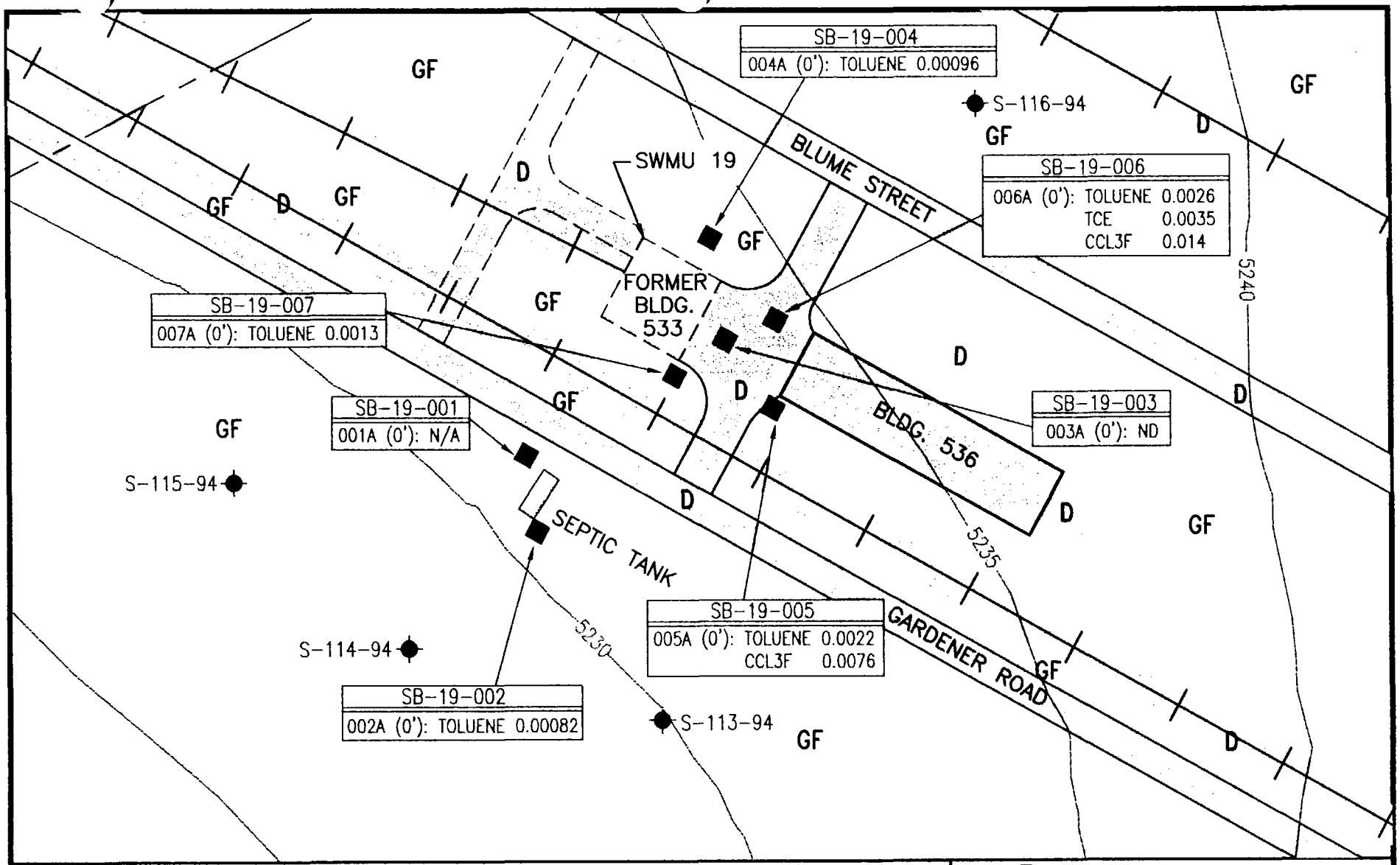
Three VOCs (toluene, TCE, and trichlorofluoromethane) were detected in surface soils at SWMU 19 during the Phase II investigation. Toluene was detected in five of the six surface samples (SB-19-002A, SB-19-004A, SB-19-005A, SB-19-006A, and SB-19-007A). The toluene detected in the surface soils ranged from 0.000820 µg/g (SB-19-002A) to 0.00260 µg/g (SB-19-006A), and was within an order of magnitude of the detection limit for toluene (0.000780 µg/g). TCE was detected in one of the six surface soil samples collected at the site (SB-19-006) at 0.00350 µg/g, which is close to the detection limit of 0.00280 µg/g. Trichlorofluoromethane was detected in two of six surface soil samples (SB-19-005A and SB-19-006A) at 0.00760 and 0.0140 µg/g, which is close to the 0.00590 µg/g detection limit.

No SVOCs or PCBs were detected in the surface soils at SWMU 19.

SWMU 19 Subsurface Soil Sampling Results—Subsurface soil samples were collected from three of the seven soil borings drilled at SWMU 19. The location of the borings and the sampling depths were based on the results of the SOV survey (Section 7.5.2). Table 7-7 summarizes the results of these analyses. Table 7-8 presents a statistical summary of chemicals detected in subsurface soils at SWMU 19. Comprehensive data tables are presented in Appendix I. Figure 7-7 shows the results and distribution of the detected compounds.

Two VOCs (toluene and trichlorofluoromethane) were detected in subsurface soils at SWMU 19. Toluene was detected in two of the four subsurface soil samples (SB-19-001B and SB-19-007B) collected and analyzed at SWMU 19. The detected concentrations (0.0013 µg/g, SB-19-001B [15 feet BLS] and 0.0011 µg/g, SB-19-007D [7 feet BLS]) were within an order of magnitude of the detection limit for toluene (0.00078 µg/g). Trichlorofluoromethane was detected in one sample from boring SB-19-001B (15 feet BLS) at 0.0097 µg/g, less than twice the detection limit of 0.0059 µg/g.

No SVOCs or PCBs were detected in the subsurface soils at SWMU 19.



7-19

LEGEND:

- SWMU LOCATIONS
- RAILROAD
- EXIST. WATER LINES
- ABANDONED ROADS
- ELEVATION CONTOUR
- MONITORING WELL LOCATION
- SOIL BORING LOCATION
- CCL3F....TRICHLOROFLOUROMETHANE
- ND ....ORGANICS: NOT DETECTED
- N/A...SAMPLE NOT COLLECTED FOR ANALYSIS

VEGETATION TYPES:

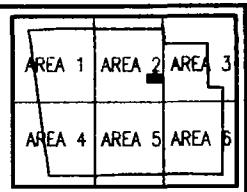
- D .....DISTURBED AREAS-NO VEGETATION
- GF .....BUNCHGRASSES/ANNUAL FORBS

NOTES:

1.) BASE MAP INFO. WAS SCANNED AND IS ACCURATE TO 1:1000.
2.) BORING DEPTHS ARE IN FEET BLS.
3.) ALL CONCENTRATIONS ug/g.

N

0 50 100
SCALE: 1" = 100'

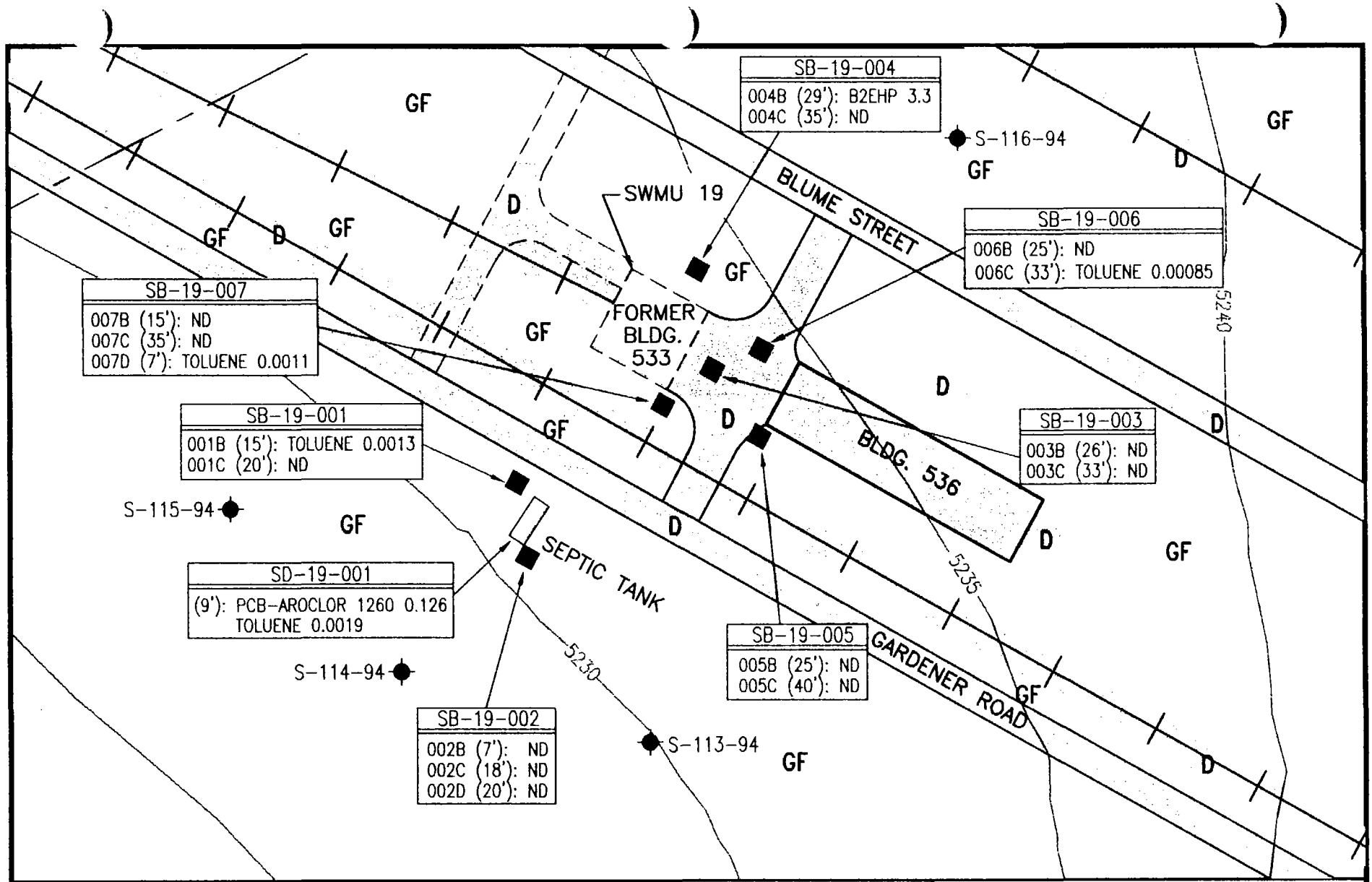


KEY MAP
NOT TO SCALE

Deseret Chemical Depot
Tooele, Utah

SWMU 19 – PHASE II SURFACE SOIL SAMPLE RESULTS

Figure:	Project:	File:	Date:
7-6	01-0827-03-6523-042	7109/RFI19SSR	NOV. 2000



LEGEND:

- SWMU LOCATIONS
- RAILROAD
- EXIST. WATER LINES
- ABANDONED ROADS
- ELEVATION CONTOUR
- MONITORING WELL LOCATION
- SOIL BORING LOCATION
- ND ..... ORGANICS: NOT DETECTED
- B2EHP ..... BIS(2-ETHYLHEXYL)PHTHALATE

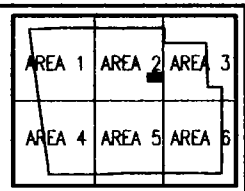
VEGETATION TYPES:

- D ..... DISTURBED AREAS-NO VEGETATION
- GF ..... BUNCHGRASSES/ANNUAL FORBS

NOTES:

1.) BASE MAP INFO. WAS SCANNED AND IS ACCURATE TO 1:1000.
2.) BORING DEPTHS ARE IN FEET BLS.
3.) ALL CONCENTRATIONS ug/g.

0 50 100
SCALE: 1" = 100'



KEY MAP
NOT TO SCALE

Deseret Chemical Depot
Tooele, Utah

SWMU 19 – PHASE II SUBSURFACE SOIL AND SEPTIC TANK SAMPLE RESULTS

Figure:	Project:	File:	Date:
7-7	01-0827-03-6523-042	7109/RFI19STS	NOV. 2000

Septic Tank Sediment Results—One sample (SD-19-001) of the sediment that was present in the septic tank during Phase II activities was collected for analysis. The sample was analyzed for VOCs, SVOCs, and PCBs. Table 7-7summarizes the results of these analyses. Comprehensive data tables are presented in Appendix I. Figure 7-7 presents the results of the septic tank sample analysis.

One VOC (toluene) and one PCB (Aroclor 1260) were detected in the septic tank sample. Toluene was detected in the sample at 0.0019 µg/g, which is consistent with the concentrations of toluene detected in soil samples at the site (0.00082 to 0.0026 µg/g) during Phase II. One PCB (Aroclor 1260) was detected at 0.126 µg/g. PCBs were not detected in any of the other Phase II samples collected at SWMU 19; Aroclor 1260 was detected during Phase I activities in a sediment sample (0.78 µg/g) collected from a sump in the foundation of Building 533. Because the sump in Building 533 has been backfilled since with cobbles, re-sampling from the sump to confirm the previous results was not possible.

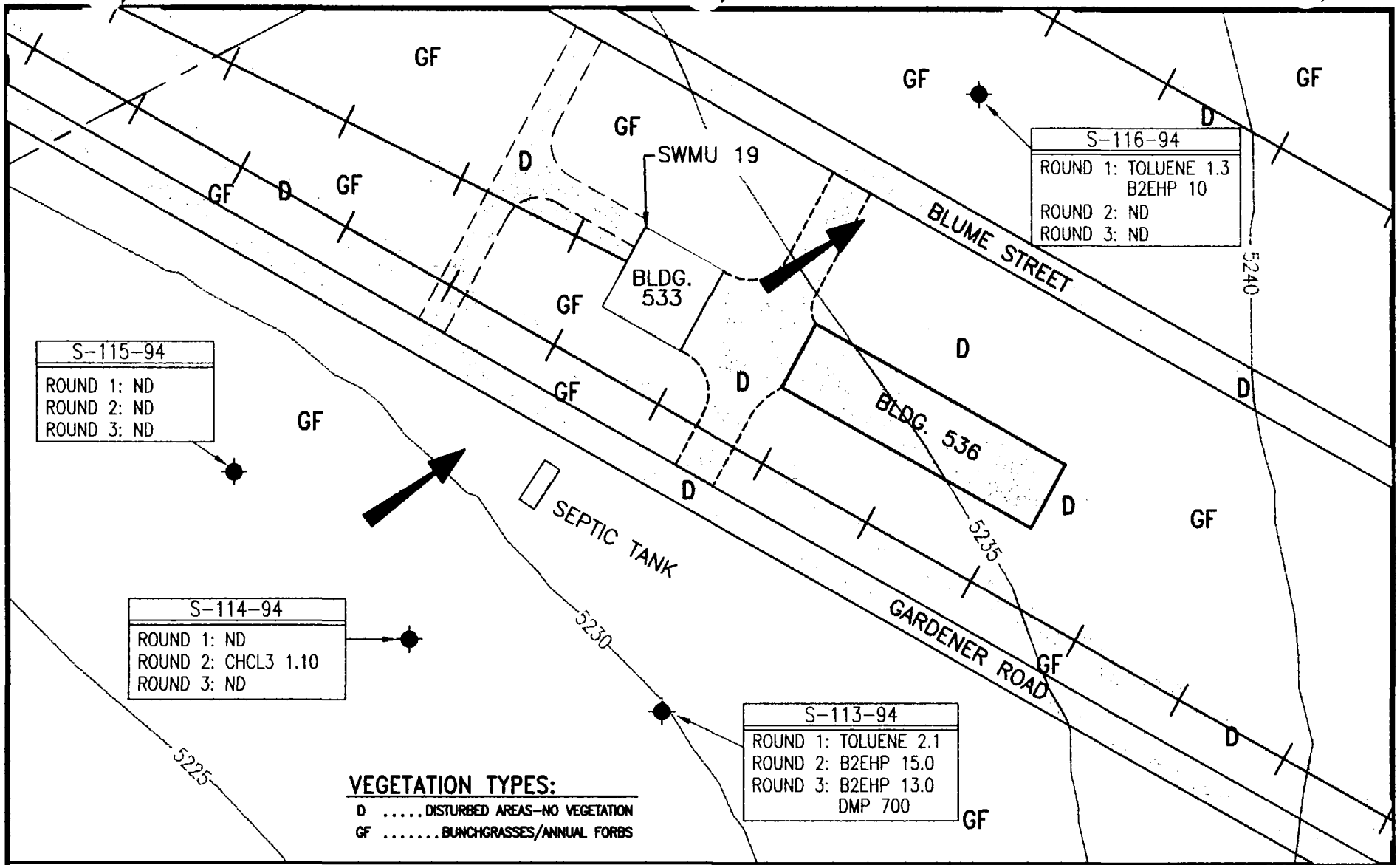
Summary of Soil Sampling Results—The results of the Phase II investigation indicate that soil contamination at SWMU 19 is limited to very low concentrations of VOCs and has not migrated into the subsurface soils. The areal and vertical extent of the acetone, 1,1,2,2-PCA, 1,1,1-TCA, carbon tetrachloride, chloroform, and chlorobenzene detected in soils during Phase I is limited to the foundation of former Building 533 and was not identified during Phase II activities. The Phase II soil gas analyses confirmed the Phase I results, identifying the presence of VOCs and chlorinated solvents in the area between former Building 533 and Building 536.

During the Phase II sampling effort, toluene was identified at random locations and depths with no obvious pattern in the areal or subsurface distribution in soils at the site. Combined with the fact that toluene was not detected during the Phase II SOV survey and was detected in only 1 of 14 Phase I SOV samples and no Phase I soil samples, the toluene detected in the Phase II samples may not be indicative of site conditions.

TCE was detected in one of the six surface soil samples collected at SWMU 19 during Phase II and was not detected in any of the subsurface soil samples collected at SWMU 19. Phase I soil sample results showed a irregular distribution of TCE (four of eight samples; maximum concentration of 0.011 µg/g), with TCE predominantly identified within the building foundation area. The distribution of TCE was limited in both its areal and vertical extent.

7.5.3.2 SWMU 19 Groundwater Sampling Results

Two VOCs were detected in groundwater samples collected from the SWMU 19 wells. Chloroform was detected in sample S-114-94 (Round 2) at 1.1 µg/L. Toluene was detected in monitoring well S-113-94 (2.1 µg/L) and monitoring well S-116-94 (1.3 µg/L) in October 1994. Table 7-9 summarizes the results of these analyses. Comprehensive data tables are presented in Appendix I. Table 7-10 presents a statistical summary, which includes a proportion of detected compounds and the range of concentrations. Figure 7-8 presents the results and distribution of the detected compounds.


GF
D
SWMU 19
BLUME STREET
BLDG. 533
BLDG. 536
SEPTIC TANK
GARDENER ROAD
5240
5235
5230
5225
S-116-94
ROUND 1: TOLUENE 1.3
B2EHP 10
ROUND 2: ND
ROUND 3: ND
S-115-94
ROUND 1: ND
ROUND 2: ND
ROUND 3: ND
S-114-94
ROUND 1: ND
ROUND 2: CHCL3 1.10
ROUND 3: ND
S-113-94
ROUND 1: TOLUENE 2.1
ROUND 2: B2EHP 15.0
ROUND 3: B2EHP 13.0
DMP 700
VEGETATION TYPES:
D .....DISTURBED AREAS–NO VEGETATION
GF .....BUNCHGRASSES/ANNUAL FORBS
LEGEND:
.....SWMU LOCATIONS
..... RAILROAD
..... EXIST. WATER LINES
..... ABANDONED ROADS
..... GRAVEL DRIVE
.....ELEVATION CONTOUR
.....MONITORING WELL LOCATION
ND ..... ORGANICS: NOT DETECTED
CHCL3..... CHLOROFORM
B2EHP.....BIS(2-ETHYLHEXYL)PHTHALATE
DMP .....DIMETHYL PHTHALATE
.....GENERAL GROUNDWATER FLOW DIRECTION, JANUARY 2000
ROUND 1: 10/94
ROUND 2: 1/95
ROUND 3: 11/98
N
NOTES:
1.) BASE MAP INFO. WAS SCANNED AND IS ACCURATE TO 1:1000.
2.) ALL CONCENTRATIONS ug/L.
0 50 100
SCALE: 1" = 100'
AREA 1 AREA 2 AREA 3
AREA 4 AREA 5 AREA 6
KEY MAP
NOT TO SCALE
Deseret Chemical Depot
Tooele, Utah
SWMU 19 – PHASE II GROUNDWATER SAMPLE RESULTS
Figure: 7-8
Project: 01-0827-03-6523-042
File: 7109/RFI19GWR
Date: NOV. 2000

Bis(2-ethylhexyl)phthalate (B2EHP) and dimethyl phthalate were the only SVOCs detected in the groundwater samples during Phase II. B2EHP was detected in well S-116-94 (10.0 µg/L) during Round 1 and in well S-113-94 during Round 2 (15.0 µg/L) and Round 3 (13.0 µg/L). Dimethyl phthalate also was detected in well S-113-94 during Round 3 at 700 µg/L (detection limit of 1.50 µg/L).

Following the completion of Phase II, wells S-115-94 and S-116-94 were sampled in December 1999 by Kleinfelder for explosives, VOCs, and SVOCs at lower detection limits than had been used during the Phase II investigation. The explosive compound 1,3-dinitrobenzene was detected in both wells at 0.720 and 0.730 µg/L, respectively (detection limit of 0.650 µg/L). Dimethyl phthalate was detected in both samples at 1 µg/L, B2EHP was detected at 1 µg/L (S-115-94) and 2.00 µg/L (S-116-94), and di-n-octyl phthalate was detected at 2 (S-115-94) and 4 µg/L (S-116-94).

SWMU 19 Summary of Groundwater Sampling Results—Toluene was detected during the initial round of sampling, but was not detected in the monitoring wells when they were resampled in January 1995. No VOCs have been detected in any well since January 1995. B2EHP and dimethyl phthalate also were detected inconsistently between sampling rounds. The limited occurrence of B2EHP, the lack of an identifiable source, combined with the fact that the compound is a common laboratory contaminant and was detected in method blanks associated with other samples from SWMU 19, indicates that B2EHP is not likely a site-related contaminant. Dimethyl phthalate was not detected during Rounds 1 or 2, was detected in only one well during Round 3, and was detected during the 1999 sampling event at low concentrations. Limited and inconsistent VOC and SVOC contamination was detected during the groundwater sampling at SWMU 19. Explosives were detected in 1999 at concentrations of the same magnitude as the detection limit.

7.6 SWMU 19 HUMAN HEALTH RISK ASSESSMENT

A baseline human health risk assessment was conducted to determine the risks associated with exposure to chemicals detected at SWMU 19. Baseline risks are defined as risks in the absence of remediation or institutional controls at the SWMU. All of the human health data tables for SWMU 19 are presented at the end of Section 7.

7.6.1 Baseline Human Health Risk Assessment

This section presents the results and conclusions along with SWMU-specific information pertaining to the human health risk assessment for SWMU 19. The general methods used to conduct the risk assessment and information applicable to all of the SWMU is presented in Section 4.1.

7.6.1.1 Methodology Overview

The methods for selecting COPCs are detailed in Section 4.1.1.2. As part of the COPC selection process, data were aggregated into exposure units and compared to the corresponding background data set. Monitoring data for produce and beef tissue are not available at SWMU 19.

However, the risk assessment evaluates exposures to these media. Exposure point concentrations for these media were derived from soil concentrations using simple models (see Section 4.1.2.3). Therefore, the COPCs selected for soils are also the COPCs for produce and beef.

The COPCs in soil and groundwater for SWMU 19 are listed in Tables 7-11 and 7-12. Additional information is presented in the Appendix K tables entitled, "Summary Statistics and Exposure Point Concentrations." These tables present general summary statistics (e.g., minimum and maximum detected values, minimum and maximum certified reporting limits [CRLs], mean, and 95 percent upper confidence limit [UCL]) and exposure point concentrations.

The risk assessment evaluates exposures under both current and potential future land uses. Under current land use, an industrial land use scenario has been evaluated in which the receptors at potential risk of exposure are Depot workers. The most likely future land use of DCD is the same as current land use (i.e., industrial). At SWMU 19, risks under a future industrial land use scenario would be the same as the risks under the current industrial scenario. Therefore, the industrial land use scenario has a "current/future" designation to show that it is applicable to both current and future land use. Additional future land use scenarios include a residential scenario, evaluated in accordance with the Utah Hazardous Waste Management Rules (Utah 1999), and a future construction worker scenario. Exposure pathways evaluated in the risk assessment are shown in Table 4-2.

The derivation of the exposure point concentrations for all pathways is explained in Section 4.1.2.3. The exposure point concentrations for the COPCs are presented in the Appendix K tables entitled, "Summary Statistics and Exposure Point Concentrations" and in each chemical-specific risk characterization table in Appendix L. The exposure assumptions used to estimate chronic daily intake are presented in Table 4-3.

The methods used in the risk characterization are detailed in Section 4.1.4. The human health risks are presented in terms of excess lifetime cancer risks (ELCRs), hazard indices (HIs), and blood lead levels for each pathway and receptor. The State of Utah has established target risk levels for use in determining the need for remediation. The risk assessment calculates risks and compares these risks to target levels. If the target levels are exceeded, the chemicals of concern (COCs) responsible for the exceedances are identified. As opposed to COPCs, COCs are identified after the quantitative risk assessment has been completed. To be consistent with the guidelines set by the State of Utah for corrective action, COCs in the human health risk assessment are individual chemicals that contribute to pathway risks exceeding any of the following:

- HI of 1
- Cancer risk greater than 1×10^{-4} for the actual or potential land use scenario
- Cancer risk greater than 1×10^{-6} for the residential land use scenario.

COCs have been identified separately for each land use scenario and may either independently exceed targets or combine to exceed targets.

7.6.1.2 Human Health Risk Assessment Results

The results of the risk characterization for all analytes except lead are presented in Tables 7-13 and 7-14 (food chain pathway risks are presented separately). Tables 7-15 and 7-16 present the COCs for each medium, their respective reasonable maximum exposure (RME) risk, and contribution to the total RME HI or cancer risk. These results are summarized below.

Depot Workers (Current/Future Land Use)—The combined noncancer HI resulting from surface soil exposures for the current Depot worker is 2×10^{-6}, which is less than the target HI of 1. The combined cancer risk for the current Depot worker is 5×10^{-11}, which is less than the target cancer risk of 1×10^{-4}.

Construction Workers (Future Land Use)—The combined noncancer HIs for the construction worker are 5×10^{-7} for surface soil exposures and 0.09 for subsurface soil exposures. Both are less than the target HI of 1. The combined cancer risks are 4×10^{-12} for surface soil exposures and 3×10^{-6} for subsurface soil exposures, which are less than the target cancer risk of 1×10^{-4}.

Residents (Future Land Use)—The combined noncancer HIs for the child (2 including surface soil exposures and 3 including subsurface soil exposures) exceed the target HI of 1 due to subsurface soil and groundwater exposures. However, when the noncancer HIs were segregated according to target organ, the target organ HIs (TOHIs) did not exceed the target of 1. The combined noncancer HIs for the adult (1 including surface soil exposures and 1 including subsurface soil exposures) are at the target HI of 1. The combined cancer risks for the integrated child/adult resident (3×10^{-6} including surface soil exposures and 8×10^{-5} including subsurface soil exposures) exceed the cancer risk target of 1×10^{-6} due to subsurface soil and groundwater exposures.

The following were identified as COCs in subsurface soil and groundwater for residents:

- Arsenic — Subsurface soil ingestion cancer risk = 5×10^{-5}
  Subsurface soil dermal contact cancer risk = 3×10^{-5}
- B2EHP — Groundwater ingestion cancer risk = 2×10^{-6}.

For the food chain pathways (produce and beef ingestion), the combined noncancer HIs for surface soil (0.0006 for the resident child and 0.0002 for the resident adult) do not exceed the target HI of 1. The combined noncancer HIs for subsurface soil (4 for the resident child and 1 for the resident adult) are at or exceed the target HI of 1. The combined food chain pathway cancer risks are 7×10^{-9} for surface soil and 4×10^{-4} for subsurface soil. The cancer risk for the subsurface soil pathways exceeds the target cancer risk of 1×10^{-6}.

The following was identified as a COC associated with produce grown in subsurface soils for residents:

- Arsenic — Leafy vegetable ingestion hazard quotient (HQ) = 3 (child), 0.9 (adult)
  Leafy vegetable ingestion cancer risk = 2×10^{-4}

Tuberous vegetable ingestion HQ = 1 (child), 0.3 (adult)

Tuberous vegetable ingestion cancer risk = 9×10^{-5}

Fruit ingestion cancer risk = 2×10^{-5}.

7.7 SWMU 19 SCREENING-LEVEL ECOLOGICAL RISK ASSESSMENT

This section presents conclusions along with SWMU-specific information pertaining to the screening-level ecological risk assessment (SERA) conducted for SWMU 19. Details on the methodology employed to support this analysis are provided in Section 4.2. All of the SERA data tables for SWMU 19 are presented at the end of Section 7.

7.7.1 Ecological Resources

The area of SWMU 19 is approximately 2.5 acres and is covered in bunchgrasses/annual forbs habitat. Sunflowers and tumbleweed are also abundant on the site. An abandoned railroad bed runs into the area from the northwest and another abandoned railroad bed borders the SWMU on the southwest. The SWMU has been disturbed significantly in the past from industrial activity with the remains of a concrete building foundation located between the railroad beds. During the limited 1994 ecological reconnaissance conducted by Science Applications International Corporation (SAIC), seven mule deer (*Odocoileus hemionus*) were seen grazing on sagebrush and rabbitbrush approximately 325 feet northwest of the SWMU, while numerous mammal burrows were seen onsite near the concrete foundations. During the field investigation activities, golden eagles were seen perched atop the telephone poles near the SWMU area.

7.7.2 Ecological Risk Methodology

An ecological risk assessment is necessary at SWMU 19 because habitat conditions are sufficient on and near the SWMU to support small mammals, such as a white-footed deer mouse (*Peromyscus maniculatus*), black-tailed jackrabbit (*Lepus californicus*), and larger native vertebrates, such as mule deer. The size of the available habitat is approximately 2.5 acres and is composed primarily of grasses and rabbitbrush. The size of the home range of the black-tailed jackrabbit in desert conditions is approximately 40 acres (French et al. 1965). When this desert home range is compared to the available habitat on the SWMU, it becomes apparent that there is approximately only 6 percent of the home range area needed for survival of a black-tailed jackrabbit. The implication is that insufficient habitat exists for jackrabbits.

However, the area immediately surrounding the SWMU is capable of supporting individuals and populations that can easily utilize the SWMU area for food, water, and cover. A SERA is performed on a SWMU having open habitat in most directions, having at least one-third the area of an animal's home range, or having a unique characteristic (e.g., water) on it. Since one condition (i.e., open habitat) exists at SWMU 19, a SERA is needed.

The methods for conducting ecological risk assessments are detailed in Section 4.2. The systematic methods follow four inter-related steps: problem formulation, exposure assessment,

effects assessment, and risk characterization. The following summarization of risk characterization uses the previously described methods and applies them to SWMU 19.

The conceptual site model (CSM) for ecological receptors presented in Figure 7-9 shows the projected completed pathways for SWMU 19. Vegetation exposure is via root uptake from soil. Ingestion of soil and vegetation was evaluated for jackrabbits. Ingestion of small mammals (i.e., jackrabbits) was evaluated for golden eagles.

The SERA consisted of a two-step process. First, detected chemicals were selected as ecological chemicals of potential concern (ecoCOPCs) based on a comparison with U.S. Environmental Protection Agency (EPA) Region V ecological data quality levels (EDQLs) for surface soil (EPA 1999c) and background concentrations. The ecoCOPCs were evaluated further in the risk characterization section below.

Risk characterization compares exposures to effects to determine the risk or likelihood of harm to plants and animals. An evaluation of the ecological assessment endpoints, using HQs for ecoCOPCs at SWMU 19, forms the quantitative basis of this risk characterization. The use of HQs to calculate the risks to ecological receptors is supported by available guidance (EPA 1992f, 1997c, and 1998).

HQs compare the estimated exposure concentrations to toxicity threshold concentrations. Exposure concentrations are derived from measured environmental concentrations, such as the 95 percent upper confidence limit (UCL), by multiplying the measured concentration by exposure parameters. As detailed in Section 4.2.5, the exposure parameter incorporates realistic adjustments to the measured environmental concentration (e.g., fraction of ingestion diet that comes from contaminated soil for small mammals) and realistic and reasonable assumptions (e.g., continuous year-round exposure). That is:

$$HQ = \frac{\text{Exposure Point Concentration} \times \text{Exposure Parameters}}{\text{Toxicity Reference Value}}$$

There are instances at SWMU 19 where an HQ cannot be calculated for an ecoCOPC because insufficient data were available to establish a toxicity threshold. These ecoCOPCs will be carried through the risk characterization as ecoCOPCs of uncertain risk to ecological receptors.

In determining the ecological assessment endpoints for DCD (Section 4.2.4), an HQ greater than or equal to unity (1) indicates that there is a potential for harmful ecological effects and that the ecoCOPC qualifies as an ecological chemical of concern (ecoCOC). Moreover, the risk of potential effects, severity of effects, or both, is assumed to increase with the magnitude of the ratio. An HQ threshold of 1 assumes that the toxicity threshold and exposure concentrations are based on accurate predictions and measurements. As detailed in Section 4.2.4 regarding assessment endpoints, setting the threshold of the HQ ratio at 10 rather than 1 adjusts for the overestimation of risk to receptor populations resulting from the use of conservative exposure factors and toxicity thresholds. The eagle is an exception to the 10 threshold; its threshold is 1 because of the necessity to protect individual organisms of threatened and endangered (T&E) species.

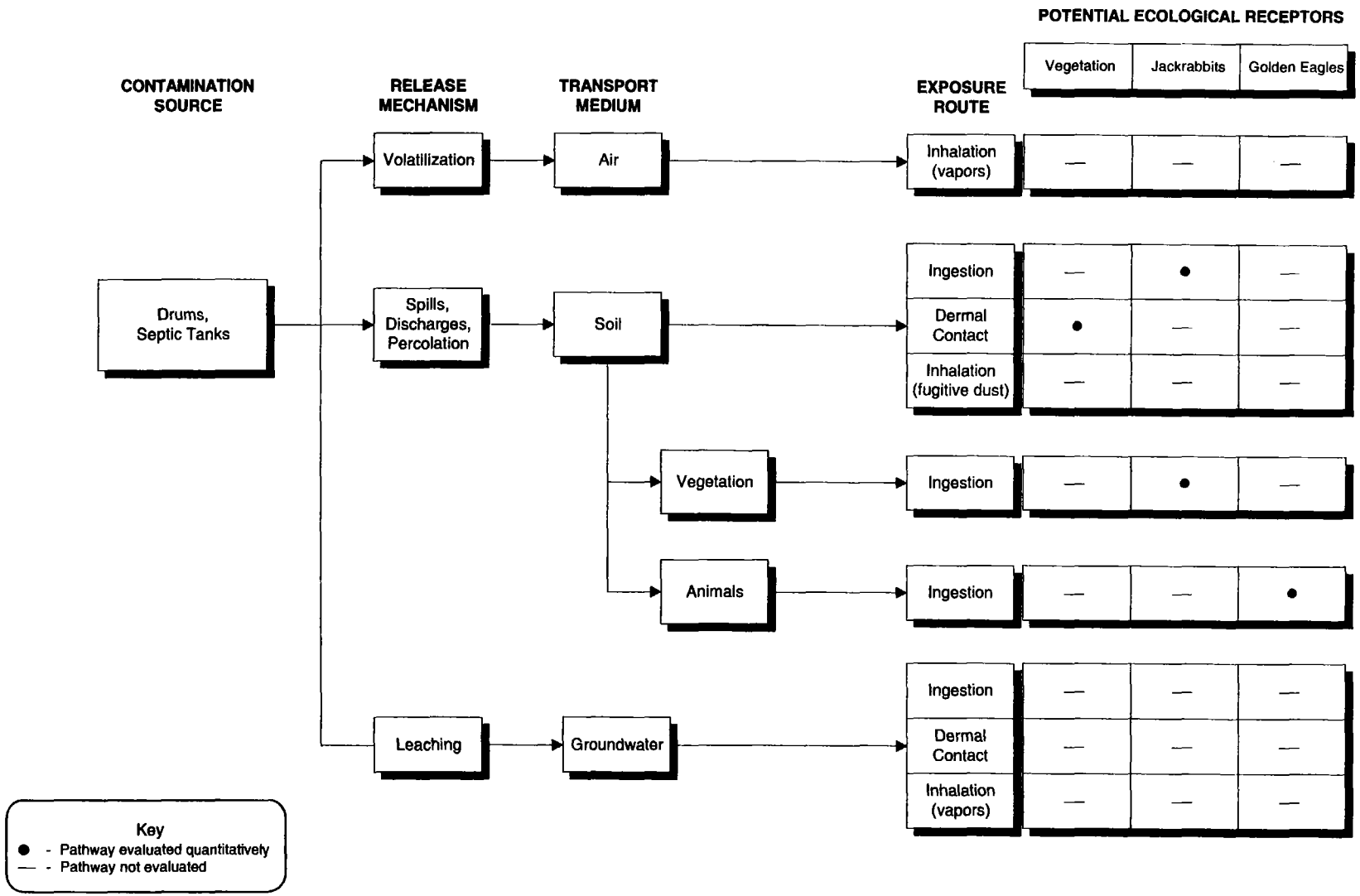


Figure 7-9. Conceptual Site Model for DCD Screening-level Ecological Risk Assessment at SWMU 19. Deseret Chemical Depot, Tooele, Utah

For SWMU 19, there is one exposure unit at two soil depths (0 to 0.5 and 0.5 to 15 feet BLS). The receptors evaluated include vegetation, black-tailed jackrabbits, and golden eagles.

7.7.3 Ecological Risk Findings

No stressed plants or animals were observed during the qualitative habitat surveys. Thus, no imminent threat to ecological receptors appears to exist. The chemicals detected in the SMWU 19 surface and subsurface soil samples are presented in Tables 7-17 and 7-18, respectively. These tables include a summary of the frequency of detection, the location of the maximum detected concentration, the site exposure point concentration and range of detected concentrations, and the results of the ecological toxicity and background screens. The methods for selecting ecoCOPCs were discussed briefly in Section 5.7.2.2 and are presented in greater detail in Section 4.2. Three organics (toluene, TCE, and trichlorofluoromethane) were detected below their Region V EDQLs (Table 7-17). As a result, they were eliminated from further analysis. Thus, no ecological risks are associated with surface soil at SWMU 19. Two inorganics (arsenic and lead) were selected as ecoCOPCs in subsurface soil (Table 7-18). These ecoCOPCs were evaluated further in the SERA using HQs.

EcoCOPCs in subsurface soil with HQs above the threshold of 1 occurred for arsenic (2.0 for terrestrial plants and 3.4 for rabbits) and lead (3.3 for terrestrial plants) (Table 7-19). Risks for all ecoCOPCs are presented in Tables M-14 through M-16 of Appendix M. No inorganic ecoCOPCs had HQs exceeding 1 for golden eagles, in part because the size of SWMU 19 is smaller relative to their home ranges. An HQ above the threshold of 1, but below 10, indicates a potential risk to individuals rather than a risk to the population as a whole. Thus, arsenic and lead are likely not of concern at SWMU 19 because the HQs for plants and rabbits are under 10. Assuming an HQ of 10 as being a more realistic assessment endpoint for plant and rabbit populations, no ecoCOCs are present at SWMU 19.

Future estimated risks to plants and animals at SWMU 19 are considered similar to current risks. The same species of plants and animals are assumed to be present at SWMU 19 in the future. Habitats may change as a result of ecological succession and land use changes. This may affect the exact set of receptors at some locations. However, these changes are likely subtle in the context of this work because of the similarity of habitat in all directions, and no risk calculations were made solely for future conditions. Again, future and current risks are assumed to be similar.

Table 7-7. Data Summary Table: Soil - SWMU 19
Deseret Chemical Depot, Tooele, Utah

Site ID			SB-19-002D	SB-19-003A	SB-19-003B	SB-19-003C	SB-19-004A
Field Sample Number			SAIC04	SAIC01	SAIC02	SAIC03	SAIC01
Site Type			BORE	BORE	BORE	BORE	BORE
Collection Date			10/7/94	10/7/94	10/7/94	10/7/94	10/7/94
Depth (ft)			20	0	28	33	0
Associated Field QC Sample - Site ID							
Associated Field QC Sample - Field Sample No.							
Associated Field QC Sample - Site ID							
Associated Field QC Sample - Field Sample No.							
VOLATILES/SOIL/GCMS (µg/g)							
Laboratory ID Number			TSSA*243	TSSA*245	TSSA*246	TSSA*247	TSSA*248
Parameter	Units	CRL					
Toluene	µg/g	0.0008	LT 0.00078**	LT 0.00078**	LT 0.00078**	LT 0.00078**	0.00096**
Trichloroethene	µg/g	0.0028	LT 0.0028**	LT 0.0028**	LT 0.0028**	LT 0.0028**	LT 0.0028**
TICs	µg/g		0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
SEMIVOLATILES/SOIL/GCMS (µg/g)							
Laboratory ID Number			TSSA*243	TSSA*245	TSSA*246	TSSA*247	TSSA*248
Parameter	Units	CRL					
bis(2-Ethylhexyl)phthalate	µg/g	0.62	LT 0.62**	LT 0.62**	LT 0.62**	LT 0.62**	LT 0.62**
TICs	µg/g		0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (0.5)
PCBs/SOIL/GCEC (µg/g)							
Laboratory ID Number			TSSA*243	TSSA*245	TSSA*246	TSSA*247	TSSA*248
Parameter	Units	CRL					
PCB-1260	µg/g	0.052	LT 0.0804**	LT 0.0804**	LT 0.0804**	LT 0.0804**	LT 0.0804**

Table 7-7. Data Summary Table: Soil - SWMU 19 (Continued)
Deseret Chemical Depot, Tooele, Utah

Site ID			SB-19-004B	SB-19-004C	SB-19-005A	SB-19-005B	SB-19-005C
Field Sample Number			SAIC02	SAIC03	SAIC01	SAIC02	SAIC03
Site Type			BORE	BORE	BORE	BORE	BORE
Collection Date			10/7/94	10/7/94	10/6/94	10/6/94	10/6/94
Depth (ft)			29	35	0	25	40
Associated Field QC Sample - Site ID							
Associated Field QC Sample - Field Sample No.							
Associated Field QC Sample - Site ID							
Associated Field QC Sample - Field Sample No.							
VOLATILES/SOIL/GCMS (µg/g)							
Laboratory ID Number			TSSA*249	TSSA*262	TSSA*250	TSSA*252	TSSA*253
Parameter	Units	CRL					
Toluene	µg/g	0.0008	LT 0.00076**	LT 0.00076**	0.0022**	LT 0.00076**	LT 0.00076**
Trichloroethene	µg/g	0.0028	LT 0.0028**	LT 0.0026**	LT 0.0028**	LT 0.0028**	LT 0.0028**
TICs	µg/g		0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
SEMIVOLATILES/SOIL/GCMS (µg/g)							
Laboratory ID Number			TSSA*249	TSSA*262	TSSA*250	TSSA*252	TSSA*253
Parameter	Units	CRL					
bis(2-Ethylhexyl)phthalate	µg/g	0.62	3.3**	LT 0.62**	LT 0.62**	LT 0.62**	LT 0.62**
TICs	µg/g		0 (0.0)	0 (0.0)	1 (2.0)	0 (0.0)	0 (0.0)
PCBs/SOIL/GCEC (µg/g)							
Laboratory ID Number			TSSA*249	TSSA*262	TSSA*250	TSSA*252	TSSA*253
Parameter	Units	CRL					
PCB-1260	µg/g	0.062	LT 0.0604**	LT 0.0604**	LT 0.0604**	LT 0.0604**	LT 0.0604**

Table 7-7. Data Summary Table: Soil - SWMU 19 (Continued)
Deseret Chemical Depot, Tooele, Utah

Site ID			SB-19-006A	SB-19-006B	SB-19-006B	SB-19-006C	SB-19-007A
Field Sample Number			SAIC01	SAIC02	SAIC03	SAIC03	SAIC01
Site Type			BORE	BORE	BORE	BORE	BORE
Collection Date			10/8/94	10/8/94	10/8/94	10/8/94	10/8/94
Depth (ft)			0	25	25	33	0
Associated Field QC Sample - Site ID							
Associated Field QC Sample - Field Sample No.							
Associated Field QC Sample - Site ID							
Associated Field QC Sample - Field Sample No.							
VOLATILES/SOIL/GCMS (µg/g)							
Laboratory ID Number			TSSA*254	TSSA*255	TSSA*256	TSSA*257	TSSA*258
Parameter	Units	CRL					
Toluene	µg/g	0.0008	0.0026**	LT 0.00078**	LT 0.00078** D	0.00085**	0.0013**
Trichloroethene	µg/g	0.0028	0.0035**	LT 0.0028**	LT 0.0028** D	LT 0.0028**	LT 0.0028**
TICs	µg/g		0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
SEMIVOLATILES/SOIL/GCMS (µg/g)							
Laboratory ID Number			TSSA*254	TSSA*255	TSSA*256	TSSA*257	TSSA*258
Parameter	Units	CRL					
bis(2-Ethylhexyl)phthalate	µg/g	0.62	LT 0.62**	LT 0.62**	80** D	LT 0.62**	LT 0.62**
TICs	µg/g		0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (0.5)
PCBs/SOIL/GCEC (µg/g)							
Laboratory ID Number			TSSA*254	TSSA*255	TSSA*256	TSSA*257	TSSA*258
Parameter	Units	CRL					
PCB-1260	µg/g	0.062	LT 0.0804**	LT 0.0804**	LT 0.0804** D	LT 0.0804**	LT 0.0804**

Table 7-7. Data Summary Table: Soil - SWMU 19 (Continued)
Deseret Chemical Depot, Tooele, Utah

Site ID			SB-19-007B	SB-19-007C	SB-19-007D	SD-19-001
Field Sample Number			SAIC02	SAIC03	SAIC04	SAIC01
Site Type			BORE	BORE	BORE	SPTK
Collection Date			10/6/94	10/6/94	10/6/94	10/6/94
Depth (ft)			15	35	7	0
Associated Field QC Sample - Site ID						
Associated Field QC Sample - Field Sample No.						
Associated Field QC Sample - Site ID						
Associated Field QC Sample - Field Sample No.						
VOLATILES/SOIL/GCMS (µg/g)						
Laboratory ID Number			TSSA*260	TSSA*261	TSSA*263	TSSA*258
Parameter	Units	CRL				
Toluene	µg/g	0.0008	LT 0.00078**	LT 0.00078**	0.0011**	0.0019**
Trichloroethene	µg/g	0.0028	LT 0.0028**	LT 0.0028**	LT 0.0028**	LT 0.0028**
TICs	µg/g		0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
SEMIVOLATILES/SOIL/GCMS (µg/g)						
Laboratory ID Number			TSSA*260	TSSA*261	TSSA*263	TSSA*258
Parameter	Units	CRL				
bis(2-Ethylhexyl)phthalate	µg/g	0.62	LT 0.62**	LT 0.62**	LT 0.62**	LT 20**
TICs	µg/g		1 (0.4)	0 (0.0)	0 (0.0)	9 (1250.0)
PCBs/SOIL/GCEC (µg/g)						
Laboratory ID Number			TSSA*260	TSSA*261	TSSA*263	TSSA*258
Parameter	Units	CRL				
PCB-1260	µg/g	0.062	LT 0.0804**	LT 0.0804**	LT 0.0804**	0.126** C

Footnotes:
- * - Data collected from chemical transfer file (Phase I)
- ** - Data collected from AEC Pyramid system (Phase III)
- CRL - Certified reporting limits
- ID - Identification
- N/A - Not applicable
- QC - Quality control
- TICs - Tentatively Identified Compound : number of TICs (total value)

Boolean Codes
- LT - Less than the certified reporting limit / method detection level

Flagging Codes
- C - Analysis was confirmed.
- D - Duplicate analysis.
- T - Non-target compound analyzed for but not detected (non-GC/MS methods).

Table 7-7. Data Summary Table: Soil - SWMU 19 (Continued)
Deseret Chemical Depot, Tooele, Utah

Site ID			SB-19-001B	SB-19-001C	SB-19-002A	SB-19-002B	SB-19-002C
Field Sample Number			SAIC02	SAIC03	SAIC01	SAIC02	SAIC03
Site Type			BORE	BORE	BORE	BORE	BORE
Collection Date			10/7/94	10/7/94	10/7/94	10/7/94	10/7/94
Depth (ft)			15	20	0	7	18
Associated Field QC Sample - Site ID							
Associated Field QC Sample - Field Sample No.							
Associated Field QC Sample - Site ID							
Associated Field QC Sample - Field Sample No.							
VOLATILES/SOIL/GC/MS (µg/g)							
Laboratory ID Number			TSSA*238	TSSA*239	TSSA*240	TSSA*241	TSSA*242
Parameter	Units	CRL					
Toluene	µg/g	0.0008	0.0013**	LT 0.00078**	0.00082**	LT 0.00078**	LT 0.00078**
Trichloroethene	µg/g	0.0028	LT 0.0028**	LT 0.0028**	LT 0.0028**	LT 0.0028**	LT 0.0028**
TICs	µg/g		0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
SEMIVOLATILES/SOIL/GC/MS (µg/g)							
Laboratory ID Number			TSSA*238	TSSA*239	TSSA*240	TSSA*241	TSSA*242
Parameter	Units	CRL					
bis(2-Ethylhexyl)phthalate	µg/g	0.62	LT 0.62**	LT 0.62**	LT 0.62**	LT 0.62**	LT 0.62**
TICs	µg/g		0 (0.0)	0 (0.0)	2 (1.4)	0 (0.0)	0 (0.0)
PCBs/SOIL/GC/EC (µg/g)							
Laboratory ID Number			TSSA*238	TSSA*239	TSSA*240	TSSA*241	TSSA*242
Parameter	Units	CRL					
PCB-1260	µg/g	0.062	LT 0.0604**	LT 0.0604**	LT 0.0604**	LT 0.0604**	LT 0.0604**

Table 7-8. Summary of Chemicals Detected in Soils at SWMU 19
Deseret Chemical Depot, DCD, Tooele, Utah

Chemical	Units	Proportion of Detects All Samples[a]	Detects Minimum	Detects Maximum	95% UTL of Background Data Set		Proportion of Detected Results Greater Than Background UTL	Maximum Concentration Location	Maximum Concentration Depth	COPC?
Surface Soils										
Organics										
Toluene	ug/g	5 / 6	0.00082	0.0026	0.0		5 / 5	SB-19-006A	0	Yes
Trichloroethylene	ug/g	1 / 6	0.0035	0.0035	0.0		1 / 1	SB-19-006A	0	Yes
Trichlorofluoromethane	ug/g	2 / 6	0.0076	0.014	0.0		2 / 2	SB-19-006A	0	Yes
Subsurface Soils										
Inorganics										
Arsenic	ug/g	2 / 4	17	20	3.4	*	0 / 2	S-SS-19-01	1.5	Yes
Beryllium	ug/g	2 / 2	0.24	0.26	1.2		0 / 2	S-SS-19-02	1.5	No
Chromium	ug/g	2 / 2	26	44	56		0 / 2	S-SS-19-02	1.5	No
Copper	ug/g	2 / 2	28	31	162		0 / 2	S-SS-19-01	1.5	No
Lead	ug/g	4 / 4	87	175	401		0 / 4	S-SS-19-01	1.5	Yes
Mercury	ug/g	2 / 2	0.15	0.20	0.36		0 / 2	S-SS-19-02	1.5	No
Silver	ug/g	2 / 4	0.63	0.93	0.47	*	0 / 2	S-SS-19-01	1.5	Yes
Zinc	ug/g	2 / 2	109	142	385		0 / 2	S-SS-19-01	1.5	No
Organics										
Toluene	ug/g	2 / 4	0.0011	0.0013	0.0		2 / 2	SB-19-001B	15	Yes
Trichlorofluoromethane	ug/g	1 / 4	0.0097	0.0097	0.0		1 / 1	SB-19-001B	15	Yes

* 95% UTL is presented in log-space. In order to conduct an accurate comparison, take the natural log of the maximum concentration before comparing to the 95% UTL.

[a] For the proportion of detects, counts were based on the unaveraged data set.

[1] Surface samples are collected within the range of 0 to 0.5 feet BLS.

[2] Subsurface samples are collected within the range of >0.5 feet BLS.

Table 7-9. Data Summary Table: Groundwater - SWMU 19
Deseret Chemical Depot, Tooele, Utah

Site ID			S-113-94		S-113-94		S-114-94		S-115-94		S-115-94		S-115-94		S-116-94
Field Sample Number			SAIC04		SAIC04D		SAIC04		121099		GW-15		SAIC04		121099
Site Type			WELL		WELL		WELL		WELL		WELL		WELL		WELL
Collection Date			11/16/98		11/16/98		11/16/98		12/10/99		11/18/98		11/17/98		12/10/99
Depth (ft)			125.00		125.00		130.00		0.00		0.00		130.00		0.00
Associated Field QC Sample - Site Id															
Associated Field QC Sample - Field Sample No.															
Associated Field QC Sample - Site Id															
Associated Field QC Sample - Field Sample No.															
Explosives (8330)															
Laboratory Id Number															
Parameter	Units	RL													
1,3-Dinitrobenzene	ug/L	0.65	N/A		N/A		N/A		0.720		N/A		N/A		0.730
Metals (6010)															
Laboratory Id Number															
Parameter	Units	RL													
Aluminum	ug/L	200	N/A		N/A		N/A		N/A		N/A		N/A		N/A
Barium	ug/L	20	N/A		N/A		N/A		N/A		0.113		N/A		N/A
Calcium	ug/L	100	N/A		N/A		N/A		N/A		52.7		N/A		N/A
Cobalt	ug/L	50	N/A		N/A		N/A		N/A		N/A		N/A		N/A
Magnesium	ug/L	100	N/A		N/A		N/A		N/A		33.8		N/A		N/A
Nickel	ug/L	40	N/A		N/A		N/A		N/A		N/A		N/A		N/A
Sodium	ug/L	200	N/A		N/A		N/A		N/A		47.2		N/A		N/A
Semivolatiles (8270)															
Laboratory Id Number			DCDW1*5		DCDW1*6		DCDW1*7						DCDW1*10		
Parameter	Units	RL													
Dimethyl Phthalate	ug/L	5	700		900 DG+		900 G+	LT	10.0		N/A		500 G+		1.00
bis(2-Ethylhexyl)phthalate	ug/L	5	13.0	LT	4.80 DG+B+T	LT	4.80 B+,G+,T		1.00		N/A	LT	4.80 B+G+T+		2.00
di-N-Octyl Phthalate	ug/L	5	LT 15.0	LT	15.0 D	LT	15.0		4.00	J	N/A	LT	15.0		4.00
Water Quality (3101)															
Laboratory Id Number			DCDW1*5		DCDW1*6		DCDW1*7						DCDW1*10		
Parameter	Units	RL													
Alkalinity	mg/L	5.0	84.0		80.0 D		92.0		N/A		N/A		128		N/A
Biochemical Oxygen Demand	mg/L	1.0	1.20	LT	1.00 D	LT	1.00		N/A		N/A	LT	1.00		N/A
Chemical Oxygen Demand	mg/L	5.0	LT 5.00	LT	5.00 D	LT	5.00		N/A		N/A	LT	5.00		N/A
Chloride	ug/L		140000		150000 D		160000		N/A		N/A		140000		N/A
Hardness	mg/L	1.0	288		282 D		274		N/A		N/A		298		N/A
Nitrite, Nitrate	ug/L		3800		3800 D		3700		N/A		N/A		3700		N/A
Specific Conductance	UMHC		786		795 D		779		N/A		N/A		803		N/A
Sulfate	ug/L		LT 100000	LT	100000 D	LT	100000		N/A		N/A	LT	100000		N/A
Total Dissolved Solids	mg/L	10.0	537		527 D		507		N/A		N/A		473		N/A
Total Organic Carbon	mg/L	1.0	2.80		1.74 D		1.84		N/A		N/A		1.46		N/A
pH			6.36		6.85 D		7.29		N/A		N/A		6.44		N/A

Boolean Codes:
- LT - Less than the certified reporting limit
- ND - Not detected

Footnotes:
- CRL - Certified reporting limits
- ID - Identification
- N/A - Not applicable
- TICs - Tentatively Identified Compound

Flagging Codes:
- + - Indicates that the concentration detected in a sample is less than 5 to 10 that detected in t
- B - Analyte found in the method blank or QC blank
- D - Duplicate analysis.
- G - Analyte found in rinse blank as well as in sample.
- T - Non-target compound analyzed for but not detected (non-GC/MS methods).

Qualifiers:
- J - Analyte was positively identified; the associated numerical value is th

Table 7-9. Data Summary Table: Groundwater - SWMU 19 (Continued)
Deseret Chemical Depot, Tooele, Utah

Site ID				S-116-94
Field Sample Number				SAIC04
Site Type				WELL
Collection Date				11/17/98
Depth (ft)				200.00
Associated Field QC Sample - Site Id				
Associated Field QC Sample - Field Sample No.				
Associated Field QC Sample - Site Id				
Associated Field QC Sample - Field Sample No.				
Explosives (8330)				
Laboratory Id Number				
Parameter	Units	RL		
1,3-Dinitrobenzene	ug/L	0.65		N/A
Metals (6010)				
Laboratory Id Number				
Parameter	Units	RL		
Aluminum	ug/L	200		N/A
Barium	ug/L	20		N/A
Calcium	ug/L	100		N/A
Cobalt	ug/L	50		N/A
Magnesium	ug/L	100		N/A
Nickel	ug/L	40		N/A
Sodium	ug/L	200		N/A
Semivolatiles (8270)				
Laboratory Id Number				DCDW1*12
Parameter	Units	RL		
Dimethyl Phthalate	ug/L	5		400 G+
bis(2-Ethylhexyl)phthalate	ug/L	5	LT	4.80 B+,G+,T+
di-N-Octyl Phthalate	ug/L	5	LT	15.0
Water Quality (3101)				
Laboratory Id Number				DCDW1*12
Parameter	Units	RL		
Alkalinity	mg/L	5.0		62.0
Biochemical Oxygen Demand	mg/L	1.0	LT	1.00
Chemical Oxygen Demand	mg/L	5.0		11.3
Chloride	ug/L			130000
Hardness	mg/L	1.0		138
Nitrite, Nitrate	ug/L			3000
Specific Conductance	UMHC			686
Sulfate	ug/L		LT	100000
Total Dissolved Solids	mg/L	10.0		347
Total Organic Carbon	mg/L	1.0		1.46
pH				7.45

Created on: 12/21/00

Table 7-10. Summary of Chemicals Detected in Groundwater at SWMU 19
Deseret Chemical Depot, DCD, Tooele, Utah

Chemical	Units	Proportion of Detects All Samples[a]	Detects Minimum	Detects Maximum	95% UTL of Background Data Set	Proportion of Detected Results Greater Than Background UTL	Maximum Concentration Location	Maximum Concentration Depth	COPC?
Alkalinity	mg/L	4 / 4	62	128	0.0	4 / 4	S-115-94	130	Yes
Barium	µg/L	3 / 3	0.11	113	200	0 / 3	S-115-94	0	No
Biochemical Oxygen Demand	mg/L	1 / 4	1.2	1.2	0.0	1 / 1	S-113-94	125	Yes
Calcium	µg/L	1 / 1	53	53	0.0	1 / 1	S-115-94	0	Yes
Chemical Oxygen Demand	mg/L	1 / 4	11	11	0.0	1 / 1	S-116-94	200	Yes
Chloride	µg/L	4 / 4	130,000	160,000	1.4E+06	0 / 4	S-114-94	130	No
Hardness	mg/L	4 / 4	138	298	0.0	4 / 4	S-115-94	130	Yes
Magnesium	µg/L	1 / 1	34	34	0.0	1 / 1	S-115-94	0	Yes
Nitrite, Nitrate	µg/L	4 / 4	3,000	3,700	5,600	0 / 4	S-115-94	130	No
Sodium	µg/L	1 / 1	47	47	61,000	0 / 1	S-115-94	0	No
Specfic Conductance	UMHC	4 / 4	686	803	0.0	4 / 4	S-115-94	130	Yes
Total Dissolved Solids	mg/L	4 / 4	347	537	0.0	4 / 4	S-113-94	125	Yes
Total Organic Carbon	mg/L	4 / 4	1.5	2.5	0.0	4 / 4	S-113-94	125	Yes
pH	0	4 / 4	6.4	7.5	0.0	4 / 4	S-116-94	200	Yes
1,3-Dinitrobenzene	µg/L	4 / 4	0.72	0.73	0.0	4 / 4	S-116-94	0	Yes
Chloroform	µg/L	1 / 14	1.1	1.1	0.0	1 / 1	S-114-94	109	Yes
Dimethyl Phthalate	µg/L	3 / 15	1.00	700	0.0	3 / 3	S-113-94	125	Yes
Toluene	µg/L	2 / 12	1.3	2.1	0.0	2 / 2	S-113-94	110	Yes
bis(2-Ethylhexyl)phthalate	µg/L	7 / 16	1.00	15	0.0	7 / 7	S-113-94	109	Yes
di-N-Octyl Phthalate	µg/L	4 / 16	2.0	4.0	0.0	4 / 4	S-116-94	0	Yes

* 95% UTL is presented in log-space. In order to conduct an accurate comparison, take the natural log of the maximum concentration before comparing to the 95% UTL.

[a] For the proportion of detects, counts were based on the unaveraged data set.

[1] Surface samples are collected within the range of 0 to 0.5 feet BLS.

[2] Subsurface samples are collected within the range of >0.5 feet BLS.

Table 7-11. Chemicals of Potential Concern in Soil at SWMU 19
Building 533 Foundation
Deseret Chemical Depot, Tooele, Utah

Metals	VOCs/SVOCs
Surface Soil (0 to 0.5 feet BLS)	
	Toluene
	Trichloroethylene
	Trichlorofluoromethane
Subsurface Soil (0.5 to 15 feet BLS)	
Arsenic	Toluene
Lead	Trichlorofluoromethane
Silver	

Table 7-12. Chemicals of Potential Concern in Groundwater at SWMU 19
Building 533 Foundatiion
Deseret Chemical Depot, Tooele, Utah

Metals	VOCs/SVOCs	Explosives
Calcium	Chloroform	1,3-Dinitrobenzene
Magnesium	Dimethyl Phthalate	
	Toluene	
	bis(2-Ethylhexyl)phthalate	
	di-N-Octyl Phthalate	

Table 7-13. RME Risk Characterization Summary: SWMU 19 - Building 533 Foundation
Group 3 Phase II RFI, DCD, Tooele, Utah

Medium	Exposure Route	Current/Future Land Use				Future Land Use								
		Noncancer HI		Cancer Risk		Noncancer HI						Cancer Risk		
		Depot Worker		Depot Worker		Resident Child		Resident Adult		Construction Worker		Resident Integrated		Construction Worker
Surface Soil (0 to 0.5 ft BLS)	Ingestion	5E-07	B	1E-11	B	6E-06	B	7E-07	B	4E-07	B	4E-11	B	2E-12	B
	Dermal Contact	0E+00	B	0E+00	B	0E+00	B	0E+00	B	0E+00	B	0E+00	B	0E+00	B
	Inhalation (Dust)	2E-11	B	1E-15	B	7E-11	B	3E-11	B	1E-12	B	3E-15	B	6E-17	B
	Inhalation (Volatiles)	2E-06	B	4E-11	B	5E-06	B	2E-06	B	6E-08	B	8E-11	B	2E-12	B
Subsurface Soil (>0.5 to 15 ft BLS)	Ingestion	NA		NA		9E-01	B	9E-02	B	6E-02	B	5E-05	E	2E-06	B
	Dermal Contact	NA		NA		3E-01	B	2E-01	B	2E-02	B	3E-05	E	7E-07	B
	Inhalation (Dust)	NA		NA		4E-11	B	2E-11	B	9E-13	B	5E-08	B	1E-09	B
	Inhalation (Volatiles)	NA		NA		3E-06	B	1E-06	B	4E-08	B	0E+00	B	0E+00	B
Groundwater	Ingestion	NA		NA		5E-01	B	2E-01	B	NA		2E-06	E	NA	
	Dermal Contact	NA		NA		1E+00	B	7E-01	B	NA		2E-07	B	NA	
	Inhalation	NA		NA		4E-01	B	8E-02	B	NA		4E-07	B	NA	
Surface Soil and Groundwater Combined Hazard Index (HI):		2E-06	B			2E+00	E	1E+00	B	5E-07	B				
Combined Cancer Risk:				5E-11	B							3E-06	E	4E-12	B
Subsurface Soil and Groundwater Combined Hazard Index (HI):		NA				3E+00	E	1E+00	B	9E-02	B				
Combined Cancer Risk:				NA								8E-05	E	3E-06	B

NA - pathway not evaluated
0E+00 - pathway evaluated but no risks could be calculated due to lack of EPA-approved toxicity values
B - HI ≤ 1 or ELCR ≤ 10^{-6} for the residential scenario; HI ≤ 1 or ELCR ≤ 10^{-4} for the worker scenarios
E - HI > 1 or ELCR > 10^{-6} for the residential scenario; HI > 1 or ELCR > 10^{-4} for the worker scenarios
Integrated receptor combines both child and adult exposures

Table 7-14. RME Risk Characterization Summary for Produce and Beef: SWMU 19 - Building 533 Foundation Group 3 Phase II RFI, DCD, Tooele, Utah

Medium	Exposure Route	Future Land Use					
		Noncancer HI				Cancer Risk	
		Resident Child		Resident Adult		Resident Integrated	
Produce Surface Soil (0 to 0.5 ft BLS)	Leafy Vegetable Ingestion	1E-08	B	5E-09	B	2E-13	B
	Tuberous Vegetable Ingestion	4E-04	B	1E-04	B	4E-09	B
	Fruit Ingestion	3E-04	B	8E-05	B	3E-09	B
Produce Subsurface Soil (>0.5 to 15 ft BLS)	Leafy Vegetable Ingestion	3E+00	E	9E-01	B	2E-04	E
	Tuberous Vegetable Ingestion	1E+00	B	3E-01	B	9E-05	E
	Fruit Ingestion	2E-01	B	8E-02	B	2E-05	E
Beef	Ingestion	7E-09	B	2E-09	B	9E-14	B
Produce (Surface Soil) and Beef							
Combined Hazard Index (HI):		6E-04	B	2E-04	B		
Combined Cancer Risk:						7E-09	B
Produce (Subsurface Soil) and Beef							
Combined Hazard Index (HI):		4E+00	E	1E+00	B		
Combined Cancer Risk:						4E-04	E

NA - pathway not evaluated
0E+00 - pathway evaluated but no risks could be calculated due to lack of EPA-approved toxicity values
B - HI ≤ 1 or ELCR ≤ 10^{-6} for the residential scenario; HI ≤ 1 or ELCR ≤ 10^{-4} for the worker scenarios
E - HI > 1 or ELCR > 10^{-6} for the residential scenario; HI > 1 or ELCR > 10^{-4} for the worker scenarios
Integrated receptor combines both child and adult exposures

Table 7-15. Chemicals of Concern for RME Risks at SWMU 19 - Building 533 Foundation Group 3 Phase II RFI, DCD, Tooele, Utah

Medium	Exposure Route	COC[a]	% of Total HI	% of Total Cancer Risk	Current Land Use		Future Land Use				
					Noncancer HI: Depot Worker	Cancer Risk: Depot Worker	Noncancer HI			Cancer Risk	
							Resident Child	Resident Adult	Construction Worker	Resident Integrated	Construction Worker
Surface Soil (0 to 0.5 ft BLS)	Ingestion Dermal Contact Inhalation (Dust) Inhalation (Volatiles)										
Subsurface Soil (>0.5 to 15 ft BLS)	Ingestion Dermal Contact Inhalation (Dust) Inhalation (Volatiles)	Arsenic Arsenic		100% 100%						5E-05 3E-05	
Groundwater	Ingestion Dermal Contact Inhalation	bis(2-Ethylhexyl)phthalate		98%						2E-06	

[a] COCs are chemicals which contribute to a pathway with HI > 1 and ELCR > 10^{-6} for the residential scenario and HI > 1 and ELCR > 10^{-4} for the worker scenarios
A blank space indicates a pathway not analyzed or an analyte which is not a COC for that pathway
Integrated receptor combines both child and adult exposures

Table 7-16. Chemicals of Concern for Produce and Beef RME Risks at SWMU 19 - Building 533 Foundation Group 3 Phase II RFI, DCD, Tooele, Utah

Medium	Exposure Route	COC[a]	% of Total HI	% of Total Cancer Risk	Future Land Use		
					Noncancer HI		Cancer Risk
					Resident Child	Resident Adult	Resident Integrated
Produce (Surface Soil)	Leafy Vegetable Ingestion						
	Tuberous Vegetable Ingestion						
	Fruit Ingestion						
Produce (Subsurface Soil)	Leafy Vegetable Ingestion	Arsenic	100%	100%	3E+00	9E-01	2E-04
	Tuberous Vegetable Ingestion	Arsenic	100%	100%	1E+00	3E-01	9E-05
	Fruit Ingestion	Arsenic		100%			2E-05
Beef	Ingestion						

[a] COCs are chemicals which contribute to a pathway with HI > 1 and ELCR > 10^{-6} for the residential scenario and HI > 1 and ELCR > 10^{-4} for the worker scenarios
A blank space indicates a pathway not analyzed or an analyte which is not a COC for that pathway
Integrated receptor combines both child and adult exposures

Table 7-17. Occurrence, Distribution, and Selection of Ecological Chemicals of Potential Concern (ecoCOPCs) for Surface Soils (0-0.5 ft BLS) at SWMU 19
Deseret Chemical Depot, Tooele, Utah

Run Time: 11:58:02 AM
Run Date: 12/1/00
Exposure Unit: 19__SS1

Chemical	Frequency of Detection [a]	Number of Samples in Mean [b]	Range of Detection Limits	Range of Detected Concentrations	Units	Location of Maximum Concentration	Arithmetic Mean [b]	Site EPC [b,c]	Concentration Used for Screening [d]	Ecological Toxicity Screening Value [e]	Exceeds Ecological Screening Value Y/N [f]	Background Screening Status [g]	ecoCOPC Y/N [h]
Toluene	5 / 6	6	0.00078 - 0.00078	0.00082 - 0.0026	ug/g	SB-19-006A	0.0014	0.0021	0.0026	5.5	N	--	N
Trichloroethylene	1 / 6	6	0.0028 - 0.0028	0.0035 - 0.0035	ug/g	SB-19-006A	0.0018	0.0026	0.0035	12	N	--	N
Trichlorofluoromethane	2 / 6	6	0.0059 - 0.0059	0.0076 - 0.014	ug/g	SB-19-006A	0.0056	0.014 #	0.014	16	N	--	N

-- Not applicable (e.g., background comparison not conducted for organic compounds, or screening values not available)

[a] For the Frequency of Detection, counts were based on the unaveraged data set.

[b] Results of duplicate analyses were averaged and nondetects were treated as one-half the detection limit in the calculation of the arithmetic mean, standard deviation, and 95% UCL.

[c] The exposure point concentration (EPC) is the 95% upper confidence (UCL) of the arithmetic mean, unless the 95% UCL exceeds the maximum detected value. If the latter is true, the maximum detected value is substituted as the EPC (denoted by a "#" next to the EPC).

[d] The maximum detected concentration at the site was used for the screen.

[e] Ecological toxicity screening value is the EPA Region V RCRA ecological data quality level (EDQL). See Section 4.2.3.3 for further discussion.

[f] Maximum detected concentration compared to the screening value.

[g] For inorganics, if the analysis of variance determines that the site data are from the same population as the background data, [<bk] appears in the column. If not, "Above" appears in the column.

[h] If the maximum concentration was above the screening value and the site concentration was determined to be above background by ANOVA, the chemical was identified as an ecoCOPC. If only one value was available (screening or background) and the site maximum exceeded that value or if the site concentration was determined to be above background by ANOVA, the chemical was retained as an ecoCOPC. If neither a screening value nor background concentration was available, the chemical was selected as an ecoCOPC.

NA = Not Available.

Table 7-18. Occurrence, Distribution, and Selection of Ecological Chemicals of Potential Concern (ecoCOPCs) for Subsurface Soils (>0.5-15 ft BLS) at SWMU 19 Deseret Chemical Depot, Tooele, Utah

Run Time: 11:58:02 AM
Run Date: 12/1/00
Exposure Unit: 19__SS1

Chemical	Frequency of Detection [a]	Number of Samples in Mean [b]	Range of Detection Limits			Range of Detected Concentrations			Units	Location of Maximum Concentration	Arithmetic Mean [b]	Site EPC [b,c]		Concentration Used for Screening [d]	Ecological Toxicity Screening Value [e]	Exceeds Ecological Screening Value Y/N [f]	Background Screening Status [g]	ecoCOPC Y/N [h]
Arsenic	2 / 4	4	47	-	47	17	-	20	ug/g	S-SS-19-01	21	20	#	20	5.7	Y	Above	Y
Beryllium	2 / 2	2	--	-	--	0.24	-	0.26	ug/g	S-SS-19-02	0.25	0.26	#	0.26	1.1	N	[<bk]	N
Chromium	2 / 2	2	--	-	--	26	-	44	ug/g	S-SS-19-02	35	44	#	44	0.40	Y	[<bk]	N
Copper	2 / 2	2	--	-	--	28	-	31	ug/g	S-SS-19-01	29	31	#	31	0.31	Y	[<bk]	N
Lead	4 / 4	4	--	-	--	87	-	175	ug/g	S-SS-19-01	115	164		175	0.054	Y	Above	Y
Mercury	2 / 2	2	--	-	--	0.15	-	0.20	ug/g	S-SS-19-02	0.18	0.20	#	0.20	0.100	Y	[<bk]	N
Silver	2 / 4	4	16	-	16	0.63	-	0.93	ug/g	S-SS-19-01	4.3	0.93	#	0.93	4.0	N	Above	N
Zinc	2 / 2	2	--	-	--	109	-	142	ug/g	S-SS-19-01	126	142	#	142	6.6	Y	[<bk]	N
Toluene	2 / 4	4	0.00078	-	0.00078	0.0011	-	0.0013	ug/g	SB-19-001B	0.00080	0.0013	#	0.0013	5.5	N	--	N
Trichlorofluoromethane	1 / 4	4	0.0059	-	0.0059	0.0097	-	0.0097	ug/g	SB-19-001B	0.0046	0.0097	#	0.0097	16	N	--	N

-- Not applicable (e.g., background comparison not conducted for organic compounds, or screening values not available)

[a] For the Frequency of Detection, counts were based on the unaveraged data set.

[b] Results of duplicate analyses were averaged and nondetects were treated as one-half the detection limit in the calculation of the arithmetic mean, standard deviation, and 95% UCL.

[c] The exposure point concentration (EPC) is the 95% upper confidence (UCL) of the arithmetic mean, unless the 95% UCL exceeds the maximum detected value. If the latter is true, the maximum detected value is substituted as the EPC (denoted by a "#" next to the EPC).

[d] The maximum detected concentration at the site was used for the screen.

[e] Ecological toxicity screening value is the EPA Region V RCRA ecological data quality level (EDQL). See Section 4.2.3.3 for further discussion.

[f] Maximum detected concentration compared to the screening value.

[g] For inorganics, if the analysis of variance determines that the site data are from the same population as the background data, [<bk] appears in the column. If not, "Above" appears in the column.

[h] If the maximum concentration was above the screening value and the site concentration was determined to be above background by ANOVA, the chemical was identified as an ecoCOPC. If only one value was available (screening or background) and the site maximum exceeded that value or if the site concentration was determined to be above background by ANOVA, the chemical was retained as an ecoCOPC. If neither a screening value nor background concentration was available, the chemical was selected as an ecoCOPC.

NA = Not Available.

Table 7-19. Summary of HQs at or Above 1 for EcoCOPCs at SWMU 19 Deseret Chemical Depot, Tooele, Utah

SWMU 19 Subsurface Soil	
HQ	—
>100	None
10 – 100	None
1 – 10	Arsenic 2 (plants) 3.4 (rabbits) Lead 3.3 (plants)