

5.13 SWMU 21: INCENDIARY WASHOUT OPERATIONS (BUILDING S-554) AND SWMU 22: INCENDIARY WASHOUT BASINS

5.13.1 Site Description and Waste Generation

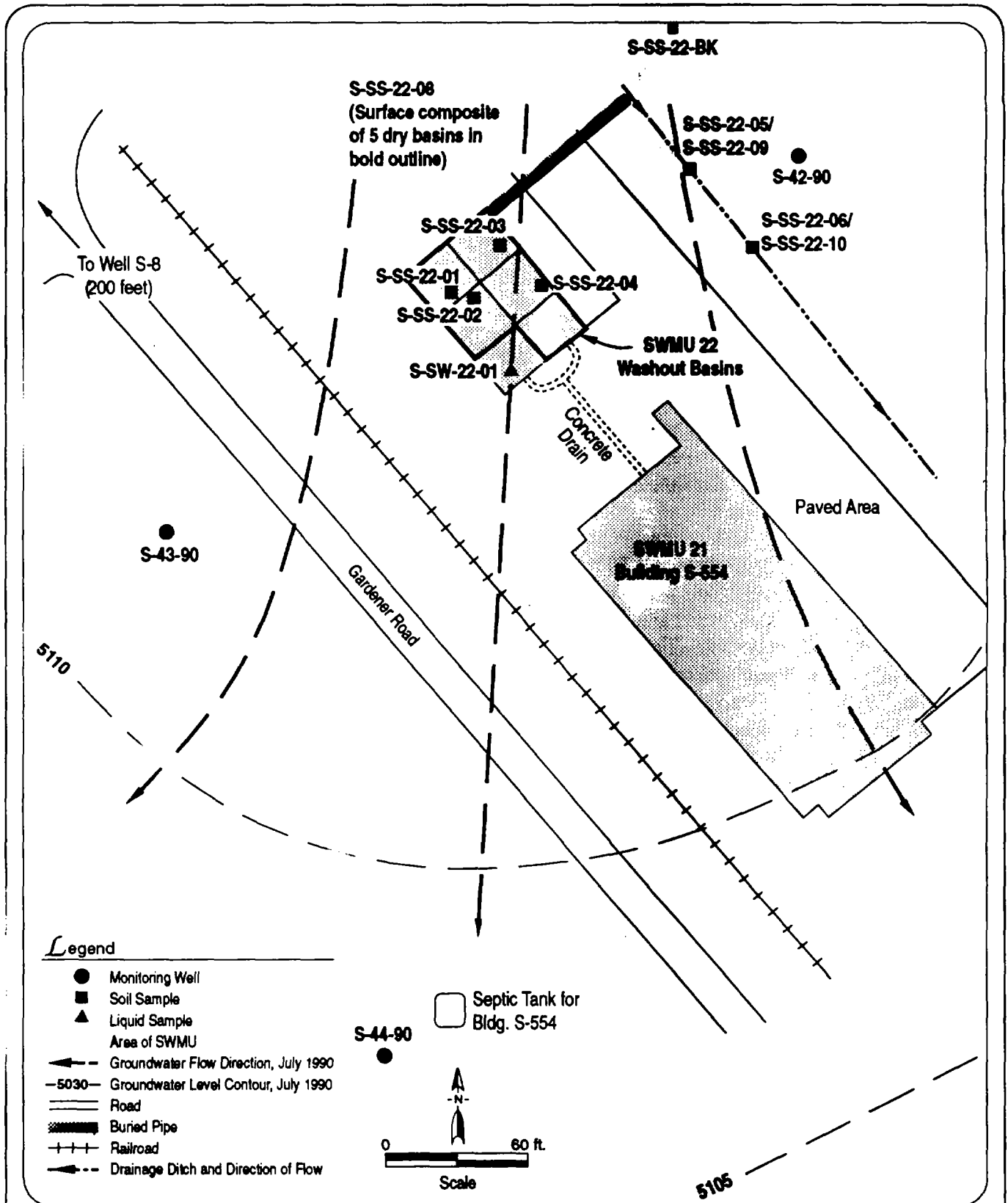
The Incendiary Washout Operations (Building S-554) and adjacent Incendiary Washout Basins (S-554A) (SWMUs 21 and 22, respectively) are located near the intersection of Montgomery and Gardener Roads, in the east central portion of TEAD-S (Figures 5.0-1 and 5.13-1). Washout of incendiary munitions occurred in Building S-554 from the 1940s to the late 1950s (USATHAMA 1979; USAEHA 1986). Munitions including M14, M17, and M17A1 incendiary bombs were demilitarized in Building S-554 by removing the tail assembly and firing pin and washing the first-fire and thermate mix from the M50-type bombs (USATHAMA 1979). There is little evidence of this former operation except for nonfunctional steam and drain lines (NUS 1987). The TEAD-S Ammunition Radiographic Facility was also previously located in Building S-554; however, the dates of this use are unknown (USATHAMA 1979).

Wastewater from operations in Building S-554 was channelled to a concrete drain that divided the flow equally between the north and south washout basins and then to six adjacent concrete washout basins (USATHAMA 1979). Each washout basin is approximately 20 ft by 20 ft by 12 ft deep (USAEHA 1986). Explosives residues were separated from the wastewater by gravity settling in the basins (NUS 1987). USATHAMA (1979) indicated that these settling basins were periodically drained and that the residual material was burned and buried in the Demolition Area (either SWMU 1 or 25). Residual bomb and cluster parts from Building S-554 were taken to SWMU 25 and piled in windrows or burial pits (USATHAMA 1979). The effluent from the settling basins was probably channelled by a valve pit located at the western edge of the basins. It reportedly drained northeast to a headwall and eventually to a ditch (NUS 1987). Green residue, construction debris, and water (probably due to precipitation) were noted in the pits during the RFI-Phase I and previous site inspections (USAEHA 1986; NUS 1987). Potential site contaminants include tetryl, cadmium dust, thermate mix and first fire mix (USATHAMA 1979). Ertec (1982) listed x-ray film developer as another potential site contaminant.

5.13.2 Site Hydrogeology

SWMUs 21 and 22 are located on sloping topography in the northeastern quadrant of TEAD-S. Quaternary alluvial deposits underlie the site. Subsurface lithologic descriptions are taken from field boring logs and sieve analyses of samples from each monitoring well near the SWMUs (S-8, S-42-90, S-43-90, S-44-90).

Surficial soil is loose, light yellowish-brown, gravelly silty sand (SW) and sandy gravel (GP), with a trace of organic matter. The unsaturated zone is composed of 60 to 65 ft of dry to moist, loose to dense, light gray to dark yellowish-brown, interbedded, sandy and clayey gravel (GW, GM), gravelly, silty, and clayey sand (SP, SW, SM, SC), and gravelly clay (CL). The saturated zone from about 65 to 90 ft is composed of firm to very stiff, light brownish-gray to yellowish-brown, gravelly, sandy, and silty clay (CL) and clayey silt (ML). Beds of silty sand and sandy gravel (SM, GW) are also common, as shown in the sieve analysis. The screened interval was



Source:
EBASCO Field Measurement
Basic Information Maps 1985

Figure 5.13-1
Site Map
SWMU 21 - Incendiary Washout Operations
(Building S-554) and
SWMU 22 - Incendiary Washout Basins

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

10 ft in well S-42-90, from 76 to 86 ft. Twenty-ft screens were used in well S-8, from 65 to 85 ft, and in wells S-43-90 and S-44-90, from 70 to 90 ft.

Three of the monitoring wells at the site (all except nearby well S-8) were installed during the RFI-Phase I. One well was placed northeast of the basins to provide background contaminant levels (S-42-90), and two wells were installed on the southwest side of the site (S-43-90, S-44-90). Well S-44-90 was drilled near the septic tank for Building S-554. Well S-8 already existed to the northwest of SWMUs 21 and 22.

The depth to groundwater in July 1990 ranged from 78 ft below ground surface at well S-42-90, to 73 ft below ground surface at well S-44-90. Groundwater elevations varied from 5,112 ft msl at well S-42-90 to 5,109 ft msl at well S-44-90. July 1990 water level measurements indicated a groundwater high below SWMUs 21 and 22 (Plates 3,4,5). This groundwater high may be due to local recharge from ditches at SWMUs 21 and 22 and nearby Building 553. Alternatively, the high may be linear, extending under a possibly leaking water main adjacent to Montgomery Road. Depending on the shape of the water table, groundwater may flow southeast or southwest at these SWMUs.

5.13.3 Previous Sampling and RFI-Phase I Sampling Results

No previous soil sampling was conducted at SWMUs 21 and 22. During the RFI-Phase I, seven soil samples were collected and three monitoring wells were installed and sampled in the vicinity of SWMUs 21 and 22. Four of the soil samples were collected from residues inside the SWMU 22 holding tanks and two were collected from the drainage where the effluent was channeled after settling. These samples were analyzed for explosives and metals. One background soil sample was collected and analyzed for metals only.

The relative percent difference for 2,4,6-trinitrotoluene in MS/MSD samples was greater than 20 percent; therefore, as part of the interim sampling program, two replacement samples for explosives analysis were collected from the ditch. These replacement samples were also analyzed for radiological parameters since radiographic facility wastes may have entered the building effluent. Samples of basin sediments and water were analyzed for toxicity characteristic leaching procedure (TCLP) analytes in order to plan basin sediment removal and disposal.

One previously installed monitoring well (S-8) and three monitoring wells installed during the RFI-Phase I were sampled and analyzed for the full suite of groundwater analytes presented in Section 3.10. Well S-42-90 is located upgradient of Building S-554, and wells S-43-90 and S-44-90 are located downgradient of the SWMU 22 holding tanks. Well S-8 is located more than 200 ft northwest of SWMUs 21 and 22 and is probably neither upgradient nor downgradient of these SWMUs. However, previous detections of analytes in soil and groundwater samples collected at well S-8 are presented for review in Table 5.13-1. RFI-Phase I detections in soil, surface water, and groundwater are presented in Table 5.13-2. Sampling locations, compounds detected, and associated concentrations are presented in Figures 5.13-2 through 5.13-5.

TABLE 5.13-1

**Summary of Previous Analytical Investigations for
SWMU 21 and SWMU 22: Incendiary Washout Operations
(Building 554) and Basins**

SOIL (µg/l)

GROUNDWATER (µg/l)

Analytical Groups and Analytes Detected	S-8*					S-8		
	(15-16.4 ft) 1982	(40-41.5 ft) 1982	(55-56.5 ft) 1982	(65-66.1 ft) 1982	(80-81.1 ft) 1982	1982	1987	1988
Volatile Organics:	NA	NA	NA	NA	NA			
Toluene (MEC6H5)						NA	10 (u)	LT (5.0)
Semivolatile Organics:								
Bis(2-ethylhexyl) phthalate (B2EHP)	NA	NA	NA	NA	NA	NA	10* (3.0)	LT (10)
Butylbenzyl phthalate (BBZP)	NA	NA	NA	NA	NA	NA	10* (3.0)	LT (10)
Diethyl phthalate (DEP)	LT (0.30)	LT (0.30)	LT (0.30)	LT (0.30)	GT 9.0 + (0.30)	LT (u)	LT (u)	LT (10)
Unknowns ^c								12/140
Agent Breakdown Products:								
Isopropylmethyl phosphonic acid (IMPA)							NA	1,200.(470)
Metals (total or total/dissolved):								
Antimony (Sb)	NA	NA	NA	NA	NA	NA	LT (7.0)	5.3/LT (3.0)
Arsenic (As)	9 (4.0)	40 (4.0)	30 (4.0)	LT (4.0)	LT (4.0)	LT (4.0)	14 (2.5)	LT (5.0)

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* Soil leach concentration
 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
 mg/l microgram per liter

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

TABLE 5.13-1

**Summary of Previous Analytical Investigations for
SWMU 21 and SWMU 22: Incendiary Washout Operations
(Building 554) and Basins**

SOIL (µg/l)

GROUNDWATER (µg/l)

Analytical Groups and Analytes Detected	S-8*					S-8		
	(15-16.4 ft) 1982	(40-41.5 ft) 1982	(55-56.5 ft) 1982	(65-66.1 ft) 1982	(80-81.1 ft) 1982	1982	1987	1988
<i>Metals (total or total/dissolved) Cont'd:</i>								
Barium (Ba)	NA	NA	NA	NA	NA	NA	110 (3.4)	NA
Cadmium (Cd)	LT (u)	LT (u)	LT (u)	LT (u)	LT (u)	LT (u)	LT (12)	8.6/LT (5.1)
Chromium (Cr)	LT (20)	LT (20)	LT (20)	LT (20)	LT (20)	LT (20)	24 (11)	LT (38)
Copper (Cu)	LT (6.0)	LT (6.0)	LT (6.0)	LT (6.0)	LT (6.0)	LT (6.0)	LT (21)	4.7/LT (1.8)
Lead (Pb)	LT (u)	LT (u)	LT (u)	LT (u)	LT (u)	LT (30)	7.8 (1.5)	LT (2.5)
Nickel (Ni)	7.0 (4.0)	50 (4.0)	LT (4.0)	LT (4.0)	LT (4.0)	LT (4.0)	LT (65)	15/15 (9.6)
Selenium (Se)	NA	NA	NA	NA	NA	NA	LT (u)	5.5/LT (5.0)
Silver (Ag)	LT (40)	LT (40)	LT (40)	LT (40)	LT (40)	LT (8.0)	LT (0.14)	0.20/LT (0.20)
Sodium (Na)	40,000 (1000)	20,000 (1000)	20,000 (1000)	20,000 (1000)	7,000 (1000)	92,000 (1000)	1,800,000 (450)	150,000
Zinc (Zn)	4.0 (3.0)	7.0 (3.0)	4.0 (3.0)	5.0 (3.0)	50 (3.0)	9.0 (3.0)	60 (14)	510/610 (17)
<i>Anions:</i>								
Chloride (Cl)	2,000 (1000)	20,000 (1000)	2,000 (1000)	20,000 (1000)	9,000 (1000)	GT 17,000 (100)	49,000 (5000)	130,000 (75)
Fluoride (F)	LT (1000)	890+ (1000)	LT (1000)	LT (1000)	LT (1000)	LT (1000)	LT (360)	LT (50)
Orthophosphate (PO ₄ ORT)	NA	NA	NA	NA	NA	NA	57 (57)	NA
Sulfate (SO ₄)	6,000 (1000)	9,000 (1000)	LT (1000)	5,000 (1000)	LT (1000)	GT 19,000 (1000)	80,000 (4700)	180,000 (130000)

* Soil leach concentration

NA Not analyzed
u Detection limit unavailable
mg/l Microgram per liter

GT Greater than
LT Less Than
() Detection limit

References 1982 data - Ertec 1982
1987 data - EA Engineering 1988
1988 data - Weston 1991

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TABLE 5.13-1

**Summary of Previous Analytical Investigations for
SWMU 21 and SWMU 22: Incendiary Washout Operations
(Building 554) and Basins**

SOIL (µg/l)

GROUNDWATER (µg/l)

Analytical Groups and Analytes Detected	S-8*					S-8		
	(15-16.4 ft) 1982	(40-41.5 ft) 1982	(55-56.5 ft) 1982	(65-66.1 ft) 1982	(80-81.1 ft) 1982	1982	1987	1988
Anions, Cont'd:								
Nitrite (NO ₂)	LT (900)	LT (900)	LT (900)	LT (900)	LT (900)	LT (900)		
Nitrate (NO ₃)	LT (1000)	GT 1000 (1000)	LT (1000)	GT 1000 (1000)	3000 (1000)	GT 21000 (1000)		
Nitrate-nonspecific (NIT)							2200 (+24)	5,700 (5000)
Radionuclides (pCi/l):								
Gross alpha (ALPHAG)	LT (u)	LT (u)	LT (u)	LT (u)	LT (u)	LT (3.0)	LT 6.2 (u)	LT 8.7 (v)
Gross beta (BETAG)	LT (u)	LT (u)	LT (u)	LT (u)	LT (u)	LT (6.0)	LT 73 (u)	LT 7.4 (v)
Uranium - Total	NA	NA	NA	NA	NA	NA	NA	1.6 (v)

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- * Soil leach concentration
- 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
- µ microgram per liter

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

TABLE 5.13-2

Summary of RFI-Phase I Investigations for SWMU 21 and SWMU 22:
Incendiary Washout Operations (Building 554) and Basins

SOIL (µg/g)

Analytical Group and Analytes Detected	PHASE I							ADDITIONAL SAMPLING JUNE 1992			
	S-SS-22-01	S-SS-22-02	S-SS-22-03	S-SS-22-04	S-SS-22-05	S-SS-22-06	S-SS-22-BK ¹	S-SW-22-01	S-SS-22-08	S-SS-22-09	S-SS-22-10
Metals:								NA	NA	NA	NA
Arsenic (As)	28	26	28	23	14	15	16				
Beryllium (Be)	LT 0.16	LT 0.16	LT 0.16	LT 0.16	0.28	0.30	0.29				
Cadmium (Cd)	53	LT 0.89	LT 0.89	39	LT 0.89	LT 0.89	21				
Chromium (Cr)	26,000	27,000	23,000	13,000	26	34	26				
Copper (Cu)	4400	5900	5000	2800	12	23	19				
Lead (Pb)	210	310	210	190	23	36	23				
Nickel (Ni)	220	250	110	82	LT 4.9	LT 4.9	LT 4.9				
Silver (Ag)	1.1	1.2	1.2	0.74	0.21	0.29	0.30				
Sodium (Na)	170	LT 100	LT 100	LT 100	LT 100	LT 100	LT 100				
Zinc (Zn)	470	560	450	370	65	79	66				
Explosives:											
None detected								NA	NA		
Radionuclides (pCi/g):								NA	NA		
Gross alpha (ALPHAG)	NA	NA	NA	NA	NA	NA	NA	NA	NA	13	11
Gross beta (BETAG)										21	26
Uranium (U) (µg/g)										2.0	2.0
TCLP Metals: (mg/l)²											
Barium (Ba)	NA	NA	NA	NA	NA	NA	NA	5.4	2,700?	NA	NA
Cadmium (Cd)								LT 0.03			

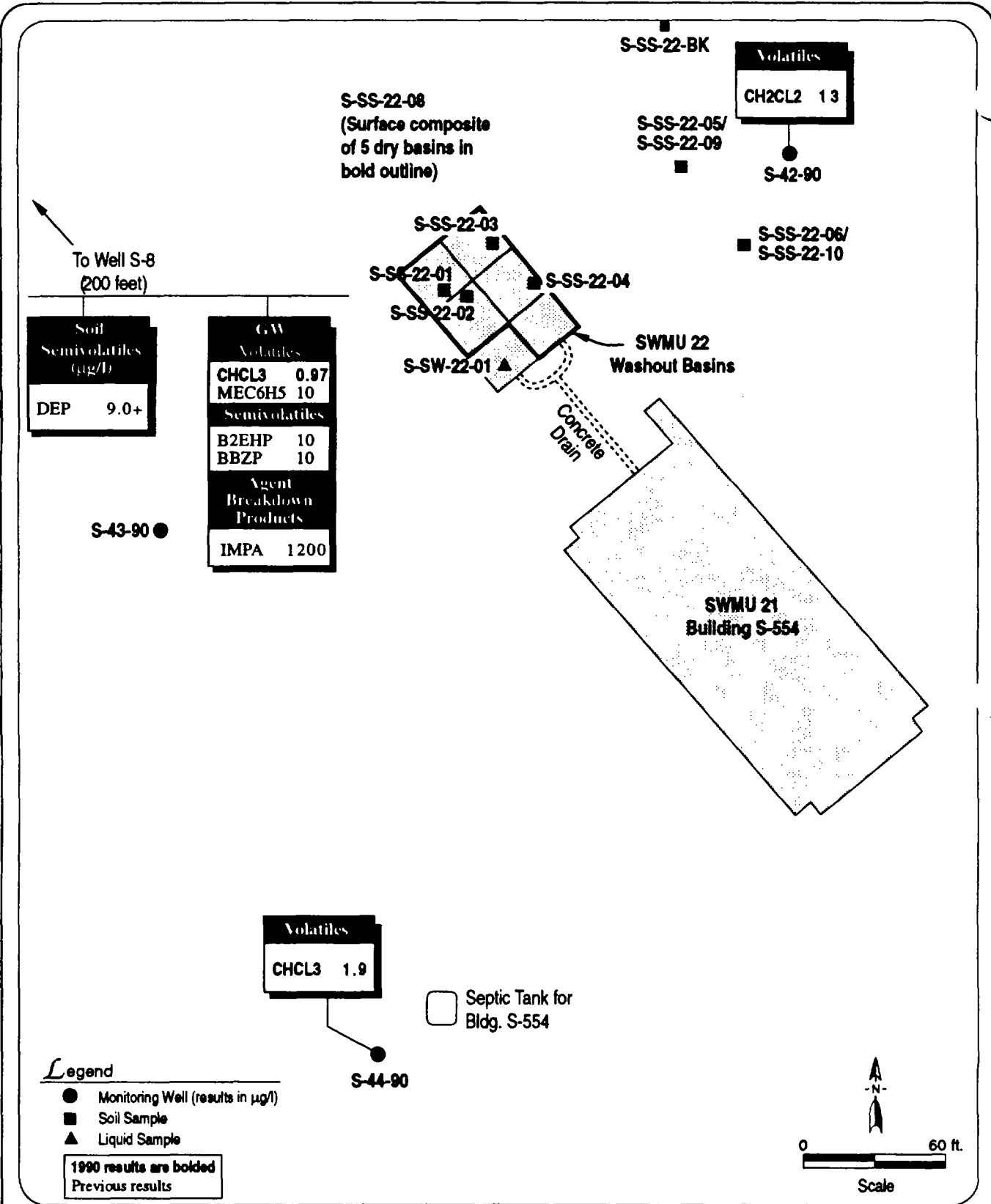
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1 Metals analysis only
 2 Summary of RCRA Characteristics and regulatory levels presented in Appendix II
 LT Less than
 NA Not analyzed
 pCi/g Picocurie per gram
 mg/l Milligram per liter
 µg/g Microgram per gram

GROUNDWATER ($\mu\text{g/l}$)

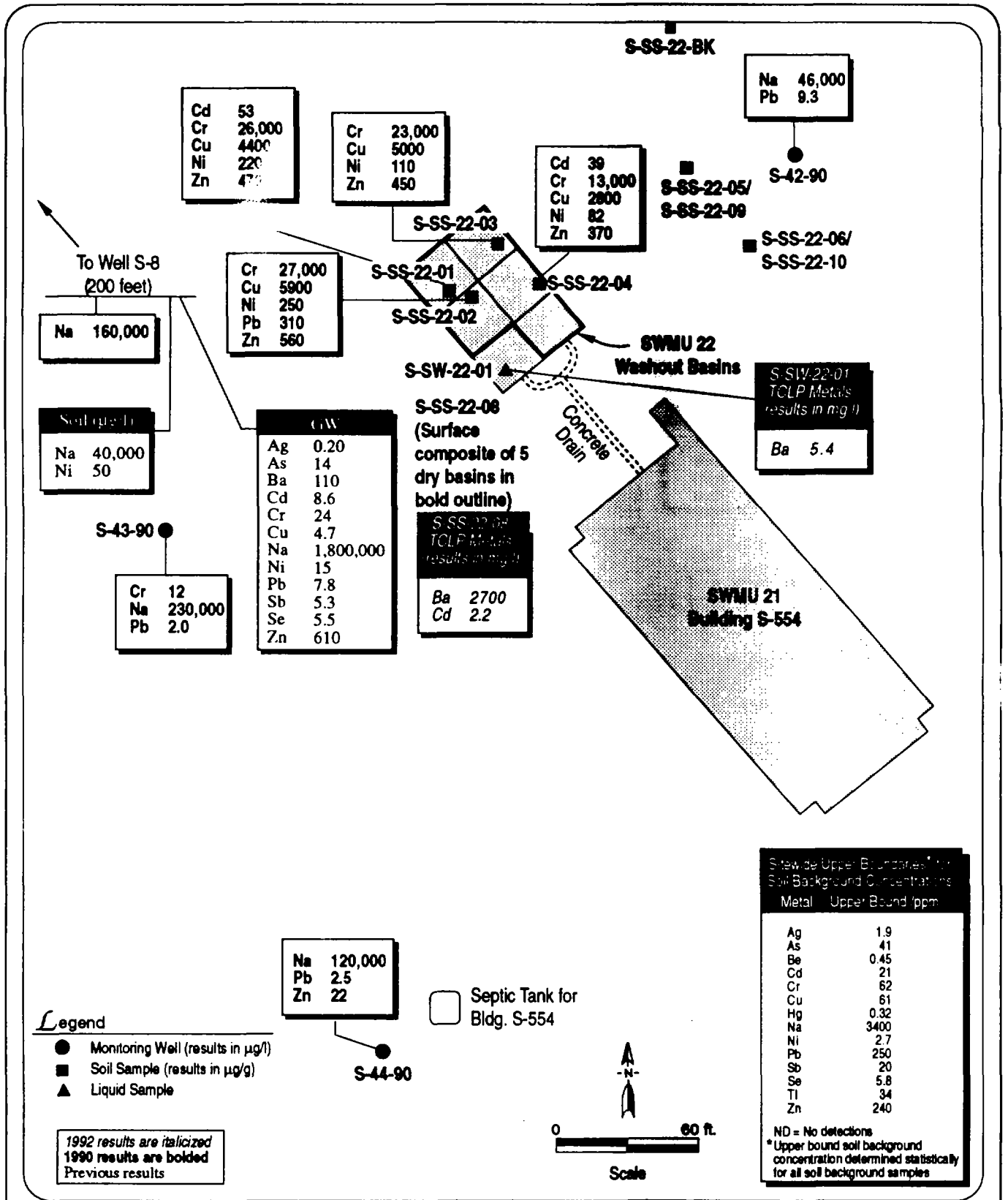
Analytical Groups and Analytes Detected	S-42-90	S-43-90	S-44-90	S-8
Volatile Organics:				
Chloroform (CHCL3)	LT 0.83	LT 0.83	1.9	0.97
Methylene chloride(CH2CL2)	13	LT 5.4	LT 5.4	LT 5.4
Semivolatile Organics:				
Unknowns	30			7.0
Metals:				
Arsenic (As)	LT 2.5	LT 2.5	LT 2.5	LT 2.5
Chromium (Cr)	LT 6.0		LT 6.0	LT 6.0
Copper (Cu)	LT 8.1	LT 8.1	LT 8.1	LT 8.1
Lead (Pb)	9.3	2.0	2.5	LT 1.3
Sodium (Na)	46,000	230,000	120,000	160,000
Zinc (Zn)	LT 21	LT 21	22	LT 21
Anions:				
Bromide (Br)	LT 10,000	310	LT 1,000	89
Chloride (Cl)	520,000	480,000	LT 1,400,000	160,000
Radionuclides (pCi/l):				
Gross alpha (ALPHAG)	120	240	160	26
Gross beta (BETAG)	LT 0.30	LT 0.30	LT 0.30	16
Uranium (U)	16	31	85	13

LT Less than
pCi/l Picocurie per liter
 $\mu\text{g/l}$ Microgram per liter



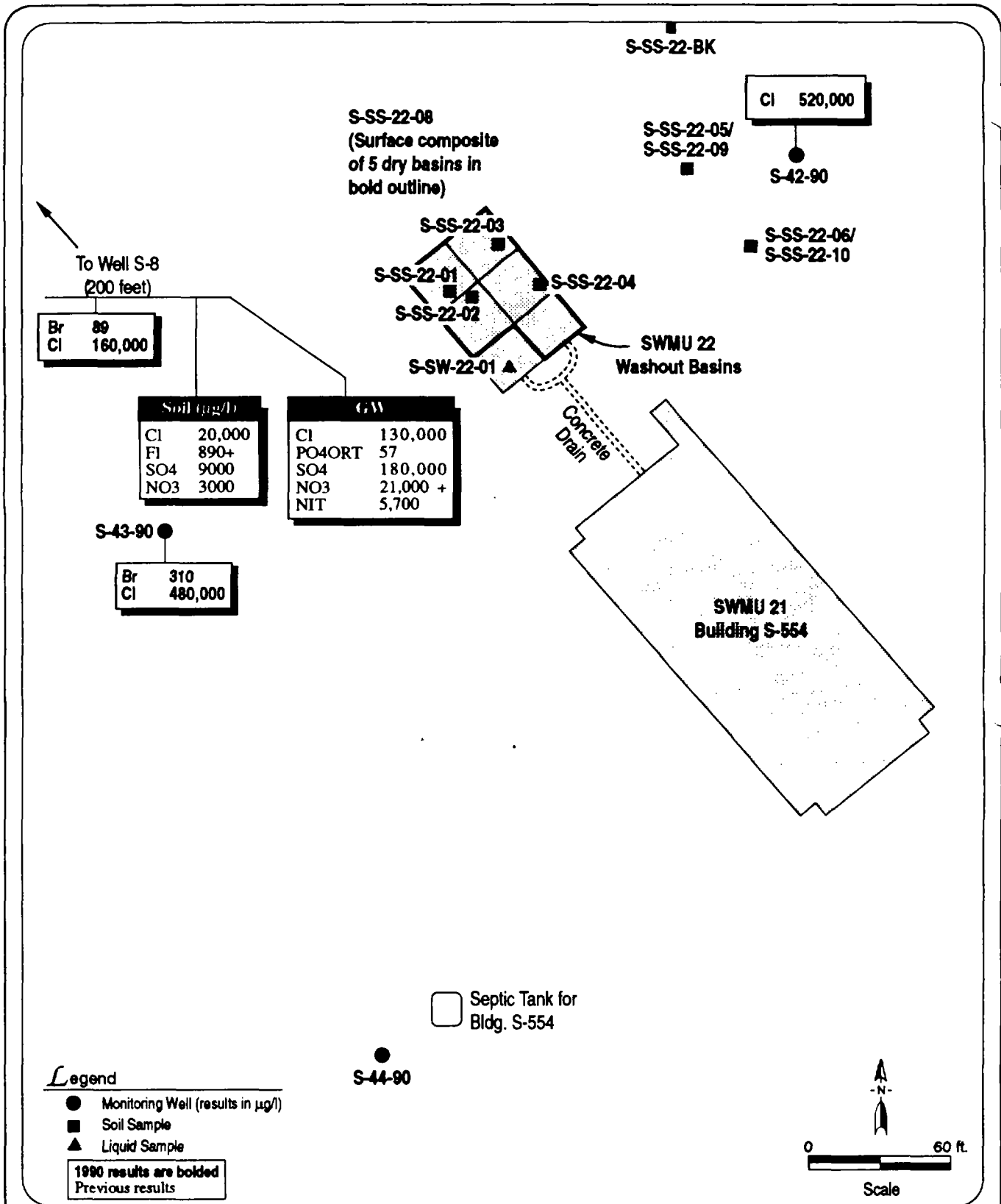
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Figure 5.13-2
SWMU 21 - Incendiary Washout Operations
(Building S-554) and
SWMU 22 - Incendiary Washout Basins
Agent Breakdown Products and Organics



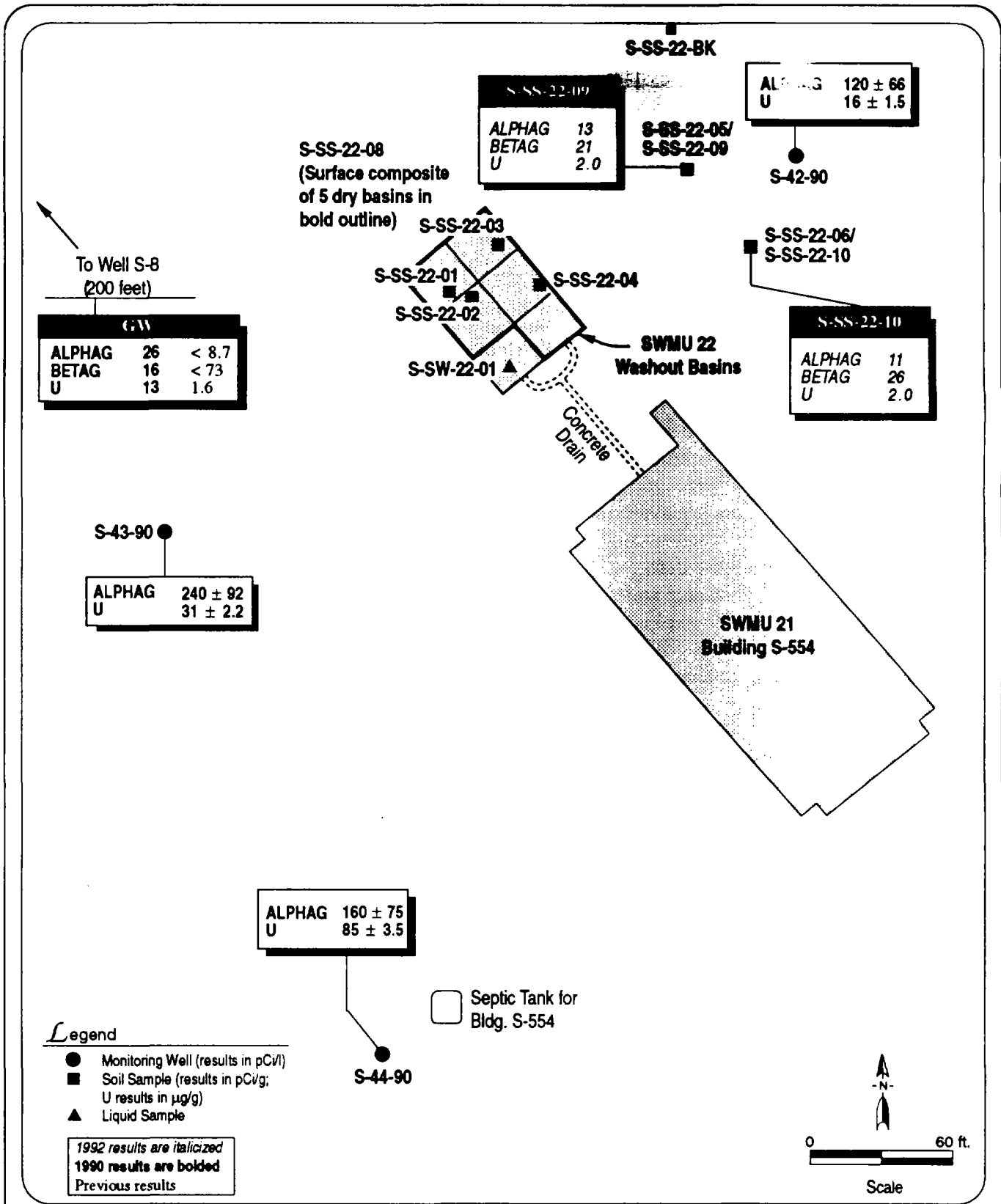
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Figure 5.13-3
SWMU 21 - Incendiary Washout Operations (Building S-554) and SWMU 22 - Incendiary Washout Basins Metals



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Figure 5.13-4
SWMU 21 - Incendiary Washout Operations
(Building S-554) and
SWMU 22 - Incendiary Washout Basins
Anions



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Figure 5.13-5
SWMU 21 - Incendiary Washout Operations (Building S-554) and
SWMU 22 - Incendiary Washout Basins Radionuclides

5.13.4 Contamination Assessment

Methylene chloride and chloroform are the only organic compounds that were detected downgradient of SWMUs 21 and 22. The low concentration of methylene chloride in the sample from upgradient well S-42-90 was most likely caused by laboratory contamination. Low levels of chloroform, such as were found in well S-44-90, are common in releases of chlorinated water. Previous detections of toluene, phthalates, and IMPA, which were not repeated at well S-8 during RFI-Phase I analyses, were likely related to Building 553 rather than SWMUs 21 and 22. The IMPA analysis performed in the RFI-Phase I had a lower detection limit than the previously detected concentration.

All wells at SWMUs 21 and 22 are included in water quality zone I. Inorganic groundwater quality data from each well was compared to concentrations typical of this zone to determine whether any analytes were detected at elevated concentrations. Slightly elevated concentrations of chloride were detected in wells S-42-90 and S-43-90. Sodium was also slightly elevated in well S-43-90. Low concentrations of radionuclides were detected in soil samples from the ditch. The uranium results were within the background concentrations for soil presented in Weston (1991). No other data are available to establish the background concentrations of radionuclides.

Nickel and sodium were detected during previous investigations at concentrations slightly above background in a subsurface soil sample from well S-8, located several hundred feet northwest of the washout basins. No explosives were detected in any of the SWMU 22 soil samples, including the replacement samples collected during the interim sampling program. Barium and cadmium, above RCRA toxicity characteristic levels were detected in the composite sediment sample from the basins.

5.13.5 Recommendations

As no significant contamination was found in soil from the ditch or in groundwater from this SWMU, no Phase II investigation is needed. The SWMU 22 basin sediments should be removed and disposed of properly as hazardous waste. The State of Utah Division of Solid and Hazardous Waste will be notified before this removal occurs.