5.5 SWMU 5: BUILDING 600 FOUNDATION, DRAINAGE POND, AND DITCH

5.5.1 Site Description and Waste Generation

SWMU 5 is referred to as Building 600 Drainage Pond, Foundation, and Leaching Pit in the Corrective Action Permit; however, the SWMU name has been revised to reflect the actual site features.

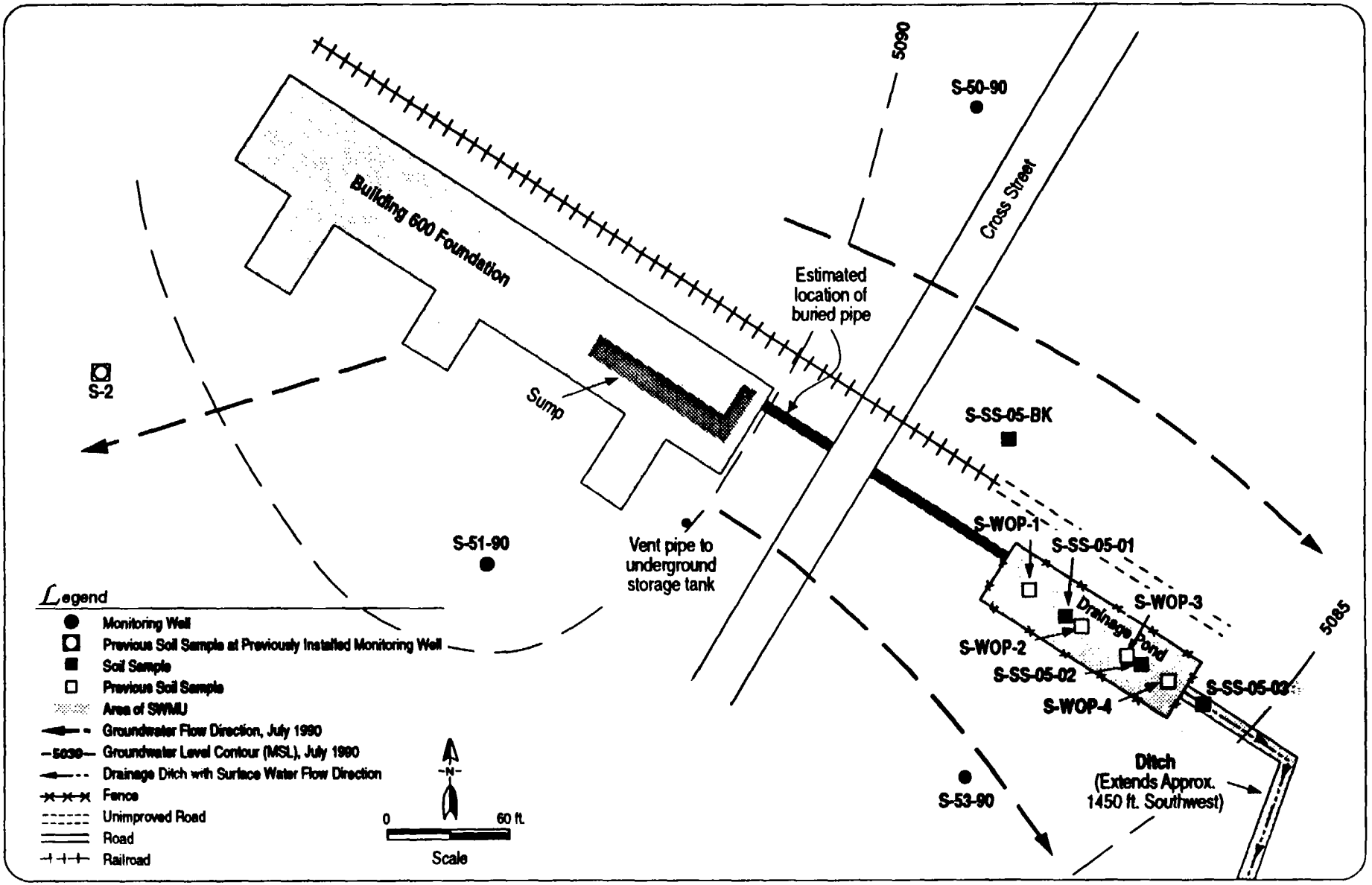
SWMU 5 consists of a concrete building foundation (formerly Building 600), an earthen drainage pond, and a ditch, which has previously been called a leaching pit. The Building 600 foundation is located on the west side of Cross Street. The drainage pond and ditch are located to the east of this street (Figure 5.5-1). A drainage pipe crosses under the street and connects the northeast corner of the Building 600 foundation to the drainage pond. The drainage pond empties into the ditch, which leads south and eventually empties onto surrounding land.

The Installation Assessment (USATHAMA 1979) stated that chemical munitions, including white phosphorous (WP) grenades, were renovated in Building 600. The Installation Assessment further recorded that high explosive (HE) cluster bombs were washed out here in the late 1940s and early 1950s, and that the unlined drainage pond east of the building received the wastes. Mustard projectiles, M15 WP grenades, and M4-A2 smoke pots were renovated in this building (USATHAMA 1979), but the dates of these operations were not provided. In addition to chemical agents, USATHAMA listed paint constituents and chromic acid as potential contaminants. Ertec (1982) listed "Composition B," RDX, and TNT as potential contaminants at the site, but the source of this information was not recorded.

A former employee who worked at TEAD-S for 33 years beginning in 1956 also recalled sandblasting and repainting at this building, with operations ending in the late 1950s to early 1960s (Barnes 1989). The employee remembered paint spray operations, sand blasting, and general munitions renovations, but no munitions washout. This information confirms that washout may have ended there in the early 1950s (USATHAMA 1979).

There was a one-time truck decontamination at SWMU 5 at the time of the M70 mustard leak at SWMU 9 (in the 1950s). Trucks moving the leaking munitions to SWMU 1 were decontaminated with DANC and hosed off at SWMU 5. The wash water was directed into the drainage pond. A former employee (Barnes 1992) further stated that DANC was commonly used at this SWMU and discharged to the pond and ditch.

During the RFI-Phase I, a vent or pipe southeast of the building foundation was investigated and found to be connected to an underground storage tank that appeared to contain fuel or oil.



Source:

EA Engineering, Science, and Technology, Inc. 1988
EBASCO Field Measurement
Basic Information Maps 1985
EPIC 1986

Figure 5.5-1

Site Map
SWMU 5 - Building 600 Foundation, Drainage Pond, and Ditch

Tooele Army Depot - South Area
Prepared by: Ebasco Services Incorporated

5.5.2 Site Hydrogeology

SWMU 5 is located on a gentle southwest-sloping topographic surface. No significant runoff is likely to enter the area near SWMU 5 because railroad tracks upslope to the north obstruct surface water flow. However, the ditch that received flow from the drainage pond extends from the pond under several sets of railroad tracks to a field west of SWMU 9.

The site is underlain by Quaternary alluvial deposits. Details of SWMU 5 subsurface lithology were taken from field boring logs (Appendix A) of each monitoring well at the SWMU (S-50-90, S-51-90, S-53-90), from sieve analyses for representative samples, and from soil samples S-SS-05-01, S-SS-05-02, and S-SS-05-03. Near-surface sediment, down to a depth of approximately 5 ft, is composed of loose, light olive-brown sand with some clayey silt and a trace of gravel (SP). The uppermost 5 to 20 ft of the unsaturated zone is a light olive-brown to light yellowish-gray silt and clay, with some fine sand and a trace of gravel (ML, CL). The gravel content of the unsaturated zone increases gradually with depth, and the silt and clay layer is underlain by 30 to 50 ft of light yellowish-brown to olive-brown gravel with some silty clay and a trace of fine sand (GP, GW, GM). Results from the sieve analysis indicate that there are also gravelly, silty, and clayey sands (SP, SM, SC) in this section. Yellowish-brown to yellowish-gray, gravelly clay (CL) also occurs with the gravels. Bore logs and sieve analyses of samples describe the saturated zone from about 10 to 70 ft as pale brown to yellowish-brown, silty and clayey sand and silty clay (SP, CL).

During the RFI-Phase I, three monitoring wells were installed at SWMU 5, one upgradient on the north side of the SWMU (S-50-90), and two to the southwest of the building and drainage pond in what was believed to be a downgradient location (S-51-90, S-53-90). A 10-ft interval was screened in each of the wells, from 57 to 67 ft in well S-50-90, 56 to 66 ft in well S-51-90, and 60 to 70 ft in well S-53-90. Well S-2 was installed west of SWMU 5 prior to the RFI-Phase I.

In July 1990, the depth to groundwater ranged from 55 ft below ground surface at well S-51-90, to 61 or 62 ft below ground surface at wells S-53-90 and S-50-90. Groundwater elevations varied from 5,087 ft msl at well S-53-90 to 5,092 ft msl at well S-51-90. Water level measurements collected during the RFI-Phase I indicated that groundwater may flow approximately south-southeast at SWMU 5, rather than south-southwest as previously believed. July 1990 water level measurements indicate that well S-50-90 is upgradient of the drainage pond and Wells S-51-90 and S-53-90 are downgradient of the Building 600 foundation. Well S-2 also appears to be roughly downgradient of the Building 600 foundation, although flow directions may vary from the gradient indicated by the July 1990 water level measurements, depending on recharge variations.

Groundwater flow in this area is affected by a groundwater high that appears to extend along Montgomery Road from SWMUs 14, 28, and 32, past SWMUs 21 and 22, to the SWMU 5 area (Plates 3, 4, and 5). This groundwater recharge area may result either from leakage of a water main that follows Montgomery Road or from building discharge in and near SWMUs 5 and 22.

5.5.3 Previous Sampling and RFI-Phase I Sampling Results

Previous sampling at SWMU 5 consisted of groundwater sampling at well S-2, four soil samples collected from the drainage pond, and one soil sample collected during the installation of monitoring well S-2. Groundwater samples from monitoring well S-2 were previously analyzed for volatile organics, semivolatile organics, agent breakdown products, explosives, metals, anions, and radiological parameters. Soil samples were previously analyzed for volatile organics, semivolatile organics, metals, anions, and radiological parameters. Table 5.5-1 summarizes the detections from previous investigations at SWMU 5.

The RFI-Phase I investigation of SWMU 5 included the collection of groundwater samples from well S-2 and the three new wells (S-50-90, S-51-90, and S-53-90). The close spacing (250 ft) of wells S-51-90 and S-53-90 eliminated the need for originally planned well S-52-90. These groundwater samples were analyzed by the standard suite of methods listed in Table 3.10-3, Section 3.10.10. Four additional soil samples were also collected and analyzed for semivolatile organics, agent breakdown products, explosives, and metals to detect releases of chlorinated solvents and thiodiglycol (a mustard agent breakdown product) from the truck decontamination and munitions washout and painting activities. Two of the four soil samples were collected from the drainage pond, one was collected from the ditch, and one was collected from an area northwest of the drainage pond to provide background metal concentrations. Table 5.5-2 summarizes the concentrations of analytes detected in the RFI-Phase I at SWMU 5. Figures 5.5-2 through 5.5-5 illustrate the sampling locations and concentrations of analytes in the RFI-Phase I and previous investigations.

5.5.4 Contamination Assessment

Detections of trichlorethylene in well S-53-90 and toluene in S-2 may indicate groundwater contamination from paint or solvent releases at SWMU 5. However, well S-2 is not clearly downgradient of the SWMU, as the flow path of groundwater in this area is not exactly known or necessarily constant. Other detections in these wells of chloroform, chloromethane, and methylene chloride may also indicate releases at SWMU 5. Low concentrations of methylene chloride are commonly associated with laboratory contamination of samples, and low concentrations of chloroform and chloromethane may be attributable to recharge of the aquifer by chlorinated water, which can form these compounds through reaction with naturally occurring organic compounds. Chloroform is also a possible decontamination product of HD (Department of Army 1988).

All wells at SWMU 5 are included in groundwater quality zone I. Inorganic groundwater quality data from each well was compared to concentrations typical of this zone to determine whether any inorganic analytes were detected at elevated concentrations. Zone I generally has lower concentrations of inorganic analytes and a smaller range of concentrations than zones II and III. Sodium and zinc were previously reported at elevated concentrations in well S-2, but these results were not confirmed by the RFI-Phase I data. Chromium was slightly elevated in well S-2, and lead was slightly elevated at S-53-90. The elevated chromium and lead may be related to

TABLE 5.5-1 **Summary of Previous Analytical Investigations for SWMU 5: Building 600 Foundation, Drainage Pond, and Ditch**

	SOIL (µg/g)				SOIL (µg/l)			GROUNDWATER (µg/l)		
	S-WOP-1	S-WOP-2	S-WOP-3	S-WOP-4	S-2*			S-2		
Analytical groups and Analytes Detected	(0-2ft) 1987	(0-2ft) 1987	(0-2ft) 1987	(0-2ft) 1987	(5-6ft) 1982	(25-25.6ft) 1982	(45-46.5ft) 1982	1982	1987	1988
Volatile Organics:	NA	NA	NA	NA	NA	NA	NA			
Toluene (MEC6H5)								NA	4.0 (u)	LT (5.0)
Semivolatile Organics:	NA	NA	NA	NA						
Butylbenzyl phthalate (BBZP)					NA	NA	NA	NA	6.0[a] (3.0)	LT (10)
Unknowns[c]										120
Metals (total or total/dissolved):	NA	NA	NA	NA						
Arsenic (As)					LT (4.0)	LT (4.0)	LT (4.0)	LT (4.0)	5.7 (2.5)	7.8/6.7 (5.0)
Barium (Ba)					NA	NA	NA	NA	130 (3.4)	NA
Copper (Cu)					LT (u)	LT (u)	LT (u)	LT (6.0)	LT (21)	3.2/LT (1.8)
Nickel (Ni)					LT (4.0)	LT (4.0)	LT (4.0)	LT (4.0)	LT (65)	92/44 (9.6)
Sodium (Na)					200,000 (1000)	2,000 (1000)	7,000 (1000)	27,000 (1000)	26,000,000 (450)	27,000
Zinc (Zn)					2.0 (3.0)	3.0 (3.0)	2.0 (3.0)	13 (3.0)	20 (14)	22/350 (17)

* Soil leach concentration, concentrations in µg/l
a Probably due to laboratory contamination
c The identity or concentrations of these compounds cannot be conclusively determined and reporting limits have not been established.

NA Not analyzed
LT Less than
u Detection limit unavailable
( ) Detection limit
µg/g Microgram per gram
ug/l Microgram per liter

Reference: 1982 data - Ertec 1982
1987 data - EA Engineering 1988
1988 data - Weston 1991

TABLE 5.5-1 **Summary of Previous Analytical Investigations for SWMU 5: Building 600 Foundation, Drainage Pond, and Ditch**

	SOIL (µg/g)				SOIL (µg/l)			GROUNDWATER (µg/l)		
	S-WOP-1	S-WOP-2	S-WOP-3	S-WOP-4	S-2*			S-2		
Analytical Groups and Analytes Detected	(0-2ft) 1987	(0-2ft) 1987	(0-2ft) 1987	(0-2ft) 1987	(5-6ft) 1982	(25-25.6ft) 1982	(45-46.5ft) 1982	1982	1987	1988
Anions:										
Chloride (Cl)	NA	NA	NA	NA	300,000 (1000)	200,000 (1000)	100,000 (1000)	GT 17000 (100)	25,000	LT (5000) (130,000)
Sulfate (SO_4)	NA	NA	NA	NA	LT (1000)	LT (1000)	LT (1000)	GT 19000 (1000)	19,000 (4700)	LT (130,000)
Nitrite (NO_2)					LT (900)	LT (900)	LT (900)	LT (900)		
Nitrate (NO_3)					10,000 (1000)	8,000 (1000)	7,000 (1000)	11,000 (1000		
Nitrate-nonspecific (NIT)	31 (+11)	LT (+11)	2,300 (+11)	LT (+11)					6,700 (+24)	LT (5000)
Radionuclides (pCi/l):	NA	NA	NA	NA						
Gross alpha (ALPHAG)					LT (u)	LT (u)	LT (u)	13±10(3.0)	2.4±1.2 (u)	LT 3.4 (v)
Gross beta (BETAG)					LT (u)	LT (u)	LT (u)	LT (6.0)	2.1±0.9 (u)	LT 2.5 (v)
Uranium - Total					NA	NA	NA	NA	NA	LT 0.30 (v)

* Soil leach concentration, concentrations in µg/l
NA Not analyzed
GT Greater than
LT Less than
pCi/l Picocurie per liter
u Detection limit unavailable
v Detection limit for radionuclides varies for each sample
( ) Detection limit
µg/g Microgram per gram
ug/l Microgram per liter

References: 1982 data - Ertec 1982
1987 data - EA Engineering 1988
1988 data - Weston 1989

TABLE 5.5-2 **Summary of RFI-Phase I Investigations for SWMU 5 : Building 600 Foundation, Drainage Pond, and Ditch**

SOIL (µg/g)

Analytical Groups and Analytes Detected	S-SS-05-01	S-SS-05-02	S-SS-05-03	S-SS-05-BK[1]
Semivolatile Organics:				
Unknowns	190*	29*	20*	
Agent Breakdown Products:				
Thiodiglycol (TDGCL): None Detected				
Metals:				
Arsenic (As)	95	55	14	17
Beryllium (Be)	0.24	0.19	0.25	0.27
Cadmium (Cd)	2.8	LT 0.89	LT 0.89	LT 0.89
Chromium (Cr)	590	810	230	21
Copper (Cu)	97	22	17	11*
Lead (Pb)	1900	490	67	19
Mercury (Hg)	0.50	0.13	0.049	LT 0.026
Nickel (Ni)	57	46	LT 4.9	LT 4.9
Silver (Ag)	14	1.9	1.7	0.20
Sodium (Na)	220	440	LT 100	1300
Zinc (Zn)	2800	870	170	77

1 Metals analysis only
* Detected in associated method blank
LT Less than
µg/g Microgram per gram

GROUNDWATER (µg/l)

Analytical Group and Analytes Detected	S-2	S-50-90	S-51-90	S-53-90
Volatile Organics:				
Chloroform (CHCL3)	LT 0.83	LT 0.83	LT 0.83	1.6
Chloromethane (CH3CL)	1.2	LT 1.6	LT 1.6	LT 1.6
Methylene chloride(CH2CL2)	LT 5.4	LT 5.4	LT 5.4	7.9
Trichloroethylene/Trichloroethene (TRCLE)	LT 7.0	LT 7.0	LT 7.0	8.2
Unknowns		10		
Semivolatile Organics:				
Unknowns	7.0*	60		
Metals:				
Arsenic (As)	15	LT 2.5	LT 2.5	7.9
Chromium (Cr)	27	10	12	19
Copper (Cu)	8.8	LT 8.1	LT 8.1	21
Lead (Pb)	15*	2.0	2.3	17
Sodium (Na)	23,000	28,000	33,000	37,000
Zinc (Zn)	76	LT 21	LT 21	81
Anions:				
Bromide (Br)	LT 50	85	100	140
Chloride (Cl)	24,000	100,000	1,300,000	240,000
Fluoride (F)	LT 780	400	140	LT 1,400
Radionuclides (pCi/l):				
Gross alpha (ALPHAG)	24	140	69*	13*
Gross beta (BETAG)	15	LT 0.30	LT 0.30	LT 0.30
Uranium (U)	1.2	14	10*	7.2*

* Detected in associated method blank
LT Less than
pCi/l Picocurie per liter
µg/l Microgram per liter

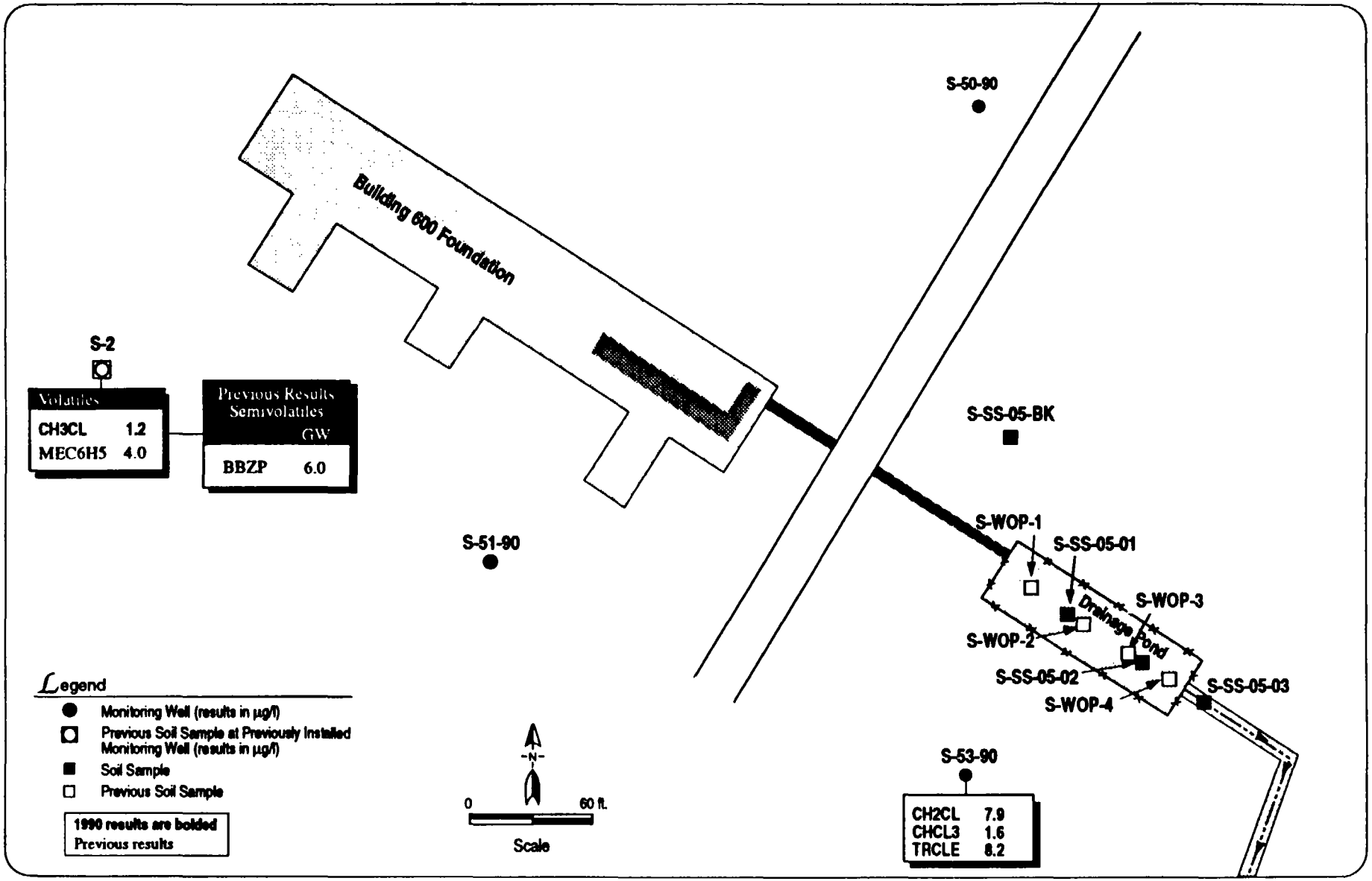


Figure 5.5-2

SWMU 5 - Building 600 Foundation, Drainage Pond, and Ditch

Organics

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Prepared by: Ebasco Services Incorporated

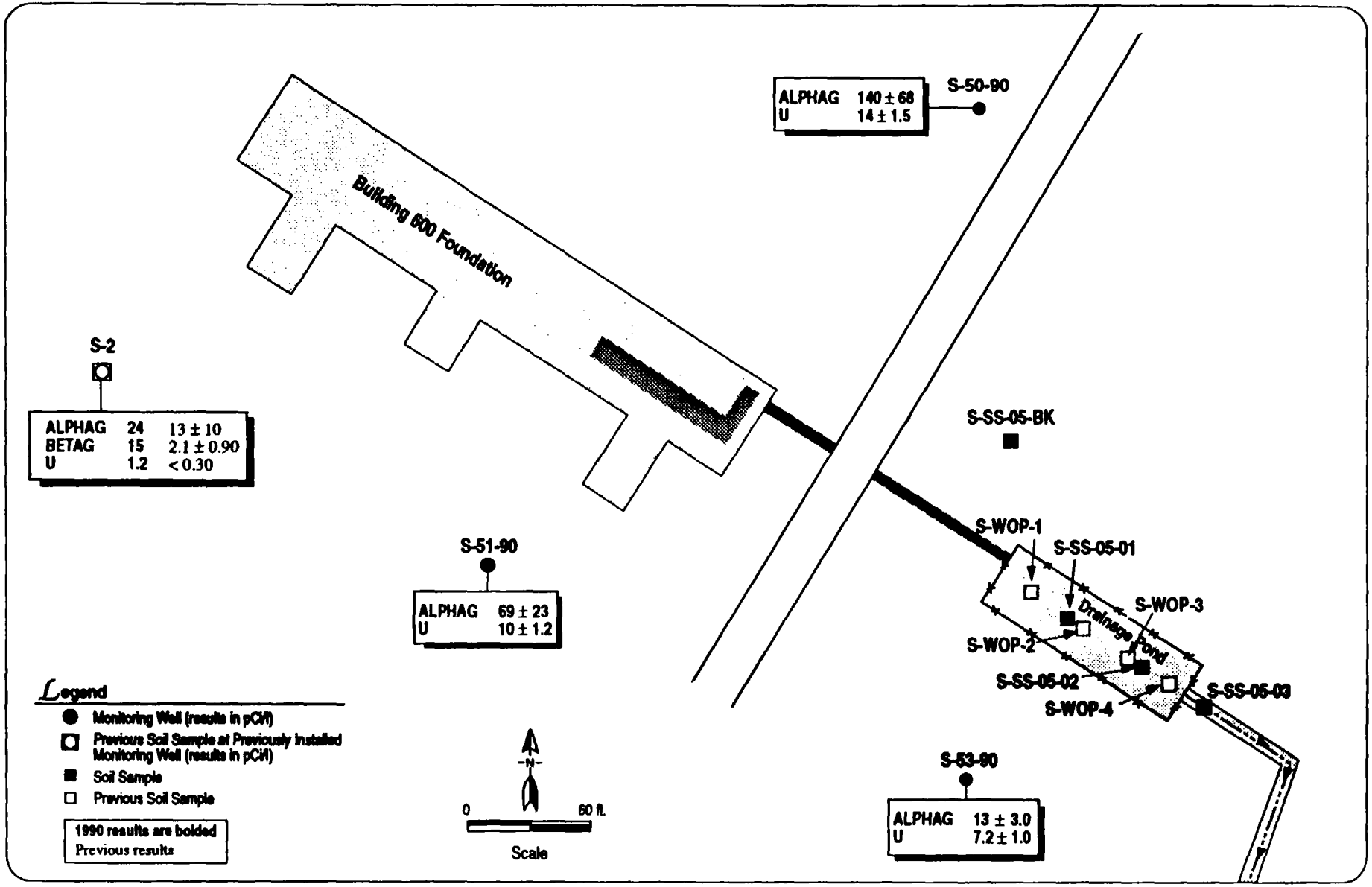

Figure 5.5-3

SWMU 5 - Building 600 Foundation, Drainage Pond, and Ditch

Radionuclides

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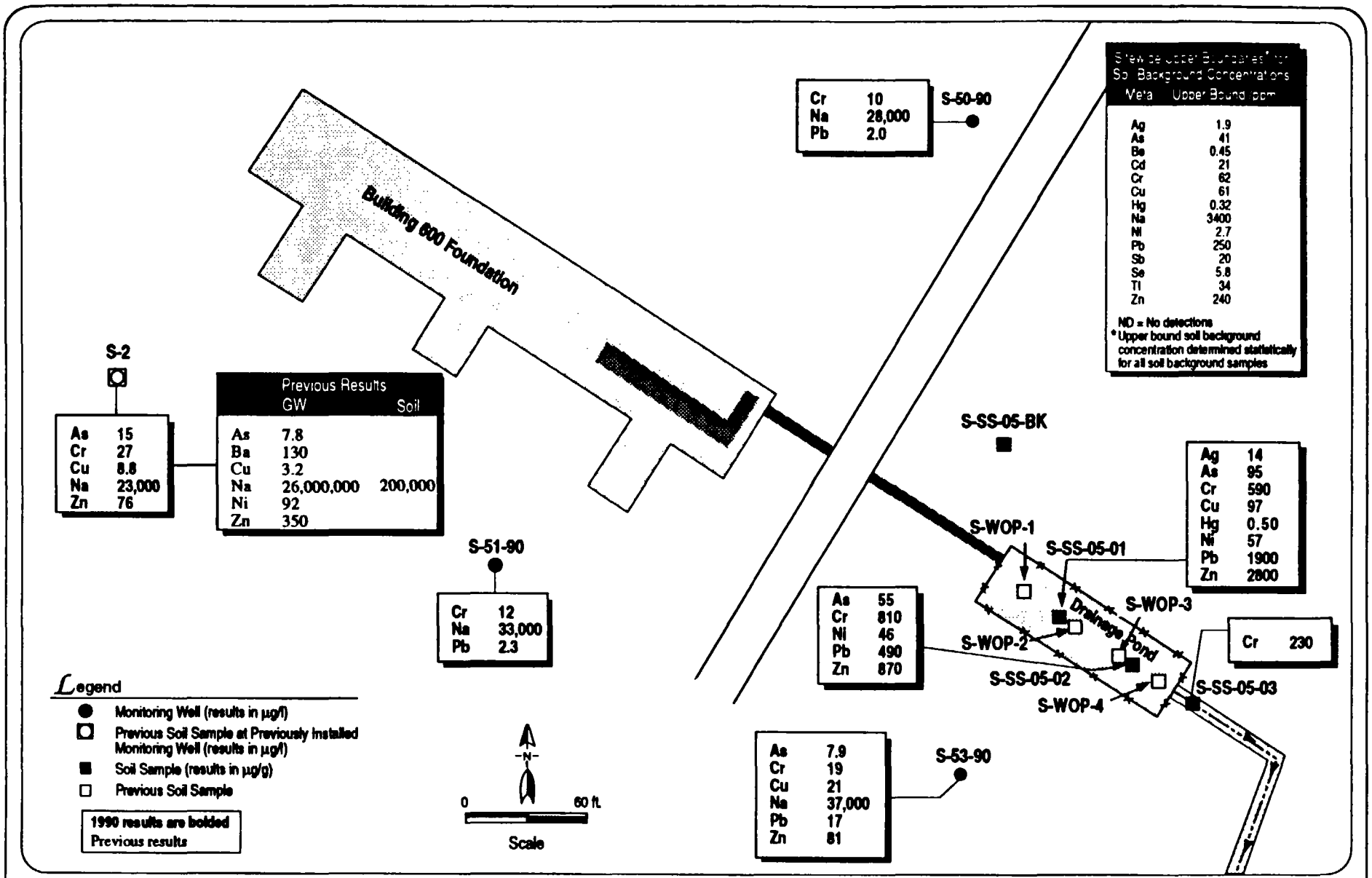

Figure 5.5-4

SWMU 5 - Building 600 Foundation, Drainage Pond, and Ditch

Metals

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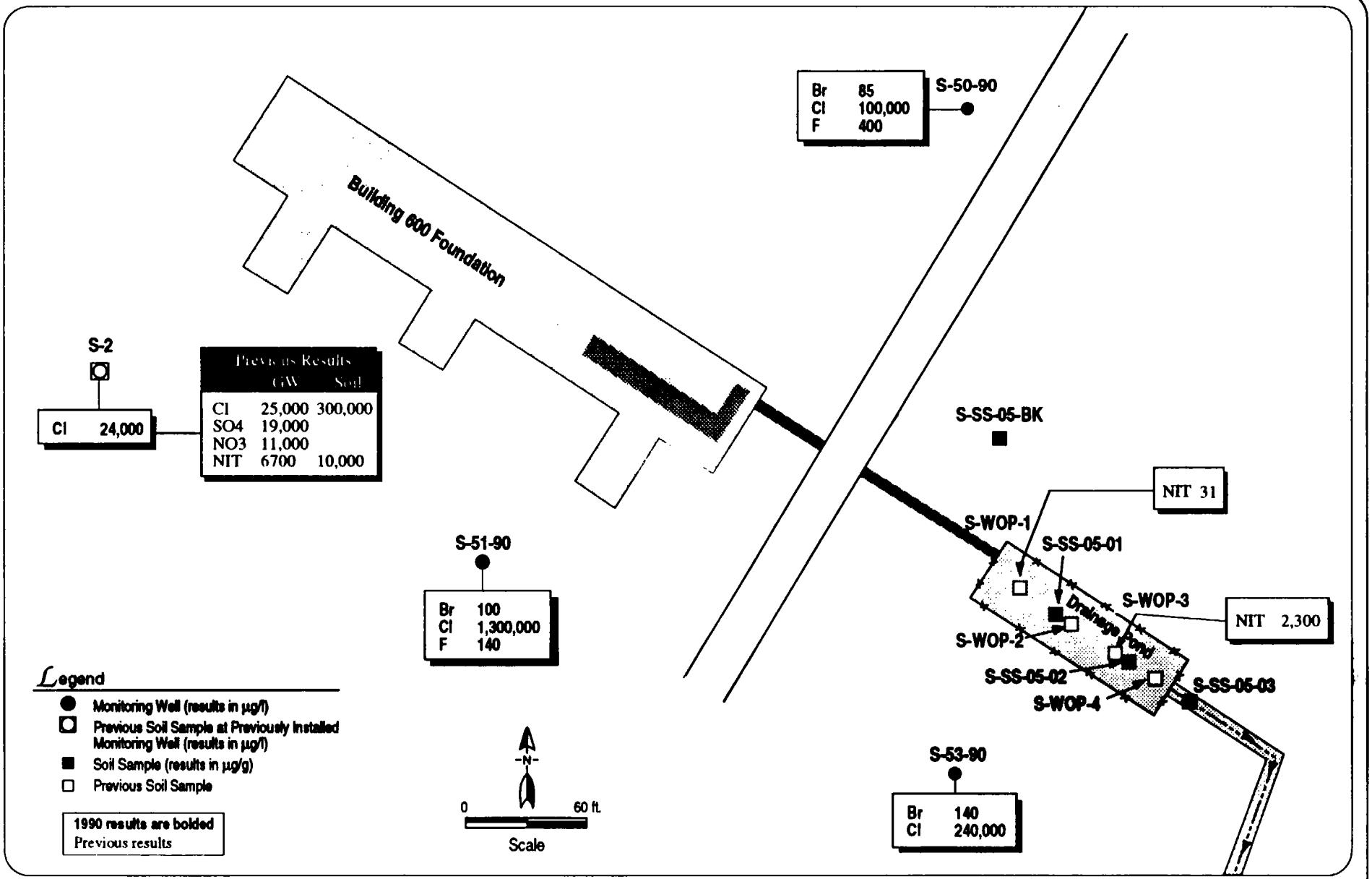

Figure 5.5-5

SWMU 5 - Building 600 Foundation, Drainage Pond, and Ditch

Anions

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sandblasting and painting at the site, but could also be due to natural variation of groundwater quality.

Previous and RFI-Phase I soil samples collected from the drainage pond contained no volatile or semivolatile organic compounds, agent breakdown products, or explosives. Previous nitrate/nitrite detections may be too low to indicate explosive compound residues from munitions wash out.

RFI-Phase I soil samples indicated a release of heavy metals, probably from paint residues. Concentrations of lead, chromium, mercury, silver, and zinc exceeded background levels established for TEAD-S soil (Section 4.0). The concentrations of these metals in the drainage pond decrease in the direction of effluent flow.

5.5.5 Recommendations

Two additional monitoring wells are recommended at SWMU 5 to aid in delineating the lateral extent of possible solvent contamination in groundwater. One of these wells will be positioned to obtain data directly downgradient from the drainage pond since the groundwater flow direction is now thought to be to the southeast. The other well will be installed further downgradient and near the ditch to evaluate whether contaminants have migrated or have been released to the south-southeast of the area investigated during Phase I. The proposed and existing monitoring wells should be sampled for volatile organic compounds to confirm detections of chlorinated solvents. Metals (lead, chromium, mercury, silver, and zinc, at a minimum) should also be analyzed in filtered and unfiltered samples from the wells to further investigate whether the metals contamination in SWMU 5 soil has migrated to the groundwater. If organic contaminants are detected, or metals are measured above background concentrations, the downgradient extent of groundwater contamination will be investigated with additional wells. Slug tests will also be performed in the new wells to better understand the aquifer hydraulic characteristics. Figures 5.5-6 and 5.5-7 illustrate the proposed locations of these monitoring wells.

Eight additional soil borings are recommended to determine the extent of metals contamination in the drainage pond and ditch. Four soil borings should be drilled to define the depth of contamination below the pond and the extent of contamination up the sides of the pond. Four surface soil samples (0 to 6 inches) should be collected around the pond to delineate any contamination due to fugitive dust. Samples in the bottom of the drainage pond should be collected from the 0- to 6-inch, 6- to 12-inch, 2- to 3-ft, and 4- to 5-ft intervals. Samples from the sides of the pond should be collected from the 0- to 6-inch and 6- to 12-inch depth intervals. Four additional soil borings should be drilled in the ditch to delineate the downstream extent of metals contamination there. A representative number of the samples for each area should also be analyzed for pH, total organic carbon, and electrical conductance. These samples should be collected from 0- to 6-inch, 6- to 12-inch, and 2- to 3-ft depth intervals. Figures 5.5-6 and 5.5-7 illustrate the proposed locations of these soil borings.

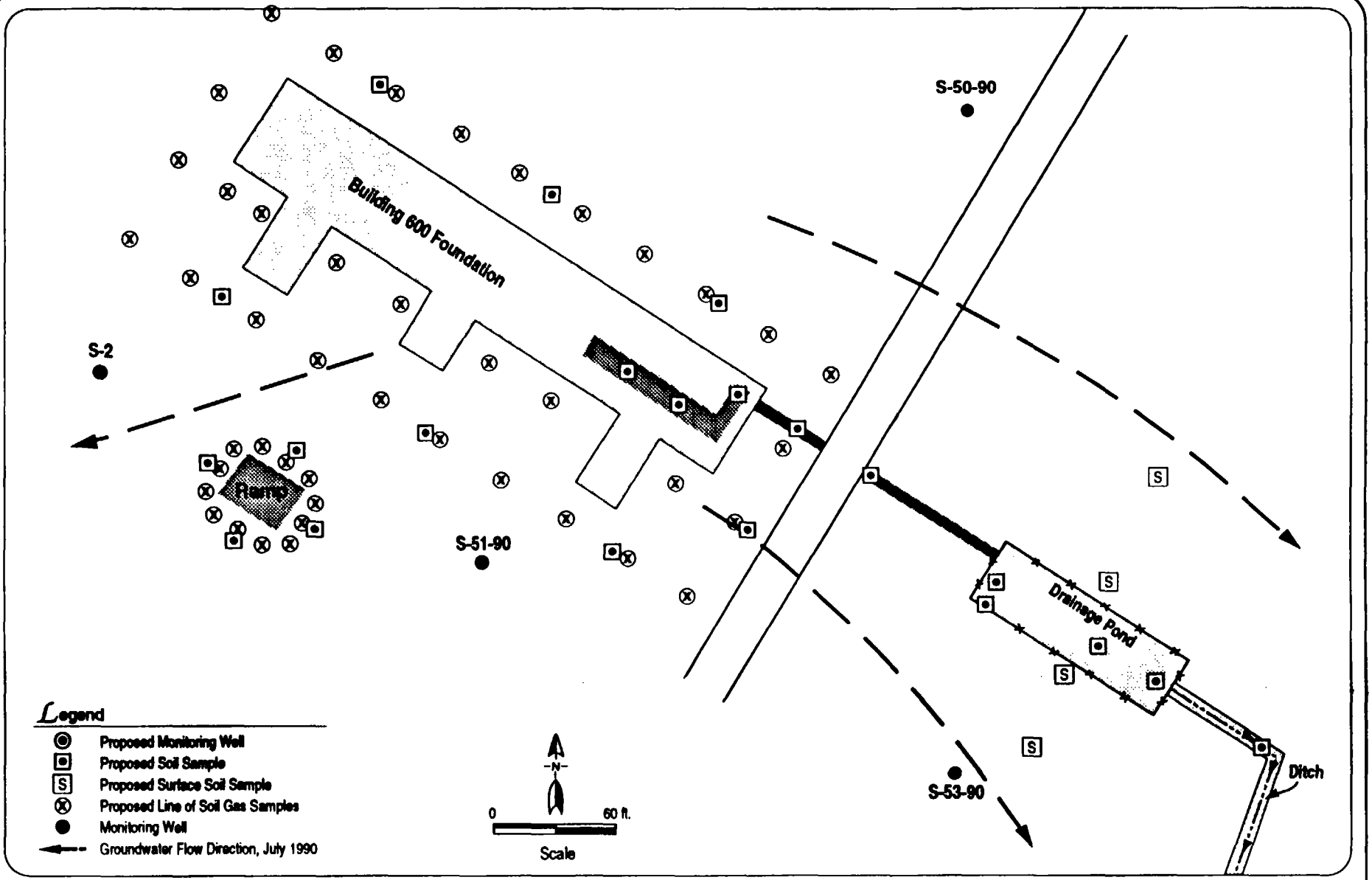


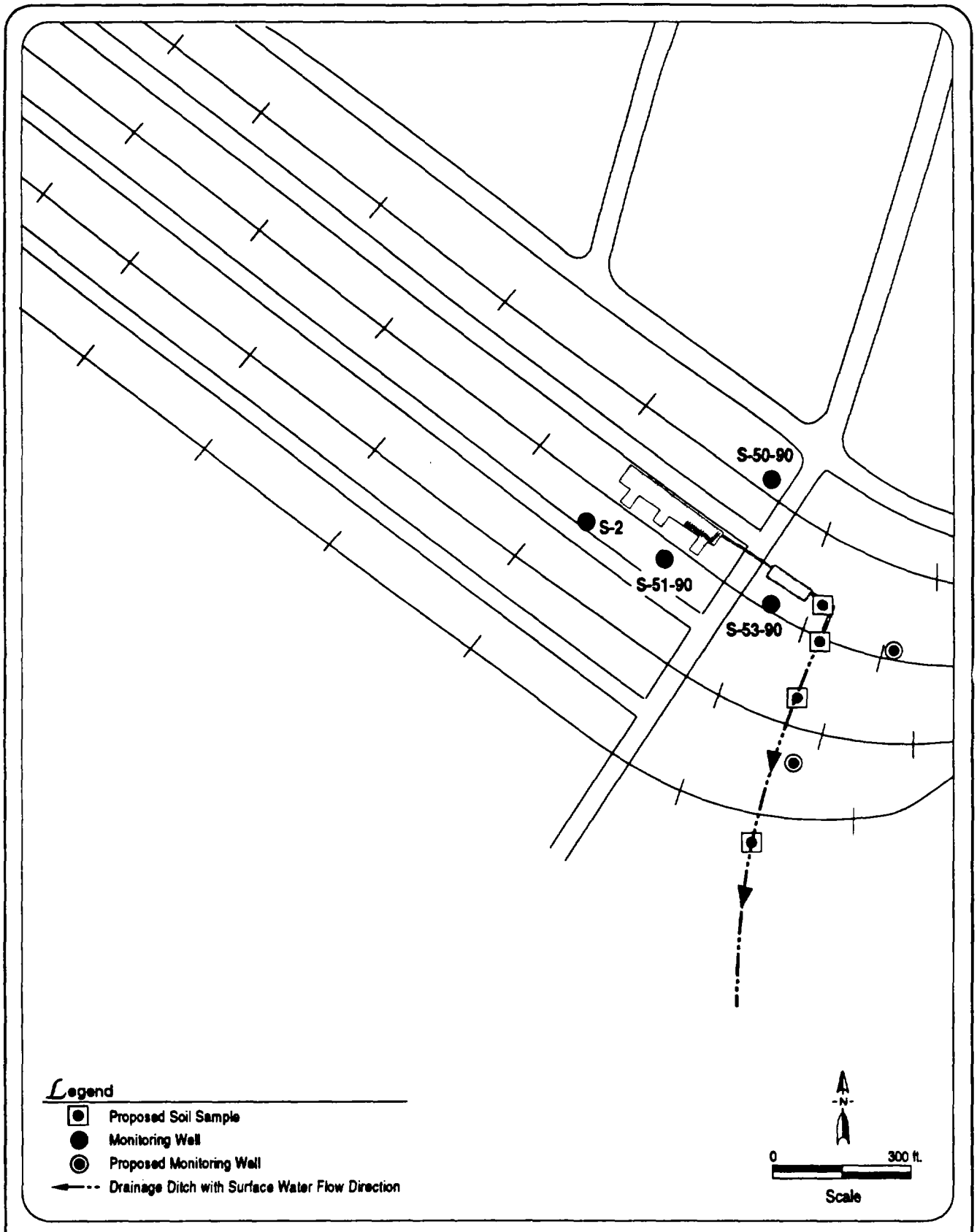
Figure 5.5-6

SWMU 5 - Building 600 Foundation, Drainage Pond, and Ditch

Proposed Sampling Locations

Tooele Army Depot - South Area
Prepared by: Ebasco Services Incorporated

EBASCO



Source:
Basic Information Maps 1985
Weston 1991

Figure 5.5-7
SWMU 5 - Bulding 600 Foundation, Drainage Pond, and Ditch

Additional Proposed Sampling Locations
Tooele Army Depot - South Area
Prepared by: Ebasco Services Incorporated

Sixteen soil borings should also be drilled around the building foundation and a wooden structure resembling a ramp in order to evaluate whether contaminant releases occurred during loading or unloading of munitions, paints, or other chemicals that may have been used in the former washout and painting operations. Two soil samples should be collected from each of these borings and analyzed for organics and metals. A representative number of these samples should also be analyzed for pH, total organic carbon, and electrical conductance. Since some of these chemicals probably contained solvents, a soil gas survey should be used to select the soil sampling locations and depths around the foundation and ramp.

Since this building is no longer in use, it is recommended that the suspected underground storage tank (UST) be drained and removed. The Utah Division of Solid and Hazardous Waste (DSHW) will be notified prior to UST removal to allow DSHW representatives to be present during the tank removal. Evidence of tank leakage should be noted during UST removal. If staining is noted, a soil boring should be drilled to an approximate depth of 15 ft and three samples of stained soil should be collected according to the apparent amount of leakage. These samples should then be analyzed for organics and metals. If no staining is noted, no sampling is recommended. Also, an explosive risk determination will be conducted at this SWMU.