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Concentrations of Polynuclear Aromatic Hydrocarbons and Inorganic Constituents in Ambient Surface Soils, Chicago, Illinois: 2001-02

B R T. K [1], T L. A [1], F. C [1], D G [2], E M [3], R B [3]

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Figures

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CONVERSION FACTORS AND ABBREVIATED SOIL- AND AIR-QUALITY UNITS

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Concentrations of Polynuclear Aromatic Hydrocarbons and Inorganic Constituents in Ambient Surface Soils, Chicago, Illinois: 2001-02

By R T. K , T L. A , F. C , D G , E M , R B

Abstract

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INTRODUCTION

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Purpose and Scope

Acknowledgments

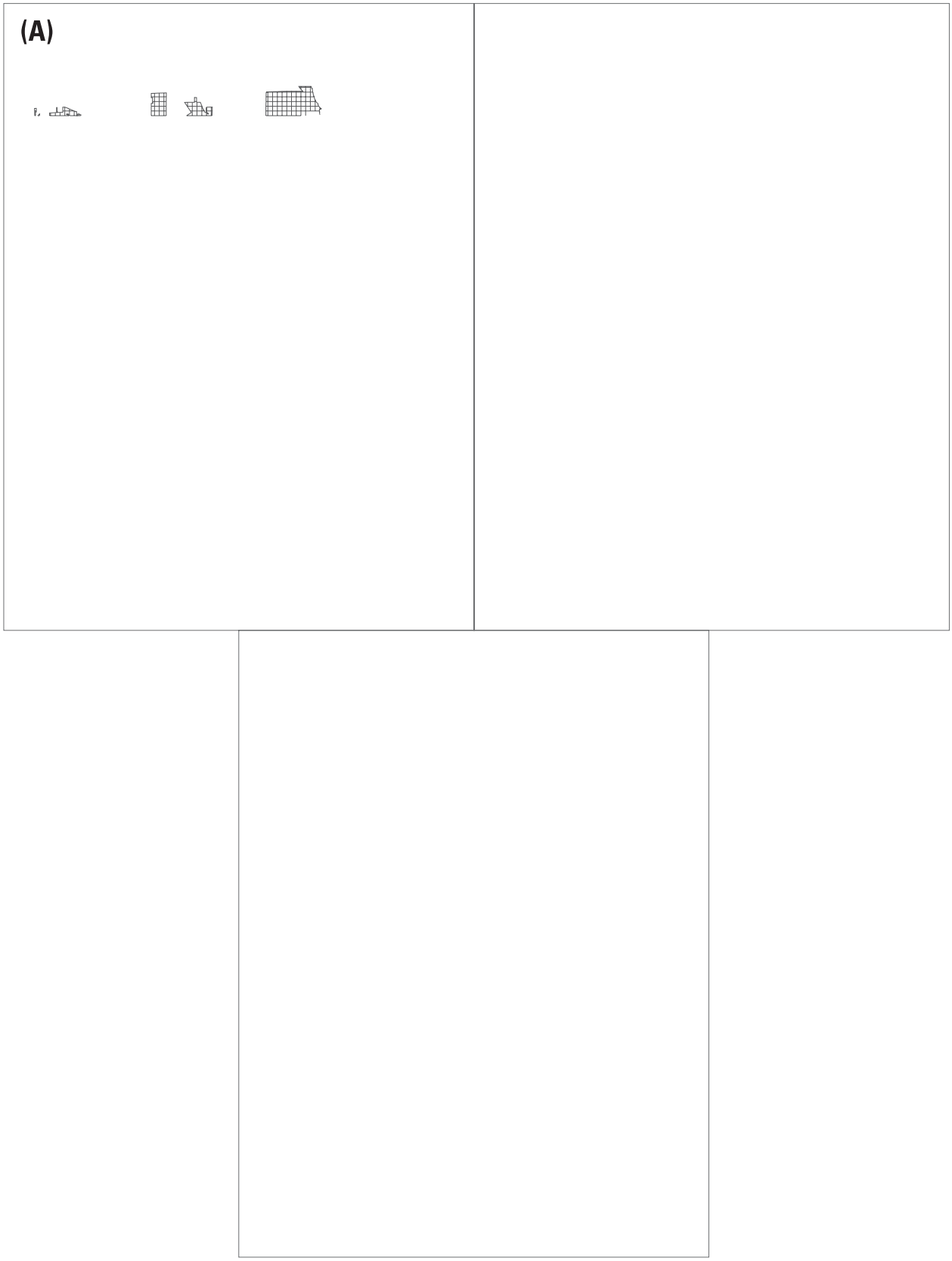

Figure 2. L (A) , (B) (C) , C , I .

Figure 4. L[illegible]

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Statistical Analysis of Uncensored Polynuclear Aromatic Hydrocarbon Data

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Statistical Analysis of Censored Polynuclear Aromatic Hydrocarbon Data

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ANALYSIS OF POLYNUCLDc/R

Figure 5. B

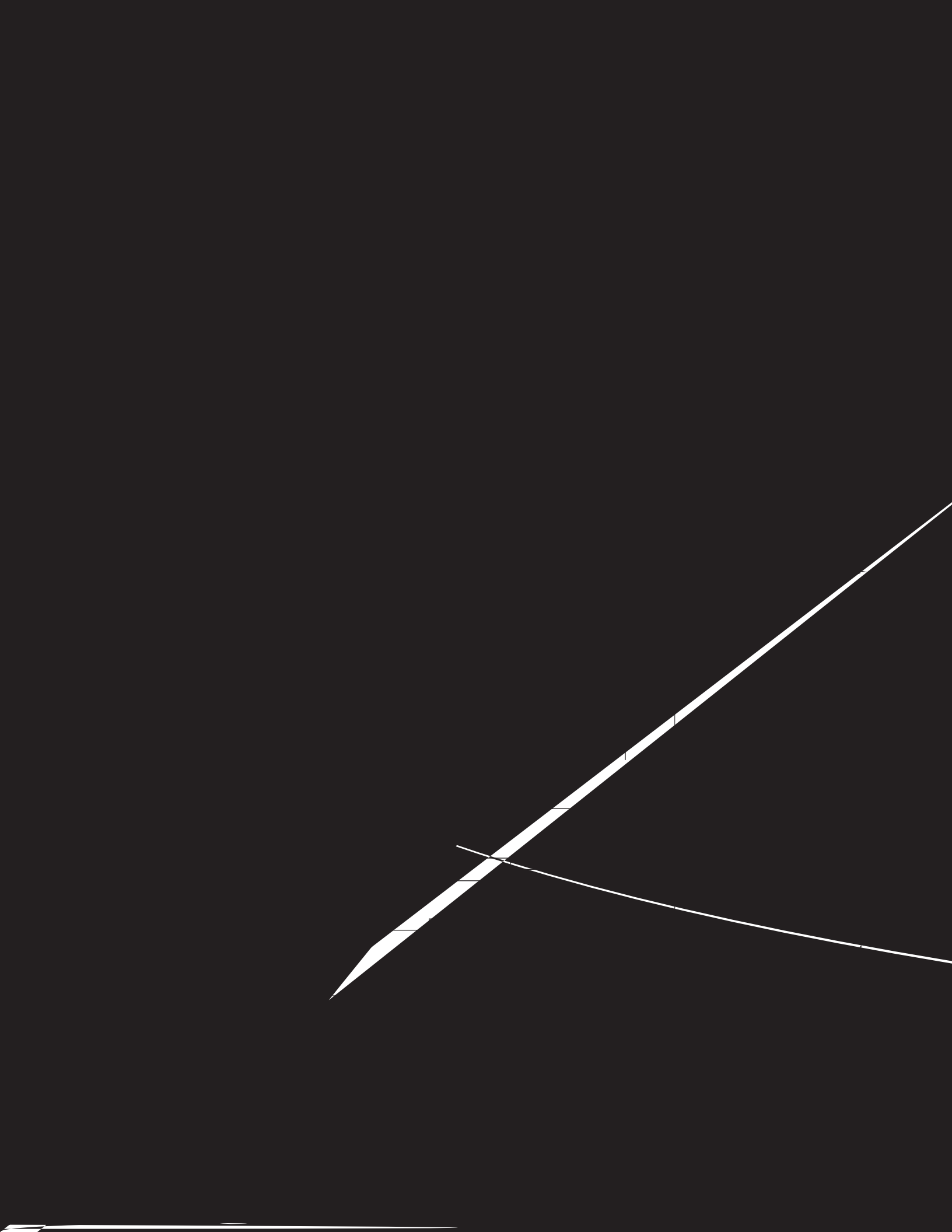

Figure 7. N (A) (B

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Figure 7. N (A) (B) , C , I C .

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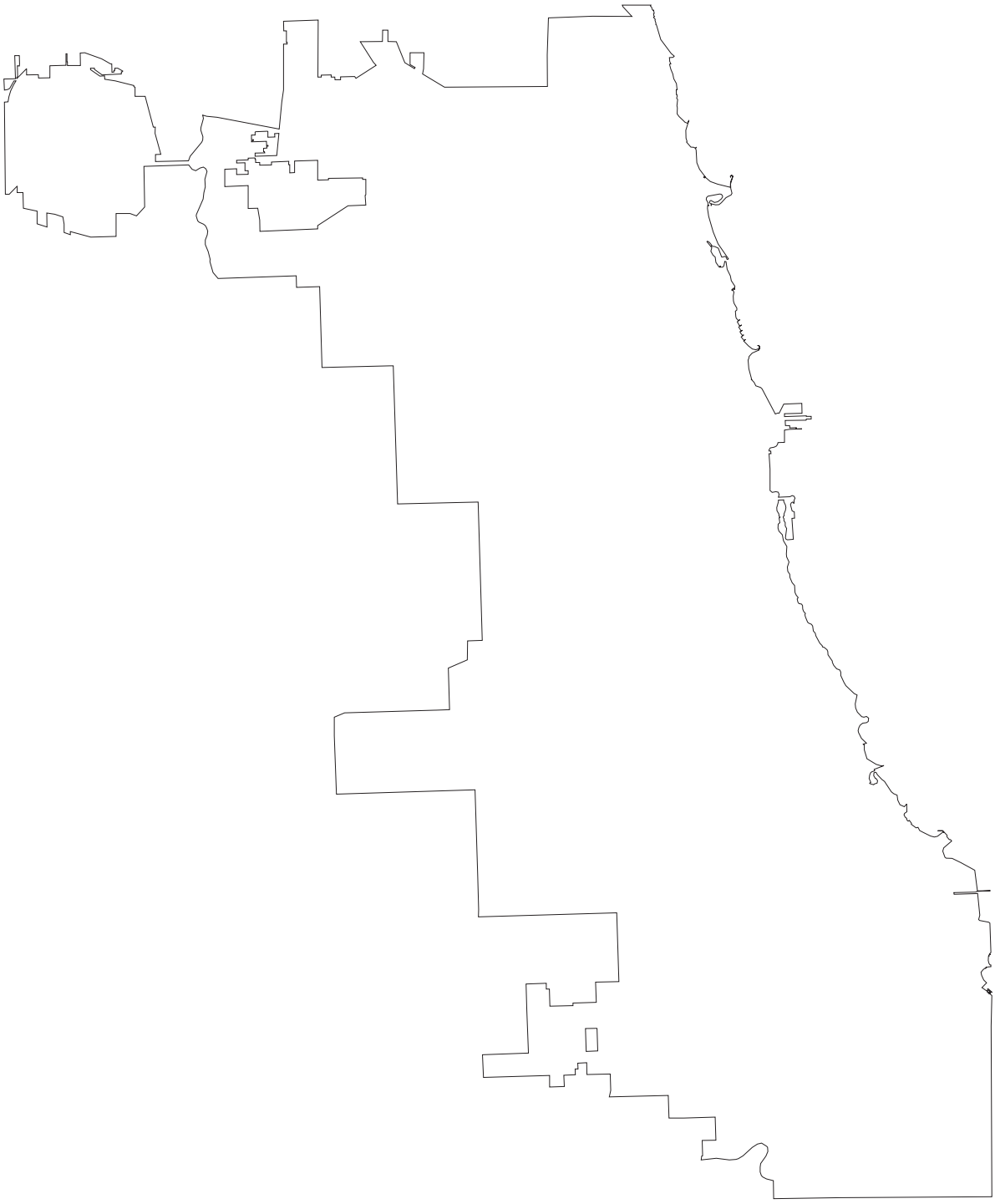

Figure 9. (A) K [illegible] ( ) [illegible] , C [illegible] , I [illegible] (B) [illegible]
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ANALYSIS OF INORGANIC DATA

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. 2, . 275-294.

Tables

Table 1.

Table 2. S - [illegible]

[D, duplicate sample; USGS, U.S. Geological Survey]

Sample number (location shown in figure 4)	Latitude	Longitude	USGS site identification number	Land use at site	Distance from nearest roadway (feet)	Date of sample collection
AH-CE-1	42 00’35	87 46’20	420003508746201	C	25	1/24/2002
AH-CE-2	41 58’46	87 48’25	415846087482501	T	40	1/24/2002
AH-CE-3	41 57’40	87 42’41	415740087424101	C	61	1/24/2002
AH-CE-4	41 54’04	87 38’18	415404087381801	C	190	1/24/2002
AH-CE-4D	41 54’04	87 38’18	415404087381802	C	190	1/24/2002
AH-CE-5	41 53’16	87 40’11	415316087401101	I	118	1/24/2002
AH-CE-6	41 51’07	87 42’14	415107087421401	C	7	1/24/2002
AH-CE-7	41 50’42	87 37’31	415042087373101	I	74	1/24/2002
AH-CE-8	41 49’17	87 36’38	414917087363801		78	1/24/2002
AH-CE-9	41 47’43	87 37’41	414743087374101		125	1/24/2002
AH-CE-10	41 43’24	87 36’16	414324087361601	T	16	1/24/2002
AH-CE-11	41 44’57	87 40’37	414457087403701	I	221	1/24/2002
AH-CE-12	41 45’18	87 42’51	414518087425101		37	1/24/2002
AH-CE-13	41 45’51	87 44’12	414551087441201	I	626	1/24/2002
AH-CE-14	41 46’42	87 44’26	414642087442601	C	41	1/24/2002
AH-CE-15	41 42’11	87 39’13	414211087391301	I	140	1/25/2002
AH-CE-15D	41 42’11	87 39’13	414211087391302	I	140	1/25/2002
AH-CE-16	41 42’49	87 32’45	414249087324501		85	1/25/2002
AH-CE-17	41 42’15	87 31’33	414215087313301	T	69	1/25/2002
AH-CE-18	41 44’42	87 38’37	414442087383701	C	69	1/25/2002
AH-CE-19	41 46’52	87 37’08	414652087370801		120	1/25/2002
AH- -01	41 55’57	87 43’37	415557087435701	I	30	6/5/2001
AH- -02	41 55’15	87 41’50	415515087415001	C	10	6/5/2001
AH- -03	41 54’33	87 46’08	415433087460801	C	10	6/5/2001
AH- -04	41 56’20	87 45’00	415620087450001	C	45	6/5/2001
AH- -05	41 55’25	87 48’02	415525087480201	C	35	6/5/2001
AH- -06	41 56’42	87 48’57	415642087485701		1	6/5/2001
AH- -07	41 57’05	87 48’26	415705087482601	C	45	6/5/2001
AH- -08	41 58’37	87 50’12	415837087501201		16	6/5/2001
AH- -09	41 59’31	87 47’54	415931087475401		22	6/5/2001
AH- -10	41 58’27	87 45’59	415827087455901	C	32	6/5/2001
AH- -11	41 41’35	87 42’03	414135087420301	C	30	6/5/2001
AH- -12	41 42’18	87 39’24	414218087392401	T	25	6/5/2001
AH- -13	41 41’14	87 37’18	414114087371801	C	20	6/5/2001
AH- -14	41 40’36	87 31’21	414036087312101		10	6/5/2001

Table 2. S - [D, duplicate sample; USGS, U.S. Geological Survey]

Sample number (location shown in figure 4)	Latitude	Longitude	USGS site identification number	Land use at site	Distance from nearest roadway (feet)	Date of sample collection
AH- -15	41 39’19	87 35’50	413919087355001	C	50	6/5/2001
AH- -16	41 39’34	87 32’55	413934087325501		10	6/5/2001
AH- -17	41 40’58	87 32’24	414058087322401		23	6/5/2001
AH- -17D	41 40’58	87 32’24	414058087322402		23	6/5/2001
AH- -18	41 43’35	87 33’00	414335087330001		10	6/5/2001
AH- -19	41 45’06	87 34’38	414506087343801	C	20	6/5/2001
AH- -20	41 45’44	87 33’50	414544087335001			

56.9(10.197.315 554.997 T (33’50) 2882.4(47) T 5.2473 ( )) 8 9 137 T 9 0 0 9 19

AH-97 T D ( )92(AH- -20)-4168.8(41) T 5.247 0 0 5.247 134.6921557.994 T ( ) T 9 0 0 9 137.315 554.997 42.9540’58 87

Table 3. S

[<, less than; na, not applicable]

Constituent	Number of samples collected	Number of detections	Percentage of samples with analyte detected	Range of detected concentrations including sample PAH-CE-19 (micrograms per kilogram)	Range of detected concentrations without sample PAH-CE-19 (micrograms per kilogram)	Number of samples exceeding Tier 1 remedial objectives for residential soil because of ingestion[1]	Number of samples exceeding Tier 1 remedial objectives for industrial or commercial soil because of ingestion[1]	Number of samples exceeding Tier 1 remedial objectives for construction workers because of ingestion[1]
A	57	51	89	<5-43,000	<5-1,500	0	0	0
A	57	43	75	<6-1,035	<6-1,035			
A	57	54	95	<7-120,000	<7-4,600	0	0	0
B ( )	57	57	100	26-370,000	26-16,000	27	5	1
B ( ) ι	57	57	100	40-550,000	40-18,000	32	6	1
B ( ) ι	57	57	100	36-280,000	36-10,000	3	1	0
B (, ,)	57	57	100	24-290,000	24-8,100			
B ( )	57	57	100	39-460,000	39-17,000	51	31	2
C	57	57	100	31-350,000	31-15,000	1	0	0
D (,)	57	57	100	8-41,000	8-1,600	38	7	1
F ι	57	57	100	52-1,100,000	52-35,000	0	0	0
F ι	57	51	89	<6-36,000	<6-2,000	0	0	0
I (1,2,3-)	57	57	100	31-370,000	31-9,900	22	3	1
	57	35	61	<13-2,500	<13-700	0	0	0
	57	57	100	22-520,000	22-19,000			
	57	57	100	51-720,000	51-30,000	0	0	0

[1] I ι C B , 2002

Table 4. M [illegible] C [illegible]

[--, no data]

Sample number (location shown in figure 4)	Mean distance to unclassified land use (feet)	Mean distance to residential land use (feet)	Mean distance to commercial land use (feet)	Mean distance to institutional land use (feet)	Mean distance to industrial, warehousing, and wholesale land use (feet)	Mean distance to transportation, communication, and utilities land use (feet)	Mean distance to agricultural land use (feet)	Mean distance to open space land use (feet)	Mean distance to vacant or wetland land use (feet)	Mean distance to water (feet)
AH-CE-1	--	4,356	4,265	5,216	2,395	8,144	--	4,936	6,384	--
AH-CE-2	5,253	3,403	2,645	3,441	--	1,970	--	2,294	1,361	--
AH-CE-3	--	4,911	4,974	6,659	6,082	6,244	--	5,373	6,979	5,111
AH-CE-4	--	4,967	5,055	4,288	4,737	4,944	--	5,459	3,786	5,235
AH-CE-5	--	5,073	4,787	6,209	3,516	4,838	--	4,939	3,947	--
AH-CE-6	--	3,767	3,531	3,957	4,944	4,428	--	2,922	4,585	6,241
AH-CE-7	--	5,086	5,436	3,846	5,595	5,536	--	5,017	5,503	6,224
AH-CE-8	--	4,727	4,621	4,601	6,503	5,926	--	5,385	3,801	--
AH-CE-9	--	4,479	4,415	4,592	6,564	3,681	--	4,572	3,907	--
AH-CE-10	--	4,973	5,277	4,041	5,024	5,901	--	7,191	6,299	--
AH-CE-11	9,308	4,924	4,597	4,531	3,720	3,549	--	5,767	5,197	--
AH-CE-12	10,330	5,321	5,448	7,313	2,457	3,294	--	4,829	3,933	4,874
AH-CE-13	4,376	4,523	4,736	2,909	2,531	2,102	--	2,320	2,054	--
AH-CE-14	11,084	9,809	9,386	10,373	10,686	5,856	--	8,757	5,353	--
AH-CE-15	10,271	5,054	4,971	5,196	6,916	5,514	--	5,525	7,751	--
AH-CE-16	--	4,386	3,752	5,079	3,195	5,434	--	5,964	6,269	2,825
AH-CE-17	--	2,963	1,882	3,162	1,260	1,939	--	4,104	2,331	--
AH-CE-18	--	4,829	4,670	4,213	3,401	4,642	--	4,908	4,800	--
AH-CE-19	--	5,081	4,985	5,618	2,469	3,748	--	6,244	4,103	4,854
AH- -01	--	4,130	3,963	3,865	4,061	5,186	--	3,497	5,280	--
AH- -02	--	4,772	5,106	5,193	6,193	5,571	--	4,559	5,644	6,288
AH- -03	4,951	3,904	4,059	4,690	3,946	3,012	--	4,016	3,757	--
AH- -04	--	4,269	4,200	4,708	3,253	5,039	--	4,270	3,086	--
AH- -05	5,112	4,083	4,035	3,988	3,297	5,758	--	4,542	3,632	--
AH- -06	3,942	3,482	4,513	5,343	9,768	--	--	7,798	5,695	9,734
AH- -07	4,008	4,556	3,244	3,868	4,659	--	--	4,504	5,144	--
AH- -08	6,461	8,073	7,135	14,488	19,612	19,974	25,114	6,211	19,443	13,079
AH- -09	12,046	6,017	5,384	4,158	3,059	4,909	--	4,396	6,918	--
AH- -10	6,691	4,678	3,765	4,720	4,678	4,054	--	5,734	7,861	--

Table 4. M [illegible] C [illegible]

[--, no data]

Sample number (location shown in figure 4)	Mean distance to unclassified land use (feet)	Mean distance to residential land use (feet)	Mean distance to commercial land use (feet)	Mean distance to institutional land use (feet)	Mean distance to industrial, warehousing, and wholesale land use (feet)	Mean distance to transportation, communication, and utilities land use (feet)	Mean distance to agricultural land use (feet)	Mean distance to open space land use (feet)	Mean distance to vacant or wetland land use (feet)	Mean distance to water (feet)
AH- -11	7,930	5,957	6,824	5,864	9,956	7,545	5,100	4,773	9,022	8,472
AH- -12	9,651	5,263	6,921	4,228	4,723	3,305	--	5,157	4,614	--
AH-6 -13	--	--	96(--) Tj 0 -1.7778 TD ( )92(AH-7 -13)-2768.5(--)-4303,7	,228	--	5,864--	AH-8 -13	--		

Table 5.

Table 5. P[illegible] C[illegible]

Sample number (location shown in figure 4)	Residential	Commercial and services	Institutional	Industrial, warehousing, and wholesale	Transportation, communication, and utilities	Open space	Vacant or wetland	Agricul-ture	Water	Unclassified (outside of city boundary)
AH- -12	31.7	10.2	14.5	16.6	17.8	0.4	8.8	0	0	0
AH- -13	52.5	41.2	5.1	0	0	.2	1.0	0	0	0
AH- -14	84.6	14.2	0	0	0	0	1.2	0	0	0
AH- -15	55.6	14.1	10.4	0	1.3	16.5	2.1	0	0	0
AH- -16	58.4	2.9	2.8	0	10.0	13.6	12.3	0	0	0
AH- -17	5.8	28.9	0	23.8	0	9.6	31.8	0	0	0
AH- -18	15.9	31.7	0.8	11.1	20.0	0	20.5	0	0	0
AH- -19	78.9	14.8	5.9	0	0	0	.4	0	0	0
AH- -20	82.5	11.5	2.4	1.0	0	0	2.6	0	0	0
AH- -21	28.2	11.4	28.8	8.3	17.1	0	2.8	0	3.4	0
AH- -22	60.4	26.8	8.0	0	1.3	0	3.5	0	0	0
AH- -23	66.6	31.1	1.8	0	0	0	.5	0	0	0
AH- -24	78.2	17.7	3.5	0	0	0	.6	0	0	0
AH- -25	60.7	24.0	4.5	1.4	0	2.4	7.0	0	0	0
AH- -26	60.8	26.1	1.8	3.3	0	.7	7.3	0	0	0
AH- -27	54.8	28.6	4.3	12.3	0	0	0	0	0	0
AH- -28	78.4	5.3	2.5	.9	0	12.2	.7	0	0	0
AH- -29	36.6	7.1	5.7	15.5	4.7	9.7	20.7	0	0	0
AH- -30	42.5	14.6	10.8	12.2	11.0	5.1	3.8	0	0	0
AH- -31	43.1	4.2	16.8	15.1	1.7	8.1	11.0	0	0	0
AH- -32	43.2	12.8	7.9	11.9	21.9	0	2.3	0	0	0
AH- -33	66.3	23.7	2.8	6.3	0	0	.9	0	0	0
AH- -34	68.5	25.0	6.5	0	0	0	0	0	0	0
AH- -35	66.6	25.0	6.0	0	0	1.1	1.3	0	0	0
AH- -36	63.7	23.2	10.4	0	2.4	0	.3	0	0	0
AH- -37	1.8	56.2	8.6	3.8	22.1	0.3	3.7	0	3.5	0
AH- -38	66.4	18.9	4.1	0	3.6	7.0	0	0	0	0

Table 5. P[illegible] C[illegible]

Sample number (location shown in figure 4)	Residential	Commercial and services	Institutional	Industrial, warehousing, and wholesale	Transportation, communication, and utilities	Open space	Vacant or wetland	Agricul-ture	Water	Unclassified (outside of city boundary)
				Percent landuse within a 1/2-mile radius (1-mile diameter) around the sampling site						
AH-CE-1	48.4	9.3	1.9	19.5	0	1.2	0	0	0	19.8
AH-CE-2	71.5	10.0	4.5	0	9.6	3.9	.6	0	0	0
AH-CE-3	79.5	15.9	4.3	0	.3	0	.1	0	0	0
AH-CE-4	29.7	15.7	9.1	21.4	7.1	5.1	9.7	0	2.1	0
AH-CE-5	25.6	10.7	5.3	39.2	5.0	3.6	10.7	0	0	0
AH-CE-6	55.9	19.2	8.0	0.3	1.8	11.8	3.1	0	0	0
AH-CE-7	23.7	10.5	14.5	16.7	16.2	8.3	10.1	0	0	0
AH-CE-8	58.1	9.9	4.3	1.1	.9	8.4	17.5	0	0	0
AH-CE-9	47.2	12.5	4.6	1.9	14.4	4.2	15.2	0	0	0
AH-CE-10	45.2	6.3	20.9	12.8	7.9	2.3	4.6	0	0	0
AH-CE-11	53.5	12.4	6.4	8.9	10.1	8.1	0.7	0	0	0
AH-CE-12	57.9	3.8	4.1	18.7	13.2	1.0	1.2	0	0	0
AH-CE-13	8.4	2.1	2.4	44.2	27.8	1.7	13.4	0	0	0
AH-CE-14	48.9	14.0	1.6	9.0	20.1	2.1	4.4	0	0	0
AH-CE-15	63.3	5.1	5.8	7.7	9.7	4.0	4.4	0	0	0
AH-CE-16	20.7	2.8	0.7	26.5	17.7	2.7	17.3	0	11.6	0
AH-CE-17	33.5	8.3	.7	2.9	9.2	1.1	1.6	0	0	42.7
AH-CE-18	56.4	10.5	6.8	15.1	4.0	1.5	5.7	0	0	0
AH-CE-19	44.0	8.5	2.6	13.9	19.2	2.6	9.2	0	0	0
AH- -01	56.9	12.4	3.5	23.4	.9	2.7	.3	0	0	0
AH- -02	65.2	20.7	5.2	2.8	0.2	4.8	1.1	0	0	0
AH- -03	75.4	8.2	2.1	5.8	5.5	1.2	1.8	0	0	0
AH- -04	72.9	13.6	3.5	9.5	.2	0	.4	0	0	0
AH- -05	61.3	15.2	4.4	6.3	0	3.3	0.5	0	0	9.1
AH- -06	83.7	4.5	10.7	0	0	1.1	0	0	0	0
AH- -07	53.6	8.2	12.2	0	0	0	0.1	0	0	25.9
AH- -08	77.7	12.3	4.8	0	4.3	0	0	0	0	1.0
AH- -09	79.5	6.6	7.0	1.9	0	5.1	0	0	0	0
AH- -10	71.0	12.2	2.2	2.5	9.0	3.1	0	0	0	0
AH- -11	69.0	7.1	23.2	0	0	.7	0	0	0	0

Table 5.

Table 5. P[illegible] C[illegible]

Sample number (location shown in figure 4)	Residential	Commercial and services	Institutional	Industrial, warehousing, and wholesale	Transportation, communication, and utilities	Open space	Vacant or wetland	Agricul-ture	Water	Unclassified (outside of city boundary)
AH-CE-3	71.4	15.5	4.0	0.8	0.3	6.5	0.2	0	1.4	0
AH-CE-4	25.1	19.1	6.5	19.6	10.1	5.3	7.7	0	3.0	3.6
AH-CE-5	32.8	15.7	7.1	25.0	7.8	2.7	9.0	0	0	0
AH-CE-6	49.4	12.7	8.6	8.8	3.8	10.3	5.8	0	.6	0
AH-CE-7	23.6	13.5	10.1	11.3	20.2	7.5	9.5	0	.9	3.4
AH-CE-8	42.9	11.1	5.8	1.5	4.9	10.5	12.5	0	0	10.9
AH-CE-9	39.6	9.5	4.9	4.2	15.6	13.8	12.0	0	.5	0
AH-CE-10	52.2	3.7	10.8	14.5	9.2	3.9	5.8	0	0	0
AH-CE-11	53.9	8.5	4.1	8.3	9.6	12.8	2.8	0	0	0
AH-CE-12	55.5	7.0	7.4	11.1	9.6	5.4	3.5	0	.6	0
AH-CE-13	28.8	10.4	6.0	24.8	11.5	1.9	5.7	0	0	11.0
AH-CE-14	39.1	7.3	1.0	6.4	30.5	3.3	6.1	0	0	6.3
AH-CE-15	75.7	6.8	4.9	2.2	5.5	2.5	2.5	0	0	0
AH-CE-16	33.7	6.0	1.3	17.9	13.4	6.3	15.0	0	5.8	.6
AH-CE-17	30.3	3.5	1.4	4.3	4.5	5.9	1.5	0	.7	47.9
AH-CE-18	58.4	10.0	3.8	12.4	6.2	3.2	6.0	0	0	0
AH-CE-19	45.1	9.3	7.7	6.2	12.1	10.3	8.5	0	.9	0
AH- -01	68.2	12.0	3.3	12.2	1.3	2.4	.6	0	0	0
AH- -02	59.9	17.1	3.5	6.2	3.4	6.6	3.0	0	.4	0
AH- -03	65.7	9.0	3.3	9.1	3.1	4.5	1.8	0	0	3.4
AH- -04	72.7	13.0	3.7	7.4	0.5	2.6	0.3	0	0	0
AH- -05	49.8	12.7	2.2	8.7	0	2.8	1.1	0	0	22.7
AH- -06	67.0	5.0	13.7	0	0	1.8	.0	0	0	12.5
AH- -07	46.5	5.1	20.3	.3	0	1.0	2.8	0	0	24.0
AH- -08	56.4	10.3	2.8	0	4.7	17.4	.6	0	.1	7.8
AH- -09	62.8	6.3	16.8	1.5	3.5	8.2	0.2	0	0	0.8
AH- -10	69.4	10.2	2.8	5.5	5.0	6.9	.2	0	0	0
AH- -11	65.0	5.0	14.1	.1	0	7.6	1.2	2.6	.1	4.4
AH- -12	77.5	5.8	4.3	2.2	5.4	2.5	2.4	0	0	0
AH- -13	64.7	11.3	5.3	10.3	2.6	2.5	3.2	0	.2	0

Table 5. P

Sample number (location shown in figure 4)	Residential	Commercial and services	Institutional	Industrial, warehousing, and wholesale	Transportation, communication, and utilities

T 7. S [illegible]

[Alpha = 0.1. Null hypothesis (H) is that the distribution is lognormal.]

Constituent (natural-log transformed)	Shapiro-Wilk test statistic					
	Excluding sample PAH-CE-19			Including sample PAH-CE-19		
	Value	p-value	Conclusion	Value	p-value	Conclusion

Table 8. S [illegible] , C [illegible] , I [illegible]

[Bold denotes retained estimates]

Constituent (natural-log transformed)	Number of samples	Number less than detection limit	Number of detection limits	Maximum detection limit (micrograms per kilogram)	Mean (micrograms per kilogram)	Standard deviation (micrograms per kilogram)	Value of 25th percentile (micrograms per kilogram)	Median (micrograms per kilogram)	Value of 75th percentile (micrograms per kilogram)
Estimates using log-probability regression of samples with concentrations greater than the detection limit									
All Samples									
A	57	7	5	3.05	4.24	1.86	2.41	4.44	5.63
A	57	16	6	3.18	3.22	1.55	1.91	2.83	4.18
A	57	3	3	3.05	5.22	1.89	3.68	5.39	6.48
F_t	57	7	5	3.05	4.36	1.88	2.53	4.51	5.75
	57	22	7	3.18	3.56	1.44	2.42	3.00	4.54
Excluding Sample PAH-CE-19									
A	56	7	5	3.05	**4.14**	**1.65**	2.45	4.44	5.52
A	56	16	6	3.18	**3.16**	**1.47**	1.90	2.80	4.10
A	56	3	3	3.05	**5.10**	**1.69**	3.66	5.32	6.44
F_t	56	7	5	3.05	**4.25**	**1.69**	2.53	4.43	5.72
	56	22	7	3.18	**3.51**	**1.30**	2.46	2.97	4.49
Estimates using adjusted lognormal maximum likelihood regression of samples with concentrations above the detection limit									
All Samples									
A	57	7	5	3.05	4.26	2.32	2.66	4.44	5.63
A	57	16	6	3.18	3.22	1.76	2.00	2.83	4.18
A	57	3	3	3.05	5.24	2.15	3.68	5.39	6.48
F_t	57	7	5	3.05	4.38	2.27	2.79	4.51	5.75
	57	22	7	3.18	3.51	1.65	2.35	3.18	4.54
Excluding Sample PAH-CE-19									
A	56	7	5	3.05	4.15	2.17	**2.64**	**4.44**	**5.52**
A	56	16	6	3.18	3.16	1.68	**1.99**	**2.79**	**4.10**
A	56	3	3	3.05	5.13	2.02	**3.66**	**5.32**	**6.44**
F_t	56	7	5	3.05	4.27	2.13	**2.78**	**4.43**	**5.72**
	56	22	7	3.18	3.44	1.54	**2.36**	**3.14**	**4.49**

Table 11. R [illegible]

Table 12. P

[Italic denotes constituents with censored data. --, not applicable]

Constituent	*Acenaphthene*	*Acenaphthylene*	*Anthracene*	Benzo(a)anthracene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	Benzo(g,h,i)perylene	Benzo(a)pyrene	Chrysene	Dibenzo(a,h)anthracene	Fluoranthene	*Fluorene*	Indeno(1,2,3-cd)pyrene	*Naphthalene*	Phenanthrene	Pyrene	Total organic carbon
A	--	0.79	0.97	0.93	0.92	0.92	0.86	0.92	0.92	0.81	0.94	0.98	0.88	0.73	0.95	0.94	0.48
A	--	--	.83	.87	.87	.87	.84	.87	.86	.75	.85	.83	.86	.78	.83	.87	.49
A	--	--	--	.98	.97	.96	.92	.97	.98	.87	.98	.98	.94	.76	.99	.97	.52
B ( )	--	--	--	--	.99	.99	.95	1.00	1.00	.89	1.00	.95	.97	.74	.99	.99	.55
B ( ) t	--	--	--	--	--	.99	.95	1.00	.99	.89	.99	.94	.97	.74	.98	.98	.56
B ( ) t	--	--	--	--	--	--	.94	.99	.98	.88	.98	.94	.96	.75	.97	.97	.57
B (, ,)	--	--	--	--	--	--	--	.96	.96	.95	.95	.88	.99	.72	.94	.95	.57
B ( )	--	--	--	--	--	--	--	--	1.00	.90	.99	.94	.98	.74	.98	.99	.57
C	--	--	--	--	--	--	--	--	--	.90	.99	.94	.98	.73	.98	.99	.56
D (,)	--	--	--	--	--	--	--	--	--	--	.88	.82	.95	.70	.89	.88	.57
F t	--	--	--	--	--	--	--	--	--	--	--	.95	.96	.72	.99	.99	.55
F , , ,	--	--	--	--	--	--	--	--	--	--	--	--	.90	.77	.96	.95	.48
I (1,2,3-)	--	--	--	--	--	--	--	--	--	--	--	--	--	.73	.96	.96	.57
, , , .	--	--	--	--	--	--	--	--	--	--	--	--	--	--	.75	.75	.40
	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	.99	.53
	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	.54

Table 13. P

[°C, degrees Celsius]

Constituent	Molecular weight (grams per mole)	Solubility in water at 25°C (micrograms per liter)	Octonal-water partition coefficient (dimensionless)	Organic carbon partition coefficient (milliliters water per gram carbon)	Henry's Law Constant (cubic meters atmosphere per mole)
A	154	3,930.	9,600	4,600	1.40E-04
A	154	3,420.	5,300	2,500	1.45E-03
A	178	59.	14,000	28,000	5.87E-05
B ( )	228	11.	410,000	200,000	3.01E-06
B ( )	252	2.4	1,100,000	550,000	1.22E-05
B ( )	252	2.4	1,150,000	550,000	7.48E-07
B (, ,)	276	.3	3,200,000	1,600,000	1.44E-07
B ( )	252	3.8	1,550,000	5,500,000	1.28E-09
C	228	1.9	410,000	200,000	8.45E-05
D (,)	278	.4	6,900,000	3,300,000	1.33E-08
F	202	260.	79,000	38,000	1.45E-05
F	166	800.	15,000	7,300	5.74E-05
I (1,2,3-)	276	.5	3,200,000	1,600,000	6.95E-08
	128	12,500.	2,344	1,290	1.08E-03
	178	435.	28,000	14,000	1.45E-04
	202	133.	80,000	38,000	9.92E-06

Table 15. R

[Alpha = 0.05. Null hypothesis (H) is that all means are equal.]

Constituent (natural-log transformed)	F value	Probability of (F)[1]	Conclusion	
B ( )	0.31	0.93	F	H
B ( )	.29	.94	F	H
B ( )	.36	.90	F	H
B (, ,)	.34	.91	F	H
B ( )	.32	.93	F	H
C	.42	.86	F	H
D (,)	.39	.88	F	H
F	.31	.93	F	H
I (1,2,3-)	.56	.76	F	H
	.26	.95	F	H
	.43	.86	F	H

[1]

Table 16. Statistical description of polynuclear aromatic hydrocarbons in ambient soils for different land-use categories, Chicago, Illinois—Continued

[Bold denotes rejection of the assumption of normal distribution for the constituent. %, percent]

Constituent (natural-log transformed)	Mean	Standard deviation	Lowest value (0%)	First quartile (25%)	Median (50%)	Third quartile (75%)	Highest value (100%)	Shapiro-Wilk test (p-value)
Industrial, Warehousing, and Wholesale (5 cases)								
	7.15	1.28	5.19	6.55	7.65	8.10	8.27	0.34
F ι	7.91	1.14	6.13	7.44	8.40	8.70	8.87	.28
	7.55	1.14	6.06	6.72	7.74	8.56	8.68	.48
B ( )	7.00	1.17	5.35	6.40	7.09	8.07	8.10	.49
C	7.04	1.10	5.39	6.58	7.17	7.97	8.07	.52
B ( ) ι	7.37	1.01	5.86	6.91	7.63	8.13	8.34	.57
B ( ) ι	6.95	1.13	5.44	6.11	7.33	7.90	7.97	.31
B ( )	7.18	1.08	5.60	6.63	7.41	8.07	8.19	.51
D (,)	5.07	1.01	3.30	5.25	5.39	5.56	5.83	**.03**
B (, ,)	6.35	1.02	4.70	6.02	6.84	7.09	7.09	.12
I (1,2,3-)	6.59	0.98	5.08	6.15	7.04	7.31	7.38	.21
Residential (9 cases)								
	7.33	1.77	4.87	5.48	7.60	8.67	9.68	0.40
F ι	8.03	1.61	5.70	6.48	8.37	9.39	9.90	.33
	7.65	1.63	5.52	5.86	8.24	8.73	9.74	.22
B ( )	7.10	1.64	4.94	5.35	7.44	8.54	9.12	.24
C	7.14	1.64	5.08	5.39	7.44	8.67	9.31	.27
B ( ) ι	7.38	1.61	5.25	5.91	7.55	8.88	9.55	.47
B ( ) ι	6.91	1.52	4.61	5.67	7.17	8.29	9.11	.82
B ( )	7.24	1.60	5.08	5.67	7.50	8.73	9.39	.45
D (,)	5.28	1.21	3.33	4.44	5.30	6.23	7.00	.82
B (, ,)	6.52	1.51	4.79	5.14	6.59	7.60	8.84	.41
I (1,2,3-)	6.81	1.54	4.87	5.39	6.82	8.37	9.00	.37

Table 17. R [illegible]

[Alpha = 0.05. Null hypothesis (H) is that mean concentrations are not significantly different among land-use categories.]

Constituent (natural-log transformed)	F value	Probability[1]	Conclusion
B ( )	0.92	0.49	F H

Table 20. C , C , I

[Bold denotes analytes concentrated by a factor of two or more; mg/Kg, milligrams per kilogram]

Constituent	Arithmetic mean concentration in 57 Chicago soil samples	Arithmetic mean concentration in 106 soil samples collected within 500 kilometers of Chicago	Concentration factor in Chicago soils relative to soils within 500 kilometers of Chicago
A l t ( )	4.8	4.86	0.99
A e c (/K)	**19.5**	**6.56**	**2.97**
B l (/)	427.3	499.3	.86
B l (/)	2.2	1.2	1.83
Ca c (e e ce)	**4.06**	**.82**	**4.95**
T a Ca (e e ce)	**7.61**	**2.55**	**2.98**
C l (/)	71.2	44.1	1.61
C (/)	11.	8.51	1.29
C e (/K)	**150.5**	**18.4**	**8.18**
G l (/)	13.9	12.8	1.09
I ( )	3.3	1.85	1.78
D l (/)	25.7	36.2	.71
Lead (/K)	**395.3**	**19.4**	**20.38**
D l (/)	31.3	19.74	1.59
Ma e (e e ce)	**2.47**	**.4**	**6.18**
(/)	583.4	460.4	1.27
Me c (/K)	**.64**	**.14**	**4.57**
M de (/K)	**5.74**	**2.46**	**2.33**
N c e (/K)	**36.44**	**15.95**	**2.28**
P (e e ce)	**.086**	**.043**	**2.00**
l ( )	1.75	1.56	1.12
l (/)	8.6	8.2	1.05
Se e (/K)	**1.**	**.46**	**2.17**
l ( )	.52	.73	.71
l (/)	113.6	122.1	.93
T l (/)	9.	8.2	1.10
T l ( )	.22	.27	.81
l (/)	76.5	61.1	1.25
l (/)	15.8	20.8	.76
Z c (/K)	**396.68**	**53.57**	**7.40**

Table 21. P [illegible] , C [illegible] , I [illegible]

[Positive coefficients greater than 0.70 in bold]

	ALUMINUM	ARSENIC	BARIUM	CALCIUM	CARBONATE CARBON	ORGANIC CARBON	CERIUM	CHROMIUM	COBALT	COPPER	GALLIUM	IRON	LANTHANUM	LEAD	LITHIUM	MAGNESIUM
AL D I	1.00															
A E IC	-.13	1.00														
BA I	**.71**	.13	1.00													
CAL DCI	-.73	.07	-.71	1.00												
CA B ATE																
CA B	-.75	.07	-.73	**.99**	1.00											
GA IC																
CA B	.02	.19	.13	-.17	-.26	1.00										
CE I	**.94**	-.17	.69	-.62	-.62	-.14	1.00									

Appendix 1. Polynuclear aromatic hydrocarbons in ambient surface soils, Chicago, Illinois.

Appendix 1. P , C , I

Appendix 1. P [illegible] C [illegible]

[µg/Kg, micrograms per kilogram; 15 U, constituent not detected and detection limit; J, estimated; D, duplicate sample]

Sample Number	Constituent							
	Benzo(a)-anthracene (µg/Kg)	Chrysene (µg/Kg)	Benzo(b)-fluoranthene (µg/Kg)	Benzo(k)-fluoranthene (µg/Kg)	Benzo(a)-pyrene (µg/Kg)	Dibenzo-(a,h)anthra-cene (µg/Kg)	Benzo-(g,h,i)-perylene (µg/Kg)	Indeno-(1,2,3-cd)-pyrene (µg/Kg)
AH- -01	600	720	1,000	450	760	190	410	470
AH- -02	200	250	340	220	260	93	200	210
AH- -03	720	800	920	650	850	140	430	500
AH- -04	740	910	1,100	900	1,000	150	490	610
AH- -05	510	650	760	530	680	110	360	430
AH- -06	9,100	11,000	14,000	9,000	12,000	770	6,900	8,100
AH- -07	47	54	100	53	81	68	120	110
AH- -08	180	220	260	220	250	96	170	200
AH- -09	2,700	2,900	3,000	2,200	3,000	290	1,000	1,300
AH- -10	26	31	40	36	39	62	110	98
AH- -11	43	61	63	59	66	62	100	110
AH- -12	110	120	150	95	130	68	130	140
AH- -13	3,400	3,500	4,000	1,900	3,700	640	1,300	1,500
AH- -14	5,100	5,800	7,200	4,400	6,200	510	2,000	4,300
AH- -15	160	180	240	140	200	82	160	170
AH- -16	59	79	97	58	81	69	120	130
AH- -17	10,000	9,300	13,000	7,100	11,000	870	7,100	8,100
AH- -17D	8,400	8,200	9,400	8,600	9,700	780	5,500	6,100
AH- -18	4,900	5,500	6,800	3,600	5,600	520	3,700	4,100
AH- -19	77	99	99	70	95	70	130	140
AH- -20	140	160	190	100	160	28	120	130
AH- -21	210	230	300	170	250	44	180	210
AH- -21D	230	260	330	190	280	52	200	240
AH- -22	16,000	15,000	18,000	10,000	17,000	1,600	8,100	9,900
AH- -23	880	980	970	1,000	1,000	110	490	620
AH- -24	2,500	2,600	3,700	2,000	3,000	290	1,500	1,800
AH- -25	240	280	340	210	280	59	210	250
AH- -25D	280	330	380	270	340	70	230	280
AH- -26	550	540	530	340	570	71	280	370
AH- -27	3,800	4,200	5,700	2,900	4,200	760	3,200	3,800
AH- -28	2,000	1,900	2,600	1,300	2,100	280	920	1,100
AH- -29	1,700	1,700	1,900	1,300	1,800	200	730	920
AH- -30	1,700	1,600	1,600	1,500	1,600	280	640	830
AH- -31	2,400	2,500	3,000	1,700	2,400	370	930	1,200
AH- -32	6,400	6,600	6,000	6,300	6,600	940	3,600	4,600
AH- -33	1,300	1,300	1,300	1,400	1,400	220	570	700

Appendix 1. P [illegible]

[µg/Kg, micrograms per kilogram; 15 U, constituent not detected and detection limit; J, estimated; D, duplicate sample]

	Constituent		
Sample Number	Naphthalene (µg/Kg)	Acenaph-thylene (µg/Kg)	Acenaph-thene (µg/Kg)

Appendix 1. P [illegible] C [illegible]

[µg/Kg, micrograms per kilogram; 15 U, constituent not detected and detection limit; J, estimated; D, duplicate sample]

Sample Number	Constituent							
	Benzo(a)-anthracene (µg/Kg)	Chrysene (µg/Kg)	Benzo(b)-fluoranthene (µg/Kg)	Benzo(k)-fluoranthene (µg/Kg)	Benzo(a)-pyrene (µg/Kg)	Dibenzo-(a,h)anthra-cene (µg/Kg)	Benzo-(g,h,i)-perylene (µg/Kg)	Indeno-(1,2,3-cd)-pyrene (µg/Kg)
AH- -33D	1,300	1,300	1,700	950	1,400	220	540	700
AH- -34	1,500	1,600	2,100	720	1,600	220	920	1,200
AH- -35	8,100	7,800	9,000	4,000	7,500	1,100	4,100	5,000
AH- -36	6,100	6,400	8,500	3,900	6,600	1,100	4,000	5,200
AH- -37	1,800	1,500	2,600	1,300	1,700	130	570	870
AH- -38	300	310	440	490	490	140	220	360
AH-CE-1	320	380	480	330	410	38	200	270
AH-CE-2	30	35	50	36	41	8	24	33
AH-CE-3	430	430	550	410	480	48	200	260
AH-CE-4	1,400	1,400	1,800	1,400	1,600	120	560	790
AH-CE-4D	1,000	1,000	1,300	950	1,200	130	560	770
AH-CE-5	3,200	2,900	3,400	2,900	3,600	260	1,200	1,500
AH-CE-6	880	850	1,200	820	950	120	580	700
AH-CE-7	3,300	3,200	4,200	2,700	3,200	340	1,200	1,600
AH-CE-8	830	730	830	620	780	78	290	410
AH-CE-9	28	36	50	44	45	10	24	31
AH-CE-10	210	200	320	200	250	27	99	130
AH-CE-11	210	220	350	230	270	27	110	160
AH-CE-12	210	200	370	290	290	85	130	220
AH-CE-13	1,800	1,800	3,900	2,900	3,500	200	820	1,200
AH-CE-14	1,300	1,300	2,100	1,800	1,600	200	390	580
AH-CE-15	1,600	1,800	2,600	2,100	2,100	220	1,300	1,500
AH-CE-15D	810	790	1,500	960	1,200	220	560	780
AH-CE-16	240	260	430	380	430	130	310	300
AH-CE-17	360	360	540	580	550	160	430	470
AH-CE-18	4,100	3,700	4,000	3,200	4,100	980	2,100	3,100
AH-CE-19	370,000	350,000	550,000	280,000	460,000	41,000	290,000	370,000

Appendix 2. Inorganic constituents in ambient surface soils, Chicago, Illinois.

Appendix 2. [illegible]

[percent, percent-weight; D, duplicate sample; <50, constituent not detected and detection limit]

Sample Number	Constituent							
	Carbon Dioxide (percent)	Carbonate Carbon (percent)	Total Carbon (percent)	Total Organic Carbon (percent)	Aluminum (percent)	Calcium (percent)	Iron (percent)	Magnesium (percent)
AH- -01	0.91	0.25	6.01	5.76	5.66	1.27	2.78	0.92
AH- -02	2.02	.55	4.50	3.95	5.83	1.77	2.29	1.16
AH- -03	2.38	.65	5.64	4.99	6.90	1.94	3.50	1.47
AH- -04	3.77	1.03	6.79	5.76	5.68	2.65	2.63	1.77
AH- -05	16.30	4.45	7.77	3.32	4.33	7.95	2.57	5.25
AH- -06	16.40	4.48	11.50	7.02	4.58	8.95	3.19	5.65
AH- -07	1.97	.54	2.49	1.95	7.13	1.68	3.23	1.43
AH- -08	1.54	.42	4.85	4.43	6.26	1.48	2.90	1.18
AH- -09	1.88	.51	5.99	5.48	5.89	1.70	2.97	1.23
AH- -10	.14	.04	2.21	2.17	6.04	.62	2.99	.59
AH- -11	2.76	0.75	4.88	4.13	5.54	2.34	2.83	1.39
AH- -12	.35	.10	2.39	2.29	6.12	.86	2.88	.74
AH- -13	3.15	.86	5.13	4.27	6.74	2.64	3.63	1.71
AH- -14	3.38	.92	6.95	6.03	6.52	2.77	3.94	1.68
AH- -15	3.49	.95	3.50	2.55	6.39	2.66	3.30	1.67
AH- -16	1.46	0.40	3.32	2.92	6.48	1.67	3.21	1.04
AH- -17	4.40	1.20	8.26	7.06	5.42	4.15	5.27	1.82
AH- -17D	4.54	1.24	7.94	6.70	5.32	4.58	5.61	1.82
AH- -18	3.85	1.05	16.00	14.95	3.78	3.43	14.50	1.52
AH- -19	1.33	.36	2.62	2.26	6.49	1.32	3.05	1.16
AH- -20	4.23	1.15	9.30	8.15	4.58	3.30	3.83	1.76
AH- -21	.76	.21	3.21	3.00	6.71	1.15	3.00	.94
AH- -21D	.80	.22	3.16	2.94	6.78	1.18	3.02	.98
AH- -22	15.10	4.12	7.93	3.81	4.82	8.55	2.76	4.58
AH- -23	1.83	.50	5.91	5.41	5.86	1.80	3.07	1.09
AH- -24	0.61	0.17	5.69	5.52	6.26	1.15	3.19	0.94
AH- -25	.90	.25	3.55	3.30	5.78	1.15	2.63	.86
AH- -25D	.94	.26	3.56	3.30	5.83	1.23	2.70	.95
AH- -26	6.97	1.90	7.98	6.08	4.92	4.42	2.75	2.53
AH- -27	9.55	2.61	10.50	7.89	4.73	5.45	4.18	3.46
AH- -28	2.18	0.59	6.07	5.48	7.00	1.89	3.98	1.67
AH- -29	26.90	7.34	9.77	2.43	3.09	12.90	2.24	8.06
AH- -30	1.97	.54	4.73	4.19	6.44	1.79	4.28	1.22
AH- -31	3.07	.84	10.90	10.06	4.56	2.41	5.75	1.39
AH- -32	5.49	1.50	8.99	7.49	5.89	3.96	3.67	2.09

Appendix 2. [illegible]

[percent, percent-weight; D, duplicate sample; <50, constituent not detected and detection limit]

Sample Number	Constituent							
	Carbon Dioxide (percent)	Carbonate Carbon (percent)	Total Carbon (percent)	Total Organic Carbon (percent)	Aluminum (percent)	Calcium (percent)	Iron (percent)	Magnesium (percent)
AH- -33	4.25	1.16	8.38	7.22	5.97	3.10	3.36	1.95
AH- -33D	4.30	1.17	8.34	7.17	5.86	3.18	3.31	1.94
AH- -34	6.89	1.88	5.53	3.65	5.44	3.85	2.79	2.82
AH- -35	5.68	1.55	11.50	9.95	7.46	4.55	5.51	1.94
AH- -36	6.97	1.90	11.80	9.90	4.30	4.53	4.32	2.59
AH- -37	7.35	2.01	6.94	4.93	2.60	3.89	2.15	2.16
AH- -38	.65	.18	7.35	7.17	5.26	1.23	2.44	.81
AH-CE-01	16.00	4.37	13.40	9.03	2.33	7.38	1.23	4.60
AH-CE-02	29.20	7.97	8.19	.22	1.21	12.30	.56	7.84
AH-CE-03	18.40	5.02	9.11	4.09	3.44	8.10	2.38	5.44
AH-CE-04	40.00	10.92	12.10	1.18	0.83	15.90	0.80	10.80

Appendix 2. [illegible]

[percent, percent-weight; D, duplicate sample; <50, constituent not detected and detection limit]

Sample Number	Constituent							
	Phosphorus (percent)	Potassium (percent)	Sodium (percent)	Sulfur (percent)	Titanium (percent)	Arsenic (milligrams per kilogram)	Barium (milligrams per kilogram)	Beryllium (milligrams per kilogram)
AH- -01	0.080	2.04	0.56	0.08	0.273	15	445	2
AH- -02	.090	1.84	.74	.05	.273	<10	449	1
AH- -03	.070	2.45	.47	.09	.278	16	453	2
AH- -04	.175	2.19	.49	.10	.247	10	403	2
AH- -05	.070	1.71	.56	.06	.210	12	278	1
AH- -06	0.090	1.62	0.67	0.12	0.221	12	403	2
AH- -07	.055	2.63	.59	.05	.305	11	475	2
AH- -08	.085	2.31	.76	.06	.284	<10	481	2
AH- -09	.110	2.24	.70	.08	.252	11	463	2
AH- -10	.065	1.98	.81	<0.05	.305	13	540	1
AH- -11	0.095	1.84	0.61	0.05	0.268	11	499	1
AH- -12	.065	1.88	.69	<0.05	.310	10	543	1
AH- -13	.210	2.60	.51	.09	.257	20	572	2
AH- -14	.100	2.28	.54	.13	.268	12	666	3
AH- -15	.055	2.34	.52	.05	.289	17	442	2
AH- -16	.070	2.43	0.53	0.05	0.326	15	485	2
AH- -17	.120	1.91	.45	.16	.252	<10	426	2
AH- -17D	.130	1.87	.44	.14	.247	<10	436	2
AH- -18	.240	.94	.64	.30	.200	25	477	3
AH- -19	.060	2.45	.58	<0.05	.305	13	505	2
AH- -20	0.140	1.55	0.70	0.14	0.210	19	397	2
AH- -208.9(1) T T	2583.4(.05)-2583.4(.289)-2083T T				2583.4(	45 -17 .9(2) T 0	-160)-2583.4(	.57683.4(

Appendix 2. [illegible]

[percent, percent-weight; D, duplicate sample; <50, constituent not detected and detection limit]

Sample Number	Constituent							
	Bismuth (milligrams per kilogram)	Cadmium (milligrams per kilogram)	Cesium (milligrams per kilogram)	Chromium (milligrams per kilogram)	Cobalt (milligrams per kilogram)	Copper (milligrams per kilogram)	Europium (milligrams per kilogram)	Gallium (milligrams per kilogram)
AH- -01	<50	<2	63	65	11	43	<2	14
AH- -02	<50	<2	61	53	10	37	<2	15
AH- -03	<50	<2	63	75	13	57	<2	18
AH- -04	<50	3	54	66	11	69	<2	17
AH- -05	<50	<2	41	44	9	51	<2	16
AH- -06	<50	6	44	78	12	343	<2	17
AH- -07	<50	<2	72	70	14	39	<2	19
AH- -08	<50	<2	62	64	12	35	<2	16
AH- -09	<50	<2	61	64	11	43	<2	16
AH- -10	<50	<2	64	54	11	28	<2	13
AH- -11	<50	<2	61	56	9	36	<2	16
AH- -12	<50	<2	71	68	11	38	<2	15
AH- -13	<50	<2	69	78	14	66	<2	20
AH- -14	<50	<2	67	102	13	73	<2	17
AH- -15	<50	<2	68	63	14	42	<2	16
AH- -16	<50	<2	75	66	15	36	<2	15
AH- -17	<50	<2	55	340	11	75	<2	16
AH- -17D	<50	<2	60	387	11	76	<2	13
AH- -18	<50	7	38	192	16	395	<2	14
AH- -19	<50	<2	69	61	12	42	<2	16
AH- -20	<50	<2	43	66	11	67	<2	13
AH- -21	<50	<2	70	76	11	44	<2	18
AH- -21D	<50	<2	73	72	12	47	<2	17
AH- -22	<50	<2	46	57	13	89	<2	15
AH- -23	<50	<2	63	69	12	74	<2	16
AH- -24	<50	<2	64	73	13	57	<2	17
AH- -25	<50	<2	58	59	10	35	<2	16
AH- -25D	<50	<2	63	61	10	37	<2	14
AH- -26	<50	<2	51	64	11	48	<2	10
AH- -27	<50	5	48	94	12	2,780	<2	14
AH- -28	<50	2	70	78	16	117	<2	23
AH- -29	<50	3	33	50	9	208	<2	8
AH- -30	<50	<2	66	76	14	99	<2	18
AH- -31	<50	<2	44	82	13	214	<2	17
AH- -32	<50	<2	60	79	14	134	<2	18

Appendix 2. [illegible]

[percent, percent-weight; D, duplicate sample; <50, constituent not detected and detection limit]

Sample Number	Constituent							
	Bismuth (milligrams per kilogram)	Cadmium (milligrams per kilogram)	Cesium (milligrams per kilogram)	Chromium (milligrams per kilogram)	Cobalt (milligrams per kilogram)	Copper (milligrams per kilogram)	Europium (milligrams per kilogram)	Gallium (milligrams per kilogram)
AH- -33	<50	<2	60	77	12	84	<2	17
AH- -33D	<50	<2	59	81	14	83	<2	18
AH- -34	<50	<2	54	61	11	46	<2	16
AH- -35	<50	3	104	129	26	234	3	23
AH- -36	<50	7	45	118	12	355	<2	17
AH- -37	<50	3	15	67	7	73	<2	7
AH- -38	57	<2	52	45	12	35	<2	13
AH-CE-01	<50	3	19	29	8	47	<2	6
AH-CE-02	<50	<2	<5	8	5	9	<2	<4
AH-CE-03	<50	4	23	90	10	66	<2	10
AH-CE-04	<50	3	<5	20	5	98	<2	<4
AH-CE-04D	<50	2	<5	17	4	77	<2	<4
AH-CE-05	<50	7	23	131	14	475	<2	11
AH-CE-06	<50	6	8	87	5	419	<2	6
AH-CE-07	<50	7	16	88	14	484	<2	11
AH-CE-08	<50	<2	11	19	5	12	<2	7
AH-CE-09	<50	<2	60	55	13	25	<2	17
AH-CE-10	<50	<2	18	31	4	24	<2	8
AH-CE-11	<50	<2	13	23	5	24	<2	<4
AH-CE-12	<50	<2	47	54	13	78	<2	15
AH-CE-13	<50	5	13	82	16	45	<2	11
AH-CE-14	<50	<2	29	45	10	63	<2	9
AH-CE-15	<50	<2	41	43	11	46	<2	12
AH-CE-15D	<50	<2	38	42	9	42	<2	11
AH-CE-16	<50	<2	16	26	6	13	<2	6
AH-CE-17	<50	<2	25	56	6	59	<2	8
AH-CE-18	<50	3	30	45	9	200	<2	11
AH-CE-19	<50	3	6	26	5	59	<2	5

Appendix 2. [illegible]

[percent, percent-weight; D, duplicate sample; <50, constituent not detected and detection limit]

Sample Number	Constituent							
	Gold (milligrams per kilogram)	Holmium (milligrams per kilogram)	Lanthanum (milligrams per kilogram)	Lead (milligrams per kilogram)	Lithium (milligrams per kilogram)	Manganese (milligrams per kilogram)	Mercury (milligrams per kilogram)	Molybde-num (milligrams per kilogram)
AH- -01	<8	<4	32	93	36	561	0.11	4
AH- -02	<8	<4	33	40	32	327	.09	2
AH- -03	<8	<4	34	198	52	461	.86	5
AH- -04	<8	<4	30	283	43	365	.31	4
AH- -05	<8	<4	23	150	29	433	.17	4
AH- -06	<8	<4	25	654	37	628	0.32	6
AH- -07	<8	<4	35	42	52	390	.07	5
AH- -08	<8	<4	33	87	40	507	.09	3
AH- -09	<8	<4	31	224	38	582	.38	3
AH- -10	<8	<4	34	27	28	751	.08	3
AH- -11	<8	<4	33	35	30	699	0.08	3
AH- -12	<8	<4	36	39	29	651	.19	2
AH- -13	<8	<4	34	323	51	524	1.89	6
AH- -14	<8	<4	33	504	55	821	.33	6
AH- -15	<8	<4	34	47	42	694	.07	5
AH- -16	<8	<4	36	65	44	795	0.08	5
AH- -17	<8	<4	30	240	39	3,250	.18	15
AH- -17D	<8	<4	33	246	38	4,090	.16	17
AH- -18	<8	<4	21	1,690	28	2,330	.93	14
AH- -19	<8	<4	35	44	43	634	.07	3
AH- -20	<8	<4	24	239	25	802	0.25	4
AH- -21	<8	<4	34	72	51	427	.27	3
AH- -21D	<8	<4	35	70	51	420	.59	3
AH- -22	<8	<4	25	303	36	541	1.91	6
AH- -23	<8	<4	33	198	39	442	.28	5
AH- -24	<8	<4	34	109	38	683	0.17	5
AH- -25	<8	<4	31	82	33	471	.06	2
AH- -25D	<8	<4	33	90	35	549	.06	3
AH- -26	<8	<4	27	105	31	459	.14	6
AH- -27	<8	<4	24	1,310	33	697	1.65	11
AH- -28	<8	<4	35	275	49	415	0.39	7
AH- -29	<8	<4	18	473	25	512	.70	5
AH- -30	<8	<4	34	355	42	544	.25	6
AH- -31	<8	<4	24	469	26	631	.31	7
AH- -32	<8	<4	29	528	42	495	.21	7

Appendix 2. [illegible]

[percent, percent-weight; D, duplicate sample; <50, constituent not detected and detection limit]

Sample Number	Constituent							
	Gold (milligrams per kilogram)	Holmium (milligrams per kilogram)	Lanthanum (milligrams per kilogram)	Lead (milligrams per kilogram)	Lithium (milligrams per kilogram)	Manganese (milligrams per kilogram)	Mercury (milligrams per kilogram)	Molybde-num (milligrams per kilogram)
AH- -33	<8	<4	31	281	46	411	0.44	6
AH- -33D	<8	<4	31	283	45	405	.43	6
AH- -34	<8	<4	28	175	36	533	.12	4
AH- -35	<8	<4	52	1,270	67	710	5.13	12
AH- -36	<8	<4	24	1,910	28	642	.75	6
AH- -37	<8	<4	13	1,000	12	390	0.25	4
AH- -38	<8	<4	28	85	32	484	.08	3
AH-CE-01	<8	<4	13	260	13	240	.12	2
AH-CE-02	<8	<4	10	13	7	196	<0.02	<2
AH-CE-03	<8	<4	18	886	24	335	13.10	5
AH-CE-04	<8	<4	7	270	5	166	0.08	<2
AH-CE-04D	<8	<4	6	200	5	150	.12	<2
AH-CE-05	<8	<4	19	1,450	20	415	.38	13
AH-CE-06	<8	<4	11	1,500	8	327	.21	6
AH-CE-07	<8	<4	17	1,680	17	517	.41	15
AH-CE-08	<8	<4	12	70	7	276	0.03	<2
AH-CE-09	<8	<4	32	30	42	479	.03	3
AH-CE-10	<8	<4	12	98	8	241	.28	<2
AH-CE-11	<8	<4	13	66	15	236	.02	2
AH-CE-12	<8	<4	28	167	40	368	.06	6
AH-CE-13	<8	<4	21	49	32	579	0.03	17
AH-CE-14	<8	<4	18	977	22	405	.11	6
AH-CE-15	<8	<4	23	135	32	346	.10	6
AH-CE-15D	<8	<4	22	114	32	333	.07	6
AH-CE-16	<8	<4	11	30	8	311	.03	2
AH-CE-17	<8	<4	17	332	14	954	0.48	4
AH-CE-18	<8	<4	20	428	22	414	.44	3
AH-CE-19	<8	<4	10	90	7	320	.09	<2

Appendix 2. [illegible]

[percent, percent-weight; D, duplicate sample; <50, constituent not detected and detection limit]

Sample Number	Constituent							
	Niobium (milligrams per kilogram)	Neodymium (milligrams per kilogram)	Nickel (milligrams per kilogram)	Scandium (milligrams per kilogram)	Selenium (milligrams per kilogram)	Silver (milligrams per kilogram)	Strontium (milligrams per kilogram)	Tantalum (milligrams per kilogram)
AH- -01	9	27	29	10	0.7	<2	98	<40
AH- -02	7	31	27	9	.7	<2	102	<40
AH- -03	7	30	41	12	1.0	<2	100	<40
AH- -04	8	27	37	10	.8	<2	125	<40
AH- -05	10	24	26	7	.6	<2	100	<40
AH- -06	11	24	52	8	0.9	<2	123	<40
AH- -07	6	29	38	13	.5	<2	98	<40
AH- -08	8	30	30	11	.7	<2	99	<40
AH- -09	6	32	29	10	.8	<2	107	<40
AH- -10	10	32	25	9	.7	<2	98	<40
AH- -11	7	28	24	9	0.7	<2	122	<40
AH- -12	10	31	27	10	.6	<2	99	<40
AH- -13	12	33	41	13	1.2	<2	106	<40
AH- -14	13	31	45	12	1.3	<2	106	<40
AH- -15	9	30	32	11	.8	<2	104	<40
AH- -16	10	32	31	12	0.9	<2	94	<40

Appendix 2. [illegible]

[percent, percent-weight; D, duplicate sample; <50, constituent not detected and detection limit]

Sample Number	Constituent						
	Thorium (milligrams per kilogram)	Tin (milligrams per kilogram)	Uranium (milligrams per kilogram)	Vanadium (milligrams per kilogram)	Ytterbium (milligrams per kilogram)	Yttrium (milligrams per kilogram)	Zinc (milligrams per kilogram)
AH- -33	8	<50	<100	91	2	18	348
AH- -33D	8	<50	<100	88	2	18	339
AH- -34	<6	<50	<100	81	2	17	191
AH- -35	13	<50	<100	145	3	38	1,500
AH- -36	<6	<50	<100	79	1	16	1,140
AH- -37	6	<50	<100	42	1	9	431
AH- -38	11	<50	<100	71	2	16	133
AH-CE-01	7	<50	<100	35	<1	9	606
AH-CE-02	10	<50	<100	24	<1	6	100
AH-CE-03	8	101	<100	62	1	13	930
AH-CE-04	8	<50	<100	34	<1	7	242
AH-CE-04D	<6	<50	<100	32	<1	8	187
AH-CE-05	11	<50	<100	73	2	16	1,260
AH-CE-06	10	<50	<100	38	<1	8	1,400
AH-CE-07	8	51	<100	70	1	14	1,690
AH-CE-08	11	<50	<100	27	<1	7	83
AH-CE-09	10	<50	<100	88	3	17	80
AH-CE-10	8	<50	<100	30	<1	7	106
AH-CE-11	<6	<50	<100	34	<1	9	142
AH-CE-12	13	<50	<100	82	2	15	174
AH-CE-13	8	<50	<100	124	3	26	490
AH-CE-14	7	<50	<100	58	2	13	251
AH-CE-15	11	<50	<100	65	2	14	163
AH-CE-15D	12	<50	<100	63	2	14	158
AH-CE-16	10	<50	<100	34	<1	8	89
AH-CE-17	12	<50	<100	50	2	11	528
AH-CE-18	7	<50	<100	53	2	13	371
AH-CE-19	6	<50	<100	34	<1	7	264

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