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DETERMINATION OF UPPER TOLERANCE LIMITS FOR RADIONUCLIDES AND CHEMICALS FOR SURFACE SOIL AT THE FEMP MARCH 24, 1992

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DETERMINATION OF UPPER TOLERANCE LIMITS FOR RADIONUCLIDES AND CHEMICALS FOR SURFACE SOIL AT THE FEMP

3061

March 24, 1992
John R. Frazier, Ph.D., CHP

Upper Tolerance Limits (UTLs) are selected to correspond to the upper 95% confidence limit on the 95th quantile of the background distribution. Regional data for Indiana and Ohio have been used as background data for radionuclides and chemicals in surface soil. The data for radionuclides are taken from a report by Myrick, et al. (1981) and are presented in Attachment I. Regional data for fission products (e.g., Cs-137) and activation products are not available, and UTLs for such radionuclides are assumed to be zero until site-specific background measurements are available. The data for chemicals are taken from the U.S. Department of Interior Geological Survey Report (1981) and are presented in Attachment II.

The data for radionuclides are summarized in Table I.

Table I
BACKGROUND DATA FOR RADIONUCLIDES IN SURFACE SOIL

Radionuclide	Frequency of Detection	Range of Values (pCi/g)	Arithmetic Mean (pCi/g)	Distribution Type	UTL[a] (pCi/g)
Ra-226	14/14	0.81-2.5	1.41	Lognormal	2.230
Th-232	14/14	0.71-1.5	1.05	Lognormal	1.475
U-238	14/14	0.76-2.2	1.36	Lognormal	2.109

[a]The use of four significant figures is not intended to imply a high degree of precision or accuracy, but rather to present results as calculated for future comparisons.

Determination of the distribution type was made in accordance with the methodology presented in Section 4.0 of the RI/FS Risk Assessment Work Plan Addendum, February 1992. The data for each radionuclide suggest that either a normal or lognormal distribution can be assumed, but a lognormal distribution is more appropriate for these data.

The UTL for each radionuclide given in Table I is calculated from the regional data as (Gilbert 1987):

$$UTL = e^{(\bar{y} + ZS_y)}$$

where

$$\bar{y} = \frac{1}{n} \Sigma \ln x$$

such that $e^{\bar{y}}$ is the geometric mean,

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Z = 1.645 (95% confidence limit for one-tailed test)

(Pearson and Hartley 1966)

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and

$$Sy = \frac{\sqrt{\Sigma(y-\bar{y})^2}}{n-1}$$

such that e^{Sy} is the geometric standard deviation.

If a normal distribution had been assumed for each radionuclide, the UTL is calculated to be (EPA 1989):

Radionuclide	UTL (pCi/g)
Ra-226	2.613
Th-232	1.668
U-238	2.368

But, as stated previously, the lognormal distribution is more appropriate for these data.

It is assumed that the radioactive progeny of these radionuclides are in secular equilibrium whereby the UTLs are as follows:

	Radionuclide	UTL (pCi/g)
Thorium Series	Ra-228	1.475
	Ac-228	1.475
	Th-228	1.475
	Ra-224	1.475
Uranium Series	Th-234	2.109
	Pa-234	2.109
	U-234	2.109
	Th-230	2.109
Uranium Series below Rn-222	Po-218	2.230
	Pb-214	2.230
	Bi-214	2.230
	Po-214	2.230
	Pb-210	2.230
	Bi-210	2.230
	Po-210	2.230

It is also assumed that uranium-235 occurs at its natural isotopic abundance (0.72% by mass) in background soil. The UTL for uranium-235 and each selected progeny (Th-231, Pa-231, Ac-227) is equal to 0.097 pCi/g.

The data for chemicals in surface soil are summarized in Table II. UTLs are calculated according to the referenced methodology for the appropriate distribution type.

Table II

BACKGROUND DATA FOR CHEMICALS IN SURFACE SOIL

Chemical	Frequency of Detection[a]	Range of Values (mg/kg)	Arithmetic Mean[b] (mg/kg)	Dist Type	UTL (mg/kg)
Aluminum	24/24	15000-100000	52500	normal	108200.
Arsenic	24/24	3.6-27.00	9.98	lognormal	20.5
Barium	24/24	300.-700.	483.	normal	815.
Beryllium	8/24	<1.00-2.00	1.56	normal	2.15
Cadmium	15/15	1.00-11.00	2.67	normal	11.1
Calcium	24/24	1100-160800	15700.	lognormal	41300.
Chromium	24/24	15.0-100.	51.3	normal	103.
Cobalt	24/24	3.00-20.0	11.7	normal	21.4
Copper	24/24	7.00-70.0	27.6	lognormal	58.6
Iron	24/24	10000-50000	24600.	lognormal	46200.
Lead	23/24	<15.0-30.0	21.5	normal	37.3
Magnesium	24/24	1500-30000	6460.	lognormal	15900.
Manganese	24/24	150.-1000	535.	lognormal	1140.
Mercury	24/24	0.030-0.590	0.13	lognormal	0.292
Molybdenum	11/24	<3.00-7.00	5.55	normal	8.85
Nickel	24/24	7.00-50.0	21.8	lognormal	33.4
Potassium	24/24	11800-25100	17100.	lognormal	23800.
Selenium	21/24	<0.100-1.20	0.52	normal	1.17
Silver	6/6	0.700-5.00	2.78	normal	8.03
Sodium	23/23	5000-10000	7520.	normal	11400.
Vanadium	24/24	20.0-150.	81.3	normal	172.
Zinc	24/24	25.0-113.	62.7	lognormal	113.

[a]Regional data for Ohio and Indiana except for cadmium and silver, which are national data.
[b]Arithmetic mean of the detected values.

The UTLs presented for radionuclides and chemicals are also assumed for subsurface soil and sediment. UTLs for other constituents and/or other media are generally based on site-specific data rather than on regional data. A sampling and analysis program is currently underway to determine site-specific UTLs to replace regional values.

REFERENCES

Boerngen, J.G. and H.T. Shacklette, 1981, Chemical Analyses of Soils and Other Surficial Materials of the Conterminous United States, Open-File Report 91-197, U.S. Department of the Interior, Geological Survey, Washington, DC.

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Myrick, T.E., B.A. Berven, and F.F. Haywood, November, 1981, State Background Radiation Levels: Results of Measurements Taken During 1975-1979, ORNL/TM-7343, Oak Ridge National Laboratory, Oak Ridge, TN.

Pearson, E.S. and H.O. Hartley, 1966, Biometric Tables for Statisticians, Vol. 1, 3rd ed., Cambridge University Press, London.

U.S. Environmental Protection Agency, 1989, "Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities", EPA/530-SW-89-026, EPA, Office of Solid Waste, Washington, DC.

Attachment I

BACKGROUND LEVELS FOR RADIONUCLIDES IN SURFACE SOIL[1]

Table 25. Background radiation levels and nuclide concentrations in surface soil samples in the State of Ohio

Sample designation	Description of sample location	Average external gamma exposure rate (μR/h)[a]	Nuclide concentration in surface soil (pCi/g)[b]		
			^{226}Ra	^{232}Th	^{238}U
OH-1	Rest area on S side of I-71, ~16 km S of Columbus, Ohio, at mile marker 92	9.2	2.5 ± 0.16	0.71 ± 0.02	2.2
OH-2	Approx. 51 km N of Columbus, Ohio, at rest stop on S side of I-71	7.1	1.5 ± 0.12	0.74 ± 0.60	1.3
OH-3	Approx. 21 km E of Wickliffe, Ohio, at rest stop on S side of I-90	9.2	1.1 ± 0.04	1.1 ± 0.10	1.2
OH-4	Approx. 8 km S of I-70, at intersection of Hwy 13 and 188, near Thornville, Ohio	c	2.0 ± 0.14	1.0 ± 0.16	1.7
OH-5	SE corner of intersection of I-77 and Hwy 821, at Macksburg, Ohio	11	1.3 ± 0.12	1.5 ± 0.20	1.6
OH-6	Rest area on E side of I-77, ~16 km S of I-70, near Buffalo, Ohio	8.2	1.9 ± 0.16	1.1 ± 0.24	1.6
OH-7	SW corner of intersection of I-70 and Hwy 9, S of St. Clairsville, Ohio	8.5	1.5 ± 0.16	1.5 ± 0.18	1.7
OH-8	W side of I-475, between Hwys 20 and 2, in W Toledo, Ohio	5.1	0.81 ± 0.04	0.80 ± 0.02	0.76
OH-9	Rest stop on W side of I-75, just S of Findlay, Ohio	4.9	1.3 ± 0.08	0.93 ± 0.06	1.2
OH-10	W side of I-75, just S of Hwy 67 exit, E of Wapakoneta, Ohio	4.8	1.5 ± 0.06	1.0 ± 0.06	1.4
OH-11	W side of I-75, ~0.4 km N of intersection with Hwy 571, near Tipp City, Ohio	2.8	1.2 ± 0.04	0.99 ± 0.06	0.96
OH-12	W side of I-75, just N of intersection with Hwy 122, E of Middletown, Ohio	4.8	1.0 ± 0.04	0.98 ± 0.04	0.86

[a]Exposure rate determined from 3 to 4 measurements at each location using a "Phil" tube as described in Appendix I.

[b]Standard deviation of ^{226}Ra and ^{232}Th measurements are given as the 2σ value. Error in the ^{238}U measurements are ≤5% (2σ).

[c]No data obtained.

Table 12. Background radiation levels and nuclide concentrations in surface soil samples in the State of Indiana

Sample designation	Description of sample location	Average external gamma exposure rate (μR/h)[a]	Nuclide concentration in surface soil (pCi/g)[b]		
			^{226}Ra	^{232}Th	^{238}U
IN-1	SE corner of intersection of I-64 and Hwy 161, in edge of woods	6.0	1.0 ± 0.08	1.1 ± 0.10	1.1
IN-2	SE corner of intersection of I-64 and Hwy 66, next to graveyard	7.1	1.1 ± 0.06	1.2 ± 0.08	1.4

[a]Exposure rate determined from 3 to 4 measurements at each location using a "Phil" tube as described in Appendix I.

[b]Standard deviation of ^{226}Ra and ^{232}Th measurements are given as the 2σ value. Error in the ^{238}U measurements are ≤5% (2σ).

[1] Myrick, T.E., B.A. Berven, and F.F. Haywood, November 1981, State Background Radiation Levels: Results of Measurements Taken During 1975-1979, ORNL/TM-7343, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

Attachment II

BACKGROUND LEVELS FOR CHEMICALS IN SURFACE SOIL

UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

3061

CHEMICAL ANALYSES OF SOILS AND OTHER SURFICIAL MATERIALS OF THE CONTERMINOUS UNITED STATES

By

Josephine G. Boerngen and Hansford T. Shacklette

Open-File Report 81-197

1981

This report is preliminary and has not been edited or reviewed for conformity with U.S. Geological Survey standards or nomenclature

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Table 1.--Location, description, and concentrati[illegible] of elements for samples of surficial materials--co[illegible]ued

Sample No.	State	County	Lati-tude	Long-itude	Date Colln.	Site and Soil Descriptions
GC034550	ID	JEROME	42 40	114 31	65 8	RT 79 4 MI S JEROME; GRAY-BROWN SILT ON BASALT
GC037050	ID	KOOTENAI	47 40	116 45	65 10	I-90 1 MI S COER D'ALENE; MED BROWN SILT
GC038050	ID	MADISON	43 53	111 38	65 10	RT 33 1 MI E TETON; BROWN-GRAY SILTY LOAM EDGE CULTIVATED FIELD
GC061250	ID	NEZ PERCE	46 26	116 50	70 10	US 12 10 MI E LEWISTON; ORGANIC SILT OVER BASALT
GC017050	ID	OWYHEE	42 27	115 35	63 10	CO RD 40 MI SE BRUNEAU ON INDIAN HOT SPRING RD; SOIL UNDER HOPSAGE
GC076050	ID	POWER	42 37	113 9	73 9	I-15W 1.9 E CASSIA CO LINE; LOESSIAL SILT BY SNAKE RIVER
GC037150	ID	SHOSHONE	47 29	115 58	65 10	US 10 1 MI NW WALLACE; BROWN-BLACK ORGANIC COLLUVIUM
GC038150	ID	TETON	43 39	111 7	65 10	RT 33 5 MI S DRIGGS; BROWN-GRAY SANDY LOAM
GC231150	ID	VALLEY	45 16	115 14	66 7	BIG RAMEY CR UPPER RAMEY MEADOWS; SOIL NOT DESCRIBED
GC231550	ID	VALLEY	44 16	116 5	66 7	RT 15 2 MI S SMITHS FERRY; POOR B HORIZON ON GRANITE
GC026850	ID	WASHINGTON	44 20	116 23	71 9	DIRT RD IN BROAD VALLEY 1 MI SE JCT CRANE CREEK RD; ON BASALT ALLUV
GC057550	IL	BUREAU	41 17	89 22	70 6	RT 29 2 MI NW HENNEPIN; BROWN FOREST LOAM
GC057950	IL	CLARK	39 18	87 50	70 8	US 50 9 MI E MARTAINSVILLE; LOAM FROM GLACIAL TILL
GC002250	IL	COOK	41 30	87 44	62 5	US 30 5 MI W CHICAGO HTS; DARK BROWN-BLACK SILTY CLAY LOAM
GC007650	IL	DOUGLAS	39 47	88 17	62 10	US 36 2 MI W US 45 JCT; DARK BROWN-GRAY CLAY LOAM
GC059750	IL	EFFINGHAM	39 3	88 45	70 8	US 40 .8 MI E ALTAMONT; GRAY SILT
GC002150	IL	GRUNDY	41 11	88 19	62 5	US 66 1 MI W GARDNER; DARK BROWN-BLACK SILTY CLAY LOAM
GC042950	IL	HENRY	41 25	90 0	66 10	I-80 AT ATKINSON; BROWNISH-BLACK SILTY CLAY LOAM
GC042650	IL	IROQUOIS	40 47	87 40	66 10	US 24 5 MI W IND-ILL LINE; BLACK SILTY LOAM
GC030150	IL	KANE	42 7	88 28	72 9	JCT I-90 & US 20; DARK PRAIRIE SOIL
GC042850	IL	LA SALLE	41 20	89 0	66 10	US 51 5 MI S PERU; BLACK SILTY LOAM
GC067150	IL	LAWRENCE	38 43	87 45	72 10	US 50 4 MI W LAWRENCEVILLE; YELLOW CLAY
GC001950	IL	LOGAN	40 3	89 28	62 5	US 66 1 MI N BROADWELL SW MI; BROWN CLAY LOAM
GC007750	IL	MACON	39 50	89 8	62 10	US 36 10 MI W DECATUR; DARK BROWN-GRAY CLAY LOAM
GC057750	IL	MC DONOUGH	40 26	90 48	70 6	N EDGE OF COLCHESTER; LOAM ON LOESS
GC002050	IL	MC LEAN	40 40	88 46	62 5	US 66 1 MI N LEXINGTON; DARK BROWN CLAY LOAM
GC057650	IL	OGLE	41 59	89 16	70 6	RT 64 4 MI E OREGON; SANDY SOIL OVER SANDSTONE
GC001650	IL	PIKE	39 43	91 12	62 5	US 36 AT HULL; DARK BROWN-GRAY CLAY LOAM
GC001750	IL	PIKE	39 36	90 46	62 5	US 36-54 2 MI E PITTSFIELD; OLIVE-GRAY SILTY CLAY LOAM
GC057850	IL	RANDOLPH	38 6	89 40	70 6	RT 4 4 MI S SPARTA; BROWN FOREST
GC001850	IL	SANGAMON	39 44	89 57	62 5	US 36-54 2 MI W NEW BERLIN; DARK BROWN CLAYEY LOAM
GC067050	IL	ST CLAIR	38 36	87 45	72 10	US 50 4 MI W LEBANON; CLAY LOAM
GC047451	IL	STEPHENSON	42 5	89 55	61 7	US 52 4.5 MI W LANARK; YELLOWISH-BROWN
GC042350	IN	ADAMS	40 45	84 52	66 10	RT 124 .7 MI W OHIO-IND LINE; BROWN SILTY LOAM
GC002450	IN	ELKHART	41 44	85 59	62 5	IND TPK 1 MI W JCT RT 19; ORANGE-BROWN SANDY SUBSOIL
GC067250	IN	FLOYD	38 17	85 51	72 10	I-64 2 MI W NEW ALBANY; CLAY SOIL IN FOREST
GC007450	IN	HENDRICKS	39 46	86 29	62 10	US 36 4 MI W AVON; GRAY-ORANGE SANDY CLAY SUBSOIL
GC007350	IN	HENRY	39 48	85 19	62 10	US 40 2 MI W STRAUGHN; BROWN CLAY LOAM
GC059950	IN	MONROE	39 10	86 32	70 8	AT BLOOMINGTON, STARNES RD NEAR FLATWOODS RD JCT; LOAM ON TILL
GC002350	IN	PORTER	41 36	87 4	62 5	RT 49 3 MI N BLACK HAWK BEACH; ORANGE-BROWN SILTY LOAM
GC002550	IN	STEUBEN	41 44	84 58	62 5	IND TPK AT INTERCHANGE 10; OLIVE CLAY & LEACHED CLAY
GC007550	IN	VERMILLION	39 48	87 27	62 10	US 36 2 MI E IND 71 JCT; BROWNISH-GRAY CLAY LOAM
GC042450	IN	WABASH	40 44	85 46	66 10	RT 15 4 MI NW LAFONTAINE; GRAY-BROWN SILTY LOAM
GC042550	IN	WHITE	40 50	86 45	66 10	US 24 3.5 MI W IDAVILLE; BLACK SILTY LOAM
GC155850	KS	BOURBON	37 45	94 55	63 10	US 54 10 MI W FT. SCOTT; DARK PRAIRIE SOIL OVER LIMESTONE
GC156050	KS	BUTLER	37 45	96 37	63 10	US 54 1 MI W ROSALIA; DARK PRAIRIE SOIL OVER LIMESTONE
GC058650	KS	CHEROKEE	37 9	94 48	70 10	RT 96 6 MI E COLUMBUS; PLOW ZONE
GC000450	KS	CHEYENNE	39 45	101 32	62 5	US 36 6 MI E BIRD CITY; BROWN-GRAY SILTY LOAM
GC058250	KS	COMANCHE	37 13	99 27	70 10	RT 160 4 MI E PROTECTION; SANDY SOIL
GC058450	KS	COWLEY	37 15	96 46	70 10	RT 160 5 MI S BURDEN; CHERNOZEM

Table 1.--Locations, descriptions, and concentration of elements for samples of surficial materials--continued

Sample No.	Al %	As ppm	B ppm	Ba ppm	Be ppm	Br ppm	C %	Ca %	Ce ppm	Co ppm	Cr ppm	Cu ppm
GC034550	5.00	3.7	30	700	N	--	--	1.30	N	15	50.0	20.0
GC037050	>10.00	23.0	20	1,000	N	--	--	1.00	N	15	50.0	70.0
GC038050	7.00	4.5	30	700	N	--	--	1.20	N	10	70.0	20.0
GC061250	7.00	4.7	<20	1,000	N	--	--	2.54	<150	15	30.0	20.0
GC017050	>10.00	--	N	500	1.5	--	--	2.00	N	7	50.0	15.0
GC076050	5.00	4.2	50	700	2.0	<.5	1.0	1.61	N	7	50.0	20.0
GC037150	7.00	13.0	150	700	N	--	--	4.20	N	5	50.0	30.0
GC038150	5.00	11.0	30	500	N	--	--	8.10	N	5	70.0	20.0
GC231150	7.00	2.7	N	1,000	1.0	--	--	.79	150	5	15.0	7.0
GC231550	7.00	3.8	N	700	N	--	--	2.21	150	7	15.0	7.0
GC026850	10.00	3.6	N	1,000	2.0	<.5	.9	2.31	N	20	15.0	70.0
GC057550	7.00	5.8	30	700	N	--	1.3	.40	N	7	50.0	10.0
GC057950	7.00	7.0	50	700	1.0	--	--	.27	N	5	50.0	20.0
GC002250	3.00	8.4	70	500	N	--	--	.86	N	15	50.0	30.0
GC007650	7.00	8.4	N	500	N	--	--	.70	N	10	50.0	30.0
GC059750	7.00	3.3	30	500	N	--	--	.30	N	3	30.0	15.0
GC002150	3.00	10.0	70	300	N	--	--	.71	N	7	30.0	30.0
GC042950	7.00	9.2	50	700	1.0	--	--	.65	150	15	70.0	30.0
GC042650	7.00	7.4	70	700	1.5	--	--	.70	N	10	70.0	30.0
GC030150	3.00	3.3	20	300	N	1.1	5.7	1.10	N	5	50.0	30.0
GC042850	7.00	9.8	50	700	1.0	--	--	.75	150	15	70.0	20.0
GC067150	3.00	7.9	70	500	1.5	.9	2.0	.28	N	10	70.0	15.0
GC001950	3.00	11.0	70	500	1.5	--	--	1.07	N	15	30.0	50.0
GC007750	7.00	7.9	30	500	N	--	--	.50	N	10	50.0	20.0
GC057750	7.00	5.2	50	700	N	--	.8	.30	N	10	50.0	10.0
GC002050	3.00	10.0	30	500	N	--	--	.49	150	15	30.0	30.0
GC057650	.30	2.7	30	30	N	--	.5	--	N	N	15.0	7.0
GC001650	3.00	4.3	70	700	N	--	--	.61	N	7	30.0	30.0
GC001750	3.00	8.8	70	500	N	--	--	.56	150	15	30.0	30.0
GC057850	7.00	4.4	30	700	N	--	1.3	.40	N	7	50.0	10.0
GC001850	3.00	8.4	70	700	N	--	--	.71	150	15	50.0	50.0
GC067050	5.00	7.5	50	700	N	.9	3.2	.66	<150	7	70.0	30.0
GC047451	--	4.7	30	500	--	--	--	.50	--	10	70.0	10.0
GC042350	5.00	7.9	70	500	1.0	--	--	7.10	N	15	70.0	50.0
GC002450	1.50	3.6	30	300	N	--	--	.30	N	7	15.0	15.0
GC067250	10.00	10.2	70	500	2.0	1.0	3.4	.19	<150	10	70.0	20.0
GC007450	7.00	15.0	30	500	N	--	--	.70	N	15	50.0	30.0
GC007350	5.00	4.8	30	500	N	--	--	.62	N	10	50.0	20.0
GC059950	7.00	8.0	50	700	N	--	--	.25	<150	7	50.0	15.0
GC002350	3.00	5.7	70	500	N	--	--	.34	N	15	30.0	15.0
GC002550	3.00	4.4	N	300	N	--	--	16.08	N	7	30.0	15.0
GC007550	7.00	12.0	30	500	N	--	--	.40	N	15	50.0	30.0
GC042450	5.00	7.5	70	700	1.0	--	--	1.80	150	7	70.0	70.0
GC042550	1.50	3.7	30	500	N	--	--	.65	N	3	30.0	15.0
GC155850	7.00	6.3	30	500	N	--	--	.56	N	7	70.0	15.0
GC156050	7.00	9.7	30	500	1.5	--	--	.56	N	10	70.0	20.0
GC058650	7.00	8.3	30	500	<1.0	--	--	.28	<150	3	50.0	20.0
GC000450	5.00	3.7	30	700	N	--	--	1.00	150	15	30.0	30.0
GC058250	7.00	2.4	<20	1,000	N	--	--	.41	N	N	10.0	7.0
GC058450	7.00	7.2	20	300	<1.0	--	--	8.65	N	5	50.0	50.0

Table 1.--Locations, descriptions, and concentration of elements for samples of surficial materials--continued

Sample No.	F %	Fe %	Ga ppm	Ge ppm	Hg ppm	I ppm	K %	La ppm	Li ppm	Mg %	Mn ppm	Mo ppm
GC034550	.020	2.00	20	--	.06	--	2.00	30	19	1.000	700	N
GC037050	.033	7.00	20	--	.03	--	2.80	50	31	.700	700	N
GC038050	.029	2.00	15	--	.06	--	1.20	30	26	.700	500	N
GC061250	.056	7.00	15	--	.03	--	1.52	50	22	1.500	500	N
GC017050	--	2.00	20	--	--	--	2.50	30	--	1.000	200	5
GC076050	.060	2.00	10	1.42	.01	.7	1.85	50	20	1.000	500	N
GC037150	.098	2.00	15	--	.71	--	2.50	N	112	1.000	500	N
GC038150	.050	2.00	15	--	.05	--	2.10	N	20	2.000	500	N
GC231150	.038	3.00	30	--	.12	--	3.34	70	30	.500	500	N
GC231550	.027	3.00	30	--	.14	--	1.76	70	29	1.000	500	N
GC026850	--	7.00	15	1.66	.03	<.5	1.54	30	15	.500	1,000	N
GC057550	.015	1.50	10	--	.06	<.5	1.60	30	17	.200	1,000	N
GC057950	.013	1.50	10	--	.04	--	1.48	30	23	.300	200	N
GC002250	.040	3.00	30	--	.26	--	1.89	30	32	.700	300	N
GC007650	.024	1.50	20	--	.20	--	2.00	30	26	.700	500	N
GC059750	.012	1.00	7	--	.05	--	1.31	30	14	.150	700	N
GC002150	.025	2.00	30	--	.12	--	1.83	30	30	1.000	300	3
GC042950	.019	3.00	20	--	.07	--	1.10	50	19	.300	700	N
GC042650	.013	3.00	30	--	.14	--	1.70	50	33	.300	300	N
GC030150	--	2.00	10	.70	.05	1.8	1.48	<30	20	.500	700	N
GC042850	.017	3.00	30	--	.06	--	1.60	70	24	.300	1,000	N
GC067150	--	1.50	7	1.45	.07	.8	1.37	<30	15	.200	1,500	N
GC001950	.007	3.00	20	--	.37	--	1.73	30	22	.700	1,000	3
GC007750	.015	1.50	15	--	.13	--	1.80	30	25	.500	700	N
GC057750	.021	1.50	10	--	.04	<.5	1.60	30	20	.200	700	N
GC002050	.023	3.00	30	--	.11	--	1.78	70	27	.700	700	N
GC057650	.030	.15	N	--	.03	<.5	.20	N	<5	.020	15	N
GC001650	.023	1.50	15	--	.07	--	1.64	30	19	.300	700	N
GC001750	.017	1.50	15	--	.13	--	1.74	70	20	.700	1,000	N
GC057850	.013	1.50	10	--	.04	<.5	1.40	30	17	.200	300	N
GC001850	.036	3.00	20	--	.16	--	1.83	50	22	.700	700	N
GC067050	--	1.50	10	1.49	.04	1.4	1.68	50	15	.300	700	N
GC047451	.050	1.00	7	--	.20	--	1.80	--	17	.200	500	--
GC042350	.047	3.00	30	--	.07	--	2.20	30	37	1.500	500	7
GC002450	.006	1.50	7	--	.09	--	1.27	N	13	.150	700	N
GC067250	.050	5.00	20	1.63	.05	.9	2.12	70	57	.700	200	N
GC007450	.036	2.00	20	--	.26	--	1.70	N	29	.500	500	5
GC007350	.026	1.50	15	--	.21	--	1.80	30	28	.500	500	N
GC059950	.055	1.50	10	--	.04	--	1.43	30	19	.300	500	N
GC002350	.032	1.50	15	--	.11	--	1.86	30	16	.300	1,000	N
GC002550	.057	1.50	15	--	.07	--	1.20	N	22	3.000	300	7
GC007550	.026	2.00	20	--	.16	--	1.90	N	27	.500	1,000	N
GC042450	.007	3.00	30	--	.06	--	1.50	30	20	.700	300	7
GC042550	.003	1.00	15	--	.08	--	1.30	N	10	.150	200	N
GC155850	.030	1.50	15	--	.05	--	1.40	50	27	.500	500	N
GC156050	.030	3.00	30	--	.11	--	1.60	50	34	.700	500	N
GC056650	.013	1.50	7	--	.04	--	.96	50	28	.200	700	N
GC000450	.051	1.50	30	--	.04	--	2.23	70	26	.700	500	N
GC058250	.001	.70	5	--	.04	--	2.37	N	9	.150	150	N
GC058450	.020	1.50	10	--	.11	--	1.25	30	25	.500	700	N

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Table 1.--Location, description, and concentration of elements for samples of surficial materials--continued

Sample No.	Na %	Nb ppm	Nd ppm	Ni ppm	P %	Pb ppm	Rb ppm	S %	Sb ppm	Sc ppm	Se ppm	Si %
GC034550	1.00	30	N	20	.030	30	--	--	--	10	.1	--
GC037050	1.50	N	N	30	.004	20	--	--	--	15	.3	--
GC038050	1.50	N	N	30	.030	N	--	--	--	7	.4	--
GC061250	1.50	10	70	15	--	10	--	--	--	20	.2	--
GC017050	1.50	10	--	20	.170	15	--	--	--	10	--	--
GC076050	.70	<10	N	15	--	15	70	<.08	<1	7	<.1	33
GC037150	1.50	N	--	15	.030	50	--	--	--	10	<.1	--
GC038150	1.00	N	--	20	.024	N	--	--	--	7	.4	--
GC231150	3.00	10	70	<5	.074	15	--	--	--	7	<.1	--
GC231550	1.50	15	70	5	.105	15	--	--	--	7	1.2	--
GC026850	1.00	10	N	10	--	15	60	<.08	<1	20	.3	28
GC057550	--	<10	<70	15	.039	15	--	--	--	7	.2	37
GC057950	.70	10	N	10	--	30	--	--	--	7	.2	--
GC002250	.70	15	N	30	.052	70	--	--	--	15	1.0	--
GC007650	1.00	10	N	20	.040	20	--	--	--	7	.5	--
GC059750	.70	10	N	7	--	20	--	--	--	7	.6	--
GC002150	.70	15	N	30	.048	30	--	--	--	10	.6	--
GC042950	.70	10	70	30	.020	30	--	--	--	15	.5	--
GC042650	1.00	15	70	30	.040	20	--	--	--	15	1.0	--
GC030150	.70	N	N	10	--	30	50	<.08	<1	7	.1	32
GC042850	.70	10	70	20	.030	30	--	--	--	15	.6	--
GC067150	.70	10	N	10	--	30	60	<.08	<1	7	.4	36
GC001950	.70	15	N	30	.092	300	--	--	--	15	.5	--
GC007750	1.00	15	N	20	.030	15	--	--	--	7	.7	--
GC057750	--	10	N	15	.031	20	--	--	--	7	.6	38
GC002050	.70	15	N	20	.162	30	--	--	--	15	1.9	--
GC057650	--	N	--	N	.052	N	--	--	--	N	.1	42
GC001650	.70	15	N	15	.052	15	--	--	--	7	.5	--
GC001750	.70	30	N	20	.031	30	--	--	--	15	.5	--
GC057850	--	<10	N	15	.044	15	--	--	--	7	.4	39
GC001850	.70	30	N	30	.131	30	--	--	--	15	.8	--
GC067050	1.00	<10	70	15	--	50	65	<.08	1	7	<.1	33
GC047451	--	--	--	15	.030	15	--	--	--	--	.4	--
GC042350	1.00	10	N	30	.040	15	--	--	--	15	.4	--
GC002450	.50	10	N	15	.035	N	--	--	--	N	<.1	--
GC067250	1.00	10	70	20	--	30	110	<.08	<1	10	<.1	28
GC007450	1.00	15	N	20	.020	20	--	--	--	10	.4	--
GC007350	1.00	10	N	20	.030	15	--	--	--	7	.3	--
GC059950	.70	10	70	10	--	15	--	--	--	7	.4	--
GC002350	.70	15	N	15	.017	15	--	--	--	7	.5	--
GC002550	.70	N	--	20	.052	15	--	--	--	15	.5	--
GC007550	1.00	15	N	20	.020	20	--	--	--	7	.4	--
GC042450	.70	15	N	20	.020	20	--	--	--	10	.5	--
GC042550	.50	10	--	7	.040	30	--	--	--	5	.3	--
GC155850	1.00	20	N	20	.016	20	--	--	--	10	.6	--
GC156050	1.00	15	N	30	.012	30	--	--	--	10	.6	--
GC058650	.50	10	70	10	--	20	--	--	--	10	.5	--
GC000450	.70	15	70	15	.044	30	--	--	--	15	.3	--
GC058250	.50	<10	N	<5	--	15	--	--	--	N	<.1	--
GC058450	.70	<10	N	15	--	15	--	--	--	7	.5	--

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Table 1.--Locations, descriptions, and concentration of elements for samples of surficial materials--continued

Sample No.	Sn ppm	Sr ppm	Ti %	Th ppm	U ppm	V ppm	Y ppm	Yb ppm	Zn %	Zr ppm
GC034550	--	200	.300	--	--	70	30	3.0	30	300
GC037050	--	300	.500	--	--	150	30	3.0	90	150
GC038050	--	200	.300	--	--	70	20	2.0	50	300
GC061250	--	300	.700	--	--	150	50	5.0	88	150
GC017050	--	200	.200	--	--	70	30	3.0	25	150
GC076050	1.44	200	.300	11.73	3.07	70	20	3.0	56	500
GC037150	--	70	.300	--	--	70	30	3.0	170	150
GC038150	--	200	.150	--	--	70	30	2.0	60	150
GC231150	--	300	.200	--	--	30	20	2.0	56	300
GC231550	--	500	.200	--	--	70	15	1.5	95	150
GC026850	1.94	300	1.000	22.00	2.88	300	20	2.0	117	200
GC057550	--	150	.300	--	--	50	20	3.0	87	300
GC057950	--	150	.300	--	--	50	20	3.0	38	300
GC002250	--	70	.300	--	--	70	30	3.0	100	200
GC007650	--	150	.200	--	--	70	20	2.0	65	150
GC059750	--	100	.300	--	--	30	30	3.0	59	200
GC002150	--	70	.150	--	--	70	30	3.0	84	200
GC042950	--	200	.300	--	--	70	50	5.0	50	200
GC042650	--	200	.300	--	--	100	30	5.0	50	150
GC030150	.57	100	.150	--	2.16	70	15	1.5	80	100
GC042850	--	200	.500	--	--	70	50	5.0	70	200
GC067150	1.24	100	.300	10.04	3.41	70	30	5.0	47	300
GC001950	--	70	.200	--	--	70	30	7.0	140	300
GC007750	--	200	.300	--	--	100	30	3.0	45	200
GC057750	--	150	.500	--	--	70	20	3.0	47	300
GC002050	--	70	.300	--	--	70	30	7.0	67	300
GC057650	--	7	.050	--	--	10	N	N	--	30
GC001650	--	70	.300	--	--	30	30	7.0	63	300
GC001750	--	70	.300	--	--	70	30	7.0	56	500
GC057850	--	150	.500	--	--	50	20	2.0	34	200
GC001850	--	100	.300	--	--	70	50	7.0	110	300
GC067050	1.56	150	.300	10.55	3.38	70	30	5.0	67	300
GC047451	--	150	.200	--	--	30	20	--	50	300
GC042350	--	300	.300	--	--	100	30	3.0	50	100
GC002450	--	30	.150	--	--	20	15	1.5	32	150
GC067250	1.15	150	.500	10.94	3.23	150	30	5.0	113	200
GC007450	--	150	.200	--	--	100	20	2.0	70	150
GC007350	--	150	.300	--	--	70	20	2.0	50	150
GC059950	--	100	.500	--	--	70	30	3.0	45	500
GC002350	--	70	.300	--	--	30	30	3.0	51	300
GC002550	--	500	.150	--	--	70	15	3.0	55	70
GC007550	--	150	.200	--	--	100	30	3.0	55	200
GC042450	--	200	.300	--	--	70	30	5.0	50	300
GC042550	--	100	.150	--	--	30	15	1.5	40	150
GC155850	--	100	.500	--	--	50	30	5.0	50	300
GC156050	--	150	.300	--	--	100	30	5.0	50	300
GC058650	--	70	.700	--	--	50	30	3.0	200	300
GC000450	--	150	.150	--	--	70	30	5.0	74	300
GC058250	--	100	.150	--	--	15	15	1.5	21	300
GC058450	--	150	.300	--	--	70	30	3.0	78	300

Table 1.--Location, description, and concentrat of elements for samples of surficial materials--co ued

Sample No.	State	County	Latitude	Longitude	Date Collin.	Site and Soil Descriptions
GC052550	NV	NYE	36 45	116 15	63 6	SITE AND SOIL DESCRIPTION NOT RECORDED
GC072250	NV	NYE	36 36	116 0	73 2	US 95 5 MI NW OF CO LINE NEAR MERCURY EXIT; GRAY DESERT ALKALI SOIL
GC262450	NV	NYE	38 40	116 15	68 7	DIRT RD IN HOT CREEK VALLEY ABOUT 45 MI NE WARM SPRINGS; LIGHT ROCKY
GC262650	NV	NYE	36 52	116 45	68 7	US 95 2 MI S BEATTY; ALLUVIUM BELOW DESERT PAVEMENT
GC262850	NV	NYE	38 45	117 7	68 7	RT 8A 3 MI S JCT RT 92 TO ROUND MOUNTAIN; HEAVY ALLUVIUM
GC241750	NV	PERSHING	40 40	118 4	66 7	I-80 AT MILL CITY; SOIL NOT DESCRIBED
GC241850	NV	PERSHING	40 21	118 19	66 7	I-80 AT RT 50 EXIT 14 MI N LOVELOCK; SOIL NOT DESCRIBED
GC060150	NV	WASHOE	39 56	119 22	70 10	RT 34 40 MI S GERLACH; GRAY DESERT OVER OLD PLAYA
GC062750	NV	WASHOE	40 39	119 23	70 10	RT 81 8 MI N GERLACH; GRAY DESERT IN PLAYA
GC242550	NV	WASHOE	39 31	119 52	66 7	US 395 5 MI E PURDY; SOIL NOT DESCRIBED
GC015450	NV	WHITE PINE	39 1	114 32	62 8	US 6 29 MI SE ELY; B IN. ON PEDIMENT SURFACE
GC065650	NV	WHITE PINE	39 24	115 28	72 9	US 50 AT LITTLE ANTELOPE SUMMIT; BROWN SOIL WITH ANDESITE FLOAT
GC065750	NV	WHITE PINE	39 10	114 40	72 9	US 50, 6, & 93 AT SCHELL CREEK TURNOFF; LGHT BRWN SOIL ON GRAVEL TILL
GC065850	NV	WHITE PINE	39 5	114 8	72 9	US 50 AT SCHELL CREEK TURNOFF; LIGHT BROWN SILT IN TERT/QUAT ALLUVIUM
GC078850	NV	WHITE PINE	39 4	114 30	73 9	RT 50 4 MI E JCT RT 93; LIGHT BROWN SILT UNDER DESERT PAVEMENT
GC263050	NV	WHITE PINE	39 40	114 15	68 7	US 93-US ALT 50,5 MI S JCT OF THESE HIGHWAYS; ALLUVIUM HIGH IN CLAY
GC003850	NY	ALBANY	42 45	73 56	62 5	I-90 AT INTERCHANGE 25; SANDY B HORIZON
GC003150	NY	CHAUTAUQUA	42 15	79 45	62 5	I-90 1 MI E NY STATE LINE; WELL DEVELOPED YELLOWISH-ORANGE SOIL
GC031050	NY	CHAUTAUQUA	42 32	79 10	72 9	I-90 2 MI S SILVER CREEK; LIGHT BROWN CLAY
GC031250	NY	CHENANGO	42 41	75 28	72 9	RT 80 2.5 MI E SHERBOURNE; LIGHT BROWN SILT
GC184350	NY	CHENANGO	42 17	75 29	76 11	RT 7 1 MI S BAINBRIDGE; SOIL NOT DESCRIBED
GC040250	NY	CLINTON	44 58	73 40	66 10	US 11 3.5 MI W MOOERS; B HORIZON IN SANDY DRIFT
GC003250	NY	ERIE	42 39	78 58	62 5	I-90 9 MI E INTERCHANGE 58; CLAYEY B HORIZON
GC040350	NY	FRANKLIN	44 45	74 35	66 10	US 11 .8 MI W MOIRA; GRAY CLAYEY SAND DEVELOPED ON OUTWASH
GC003350	NY	GENESEE	43 0	78 21	62 5	I-90 7 MI W INTERCHANGE 48; ORANGE-BROWN TO BROWN SANDY LOAM
GC040750	NY	HAMILTON	43 45	74 20	66 10	RT 28 3 MI W INDIAN LAKE; B HORIZON ON SANDY TILL
GC003750	NY	HERKIMER	43 2	74 37	62 5	I-90 AT INDIAN CASTLE SERVICE AREA; ORANGE-BROWN SANDY B HORIZON
GC040550	NY	JEFFERSON	43 58	75 50	66 10	RT 12 1 MI S RT 3 JCT NEAR WATERTOWN; BLACK SANDY LOAM
GC040650	NY	LEWIS	43 35	75 10	66 10	CO RD 3 MI NE PORTER; SANDY ORANGE-BROWN B HORIZON
GC003650	NY	ONEIDA	43 7	75 25	62 5	I-90 1 MI W INTERCHANGE 32; BROWN SAND
GC003550	NY	ONONDAGA	43 6	76 3	62 5	I-90 AT INTERCHANGE 35; SANDY LOAM
GC003450	NY	ONTARIO	43 0	77 9	62 5	I-90 3 MI E INTERCHANGE 43; B HORIZON IN PEBBLY SAND
GC031350	NY	SCHOHARIE	42 25	74 35	72 9	RT 23 2 MI E STAMFORD; LIGHT BROWN SANDY SOIL
GC040450	NY	ST LAWRENCE	44 30	75 20	66 10	US 11 2.5 MI W DEKALB JCT; POORLY DEVELOPED B HORIZON IN CLAYEY SAND
GC061550	NY	STEUBEN	42 10	77 8	70 9	RT 415 .7 MI N US 15 INTERCHANGE; SOIL NOT DESCRIBED
GC031550	NY	SULLIVAN	41 34	74 30	72 9	US 209 2 MI SW WURTSBORO; SILTY LOAM, ROCKY
GC184150	NY	TIOGA	42 0	76 30	67 11	RT 17 NEAR WAVERLY; LITHOSOL DERIVED FROM SHALE
GC184250	NY	TOMPKINS	42 25	76 30	67 11	RT 34 NEAR ITHACA; SOIL FROM DEVONIAN SHALE
GC031450	NY	ULSTER	41 55	74 11	72 9	RT 213 2 MI S OLIVEBRIDGE; LIGHT BROWN SANDY LOAM
GC040850	NY	WASHINGTON	43 25	73 37	66 10	RT 149 .3 MI E US 9-L JCT SE LAKE GEORGE; B HORIZON ON SANDY DRIFT
GC031150	NY	WAYNE	43 16	77 0	72 9	LAKE RD 1 MI W SODUS POINT; YELLOW-BROWN SANDY LOAM
GC006950	OH	ATHENS	39 17	82 8	62 10	US 50 5 MI SW ATHENS; YELLOW-ORANGE SILT SUBSOIL
GC042250	OH	AUGLAIZE	40 30	83 55	66 10	US 33 1 MI NW LAKE VIEW; BROWN SILTY LOAM CULTIVATED
GC002850	OH	CUYAHOGA	41 18	81 42	62 5	OHIO TPK 2 MI W INTERCHANGE 11; YELLOW-BROWN CLAY
GC007150	OH	FAYETTE	39 35	83 35	62 10	US 35 8 MI NW WASHINGTON C.H.; ORANGE AND GRAY CLAY LOAM
GC042150	OH	FRANKLIN	40 7	83 7	66 10	US 33 .8 MI W JCT RT 161 AT DUBLIN; OLIVE-GRAY CLAY LOAM
GC002650	OH	FULTON	41 36	83 53	62 5	OHIO TPK FALLEN TIMBERS SERV AREA; SANDY YELLOW-BROWN SUBSOIL
GC041950	OH	GUERNSEY	40 3	81 15	66 10	US 40 17 MI W ST CLAIRSVILLE; SANDY LOAM
GC057450	OH	HENRY	41 11	84 3	70 6	RT 109 3 MI S HAMLER; BLACK CLAY LOAM
GC002950	OH	LAKE	41 40	81 17	62 5	I-90 4 MI E RT 306 INTERCHANGE; YELLOW CLAYEY SOIL

Table 1.--Location, description, and concentration of elements for samples of surficial materials--continued

Sample No.	Al %	As ppm	B ppm	Ba ppm	Be ppm	Br ppm	C %	Ca %	Ce ppm	Co ppm	Cr ppm	Cu pp
GC052550	7.00	--	30	1,000	1.5	--	--	2.10	N	7	50.0	15.0
GC072250	10.00	4.2	20	500	2.0	<.5	.8	2.68	200	5	50.0	10.0
GC262450	>10.00	7.9	30	1,500	2.0	--	--	.50	200	3	7.0	7.0
GC262650	>10.00	14.0	30	700	1.5	--	--	4.10	150	10	30.0	15.0
GC262850	>10.00	8.7	30	1,000	2.0	--	--	1.20	150	7	15.0	15.0
GC241750	7.00	8.7	30	700	N	--	--	2.96	150	10	30.0	30.0
GC241850	3.00	20.0	70	500	1.0	--	--	3.50	N	10	30.0	30.0
GC060150	7.00	11.0	N	1,000	N	--	--	15.44	N	7	30.0	70.0
GC062750	7.00	6.0	30	2,000	N	--	--	15.01	N	7	50.0	30.0
GC242550	7.00	5.7	70	700	N	--	--	2.69	N	15	70.0	30.0
GC015450	7.00	--	N	300	N	--	--	9.60	--	5	50.0	30.0
GC065650	>10.00	7.7	50	1,000	2.0	<.5	1.3	1.91	<150	20	100.0	70.0
GC065750	3.00	10.2	<20	300	N	3.1	5.4	15.60	N	5	30.0	20.0
GC065850	3.00	5.1	20	500	N	3.0	2.8	9.13	N	5	50.0	30.0
GC078850	5.00	8.0	<20	500	1.5	1.5	3.4	9.82	--	5	30.0	10.0
GC263050	>10.00	7.2	20	1,000	3.0	--	--	2.70	150	7	20.0	15.0
GC003850	2.00	2.6	30	300	N	--	--	.55	N	5	15.0	7.0
GC003150	3.00	9.2	70	300	N	--	--	.38	N	7	30.0	30.0
GC031050	10.00	8.8	50	500	N	2.1	5.4	.36	<150	5	70.0	50.0
GC031250	10.00	8.4	100	500	2.0	.9	2.9	.19	<150	10	100.0	20.0
GC184350	7.00	8.2	70	200	1.0	--	--	.20	N	10	30.0	15.0
GC040250	1.50	4.9	N	300	N	--	--	.10	N	3	15.0	7.0
GC003250	3.00	13.0	70	500	N	--	--	.28	N	15	30.0	20.0
GC040350	5.00	1.6	30	500	1.5	--	--	.90	150	10	30.0	7.0
GC003350	2.00	2.0	N	300	N	--	--	.71	N	3	15.0	7.0
GC040750	5.00	3.8	30	300	1.5	--	--	2.80	N	15	30.0	7.0
GC003750	2.00	9.6	30	200	N	--	--	.30	N	7	20.0	30.0
GC040550	3.00	2.6	50	300	1.5	--	--	1.00	N	7	30.0	15.0
GC040650	5.00	1.5	N	500	1.5	--	--	.85	N	3	7.0	3.0
GC003650	3.00	13.0	70	300	N	--	--	.41	N	15	30.0	70.0
GC003550	2.00	7.6	30	200	N	--	--	.36	N	3	15.0	30.0
GC003450	3.00	2.5	70	300	N	--	--	.59	N	15	30.0	70.0
GC031350	7.00	10.9	50	300	N	1.7	5.8	.13	<150	5	70.0	20.0
GC040450	3.00	5.9	150	500	1.5	--	--	.75	N	10	30.0	10.0
GC061550	7.00	7.2	50	300	1.0	--	--	.19	N	10	30.0	20.0
GC031550	10.00	7.1	30	300	N	1.1	3.9	.10	200	7	50.0	30.0
GC184150	7.00	16.0	70	300	1.5	--	--	.15	N	15	30.0	15.0
GC184250	7.00	16.0	70	300	N	--	--	.35	N	7	30.0	15.0
GC031450	5.00	5.3	50	200	N	2.4	3.1	.08	N	5	50.0	20.0
GC040850	1.50	2.7	30	300	N	--	--	.60	N	7	30.0	15.0
GC031150	5.00	4.1	50	300	N	.7	2.1	.68	<150	5	30.0	20.0
GC006950	7.00	9.8	30	500	N	--	--	.30	N	15	50.0	20.0
GC042250	7.00	13.0	70	700	2.0	--	--	1.00	150	15	100.0	70.0
GC002850	3.00	10.0	70	300	N	--	--	.21	N	15	30.0	15.0
GC007150	7.00	22.0	50	500	N	--	--	.42	N	15	50.0	30.0
GC042150	7.00	18.0	70	700	2.0	--	--	.50	150	20	70.0	30.0
GC002650	2.00	7.5	30	300	N	--	--	.61	N	7	15.0	7.0
GC041950	3.00	7.3	30	500	1.5	--	--	.25	N	10	70.0	20.0
GC057450	10.00	5.2	50	500	1.5	--	4.4	1.10	N	7	50.0	30.0
GC002950	3.00	27.0	70	300	N	--	--	.11	N	10	30.0	20.0

Table 1.--Location, description, and concentration of elements for samples of surficial materials--continued

Sample No.	F %	Fe %	Ga ppm	Ge ppm	Hg ppm	I ppm	K %	La ppm	Li ppm	Mg %	Mn ppm	Mo ppm
GC052550	--	3.00	30	--	--	--	2.90	70	--	1.500	700	N
GC072250	--	3.00	15	1.23	.02	1.0	1.92	150	25	1.000	300	N
GC262450	.038	1.00	30	--	.02	--	4.20	200	39	.300	700	3
GC262650	.056	2.00	30	--	.05	--	3.60	150	36	1.000	700	N
GC262850	.042	1.00	20	--	.06	--	3.80	70	37	.700	300	<3
GC241750	.035	3.00	30	--	.08	--	2.34	70	42	1.500	700	N
GC241850	.049	2.00	30	--	.16	--	2.34	30	46	1.500	500	N
GC060150	.074	5.00	20	--	.02	--	1.30	30	22	1.500	700	N
GC062750	.041	2.00	15	--	.01	--	1.48	30	45	2.000	300	N
GC242550	.006	3.00	30	--	.03	--	2.19	N	18	1.500	700	N
GC015450	--	1.50	20	--	--	--	1.80	30	--	1.000	300	N
GC065650	.060	7.00	20	1.62	.04	1.0	2.09	50	30	1.500	1,000	N
GC065750	.060	1.00	10	1.13	.04	3.8	1.15	N	23	1.500	300	N
GC065850	.050	2.00	10	1.12	.08	4.6	1.62	N	30	1.500	200	N
GC078850	--	1.50	10	1.47	.02	1.9	1.36	N	20	1.000	300	N
GC263050	.071	2.00	30	--	.03	--	4.30	70	30	.700	500	3
GC003850	.006	2.00	15	--	.05	--	1.39	N	15	.300	500	N
GC003150	.015	2.00	15	--	.06	--	1.21	N	31	.500	300	3
GC031050	.060	5.00	20	1.62	.07	1.6	1.22	50	30	.500	150	10
GC031250	--	5.00	15	1.64	.13	1.7	1.73	70	55	.500	300	N
GC184350	.018	1.50	15	--	.08	--	1.00	30	44	.300	700	N
GC040250	.018	1.00	7	--	.06	--	1.80	N	7	.150	150	N
GC003250	.037	3.00	30	--	.04	--	1.66	N	37	.700	300	3
GC040350	.041	3.00	20	--	.06	--	2.00	70	22	.700	300	N
GC003350	.015	1.50	15	--	.25	--	1.18	N	18	.300	300	N
GC040750	.095	7.00	30	--	.35	--	1.90	N	24	1.500	700	N
GC003750	.028	2.00	15	--	.08	--	1.47	N	29	.700	1,500	N
GC040550	.047	3.00	30	--	.48	--	1.80	30	18	.500	700	N
GC040650	.027	3.00	30	--	.06	--	3.70	30	13	.300	300	N
GC003650	.036	3.00	20	--	.38	--	1.20	30	49	.700	2,000	N
GC003550	.006	1.50	15	--	.60	--	1.08	N	22	.300	300	N
GC003450	.055	3.00	30	--	.09	--	1.92	30	57	1.500	700	N
GC031350	.050	3.00	20	1.83	.08	1.3	1.38	50	40	.300	700	N
GC040450	.043	3.00	30	--	.08	--	2.50	30	17	.700	700	N
GC061550	.032	3.00	15	--	.03	--	1.21	30	43	.300	700	N
GC031550	.080	5.00	15	1.59	.06	2.2	.71	150	32	.300	500	N
GC184150	.039	1.50	15	--	.08	--	2.10	30	64	.700	300	N
GC184250	.031	1.50	15	--	.37	--	1.60	30	40	.300	300	N
GC031450	--	2.00	10	1.81	.07	3.1	.44	N	27	.200	70	N
GC040850	.016	2.00	10	--	.05	--	1.00	N	11	.300	700	N
GC031150	.040	2.00	10	1.47	.06	1.4	1.53	<30	20	.500	200	N
GC006950	.015	3.00	20	--	.13	--	1.60	30	32	.300	500	N
GC042250	.081	5.00	30	--	.10	--	2.50	70	46	.700	300	7
GC002850	.079	2.00	20	--	.18	--	1.42	30	28	.700	700	3
GC007150	.061	3.00	20	--	.22	--	1.90	30	45	.500	300	5
GC042150	.018	5.00	30	--	.08	--	1.60	70	32	.300	1,000	7
GC002650	.005	1.50	15	--	.08	--	1.18	N	10	.300	700	N
GC041950	.024	3.00	20	--	.03	--	1.30	50	25	.300	500	N
GC057450	.034	2.00	20	--	.59	<.5	2.00	30	39	.700	150	N
GC002950	.030	2.00	20	--	.06	--	1.62	30	44	.300	300	3

Table 1.--Location, description, and concentration of elements for samples of surficial materials--continued

Sample No.	Na %	Nb ppm	Nd ppm	Ni ppm	P %	Pb ppm	Rb ppm	S %	Sb ppm	Sc ppm	Se ppm	Si %
GC052550	2.00	10	--	15	.050	20	--	--	--	10	--	--
GC072250	.70	<10	150	10	--	10	90	<.08	<1	7	.5	31
GC262450	.70	15	100	7	.016	70	--	--	--	<5	.2	--
GC262650	3.00	20	70	20	.040	30	--	--	--	7	<.1	--
GC262850	1.00	10	70	10	.016	30	--	--	--	7	.2	--
GC241750	1.50	15	70	15	.135	30	--	--	--	15	.3	--
GC241850	1.00	15	N	15	.131	70	--	--	--	10	.8	--
GC060150	3.00	N	N	10	--	10	--	--	--	10	<.1	--
GC062750	2.00	N	N	15	--	15	--	--	--	15	.1	--
GC242550	1.50	N	N	30	.096	50	--	--	--	15	.4	--
GC015450	1.50	15	N	15	.044	15	--	--	--	7	--	--
GC065650	1.50	10	70	50	--	15	115	<.08	1	15	.5	27
GC065750	1.00	N	--	10	--	10	60	<.08	<1	5	.2	18
GC065850	1.00	N	--	15	--	15	75	.09	<1	5	<.1	24
GC078850	.70	<10	--	5	--	10	70	<.08	<1	5	.3	25
GC263050	.70	15	70	7	.050	20	--	--	--	7	.2	--
GC003850	.70	15	--	7	.057	N	--	--	--	7	.1	--
GC003150	.70	15	--	15	.035	15	--	--	--	10	.4	--
GC031050	.70	10	N	20	--	30	95	.31	<1	10	<.1	26
GC031250	.70	<10	70	20	--	20	120	<.08	<1	15	.2	29
GC184350	.70	10	70	20	.120	30	--	--	--	7	.6	--
GC040250	.30	<10	--	N	.016	10	--	--	--	N	<.1	--
GC003250	.70	15	--	15	--	30	--	--	--	15	.4	--
GC040350	1.00	10	70	15	.050	15	--	--	--	15	.4	--
GC003350	.70	15	--	7	.039	15	--	--	--	7	.4	--
GC040750	1.50	15	--	7	.090	15	--	--	--	15	<.1	--
GC003750	.70	15	--	15	.013	15	--	--	--	7	.2	--
GC040550	1.00	10	70	15	.100	30	--	--	--	7	.5	--
GC040650	1.50	15	N	N	.030	30	--	--	--	7	.4	--
GC003650	.70	15	N	20	.052	15	--	--	--	15	.5	--
GC003550	.70	15	--	7	.070	15	--	--	--	7	.6	--
GC003450	.70	15	70	15	.039	30	--	--	--	15	.5	--
GC031350	.50	10	N	15	.684	50	105	.08	1	7	<.1	27
GC040450	1.00	10	N	15	.040	15	--	--	--	7	.2	--
GC061550	.70	10	70	30	--	15	--	--	--	7	.3	--
GC031550	.50	<10	150	15	--	50	60	.09	1	5	<.1	32
GC184150	.70	15	70	30	.050	15	--	--	--	15	.4	--
GC184250	.70	15	N	20	.060	30	--	--	--	7	.5	--
GC031450	.50	10	--	5	--	20	30	<.08	1	5	<.1	36
GC040850	.50	10	--	15	.040	10	--	--	--	7	.1	--
GC031150	.70	<10	N	10	--	15	55	<.08	<1	7	.2	33
GC006950	.70	15	N	20	.020	20	--	--	--	10	1.1	--
GC042250	.70	15	70	30	.080	30	--	--	--	15	1.2	--
GC002850	.70	15	N	15	.022	30	--	--	--	10	.8	--
GC007150	.70	N	N	50	.020	20	--	--	--	10	.5	--
GC042150	.70	15	70	30	.030	30	--	--	--	15	.3	--
GC002650	.70	15	--	15	.035	15	--	--	--	7	<.1	--
GC041950	.70	15	70	20	.030	30	--	--	--	7	.1	--
GC057450	--	<10	<70	30	.109	15	--	--	--	15	1.0	29
GC002950	.50	15	N	15	.031	30	--	--	--	10	.3	--

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Table 1.--Location, description, and concentration of elements for samples of surficial materials--continued

Sample No.	Sn ppm	Sr ppm	Ti %	Th ppm	U ppm	V ppm	Y ppm	Yb ppm	Zn %	Zr ppm
GC052550	--	500	.200	--	--	70	20	3.0	50	300
GC072250	.81	200	.200	12.74	2.87	70	20	3.0	58	150
GC262450	--	200	.150	--	--	30	30	3.0	45	150
GC262650	--	500	.300	--	--	50	50	5.0	45	300
GC262850	--	500	.150	--	--	30	30	3.0	45	200
GC241750	--	300	.200	--	--	70	30	5.0	90	150
GC241850	--	150	.150	--	--	70	30	3.0	110	150
GC060150	--	1,500	.300	--	--	100	20	2.0	79	70
GC062750	--	1,500	.200	--	--	100	30	3.0	73	100
GC242550	--	300	.300	--	--	150	30	3.0	90	100
GC015450	--	300	.150	--	--	50	20	2.0	45	100
GC065650	1.35	300	.500	8.51	3.25	150	20	2.0	113	300
GC065750	1.14	100	.100	8.25	1.99	30	10	2.0	60	70
GC065850	1.14	500	.200	11.49	1.87	30	10	1.0	51	100
GC078850	.72	300	.100	10.42	2.01	50	15	2.0	55	50
GC263050	--	300	.300	--	--	50	30	5.0	55	200
GC003850	--	30	.300	--	--	30	30	3.0	39	300
GC003150	--	70	.300	--	--	50	30	5.0	93	300
GC031050	1.91	150	.500	--	4.91	150	20	3.0	95	200
GC031250	1.89	150	.500	12.37	3.85	150	30	5.0	101	200
GC184350	--	70	.300	--	--	50	30	5.0	80	300
GC040250	--	70	.100	--	--	20	10	1.5	25	200
GC003250	--	70	.300	--	--	70	30	7.0	63	300
GC040350	--	200	.300	--	--	70	70	7.0	50	300
GC003350	--	70	.150	--	--	30	15	1.5	49	150
GC040750	--	200	.700	--	--	150	50	7.0	40	200
GC003750	--	30	.300	--	--	30	20	5.0	81	300
GC040550	--	150	.300	--	--	50	30	5.0	50	300
GC040650	--	150	.300	--	--	30	30	5.0	30	200
GC003650	--	30	.150	--	--	70	30	7.0	100	300
GC003550	--	50	.150	--	--	30	20	3.0	41	300
GC003450	--	70	.300	--	--	70	30	7.0	120	300
GC031350	2.71	100	.200	7.62	2.59	100	30	3.0	88	150
GC040450	--	150	.300	--	--	50	30	5.0	30	200
GC061550	--	70	.500	--	--	50	30	3.0	77	500
GC031550	1.74	70	.300	9.70	2.05	70	20	3.0	76	150
GC184150	--	100	.300	--	--	70	30	5.0	75	200
GC184250	--	100	.300	--	--	50	30	3.0	85	150
GC031450	2.16	30	.200	9.65	2.28	70	20	3.0	38	200
GC040850	--	70	.300	--	--	30	30	3.0	20	200
GC031150	1.19	150	.300	6.05	1.94	70	15	2.0	47	300
GC006950	--	70	.300	--	--	70	20	3.0	50	200
GC042250	--	300	.300	--	--	150	30	5.0	90	150
GC002850	--	70	.300	--	--	70	30	7.0	81	200
GC007150	--	100	.200	--	--	100	30	5.0	110	150
GC042150	--	200	.300	--	--	100	70	7.0	80	200
GC002650	--	70	.150	--	--	20	15	1.5	25	200
GC041950	--	150	.300	--	--	70	30	3.0	30	200
GC057450	--	200	.300	--	--	150	20	2.0	96	100
GC002950	--	30	.300	--	--	70	30	7.0	76	200

Table 1.--Locations, descriptions, and concentrati[illegible] elements for samples of surficial materials--con[illegible]ed

Sample No.	State	County	Lati-tude	Long-itude	Date Colln.	Site and Soil Descriptions
GC007250	OH	MONTGOMERY	39 44	84 29	62 10	US 35 5 MI W NEW LEBANON; MEDIUM BROWN SILTY CLAY LOAM
GC042050	OH	MUSKINGUM	39 58	82 7	66 10	US 40 5 MI W ZANESVILLE; YELLOWISH-ORANGE SILTY LOAM
GC007050	OH	ROSS	39 17	82 51	62 10	US 50 3 MI W LONDONDERRY; MEDIUM BROWN LOAM
GC002750	OH	SANDUSKY	41 21	82 56	62 5	OHIO TPK COMM PERRY SERV AREA; OLIVE BROWNISH-GRAY CLAY
GC065350	OK	BEAVER	36 37	100 22	72 10	US 270 14 MI W SLAPOUT; CLAY LOAM
GC277450	OK	CIMARRON	36 45	102 30	69 1	US 385 1 MI N BOISE CITY; TAN PRAIRIE SOIL
GC199850	OK	CREEK	36 5	96 22	65 7	RT 51 6 MI W MANNFORD; YELLOW SANDSTONE LITHOSOL
GC200150	OK	CUSTER	35 47	98 43	65 7	RT 33 6 MI E THOMAS; LIGHT BROWN VERY SANDY LOAM
GC199650	OK	DELAWARE	36 11	94 53	65 7	RT 33 3 MI W FLINT; YELLOW LOAM LITHOSOL
GC065050	OK	GARFIELD	36 24	97 58	72 10	US 60 1 MI W ENID; BROWN SANDY SOIL
GC276650	OK	GARVIN	34 35	97 18	69 1	RT 7 11 MI S DAVIS; DARK BROWN ALLUVIUM
GC276950	OK	JACKSON	34 40	99 32	69 1	US 62 2 MI E DUKE; BLACK PRAIRIE SOIL
GC200050	OK	KINGFISHER	35 54	97 56	65 7	US 81 12 MI S HENNESEY; CHOCOLATE BROWN LOAM
GC276850	OK	KIOWA	34 37	98 43	69 1	US 62 4 MI W CACHE; BLACK PRAIRIE SOIL
GC276350	OK	LATIMER	34 55	95 15	69 1	US 270 3 MI E WILBURTON; LITHOSOL OVER SANDSTONE
GC276250	OK	LE FLORE	34 38	94 30	69 1	RT 128 2 MI W STATE LINE; RED AND GRAY MOTTLED CLAY OVER SHALE
GC065150	OK	MAJOR	36 25	98 48	72 10	RT 15 8 MI E JCT US 281; RED SANDY SOIL
GC064950	OK	NOBLE	36 18	97 10	72 10	US 64 8 MI E PERRY; BROWN SILTY LOAM
GC064850	OK	PAWNEE	36 14	96 25	72 10	US 64 8 MI SE CLEVELAND; BROWN SAND
GC199950	OK	PAYNE	36 5	97 10	65 7	RT 51 10 MI W STILLWATER; MEDIUM BROWN LOAM
GC276450	OK	PITTSBURG	34 57	96 1	69 1	US 270 4 MI W APELAR; LITHOSOL OVER SANDSTONE
GC276550	OK	PONTOTOC	34 44	96 41	69 1	RT 12 3 MI S ADA; LITHOSOL OVER SANDSTONE
GC200250	OK	ROGER MILLS	35 48	99 23	65 7	RT 47 3 MI E ANGORA; DARK BROWN SOIL OVER SANDSTONE
GC199750	OK	ROGERS	36 8	95 46	65 7	RT 33 AT CATOOSA; ORANGE, SANDY, OVER SANDSTONE
GC064750	OK	SEQUOYAH	35 30	95 0	72 10	I-40 1 MI W VIAN; BROWN SILTY LOAM
GC276750	OK	STEPHENS	34 35	98 2	69 1	RT 7 22 MI E LAWTON; DARK BROWN LOAM OVER SANDSTONE
GC065450	OK	TEXAS	36 37	101 14	72 10	RT 3 3 MI W HARDESTY; WHITE ALLUVIAL SAND
GC065550	OK	TEXAS	36 45	102 0	72 10	US 64 7 MI W RT 95 JCT; BROWN LOAM
GC065250	OK	WOODWARD	36 32	99 30	72 10	US 270 12 MI W WOODWARD; TAN SANDY SOIL
GC035050	OR	BAKER	44 53	117 55	65 8	US 30 7 MI NW BAKER; DARK GRAY CLAY LOAM
GC269650	OR	BENTON	44 36	123 32	68 9	US 20 2 MI W BLODGETT; B HORIZON SOIL
GC076550	OR	COLUMBIA	46 8	123 20	73 9	US 30 2 MI E WESTPORT; REDDISH-YELLOW LOAM
GC076850	OR	COOS	43 9	124 24	73 9	US 101 4 MI N BRANDON; SAND OF OLD BEACH DUNE
GC076950	OR	CURRY	42 30	124 24	72 9	US 101 12 MI N GOLD BEACH; DUNE SAND
GC060450	OR	DESCHUTES	43 48	120 28	70 10	US 20 AT BROTHERS; GRAY SILT DEVELOPED FROM PUMICE
GC269850	OR	DOUGLAS	43 28	123 25	68 9	RT 38 2 MI E REEDSPORT; B HORIZON SOIL
GC269950	OR	DOUGLAS	43 20	122 56	68 9	RT 138 7 MI SE KELLOGG; B HORIZON SOIL
GC270050	OR	DOUGLAS	43 15	122 10	68 9	RT 138 5 MI E IDLEYLD PARK; B HORIZON SOIL
GC035450	OR	GILLIAM	45 43	120 33	65 8	I-80N 3 MI W QUINTON; BROWN COLLUVIAL SILT AT FOOT OF BASALT WALL
GC269250	OR	GRANT	43 58	118 59	68 9	US 395 AT SENECA; B HORIZON SOIL
GC269350	OR	GRANT	44 24	119 4	68 9	US 395 AT BEACH CK. RECREATION AREA MALHEUR NAT. FOR.; B HORIZON SOIL
GC059850	OR	HARNEY	43 15	119 37	70 10	US 395 AT WAGONTIRE; SHALLOW GRAY SILT OVER PUMICE-BRECCIA
GC269150	OR	HARNEY	43 37	118 43	68 9	US 20 6 MI W BUCHANAN; B HORIZON SOIL
GC060550	OR	JEFFERSON	44 32	121 8	70 10	US 97 10 MI S MADRAS; SHALLOW GRAY SILT OVER VOLCANIC ROCK
GC270150	OR	KLAMATH	42 41	122 0	68 9	RT 138 5 MI N DIAMOND LAKE; B HORIZON SOIL
GC270250	OR	KLAMATH	42 2	121 35	68 9	RT 62 AT JCT WITH RT 232 2 MI S FT KLAMATH; B HORIZON SOIL
GC060350	OR	LAKE	42 28	120 16	70 10	US 395 2 MI S VALLEY FALLS; DARK SILT OVER BASALT
GC269750	OR	LINCOLN	44 30	124 5	68 9	US 101 AT SEAL ROCK; B HORIZON SOIL
GC034950	OR	MALHEUR	44 12	117 9	65 8	I-80N 15 MI NW ONTARIO; BROWNISH-GRAY SILT
GC060050	OR	MALHEUR	42 20	117 50	70 10	US 95 AT BLUE MT PASS; TAN SILT OVER BASALT

Table 1.--Location, description, and concentration of elements for samples of surficial materials--continued

Sample No.	Al %	As ppm	B ppm	Ba ppm	Be ppm	Br ppm	C %	Ca %	Ce ppm	Co ppm	Cr ppm	Cu ppm
GC007250	5.00	9.8	30	300	N	--	--	3.10	N	10	50.0	30.0
GC042050	7.00	9.9	70	700	1.5	--	--	.25	150	15	100.0	30.0
GC007050	5.00	8.0	30	500	N	--	--	.44	N	15	50.0	15.0
GC002750	5.00	9.1	70	300	N	--	--	.86	150	15	50.0	50.0
GC065350	5.00	5.1	20	700	1.5	.5	1.4	2.13	N	5	50.0	15.0
GC277450	5.00	3.8	<20	500	N	--	--	1.20	N	5	20.0	15.0
GC199850	2.00	3.4	50	200	N	--	--	.25	N	5	50.0	15.0
GC200150	2.00	1.9	N	500	N	--	--	.35	N	N	10.0	7.0
GC199650	1.50	12.0	N	300	N	--	--	.20	N	10	100.0	15.0
GC065050	3.00	2.4	20	500	N	<.5	.9	.31	N	3	15.0	7.0
GC276650	5.00	4.3	30	500	1.0	--	--	.65	N	5	30.0	20.0
GC276950	7.00	6.1	30	700	1.0	--	--	.65	150	7	50.0	20.0
GC200050	5.00	5.8	70	500	N	--	--	.45	N	7	70.0	15.0
GC276850	7.00	5.7	30	500	3.0	--	--	1.20	150	10	50.0	20.0
GC276350	3.00	30.0	20	300	3.0	--	--	.12	N	15	70.0	15.0
GC276250	>10.00	19.0	50	300	3.0	--	--	.06	150	15	100.0	50.0
GC065150	5.00	2.2	100	500	2.0	<.5	1.0	.86	N	7	70.0	15.0
GC064950	3.00	4.3	30	300	1.5	2.0	1.7	.42	<150	5	50.0	50.0
GC064850	2.00	2.0	20	200	N	<.5	.7	.21	<150	5	50.0	10.0
GC199950	2.00	3.3	50	150	N	--	--	.30	N	7	30.0	10.0
GC276450	2.00	27.0	N	200	2.0	--	--	.08	N	20	50.0	20.0
GC276550	3.00	7.7	20	150	N	--	--	5.30	N	3	30.0	10.0
GC200250	5.00	2.5	70	500	N	--	--	4.50	N	10	70.0	15.0
GC199750	2.00	6.4	30	150	N	--	--	.20	N	10	15.0	10.0
GC064750	3.00	7.7	50	300	N	<.5	1.3	.19	N	7	70.0	10.0
GC276750	1.50	3.4	20	300	N	--	--	.13	N	3	20.0	7.0
GC065450	2.00	2.1	<20	1,000	N	<.5	.7	1.94	N	N	20.0	3.0
GC065550	10.00	6.8	20	1,000	2.0	1.2	1.7	1.28	<150	10	50.0	20.0
GC065250	2.00	<.1	20	500	N	<.5	.4	.29	N	N	10.0	3.0
GC035050	7.00	3.9	N	500	N	--	--	10.20	--	10	50.0	30.0
GC269650	10.00	10.0	20	300	1.0	--	--	.45	N	3	100.0	70.0
GC076550	>10.00	4.5	<20	700	1.5	9.1	3.5	.45	N	7	100.0	20.0
GC076850	3.00	1.1	<20	500	N	.9	6.1	.36	N	N	150.0	10.0
GC076950	7.00	4.7	70	200	N	<.5	.3	3.03	--	10	2,000.0	7.0
GC060450	>10.00	3.5	N	1,000	1.5	--	--	1.52	N	7	20.0	20.0
GC269850	>10.00	2.8	20	1,500	N	--	--	.65	N	10	70.0	10.0
GC269950	>10.00	4.5	<20	300	1.0	--	--	4.10	N	15	3.0	7.0
GC270050	>10.00	2.6	20	700	N	--	--	2.40	N	10	20.0	70.0
GC035450	>10.00	2.3	N	700	N	--	--	3.80	N	30	50.0	30.0
GC269250	>10.00	12.0	30	70	1.0	--	--	2.40	N	15	30.0	150.0
GC269350	7.00	1.2	N	500	N	--	--	6.30	N	30	150.0	200.0
GC059850	10.00	7.8	20	700	1.5	--	--	1.16	<150	7	30.0	30.0
GC269150	>10.00	5.5	20	700	1.5	--	--	1.60	N	15	30.0	30.0
GC060550	10.00	3.2	<20	500	1.0	--	--	2.77	N	15	30.0	50.0
GC270150	>10.00	2.4	20	700	1.0	--	--	3.00	N	10	20.0	70.0
GC270250	>10.00	5.8	20	700	1.0	--	--	4.60	N	20	70.0	70.0
GC060350	>10.00	6.0	N	1,000	1.0	--	--	2.68	<150	15	30.0	50.0
GC269750	10.00	4.3	20	700	1.0	--	--	1.30	N	3	100.0	7.0
GC034950	>10.00	12.0	30	700	2.0	--	--	1.80	N	20	70.0	30.0
GC060050	10.00	8.9	N	1,500	1.5	--	--	1.58	<150	15	50.0	50.0

Table 1.--Location, description, and concentration of elements for samples of surficial materials--continued

Sample No.	F %	Fe %	Ga ppm	Ge ppm	Hg ppm	I ppm	K %	La ppm	Li ppm	Mg %	Mn ppm	Mo pp
GC007250	.043	1.50	15	--	.08	--	1.80	30	29	1.000	500	N
GC042050	.026	3.00	30	--	.13	--	1.80	70	31	.300	700	3
GC007050	.013	1.50	15	--	.08	--	1.50	50	24	.300	1,000	N
GC002750	.018	3.00	30	--	.08	--	2.51	70	30	1.500	500	7
GC065350	--	2.00	10	1.36	.02	.7	2.05	N	15	.500	300	N
GC277450	.008	1.00	10	--	.03	--	1.90	N	13	.200	200	N
GC199850	.029	1.00	7	--	.06	--	.50	30	16	.150	150	N
GC200150	.013	.70	7	--	.02	--	1.40	N	8	.100	150	N
GC199650	.009	3.00	10	--	.05	--	.60	N	15	.100	700	N
GC065050	--	1.00	7	1.32	.03	.8	1.84	N	--	.100	100	N
GC276650	.023	1.50	10	--	.03	--	1.70	30	21	.300	700	N
GC276950	.040	2.00	15	--	.05	--	2.00	50	29	.700	500	N
GC200050	.003	1.50	10	--	.03	--	1.60	30	23	.500	300	N
GC276850	.038	3.00	15	--	.03	--	1.10	70	33	1.000	500	N
GC276350	.024	3.00	7	--	.11	--	.65	30	24	.150	2,000	N
GC276250	.007	5.00	30	--	.08	--	2.00	50	98	.700	500	N
GC065150	.050	3.00	15	.85	.03	.7	2.57	<30	38	1.500	300	N
GC064950	--	1.00	10	1.39	.02	1.3	1.10	50	16	.200	300	N
GC064850	--	.70	5	1.09	.02	<.5	.63	N	13	.100	200	N
GC199950	.005	1.00	5	--	.03	--	.40	30	16	.150	200	N
GC276450	.013	7.00	7	--	.06	--	.43	N	20	.100	2,000	N
GC276550	.004	1.00	7	--	.15	--	.55	N	16	.200	300	N
GC200250	.025	1.50	15	--	.03	--	2.20	N	46	3.000	300	N
GC199750	.017	1.50	5	--	.02	--	.37	30	10	.100	300	N
GC064750	--	2.00	7	1.55	.05	<.5	.81	50	16	.100	700	N
GC276750	.006	.50	5	--	.03	--	.60	N	11	.150	200	N
GC065450	--	.70	5	1.27	.01	1.4	2.17	N	--	.200	70	N
GC065550	.050	3.00	20	1.56	.04	1.7	1.92	70	22	.700	500	N
GC065250	--	.70	5	.96	.01	<.5	1.84	N	6	.100	150	N
GC035050	.042	1.50	15	--	.03	--	1.30	N	20	3.000	500	N
GC269650	.005	5.00	20	--	.19	--	1.00	N	29	.700	700	<3
GC076550	--	5.00	30	1.81	.09	9.6	1.56	N	25	.500	700	N
GC076850	--	1.00	15	.90	.02	.9	.77	N	15	.100	100	N
GC076950	--	3.00	10	1.51	.02	<.5	.44	N	15	1.500	500	N
GC060450	.032	3.00	20	--	.02	--	2.06	30	32	.700	500	3
GC269850	.020	3.00	15	--	.03	--	2.60	30	24	.700	700	N
GC269950	.090	7.00	30	--	.03	--	.85	N	16	2.000	700	3
GC270050	.018	5.00	20	--	.70	--	1.30	N	24	1.500	700	3
GC035450	.028	7.00	30	--	.06	--	1.40	N	15	2.000	1,000	5
GC269250	.046	5.00	15	--	.03	--	2.40	N	25	1.500	700	7
GC269350	.013	10.00	20	--	.04	--	.65	N	11	2.000	1,000	N
GC059850	.021	3.00	20	--	.03	--	2.53	50	33	.500	500	N
GC269150	<.001	5.00	30	--	.02	--	2.80	50	26	.700	700	5
GC060550	.018	5.00	20	--	.01	--	1.14	30	25	1.000	500	N
GC270150	.025	3.00	30	--	.08	--	1.40	N	23	2.000	700	3
GC270250	.015	7.00	20	--	.04	--	1.30	N	21	2.000	500	N
GC060350	.026	5.00	20	--	.06	--	1.30	50	15	.700	1,000	N
GC269750	.004	1.00	10	--	.04	--	1.70	N	19	.300	150	N
GC034950	.025	3.00	20	--	.07	--	1.90	50	30	.700	700	N
GC060050	.025	5.00	20	--	.04	--	2.63	70	27	.500	1,000	3

Table 1.--Location, description, and concentration of elements for samples of surficial materials--continued

Sample No.	Na %	Nb ppm	Nd ppm	Ni ppm	P %	Pb ppm	Rb ppm	S %	Sb ppm	Sc ppm	Se ppm	Si %
GC007250	1.00	N	N	20	.040	15	--	--	--	7	.6	--
GC042050	.70	15	70	30	.030	30	--	--	--	15	.5	--
GC007050	.70	15	N	20	.040	20	--	--	--	7	.3	--
GC002750	.70	15	70	30	.065	15	--	--	--	15	.5	--
GC065350	.70	<10	--	10	--	20	65	<.08	<1	7	.4	32
GC277450	.50	10	--	10	.016	15	--	--	--	5	.2	--
GC199850	.30	20	N	10	.008	N	--	--	--	5	<.1	--
GC200150	.70	N	N	5	.004	N	--	--	--	N	<.1	--
GC199650	.20	20	N	10	.024	30	--	--	--	N	.6	--
GC065050	.70	N	--	5	--	15	65	.09	<1	<5	<.1	36
GC276650	1.00	15	70	15	.040	20	--	--	--	7	.3	--
GC276950	.70	15	70	15	.030	20	--	--	--	10	.7	--
GC200050	.70	20	N	20	.012	15	--	--	--	7	.3	--
GC276850	.70	20	70	30	.016	15	--	--	--	10	.4	--
GC276350	.20	10	N	20	.100	15	--	--	--	7	.7	--
GC276250	.30	10	70	50	.040	30	--	--	--	15	.7	--
GC065150	.70	10	N	20	--	15	95	<.08	<1	10	<.1	34
GC064950	.70	10	N	10	--	20	50	.11	<1	7	.6	38
GC064850	.30	<10	--	7	--	N	35	<.08	<1	5	.1	41
GC199950	.15	20	N	10	.006	10	--	--	--	5	.1	--
GC276450	.15	10	--	30	.070	30	--	--	--	7	.9	--
GC276550	.20	10	--	15	.016	50	--	--	--	5	.2	--
GC200250	1.00	15	N	20	.024	20	--	--	--	10	.2	--
GC199750	.15	10	N	15	.012	10	--	--	--	5	.2	--
GC064750	.30	10	N	10	--	15	45	<.08	1	5	<.1	39
GC276750	.70	10	--	7	.008	<10	--	--	--	N	.2	--
GC065450	.70	N	--	<5	--	15	65	<.08	<1	N	<.1	33
GC065550	.70	10	70	20	--	20	100	.11	<1	10	<.1	30
GC065250	.50	<10	--	<5	--	15	55	<.08	<1	N	<.1	41
GC035050	3.00	N	N	15	.030	15	--	--	--	10	.3	--
GC269650	.30	10	--	15	.090	15	--	--	--	10	1.0	--
GC076550	1.00	<10	--	10	--	15	65	<.08	<1	10	1.1	26
GC076850	.70	<10	--	7	--	10	35	<.08	<1	N	.2	33
GC076950	.70	N	--	20	--	N	20	<.08	<1	10	<.1	33
GC060450	3.00	10	70	15	--	15	--	--	--	15	<.1	--
GC269850	1.50	15	N	15	.060	15	--	--	--	7	<.1	--
GC269950	1.50	10	--	<5	.040	10	--	--	--	30	<.1	--
GC270050	3.00	N	--	15	.060	10	--	--	--	10	.1	--
GC035450	2.00	15	N	20	.090	15	--	--	--	30	<.1	--
GC269250	1.00	10	--	30	.090	10	--	--	--	15	2.6	--
GC269350	1.50	20	--	50	.060	N	--	--	--	50	<.1	--
GC059850	3.00	<10	70	15	--	15	--	--	--	15	.3	--
GC269150	1.50	15	<70	20	.030	10	--	--	--	10	<.1	--
GC060550	2.00	<10	N	20	--	15	--	--	--	20	<.1	--
GC270150	3.00	10	--	15	.120	10	--	--	--	15	<.1	--
GC270250	1.50	10	--	50	.030	10	--	--	--	20	<.1	--
GC060350	3.00	10	70	20	--	15	--	--	--	15	<.1	--
GC269750	1.50	10	--	15	.016	10	--	--	--	7	.3	--
GC034950	1.50	30	N	30	.016	30	--	--	--	15	.2	--
GC060050	1.50	10	70	15	--	15	--	--	--	15	.1	--

Table 1.--Location, description, and concentration of elements for samples of surficial materials--continued

Sample No.	Sn ppm	Sr ppm	Ti %	Th ppm	U ppm	V ppm	Y ppm	Yb ppm	Zn %	Zr pp
GC007250	--	150	.200	--	--	70	20	2.0	70	100
GC042050	--	200	.700	--	--	70	70	7.0	50	300
GC007050	--	100	.300	--	--	50	30	5.0	45	300
GC002750	--	100	.300	--	--	150	50	7.0	91	200
GC065350	1.42	150	.300	8.15	3.04	70	20	3.0	36	500
GC277450	--	100	.200	--	--	30	10	2.0	30	150
GC199850	--	70	.300	--	--	30	20	3.0	--	300
GC200150	--	70	.100	--	--	20	10	1.0	--	200
GC199650	--	50	.300	--	--	70	30	3.0	--	200
GC065050	.94	70	.200	5.69	1.93	20	10	1.0	33	500
GC276650	--	70	.500	--	--	30	50	5.0	35	300
GC276950	--	150	.300	--	--	50	30	5.0	40	300
GC200050	--	70	.300	--	--	70	20	3.0	20	300
GC276850	--	150	.500	--	--	70	70	7.0	50	300
GC276350	--	70	.200	--	--	30	50	5.0	70	150
GC276250	--	100	.500	--	--	150	50	5.0	90	150
GC065150	.43	100	.200	7.30	2.03	70	15	3.0	60	150
GC064950	.40	100	.300	7.59	3.36	50	20	5.0	96	700
GC064850	.12	50	.300	8.69	2.56	20	15	3.0	21	700
GC199950	--	20	.300	--	--	50	20	3.0	--	300
GC276450	--	30	.150	--	--	30	20	3.0	85	100
GC276550	--	50	.150	--	--	30	20	2.0	95	150
GC200250	--	150	.200	--	--	70	20	3.0	35	150
GC199750	--	70	.200	--	--	30	15	1.5	--	100
GC064750	1.62	70	.500	9.49	3.43	50	50	5.0	65	500
GC276750	--	30	.150	--	--	20	30	3.0	15	500
GC065450	.47	100	.150	5.77	1.49	20	<10	1.0	15	150
GC065550	1.31	300	.200	10.34	3.04	150	50	7.0	97	300
GC065250	<.10	50	.150	--	1.34	20	15	2.0	20	200
GC035050	--	1,000	.200	--	--	100	15	2.0	35	70
GC269650	--	100	.300	--	--	70	15	2.0	50	150
GC076550	1.34	300	.300	11.02	2.25	150	10	2.0	93	100
GC076850	1.74	150	.100	3.09	1.07	70	<10	1.5	16	100
GC076950	.28	200	.150	--	.68	150	15	3.0	39	200
GC060450	--	500	.300	--	--	70	30	3.0	75	150
GC269850	--	300	.300	--	--	50	30	2.0	55	200
GC269950	--	500	.700	--	--	200	30	3.0	65	70
GC270050	--	500	.300	--	--	70	30	2.0	35	150
GC035450	--	700	1.000	--	--	200	30	5.0	75	150
GC269250	--	300	.300	--	--	200	30	3.0	310	150
GC269350	--	300	1.000	--	--	500	30	5.0	65	70
GC059850	--	500	.200	--	--	70	50	5.0	99	100
GC269150	--	300	1.000	--	--	70	70	7.0	50	200
GC060550	--	500	.500	--	--	150	30	3.0	88	100
GC270150	--	700	.300	--	--	70	20	3.0	40	100
GC270250	--	700	.500	--	--	150	30	2.0	50	100
GC060350	--	700	.700	--	--	150	30	3.0	97	150
GC269750	--	300	.200	--	--	30	10	1.5	20	70
GC034950	--	500	.700	--	--	150	30	5.0	45	200
GC060050	--	300	.700	--	--	100	50	3.0	116	200

SAMPLE NO.	STATE	COUNTY	LATI-TUDE	LONGI-TUDE	DATE COLLECTED	LOCATION, DESCRIPTION, AND CONCENTRATION (PPM) OF ELEMENTS	
						BISMUTH	
0C171650	AZ	PINAL	33 18	111 5	64 5	US 60-70 W EDGE OF SUPERIOR; STONY ROUGH SOIL	15
250450	CA	INYO	36 28	117 52	66 6	RT 190 OWENS LAKE 5 MI S KEELER; SAND NEAR PLAYA	15
						CADMIUM	
060250	CA	KERN	35 30	119 38	70 7	JCT RT 33 AND UNNUMBERED RD 10 MI NW BUTTONWILLOW; SOIL NOT DESCRIBED	1.0
242750	CA	NEVADA	39 14	121 2	66 7	I-40 AT CISCO; SOIL NOT DESCRIBED	1.0
243150	CA	SANTA CLARA	36 58	121 33	66 7	US 101 AT RT 152 EXIT GILROY; SOIL NOT DESCRIBED	10.0
270650	CA	SHASTA	40 31	121 30	68 9	IN LASSEN VOLCANIC N.P. 3 MI SE MANZANITA LAKE; B HORIZON SOIL	1.0
185450	CO	MOFFAT	40 15	108 40	65 6	US 40 5 MI E MASSADONA; BROWN CLAYEY SILT 8 IN. DEPTH	1.0
066950	CO	SUMMIT	39 33	106 9	72 9	US 6 .5 MI E OFFICERS GULCH CAMPGROUND; BROWN GRAVELLY SOIL ON TILL	11.0
155850	KS	BOURBON	37 45	94 55	63 10	US 54 10 MI W FT. SCOTT; DARK PRAIRIE SOIL OVER LIMESTONE	1.5
024850	KS	LOGAN	39 7	101 44	71 10	US 40 AT OAKLEY; BLACK PRAIRIE SOIL	2.0
023550	MT	CASCADE	47 32	111 10	71 5	1 MI NORTH MALSTROM AIR BASE; CULTIVATED, PLOW ZONE	2.0
191350	NM	CHAVES	33 22	104 50	65 6	US 70 18 MI SW ROSWELL; VERY DRY, TAN, MANY CHERT FRAGMENTS	1.5
042250	OH	AUGLAIZE	40 30	83 55	66 10	US 33 1 MI NW LAKEVIEW; BROWN SILTY LOAM CULTIVATED	1.0
267450	SD	BROWN	45 25	98 7	68 8	RT 37 1 MI S GROTON; GRAY MOTTLED B HORIZON LACUSTRINE CLAY, GRASSLAND	1.0
152150	TX	HARRIS	29 47	95 38	63 7	US 90 2 MI E ADDICKS; DARK ALLUVIAL CLAY	1.0
022750	VA	WYTHE	36 58	80 57	72 9	RT 121 AT MAX MEADOWS; MUCK	4.0
056050	WI	POLK	45 31	92 35	70 5	RT 35 2 MI S LUCK; YELLOW SANDY LOAM	1.0
						PRASEODYMIUM	
070350	AL	MONTGOMERY	32 17	86 12	73 1	US 231 5 MI S MONTGOMERY; SANDY LOAM	100
						SILVER	
171450	AZ	COCONINO	34 33	111 18	64 5	RT 87 AT CLINTS WELL; DARK FOREST SOIL	3.0
033150	CO	CLEAR CREEK	39 47	105 47	65 8	US 40 ON BERTHOUD PASS; BROWN, ON GRANITE AND GNEISS RUBBLE	2.0
186250	ID	BANNOCK	42 47	112 24	65 6	I-15 8 MI SE POCATELLO; BROWN SILT, 4 IN. DEPTH	3.0
023550	MT	CASCADE	47 32	111 10	71 5	1 MI NORTH MALSTROM AIR BASE; CULTIVATED, PLOW ZONE	.7
263150	UT	SUMMIT	40 52	111 15	68 7	I-80 2 MI S RT 133 EXIT NEAR STREAM BED; BLACK ORGANIC ALLUVIUM	5.0
022750	VA	WYTHE	36 58	80 57	72 9	RT 121 AT MAX MEADOWS; MUCK	3.0