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FINAL LETTER WORK PLAN FOR ADDITIONAL SAMPLING AT THE AEROSPACE MUSEUM SITE NAS FORT WORTH TX

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FINAL
LETTER WORK PLAN FOR ADDITIONAL SAMPLING AT THE AEROSPACE MUSEUM SITE, NAVAL AIR STATION FORT WORTH, JOINT RESERVE BASE, FORMER CARSWELL AIR FORCE BASE, TEXAS

Prepared by
Universe Technologies, Inc.
Brooks Air Force Base, Texas

October 2000

UNIVERSE TECHNOLOGIES, INC.
Engineering and Scientific Solutions

Client Retention Is Our Highest Priority And Ultimate Goal

20 October 2000

AFBCA
3711 Fighter Drive, Suite 200
Bergstrom AFB, Austin, Texas 78719-2557

ATTN: Gary Miller (USEPA), Mark Weegar (TNRCC), and Tim Sewell (TNRCC)

SUBJECT: Work Plan for Additional Sampling at the Aerospace Museum Site (AMS), Naval Air Station, Fort Worth, Joint Reserve Base, former Carswell Air Force Base (AFB), Texas, Contract No.: F41624-95-D-8003, Delivery Order 0023.

OBJECTIVES

This Work Plan Addendum includes the following additional soil sampling and analyses recommended during the BRAC Closure Team (BCT) meeting on 23 March 2000 to support closure of the AMS:

- Sampling at the site boundary locations to confirm the nature and extent of zinc, lead, silver, benzo(a)pyrene, and nickel contamination.
- Conduct Synthetic Precipitate Leaching Procedure (SPLP) tests for contaminants that exceed Risk Reduction Standard 2 (RRS2) values. SPLP tests will determine whether contaminants of concern are leaching into the groundwater.
- Sampling for zinc to define the nature and extent of zinc contamination along and away from the fence line.

SITE LOCATION AND HISTORY

The AMS is located along Spur 341, west of the North-South primary instrument runway, south of AFP-4, and adjacent to Farmers Branch Creek (Figure 1). The site is currently covered with grass and slopes gently from northwest to southeast.

This 12.5-acre museum site has been used for display of various aircraft, vehicles, and storage equipment. A record search indicated that an asphalt batching plant was previously located at the site. Also, a B-52 bomber was previously stored and dismantled at the site, resulting in small chips of aircraft skin being buried in the surface soil.

PREVIOUS INVESTIGATIONS

October 1995, Site Investigation/Site Characterization, Law Engineering (LAW):

Forty-nine surface soil samples and two background samples were collected from 0 to 2 feet below ground surface (bgs) using stainless steel hand augers at locations based on a grid layout (Figure 2). The objective of the sampling was to determine the extent of surface contamination in soils resulting from previous site activities. The soil samples were analyzed for total metals, volatile organic compounds (VOCs), and semi-volatile organic compounds (SVOCs).

Methylene chloride was detected in OT3804SA (0.00628 mg/kg) below the medium specific concentration (MSC) of 0.5 mg/kg. Toluene was detected in both background samples and 44 of 51 samples. The maximum toluene concentration detected in the background sample OT3851SA was 0.0302 mg/kg.

SVOCs were detected in soil samples and in background sample OT38504SA. Polynuclear aromatic hydrocarbons (PAHs) were detected in 20 soil samples out of the 49 samples collected at the site. High levels of PAHs were reported in OT3801SA, OT3814SA, and background sample OT3851SA. Phthalates were detected in several soil samples and also in background sample OT3851SA.

Sample data for metals were compared to the maximum values obtained from the background samples OT3850SA and OT3851SA. Aluminum, antimony, arsenic, barium, beryllium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, molybdenum, nickel, potassium, sodium, vanadium, and zinc concentrations exceeded the maximum background concentrations.

June 1997, Demolition and Removal of Structures/Disposal of Transformers with PCB Oil, Unified Services of Texas, Inc. (UST, Inc.):

UST, Inc. demolished and removed a wooden shed, an electrical equipment box, two old concrete blast shields, two concrete pads, one asphalt concrete pad, a mobile fuel test system, soil piles, a rubble pile, and loose railroad ties in the former AMS museum area. The site was restored with clean backfill, compacted, and reseeded with native grass.

January 1997, Basewide Background Study, Jacobs Engineering Group, Inc (Jacobs):

Thirty surface soil, 30 subsurface soil, 12 groundwater, 8 surface water and 8 stream sediment samples were collected to establish basewide background concentrations of inorganic constituents. The United States Environmental Protection Agency (USEPA) Tolerance Interval (TI) method was used to calculate background concentrations in various matrices as shown in Table 1. Tables 2a, 2b, 2c, and 2d summarize background values of inorganic constituents for subsurface samples, unfiltered groundwater samples, sediment samples, and organic constituents detected in surface, subsurface, and sediment samples.

In 1996, Jacobs compared the results reported in the LAW 1996 report to background concentrations reported in the Jacobs Basewide Background Study. According to the comparison, cadmium, chromium, cobalt, copper, and lead exceeded the upper tolerance limit $(UTL)_{95,99}$ for surface soils. Although the general concentrations of metals exceeded background concentrations, only sample OT3840SA exceeded the background concentrations and the MSC of 1,000 mg/kg for lead. Further sampling was therefore recommended for lead.

Methylene chloride, a common laboratory contaminant, was detected below the MSC of 0.5 mg/kg. Low concentrations of toluene were detected throughout the site, and were concluded to be anthropogenic. Low concentrations of SVOCs were detected throughout the site and below the TNRCC Soil/Air and Ingestion for Industrial (SAI-Ind) MSC Standards. It was also concluded that PAHs represent anthropogenic background concentrations, and did not require additional sampling.

May 1997, Draft Letter Report for Results of Sampling at the Aerospace Museum Site, Jacobs:

Twenty–seven soil samples were collected at the AMS to confirm the analytical results collected by LAW in October 1995 (Table 3). Samples were analyzed for arsenic, beryllium, chromium, lead, nickel, and antimony. Leaching tests were also conducted on these samples using SPLP. The results were compared to the RRS2 SAI-Ind values. Arsenic, chromium, nickel, and antimony were not detected in any of the samples. Beryllium was above the RRS2 Ground Water Industrial (GW-Ind) Standards of 0.004 mg/L with a maximum concentration of 0.0144 mg/L. Lead concentrations ranged from 0.0206 to 0.0629 mg/L, and exceeded the RRS2 GW-Ind Standards of 0.015 mg/L.

March and December 1999, Closure Investigation, Fanning, Phillips, and Molnar (FPM):

Twenty-five surface and subsurface samples were collected by FPM as part of risk-based closure activities for the AMS in accordance with Resource Conservation and Recovery Act Part B Permit HW50289. The sampling activities included the following:

- Collection of soil samples for SPLP analysis to fill data gaps identified in the initial data evaluation.
- Collection of soil samples for horizontal and vertical delineation of localized areas that exceed site-specific target levels for closure.
- Implementation of incidental soil removal/interim removal actions to meet site-specific contaminant target levels that will allow for risk-based site closure.
- Preparation of closure documentation in accordance with the TNRCC RRS2 Regulation, Section 335.555, Subchapter S guidelines.

Soil samples were analyzed for SVOCs and lead. Lead (41.20 mg/kg) exceeded the background concentration of 30.97 mg/kg. Benzo(a)pyrene (3.36 mg/kg) exceeded the RRS2 SAI-Ind concentration of 0.34 mg/kg. Results of this investigation are shown in Table 4.

- In December 1999, FPM collected soil samples from 24 locations and analyzed for lead, nickel, silver, chromium, zinc, antimony, and VOCs (Figure 3). The concentrations of zinc, lead, nickel, and silver exceeded background concentrations but were below RRS2 MSC values. The concentrations and sampling locations for the COCs that exceeded background can be found on Figure 4. Methylene chloride and tetrachloroethene (PCE) were also detected at levels below RRS2 MSC values (Table 5).

In March 2000, UNITEC presented the following summary of findings to obtain concurrence from the TNRCC and EPA regulators on the closure of the AMS, at Carswell AFB, Texas:

- SPLP concentration of lead in surface soil was less than the Ground Water for Industrial Standard (GW-Ind) (15 ug/L). Lead concentrations at location OT3840SA and all eight horizontal delineation locations (10 –15 ft) were greater than the GWP-Ind Standard (1.5 mg/kg).

- Lead concentrations from S54 (536 mg/kg), S55 (227 mg/kg), and OT3848SA (344 mg/kg) were below RRS2 MSC of 1,000 mg/kg.

- Zinc concentrations from S52 (179 mg/kg), S53 (186 mg/kg), S55 (127 mg/kg), S59 (62.4 mg/kg), and S62 (42.3 mg/kg) exceeded background concentrations, but remained below the RRS2 MSC of 4.1×10^5 mg/kg. The concentrations and sampling locations for the COCs that exceeded background can be found on Figure 4.

- PCE and methylene chloride were below the RRS2 MSC. No further sampling is required for these contaminants.

- Benzo(a)pyrene concentrations ranged from 1.53 to 3.36 mg/kg from OT3801SA and exceeded the RRS2 MSC of 0.34 mg/kg in the March 1999 sampling event. Benzo(a)pyrene will be analyzed using Method SW 8310.

During the presentation, Mr. Mark Weeger, Remedial Project Manager (RPM), TNRCC, recommended the following investigation to meet closure requirements at the AMS:

- Analyze metal strips from the fence. Sample for zinc residue along the fence, and also along the drainage way between the fence and the roadway. Conduct SPLP zinc analyses for all samples that exceed RRS2 GWP-Ind values.

- Collect confirmatory soil samples from original sampling locations, and conduct SPLP analyses for all COCs that exceed RRS2 GWP-Ind values.

PROPOSED ADDITIONAL SAMPLING FOR AMS CLOSURE

The sampling locations were determined based on the exceedances above background for December 1999 sampling (Figure 4). A total of 38 surface and subsurface samples including fence strips, four matrix spike/matrix spike duplicate (MS/MSD) will be collected (Table 6). Sixteen confirmation samples will be collected from the original sampling locations (S52, S53, S54, S55, OT3848SA, S58, S59, S62, OT3801SA) and analyzed for zinc, lead, silver, nickel, and benzo(a)pyrene. Confirmation samples will be collected from 0-2 and 2-4 feet, and both elevations will be analyzed for the afore-mentioned COCs that exceeded background. SPLP concentrations of all COCs that exceed RRS2 GWP-Ind values will be analyzed.

In order to determine the source and extent of zinc contamination, samples will be collected from four locations (0'-2' and 2'-4') beneath the fence, and from four locations (0'-2' and 2'-4') within the drainage way. Two metal strips will be collected from the fence (Figure 5). SPLP concentrations of all COCs that exceed RRS2 GWP-Ind values will be analyzed.

FIELD SAMPLING PROCEDURES

Soil samples will be collected using hand augers and according to the AFCEE Model Field Sampling Plan.

OTHER REQUIREMENTS

Sampling activities will be coordinated by IT Corporation with the Base. The sampling locations will be surveyed for use in determining closure boundaries. Final site closure will also require a recent metes and bounds survey for the AMS, and the preparation of closure documentation according to the TNRCC RRS2 Regulations Section 335.555, Subchapter S guidelines.

Please call me at (877) 386-5429 Ext 20, or Irene Tucker at (210) 531-0011 Ext 245, if you have any questions on this document.

Sincerely,

Rafael Vazquez
BRAC Environmental Coordinator
AFBCA/ROL BERG.
877-386-5429 Ext 20

Attachments
cc: Charles Pringle (HQ AFCEE/ERB)

TABLES

Table 1

Summary of Background UTLs by Matrix
Naval Air Station Fort Worth

Analyte	Surface Soil (mg/kg)	Subsurface Soil (mg/kg)	Low-Stress Procedure Groundwater (mg/L)	Bailer Sampled Groundwater (mg/L)	Surface Water (mg/L)	Stream Sediment (mg/kg)
Aluminum	22035	20260	1.332	11.07	0.272	19700
Antimony	0.56	0.712	ND at 0.002	0.0024	0.003	0.33
Arsenic	5.85	6.58	ND at 0.0049	0.0067	ND at 0.0049	7.96
Barium	233	128.1	0.587	1.133	0.151	144
Beryllium	1.02	1.13	0.0003	0.0019	ND at 0.0003	0.721
Calcium	167788	272000	266.3	2438	133.7	361000
Cadmium	0.556	0.59	ND at 0.0005	0.0016	ND at 0.0005	1.79
Chromium	25.86	16.31	0.006	0.0136	0.0078	16.1
Cobalt	11.05	6.19	ND at0.0089	0.01	ND at 0.0089	4.82
Copper	17.37	13.72	0.0028	0.0101	0.01	17.1
Iron	17717	17469	0.224	7.23	0.921	10270
Lead	30.97	12.66	ND at 0.0016	ND at 0.0016	ND at 0.0016	88.1
Magnesium	3003	2420	37.8	68.78	9.35	2640
Manganese	849	351.7	0.175	10.571	0.4193	350
Mercury	0.14	ND at 0.035	ND at 0.0001	ND at 0.0001	0.0001	0.036
Molybdenum	1.46	1.93	ND at 0.0144	ND at 0.0144	ND at 0.0144	3.57
Nickel	14.6	19.76	0.0204	0.036	0.0178	16.1
Potassium	2895	1717	15.03	3.9	6.35	5000
Selenium	0.907	0.313	0.0077	0.0072	0.0025	0.214
Silver	0.213	0.128	0.0002	0.0003	0.0003	1.57
Sodium	37300	53200	167	176.2	45.5	6.07
Thallium	2.43	1.5	ND at 0.0632	ND at 0.0632	ND at 0.0632	1.44
Vanadium	46.3	37.4	0.012	0.0653	0.0159	32.4
Zinc	38.8	31.3	0.118	0.0682	0.0122	81.3

Notes:

mg/kg = milligrams per kilgram
mg/L = milligrams per liter
ND = not detected
UTL = upper tolerance limit

Table 2a

Summary of Background Values for Subsurface Soil
Naval Air Station Fort Worth

Analyte	% Non Detects	Detects/ Total	W (crit)	W (log)	W (raw)	Minimum	Maximum	Mean	Standard Deviation	$UTL_{95.95}$	Outlier ?
Aluminum	0.0%	30/30	0.927	0.960 Accept	0.955 Accept	3780	17700	9905	3277	17180	No
Antimony	80.0%	6/30	0.927	-	-	<0.21	0.712	nc	nc	0.712	-
Arsenic	0.0%	30/30	0.927	0.963 Accept	0.942 Accept	1.42	5.31	3.0317	1.1266	5.533	No
Barium	0.0%	30/30	0.927	0.922 Reject	0.974 Accept	16.4	127	65.83	28.03	128.1	No
Beryllium	0.0%	30/30	0.927	0.966 Accept	0.969 Accept	0.208	1.07	0.5629	0.1776	0.957	No
Calcium	0.0%	30/30	0.927	0.733 Reject	0.853 Reject	751	347000	91395	76216	272000	Yes
Cadmium	33.3%	20/30	0.927	0.829 Reject	0.390 Reject	0.055	1.48	0.1754	0.254	0.5891	Yes
Chromium	0.0%	30/30	0.927	0.937 Accept	0.847 Reject	5.77	17.9	9.494	2.766	16.31	No
Cobalt	10.0%	27/30	0.927	0.762 Reject	0.954 Accept	0.4395	5.5	3.181	1.356	6.191	No
Copper	0.0%	30/30	0.927	0.846 Reject	0.952 Accept	2.61	13.3	8.119	2.524	13.72	No
Iron	0.0%	30/30	0.927	0.936 Accept	0.941 Accept	3840	16900	9185	2720	15224	No
Lead	6.7%	28/30	0.927	0.746 Reject	0.949 Accept	0.073	14.3	5.28	3.325	12.66	No
Magnesuim	0.0%	30/30	0.927	0.697 Reject	0.843 Reject	292	2420	1569	582.1	2420	No
Manganese	0.0%	30/30	0.927	0.904 Reject	0.964 Accept	28.7	317	169.6	82.03	351.7	No
Mercury	100.0%	0/30	0.927	-	-	<0.03	<0.035	nc	nc	ND at 0.035	-
Molybdenum	80.0%	6/30	0.927	-	-	<0.638	1.93	nc	nc	1.93	-
Nickel	0.0%	30/30	0.927	0.959 Accept	0.837 Reject	4.17	22.1	9.166	3.862	19.76	No
Potassium	0.0%	30/30	0.927	0.909 Reject	0.977 Accept	271	1900	1000	322.8	1717	No
Selenium	80.0%	6/30	0.927	-	-	<0.12	0.313	nc	nc	0.313	-
Silver	33.3%	20/30	0.927	0.862 Reject	0.847 Reject	<0.021	0.0928	0.0354	0.0273	0.1277	No
Sodium	10.0%	27/30	0.927	0.898 Reject	0.426 Reject	1.1	53200	4225	11762	53200	No
Thallium	13.3%	26/30	0.927	0.630 Reject	0.858 Reject	0.575	65.4	34.74	19.84	65.4	No
Vanadium	0.0%	30/30	0.927	0.980 Accept	0.926 Reject	9.7	37.8	20.33	6.245	37.39	No
Zinc	0.0%	30/30	0.927	0.851Reject	0.963 Accept	5.9	31	18.7	5.663	31.27	No

Notes:
All units are in milligrams per kilogram (mg/kg)

na	=	not applicable
nc	=	not calculated
ND	=	not detected
$UTL_{95.95}$	=	Upper Tolerance Level (95% confidence and 95% coverage)
Outlier?	=	Result of test to dermine if the maximum value is a potential outlier.
W (crit)	=	*Shapiro-Wilk critical value.*
W (log)	=	calculated W using log-transformed data and result when compared to W (crit).
W (raw)	=	calculated W using raw data and result when compred to W (crit).

TABLE 2b

Organic Analytes Detected in Background Samples
Naval Air Station Fort Worth

MATRIX	SAMPLE ID	LOCATION	VALUE	LAB_ QUAL	JEG_ QUAL	UNITS	NAME	DETECT	PQUANT	DILUTION
SURFACE SOIL	BJETA508-A	BJETA508	365.0000	F		MG/KG	BENZYL BUTYL PHTHALATE	256.0000	883.0000	1.00
SURFACE SOIL	BJETA530-A	BJETA530	219.0000	F		MG/KG	BIS(2-ETHYLEHEXYL) PHTHALATE	105.0000	753.0000	1.00
SURFACE SOIL	BJETA514-A	BJETA514	2660.0000			MG/KG	DI-N-BUTYL PHTHALATE	134.0000	844.0000	1.00
SURFACE SOIL	BJETA511-A	BJETA511	702.0000	F		MG/KG	DI-N-BUTYL PHTHALATE	135.0000	854.0000	1.00
SURFACE SOIL	BJETA512-A	BJETA512	389.0000	F		MG/KG	DI-N-BUTYL PHTHALATE	138.0000	871.0000	1.00
SURFACE SOIL	BJETA530-A	BJETA530	175.0000	F		MG/KG	DI-N-BUTYL PHTHALATE	119.0000	753.0000	1.00
SURFACE SOIL	BJETA534-A	BJETA534	161.0000	F		MG/KG	DI-N-BUTYL PHTHALATE	132.0000	833.0000	1.00
SURFACE SOIL	BJETA532-A	BJETA532	147.0000	F		MG/KG	FLUORANTHENE	115.0000	781.0000	1.00
SURFACE SOIL	BJETA517-ARS	BJETA517	6.6500			µG/KG	METHYLENE CHLORIDE	3.0400	6.1100	1.00
SURFACE SOIL	BJETA527-A	BJETA527	6.4900			µG/KG	METHYLENE CHLORIDE	2.8500	5.7200	1.00
SURFACE SOIL	BJETA523-A	BJETA523	8.4500		e	µG/KG	METHYLENE CHLORIDE	3.1000	6.2300	1.00
SURFACE SOIL	BJETA524-A	BJETA524	5.1500	F	e	µG/KG	METHYLENE CHLORIDE	3.1600	6.3400	1.00
SURFACE SOIL	BJETA518-A	BJETA518	3.7700	F	e	µG/KG	METHYLENE CHLORIDE	2.9300	5.8800	1.00
SURFACE SOIL	BJETA509-A	BJETA509	3.7200	F	be	µG/KG	METHYLENE CHLORIDE	3.1400	6.3000	1.00
SURFACE SOIL	BJETA522-A	BJETA522	3.6500	F	e	µG/KG	METHYLENE CHLORIDE	2.9100	5.8400	1.00
SURFACE SOIL	BJETA519-A	BJETA519	3.2100	F	e	µG/KG	METHYLENE CHLORIDE	2.7800	5.5900	1.00
SURFACE SOIL	BJETA508-A	BJETA508	3.2000	F	be	µG/KG	METHYLENE CHLORIDE	3.0900	6.2100	1.00
SURFACE SOIL	BJETA504-A	BJETA504	3.1000	F	be	µG/KG	METHYLENE CHLORIDE	3.0600	6.1400	1.00
SURFACE SOIL	BJETA508-A	BJETA508	1.6000	F		µG/KG	TOLUENE	0.5020	6.2100	1.00
SURFACE SOIL	BJETA508-A	BJETA508	1.0900	F		µG/KG	TOLUENE	0.5020	6.2100	1.00
SURFACE SOIL	BJETA506-A	BJETA506	0.9510	F		µG/KG	TOLUENE	0.5030	6.2300	1.00
SURFACE SOIL	BJETA502-A	BJETA502	0.8020	F		µG/KG	TOLUENE	0.5180	6.4100	1.00
SURFACE SOIL	BJETA503-A	BJETA503	0.7830	F		µG/KG	TOLUENE	0.4980	6.1700	1.00
SURFACE SOIL	BJETA509-A	BJETA509	0.6980	F		µG/KG	TOLUENE	0.5090	6.3000	1.00
SURFACE SOIL	BJETA506-A	BJETA506	0.6650	F		µG/KG	TOLUENE	0.5030	6.2300	1.00
SURFACE SOIL	BJETA501-A	BJETA501	0.6540	F		µG/KG	TOLUENE	0.5070	6.2700	1.00
SURFACE SOIL	BJETA510-A	BJETA510	0.6520	F		µG/KG	TOLUENE	0.4920	6.0900	1.00
SURFACE SOIL	BJETA503-B	BJETA503	8.3000	F		µG/KG	ACETONE	4.7800	106.0000	1.00
SURFACE SOIL	BJETA528-B	BJETA528	8.0600	F		µG/KG	ACETONE	4.9600	111.0000	1.00
SURFACE SOIL	BJETA521-B	BJETA521	6.3400	F		µG/KG	ACETONE	5.0900	114.0000	1.00
SURFACE SOIL	BJETA510-B	BJETA510	8.0900	F		µG/KG	ACETONE	5.1700	115.0000	1.00
SURFACE SOIL	BJETA525-B	BJETA525	5.7500	F		µG/KG	ACETONE	4.9500	110.0000	1.00
SURFACE SOIL	BJETA518-B	BJETA518	5.1900	F		µG/KG	ACETONE	5.0500	113.0000	1.00
SURFACE SOIL	BJETA513-B	BJETA513	2170.0000			MG/KG	DI-N-BUTYL PHTHALATE	126.0000	796.0000	1.00
SEDIMENT	JEFB004-SE	JEFB004	146.0000	F		MG/KG	BENZO (B) FLUORANTHENE	144.0000	943.0000	1.00
SEDIMENT	JEFB002-SE	JEFB002	207.0000	F		MG/KG	BIS (2-ETHYLHEXYL) PHTHALATE	124.0000	884.0000	1.00
SEDIMENT	JEFB007-SE	JEFB007	179.0000	F		MG/KG	BIS (2-ETHYLHEXYL) PHTHALATE	138.0000	985.0000	1.00
SEDIMENT	JEFB003-SE	JEFB003	175.0000	F		MG/KG	BIS (2-ETHYLHEXYL) PHTHALATE	140.0000	1000.0000	1.00
SEDIMENT	JEFB005-SE	JEFB005	157.0000	F		MG/KG	BIS (2-ETHYLHEXYL) PHTHALATE	138.0000	989.0000	1.00
SEDIMENT	JEFB004-SE	JEFB004	138.0000	F		MG/KG	BIS (2-ETHYLHEXYL) PHTHALATE	132.0000	943.0000	1.00
SEDIMENT	JEFB001-SE	JEFB001	207.0000	F		MG/KG	FLUORANTHENE	126.0000	854.0000	1.00
SEDIMENT	JEFB004-SE	JEFB004	174.0000	F		MG/KG	FLUORANTHENE	139.0000	943.0000	1.00
SEDIMENT	JEFB001-SE	JEFB001	131.0000	F		MG/KG	PYRENE	117.0000	854.0000	1.00

NOTES:

b	=	detection less than five times the trip blank value
e	=	detection less than five times the equipment blank value
F	=	detection greater than the detection limit (DETECT), but less than the practical quantitation limit (PQUANT)
Lab_qual	=	laboratory qualifier
JEG_qual	=	Jacobs qualifier

TABLE 2c

Summary of Background Values for Stream Sediment Samples
Naval Air Station Fort Worth

Analyte	% Non Detects	Detects/ Total	W (crit)	W (log)	W (raw)	Minimum	Maximum	Mean	Standard Deviation	UTL 95.95	Outlier ?
Aluminum	0.0%	8/8	0.818	0.892 Accept	0.924 Accept	2280	9240	5540	2679	28767	No
Antimony	87.5%	1/8	0.818	-	-	<0.244	0.33	nc	nc	0.33	-
Arsenic	0.0%	8/8	0.818	0.951 Accept	0.925 Accept	2.85	5.27	3.7488	0.7848	7.018	No
Barium	0.0%	8/8	0.818	0.920 Accept	0.918 Accept	21.9	76.8	48.03	19.6	180.4	No
Beryllium	0.0%	8/8	0.818	0.912 Accept	0.912 Accept	0.194	0.557	0.3734	0.1336	1.189	No
Calcium	0.0%	8/8	0.818	0.877 Accept	0.928 Accept	75100	189000	139888	35825	337544	No
Cadmium	0.0%	8/8	0.818	0.859 Accept	0.866 Accept	0.152	0.292	0.2164	0.0588	0.5071	No
Chromium	0.0%	8/8	0.818	0.869 Accept	0.885 Accept	4.81	9.59	7.546	1.84	17	No
Cobalt	0.0%	8/8	0.818	0.882 Accept	0.872 Accept	1.59	3.43	2.51	0.7757	6.651	No
Copper	0.0%	8/8	0.818	0.961 Accept	0.953 Accept	4.28	11.7	7.428	2.627	22.18	No
Iron	0.0%	8/8	0.818	0.807 Reject	0.832 Accept	5030	8080	6923	1184	10696	No
Lead	0.0%	8/8	0.818	0.956 Accept	0.818 Reject	2.21	26.9	9.1	8.33	104.1	No
Magnesuim	0.0%	8/8	0.818	0.912 Accept	0.938 Accept	1450	2140	1876	221.7	2772	No
Manganese	0.0%	8/8	0.818	0.840 Accept	0.743 Reject	143	362	198.4	71.16	491.3	Yes
Mercury	87.5%	1/8	0.818	-	-	<0.037	0.036	nc	nc	0.036	-
Molybdenum	12.5%	7/8	0.818	0.894 Accept	0.963 Accept	0.4355	2.68	1.659	0.7692	9.693	No
Nickel	0.0%	8/8	0.818	0.937 Accept	0.958 Accept	5.55	12	9.0475	2.147	19.78	No
Potassium	0.0%	8/8	0.818	0.904 Accept	0.929 Accept	386	1300	788.4	340	3227	No
Selenium	87.5%	1/8	0.818	-	-	<0.134	0.214	nc	nc	0.214	-
Silver	0.0%	8/8	0.818	0.965 Accept	0.888 Accept	0.0311	0.0929	0.0532	0.0188	0.144	No
Sodium	75.0%	2/8	0.818	-	-	<2.44	6.07	nc	nc	6.07	-
Thallium	0.0%	8/8	0.818	0.912 Accept	0.936 Accept	22.2	43.4	33.41	7.443	69.74	No
Vanadium	0.0%	8/8	0.818	0.902 Accept	0.896 Accept	15.4	24.1	19.26	3.206	32.26	No
Zinc	0.0%	8/8	0.818	0.971 Accept	0.853 Accept	11.3	53.9	25.48	13.11	101.3	No

Notes:
All units are in milligrams per kilogram (mg/kg)

na	=	not applicable
nc	=	not calculated
ND	=	not detected
$UTL_{95.95}$	=	Upper Tolerance Level (95% confidence and 95% coverage)
Outlier?	=	Result of test to dermine if the maximum value is a potential outlier.
W (crit)	=	Shapiro-Wilk critical value.
W (log)	=	calculated W using log-transformed data and result when compared to W (crit).
W (raw)	=	calculated W using raw data and result when compred to W (crit).

TABLE 2d

Summary of Background Values for Unfiltered Groundwater Samples
Naval Air Station Fort Worth

Analyte	% Non Detects	Detects/ Total	W (crit)	W (log)	W (raw)	Minimum	Maximum	Mean	Standard Deviation	UTL 95.95	Outiler ?
Aluminum	0.0%	12/12	0.859	0.950 Accept	0.779 Reject	0.0699	2.45	0.8072	0.8586	11.07	No
Antimony	91.7%	1/12	0.859	-	-	<0.002	0.0024	nc	nc	0.0024	-
Arsenic	91.7%	1/12	0.859	-	-	<0.0049	0.0067	nc	nc	0.0067	-
Barium	0.0%	12/12	0.859	0.982 Accept	0.882 Accept	0.0358	0.513	0.1931	0.1362	1.133	No
Beryllium	66.7%	4/12	0.859	-	-	<0.0003	0.0019	nc	nc	0.0019	-
Calcium	0.0%	12/12	0.859	0.916 Accept	0.806 Reject	102	881	406.6	300.8	2438	No
Cadmium	66.7%	4/12	0.859	-	-	<0.0005	0.0016	nc	nc	0.0016	-
Chromium	58.3%	5/12	0.859	-	-	<0.0053	0.0136	nc	nc	0.0136	-
Cobalt	91.7%	1/12	0.859	-	-	<0.0089	0.01	nc	nc	0.01	-
Copper	50.0%	6/12	0.859	-	-	<0.0008	0.0101	nc	nc	0.0101	-
Iron	0.0%	12/12	0.859	0.984 Accept	0.828 Reject	0.0768	2.64	0.7838	0.7026	7.234	No
Lead	100.0%	0/12	0.859	-	-	<0.0016	<0.0016	nc	nc	ND at 0.0016	-
Magnesuim	0.0%	12/12	0.859	0.905 Accept	0.735 Reject	3.79	35.6	11.91	10.65	68.78	No
Manganese	0.0%	12/12	0.859	0.958 Accept	0.863 Accept	0.0393	2.17	0.7055	0.6592	10.57	No
Mercury	100.0%	0/12	0.859	-	-	<0.0001	<0.0001	nc	nc	ND at 0.0001	-
Molybdenum	100.0%	0/12	0.859	-	-	<0.0144	<0.0144	nc	nc	ND at 0.0144	-
Nickel	0.0%	12/12	0.859	0.92 Accept	0.78 Reject	0.0022	0.0203	0.0068	0.0055	0.0364	No
Potassium	50.0%	6/12	0.859	-	-	<0.466	3.9	nc	nc	3.9	-
Selenium	16.7%	10/12	0.859	0.891 Accept	0.851 Reject	<0.0011	0.0042	0.0018	0.0009	0.0072	No
Silver	91.7%	1/12	0.859	-	-	<0.0002	0.0003	nc	nc	0.0003	-
Sodium	0.0%	12/12	0.859	0.960 Accept	0.630 Reject	1.96	91.5	20.24	23.68	176.2	No
Thallium	100.0%	0/12	0.859	-	-	<0.0632	<0.0632	nc	nc	ND at 0.0632	-
Vanadium	9.1%	10/11	0.859	0.943 Accept	0.920 Accept	0.00145	0.0247	0.0093	0.0066	0.0653	No
Zinc	9.1%	10/11	0.859	0.964 Accept	0.874 Accept	0.00195	0.0307	0.0107	0.0082	0.0682	No

Notes:
All units are in milligrams per liter (mg/L)

na	=	not applicable
nc	=	not calculated
ND	=	not detected
$UTL_{95.95}$	=	Upper Tolerance Level (95% confidence and 95% coverage)
Outlier?	=	Result of test to dermine if the maximum value is a potential outlier.
W (crit)	=	Shapiro-Wilk critical value.
W (log)	=	calculated W using log-transformed data and result when compared to W (crit).
W (raw)	=	calculated W using raw data and result when compred to W (crit).

TABLE 3

Summary of Results from Soil Sampling at the Aerospace Museum Site

SAMPLE ID	SAMPLE INTERVAL	UNITS	ANALYTE	VALUE	PARVQ	MDL	PQL	LABQ	JEGQ	RRS2 Standard	Result Exceeds Standard?	MDL Exceeds Standard?
AMS-001	0 - 2	MG/L	Arsenic	0.0000	ND	0.0490	0.1000	U		0.050	No	No
AMS-002	0 - 2	MG/L	Arsenic	0.0000	ND	0.0490	0.1000	U		0.050	No	No
AMS-003	0 - 2	MG/L	Arsenic	0.0000	ND	0.0490	0.1000	U		0.050	No	No
AMS-004	0 - 2	MG/L	Arsenic	0.0000	ND	0.0490	0.1000	U		0.050	No	No
AMS-005	0 - 2	MG/L	Arsenic	0.0000	ND	0.0490	0.1000	U		0.050	No	No
AMS-006	0 - 2	MG/L	Arsenic	0.0000	ND	0.0490	0.1000	U		0.050	No	No
AMS-007	0 - 2	MG/L	Arsenic	0.0000	ND	0.0490	0.1000	U		0.050	No	No
AMS-008	0 - 2	MG/L	Arsenic	0.0000	ND	0.0490	0.1000	U		0.050	No	No
AMS-009	0 - 2	MG/L	Arsenic	0.0000	ND	0.0490	0.1000	U		0.050	No	No
AMS-010	0 - 2	MG/L	Arsenic	0.0000	ND	0.0490	0.1000	U		0.050	No	No
AMS-011	0 - 2	MG/L	Arsenic	0.0000	ND	0.0490	0.1000	U		0.050	No	No
AMS-012	0 - 2	MG/L	Arsenic	0.0000	ND	0.0490	0.1000	U		0.050	No	No
AMS-013	0 - 2	MG/L	Arsenic	0.0000	ND	0.0490	0.1000	U		0.050	No	No
AMS-014	0 - 2	MG/L	Arsenic	0.0000	ND	0.0490	0.1000	U		0.050	No	No
FD-AMS014	0 - 2	MG/L	Arsenic	0.0000	ND	0.0490	0.1000	U		0.050	No	No
AMS-015	0 - 2	MG/L	Arsenic	0.0000	ND	0.0490	0.1000	U		0.050	No	No
AMS-016	0 - 2	MG/L	Arsenic	0.0000	ND	0.0490	0.1000	U		0.050	No	No
AMS-017	0 - 2	MG/L	Arsenic	0.0000	ND	0.0490	0.1000	U		0.050	No	No
AMS-018	0 - 2	MG/L	Arsenic	0.0000	ND	0.0490	0.1000	U		0.050	No	No
AMS-019	0 - 2	MG/L	Arsenic	0.0000	ND	0.0490	0.1000	U		0.050	No	No
AMS-020	0 - 2	MG/L	Arsenic	0.0000	ND	0.0490	0.1000	U		0.050	No	No
AMS-021	0 - 2	MG/L	Arsenic	0.0000	ND	0.0490	0.1000	U		0.050	No	No
AMS-022	0 - 2	MG/L	Arsenic	0.0000	ND	0.0490	0.1000	U		0.050	No	No
AMS-023	0 - 2	MG/L	Arsenic	0.0000	ND	0.0490	0.1000	U		0.050	No	No
AMS-024	0 - 2	MG/L	Arsenic	0.0000	ND	0.0490	0.1000	U		0.050	No	No
AMS-025	0 - 2	MG/L	Arsenic	0.0000	ND	0.0490	0.1000	U		0.050	No	No
AMS-026	0 - 1.5	MG/L	Arsenic	0.0000	ND	0.0490	0.1000	U		0.050	No	No
AMS-026B	1.5 - 2	MG/L	Arsenic	0.0000	ND	0.0490	0.1000	U		0.050	No	No
FD-AMS026	0 - 1.5	MG/L	Arsenic	0.0000	ND	0.0490	0.1000	U		0.050	No	No
AMS-001	0 - 2	MG/L	Beryllium	0.0135	TR	0.0030	0.0300	F	B	0.004	Yes	No
AMS-002	0 - 2	MG/L	Beryllium	0.0124	TR	0.0030	0.0300	F	B	0.004	Yes	No
AMS-003	0 - 2	MG/L	Beryllium	0.0119	TR	0.0030	0.0300	F	B	0.004	Yes	No
AMS-004	0 - 2	MG/L	Beryllium	0.0115	TR	0.0030	0.0300	F	B	0.004	Yes	No
AMS-005	0 - 2	MG/L	Beryllium	0.0115	TR	0.0030	0.0300	F	B	0.004	Yes	No
AMS-006	0 - 2	MG/L	Beryllium	0.0114	TR	0.0030	0.0300	F	B	0.004	Yes	No
AMS-007	0 - 2	MG/L	Beryllium	0.0111	TR	0.0030	0.0300	F	B	0.004	Yes	No
AMS-008	0 - 2	MG/L	Beryllium	0.0109	TR	0.0030	0.0300	F	B	0.004	Yes	No
AMS-009	0 - 2	MG/L	Beryllium	0.0110	TR	0.0030	0.0300	F	B	0.004	Yes	No
AMS-010	0 - 2	MG/L	Beryllium	0.0108	TR	0.0030	0.0300	F	B	0.004	Yes	No
AMS-011	0 - 2	MG/L	Beryllium	0.0137	TR	0.0030	0.0300	F	B	0.004	Yes	No
AMS-012	0 - 2	MG/L	Beryllium	0.0117	TR	0.0030	0.0300	F	B	0.004	Yes	No
AMS-013	0 - 2	MG/L	Beryllium	0.0108	TR	0.0030	0.0300	F	B	0.004	Yes	No
AMS-014	0 - 2	MG/L	Beryllium	0.0113	TR	0.0030	0.0300	F	B	0.004	Yes	No
FD-AMS014	0 - 2	MG/L	Beryllium	0.0121	TR	0.0030	0.0300	F	B	0.004	Yes	No
AMS-015	0 - 2	MG/L	Beryllium	0.0104	TR	0.0030	0.0300	F	B	0.004	Yes	No
AMS-016	0 - 2	MG/L	Beryllium	0.0112	TR	0.0030	0.0300	F	B	0.004	Yes	No
AMS-017	0 - 2	MG/L	Beryllium	0.0106	TR	0.0030	0.0300	F	B	0.004	Yes	No
AMS-018	0 - 2	MG/L	Beryllium	0.0144	TR	0.0030	0.0300	F	B	0.004	Yes	No
AMS-019	0 - 2	MG/L	Beryllium	0.0113	TR	0.0030	0.0300	F	B	0.004	Yes	No
AMS-020	0 - 2	MG/L	Beryllium	0.0117	TR	0.0030	0.0300	F	B	0.004	Yes	No
AMS-021	0 - 2	MG/L	Beryllium	0.0112	TR	0.0030	0.0300	F	B	0.004	Yes	No
AMS-022	0 - 2	MG/L	Beryllium	0.0110	TR	0.0030	0.0300	F	B	0.004	Yes	No
AMS-023	0 - 2	MG/L	Beryllium	0.0128	TR	0.0030	0.0300	F	B	0.004	Yes	No
AMS-024	0 - 2	MG/L	Beryllium	0.0118	TR	0.0030	0.0300	F	B	0.004	Yes	No
AMS-025	0 - 2	MG/L	Beryllium	0.0111	TR	0.0030	0.0300	F	B	0.004	Yes	No
AMS-026	0 - 1.5	MG/L	Beryllium	0.0110	TR	0.0030	0.0300	F	B	0.004	Yes	No
AMS-026B	1.5 - 2	MG/L	Beryllium	0.0109	TR	0.0030	0.0300	F	B	0.004	Yes	No
FD-AMS026	0 - 1.5	MG/L	Beryllium	0.0115	TR	0.0030	0.0300	F	B	0.004	Yes	No
AMS-001	0 - 2	MG/L	Chromium	0.0000	ND	0.0890	0.2000	U		0.100	No	No
AMS-002	0 - 2	MG/L	Chromium	0.0000	ND	0.0890	0.2000	U		0.100	No	No
AMS-003	0 - 2	MG/L	Chromium	0.0000	ND	0.0890	0.2000	U		0.100	No	No
AMS-004	0 - 2	MG/L	Chromium	0.0000	ND	0.0890	0.2000	U		0.100	No	No

TABLE 3

Summary of Results from Soil Sampling at the Aerospace Museum Site

SAMPLE ID	SAMPLE INTERVAL	UNITS	ANALYTE	VALUE	PARVQ	MDL	PQL	LABQ	JEGQ	RRS2 Standard	Result Exceeds Standard?	MDL Exceeds Standard?
AMS-005	0 - 2	MG/L	Chromium	0.0000	ND	0.0890	0.2000	U		0.100	No	No
AMS-006	0 - 2	MG/L	Chromium	0.0000	ND	0.0890	0.2000	U		0.100	No	No
AMS-007	0 - 2	MG/L	Chromium	0.0000	ND	0.0890	0.2000	U		0.100	No	No
AMS-008	0 - 2	MG/L	Chromium	0.0000	ND	0.0890	0.2000	U		0.100	No	No
AMS-009	0 - 2	MG/L	Chromium	0.0000	ND	0.0890	0.2000	U		0.100	No	No
AMS-010	0 - 2	MG/L	Chromium	0.0000	ND	0.0890	0.2000	U		0.100	No	No
AMS-011	0 - 2	MG/L	Chromium	0.0000	ND	0.0890	0.2000	U		0.100	No	No
AMS-012	0 - 2	MG/L	Chromium	0.0000	ND	0.0890	0.2000	U		0.100	No	No
AMS-013	0 - 2	MG/L	Chromium	0.0000	ND	0.0890	0.2000	U		0.100	No	No
AMS-014	0 - 2	MG/L	Chromium	0.0000	ND	0.0890	0.2000	U		0.100	No	No
FD-AMS014	0 - 2	MG/L	Chromium	0.0000	ND	0.0890	0.2000	U		0.100	No	No
AMS-015	0 - 2	MG/L	Chromium	0.0000	ND	0.0890	0.2000	U		0.100	No	No
AMS-016	0 - 2	MG/L	Chromium	0.0000	ND	0.0890	0.2000	U		0.100	No	No
AMS-017	0 - 2	MG/L	Chromium	0.0000	ND	0.0890	0.2000	U		0.100	No	No
AMS-018	0 - 2	MG/L	Chromium	0.0000	ND	0.0890	0.2000	U		0.100	No	No
AMS-019	0 - 2	MG/L	Chromium	0.0000	ND	0.0890	0.2000	U		0.100	No	No
AMS-020	0 - 2	MG/L	Chromium	0.0000	ND	0.0890	0.2000	U		0.100	No	No
AMS-021	0 - 2	MG/L	Chromium	0.0000	ND	0.0890	0.2000	U		0.100	No	No
AMS-022	0 - 2	MG/L	Chromium	0.0000	ND	0.0890	0.2000	U		0.100	No	No
AMS-023	0 - 2	MG/L	Chromium	0.0000	ND	0.0890	0.2000	U		0.100	No	No
AMS-024	0 - 2	MG/L	Chromium	0.0000	ND	0.0890	0.2000	U		0.100	No	No
AMS-025	0 - 2	MG/L	Chromium	0.0000	ND	0.0890	0.2000	U		0.100	No	No
AMS-026	0 - 1.5	MG/L	Chromium	0.0000	ND	0.0890	0.2000	U		0.100	No	No
AMS-026B	1.5 - 2	MG/L	Chromium	0.0000	ND	0.0890	0.2000	U		0.100	No	No
FD-AMS026	0 - 1.5	MG/L	Chromium	0.0000	ND	0.0890	0.2000	U		0.100	No	No
AMS-001	0 - 2	MG/L	Nickel	0.0000	ND	0.0200	0.1000	U		0.100	No	No
AMS-002	0 - 2	MG/L	Nickel	0.0000	ND	0.0200	0.1000	U		0.100	No	No
AMS-003	0 - 2	MG/L	Nickel	0.0000	ND	0.0200	0.1000	U		0.100	No	No
AMS-004	0 - 2	MG/L	Nickel	0.0000	ND	0.0200	0.1000	U		0.100	No	No
AMS-005	0 - 2	MG/L	Nickel	0.0000	ND	0.0200	0.1000	U		0.100	No	No
AMS-006	0 - 2	MG/L	Nickel	0.0000	ND	0.0200	0.1000	U		0.100	No	No
AMS-007	0 - 2	MG/L	Nickel	0.0000	ND	0.0200	0.1000	U		0.100	No	No
AMS-008	0 - 2	MG/L	Nickel	0.0000	ND	0.0200	0.1000	U		0.100	No	No
AMS-009	0 - 2	MG/L	Nickel	0.0000	ND	0.0200	0.1000	U		0.100	No	No
AMS-010	0 - 2	MG/L	Nickel	0.0000	ND	0.0200	0.1000	U		0.100	No	No
AMS-011	0 - 2	MG/L	Nickel	0.0000	ND	0.0200	0.1000	U		0.100	No	No
AMS-012	0 - 2	MG/L	Nickel	0.0000	ND	0.0200	0.1000	U		0.100	No	No
AMS-013	0 - 2	MG/L	Nickel	0.0000	ND	0.0200	0.1000	U		0.100	No	No
AMS-014	0 - 2	MG/L	Nickel	0.0000	ND	0.0200	0.1000	U		0.100	No	No
FD-AMS014	0 - 2	MG/L	Nickel	0.0000	ND	0.0200	0.1000	U		0.100	No	No
AMS-015	0 - 2	MG/L	Nickel	0.0000	ND	0.0200	0.1000	U		0.100	No	No
AMS-016	0 - 2	MG/L	Nickel	0.0000	ND	0.0200	0.1000	U		0.100	No	No
AMS-017	0 - 2	MG/L	Nickel	0.0000	ND	0.0200	0.1000	U		0.100	No	No
AMS-018	0 - 2	MG/L	Nickel	0.0000	ND	0.0200	0.1000	U		0.100	No	No
AMS-019	0 - 2	MG/L	Nickel	0.0000	ND	0.0200	0.1000	U		0.100	No	No
AMS-020	0 - 2	MG/L	Nickel	0.0000	ND	0.0200	0.1000	U		0.100	No	No
AMS-021	0 - 2	MG/L	Nickel	0.0000	ND	0.0200	0.1000	U		0.100	No	No
AMS-022	0 - 2	MG/L	Nickel	0.0000	ND	0.0200	0.1000	U		0.100	No	No
AMS-023	0 - 2	MG/L	Nickel	0.0000	ND	0.0200	0.1000	U		0.100	No	No
AMS-024	0 - 2	MG/L	Nickel	0.0000	ND	0.0200	0.1000	U		0.100	No	No
AMS-025	0 - 2	MG/L	Nickel	0.0000	ND	0.0200	0.1000	U		0.100	No	No
AMS-026	0 - 1.5	MG/L	Nickel	0.0000	ND	0.0200	0.1000	U		0.100	No	No
AMS-026B	1.5 - 2	MG/L	Nickel	0.0000	ND	0.0200	0.1000	U		0.100	No	No
FD-AMS026	0 - 1.5	MG/L	Nickel	0.0000	ND	0.0200	0.1000	U		0.100	No	No
AMS-001	0 - 2	MG/L	Lead	0.0000	ND	0.0160	0.0500	U		0.015	No	Yes
AMS-002	0 - 2	MG/L	Lead	0.0000	ND	0.0160	0.0500	U		0.015	No	Yes
AMS-003	0 - 2	MG/L	Lead	0.0000	ND	0.0160	0.0500	U		0.015	No	Yes
AMS-004	0 - 2	MG/L	Lead	0.0000	ND	0.0160	0.0500	U		0.015	No	Yes
AMS-005	0 - 2	MG/L	Lead	0.0390	TR	0.0160	0.0500	F		0.015	Yes	Yes
AMS-006	0 - 2	MG/L	Lead	0.0000	ND	0.0160	0.0500	U		0.015	No	Yes
AMS-007	0 - 2	MG/L	Lead	0.0000	ND	0.0160	0.0500	U		0.015	No	Yes
AMS-008	0 - 2	MG/L	Lead	0.0000	ND	0.0160	0.0500	U		0.015	No	Yes

TABLE 3

Summary of Results from Soil Sampling at the Aerospace Museum Site

SAMPLE ID	SAMPLE INTERVAL	UNITS	ANALYTE	VALUE	PARVQ	MDL	PQL	LABQ	JEGQ	RRS2 Standard	Result Exceeds Standard?	MDL Exceeds Standard?
AMS-009	0 - 2	MG/L	Lead	0.0000	ND	0.0160	0.0500	U		0.015	No	Yes
AMS-010	0 - 2	MG/L	Lead	0.0000	ND	0.0160	0.0500	U		0.015	No	Yes
AMS-011	0 - 2	MG/L	Lead	0.0000	ND	0.0160	0.0500	U		0.015	No	Yes
AMS-012	0 - 2	MG/L	Lead	0.0000	ND	0.0160	0.0500	U		0.015	No	Yes
AMS-013	0 - 2	MG/L	Lead	0.0000	ND	0.0160	0.0500	U		0.015	No	Yes
AMS-014	0 - 2	MG/L	Lead	0.0315	TR	0.0160	0.0500	F		0.015	Yes	Yes
FD-AMS014	0 - 2	MG/L	Lead	0.0629	=	0.0160	0.0500			0.015	Yes	Yes
AMS-015	0 - 2	MG/L	Lead	0.0000	ND	0.0160	0.0500	U		0.015	No	Yes
AMS-016	0 - 2	MG/L	Lead	0.0000	ND	0.0160	0.0500	U		0.015	No	Yes
AMS-017	0 - 2	MG/L	Lead	0.0000	ND	0.0160	0.0500	U		0.015	No	Yes
AMS-018	0 - 2	MG/L	Lead	0.0000	ND	0.0160	0.0500	U		0.015	No	Yes
AMS-019	0 - 2	MG/L	Lead	0.0000	ND	0.0160	0.0500	U		0.015	No	Yes
AMS-020	0 - 2	MG/L	Lead	0.0000	ND	0.0160	0.0500	U		0.015	No	Yes
AMS-021	0 - 2	MG/L	Lead	0.0000	ND	0.0160	0.0500	U		0.015	No	Yes
AMS-022	0 - 2	MG/L	Lead	0.0206	TR	0.0160	0.0500	F		0.015	Yes	Yes
AMS-023	0 - 2	MG/L	Lead	0.0000	ND	0.0160	0.0500	U		0.015	No	Yes
AMS-024	0 - 2	MG/L	Lead	0.0000	ND	0.0160	0.0500	U		0.015	No	Yes
AMS-025	0 - 2	MG/L	Lead	0.0000	ND	0.0160	0.0500	U		0.015	No	Yes
AMS-026	0 - 1.5	MG/L	Lead	0.0000	ND	0.0160	0.0500	U		0.015	No	Yes
AMS-026B	1.5 - 2	MG/L	Lead	0.0000	ND	0.0160	0.0500	U		0.015	No	Yes
FD-AMS026	0 - 1.5	MG/L	Lead	0.0000	ND	0.0160	0.0500	U		0.015	No	Yes
AMS-001	0 - 2	MG/L	Antimony	0.0000	ND	0.0200	0.0500	U		0.006	No	Yes
AMS-002	0 - 2	MG/L	Antimony	0.0000	ND	0.0200	0.0500	U		0.006	No	Yes
AMS-003	0 - 2	MG/L	Antimony	0.0000	ND	0.0200	0.0500	U		0.006	No	Yes
AMS-004	0 - 2	MG/L	Antimony	0.0000	ND	0.0200	0.0500	U		0.006	No	Yes
AMS-005	0 - 2	MG/L	Antimony	0.0000	ND	0.0200	0.0500	U		0.006	No	Yes
AMS-006	0 - 2	MG/L	Antimony	0.0000	ND	0.0200	0.0500	U		0.006	No	Yes
AMS-007	0 - 2	MG/L	Antimony	0.0000	ND	0.0200	0.0500	U		0.006	No	Yes
AMS-008	0 - 2	MG/L	Antimony	0.0000	ND	0.0200	0.0500	U		0.006	No	Yes
AMS-009	0 - 2	MG/L	Antimony	0.0000	ND	0.0200	0.0500	U		0.006	No	Yes
AMS-010	0 - 2	MG/L	Antimony	0.0000	ND	0.0200	0.0500	U		0.006	No	Yes
AMS-011	0 - 2	MG/L	Antimony	0.0000	ND	0.0200	0.0500	U		0.006	No	Yes
AMS-012	0 - 2	MG/L	Antimony	0.0000	ND	0.0200	0.0500	U		0.006	No	Yes
AMS-013	0 - 2	MG/L	Antimony	0.0000	ND	0.0200	0.0500	U		0.006	No	Yes
AMS-014	0 - 2	MG/L	Antimony	0.0000	ND	0.0200	0.0500	U		0.006	No	Yes
FD-AMS014	0 - 2	MG/L	Antimony	0.0000	ND	0.0200	0.0500	U		0.006	No	Yes
AMS-015	0 - 2	MG/L	Antimony	0.0000	ND	0.0200	0.0500	U		0.006	No	Yes
AMS-016	0 - 2	MG/L	Antimony	0.0000	ND	0.0200	0.0500	U		0.006	No	Yes
AMS-017	0 - 2	MG/L	Antimony	0.0000	ND	0.0200	0.0500	U		0.006	No	Yes
AMS-018	0 - 2	MG/L	Antimony	0.0000	ND	0.0200	0.0500	U		0.006	No	Yes
AMS-019	0 - 2	MG/L	Antimony	0.0000	ND	0.0200	0.0500	U		0.006	No	Yes
AMS-020	0 - 2	MG/L	Antimony	0.0000	ND	0.0200	0.0500	U		0.006	No	Yes
AMS-021	0 - 2	MG/L	Antimony	0.0000	ND	0.0200	0.0500	U		0.006	No	Yes
AMS-022	0 - 2	MG/L	Antimony	0.0000	ND	0.0200	0.0500	U		0.006	No	Yes
AMS-023	0 - 2	MG/L	Antimony	0.0000	ND	0.0200	0.0500	U		0.006	No	Yes
AMS-024	0 - 2	MG/L	Antimony	0.0000	ND	0.0200	0.0500	U		0.006	No	Yes
AMS-025	0 - 2	MG/L	Antimony	0.0000	ND	0.0200	0.0500	U		0.006	No	Yes
AMS-026	0 - 1.5	MG/L	Antimony	0.0000	ND	0.0200	0.0500	U		0.006	No	Yes
AMS-026B	1.5 - 2	MG/L	Antimony	0.0000	ND	0.0200	0.0500	U		0.006	No	Yes
FD-AMS026	0 - 1.5	MG/L	Antimony	0.0000	ND	0.0200	0.0500	U		0.006	No	Yes

NOTES:

B = Detected at concentration less than 5 times the lab blank concentration
F = Detected above the method detected limit (MDL) but below the Practical Quantitation Limit (PQL).
JEGQ = Qualifier assigned by Jacobs Engineering data review program
LABQ = Laboratory qualifier
MG/L = Milligrams per liter
ND = Not detected
RRS2 = Medium Specific concentration (MSC) for Groundwater based on Risk Reduction Standards Number 2.
TR = Detected above the method detected limit (MDL) but below the Practical Quantitation Limit (PQL).
U = Not detected

TABLE 4
March 1999 Analytical Results
Comparison of Analytical Results with RRSs

Site Type Identifier					TYPE 1 AREAS																							TYPE 2 AREAS		
Former Sample Location	BW	RRS (2)			OT3801SA											OT3840SA												OT3804SA	OT3814SA	OT3851SA
FPM Sample Identifiers	Bckgrd (1)				A08S0102AA	A08S0104AA	A08S0102AA	A08S0110ABN	A08S0110ABS	A08S0110ABE	A08S0110ABW	A08S0115ABN	A08S0115ABS	A08S0115ABE	A08S0115ABW	A08S4002AA	A08S4002AA	A08S4004AA	A08S4010ABN	A08S4010ABS	A08S4010ABE	A08S4010ABW	A08S4015ABN	A08S4015ABS	A08S4015ABE	A08S4015ABW	A08S0404AA	A08S1404AA	A08S1104AA
		SAI-Ind	GWP-Ind	GW-Ind	SAI-Ind		GWP-Ind	10 ft horizontal				15 ft horizontal				SAI-Ind	GWP-Ind	GWP-Ind	10 ft horizontal				15 ft horizontal				GWP-Ind	GWP-Ind	GWP-Ind
Analytes / Depth	(mg/kg)	(mg/kg)	(mg/kg)	(ug/L)	0-2 ft	2-4 ft	0-2 ft	North 0-2 ft	South 0-2 ft	East 0-2 ft	West 0-2 ft	North 0-2 ft	South 0-2 ft	East 0-2 ft	West 0-2 ft	0-2 ft	0-2 ft	2-4 ft	North 0-2 ft	South 0-2 ft	East 0-2 ft	West 0-2 ft	North 0-2 ft	South 0-2 ft	East 0-2 ft	West 0-2 ft	2-4 ft	2-4 ft	2-4 ft
Lead	30.97	1000	1.5	(15)												9.00	9.00 (7.39)	(ND)	7.88 (ND)	7.99 (ND)	17.0 (10.8)	25.30 (5.65)	8.65 (ND)	7.86 (5.73)	41.20 (6.98)	28.40 (6.68)			
Hexachlorobenzene	–	1	0.1	(1)			ND (ND)	ND (ND)	ND (ND)	ND (ND)	ND (ND)	ND (ND)	ND (ND)	ND (ND)	ND (ND)														
bis(2-Chloroethyl)ether	–	0.32	0.026	(0.26)	ND	ND	ND (ND)	ND (ND)	ND (ND)	ND (ND)	ND (ND)	ND (ND)	ND (ND)	ND (ND)	ND (ND)														
n-Nitrosodi-n-propylamine	–	0.16	0.0041	(0.041)			ND (ND)	ND (ND)	ND (ND)	ND (ND)	ND (ND)	ND (ND)	ND (ND)	ND (ND)	ND (ND)														
Benz(a)anthracene	–	3.4	0.039	(0.39)	3.22	ND	3.22 (ND)	ND (ND)	ND (ND)	1.30 (ND)	0.866 (ND)	ND (ND)	ND (ND)	ND (ND)	ND (ND)													(ND)	(ND)
Benzo(a)pyrene	–	0.34	0.02	(0.2)	**3.36**	ND	**3.36** (ND)	ND (ND)	ND (ND)	**1.63** (ND)	**3.48** (ND)	ND (ND)	ND (ND)	ND (ND)	ND (ND)													(ND)	(ND)
Benzo(b)fluoranthene	–	3.4	0.039	(0.39)	3.09	ND	3.09 (ND)	ND (ND)	ND (ND)	1.44 (ND)	3.23 (ND)	ND (ND)	ND (ND)	ND (ND)	ND (ND)													(ND)	(ND)
Benzo(k)fluoranthene	–	34	0.39	(3.9)			4.14 (ND)	ND (ND)	ND (ND)	1.72 (ND)	3.48 (ND)	ND (ND)	ND (ND)	ND (ND)	ND (ND)														(ND)
Dibenzo(a,h)anthracene	–	0.34	0.0039	(0.039)	ND	ND	ND (ND)	ND (ND)	ND (ND)	ND (ND)	ND (ND)	ND (ND)	ND (ND)	ND (ND)	ND (ND)														
Indeno(1,2,3-cd)pyrene	–	3.4	0.039	(0.39)			2.11 (ND)	ND (ND)	ND (ND)	ND (ND)	2.26 (ND)	ND (ND)	ND (ND)	ND (ND)	ND (ND)														
bis(2-Ethylhexyl)phthalate	–	65	0.6	(6)			ND (ND)	ND (ND)	ND (ND)	ND (ND)	ND (ND)	ND (ND)	ND (ND)	ND (ND)	ND (ND)												(ND)		
2,4-Dinitrotoluene	–	4.2	0.042	(0.42)			ND (ND)	ND (ND)	ND (ND)	ND (ND)	ND (ND)	ND (ND)	ND (ND)	ND (ND)	ND (ND)														
2,6-Dinitrotoluene	–	4.2	0.042	(0.42)			ND (ND)	ND (ND)	ND (ND)	ND (ND)	ND (ND)	ND (ND)	ND (ND)	ND (ND)	ND (ND)														
3,3-Dichlorobenzidine	–	8.4	0.064	(0.64)			ND (ND)	ND (ND)	ND (ND)	ND (ND)	ND (ND)	ND (ND)	ND (ND)	ND (ND)	ND (ND)														
Pentachlorophenol	–	14	0.1	(1)			ND (ND)	ND (ND)	ND (ND)	ND (ND)	ND (ND)	ND (ND)	ND (ND)	ND (ND)	ND (ND)														

(1) Basewide Background Study, Jacobs Engineering Group, Inc. 1997.
(2) TAC, Chapter 335 Industrial Soild Waste and Municipal Hazardous Waste, Risk Reduction Standards, Subchapter S.

GWP-Ind Soil MSC for Industrial Use Based on Groundwater Protection
SAI-Ind Soil/Air and Ingestion Standard for Industrial Use
GW-Ind Groundwater MSC for Industrial Use

BOLD: Exceed GWP only
: Exceed SAI and GWP
NA : Not Analyzed
ND: Non Detect
– : Assumed Non-Detect
( ) : SPLP results
: Not a contaminant of concern

TABLE 5

Analytical Results for December 1999 Sampling

Analyte	Location	Concentration (mg/kg)	RRS2 (mg/kg)
Zinc	S64	22.1/21.8	4.1×10^5
	OT3801SA	30.9	4.1×10^5
	S63	37.8	4.1×10^5
	S62	42.3	4.1×10^5
	S61	8.12	4.1×10^5
	S60	15.6	4.1×10^5
	S59	62.4	4.1×10^5
	S58	34/152	4.1×10^5
	S57	7.65	4.1×10^5
	OT3844SA	36.5	4.1×10^5
	S56	33.5	4.1×10^5
	S55	127	4.1×10^5
	S54	190/74.2	4.1×10^5
	S53	186	4.1×10^5
	S52	179	4.1×10^5
	OT3826SA	37.9	4.1×10^5
Nickel	S64	7.94/7.15	1.2×10^4
	OT3801SA	10.4	1.2×10^4
	S63	12.9	1.2×10^4
	S62	23.3	1.2×10^4
	S61	5.13	1.2×10^4
	S60	5.81	1.2×10^4
	S59	11.2	1.2×10^4
	S58	10.3/10.6	1.2×10^4
	S57	5.32	1.2×10^4
	OT3844SA	12.7	1.2×10^4
	S57	5.32	1.2×10^4
	S56	9.05	1.2×10^4
	S55	9.94	1.2×10^4
	S54	11.8/11.6	1.2×10^4
	S53	9.96	1.2×10^4
	S52	12.4	1.2×10^4

Table 5 (Cont'd)

Analyte	Location	Concentration (mg/kg)	RRS2 (mg/kg)
	OT3836SA	8.3	1.2×10^4
	OT3826SA	12.2	1.2×10^4
Lead	OT3801SA	19.3	1.0×10^3
	OT3847SA	18.1	1.0×10^3
	OT3848SA	344	1.0×10^3
	S54	536	1.0×10^3
	S55	227	1.0×10^3
Silver	OT3801SA	0.326	2.8×10^3
Chromium	OT3801SA	15.3	1.2×10^3
Antimony	OT3801SA	ND	4.9×10^2
	S55	ND	4.9×10^2
	S54	ND	4.9×10^2
	S53	ND	4.9×10^2
	OT3836SA	ND	4.9×10^2
Methylene chloride	OT3802SA	4.65×10^{-3}	1.6×10^1
	OT3811SA	2.88×10^{-3}	1.6×10^1
	OT3841SA	6.38×10^{-3}	1.6×10^1
	OT3842SA	1.38×10^{-3}	1.6×10^1
	OT3842SA(DUP)	3.9×10^{-3}	1.6×10^1
Tetrachloroethene	OT3802SA	3.55×10^{-3}	1.7×10^1
	OT3811SA	1.28×10^{-3}	1.7×10^1
	OT3841SA	1.4×10^{-3}	1.7×10^1
	OT3842SA	2.12×10^{-3}	1.7×10^1
	OT3842SA(DUP)	2.09×10^{-3}	1.7×10^1

TABLE 6
RECOMMENDED SAMPLING FOR CLOSURE

Location	Matrix	Constituents	Method	# of Samples 0-2"	# of Samples 2-4"	MS/MSD	Total
Fence	(2) Metal Strips	Zinc	SW6010			1	3
S52C[1]	Soil	Zinc	SW6010	1	1	1	3
	Soil	Zinc	SW6010				
S53C	Soil	Zinc	SW6010	1	1		2
S54C	Soil	Zinc	SW6010	1	1		2
	Soil	Lead	SW6010				
S55C	Soil	Zinc	SW6010	1	1		2
	Soil	Lead	SW6010				
S58C	Soil	Zinc	SW6010	1	1		2
S59C	Soil	Zinc	SW6010	1	1		2
S62C	Soil	Zinc	SW6010	1	1		2
	Soil	Nickel	SW6010				
OT3848SAC	Soil	Lead	SW6010	1	1		2
OT3801SAC	Soil	Silver	SW6010	1	1		2
	Soil	Benzo(a)pyrene	SW8310			1	1
S52F[2]	Soil	Zinc	SW6010	1	1		2
S53F	Soil	Zinc	SW6010	1	1		2
S54F	Soil	Zinc	SW6010	1	1	1	3
S55F	Soil	Zinc	SW6010	1	1		2
S52W[3]	Soil	Zinc	SW6010	1	1		2
S53W	Soil	Zinc	SW6010	1	1		2
S54W	Soil	Zinc	SW6010	1	1		2
S55W	Soil	Zinc	SW6010	1	1		2
Total samples excluding MS/MSD							36
Total samples including MS/MSD							40

C[1] = Confirmation Samples
F[2] = Fence Samples
W[3] = Drainage way samples

FIGURES

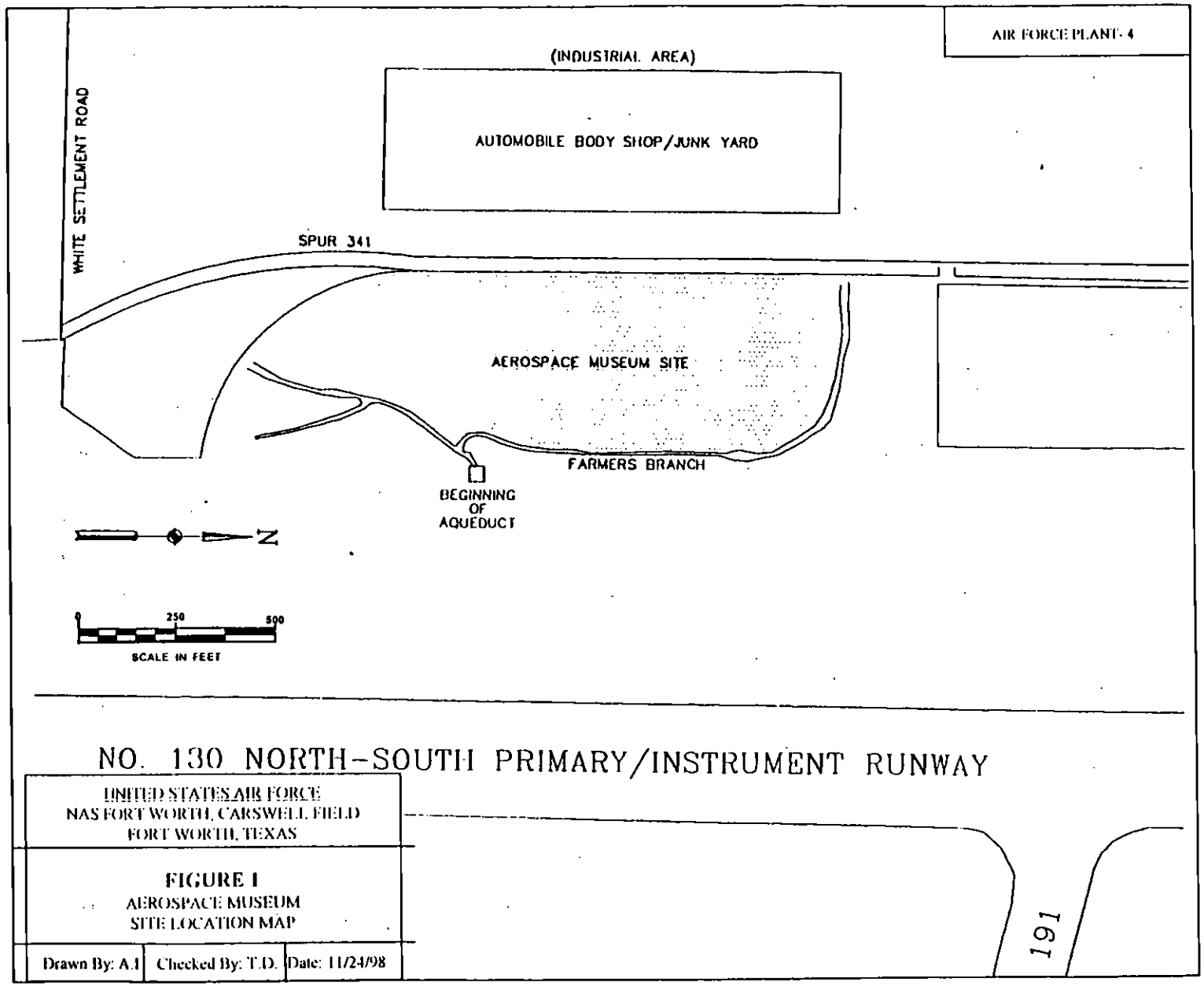
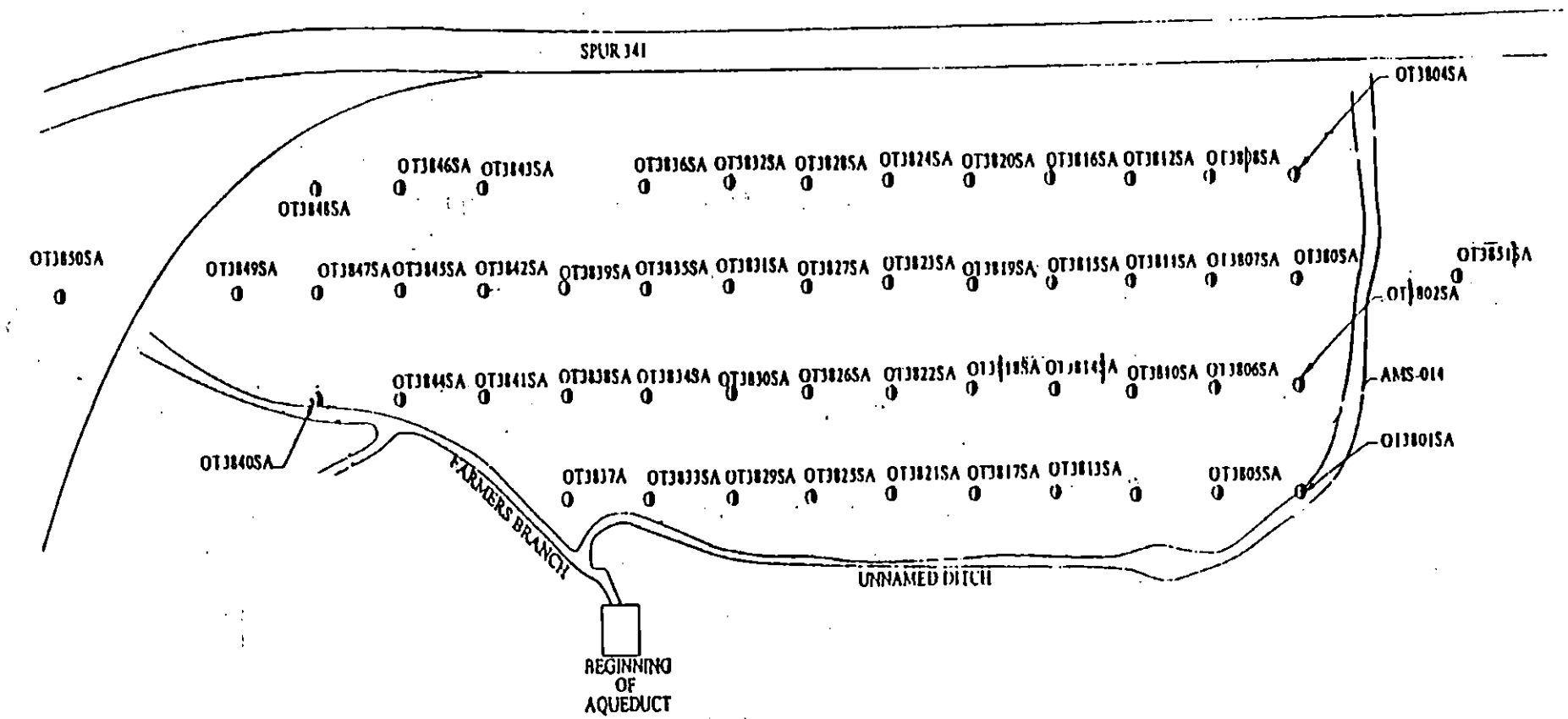

AIR FORCE PLANT 4
(INDUSTRIAL AREA)
AUTOMOBILE BODY SHOP/JUNK YARD
WHITE SETTLEMENT ROAD
SPUR 341
AEROSPACE MUSEUM SITE
FARMERS BRANCH
BEGINNING OF AQUEDUCT
N
0
250
500
SCALE IN FEET
NO. 130 NORTH-SOUTH PRIMARY/INSTRUMENT RUNWAY
191
UNITED STATES AIR FORCE
NAS FORT WORTH, CARSWELL FIELD
FORT WORTH, TEXAS
FIGURE 1
AEROSPACE MUSEUM
SITE LOCATION MAP
Drawn By: A.I
Checked By: T.D.
Date: 11/24/98

FIGURE 1

Surface Soil Sampling Locations

October 1995, Law Engineering



LEGEND

o Surface soil sampling locations

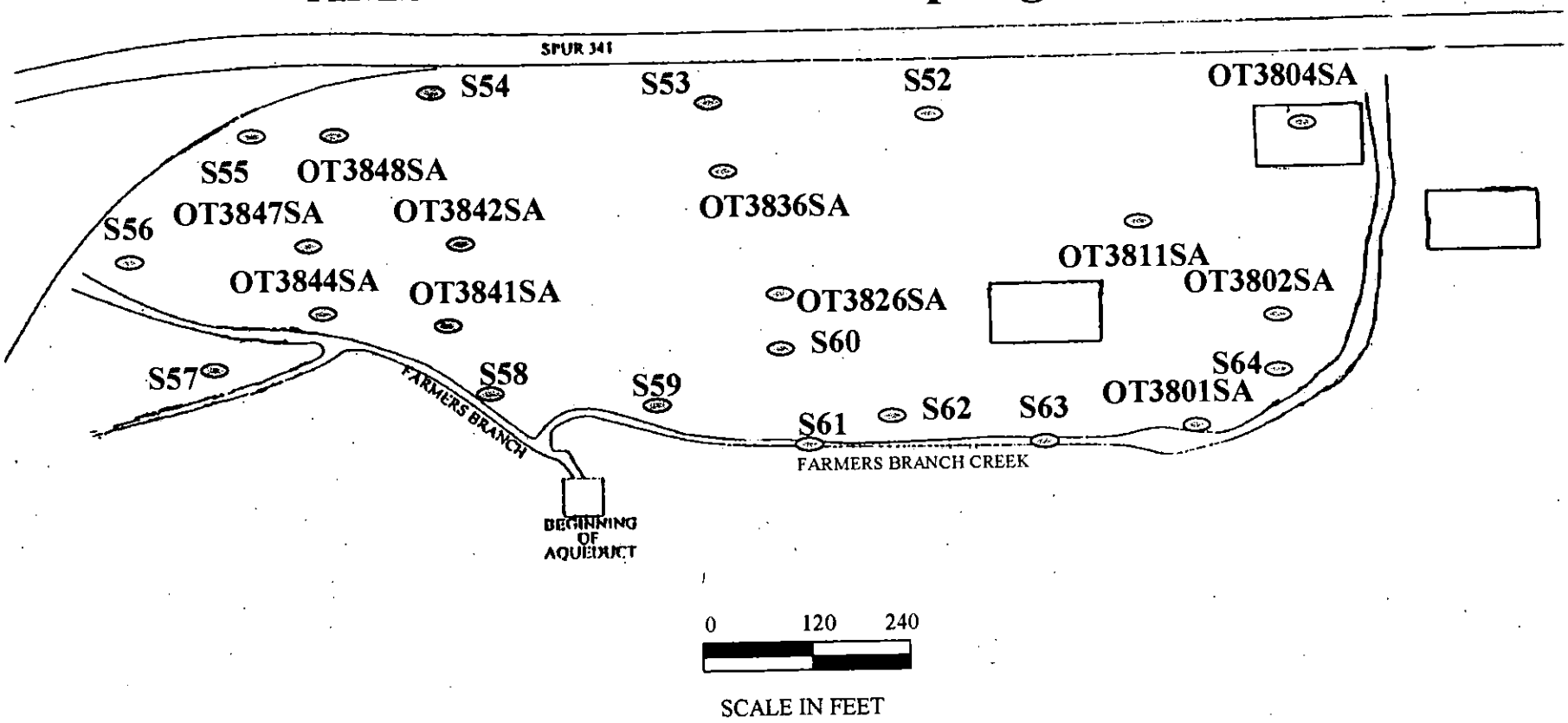
0 120 240

SCALE IN FEET

535 22

FIGURE 2

AMS December 1999 Sampling Locations



LEGEND

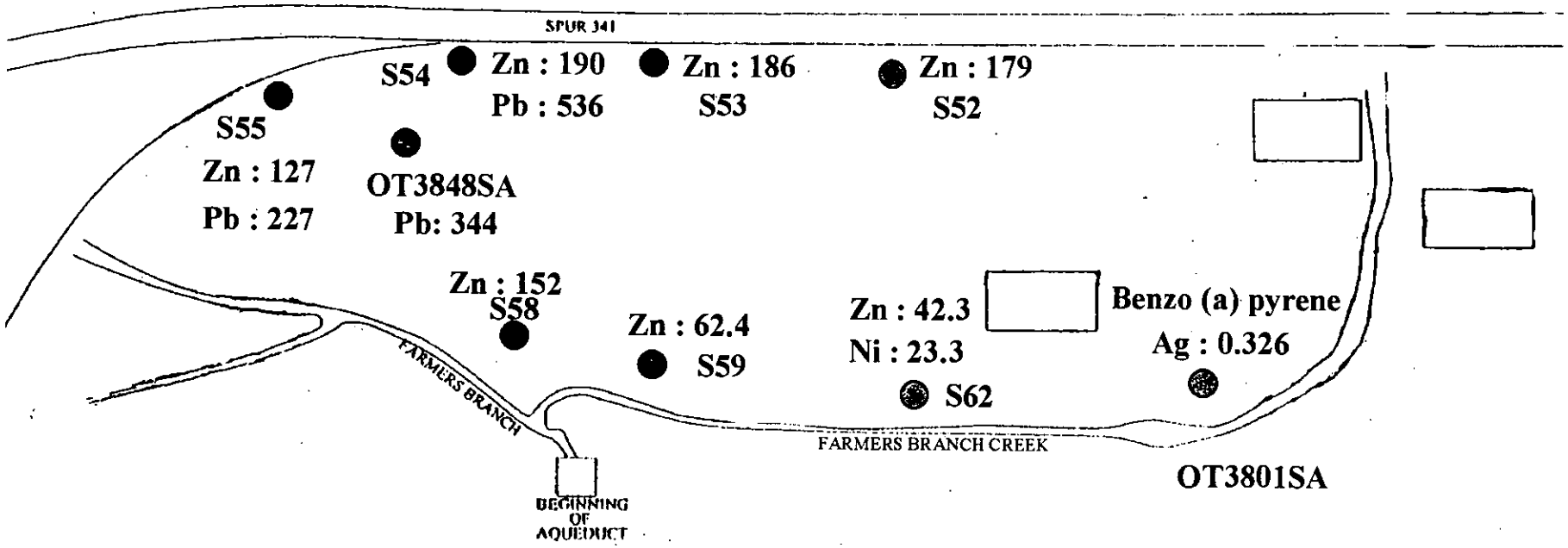
SAMPLE LOCATIONS

Unit for all samples mg/kg

FIGURE 3

535 23

Proposed Confirmation Sampling Locations



0 120 240

SCALE IN FEET

RRS SAI-Ind values

Zn	410,000
Ni	12,000
Pb	1000
Ag	2800

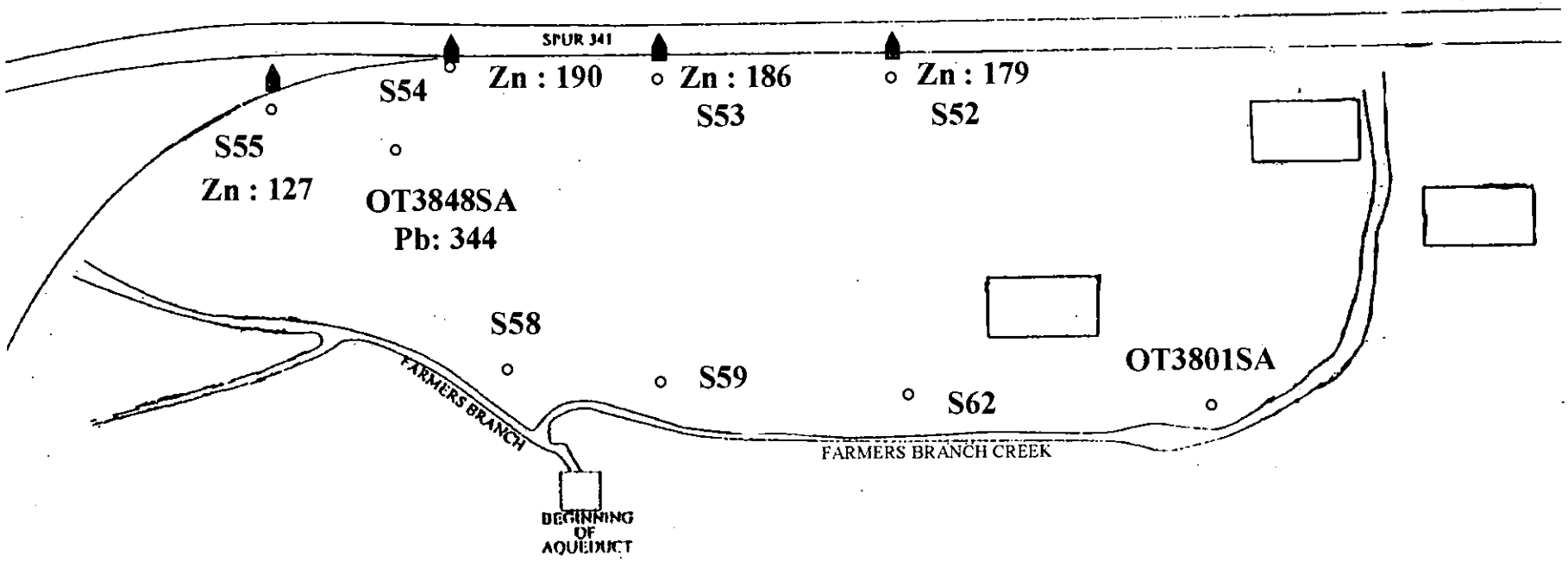
LEGEND

● CONFIRMATION SAMPLING LOCATIONS

All concentrations in mg/kg

FIGURE 4

Proposed Zinc Sampling Locations



0 120 240

SCALE IN FEET

RRS SAI-Ind values

Zn	410,000
Ni	12,000
Pb	1000
Ag	2800

LEGEND

- ○ 1999 SAMPLING LOCATIONS
- ■ SAMPLING FOR ZINC ALONG THE FENCE
- ▲ SAMPLING FOR ZINC ALONG DRAINAGE WAY

All concentrations in mg/kg

FIGURE 5

FINAL PAGE

ADMINISTRATIVE RECORD

FINAL PAGE