

Soil
HEALTH CONSULTATION

KELLY AIR-FORCE BASE

SAN ANTONIO, BEXAR COUNTY, TEXAS

CERCLIS NO. TX2571724333

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Prepared by:

Exposure Investigation and Consultation Branch
Division of Health Assessment and Consultation
Agency for Toxic Substances and Disease Registry

Background and Statement of Issues

The U.S. Environmental Agency (EPA) Region VI provided ATSDR's Division of Health Consultation and Assessment (DHAC) with results of residential soil samples collected from properties adjacent to Kelly Air Force Base in San Antonio, Texas (see attached data). The samples were collected at the request of citizens concerned that contamination from the base may have migrated into their yards. The EPA requested that ATSDR evaluate the data and (1) determine if soil contaminant levels pose a health hazard to the residents, and (2) provide any appropriate public health recommendations [1].

The source of contamination that residents are concerned with involves the S-1 area at Kelly Air Force Base. It has been reported by area residents that flooding during rain events in the past may have resulted in soil run off from the S-1 area into their yards. The S-1 area served as a temporary storage location from the early 1960's to 1973 for waste to be reclaimed off base. Spent solvents and oil were among the type of waste stored and handled at the S-1 area [2].

In February 2000, a single surface soil sample (0" - to 6") was collected from each of ten residential properties (see attached soil sample location table). The soil samples were analyzed for inorganic content. The results showed one of the samples, (SS-05), to be slightly elevated for lead. Sample SS-05 was collected from the backyard of a property on Menefee Street, and detected lead at 660 parts per million (ppm).

Discussion

Based on the sampling results, only one soil sample was elevated and exceeded EPA's Human Health Medium specific screening levels (EPA MSSSL). The EPA MSSSL's are listed in the results table attached to this document, and are considered protective of public health.

The one residential soil sample that exceeded the EPA screening values detected lead at 660 ppm. Since the concentration of lead in the other samples ranged from 20 to 40 ppm, the data does not indicate contamination is wide spread. However, a soil lead level of 660 ppm warrants further investigation of the property where the contamination was identified. Soil lead concentrations in 660 ppm range may pose a slight health risk to young children coming in frequent contact with the soil. Children have developing nervous systems that are vulnerable to the deleterious affects of lead. In addition, children are more likely to ingest contaminated soil due to frequent hand to mouth activity, and can receive larger doses relative to body weight [3].

It is not known if the lead contamination on the one residential property is confined to a small area, or is present throughout that property. It is not uncommon to detect lead in urban areas where lead-based paint, leaded gasoline, and other sources of lead may have been present. Only a comprehensive evaluation of this property (i.e. lead-based paint evaluation and additional soil testing) could determine if the lead contamination is wide spread and poses a health threat.

References

1. Technical Assistance Request from Jennifer Lyke, ATSDR Region VI. March 31, 2000.
2. ATSDR Public Health Assessment for Kelly Air Force Base. October 26, 1999.
3. Toxicological Profile for Lead, Update, U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry. April 1993.

**SOIL SAMPLE LOCATIONS
KELLY AIR FORCE BASE**

Sample Number	Address	Owner	Location Description
SS-01	3855 Beech	Virginia Castillo	The soil sample was collected approximately 200 feet south of the property owner's house in a undeveloped lot. The sample was collected from a depth of 0 to 6 inches.
SS-02	3903 Beech	Raul Villar	The soil sample was collected approximately three feet north of the northwest corner of the property owner's house. The sample was collected from a depth of 0 to 6 inches.
SS-03	3867 Beech	Raymond Sarabia	The soil sample was collected from the middle of the eastern half of the owner's front yard, approximately 20 feet south of the property owner's house. The sample was collected from a depth of 0 to 6 inches.
SS-04	2623 Wescott	Pearl Olmos	The soil sample was collected from the middle of the property owner's back yard, approximately 25 feet west of the property owner's house. The sample was collected from a depth of 0 to 6 inches.
SS-05	1631 Menefee	Tomasa Moreno	The soil sample was collected from the property owner's back yard, approximately 100 feet north of the property owner's house. The sample was collected from a depth of 0 to 6 inches.
SS-06	3814 Carnation	Julian Olivares	The soil sample was collected from the property owner's front yard, approximately 10 feet north of the northwest corner of the property owner's house. The sample was collected from a depth of 0 to 6 inches.
SS-07	3810 Carnation	David Perez	The soil sample was collected from the property owner's back yard adjacent to a swing set, and approximately 25 feet south of the southeast corner of the property owner's house. The sample was collected from a depth of 0 to 6 inches.
SS-08	3862 Bay	Andrew Rosas	The soil sample was collected inside the fence at the northwest corner of the property. The sample was collected from a depth of 0 to 6 inches.
SS-09	2619 Wescott	Carmen Yanez	The soil sample was collected from the property owner's back yard near the northwest corner of the fenced area. The sample was collected from a depth of 0 to 6 inches.
SS-10	2615 Wescott	Diamantina Diaz	The soil sample was collected from the property owner's back yard, approximately 35 feet west of the property owner's house and 10 feet south of the property fence. The sample was collected from a depth of 0 to 6 inches.

**TABLE (CONTINUED)
SUMMARY OF ORGANIC ANALYTICAL RESULTS
SURFACE SOIL SAMPLES**

ANALYTE (µg/kg)	Background	SAMPLE NUMBER										Residential	
		On Site											
		AD-01-SS	AD-02-SS	AD-04-SS	AD-05-SS	AD-06-SS	AD-07-SS	AD-08-SS	AD-09-SS	AD-10-SS	AD-11-SS	AD-13-SS	AD-03-SS
Benzo(g,h,i)perylene	360U	--	--	--	190J	790J	240J	--	--	110J	190J	--	150J
Miscellaneous Extractable Compounds*													
Alkanes	700J	3000J		2000J	1000J	5000J	3000J	900J			2000J		2000J
Unidentified Compound/No.				2000J/3		2000J/3		700J/1			2000J/4	3000J/1	
Benzonaphthofuran						100JN							
Benzopyranone											1000JN		
Benzoic Acid											400JN		
Pesticides/PCB													
Gamma-BHC (Lindane)	0.79J	0.69J	0.52J	--	--	--	--	--	1.6J	1.8J	3.5	--	--
Aldrin	1.8U	--	--	--	--	--	--	--	--	--	--	--	5.3J
Heptachlor Epoxide	1.8U	--	--	--	--	2.5	--	--	--	--	--	--	--
Dieldrin	3.6U	--	--	5.5JN	7.1	--	3.4JN	3.5JN	--	--	--	--	13J
4,4'-DDE (P,P'-DDE)	20	14	--	--	--	--	4.9J	--	--	--	--	--	62
Endrin	3.6U	--	--	--	--	--	0.84J	--	--	--	--	--	--
4,4'-DDD (P,P'-DDD)	3.6U	9.5	--	--	22	--	--	--	--	--	12	--	--
4,4'-DDT (P,P'-DDT)	10U	18	--	10J	--	8.4	8.9	--	--	--	64	--	44
Methoxychlor	18U	--	--	--	--	--	--	--	--	--	5.5J	--	--
Endrin Keytone	3.6U	--	--	--	2.0JN	2.9JN	--	--	0.67JN	--	--	--	--
Endrin Aldehyde	3.6U	--	--	--	4.0	--	--	--	--	--	9.5	--	--
Alpha-chlordane/2	1.8U	--	--	--	10	--	--	--	--	--	--	--	--
Gamma-chlordane/2	1.8U	--	--	2.3J	--	--	--	--	--	--	--	--	--

Notes:

µg/kg Micrograms per kilogram
AD Arkwright Dump site
SS Surface soil sample
U Constituent analyzed for but not detected; value reported is the sample quantitation limit (SQL).
J Estimated value
N Presumptive evidence of presence of material
-- Constituent analyzed for but not detected

* Miscellaneous compounds are not on the target compound list and are reported only as detected in individual samples; SQL not provided
PCB Polychlorinated biphenyls
Shaded areas indicate elevated concentrations of constituents

**TABLE
SUMMARY OF ORGANIC ANALYTICAL RESULTS
SUBSURFACE SOIL SAMPLES**

ANALYTE ($\mu\text{g}/\text{kg}$)	SAMPLE NUMBER		
	Background	On Site	
	AD-01-SB	AD-10-SB	AD-11-SB
Volatiles			
None			
Extractables			
Phenanthrene	80J	--	310J
Anthracene	430U	--	63J
Fluoranthene	170J	--	370J
Pyrene	180J	--	470J
Benzo(a)anthracene	110J	--	190J
Chrysene	94J	--	190J
Benzo(b or k)fluoranthene	190J	--	330J
Benzo(a)pyrene	100J	--	190J
Indeno(1,2,3-cd)pyrene	430U	--	80J
Benzo(ghi)perylene	110J	--	--
Miscellaneous Extractable Compounds*			
Benzoic Acid	1000JN		
Alkanes	2000J		
Benzopyranone	700JN		
Diphenylpropanedione	300JN		
Diphenylpropenone	200JN		
Pesticides/PCB			
Gamma-BHC (Lindane)	2.2U	--	2.6

Notes:

- $\mu\text{g}/\text{kg}$ Micrograms per kilogram
- AD Arkwright Dump site
- SB Subsurface soil sample
- U Constituent analyzed for but not detected. Value reported is the sample quantitation limit (SQL).
- J Estimated value
- N Presumptive evidence of presence of material
- Constituent analyzed for but not detected.
- * Miscellaneous compounds are not on the target compound list and are reported only as detected in individual samples; SQL not provided
- PCB Polychlorinated biphenyls
- Shaded areas indicate elevated concentrations of constituents

TABLE
SUMMARY OF INORGANIC ANALYTICAL RESULTS
SURFACE WATER SAMPLES

ANALYTE ($\mu\text{g/L}$)	Fairforest Creek Background	Fairforest Creek Control	SAMPLE NUMBER				
			Fairforest Creek Downgradient			Unnamed Tributary of Fairforest Creek Control	Unnamed Tributary of Fairforest Creek Downgradient
			AD-04-SW	AD-05-SW	AD-06-SW	AD-02-SW	AD-03-SW
Aluminum	90U	660	620	--	750	170U	10,000
Arsenic	2U	2U	--	--	--	2U	--
Barium	35	37	38	45	39	66	83
Calcium	8400	10,000	10,000	11,000	11,000	13,000	17,000
Chromium	1U	1U	--	--	--	1U	12
Copper	3U	3U	--	4J	--	3U	11J
Iron	310U	340U	--	11,000	630	830	12,000
Lead	2U	2U	--	4J	10J	4J	17J
Magnesium	2,500	3,100	3,100	3,500	3,200	4,100	4,900
Manganese	23	150	130	720	160	100	230
Nickel	4U	4U	--	--	--	4U	6J
Potassium	2,900	4,800	4,800	4,100	4,900	2,800	5,600
Sodium	6,000	6,500	6,300	6,700	6,700	5,900	5,300
Vanadium	3U	3U	--	--	--	3U	28J
Zinc	20U	20U	--	34	50	20U	5J

Notes:

- $\mu\text{g/L}$ Micrograms per liter
- AD Arkwright Dump site
- SW Surface water sample
- U Constituent analyzed for but not detected; value reported is the sample quantitation limit
- J Estimated value
- Constituent analyzed for but not detected.

Shaded areas indicate elevated concentrations of constituents

TABLE
SUMMARY OF ORGANIC ANALYTICAL RESULTS
SEDIMENT SAMPLES

ANALYTE (µg/kg)	SAMPLE NUMBER						
	Fairforest Creek Background	Fairforest Creek Control	Fairforest Creek Downgradient			Unnamed Tributary of Fairforest Creek Control	Unnamed Tributary of Fairforest Creek Downgradient
			AD-04-SD	AD-05-SD	AD-06-SD		
AD-01-SD	AD-07-SD	AD-04-SD	AD-05-SD	AD-06-SD	AD-07-SD	AD-08-SD	
Volatiles							
Carbon Disulfide	12U	13U	2J	--	--	--	--
Extractables							
Phenanthrene	80J	430U	77J	--	69J	62J	--
Fluoranthene	210J	83J	210J	--	130J	130J	290J
Pyrene	210J	81J	170J	--	160J	140J	260J
Benzo(a)anthracene	110J	46J	91J	--	59J	73J	140J
Chrysene	110J	54J	110J	--	71J	71J	160J
Benzo(a or k)fluoranthene	230J	75J	210J	--	130J	140J	370J
Benzo(a)pyrene	120J	50J	99J	--	66J	64J	160J
Benzo(ghi)perylene	100J	430U	82J	--	--	490U	190J
Miscellaneous Extractable Compounds*							
Alkanes	4000J	3000J	2000J			3000J	7000J
Unidentified Compound/No.	1000J/2	2000J/3				7000J/6	4000J/3
Pesticides/PCB							
Dieldrin	0.47J	--	--	--	--	4.9U	--
4,4'-DDE(P,P'-DDE)	3.9U	--	--	--	--	25	--
4,4'-DDT(P,P'-DDT)	3.9U	--	--	--	--	21	--
Gamma-chlordane/2	2.0U	--	--	--	1.8J	2.5U	--

Notes:

- µg/kg Micrograms per kilogram
- AD Arkwright Dump site
- SD Sediment sample
- U Constituent analyzed for but not detected; value reported is the sample quantitation limit (SQL)
- J Estimated value
- Constituent analyzed for but not detected
- * Miscellaneous compounds are not on the target compound list and are reported only as detected in individual samples; SQL not provided
- PCB Polychlorinated biphenyls
- Shaded areas indicate elevated concentrations of constituents