

City of Oakland Survey of Studies on Naturally-occurring Metals Concentrations

Some naturally-occurring concentrations of metals in Oakland soils are higher than the thresholds calculated by risk-based models. In such cases, there is unlikely to be any real reduction in risk realized from remediation to the risk-based threshold since the observed concentrations are likely to represent ambient conditions. In Oakland, this is especially true of arsenic. The following table contains the results from studies on naturally-occurring metals conducted in locations that are relevant to Oakland's geology.

**Background Metal Concentrations
(ppm in soil)**

Source	Antimony	Arsenic	Beryllium	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Selenium	Silver	Thallium	Zinc
Lawrence Berkeley National Laboratories ¹	5.5	19.1	1.0	2.7	99.6	69.4	16.1	0.4	119.8	5.6	1.8	27.1	106.1
-Colluvian & Fill	5.9	14.0	0.9	1.5	91.4	59.6	14.7	0.3	120.2	5.6	1.7	42.5	91.5
-Great Valley Group	6.3	31.0	1.0	3.2	59.0	99.7	21.5	0.6	69.7	4.8	2.2	8.7	135.9
-Moraga Formation	6.1	9.3	0.8	2.6	142.2	54.1	8.9	0.3	100.4	4.7	2.0	38.9	84.7
-Orinda Formation	5.2	17.8	1.1	3.3	95.2	66.9	14.8	0.3	144.3	7.0	1.9	19.8	98.3
-San Pablo Group	7.1	15.7	0.8	2.9	78.6	40.9	10.3	0.4	125.9	4.9	1.5	10.9	97.7
San Leandro, Ca ²	<3-<15	1.8-5.9	<0.25-<1.30	<0.25-<1.30	24.8-43.0	11.8-68.0	3.3-10.4	<0.10	2.93-43.60	<0.25-<2.50	<0.50-<2.50	<0.50-<5.00	9.3-61.3
Union City, Ca ³	5.0	6.92-9.34	0.5-0.81	0.5-1.30	46.5-112	28.2-60.1	19.8-148	0.1-0.36	32.4-60.6	0.5	0.5	5.0	97.1-474
Western U.S. ⁴	--	1-50	--	0.1-0.7	1-1,000	2-100	20-100	0.01-0.3	5-500	--	--	--	10-300

Sources:

¹ Lawrence Berkeley National Laboratory Environmental Restoration Program, 1995. 500 samples were taken from 71 locations representing 5 geologic units at LBNL: Colluvian & Fill, Great Valley group, Moraga formation, Orinda formation and San Pablo group. Concentrations listed are Upper 95% Confidence Limits of data from 71 monitoring well borings.

² Chemical Testing on Background Soil Samples: Roberts Landing Development Site, San Leandro, CA, 1994.

³ Site Wide Remedial Investigation: Pacific States Steel Corp. Union City, CA, 1992.

⁴ USEPA (found in Remedial Investigation Report, Hercules Properties, Inc., 1991).