

ONFCI Comparison of Metals Analysis in parts per million or mg/kg
Sample Type: Soil Page 1

<u>Element</u>	<u>Concentration Found (XRF)</u> <i>(Place your results below)</i>	<u>EPA Method 6200 Element Concentrations in Soils, Conterminous United States</u>						<u>EPA Human Health Soil Screening Levels</u>
		<u>Detection Limits</u>	<u>From "Shacklette & Boerngen" Average</u>	<u>Range</u>	<u>From ATSDR Toxicological Profiles Date</u>	<u>Range</u>	<u>Average</u>	
Antimony (Sb)		40	0.66	<1 - 8.8	Dec. '92	1 to 8.8 ppm	0.48 ppm (Shacklette & Boerngen 1984)	31 ppm
Arsenic (As)		40	7.2	<0.1 - 97	Aug '98 (Pg. 216)	1 to 40 ppm	5.00 ppm (NAS1977a)	Cancer Endpoint 0.39 Noncancer = 22.0
					2005	1-40 ppm	5.00 ppm	
Barium (Ba)		20	580	10 - 5,000	Sept. '05 (Pg 123)	15 to 3,500	265 to 835 ppm	16,000 ppm
Bismuth (Bi)					None			No Screening Level
Cadmium (Cd)		100		*<0,005-2.	July '99 Sectn 1.3	0.25 ppm in unpolluted soil 4 ppm at Hazardous Waste Sites		39 ppm
Calcium (Ca)		70	24,000	100 - 320,000				No Screening Level
Chromium (Cr)		150	54	1 - 2,000	Sept '00 Page 299 CANADA	1 – 2,000 ppm	37 ppm	210 ppm
						5 – 1,500 ppm	43 ppm	
Cobalt (Co)		60	9.1	<3 – 70	Apr ' 04 Sectn 1.3	1 – 40 ppm	7 ppm	900 ppm

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<u>Element</u>	<u>EPA Method 6200</u> Concentration <u>Found (XRF)</u> <i>(Place your results below)</i>	<u>Detection</u> <u>Limits</u>	<u>Element Concentrations in Soils, Conterminous United States</u>			<u>EPA Human Health</u> <u>Soil Screening Levels</u>
			<u>From "Shacklette & Boerngen"</u> <u>Average</u>	<u>Range</u>	<u>From ATSDR Toxicological Profiles</u> <u>Date</u> <u>Range</u> <u>Average</u>	
Copper (Cu)		50	25	<1 – 700	Sept '02 Page 11 4 – 41 ppm Sept '04 2 – 250 ppm Dec. '90 Page 88 50 ppm Earth's Crust (Perwack et al 1980)	2,900 ppm
Gold (Au)						No Screening Level
Iron (Fe)		60	26,000	100 - >100,000		55,000 ppm
Lead (Pb)		20	19	<10 – 700	2005 <10 – 30 ug/g soil	400 ppm
Manganese (Mn)		70	550	<2 - 7,000	Sept '00 Section 1.3 40 – 90 ppm	3,200 ppm
Mercury (Hg)		30	.09	<0.01 - 4.6	Aug '97 Page 6 0.02 – 0.625 ppm	23 ppm
Moylbdenum (Mo)		10	.97	<3 – 15		390 ppm
Nickel (Ni)		50	19	<5 – 700	Aug '05 Sectn 1.3 4 – 80 ppm	1,600 ppm

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<u>Element</u>	<u>Concentration Found (XRF)</u>	<u>EPA Method 6200 Detection Limits</u>	<u>Element Concentrations in Soils, Conterminous United States</u>				<u>EPA Human Health Soil Screening Level</u>
			<u>From "Shacklette & Boerngen" Average</u>	<u>Range</u>	<u>From ATSDR Toxicological Profiles Date</u>	<u>Range</u>	
Niobium (Nb)			11	<10 - 100			No Screening Level
Palladium (Pd)							No Screening Level
Platinum (Pt)							No Screening Level
Potassium (K)		200	15,000	50 - 63,000			No Screening Level
Rubidium (Rb)		10	67	<20 - 210			No Screening Level
Scandium (Sc)			8.9	<5 - 50			No Screening Level
Selenium (Se)		40	.39	< 0.1 - 4.3	Feb '95 5.4..3	0.05 - 0.09 ppm Volcanic Rock 120 ppm (Glover et al '79)	390 ppm
					Sept '03 6.4.3	0.01 - 0.2 ppm Most soils (Sindeva 1964) With Maximum of < 100 ppm (Rosenfeld & Beath 1964)	
Silver (Ag)		70			Dec '90 5.4.3	0.30 ppm Earth's Crust 0.10 ppm Haz Waste Sites 4.5 ppm	390 ppm
Strontium (Sr)		10	240	<5 - 3,000	Apr '04 1.2	0.2 ppm	47,000 ppm

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<u>Element</u>	<u>Concentration Found (XRF)</u>	<u>Detection Limits</u>	<u>Element Concentrations in Soils, Conterminous United States</u>					<u>EPA Human Health Soil Screening Level</u>
			<u>From "Shacklette & Boerngen"</u> <u>Average</u>	<u>Range</u>	<u>From ATSDR Toxicological Profiles</u>		<u>Mean</u>	
					<u>Date</u>	<u>Range</u>		
Thorium (Th)		10	9.4	2.2 – 31	Oct '90 5.2.3	2 – 12 ppm	6 ppm	No Screening Level
Tin (Sn)		60	1.3	<0.1 – 10	Aug '05 1.3 Updated 11/6/06	1 – 200 ppm	1 ppm	47,000 ppm
Titanium (Ti)		50	2,900	70 – 20,000				No Screening Level
Vanadium (V)		50	80	<7 – 500	July '92 5.4.3	3-310 ppm Earth's Crust 150 ppm	200 ppm (Byerrum et al 1974)	390 ppm
Zinc (Zn)		50	60	<5 – 2,900	May '94 Pg 132	10 – 300 ppm	50 ppm (EPA 1980d)	23,000 ppm
Zirconium (Zr)		10	230	<20 – 2,000				No Screening Level

References:

Shacklette, H.T., and Boerngen, J. G., 1984. Element concentrations in soils and other surficial materials of the conterminous United States: U.S. Geological Paper 1270, 105 p.
<http://pubs.usgs.gov/pp/1270/>

Agency for Toxic Substances and Disease Registry (ATSDR) Toxicological Profiles (by element) can be found on the website for the Center for Disease Control (CDC) – www.cdc.gov by inserting "Toxicological Profile for (each element)" into the search engine.

Holmgren, G.G.S., Meyer, M.W., Chaney, R.L., and Daniels, R.B., 1983, Cadmium, lead, zinc, copper, and nickel in agricultural soils of the United States: Journal of Environmental Quality, v. 22, p. 335-348