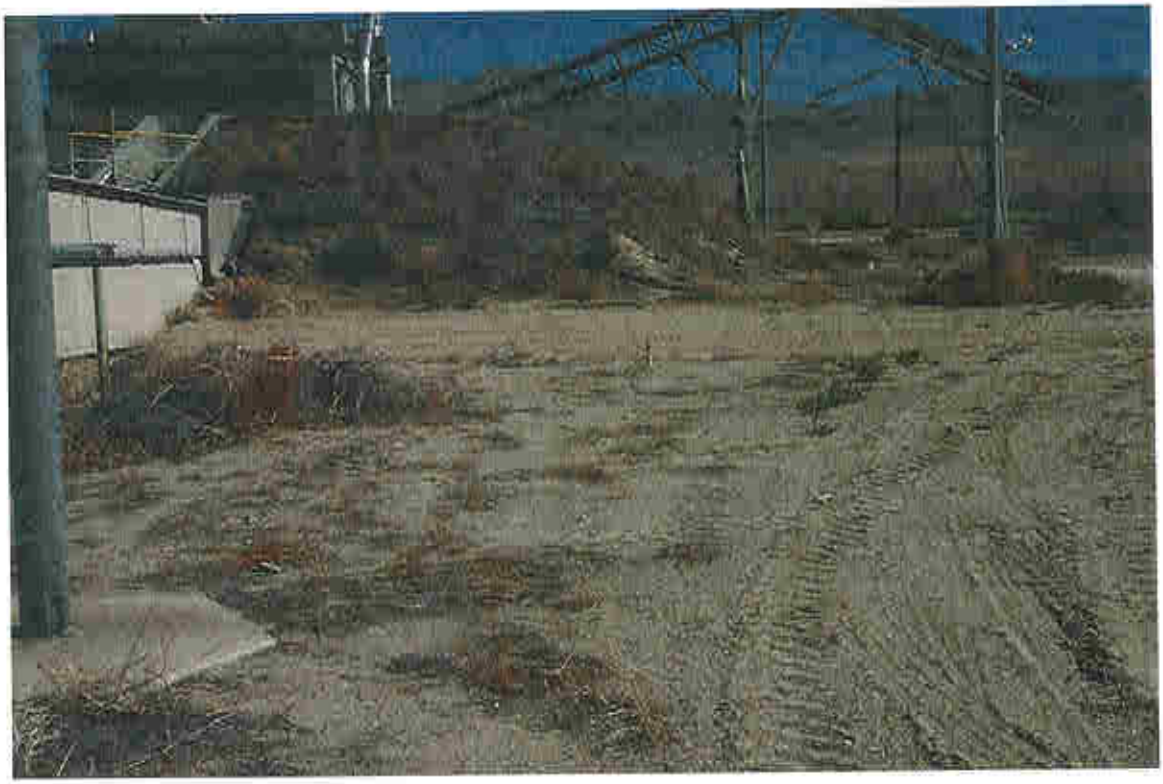
Decision Document

Solid Waste Management Unit B-17a
Building 101-20 South Catchment Pit
Hawthorne Army Depot
Hawthorne, Nevada



March 2000

Hawthorne Army
Depot

Decision Document SWMU B-17a

March 2000

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ENVIRONMENTAL PROTECTION

The selected remedy is protective of human health and the environment. It has been shown that a complete pathway to human health and the environment does not exist, and there is no potential for an exposure pathway to be completed in the future.

U. S. Army

11 APR 2000

James A. Piner
Lt. Colonel, U.S. Army
Commanding

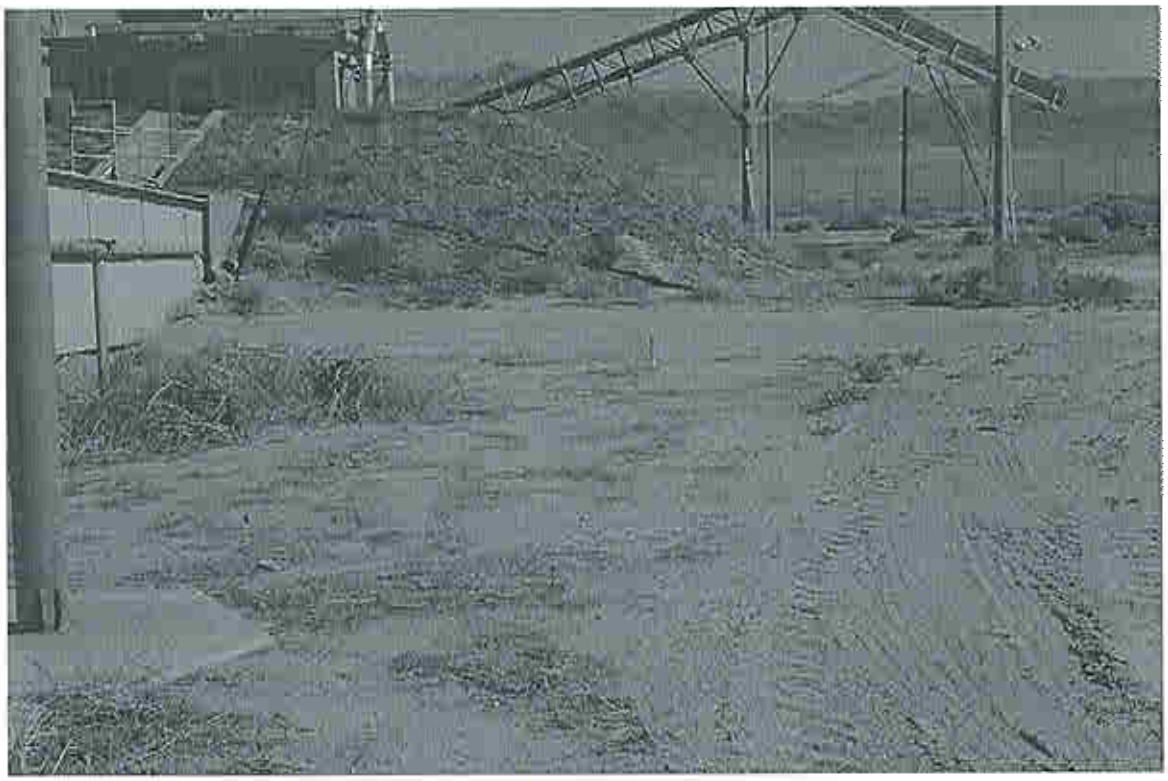
State of Nevada

24 April 2000

Paul Liebendorfer
Chief, Bureau of Federal Facilities

Decision Document

Solid Waste Management Unit B-17a
Building 101-20 South Catchment Pit
Hawthorne Army Depot
Hawthorne, Nevada



March 2000

Hawthorne Army
Depot

Decision Document
SWMU B-17a
Building 101-20 South Catchment Pit
HAWTHORNE ARMY DEPOT
HAWTHORNE, NEVADA

1.0 Introduction:

This decision document describes the rationale for the proposed closure of SWMU B-17a, building 101-20 south catchment pit, at the Hawthorne Army Depot (HWAD), Hawthorne, Nevada. This document was prepared by the U.S. Army Corps of Engineers, Sacramento District, with the help of HWAD for the Nevada Department of Environmental Protection (NDEP).

Tetra Tech, Inc. (Tt), was tasked by the US Army Corps of Engineers, Sacramento District (USACE), to perform remedial investigations and ground water monitoring at the Hawthorne Army Depot (HWAD), Hawthorne, Nevada. These tasks were conducted from 1993 through 1997, primarily at solid waste management units (SWMUs) designated by the Army and the Nevada Division of Environmental Protection (NDEP). The NDEP is the lead regulatory agency for environmental issues at HWAD. The purpose of the sampling was to determine the extent and degree of environmental impacts, if any, associated with activities performed at each SWMU. The primary goal of the investigation was to assess the environmental impacts and to report the findings, present conclusions, and recommend any remediation, if necessary.

With guidance from the NDEP, basewide proposed closure goals (PCGs) for soil were established as acceptable levels so that SWMU closure could be recommended and to assist in directing the investigative efforts toward those SWMUs where the target analytes were of greatest concern (Appendix A). These PCGs were used as action levels throughout this investigation and are used for comparison with the detected analytes in this report.

2.0 Site History

SWMU B17a is in the HWAD's central magazine area, on the northwest side of the 101 Production Area. SWMU B-17a is an inactive unlined catchment pit located 40 feet south of Building 101-20 (Figure 1-1). The catchment pit measures approximately 15 feet by 15 feet square, and is up to three feet deep. The pit has been partially eroded and is partially filled with windblown sand.

The USACE, HWAD, and the NDEP agreed to define the boundaries of each SWMU using annotated monuments and survey pins. As part of E&E's 1997 field investigations, a survey monument was constructed and surveyed at SWMU B-17a. A brass survey pin

on the monument designates the monument number HWAAP-87-1996 and the SWMU number B-17a, respectively. Three corner pins were set and surveyed to define the SWMU boundary, with the monument as the northwest corner. The location of these corner markers and the SWMU boundary are shown on Figure 1-2. The survey data for this SWMU are presented in Appendix B.

3.0 Site Conditions

Soils encountered during E&E's investigation of SWMU B-17a were composed mostly of fine to medium sands. During Tt's 1997 first and second quarter ground water monitoring, the depth to ground water was measured at approximately 100 feet bgs at monitoring wells IRPMW34 and IRPMW35. These wells are approximately 1,975 feet crossgradient to the south-southwest of SMWU B17a.

Based on the past uses of the catchment pit at SWMU B-17a, and the observations made during the previous site inspections, the target analytes at this SWMU are known to be explosives and metals.

4.0 INVESTIGATIONS

Site inspections of SWMU B-17a were conducted by the USAEHA (1988), Jacobs Engineering (1988), and RAI (1992). In 1994, sampling activities proposed by E&E for the remedial investigation at SWMU B-17a included collecting and analyzing both surface and subsurface soil samples. Two surface soil samples and one near-surface soil sample were collected from the two sample locations SS01 and HA01 at SWMU B17a. Sample location SS01 was located on the west side of the catchment pit to characterize the potential for contaminated soils outside of the pit. HA01 was located at the lowest elevation in the pit to assess the potential impact from the explosive wastewater that would tend to accumulate in this area (see Figure 3-1). The subsurface investigation at SWMU B-17a consisted of one CPT sounding with an adjacent sample boring drilled on the east side of the catchment pit.
The SWMU inspections conducted in 1988 and 1991 established assumed conclusion that red stained soil was evidence of TNT contamination. In 1995 field screening tests indicated contamination levels above safe shipping concentrations in many of the areas where the staining occurred. However, in some areas where the field tests indicated a high but shippable levels of contamination, the laboratory test results did not agree with the field test results. In late 1998 questions arose that the red satined soil may not be contaminated soil. To test this assumption the Corps of Engineers took samples of the stained soil in January 1999 from several sites in the 101 area including SWMU B-17a.

5.0 Investigation Results

Arsenic (1.2 mg/kg to 4.5 mg/kg), barium (70 mg/kg to 85 mg/kg), total chromium (2.4 mg/kg to 4.2 mg/kg), and lead (2.8 mg/kg to 130 mg/kg) were detected in the three surface and near-surface soil samples collected at locations SS01 and HA01. No other metals were detected in these surface and near-surface samples. The laboratory results of the surface sample collected at location SS01 detected TNT at 8.2 mg/kg, 2,4-DNT at 0.31 mg/kg, 2-amino-4,6-DNT at 1.3 mg/kg, RDX at 7.9 mg/kg, sym-trinitrobenzene (TNB) at 31 mg/kg, and picric acid at 0.94 mg/kg. No explosive compounds were detected in the five-foot sample collected at HA01. Arsenic (1.6 mg/kg to 7.2 mg/kg), barium (71 mg/kg to 110 mg/kg), cadmium (1.9 mg/kg to 3.9 mg/kg), total chromium (2.8 mg/kg to 180 mg/kg), and lead (1.8 mg/kg to 20 mg/kg) were detected in the three subsurface soil samples collected at location CPS01. Because the known disposal waste at this SWMU (explosives) is not likely to contain high concentrations of total chromium and lead, it is presumed that the detected concentrations of these metals is a low-level naturally occurring anomaly, and is not from a release of these metals at this SWMU. Therefore, at SWMU B17a, the detected metals arsenic, barium, cadmium, total chromium, and lead, which are common metals in the Walker Valley soils, are evaluated to be at naturally occurring concentrations near their background levels. No other metals were detected in these subsurface samples.

Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX) and RDX were the only explosives detected in the 22-foot CPT subsurface soil sample, at concentrations of 1.6 mg/kg and 0.96 mg/kg, respectively. Explosives were not detected in either of the other CPT subsurface samples. Appendix C has the analytical results of these investigations,

The Corps of Engineers sampling effort of March 1999 indicated one section of SWMU B-17a with concentrations of TNT that exceeded PCG's. The results of the sampling event are shown in table 1-1 and the locations of the samples are shown in fig 4.

Table 1-1

SWMU B-17a
SAMPLE RESULTS

SAMPLE NUMBER	TNT (ppm)	RDX (ppm)
CS17-BB-01	1.7	1.0
CS17-SA-01	1,480	<26
CS17-SA-02	<0.26	<0.26

6.0 Remediation

Analysis of a soil sample collected from the west end of SWMU B-17a indicated a TNT concentration of 1,480 ppm. It was determined that this area of the SWMU would be excavated and resampled. The excavated soil would treated as part of the 101 program.

7.0 Remediation Results

SWMU B-17a had 27 cubic yards of material excavated and placed in the composting windrow 2C. A confirmation sample from B-17a indicated a TNT level of 65ppm, which is below the PCG's. The analytical results from this sample and the samples from windrow 2C are shown in appendix D, the location of the confirmation sample is shown in figure 5.

8.0 Public Involvement:

It is the U.S. Department of Defense and Army policy to involve the local community throughout the investigation process at an installation. To initiate this involvement, HWAD has established and maintains a repository library at the local public library. This repository includes final copies of all past studies and other documents regarding environmental issues at HWAD. As future environmental documents are made available to HWAD the repository shall be updated.

HWAD has solicited community participation in establishment of a restoration and advisory board (RAB). To date there has been insufficient response and HWAD has not formed a RAB. HWAD has held open houses to inform the public of on going environmental issues. HWAD shall continue to solicit community involvement, and will establish a RAB should sufficient community interest be obtained.

9.0 Conclusions

The contaminated soil has been removed from SWMU B-17a and has been treated in the composting windrows to levels below clean up goals. SWMU B-17a should be closed with the restrictions that no structure be constructed on the SWMU, that the site remain only for industrial use and documented on the depot site master plan.

10.0 REFERENCES

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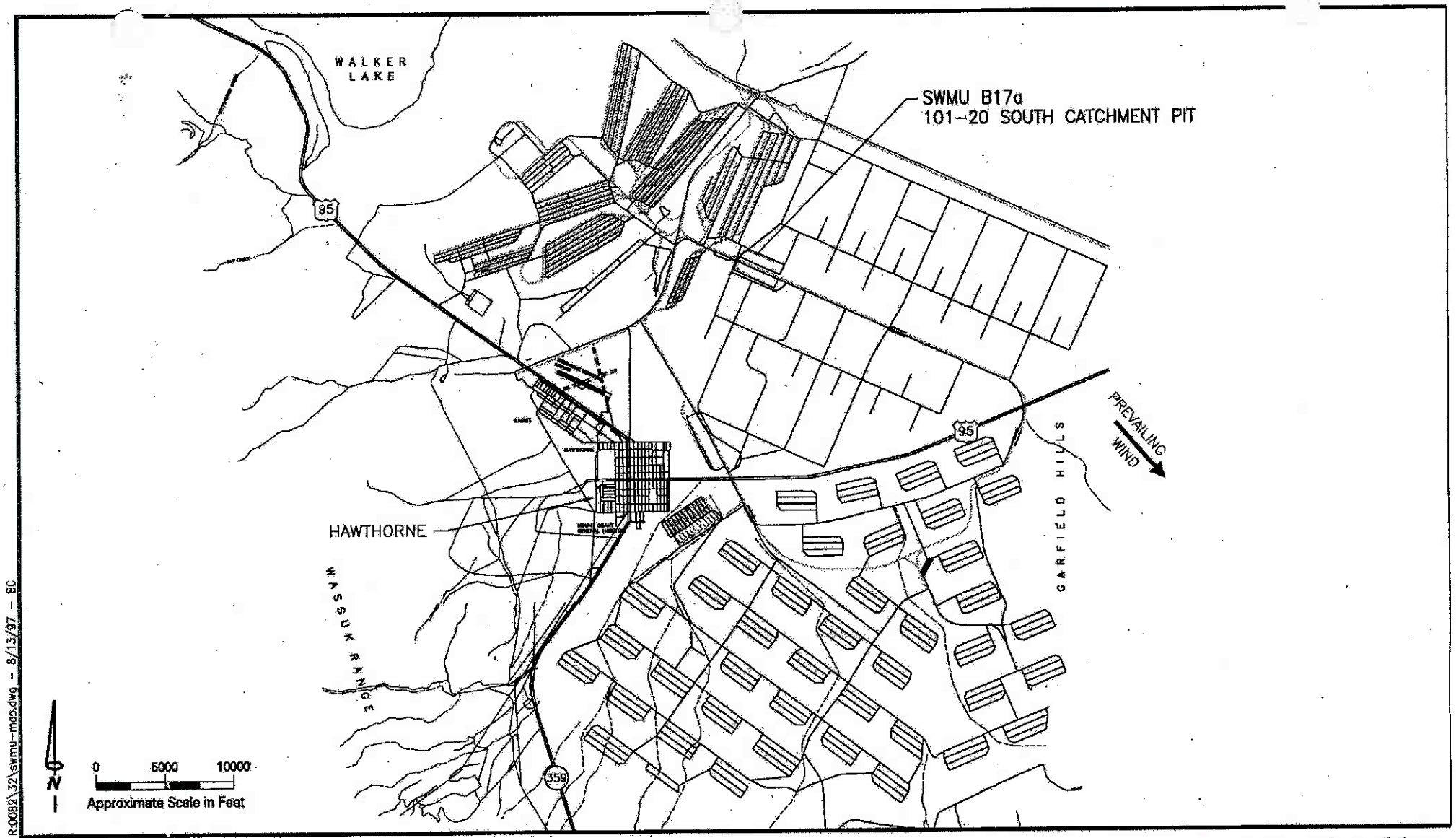

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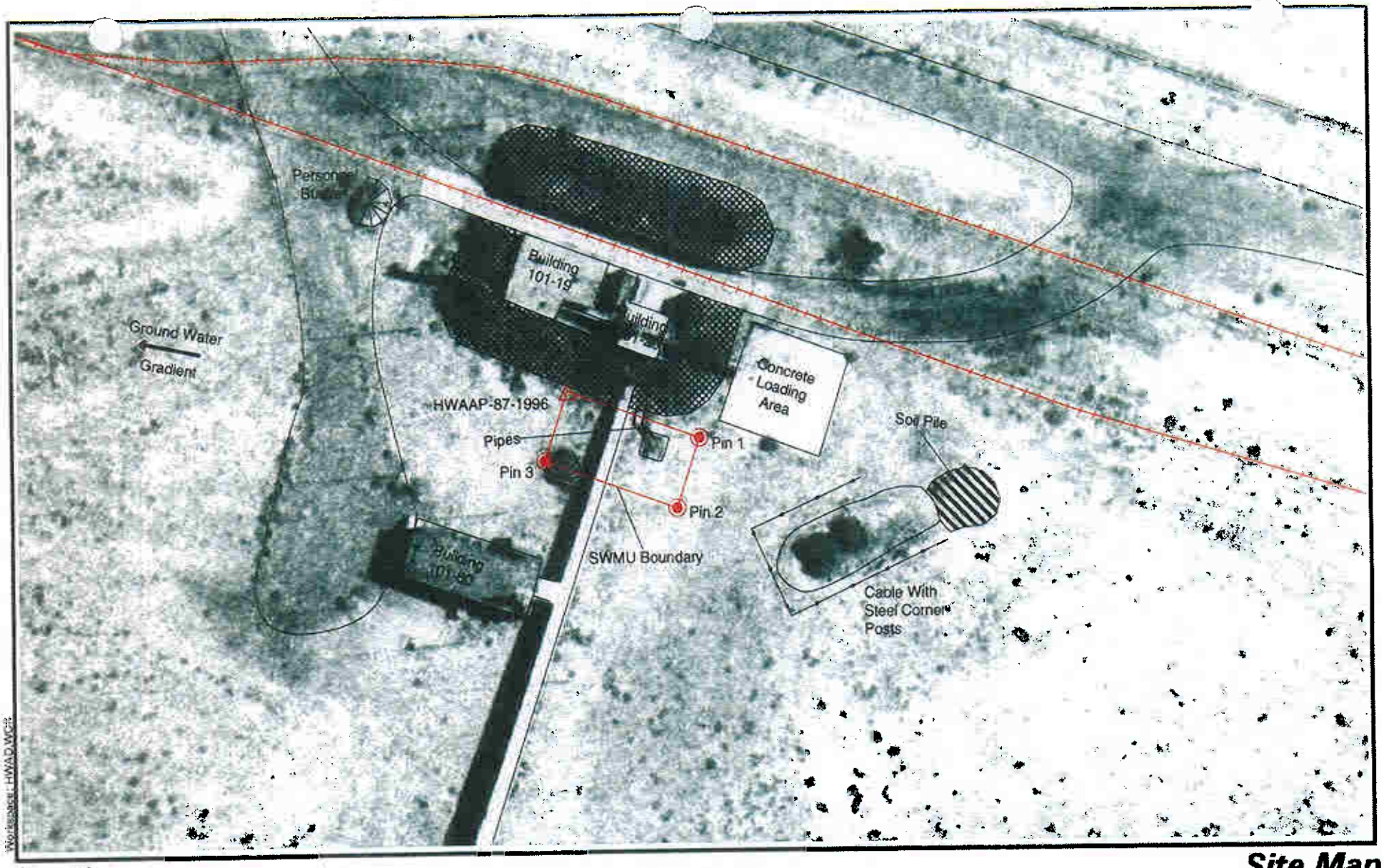
SOURCE: TETRA TECH FINAL DATA PACKAGE, 1996 (REV. 1997)

Location Map
SWMU B17a
101-20 South Catchment Pit

Hawthorne Army Depot
Hawthorne, Nevada

Tetra Tech, Inc.

Figure 1-1



Legend:

- Boundary Corner Pin
- Hand Auger Location
- Explosion Barrier
- Fence
- Railroad
- SWMU Monument

N

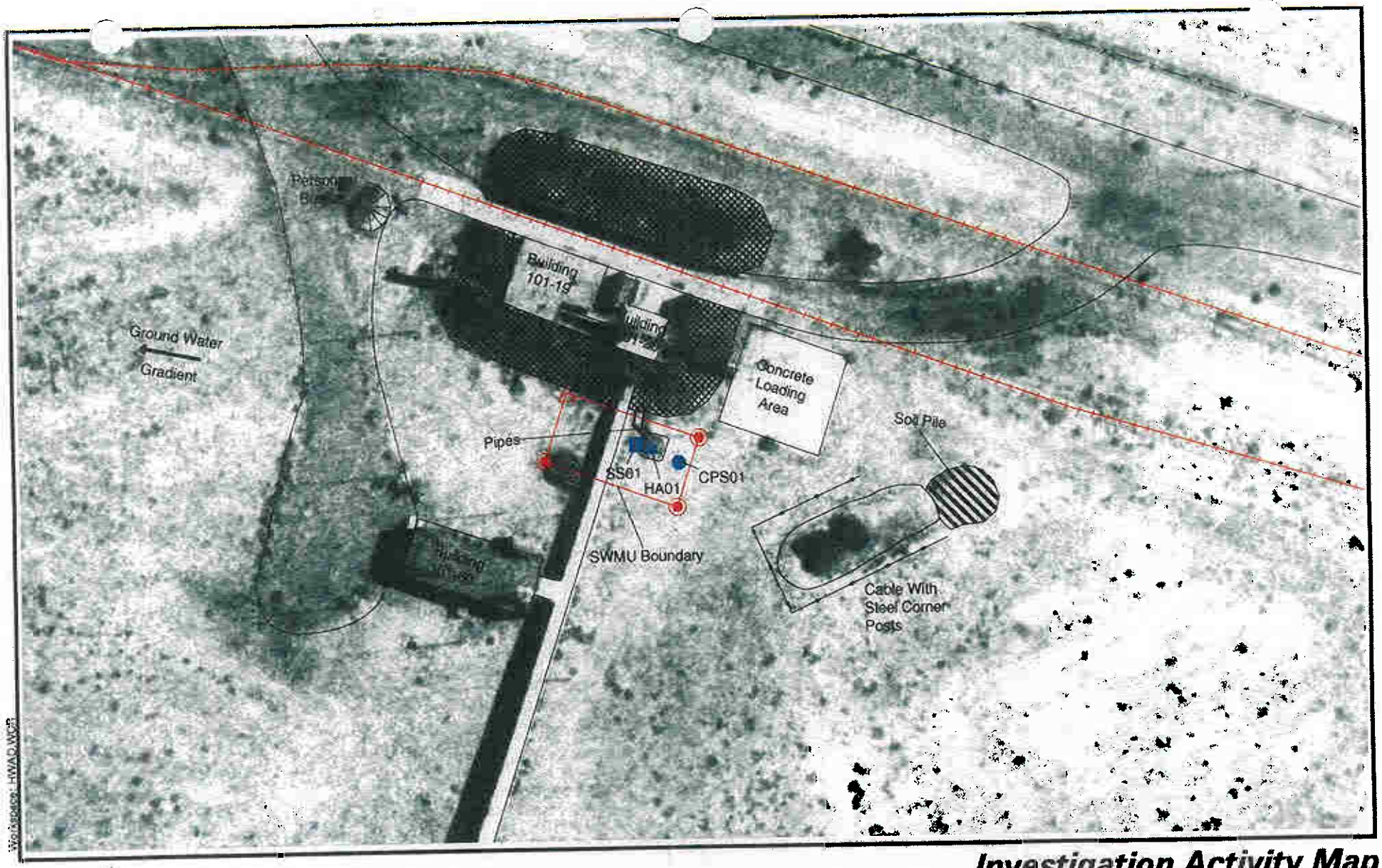
0 35 70
Approximate Scale in Feet

Tetra Tech, Inc.

Site Map
SWMU B17a
101-20 South Catchment Pit

Hawthorne Army Depot
Hawthorne, Nevada

Figure 1-2



Legend:

- Boundary Corner Pin
- Hand Auger Location
- Soil Boring Location
- SWMU Monument
- Explosion Barrier
- Fence
- Railroad
- Surface Soil/Sludge Sample

N

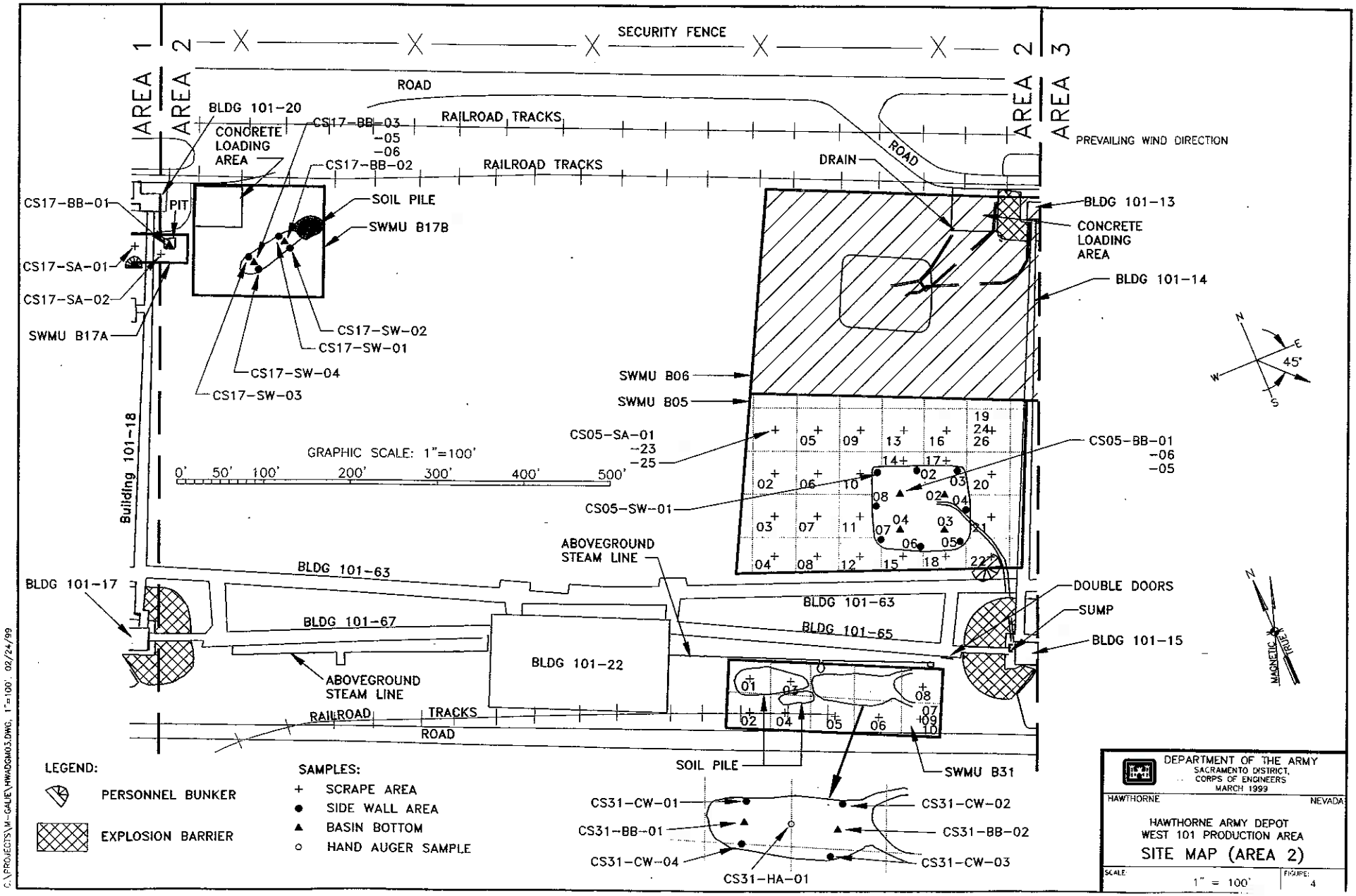
0 35 70
Approximate Scale in Feet

Tetra Tech, Inc.

Investigation Activity Map
SWMU B17a
101-20 South Catchment Pit

Hawthorne Army Depot
Hawthorne, Nevada

Figure 3-1


SECURITY FENCE
AREA 1
AREA 2
AREA 2
AREA 3
ROAD
BLDG 101-20
CONCRETE LOADING AREA
CS17-BB-03
-05
-06
RAILROAD TRACKS
CS17-BB-02
RAILROAD TRACKS
DRAIN
ROAD
PREVAILING WIND DIRECTION
CS17-BB-01
PIT
SOIL PILE
SWMU B17B
CS17-SA-01
CS17-SA-02
SWMU B17A
CS17-SW-02
CS17-SW-01
CS17-SW-04
CS17-SW-03
BLDG 101-13
CONCRETE LOADING AREA
BLDG 101-14
SWMU B06
SWMU B05
CS05-SA-01
-23
-25
CS05-BB-01
-06
-05
CS05-SW-01
GRAPHIC SCALE: 1"=100'
0' 50' 100' 200' 300' 400' 500'
Building 101-18
ABOVEGROUND STEAM LINE
BLDG 101-63
BLDG 101-17
BLDG 101-67
BLDG 101-22
BLDG 101-63
BLDG 101-65
DOUBLE DOORS
SUMP
BLDG 101-15
ABOVEGROUND STEAM LINE
RAILROAD TRACKS
ROAD
SOIL PILE
SWMU B31
CS31-CW-01
CS31-CW-02
CS31-BB-01
CS31-BB-02
CS31-CW-04
CS31-CW-03
CS31-HA-01
N
E
W
S
45°
MAGNETIC
TRUE
LEGEND:
PERSONNEL BUNKER
EXPLOSION BARRIER
SAMPLES:
+ SCRAPE AREA
● SIDE WALL AREA
▲ BASIN BOTTOM
○ HAND AUGER SAMPLE
DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
MARCH 1999
HAWTHORNE
NEVADA
HAWTHORNE ARMY DEPOT
WEST 101 PRODUCTION AREA
SITE MAP (AREA 2)
SCALE: 1" = 100'
FIGURE: 4
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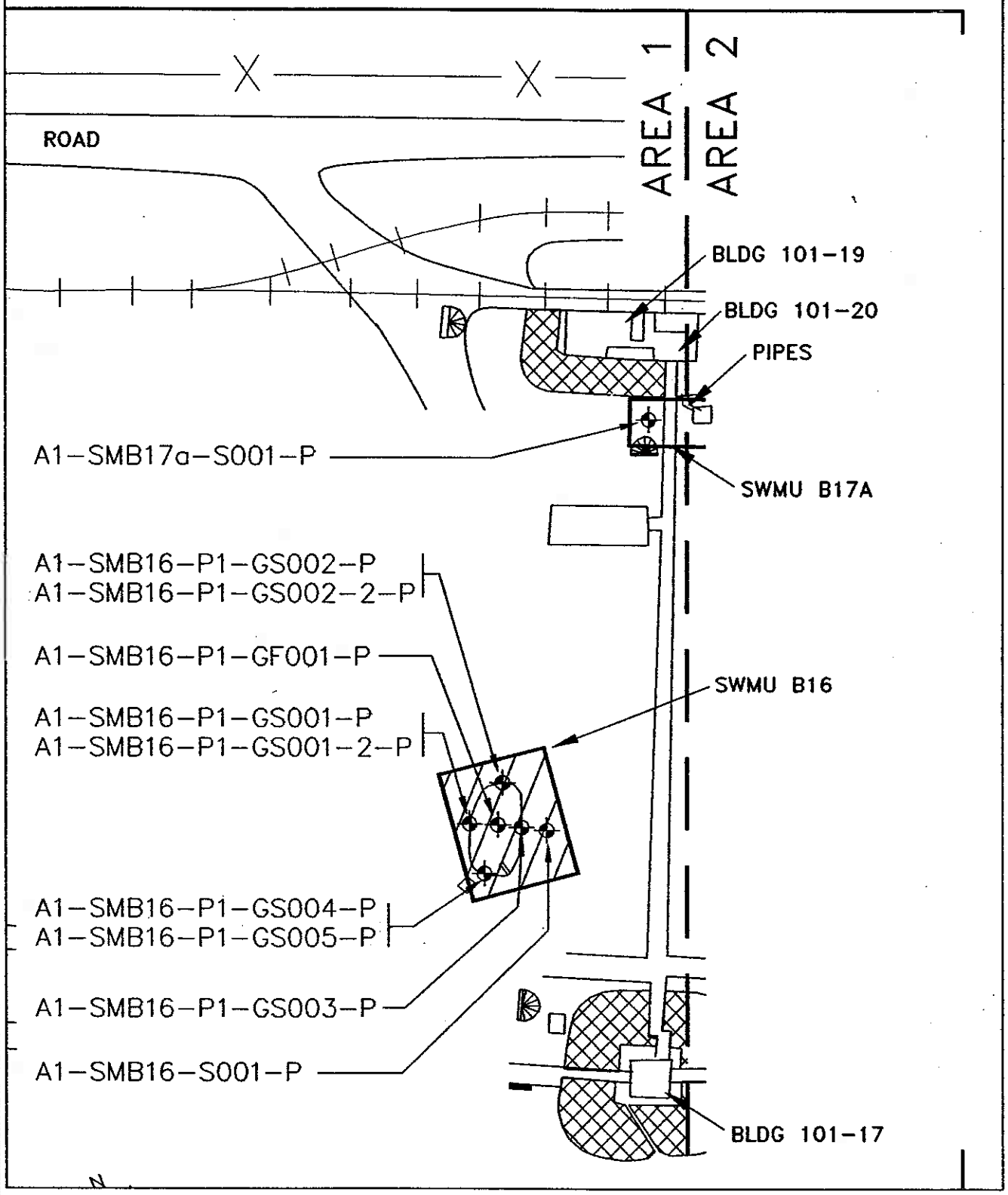

DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT,
CORPS OF ENGINEERS
JANUARY 2000

HAWTHORNE NEVADA

HAWTHORNE ARMY DEPOT
WEST 101 PROJECTION AREA

SITE MAP (AREA 1)-
SOIL SAMPLE LOCATIONS

SCALE: 1" = 100'

FIGURE: 5

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Appendix A

Proposed Closure Goals
Hawthorne Army Depot
Hawthorne, Nevada

Constituent of Concern	Chemical Classification	Carcinogenic (C) or Non-Carcinogenic (NC)	HWAD Proposed Closure Goals for Soil (mg/kg)	HWAD Proposed Closure Goal Source
Nitrate	Anion	NC	128,000	Calculated Subpart S[a]
2-Amino-dinitrotoluene	Explosive	NC	-	NA[b]
4-Amino-dinitrotoluene	Explosive	NC	-	NA
1,3-Dinitrobenzene	Explosive	NC	8	Calculated Subpart S
2,4-Dinitrotoluene	Explosive	NC	160	Calculated Subpart S
2,6-Dinitrotoluene	Explosive	NC	80	Calculated Subpart S
HMX	Explosive	NC	4,000	Calculated Subpart S
Nitrobenzene	Explosive	NC	40	Calculated Subpart S
Nitrotoluene (2-, 3-, 4-)	Explosive	NC	800	Calculated Subpart S
RDX	Explosive	NC	64	Calculated Subpart S
Tetryl	Explosive	NC	800	Calculated Subpart S
1,3,5-Trinitrobenzene	Explosive	NC	4	Calculated Subpart S
2,4,6-Trinitrotoluene	Explosive	C	233	Calculated Subpart S
Aluminum	Metal	NC	80,000	Calculated Subpart S
Arsenic (cancer endpoint)	Metal	C & NC	30	Background[c]
Barium and compounds	Metal	NC	5,600	Calculated Subpart S
Beryllium and compounds	Metal	C	1	Background
Cadmium and compounds	Metal	NC	40	Calculated Subpart S
Chromium III and compounds	Metal	NC	80,000	Calculated Subpart S
Lead	Metal	NC	1000	PRG[d]
Mercury and compounds (inorganic)	Metal	NC	24	Calculated Subpart S
Selenium	Metal	NC	400	Calculated Subpart S
Silver and compounds	Metal	NC	400	Calculated Subpart S
Acenaphthene	PAH	NC	4,800	Calculated Subpart S
Benzo[a]anthracene	PAH	C	0.96	Calculated Subpart S
Benzo[a]pyrene	PAH	C	0.10	Detection Limit[e]
Benzo[b]fluoranthene	PAH	C	0.96	Calculated Subpart S
Benzo[k]fluoranthene	PAH	C	10	Calculated Subpart S
Chrysene	PAH	C	96	Calculated Subpart S
Dibenz[ah]anthracene	PAH	C	0.96	Calculated Subpart S
Fluoranthene	PAH	NC	3,200	Calculated Subpart S
Fluorene	PAH	NC	3,200	Calculated Subpart S
Indeno[1,2,3-cd]pyrene	PAH	C	-	NA
Naphthalene	PAH	NC	3,200	Calculated Subpart S
Pyrene	PAH	NC	2,400	Calculated Subpart S
Total Petroleum Hydrocarbons as Diesel (TPH-d)	PAH	C	100	NDEP Level Clean-up[f]
Polychlorinated biphenyls (PCBs)	PCBs	C	25	TSCA[g]
Bis(2-ethylhexyl)phthalate (DEHP)	SVOC	C	1,600	Calculated Subpart S
Bromoform (tribromomethane)	SVOC	C	89	Calculated Subpart S

Proposed Closure Goals
Hawthorne Army Depot
Hawthorne, Nevada

Constituent of Concern	Chemical Classification	Carcinogenic (C) or Non-carcinogenic (NC)	HWAD Proposed Closure Goals for Soil (mg/kg)	HWAD Proposed Closure Goal Source
Butyl benzyl phthalate	SVOC	NC	16,000	Calculated Subpart S
Dibromochloromethane	SVOC	C	83	Calculated Subpart S
Dibutyl-phthalate	SVOC	NC	8,000	Calculated Subpart S
Diethyl phthalate	SVOC	NC	64,000	Calculated Subpart S
Phenanthrene	SVOC		-	NA
Phenol	SVOC	NC	48,000	Calculated Subpart S
Acetone	VOC	NC	800	Calculated Subpart S
Anthracene	VOC	NC	24,000	Calculated Subpart S
Benzene	VOC	C	24	Calculated Subpart S
Bis(2-chloroisopropyl)ether	VOC	C	3,200	Calculated Subpart S
Bromomethane	VOC	NC	112	Calculated Subpart S
Carbon tetrachloride	VOC	C	5	Calculated Subpart S
Chlorobenzene	VOC	NC	1,600	Calculated Subpart S
Chloroform	VOC	C	115	Calculated Subpart S
Chloromethane	VOC	C	538	Calculated Subpart S
Dibromomethane	VOC	C	0.008	Calculated Subpart S
1,2-Dichlorobenzene	VOC	NC	7,200	Calculated Subpart S
1,4-Dichlorobenzene	VOC	C	18,300	Calculated Subpart S
Dichlorodifluoromethane	VOC	C	16,000	Calculated Subpart S
Ethylbenzene	VOC	NC	8,000	Calculated Subpart S
Methylene bromide	VOC	NC	800	Calculated Subpart S
Methylene chloride	VOC	C	4,800	Calculated Subpart S
2-Methylnaphthalene	VOC		-	NA
1,1,2,2-Tetrachloroethane	VOC	C	35	Calculated Subpart S
Tetrachloroethylene (PCE)	VOC	C & NC	800	Calculated Subpart S
Toluene	VOC	NC	16,000	Calculated Subpart S
1,1,1-Trichloroethane	VOC	NC	7,200	Calculated Subpart S
Trichloroethylene (TCE)	VOC	C & NC	480	Calculated Subpart S
Trichlorofluoromethane	VOC	NC	24,000	Calculated Subpart S
1,2,3-Trichloropropane	VOC	C	480	Calculated Subpart S
Vinyl chloride	VOC	C	0.37	Calculated Subpart S
Xylene Total (m-, o-, p-)	VOC	NC	160,000	Calculated Subpart S
2,3,7,8-TCDD	Dioxin	C	0.000005	Calculated Subpart S

[a] RCRA 55 FR 30870

[b] Not available

[c] Highest background concentration detected in 50 background soil samples

[d] Smucker, Stanford J. USEPA Rgion IX, Preliminary Remedial Goals, Second Half, Sep. 1995

[e] Method detection limit for Volatile Organic Compounds by EPA Method 8260 or

Semi-Volatile Organic Compounds analyzed by EPA Method 8270

[f] Nevada Division of Environmental Protection

[g] Cleanup level for PCB spills in accordance with Toxic Substance and Control Act Spill Policy Guidelines 40 CFR 761

Clean-up Goals by Screening* and Definitive Analysis

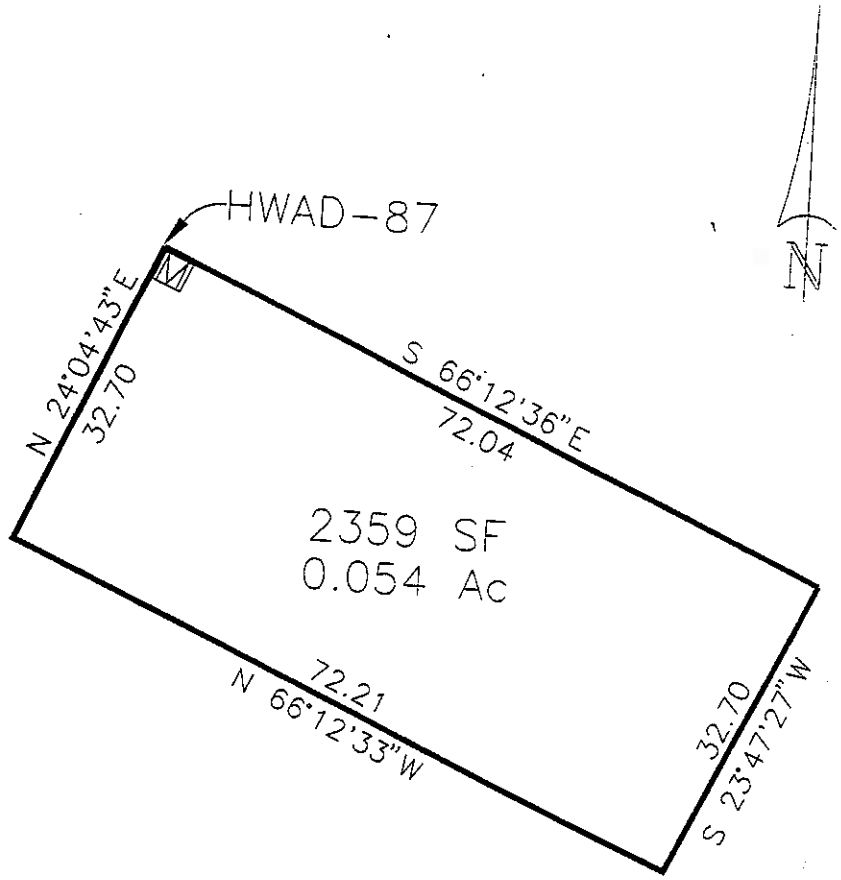
Contaminant	Concentration (mg/kg)
2,4,6,-trinitrotoluene (TNT)	40*
2,4-dinitrotoluene (2,4-DNT)	2.6
2,6-dinitrotoluene (2,6-DNT)	2.6
1,3,5-trinitrobenzene (1,3,5-TNB)	4
1,3,-drinitrobenzne (1,3-DNB)	8
2-amino-4,6dinitrotoluene (2-Am-DNT)	NE
4-amino-2,6-dinitrotoluene (4-Am-DNT)	NE
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	100
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	64
Picric acid	7
Pentachlorophenol	None

NE - not established

Proposed Excavation Goal (PEG's) by Definitive and Screening * Analysis-
Maximum Concentration of Contaminants
In Soil to Be Left in Place at Depth Below the Surface

Contaminant	Concentration (mg/kg)
2,4,6,-trinitrotoluene (TNT)	800*
2,4-dinitrotoluene (2,4-DNT)	80
2,6-dinitrotoluene (2,6-DNT)	80
1,3,5-trinitrobenzene (1,3,5-TNB)	150
1,3,-drinitrobenzne (1,3-DNB)	NE
2-amino-4,6dinitrotoluene (2-Am-DNT)	NE
4-amino-2,6-dinitrotoluene (4-Am-DNT)	NE
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	4000
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	300
Picric acid	7.0
Pentachlorophenol	NE
Nitroaromatics/Nitroamines	<30

Appendix B



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NE COR	N	14513908.408	E	2622364.892	ELEV	4190.338
SE COR	N	14513860.004	E	2622343.705	ELEV	4190.937
SW COR	N	14513889.133	E	2622277.632	ELEV	4189.963

PROFESSIONAL LAND SURVEYOR STATE OF NEVADA
RICHARD A. STINCHFIELD
7/21/97
No. 3631

15 7 0 15 30 45
SCALE IN FEET

ology and environment, inc.
International Specialists in the Environment

SWMU B-17a

COMSTOCK LAND SURVEYING
777 LA RUE AVENUE, SUITE A
RENO, NEVADA

SWMU B17a Survey Data
Hawthorne Army Depot
Hawthorne, Nevada

SWMU	Point ID	Northing (feet)	Easting (feet)	Elevation
B17a	CPS01	1390530.96	497943.55	NE
B17a	HA01	1390539.96	497929.75	NE
B17a	SS01	1390541.95	497922.35	NE
B17a	Pin 3	1390541.09	497871.82	4189.963
B17a	Pin 2	1390511.22	497942.9	4190.937
B17a	Pin 1	1390548.56	497959.56	4190.338
B17a	HWAAP-87-1996	1390579.15	497888.71	4189.981

Notes:

NE = Not established

Coordinate data based on electronic map file using the NAD 1927 datum.

Elevation data based on surveyors map using NGVD 1929 datum.

Appendix C

Nitrogen
Method 353.2 (ASC)

Sample ID	Location ID	Sample Date	Depth (feet)	Lab	Nitrogen Nitrate	Ammonia as Nitroge
					mg/kg	mg/kg
B17A-HA1-1-005	HA01	5/12/94	5	ASC	4	NA
B17A-SS1-1-000	SS01	5/12/94	0	ASC	38	NA
B17A-CPS1-1-017	CPS01	5/31/94	17	ASC	1.6	NA
B17A-CPS1-1-022	CPS01	5/31/94	22	ASC	2.9	NA
B17A-CPS1-1-023.5	CPS01	5/31/94	23.5	ASC	<1	NA
B17A-CPS2-1-017	CPS01	5/31/94	17	ASC	<1	NA
Analyses					6	0
Detections					4	0
Minimum Concentration					1.6	0
Maximum Concentration					38	0
HWAD - PCG					128000	NE
HWAD - PCG Hits					0	NE

Notes:
NA = Not analyzed
NE = Not established
Zero values is listed for maximum and minimum concentrations indicate a nondetect value for that analyte.

Metals
Method 6010A (ASC)

Sample ID	Location ID	Sample Date	Depth (feet)	Lab	Barium	Beryllium	Cadmium	Chromium Total	Silver	Arsenic	Lead	Selenium
					mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
B17A-HA1-1-005	HA01	5/12/94	5	ASC	85	<0.52	<0.52	4.2	<1	NA	NA	NA
B17A-SS1-1-000	SS01	5/12/94	0	ASC	70	<0.52	<0.52	2.4	<1	4.5	130	<0.52
B17A-CPS1-1-017	CPS01	5/31/94	17	ASC	110	<0.51	1.9	2.8	<1	1.6	1.8	<0.51
B17A-CPS1-1-022	CPS01	5/31/94	22	ASC	77	<0.53	3.9	10	<1.1	7.2	20	<0.53
B17A-CPS1-1-023.5	CPS01	5/31/94	23.5	ASC	110	<0.53	3.3	180	<1	4.3	6.6	<0.53
B17A-CPS2-1-017	CPS01	5/31/94	17	ASC	71	<0.51	3.3	73	<1	2.5	2	<0.51
Analyses					6	6	6	6	6	5	5	5
Detections					6	0	4	6	0	5	5	0
Minimum Concentration					70	0	1.9	2.4	0	1.6	1.8	0
Maximum Concentration					110	0	3.9	180	0	7.2	130	0
HWAD - PCG					2000	1	20	20	100	100	100	20
HWAD - PCG Hits					0	0	0	2	0	0	1	0

Note:
NA = Not analyzed
Zero values listed for maximum and minimum concentrations indicate a nondetect value for that analyte.

Arsenic
Method 7060 (ASC)

Sample ID	Location ID	Sample Date	Depth (feet)	Lab	Arsenic
					mg/kg
B17A-HA1-1-005	HA01	5/12/94	5	ASC	1.2
B17A-SS1-1-000	SS01	5/12/94	0	ASC	4.5
B17A-CPS1-1-017	CPS01	5/31/94	17	ASC	1.6
B17A-CPS1-1-022	CPS01	5/31/94	22	ASC	7.2
B17A-CPS1-1-023.5	CPS01	5/31/94	23.5	ASC	4.3
B17A-CPS2-1-017	CPS01	5/31/94	17	ASC	2.5

Analyses	6
Detections	6
Minimum Concentration	1.2
Maximum Concentration	7.2
HWAD - PCG	100
HWAD - PCG Hits	0

Lead
Method 7421(ASC)

Sample ID	Location ID	Sample Date	Depth (feet)	Lab	Lead
					mg/kg
B17A-HA1-1-005	HA01	5/12/94	5	ASC	2.8
B17A-CPS1-1-017	CPS01	5/31/94	17	ASC	1.8
B17A-CPS1-1-022	CPS01	5/31/94	22	ASC	20
B17A-CPS1-1-023.5	CPS01	5/31/94	23.5	ASC	6.6
B17A-CPS2-1-017	CPS01	5/31/94	17	ASC	2

Analyses	5
Detections	5
Minimum Concentration	1.8
Maximum Concentration	20
HWAD - PCG	100
HWAD - PCG Hits	0

Mercury
Method 7471 (ASC)

Sample ID	Location ID	Sample Date	Depth (feet)	Lab	Mercury
					mg/kg
B17A-HA1-1-005	HA01	5/12/94	5	ASC	<0.1
B17A-SS1-1-000	SS01	5/12/94	0	ASC	<0.1
B17A-CPS1-1-017	CPS01	5/31/94	17	ASC	<0.1
B17A-CPS1-1-022	CPS01	5/31/94	22	ASC	<0.11
B17A-CPS1-1-023.5	CPS01	5/31/94	23.5	ASC	<0.1
B17A-CPS2-1-017	CPS01	5/31/94	17	ASC	<0.1

Analyses	6
Detections	0
Minimum Concentration	0
Maximum Concentration	0
HWAD - PCG	24
HWAD - PCG Hits	0

Note:
Zero values listed for maximum and minimum concentrations indicate a nondetect value for that analyte.

Selenium
Method 7740 (ASC)

Sample ID	Location ID	Sample Date	Depth (feet)	Lab	Selenium
					mg/kg
B17A-HA1-1-005	HA01	5/12/94	5	ASC	<0.52
B17A-SS1-1-000	SS01	5/12/94	0	ASC	<0.52
B17A-CPS1-1-017	CPS01	5/31/94	17	ASC	<0.51
B17A-CPS1-1-022	CPS01	5/31/94	22	ASC	<0.53
B17A-CPS1-1-023.5	CPS01	5/31/94	23.5	ASC	<0.53
B17A-CPS2-1-017	CPS01	5/31/94	17	ASC	<0.51

Analyses	6
Detections	0
Minimum Concentration	0
Maximum Concentration	0
HWAD - PCG	20
HWAD - PCG Hits	0

Note:
Zero values for maximum and minimum concentrations indicate a nondetect value for that analyte.

Explosives
Method 8330 (ASC)

Sample ID	Location ID	Sample Date	Depth (feet)	Lab	2,4,6-TNT	2,4-Dinitrotoluene	2,6-Dinitrotoluene	2-Amino-4,6-DNT	2-Nitrotoluene	3-Nitrotoluene	4-Amino-2,6-DNT	4-Nitrotoluene	HMX
					mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
B17A-HA1-1-005	HA01	5/12/94	5	ASC	<1	<1	<1	<1	<1	<1	<1	<1	<1
B17A-SS1-1-000	SS01	5/12/94	0	ASC	8.2	0.31 J	<1	1.3	<1	<1	<1	<1	<1
B17A-CPS1-1-017	CPS01	5/31/94	17	ASC	<1	<1	<1	<1	<1	<1	<1	<1	<1
B17A-CPS1-1-022	CPS01	5/31/94	22	ASC	<1	<1	<1	<1	<1	<1	<1	<1	1.6
B17A-CPS1-1-023.5	CPS01	5/31/94	23.5	ASC	<1	<1	<1	<1	<1	<1	<1	<1	<1
B17A-CPS2-1-017	CPS01	5/31/94	17	ASC	<1	<1	<1	<1	<1	<1	<1	<1	<1
Analyses					6	6	6	6	6	6	6	6	6
Detections					1	1	0	1	0	0	0	0	1
Minimum Concentration					8.2	0.31	0	1.3	0	0	0	0	1.6
Maximum Concentration					8.2	0.31	0	1.3	0	0	0	0	1.6
HWAD - PCG					233	2.6	80	NE	800	800	NE	800	4000
HWAD - PCG Hits					0	0	0	NE	0	0	NE	0	0

Notes:
NE = Not established
Zero values listed for maximum and minimum concentrations indicated a nondetect value for that analyte.

Explosives
Method 8330 (ASC)

Sample ID	Location ID	Sample Date	Depth (feet)	Lab	m-Dinitrobenzene	Nitrobenzene	RDX	sym-Trinitrobenzene	Tetryl
					mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
B17A-HA1-1-005	HA01	5/12/94	5	ASC	<1	<1	<1	<1	<1
B17A-SS1-1-000	SS01	5/12/94	0	ASC	<1	<1	7.9	31	<1
B17A-CPS1-1-017	CPS01	5/31/94	17	ASC	<1	<1	<1	<1	<1
B17A-CPS1-1-022	CPS01	5/31/94	22	ASC	<1	<1	0.96 J	<1	<1
B17A-CPS1-1-023.5	CPS01	5/31/94	23.5	ASC	<1	<1	<1	<1	<1
B17A-CPS2-1-017	CPS01	5/31/94	17	ASC	<1	<1	<1	<1	<1
Analyses					6	6	6	6	6
Detections					0	0	2	1	0
Minimum Concentration					0	0	0.96	31	0
Maximum Concentration					0	0	7.9	31	0
HWAD - PCG					8	40	64	4	800
HWAD - PCG Hits					0	0	0	1	0

Notes:
NE = Not established
Zero values listed for maximum and minimum concentrations indicated a nondet value for that analyte.

Picric Acid
Method 8330M (ASC)

Sample ID	Location ID	Sample Date	Depth (feet)	Lab	Picric Acid
					mg/kg
B17A-HA1-1-005	HA01	5/12/94	5	ASC	<0.25
B17A-SS1-1-000	SS01	5/12/94	0	ASC	0.94
B17A-CPS1-1-017	CPS01	5/31/94	17	ASC	<0.25
B17A-CPS1-1-022	CPS01	5/31/94	22	ASC	<0.25
B17A-CPS1-1-023.5	CPS01	5/31/94	23.5	ASC	<0.25
B17A-CPS2-1-017	CPS01	5/31/94	17	ASC	<0.25

Analyses	6
Detections	1
Minimum Concentration	0.94
Maximum Concentration	0.94
HWAD - PCG	NE
HWAD - PCG Hits	NE

Note:
NE = Not established

Appendix D

Applied P & Ch Laboratory
13760 Magnolia Ave. Chino CA 91710
Tel: (909) 590-1828 Fax: (909) 590-1498

APCL Analytical Report

Submitted to:
Tetra Tech, Inc. (San Francisco)
Attention: Roy Roenbeck
180 Howard St. Ste. 250
San Francisco CA 94105
Tel: (415)974-1221 Fax: (415)974-5914

Service ID #: 801-995332
Collected by: D. Gonzales
Collected on: 08/11-12/99

Received: 08/14/99
Extracted: 08/17-23/99
Tested: 08/16-25/99
Reported: 08/26/99

Sample Description: Compost, Soil and Water
Project Description: W 101 Bioremediation

Analysis of Water and Soil Samples

I. Analysis of Water Samples

Component Analyzed	Method	Unit	PQL	Analysis Result ER-081199-0805-1 99-05332-20
NITROAROMATICS AND NITROAMINES				
Dilution Factor				2.2
4-AMINO-2,6-DINITROTOLUENE	8330	µg/L	10	<22
2-AMINO-4,6-DINITROTOLUENE	8330	µg/L	10	<22
1,3-DINITROBENZENE	8330	µg/L	4	<8.8
2,4-DINITROTOLUENE	8330	µg/L	5.7	<13
2,6-DINITROTOLUENE	8330	µg/L	9.4	<21
HMX	8330	µg/L	13	<29
NITROBENZENE	8330	µg/L	6.4	<14
3-NITROTOLUENE	8330	µg/L	7.9	<17
RDX	8330	µg/L	14	<31
TETRYL	8330	µg/L	4	<8.8
1,3,5-TRINITROBENZENE	8330	µg/L	7.3	<16
2,4,6-TRINITROTOLUENE	8330	µg/L	6.9	<15
2-NITROTOLUENE [a]	8330	µg/L	8.5	<19
4-NITROTOLUENE [a]	8330	µg/L	8.5	<19

II. Analysis of Soil Samples

Component Analyzed	Method	Unit	PQL	Analysis Result A2-SM17B-5003-2-P 99-05332-1	A3-WR002C-C001-CC002-P 99-05332-2
MOISTURE	ASTM-D2216	%Moisture	0.5	1.7	16.9
NITROAROMATICS AND NITROAMINES					
Dilution Factor				1	1
4-AMINO-2,6-DINITROTOLUENE	8330	mg/kg	0.2	<0.20	<0.24
2-AMINO-4,6-DINITROTOLUENE	8330	mg/kg	0.2	<0.20	<0.24
1,3-DINITROBENZENE	8330	mg/kg	0.25	<0.25	<0.30
2,4-DINITROTOLUENE	8330	mg/kg	0.25	<0.25	<0.30
2,6-DINITROTOLUENE	8330	mg/kg	0.25	<0.25	<0.30
HMX	8330	mg/kg	0.25	3.0	0.41
NITROBENZENE	8330	mg/kg	0.25	<0.25	<0.30
3-NITROTOLUENE	8330	mg/kg	0.25	<0.25	<0.30
RDX	8330	mg/kg	0.25	22.0	0.2J
TETRYL	8330	mg/kg	0.25	<0.25	<0.30
1,3,5-TRINITROBENZENE	8330	mg/kg	0.25	13.4	<0.30
2,4,6-TRINITROTOLUENE	8330	mg/kg	0.25	5.50	<0.30
2-NITROTOLUENE [a]	8330	mg/kg	0.25	<0.25	<0.30
4-NITROTOLUENE [a]	8330	mg/kg	0.25	<0.25	<0.30

Applied P & Ch Laboratory
13760 Magnolia Ave. Chino CA 91710
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APCL Analytical Report

Component Analyzed	Method	Unit	PQL	Analysis Result A3-WR002C-C002-CC002-P 99-05332-3	Analysis Result A3-WR002C-C003-CC002-P 99-05332-4
MOISTURE	ASTM-D2216	%Moisture	0.5	19.0	25.7
NITROAROMATICS AND NITROAMINES					
Dilution Factor				1	1
4-AMINO-2,6-DINITROTOLUENE	8330	mg/kg	0.2	0.5	<0.27
2-AMINO-4,6-DINITROTOLUENE	8330	mg/kg	0.2	<0.25	<0.27
1,3-DINITROBENZENE	8330	mg/kg	0.25	<0.31	<0.34
2,4-DINITROTOLUENE	8330	mg/kg	0.25	<0.31	<0.34
2,6-DINITROTOLUENE	8330	mg/kg	0.25	<0.31	<0.34
HMX	8330	mg/kg	0.25	0.49	<0.34
NITROBENZENE	8330	mg/kg	0.25	<0.31	<0.34
3-NITROTOLUENE	8330	mg/kg	0.25	<0.31	<0.34
RDX	8330	mg/kg	0.25	5.1	0.61
TETRYL	8330	mg/kg	0.25	<0.31	<0.34
1,3,5-TRINITROBENZENE	8330	mg/kg	0.25	0.1J	<0.34
2,4,6-TRINITROTOLUENE	8330	mg/kg	0.25	<0.31	0.2J
2-NITROTOLUENE [a]	8330	mg/kg	0.25	<0.31	<0.34
4-NITROTOLUENE [a]	8330	mg/kg	0.25	<0.31	<0.34

Component Analyzed	Method	Unit	PQL	Analysis Result A3-WR002C-C004-CC002-P 99-05332-5	Analysis Result A3-WR002C-C005-CC002-P 99-05332-6
MOISTURE	ASTM-D2216	%Moisture	0.5	17.2	19.6
NITROAROMATICS AND NITROAMINES					
Dilution Factor				1	1
4-AMINO-2,6-DINITROTOLUENE	8330	mg/kg	0.2	<0.24	<0.25
2-AMINO-4,6-DINITROTOLUENE	8330	mg/kg	0.2	<0.24	<0.25
1,3-DINITROBENZENE	8330	mg/kg	0.25	<0.30	<0.31
2,4-DINITROTOLUENE	8330	mg/kg	0.25	<0.30	<0.31
2,6-DINITROTOLUENE	8330	mg/kg	0.25	<0.30	<0.31
HMX	8330	mg/kg	0.25	<0.30	<0.31
NITROBENZENE	8330	mg/kg	0.25	<0.30	<0.31
3-NITROTOLUENE	8330	mg/kg	0.25	<0.30	<0.31
RDX	8330	mg/kg	0.25	<0.30	3.8
TETRYL	8330	mg/kg	0.25	<0.30	<0.31
1,3,5-TRINITROBENZENE	8330	mg/kg	0.25	<0.30	<0.31
2,4,6-TRINITROTOLUENE	8330	mg/kg	0.25	0.2J	0.1J
2-NITROTOLUENE [a]	8330	mg/kg	0.25	<0.30	<0.31
4-NITROTOLUENE [a]	8330	mg/kg	0.25	<0.30	<0.31

Component Analyzed	Method	Unit	PQL	Analysis Result A3-WR003C-C001-CC002-P 99-05332-7	Analysis Result A3-WR003C-C002-CC002-P 99-05332-8
MOISTURE	ASTM-D2216	%Moisture	0.5	16.4	14.5

Applied P & Ch Laboratory
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APCL Analytical Report

Submitted to:
Tetra Tech, Inc. (San Francisco)
Attention: Roy Roenbeck
180 Howard St. Ste. 250
San Francisco CA 94105
Tel: (415)974-1221 Fax: (415)974-5914

Service ID #: 801-994434
Collected by: D. Gonzales
Collected on: 06/22-24/99

Received: 06/25/99
Extracted: 06/29/99
Tested: 06/28-07/02/99
Reported: 07/07/99

Sample Description: Soil and Water
Project Description: W 101 Bioremediation

Analysis of Water and Soil Samples

I . Analysis of Water Samples

Component Analyzed	Method	Unit	PQL	Analysis Result BR-062299-0849-1 99-04434-22
NITROAROMATICS AND NITROAMINES				
Dilution Factor				3.85
4-AMINO 2,6-DINITROTOLUENE	8330	µg/L	10	<38
2-AMINO-4,6 DINITROTOLUENE	8330	µg/L	10	<38
1,3-DINITROBENZENE	8330	µg/L	4	<15
2,4-DINITROTOLUENE	8330	µg/L	5.7	<22
2,6-DINITROTOLUENE	8330	µg/L	9.4	<36
HMX	8330	µg/L	13	<49
NITROBENZENE	8330	µg/L	6.4	<24
3-NITROTOLUENE	8330	µg/L	7.9	<30
RDX	8330	µg/L	14	<53
TETRYL	8330	µg/L	4	<15
1,3,5-TRINITROBENZENE	8330	µg/L	7.3	<28
2,4,6-TRINITROTOLUENE	8330	µg/L	6.9	<26
2-NITROTOLUENE [a]	8330	µg/L	8.5	<32
4-NITROTOLUENE [a]	8330	µg/L	8.5	<32

II . Analysis of Soil Samples

Component Analyzed	Method	Unit	PQL	Analysis Result A1-SMB17-S001-P 99-04434-1	A3-WR001BC001-CC002P 99-04434-2
MOISTURE, PERCENT IN SOIL	ASTM-D2216	%Moisture	0.5	1.6	35.4
NITROAROMATICS AND NITROAMINES					
Dilution Factor				10	1
4-AMINO-2,6-DINITROTOLUENE	8330	mg/kg	0.2	<2.0	<0.31
2-AMINO-4,6-DINITROTOLUENE	8330	mg/kg	0.2	<2.0	<0.31
1,3-DINITROBENZENE	8330	mg/kg	0.25	<2.5	<0.39
2,4-DINITROTOLUENE	8330	mg/kg	0.25	<2.5	<0.39
2,6-DINITROTOLUENE	8330	mg/kg	0.25	<2.5	<0.39
HMX	8330	mg/kg	0.25	1J	<0.39
NITROBENZENE	8330	mg/kg	0.25	<2.5	<0.39
3-NITROTOLUENE	8330	mg/kg	0.25	<2.5	<0.39
RDX	8330	mg/kg	0.25	6.4	0.85
TETRYL	8330	mg/kg	0.25	<2.5	<0.39
1,3,5-TRINITROBENZENE	8330	mg/kg	0.25	14	<0.39
2,4,6-TRINITROTOLUENE	8330	mg/kg	0.25	65	<0.39
2-NITROTOLUENE [a]	8330	mg/kg	0.25	<2.5	<0.39
4-NITROTOLUENE [a]	8330	mg/kg	0.25	<2.5	<0.39

Appendix E

B17a, Facing south towards impoundment. The inside of the impoundment.#R2-N24, 9/28/94

B17a, Soil staining on road next to pit B17a.

September 1994

SWMU 17a September 1999