Decision Document

Solid Waste Management Unit B-18
Building 101-62/64 Catchment Pits
Hawthorne Army Depot
Hawthorne, Nevada

September 2000

Hawthorne Army
Depot

Decision Document SWMU B-18

September 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

18 OCT 2000

Anne L. Davis
Lieutenant Colonel, U.S. Army
Commanding

State of Nevada

2 MARCH 2001

Paul Liebendorfer
Chief, Bureau of Federal Facilities

Decision Document

Solid Waste Management Unit B-18
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Decision Document
SWMU B-18
Building 101-62/64 Catchment Pits
HAWTHORNE ARMY DEPOT
HAWTHORNE, NEVADA

1.0 Introduction:

This decision document describes the rationale for the proposed closure of SWMU B-18, building 101-62/64 Production Area, 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).

Ecology and Environmental, Inc. (E&E), 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 B18 is in HWAD's central magazine are, on the northeast side of the 101 Production Area (Figure 1-1). This SWMU has two inactive unlined catchment pits. One of the pits is north of Building 101-64 and the other is between Buildings 101-64 and Building 101-62 and east of Building 101-15 (Figure 1-2). The USACE and HWAD added the latter of the two pits as part of SWMU B18 in 1996. This pit is approximately 45 feet long, 15 feet wide, and four feet deep in the center. The other catchment pit is approximately 35 feet north of Building 101-62 and measures 75 feet long by 21 feet wide and is up to six feet deep.

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 two survey monuments were constructed and surveyed at the Building 101-62 pit and at the Building 101-64 pit. A brass survey pin on each of the monuments designates the monument numbers HWAAP-89-1996 and HWAAP-90-1996 and the SWMU number B18. Three corner pins were set and surveyed at each monument to define the SWMU boundaries, with the monument as the northwest corner. The location of these corner markers and the SWMU boundaries are shown on Figure 1-2. Survey data is presented in Appendix B.

3.0 Site Conditions

The SWMU B18 catchment pits reportedly were in operation from 1940 to the early 1970s and received wastewater containing TNT and cyclotrimethlyenetrinitramine (RDX). The wastes discharged into the catchment pits also may have included picric acid, Composition A, Composition B, various propellant and pyrotechnic compositions, pentaerythrite tetranitrate (PETN), and Amitol (USATHAMA 1977).

Soils encountered during E&E's investigation of SWMU B18 primarily included coarse sands to silty sands. Visual evidence of stained soils was not noted on the surface of either catchment pit.

USAEHA estimated the depth to ground water in the vicinity of SWMU B18 at approximately 120 feet below ground surface (bgs).

4.0 Investigations

Site inspections of SWMU B18 were conducted by the USAEHA (1988), Jacobs Engineering (1988), and RAI (1992). During these inspections TNT-stained soil was noted in the Building 101-62 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 B18 included collecting and analyzing both surface and subsurface soil samples at the Building 101-62 catchment pit. No sampling activities were performed at the Buildings 101-64 catchment pit.

Two surface soil samples and two near-surface samples were collected from each of the two hand auger locations (HA01 and HA02) inside the catchment pit, shown on Figure 3-1. The surface samples were collected at a depth of approximately six to 12 inches, and the near-surface samples were collected using a hand auger at a depth of five feet beneath the bottom of the pit (E&E 1995).

The subsurface investigation of SWMU B18 consisted of one CPT sounding with an adjacent sample boring drilled on the downgradient (northwest) side of the Building 101-62 catchment pit, shown on Figure 3-1. The sounding at CPS01 was advanced to a depth of 79 feet.

In November 1998 DZHC collected four (4) soil samples (fig. 4) from the main pit and had them analyzed for explosives when the high field test results for explosives became suspect. In January 1999 the USACE took a surface soil sample at the second pit and had it analyzied for explosives.

5.0 Investigation Results

The two surface and near-surface soil samples that were analyzed by the laboratory, B18-HA1-2-000 and B18-HA1-2-005, detected arsenic (1.1 mg/kg to 4.6 mg/kg), barium (46 mg/kg to 94 mg/kg), total chromium (2.5 mg/kg to 5 mg/kg), and lead (4 mg/kg to 14 mg/kg) in both samples. Mercury was detected only in B18-HA1-2-000 at a concentration of 0.12 mg/kg. No other metals were detected in the two surface and near-surface samples.

Arsenic (7.5 mg/kg to 22 mg/kg), barium (65 mg/kg to 950 mg/kg), cadmium (4.2 mg/kg to 4.5 mg/kg), total chromium (4.6 mg/kg to 10 mg/kg), and lead (7.3 mg/kg to 5.9 mg/kg) were detected in both of the subsurface soil samples.

At SWMU B18, the detected metals arsenic, barium, cadmium, total chromium, lead, and mercury, which are common metals in the Walker Valley soils, were evaluated to be at naturally occurring concentrations near their background levels.

In 1994 the two surface and near-surface soil samples collected at location HA01 reported concentrations of RDX at greater than 60,000 mg/kg from field screening tests. TNT was the detected only in the surface sample B18-HA1-2-000 at a concentration of 0.14 mg/kg. No other explosives were detected in the two surface and near-surface soil samples analyzed. TNT, RDX, and sym-trinitrobenzene (TNB) were detected at concentrations of 1.4 mg/kg, 0.9 mg/kg and 3.2 mg/kg, respectively, in soil sample CPS1-1-18.5 collected from boring CPS01 at a depth of 18.5 feet bgs. The results of the 1994 investigation are presented in appendix C.

The resampling of the main pit by DZHC indicated a detection of HMX at 0.44 mg/kg. All the other results were below laboratory reporting limits. The results of this investigation are presented in appendix C.

The sample from the secondary pit taken by the USACE indicated TNTcontamination at 5,770 mg/kg and RDX at 4,300 mg/kg.

The main pit at SWMU B-18 would not require any remediation action; however, the secondary pit had explosive levels in excess of PCG's and did require remediation action

6.0 Remediation

The explosives contaminated soil from SWMU B-18 was treated by windrow composting. Composting is a natural process in which microorganisms biologically degrade organic material. For the destruction of the explosives contamination temperatures in the compost must reach between 120° F — 160° F and the system must remain in aerobic conditions. The windrow system of composting was selected as the most efficient and economical to be used at the site. Thirty six (36) cubic yards of contaminated soil was removed from B-18 and placed in compost windrows. Confirmation samples, from the excavated area and finished compost, were taken in accordance with the project work plan.

7.0 Remediation Results

Contaminated soil from B-18 was placed into a windrow at remediation pad 1(windrow 1A). After the treatment process the windrows were sampled for explosives and the test results are shown in appendix D; along with the windrow temperature graphs. The location of the confirmation samples taken in the B-18 excavation area are shown in figure 5 with the analytical results of these tests also shown in appendix D.

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

SWMU B-18 should be closed with the restrictions that no structure be constructed on the filled pit areas of the SWMU, that the site remain only for industrial use and documented on the depot site master plan.

10.0 REFERENCES

Ecology and Environment. 1995. RCRA Facility Assessment Report for 24 Solid Waste Management Units, Hawthorne Army Depot, Hawthorne, Nevada. April 1995.

_____. 1997. RCRA Facility Investigation Report for Group A SWMU's A-04,B-16, B-21, B-24, B-26, and H-01, Hawthorne Army Depot, Hawthorne, Nevada. February 1997.

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_____. 1996. Region IX Preliminary Remediation Goals. USEPA Region IX. August 1996.

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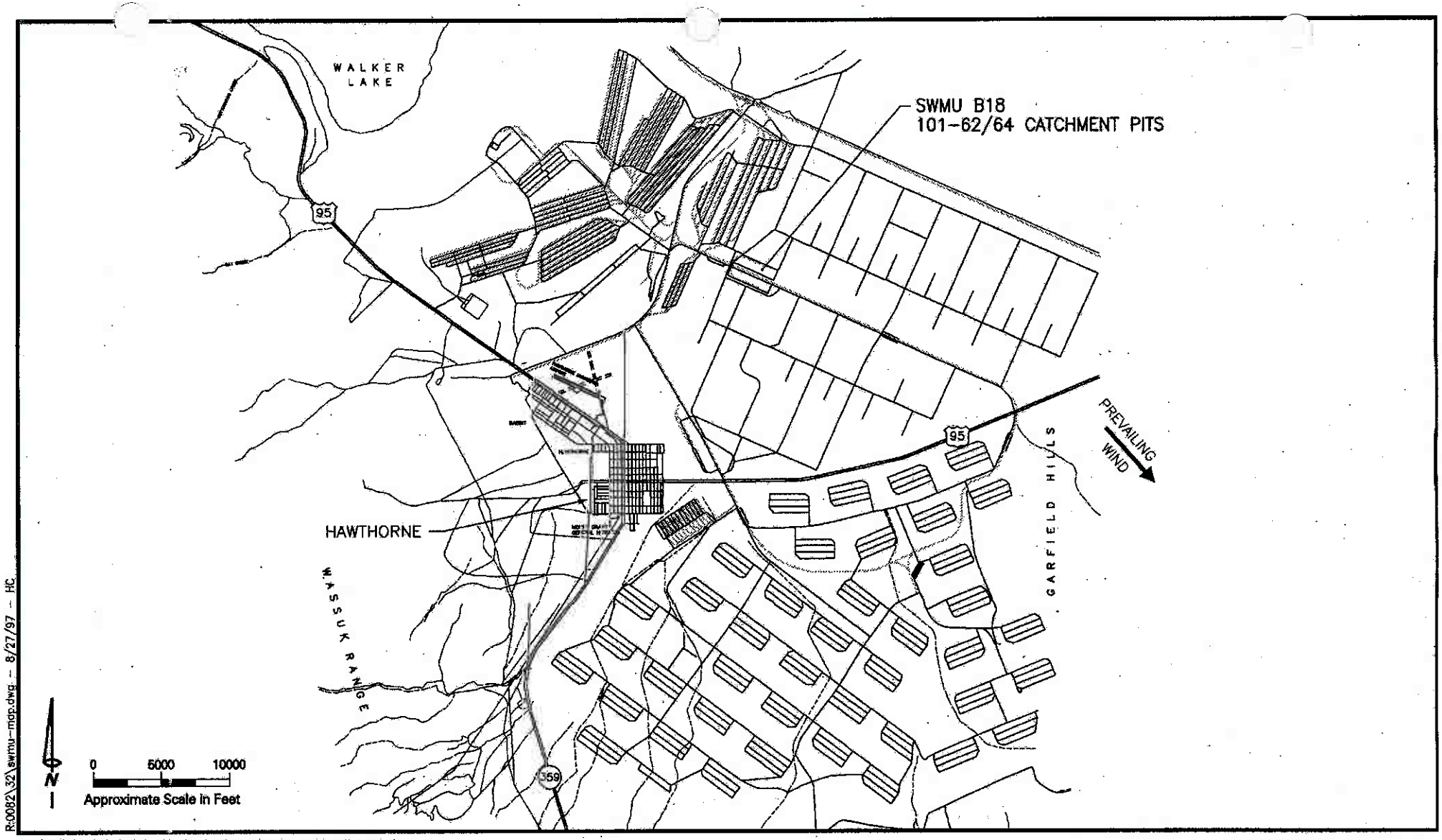


R:\0082\32\swmu-map.dwg -- 8/27/97 -- HC

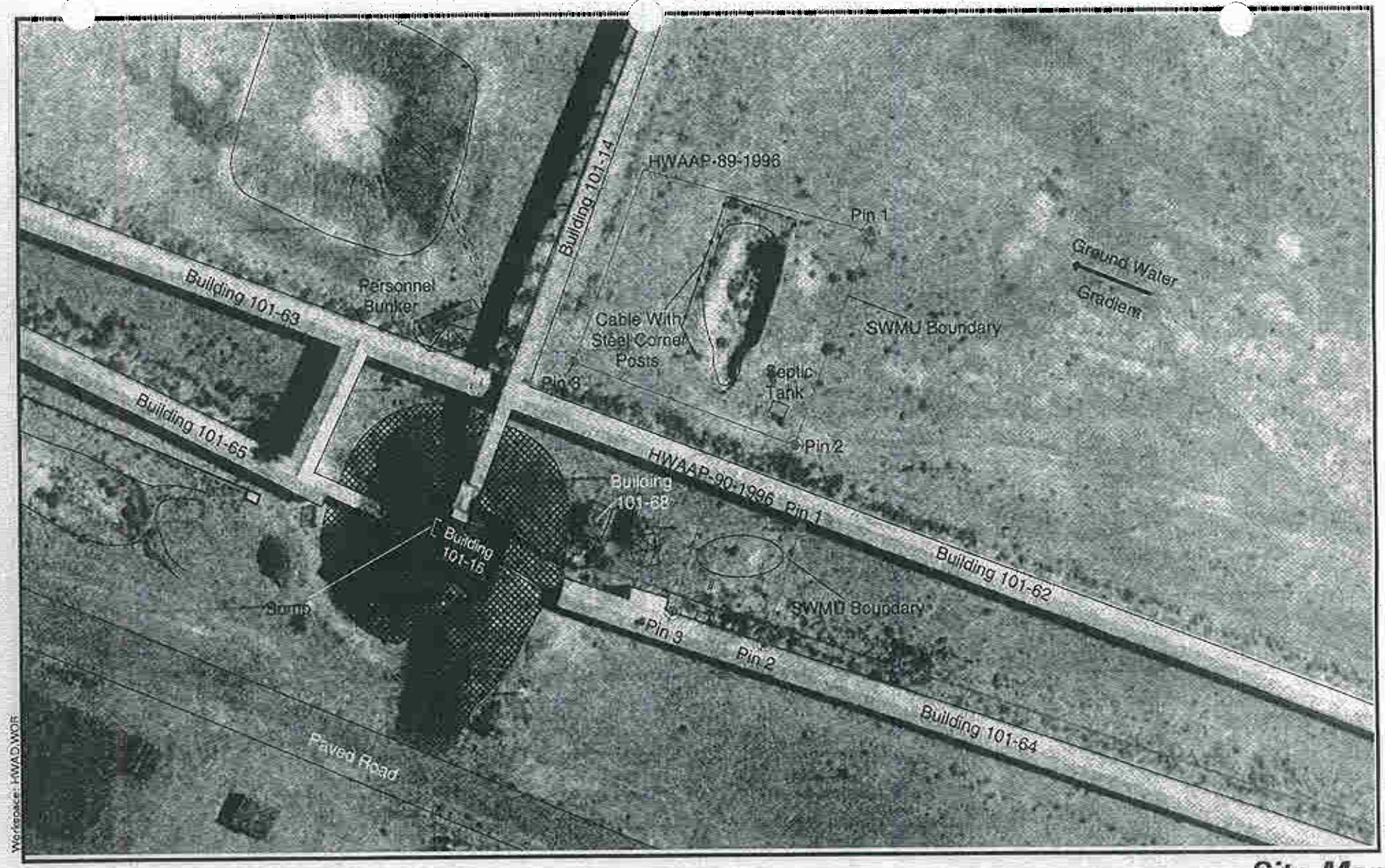
SOURCE: TETRA TECH FINAL DATA PACKAGE, 1996 (REV. 1997)

Location Map
SWMU B18
101-62/64 Catchment Pits

Hawthorne Army Depot
Hawthorne, Nevada

Tetra Tech, Inc.

Figure 1-1



Legend:

- Boundary Corner Pin
- Drain Line
- Explosion Barrier
- SWMU Monument

N

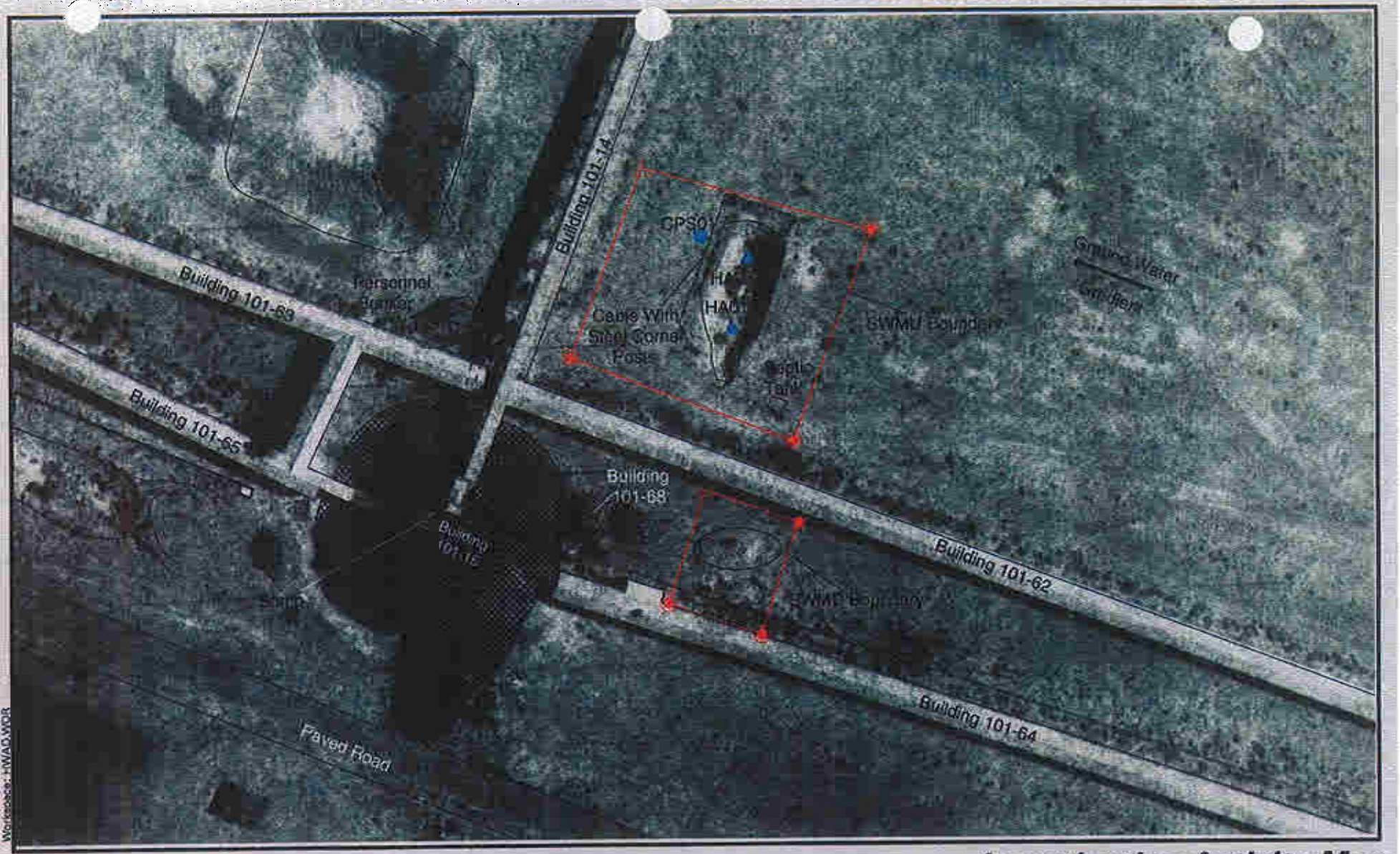
0 35 70
Approximate Scale in Feet

Tetra Tech, Inc.

Site Map
SWMU B18
101-62/64 Catchment Pits

Hawthorne Army Depot
Hawthorne, Nevada

Figure 1-2



Worksheet: HWAO.WOR

Legend:

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

N

0 35 70

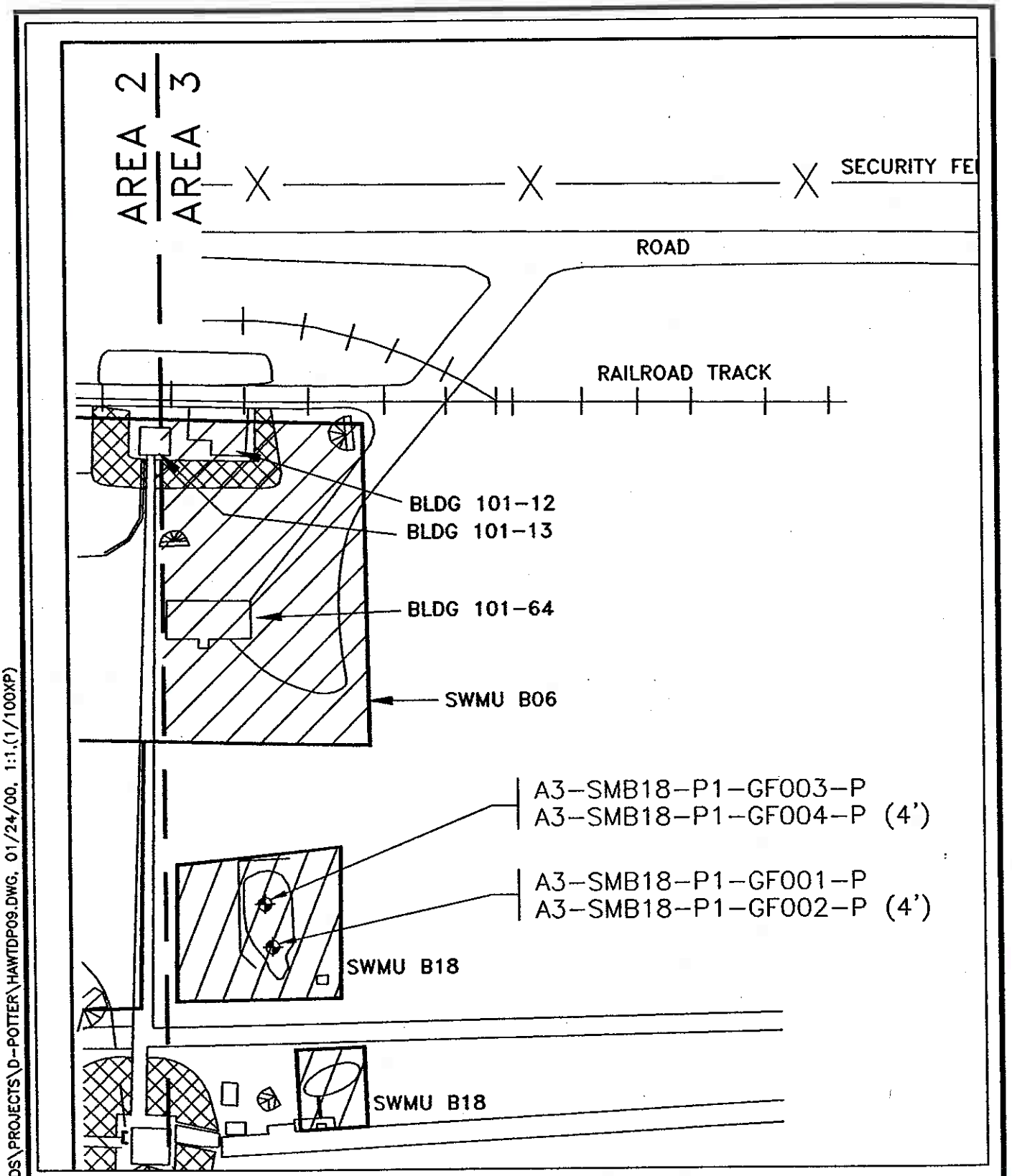
Approximate Scale in Feet

Tetra Tech, Inc.

Investigation Activity Map
SWMU B18
101-62/64 Catchment Pits

Hawthorne Army Depot
Hawthorne, Nevada

Figure 3-1



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

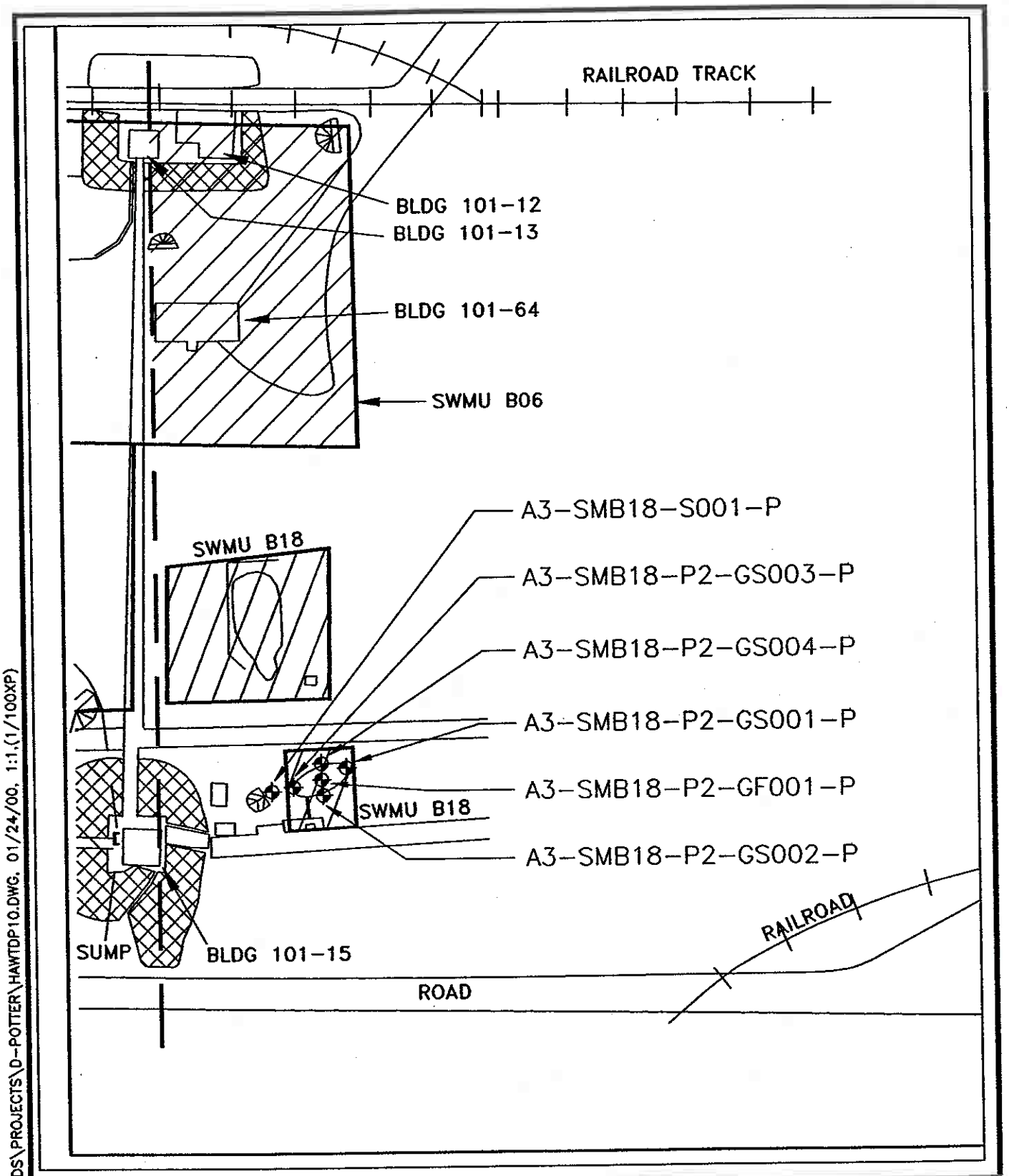
HAWTHORNE NEVADA

HAWTHORNE ARMY DEPOT
WEST 101 PROJECTION AREA

SITE MAP (AREA 3)-
SOIL SAMPLE LOCATIONS

SCALE: 1" = 100'

FIGURE: 4



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

HAWTHORNE NEVADA

HAWTHORNE ARMY DEPOT
WEST 101 PROJECTION AREA

SITE MAP (AREA 3)-
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

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

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

Appendix B

NOTES

1. FOR THE LOCATION OF THE FOLLOWING SWMU'S, REFER TO FIGURE 3-6 OF THE "FINAL R.C.R.A. FACILITY INVESTIGATION REPORT OF GROUP "A" SOLID WASTE MANAGEMENT UNITS A-04, B-16, B-21, B-24, B-26, AND H-01".

2. THE "HWAD" MONUMENTS AS SHOWN HEREIN AS "M", ARE A 1' X 1' X 2'+ CONCRETE MONUMENT WITH A BRASS CAP STAMPED AS PER SPECIFICATIONS. ALL OF THE OTHER CORNERS ARE MARKED BY A 5/8" RE-BAR WITH A PLASTIC CAP STAMPED "STINCHFIELD PLS 3631" UNLESS NOTED OTHERWISE ON THE MAPS.

3. HORIZONTAL DATUM IS BASED ON NAD 83(1994) AND MORE SPECIFICALLY, NGS STATION "W 2". "W 2" IS A FEDERAL BASE NETWORK CONTROL STATION AND IS LOCATED IN THE APPROXIMATE CENTER OF THIS PROJECT.

4. VERTICAL DATUM IS BASED ON NAVD 29. NAVD 88 ELEVATIONS HAVE BEEN SCALED AND THEREFORE ARE NOT ACCURATE. VERTICAL CONTROL USING GPS WAS USED TO ESTABLISH THE ELEVATIONS OF THE EXISTING CONTROL POINTS AND THE "HWAD" MONUMENTS. THE VALUE OF NGS STATION "W 2" WAS USED AS A BASIS FOR THE VERTICAL CONTROL.

5. COORDINATE VALUES OF EXISTING NGS CONTROL, TRAVERSE POINTS, AND HWAD MONUMENTS ARE STATE PLANE COORDINATES, WEST ZONE.

6. THE COMBINED FACTOR WAS CALCULATED USING THE FOLLOWING FIGURES. THE "MAP SCALE" AT POINT "W 2" IS 0.99990022, THE MEAN ELEVATION OF THE TOTAL PROJECT WAS TAKEN AS 4150.00 FEET ABOVE SEA LEVEL AND THE MEAN RADIUS OF THE EARTH WAS TAKEN AS 20,906,000 FEET. THE SEA LEVEL FACTOR WAS CALCULATED AS FOLLOWS: 20,906000/20,906,000 + 4150.00 = 0.999801532. THE COMBINED FACTOR (CF) WAS CALCULATED AS FOLLOWS: 0.99990022 X 0.999801532 = 0.999701772.

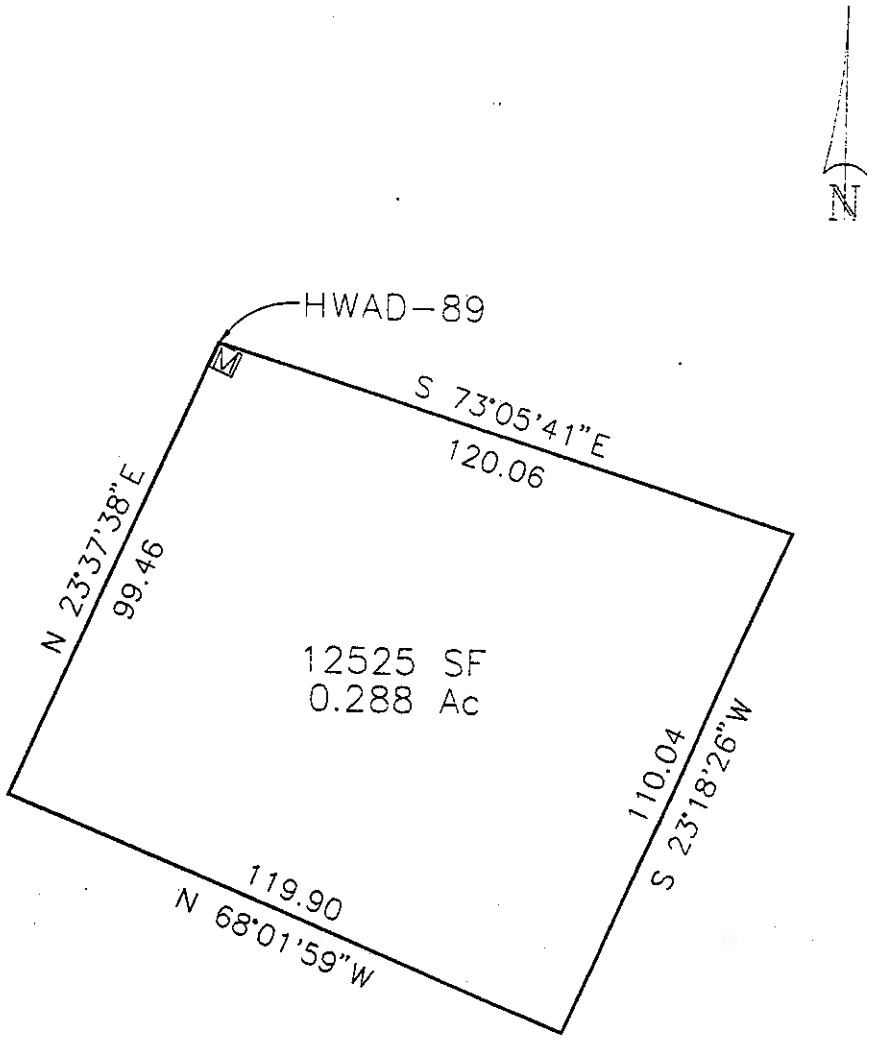
7. GROUND DISTANCE X CF (0.999801532) = GRID DISTANCE.

8. GRID DISTANCE X INVERSE CF (1.00298317) = GROUND DISTANCE.

9. COORDINATE VALUES OF ALL OTHER POINTS INCLUDING SWMU CORNERS OTHER THAN "HWAD" MONUMENTS, REFERENCE POINTS, TEST PIT OR HOLE LOCATIONS ETC., WERE CALCULATED USING GROUND DISTANCES AND ARE THEREFORE NOT TRUE STATE PLANE COORDINATES.

10. DISTANCES AS SHOWN ON THESE SWMU'S ARE HORIZONTAL GROUND DISTANCES.

PROFESSIONAL LAND SURVEYOR
RICHARD A. STINCHFIELD
7/28/97
No.3631



NW COR	N	14513242.396	E	2623154.070	ELEV	4196.365
NE COR	N	14513207.484	E	2623268.941	ELEV	4196.504
SE COR	N	14513106.423	E	2623225.402	ELEV	4196.807
SW COR	N	14513151.274	E	2623114.208	ELEV	4196.356

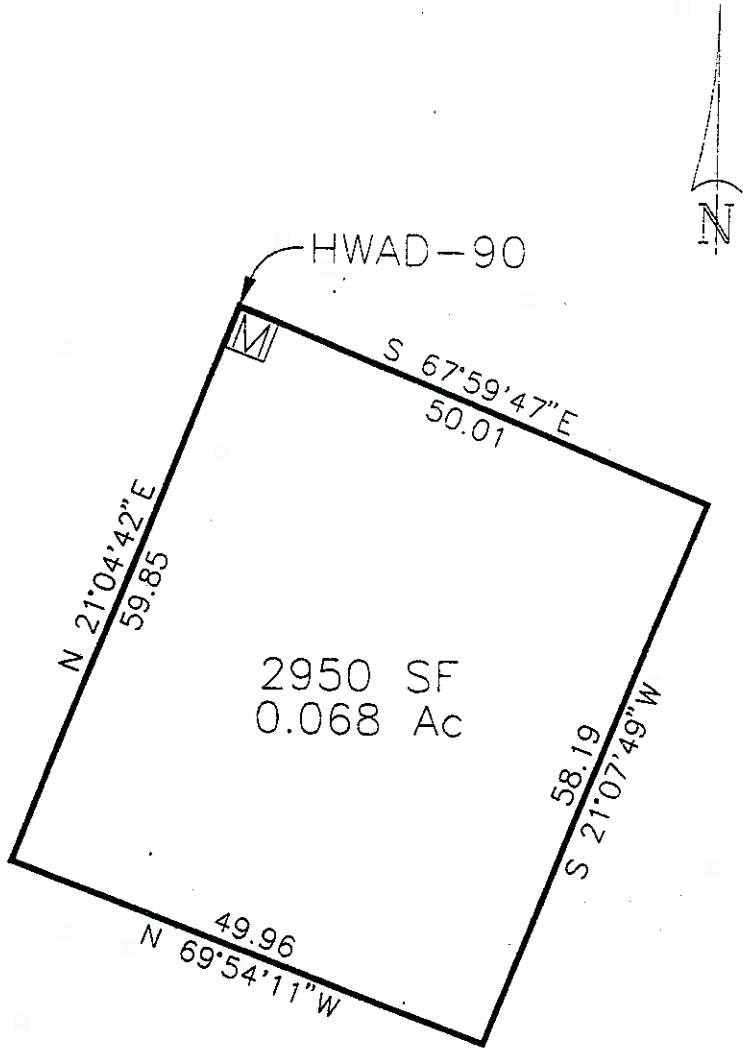
PROFESSIONAL LAND SURVEYOR
RICHARD A. STINCHFIELD
7/21/97
No. 3631
STATE OF NEVADA

30 15 0 30 60 90
SCALE IN FEET

ecology and environment, inc.
International Specialists in the Environment

SWMU B-18

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



NW COR	N	14513085.681	E	2623180.491	ELEV	4198.030
NE COR	N	14513066.944	E	2623226.858	ELEV	4197.610
SE COR	N	14513012.666	E	2623205.881	ELEV	4196.779
SW COR	N	14513029.832	E	2623158.965	ELEV	4196.889

PROFESSIONAL LAND SURVEYOR STATE OF NEVADA
BALLARD J. STINCHFIELD
7/21/97
No.3631

15 7 0 15 30 45
SCALE IN FEET

ecology and environment, inc.
International Specialists in the Environment

SHEET 21 OF 38

SWMU B-18s

COMSTOCK LAND SURVEYING
777 LA RUE AVENUE, SUITE A
RENO, NEVADA 89509
PH. (702) 329-2072

SWMU B18 Survey Data
Hawthorne Army Depot
Hawthorne, Nevada

SWMU	Point ID	Northing (feet)	Easting (feet)	Elevation
B18	HWAAP-89-1996	1389903.38	498763.39	4196.81
B18	Pin 1	1389868.46	498878.26	4196.36
B18	Pin 2	1389767.40	498834.72	4196.37
B18	Pin 3	1389812.25	498723.53	4199.50
B18	HA01	1389828.38	498805.86	NE
B18	HA02	1389858.38	498814.96	NE
B18	CPS01	1389869.38	498791.56	NE
B18	HWAAP-90-1996	1389746.66	498789.81	4196.78
B18	Pin 1	1389727.92	498836.18	4196.89
B18	Pin 2	1389673.65	498815.20	4198.03
B18	Pin 3	1389690.81	498876.28	4197.61

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
B18-HA1-2-000	HA02	5/12/94	0.5	ASC	3.5
B18-HA1-2-005	HA02	5/12/94	5	ASC	2.3
B18-CPS1-1-014	CPS01	5/31/94	14	ASC	1.7
B18-CPS1-1-018.5	CPS01	5/31/94	18.5	ASC	<1.1

Analyses	4
Detections	3
Minimum Concentration	1.7
Maximum Concentration	3.5
HWAD - PCG	128000
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
B18-HA1-2-000	HA02	5/12/94	0.5	ASC	94	<0.6	<0.6	5	<1.2	NA	NA	NA
B18-HA1-2-005	HA02	5/12/94	5	ASC	46	<0.54	<0.54	2.5	<1.1	1.1	4	<0.54
B18-CPS1-1-014	CPS01	5/31/94	14	ASC	65	<0.52	4.2	4.6	<1	7.5	7.3	<0.52
B18-CPS1-1-018.5	CPS01	5/31/94	18.5	ASC	950	<0.57	4.5	10	<1.1	22	5.9	<0.57
Analyses					4	4	4	4	4	3	3	3
Detections					4	0	2	4	0	3	3	0
Minimum Concentration					46	0	4.2	2.5	0	1.1	4	0
Maximum Concentration					950	0	4.5	10	0	22	7.3	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.

Arsenic
Method 7060 (ASC)

Sample ID	Location ID	Sample Date	Depth	Lab	Arsenic
					mg/kg
B18-HA1-2-000	HA02	5/12/94	0.5	ASC	4.6
B18-HA1-2-005	HA02	5/12/94	5	ASC	1.1
B18-CPS1-1-014	CPS01	5/31/94	14	ASC	7.5
B18-CPS1-1-018.5	CPS01	5/31/94	18.5	ASC	22

Analyses	4
Detections	4
Minimum Concentration	1.1
Maximum Concentration	22
HWAD - PCG	100
HWAD - PCG Hits	0

Lead
Method 7421 (ASC)

Sample ID	Location ID	Sample Date	Depth	Lab	Lead
					mg/kg
B18-HA1-2-000	HA02	5/12/94	0.5	ASC	14
B18-HA1-2-005	HA02	5/12/94	5	ASC	4
B18-CPS1-1-014	CPS01	5/31/94	14	ASC	7.3
B18-CPS1-1-018.5	CPS01	5/31/94	18.5	ASC	5.9

Analyses	4
Detections	4
Minimum Concentration	4
Maximum Concentration	14
HWAD - PCG	100
HWAD - PCG Hits	0

Mercury
Method 7471 (ASC)

Sample ID	Location ID	Sample Date	Depth (feet)	Lab	Mercury
					mg/kg
B18-HA1-2-000	HA02	5/12/94	0.5	ASC	0.12
B18-HA1-2-005	HA02	5/12/94	5	ASC	<0.11
B18-CPS1-1-014	CPS01	5/31/94	14	ASC	<0.1
B18-CPS1-1-018.5	CPS01	5/31/94	18.5	ASC	<0.11

Analyses	4
Detections	1
Minimum Concentration	0.12
Maximum Concentration	0.12
HWAD - PCG	24
HWAD - PCG Hits	0

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

Selenium
Method 7740 (ASC)

Sample ID	Location ID	Sample Date	Depth	Lab	Selenium
					mg/kg
B18-HA1-2-000	HA02	5/12/94	0.5	ASC	<0.6
B18-HA1-2-005	HA02	5/12/94	5	ASC	<0.54
B18-CPS1-1-014	CPS01	5/31/94	14	ASC	<0.52
B18-CPS1-1-018.5	CPS01	5/31/94	18.5	ASC	<0.57

Analyses	4
Detections	0
Minimum Concentration	0
Maximum Concentration	0
HWAD - PCG	20
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	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
B18-HA1-2-000	HA02	5/12/94	0.5	ASC	0.14 J	<1	<1	<1	<1	<1	<1	<1	<1
B18-HA1-2-005	HA02	5/12/94	5	ASC	<1	<1	<1	<1	<1	<1	<1	<1	<1
B18-CPS1-1-014	CPS01	5/31/94	14	ASC	<1	<1	<1	<1	<1	<1	<1	<1	<1
B18-CPS1-1-018.5	CPS01	5/31/94	18.5	ASC	1.4	<1	<1	<1	<1	<1	<1	<1	<1
Analyses					4	4	4	4	4	4	4	4	4
Detections					2	0	0	0	0	0	0	0	0
Minimum Concentration					0.14	0	0	0	0	0	0	0	0
Maximum Concentration					1.4	0	0	0	0	0	0	0	0
HWAD - PCG					233	2.6	80	NE	800	800	NE	800	4000
HWAD - PCG Hits					0	0	0	NE	0	0	BE	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	Lab	m-Dinitrobenzene	Nitrobenzene	RDX	sym-Trinitrobenzene	Tetryl
					mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
B18-HA1-2-000	HA02	5/12/94	0.5	ASC	<1	<1	<1	<1	<1
B18-HA1-2-005	HA02	5/12/94	5	ASC	<1	<1	<1	<1	<1
B18-CPS1-1-014	CPS01	5/31/94	14	ASC	<1	<1	<1	<1	<1
B18-CPS1-1-018.5	CPS01	5/31/94	18.5	ASC	<1	<1	0.9 J	3.2	<1
Analyses					4	4	4	4	4
Detections					0	0	1	1	0
Minimum Concentration					0	0	0.9	3.2	0
Maximum Concentration					0	0	0.9	3.2	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	Lab	Picric Acid
					mg/kg
B18-HA1-2-000	HA02	5/12/94	0.5	ASC	<0.25
B18-HA1-2-005	HA02	5/12/94	5	ASC	<0.25
B18-CPS1-1-014	CPS01	5/31/94	14	ASC	<0.25
B18-CPS1-1-018.5	CPS01	5/31/94	18.5	ASC	<0.25

Analyses	4
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.

Nitroaromatics and Nitramines by HPLC
Method 8330

rps of Engineers
P1-GF-001-P
)1-SA

Sampled: 03 NOV 98 Received: 06 NOV 98
Prepared: 13 NOV 98 Analyzed: 17 NOV 98

Result	Units	Reporting Limit	Qualifier
0.44	mg/kg	0.25	
0.11	mg/kg	0.25	J
ND	mg/kg	0.25	
ND	mg/kg	0.25	
ND	mg/kg	0.25	
0.18	mg/kg	0.25	J
ND	mg/kg	0.25	
0.071	mg/kg	0.25	J
0.080	mg/kg	0.25	J
ND	mg/kg	0.25	
ND	mg/kg	0.25	
ND	mg/kg	0.25	
ND	mg/kg	0.25	
ND	mg/kg	0.25	

Recovery	Acceptable Range
102 %	65 - 135

PRELIMINARY RESULTS

ected below the reporting limit or is an estimated concentration.

dson Approved By:

er letter is an integral part of this report.
Rev 230787

Nitroaromatics and Nitramines by HPLC
Method 8330

Client Name: US Army Corps of Engineers
Client ID: A-3-SMB18-P1-GF-003-P
LAB ID: 302561-0003-SA
Matrix: SOIL
Authorized: 06 NOV 98

Sampled: 03 NOV 98
Prepared: 13 NOV 98

Received: 06 NOV 98
Analyzed: 18 NOV 98

Dilution Factor: 1.0

Parameter	Result	Units	Reporting Limit	Qualifier
HMX	ND	mg/kg	0.25	
1,3,5-Trinitrobenzene	ND	mg/kg	0.25	
RDX	ND	mg/kg	0.25	
1,3-Dinitrobenzene	ND	mg/kg	0.25	
Nitrobenzene	ND	mg/kg	0.25	
2,4,6-Trinitrotoluene	0.22	mg/kg	0.25	J
Tetryl	ND	mg/kg	0.25	
2,4-Dinitrotoluene	ND	mg/kg	0.25	
2,6-Dinitrotoluene	ND	mg/kg	0.25	
2-Am-DNT	ND	mg/kg	0.25	
4-Am-DNT	ND	mg/kg	0.25	
2-Nitrotoluene	ND	mg/kg	0.25	
4-Nitrotoluene	ND	mg/kg	0.25	
3-Nitrotoluene	ND	mg/kg	0.25	

Surrogate	Recovery	Acceptable Range
2,4-Dinitrofluorobenzene	98 %	65 - 135

PRELIMINARY RESULTS

Note J = Result is detected below the reporting limit or is an estimated concentration.
ND = Not Detected

Reported By: Jon Edmondson

Approved By:

The cover letter is an integral part of this report.
Rev 230787

Nitroaromatics and Nitramines by HPLC
Method 8330

Client Name: US Army Corps of Engineers
Client ID: A-3-SMB18-P1-GF-004-P
LAB ID: 302561-0004-SA
Matrix: SOIL
Authorized: 06 NOV 98

Sampled: 03 NOV 98
Prepared: 13 NOV 98

Received: 06 NOV 98
Analyzed: 18 NOV 98

Dilution Factor: 1.0

Parameter	Result	Units	Reporting Limit	Qualifier
HMX	ND	mg/kg	0.25	
1,3,5-Trinitrobenzene	ND	mg/kg	0.25	
RDX	ND	mg/kg	0.25	
1,3-Dinitrobenzene	ND	mg/kg	0.25	
Nitrobenzene	ND	mg/kg	0.25	
2,4,6-Trinitrotoluene	0.12	mg/kg	0.25	J
Tetryl	ND	mg/kg	0.25	
2,4-Dinitrotoluene	ND	mg/kg	0.25	
2,6-Dinitrotoluene	ND	mg/kg	0.25	
2-Am-DNT	0.21	mg/kg	0.25	J
4-Am-DNT	0.33	mg/kg	0.25	
2-Nitrotoluene	ND	mg/kg	0.25	
4-Nitrotoluene	ND	mg/kg	0.25	
3-Nitrotoluene	ND	mg/kg	0.25	

Surrogate	Recovery	Acceptable Range
2,4-Dinitrofluorobenzene	104 %	65 - 135

PRELIMINARY RESULTS

Note J = Result is detected below the reporting limit or is an estimated concentration.
ND = Not Detected

Reported By: Jon Edmondson

Approved By:

The cover letter is an integral part of this report.
Rev 230787

Nitroaromatics and Nitramines by HPLC
Method 8330

Client Name: US Army Corps of Engineers
Client ID: A-3-SMB18-P1-GF-002-P
LAB ID: 302561-0002-SA
Matrix: SOIL
Authorized: 06 NOV 98

Sampled: 03 NOV 98
Prepared: 13 NOV 98

Received: 06 NOV 98
Analyzed: 17 NOV 98

Dilution Factor: 1.0

Parameter	Result	Units	Reporting Limit	Qualifier
HMX	0.10	mg/kg	0.25	J
1,3,5-Trinitrobenzene	ND	mg/kg	0.25	
RDX	0.11	mg/kg	0.25	J
1,3-Dinitrobenzene	ND	mg/kg	0.25	
Nitrobenzene	ND	mg/kg	0.25	
2,4,6-Trinitrotoluene	0.18	mg/kg	0.25	J
Tetryl	ND	mg/kg	0.25	
2,4-Dinitrotoluene	ND	mg/kg	0.25	
2,6-Dinitrotoluene	ND	mg/kg	0.25	
2-Am-DNT	0.19	mg/kg	0.25	J
4-Am-DNT	0.26	mg/kg	0.25	
2-Nitrotoluene	ND	mg/kg	0.25	
4-Nitrotoluene	ND	mg/kg	0.25	
3-Nitrotoluene	ND	mg/kg	0.25	

Surrogate	Recovery	Acceptable Range
2,4-Dinitrofluorobenzene	102 %	65 - 135

PRELIMINARY RESULTS

Note J = Result is detected below the reporting limit or is an estimated concentration.
ND = Not Detected

Reported By: Jon Edmondson Approved By:

The cover letter is an integral part of this report.
Rev 230787

Appendix D

Windrow Confirmation Samples

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 #: 801-993611
Collected by:
Collected on: 05/12-13/99

Received: 05/14/99
Extracted: 05/17/99
Tested: 05/17-18/99
Reported: 05/23/99

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 ~~BR051399-1808-1~~ 99-03611-19	~~BR-051399-0820-2~~ 99-03611-20
NITROAROMATICS AND NITROAMINES					
Dilution Factor				2.08	6.38
4-AMINO-2,6-DINITROTOLUENE	8330	µg/L	10	<21	<65
2-AMINO-4,6-DINITROTOLUENE	8330	µg/L	10	<21	<65
1,3-DINITROBENZENE	8330	µg/L	4	<8.4	<26
2,4-DINITROTOLUENE	8330	µg/L	5.7	<12	<37
2,6-DINITROTOLUENE	8330	µg/L	9.4	<20	<61
HMX	8330	µg/L	13	<27	<85
NITROBENZENE	8330	µg/L	6.4	<14	<42
3-NITROTOLUENE	8330	µg/L	7.9	<17	<51
RDX	8330	µg/L	14	<30	<91
TETRYL	8330	µg/L	4	0.5J	3J
1,3,5-TRINITROBENZENE	8330	µg/L	7.3	<15	<47
2,4,6-TRINITROTOLUENE	8330	µg/L	6.9	0.3J	<45
2/4-NITROTOLUENE	8330	µg/L	8.5	<18	<55

II. Analysis of Soil Samples

Component Analyzed	Method	Unit	PQL	Analysis Result A3-WR001A-C001CC002P 99-03611-1	A3-WR001A-C002CC002P 99-03611-2
MOISTURE, PERCENT IN SOIL	ASTM-D2216	%Moisture	0.5	28.3	30.2
NITROAROMATICS AND NITROAMINES					
Dilution Factor				1	1
4-AMINO-2,6-DINITROTOLUENE	8330	mg/kg	0.2	0.6	<0.29
2-AMINO-4,6-DINITROTOLUENE	8330	mg/kg	0.2	0.5	<0.29
1,3-DINITROBENZENE	8330	mg/kg	0.25	<0.35	0.1J
2,4-DINITROTOLUENE	8330	mg/kg	0.25	<0.35	<0.36
2,6-DINITROTOLUENE	8330	mg/kg	0.25	<0.35	<0.36
HMX	8330	mg/kg	0.25	0.97	<0.36
NITROBENZENE	8330	mg/kg	0.25	<0.35	<0.36
3-NITROTOLUENE	8330	mg/kg	0.25	<0.35	<0.36
RDX	8330	mg/kg	0.25	9.83	<0.36
TETRYL	8330	mg/kg	0.25	<0.35	<0.36
1,3,5-TRINITROBENZENE	8330	mg/kg	0.25	<0.35	<0.36
2,4,6-TRINITROTOLUENE	8330	mg/kg	0.25	1.4	0.37
2/4-NITROTOLUENE	8330	mg/kg	0.25	<0.35	<0.36

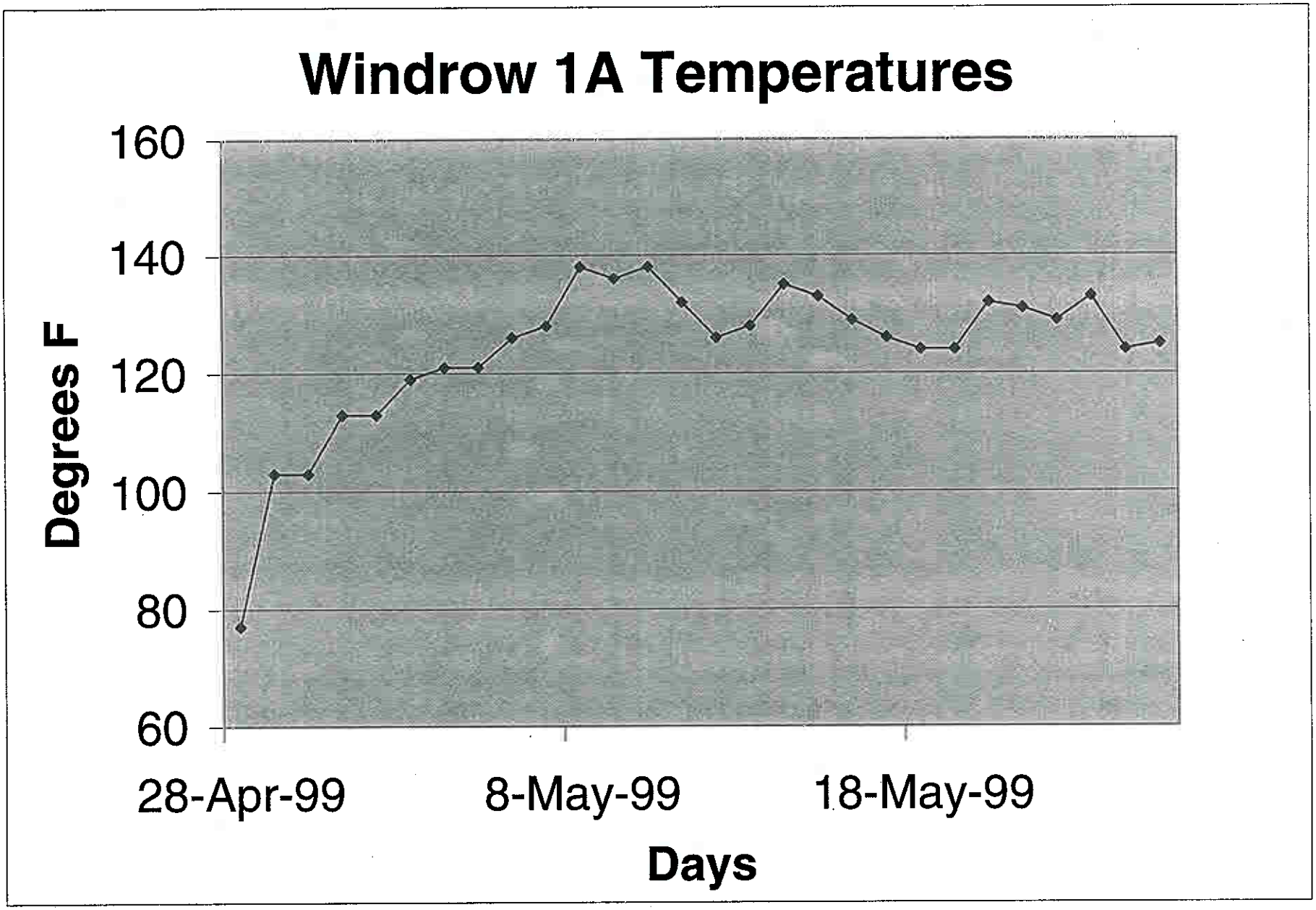
Applied P & Ch Laboratory
13760 Magnolia Ave. Chino CA 91710
Tel: (909) 590-1828 Fax: (909) 590-1498

APCL Analytical Report

Component Analyzed	Method	Unit	PQL	Analysis Result A3-WR001A-C003CC002P 99-03611-3	Analysis Result A3-WR001A-C004CC002P 99-03611-4
MOISTURE, PERCENT IN SOIL	ASTM-D2216	%Moisture	0.5	28.3	35.8
NITROAROMATICS AND NITROAMINES					
Dilution Factor				1	1
4-AMINO-2,6-DINITROTOLUENE	8330	mg/kg	0.2	<0.28	0.67
2-AMINO-4,6-DINITROTOLUENE	8330	mg/kg	0.2	<0.28	0.4
1,3-DINITROBENZENE	8330	mg/kg	0.25	<0.35	<0.39
2,4-DINITROTOLUENE	8330	mg/kg	0.25	<0.35	<0.39
2,6-DINITROTOLUENE	8330	mg/kg	0.25	<0.35	<0.39
HMX	8330	mg/kg	0.25	<0.35	0.86
NITROBENZENE	8330	mg/kg	0.25	<0.35	<0.39
3-NITROTOLUENE	8330	mg/kg	0.25	<0.35	<0.39
RDX	8330	mg/kg	0.25	<0.35	10.5
TETRYL	8330	mg/kg	0.25	<0.35	<0.39
1,3,5-TRINITROBENZENE	8330	mg/kg	0.25	<0.35	<0.39
2,4,6-TRINITROTOLUENE	8330	mg/kg	0.25	0.1J	0.42
2/4-NITROTOLUENE	8330	mg/kg	0.25	<0.35	<0.39

Component Analyzed	Method	Unit	PQL	Analysis Result A3-WR001A-C005CC002P 99-03611-5	Analysis Result ~~A3-WR002A-C001CC002P~~ 99-03611-6
MOISTURE, PERCENT IN SOIL	ASTM-D2216	%Moisture	0.5	29.8	22.0
NITROAROMATICS AND NITROAMINES					
Dilution Factor				1	1
4-AMINO-2,6-DINITROTOLUENE	8330	mg/kg	0.2	<0.28	<0.26
2-AMINO-4,6-DINITROTOLUENE	8330	mg/kg	0.2	<0.28	<0.26
1,3-DINITROBENZENE	8330	mg/kg	0.25	0.2J	<0.32
2,4-DINITROTOLUENE	8330	mg/kg	0.25	<0.36	<0.32
2,6-DINITROTOLUENE	8330	mg/kg	0.25	<0.36	<0.32
HMX	8330	mg/kg	0.25	<0.36	0.2J
NITROBENZENE	8330	mg/kg	0.25	<0.36	<0.32
3-NITROTOLUENE	8330	mg/kg	0.25	<0.36	<0.32
RDX	8330	mg/kg	0.25	<0.36	<0.32
TETRYL	8330	mg/kg	0.25	<0.36	<0.32
1,3,5-TRINITROBENZENE	8330	mg/kg	0.25	<0.36	0.3J
2,4,6-TRINITROTOLUENE	8330	mg/kg	0.25	0.50	<0.32
2/4-NITROTOLUENE	8330	mg/kg	0.25	<0.36	<0.32

Component Analyzed	Method	Unit	PQL	Analysis Result A3-WR002A-C002CC002P 99-03611-7	Analysis Result A3-WR002A-C003CC002P 99-03611-8
MOISTURE, PERCENT IN SOIL	ASTM-D2216	%Moisture	0.5	26.6	36.4


Windrow 1A Temperatures
160
140
120
100
80
60
Degrees F
28-Apr-99
8-May-99
18-May-99
Days

SWMU Confirmation Samples

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 #: 801-993156
Collected by:
Collected on: 04/20-21/99

Received: 04/22/99
Extracted: 04/26/99
Tested: 04/22-27/99
Reported: 04/30/99

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 ER-042099-1120-2 99-03156-21
NITROAROMATICS AND NITROAMINES [a]				
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	1J
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	2J
2/4-NITROTOLUENE	8330	µg/L	8.5	<32

II. Analysis of Soil Samples

Component Analyzed	Method	Unit	PQL	Analysis Result A3-SMB18-P1-GF001-P 99-03156-1	A3-SMB18-P1-GS001-P 99-03156-2
MOISTURE	ASTM-D2216	%Moisture	0.5	1.9	1.2
NITROAROMATICS AND NITROAMINES [a]					
Dilution Factor				1	1
4-AMINO-2,6-DINITROTOLUENE	8330	mg/kg	0.2	0.44	0.3
2-AMINO-4,6-DINITROTOLUENE	8330	mg/kg	0.2	0.49	0.52
1,3-DINITROBENZENE	8330	mg/kg	0.25	<0.25	<0.25
2,4-DINITROTOLUENE	8330	mg/kg	0.25	0.2J	0.27
2,6-DINITROTOLUENE	8330	mg/kg	0.25	<0.25	<0.25
HMX	8330	mg/kg	0.25	0.83	0.74
NITROBENZENE	8330	mg/kg	0.25	<0.25	<0.25
3-NITROTOLUENE	8330	mg/kg	0.25	<0.25	<0.25
RDX	8330	mg/kg	0.25	3.6	7.54
TETRYL	8330	mg/kg	0.25	<0.25	<0.25
1,3,5-TRINITROBENZENE	8330	mg/kg	0.25	0.1J	0.82
2,4,6-TRINITROTOLUENE	8330	mg/kg	0.25	18.1	2.8
2/4-NITROTOLUENE	8330	mg/kg	0.25	<0.25	<0.25

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Component Analyzed	Method	Unit	PQL	Analysis Result A3-SMB18-P1-GS002-P 99-03156-3	Analysis Result A3-SMB18-P1-GS003-P 99-03156-4
MOISTURE	ASTM-D2216	%Moisture	0.5	2.2	1.7
NITROAROMATICS AND NITROAMINES [a]					
Dilution Factor				1	1
4-AMINO-2,6-DINITROTOLUENE	8330	mg/kg	0.2	0.51	<0.20
2-AMINO-4,6-DINITROTOLUENE	8330	mg/kg	0.2	0.71	0.1J
1,3-DINITROBENZENE	8330	mg/kg	0.25	<0.26	<0.25
2,4-DINITROTOLUENE	8330	mg/kg	0.25	0.26	<0.25
2,6-DINITROTOLUENE	8330	mg/kg	0.25	<0.26	<0.25
HMX	8330	mg/kg	0.25	5.1	0.2J
NITROBENZENE	8330	mg/kg	0.25	<0.26	<0.25
3-NITROTOLUENE	8330	mg/kg	0.25	<0.26	<0.25
RDX	8330	mg/kg	0.25	15.0	0.43
TETRYL	8330	mg/kg	0.25	<0.26	<0.25
1,3,5-TRINITROBENZENE	8330	mg/kg	0.25	7.96	0.37
2,4,6-TRINITROTOLUENE	8330	mg/kg	0.25	20.1	0.35
2/4-NITROTOLUENE	8330	mg/kg	0.25	<0.26	<0.25

Component Analyzed	Method	Unit	PQL	Analysis Result A3-SMB18-P1-GS004-P 99-03156-5	Analysis Result A3-SMB18-S001-P 99-03156-6
MOISTURE	ASTM-D2216	%Moisture	0.5	2.9	2.7
NITROAROMATICS AND NITROAMINES [a]					
Dilution Factor				1	1
4-AMINO-2,6-DINITROTOLUENE	8330	mg/kg	0.2	<0.21	0.4
2-AMINO-4,6-DINITROTOLUENE	8330	mg/kg	0.2	<0.21	0.57
1,3-DINITROBENZENE	8330	mg/kg	0.25	<0.26	<0.26
2,4-DINITROTOLUENE	8330	mg/kg	0.25	<0.26	0.2J
2,6-DINITROTOLUENE	8330	mg/kg	0.25	<0.26	<0.26
HMX	8330	mg/kg	0.25	<0.26	1.1
NITROBENZENE	8330	mg/kg	0.25	<0.26	<0.26
3-NITROTOLUENE	8330	mg/kg	0.25	<0.26	<0.26
RDX	8330	mg/kg	0.25	0.76	2.8
TETRYL	8330	mg/kg	0.25	<0.26	<0.26
1,3,5-TRINITROBENZENE	8330	mg/kg	0.25	<0.26	2.0
2,4,6-TRINITROTOLUENE	8330	mg/kg	0.25	0.64	18.1
2/4-NITROTOLUENE	8330	mg/kg	0.25	<0.26	<0.26

Component Analyzed	Method	Unit	PQL	Analysis Result A3-WR006-C001-CC002-P 99-03156-7	Analysis Result A3-WR006-C002-CC002-P 99-03156-8
MOISTURE	ASTM-D2216	%Moisture	0.5	18.9	24.4

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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 #: 801-993611
Collected by:
Collected on: 05/12-13/99

Received: 05/14/99
Extracted: 05/17/99
Tested: 05/17-18/99
Reported: 05/23/99

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 ~~PR031299-1808-1~~ 99-03611-19	Analysis Result ~~MC-051399-0820/2~~ 99-03611-20
NITROAROMATICS AND NITROAMINES					
Dilution Factor				2.08	6.38
4-AMINO-2,6-DINITROTOLUENE	8330	µg/L	10	<21	<65
2-AMINO-4,6-DINITROTOLUENE	8330	µg/L	10	<21	<65
1,3-DINITROBENZENE	8330	µg/L	4	<8.4	<26
2,4-DINITROTOLUENE	8330	µg/L	5.7	<12	<37
2,6-DINITROTOLUENE	8330	µg/L	9.4	<20	<61
HMX	8330	µg/L	13	<27	<85
NITROBENZENE	8330	µg/L	6.4	<14	<42
3-NITROTOLUENE	8330	µg/L	7.9	<17	<51
RDX	8330	µg/L	14	<30	<91
TETRYL	8330	µg/L	4	0.5J	3J
1,3,5-TRINITROBENZENE	8330	µg/L	7.3	<15	<47
2,4,6-TRINITROTOLUENE	8330	µg/L	6.9	0.3J	<45
2/4-NITROTOLUENE	8330	µg/L	8.5	<18	<55

II. Analysis of Soil Samples

Component Analyzed	Method	Unit	PQL	Analysis Result A3-WR001A-C001CC002P 99-03611-1	Analysis Result A3-WR001A-C002CC002P 99-03611-2
MOISTURE, PERCENT IN SOIL	ASTM-D2216	%Moisture	0.5	28.3	30.2
NITROAROMATICS AND NITROAMINES					
Dilution Factor				1	1
4-AMINO-2,6-DINITROTOLUENE	8330	mg/kg	0.2	0.6	<0.29
2-AMINO-4,6-DINITROTOLUENE	8330	mg/kg	0.2	0.5	<0.29
1,3-DINITROBENZENE	8330	mg/kg	0.25	<0.35	0.1J
2,4-DINITROTOLUENE	8330	mg/kg	0.25	<0.35	<0.36
2,6-DINITROTOLUENE	8330	mg/kg	0.25	<0.35	<0.36
HMX	8330	mg/kg	0.25	0.97	<0.36
NITROBENZENE	8330	mg/kg	0.25	<0.35	<0.36
3-NITROTOLUENE	8330	mg/kg	0.25	<0.35	<0.36
RDX	8330	mg/kg	0.25	9.83	<0.36
TETRYL	8330	mg/kg	0.25	<0.35	<0.36
1,3,5-TRINITROBENZENE	8330	mg/kg	0.25	<0.35	<0.36
2,4,6-TRINITROTOLUENE	8330	mg/kg	0.25	1.4	0.37
2/4-NITROTOLUENE	8330	mg/kg	0.25	<0.35	<0.36

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Component Analyzed	Method	Unit	PQL	Analysis Result A3-WR001A-C003CC002P 99-03611-3	Analysis Result A3-WR001A-C004CC002P 99-03611-4
MOISTURE, PERCENT IN SOIL	ASTM-D2216	%Moisture	0.5	28.3	35.8
NITROAROMATICS AND NITROAMINES					
Dilution Factor				1	1
4-AMINO-2,6-DINITROTOLUENE	8330	mg/kg	0.2	<0.28	0.67
2-AMINO-4,6-DINITROTOLUENE	8330	mg/kg	0.2	<0.28	0.4
1,3-DINITROBENZENE	8330	mg/kg	0.25	<0.35	<0.39
2,4-DINITROTOLUENE	8330	mg/kg	0.25	<0.35	<0.39
2,6-DINITROTOLUENE	8330	mg/kg	0.25	<0.35	<0.39
HMX	8330	mg/kg	0.25	<0.35	0.86
NITROBENZENE	8330	mg/kg	0.25	<0.35	<0.39
3-NITROTOLUENE	8330	mg/kg	0.25	<0.35	<0.39
RDX	8330	mg/kg	0.25	<0.35	10.5
TETRYL	8330	mg/kg	0.25	<0.35	<0.39
1,3,5-TRINITROBENZENE	8330	mg/kg	0.25	<0.35	<0.39
2,4,6-TRINITROTOLUENE	8330	mg/kg	0.25	0.1J	0.42
2/4-NITROTOLUENE	8330	mg/kg	0.25	<0.35	<0.39

Component Analyzed	Method	Unit	PQL	Analysis Result A3-WR001A-C005CC002P 99-03611-5	Analysis Result ~~A3-WR002A-C001CC002P~~ 99-03611-6
MOISTURE, PERCENT IN SOIL	ASTM-D2216	%Moisture	0.5	29.8	22.0
NITROAROMATICS AND NITROAMINES					
Dilution Factor				1	1
4-AMINO-2,6-DINITROTOLUENE	8330	mg/kg	0.2	<0.28	<0.26
2-AMINO-4,6-DINITROTOLUENE	8330	mg/kg	0.2	<0.28	<0.26
1,3-DINITROBENZENE	8330	mg/kg	0.25	0.2J	<0.32
2,4-DINITROTOLUENE	8330	mg/kg	0.25	<0.36	<0.32
2,6-DINITROTOLUENE	8330	mg/kg	0.25	<0.36	<0.32
HMX	8330	mg/kg	0.25	<0.36	0.2J
NITROBENZENE	8330	mg/kg	0.25	<0.36	<0.32
3-NITROTOLUENE	8330	mg/kg	0.25	<0.36	<0.32
RDX	8330	mg/kg	0.25	<0.36	<0.32
TETRYL	8330	mg/kg	0.25	<0.36	<0.32
1,3,5-TRINITROBENZENE	8330	mg/kg	0.25	<0.36	0.3J
2,4,6-TRINITROTOLUENE	8330	mg/kg	0.25	0.50	<0.32
2/4-NITROTOLUENE	8330	mg/kg	0.25	<0.36	<0.32

Component Analyzed	Method	Unit	PQL	Analysis Result A3-WR002A-C002CC002P 99-03611-7	Analysis Result A3-WR002A-C003CC002P 99-03611-8
MOISTURE, PERCENT IN SOIL	ASTM-D2216	%Moisture	0.5	26.6	36.4

Appendix E

B18, Facing north towards impoundment with Bldg. 101-14 in background.#R2-N7, 9/28/94

B18, Facing southwest of impoundment with Bldg. 101-64 in background.#R2-N8, 9/28/94

SWMU B-18 February 2000