8. SWMU 20 – BUILDING 520 (CRATING FACILITY)

This section presents the results of the Phase I and II Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) for solid waste management unit (SWMU) 20 – Building 520 (Crating Facility). The site geologic and hydrologic features are presented and are followed by a discussion of 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.

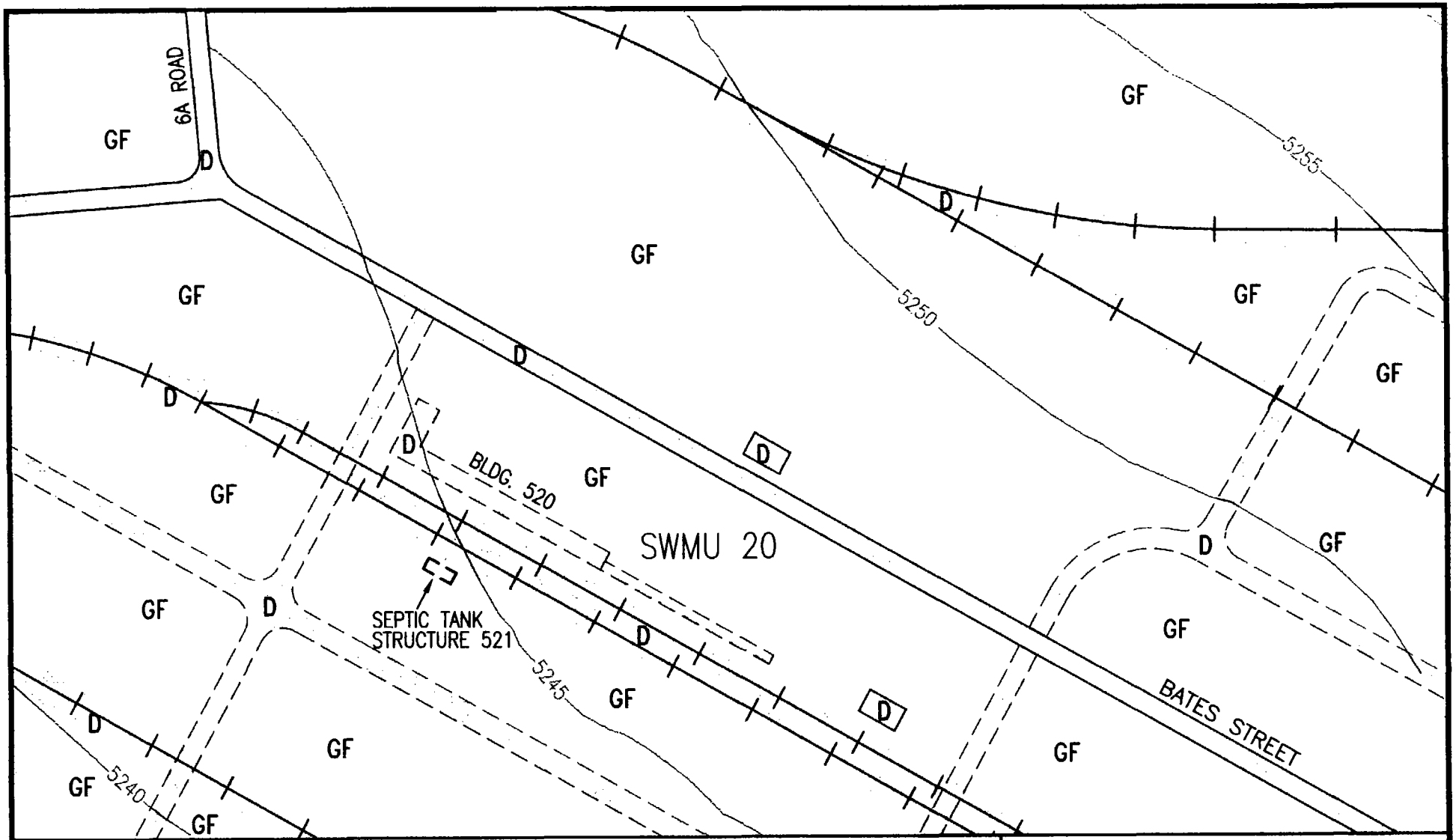
8.1 SWMU 20 DESCRIPTION/CURRENT SITE CONDITIONS

SWMU 20 – Building 520 (Crating Facility) is located in the north-central portion of Deseret Chemical Depot (DCD). SWMU 20 included Building 520 and the associated septic tank (Structure 521), as shown in Figure 8-1. Both the building and the septic tank were demolished and removed in 1999. The complete history of Building 520 was unknown; a site reconnaissance was conducted in 1998 with current and former DCD employees to gain additional information. Appendix A presents the site reconnaissance report and the results of the associated records search and personnel interviews.

The following history is based on information gathered during the 1998 site reconnaissance. Building 520 was constructed in 1947 and served as a carpentry shop and a less-than-carload facility for inspecting smoke pots until the mid-1960s (EBASCO 1993). From 1965 until the mid-1970s, the building was a Surveillance Change House in which the inspection of conventional small arms munitions, such as hand grenades, and land mines was conducted. Inspections were conducted on munitions prior to loading them onto railcars for shipment. Reportedly, chemical munitions were not inspected within the building (Sandoval 1998). From 1979 until 1985, the building remained as a Surveillance Change House where periodic inspections of conventional and chemical munitions were conducted in the western portion of Building 520. Conventional weapons were visually inspected for surface damage (e.g., rust, faded markings, and faded paint) and deficient munitions were repaired (e.g., re-painted) and shipped (DuBois 1998). Inspection of the chemical munitions included removing a plug from the round and collecting an air sample from within the core/well chamber using an M-18 kit (DuBois 1998). Reportedly, chemical agent never was identified as part of these inspections (i.e., no leakers) (DuBois 1998). The building remained idle from 1985 until its demolition in 1999 (Doan 2000).

8.2 SWMU 20 SPECIFIC GEOLOGY AND HYDROGEOLOGY

SWMU 20 is located on a southwest-sloping topography at approximately 5,250 feet above mean sea level (msl). The site is approximately 750 feet north of SWMU 19. Since soil samples were not collected at greater than 20 feet BLS at SWMU 20, it is assumed that it is underlain by the Quaternary alluvial deposits associated with the Ophir Creek alluvial fan that were encountered in the deeper borings at SWMU 19 (see Section 7.2). During the Phase II (1994-95) investigation, two soil borings (SB-20-001 and SB-20-002) were drilled at SWMU 20 to 20.5 feet below land surface (BLS). During the Phase IIB (1999-2000) activities, 10 test pits



LEGEND:

- SWMU LOCATION
- RAILROAD
- ABANDONED ROADS
- 5250 .... ELEVATION CONTOUR
- FORMER BUILDING
- FORMER SEPTIC TANK

VEGETATION TYPES:

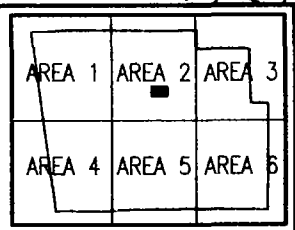
D .. DISTURBED AREAS–NO VEGETATION
GF .... BUNCHGRASSES/ANNUAL FORBS

NOTES:

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

N

0 50 100 150
SCALE: 1" = 150'



KEY MAP
NOT TO SCALE

Deseret Chemical Depot
Tooele, Utah

SWMU 20 – BUILDING 520 (CRATING FACILITY)

Figure:	Project:	File:	Date:
8-1	01-0827-03-6523-042	7109/RFISMU20	NOV. 2000

8-2

were excavated to approximately 15 feet BLS along the length of the septic discharge line. A geological log was constructed for the borings and test pits; these logs are presented in Appendix C.

The soils encountered during the drilling of the Phase II (1994) soil borings are representative of the two surface soils (colluvium) horizons typically encountered on DCD. The first horizon extends from the surface to 14 feet BLS and consists of coarse, unconsolidated sandy gravels. This horizon overlies a 4- to 8-foot layer of moist clayey silt. The silt is consolidated and plastic, and potentially could act as an aquitard for water storage and movement. These two horizons were noted in both borings. In boring SB-20-001, the clayey silt horizon extended from the surface to the completion depth (20.5 feet BLS). However, in boring SB-20-002, interbedded gravels and clays were found from 16.5 to 20.5 feet BLS. No water was encountered in either boring.

The soil encountered during the Phase IIB test pit excavation activities from 0 to 5 feet BLS in the area of the septic line consists of a moist, slightly dense, slightly plastic, yellowish brown, sandy silt to approximately 0.5 feet BLS and grades into a sandy gravel between 2.5 and 5 feet BLS. Beneath the septic pipe (approximately 5 feet BLS), the formation consisted of sandy gravel with small boulders up to approximately 12 inches in diameter.

The subsurface investigation conducted at SWMU 20 was limited to the uppermost 20.5 feet of soil. Therefore, the static water level in this area is estimated to be approximately 110 feet BLS at SWMU 20 based on elevations recorded at the closest monitoring wells (SWMU 19). SWMU 19 is located approximately 750 feet south of SWMU 20.

8.3 SWMU 20 PREVIOUS INVESTIGATION RESULTS

The Phase I RFI, conducted in 1992 by EBASCO, was the first sampling performed at SWMU 20. The Phase I activities included the collection of a sludge sample from the Building 520 septic tank. This sample was analyzed for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), agent breakdown products, and metals. Table 8-1 summarizes the previous investigation activities and results at SWMU 20.

Table 8-1. SWMU 20 Previous Field Investigation Activities
Deseret Chemical Depot, Tooele, Utah

Phase	Previous Activity	Result
Phase I (1990-92)	Collected one sludge sample from a septic holding tank associated with Building 520; analyzed sample for VOCs, SVOCs, agent breakdown products, and metals.	COPCs: SVOCs and inorganics.

The Phase I sludge sample results indicated that the concentrations of SVOCs and several metals were elevated. The detection of some of the SVOCs may be attributed to the use of dyes in various sanitary products. Several metals were detected at concentrations near or below background concentrations for native soils (EBASCO 1993a).

8.4 SWMU 20 PHASE II RFI FIELD INVESTIGATION APPROACH

Phase II field activities at SWMU 20 were conducted in 1994-95 (Phase II), 1998-99 (Phase IIA), and 1999-2000 (Phase IIB). The 1994-95 Phase II field activities were conducted to determine if the contamination identified during Phase I had migrated into the soils below the septic tank. Phase II activities included an explosive risk survey and the drilling and sampling of soil borings adjacent to the septic tank. Figure 8-2 shows the Phase II sample locations at SWMU 20. Table 8-2 presents the planned versus actual activities for the entire Phase II RFI field investigation.

The 1998-99 Phase IIA field activities were conducted to collect additional information on previous building activities and operations and to determine the hazardous characteristics of the sludge in the Building 520 septic tank. A detailed site reconnaissance was conducted in May 1998 to field validate the need for additional site investigation activities at SWMU 20. (Appendix A presents the reconnaissance report.) The site reconnaissance activities included a detailed records search of historical activities conducted at SWMU 20/Building 520, interviews with DCD employees who worked at Building 520, a review of engineering drawings related to Building 520, and a visual inspection of SWMU 20. In addition, a delineation of the vegetation surrounding SWMU 20 was conducted in February 1999. Vegetation consisted of bunchgrasses with a mixture of annual forbes and grasses.

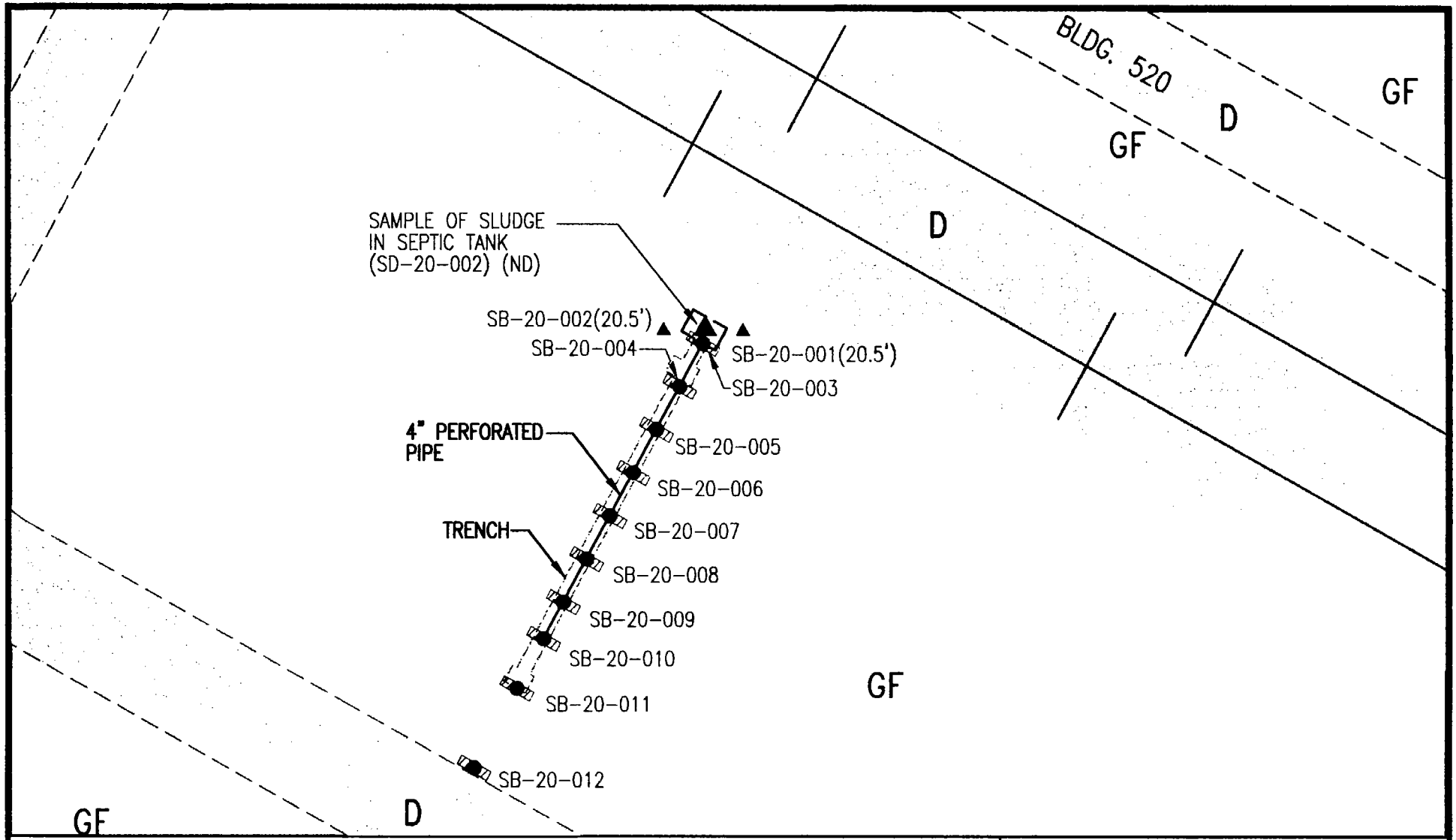
The 1999-2000 Phase IIB field activities were conducted based on Utah Department of Environmental Quality (UDEQ) comments regarding the presence of methyl ethyl ketone (MEK) in a septic tank sludge sample collected during the Phase I investigation. The objectives of the Phase IIB field investigation were to locate the discharge pipe extending from the former Building 520 septic tank and confirm the presence or absence of potential chemical constituents that may have been released to the environment as a result of past site operations. The Phase IIB field activities conducted at SWMU 20 included trenching and soil sampling operations in the area of the discharge pipe (see Figure 8-2). Table 8-3 presents the sampling observations and findings during the Phase IIB RFI field investigation. Appendix N presents representative photographs of field investigation activities.

8.5 SWMU 20 PHASE II RFI RESULTS

The following sections summarize the Phase II RFI results for the activities conducted at SWMU 20. Discussions on the explosive risk, soil sampling results, and the nature and extent of identified contamination are included.

8.5.1 SWMU 20 Explosive Risk Evaluation

An evaluation was conducted at SWMU 20 to determine the explosive risks at the site based on past activities and materials storage practices. Prior to any intrusive activities, an unexploded ordnance (UXO) evaluation and survey were conducted that included a review of historical records, a visual surface inspection of the SWMU area, and a surface magnetometer survey. Review of past practices did not indicate the storage or use of UXO at this area, and UXO was not identified during the surface investigation. Based on the UXO evaluation and survey, it was determined that no explosive risk at this SWMU exists.



8-5

LEGEND:

- SWMU LOCATION
- RAILROAD
- ABANDONED ROADS
- FORMER BUILDING
- FORMER SEPTIC TANK
- (ND) ..... TCLP RESULTS BELOW REGULATORY LIMITS
- PHASE IIA SLUDGE SAMPLE
- PHASE II SOIL BORING
- PHASE IIB SOIL BORING
- PHASE IIB TEST PIT

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 15 30
SCALE: 1" = 30'

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

KEY MAP
NOT TO SCALE

Deseret Chemical Depot
Tooele, Utah

SWMU 20 – PHASE II SAMPLE LOCATIONS

Figure:	Project:	File:	Date:
8-2	01-0827-03-6523-042	7109/RFI20SL	NOV. 2000

Table 8-2. SWMU 20 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
	Drill two soil borings to 20.5 feet BLS in the vicinity of the septic tank; collect two samples from each boring at 10 feet BLS (the approximate depth of the bottom of the tank) and 20 feet BLS; analyze for SVOCs, PCBs, metals, and cyanide.	Determine if contaminants leaked from the septic tank and migrated into the subsurface soils.	Dual-walled percussion drilling method was used instead of the hollow-stem auger method.	Driller had scheduling conflict with hollow-stem auger rig.
Phase IIA (1998-99)	Conduct detailed site reconnaissance of SWMU 20.	Required to fill data gaps in SWMU 20 history. Detailed review of site engineering drawings, personnel interviews, and visual inspection conducted. See Appendix A for reconnaissance report.	None; activities implemented as planned.	N/A
	Collect samples of sludge in septic tank (Structure 521); analyze samples for TCLP VOCs, TCLP SVOCs, TCLP metals, and agent breakdown products. DCD to dispose of sludge based on results.	Action resulting from site visit by UDEQ and discussions/written correspondence between UDEQ and DCD.	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

Table 8-2. SWMU 20 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 IIB (1999-2000)	Unearth effluent pipe from former building septic tank; segregate the soil collected from above the pipe and all identified effluent pipe.	Locate the leach field associated with the former septic tank.	None; activity implemented as planned.	N/A
	Collect soil samples at 10-foot intervals along the length of the pipe. The pipe is estimated to be 150 feet long (16 sample locations).	Determine if effluent pipe and/or subsurface soils are TCLP hazardous.	Collected soil samples from test pits using a backhoe instead of Geoprobe® method.	Geoprobe® refusal prohibited collecting soil samples at depth; test pit method did not jeopardize data quality requirements.
	Collect TCLP samples from the soil above the pipe, the pipe itself, and any sludge in the pipe. Analyze the three samples for TCLP VOCs, TCLP SVOCs, and TCLP metals.	Sampling conducted because of the presence of a listed chemical (MEK) originally identified in septic tank sludge.	Soil samples were not collected at 5 feet below the pipe at sample location SB-20-004.	Sample location SB-20-003 was moved closer to SB-20-004 because of presence of septic tank backfill; unnecessary to collect deeper samples from SB-20-004.
	Collect samples from 0 to 6 inches and 5 and 10 feet below the pipe at eight locations. Analyze all samples for VOCs and SVOCs.	Determine if discharge water from the septic tank has contaminated the soils adjacent to the effluent pipe and/or subsurface soils.	Soil samples were not collected 10 feet below the pipe at any of the sample locations, except SB-20-10.	Soil samples could not be collected at the 10-foot below the pipe interval due to the limitations of site geology and sample collection method (i.e., gravel formation was collapsing and backhoe buckets could not extend further).
	Collect samples from 0 to 6 inches and 5 feet below the pipe at eight locations. Analyze all samples for VOCs and SVOCs.	Planned activities are based on comments provided by UDEQ.	Collected samples at nine borings from immediately below pipe (gravel backfill layer), 5 feet below the pipe, and as deep as equipment and formation would allow.	

Table 8-3. SWMU 20 Phase IIB Soil Sampling Scheme
Deseret Chemical Depot, Tooele, Utah

Boring Number	Total Depth (feet BLS)	Sample Depths Below Pipe[a]	Sample Depths Below Land Surface[b]	Comments
SB-20-03	10	0-0.5, 5, 7	3, 8,10	Could not sample to planned depth due to formation collapse.
SB-20-04	3	0-0.5	5	Boring SB-20-03 moved directly adjacent to SB-20-04; unnecessary to collect deeper samples from SB-20-04; duplicate collected.
SB-20-05	11	0-0.5, 5, 8	5, 8, 11	Could not sample to planned depth due to formation collapse. MS/MSD collected from 11 feet BLS.
SB-20-06	11.5	0-0.5, 5, 8	5, 8, 11.5	Could not sample to planned depth due to formation collapse. Duplicate collected from 5 feet BLS.
SB-20-07	11.5	0-0.5, 5, 8.5	5, 8, 11.5	Could not sample to planned depth due to formation collapse.
SB-20-08	14	0-0.5, 5, 8	5, 9, 14	Could not sample to planned depth due to formation collapse. MS/MSD sample collected from 5 feet BLS.
SB-20-09	14	0-0.5, 5, 8	5, 9, 14	Could not sample to planned depth due to formation collapse. Duplicate collected from 5 feet BLS.
SB-20-10	15	0-0.5, 5, 10	5, 10, 15	Could not sample to planned depth due to formation collapse.
SB-20-11	14	0-0.5, 5, 9.5	4, 9, 14	Could not sample to planned depth due to formation collapse.
SB-20-12	14	0-0.5, 5, 9.5	4, 9, 14	Could not sample to planned depth due to formation collapse.

Notes:
[a] Depths are measured in feet below the discharge pipe.
[b] All depths are measured in feet below land surface.

8.5.2 SWMU 20 Soil Sampling Results

Phase II activities conducted in 1994-95 focused on the septic tank south of Building 520 and included the sampling of two borings (SB-20-001 and SB-20-002) at locations directly adjacent to the tank. Two samples were collected from each boring at depths ranging from 10 to 20 feet BLS and analyzed for metals, cyanide, polychlorinated biphenyls (PCBs), and SVOCs. Phase IIB activities were conducted to evaluate the septic tank leach field and associated discharge pipe. The discharge pipe contained perforations along the bottom for drainage and ran approximately 70 feet south of the tank, starting approximately 1 foot BLS where it connected to the former septic tank, reaching 5 feet BLS at its terminus. Ten borings (SB-20-003 through SB-20-012) were located along the length of the discharge pipe at 10-foot intervals, with one boring (SB-20-012) placed 20 feet beyond the end of the pipe. Samples were collected from the

soil below the gravel fill surrounding the pipe (approximately 5 feet BLS at all sample locations) and from 5 to 9.5 feet below the pipe. Phase IIB samples were analyzed for VOCs and SVOCs. Figure 8-2 shows all Phase II sample locations. All of the data and statistical summary tables for SWMU 20 are presented at the end of Section 8.

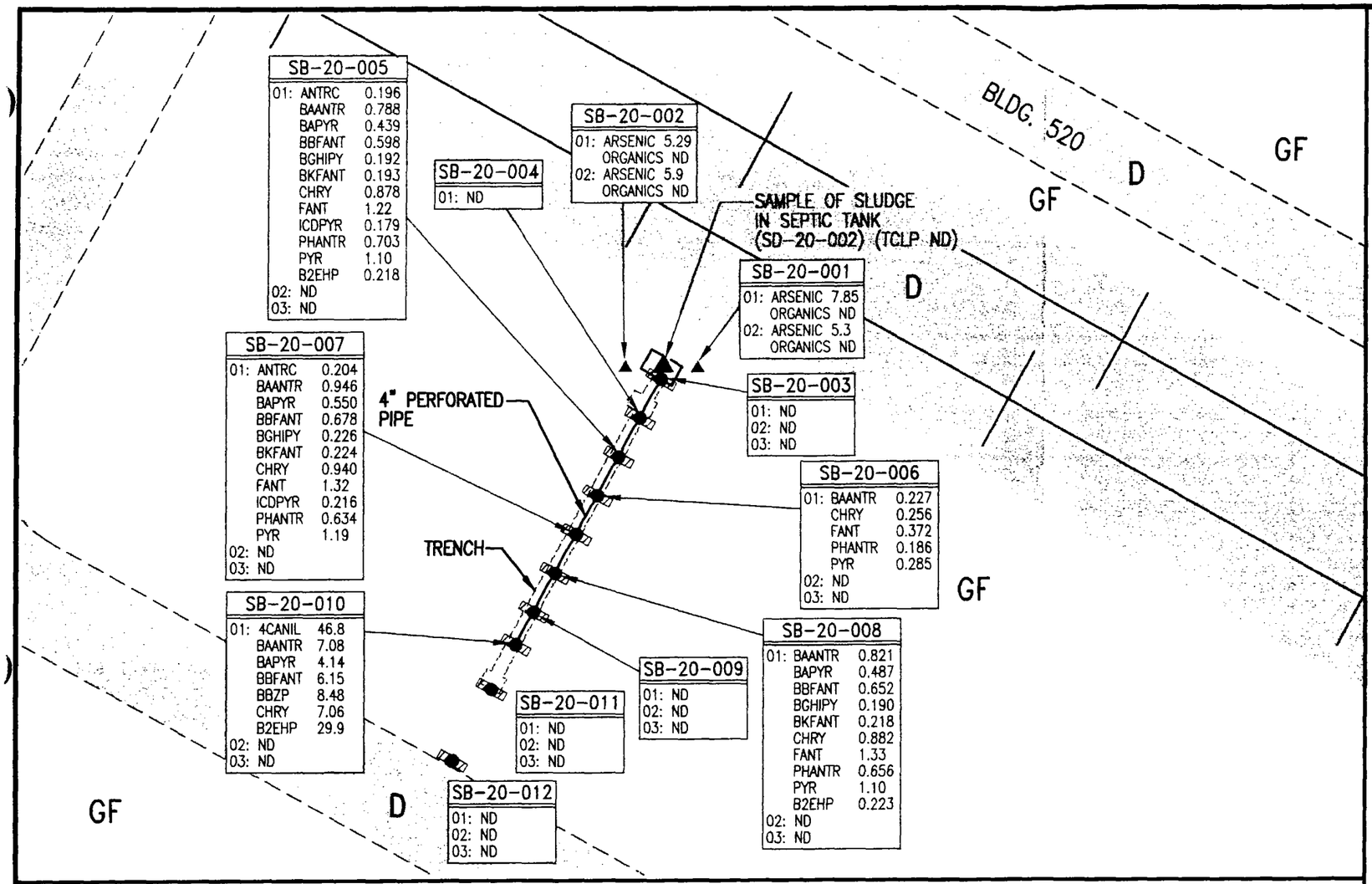
Arsenic was the only inorganic chemical detected during Phase II at concentrations exceeding its upper tolerance limit (UTL) (3.4 µg/g). Concentrations ranged from 5.3 µg/g (SB-20-002A, 9 feet BLS) to 7.85 µg/g (SB-20-001A, 14 feet BLS). Cyanide and PCBs were not detected during Phase II. Organic compounds (SVOCs) were not detected in any sample collected during the 1994-95 Phase II sampling. VOCs were not detected during the Phase IIB sampling; however, SVOCs were detected during the Phase IIB sampling below the septic pipe. Table 8-4 summarizes the SWMU 20 Phase II results. Appendix I presents comprehensive tables of all SWMU 20 analytical results. Table 8-5 presents a statistical evaluation of the SWMU 20 Phase II sample results, identifying the minimum and maximum detected concentrations for each compound and the location and depth of the maximum chemical concentrations.

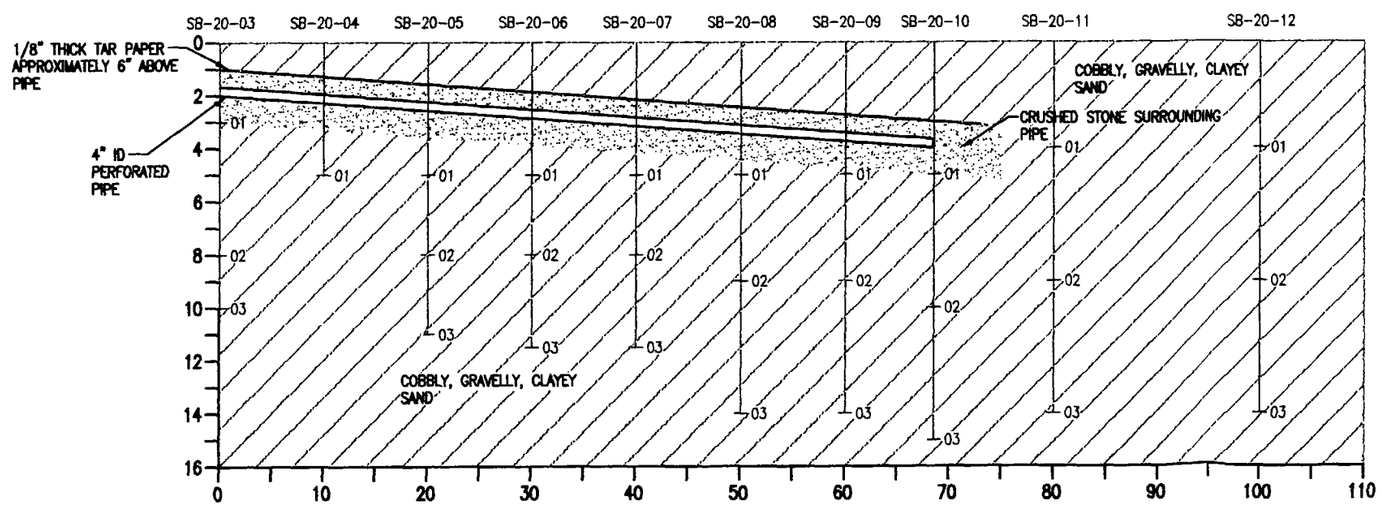
Fourteen SVOCs were detected, all in samples collected directly below the pipe (5 feet BLS). Eleven of these compounds were polycyclic aromatic hydrocarbons (PAHs) and two were phthalates. No SVOCs were detected below the 5-foot depth. The SVOCs detected consisted of: 4-chloroaniline, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, butyl benzyl phthalate, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, pyrene, and bis(2-ethylhexyl)phthalate (B2EHP). The detection limit for the SWMU 20 SVOCs was 0.170 µg/g. With the exception of the sample collected from the end of the discharge pipe, all SVOCs were within an order of magnitude of that detection limit. Approximately 40 percent of those low-level SVOCs were less than twice the detection limit. However, SVOCs detected in the soil sample from the end of the discharge pipe (SB-20-10) ranged from 4.14 to 46.8 µg/g.

The maximum concentrations of 7 of the 14 SVOCs (3 of which were PAHs) were detected in the sample collected directly below the end of the discharge pipe at location SB-20-10. No SVOCs were detected in sample points adjacent to SB-20-10 (i.e., SB-20-09, located 10 feet in the pipe's upgradient direction, and SB-20-11, located 10 feet beyond the end of the pipe). Figure 8-3 presents the results for SWMU 20. In addition, no SVOCs were detected in any of the samples collected from SB-20-03 or SB-20-04, located nearest the former septic tank, or in SB-20-12, located 20 feet beyond the discharge point of the pipe. The maximum concentrations of five of the SVOCs were detected in the samples collected below the pipe at SB-20-07, located approximately 40 feet from the former septic tank. The maximum concentration of the remaining two SVOCs were detected on the 5-foot sample from SB-20-05 and SB-20-08.

8.5.3 Summary of SWMU 20 Soil Sampling Results

The SVOCs detected at SWMU 20 were confined to the area immediately below the perforated discharge pipe. No vertical contaminant migration was observed and no contamination was observed beyond the end of the discharge pipe.





TRENCH PROFILE

VERTICAL SCALE: 1"=6'
HORIZONTAL SCALE: 1"=15'

SEPTIC TANK DISCHARGE PIPE

REPRESENTATIVE PHOTO OF LEACH FIELD CONSTRUCTION

LEGEND:

- ..... SWMU LOCATION
- ..... RAILROAD
- ..... ABANDONED ROADS
- ..... FORMER BUILDING
- ..... FORMER SEPTIC TANK
- ..... PHASE II SOIL BORING
- .... PHASE IIA SLUDGE SAMPLE
- .....PHASE IIB SOIL BORING
- ..... PHASE IIB TEST PIT
- 01 ..... 01 SAIC SAMPLE DEPTH
- 02 ..... 02 SAIC SAMPLE DEPTH
- 03 ..... 03 SAIC SAMPLE DEPTH
- (TCLP ND)....TCLP RESULTS BELOW REGULATORY LIMITS
- (ND).....METALS < UTL AND/OR ORGANICS NOT DETECTED

- 4CANIL 4-CHLOROANILINE
- ANTRC..... ANTHRACENE
- BAANTR..... BENZO(A)ANTHRACENE
- BAPYR..... BENZO(A)PYRENE
- BBFANT... BENZO(B)FLOURANTHENE
- BGHIPY ....BENZO(G,H,I)PERYLENE
- BKFANT... BENZO(K)FLOURANTHENE
- BBZP....BUTYL BENZYL PHTHALATE
- CHRY..... CHRYSENE
- FANT..... FLOURANTHENE
- ICDPYR ..INDENO(1,2,3-CD)PYRENE
- PHANTR..... PHENANTHRENE
- PYR ..... PYRENE
- B2EHP..... BIS(2-ETHYLHEXYL) PHTHALATE

VEGETATION TYPES:

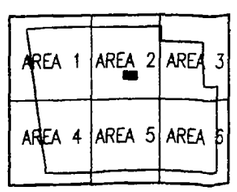
D .. DISTURBED AREAS-NO VEGETATION
GF .... BUNCHGRASSES/ANNUAL FORBS

N

0 15 30
SCALE: 1" = 30'

NOTES:

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



KEY MAP
NOT TO SCALE

Deseret Chemical Depot
Tooele, Utah

SWMU 20 – PHASE II SAMPLE RESULTS

Figure:	Project:	File:	Date:
8-3	01-0827-03-6523-042	7109/RFI20SR	NOV. 2000

DCD demolished Building 520 in 1999 and removed the septic tank in April 1999. As part of the septic tank removal, DCD collected a sample of the tank concrete and the soil immediately below the tank and analyzed each sample for toxicity characteristics leaching procedure (TCLP) VOCs, TCLP SVOCs, and TCLP metals. None of the samples exceeded TCLP regulatory criteria. Prior to DCD's septic tank removal activities, a sample of sludge in the tank was analyzed for TCLP VOCs, TCLP SVOCs, TCLP metals, and agent breakdown products. All sludge sample TCLP concentrations were below regulatory action levels; agent breakdown products were not detected. Appendix O presents the SWMU 20 septic tank TCLP results.

8.5.4 SWMU 20 Chemical Transport Model Results

Because of the lack of groundwater analytical data at SWMU 20, chemical transport of selected constituents from the shallow soil to the groundwater table was estimated using the Pesticide Root Zone Model (PRZM-2) developed by EPA (1993). PAHs were selected as the compound of concern for the modeling effort at SWMU 20 based on their detection below the septic pipe during Phase IIB sampling. Parameters for the model were obtained from site data, literature values, and model default values. The model estimates assume that the initial (maximum) concentrations obtained during Phase II activities are representative of site conditions and that the source of the chemical constituents has been abated. Historical meteorological conditions as represented by conditions at Salt Lake City, Utah, are assumed to sufficiently estimate conditions at DCD. The subsurface conceptual model was determined based on the observations recorded during the drilling and sampling of monitoring wells at SWMU 19. This assumption is based on the fact that the soil sampling at SWMU 20 was confined to the upper 20 feet, the lithologic sampling of the well borings at SWMU 19 extended to the groundwater table (approximately 117 feet BLS), and SWMU 20 is approximately 750 feet north of SWMU 19.

PAHs were detected at 5 feet BLS in soil at SWMU 20. Benzo(a)pyrene was selected as a chemical of interest because it is commonly a human health risk driver compound and because the chemical properties of the compound are similar to other PAHs detected in the soil (e.g., benzo[a]anthracene, benzo[b]fluoranthene, and chrysene). The source of PAHs at SWMU 20 in the soil is presumed to be associated with a former septic tank and piping. This source has been removed and the associated building at SWMU 20 has been demolished. Chemical properties for PAHs were obtained from the various sources identified in Section 3.2.8. PAHs in general have high estimated soil/water partition coefficients (K_d values range from 0.18 to 309,029 cm^3/g), indicating their strong affinity for adsorbing to soil. Chemical properties for benzo(a)pyrene were obtained from various sources. The compound has low solubility (0.004 mg/L) in water, readily adsorbs to soil (K_d=8,912 cm^3/g), and is moderately volatile from water ($K_H = 2.48 \times 10^{-6}$ atm m^3/mol). The diffusivity in air (5,829 cm^2/day) and the soil degradation rate constant (1.31×10^{-3} day^{-1}) indicate that the compound may substantially degrade under variably saturated soil conditions.

The results of PRZM-2 estimates of chemical transport in the variably saturated DCD soil indicate that benzo(a)pyrene concentrations in the shallow soil may degrade to below the detection limit (0.17 µg/g) after 7 years and would not reach the water table (approximately 117 feet BLS) in detectable concentrations over 35 years under the conditions of the model. Section 3.2.8 provides details on the model and Appendix F presents the model calculations.

Chemical concentrations at the last 1-foot interval (20 feet BLS) are below detection limits throughout the model period (35 years).

8.6 SWMU 20 HUMAN HEALTH RISK ASSESSMENT

A baseline human health risk assessment was conducted to determine the risks associated with exposure to chemicals detected at SWMU 20. Baseline risks are defined as risks in the absence of remediation or institutional controls at the SWMU. All of the human health risk data tables for SWMU 20 are presented at the end of Section 8.

8.6.1 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 20. The general methods used to conduct the risk assessment and information applicable to all of the SWMU are presented in Section 4.1.

8.6.1.1 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 are not available at SWMU 20; 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.

The COPCs in soil for SWMU 20 are listed in Table 8-6. 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. However, the Depot worker (a potentially exposed receptor under both current and future land uses) is assumed to be exposed only to the surface soil. Because surface soil was not a part of the investigation at SWMU 20, risks for the Depot worker have not been calculated. Future land use scenarios evaluated include a residential scenario, analyzed 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 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.

8.6.1.2 Human Health Risk Assessment Results

The results of the risk characterization for all analytes except lead are presented in Tables 8-7 and 8-8 (food chain pathway risks are presented separately). Tables 8-9 and 8-10 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)—Risks were not calculated for the Depot worker. Depot workers are assumed to be exposed only to surface soils. Surface soils were not investigated at SWMU 20.

Construction Workers (Future Land Use)—The combined noncancer HI for the construction worker is 0.0001 for subsurface soil exposures, which falls below the target HI of 1. The combined cancer risk is 4×10^{-7}, which falls below the target cancer risk of 1×10^{-4}.

Residents (Future Land Use)—The combined noncancer HIs for the resident child and adult exposed to subsurface soil (0.002 and 0.0003, respectively) fall below the target HI of 1. The combined cancer risk for the integrated child/adult resident exposed to subsurface soil (2×10^{-5}) exceeds the cancer risk target of 1×10^{-6} due to the ingestion and dermal contact pathways.

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

- Benzo(a)anthracene — Subsurface soil ingestion cancer risk = 5×10^{-7}; Subsurface soil dermal contact cancer risk = 1×10^{-6}
- Benzo(a)pyrene — Subsurface soil ingestion cancer risk = 3×10^{-6}; Subsurface soil dermal contact cancer risk = 9×10^{-6}
- Benzo(b)fluoranthene — Subsurface soil dermal contact cancer risk = 1×10^{-6}.

For the produce pathways, the combined noncancer HIs for the subsurface soil (0.4 for the resident child and 0.1 for the resident adult) do not exceed the target HI of 1. The combined produce pathway cancer risk is 6×10^{-5} for the subsurface soil, which exceeds the target cancer risk of 1×10^{-6}.

The following were identified as COCs associated with produce grown in subsurface soils for residents:

- Benzo(a)anthracene — Tuberous vegetable ingestion cancer risk = 1×10^{-5}
- Benzo(a)pyrene — Tuberous vegetable ingestion cancer risk = 5×10^{-5}
- Benzo(b)fluoranthene — Tuberous vegetable ingestion cancer risk = 3×10^{-6}
- Benzo(k)fluoranthene — Tuberous vegetable ingestion cancer risk = 7×10^{-7}
- Indeno(1,2,3-cd)pyrene — Tuberous vegetable ingestion cancer risk = 9×10^{-7}.

8.7 SWMU 20 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 20. Details on the methodology employed to support this analysis are provided in Section 4.2. All of the SERA data tables for SWMU 20 are presented at the end of Section 8.

8.7.1 Ecological Resources

The area of SWMU 20 covers approximately 3 acres and includes an abandoned building (Building 520) and an associated septic tank that lies approximately 80 feet to the southwest of the building. The septic tank area and associated leach field were the focus of the Phase II investigation. The building was demolished and the septic tank was removed in 1999. Two abandoned railroad beds are located between the building and the septic tank. The railroad beds are raised mounds of gravel upon which sparse clumps of grass grow. During the limited 1994 ecological reconnaissance conducted by Science Applications International Corporation (SAIC), gravel and small grasses covering the SWMU area were recorded. Southwest of the SWMU, on adjacent land, the area was covered in clumps of big sage and rabbitbrush. During the reconnaissance, numerous bird droppings and bullet casings covering the wood flooring of Building 520 also were found. Vegetation mapping by EBASCO (1994) indicates the SWMU lies within a bunchgrass/annual forb habitat.

8.7.2 Ecological Risk Methodology

A SERA is necessary at SWMU 20 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 (*Odocoileus hemionus*). The size of the available habitat is approximately 1.15 acres and 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 approximately 3 percent of the home range area is needed for a black-tailed jackrabbit. The implication is that insufficient habitat exists for jackrabbits.

However, the area immediately surrounding the SWMU also is capable of supporting individuals and populations that easily can 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 exists on SWMU 20, a SERA is needed.

The methods for conducting ecological risk assessments are detailed in Section 4.2. In summary, 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 20.

The conceptual site model (CSM) (Figure 8-4) for ecological receptors presents the projected completed pathways for SWMU 20. 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 hazard quotients (HQs) for ecoCOPCs at SWMU 20, 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 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 20 where an HQ could not be calculated for an ecoCOPC because insufficient data were available to establish a toxicity threshold. These ecoCOPCs are carried through the risk characterization as ecoCOPCs of uncertain risk to ecological receptors.

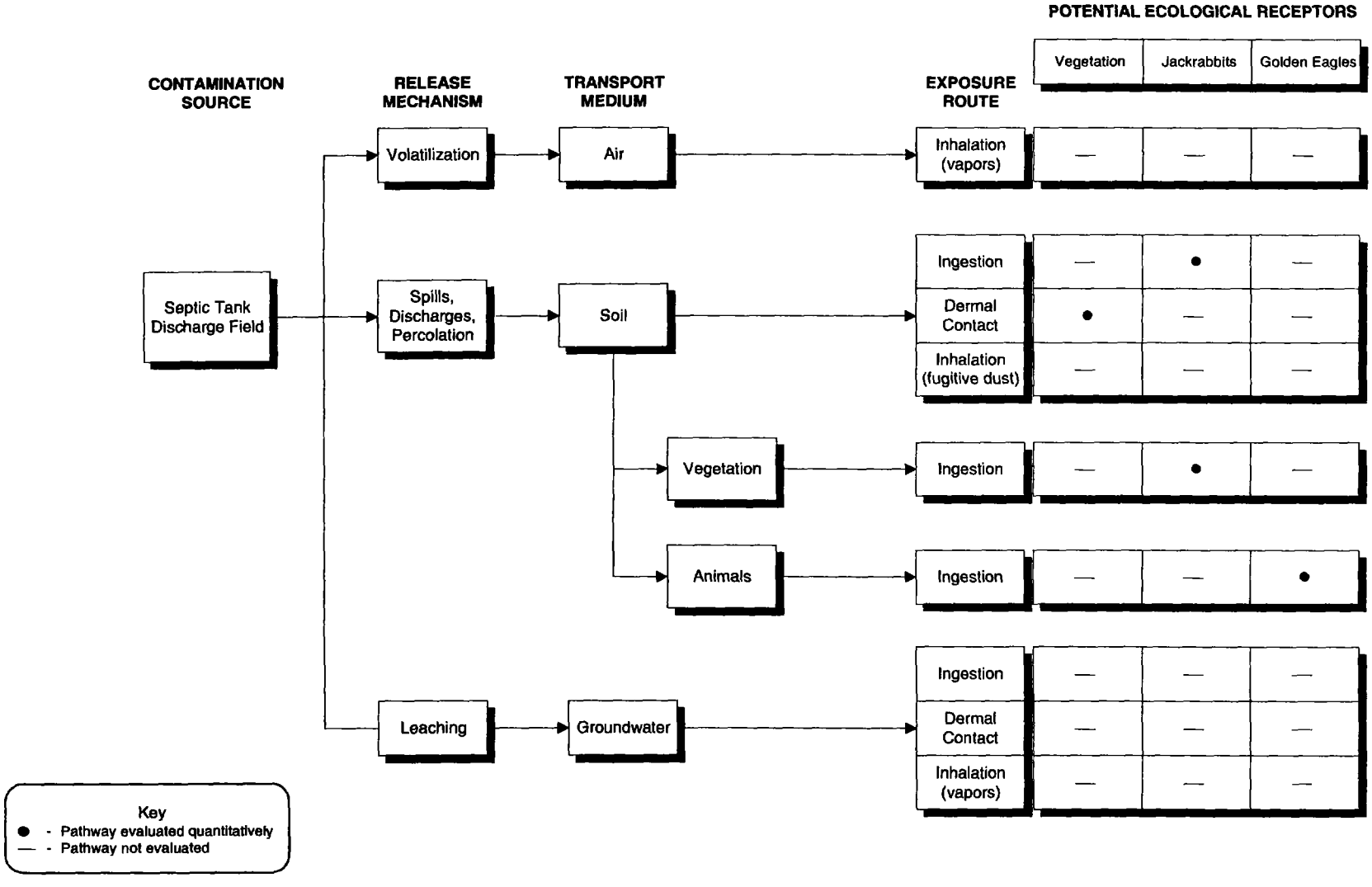


Figure 8-4. Conceptual Site Model for DCD Screening-level Ecological Risk Assessment at SWMU 20

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 for threatened and endangered (T&E) organisms.

For SWMU 20, there is one exposure unit at one soil depth (0.5 to 15 feet). The exposure unit comprises the area outside the building, including the test pit. The receptors are vegetation, black-tailed jackrabbits, and golden eagles.

8.7.3 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 20 subsurface soil samples are presented in Table 8-11. This table summarizes 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 are discussed briefly in Section 5.7.2.2 and are presented in greater detail in Section 4.2. Six organics (i.e., 4-choroaniline, benzo[a]anthracene, benzo[a]pyrene, B2EHP, butyl benzyl phthalate, and chrysene) were selected as ecoCOPCs in subsurface soil at SWMU 20 (Table 8-11). These ecoCOPCs were evaluated further in the SERA using HQs.

No HQs are over the threshold of 1 for any of the receptors (terrestrial plants, black-tailed jackrabbits, and golden eagles) for the ecoCOPCs at SWMU 20 subsurface soil (Tables M-17 through M-19 in Appendix M). No organic ecoCOPCs had HQs exceeding 1 for jackrabbits and golden eagles, in part because the size of SWMU 20 is smaller relative to their home ranges. Toxicity reference values (TRVs) were not available for 4-chloroaniline for all receptors, so this ecoCOPC could not be evaluated further. However, 4-chloroaniline only was detected in 1 of 28 samples and ecological receptors are unlikely to be exposed to this contaminant. A TRV was not available for benzo(a)pyrene for the golden eagle. However, all other ecoCOPCs for the golden eagle have HQs <1 in part due to the small size of SWMU 20 in relation to the home range of the eagle. Based on the available information, no unacceptable ecological risks appear to be associated with subsurface soil exposures at SWMU 20. Therefore, no ecoCOCs have been identified at SWMU 20.

Future estimated risks to plants and animals at SWMU 20 are considered similar to current risks. The same species of plants and animals are assumed to be present at SWMU 20 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 8-4. Data Summary Table: Soil - Site 20
Deseret Chemical Depot, Tooele, Utah

Site ID			SB-20-001A		SB-20-001A		SB-20-001B		SB-20-002A		SB-20-002B	
Field Sample Number			SAIC01		SAIC02		SAIC02		SAIC01		SAIC02	
Site Type			BORE		BORE		BORE		BORE		BORE	
Collection Date			9/22/94		9/22/94		9/22/94		9/23/94		9/23/94	
Depth (ft)			14		14		20		9		20	
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.												
METALS/SOIL/CVAA (µg/g)												
Laboratory ID Number			STSSA*24		STSSA*25		STSSA*23		STSSA*46		STSSA*47	
Parameter	Units	CRL										
Mercury	µg/g	0.06	LT	0.05**	LT	0.05** D	LT	0.05**	LT	0.05** I	LT	0.05** I
METALS/SOIL/GFAA (µg/g)												
Laboratory ID Number			STSSA*24		STSSA*25		STSSA*23		STSSA*46		STSSA*47	
Parameter	Units	CRL										
Antimony	µg/g	2.42	LT	7.14**	LT	7.14** D	LT	7.14**	LT	7.14**	LT	7.14**
Arsenic	µg/g	0.25		7.85**		8.09** D		5.3**		5.29**		5.9**
Selenium	µg/g	0.25	LT	0.25**	LT	0.25** D	LT	0.25**	LT	0.25**	LT	0.25**
Lead	µg/g	0.177				25** D				14**		13**
METALS/SOIL/ICP (µg/g)												
Laboratory ID Number			STSSA*24		STSSA*25		STSSA*23		STSSA*46		STSSA*47	
Parameter	Units	CRL										
Silver	µg/g	0.589	LT	0.589**	LT	0.589** D	LT	0.589**	LT	0.589**	LT	0.589**
Aluminum	µg/g	2.36		9020**		8930** D		6590**		2030**		4180**
Barium	µg/g	5.18		86.6**		79.8** D		64.7**		27.2**		84.5**
Beryllium	µg/g	0.5		0.782**		0.803** D		0.9**	LT	0.5**	LT	0.5**
Calcium	µg/g	100		130000**		120000** D		110000**		140000**		110000**
Cadmium	µg/g	0.7		1.02**	LT	0.7** D		0.824**	LT	0.7**	LT	0.7**
Cobalt	µg/g	1.42		5.07**		5.46** D		4.47**		1.88**		3.16**
Chromium	µg/g	4.05		16.5**		17.4** D		11.8**		6.34**		5.66**
Copper	µg/g	0.985		14**		13.1** D		14.6**		8.74**		9.32**
Iron	µg/g	3.68		13800**		13000** D		9660**		4490**		5340**
Lead	µg/g	10.5		31.7**				32.3**				
Potassium	µg/g	100		1640**		1650** D		1360**		427**		1260**
Magnesium	µg/g	100		14000**		13400** D		15100**		7830**		8940**
Manganese	µg/g	2.05		456**		405** D		349**		219**		246**
Sodium	µg/g	100		667**		631** D		628**		411**		561**
Nickel	µg/g	1.71		24.8**		23.4** D		16.4**		9.74**		9.27**
Thallium	µg/g	6.623		9.56**	LT	6.62** D		10**	LT	6.62**		9.13**
Vanadium	µg/g	3.39		22.5**		21.8** D		16.2**		8.31**		10.6**
Zinc	µg/g	8.03		92**		79.3** D		69.2**		36.4**		32.8**

Table 8-4. Data Summary Table: Soil - Site 20 (Continued)
Deseret Chemical Depot, Tooele, Utah

Site ID	SB-20-001A	SB-20-001A	SB-20-001B	SB-20-002A	SB-20-002B
Field Sample Number	SAIC01	SAIC02	SAIC02	SAIC01	SAIC02
Site Type	BORE	BORE	BORE	BORE	BORE
Collection Date	9/22/94	9/22/94	9/22/94	9/23/94	9/23/94
Depth (ft)	14	14	20	9	20
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.					

CYANIDES/SOIL/TECHNICON (µg/g)

Laboratory ID Number			STSSA*24	STSSA*25	STSSA*23	STSSA*46	STSSA*47
Parameter	Units	CRL					
Cyanide	µg/g	0.92	LT 0.92**	LT 0.92** D	LT 0.92**	LT 0.92**	LT 0.92**

VOLATILES/SOIL/GCMS (µg/g)

Laboratory ID Number			N/A	N/A	N/A	N/A	N/A
Parameter	Units	CRL					
1,1,1-Trichloroethane	µg/g	0.0044	N/A	N/A	N/A	N/A	N/A
1,1,2-Trichloroethane	µg/g	0.0054	N/A	N/A	N/A	N/A	N/A
1,1-Dichloroethene	µg/g	0.0039	N/A	N/A	N/A	N/A	N/A
1,1-Dichloroethane	µg/g	0.0023	N/A	N/A	N/A	N/A	N/A
1,2-Dichloroethene	µg/g	0.003	N/A	N/A	N/A	N/A	N/A
1,2-Dichloroethane	µg/g	0.0017	N/A	N/A	N/A	N/A	N/A
1,2-Dichloropropane	µg/g	0.0029	N/A	N/A	N/A	N/A	N/A
trans-1,3-Dichloropropene	µg/g	0.0028	N/A	N/A	N/A	N/A	N/A
Acetone	µg/g	0.017	N/A	N/A	N/A	N/A	N/A
Bromodichloromethane	µg/g	0.0029	N/A	N/A	N/A	N/A	N/A
Styrene	µg/g	0.0026	N/A	N/A	N/A	N/A	N/A
2-Hexanone	µg/g	0.032	N/A	N/A	N/A	N/A	N/A
Vinyl Chloride	µg/g	0.0062	N/A	N/A	N/A	N/A	N/A
Chloroethane	µg/g	0.012	N/A	N/A	N/A	N/A	N/A
Carbon Disulfide	µg/g	0.0044	N/A	N/A	N/A	N/A	N/A
Benzene	µg/g	0.0015	N/A	N/A	N/A	N/A	N/A
Carbon Tetrachloride	µg/g	0.007	N/A	N/A	N/A	N/A	N/A
Methylene Chloride	µg/g	0.012	N/A	N/A	N/A	N/A	N/A
Bromomethane	µg/g	0.0057	N/A	N/A	N/A	N/A	N/A
Chloromethane	µg/g	0.0066	N/A	N/A	N/A	N/A	N/A
Bromoform	µg/g	0.0069	N/A	N/A	N/A	N/A	N/A
Chloroform	µg/g	0.0009	N/A	N/A	N/A	N/A	N/A
Chlorobenzene	µg/g	0.0009	N/A	N/A	N/A	N/A	N/A
Dibromochloromethane	µg/g	0.0031	N/A	N/A	N/A	N/A	N/A
Ethylbenzene	µg/g	0.0017	N/A	N/A	N/A	N/A	N/A
Toluene	µg/g	0.0008	N/A	N/A	N/A	N/A	N/A
Methylethylketone	µg/g	0.07	N/A	N/A	N/A	N/A	N/A
Methylisobutylketone	µg/g	0.027	N/A	N/A	N/A	N/A	N/A
Vinyl Acetate	µg/g	0.032	N/A	N/A	N/A	N/A	N/A
1,1,2,2-Tetrachloroethane	µg/g	0.0024	N/A	N/A	N/A	N/A	N/A
Tetrachloroethene	µg/g	0.0008	N/A	N/A	N/A	N/A	N/A
Trichloroethene	µg/g	0.0028	N/A	N/A	N/A	N/A	N/A
1,2-Dimethylbenzene	µg/g	0.0015	N/A	N/A	N/A	N/A	N/A
cis-1,3-Dichloropropene	µg/g	0.0032	N/A	N/A	N/A	N/A	N/A

Table 8-4. Data Summary Table: Soil - Site 20 (Continued)
Deseret Chemical Depot, Tooele, Utah

Site ID		SB-20-001A	SB-20-001A	SB-20-001B	SB-20-002A	SB-20-002B
Field Sample Number		SAIC01	SAIC02	SAIC02	SAIC01	SAIC02
Site Type		BORE	BORE	BORE	BORE	BORE
Collection Date		9/22/94	9/22/94	9/22/94	9/23/94	9/23/94
Depth (ft)		14	14	20	9	20
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.						
TICs	µg/g	N/A	N/A	N/A	N/A	N/A

SEMIVOLATILES/SOIL/GCMS (µg/g)

Laboratory ID Number			STSSA*24		STSSA*25		STSSA*23		STSSA*46		STSSA*47	
Parameter	Units	CRL										
1,2,4-Trichlorobenzene	µg/g	0.04	LT	0.04**	LT	0.04** D	LT	0.04**	LT	0.04**	LT	0.04**
1,2-Dichlorobenzene	µg/g	0.11	LT	0.11**	LT	0.11** D	LT	0.11**	LT	0.11**	LT	0.11**
1,3-Dichlorobenzene	µg/g	0.13	LT	0.13**	LT	0.13** D	LT	0.13**	LT	0.13**	LT	0.13**
1,4-Dichlorobenzene	µg/g	0.098	LT	0.098**	LT	0.098** D	LT	0.098**	LT	0.098**	LT	0.098**
2,4,5-Trichlorophenol	µg/g	0.1	LT	0.1**	LT	0.1** D	LT	0.1**	LT	0.1**	LT	0.1**
2,4,6-Trichlorophenol	µg/g	0.17	LT	0.17**	LT	0.17** D	LT	0.17**	LT	0.17**	LT	0.17**
2,4-Dichlorophenol	µg/g	0.18	LT	0.18**	LT	0.18** D	LT	0.18**	LT	0.18**	LT	0.18**
2,4-Dimethylphenol	µg/g	0.69	LT	0.69**	LT	0.69** D	LT	0.69**	LT	0.69**	LT	0.69**
2,4-Dinitrophenol	µg/g	1.2	LT	1.2**	LT	1.2** D	LT	1.2**	LT	1.2**	LT	1.2**
2,4-Dinitrotoluene	µg/g	0.14	LT	0.14**	LT	0.14** D	LT	0.14**	LT	0.14**	LT	0.14**
2,6-Dinitrotoluene	µg/g	0.085	LT	0.085**	LT	0.085** D	LT	0.085**	LT	0.085**	LT	0.085**
2-Chlorophenol	µg/g	0.06	LT	0.06**	LT	0.06** D	LT	0.06**	LT	0.06**	LT	0.06**
2-Chloronaphthalene	µg/g	0.036	LT	0.036**	LT	0.036** D	LT	0.036**	LT	0.036**	LT	0.036**
2-Methylnaphthalene	µg/g	0.049	LT	0.049**	LT	0.049** D	LT	0.049**	LT	0.049**	LT	0.049**
2-Methyl Phenol	µg/g	0.029	LT	0.029**	LT	0.029** D	LT	0.029**	LT	0.029**	LT	0.029**
2-Nitrophenol	µg/g	0.14	LT	0.14**	LT	0.14** D	LT	0.14**	LT	0.14**	LT	0.14**
3,3'-Dichlorobenzidine	µg/g	6.3	LT	6.3**	LT	6.3** D	LT	6.3**	LT	6.3**	LT	6.3**
3-Nitroaniline	µg/g	0.45	LT	0.45**	LT	0.45** D	LT	0.45**	LT	0.45**	LT	0.45**
4,6-Dinitro-2-cresol	µg/g	0.55	LT	0.55**	LT	0.55** D	LT	0.55**	LT	0.55**	LT	0.55**
4-Bromophenyl Phenyl Ether	µg/g	2.7	LT	0.033**	LT	0.033** D	LT	0.033**	LT	0.033**	LT	0.033**
4-Chloro-3-methylphenol	µg/g	0.095	LT	0.095**	LT	0.095** D	LT	0.095**	LT	0.095**	LT	0.095**
4-Chlorophenyl Phenyl Ether	µg/g	0.033	LT	0.033**	LT	0.033** D	LT	0.033**	LT	0.033**	LT	0.033**
4-Methyl Phenol	µg/g	0.23	LT	0.24**	LT	0.24** D	LT	0.24**	LT	0.24**	LT	0.24**
4-Nitrophenol	µg/g	1.4	LT	1.4**	LT	1.4** D	LT	1.4**	LT	1.4**	LT	1.4**
Acenaphthene	µg/g	0.036	LT	0.036**	LT	0.036** D	LT	0.036**	LT	0.036**	LT	0.036**
Acenaphthylene	µg/g	0.033	LT	0.033**	LT	0.033** D	LT	0.033**	LT	0.033**	LT	0.033**
Anthracene	µg/g	0.033	LT	0.033**	LT	0.033** D	LT	0.033**	LT	0.033**	LT	0.033**
bis(2-Chloroethoxy) Methane	µg/g	0.059	LT	0.059**	LT	0.059** D	LT	0.059**	LT	0.059**	LT	0.059**
bis(2-Chloroisopropyl) Ether	µg/g	0.2	LT	0.2**	LT	0.2** D	LT	0.2**	LT	0.2**	LT	0.2**
bis(2-Chloroethyl)ether	µg/g	0.033	LT	0.033**	LT	0.033** D	LT	0.033**	LT	0.033**	LT	0.033**
bis(2-Ethylhexyl)phthalate	µg/g	0.62	LT	0.62**		7.4** D	LT	0.62**	LT	0.62**	LT	0.62**
Benzo(a)anthracene	µg/g	0.17	LT	0.17**	LT	0.17** D	LT	0.17**	LT	0.17**	LT	0.17**
Benzo(a)pyrene	µg/g	0.25	LT	0.25**	LT	0.25** D	LT	0.25**	LT	0.25**	LT	0.25**
Benzo(b)fluoranthene	µg/g	0.21	LT	0.21**	LT	0.21** D	LT	0.21**	LT	0.21**	LT	0.21**
Butyl Benzyl Phthalate	µg/g	0.17	LT	0.17**	LT	0.17** D	LT	0.17**	LT	0.17**	LT	0.17**
Benzo(g,h,i)perylene	µg/g	0.25	LT	0.25**	LT	0.25** D	LT	0.25**	LT	0.25**	LT	0.25**
Benzo(k)fluoranthene	µg/g	0.066	LT	0.066**	LT	0.066** D	LT	0.066**	LT	0.066**	LT	0.066**
4-Nitroaniline	µg/g	0.41	LT	0.41**	LT	0.41** D	LT	0.41**	LT	0.41**	LT	0.41**

Table 8-4. Data Summary Table: Soil - Site 20 (Continued)
Deseret Chemical Depot, Tooele, Utah

Site ID			SB-20-001A		SB-20-001A		SB-20-001B		SB-20-002A		SB-20-002B	
Field Sample Number			SAIC01		SAIC02		SAIC02		SAIC01		SAIC02	
Site Type			BORE		BORE		BORE		BORE		BORE	
Collection Date			9/22/94		9/22/94		9/22/94		9/23/94		9/23/94	
Depth (ft)			14		14		20		9		20	
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.												
2-Nitroaniline	µg/g	0.62	LT	0.062**	LT	0.062** D	LT	0.062**	LT	0.062**	LT	0.062**
4-Chloroaniline	µg/g	0.81	LT	0.81**	LT	0.81** D	LT	0.81**	LT	0.81**	LT	0.81**
Benzyl Alcohol	µg/g	0.19	LT	0.19**	LT	0.19** D	LT	0.19**	LT	0.19**	LT	0.19**
Chrysene	µg/g	0.12	LT	0.12**	LT	0.12** D	LT	0.12**	LT	0.12**	LT	0.12**
Hexachlorobenzene	µg/g	0.033	LT	0.033**	LT	0.033** D	LT	0.033**	LT	0.033**	LT	0.033**
Hexachlorocyclopentadiene	µg/g	6.2	LT	6.2**	LT	6.2** D	LT	6.2**	LT	6.2**	LT	6.2**
Hexachloroethane	µg/g	0.15	LT	0.15**	LT	0.15** D	LT	0.15**	LT	0.15**	LT	0.15**
Dibenzo(a,h)anthracene	µg/g	0.21	LT	0.21**	LT	0.21** D	LT	0.21**	LT	0.21**	LT	0.21**
Dibenzofuran	µg/g	0.035	LT	0.035**	LT	0.035** D	LT	0.035**	LT	0.035**	LT	0.035**
Diethyl Phthalate	µg/g	0.24	LT	0.24**	LT	0.24** D	LT	0.24**	LT	0.24**	LT	0.24**
Dimethyl Phthalate	µg/g	0.17	LT	0.17**	LT	0.17** D	LT	0.17**	LT	0.17**	LT	0.17**
di-N-Butyl Phthalate	µg/g	0.061	LT	0.061**	LT	0.061** D	LT	0.061**	LT	0.061**	LT	0.061**
di-N-Octyl Phthalate	µg/g	0.19	LT	0.19**	LT	0.19** D	LT	0.19**	LT	0.19**	LT	0.19**
Fluoranthene	µg/g	0.068	LT	0.068**	LT	0.068** D	LT	0.068**	LT	0.068**	LT	0.068**
Fluorene	µg/g	0.033	LT	0.033**	LT	0.033** D	LT	0.033**	LT	0.033**	LT	0.033**
Hexachlorobutadiene	µg/g	0.23	LT	0.23**	LT	0.23** D	LT	0.23**	LT	0.23**	LT	0.23**
Indeno(1,2,3-cd)pyrene	µg/g	0.29	LT	0.29**	LT	0.29** D	LT	0.29**	LT	0.29**	LT	0.29**
Isophorone	µg/g	0.033	LT	0.033**	LT	0.033** D	LT	0.033**	LT	0.033**	LT	0.033**
Naphthalene	µg/g	0.037	LT	0.037**	LT	0.037** D	LT	0.037**	LT	0.037**	LT	0.037**
Nitrobenzene	µg/g	0.045	LT	0.045**	LT	0.045** D	LT	0.045**	LT	0.045**	LT	0.045**
N-Nitroso-di-N-propylamine	µg/g	0.2	LT	0.2**	LT	0.2** D	LT	0.2**	LT	0.2**	LT	0.2**
N-Nitrosodiphenylamine	µg/g	0.19	LT	0.19**	LT	0.19** D	LT	0.19**	LT	0.19**	LT	0.19**
Pentachlorophenol	µg/g	1.3	LT	1.3**	LT	1.3** D	LT	1.3**	LT	1.3**	LT	1.3**
Phenanthrene	µg/g	0.033	LT	0.033**	LT	0.033** D	LT	0.033**	LT	0.033**	LT	0.033**
Phenol	µg/g	0.11	LT	0.11**	LT	0.11** D	LT	0.11**	LT	0.11**	LT	0.11**
Pyrene	µg/g	0.033	LT	0.033**	LT	0.033** D	LT	0.033**	LT	0.033**	LT	0.033**
TICs	µg/g			0 (0.0)		0 (0.0)		0 (0.0)		0 (0.0)		0 (0.0)

PCBs/SOIL/GCEC (µg/g)

Laboratory ID Number			STSSA*24		STSSA*25		STSSA*23		STSSA*46		STSSA*47	
Parameter	Units	CRL										
PCB-1016	µg/g	0.067	LT	0.0666**	LT	0.0666** D	LT	0.0666**	LT	0.0666**	LT	0.0666**
PCB-1260	µg/g	0.062	LT	0.0604**	LT	0.0604** D	LT	0.0604**	LT	0.0604**	LT	0.0604**
PCB-1221*	µg/g	0.062	ND	0.062** T	ND	0.062** TD	ND	0.062** T	ND	0.062** T	ND	0.062** T
PCB-1232*	µg/g	0.062	ND	0.062** T	ND	0.062** TD	ND	0.062** T	ND	0.062** T	ND	0.062** T
PCB-1242*	µg/g	0.062	ND	0.062** T	ND	0.062** TD	ND	0.062** T	ND	0.062** T	ND	0.062** T
PCB-1248*	µg/g	0.062	ND	0.062** T	ND	0.062** TD	ND	0.062** T	ND	0.062** T	ND	0.062** T
PCB-1254*	µg/g	0.062	ND	0.062** T	ND	0.062** TD	ND	0.062** T	ND	0.062** T	ND	0.062** T

Table 8-4. Data Summary Table: Soil - Site 20 (Continued)
Deseret Chemical Depot, Tooele, Utah

Site ID			SB-20-001A	SB-20-001A	SB-20-001B	SB-20-002A	SB-20-002B
Field Sample Number			SAIC01	SAIC02	SAIC02	SAIC01	SAIC02
Site Type			BORE	BORE	BORE	BORE	BORE
Collection Date			9/22/94	9/22/94	9/22/94	9/23/94	9/23/94
Depth (ft)			14	14	20	9	20
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.							
MIPA/FC2A/SOIL (µg/g)							
Laboratory ID Number			N/A	N/A	N/A	N/A	N/A
Parameter	Units	CRL					
Isopropyl methylphosphonate	µg/g	0.5	N/A	N/A	N/A	N/A	N/A
Methylphosphonic acid	µg/g	0.5	N/A	N/A	N/A	N/A	N/A
AGENTPRODS/SOIL/HPLC (µg/g)							
Laboratory ID Number			N/A	N/A	N/A	N/A	N/A
Parameter	Units	CRL					
Thiodiglycol	µg/g	3.94	N/A	N/A	N/A	N/A	N/A
EXPLOSIVES/SOIL/HPLC (µg/g)							
Laboratory ID Number			N/A	N/A	N/A	N/A	N/A
Parameter	Units	CRL					
1,3,5-Trinitrobenzene	µg/g	0.468	N/A	N/A	N/A	N/A	N/A
1,3-Dinitrobenzene	µg/g	0.496	N/A	N/A	N/A	N/A	N/A
2,4,6-Trinitrotoluene	µg/g	0.456	N/A	N/A	N/A	N/A	N/A
2,4-Dinitrotoluene	µg/g	0.424	N/A	N/A	N/A	N/A	N/A
2,6-Dinitrotoluene	µg/g	0.524	N/A	N/A	N/A	N/A	N/A
Cyclotetramethylenetetranitra	µg/g	0.666	N/A	N/A	N/A	N/A	N/A
Nitrobenzene	µg/g	2.41	N/A	N/A	N/A	N/A	N/A
Hexahydro-1,3,5-trinitro-1,3,	µg/g	0.587	N/A	N/A	N/A	N/A	N/A
N-Methyl-N,2,4,6-tetranitroan	µg/g	0.731	N/A	N/A	N/A	N/A	N/A

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
- D - Duplicate analysis.
- T - Non-target compound analyzed for but not detected (non-GC/MS methods).

Data Qualifiers
- I - The low-spike recovery is high.

Table 8-4. Data Summary Table: Soil - Site 20 (Continued)
Deseret Chemical Depot, Tooele, Utah

Site ID			SB-20-03		SB-20-03		SB-20-03		SB-20-04		SB-20-04		SB-20-05		SB-20-05
Field Sample Number			SAIC01		SAIC02		SAIC03		SAIC01		SAIC01D		SAIC01		SAIC02
Site Type			BORE		BORE		BORE		BORE		BORE		BORE		BORE
Collection Date			1/27/00		1/27/00		1/27/00		1/26/00		1/26/00		1/26/00		1/27/00
Depth (ft)			3.00		8.00		10.00		5.00		5.00		5.00		8.00
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.															
Semivolatiles (8270)															
Laboratory Id Number			00U00521		00U00522		00U00523		00U00443		00U00444		00U00445		00U00524
Parameter	Units	RL													
4-Chloroaniline	ug/g	0.170	LT 0.170		LT 0.170		LT 0.170		LT 0.170		LT 0.170 D		LT 0.170		LT 0.170
Anthracene	ug/g	0.170	LT 0.170		LT 0.170		LT 0.170		LT 0.170		LT 0.170 D		**0.196**		LT 0.170
Benzo(a)anthracene	ug/g	0.170	LT 0.170		LT 0.170		LT 0.170		LT 0.170		LT 0.170 D		**0.788**		LT 0.170
Benzo(a)pyrene	ug/g	0.170	LT 0.170		LT 0.170		LT 0.170		LT 0.170		LT 0.170 D		**0.439**		LT 0.170
Benzo(b)fluoranthene	ug/g	0.170	LT 0.170		LT 0.170		LT 0.170		LT 0.170		LT 0.170 D		**0.598**		LT 0.170
Benzo(g,h,i)perylene	ug/g	0.170	LT 0.170		LT 0.170		LT 0.170		LT 0.170		LT 0.170 D		**0.192**		LT 0.170
Benzo(k)fluoranthene	ug/g	0.170	LT 0.170		LT 0.170		LT 0.170		LT 0.170		LT 0.170 D		**0.193**		LT 0.170
Butyl Benzyl Phthalate	ug/g	0.170	LT 0.170		LT 0.170		LT 0.170		LT 0.170		LT 0.170 D		LT 0.170		LT 0.170
Chrysene	ug/g	0.170	LT 0.170		LT 0.170		LT 0.170		LT 0.170		LT 0.170 D		**0.878**		LT 0.170
Fluoranthene	ug/g	0.170	LT 0.170		LT 0.170		LT 0.170		LT 0.170		LT 0.170 D		**1.22**		LT 0.170
Indeno(1,2,3-cd)pyrene	ug/g	0.170	LT 0.170		LT 0.170		LT 0.170		LT 0.170		LT 0.170 D		**0.179** JP		LT 0.170
Phenanthrene	ug/g	0.170	LT 0.170		LT 0.170		LT 0.170		LT 0.170		LT 0.170 D		**0.703**		LT 0.170
Pyrene	ug/g	0.170	LT 0.170		LT 0.170		LT 0.170		LT 0.170		LT 0.170 D		**1.10**		LT 0.170
bis(2-Ethylhexyl)phthalate	ug/g	0.170	LT 0.170		LT 0.170		LT 0.170		LT 0.170		LT 0.170 D		**0.218**		LT 0.170
Volatiles (8260)															
Laboratory Id Number			00U00521		00U00522		00U00523		00U00443		00U00444		00U00445		00U00524
Parameter	Units	RL													
Methylene Chloride	ug/g	0.005	LT 0.00500		LT 0.00500		LT 0.00500		LT 0.00500		LT 0.00500 D		LT 0.00500		LT 0.00500
Toluene	ug/g	0.005	**0.000396** U		**0.000271** U		**0.000277** U		**0.000427** U		**0.000286** DU		LT 0.00500		LT 0.00500

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:
- D - Duplicate analysis.
- J - Value is estimated.
- P - Results less than reporting limit but greater than instrumental detecti
- U - Analysis is unconfirmed.

Created on: 12/14/00

Table 8-4. Data Summary Table: Soil - Site 20 (Continued)
Deseret Chemical Depot, Tooele, Utah

Site ID			SB-20-05		SB-20-06		SB-20-06		SB-20-06		SB-20-06		SB-20-07		SB-20-07
Field Sample Number			SAIC03		SAIC01		SAIC01D		SAIC02		SAIC03		SAIC01		SAIC02
Site Type			BORE		BORE		BORE		BORE		BORE		BORE		BORE
Collection Date			1/27/00		1/26/00		1/26/00		1/27/00		1/27/00		1/26/00		1/27/00
Depth (ft)			11.00		5.00		5.00		8.00		11.50		5.00		8.00
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.															
Semivolatiles (8270)															
Laboratory Id Number			00U00525		00U00446		00U00447		00U00526		00U00527		00U00448		00U00528
Parameter	Units	RL													
4-Chloroaniline	ug/g	0.170	LT 0.170		LT 0.170		LT 0.170 D		LT 0.170		LT 0.170		LT 0.170		LT 0.170
Anthracene	ug/g	0.170	LT 0.170		LT 0.170		LT 0.170 D		LT 0.170		LT 0.170		**0.204**		LT 0.170
Benzo(a)anthracene	ug/g	0.170	LT 0.170		**0.227**		**0.251** D		LT 0.170		LT 0.170		**0.946**		LT 0.170
Benzo(a)pyrene	ug/g	0.170	LT 0.170		LT 0.170		LT 0.170 D		LT 0.170		LT 0.170		**0.550**		LT 0.170
Benzo(b)fluoranthene	ug/g	0.170	LT 0.170		LT 0.170		**0.186** D		LT 0.170		LT 0.170		**0.678**		LT 0.170
Benzo(g,h,i)perylene	ug/g	0.170	LT 0.170		LT 0.170		LT 0.170 D		LT 0.170		LT 0.170		**0.226**		LT 0.170
Benzo(k)fluoranthene	ug/g	0.170	LT 0.170		LT 0.170		LT 0.170 D		LT 0.170		LT 0.170		**0.224**		LT 0.170
Butyl Benzyl Phthalate	ug/g	0.170	LT 0.170		LT 0.170		LT 0.170 D		LT 0.170		LT 0.170		LT 0.170		LT 0.170
Chrysene	ug/g	0.170	LT 0.170		**0.256**		**0.260** D		LT 0.170		LT 0.170		**0.940**		LT 0.170
Fluoranthene	ug/g	0.170	LT 0.170		**0.372**		**0.375** D		LT 0.170		LT 0.170		**1.32**		LT 0.170
Indeno(1,2,3-cd)pyrene	ug/g	0.170	LT 0.170		LT 0.170		LT 0.170 D		LT 0.170		LT 0.170		**0.216**		LT 0.170
Phenanthrene	ug/g	0.170	LT 0.170		**0.186**		**0.182** D		LT 0.170		LT 0.170		**0.634**		LT 0.170
Pyrene	ug/g	0.170	LT 0.170		**0.285**		**0.311** D		LT 0.170		LT 0.170		**1.19**		LT 0.170
bis(2-Ethylhexyl)phthalate	ug/g	0.170	LT 0.170		LT 0.170		LT 0.170 D		LT 0.170		LT 0.170		LT 0.170		LT 0.170
Volatiles (8260)															
Laboratory Id Number			00U00525		00U00448		00U00447		00U00526		00U00527		00U00448		00U00528
Parameter	Units	RL													
Methylene Chloride	ug/g	0.005	LT 0.00500		LT 0.00500		LT 0.00500 D		**0.000479** U		LT 0.00500		LT 0.00500		LT 0.00500
Toluene	ug/g	0.005	**0.000264** U		**0.000414** U		**0.000458** DU		**0.000326** U		**0.000265** U		**0.000287** U		LT 0.00500

Created on. 12/14/00

Table 8-4. Data Summary Table: Soil - Site 20 (Continued)
Deseret Chemical Depot, Tooele, Utah

Site ID				SB-20-07		SB-20-08		SB-20-08		SB-20-08		SB-20-09		SB-20-09		SB-20-09
Field Sample Number				SAIC03		SAIC01		SAIC02		SAIC03		SAIC01		SAIC01D		SAIC02
Site Type				BORE		BORE		BORE		BORE		BORE		BORE		BORE
Collection Date				1/27/00		1/26/00		1/27/00		1/27/00		1/26/00		1/26/00		1/27/00
Depth (ft)				11.50		5.00		9.00		14.00		5.00		5.00		9.00
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.																
Semivolatiles (8270)																
Laboratory Id Number				00U00529		00U00449		00U00530		00U00531		00U00450		00U00451		00U00532
Parameter	Units	RL														
4-Chloroaniline	ug/g	0.170	LT	0.170	LT	0.170	LT	0.170	LT	0.170	LT	0.170	LT	0.170 D	LT	0.170
Anthracene	ug/g	0.170	LT	0.170	LT	0.170	LT	0.170	LT	0.170	LT	0.170	LT	0.170 D	LT	0.170
Benzo(a)anthracene	ug/g	0.170	LT	0.170		**0.821**	LT	0.170	LT	0.170	LT	0.170	LT	0.170 D	LT	0.170
Benzo(a)pyrene	ug/g	0.170	LT	0.170		**0.487**	LT	0.170	LT	0.170	LT	0.170	LT	0.170 D	LT	0.170
Benzo(b)fluoranthene	ug/g	0.170	LT	0.170		**0.652**	LT	0.170	LT	0.170	LT	0.170	LT	0.170 D	LT	0.170
Benzo(g,h,i)perylene	ug/g	0.170	LT	0.170		**0.190**	LT	0.170	LT	0.170	LT	0.170	LT	0.170 D	LT	0.170
Benzo(k)fluoranthene	ug/g	0.170	LT	0.170		**0.218**	LT	0.170	LT	0.170	LT	0.170	LT	0.170 D	LT	0.170
Butyl Benzyl Phthalate	ug/g	0.170	LT	0.170	LT	0.170	LT	0.170	LT	0.170	LT	0.170	LT	0.170 D	LT	0.170
Chrysene	ug/g	0.170	LT	0.170		**0.882**	LT	0.170	LT	0.170	LT	0.170	LT	0.170 D	LT	0.170
Fluoranthene	ug/g	0.170	LT	0.170		**1.33**	LT	0.170	LT	0.170	LT	0.170	LT	0.170 D	LT	0.170
Indeno(1,2,3-cd)pyrene	ug/g	0.170	LT	0.170	LT	0.170	LT	0.170	LT	0.170	LT	0.170	LT	0.170 D	LT	0.170
Phenanthrene	ug/g	0.170	LT	0.170		**0.656**	LT	0.170	LT	0.170	LT	0.170	LT	0.170 D	LT	0.170
Pyrene	ug/g	0.170	LT	0.170		**1.10**	LT	0.170	LT	0.170	LT	0.170	LT	0.170 D	LT	0.170
bis(2-Ethylhexyl)phthalate	ug/g	0.170	LT	0.170		**0.223**	LT	0.170	LT	0.170	LT	0.170		**0.182** D	LT	0.170
Volatiles (8260)																
Laboratory Id Number				00U00529		00U00449		00U00530		00U00531		00U00450		00U00451		00U00532
Parameter	Units	RL														
Methylene Chloride	ug/g	0.005	LT	0.00500	LT	0.00500	LT	0.00500	LT	0.00500	LT	0.00500		**0.000705** DU	LT	0.00500
Toluene	ug/g	0.005	LT	0.00500		**0.00105** U		**0.000735** U	LT	0.00500		**0.000713** U	LT	0.00500 D	LT	0.00500

Created on: 12/14/00

Table 8-4. Data Summary Table: Soil - Site 20 (Continued)
Deseret Chemical Depot, Tooele, Utah

Site ID				SB-20-09		SB-20-10		SB-20-10		SB-20-10		SB-20-11		SB-20-11		SB-20-11
Field Sample Number				SAIC03		SAIC01		SAIC02		SAIC03		SAIC01		SAIC02		SAIC03
Site Type				BORE		BORE		BORE		BORE		BORE		BORE		BORE
Collection Date				1/27/00		1/26/00		1/27/00		1/27/00		1/27/00		1/27/00		1/27/00
Depth (ft)				14.00		5.00		10.00		15.00		4.00		9.00		14.00
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.																
Semivolatiles (8270)																
Laboratory Id Number				00U00533		00U00452		00U00534		00U00535		00U00536		00U00537		00U00538
Parameter	Units	RL														
4-Chloroaniline	ug/g	0.170	LT	0.170		**48.8**	LT	0.170	LT	0.170	LT	0.170	LT	0.170	LT	0.170
Anthracene	ug/g	0.170	LT	0.170	LT	3.40	LT	0.170	LT	0.170	LT	0.170	LT	0.170	LT	0.170
Benzo(a)anthracene	ug/g	0.170	LT	0.170		**7.08**	LT	0.170	LT	0.170	LT	0.170	LT	0.170	LT	0.170
Benzo(a)pyrene	ug/g	0.170	LT	0.170		**4.14** JP	LT	0.170	LT	0.170	LT	0.170	LT	0.170	LT	0.170
Benzo(b)fluoranthene	ug/g	0.170	LT	0.170		**6.15**	LT	0.170	LT	0.170	LT	0.170	LT	0.170	LT	0.170
Benzo(g,h,i)perylene	ug/g	0.170	LT	0.170	LT	3.40	LT	0.170	LT	0.170	LT	0.170	LT	0.170	LT	0.170
Benzo(k)fluoranthene	ug/g	0.170	LT	0.170	LT	3.40	LT	0.170	LT	0.170	LT	0.170	LT	0.170	LT	0.170
Butyl Benzyl Phthalate	ug/g	0.170	LT	0.170		**8.48**	LT	0.170	LT	0.170	LT	0.170	LT	0.170	LT	0.170
Chrysene	ug/g	0.170	LT	0.170		**7.06**	LT	0.170	LT	0.170	LT	0.170	LT	0.170	LT	0.170
Fluoranthene	ug/g	0.170	LT	0.170	LT	3.40	LT	0.170	LT	0.170	LT	0.170	LT	0.170	LT	0.170
Indeno(1,2,3-cd)pyrene	ug/g	0.170	LT	0.170	LT	3.40	LT	0.170	LT	0.170	LT	0.170	LT	0.170	LT	0.170
Phenanthrene	ug/g	0.170	LT	0.170	LT	3.40	LT	0.170	LT	0.170	LT	0.170	LT	0.170	LT	0.170
Pyrene	ug/g	0.170	LT	0.170	LT	3.40	LT	0.170	LT	0.170	LT	0.170	LT	0.170	LT	0.170
bis(2-Ethylhexyl)phthalate	ug/g	0.170	LT	0.170		**29.9**	LT	0.170	LT	0.170	LT	0.170	LT	0.170	LT	0.170
Volatiles (8260)																
Laboratory Id Number				00U00533		00U00452		00U00534		00U00535		00U00536		00U00537		00U00538
Parameter	Units	RL														
Methylene Chloride	ug/g	0.005	LT	0.00500		**0.00107** U	LT	0.00500	LT	0.00500	LT	0.00500	LT	0.00500	LT	0.00500
Toluene	ug/g	0.005	LT	0.00500	LT	0.00500		**0.000377** U	LT	0.00500		**0.000470** U	LT	0.00500	LT	0.00500

Created on: 12/14/00

Table 8-4. Data Summary Table: Soil - Site 20 (Continued)
Deseret Chemical Depot, Tooele, Utah

Site ID			SB-20-12		SB-20-12		SB-20-12	SD-20-02
Field Sample Number			SAIC01		SAIC02		SAIC03	SAIC01
Site Type			BORE		BORE		BORE	TANK
Collection Date			1/27/00		1/27/00		1/27/00	2/3/99
Depth (ft)			4.00		9.00		14.00	6.00
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.								
Semivolatiles (8270)								
Laboratory Id Number			00U00539		00U00540		00U00541	
Parameter	Units	RL						
4-Chloroaniline	ug/g	0.170	0.170	LT	0.170	LT	0.170	N/A
Anthracene	ug/g	0.170	0.170	LT	0.170	LT	0.170	N/A
Benzo(a)anthracene	ug/g	0.170	0.170	LT	0.170	LT	0.170	N/A
Benzo(a)pyrene	ug/g	0.170	0.170	LT	0.170	LT	0.170	N/A
Benzo(b)fluoranthene	ug/g	0.170	0.170	LT	0.170	LT	0.170	N/A
Benzo(g,h,i)perylene	ug/g	0.170	0.170	LT	0.170	LT	0.170	N/A
Benzo(k)fluoranthene	ug/g	0.170	0.170	LT	0.170	LT	0.170	N/A
Butyl Benzyl Phthalate	ug/g	0.170	0.170	LT	0.170	LT	0.170	N/A
Chrysene	ug/g	0.170	0.170	LT	0.170	LT	0.170	N/A
Fluoranthene	ug/g	0.170	0.170	LT	0.170	LT	0.170	N/A
Indeno(1,2,3-cd)pyrene	ug/g	0.170	0.170	LT	0.170	LT	0.170	N/A
Phenanthrene	ug/g	0.170	0.170	LT	0.170	LT	0.170	N/A
Pyrene	ug/g	0.170	0.170	LT	0.170	LT	0.170	N/A
bis(2-Ethylhexyl)phthalate	ug/g	0.170	0.170	LT	0.170	LT	0.170	N/A
Volatiles (8260)								
Laboratory Id Number			00U00539		00U00540		00U00541	
Parameter	Units	RL						
Methylene Chloride	ug/g	0.005	**0.000577** U		LT 0.00500		**0.000586** U	N/A
Toluene	ug/g	0.005	LT 0.00500		LT 0.00500	LT	0.00500	N/A

Created on: 12/14/00

Table 8-5. Summary of Chemicals Detected in Soils at SWMU 20
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									
4-Chloroaniline	ug/g	1 / 28	47	47	0.0	1 / 1	SB-20-10	5	Yes
Anthracene	ug/g	2 / 28	0.20	0.20	0.0	2 / 2	SB-20-07	5	Yes
Benzo(a)anthracene	ug/g	5 / 28	0.23	7.1	0.0	5 / 5	SB-20-10	5	Yes
Benzo(a)pyrene	ug/g	4 / 28	0.44	4.1	0.0	4 / 4	SB-20-10	5	Yes
Benzo(b)fluoranthene	ug/g	4 / 28	0.60	6.2	0.0	4 / 4	SB-20-10	5	Yes
Benzo(g,h,i)perylene	ug/g	3 / 28	0.19	0.23	0.0	3 / 3	SB-20-07	5	Yes
Benzo(k)fluoranthene	ug/g	3 / 28	0.19	0.22	0.0	3 / 3	SB-20-07	5	Yes
Butyl Benzyl Phthalate	ug/g	1 / 28	8.5	8.5	0.0	1 / 1	SB-20-10	5	Yes
Chrysene	ug/g	5 / 28	0.26	7.1	0.0	5 / 5	SB-20-10	5	Yes
Fluoranthene	ug/g	4 / 28	0.37	1.3	0.0	4 / 4	SB-20-08	5	Yes
Indeno(1,2,3-cd)pyrene	ug/g	2 / 28	0.18	0.22	0.0	2 / 2	SB-20-07	5	Yes
Phenanthrene	ug/g	4 / 28	0.19	0.70	0.0	4 / 4	SB-20-05	5	Yes
Pyrene	ug/g	4 / 28	0.29	1.2	0.0	4 / 4	SB-20-07	5	Yes
bis(2-Ethylhexyl)phthalate	ug/g	3 / 28	0.22	30	0.0	3 / 3	SB-20-10	5	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 8-6. Chemicals of Potential Concern in Soil at SWMU 20
Building 520/Structure 521 (Septic Tank)
Deseret Chemical Depot, Tooele, Utah

SVOCs
Subsurface Soil (0.5 to 15 feet BLS)
4-Chloroaniline
Anthracene
Benzo(a)anthracene
Benzo(a)pyrene
Benzo(b)fluoranthene
Benzo(g,h,i)perylene
Benzo(k)fluoranthene
bis(2-Ethylhexyl)phthalate
Butyl Benzyl Phthalate
Chrysene
Fluoranthene
Indeno(1,2,3-cd)pyrene
Phenanthrene
Pyrene

Table 8-7. RME Risk Characterization Summary: SWMU 20 - Building 520/Structure 521 (Septic Tank) 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	
Subsurface Soil (>0.5 to 15 ft BLS)	Ingestion	NA	NA	2E-03	B	2E-04	B	1E-04	B	4E-06	E	2E-07	B
	Dermal Contact	NA	NA	2E-04	B	1E-04	B	2E-06	B	1E-05	E	3E-07	B
	Inhalation (Dust)	NA	NA	0E+00	B	0E+00	B	0E+00	B	2E-10	B	4E-12	B
	Inhalation (Volatiles)	NA	NA	0E+00	B	0E+00	B	0E+00	B	0E+00	B	0E+00	B
Subsurface Soil													
Combined Hazard Index (HI):		NA		2E-03	B	3E-04	B	1E-04	B				
Combined Cancer Risk:			NA							2E-05	E	4E-07	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 8-8. RME Risk Characterization Summary for Produce: SWMU 20 - Building 520/Structure 521 (Septic Tank) 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	Leafy Vegetable Ingestion	2E-01	B	5E-02	B	5E-10	B
Subsurface Soil (>0.5 to 15 ft BLS)	Tuberous Vegetable Ingestion	2E-01	B	6E-02	B	6E-05	E
	Fruit Ingestion	2E-02	B	6E-03	B	2E-11	B
Produce (Subsurface Soil) and Beef							
Combined Hazard Index (HI):		4E-01	B	1E-01	B		
Combined Cancer Risk:						6E-05	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 8-9. Chemicals of Concern for RME Risks at SWMU 20 - Building 520/Structure 521 (Septic Tank) 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
Subsurface Soil (>0.5 to 15 ft BLS)	Ingestion	Benzo(a)anthracene		11%						5E-07	
		Benzo(a)pyrene		74%						3E-06	
	Dermal Contact	Benzo(a)anthracene		11%						1E-06	
		Benzo(a)pyrene		75%						9E-06	
		Benzo(b)fluoranthene		9%						1E-06	
	Inhalation (Dust)										
	Inhalation (Volatiles)										

[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 8-10. Chemicals of Concern for Produce RME Risks at SWMU 20 - Building 520/Structure 521 (Septic Tank) 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 (Subsurface Soil)	Leafy Vegetable Ingestion						
	Tuberous Vegetable Ingestion	Benzo(a)anthracene		17%			1E-05
		Benzo(a)pyrene		75%			5E-05
		Benzo(b)fluoranthene		5%			3E-06
		Benzo(k)fluoranthene		1%			7E-07
		Indeno(1,2,3-cd)pyrene		1%			9E-07
	Fruit 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 8-11. Occurrence, Distribution, and Selection of Ecological Chemicals of Potential Concern (ecoCOPCs) for Subsurface Soils (>0.5-15 ft BLS) at SWMU 20 Deseret Chemical Depot, Tooele, Utah

Run Time: 12:03:56 PM
Run Date: 12/1/00
Exposure Unit: 20__SD1

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]
4-Chloroaniline	1 / 28	28	0.17 - 0.17	47 - 47	ug/g	SB-20-10	1.8	0.40	47	1.1	Y	--	Y
Anthracene	2 / 28	28	0.17 - 3.4	0.20 - 0.20	ug/g	SB-20-07	0.15	0.15	0.20	1,480	N	--	N
Benzo(a)anthracene	5 / 28	28	0.17 - 0.17	0.23 - 7.1	ug/g	SB-20-10	0.42	0.40	7.1	5.2	Y	--	Y
Benzo(a)pyrene	4 / 28	28	0.17 - 0.17	0.44 - 4.1	ug/g	SB-20-10	0.27	0.26	4.1	1.5	Y	--	Y
Benzo(b)fluoranthene	4 / 28	28	0.17 - 0.17	0.60 - 6.2	ug/g	SB-20-10	0.36	0.32	6.2	60	N	--	N
Benzo(g,h,i)perylene	3 / 28	28	0.17 - 3.4	0.19 - 0.23	ug/g	SB-20-07	0.16	0.16	0.23	119	N	--	N
Benzo(k)fluoranthene	3 / 28	28	0.17 - 3.4	0.19 - 0.22	ug/g	SB-20-07	0.16	0.16	0.22	148	N	--	N
Butyl Benzyl Phthalate	1 / 28	28	0.17 - 0.17	8.5 - 8.5	ug/g	SB-20-10	0.38	0.22	8.5	0.24	Y	--	Y
Chrysene	5 / 28	28	0.17 - 0.17	0.26 - 7.1	ug/g	SB-20-10	0.43	0.41	7.1	4.7	Y	--	Y
Fluoranthene	4 / 28	28	0.17 - 3.4	0.37 - 1.3	ug/g	SB-20-08	0.28	0.36	1.3	122	N	--	N
Indeno(1,2,3-cd)pyrene	2 / 28	28	0.17 - 3.4	0.18 - 0.22	ug/g	SB-20-07	0.15	0.15	0.22	109	N	--	N
Phenanthrene	4 / 28	28	0.17 - 3.4	0.19 - 0.70	ug/g	SB-20-05	0.21	0.25	0.70	46	N	--	N
Pyrene	4 / 28	28	0.17 - 3.4	0.29 - 1.2	ug/g	SB-20-07	0.26	0.33	1.2	79	N	--	N
bis(2-Ethylhexyl)phthalate	3 / 28	28	0.17 - 0.17	0.22 - 30	ug/g	SB-20-10	1.2	0.37	30	0.93	Y	--	Y

-- 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.