Decision Document

Solid Waste Management Units B-31
Building 101-65 Catchment Pit
Hawthorne Army Depot
Hawthorne, Nevada

March 2000

Hawthorne Army
Depot

Decision Document SWMU B-31

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ENVIRONMENTAL PROTECTION

March 2000

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

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SWMU B-31
Building 101-65 Catchment Pit
HAWTHORNE ARMY DEPOT
HAWTHORNE, NEVADA

1.0 Introduction:

This decision document describes the rationale for the proposed closure of SWMU B-31, building 101-65 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 B31 is in the HWAD's central magazine area, on the north central side of the 101 Production Area (Figure 1-1). SWMU B31 is an inactive unlined catchment pit located 30 feet south of Building 101-65 (Figure 1-2). The catchment pit measures 90 feet long by 35 feet wide and is up to five feet deep. The catchment pit has been heavily 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 B31. A brass survey pin on the monument designates the monument number HWAAP-104-1996 and the SWMU number B31. Three corner pins were set and

surveyed to define a 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. Survey data is presented in Appendix B.

3.0 Site Conditions

Soils encountered during E&E's investigation of SWMU B31 included coarse-grained sands on the surface that graded to silty fine sands at a depth of 5 feet below ground surface (bgs). A pink coloration was noted in the soils at a depth of 10 inches below the bottom of the pit at hand auger location HA02. This observation was the only visual indication of stained soils noted during the remedial investigation at this SWMU. During E&E's 1994 investigation and Tt's 1997 first and second quarter ground water monitoring (Tt 1997a, 1997b), the depth to ground water was measured at approximately 100 feet bgs at well DZB101-15MW7. This well is approximately 160 feet crossgradient to the northeast of SWMU B31. Based on the past uses of the pit and on observations made during the previous site inspections, the target analytes were considered to be explosives and metals.

4.0 INVESTIGATIONS

Site inspections of SWMU B31 were conducted by the USAEHA (1988), Jacobs Engineering (1988), and RAI (1992). During these inspections, TNT-stained soil was noted in the catchment pit. No investigation activities were conducted during these inspections, and no samples were collected from the SWMU at that time. In 1994, sampling activities proposed by E&E for the remedial investigation at SWMU B31 included collecting and analyzing surface, near-surface, and subsurface soil samples. Three surface soil samples including one duplicate sample and two near-surface soil samples were collected at the two hand auger locations HA01 and HA02 inside the pit as shown on Figure 3-1. The subsurface investigation at SWMU B31 consisted of two CPT soundings with adjacent sample borings at the locations, CPS01 and CPS02, shown on Figure 3-1. The total depth of the soundings at CPS01 and CPS02 were 42 and 52 feet bgs, and ground water was not encountered in either of these borings. Two CPT subsurface soil samples were collected at CPT location CPS01 from fine-grained horizons at 8.5 and 17 feet bgs. One CPT soil sample was collected at CPT location CPS02 from a fine-grained horizon at 9 feet bgs.

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. The Corps of Engineers took samples of the stained soil in January 1999 from several sites in the 101 area including SWMU B-31. When the samples taken from B-31 did not indicate any explosives contamination, it was determined to sample the SWMU for closure. In March of 1999 The Corps of Engineers took soil samples from SWMU B-31 as a confirmation sampling event. The sample locations from the March 1999 sampling event are shown on figure 4.

5.0 Investigation Results

The five surface and near-surface soil samples collected at SWMU B31 contained arsenic (1.2 mg/kg to 7.9 mg/kg), barium (51 mg/kg to 100 mg/kg), total chromium (2.2 mg/kg to 5.3 mg/kg), and lead (4.2 mg/kg to 12 mg/kg) in all of the samples. No other metals were detected in these samples. Arsenic (2.5 mg/kg to 6.1 mg/kg), barium (83 mg/kg to 130 mg/kg), cadmium (2.3 mg/kg to 3.1 mg/kg), chromium (5 mg/kg to 10 mg/kg), and lead (1.8 mg/kg to 7.3 mg/kg) were detected in all of the CPT subsurface soil samples collected at SWMU B31. No other metals were detected in the subsurface soil sample at this SWMU.

During the explosives field screening, sample B31-HA1-2-000 reported RDX at concentrations between 5,000 to 15,000 ppm and sample B31-HA1-2-005 reported RDX between 45,000 to 60,000 ppm. Field screening also detected TNT at a concentration between 15,000 to 30,000 ppm in sample B31-HA1-2-005. These field-screening results show an inconsistent agreement with the results generated by the laboratory analyses. For example, the field screening results for sample B31-HA1-2-000 reported a RDX concentration of 5,000 to 15,000 ppm, while laboratory results for this same sample reported RDX at a level of less than 1 mg/kg (1 ppm). Similarly for sample B31-HA1-2-005, both the field screening results for RDX (45,000 to 60,000 ppm) and for TNT (15,000 to 30,000 ppm) were reported at concentrations significantly greater than corresponding laboratory results of less than 1 mg/kg (1 ppm) provided for RDX and TNT in this same sample. RDX was detected in the two CPT subsurface soil samples collected at location CPS01 from depths of 8.5 feet and 17 feet bgs. These concentrations were reported at 5.7 mg/kg and 0.71 mg/kg, respectively. TNT also was detected at 0.47 mg/kg in the CPT sample collected from this boring at a depth of 17 feet bgs. No other explosives were detected in the subsurface soil samples collected at SWMU B31.

The USACE sampling event of March 1999 collected 17 samples from the SWMU area (fig 4). Results of the samples analysis are presented in appendix D. Table 1-1 provides a summary of the sampling results. The samples were anayized for TNT and RDX; all test results were below PCG's. The largest detection of explosives was a concentration of TNT at 8.4 mg/kg. The laboratory analysis of these samples is presented in appendix D.

Table 1-1

SWMU B-31						
Sample Number	TNT (ppm)	RDX (ppm)		Sample Number	TNT (ppm)	RDX (ppm)
CS31-BB-01	<0.26	<0.26		CS31-SA-01	<0.26	<0.26
CS31-BB-02	0.65	<0.26		CS31-SA-02	<0.26	<0.26
CS31-SW-01	<0.26	<0.26		CS31-SA-03	<0.26	<0.26
CS31-SW-02	0.8	<0.26		CS31-SA-04	<0.26	<0.26
CS31-SW-03	8.48	0.58		CS31-SA-05	<0.26	<0.26
CS31-SW-04	<0.26	<0.26		CS31-SA-06	<0.26	<0.26
HA31-BB-01	<0.26	<0.26		CS31-SA-07	<0.26	<0.26
HA31-BB-02	<0.26	<0.26		CS31-SA-08	<0.26	<0.26
HA31-BB-03	<0.26	<0.26				

6.0 Remediation

No remediation action was required for this site.

7.0 Remediation Results

Not applicable

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

There is no evidence of any of the chemicals of concern, in excess of PCG's, at SWMU B-31. SWMU B-31 was backfilled with compost material. It should be closed with the restrictions that no structurial construction be made within the SWMU boundary, and these restrictions documented on the depot site master plan.

10.0 REFERENCES

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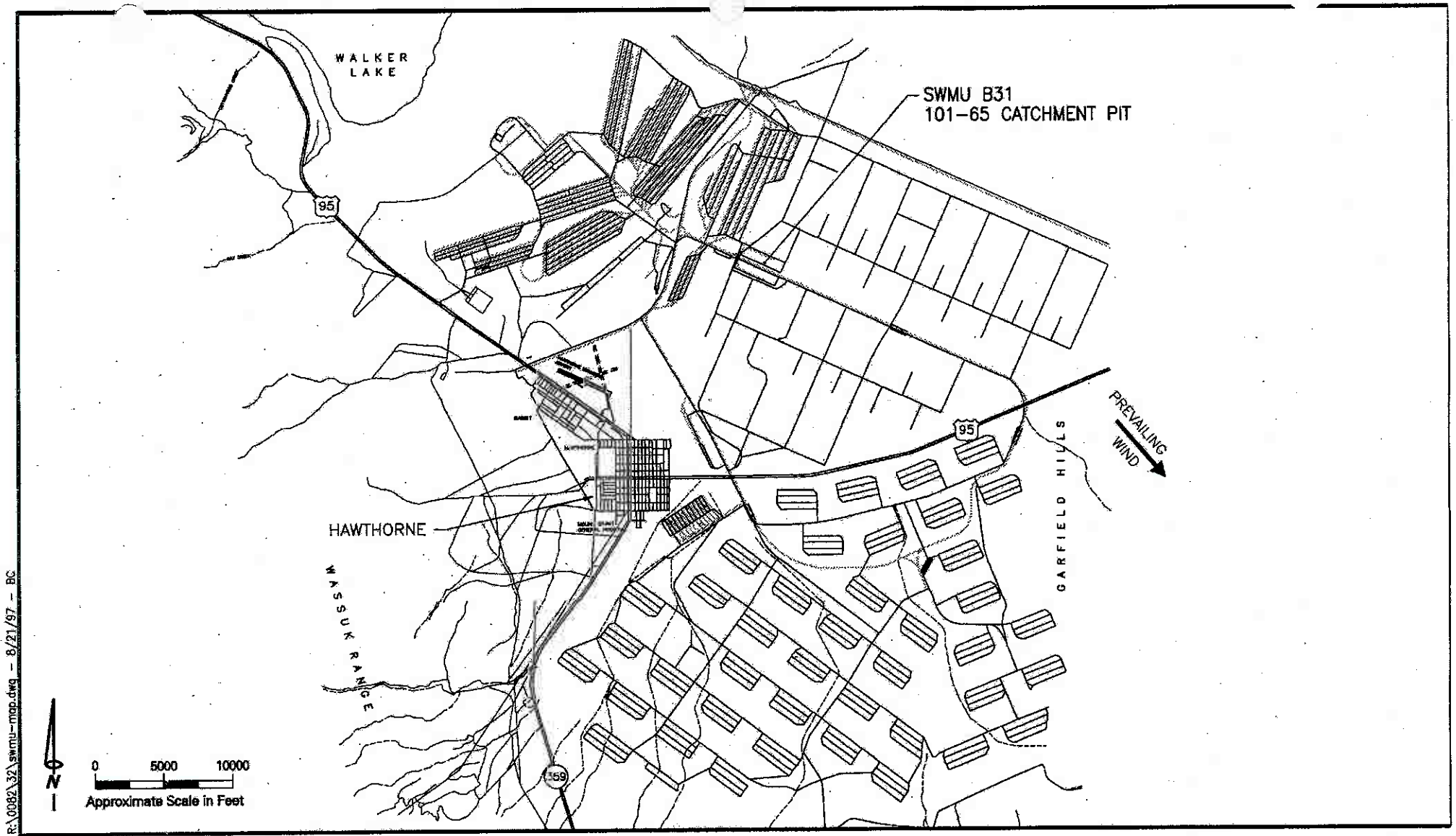


R:\0082\32\swmu-map.dwg - 8/21/97 - BC

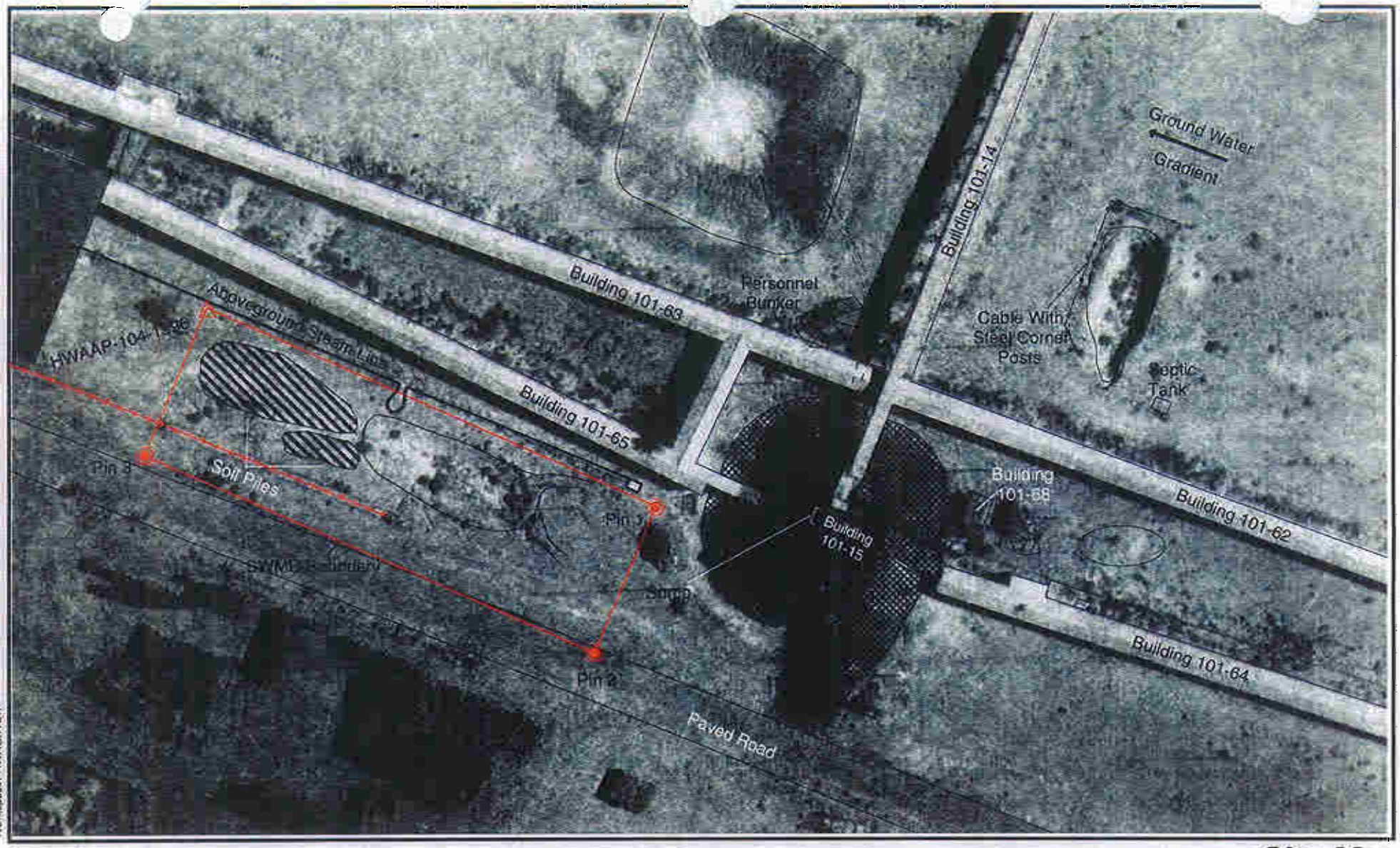
SOURCE: TETRA TECH FINAL DATA PACKAGE, 1996 (REV. 1997)

Location Map
SWMU B31
101-65 Catchment Pit

Hawthorne Army Depot
Hawthorne, Nevada

Tetra Tech, Inc.

Figure 1-1



Workspace: HWAD.WOR

Legend:

- Boundary Corner Pin
- Explosion Barrier
- Railroad
- SWMU Monument

N

0 35 70

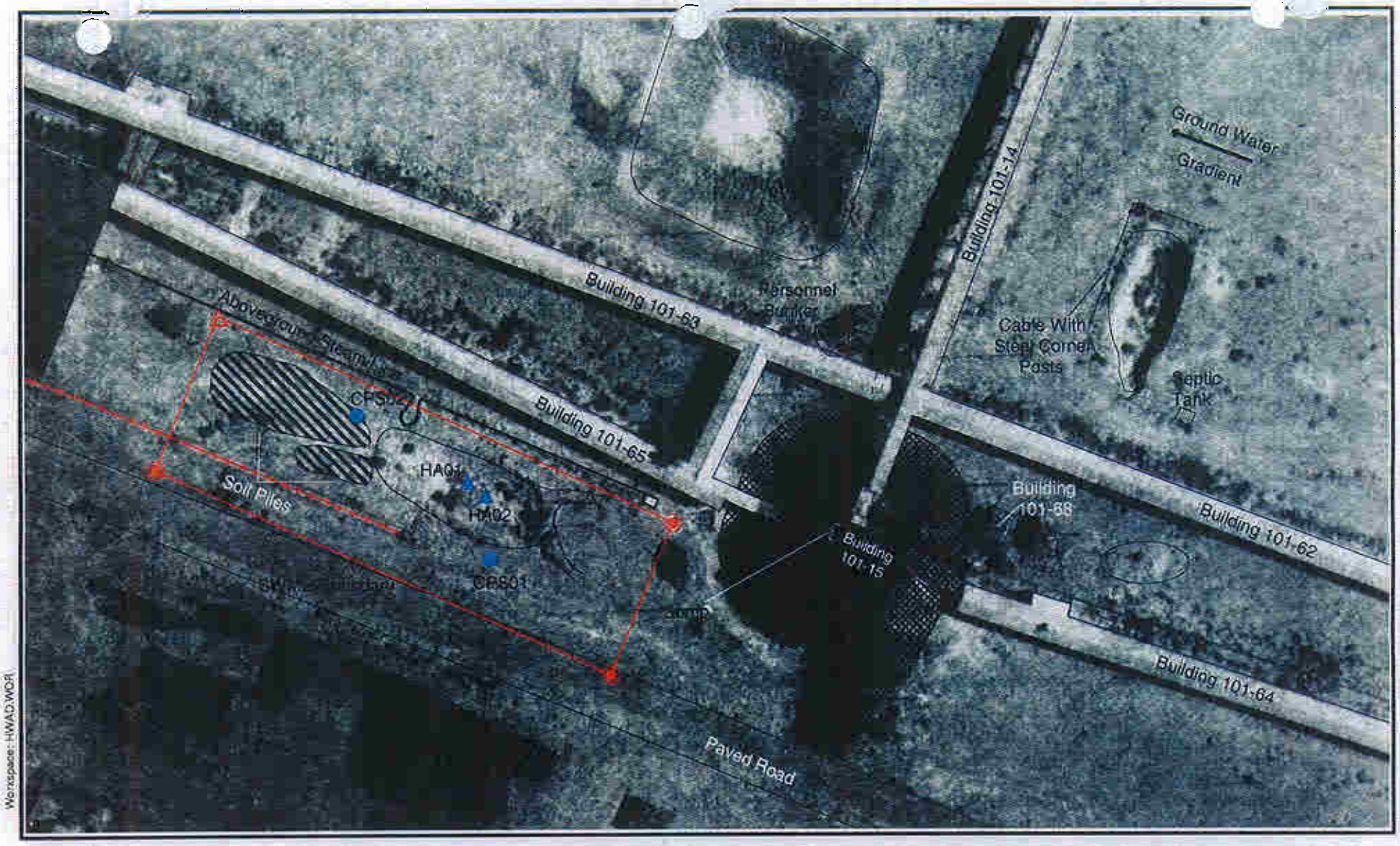
Approximate Scale in Feet

Tetra Tech, Inc.

Site Map
SWMU B31
101-65 Catchment Pit

Hawthorne Army Depot
Hawthorne, Nevada

Figure 1-2



Workspace: HWAD.WOR

Legend:

- Boundary Corner Pin
- Drain Line
- Hand Auger Location
- Soil Boring Locatio
- Explosion Barrier
- Railroad
- SWMU Monument

N

0 35 70

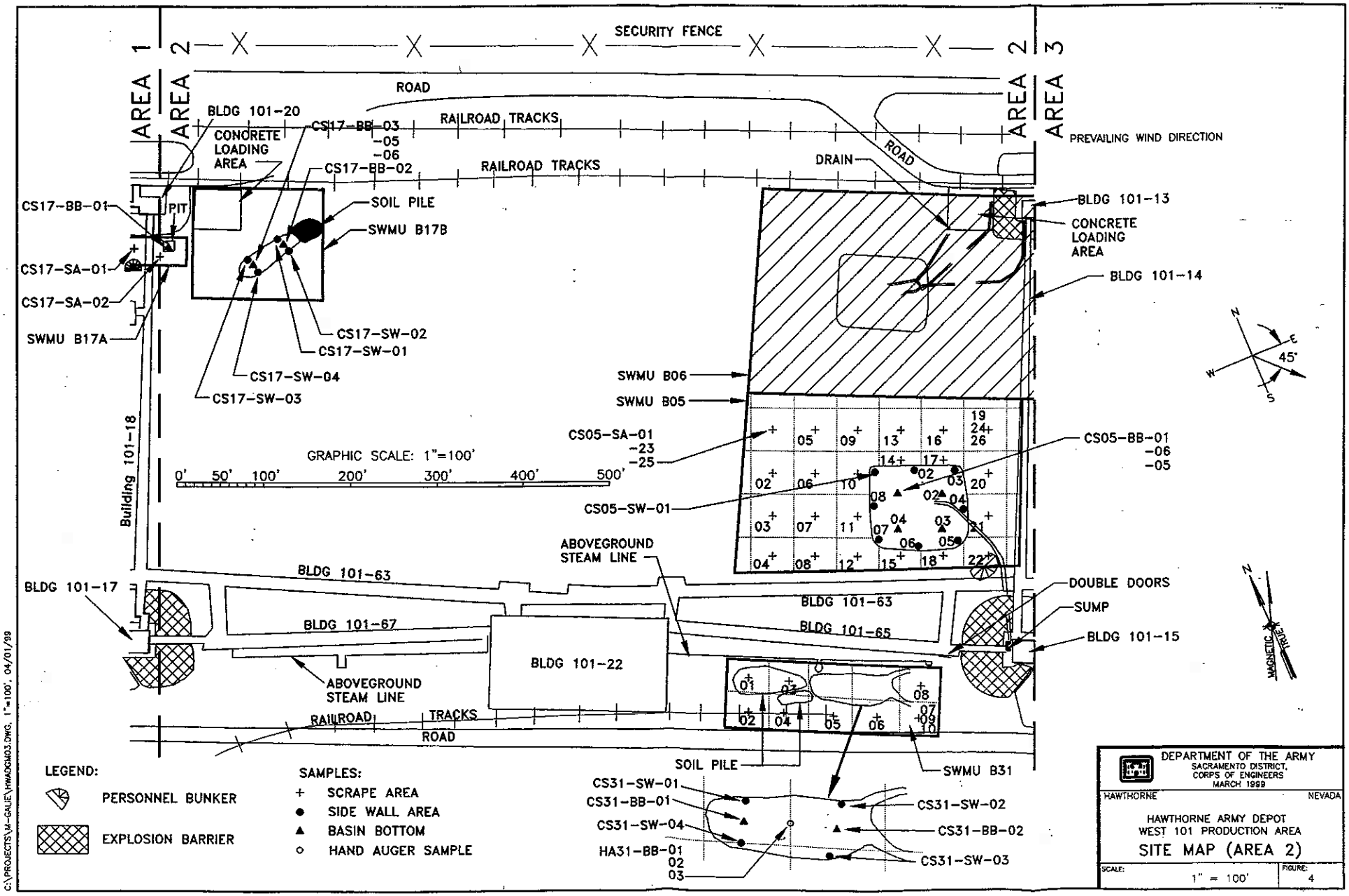
Approximate Scale in Feet

Investigation Activity Map
SWMU B31
101-65 Catchment Pit

Hawthorne Army Depot
Hawthorne, Nevada

Figure 3-1

Tetra Tech, Inc.


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 101-63
BLDG 101-65
DOUBLE DOORS
SUMP
BLDG 101-15
BLDG 101-22
ABOVEGROUND STEAM LINE
RAILROAD TRACKS
ROAD
SOIL PILE
SWMU B31
CS31-SW-01
CS31-BB-01
CS31-SW-04
HA31-BB-01
02
03
CS31-SW-02
CS31-BB-02
CS31-SW-03
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
C:\PROJECTS\M-GAUE\HWADGM03.DWG, 1"=100', 04/01/99

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

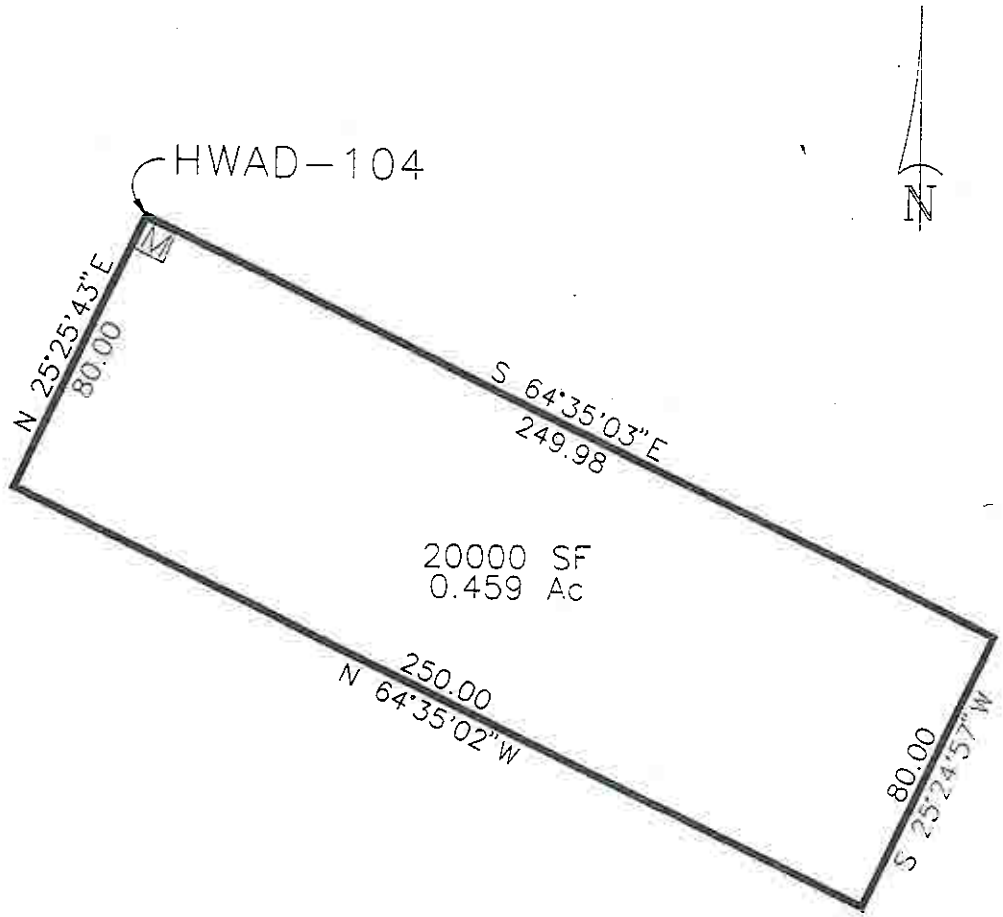
[e] Method detection limit for Volatile Organic Compounds by EPA Method 8260 or

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

Appendix B



NW COR	N	14513190.259	E	2622731.522	ELEV	4194.375
NE COR	N	14513082.970	E	2622957.310	ELEV	4196.141
SE COR	N	14513010.712	E	2622922.975	ELEV	4196.044
SW COR	N	14513118.009	E	2622697.171	ELEV	4193.551

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

40 20 0 40 80 120
SCALE IN FEET

ecology and environment, inc.
International Specialists in the Environment

SWMU B-31

COMSTOCK LAND SURVEYING
777 LA RUE AVENUE, SUITE A
RENO, NEVADA 89509

SWMU B31 Survey Data
Hawthorne Army Depot
Hawthorne, Nevada

SWMU	Point ID	Northing (feet)	Easting (feet)	Elevation
B31	CPS01	1389731.00	498472.80	NE
B31	CPS02	1389802.00	498408.50	NE
B31	HA01	1389768.00	498463.30	NE
B31	HA02	1389761.00	498472.00	NE
B31	HWAAP-104-1996	1389851.24	498340.84	4196.04
B31	Pin 1	1389743.95	498566.63	4193.55
B31	Pin 2	1389671.69	498532.29	4194.38
B31	Pin 3	1389778.988	498306.49	4196.14

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
					mg/kg
B31-HA1-1-000	HA01	5/12/94	0.5	ASC	5
B31-HA1-1-005	HA01	5/12/94	5	ASC	2.3
B31-HA1-2-000	HA02	5/12/94	0.5	ASC	1.6
B31-HA1-2-005	HA02	5/12/94	5	ASC	<1.1
B31-HA2-2-000	HA02	5/12/94	0.5	ASC	3.3
B31-CPS1-1-008.5	CPS01	5/31/94	8.5	ASC	5.8
B31-CPS1-1-017	CPS01	5/31/94	17	ASC	<1
B31-CPS1-2-009	CPS02	5/31/94	9	ASC	3.5

Analyses	8
Detections	6
Minimum Concentration	1.6
Maximum Concentration	5.8
HWAD - PCG	128000
HWAD - PCG Hits	0

Arsenic
Method 7060 (ASC)

Sample ID	Location ID	Sample Date	Depth (feet)	Lab	Arsenic
					mg/kg
B31-HA1-1-000	HA01	5/12/94	0.5	ASC	7.9
B31-HA1-1-005	HA01	5/12/94	5	ASC	4.3
B31-HA1-2-000	HA02	5/12/94	0.5	ASC	4
B31-HA1-2-005	HA02	5/12/94	5	ASC	1.2
B31-HA2-2-000	HA02	5/12/94	0.5	ASC	4.6
B31-CPS1-1-008.5	CPS01	5/31/94	8.5	ASC	6.1
B31-CPS1-1-017	CPS01	5/31/94	17	ASC	2.5
B31-CPS1-2-009	CPS02	5/31/94	9	ASC	3.6

Analyses	8
Detections	8
Minimum Concentration	1.2
Maximum Concentration	7.9
HWAD - PCG	100
HWAD - PCG Hits	0

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
B31-HA1-1-000	HA01	5/12/94	0.5	ASC	100	<0.51	<0.51	2.7	<1	NA	NA	NA
B31-HA1-1-005	HA01	5/12/94	5	ASC	96	<0.57	<0.57	5.3	<1.1	4.3	6.7	<1.1
B31-HA1-2-000	HA02	5/12/94	0.5	ASC	54	<0.52	<0.52	2.2	<1	4	7.5	<0.52
B31-HA1-2-005	HA02	5/12/94	5	ASC	51	<0.53	<0.53	3.5	<1.1	1.2	4.2	<0.53
B31-HA2-2-000	HA02	5/12/94	0.5	ASC	56	<0.52	<0.52	2.6	<1	4.6	5.9	<0.52
B31-CPS1-1-008.5	CPS01	5/31/94	8.5	ASC	92	<0.55	4	10	<1.1	6.1	7.3	<0.55
B31-CPS1-1-017	CPS01	5/31/94	17	ASC	130	<0.53	2.3	5.2	<1	2.5	1.8	<0.53
B31-CPS1-2-009	CPS02	5/31/94	9	ASC	83	<0.53	3.1	5	<1	3.6	3.4	<0.53
Analyses					8	8	8	8	8	7	7	7
Detections					8	0	3	8	0	7	7	0
Minimum Concentration					51	0	2.3	2.2	0	1.2	1.8	0
Maximum Concentration					130	0	4	10	0	6.1	7.5	0
HWAD - PCG					2000	1	20	20	100	100	100	20
HWAD - PCG Hits					0	0	0	0	0	0	0	0

Note:
NA = Not analyzed
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
B31-HA1-1-000	HA01	5/12/94	0.5	ASC	<1
B31-HA1-1-005	HA01	5/12/94	5	ASC	<1.1
B31-HA1-2-000	HA02	5/12/94	0.5	ASC	<0.52
B31-HA1-2-005	HA02	5/12/94	5	ASC	<0.53
B31-HA2-2-000	HA02	5/12/94	0.5	ASC	<0.52
B31-CPS1-1-008.5	CPS01	5/31/94	8.5	ASC	<0.55
B31-CPS1-1-017	CPS01	5/31/94	17	ASC	<0.53
B31-CPS1-2-009	CPS02	5/31/94	9	ASC	<0.53

Analyses	8
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.

Lead
Method 7421 (ASC)

Sample ID	Location ID	Sample Date	Depth (feet)	Lab	Lead
					mg/kg
B31-HA1-1-000	HA01	5/12/94	0.5	ASC	12
B31-HA1-1-005	HA01	5/12/94	5	ASC	6.7
B31-HA1-2-000	HA02	5/12/94	0.5	ASC	7.5
B31-HA1-2-005	HA02	5/12/94	5	ASC	4.2
B31-HA2-2-000	HA02	5/12/94	0.5	ASC	5.9
B31-CPS1-1-008.5	CPS01	5/31/94	8.5	ASC	7.3
B31-CPS1-1-017	CPS01	5/31/94	17	ASC	1.8
B31-CPS1-2-009	CPS02	5/31/94	9	ASC	3.4

Analyses	8
Detections	8
Minimum Concentration	1.8
Maximum Concentration	12
HWAD - PCG	100
HWAD - PCG Hits	0

Mercury
Method 7471 (ASC)

Sample ID	Location ID	Sample Date	Depth (feet)	Lab	Mercury
					mg/kg
B31-HA1-1-000	HA01	5/12/94	0.5	ASC	<0.1
B31-HA1-1-005	HA01	5/12/94	5	ASC	<0.091
B31-HA1-2-000	HA02	5/12/94	0.5	ASC	<0.1
B31-HA1-2-005	HA02	5/12/94	5	ASC	<0.11
B31-HA2-2-000	HA02	5/12/94	0.5	ASC	<0.1
B31-CPS1-1-008.5	CPS01	5/31/94	8.5	ASC	<0.11
B31-CPS1-1-017	CPS01	5/31/94	17	ASC	<0.1
B31-CPS1-2-009	CPS02	5/31/94	9	ASC	<0.1

Analyses	8
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.

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
B31-HA1-1-000	HA01	5/12/94	0.5	ASC	<1	<1	<1	<1	<1	<1	<1	<1	<1
B31-HA1-1-005	HA01	5/12/94	5	ASC	<1	<1	<1	0.27 J	<1	<1	<1	<1	<1
B31-HA1-2-000	HA02	5/12/94	0.5	ASC	<1	<1	<1	0.26 J	<1	<1	0.19 J	<1	<1
B31-HA1-2-005	HA02	5/12/94	5	ASC	<1	<1	<1	<1	<1	<1	<1	<1	<1
B31-HA2-2-000	HA02	5/12/94	0.5	ASC	0.16 J	<1	<1	0.29 J	<1	<1	0.2 J	<1	<1
B31-CPS1-1-008.5	CPS01	5/31/94	8.5	ASC	<1	<1	<1	<1	<1	<1	<1	<1	<1
B31-CPS1-1-017	CPS01	5/31/94	17	ASC	0.47 J	<1	<1	<1	<1	<1	<1	<1	<1
B31-CPS1-2-009	CPS02	5/31/94	9	ASC	<1	<1	<1	<1	<1	<1	<1	<1	<1
Analyses					8	8	8	8	8	8	8	8	8
Detections					2	0	0	3	0	0	2	0	0
Minimum Concentration					0.16	0	0	0.26	0	0	0.19	0	0
Maximum Concentration					0.47	0	0	0.29	0	0	0.2	0	0
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 indicate 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
B31-HA1-1-000	HA01	5/12/94	0.5	ASC	<1	<1	<1	<1	<1
B31-HA1-1-005	HA01	5/12/94	5	ASC	<1	<1	0.48 J	<1	<1
B31-HA1-2-000	HA02	5/12/94	0.5	ASC	<1	<1	<1	<1	<1
B31-HA1-2-005	HA02	5/12/94	5	ASC	<1	<1	<1	<1	<1
B31-HA2-2-000	HA02	5/12/94	0.5	ASC	<1	<1	<1	<1	<1
B31-CPS1-1-008.5	CPS01	5/31/94	8.5	ASC	<1	<1	5.7	<1	<1
B31-CPS1-1-017	CPS01	5/31/94	17	ASC	<1	<1	0.71 J	<1	<1
B31-CPS1-2-009	CPS02	5/31/94	9	ASC	<1	<1	<1	<1	<1
Analyses					8	8	8	8	8
Detections					0	0	3	0	0
Minimum Concentration					0	0	0.48	0	0
Maximum Concentration					0	0	5.7	0	0
HWAD - PCG					8	40	64	4	800
HWAD - PCG Hits					0	0	0	0	0

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

Picric Acid
Method 8330M (ASC)

Sample ID	Location ID	Sample Date	Depth (feet)	Lab	Picric Acid
					mg/kg
B31-HA1-1-000	HA01	5/12/94	0.5	ASC	<0.25
B31-HA1-1-005	HA01	5/12/94	5	ASC	<0.25
B31-HA1-2-000	HA02	5/12/94	0.5	ASC	<0.25
B31-HA1-2-005	HA02	5/12/94	5	ASC	<0.25
B31-HA2-2-000	HA02	5/12/94	0.5	ASC	<0.25
B31-CPS1-1-008.5	CPS01	5/31/94	8.5	ASC	<0.25
B31-CPS1-1-017	CPS01	5/31/94	17	ASC	<0.25
B31-CPS1-2-009	CPS02	5/31/94	9	ASC	<0.25

Analyses	8
Detections	0
Minimum Concentration	0
Maximum Concentration	0
HWAD - PCG	NE
HWAD - PCG Hits	NE

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

Appendix D

Applied P & Ch Laboratory
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APCL Analytical Report

Component Analyzed	Method	Unit	PQL	CS09-SA-02 99-02443-9	CS17-SW-01 99-02443-10	CS17-SW-02 99-02443-11	CS17-SW-03 99-02443-12
				Analysis Result			
MOISTURE	ASTM-D2216	%Moisture	0.5	1.2	2.3	6.3	2.1
NITROAROMATICS AND NITROAMINES [a]							
Dilution Factor				1	1	1	1
4-AMINO-2,6-DINITROTOLUENE	8330	mg/kg	0.2	<0.20	<0.20	<0.21	<0.20
2-AMINO-4,6-DINITROTOLUENE	8330	mg/kg	0.2	<0.20	<0.20	<0.21	<0.20
1,3-DINITROBENZENE	8330	mg/kg	0.25	<0.25	<0.26	<0.27	<0.26
2,4-DINITROTOLUENE	8330	mg/kg	0.25	<0.25	<0.26	<0.27	<0.26
2,6-DINITROTOLUENE	8330	mg/kg	0.25	<0.25	<0.26	<0.27	<0.26
HMX	8330	mg/kg	0.25	<0.25	<0.26	<0.27	<0.26
NITROBENZENE	8330	mg/kg	0.25	<0.25	<0.26	<0.27	<0.26
3-NITROTOLUENE	8330	mg/kg	0.25	<0.25	<0.26	<0.27	<0.26
RDX	8330	mg/kg	0.25	<0.25	0.57	<0.27	0.55
TETRYL	8330	mg/kg	0.25	<0.25	<0.26	<0.27	<0.26
1,3,5-TRINITROBENZENE	8330	mg/kg	0.25	<0.25	0.59	<0.27	4.8
2,4,6-TRINITROTOLUENE	8330	mg/kg	0.25	<0.25	<0.26	<0.27	0.80
2/4-NITROTOLUENE	8330	mg/kg	0.25	<0.25	<0.26	<0.27	<0.26

Component Analyzed	Method	Unit	PQL	CS17-SW-04 99-02443-13	CS31-BB-01 99-02443-14	CS31-BB-02 99-02443-15	CS31-SA-01 99-02443-16
				Analysis Result			
MOISTURE	ASTM-D2216	%Moisture	0.5	1.1	1.1	5.6	1.9
NITROAROMATICS AND NITROAMINES [a]							
Dilution Factor				1	1	1	1
4-AMINO-2,6-DINITROTOLUENE	8330	mg/kg	0.2	<0.20	<0.20	<0.21	<0.20
2-AMINO-4,6-DINITROTOLUENE	8330	mg/kg	0.2	<0.20	<0.20	<0.21	<0.20
1,3-DINITROBENZENE	8330	mg/kg	0.25	<0.25	<0.25	<0.26	<0.25
2,4-DINITROTOLUENE	8330	mg/kg	0.25	<0.25	<0.25	<0.26	<0.25
2,6-DINITROTOLUENE	8330	mg/kg	0.25	<0.25	<0.25	0.39	<0.25
HMX	8330	mg/kg	0.25	<0.25	<0.25	<0.26	<0.25
NITROBENZENE	8330	mg/kg	0.25	<0.25	<0.25	<0.26	<0.25
3-NITROTOLUENE	8330	mg/kg	0.25	<0.25	<0.25	<0.26	<0.25
RDX	8330	mg/kg	0.25	0.39	<0.25	<0.26	<0.25
TETRYL	8330	mg/kg	0.25	<0.25	<0.25	<0.26	<0.25
1,3,5-TRINITROBENZENE	8330	mg/kg	0.25	0.83	<0.25	<0.26	<0.25
2,4,6-TRINITROTOLUENE	8330	mg/kg	0.25	<0.25	<0.25	0.65	<0.25
2/4-NITROTOLUENE	8330	mg/kg	0.25	<0.25	<0.25	<0.26	<0.25

Component Analyzed	Method	Unit	PQL	CS31-SA-02 99-02443-17	CS31-SA-03 99-02443-18	CS31-SA-04 99-02443-19	CS31-SA-05 99-02443-20
				Analysis Result			
MOISTURE	ASTM-D2216	%Moisture	0.5	0.8	1.7	2.5	1.1

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Component Analyzed	Method	Unit	PQL	CS31-SA-02 99-02443-17	CS31-SA-03 99-02443-18	CS31-SA-04 99-02443-19	CS31-SA-05 99-02443-20
				Analysis Result			
NITROAROMATICS AND NITROAMINES [a]							
Dilution Factor				1	1	1	1
4-AMINO-2,6-DINITROTOLUENE	8330	mg/kg	0.2	<0.20	<0.20	<0.21	<0.20
2-AMINO-4,6-DINITROTOLUENE	8330	mg/kg	0.2	<0.20	<0.20	<0.21	<0.20
1,3-DINITROBENZENE	8330	mg/kg	0.25	<0.25	<0.25	<0.26	<0.25
2,4-DINITROTOLUENE	8330	mg/kg	0.25	<0.25	<0.25	<0.26	<0.25
2,6-DINITROTOLUENE	8330	mg/kg	0.25	<0.25	<0.25	<0.26	<0.25
HMX	8330	mg/kg	0.25	<0.25	0.27	<0.26	<0.25
NITROBENZENE	8330	mg/kg	0.25	<0.25	<0.25	<0.26	<0.25
3-NITROTOLUENE	8330	mg/kg	0.25	<0.25	<0.25	<0.26	<0.25
RDX	8330	mg/kg	0.25	<0.25	<0.25	<0.26	<0.25
TETRYL	8330	mg/kg	0.25	<0.25	<0.25	<0.26	<0.25
1,3,5-TRINITROBENZENE	8330	mg/kg	0.25	<0.25	<0.25	<0.26	<0.25
2,4,6-TRINITROTOLUENE	8330	mg/kg	0.25	<0.25	<0.25	<0.26	<0.25
2/4-NITROTOLUENE	8330	mg/kg	0.25	<0.25	<0.25	<0.26	<0.25

Component Analyzed	Method	Unit	PQL	CS31-SA-06 99-02443-21	CS31-SA-07 99-02443-22	CS31-SA-08 99-02443-23	CS31-SA-09 99-02443-24
				Analysis Result			
MOISTURE	ASTM-D2216	%Moisture	0.5	1.0	1.2	1.0	<0.5
NITROAROMATICS AND NITROAMINES [a]							
Dilution Factor				1	1	1	1
4-AMINO-2,6-DINITROTOLUENE	8330	mg/kg	0.2	<0.20	<0.20	<0.20	<0.2
2-AMINO-4,6-DINITROTOLUENE	8330	mg/kg	0.2	<0.20	<0.20	<0.20	<0.2
1,3-DINITROBENZENE	8330	mg/kg	0.25	<0.25	<0.25	<0.25	<0.25
2,4-DINITROTOLUENE	8330	mg/kg	0.25	<0.25	<0.25	<0.25	<0.25
2,6-DINITROTOLUENE	8330	mg/kg	0.25	<0.25	<0.25	<0.25	<0.25
HMX	8330	mg/kg	0.25	0.26	<0.25	<0.25	<0.25
NITROBENZENE	8330	mg/kg	0.25	<0.25	<0.25	<0.25	<0.25
3-NITROTOLUENE	8330	mg/kg	0.25	<0.25	<0.25	<0.25	<0.25
RDX	8330	mg/kg	0.25	<0.25	<0.25	<0.25	0.29
TETRYL	8330	mg/kg	0.25	<0.25	<0.25	<0.25	<0.25
1,3,5-TRINITROBENZENE	8330	mg/kg	0.25	<0.25	<0.25	<0.25	<0.25
2,4,6-TRINITROTOLUENE	8330	mg/kg	0.25	<0.25	<0.25	<0.25	<0.25
2/4-NITROTOLUENE	8330	mg/kg	0.25	<0.25	<0.25	<0.25	<0.25

Component Analyzed	Method	Unit	PQL	CS31-SW-01 99-02443-25	CS31-SW-02 99-02443-26	CS31-SW-03 99-02443-27	CS31-SW-04 99-02443-28
				Analysis Result			
MOISTURE	ASTM-D2216	%Moisture	0.5	0.9	0.8	1	1.4

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Component Analyzed	Method	Unit	PQL	Analysis Result CS31-SW-01 99-02443-25	CS31-SW-02 99-02443-26	CS31-SW-03 99-02443-27	CS31-SW-04 99-02443-28
NITROAROMATICS AND NITROAMINES [a]							
Dilution Factor				1	1	1	1
4-AMINO-2,6-DINITROTOLUENE	8330	mg/kg	0.2	<0.20	<0.20	0.84	<0.20
2-AMINO-4,6-DINITROTOLUENE	8330	mg/kg	0.2	<0.20	0.45	1.2	<0.20
1,3-DINITROBENZENE	8330	mg/kg	0.25	<0.25	<0.25	<0.25	<0.25
2,4-DINITROTOLUENE	8330	mg/kg	0.25	<0.25	<0.25	0.32	<0.25
2,6-DINITROTOLUENE	8330	mg/kg	0.25	<0.25	<0.25	<0.25	<0.25
HMX	8330	mg/kg	0.25	<0.25	<0.25	0.58	<0.25
NITROBENZENE	8330	mg/kg	0.25	<0.25	<0.25	<0.25	<0.25
3-NITROTOLUENE	8330	mg/kg	0.25	<0.25	<0.25	<0.25	<0.25
RDX	8330	mg/kg	0.25	<0.25	<0.25	0.58	<0.25
TETRYL	8330	mg/kg	0.25	<0.25	<0.25	<0.25	<0.25
1,3,5-TRINITROBENZENE	8330	mg/kg	0.25	<0.25	0.13	0.80	1.1
2,4,6-TRINITROTOLUENE	8330	mg/kg	0.25	<0.25	0.80	8.48	<0.25
2/4-NITROTOLUENE	8330	mg/kg	0.25	<0.25	<0.25	<0.25	<0.25

Component Analyzed	Method	Unit	PQL	Analysis Result HA31-BB-01 99-02443-29	HA31-BB-02 99-02443-30	HA31-BB-03 99-02443-31
MOISTURE	ASTM-D2216	%Moisture	0.5	5.6	5.3	8.8
NITROAROMATICS AND NITROAMINES [a]						
Dilution Factor				1	1	1
4-AMINO-2,6-DINITROTOLUENE	8330	mg/kg	0.2	<0.21	<0.21	<0.22
2-AMINO-4,6-DINITROTOLUENE	8330	mg/kg	0.2	<0.21	<0.21	<0.22
1,3-DINITROBENZENE	8330	mg/kg	0.25	<0.26	<0.26	<0.27
2,4-DINITROTOLUENE	8330	mg/kg	0.25	<0.26	<0.26	<0.27
2,6-DINITROTOLUENE	8330	mg/kg	0.25	<0.26	<0.26	<0.27
HMX	8330	mg/kg	0.25	<0.26	<0.26	<0.27
NITROBENZENE	8330	mg/kg	0.25	<0.26	<0.26	<0.27
3-NITROTOLUENE	8330	mg/kg	0.25	<0.26	<0.26	<0.27
RDX	8330	mg/kg	0.25	<0.26	<0.26	<0.27
TETRYL	8330	mg/kg	0.25	<0.26	<0.26	<0.27
1,3,5-TRINITROBENZENE	8330	mg/kg	0.25	<0.26	0.69	0.41
2,4,6-TRINITROTOLUENE	8330	mg/kg	0.25	<0.26	<0.26	<0.27
2/4-NITROTOLUENE	8330	mg/kg	0.25	<0.26	<0.26	<0.27

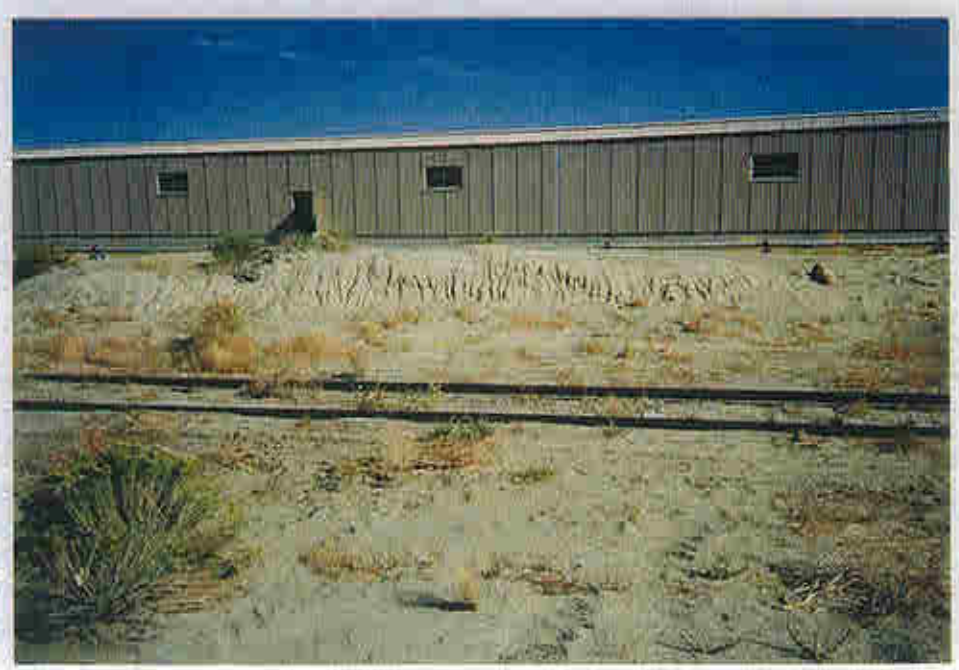
PQL: Practical Quantitation Limit. MDL: Method Detection Limit. CRDL: Contract Required Detection Limit
N.D.: Not Detected or less than the practical quantitation limit. "-": Analysis is not required.
J: Reported between PQL and MDL.
† All results are reported on dry basis for soil samples.
Listed Dilution Factors (DF) are relative to the method default DF. All unlisted DFs are 1.0
[a] Positive results had been confirmed by second column.

Respectfully submitted,

Dominic Lau
Laboratory Director
Applied P & Ch Laboratory

Appendix E

B31, Facing west of impoundment with Bldg. 101-65 in background. Railroad track just west of impoundment. Drain pipe just west of site running northwest towards Bldg. 101-22.#R9-N2, 10/1/94



B31, Facing west, dredge pile on northwest end of impoundment.#R9-N3, 10/1/94

SWMU B-31 – September 1999