

Appendix M  
Supplemental Ecological Risk  
Assessment (ERA) Information

# Appendix M

## Supplemental ERA Information

### Contents

This appendix provides supplemental tabulated information for the ecological risk assessment (ERA) presented in Section 10 of the Remedial Investigation Report for the Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona.

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TABLE M-1  
Summary Statistics for Ecological Exposure Areas - Soil  
Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona

Exposure				Standard														
Area ID	Media	Analyte	Units	Number of Observations	Number of Detects	Percent Detected	Minimum Non Detect	Maximum Non Detect	Minimum Detect	Maximum Detect	Mean of Detects	Median of Detects	Variance of Detects	Deviation of Detects	95% UCL	95% UCL Basis	EPC	EPC Basis
3001	Soil	Aluminum	mg/kg	3	3	100%	N/A	N/A	22,200	26,200	24,633	25,500	4,563,333	2,136	26,200	Max Detect	26,200	Max Detect
3001	Soil	Arsenic	mg/kg	32	31	97%	11.9	11.9	15.4	132	59.76	48.3	1,253	35.4	69.01	95% KM (t) UCL	69.01	95% KM (t) UCL
3001	Soil	Barium	mg/kg	3	3	100%	N/A	N/A	83.2	196	150.1	171	3,510	59.24	196	Max Detect	196	Max Detect
3001	Soil	Beryllium	mg/kg	3	3	100%	N/A	N/A	0.7	0.93	0.83	0.86	0.0139	0.118	0.93	Max Detect	0.93	Max Detect
3001	Soil	Cadmium	mg/kg	3	3	100%	N/A	N/A	0.21	3.3	1.903	2.2	2.453	1.566	3.3	Max Detect	3.3	Max Detect
3001	Soil	Chromium	mg/kg	3	3	100%	N/A	N/A	56.1	84	68.3	64.8	203.8	14.28	84	Max Detect	84	Max Detect
3001	Soil	Cobalt	mg/kg	3	3	100%	N/A	N/A	20.4	32.5	24.93	21.9	43.5	6.596	32.5	Max Detect	32.5	Max Detect
3001	Soil	Copper	mg/kg	3	3	100%	N/A	N/A	54.9	626	344.3	352	81,583	285.6	626	Max Detect	626	Max Detect
3001	Soil	Iron	mg/kg	32	32	100%	N/A	N/A	17,600	85,700	57,231	61,250	226,800,000	15,061	61,746	95% Student's-t UCL	61,746	95% Student's-t UCL
3001	Soil	Lead	mg/kg	32	31	97%	4.23	4.23	5.86	187	58.25	46.5	2,976	54.55	98.58	95% KM (Chebyshev) UCL	98.58	95% KM (Chebyshev) UCL
3001	Soil	Manganese	mg/kg	32	32	100%	N/A	N/A	600	1,460	885.1	858	34,424	185.5	940.7	95% Student's-t UCL	940.7	95% Student's-t UCL
3001	Soil	Mercury	mg/kg	3	2	67%	0.0059	0.0059	0.14	0.31	0.225	0.225	0.0145	0.12	0.31	Max Detect	0.31	Max Detect
3001	Soil	Nickel	mg/kg	3	3	100%	N/A	N/A	42.8	63.4	53.07	53	106.1	10.3	63.4	Max Detect	63.4	Max Detect
3001	Soil	Selenium	mg/kg	3	3	100%	N/A	N/A	0.85	1.8	1.383	1.5	0.236	0.486	1.8	Max Detect	1.8	Max Detect
3001	Soil	Vanadium	mg/kg	3	3	100%	N/A	N/A	104	131	115.3	111	196.3	14.01	131	Max Detect	131	Max Detect
3001	Soil	Zinc	mg/kg	32	32	100%	N/A	N/A	80.8	366	177.5	143	7,371	85.85	207.3	95% Adjusted Gamma UCL	207.3	95% Adjusted Gamma UCL
NE-02	Soil	Aluminum	mg/kg	5	5	100%	N/A	N/A	10,000	22,100	17,100	19,000	26,240,000	5,122	22,100	Max Detect	22,100	Max Detect
NE-02	Soil	Antimony	mg/kg	1	1	100%	N/A	N/A	1.6	1.6	1.6	1.6	N/A	N/A	1.6	Max Detect	1.6	Max Detect
NE-02	Soil	Arsenic	mg/kg	36	36	100%	N/A	N/A	8.42	58.3	28.84	23.45	203.1	14.25	34.33	95% H-UCL	34.33	95% H-UCL
NE-02	Soil	Barium	mg/kg	5	5	100%	N/A	N/A	70.1	132	106.9	123	809.5	28.45	132	Max Detect	132	Max Detect
NE-02	Soil	Beryllium	mg/kg	5	5	100%	N/A	N/A	0.36	0.67	0.482	0.42	0.0176	0.133	0.67	Max Detect	0.67	Max Detect
NE-02	Soil	Cadmium	mg/kg	5	5	100%	N/A	N/A	0.075	2	0.715	0.34	0.591	0.769	2	Max Detect	2	Max Detect
NE-02	Soil	Chromium	mg/kg	5	5	100%	N/A	N/A	10.5	21.4	15.02	15.2	18.94	4.352	21.4	Max Detect	21.4	Max Detect
NE-02	Soil	Cobalt	mg/kg	5	5	100%	N/A	N/A	8.8	13.7	11.38	11.5	3.117	1.766	13.7	Max Detect	13.7	Max Detect
NE-02	Soil	Copper	mg/kg	5	5	100%	N/A	N/A	23.7	117	60.88	41.2	1,491	38.61	117	Max Detect	117	Max Detect
NE-02	Soil	Iron	mg/kg	31	31	100%	N/A	N/A	25,900	38,600	30,348	30,000	9,279,247	3,046	31,277	95% Student's-t UCL	31,277	95% Student's-t UCL
NE-02	Soil	Lead	mg/kg	36	36	100%	N/A	N/A	4.3	89.5	34.8	30	384.9	19.62	41.59	95% Adjusted Gamma UCL	41.59	95% Adjusted Gamma UCL
NE-02	Soil	Manganese	mg/kg	31	31	100%	N/A	N/A	390	822	618.5	617	8,966	94.69	647.4	95% Student's-t UCL	647.4	95% Student's-t UCL
NE-02	Soil	Mercury	mg/kg	3	1	33%	0.0055	0.0059	0.18	0.18	0.18	0.18	N/A	N/A	0.18	Max Detect	0.18	Max Detect
NE-02	Soil	Nickel	mg/kg	5	5	100%	N/A	N/A	9	18.3	13.2	12.5	12.66	3.558	18.3	Max Detect	18.3	Max Detect
NE-02	Soil	Selenium	mg/kg	5	5	100%	N/A	N/A	0.28	2.9	1.008	0.63	1.152	1.073	2.9	Max Detect	2.9	Max Detect
NE-02	Soil	Silver	mg/kg	5	1	20%	0.0029	0.0031	2.6	2.6	2.6	2.6	N/A	N/A	2.6	Max Detect	2.6	Max Detect
NE-02	Soil	Vanadium	mg/kg	5	5	100%	N/A	N/A	40.7	53.3	45.86	43.6	25.83	5.083	53.3	Max Detect	53.3	Max Detect
NE-02	Soil	Zinc	mg/kg	36	36	100%	N/A	N/A	42.7	227	116.1	102.1	2,351	48.49	132.1	95% Adjusted Gamma UCL	132.1	95% Adjusted Gamma UCL
NE-04	Soil	Aluminum	mg/kg	1	1	100%	N/A	N/A	23,000	23,000	23,000	23,000	N/A	N/A	23,000	Max Detect	23,000	Max Detect
NE-04	Soil	Arsenic	mg/kg	17	16	94%	13.1	13.1	14.2	30.3	21.54	20	28.61	5.349	23.41	95% KM (t) UCL	23.41	95% KM (t) UCL
NE-04	Soil	Barium	mg/kg	1	1	100%	N/A	N/A	109	109	109	109	N/A	N/A	109	Max Detect	109	Max Detect
NE-04	Soil	Beryllium	mg/kg	1	1	100%	N/A	N/A	0.55	0.55	0.55	0.55	N/A	N/A	0.55	Max Detect	0.55	Max Detect
NE-04	Soil	Cadmium	mg/kg	1	1	100%	N/A	N/A	0.67	0.67	0.67	0.67	N/A	N/A	0.67	Max Detect	0.67	Max Detect
NE-04	Soil	Chromium	mg/kg	1	1	100%	N/A	N/A	17.7	17.7	17.7	17.7	N/A	N/A	17.7	Max Detect	17.7	Max Detect
NE-04	Soil	Cobalt	mg/kg	1	1	100%	N/A	N/A	10.7	10.7	10.7	10.7	N/A	N/A	10.7	Max Detect	10.7	Max Detect
NE-04	Soil	Copper	mg/kg	1	1	100%	N/A	N/A	92.3	92.3	92.3	92.3	N/A	N/A	92.3	Max Detect	92.3	Max Detect
NE-04	Soil	Iron	mg/kg	17	17	100%	N/A	N/A	22,200	35,400	27,147	26,400	15,292,647	3,911	28,803	95% Student's-t UCL	28,803	95% Student's-t UCL
NE-04	Soil	Lead	mg/kg	17	17	100%	N/A	N/A	18.6	34.3	26.18	25.8	20.43	4.52	28.09	95% Student's-t UCL	28.09	95% Student's-t UCL
NE-04	Soil	Manganese	mg/kg	17	17	100%	N/A	N/A	483	910	596.2	567	11,264	106.1	641.1	95% Student's-t UCL	641.1	95% Student's-t UCL
NE-04	Soil	Nickel	mg/kg	1	1	100%	N/A	N/A	14.9	14.9	14.9	14.9	N/A	N/A	14.9	Max Detect	14.9	Max Detect
NE-04	Soil	Selenium	mg/kg	1	1	100%	N/A	N/A	0.76	0.76	0.76	0.76	N/A	N/A	0.76	Max Detect	0.76	Max Detect
NE-04	Soil	Vanadium	mg/kg	1	1	100%	N/A	N/A	40.8	40.8	40.8	40.8	N/A	N/A	40.8	Max Detect	40.8	Max Detect
NE-04	Soil	Zinc	mg/kg	17	17	100%	N/A	N/A	83.7	124	101.8	98	166	12.88	107.3	95% Student's-t UCL	107.3	95% Student's-t UCL
NE-06	Soil	Aluminum	mg/kg	84	84	100%	N/A	N/A	11,000	35,900	18,862	17,950	27,541,905	5,248	19,814	95% Student's-t UCL	19,814	95% Student's-t UCL
NE-06	Soil	Antimony	mg/kg	83	27	33%	0.15	6.9	0.22	7.3	0.851	0.6	1.712	1.309	0.693	95% KM (t) UCL	0.693	95% KM (t) UCL
NE-06	Soil	Arsenic	mg/kg	230	225	98%	13.1	14.2	9.4	558	41.77	36.3	1,797	42.39	46.17	95% KM (BCA) UCL	46.17	95% KM (BCA) UCL
NE-06	Soil	Barium	mg/kg	84	84	100%	N/A	N/A	71.4	918	225.5	202.5	14,137	118.9	247.8	or 95% Modified-t UCL	247.8	or 95% Modified-t UCL
NE-06	Soil	Beryllium	mg/kg	84	55	65%	0.025	0.6	0.13	1.7	0.8	0.64	0.195	0.442	0.66	95% KM (BCA) UCL	0.66	95% KM (BCA) UCL
NE-06	Soil	Cadmium	mg/kg	84	44	52%	0.014	0.58	0.072	2.6	1.22	1.2	0.391	0.625	0.796	95% KM (Percentile Bootstrap) UCL	0.796	95% KM (Percentile Bootstrap) UCL
NE-06	Soil	Chromium	mg/kg	85	85	100%	N/A	N/A	19.4	85.7	38.33	35.1	177.6	13.33	40.77	or 95% Modified-t UCL	40.77	or 95% Modified-t UCL
NE-06	Soil	Cobalt	mg/kg	84	84	100%	N/A	N/A	9.3	27.9	17.11	16.5	19.52	4.418	17.91	95% Student's-t UCL	17.91	95% Student's-t UCL
NE-06	Soil	Copper	mg/kg	86	86	100%	N/A	N/A	24.8	201	70.18	60.85	929.8	30.49	75.75	or 95% Modified-t UCL	75.75	or 95% Modified-t UCL
NE-06	Soil	Cyanide	mg/kg	70	11	16%	0.19	3	0.18	0.83	0.354	0.27	0.0345	0.186	0.353	95% KM (t) UCL	0.353	95% KM (t) UCL
NE-06	Soil	Iron	mg/kg	226	226	100%	N/A	N/A	18,500	66,900	34,469	31,950	71,392,014					



TABLE M-1  
Summary Statistics for Ecological Exposure Areas - Soil  
Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona

Exposure				Standard														
Area ID	Media	Analyte	Units	Number of Observations	Number of Detects	Percent Detected	Minimum Non Detect	Maximum Non Detect	Minimum Detect	Maximum Detect	Mean of Detects	Median of Detects	Variance of Detects	Deviation of Detects	95% UCL	95% UCL Basis	EPC	EPC Basis
NE-06	Soil	Lead	mg/kg	230	213	93%	7	16.5	5.31	337	20.59	16.7	619.2	24.88	22.63	95% KM (BCA) UCL	22.63	95% KM (BCA) UCL
NE-06	Soil	Manganese	mg/kg	226	226	100%	N/A	N/A	260	7,880	872	745	335,258	579	939.1	or 95% Modified-t UCL	939.1	or 95% Modified-t UCL
NE-06	Soil	Mercury	mg/kg	83	23	28%	0.0055	0.12	0.012	0.24	0.0713	0.049	0.00316	0.0562	0.0472	95% KM (t) UCL	0.0472	95% KM (t) UCL
NE-06	Soil	Nickel	mg/kg	84	84	100%	N/A	N/A	14.7	76.6	37.36	39.2	168.9	13	39.72	95% Student's-t UCL	39.72	95% Student's-t UCL
NE-06	Soil	Selenium	mg/kg	84	22	26%	0.13	4.4	0.23	3.8	1.706	1.85	0.97	0.985	1.38	95% KM (Percentile Bootstrap) UCL	1.38	95% KM (Percentile Bootstrap) UCL
NE-06	Soil	Silver	mg/kg	84	6	7%	0.0029	1.3	0.057	0.23	0.107	0.0825	0.00432	0.0657	0.0577	95% KM (t) UCL	0.0577	95% KM (t) UCL
NE-06	Soil	Sulfate	mg/kg	9	9	100%	N/A	N/A	2.8	7.8	4.722	4.8	2.339	1.53	5.67	95% Student's-t UCL	5.67	95% Student's-t UCL
NE-06	Soil	Thallium	mg/kg	84	40	48%	0.021	3.1	0.27	6.1	1.8	1.3	2.305	1.518	1.391	95% GROS Approximate Gamma UCL	1.391	95% GROS Approximate Gamma UCL
NE-06	Soil	Vanadium	mg/kg	84	84	100%	N/A	N/A	40.1	131	72.53	70.7	416	20.4	76.24	95% Approximate Gamma UCL	76.24	95% Approximate Gamma UCL
NE-06	Soil	Zinc	mg/kg	230	229	100%	34.5	3.45E+01	37.8	404	87.35	81.1	1,387	37.24	91.53	95% KM (BCA) UCL	91.53	95% KM (BCA) UCL
NE-07	Soil	Aluminum	mg/kg	72	72	100%	N/A	N/A	5,930	105,000	26,972	22,650	305,000,000	17,464	30,133	95% Approximate Gamma UCL	30,133	95% Approximate Gamma UCL
NE-07	Soil	Antimony	mg/kg	71	62	87%	0.15	7.8	0.48	39.4	5.567	2.95	5.78E+01	7.604	8.798	95% KM (Chebyshev) UCL	8.798	95% KM (Chebyshev) UCL
NE-07	Soil	Arsenic	mg/kg	208	206	99%	14.2	28	5.5	377	85.21	66.05	4,152	64.44	104	95% KM (Chebyshev) UCL	104	95% KM (Chebyshev) UCL
NE-07	Soil	Barium	mg/kg	72	72	100%	N/A	N/A	61.1	784	316.9	302	33,731	183.7	353	95% Student's-t UCL	353	95% Student's-t UCL
NE-07	Soil	Beryllium	mg/kg	72	66	92%	0.025	0.39	0.14	11.4	1.743	1.3	3.657	1.912	2.021	95% KM (BCA) UCL	2.021	95% KM (BCA) UCL
NE-07	Soil	Cadmium	mg/kg	72	69	96%	0.0031	0.014	0.78	18.3	4.926	4.1	12.69	3.563	5.697	95% GROS Approximate Gamma UCL	5.697	95% GROS Approximate Gamma UCL
NE-07	Soil	Chromium	mg/kg	73	73	100%	N/A	N/A	12	441	67.44	51.3	4,055	63.68	75.21	95% H-UCL	75.21	95% H-UCL
NE-07	Soil	Cobalt	mg/kg	72	72	100%	N/A	N/A	2	29	15.25	15.65	26.58	5.156	16.26	95% Student's-t UCL	16.26	95% Student's-t UCL
NE-07	Soil	Copper	mg/kg	74	74	100%	N/A	N/A	18.4	4,830	928.1	713.5	886,823	941.7	1,141	95% Approximate Gamma UCL	1,141	95% Approximate Gamma UCL
NE-07	Soil	Cyanide	mg/kg	60	4	7%	2.5	3.3	0.15	0.64	0.303	0.21	0.0517	0.227	0.492	95% KM (t) UCL	0.492	95% KM (t) UCL
NE-07	Soil	Iron	mg/kg	205	205	100%	N/A	N/A	4,840	107,000	36,807	36,700	161,300,000	12,701	38,281	or 95% Modified-t UCL	38,281	or 95% Modified-t UCL
NE-07	Soil	Lead	mg/kg	208	205	99%	7	7	7.58	1,430	203.9	122	50,258	224.2	268.7	95% KM (Chebyshev) UCL	268.7	95% KM (Chebyshev) UCL
NE-07	Soil	Manganese	mg/kg	205	205	100%	N/A	N/A	202	4,700	942.4	822	250,143	500.1	1,001	or 95% Modified-t UCL	1,001	or 95% Modified-t UCL
NE-07	Soil	Mercury	mg/kg	71	57	80%	0.0056	0.12	0.042	1.5	0.334	0.28	0.0796	0.282	0.341	95% GROS Approximate Gamma UCL	0.341	95% GROS Approximate Gamma UCL
NE-07	Soil	Nickel	mg/kg	72	72	100%	N/A	N/A	9.8	253	58.48	52.05	1,509	38.84	78.43	95% Chebyshev (Mean, Sd) UCL	78.43	95% Chebyshev (Mean, Sd) UCL
NE-07	Soil	Selenium	mg/kg	72	30	42%	0.13	4.6	0.36	5.5	1.788	1.6	1.258	1.122	1.846	95% KM (t) UCL	1.846	95% KM (t) UCL
NE-07	Soil	Silver	mg/kg	72	48	67%	6.00E-04	1.3	0.15	10.1	2.528	1.7	5.748	2.398	2.378	95% GROS Approximate Gamma UCL	2.378	95% GROS Approximate Gamma UCL
NE-07	Soil	Thallium	mg/kg	72	10	14%	0.021	3.3	0.12	0.44	0.244	0.21	0.012	0.11	0.172	95% KM (t) UCL	0.172	95% KM (t) UCL
NE-07	Soil	Vanadium	mg/kg	72	72	100%	N/A	N/A	15.7	117	57.2	55.4	437.8	20.92	61.31	95% Student's-t UCL	61.31	95% Student's-t UCL
NE-07	Soil	Zinc	mg/kg	208	208	100%	N/A	N/A	46	4,800	609.6	418.5	399,400	632	675.5	95% Approximate Gamma UCL	675.5	95% Approximate Gamma UCL
NE-08	Soil	Aluminum	mg/kg	87	87	100%	N/A	N/A	7,440	58,300	20,028	17,400	82,168,665	9,065	21,680	or 95% Modified-t UCL	21,680	or 95% Modified-t UCL
NE-08	Soil	Antimony	mg/kg	86	50	58%	0.15	26	0.16	3.1	0.844	0.675	0.41	0.64	0.772	95% Approximate Gamma KM-UCL	0.772	95% Approximate Gamma KM-UCL
NE-08	Soil	Arsenic	mg/kg	307	307	100%	N/A	N/A	12.4	406	58.56	56.1	916.8	30.28	61.5	or 95% Modified-t UCL	61.5	or 95% Modified-t UCL
NE-08	Soil	Barium	mg/kg	87	87	100%	N/A	N/A	71.6	2,860	402.3	258	159,476	399.3	588.9	95% Chebyshev (Mean, Sd) UCL	588.9	95% Chebyshev (Mean, Sd) UCL
NE-08	Soil	Beryllium	mg/kg	87	58	67%	0.025	1	0.31	1.9	0.742	0.615	0.125	0.354	0.603	95% KM (BCA) UCL	0.603	95% KM (BCA) UCL
NE-08	Soil	Cadmium	mg/kg	87	66	76%	0.014	0.29	0.088	5.5	1.511	1.25	1.31	1.144	1.485	95% GROS Approximate Gamma UCL	1.485	95% GROS Approximate Gamma UCL
NE-08	Soil	Chromium	mg/kg	90	90	100%	N/A	N/A	17.2	140	48.51	42.55	562.2	23.71	52.75	or 95% Modified-t UCL	52.75	or 95% Modified-t UCL
NE-08	Soil	Cobalt	mg/kg	87	87	100%	N/A	N/A	8.9	33.1	20.27	19.8	26.24	5.122	21.18	95% Student's-t UCL	21.18	95% Student's-t UCL
NE-08	Soil	Copper	mg/kg	92	92	100%	N/A	N/A	40.2	774	154.2	99.4	18,965	137.7	216.8	95% Chebyshev (Mean, Sd) UCL	216.8	95% Chebyshev (Mean, Sd) UCL
NE-08	Soil	Cyanide	mg/kg	65	44	68%	0.12	2.8	0.16	4.6	0.59	0.365	0.645	0.803	0.643	95% KM (BCA) UCL	0.643	95% KM (BCA) UCL
NE-08	Soil	Iron	mg/kg	296	296	100%	N/A	N/A	20,100	166,000	47,983	42,800	388,700,000	19,715	49,894	or 95% Modified-t UCL	49,894	or 95% Modified-t UCL
NE-08	Soil	Lead	mg/kg	307	306	100%	7	7	4.5	234	43.47	32.55	1,413	37.59	46.98	95% KM (BCA) UCL	46.98	95% KM (BCA) UCL
NE-08	Soil	Manganese	mg/kg	296	296	100%	N/A	N/A	447	6,850	1,897	1,665	1,100,940	1,049	2,163	95% Chebyshev (Mean, Sd) UCL	2,163	95% Chebyshev (Mean, Sd) UCL
NE-08	Soil	Mercury	mg/kg	85	63	74%	0.0055	0.11	0.023	2.4	0.183	0.089	0.13	0.361	0.206	95% KM (BCA) UCL	0.206	95% KM (BCA) UCL
NE-08	Soil	Nickel	mg/kg	87	87	100%	N/A	N/A	8.5	150	47.36	38.2	982.5	31.34	62.01	95% Chebyshev (Mean, Sd) UCL	62.01	95% Chebyshev (Mean, Sd) UCL
NE-08	Soil	Selenium	mg/kg	89	31	35%	0.13	3.9	0.16	3.7	1.686	1	1.825	1.351	1.27	95% KM (% Bootstrap) UCL	1.27	95% KM (% Bootstrap) UCL
NE-08	Soil	Silver	mg/kg	87	30	34%	0.0029	2.6	0.054	3.1	0.446	0.24	0.44	0.663	0.283	95% KM (% Bootstrap) UCL	0.283	95% KM (% Bootstrap) UCL
NE-08	Soil	Thallium	mg/kg	87	47	54%	0.022	13	0.1	3	1.233	0.77	0.915	0.956	1	95% KM (% Bootstrap) UCL	1	95% KM (% Bootstrap) UCL
NE-08	Soil	Vanadium	mg/kg	87	87	100%	N/A	N/A	42	175	80.19	71	867.8	29.46	85.52	or 95% Modified-t UCL	85.52	or 95% Modified-t UCL
NE-08	Soil	Zinc	mg/kg	307	307	100%	N/A	N/A	43.2	480	134.4	120	4,141	64.35	140.6	or 95% Modified-t UCL	140.6	or 95% Modified-t UCL
NE-09	Soil	Aluminum	mg/kg	23	23	100%	N/A	N/A	13,500	38,400	25,048	25,400	50,322,609	7,094	27,588	95% Student's-t UCL	27,588	95% Student's-t UCL
NE-09	Soil	Antimony	mg/kg	17	4	24%	0.15	0.31	1.6	2	1.775	1.75	0.0425	0.206	0.872	95% KM (t) UCL	0.872	95% KM (t) UCL
NE-09	Soil	Arsenic	mg/kg	228	228	100%	N/A	N/A	18.9	571	95.48	73.9	4,594	67.78	115	95% Chebyshev (Mean, Sd) UCL	115	95% Chebyshev (Mean, Sd) UCL
NE-09	Soil	Barium	mg/kg	23	23	100%	N/A	N/A	85.6	588	246.8	241	13,344	115.5	288.1	95% Student's-t UCL	288.1	95% Student's-t UCL
NE-09	Soil	Beryllium	mg/kg	23	12	52%	0.025	0.031	0.18	0.88	0.534	0.55	0.0446	0.211	0.4	95% KM (t) UCL	0.4	95% KM (t) UCL
NE-09	Soil	Cadmium	mg/kg	23	7	30%	0.014	0.03	0.11	0.68	0.256	0.19	0.0382	0.195	0.145	95% KM (t) UCL	0.145	95% KM (t) UCL
NE-09	Soil	Chromium	mg/kg	24	24	100%	N/A	N/A	27.1	129	73.91	75.65	1,207	34.74	86.06	95% Student's-t UCL	86.06	95% Student's-t UCL
NE-09	Soil	Cobalt	mg/kg	23	23	100%	N/A	N/A	14.6	45.8	27.83	26.8	53.67	7.326	30.45	95% Student's-t UCL	30.45	95% Student's-t UCL
NE-09	Soil	Copper	mg/kg	24	24	100%	N/A	N/A	39	158	77.53	69.65	700.5	26.47	87.53	95% Adjusted Gamma UCL	87.53	95% Adjusted Gamma UCL
NE-09	Soil	Iron	mg/kg	225	225	100%	N/A	N/A	26,800	300,000	80,594	68,500	1,891,000,000	43,482	85,461	or 95% Modified-t UCL	85,461	or 95% Modified-t UCL

TABLE M-1  
Summary Statistics for Ecological Exposure Areas - Soil  
Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona

Exposure											Standard									
Area ID	Media	Analyte	Units	Number of Observations	Number of Detects	Percent Detected	Minimum Non Detect	Maximum Non Detect	Minimum Detect	Maximum Detect	Mean of Detects	Median of Detects	Variance of Detects	Deviation of Detects	95% UCL	95% UCL Basis	EPC	EPC Basis		
NE-09	Soil	Lead	mg/kg	228	205	90%	4.23	16.5	4.3	60.2	20.8	17.9	148.7	12.19	20.78	95% GROS Approximate Gamma UCL	20.78	95% GROS Approximate Gamma UCL		
NE-09	Soil	Manganese	mg/kg	225	225	100%	N/A	N/A	481	17,500	2,821	1,450	10,738,558	3,277	3,773	95% Chebyshev (Mean, Sd) UCL	3,773	95% Chebyshev (Mean, Sd) UCL		
NE-09	Soil	Mercury	mg/kg	23	18	78%	0.0056	0.0059	0.011	0.09	0.0432	0.042	3.50E-04	0.0187	0.0432	95% KM (t) UCL	0.0432	95% KM (t) UCL		
NE-09	Soil	Nickel	mg/kg	23	23	100%	N/A	N/A	17.8	69.8	43.76	45.3	173.2	13.16	48.47	95% Student's-t UCL	48.47	95% Student's-t UCL		
NE-09	Soil	Selenium	mg/kg	23	20	87%	0.13	0.13	0.35	1	0.669	0.65	0.0376	0.194	0.691	95% KM (t) UCL	0.691	95% KM (t) UCL		
NE-09	Soil	Thallium	mg/kg	23	3	13%	0.022	0.027	0.22	0.24	0.233	0.24	1.33E-04	0.0115	0.0808	95% KM (t) UCL	0.0808	95% KM (t) UCL		
NE-09	Soil	Vanadium	mg/kg	23	23	100%	N/A	N/A	63.1	248	138.2	154	3,321	57.63	158.8	95% Student's-t UCL	158.8	95% Student's-t UCL		
NE-09	Soil	Zinc	mg/kg	228	225	99%	34.5	34.5	35.6	265	101.3	95.2	1,798	42.41	105.2	95% Approximate Gamma KM-UCL	105.2	95% Approximate Gamma KM-UCL		
NE-11	Soil	Aluminum	mg/kg	77	77	100%	N/A	N/A	5,060	45,500	25,190	26,100	48,459,638	6,961	26,511	95% Student's-t UCL	26,511	95% Student's-t UCL		
NE-11	Soil	Antimony	mg/kg	77	36	47%	0.15	7.3	0.17	5.2	1.192	1.15	0.774	0.88	0.979	95% Approximate Gamma KM-UCL	0.979	95% Approximate Gamma KM-UCL		
NE-11	Soil	Arsenic	mg/kg	240	239	100%	13.1	13.1	3.6	388	73.79	60.6	2,757	52.51	79.17	95% KM (BCA) UCL	79.17	95% KM (BCA) UCL		
NE-11	Soil	Barium	mg/kg	77	77	100%	N/A	N/A	44.1	2,300	385.9	150	252,188	502.2	635.4	95% Chebyshev (Mean, Sd) UCL	635.4	95% Chebyshev (Mean, Sd) UCL		
NE-11	Soil	Beryllium	mg/kg	77	64	83%	0.025	0.42	0.17	1.5	0.622	0.455	0.14	0.375	0.612	95% KM (BCA) UCL	0.612	95% KM (BCA) UCL		
NE-11	Soil	Cadmium	mg/kg	77	64	83%	0.014	1.1	0.18	7.7	2.392	2.1	2.852	1.689	2.512	95% GROS Approximate Gamma UCL	2.512	95% GROS Approximate Gamma UCL		
NE-11	Soil	Chromium	mg/kg	79	79	100%	N/A	N/A	13	288	72.4	62.9	1,333	36.51	79.46	or 95% Modified-t UCL	79.46	or 95% Modified-t UCL		
NE-11	Soil	Cobalt	mg/kg	77	77	100%	N/A	N/A	6.2	58.9	29.25	29.5	58.94	7.677	30.71	or 95% Modified-t UCL	30.71	or 95% Modified-t UCL		
NE-11	Soil	Copper	mg/kg	79	79	100%	N/A	N/A	30.1	508	145	122	7,422	86.15	161.7	95% H-UCL	161.7	95% H-UCL		
NE-11	Soil	Cyanide	mg/kg	61	8	13%	0.17	2.9	0.11	0.8	0.284	0.19	0.0505	0.225	0.293	95% KM (Percentile Bootstrap) UCL	0.293	95% KM (Percentile Bootstrap) UCL		
NE-11	Soil	Iron	mg/kg	235	235	100%	N/A	N/A	10,200	160,000	63,145	61,000	623,900,000	24,977	66,005	95% Approximate Gamma UCL	66,005	95% Approximate Gamma UCL		
NE-11	Soil	Lead	mg/kg	240	229	95%	4.23	16.5	0.77	253	39.99	29.6	1,400	37.42	42.38	95% KM (BCA) UCL	42.38	95% KM (BCA) UCL		
NE-11	Soil	Manganese	mg/kg	235	235	100%	N/A	N/A	255	9,630	1,724	1,190	2,388,087	1,545	2,163	95% Chebyshev (Mean, Sd) UCL	2,163	95% Chebyshev (Mean, Sd) UCL		
NE-11	Soil	Mercury	mg/kg	76	49	64%	0.0055	0.11	0.0074	0.3	0.082	0.059	0.00431	0.0656	0.077	95% KM (BCA) UCL	0.077	95% KM (BCA) UCL		
NE-11	Soil	Nickel	mg/kg	77	77	100%	N/A	N/A	16.8	193	68.46	48.7	2,082	45.63	91.12	95% Chebyshev (Mean, Sd) UCL	91.12	95% Chebyshev (Mean, Sd) UCL		
NE-11	Soil	Nitrate as N	mg/kg	1	1	100%	N/A	N/A	3.3	3.3	3.3	3.3	N/A	N/A	3.3	Max Detect	3.3	Max Detect		
NE-11	Soil	Selenium	mg/kg	77	18	23%	0.13	7.6	0.35	1.8	0.904	0.665	0.199	0.446	0.888	95% KM (% Bootstrap) UCL	0.888	95% KM (% Bootstrap) UCL		
NE-11	Soil	Silver	mg/kg	77	35	45%	0.0028	2.2	0.033	1.6	0.453	0.41	0.106	0.326	0.368	95% KM (Percentile Bootstrap) UCL	0.368	95% KM (Percentile Bootstrap) UCL		
NE-11	Soil	Sulfate	mg/kg	1	1	100%	N/A	N/A	8.6	8.6	8.6	8.6	N/A	N/A	8.6	Max Detect	8.6	Max Detect		
NE-11	Soil	Thallium	mg/kg	77	18	23%	0.021	5.4	0.033	1.6	0.876	1.1	0.289	0.537	0.632	95% KM (BCA) UCL	0.632	95% KM (BCA) UCL		
NE-11	Soil	Vanadium	mg/kg	77	77	100%	N/A	N/A	23.3	343	133	114	5,371	73.29	147.6	95% Approximate Gamma UCL	147.6	95% Approximate Gamma UCL		
NE-11	Soil	Zinc	mg/kg	240	232	97%	34.5	34.5	37.8	388	124.3	115.5	3,235	56.88	127.7	95% Approximate Gamma KM-UCL	127.7	95% Approximate Gamma KM-UCL		
NE-11	Soil	bis(2-Ethylhexyl)phthalate	mg/kg	1	1	100%	N/A	N/A	0.061	0.061	0.061	0.061	N/A	N/A	0.061	Max Detect	0.061	Max Detect		
NR3	Soil	Aluminum	mg/kg	59	59	100%	N/A	N/A	6,710	17,500	10,734	10,300	5,335,835	2,310	11,237	95% Student's-t UCL	11,237	95% Student's-t UCL		
NR3	Soil	Antimony	mg/kg	60	39	65%	0.15	6.6	0.57	13.4	2.141	1.3	5.224	2.286	2.135	95% KM (BCA) UCL	2.135	95% KM (BCA) UCL		
NR3	Soil	Arsenic	mg/kg	172	172	100%	N/A	N/A	14.6	991	144.9	96.3	24,340	156	166	95% H-UCL	166	95% H-UCL		
NR3	Soil	Barium	mg/kg	60	60	100%	N/A	N/A	57.2	233	107.1	101	1,162	34.09	114.6	or 95% Modified-t UCL	114.6	or 95% Modified-t UCL		
NR3	Soil	Beryllium	mg/kg	59	33	56%	0.025	0.43	0.19	0.79	0.399	0.37	0.0141	0.119	0.309	95% KM (t) UCL	0.309	95% KM (t) UCL		
NR3	Soil	Cadmium	mg/kg	60	55	92%	0.014	0.57	0.2	4.8	1.839	1.8	1.091	1.044	2.319	95% KM (Chebyshev) UCL	2.319	95% KM (Chebyshev) UCL		
NR3	Soil	Chromium	mg/kg	60	60	100%	N/A	N/A	7.7	38.8	16.38	15.25	37.14	6.094	17.64	95% Approximate Gamma UCL	17.64	95% Approximate Gamma UCL		
NR3	Soil	Cobalt	mg/kg	59	59	100%	N/A	N/A	6.9	16.9	11.5	11.1	6.665	2.582	12.06	95% Student's-t UCL	12.06	95% Student's-t UCL		
NR3	Soil	Copper	mg/kg	60	60	100%	N/A	N/A	25.2	496	55.59	44.85	3,664	60.53	69.79	or 95% Modified-t UCL	69.79	or 95% Modified-t UCL		
NR3	Soil	Cyanide	mg/kg	50	9	18%	0.11	3.5	0.051	0.49	0.216	0.18	0.0196	0.14	0.265	95% KM (Percentile Bootstrap) UCL	0.265	95% KM (Percentile Bootstrap) UCL		
NR3	Soil	Iron	mg/kg	132	132	100%	N/A	N/A	13,500	61,800	33,985	33,550	101,500,000	10,073	35,437	95% Student's-t UCL	35,437	95% Student's-t UCL		
NR3	Soil	Lead	mg/kg	172	172	100%	N/A	N/A	8	3,080	215.9	101.5	133,958	366	252.9	95% H-UCL	252.9	95% H-UCL		
NR3	Soil	Manganese	mg/kg	132	132	100%	N/A	N/A	273	910	569.8	574	12,716	112.8	586.1	95% Student's-t UCL	586.1	95% Student's-t UCL		
NR3	Soil	Mercury	mg/kg	57	54	95%	0.031	0.11	0.023	4.1	0.725	0.38	0.92	0.959	1.236	95% KM (Chebyshev) UCL	1.236	9		

TABLE M-1  
Summary Statistics for Ecological Exposure Areas - Soil  
Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona

Exposure											Standard									
Area ID	Media	Analyte	Units	Number of Observations	Number of Detects	Percent Detected	Minimum Non Detect	Maximum Non Detect	Minimum Detect	Maximum Detect	Mean of Detects	Median of Detects	Variance of Detects	Deviation of Detects	95% UCL	95% UCL Basis	EPC	EPC Basis		
NR4/NR5	Soil	Cobalt	mg/kg	3	3	100%	N/A	N/A	11.9	15.9	13.43	12.5	4.653	2.157	15.9	Max Detect	15.9	Max Detect		
NR4/NR5	Soil	Copper	mg/kg	3	3	100%	N/A	N/A	68.9	192	116.6	88.8	4,367	66.08	192	Max Detect	192	Max Detect		
NR4/NR5	Soil	Iron	mg/kg	7	7	100%	N/A	N/A	30,600	54,800	38,543	36,900	61,116,190	7,818	54,800	Max Detect	54,800	Max Detect		
NR4/NR5	Soil	Lead	mg/kg	59	59	100%	N/A	N/A	7.43	16,400	1,185	382	6,600,376	2,569	2,052	95% H-UCL	2,052	95% H-UCL		
NR4/NR5	Soil	Manganese	mg/kg	7	7	100%	N/A	N/A	496	825	624.6	595	11,714	108.2	825	Max Detect	825	Max Detect		
NR4/NR5	Soil	Nickel	mg/kg	3	3	100%	N/A	N/A	10.1	18.7	15.13	16.6	20.1	4.484	18.7	Max Detect	18.7	Max Detect		
NR4/NR5	Soil	Selenium	mg/kg	3	3	100%	N/A	N/A	6.4	24	13.97	11.5	82	9.056	24	Max Detect	24	Max Detect		
NR4/NR5	Soil	Silver	mg/kg	3	3	100%	N/A	N/A	4.5	13.7	7.967	5.7	25.01	5.001	13.7	Max Detect	13.7	Max Detect		
NR4/NR5	Soil	Thallium	mg/kg	3	2	67%	2	2	0.35	1.1	0.725	0.725	0.281	0.53	1.1	Max Detect	1.1	Max Detect		
NR4/NR5	Soil	Vanadium	mg/kg	3	3	100%	N/A	N/A	51.4	60.1	55.57	55.2	19.02	4.362	60.1	Max Detect	60.1	Max Detect		
NR4/NR5	Soil	Zinc	mg/kg	59	59	100%	N/A	N/A	57.4	5,970	751.6	547	710,910	843.2	921	95% H-UCL	921	95% H-UCL		
NR6	Soil	Aluminum	mg/kg	5	5	100%	N/A	N/A	11,000	23,500	15,520	13,800	27,427,000	5,237	23,500	Max Detect	23,500	Max Detect		
NR6	Soil	Antimony	mg/kg	6	6	100%	N/A	N/A	0.78	7.8	3.313	2.05	8.602	2.933	7.8	Max Detect	7.8	Max Detect		
NR6	Soil	Arsenic	mg/kg	101	101	100%	N/A	N/A	10.9	3,400	331.3	247	166,220	407.7	395.2	95% Approximate Gamma UCL	395.2	95% Approximate Gamma UCL		
NR6	Soil	Barium	mg/kg	6	6	100%	N/A	N/A	66.6	464	230.6	170.5	24,818	157.5	464	Max Detect	464	Max Detect		
NR6	Soil	Beryllium	mg/kg	5	5	100%	N/A	N/A	0.29	0.94	0.55	0.44	0.0761	0.276	0.94	Max Detect	0.94	Max Detect		
NR6	Soil	Cadmium	mg/kg	6	6	100%	N/A	N/A	0.86	4.3	2.31	2.15	1.721	1.312	4.3	Max Detect	4.3	Max Detect		
NR6	Soil	Chromium	mg/kg	6	6	100%	N/A	N/A	9.6	31.2	21.07	21.05	52.23	7.227	31.2	Max Detect	31.2	Max Detect		
NR6	Soil	Cobalt	mg/kg	5	5	100%	N/A	N/A	13.3	20.6	16.6	15.8	8.595	2.932	20.6	Max Detect	20.6	Max Detect		
NR6	Soil	Copper	mg/kg	6	6	100%	N/A	N/A	71.9	388	181	156.5	14,335	119.7	388	Max Detect	388	Max Detect		
NR6	Soil	Iron	mg/kg	33	30	91%	31.5	31.5	23,500	46,300	37,313	38,600	28,865,333	5,373	37,476	95% KM (t) UCL	37,476	95% KM (t) UCL		
NR6	Soil	Lead	mg/kg	102	102	100%	N/A	N/A	16.3	3,420	525.9	313	369,521	607.9	632.6	95% Approximate Gamma UCL	632.6	95% Approximate Gamma UCL		
NR6	Soil	Manganese	mg/kg	33	33	100%	N/A	N/A	243	40,800	3,894	601	111,300,000	10,549	11,898	95% Chebyshev (Mean, Sd) UCL	11,898	95% Chebyshev (Mean, Sd) UCL		
NR6	Soil	Mercury	mg/kg	1	1	100%	N/A	N/A	0.22	0.22	0.22	0.22	N/A	N/A	0.22	Max Detect	0.22	Max Detect		
NR6	Soil	Nickel	mg/kg	5	5	100%	N/A	N/A	14.8	60.6	31.52	25.7	360.7	18.99	60.6	Max Detect	60.6	Max Detect		
NR6	Soil	Nitrate as N	mg/kg	1	1	100%	N/A	N/A	0.5	0.5	0.5	0.5	N/A	N/A	0.5	Max Detect	0.5	Max Detect		
NR6	Soil	Selenium	mg/kg	6	6	100%	N/A	N/A	2.6	9.7	5.267	3.8	8.815	2.969	9.7	Max Detect	9.7	Max Detect		
NR6	Soil	Silver	mg/kg	6	6	100%	N/A	N/A	1	6.5	3.767	3.2	4.383	2.093	6.5	Max Detect	6.5	Max Detect		
NR6	Soil	Sulfate	mg/kg	1	1	100%	N/A	N/A	8,800	8,800	8,800	8,800	N/A	N/A	8,800	Max Detect	8,800	Max Detect		
NR6	Soil	Thallium	mg/kg	6	3	50%	0.77	2.1	0.24	0.46	0.317	0.25	0.0154	0.124	0.46	Max Detect	0.46	Max Detect		
NR6	Soil	Vanadium	mg/kg	5	5	100%	N/A	N/A	48.5	82.5	56.68	50	212.7	14.58	82.5	Max Detect	82.5	Max Detect		
NR6	Soil	Zinc	mg/kg	102	102	100%	N/A	N/A	44.3	3,570	627.3	474	280,579	529.7	711.8	95% Approximate Gamma UCL	711.8	95% Approximate Gamma UCL		
NR7	Soil	Aluminum	mg/kg	22	22	100%	N/A	N/A	3,520	86,200	15,585	13,300	274,700,000	16,575	20,755	95% H-UCL	20,755	95% H-UCL		
NR7	Soil	Antimony	mg/kg	22	12	55%	0.16	7	2	22	7.375	5.85	34.95	5.912	8.477	95% GROS Adjusted Gamma UCL	8.477	95% GROS Adjusted Gamma UCL		
NR7	Soil	Arsenic	mg/kg	55	54	98%	13.1	13.1	10.6	1,100	157.7	118.5	31,102	176.4	258.4	95% KM (Chebyshev) UCL	258.4	95% KM (Chebyshev) UCL		
NR7	Soil	Barium	mg/kg	22	20	91%	0.022	0.022	19.7	925	301.2	275.5	82,349	287	379.4	95% KM (t) UCL	379.4	95% KM (t) UCL		
NR7	Soil	Beryllium	mg/kg	22	18	82%	0.027	0.51	0.06	3	0.607	0.54	0.461	0.679	1.113	95% KM (Chebyshev) UCL	1.113	95% KM (Chebyshev) UCL		
NR7	Soil	Cadmium	mg/kg	22	14	64%	0.015	1.1	0.26	59.1	7.011	2.45	234.4	15.31	21.41	97.5% KM (Chebyshev) UCL	21.41	97.5% KM (Chebyshev) UCL		
NR7	Soil	Chloride	mg/kg	5	3	60%	10	10	7.6	25	14.87	12	81.85	9.047	25	Max Detect	25	Max Detect		
NR7	Soil	Chromium	mg/kg	22	20	91%	0.052	0.053	0.69	185	23.86	13.65	1,777	42.16	76.03	97.5% KM (Chebyshev) UCL	76.03	97.5% KM (Chebyshev) UCL		
NR7	Soil	Cobalt	mg/kg	22	22	100%	N/A	N/A	1.6	51.9	15.72	12.4	215.4	14.68	23.35	95% Adjusted Gamma UCL	23.35	95% Adjusted Gamma UCL		
NR7	Soil	Copper	mg/kg	23	23	100%	N/A	N/A	25.6	5,250	1,651	1,200	2,216,290	1,489	2,184	95% Student's-t UCL	2,184	95% Student's-t UCL		
NR7	Soil	Cyanide	mg/kg	18	2	11%	1	2.9	0.11	0.76	0.435	0.435	0.211	0.46	N/A	N/A	0.76	Max Detect		
NR7	Soil	Iron	mg/kg	32	32	100%	N/A	N/A	14,300	154,000	42,225	34,250	788,200,000	28,074	50,037	95% Adjusted Gamma UCL	50,037	95% Adjusted Gamma UCL		
NR7	Soil	Lead	mg/kg	55	55	100%	N/A	N/A	8.9	971	209.9	154	37,295	193.1	263.1	95% Approximate Gamma UCL	263.1	95% Approximate Gamma UCL		
NR7	Soil	Manganese	mg/kg	32	30	94%	151	151	36.9	3,830	717.8	613.5	635,058	796.9	1,284	95% KM (Chebyshev) UCL	1,284	95% KM (Chebyshev) UCL		
NR7	Soil	Mercury	mg/kg	21	17	81%	0.029	0.12	0.14	1.5	0.546	0.5	0.133	0.365	0.743	95% GROS Adjusted Gamma UCL	0.743	95% GROS Adjusted Gamma UCL		
NR7	Soil	Nickel	mg/kg	22	20	91%	0.03	0.031	1.3	162	36.51	31.1	1,642	40.53	70.47	95% KM (Chebyshev) UCL	70.47	95% KM (Chebyshev) UCL		
NR7	Soil	Nitrate as N	mg/kg	7	6	86%	1	1	0.8	25	6.055	2.5	88.19	9.391	25	Max Detect	25	Max Detect		
NR7	Soil	Selenium	mg/kg	23	21	91%	4.1	7.6	0.73	37.7	13.36	14.3	122.5	11.07	16.43	95% KM (Percentile Bootstrap) UCL	16.43	95% KM (Percentile Bootstrap) UCL		
NR7	Soil	Silver	mg/kg	22	22	100%	N/A	N/A	0.3	24.6	9.468	6.7	63.58	7.973	14.32	95% Adjusted Gamma UCL	14.32	95% Adjusted Gamma UCL		
NR7	Soil	Sulfate	mg/kg	8	8	100%	N/A	N/A	120	38,000	14,305	9,600	233,000,000	15,264	24,530	95% Student's-t UCL	24,530	95% Student's-t UCL		
NR7	Soil	Thallium	mg/kg	22	17	77%	0.9	6.3	0.23	5.7	2.347	1.6	3.367	1.835	2.717	95% KM (t) UCL	2.717	95% KM (t) UCL		
NR7	Soil	Vanadium	mg/kg	22	19	86%	0.11	5.5	4	77.5	32.17	33.9	392.3	19.81	35.75	95% KM (t) UCL	35.75	95% KM (t) UCL		
NR7	Soil	Zinc	mg/kg	55	55	100%	N/A	N/A	39.9	4,660	679.7	341	782,818	884.8	866.5	95% Approximate Gamma UCL	866.5	95% Approximate Gamma UCL		
NR7	Soil	Acetophenone	mg/kg	5	2	40%	0.34	0.4	0.057	0.071	0.064	0.064	9.80E-05	0.0099	0.071	Max Detect	0.071	Max Detect		
NR7	Soil	bis(2-Ethylhexyl)phthalate	mg/kg	5	3	60%	0.34	0.35	0.059	0.33	0.159	0.087	0.0222	0.149	0.33	Max Detect	0.33	Max Detect		
NR7	Soil	Di-n-butyl phthalate	mg/kg	5	1	20%	0.34	0.4	0.049	0.049	0.049	0.049	N/A							



TABLE M-1  
Summary Statistics for Ecological Exposure Areas - Soil  
Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona

Exposure				Standard														
Area ID	Media	Analyte	Units	Number of Observations	Number of Detects	Percent Detected	Minimum Non Detect	Maximum Non Detect	Minimum Detect	Maximum Detect	Mean of Detects	Median of Detects	Variance of Detects	Deviation of Detects	95% UCL	95% UCL Basis	EPC	EPC Basis
NR8	Soil	Aluminum	mg/kg	10	10	100%	N/A	N/A	1,390	28,100	10,496	9,205	56,664,027	7,528	14,860	95% Student's-t UCL	14,860	95% Student's-t UCL
NR8	Soil	Antimony	mg/kg	10	8	80%	2.7	4.3	0.37	6.6	3.209	3.1	4.348	2.085	4.131	95% KM (t) UCL	4.131	95% KM (t) UCL
NR8	Soil	Arsenic	mg/kg	91	91	100%	N/A	N/A	17.9	3,500	359	258	173,933	417.1	549.6	95% Chebyshev (Mean, Sd) UCL	549.6	95% Chebyshev (Mean, Sd) UCL
NR8	Soil	Barium	mg/kg	10	10	100%	N/A	N/A	22.1	521	117.2	66	22,172	148.9	253.5	95% Adjusted Gamma UCL	253.5	95% Adjusted Gamma UCL
NR8	Soil	Beryllium	mg/kg	10	8	80%	0.54	0.55	0.039	0.66	0.244	0.245	0.0385	0.196	0.343	95% KM (t) UCL	0.343	95% KM (t) UCL
NR8	Soil	Cadmium	mg/kg	10	10	100%	N/A	N/A	0.11	9.4	3.143	1.5	12.8	3.578	5.217	95% Student's-t UCL	5.217	95% Student's-t UCL
NR8	Soil	Chromium	mg/kg	11	11	100%	N/A	N/A	0.81	64.8	15.81	15.6	310.8	17.63	34.67	95% Adjusted Gamma UCL	34.67	95% Adjusted Gamma UCL
NR8	Soil	Cobalt	mg/kg	10	10	100%	N/A	N/A	0.91	35.5	12.87	8.85	110.9	10.53	18.98	95% Student's-t UCL	18.98	95% Student's-t UCL
NR8	Soil	Copper	mg/kg	11	11	100%	N/A	N/A	42.1	1,560	587.8	328	322,783	568.1	1,279	95% Adjusted Gamma UCL	1,279	95% Adjusted Gamma UCL
NR8	Soil	Cyanide	mg/kg	5	1	20%	2.6	3.2	0.3	0.3	0.3	0.3	N/A	N/A	0.3	Max Detect	0.3	Max Detect
NR8	Soil	Iron	mg/kg	68	65	96%	31.5	31.5	33.5	87,400	41,007	39,200	190,900,000	13,817	47,631	95% KM (Chebyshev) UCL	47,631	95% KM (Chebyshev) UCL
NR8	Soil	Lead	mg/kg	91	91	100%	N/A	N/A	14.5	12,300	676.1	336	2,100,003	1,449	1,338	95% Chebyshev (Mean, Sd) UCL	1,338	95% Chebyshev (Mean, Sd) UCL
NR8	Soil	Manganese	mg/kg	68	65	96%	151	151	9.2	65,500	3,532	476	127,300,000	11,284	9,222	95% KM (Chebyshev) UCL	9,222	95% KM (Chebyshev) UCL
NR8	Soil	Mercury	mg/kg	7	7	100%	N/A	N/A	0.063	10.1	1.787	0.56	13.52	3.676	10.1	Max Detect	10.1	Max Detect
NR8	Soil	Nickel	mg/kg	10	10	100%	N/A	N/A	1.1	124	20.52	10.4	1,359	36.87	58.82	95% Adjusted Gamma UCL	58.82	95% Adjusted Gamma UCL
NR8	Soil	Selenium	mg/kg	10	9	90%	3.6	3.6	0.8	14	7.822	9.1	17.67	4.204	9.788	95% KM (t) UCL	9.788	95% KM (t) UCL
NR8	Soil	Silver	mg/kg	10	8	80%	0.0067	1.2	0.28	18.9	6.785	5.05	48.3	6.95	9.412	95% KM (t) UCL	9.412	95% KM (t) UCL
NR8	Soil	Sulfate	mg/kg	4	4	100%	N/A	N/A	210	74,000	47,303	57,500	1,050,000,000	32,409	74,000	Max Detect	74,000	Max Detect
NR8	Soil	Thallium	mg/kg	10	7	70%	0.86	3.1	0.18	4.7	1.31	0.53	2.797	1.672	2.838	95% Adjusted Gamma KM-UCL	2.838	95% Adjusted Gamma KM-UCL
NR8	Soil	Vanadium	mg/kg	10	9	90%	5.4	5.4	4.3	53	31.99	37.6	296.7	17.22	39.98	95% KM (t) UCL	39.98	95% KM (t) UCL
NR8	Soil	Zinc	mg/kg	91	91	100%	N/A	N/A	40.4	14,700	953.4	581	2,829,139	1,682	1,722	95% Chebyshev (Mean, Sd) UCL	1,722	95% Chebyshev (Mean, Sd) UCL
NR9	Soil	Aluminum	mg/kg	4	4	100%	N/A	N/A	4,520	26,800	14,668	13,675	109,100,000	10,443	26,800	Max Detect	26,800	Max Detect
NR9	Soil	Antimony	mg/kg	4	4	100%	N/A	N/A	2.5	44.3	14.7	6	392.1	19.8	44.3	Max Detect	44.3	Max Detect
NR9	Soil	Arsenic	mg/kg	24	24	100%	N/A	N/A	48.9	4,140	538.9	174	968,839	984.3	1,415	95% Chebyshev (Mean, Sd) UCL	1,415	95% Chebyshev (Mean, Sd) UCL
NR9	Soil	Barium	mg/kg	4	4	100%	N/A	N/A	68.8	280	158.2	141.9	10,526	102.6	280	Max Detect	280	Max Detect
NR9	Soil	Beryllium	mg/kg	4	2	50%	0.39	0.48	0.16	0.41	0.285	0.285	0.0313	0.177	0.41	Max Detect	0.41	Max Detect
NR9	Soil	Cadmium	mg/kg	4	4	100%	N/A	N/A	0.91	6.7	3.203	2.6	6.611	2.571	6.7	Max Detect	6.7	Max Detect
NR9	Soil	Chromium	mg/kg	4	4	100%	N/A	N/A	9.2	119	49.1	34.1	2,703	51.99	119	Max Detect	119	Max Detect
NR9	Soil	Cobalt	mg/kg	4	4	100%	N/A	N/A	1.4	51.4	24	21.6	503.6	22.44	51.4	Max Detect	51.4	Max Detect
NR9	Soil	Copper	mg/kg	6	6	100%	N/A	N/A	195	1,610	538.3	357.5	280,296	529.4	1,610	Max Detect	1,610	Max Detect
NR9	Soil	Cyanide	mg/kg	2	2	100%	N/A	N/A	0.11	0.17	0.14	0.14	0.0018	0.0424	0.17	Max Detect	0.17	Max Detect
NR9	Soil	Iron	mg/kg	4	4	100%	N/A	N/A	27,000	53,800	43,200	46,000	158,300,000	12,583	53,800	Max Detect	53,800	Max Detect
NR9	Soil	Lead	mg/kg	24	24	100%	N/A	N/A	35.2	6,060	649.4	225.5	1,880,122	1,371	1,869	95% Chebyshev (Mean, Sd) UCL	1,869	95% Chebyshev (Mean, Sd) UCL
NR9	Soil	Manganese	mg/kg	4	4	100%	N/A	N/A	56.4	2,570	1,036	759.5	1,190,646	1,091	2,570	Max Detect	2,570	Max Detect
NR9	Soil	Mercury	mg/kg	2	2	100%	N/A	N/A	0.056	0.6	0.328	0.328	0.148	0.385	0.6	Max Detect	0.6	Max Detect
NR9	Soil	Nickel	mg/kg	4	4	100%	N/A	N/A	2.1	116	50.08	41.1	2,866	53.53	116	Max Detect	116	Max Detect
NR9	Soil	Selenium	mg/kg	6	4	67%	2	2.1	1.5	34.8	11.28	4.4	248.3	15.76	34.8	Max Detect	34.8	Max Detect
NR9	Soil	Silver	mg/kg	4	4	100%	N/A	N/A	0.38	36	10.7	3.2	286.5	16.93	36	Max Detect	36	Max Detect
NR9	Soil	Thallium	mg/kg	4	2	50%	1.8	2.2	0.32	2.6	1.46	1.46	2.599	1.612	2.6	Max Detect	2.6	Max Detect
NR9	Soil	Vanadium	mg/kg	4	4	100%	N/A	N/A	27.5	166	74.13	51.5	4,125	64.23	166	Max Detect	166	Max Detect
NR9	Soil	Zinc	mg/kg	24	24	100%	N/A	N/A	147	8,140	1,096	589.5	2,728,374	1,652	1,512	95% H-UCL	1,512	95% H-UCL
NR10	Soil	Aluminum	mg/kg	1	1	100%	N/A	N/A	23,900	23,900	23,900	23,900	N/A	N/A	23,900	Max Detect	23,900	Max Detect
NR10	Soil	Arsenic	mg/kg	13	13	100%	N/A	N/A	48.4	4,640	2,238	2,620	3,401,500	1,844	3,150	95% Student's-t UCL	3,150	95% Student's-t UCL
NR10	Soil	Barium	mg/kg	1	1	100%	N/A	N/A	261	261	261	261	N/A	N/A	261	Max Detect	261	Max Detect
NR10	Soil	Cadmium	mg/kg	1	1	100%	N/A	N/A	0.85	0.85	0.85	0.85	N/A	N/A	0.85	Max Detect	0.85	Max Detect
NR10	Soil	Chromium	mg/kg	1	1	100%	N/A	N/A	112	112	112	112	N/A	N/A	112	Max Detect	112	Max Detect
NR10	Soil	Cobalt	mg/kg	1	1	100%	N/A	N/A	40.7	40.7	40.7	40.7	N/A	N/A	40.7	Max Detect	40.7	Max Detect
NR10	Soil	Copper	mg/kg	1	1	100%	N/A	N/A	127	127	127	127	N/A	N/A	127	Max Detect	127	Max Detect
NR10	Soil	Iron	mg/kg	1	1	100%	N/A	N/A	42,100	42,100	42,100	42,100	N/A	N/A	42,100	Max Detect	42,100	Max Detect
NR10	Soil	Lead	mg/kg	13	13	100%	N/A	N/A	63.5	11,500	3,883	3,510	11,766,418	3,430	5,579	95% Student's-t UCL	5,579	95% Student's-t UCL
NR10	Soil	Manganese	mg/kg	1	1	100%	N/A	N/A	1,410	1,410	1,410	1,410	N/A	N/A	1,410	Max Detect	1,410	Max Detect
NR10	Soil	Mercury	mg/kg	1	1		N/A	N/A	0.084	0.084	0.084	0.084	N/A	N/A	0.084	Max Detect	0.084	Max Detect
NR10	Soil	Nickel	mg/kg	1	1	100%	N/A	N/A	85.2	85.2	85.2	85.2	N/A	N/A	85.2	Max Detect	85.2	Max Detect
NR10	Soil	Selenium	mg/kg	1	1	100%	N/A	N/A	1	1	1	1	N/A	N/A	1	Max Detect	1	Max Detect
NR10	Soil	Silver	mg/kg	1	1	100%	N/A	N/A	1.9	1.9	1.9	1.9	N/A	N/A	1.9	Max Detect	1.9	Max Detect
NR10	Soil	Thallium	mg/kg	1	1	100%	N/A	N/A	2.8	2.8	2.8	2.8	N/A	N/A	2.8	Max Detect	2.8	Max Detect
NR10	Soil	Vanadium	mg/kg	1	1	100%	N/A	N/A	108	108	108	108	N/A	N/A	108	Max Detect	108	Max Detect
NR10	Soil	Zinc	mg/kg	13	13	100%	N/A	N/A	134	7,550	2,310	1,940	3,689,980	1,921	3,886	95% Adjusted Gamma UCL	3,886	95% Adjusted Gamma UCL
NR11	Soil	Aluminum	mg/kg	76	76	100%	N/A	N/A	290	254,000	87,617	69,250	5,358,000,000	73,198	124,216	95% Chebyshev (Mean, Sd) UCL	124,216	95% Chebyshev (Mean, Sd) UCL
NR11	Soil	Antimony	mg/kg	76	51	67%	0.36	8.5	0.67	118	15.33	12.2	357.1	18.9	15.04	95% Approximate Gamma KM-UCL	15.04	95% Approximate Gamma KM-UCL

TABLE M-1  
Summary Statistics for Ecological Exposure Areas - Soil  
Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona

Exposure											Standard									
Area ID	Media	Analyte	Units	Number of Observations	Number of Detects	Percent Detected	Minimum Non Detect	Maximum Non Detect	Minimum Detect	Maximum Detect	Mean of Detects	Median of Detects	Variance of Detects	Deviation of Detects	95% UCL	95% UCL Basis		EPC	EPC Basis	
NR11	Soil	Arsenic	mg/kg	219	217	99%	18.9	20	7.7	15,100	237.8	68.8	1,096,485	1,047	542.8	95% KM (Chebyshev) UCL		542.8	95% KM (Chebyshev) UCL	
NR11	Soil	Barium	mg/kg	76	73	96%	0.41	8.6	5.6	652	246.3	209	19,126	138.3	272.3	95% GROS Approximate Gamma UCL		272.3	95% GROS Approximate Gamma UCL	
NR11	Soil	Beryllium	mg/kg	76	71	93%	0.027	0.54	0.053	60.3	7.339	4	85.14	9.227	11.41	95% KM (Chebyshev) UCL		11.41	95% KM (Chebyshev) UCL	
NR11	Soil	Cadmium	mg/kg	76	69	91%	0.19	1.1	0.19	85.7	9.704	6.6	135.8	11.65	14.56	95% KM (Chebyshev) UCL		14.56	95% KM (Chebyshev) UCL	
NR11	Soil	Chloride	mg/kg	5	4	80%	12	12	9.1	130	59.53	49.5	3,558	59.65	130	Max Detect		130	Max Detect	
NR11	Soil	Chromium	mg/kg	76	74	97%	0.75	0.78	0.67	1,790	328.1	198	140,385	374.7	587	97.5% KM (Chebyshev) UCL		587	97.5% KM (Chebyshev) UCL	
NR11	Soil	Chromium, Hexavalent	mg/kg	3	1	33%	0.79	0.8	1.7	1.7	1.7	1.7	N/A	N/A	1.7	Max Detect		1.7	Max Detect	
NR11	Soil	Cobalt	mg/kg	76	76	100%	N/A	N/A	2	46	17.68	17	65.9	8.118	19.23	95% Student's-t UCL		19.23	95% Student's-t UCL	
NR11	Soil	Copper	mg/kg	77	77	100%	N/A	N/A	43.6	28,100	4,654	3,730	21,461,319	4,633	6,955	95% Chebyshev (Mean, Sd) UCL		6,955	95% Chebyshev (Mean, Sd) UCL	
NR11	Soil	Cyanide	mg/kg	49	12	24%	0.45	4.1	0.11	1.5	0.754	0.735	0.117	0.343	0.893	95% KM (Percentile Bootstrap) UCL		0.893	95% KM (Percentile Bootstrap) UCL	
NR11	Soil	Iron	mg/kg	206	206	100%	N/A	N/A	5,150	251,000	31,175	27,400	780,600,000	27,939	39,660	95% Chebyshev (Mean, Sd) UCL		39,660	95% Chebyshev (Mean, Sd) UCL	
NR11	Soil	Lead	mg/kg	220	220	100%	N/A	N/A	11	56,600	952.8	489	15,066,054	3,882	2,093	95% Chebyshev (Mean, Sd) UCL		2,093	95% Chebyshev (Mean, Sd) UCL	
NR11	Soil	Manganese	mg/kg	206	206	100%	N/A	N/A	18.4	2,110	788.1	771	105,326	324.5	886.6	95% Chebyshev (Mean, Sd) UCL		886.6	95% Chebyshev (Mean, Sd) UCL	
NR11	Soil	Mercury	mg/kg	76	64	84%	0.0064	0.12	0.068	8.1	0.791	0.315	2.113	1.454	1.351	95% KM (Chebyshev) UCL		1.351	95% KM (Chebyshev) UCL	
NR11	Soil	Nickel	mg/kg	76	76	100%	N/A	N/A	0.47	1,240	229.6	141.5	60,121	245.2	285.6	95% Approximate Gamma UCL		285.6	95% Approximate Gamma UCL	
NR11	Soil	Nitrate as N	mg/kg	11	11	100%	N/A	N/A	0.85	81	25.46	13	688.1	26.23	56.33	95% Adjusted Gamma UCL		56.33	95% Adjusted Gamma UCL	
NR11	Soil	Selenium	mg/kg	77	71	92%	0.15	4.7	0.37	22.4	6.481	4.4	31.36	5.6	8.862	95% KM (Chebyshev) UCL		8.862	95% KM (Chebyshev) UCL	
NR11	Soil	Silver	mg/kg	76	69	91%	0.0034	1.1	0.073	397	13.33	6	2,242	47.35	34.75	95% KM (Chebyshev) UCL		34.75	95% KM (Chebyshev) UCL	
NR11	Soil	Sulfate	mg/kg	13	13	100%	N/A	N/A	30	580	188.8	150	22,605	150.3	263.2	95% Student's-t UCL		263.2	95% Student's-t UCL	
NR11	Soil	Thallium	mg/kg	76	17	22%	0.0042	6.3	0.29	3.8	1.571	1.2	1.418	1.191	0.74	95% Approximate Gamma KM-UCL		0.74	95% Approximate Gamma KM-UCL	
NR11	Soil	Vanadium	mg/kg	76	73	96%	0.13	5.4	1.4	89.9	43.67	45.1	336.8	18.35	45.77	95% KM (t) UCL		45.77	95% KM (t) UCL	
NR11	Soil	Zinc	mg/kg	220	220	100%	N/A	N/A	47.5	17,600	2,464	2,140	4,495,138	2,120	2,711	95% Approximate Gamma UCL		2,711	95% Approximate Gamma UCL	
NR11	Soil	4,4'-DDE	mg/kg	4	1	25%	0.0036	0.0045	0.0097	0.0097	0.0097	0.0097	N/A	N/A	0.0097	Max Detect		0.0097	Max Detect	
NR11	Soil	4,4'-DDT	mg/kg	4	1	25%	0.0036	0.0045	0.0024	0.0024	0.0024	0.0024	N/A	N/A	0.0024	Max Detect		0.0024	Max Detect	
NR11	Soil	Acenaphthene	mg/kg	9	1	11%	0.18	0.45	0.08	0.08	0.08	0.08	N/A	N/A	N/A	N/A		0.08	Max Detect	
NR11	Soil	Acetophenone	mg/kg	9	3	33%	0.19	0.45	0.021	0.14	0.061	0.022	0.00468	0.0684	0.134	95% KM (t) UCL		0.134	95% KM (t) UCL	
NR11	Soil	Anthracene	mg/kg	9	1	11%	0.18	0.45	0.18	0.18	0.18	0.18	N/A	N/A	N/A	N/A		0.18	Max Detect	
NR11	Soil	Aroclor-1248	mg/kg	4	1	25%	0.035	0.045	0.97	0.97	0.97	0.97	N/A	N/A	0.97	Max Detect		0.97	Max Detect	
NR11	Soil	Aroclor-1254	mg/kg	4	1	25%	0.035	0.045	0.076	0.076	0.076	0.076	N/A	N/A	0.076	Max Detect		0.076	Max Detect	
NR11	Soil	Aroclor-1260	mg/kg	4	2	50%	0.035	0.045	0.026	0.03	0.028	0.028	8.00E-06	0.00283	0.03	Max Detect		0.03	Max Detect	
NR11	Soil	Benzo[a]anthracene	mg/kg	9	1	11%	0.18	0.45	0.71	0.71	0.71	0.71	N/A	N/A	N/A	N/A		0.71	Max Detect	
NR11	Soil	Benzo[a]pyrene	mg/kg	9	1	11%	0.18	0.45	0.54	0.54	0.54	0.54	N/A	N/A	N/A	N/A		0.54	Max Detect	
NR11	Soil	Benzo[b]fluoranthene	mg/kg	9	1	11%	0.18	0.45	0.72	0.72	0.72	0.72	N/A	N/A	N/A	N/A		0.72	Max Detect	
NR11	Soil	Benzo[g,h,i]perylene	mg/kg	9	1	11%	0.18	0.45	0.16	0.16	0.16	0.16	N/A	N/A	N/A	N/A		0.16	Max Detect	
NR11	Soil	Benzo[k]fluoranthene	mg/kg	9	1	11%	0.18	0.45	0.45	0.45	0.45	0.45	N/A	N/A	N/A	N/A		0.45	Max Detect	
NR11	Soil	bis(2-Ethylhexyl)phthalate	mg/kg	9	6	67%	0.19	0.45	0.025	0.083	0.0443	0.0425	4.29E-04	0.0207	0.0601	95% KM (t) UCL		0.0601	95% KM (t) UCL	
NR11	Soil	Carbazole	mg/kg	9	1	11%	0.18	0.45	0.1	0.1	0.1	0.1	N/A	N/A	N/A	N/A		0.1	Max Detect	
NR11	Soil	Chrysene	mg/kg	9	1	11%	0.18	0.45	0.72	0.72	0.72	0.72	N/A	N/A	N/A	N/A		0.72	Max Detect	
NR11	Soil	Delta-BHC	mg/kg	4	1	25%	0.0018	0.0023	0.017	0.017	0.017	0.017	N/A	N/A	0.017	Max Detect		0.017	Max Detect	
NR11	Soil	Dibenzo[a,h]anthracene	mg/kg	9	1	11%	0.18	0.45	0.11	0.11	0.11	0.11	N/A	N/A	N/A	N/A		0.11	Max Detect	
NR11	Soil	Dieldrin	mg/kg	4	1	25%	0.0036	0.0045	0.0023	0.0023	0.0023	0.0023	N/A	N/A	0.0023	Max Detect		0.0023	Max Detect	
NR11	Soil	Di-n-butyl phthalate	mg/kg	9	1	11%	0.18	0.45	0.065	0.065	0.065	0.065	N/A	N/A	N/A	N/A		0.065	Max Detect	
NR11	Soil	Endosulfan I	mg/kg	4	1	25%	0.0018	0.0023	0.002	0.002	0.002	0.002	N/A	N/A	0.002	Max Detect		0.002	Max Detect	
NR11	Soil	Fluoranthene	mg/kg	9	1	11%	0.18	0.45	1.3	1.3	1.3	1.3	N/A	N/A	N/A	N/A		1.3	Max Detect	
NR11	Soil	Heptachlor	mg/kg	4	1	25%	0.0018	0.0023	0.0073	0.0073	0.0073	0.0073	N/A	N/A	0.0073	Max Detect		0.0073	Max Detect	
NR11	Soil	Heptachlor Epoxide	mg/kg	4	1	25%	0.0018	0.0023	0.025	0.025	0.025	0.025	N/A	N/A	0.025	Max Detect		0.025	Max Detect	
NR11	Soil	Indeno[1,2,3-cd]pyrene	mg/kg	9	1	11%	0.18	0.45	0.5	0.5	0.5	0.5	N/A	N/A	N/A	N/A		0.5	Max Detect	
NR11	Soil	Phenanthrene	mg/kg	9	1	11%	0.18	0.45	0.7	0.7	0.7	0.7	N/A	N/A	N/A	N/A		0.7	Max Detect	
NR11	Soil	Pyrene	mg/kg	9	1	11%	0.18	0.45	1.1	1.1	1.1	1.1	N/A	N/A	N/A	N/A		1.1	Max Detect	
NR11	Soil	1,2,3,4,6,7,8-Hepta CDD	mg/kg	16	12	75%	3.60E-07	2.70E-06	1.30E-05	0.00182	5.85E-04	5.25E-04	3.01E-07	5.48E-04	0.0006772	95% KM (t) UCL		0.0006772	95% KM (t) UCL	
NR11	Soil	1,2,3,4,6,7,8-Hepta CDF	mg/kg	16	13	81%	3.20E-07	2.00E-06	3.90E-06	0.00692	0.00172	0.0017	3.63E-06	0.0019	0.00221	95% KM (t) UCL		0.00222		

TABLE M-1  
Summary Statistics for Ecological Exposure Areas - Soil  
Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona

Exposure			Standard															
Area ID	Media	Analyte	Units	Number of Observations	Number of Detects	Percent Detected	Minimum Non Detect	Maximum Non Detect	Minimum Detect	Maximum Detect	Mean of Detects	Median of Detects	Variance of Detects	Deviation of Detects	95% UCL	95% UCL Basis	EPC	EPC Basis
NR11	Soil	2,3,4,6,7,8-Hexa CDF	mg/kg	16	12	75%	1.80E-07	7.40E-07	5.10E-06	0.0014	3.90E-04	3.85E-04	1.56E-07	3.95E-04	0.00046143	95% KM (t) UCL	0.00046143	95% KM (t) UCL
NR11	Soil	2,3,4,7,8-Penta CDF	mg/kg	16	12	75%	1.70E-07	4.70E-07	2.80E-06	7.71E-04	1.94E-04	1.80E-04	4.44E-08	2.11E-04	0.0002346	95% KM (t) UCL	0.0002346	95% KM (t) UCL
NR11	Soil	2,3,7,8-Tetra CDD	mg/kg	16	10	63%	5.70E-08	2.80E-07	1.00E-06	2.59E-05	7.08E-06	5.55E-06	5.27E-11	7.26E-06	7.4828E-06	95% KM (Percentile Bootstrap) UCL	7.4828E-06	95% KM (Percentile Bootstrap) UCL
NR11	Soil	2,3,7,8-Tetra CDF	mg/kg	16	12	75%	1.70E-07	7.90E-07	1.40E-06	3.94E-04	8.23E-05	6.20E-05	1.11E-08	1.06E-04	0.00872	95% GROS Adjusted Gamma UCL	0.000394	Max Detect
NR11	Soil	OCDD	mg/kg	16	14	88%	1.80E-06	2.10E-06	6.80E-06	0.0093	0.00272	0.00123	1.07E-05	0.00327	0.00378	95% KM (t) UCL	0.00378	95% KM (t) UCL
NR11	Soil	OCDF	mg/kg	16	13	81%	7.00E-07	2.40E-06	5.70E-06	0.012	0.00246	0.0013	1.14E-05	0.00338	0.0034	95% KM (t) UCL	0.0034	95% KM (t) UCL
NR11	Soil	TEQBird	mg/kg	16	14	88%	6.50E-08	2.80E-07	7.40E-10	0.00206	4.00E-04	3.24E-04	2.87E-07	5.36E-04	0.0055	95% GROS Adjusted Gamma UCL	0.00206	Max Detect
NR11	Soil	TEQMammal	mg/kg	16	14	88%	6.50E-08	2.80E-07	2.22E-09	0.00116	2.23E-04	1.70E-04	9.10E-08	3.02E-04	0.00525	95% GROS Adjusted Gamma UCL	0.00116	Max Detect
NR12	Soil	Aluminum	mg/kg	40	40	100%	N/A	N/A	6,290	181,000	38,622	26,700	1,639,000,000	40,486	66,525	95% Chebyshev (Mean, Sd) UCL	66,525	95% Chebyshev (Mean, Sd) UCL
NR12	Soil	Antimony	mg/kg	40	34	85%	0.03	8	0.62	125	9.195	2.8	455	21.33	21.7	95% KM (Chebyshev) UCL	21.7	95% KM (Chebyshev) UCL
NR12	Soil	Arsenic	mg/kg	118	118	100%	N/A	N/A	13	20,200	478.1	138	3,990,350	1,998	1,280	95% Chebyshev (Mean, Sd) UCL	1,280	95% Chebyshev (Mean, Sd) UCL
NR12	Soil	Barium	mg/kg	40	40	100%	N/A	N/A	52.4	1,540	528.7	441.5	125,525	354.3	623.1	95% Student's-t UCL	623.1	95% Student's-t UCL
NR12	Soil	Beryllium	mg/kg	40	32	80%	0.026	0.56	0.11	7.8	1.602	0.87	3.68	1.918	2.564	95% KM (Chebyshev) UCL	2.564	95% KM (Chebyshev) UCL
NR12	Soil	Cadmium	mg/kg	40	38	95%	0.018	0.018	0.41	41.4	8.664	4.9	112.1	10.59	15.47	95% KM (Chebyshev) UCL	15.47	95% KM (Chebyshev) UCL
NR12	Soil	Chromium	mg/kg	40	40	100%	N/A	N/A	3	807	98.31	45.6	29,919	173	217.5	95% Chebyshev (Mean, Sd) UCL	217.5	95% Chebyshev (Mean, Sd) UCL
NR12	Soil	Chromium, Hexavalent	mg/kg	1	1	100%	N/A	N/A	18	18	18	18	N/A	N/A	18	Max Detect	18	Max Detect
NR12	Soil	Cobalt	mg/kg	40	39	98%	6.3	6.3	2.2	59.2	20.24	19.8	135.7	11.65	23.01	95% KM (Percentile Bootstrap) UCL	23.01	95% KM (Percentile Bootstrap) UCL
NR12	Soil	Copper	mg/kg	42	42	100%	N/A	N/A	104	14,200	2,116	1,100	10,713,689	3,273	4,318	95% Chebyshev (Mean, Sd) UCL	4,318	95% Chebyshev (Mean, Sd) UCL
NR12	Soil	Cyanide	mg/kg	29	17	59%	2.5	3.3	0.1	0.85	0.229	0.15	0.0377	0.194	0.309	95% KM (t) UCL	0.309	95% KM (t) UCL
NR12	Soil	Iron	mg/kg	103	102	99%	31.5	31.5	55.1	238,000	35,045	32,150	771,200,000	27,771	51,843	97.5% KM (Chebyshev) UCL	51,843	97.5% KM (Chebyshev) UCL
NR12	Soil	Lead	mg/kg	118	118	100%	N/A	N/A	14.5	13,100	797.1	313	2,971,413	1,724	1,029	95% H-UCL	1,029	95% H-UCL
NR12	Soil	Manganese	mg/kg	103	103	100%	N/A	N/A	101	46,000	3,032	838	63,611,264	7,976	6,458	95% Chebyshev (Mean, Sd) UCL	6,458	95% Chebyshev (Mean, Sd) UCL
NR12	Soil	Mercury	mg/kg	40	39	98%	0.1	0.1	0.046	7	1.083	0.4	2.909	1.706	2.223	95% KM (Chebyshev) UCL	2.223	95% KM (Chebyshev) UCL
NR12	Soil	Nickel	mg/kg	40	40	100%	N/A	N/A	1.5	803	118.5	88.1	22,035	148.4	161.5	95% Adjusted Gamma UCL	161.5	95% Adjusted Gamma UCL
NR12	Soil	Nitrate as N	mg/kg	1	1	100%	N/A	N/A	28	28	28	28	N/A	N/A	28	Max Detect	28	Max Detect
NR12	Soil	Selenium	mg/kg	42	38	90%	2	3.8	0.56	35.7	3.561	2.15	33.23	5.765	7.081	95% KM (Chebyshev) UCL	7.081	95% KM (Chebyshev) UCL
NR12	Soil	Silver	mg/kg	40	37	93%	6.00E-04	1.1	0.37	41	6.639	2.8	118.4	10.88	13.47	95% KM (Chebyshev) UCL	13.47	95% KM (Chebyshev) UCL
NR12	Soil	Sulfate	mg/kg	1	1	100%	N/A	N/A	300	300	300	300	N/A	N/A	300	Max Detect	300	Max Detect
NR12	Soil	Thallium	mg/kg	40	17	43%	0.0042	2.9	0.5	9.2	1.779	1.2	4.287	2.07	1.586	95% Adjusted Gamma KM-UCL	1.586	95% Adjusted Gamma KM-UCL
NR12	Soil	Vanadium	mg/kg	40	40	100%	N/A	N/A	3.5	108	55.39	52.1	643.8	25.37	62.15	95% Student's-t UCL	62.15	95% Student's-t UCL
NR12	Soil	Zinc	mg/kg	118	118	100%	N/A	N/A	89.5	58,900	2,329	767	39,544,522	6,288	2,733	95% H-UCL	2,733	95% H-UCL
NR12	Soil	1,2,3,4,6,7,8-Hepta CDD	mg/kg	3	1	33%	6.30E-07	9.90E-07	3.20E-04	0.00032	3.20E-04	3.20E-04	N/A	N/A	N/A	N/A	3.20E-04	Max Detect
NR12	Soil	1,2,3,4,6,7,8-Hepta CDF	mg/kg	3	1	33%	5.40E-07	1.80E-06	0.0015	0.0015	0.0015	0.0015	N/A	N/A	N/A	N/A	0.0015	Max Detect
NR12	Soil	1,2,3,4,7,8,9-Hepta CDF	mg/kg	3	1	33%	2.20E-07	2.80E-07	1.90E-04	0.00019	1.90E-04	1.90E-04	N/A	N/A	N/A	N/A	0.00019	Max Detect
NR12	Soil	1,2,3,4,7,8-Hexa CDD	mg/kg	3	1	33%	8.10E-08	1.50E-07	1.20E-05	0.000012	1.20E-05	1.20E-05	N/A	N/A	N/A	N/A	0.000012	Max Detect
NR12	Soil	1,2,3,4,7,8-Hexa CDF	mg/kg	3	1	33%	2.60E-07	6.80E-07	7.70E-04	0.00077	7.70E-04	N/A	N/A	N/A	N/A	N/A	0.00077	Max Detect
NR12	Soil	1,2,3,6,7,8-Hexa CDD	mg/kg	3	1	33%	1.10E-07	1.60E-07	2.40E-05	0.000024	2.40E-05	2.40E-05	N/A	N/A	N/A	N/A	0.000024	Max Detect
NR12	Soil	1,2,3,6,7,8-Hexa CDF	mg/kg	3	1	33%	1.00E-07	2.70E-07	2.20E-04	0.00022	2.20E-04	2.20E-04	N/A	N/A	N/A	N/A	0.00022	Max Detect
NR12	Soil	1,2,3,7,8,9-Hexa CDD	mg/kg	3	1	33%	1.40E-07	1.70E-07	2.80E-05	0.000028	2.80E-05	2.80E-05	N/A	N/A	N/A	N/A	0.000028	Max Detect
NR12	Soil	1,2,3,7,8,9-Hexa CDF	mg/kg	3	1	33%	9.10E-08	1.10E-07	1.00E-05	0.00001	1.00E-05	1.00E-05	N/A	N/A	N/A	N/A	0.00001	Max Detect
NR12	Soil	1,2,3,7,8-Penta CDD	mg/kg	3	1	33%	1.10E-07	1.50E-07	8.10E-06	0.0000081	8.10E-06	8.10E-06	N/A	N/A	N/A	N/A	0.0000081	Max Detect
NR12	Soil	1,2,3,7,8-Penta CDF	mg/kg	3	1	33%	9.10E-08	9.90E-08	9.60E-05	0.000096	9.60E-05	9.60E-05	N/A	N/A	N/A	N/A	0.000096	Max Detect
NR12	Soil	2,3,4,6,7,8-Hexa CDF	mg/kg	3	1	33%	1.70E-07	2.40E-07	1.80E-04	0.00018	1.80E-04	1.80E-04	N/A	N/A	N/A	N/A	0.00018	Max Detect
NR12	Soil	2,3,4,7,8-Penta CDF	mg/kg	3	1	33%	9.90E-08	2.30E-07	1.70E-04	0.00017	1.70E-04	1.70E-04	N/A	N/A	N/A	N/A	0.00017	Max Detect
NR12	Soil	2,3,7,8-Tetra CDD	mg/kg	3	1	33%	8.20E-08	1.00E-07	2.20E-06	0.0000022	2.20E-06	2.20E-06	N/A	N/A	N/A	N/A	0.0000022	Max Detect
NR12	Soil	2,3,7,8-Tetra CDF	mg/kg	3	1	33%	2.20E-07	5.30E-07	1.40E-04	0.00014	1.40E-04	1.40E-04	N/A	N/A	N/A	N/A	0.00014	Max Detect
NR12	Soil	OCDD	mg/kg	3	1	33%	3.90E-06	5.30E-06	0.0017	0.0017	0.0017	0.0017	N/A	N/A	N/A	N/A	0.0017	Max Detect
NR12	Soil	OCDF	mg/kg	3	1	33%	1.30E-06	2.90E-06	0.0023	0.0023	0.0023	0.0023	N/A	N/A	N/A	N/A	0.0023	Max Detect
NR12	Soil	TEQBird	mg/kg	3	1	33%	8.20E-08	1.00E-07	4.69E-04	4.69								



TABLE M-1  
Summary Statistics for Ecological Exposure Areas - Soil  
Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona

Exposure											Standard								
Area ID	Media	Analyte	Units	Number of Observations	Number of Detects	Percent Detected	Minimum Non Detect	Maximum Non Detect	Minimum Detect	Maximum Detect	Mean of Detects	Median of Detects	Variance of Detects	Deviation of Detects	95% UCL	95% UCL Basis		EPC	EPC Basis
NR13	Soil	Lead	mg/kg	11	11	100%	N/A	N/A	24.9	424	203	185	21,317	146	282.8	95% Student's-t UCL		282.8	95% Student's-t UCL
NR13	Soil	Manganese	mg/kg	1	1	100%	N/A	N/A	1,090	1,090	1,090	1,090	N/A	N/A	1,090	Max Detect		1,090	Max Detect
NR13	Soil	Nickel	mg/kg	1	1	100%	N/A	N/A	116	116	116	116	N/A	N/A	116	Max Detect		116	Max Detect
NR13	Soil	Selenium	mg/kg	1	1	100%	N/A	N/A	4.9	4.9	4.9	4.9	N/A	N/A	4.9	Max Detect		4.9	Max Detect
NR13	Soil	Silver	mg/kg	1	1	100%	N/A	N/A	4.9	4.9	4.9	4.9	N/A	N/A	4.9	Max Detect		4.9	Max Detect
NR13	Soil	Vanadium	mg/kg	1	1	100%	N/A	N/A	52.8	52.8	52.8	52.8	N/A	N/A	52.8	Max Detect		52.8	Max Detect
NR13	Soil	Zinc	mg/kg	11	11	100%	N/A	N/A	61.4	568	286	317	31,065	176.3	382.4	95% Student's-t UCL		382.4	95% Student's-t UCL
NR14	Soil	Aluminum	mg/kg	4	4	100%	N/A	N/A	15,400	36,000	24,450	23,200	78,416,667	8,855	36,000	Max Detect		36,000	Max Detect
NR14	Soil	Antimony	mg/kg	5	4	80%	0.3	0.3	1.8	43.9	13.05	3.25	423.8	20.59	43.9	Max Detect		43.9	Max Detect
NR14	Soil	Arsenic	mg/kg	61	61	100%	N/A	N/A	13.2	3,810	371.7	156	456,473	675.6	516.8	95% H-UCL		516.8	95% H-UCL
NR14	Soil	Barium	mg/kg	5	5	100%	N/A	N/A	54.7	122	94.72	103	624.4	24.99	122	Max Detect		122	Max Detect
NR14	Soil	Beryllium	mg/kg	4	3	75%	0.05	0.05	0.089	0.39	0.246	0.26	0.0228	0.151	0.39	Max Detect		0.39	Max Detect
NR14	Soil	Cadmium	mg/kg	5	4	80%	0.029	0.029	0.95	6.7	3.888	3.95	6.557	2.561	6.7	Max Detect		6.7	Max Detect
NR14	Soil	Chromium	mg/kg	6	6	100%	N/A	N/A	15.1	97.7	36.73	19.75	1,079	32.84	97.7	Max Detect		97.7	Max Detect
NR14	Soil	Cobalt	mg/kg	4	4	100%	N/A	N/A	6.9	27.2	17.65	18.25	79.04	8.891	27.2	Max Detect		27.2	Max Detect
NR14	Soil	Copper	mg/kg	6	6	100%	N/A	N/A	59.5	147	106.3	107.7	1,403	37.45	147	Max Detect		147	Max Detect
NR14	Soil	Cyanide	mg/kg	2	1	50%	2.8	2.8	0.09	0.09	0.09	0.09	N/A	N/A	0.09	Max Detect		0.09	Max Detect
NR14	Soil	Iron	mg/kg	41	41	100%	N/A	N/A	29,300	103,000	62,534	61,600	203,400,000	14,261	66,284	95% Student's-t UCL		66,284	95% Student's-t UCL
NR14	Soil	Lead	mg/kg	61	61	100%	N/A	N/A	8.17	13,400	632.4	86.6	3,995,915	1,999	1,748	95% Chebyshev (Mean, Sd) UCL		1,748	95% Chebyshev (Mean, Sd) UCL
NR14	Soil	Manganese	mg/kg	41	41	100%	N/A	N/A	123	1,800	994.2	958	126,497	355.7	1,088	95% Student's-t UCL		1,088	95% Student's-t UCL
NR14	Soil	Mercury	mg/kg	5	5	100%	N/A	N/A	0.14	0.85	0.54	0.72	0.103	0.321	0.85	Max Detect		0.85	Max Detect
NR14	Soil	Nickel	mg/kg	4	4	100%	N/A	N/A	9.3	35.9	21.58	20.55	168.1	12.96	35.9	Max Detect		35.9	Max Detect
NR14	Soil	Nitrate as N	mg/kg	1	1	100%	N/A	N/A	4	4	4	4	N/A	N/A	4	Max Detect		4	Max Detect
NR14	Soil	Selenium	mg/kg	5	4	80%	0.13	0.13	4	17.6	8.6	6.4	37.31	6.108	17.6	Max Detect		17.6	Max Detect
NR14	Soil	Silver	mg/kg	5	4	80%	0.0057	0.0057	2.6	4.9	3.8	3.85	1.367	1.169	4.9	Max Detect		4.9	Max Detect
NR14	Soil	Sulfate	mg/kg	1	1	100%	N/A	N/A	2,700	2,700	2,700	2,700	N/A	N/A	2,700	Max Detect		2,700	Max Detect
NR14	Soil	Thallium	mg/kg	5	4	80%	0.021	0.021	0.4	9.5	3.088	1.225	18.83	4.339	9.5	Max Detect		9.5	Max Detect
NR14	Soil	Vanadium	mg/kg	4	4	100%	N/A	N/A	71.3	171	112.1	103.1	2,085	45.66	171	Max Detect		171	Max Detect
NR14	Soil	Zinc	mg/kg	59	59	100%	N/A	N/A	61.8	2,370	652	401	421,667	649.4	892.8	95% H-UCL		892.8	95% H-UCL
NR15	Soil	Aluminum	mg/kg	7	7	100%	N/A	N/A	17,600	21,300	19,871	20,600	2,112,381	1,453	21,300	Max Detect		21,300	Max Detect
NR15	Soil	Antimony	mg/kg	15	3	20%	5	6.8	0.81	1.6	1.123	0.96	0.176	0.42	1.55	95% KM (t) UCL		1.55	95% KM (t) UCL
NR15	Soil	Arsenic	mg/kg	26	26	100%	N/A	N/A	15	110	31.47	24.8	516.8	22.73	39.51	or 95% Modified-t UCL		39.51	or 95% Modified-t UCL
NR15	Soil	Barium	mg/kg	8	8	100%	N/A	N/A	128	226	184.9	186	924.7	30.41	205.2	95% Student's-t UCL		205.2	95% Student's-t UCL
NR15	Soil	Beryllium	mg/kg	14	7	50%	1	1	0.43	0.62	0.51	0.52	0.0044	0.0663	0.554	95% KM (t) UCL		0.554	95% KM (t) UCL
NR15	Soil	Cadmium	mg/kg	15	4	27%	0.54	1	0.37	2.7	1.658	1.78	1.373	1.172	1.18	95% KM (t) UCL		1.18	95% KM (t) UCL
NR15	Soil	Chromium	mg/kg	15	15	100%	N/A	N/A	9.8	19.2	14.5	14	5.533	2.352	15.57	95% Student's-t UCL		15.57	95% Student's-t UCL
NR15	Soil	Cobalt	mg/kg	7	7	100%	N/A	N/A	14.8	24.3	19.2	19.2	12.67	3.559	24.3	Max Detect		24.3	Max Detect
NR15	Soil	Copper	mg/kg	15	15	100%	N/A	N/A	32.2	68.4	48.83	49	152.8	12.36	54.45	95% Student's-t UCL		54.45	95% Student's-t UCL
NR15	Soil	Cyanide	mg/kg	8	1	13%	2.6	2.8	0.06	0.06	0.06	0.06	N/A	N/A	N/A	N/A		0.06	Max Detect
NR15	Soil	Iron	mg/kg	8	8	100%	N/A	N/A	33,800	36,600	34,975	34,800	1,467,857	1,212	35,787	95% Student's-t UCL		35,787	95% Student's-t UCL
NR15	Soil	Lead	mg/kg	26	19	73%	5	5	5.3	86.6	29.34	19.6	591	24.31	44.65	95% GROS Adjusted Gamma UCL		44.65	95% GROS Adjusted Gamma UCL
NR15	Soil	Manganese	mg/kg	7	7	100%	N/A	N/A	727	1,170	934.3	969	23,329	152.7	1,170	Max Detect		1,170	Max Detect
NR15	Soil	Mercury	mg/kg	26	3	12%	0.036	0.1	0.035	0.17	0.101	0.097	0.00457	0.0676	0.0543	95% KM (t) UCL		0.0543	95% KM (t) UCL
NR15	Soil	Nickel	mg/kg	14	14	100%	N/A	N/A	12	21.3	14.82	14.4	6.476	2.545	16.03	95% Student's-t UCL		16.03	95% Student's-t UCL
NR15	Soil	Nitrate as N	mg/kg	1	1	100%	N/A	N/A	2	2	2	2	N/A	N/A	2	Max Detect		2	Max Detect
NR15	Soil	Selenium	mg/kg	15	6	40%	3.6	5	0.41	1.1	0.618	0.535	0.0671	0.259	0.805	95% KM (t) UCL		0.805	95% KM (t) UCL
NR15	Soil	Silver	mg/kg	15	6	40%	1	5	0.12	1.4	0.963	1.2	0.258	0.508	1.2	95% KM (Percentile Bootstrap) UCL		1.2	95% KM (Percentile Bootstrap) UCL
NR15	Soil	Sulfate	mg/kg	1	1	100%	N/A	N/A	100	100	100	100	N/A	N/A	100	Max Detect		100	Max Detect
NR15	Soil	Thallium	mg/kg	15	1	7%	0.73	5	2.9	2.9	2.9	2.9	N/A	N/A	N/A	N/A		2.9	Max Detect
NR15	Soil	Vanadium	mg/kg	7	7	100%	N/A	N/A	61.4	68.5	65.44	65	8.61	2.934	68.5	Max Detect		68.5	Max Detect
NR15	Soil	Zinc	mg/kg	15	15	100%	N/A	N/A	58	321	110.7	89	4,365	66.06	144.2	95% Adjusted Gamma UCL		144.2	95% Adjusted Gamma UCL
NR16	Soil	Aluminum	mg/kg	30	30	100%	N/A	N/A	736	45,300	15,154	14,300	53,317,221	7,302	20,965	95% Chebyshev (Mean, Sd) UCL		20,965	95% Chebyshev (Mean, Sd) UCL
NR16	Soil	Antimony	mg/kg	38	24	63%	0.84	6.9	1.1	125	26.79	4.85	1,611	40.13	72.82	99% KM (Chebyshev) UCL		72.82	99% KM (Chebyshev) UCL
NR16	Soil	Arsenic	mg/kg	86	86	100%	N/A	N/A	12.7	4,730	654.1	314.5	850,508	922.2	1,143	95% H-UCL		1,143	95% H-UCL
NR16	Soil	Barium	mg/kg	40	39	98%	0.021	0.021	17.6	342	116.2	101	5,210	72.18	132.9	95% KM (t) UCL		132.9	95% KM (t) UCL
NR16	Soil	Beryllium	mg/kg	30	16	53%	0.027	0.61	0.038	0.55	0.286	0.305	0.0229	0.151	0.247	95% KM (t) UCL		0.247	95% KM (t) UCL
NR16	Soil	Cadmium	mg/kg	40	36	90%	0.016	0.19	0.31	37.3	7.876	4.35	74.11	8.609	12.95	95% KM (Chebyshev) UCL		12.95	95% KM (Chebyshev) UCL
NR16	Soil	Chromium	mg/kg	40	40	100%	N/A	N/A	1.7	99.9	19.55	14.75							



TABLE M-1  
Summary Statistics for Ecological Exposure Areas - Soil  
Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona

Exposure											Standard									
Area ID	Media	Analyte	Units	Number of Observations	Number of Detects	Percent Detected	Minimum Non Detect	Maximum Non Detect	Minimum Detect	Maximum Detect	Mean of Detects	Median of Detects	Variance of Detects	Deviation of Detects	95% UCL	95% UCL Basis	EPC	EPC Basis		
NR16	Soil	Cyanide	mg/kg	33	10	30%	0.04	3	0.05	7.4	0.974	0.095	5.324	2.307	2.081	97.5% KM (Chebyshev) UCL	2.081	97.5% KM (Chebyshev) UCL		
NR16	Soil	Iron	mg/kg	83	83	100%	N/A	N/A	18,800	121,000	50,594	47,100	447,000,000	21,143	54,455	95% Student's-t UCL	54,455	95% Student's-t UCL		
NR16	Soil	Lead	mg/kg	86	83	97%	7	7	3.3	65,700	3,255	718	70,860,359	8,418	8,726	97.5% KM (Chebyshev) UCL	8,726	97.5% KM (Chebyshev) UCL		
NR16	Soil	Manganese	mg/kg	73	73	100%	N/A	N/A	18.8	7,880	827.9	749	784,903	885.9	1,280	95% Chebyshev (Mean, Sd) UCL	1,280	95% Chebyshev (Mean, Sd) UCL		
NR16	Soil	Mercury	mg/kg	40	39	98%	0.06	0.06	0.038	63.9	7.219	1.3	176.7	13.29	20.05	97.5% KM (Chebyshev) UCL	20.05	97.5% KM (Chebyshev) UCL		
NR16	Soil	Nickel	mg/kg	30	29	97%	4.9	4.9	5.1	32.7	13.43	12.3	30.25	5.5	15.17	95% GROS Adjusted Gamma UCL	15.17	95% GROS Adjusted Gamma UCL		
NR16	Soil	Nitrate as N	mg/kg	15	12	80%	0.9	1.2	0.6	12	3.088	2	10.31	3.211	5.888	95% GROS Adjusted Gamma UCL	5.888	95% GROS Adjusted Gamma UCL		
NR16	Soil	Selenium	mg/kg	40	37	93%	0.52	3.8	0.59	61.8	13.51	5.1	301.4	17.36	24.31	95% KM (Chebyshev) UCL	24.31	95% KM (Chebyshev) UCL		
NR16	Soil	Silver	mg/kg	40	37	93%	0.0032	1.1	0.42	102	14.38	3.4	578.5	24.05	29.47	95% KM (Chebyshev) UCL	29.47	95% KM (Chebyshev) UCL		
NR16	Soil	Sulfate	mg/kg	16	16	100%	N/A	N/A	900	42,000	11,538	10,050	131,500,000	11,469	16,564	95% Student's-t UCL	16,564	95% Student's-t UCL		
NR16	Soil	Thallium	mg/kg	40	22	55%	0.021	3	0.28	4.4	2.402	2.3	1.297	1.139	1.978	95% KM (t) UCL	1.978	95% KM (t) UCL		
NR16	Soil	Vanadium	mg/kg	30	30	100%	N/A	N/A	23.7	125	61.21	57.85	463.7	21.53	67.89	95% Student's-t UCL	67.89	95% Student's-t UCL		
NR16	Soil	Zinc	mg/kg	86	86	100%	N/A	N/A	70.8	10,400	1,819	1,215	3,815,196	1,953	2,737	95% Chebyshev (Mean, Sd) UCL	2,737	95% Chebyshev (Mean, Sd) UCL		
NR16	Soil	4,4'-DDD	mg/kg	7	2	29%	0.0035	0.0038	0.0033	0.0049	0.0041	0.0041	1.28E-06	0.00113	0.0049	Max Detect	0.0049	Max Detect		
NR16	Soil	4,4'-DDE	mg/kg	7	1	14%	0.0035	0.0038	0.0049	0.0049	0.0049	0.0049	N/A	N/A	0.0049	Max Detect	0.0049	Max Detect		
NR16	Soil	4,4'-DDT	mg/kg	7	2	29%	0.0035	0.0038	0.0023	0.0034	0.00285	0.00285	6.05E-07	7.78E-04	0.0034	Max Detect	0.0034	Max Detect		
NR16	Soil	4-Chloroaniline	mg/kg	7	1	14%	0.18	0.2	0.043	0.043	0.043	0.043	N/A	N/A	0.043	Max Detect	0.043	Max Detect		
NR16	Soil	Acetophenone	mg/kg	7	3	43%	0.18	0.19	0.026	0.04	0.0333	0.034	4.93E-05	0.00702	0.04	Max Detect	0.04	Max Detect		
NR16	Soil	Alpha-Chlordane	mg/kg	7	1	14%	0.0018	0.002	0.0044	0.0044	0.0044	0.0044	N/A	N/A	0.0044	Max Detect	0.0044	Max Detect		
NR16	Soil	Aroclor-1242	mg/kg	7	1	14%	0.035	0.038	0.17	0.17	0.17	0.17	N/A	N/A	0.17	Max Detect	0.17	Max Detect		
NR16	Soil	Aroclor-1254	mg/kg	7	1	14%	0.035	0.038	0.067	0.067	0.067	0.067	N/A	N/A	0.067	Max Detect	0.067	Max Detect		
NR16	Soil	Aroclor-1260	mg/kg	7	2	29%	0.035	0.038	0.032	0.22	0.126	0.126	0.0177	0.133	0.22	Max Detect	0.22	Max Detect		
NR16	Soil	Benzaldehyde	mg/kg	7	1	14%	0.18	0.19	0.09	0.09	0.09	0.09	N/A	N/A	0.09	Max Detect	0.09	Max Detect		
NR16	Soil	Benzo[a]anthracene	mg/kg	7	1	14%	0.18	0.2	0.076	0.076	0.076	0.076	N/A	N/A	0.076	Max Detect	0.076	Max Detect		
NR16	Soil	Benzo[a]pyrene	mg/kg	7	1	14%	0.18	0.2	0.07	0.07	0.07	0.07	N/A	N/A	0.07	Max Detect	0.07	Max Detect		
NR16	Soil	Benzo[b]fluoranthene	mg/kg	7	1	14%	0.18	0.2	0.055	0.055	0.055	0.055	N/A	N/A	0.055	Max Detect	0.055	Max Detect		
NR16	Soil	Benzo[g,h,i]perylene	mg/kg	7	1	14%	0.18	0.2	0.022	0.022	0.022	0.022	N/A	N/A	0.022	Max Detect	0.022	Max Detect		
NR16	Soil	Benzo[k]fluoranthene	mg/kg	7	1	14%	0.18	0.2	0.056	0.056	0.056	0.056	N/A	N/A	0.056	Max Detect	0.056	Max Detect		
NR16	Soil	Benzyl butyl phthalate	mg/kg	7	1	14%	0.18	0.2	0.028	0.028	0.028	0.028	N/A	N/A	0.028	Max Detect	0.028	Max Detect		
NR16	Soil	Beta-BHC	mg/kg	7	1	14%	0.0018	0.002	0.0017	0.0017	0.0017	0.0017	N/A	N/A	0.0017	Max Detect	0.0017	Max Detect		
NR16	Soil	bis(2-Ethylhexyl)phthalate	mg/kg	7	6	86%	0.2	0.2	0.025	0.09	0.0502	0.0515	5.28E-04	0.023	0.09	Max Detect	0.09	Max Detect		
NR16	Soil	Caprolactam	mg/kg	7	3	43%	0.18	0.2	0.046	0.08	0.0683	0.079	3.74E-04	0.0193	0.08	Max Detect	0.08	Max Detect		
NR16	Soil	Chloroform	mg/kg	3	1	33%	0.0041	0.0052	0.0088	0.0088	0.0088	0.0088	N/A	N/A	0.0088	Max Detect	0.0088	Max Detect		
NR16	Soil	Chrysene	mg/kg	7	1	14%	0.18	0.2	0.11	0.11	0.11	0.11	N/A	N/A	0.11	Max Detect	0.11	Max Detect		
NR16	Soil	Dieldrin	mg/kg	7	1	14%	0.0035	0.0038	0.0026	0.0026	0.0026	0.0026	N/A	N/A	0.0026	Max Detect	0.0026	Max Detect		
NR16	Soil	Dimethyl phthalate	mg/kg	7	1	14%	0.18	0.2	0.072	0.072	0.072	0.072	N/A	N/A	0.072	Max Detect	0.072	Max Detect		
NR16	Soil	Endrin Ketone	mg/kg	7	1	14%	0.0035	0.0038	0.0032	0.0032	0.0032	0.0032	N/A	N/A	0.0032	Max Detect	0.0032	Max Detect		
NR16	Soil	Fluoranthene	mg/kg	7	1	14%	0.18	0.2	0.099	0.099	0.099	0.099	N/A	N/A	0.099	Max Detect	0.099	Max Detect		
NR16	Soil	Gamma-Chlordane	mg/kg	7	1	14%	0.0018	0.002	0.0039	0.0039	0.0039	0.0039	N/A	N/A	0.0039	Max Detect	0.0039	Max Detect		
NR16	Soil	Indeno[1,2,3-cd]pyrene	mg/kg	7	1	14%	0.18	0.2	0.025	0.025	0.025	0.025	N/A	N/A	0.025	Max Detect	0.025	Max Detect		
NR16	Soil	Phenanthrene	mg/kg	7	1	14%	0.18	0.2	0.023	0.023	0.023	0.023	N/A	N/A	0.023	Max Detect	0.023	Max Detect		
NR16	Soil	Phenol	mg/kg	7	1	14%	0.18	0.19	0.027	0.027	0.027	0.027	N/A	N/A	0.027	Max Detect	0.027	Max Detect		
NR16	Soil	Pyrene	mg/kg	7	1	14%	0.18	0.2	0.1	0.1	0.1	0.1	N/A	N/A	0.1	Max Detect	0.1	Max Detect		
NR17	Soil	Aluminum	mg/kg	22	22	100%	N/A	N/A	4,890	26,600	13,629	12,900	25,281,308	5,028	15,473	95% Student's-t UCL	15,473	95% Student's-t UCL		
NR17	Soil	Antimony	mg/kg	29	23	79%	0.15	6.5	0.49	143	53.48	51	1,814	42.59	55.61	95% KM (Percentile Bootstrap) UCL	55.61	95% KM (Percentile Bootstrap) UCL		
NR17	Soil	Arsenic	mg/kg	64	63	98%	13.1	13.1	19	12,000	2,222	1,270	6,635,793	2,576	4,194	97.5% KM (Chebyshev) UCL	4,194	97.5% KM (Chebyshev) UCL		
NR17	Soil	Barium	mg/kg	26	20	77%	8.8	21.1	7.7	175	76.16	55.15	3,182	56.41	121.3	95% GROS Adjusted Gamma UCL	121.3	95% GROS Adjusted Gamma UCL		
NR17	Soil	Beryllium	mg/kg	25	11	44%	0.026	1	0.05	0.42	0.205	0.21	0.0169	0.13	0.23	95% KM (t) UCL	0.23	95% KM (t) UCL		
NR17	Soil	Cadmium	mg/kg	29	24	83%	0.015	1	1.3	54.3	23.43	25.85	250.3	15.82	24.76	95% KM (t) UCL	24.76	95% KM (t) UCL		
NR17	Soil	Chromium	mg/kg	29	29	100%	N/A	N/A	6.6	61.4	18.56	15	116.7	10.8	21.99	95% Adjusted Gamma UCL	21.99	95% Adjusted Gamma UCL		
NR17	Soil	Chromium, Hexavalent	mg/kg	10	1	10%	0.51	0.59	1.4	1.4	1.4	1.4	N/A	N/A	N/A	Max Detect	1.4	Max Detect		
NR17	Soil	Cobalt	mg/kg	22	21	95%	2.3	2.3	6.9	29.5	14.36	14.5	27.14	5.21	15.91	95% KM (t) UCL	15.91	95% KM (t) UCL		
NR17	Soil	Copper	mg/kg	29	29	100%	N/A	N/A	26.1	1,180	249.7	169	62,045	249.1	346.2	95% Adjusted Gamma UCL	346.2	95% Adjusted Gamma UCL		
NR17	Soil	Cyanide	mg/kg	24	8	33%	2.5	3.2	0.06	6.5	1.25	0.52	4.665	2.16	1.548	95% Adjusted Gamma KM-UCL	1.548	95% Adjusted Gamma KM-UCL		
NR17	Soil	Iron	mg/kg	41	41	100%	N/A	N/A	23,800	193,000	79,312	58,000	1,875,000,000	43,307	108,793	95% Chebyshev (Mean, Sd) UCL	108,793	95% Chebyshev (Mean, Sd) UCL		
NR17	Soil	Lead	mg/kg&gt																	

TABLE M-1  
Summary Statistics for Ecological Exposure Areas - Soil  
Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona

Exposure											Standard									
Area ID	Media	Analyte	Units	Number of Observations	Number of Detects	Percent Detected	Minimum Non Detect	Maximum Non Detect	Minimum Detect	Maximum Detect	Mean of Detects	Median of Detects	Variance of Detects	Deviation of Detects	95% UCL	95% UCL Basis		EPC	EPC Basis	
NR17	Soil	Selenium	mg/kg	29	21	72%	0.13	5	9.1	51.8	28.27	25.8	147.7	12.15	25.73	95% KM (t) UCL		25.73	95% KM (t) UCL	
NR17	Soil	Silver	mg/kg	29	23	79%	0.0029	5	0.29	29.9	13.08	11.2	64.65	8.04	13.23	95% KM (t) UCL		13.23	95% KM (t) UCL	
NR17	Soil	Sulfate	mg/kg	8	8	100%	N/A	N/A	1,400	120,000	29,800	18,000	1,417,000,000	37,639	89,441	95% Adjusted Gamma UCL		89,441	95% Adjusted Gamma UCL	
NR17	Soil	Thallium	mg/kg	29	13	45%	0.022	5	0.23	15.4	3.254	0.77	19.39	4.404	3.554	95% Adjusted Gamma KM-UCL		3.554	95% Adjusted Gamma KM-UCL	
NR17	Soil	Vanadium	mg/kg	22	22	100%	N/A	N/A	26.6	100	46.72	41.25	349.1	18.68	53.83	or 95% Modified-t UCL		53.83	or 95% Modified-t UCL	
NR17	Soil	Zinc	mg/kg	49	49	100%	N/A	N/A	50.6	16,400	3,897	1,520	22,057,992	4,697	6,822	95% Chebyshev (Mean, Sd) UCL		6,822	95% Chebyshev (Mean, Sd) UCL	
NR18	Soil	Aluminum	mg/kg	18	18	100%	N/A	N/A	15,900	30,200	20,306	19,000	15,089,967	3,885	21,898	95% Student's-t UCL		21,898	95% Student's-t UCL	
NR18	Soil	Antimony	mg/kg	24	10	42%	0.15	6.5	0.47	32.8	9.827	2.85	142.7	11.95	10.48	95% Adjusted Gamma UCL		10.48	95% Adjusted Gamma UCL	
NR18	Soil	Arsenic	mg/kg	36	36	100%	N/A	N/A	13	3,090	377.4	183	335,603	579.3	547.8	95% Adjusted Gamma UCL		547.8	95% Adjusted Gamma UCL	
NR18	Soil	Barium	mg/kg	20	20	100%	N/A	N/A	54.9	177	123	124	990.6	31.47	135.1	95% Student's-t UCL		135.1	95% Student's-t UCL	
NR18	Soil	Beryllium	mg/kg	22	8	36%	0.048	1	0.25	0.76	0.469	0.48	0.0238	0.154	0.793	95% Chebyshev (Mean, Sd) UCL		0.76	Max Detect	
NR18	Soil	Cadmium	mg/kg	24	21	88%	0.11	1	1.1	24.6	5.067	3.6	32.9	5.735	9.459	95% Chebyshev (Mean, Sd) UCL		9.459	95% Chebyshev (Mean, Sd) UCL	
NR18	Soil	Chromium	mg/kg	24	24	100%	N/A	N/A	11	140	23.84	18.75	630.6	25.11	33.44	or 95% Modified-t UCL		33.44	or 95% Modified-t UCL	
NR18	Soil	Cobalt	mg/kg	18	18	100%	N/A	N/A	15.3	59.3	22.92	19.9	100.3	10.02	26.99	95% Adjusted Gamma UCL		26.99	95% Adjusted Gamma UCL	
NR18	Soil	Copper	mg/kg	24	24	100%	N/A	N/A	33	470	95.88	59.9	9,309	96.48	181.7	95% Chebyshev (Mean, Sd) UCL		181.7	95% Chebyshev (Mean, Sd) UCL	
NR18	Soil	Cyanide	mg/kg	19	4	21%	2.5	3	0.09	0.26	0.195	0.215	0.00537	0.0733	3.203	95% Chebyshev (Mean, Sd) UCL		0.26	Max Detect	
NR18	Soil	Iron	mg/kg	21	21	100%	N/A	N/A	15,800	95,500	42,867	39,500	241,300,000	15,533	49,375	95% Adjusted Gamma UCL		49,375	95% Adjusted Gamma UCL	
NR18	Soil	Lead	mg/kg	36	33	92%	5	5	9.6	16,693	784.8	160	8,390,763	2,897	2,738	95% Chebyshev (Mean, Sd) UCL		2,738	95% Chebyshev (Mean, Sd) UCL	
NR18	Soil	Manganese	mg/kg	19	19	100%	N/A	N/A	720	1,350	957.8	885	31,094	176.3	1,028	95% Student's-t UCL		1,028	95% Student's-t UCL	
NR18	Soil	Mercury	mg/kg	35	30	86%	0.05	0.11	0.091	26	2.676	0.91	26.36	5.134	5.864	95% Chebyshev (Mean, Sd) UCL		5.864	95% Chebyshev (Mean, Sd) UCL	
NR18	Soil	Nickel	mg/kg	22	22	100%	N/A	N/A	12	115	22.4	17.4	452.7	21.28	30.89	or 95% Modified-t UCL		30.89	or 95% Modified-t UCL	
NR18	Soil	Nitrate as N	mg/kg	2	2	100%	N/A	N/A	2	970	486	486	468,512	684.5	970	Max Detect		970	Max Detect	
NR18	Soil	Selenium	mg/kg	24	16	67%	0.48	5	0.42	26.7	5.614	4.15	36.8	6.066	9.555	95% Chebyshev (Mean, Sd) UCL		9.555	95% Chebyshev (Mean, Sd) UCL	
NR18	Soil	Silver	mg/kg	24	6	25%	0.003	5	0.68	13	4.34	3.05	21.11	4.595	4.987	95% Chebyshev (Mean, Sd) UCL		4.987	95% Chebyshev (Mean, Sd) UCL	
NR18	Soil	Sulfate	mg/kg	2	2	100%	N/A	N/A	180	19,000	9,590	9,590	177,100,000	13,308	19,000	Max Detect		19,000	Max Detect	
NR18	Soil	Thallium	mg/kg	24	1	4%	0.022	5	2.9	2.9	2.9	2.9	N/A	N/A	3.912	95% Chebyshev (Mean, Sd) UCL		2.9	Max Detect	
NR18	Soil	Vanadium	mg/kg	18	18	100%	N/A	N/A	53.4	127	72.67	71.9	302.4	17.39	80.53	95% Adjusted Gamma UCL		80.53	95% Adjusted Gamma UCL	
NR18	Soil	Zinc	mg/kg	25	25	100%	N/A	N/A	91	7,580	1,051	507	2,652,301	1,629	1,869	95% H-UCL		1,869	95% H-UCL	
NR19	Soil	Aluminum	mg/kg	62	62	100%	N/A	N/A	7,580	37,600	16,172	13,950	48,432,287	6,959	17,674	or 95% Modified-t UCL		17,674	or 95% Modified-t UCL	
NR19	Soil	Antimony	mg/kg	63	27	43%	0.16	7.3	0.46	11.1	3.89	2.9	9.05	3.008	3.457	95% GROS Approximate Gamma UCL		3.457	95% GROS Approximate Gamma UCL	
NR19	Soil	Arsenic	mg/kg	207	207	100%	N/A	N/A	8.6	1,980	202.2	90.5	80,896	284.4	288.4	95% Chebyshev (Mean, Sd) UCL		288.4	95% Chebyshev (Mean, Sd) UCL	
NR19	Soil	Barium	mg/kg	64	64	100%	N/A	N/A	18.9	292	139	134.5	3,152	56.14	150.7	95% Student's-t UCL		150.7	95% Student's-t UCL	
NR19	Soil	Beryllium	mg/kg	63	34	54%	0.025	1	0.092	1.1	0.436	0.39	0.0409	0.202	0.354	95% KM (t) UCL		0.354	95% KM (t) UCL	
NR19	Soil	Cadmium	mg/kg	65	36	55%	0.015	0.55	0.037	12	2.545	1.55	9.81	3.132	2.17	95% Approximate Gamma KM-UCL		2.17	95% Approximate Gamma KM-UCL	
NR19	Soil	Chromium	mg/kg	65	65	100%	N/A	N/A	6.3	88.6	17.1	13.8	125.4	11.2	19.54	or 95% Modified-t UCL		19.54	or 95% Modified-t UCL	
NR19	Soil	Cobalt	mg/kg	62	62	100%	N/A	N/A	2.8	28	13.92	13.65	23.17	4.814	14.94	95% Student's-t UCL		14.94	95% Student's-t UCL	
NR19	Soil	Copper	mg/kg	65	65	100%	N/A	N/A	19.2	308	71.31	42.7	3,659	60.49	104	95% Chebyshev (Mean, Sd) UCL		104	95% Chebyshev (Mean, Sd) UCL	
NR19	Soil	Cyanide	mg/kg	51	11	22%	2.4	3	0.06	0.55	0.234	0.16	0.0297	0.172	0.321	95% KM (t) UCL		0.321	95% KM (t) UCL	
NR19	Soil	Iron	mg/kg	192	192	100%	N/A	N/A	17,000	93,600	46,308	46,300	233,800,000	15,291	48,139	or 95% Modified-t UCL		48,139	or 95% Modified-t UCL	
NR19	Soil	Lead	mg/kg	207	188	91%	5	16.5	4.76	4,270	270.8	60.15	331,092	575.4	486.8	97.5% KM (Chebyshev) UCL		486.8	97.5% KM (Chebyshev) UCL	
NR19	Soil	Manganese	mg/kg	191	191	100%	N/A	N/A	99.1	2,100	704.1	685	68,543	261.8	735.8	or 95% Modified-t UCL		735.8	or 95% Modified-t UCL	
NR19	Soil	Mercury	mg/kg	76	66	87%	0.0057	0.12	0.03	15.5	1.839	0.33	10.91	3.303	3.849	97.5% KM (Chebyshev) UCL		3.849	97.5% KM (Chebyshev) UCL	
NR19	Soil	Nickel	mg/kg	63	63	100%	N/A	N/A	4.5	27.8	12.87	13.3	13.77	3.711	13.65	95% Student's-t UCL		13.65	95% Student's-t UCL	
NR19	Soil	Nitrate as N	mg/kg	5	4	80%	1.1	1.1	0.72	59	15.98	2.1	823	28.69	59	Max Detect		59	Max Detect	
NR19	Soil	Selenium	mg/kg	65	39	60%	0.13	5	0.33	90.1	8.076	3.9	224.4	14.98	11.72	95% KM (Chebyshev) UCL		11.72	95% KM (Chebyshev) UCL	
NR19	Soil	Silver	mg/kg	65	43	66%	0.0029	5	0.13	14.5	2.898	1.2	13.8	3.715	3.762	95% KM (Chebyshev) UCL		3.762	95% KM (Chebyshev) UCL	
NR19	Soil	Sulfate	mg/kg	7	7	100%	N/A	N/A	22	64,000	10,849	890	556,800,000	23,597	64,000	Max Detect		64,000	Max Detect	
NR19	Soil	Thallium	mg/kg	65	27	42%	0.022	5	0.29	3.1	1.607	1.9	0.663	0.814	1.277	95% KM (t) UCL		1.277	95% KM (t) UCL	
NR19	Soil	Vanadium	mg/kg	62	62	100%	N/A	N/A	33.3	137	65.02	58.25	630.3	25.11	70.42	or 95% Modified-t UCL		70.42	or 95% Modified-t UCL	
NR19	Soil	Zinc	mg/kg	196	196	100%	N/A	N/A	48.9	6,620	505.9	303	541,479	735.9	735.1	95% Chebyshev (Mean, Sd) UCL		735.1	95% Chebyshev (Mean, Sd) UCL	
NR19	Soil	4,4'-DDD	mg/kg	2	1	50%	0.0036	0.0036	0.014	0.014	0.014	0.014	N/A							

TABLE M-1  
Summary Statistics for Ecological Exposure Areas - Soil  
Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona

Exposure			Standard															
Area ID	Media	Analyte	Units	Number of Observations	Number of Detects	Percent Detected	Minimum Non Detect	Maximum Non Detect	Minimum Detect	Maximum Detect	Mean of Detects	Median of Detects	Variance of Detects	Deviation of Detects	95% UCL	95% UCL Basis	EPC	EPC Basis
NR19	Soil	Carbon disulfide	mg/kg	1	1	100%	N/A	N/A	0.002	0.002	0.002	0.002	N/A	N/A	0.002	Max Detect	0.002	Max Detect
NR19	Soil	Dieldrin	mg/kg	2	1	50%	0.0036	0.0036	0.0036	0.0036	0.0036	0.0036	N/A	N/A	0.0036	Max Detect	0.0036	Max Detect
NR19	Soil	Ethylbenzene	mg/kg	1	1	100%	N/A	N/A	0.0043	0.0043	0.0043	0.0043	N/A	N/A	0.0043	Max Detect	0.0043	Max Detect
NR19	Soil	Gamma-Chlordane	mg/kg	2	1	50%	0.0018	0.0018	0.0014	0.0014	0.0014	0.0014	N/A	N/A	0.0014	Max Detect	0.0014	Max Detect
NR19	Soil	Methyl ethyl ketone	mg/kg	1	1	100%	N/A	N/A	0.01	0.01	0.01	0.01	N/A	N/A	0.01	Max Detect	0.01	Max Detect
NR19	Soil	p- & m-Xylenes	mg/kg	1	1	100%	N/A	N/A	0.0017	0.0017	0.0017	0.0017	N/A	N/A	0.0017	Max Detect	0.0017	Max Detect
NR19	Soil	Styrene	mg/kg	1	1	100%	N/A	N/A	0.0038	0.0038	0.0038	0.0038	N/A	N/A	0.0038	Max Detect	0.0038	Max Detect
NR20	Soil	Aluminum	mg/kg	27	27	100%	N/A	N/A	9,350	34,200	22,070	24,100	48,372,634	6,955	24,353	95% Student's-t UCL	24,353	95% Student's-t UCL
NR20	Soil	Antimony	mg/kg	27	4	15%	0.17	6.9	1.5	3.3	2.45	2.5	0.65	0.806	2.968	95% KM (t) UCL	2.968	95% KM (t) UCL
NR20	Soil	Arsenic	mg/kg	116	116	100%	N/A	N/A	12.3	609	97.99	64.2	8,827	93.95	136	95% Chebyshev (Mean, Sd) UCL	136	95% Chebyshev (Mean, Sd) UCL
NR20	Soil	Barium	mg/kg	27	27	100%	N/A	N/A	78.2	248	132	128	1,334	36.53	144	95% Student's-t UCL	144	95% Student's-t UCL
NR20	Soil	Beryllium	mg/kg	27	26	96%	0.025	0.025	0.26	2.7	1.632	1.85	0.505	0.711	2.212	95% KM (Chebyshev) UCL	2.212	95% KM (Chebyshev) UCL
NR20	Soil	Cadmium	mg/kg	27	8	30%	0.016	0.57	0.052	2.6	1.15	0.685	1.046	1.023	0.703	95% KM (Percentile Bootstrap) UCL	0.703	95% KM (Percentile Bootstrap) UCL
NR20	Soil	Chromium	mg/kg	28	28	100%	N/A	N/A	10.5	35.5	17.33	16.75	26.05	5.104	19.03	or 95% Modified-t UCL	19.03	or 95% Modified-t UCL
NR20	Soil	Cobalt	mg/kg	27	27	100%	N/A	N/A	8.9	16.2	12.23	12.1	3.394	1.842	12.83	95% Student's-t UCL	12.83	95% Student's-t UCL
NR20	Soil	Copper	mg/kg	28	28	100%	N/A	N/A	28.1	86.5	54.64	50.25	242.5	15.57	59.66	95% Student's-t UCL	59.66	95% Student's-t UCL
NR20	Soil	Iron	mg/kg	86	86	100%	N/A	N/A	23,300	60,600	40,884	40,900	39,906,555	6,317	42,017	95% Student's-t UCL	42,017	95% Student's-t UCL
NR20	Soil	Lead	mg/kg	116	112	97%	7	7	7	318	55.14	33.7	2,748	52.42	61.69	95% KM (BCA) UCL	61.69	95% KM (BCA) UCL
NR20	Soil	Manganese	mg/kg	86	86	100%	N/A	N/A	311	2,030	664.1	640.5	41,402	203.5	697.1	95% Approximate Gamma UCL	697.1	95% Approximate Gamma UCL
NR20	Soil	Mercury	mg/kg	24	19	79%	0.0062	0.11	0.021	2.5	0.386	0.21	0.322	0.567	0.78	95% KM (Chebyshev) UCL	0.78	95% KM (Chebyshev) UCL
NR20	Soil	Nickel	mg/kg	27	27	100%	N/A	N/A	10.1	16.7	13.49	13.4	2.907	1.705	14.05	95% Student's-t UCL	14.05	95% Student's-t UCL
NR20	Soil	Selenium	mg/kg	27	12	44%	0.14	4	3.3	5.2	4.142	3.95	0.506	0.712	3.758	95% KM (Percentile Bootstrap) UCL	3.758	95% KM (Percentile Bootstrap) UCL
NR20	Soil	Silver	mg/kg	27	5	19%	0.0029	1.1	0.4	3.9	2.24	2.7	2.578	1.606	1.07	95% KM (Percentile Bootstrap) UCL	1.07	95% KM (Percentile Bootstrap) UCL
NR20	Soil	Thallium	mg/kg	27	11	41%	0.024	2.9	0.21	1.6	0.785	0.78	0.209	0.457	0.962	95% KM (t) UCL	0.962	95% KM (t) UCL
NR20	Soil	Vanadium	mg/kg	27	27	100%	N/A	N/A	37.4	98.3	71.86	72.4	196	14	76.46	95% Student's-t UCL	76.46	95% Student's-t UCL
NR20	Soil	Zinc	mg/kg	116	116	100%	N/A	N/A	45.3	821	233.9	186.5	30,402	174.4	304.5	95% Chebyshev (Mean, Sd) UCL	304.5	95% Chebyshev (Mean, Sd) UCL
NW-01	Soil	Aluminum	mg/kg	28	28	100%	N/A	N/A	13,100	27,700	19,914	19,850	11,800,529	3,435	21,020	95% Student's-t UCL	21,020	95% Student's-t UCL
NW-01	Soil	Arsenic	mg/kg	273	263	96%	11.9	25.7	11.2	212	57.93	43.8	1,777	42.15	60.49	95% KM (BCA) UCL	60.49	95% KM (BCA) UCL
NW-01	Soil	Barium	mg/kg	28	28	100%	N/A	N/A	84.9	204	124.4	121.5	737.1	27.15	133.2	95% Student's-t UCL	133.2	95% Student's-t UCL
NW-01	Soil	Beryllium	mg/kg	28	19	68%	0.025	0.027	0.35	0.94	0.644	0.62	0.0189	0.138	0.548	95% KM (t) UCL	0.548	95% KM (t) UCL
NW-01	Soil	Cadmium	mg/kg	28	12	43%	0.014	0.03	0.1	1.4	0.436	0.33	0.16	0.4	0.373	95% Adjusted Gamma KM-UCL	0.373	95% Adjusted Gamma KM-UCL
NW-01	Soil	Chromium	mg/kg	28	28	100%	N/A	N/A	14.1	28.9	20.61	20.65	9.323	3.053	21.6	95% Student's-t UCL	21.6	95% Student's-t UCL
NW-01	Soil	Cobalt	mg/kg	28	28	100%	N/A	N/A	10.5	19.1	12.89	12.55	3.049	1.746	13.45	95% Student's-t UCL	13.45	95% Student's-t UCL
NW-01	Soil	Copper	mg/kg	30	30	100%	N/A	N/A	27.9	114	48.73	43.05	413.2	20.33	55.04	95% Student's-t UCL	55.04	95% Student's-t UCL
NW-01	Soil	Iron	mg/kg	262	262	100%	N/A	N/A	24,700	78,700	39,125	38,200	54,939,440	7,412	39,888	or 95% Modified-t UCL	39,888	or 95% Modified-t UCL
NW-01	Soil	Lead	mg/kg	273	257	94%	7	16.5	5.8	159	33.78	25.1	685.7	26.19	34.78	95% KM (BCA) UCL	34.78	95% KM (BCA) UCL
NW-01	Soil	Manganese	mg/kg	262	262	100%	N/A	N/A	391	1,670	704.8	669	26,258	162	721.5	or 95% Modified-t UCL	721.5	or 95% Modified-t UCL
NW-01	Soil	Mercury	mg/kg	28	28	100%	N/A	N/A	0.011	0.4	0.134	0.115	0.0159	0.126	0.238	95% Chebyshev (Mean, Sd) UCL	0.238	95% Chebyshev (Mean, Sd) UCL
NW-01	Soil	Nickel	mg/kg	28	28	100%	N/A	N/A	11.6	19.2	15.08	14.6	4.854	2.203	15.79	95% Student's-t UCL	15.79	95% Student's-t UCL
NW-01	Soil	Selenium	mg/kg	30	20	67%	0.13	2.2	0.44	1.8	0.83	0.725	0.118	0.343	0.838	95% GROS Adjusted Gamma UCL	0.838	95% GROS Adjusted Gamma UCL
NW-01	Soil	Vanadium	mg/kg	28	28	100%	N/A	N/A	43.4	87.5	70.59	72.15	155.5	12.47	74.6	95% Student's-t UCL	74.6	95% Student's-t UCL
NW-01	Soil	Zinc	mg/kg	273	272	100%	34.5	34.5	36.7	471	153	130	8,619	92.84	161.8	95% KM (BCA) UCL	161.8	95% KM (BCA) UCL
NW-03	Soil	Aluminum	mg/kg	21	21	100%	N/A	N/A	12,600	26,300	19,233	18,900	15,852,333	3,981	20,732	95% Student's-t UCL	20,732	95% Student's-t UCL
NW-03	Soil	Antimony	mg/kg	21	3	14%	0.15	0.17	1.2	1.8	1.467	1.4	0.0933	0.306	0.555	95% KM (t) UCL	0.555	95% KM (t) UCL
NW-03	Soil	Arsenic	mg/kg	208	204	98%	11.9	13.1	9.98	123	39.95	34.8	477.4	21.85	41.82	95% KM (BCA) UCL	41.82	95% KM (BCA) UCL
NW-03	Soil	Barium	mg/kg	21	21	100%	N/A	N/A	71.9	168	106	102	531.6	23.06	114.7	95% Student's-t UCL	114.7	95% Student's-t UCL
NW-03	Soil	Beryllium	mg/kg	21	14	67%	0.026	0.029	0.39	0.66	0.509	0.52	7.18E-03	0.0847	0.44	95% KM (t) UCL	0.44	95% KM (t) UCL
NW-03	Soil	Cadmium	mg/kg	21	10	48%	0.014	0.017	0.089	1.4	0.6	0.58	0.177	0.421	0.452	95% KM (t) UCL	0.452	95% KM (t) UCL
NW-03	Soil	Chromium	mg/kg	22	22	100%	N/A	N/A	13	30.9	18.68	17.3	25.37	5.037	20.53	95% Student's-t UCL	20.53	95% Student's-t UCL
NW-03	Soil	Cobalt	mg/kg	21	21	100%	N/A	N/A	9.4	15.8	12.76	12.6	2.706	1.645	13.38	95% Student's-t UCL	13.38	95% Student's-t UCL
NW-03	Soil	Copper	mg/kg	22	22	100%	N/A	N/A	26.6	112	53.68	45.2	741.6	27.23	65.22	95% Adjusted Gamma UCL	65.22	95% Adjusted Gamma UCL
NW-03	Soil	Iron	mg/kg	204	204	100%	N/A	N/A	24,000	72,400	37,349	36,650	65,656,008	8,103	38,262	95% Approximate Gamma UCL	38,262	95% Approximate Gamma UCL
NW-03	Soil	Lead	mg/kg	208	198	95%	7	7	4.76	179	28.7	22.9	428.4	20.7	30.06	95% KM (BCA) UCL	30.06	95% KM (BCA) UCL



TABLE M-1  
Summary Statistics for Ecological Exposure Areas - Soil  
Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona

Exposure												Standard								
Area ID	Media	Analyte	Units	Number of Observations	Number of Detects	Percent Detected	Minimum Non Detect	Maximum Non Detect	Minimum Detect	Maximum Detect	Mean of Detects	Median of Detects	Variance of Detects	Deviation of Detects	95% UCL	95% UCL Basis		EPC	EPC Basis	
RSAR-A	Soil	Aluminum	mg/kg	3	3	100%	N/A	N/A	11,800	25,200	20,533	24,600	57,293,333	7,569	25,200	Max Detect		25,200	Max Detect	
RSAR-A	Soil	Antimony	mg/kg	3	1	33%	0.16	0.16	2.1	2.1	2.1	2.1	N/A	N/A	2.1	Max Detect		2.1	Max Detect	
RSAR-A	Soil	Arsenic	mg/kg	47	47	100%	N/A	N/A	10	96	48.98	50	463.2	21.52	54.25	95% Student's-t UCL		54.25	95% Student's-t UCL	
RSAR-A	Soil	Barium	mg/kg	3	3	100%	N/A	N/A	79.2	117	103.1	113	431.2	20.77	117	Max Detect		117	Max Detect	
RSAR-A	Soil	Beryllium	mg/kg	3	3	100%	N/A	N/A	0.32	0.64	0.527	0.62	0.0321	0.179	0.64	Max Detect		0.64	Max Detect	
RSAR-A	Soil	Cadmium	mg/kg	3	1	33%	0.015	0.015	1.3	1.3	1.3	1.3	N/A	N/A	1.3	Max Detect		1.3	Max Detect	
RSAR-A	Soil	Chromium	mg/kg	4	4	100%	N/A	N/A	16.4	21.7	19.5	19.95	4.993	2.235	21.7	Max Detect		21.7	Max Detect	
RSAR-A	Soil	Cobalt	mg/kg	3	3	100%	N/A	N/A	12	15.2	13.63	13.7	2.563	1.601	15.2	Max Detect		15.2	Max Detect	
RSAR-A	Soil	Copper	mg/kg	4	4	100%	N/A	N/A	41.9	111	74.3	72.15	989	31.45	111	Max Detect		111	Max Detect	
RSAR-A	Soil	Iron	mg/kg	33	33	100%	N/A	N/A	29,900	44,900	38,570	38,800	12,002,803	3,465	39,591	95% Student's-t UCL		39,591	95% Student's-t UCL	
RSAR-A	Soil	Lead	mg/kg	47	47	100%	N/A	N/A	7.81	81	41.75	44.7	365.6	19.12	46.43	95% Student's-t UCL		46.43	95% Student's-t UCL	
RSAR-A	Soil	Manganese	mg/kg	33	33	100%	N/A	N/A	411	1,050	768.2	755	15,208	123.3	804.6	95% Student's-t UCL		804.6	95% Student's-t UCL	
RSAR-A	Soil	Mercury	mg/kg	2	2	100%	N/A	N/A	0.044	0.097	0.0705	0.0705	0.0014	0.0375	0.097	Max Detect		0.097	Max Detect	
RSAR-A	Soil	Nickel	mg/kg	3	3	100%	N/A	N/A	14.7	15.4	15.07	15.1	0.123	0.351	15.4	Max Detect		15.4	Max Detect	
RSAR-A	Soil	Selenium	mg/kg	3	3	100%	N/A	N/A	0.8	4.7	2.13	0.89	4.956	2.226	4.7	Max Detect		4.7	Max Detect	
RSAR-A	Soil	Silver	mg/kg	3	1	33%	0.003	0.003	3.5	3.5	3.5	3.5	N/A	N/A	3.5	Max Detect		3.5	Max Detect	
RSAR-A	Soil	Vanadium	mg/kg	3	3	100%	N/A	N/A	71.5	85.5	78.37	78.1	49.05	7.004	85.5	Max Detect		85.5	Max Detect	
RSAR-A	Soil	Zinc	mg/kg	47	47	100%	N/A	N/A	50.3	272	151.1	169	3,258	57.08	165	95% Student's-t UCL		165	95% Student's-t UCL	
RSAR-B	Soil	Aluminum	mg/kg	1	1	100%	N/A	N/A	17,100	17,100	17,100	17,100	N/A	N/A	17,100	Max Detect		17,100	Max Detect	
RSAR-B	Soil	Arsenic	mg/kg	19	18	95%	13.1	13.1	10.7	61.7	33.09	32.45	270.9	16.46	38.6	95% KM (t) UCL		38.6	95% KM (t) UCL	
RSAR-B	Soil	Barium	mg/kg	1	1	100%	N/A	N/A	120	120	120	120	N/A	N/A	120	Max Detect		120	Max Detect	
RSAR-B	Soil	Beryllium	mg/kg	1	1	100%	N/A	N/A	0.62	0.62	0.62	0.62	N/A	N/A	0.62	Max Detect		0.62	Max Detect	
RSAR-B	Soil	Cadmium	mg/kg	1	1	100%	N/A	N/A	0.14	0.14	0.14	0.14	N/A	N/A	0.14	Max Detect		0.14	Max Detect	
RSAR-B	Soil	Chromium	mg/kg	1	1	100%	N/A	N/A	19	19	19	19	N/A	N/A	19	Max Detect		19	Max Detect	
RSAR-B	Soil	Cobalt	mg/kg	1	1	100%	N/A	N/A	14.1	14.1	14.1	14.1	N/A	N/A	14.1	Max Detect		14.1	Max Detect	
RSAR-B	Soil	Copper	mg/kg	1	1	100%	N/A	N/A	31.7	31.7	31.7	31.7	N/A	N/A	31.7	Max Detect		31.7	Max Detect	
RSAR-B	Soil	Iron	mg/kg	17	17	100%	N/A	N/A	23,100	42,700	33,335	33,000	32,059,926	5,662	35,733	95% Student's-t UCL		35,733	95% Student's-t UCL	
RSAR-B	Soil	Lead	mg/kg	19	19	100%	N/A	N/A	8.9	63.7	35.88	35.9	311.5	17.65	42.91	95% Student's-t UCL		42.91	95% Student's-t UCL	
RSAR-B	Soil	Manganese	mg/kg	17	17	100%	N/A	N/A	464	906	685.6	681	14,102	118.8	735.9	95% Student's-t UCL		735.9	95% Student's-t UCL	
RSAR-B	Soil	Nickel	mg/kg	1	1	100%	N/A	N/A	16.2	16.2	16.2	16.2	N/A	N/A	16.2	Max Detect		16.2	Max Detect	
RSAR-B	Soil	Selenium	mg/kg	1	1	100%	N/A	N/A	0.56	0.56	0.56	0.56	N/A	N/A	0.56	Max Detect		0.56	Max Detect	
RSAR-B	Soil	Vanadium	mg/kg	1	1	100%	N/A	N/A	54.3	54.3	54.3	54.3	N/A	N/A	54.3	Max Detect		54.3	Max Detect	
RSAR-B	Soil	Zinc	mg/kg	19	19	100%	N/A	N/A	57.8	179	117	119	1,541	39.26	132.6	95% Student's-t UCL		132.6	95% Student's-t UCL	
RSAR-D	Soil	Aluminum	mg/kg	12	12	100%	N/A	N/A	8,880	13,700	11,313	11,350	1,881,333	1,372	12,024	95% Student's-t UCL		12,024	95% Student's-t UCL	
RSAR-D	Soil	Arsenic	mg/kg	53	47	89%	13.1	14.2	12.2	58.3	23.9	22.3	71.4	8.45	24.71	95% Approximate Gamma KM-UCL		24.71	95% Approximate Gamma KM-UCL	
RSAR-D	Soil	Barium	mg/kg	12	12	100%	N/A	N/A	70.7	142	100.3	98.25	439.8	20.97	111.2	95% Student's-t UCL		111.2	95% Student's-t UCL	
RSAR-D	Soil	Beryllium	mg/kg	12	12		N/A	N/A	0.25	0.41	0.336	0.335	0.00219	0.0468	0.36	95% Student's-t UCL		0.36	95% Student's-t UCL	
RSAR-D	Soil	Cadmium	mg/kg	12	7	58%	0.12	0.34	0.094	1.9	0.809	0.61	0.368	0.606	0.822	95% KM (t) UCL		0.822	95% KM (t) UCL	
RSAR-D	Soil	Chromium	mg/kg	12	12	100%	N/A	N/A	6.9	16.3	12.67	13.65	8.315	2.884	14.16	95% Student's-t UCL		14.16	95% Student's-t UCL	
RSAR-D	Soil	Cobalt	mg/kg	12	12	100%	N/A	N/A	7.4	13.2	10.96	11.45	3.323	1.823	11.9	95% Student's-t UCL		11.9	95% Student's-t UCL	
RSAR-D	Soil	Copper	mg/kg	12	12	100%	N/A	N/A	27.5	167	59.09	36.4	1,642	40.52	110.1	95% Chebyshev (Mean, Sd) UCL		110.1	95% Chebyshev (Mean, Sd) UCL	
RSAR-D	Soil	Cyanide	mg/kg	10	3	30%	2.5	2.7	0.27	0.39	0.31	0.27	0.0048	0.0693	0.383	95% KM (t) UCL		0.383	95% KM (t) UCL	
RSAR-D	Soil	Iron	mg/kg	53	53	100%	N/A	N/A	17,100	47,600	26,321	26,400	36,379,369	6,032	27,708	95% Student's-t UCL		27,708	95% Student's-t UCL	
RSAR-D	Soil	Lead	mg/kg	53	53	100%	N/A	N/A	8.17	216	35.27	28.9	989.8	31.46	54.11	95% Chebyshev (Mean, Sd) UCL		54.11	95% Chebyshev (Mean, Sd) UCL	
RSAR-D	Soil	Manganese	mg/kg	53	53	100%	N/A	N/A	394	1,140	563.3	545	16,536	128.6	591.7	95% Approximate Gamma UCL		591.7	95% Approximate Gamma UCL	
RSAR-D	Soil	Mercury	mg/kg	12	9	75%	0.0055	0.1	0.064	0.46	0.187	0.11	2.17E-02	0.147	0.223	95% KM (t) UCL		0.223	95% KM (t) UCL	
RSAR-D	Soil	Nickel	mg/kg	12	12	100%	N/A	N/A	8.6	15.7	12.63	13.2	6.482	2.546	13.94	95% Student's-t UCL		13.94	95% Student's-t UCL	
RSAR-D	Soil	Selenium	mg/kg	12	2	17%	3.5	3.7	0.44	0.45	0.445	0.445	5.00E-05	0.00707	0.454	95% KM (t) UCL		0.45	Max Detect	
RSAR-D	Soil	Vanadium	mg/kg	12	12	100%	N/A	N/A	25.3	42.6	34.67	35.1	22.76	4.771	37.14	95% Student's-t UCL		37.14	95% Student's-t UCL	
RSAR-D	Soil	Zinc	mg/kg	53	53	100%	N/A	N/A	53.7	438	134.3	121	4,405	66.37	148.3	95% Approximate Gamma UCL		148.3	95% Approximate Gamma UCL	
RSAR-H	Soil	Aluminum	mg/kg	2	2	100%	N/A	N/A	19,700	28,200	23,950	23,950	36,125,000	6,010	28,200	Max Detect		28,200	Max Detect	
RSAR-H	Soil	Arsenic	mg/kg	19	19	100%	N/A	N/A	20	227	53.09	39.3	2,090	45.72	98.81	95% Chebyshev (Mean, Sd) UCL		98.81	95% Chebyshev (Mean, Sd) UCL	
RSAR-H	Soil	Barium	mg/kg	2	2	100%	N/A	N/A	151	159	155	155	32	5.657	159	Max Detect		159	Max Detect	
RSAR-H	Soil	Beryllium	mg/kg	2	2	100%	N/A	N/A	0.42	0.51	0.465	0.465	0.00405	0.0636	0.51	Max Detect		0.51	Max Detect	
RSAR-H	Soil	Cadmium	mg/kg	2	2	100%	N/A	N/A	0.4	0.64	0.52	0.52	0.0288	0.17	0.64	Max Detect		0.64	Max Detect	
RSAR-H	Soil	Chromium	mg/kg	2																

TABLE M-1  
Summary Statistics for Ecological Exposure Areas - Soil  
Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona

Exposure				Number of						Maximum Detect	Standard								
Area ID	Media	Analyte	Units	Observations	Detects	Percent Detected	Minimum Non Detect	Maximum Non Detect	Minimum Detect		Mean of Detects	Median of Detects	Variance of Detects	Deviation of Detects	95% UCL	95% UCL Basis		EPC	EPC Basis
RSAR-H	Soil	Manganese	mg/kg	19	19	100%	N/A	N/A	542	1,320	855	854	34,385	185.4	928.8	95% Student's-t UCL		928.8	95% Student's-t UCL
RSAR-H	Soil	Mercury	mg/kg	2	2	100%	N/A	N/A	0.037	0.045	0.041	0.041	3.20E-05	0.00566	0.045	Max Detect		0.045	Max Detect
RSAR-H	Soil	Nickel	mg/kg	2	2	100%	N/A	N/A	25.8	48.2	37	37	250.9	15.84	48.2	Max Detect		48.2	Max Detect
RSAR-H	Soil	Selenium	mg/kg	2	2	100%	N/A	N/A	0.54	0.74	0.64	0.64	0.02	0.141	0.74	Max Detect		0.74	Max Detect
RSAR-H	Soil	Vanadium	mg/kg	2	2	100%	N/A	N/A	39	167	103	103	8,192	90.51	167	Max Detect		167	Max Detect
RSAR-H	Soil	Zinc	mg/kg	19	19	100%	N/A	N/A	55.8	147	84.72	81.7	556.1	23.58	94.1	95% Student's-t UCL		94.1	95% Student's-t UCL
SE-01	Soil	Aluminum	mg/kg	13	13	100%	N/A	N/A	20,100	54,400	35,015	32,800	91,629,744	9,572	39,747	95% Student's-t UCL		39,747	95% Student's-t UCL
SE-01	Soil	Antimony	mg/kg	12	3	25%	0.15	0.3	0.7	4.5	2.233	1.5	4.013	2.003	1.444	95% KM (t) UCL		1.444	95% KM (t) UCL
SE-01	Soil	Arsenic	mg/kg	146	146	100%	N/A	N/A	17.7	434	106.9	85.55	4,961	70.43	116.7	95% Approximate Gamma UCL		116.7	95% Approximate Gamma UCL
SE-01	Soil	Barium	mg/kg	13	13	100%	N/A	N/A	50.9	159	93.25	90.2	989.2	31.45	108.8	95% Student's-t UCL		108.8	95% Student's-t UCL
SE-01	Soil	Beryllium	mg/kg	13	8	62%	0.025	0.028	0.18	0.58	0.356	0.36	0.0166	0.129	0.328	95% KM (t) UCL		0.328	95% KM (t) UCL
SE-01	Soil	Cadmium	mg/kg	13	10	77%	0.014	0.016	0.08	5.9	2.256	1.45	4.201	2.05	2.754	95% KM (t) UCL		2.754	95% KM (t) UCL
SE-01	Soil	Chromium	mg/kg	13	13	100%	N/A	N/A	57.3	250	131	119	3,609	60.07	160.7	95% Student's-t UCL		160.7	95% Student's-t UCL
SE-01	Soil	Cobalt	mg/kg	13	13	100%	N/A	N/A	22.5	53	39.03	39.2	90.43	9.509	43.73	95% Student's-t UCL		43.73	95% Student's-t UCL
SE-01	Soil	Copper	mg/kg	13	13	100%	N/A	N/A	63.3	1,930	404.5	211	250,864	500.9	797.3	95% H-UCL		797.3	95% H-UCL
SE-01	Soil	Iron	mg/kg	144	144	100%	N/A	N/A	25,000	108,000	61,992	61,900	261,300,000	16,165	64,223	95% Student's-t UCL		64,223	95% Student's-t UCL
SE-01	Soil	Lead	mg/kg	146	145	99%	7	7	4.7	694	96.79	63.7	10,594	102.9	133.3	95% KM (Chebyshev) UCL		133.3	95% KM (Chebyshev) UCL
SE-01	Soil	Manganese	mg/kg	144	144	100%	N/A	N/A	501	2,740	1,254	1,250	142,633	377.7	1,307	95% Approximate Gamma UCL		1,307	95% Approximate Gamma UCL
SE-01	Soil	Mercury	mg/kg	13	8	62%	0.0056	0.0061	0.015	3.1	0.468	0.0685	1.138	1.067	2.769	95% Adjusted Gamma KM-UCL		2.769	95% Adjusted Gamma KM-UCL
SE-01	Soil	Nickel	mg/kg	13	13	100%	N/A	N/A	32.8	104	64.79	61.2	420.9	20.52	74.93	95% Student's-t UCL		74.93	95% Student's-t UCL
SE-01	Soil	Selenium	mg/kg	13	10	77%	0.13	0.14	0.28	5.3	1.276	0.82	2.173	1.474	2.519	95% GROS Adjusted Gamma UCL		2.519	95% GROS Adjusted Gamma UCL
SE-01	Soil	Silver	mg/kg	13	1	8%	0.0028	0.0059	6.1	6.1	6.1	6.1	N/A	N/A	N/A	N/A		6.1	Max Detect
SE-01	Soil	Vanadium	mg/kg	13	13	100%	N/A	N/A	105	327	205.4	211	4,225	65	237.5	95% Student's-t UCL		237.5	95% Student's-t UCL
SE-01	Soil	Zinc	mg/kg	146	140	96%	34.5	34.5	35.6	633	183.7	187.5	9,830	99.15	191.6	95% KM (Percentile Bootstrap) UCL		191.6	95% KM (Percentile Bootstrap) UCL
SE-02	Soil	Aluminum	mg/kg	9	9	100%	N/A	N/A	26,400	40,900	33,367	31,900	23,275,000	4,824	36,357	95% Student's-t UCL		36,357	95% Student's-t UCL
SE-02	Soil	Antimony	mg/kg	8	1	13%	0.15	0.33	3.4	3.4	3.4	3.4	N/A	N/A	N/A	N/A		3.4	Max Detect
SE-02	Soil	Arsenic	mg/kg	87	87	100%	N/A	N/A	16.6	311	110.9	110	3,609	60.07	121.6	95% Student's-t UCL		121.6	95% Student's-t UCL
SE-02	Soil	Barium	mg/kg	9	8	89%	0.022	0.022	44	158	70.91	61.45	1,323	36.37	123.7	95% KM (Chebyshev) UCL		123.7	95% KM (Chebyshev) UCL
SE-02	Soil	Beryllium	mg/kg	9	8	89%	0.028	0.028	0.12	0.43	0.3	0.315	0.00866	0.093	0.348	95% KM (t) UCL		0.348	95% KM (t) UCL
SE-02	Soil	Cadmium	mg/kg	9	5	56%	0.015	0.032	0.26	3.9	1.798	1.9	2.398	1.549	1.948	95% KM (t) UCL		1.948	95% KM (t) UCL
SE-02	Soil	Chromium	mg/kg	9	9	100%	N/A	N/A	43.3	184	98.97	101	1,938	44.02	126.3	95% Student's-t UCL		126.3	95% Student's-t UCL
SE-02	Soil	Cobalt	mg/kg	9	9	100%	N/A	N/A	13.4	50.9	34.18	33.2	139.9	11.83	41.51	95% Student's-t UCL		41.51	95% Student's-t UCL
SE-02	Soil	Copper	mg/kg	9	9	100%	N/A	N/A	56.9	772	275.7	153	61,679	248.4	429.6	95% Student's-t UCL		429.6	95% Student's-t UCL
SE-02	Soil	Iron	mg/kg	85	85	100%	N/A	N/A	27,700	103,000	67,985	71,300	184,300,000	13,575	70,434	95% Student's-t UCL		70,434	95% Student's-t UCL
SE-02	Soil	Lead	mg/kg	87	85	98%	7	16.5	4.23	241	65.4	56.7	2,803	52.94	88.86	95% KM (Chebyshev) UCL		88.86	95% KM (Chebyshev) UCL
SE-02	Soil	Manganese	mg/kg	85	85	100%	N/A	N/A	506	2,630	1,270	1,270	105,747	325.2	1,329	95% Student's-t UCL		1,329	95% Student's-t UCL
SE-02	Soil	Mercury	mg/kg	8	5	63%	0.0056	0.0062	0.019	0.23	0.12	0.12	0.0076	0.0872	0.14	95% KM (t) UCL		0.14	95% KM (t) UCL
SE-02	Soil	Nickel	mg/kg	9	9	100%	N/A	N/A	19.2	92.8	54.91	53	498.1	22.32	68.75	95% Student's-t UCL		68.75	95% Student's-t UCL
SE-02	Soil	Selenium	mg/kg	9	7	78%	0.13	0.14	0.44	9.7	2.291	1.4	10.95	3.309	7.765	95% GROS Adjusted Gamma UCL		7.765	95% GROS Adjusted Gamma UCL
SE-02	Soil	Silver	mg/kg	9	3	33%	0.0029	0.0032	0.15	7.8	2.843	0.58	18.47	4.298	2.793	95% KM (t) UCL		2.793	95% KM (t) UCL
SE-02	Soil	Thallium	mg/kg	9	1	11%	0.022	0.046	0.6	0.6	0.6	0.6	N/A	N/A	N/A	N/A		0.6	Max Detect
SE-02	Soil	Vanadium	mg/kg	9	9	100%	N/A	N/A	136	272	207.7	202	1,883	43.4	234.6	95% Student's-t UCL		234.6	95% Student's-t UCL
SE-02	Soil	Zinc	mg/kg	87	84	97%	34.5	34.5	38.8	346	175	186	6,668	81.66	184.8	95% KM (BCA) UCL		184.8	95% KM (BCA) UCL

Notes:  
<sup>a</sup> When more than one recommended UCL was given the lowest was selected as the EPC. If the recommended UCL exceeded the maximum detect, the maximum detect was selected as the EPC.

BCA = bias-corrected accelerated bootstrap method  
EPC = exposure point concentration  
KM = Kaplan Meier  
Max = maximum  
mg/kg = milligram per kilogram  
UCL = upper confidence limit

TABLE M-2

Summary Statistics for Ecological Exposure Areas - Sediment

Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona

Exposure				Number of Observations	Number of Detects	Percent Detected	Minimum Non-detect	Maximum Non-detect	Minimum Detect	Maximum Detect	Mean of Detects	Median of Detects	Variance of Detects	Standard Deviation of Detects		
Area ID	Media	Analyte	Units												EPC <sup>a</sup>	EPC Basis
AF-01	Sediment	Aluminum	mg/kg	4	4	100%	N/A	N/A	3,480	24,800	9,978	5,815	100,200,000	10,011	24,800	Max Detect
AF-01	Sediment	Arsenic	mg/kg	4	4	100%	N/A	N/A	7.2	20.6	11.88	9.85	35.48	5.956	20.6	Max Detect
AF-01	Sediment	Barium	mg/kg	4	4	100%	N/A	N/A	35.4	238	105.2	73.7	8,467	92.01	238	Max Detect
AF-01	Sediment	Beryllium	mg/kg	4	4	100%	N/A	N/A	0.11	0.89	0.4	0.3	0.119	0.345	0.89	Max Detect
AF-01	Sediment	Cadmium	mg/kg	4	1	25%	0.05	0.83	0.27	0.27	0.27	0.27	N/A	N/A	0.27	Max Detect
AF-01	Sediment	Chromium	mg/kg	4	4	100%	N/A	N/A	5.6	43.7	18.05	11.45	315.1	17.75	43.7	Max Detect
AF-01	Sediment	Cobalt	mg/kg	4	3	75%	5	5	5.3	13.5	9.167	8.7	16.97	4.12	13.5	Max Detect
AF-01	Sediment	Copper	mg/kg	4	4	100%	N/A	N/A	12.7	44.6	24.9	21.15	233.7	15.29	44.6	Max Detect
AF-01	Sediment	Iron	mg/kg	4	4	100%	N/A	N/A	8,830	31,100	16,483	13,000	101,000,000	10,049	31,100	Max Detect
AF-01	Sediment	Lead	mg/kg	4	4	100%	N/A	N/A	3.9	14.1	10.4	11.8	20.38	4.514	14.1	Max Detect
AF-01	Sediment	Manganese	mg/kg	4	4	100%	N/A	N/A	231	535	326.3	269.5	20,585	143.5	535	Max Detect
AF-01	Sediment	Mercury	mg/kg	4	1	25%	0.12	0.17	0.035	0.035	0.035	0.035	N/A	N/A	0.035	Max Detect
AF-01	Sediment	Nickel	mg/kg	4	4	100%	N/A	N/A	6.8	26	13.48	10.55	80.78	8.988	26	Max Detect
AF-01	Sediment	Selenium	mg/kg	4	1	25%	4.3	5.8	1.5	1.5	1.5	1.5	N/A	N/A	1.5	Max Detect
AF-01	Sediment	Silver	mg/kg	4	1	25%	0.0092	1	0.13	0.13	0.13	0.13	N/A	N/A	0.13	Max Detect
AF-01	Sediment	Sulfate	mg/kg	2	2	100%	N/A	N/A	28	66	47	47	722	26.87	66	Max Detect
AF-01	Sediment	Vanadium	mg/kg	4	4	100%	N/A	N/A	16.3	73.6	37.3	29.65	692.6	26.32	73.6	Max Detect
AF-01	Sediment	Zinc	mg/kg	4	4	100%	N/A	N/A	21.9	89	47.13	38.8	867.6	29.46	89	Max Detect
AF-01	Sediment	1,2,3,4,6,7,8-Hepta CDD	mg/kg	1	1	100%	N/A	N/A	1.29E-05	1.29E-05	1.29E-05	1.29E-05	N/A	N/A	1.29E-05	Max Detect
AF-01	Sediment	1,2,3,4,7,8-Hexa CDD	mg/kg	1	1	100%	N/A	N/A	2.50E-07	2.50E-07	2.50E-07	2.50E-07	N/A	N/A	0.00000025	Max Detect
AF-01	Sediment	1,2,3,6,7,8-Hexa CDD	mg/kg	1	1	100%	N/A	N/A	1.96E-07	1.96E-07	1.96E-07	1.96E-07	N/A	N/A	0.000000196	Max Detect
AF-01	Sediment	OCDD	mg/kg	1	1	100%	N/A	N/A	1.48E-04	1.48E-04	1.48E-04	1.48E-04	N/A	N/A	0.000148	Max Detect
AF-01	Sediment	OCDF	mg/kg	1	1	100%	N/A	N/A	5.09E-06	5.09E-06	5.09E-06	5.09E-06	N/A	N/A	0.00000509	Max Detect
AF-01	Sediment	TEQBird	mg/kg	1	1	100%	N/A	N/A	4.27E-08	4.27E-08	4.27E-08	4.27E-08	N/A	N/A	4.27E-08	Max Detect
AF-01	Sediment	TEQFish	mg/kg	1	1	100%	N/A	N/A	1.55E-07	1.55E-07	1.55E-07	1.55E-07	N/A	N/A	0.000000155	Max Detect
AF-01	Sediment	TEQMammal	mg/kg	1	1	100%	N/A	N/A	2.20E-07	2.20E-07	2.20E-07	2.20E-07	N/A	N/A	0.00000022	Max Detect
AF-02	Sediment	Aluminum	mg/kg	15	15	100%	N/A	N/A	6,030	110,000	17,930	9,310	701,100,000	26,479	47,731	95% Chebyshev (Mean, Sd) UCL
AF-02	Sediment	Antimony	mg/kg	16	4	25%	0.15	9.7	1.3	3.3	2.6	2.9	0.813	0.902	2.038	95% KM (t) UCL
AF-02	Sediment	Arsenic	mg/kg	16	16	100%	N/A	N/A	9.3	163	34.49	15.75	2,000	44.72	83.22	95% Chebyshev (Mean, Sd) UCL
AF-02	Sediment	Barium	mg/kg	16	16	100%	N/A	N/A	35.5	207	97.99	94.35	3,188	56.46	122.7	95% Student's-t UCL
AF-02	Sediment	Beryllium	mg/kg	15	13	87%	0.091	0.58	0.17	5.7	0.855	0.31	2.331	1.527	3.09	97.5% KM (Chebyshev) UCL
AF-02	Sediment	Cadmium	mg/kg	16	13	81%	0.11	0.84	0.042	12.7	1.196	0.14	12.04	3.47	8.852	99% KM (Chebyshev) UCL
AF-02	Sediment	Chromium	mg/kg	16	16	100%	N/A	N/A	9.3	1,160	93.61	13.4	81,463	285.4	404.6	95% Chebyshev (Mean, Sd) UCL
AF-02	Sediment	Cobalt	mg/kg	15	15	100%	N/A	N/A	5.1	28.1	11.11	9.4	32.86	5.733	13.71	95% Student's-t UCL
AF-02	Sediment	Copper	mg/kg	16	16	100%	N/A	N/A	12.4	8,030	597.8	28.05	4,005,016	2,001	5,576	99% Chebyshev (Mean, Sd) UCL
AF-02	Sediment	Cyanide	mg/kg	9	1	11%	3	4.2	0.11	0.11	0.11	0.11	N/A	N/A	0.11	Max Detect
AF-02	Sediment	Iron	mg/kg	16	16	100%	N/A	N/A	11,300	32,300	20,813	19,950	36,734,500	6,061	23,469	95% Student's-t UCL
AF-02	Sediment	Lead	mg/kg	16	15	94%	0.0093	0.0093	3.1	709	66.34	11.1	32,731	180.9	336.9	97.5% KM (Chebyshev) UCL
AF-02	Sediment	Manganese	mg/kg	16	16	100%	N/A	N/A	226	1,010	473.3	445	41,794	204.4	562.8	95% Student's-t UCL
AF-02	Sediment	Mercury	mg/kg	16	3	19%	0.0056	0.17	0.0066	0.77	0.263	0.013	0.193	0.439	0.154	95% KM (t) UCL
AF-02	Sediment	Nickel	mg/kg	15	15	100%	N/A	N/A	7.2	877	76.73	14.5	49,333	222.1	326.7	95% Chebyshev (Mean, Sd) UCL
AF-02	Sediment	Nitrate as N	mg/kg	3	2	67%	1.4	1.4	2	6.6	4.3	4.3	10.58	3.253	6.6	Max Detect
AF-02	Sediment	Selenium	mg/kg	16	13	81%	0.49	5.1	0.17	7.1	1.204	0.3	3.56	1.887	3.789	97.5% KM (Chebyshev) UCL
AF-02	Sediment	Silver	mg/kg	16	3	19%	0.0029	1.7	3.2	27.1	13.83	11.2	148	12.17	6.301	95% KM (t) UCL
AF-02	Sediment	Sulfate	mg/kg	3	3	100%	N/A	N/A	10	220	88	34	13,212	114.9	220	Max Detect
AF-02	Sediment	Thallium	mg/kg	16	1	6%	0.022	4	1.5	1.5	1.5	1.5	N/A	N/A	1.5	Max Detect
AF-02	Sediment	Vanadium	mg/kg	15	15	100%	N/A	N/A	27.2	85.2	46.28	40.9	302.3	17.39	54.19	95% Student's-t UCL
AF-02	Sediment	Zinc	mg/kg	16	16	100%	N/A	N/A	27.4	4,130	351.8	50.8	1,049,966	1,025	1,468	95% Chebyshev (Mean, Sd) UCL
AF-02	Sediment	1,2,3,7,8-Penta CDF	mg/kg	4	1	25%	0.00000239	2.48E-06	1.88E-07	1.88E-07	1.88E-07	1.88E-07	N/A	N/A	0.000000188	Max Detect
AF-02	Sediment	2,3,4,7,8-Penta CDF	mg/kg	4	1	25%	0.00000239	2.48E-06	1.04E-07	1.04E-07	1.04E-07	1.04E-07	N/A	N/A	0.000000104	Max Detect
AF-02	Sediment	OCDD	mg/kg	4	1	25%	0.00000479	4.96E-06	9.37E-06	9.37E-06	0.00000937	0.00000937	N/A	N/A	0.00000937	Max Detect
AF-02	Sediment	TEQBird	mg/kg	4	2	50%	4.79E-07	4.96E-07	9.37E-10	1.23E-07	6.20E-08	6.20E-08	7.45E-15	8.63E-08	0.000000123	Max Detect
AF-02	Sediment	TEQFish	mg/kg	4	2	50%	4.79E-07	4.96E-07	9.37E-10	6.14E-08	3.12E-08	3.12E-08	1.83E-15	4.28E-08	6.14E-08	Max Detect
AF-02	Sediment	TEQMammal	mg/kg	4	2	50%	4.79E-07	4.96E-07	2.81E-09	3.68E-08	1.98E-08	1.98E-08	5.78E-16	2.40E-08	3.68E-08	Max Detect

TABLE M-2

Summary Statistics for Ecological Exposure Areas - Sediment

Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona

Exposure				Number of Observations	Number of Detects	Percent Detected	Minimum Non-detect	Maximum Non-detect	Minimum Detect	Maximum Detect	Mean of Detects	Median of Detects	Variance of Detects	Standard Deviation of Detects		
Area ID	Media	Analyte	Units												EPC <sup>a</sup>	EPC Basis
AF-03	Sediment	Aluminum	mg/kg	11	11	100%	N/A	N/A	3,990	16,400	8,832	7,060	16,830,856	4,103	11,074	95% Student's-t UCL
AF-03	Sediment	Antimony	mg/kg	12	5	42%	0.16	7.6	0.52	1.8	0.908	0.58	0.307	0.554	0.909	95% KM (t) UCL
AF-03	Sediment	Arsenic	mg/kg	12	12	100%	N/A	N/A	8	206	35.21	16.45	3,022	54.97	104.4	95% Chebyshev (Mean, Sd) UCL
AF-03	Sediment	Barium	mg/kg	12	12	100%	N/A	N/A	29.5	174	81.04	60.35	2,353	48.51	106.2	95% Student's-t UCL
AF-03	Sediment	Beryllium	mg/kg	11	10	91%	0.24	0.24	0.084	0.57	0.283	0.23	0.0324	0.18	0.368	95% KM (t) UCL
AF-03	Sediment	Cadmium	mg/kg	12	7	58%	0.12	0.83	0.091	3.9	1.224	0.34	2.78	1.667	3.307	97.5% KM (Chebyshev) UCL
AF-03	Sediment	Chromium	mg/kg	12	12	100%	N/A	N/A	6.7	29.4	15.4	13.9	42.99	6.557	18.8	95% Student's-t UCL
AF-03	Sediment	Cobalt	mg/kg	11	11	100%	N/A	N/A	5.8	16	10.41	8.5	13.49	3.673	12.46	or 95% Modified-t UCL
AF-03	Sediment	Copper	mg/kg	12	12	100%	N/A	N/A	20.8	423	90.13	38.45	14,551	120.6	241.9	95% Chebyshev (Mean, Sd) UCL
AF-03	Sediment	Cyanide	mg/kg	9	2	22%	2.7	3.9	0.05	0.18	0.115	0.115	0.00845	0.0919	0.18	Max Detect
AF-03	Sediment	Iron	mg/kg	12	12	100%	N/A	N/A	10,700	30,700	20,200	18,450	54,632,727	7,391	24,032	95% Student's-t UCL
AF-03	Sediment	Lead	mg/kg	12	12	100%	N/A	N/A	5.9	361	44.37	11.4	10,132	100.7	171	95% Chebyshev (Mean, Sd) UCL
AF-03	Sediment	Manganese	mg/kg	12	12	100%	N/A	N/A	227	3,020	639.9	401	583,671	764	1,601	95% Chebyshev (Mean, Sd) UCL
AF-03	Sediment	Mercury	mg/kg	12	5	42%	0.0071	0.18	0.0065	1.2	0.343	0.11	0.254	0.504	0.347	95% KM (t) UCL
AF-03	Sediment	Nickel	mg/kg	11	11	100%	N/A	N/A	7.6	27.2	14.78	11.7	43.54	6.598	18.39	95% Student's-t UCL
AF-03	Sediment	Nitrate as N	mg/kg	2	1	50%	1.2	1.2	1	1	1	1	N/A	N/A	1	Max Detect
AF-03	Sediment	Selenium	mg/kg	12	3	25%	0.52	5.8	0.2	0.42	0.323	0.35	0.0126	0.112	0.42	Max Detect
AF-03	Sediment	Silver	mg/kg	12	3	25%	0.003	1.3	0.14	2.1	0.867	0.36	1.153	1.074	0.628	95% KM (t) UCL
AF-03	Sediment	Sulfate	mg/kg	2	2	100%	N/A	N/A	11	37	24	24	338	18.38	37	Max Detect
AF-03	Sediment	Vanadium	mg/kg	11	11	100%	N/A	N/A	20.3	66.2	41.06	44.9	228.5	15.12	49.33	95% Student's-t UCL
AF-03	Sediment	Zinc	mg/kg	12	12	100%	N/A	N/A	43.5	1,060	259.7	129.5	124,444	352.8	703.6	95% Chebyshev (Mean, Sd) UCL
REF-AF	Sediment	Aluminum	mg/kg	2	2	100%	N/A	N/A	3,770	4,270	4,020	4,020	125,000	353.6	4,270	Max Detect
REF-AF	Sediment	Arsenic	mg/kg	2	2	100%	N/A	N/A	6.5	7.1	6.8	6.8	0.18	0.424	7.1	Max Detect
REF-AF	Sediment	Barium	mg/kg	2	2	100%	N/A	N/A	38.6	68.5	53.55	53.55	447	21.14	68.5	Max Detect
REF-AF	Sediment	Beryllium	mg/kg	2	1	50%	0.17	0.17	0.19	0.19	0.19	0.19	N/A	N/A	0.19	Max Detect
REF-AF	Sediment	Cadmium	mg/kg	2	1	50%	0.61	0.61	0.08	0.08	0.08	0.08	N/A	N/A	0.08	Max Detect
REF-AF	Sediment	Calcium	mg/kg	2	2	100%	N/A	N/A	2,940	8,710	5,825	5,825	16,646,450	4,080	8,710	Max Detect
REF-AF	Sediment	Chromium	mg/kg	2	2	100%	N/A	N/A	8.3	9.3	8.8	8.8	0.5	0.707	9.3	Max Detect
REF-AF	Sediment	Cobalt	mg/kg	2	1	50%	5.4	5.4	4.2	4.2	4.2	4.2	N/A	N/A	4.2	Max Detect
REF-AF	Sediment	Copper	mg/kg	2	2	100%	N/A	N/A	13	13.9	13.45	13.45	0.405	0.636	13.9	Max Detect
REF-AF	Sediment	Iron	mg/kg	2	2	100%	N/A	N/A	6,990	9,450	8,220	8,220	3,025,800	1,739	9,450	Max Detect
REF-AF	Sediment	Lead	mg/kg	2	2	100%	N/A	N/A	4	5.5	4.75	4.75	1.125	1.061	5.5	Max Detect
REF-AF	Sediment	Magnesium	mg/kg	2	2	100%	N/A	N/A	2,160	2,180	2,170	2,170	200	14.14	2,180	Max Detect
REF-AF	Sediment	Manganese	mg/kg	2	2	100%	N/A	N/A	203	255	229	229	1,352	36.77	255	Max Detect
REF-AF	Sediment	Nickel	mg/kg	2	2	100%	N/A	N/A	6.5	7.9	7.2	7.2	0.98	0.99	7.9	Max Detect
REF-AF	Sediment	Potassium	mg/kg	2	2	100%	N/A	N/A	589	914	751.5	751.5	52,813	229.8	914	Max Detect
REF-AF	Sediment	Selenium	mg/kg	2	1	50%	4.3	4.3	1	1	1	1	N/A	N/A	1	Max Detect
REF-AF	Sediment	Sodium	mg/kg	2	2	100%	N/A	N/A	63.8	153	108.4	108.4	3,978	63.07	153	Max Detect
REF-AF	Sediment	Vanadium	mg/kg	2	2	100%	N/A	N/A	16.2	19.4	17.8	17.8	5.12	2.263	19.4	Max Detect
REF-AF	Sediment	Zinc	mg/kg	2	2	100%	N/A	N/A	21.5	24.3	22.9	22.9	3.92	1.98	24.3	Max Detect
REF-East	Sediment	Aluminum	mg/kg	3	3	100%	N/A	N/A	9,790	11,600	10,457	9,980	989,433	994.7	11,600	Max Detect
REF-East	Sediment	Arsenic	mg/kg	3	3	100%	N/A	N/A	39.6	41.3	40.57	40.8	0.763	0.874	41.3	Max Detect
REF-East	Sediment	Barium	mg/kg	3	3	100%	N/A	N/A	197	322	240.3	202	5,008	70.77	322	Max Detect
REF-East	Sediment	Calcium	mg/kg	3	3	100%	N/A	N/A	12,900	17,700	15,167	14,900	5,813,333	2,411	17,700	Max Detect
REF-East	Sediment	Chromium	mg/kg	3	3	100%	N/A	N/A	21.8	27.5	24.5	24.2	8.19	2.862	27.5	Max Detect
REF-East	Sediment	Cobalt	mg/kg	3	3	100%	N/A	N/A	15.7	19.7	18.03	18.7	4.333	2.082	19.7	Max Detect
REF-East	Sediment	Copper	mg/kg	3	3	100%	N/A	N/A	33.7	45.8	38.9	37.2	38.77	6.227	45.8	Max Detect
REF-East	Sediment	Iron	mg/kg	3	3	100%	N/A	N/A	23,700	24,400	24,100	24,200	130,000	360.6	24,400	Max Detect
REF-East	Sediment	Lead	mg/kg	3	3	100%	N/A	N/A	9.6	13.6	11.2	10.4	4.48	2.117	13.6	Max Detect
REF-East	Sediment	Magnesium	mg/kg	3	3	100%	N/A	N/A	6,350	7,070	6,693	6,660	130,433	361.2	7,070	Max Detect
REF-East	Sediment	Manganese	mg/kg	3	3	100%	N/A	N/A	718	1,370	954.3	775	130,396	361.1	1,370	Max Detect
REF-East	Sediment	Nickel	mg/kg	3	3	100%	N/A	N/A	31.8	34.5	33.13	33.1	1.823	1.35	34.5	Max Detect
REF-East	Sediment	Potassium	mg/kg	3	3	100%	N/A	N/A	1,250	1,540	1,427	1,490	24,033	155	1,540	Max Detect
REF-East	Sediment	Sodium	mg/kg	3	3	100%	N/A	N/A	36.3	44.5	41.37	43.3	19.61	4.429	44.5	Max Detect



TABLE M-2  
Summary Statistics for Ecological Exposure Areas - Sediment  
Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona

Exposure				Number of Observations	Number of Detects	Percent Detected	Minimum Non-detect	Maximum Non-detect	Minimum Detect	Maximum Detect	Mean of Detects	Median of Detects	Variance of Detects	Standard Deviation of Detects		
Area ID	Media	Analyte	Units												EPC <sup>a</sup>	EPC Basis
REF-East	Sediment	Vanadium	mg/kg	3	3	100%	N/A	N/A	44.7	48.8	46.3	45.4	4.81	2.193	48.8	Max Detect
REF-East	Sediment	Zinc	mg/kg	3	3	100%	N/A	N/A	54.7	63.2	59.17	59.6	18.2	4.267	63.2	Max Detect
REF-West	Sediment	Aluminum	mg/kg	3	3	100%	N/A	N/A	3,860	8,240	6,363	6,990	5,090,633	2,256	8,240	Max Detect
REF-West	Sediment	Arsenic	mg/kg	3	3	100%	N/A	N/A	4.2	11.9	8.833	10.4	16.66	4.082	11.9	Max Detect
REF-West	Sediment	Barium	mg/kg	3	3	100%	N/A	N/A	45	99.4	73.23	75.3	743	27.26	99.4	Max Detect
REF-West	Sediment	Calcium	mg/kg	3	3	100%	N/A	N/A	4,700	8,320	6,243	5,710	3,489,433	1,868	8,320	Max Detect
REF-West	Sediment	Chromium	mg/kg	3	3	100%	N/A	N/A	10.4	16.5	13.87	14.7	9.823	3.134	16.5	Max Detect
REF-West	Sediment	Cobalt	mg/kg	3	2	67%	5.1	5.1	8.8	10.5	9.65	9.65	1.445	1.202	10.5	Max Detect
REF-West	Sediment	Copper	mg/kg	3	3	100%	N/A	N/A	16.2	32.8	24.53	24.6	68.89	8.3	32.8	Max Detect
REF-West	Sediment	Iron	mg/kg	3	3	100%	N/A	N/A	9,640	18,700	14,847	16,200	21,894,533	4,679	18,700	Max Detect
REF-West	Sediment	Lead	mg/kg	3	3	100%	N/A	N/A	6.3	16.1	10.73	9.8	24.66	4.966	16.1	Max Detect
REF-West	Sediment	Magnesium	mg/kg	3	3	100%	N/A	N/A	2,290	4,540	3,567	3,870	1,334,633	1,155	4,540	Max Detect
REF-West	Sediment	Manganese	mg/kg	3	3	100%	N/A	N/A	143	518	353	398	36,675	191.5	518	Max Detect
REF-West	Sediment	Nickel	mg/kg	3	3	100%	N/A	N/A	6.8	13.3	10.53	11.5	11.26	3.356	13.3	Max Detect
REF-West	Sediment	Potassium	mg/kg	3	3	100%	N/A	N/A	787	2,300	1,586	1,670	577,626	760	2,300	Max Detect
REF-West	Sediment	Selenium	mg/kg	3	2	67%	5.7	5.7	0.36	0.64	0.5	0.5	0.0392	0.198	0.64	Max Detect
REF-West	Sediment	Sodium	mg/kg	3	3	100%	N/A	N/A	102	154	129.7	133	684.3	26.16	154	Max Detect
REF-West	Sediment	Vanadium	mg/kg	3	3	100%	N/A	N/A	21	40	32.2	35.6	98.92	9.946	40	Max Detect
REF-West	Sediment	Zinc	mg/kg	3	3	100%	N/A	N/A	30.5	58.2	43.6	42.1	193.5	13.91	58.2	Max Detect

Notes:  
<sup>a</sup> When more than one recommended UCL was given the lowest was selected as the EPC. If the recommended UCL exceeded the maximum detect, the maximum detect was selected as the EPC.

BCA = bias-corrected accelerated bootstrap method  
EPC = exposure point concentration  
KM = Kaplan Meier  
Max = maximum  
mg/kg = milligram per kilogram  
UCL = upper confidence limit

TABLE M-3

Summary Statistics for Ecological Exposure Areas - Surface Water

Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona

Standard																				
Exposure	Media	Type	Analyte	Fraction	Units	Number of Observations	Number of Detects	Percent Detected	Minimum Non-detect	Maximum Non-detect	Minimum Detect	Maximum Detect	Mean of Detects	Median of Detects	Variance of Detects	Deviation of Detects	95% UCL	95% UCL Basis	EPC <sup>a</sup>	EPC Basis
AF-01	Surface water		Aluminum	Dissolved	mg/L	5	1	20%	0.00054	0.0872	0.0095	0.0095	0.0095	0.0095	N/A	N/A	0.0095	Max Detect	0.0095	Max Detect
AF-01	Surface water		Arsenic	Dissolved	mg/L	5	5	100%	N/A	N/A	0.0036	0.0058	0.0047	0.0044	0.00000092	0.00095917	0.0058	Max Detect	0.0058	Max Detect
AF-01	Surface water		Barium	Dissolved	mg/L	5	5	100%	N/A	N/A	0.0911	0.11	0.102	0.102	0.000049642	0.00705	0.11	Max Detect	0.11	Max Detect
AF-01	Surface water		Cadmium	Dissolved	mg/L	5	1	20%	0.000028	0.005	0.00002	0.00002	0.00002	0.00002	N/A	N/A	0.00002	Max Detect	0.00002	Max Detect
AF-01	Surface water		Chromium	Dissolved	mg/L	5	4	80%	0.000017	0.000017	0.00096	0.0014	0.00124	0.0013	3.7067E-08	0.00019253	0.0014	Max Detect	0.0014	Max Detect
AF-01	Surface water		Cobalt	Dissolved	mg/L	5	3	60%	0.0000057	0.05	0.00038	0.0061	0.0046	0.0039	0.00000169	0.0013	0.0061	Max Detect	0.0061	Max Detect
AF-01	Surface water		Copper	Dissolved	mg/L	5	3	60%	0.000039	0.0015	0.0023	0.0042	0.00313	0.0029	9.4333E-07	0.00097125	0.0042	Max Detect	0.0042	Max Detect
AF-01	Surface water		Iron	Dissolved	mg/L	5	3	60%	0.00067	0.1	0.0185	0.14	0.0648	0.0358	0.00432	0.0657	0.14	Max Detect	0.14	Max Detect
AF-01	Surface water		Manganese	Dissolved	mg/L	5	4	80%	0.00032	0.00032	0.0161	0.0535	0.0342	0.0336	0.00025923	0.0161	0.0535	Max Detect	0.0535	Max Detect
AF-01	Surface water		Nickel	Dissolved	mg/L	5	4	80%	0.04	0.04	0.003	0.005	0.00423	0.00445	7.3583E-07	0.00085781	0.005	Max Detect	0.005	Max Detect
AF-01	Surface water		Vanadium	Dissolved	mg/L	5	5	100%	N/A	N/A	0.004	0.0093	0.00652	0.0058	0.000006437	0.00254	0.0093	Max Detect	0.0093	Max Detect
AF-01	Surface water		Zinc	Dissolved	mg/L	5	5	100%	N/A	N/A	0.0014	0.0241	0.0105	0.0102	0.000078203	0.00884	0.0241	Max Detect	0.0241	Max Detect
AF-02	Surface water		Aluminum	Dissolved	mg/L	18	2	11%	0.00054	0.2	0.0147	0.0356	0.0252	0.0252	0.00021841	0.0148	0.00959	95% KM (t) UCL	0.00959	95% KM (t) UCL
AF-02	Surface water		Antimony	Dissolved	mg/L	18	5	28%	0.00019	0.06	0.00039	0.0024	0.00186	0.0022	6.8532E-07	0.00082784	0.00109	95% KM (t) UCL	0.00109	95% KM (t) UCL
AF-02	Surface water		Arsenic	Dissolved	mg/L	18	17	94%	0.015	0.015	0.0039	0.0144	0.00555	0.005	6.3751E-06	0.00252	0.00822	95% KM (Chebyshev) UCL	0.00822	95% KM (Chebyshev) UCL
AF-02	Surface water		Barium	Dissolved	mg/L	18	18	100%	N/A	N/A	0.0737	0.155	0.102	0.1	0.00026425	0.0163	0.109	95% Adjusted Gamma UCL	0.109	95% Adjusted Gamma UCL
AF-02	Surface water		Cadmium	Dissolved	mg/L	17	2	12%	0.000026	0.005	0.00002	0.000061	0.0000405	0.0000405	8.405E-10	0.000028991	3.0635E-05	95% KM (t) UCL	0.000030635	95% KM (t) UCL
AF-02	Surface water		Chromium	Dissolved	mg/L	18	9	50%	0.000017	0.000017	0.00022	0.0015	0.00115	0.0013	1.406E-07	0.00037497	0.00085046	95% KM (t) UCL	0.00085046	95% KM (t) UCL
AF-02	Surface water		Cobalt	Dissolved	mg/L	18	9	50%	0.0000057	0.0000057	0.00075	0.0074	0.00467	0.005	4.7207E-06	0.00217	0.00353	95% KM (t) UCL	0.00353	95% KM (t) UCL
AF-02	Surface water		Copper	Dissolved	mg/L	18	6	33%	0.000039	0.0019	0.0023	0.0043	0.00323	0.00325	4.1467E-07	0.00064395	0.0018	95% KM (t) UCL	0.0018	95% KM (t) UCL
AF-02	Surface water		Iron	Dissolved	mg/L	18	7	39%	0.00067	0.1	0.014	0.0699	0.0331	0.0254	0.00042705	0.0207	0.0245	95% KM (t) UCL	0.0245	95% KM (t) UCL
AF-02	Surface water		Lead	Dissolved	mg/L	18	3	17%	0.000021	0.01	0.000031	0.00014	7.1667E-05	0.000044	3.5443E-09	0.000059534	5.4107E-05	95% KM (t) UCL	0.000054107	95% KM (t) UCL
AF-02	Surface water		Manganese	Dissolved	mg/L	18	11	61%	0.00032	0.00032	0.0022	3	0.0198	0.0198	0.808	0.899	1.861	99% KM (Chebyshev) UCL	1.861	99% KM (Chebyshev) UCL
AF-02	Surface water		Mercury	Dissolved	mg/L	17	1	6%	0.000091	0.0002	0.000081	0.000081	0.000081	0.000081	N/A	N/A	N/A	N/A	0.000081	Max Detect
AF-02	Surface water		Nickel	Dissolved	mg/L	18	18	100%	N/A	N/A	0.0019	0.0055	0.00381	0.0035	9.9938E-07	0.00099969	0.00422	95% Student's-t UCL	0.00422	95% Student's-t UCL
AF-02	Surface water		Phosphorus, Total As P	Dissolved	mg/L	4	2	50%	0.1	0.1	0.2	0.47	0.335	0.335	0.0365	0.191	0.469	95% KM (t) UCL	0.469	95% KM (t) UCL
AF-02	Surface water		Selenium	Dissolved	mg/L	18	3	17%	0.00025	0.035	0.0004	0.0011	0.00083333	0.001	1.4333E-07	0.00037859	0.00060558	95% KM (t) UCL	0.00060558	95% KM (t) UCL
AF-02	Surface water		Vanadium	Dissolved	mg/L	18	18	100%	N/A	N/A	0.0041	0.0122	0.00696	0.00575	8.4531E-06	0.00291	0.00818	or 95% Modified-t UCL	0.00818	or 95% Modified-t UCL
AF-02	Surface water		Zinc	Dissolved	mg/L	18	18	100%	N/A	N/A	0.001	0.0186	0.00496	0.0026	0.000023356	0.00483	0.00769	95% Adjusted Gamma UCL	0.00769	95% Adjusted Gamma UCL
AF-03	Surface water		Aluminum	Dissolved	mg/L	13	1	8%	0.00054	0.2	0.0502	0.0502	0.0502	0.0502	N/A	N/A	N/A	N/A	0.0502	Max Detect
AF-03	Surface water		Antimony	Dissolved	mg/L	13	3	23%	0.000044	0.004	0.00062	0.002	0.00119	0.00094	5.2173E-07	0.00072231	0.0007107	95% KM (t) UCL	0.0007107	95% KM (t) UCL
AF-03	Surface water		Arsenic	Dissolved	mg/L	13	13	100%	N/A	N/A	0.0035	0.0124	0.00572	0.0046	7.1381E-06	0.00267	0.0071	or 95% Modified-t UCL	0.0071	or 95% Modified-t UCL
AF-03	Surface water		Barium	Dissolved	mg/L	13	13	100%	N/A	N/A	0.0755	0.108	0.0913	0.0943	0.00011676	0.0108	0.0966	95% Student's-t UCL	0.0966	95% Student's-t UCL
AF-03	Surface water		Cadmium	Dissolved	mg/L	13	8	62%	0.000028	0.00025	0.000032	0.0023	0.00056125	0.0000895	8.1522E-07	0.00090289	0.00245	99% KM (Chebyshev) UCL	0.0023	Max Detect
AF-03	Surface water		Chromium	Dissolved	mg/L	12	7	58%	0.000017	0.000017	0.00079	0.0023	0.00141	0.0012	3.1589E-07	0.00056204	0.00127	95% KM (t) UCL	0.00127	95% KM (t) UCL
AF-03	Surface water		Cobalt	Dissolved	mg/L	13	8	62%	0.0000057	0.0000057	0.0012	0.0079	0.00443	0.00465	5.9307E-06	0.00244	0.0042	95% KM (t) UCL	0.0042	95% KM (t) UCL
AF-03	Surface water		Copper	Dissolved	mg/L	13	9	69%	0.000039	0.000039	0.0022	0.0523	0.0133	0.0045	0.00031572	0.0178	0.0279	95% Adjusted Gamma KM-UCL	0.0279	95% Adjusted Gamma KM-UCL
AF-03	Surface water		Iron	Dissolved	mg/L	13	4	31%	0.00067	0.1	0.0264	0.434	0.132	0.0337	0.0406	0.201	0.11	95% KM (t) UCL	0.11	95% KM (t) UCL
AF-03	Surface water		Lead	Dissolved	mg/L	13	6	46%	0.000021	0.001	0.000034	0.00015	0.0000995	0.000102	1.7703E-09	0.000042075	9.8119E-05	95% KM (t) UCL	0.000098119	95% KM (t) UCL
AF-03	Surface water		Manganese	Dissolved	mg/L	13	13	100%	N/A	N/A	0.0017	1.47	0.168	0.0246	0.16	0.4	1.271	99% Chebyshev (Mean, Sd) UCL	1.271	9

TABLE M-3

Summary Statistics for Ecological Exposure Areas - Surface Water

Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona

Exposure																Standard					
Area ID	Media	Type	Analyte	Fraction	Units	Number of Observations	Number of Detects	Percent Detected	Minimum Non-detect	Maximum Non-detect	Minimum Detect	Maximum Detect	Mean of Detects	Median of Detects	Variance of Detects	Deviation of Detects	95% UCL	95% UCL Basis		EPC <sup>a</sup>	EPC Basis
REF-West	Surface water	I	Arsenic	Dissolved	mg/L	3	3	100%	N/A	N/A	0.0028	0.0175	0.0122	0.0162	6.62E-05	0.00814	N/A	N/A		0.0175	Max Detect
REF-West	Surface water	I	Barium	Dissolved	mg/L	3	3	100%	N/A	N/A	0.0602	0.0881	0.0728	0.0701	2.00E-04	0.0141	N/A	N/A		0.0881	Max Detect
REF-West	Surface water	I	Calcium	Dissolved	mg/L	3	3	100%	N/A	N/A	40.6	76.4	52.7	41.1	421.3	20.53	N/A	N/A		76.4	Max Detect
REF-West	Surface water	I	Chromium	Dissolved	mg/L	3	2	67%	0.002	0.002	0.0026	0.0027	0.00265	0.00265	5.00E-09	7.07E-05	N/A	N/A		0.0027	Max Detect
REF-West	Surface water	I	Cobalt	Dissolved	mg/L	3	3	100%	N/A	N/A	0.0027	0.0048	0.00383	0.004	1.12E-06	0.00106	N/A	N/A		0.0048	Max Detect
REF-West	Surface water	I	Copper	Dissolved	mg/L	3	1	33%	0.0016	0.002	0.0023	0.0023	0.0023	0.0023	N/A	N/A	N/A	N/A		0.0023	Max Detect
REF-West	Surface water	I	Iron	Dissolved	mg/L	3	3	100%	N/A	N/A	0.0052	0.0537	0.0271	0.0223	6.05E-04	0.0246	N/A	N/A		0.0537	Max Detect
REF-West	Surface water	I	Magnesium	Dissolved	mg/L	3	3	100%	N/A	N/A	13.9	21.4	18.77	21	17.8	4.219	N/A	N/A		21.4	Max Detect
REF-West	Surface water	I	Manganese	Dissolved	mg/L	3	3	100%	N/A	N/A	0.009	0.0389	0.0269	0.0327	2.49E-04	0.0158	N/A	N/A		0.0389	Max Detect
REF-West	Surface water	I	Nickel	Dissolved	mg/L	3	3	100%	N/A	N/A	0.0023	0.0025	0.0024	0.0024	1.00E-08	1.00E-04	N/A	N/A		0.0025	Max Detect
REF-West	Surface water	I	Potassium	Dissolved	mg/L	3	3	100%	N/A	N/A	1.18	4.12	2.73	2.89	2.18	1.477	N/A	N/A		4.12	Max Detect
REF-West	Surface water	I	Sodium	Dissolved	mg/L	3	3	100%	N/A	N/A	45.8	47.5	46.9	47.4	0.91	0.954	N/A	N/A		47.5	Max Detect
REF-West	Surface water	I	Vanadium	Dissolved	mg/L	3	3	100%	N/A	N/A	0.0033	0.0161	0.0105	0.0121	4.29E-05	0.00655	N/A	N/A		0.0161	Max Detect
REF-West	Surface water	I	Zinc	Dissolved	mg/L	3	2	67%	0.002	0.002	0.0038	0.0073	0.00555	0.00555	6.13E-06	0.00247	N/A	N/A		0.0073	Max Detect
AF-01	Surface water		Aluminum	Total	mg/L	5	5	100%	N/A	N/A	0.0557	1.65	0.539	0.244	0.444	0.666	1.65	Max Detect		1.65	Max Detect
AF-01	Surface water		Arsenic	Total	mg/L	5	5	100%	N/A	N/A	0.0024	0.0061	0.00448	0.0042	0.000002187	0.00148	0.0061	Max Detect		0.0061	Max Detect
AF-01	Surface water		Barium	Total	mg/L	5	5	100%	N/A	N/A	0.104	0.113	0.107	0.105	0.0000153	0.00391	0.113	Max Detect		0.113	Max Detect
AF-01	Surface water		Chromium	Total	mg/L	5	4	80%	0.000017	0.000017	0.0011	0.0031	0.00205	0.002	7.7667E-07	0.00088129	0.0031	Max Detect		0.0031	Max Detect
AF-01	Surface water		Cobalt	Total	mg/L	5	2	40%	0.0000057	0.05	0.0014	0.0019	0.00165	0.00165	0.000000125	0.00035355	0.0019	Max Detect		0.0019	Max Detect
AF-01	Surface water		Copper	Total	mg/L	5	3	60%	0.000039	0.002	0.0016	0.0068	0.00427	0.0044	6.7733E-06	0.0026	0.0068	Max Detect		0.0068	Max Detect
AF-01	Surface water		Cyanide	Total	mg/L	4	2	50%	0.01	0.01	0.0027	0.0056	0.00415	0.00415	0.000004205	0.00205	0.0056	Max Detect		0.0056	Max Detect
AF-01	Surface water		Fluoride	Total	mg/L	2	2	100%	N/A	N/A	0.14	0.21	0.175	0.175	0.00245	0.0495	0.21	Max Detect		0.21	Max Detect
AF-01	Surface water		Iron	Total	mg/L	5	4	80%	0.00067	0.00067	0.103	1.57	0.645	0.454	0.443	0.666	1.57	Max Detect		1.57	Max Detect
AF-01	Surface water		Lead	Total	mg/L	5	1	20%	0.000021	0.01	0.0011	0.0011	0.0011	0.0011	N/A	N/A	0.0011	Max Detect		0.0011	Max Detect
AF-01	Surface water		Manganese	Total	mg/L	5	5	100%	N/A	N/A	0.0053	0.0667	0.0388	0.0491	0.00059278	0.0243	0.0667	Max Detect		0.0667	Max Detect
AF-01	Surface water		Nickel	Total	mg/L	5	5	100%	N/A	N/A	0.0016	0.0053	0.00372	0.0041	0.000002287	0.00151	0.0053	Max Detect		0.0053	Max Detect
AF-01	Surface water		Nitrate As N	Total	mg/L	3	3	100%	N/A	N/A	6.9	9.3	7.867	7.4	1.603	1.266	9.3	Max Detect		9.3	Max Detect
AF-01	Surface water		Nitrite As N	Total	mg/L	3	1	33%	0.2	0.2	0.07	0.07	0.07	0.07	N/A	N/A	0.07	Max Detect		0.07	Max Detect
AF-01	Surface water		Total Silica	Total	mg/L	1	1	100%	N/A	N/A	22.6	22.6	22.6	22.6	N/A	N/A	22.6	Max Detect		22.6	Max Detect
AF-01	Surface water		Vanadium	Total	mg/L	5	5	100%	N/A	N/A	0.0046	0.012	0.00766	0.0062	0.000011938	0.00346	0.012	Max Detect		0.012	Max Detect
AF-01	Surface water		Zinc	Total	mg/L	5	4	80%	0.00098	0.00098	0.0014	0.0241	0.0131	0.0135	0.00011007	0.0105	0.0241	Max Detect		0.0241	Max Detect
AF-02	Surface water		Aluminum	Total	mg/L	18	16	89%	0.00054	0.00054	0.0212	97.2	11.33	0.245	921.8	30.36	77.76	99% KM (Chebyshev) UCL		77.76	99% KM (Chebyshev) UCL
AF-02	Surface water		Arsenic	Total	mg/L	18	18	100%	N/A	N/A	0.0038	0.0579	0.00973	0.0047	0.00020491	0.0143	0.0244	95% Chebyshev (Mean, Sd) UCL		0.0244	95% Chebyshev (Mean, Sd) UCL
AF-02	Surface water		Barium	Total	mg/L	18	18	100%	N/A	N/A	0.0848	1.53	0.242	0.101	0.173	0.416	0.669	95% Chebyshev (Mean, Sd) UCL		0.669	95% Chebyshev (Mean, Sd) UCL
AF-02	Surface water		Beryllium	Total	mg/L	18	4	22%	0.00009	0.001	0.000039	0.0068	0.00325	0.00308	0.000013758	0.00371	0.00171	95% KM (t) UCL		0.00171	95% KM (t) UCL
AF-02	Surface water		Cadmium	Total	mg/L	18	3	17%	0.000028	0.005	0.0001	0.0012	0.0008	0.0011	0.00000037	0.00060828	0.00035065	95% KM (t) UCL		0.00035065	95% KM (t) UCL
AF-02	Surface water		Chromium	Total	mg/L	18	10	56%	0.000017	0.000017	0.0018	0.23	0.0412	0.00335	0.00671	0.0819	0.175	99% KM (Chebyshev) UCL		0.175	99% KM (Chebyshev) UCL
AF-02	Surface water		Cobalt	Total	mg/L	18	8	44%	0.0000057	0.05	0.0011	0.0434	0.0109	0.0016	0.00030685	0.0175	0.0254	97.5% KM (Chebyshev) UCL		0.0254	97.5% KM (Chebyshev) UCL
AF-02	Surface water		Copper	Total	mg/L	18	10	56%	0.000039	0.000039	0.0027	0.0997	0.0196	0.00395	0.00119	0.0345	0.0517	97.5% KM (Chebyshev) UCL		0.0517	97.5% KM (Chebyshev) UCL
AF-02	Surface water		Cyanide	Total	mg/L	8	3	38%	0.01	0.01	0.0022	0.0077	0.0057	0.0072	0.00000925	0.00304	0.00903	95% KM (t) UCL		0.0077	Max Detect
AF-02	Surface water		Fluoride	Total	mg/L	5	5	100%	N/A	N/A	0.054	0.29	0.179	0.18	0.00802	0.0895	0.264	95% Student's-t UCL		0.264	95% Student's-t UCL
AF-02	Surface water		Iron	Total	mg/L	18	10	56%	0.00067	0.00067	0.168	57.4	9.555	0.43	397.2	19.93	42.07	99% KM (Chebyshev) UCL		42.07</	

TABLE M-3

Summary Statistics for Ecological Exposure Areas - Surface Water

Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona

Standard																				
Exposure					Number of	Number of	Percent	Minimum	Maximum	Minimum	Maximum	Mean of	Median of	Variance of	Deviation of	95% UCL	95% UCL Basis		EPC <sup>a</sup>	EPC Basis
Area ID	Media	Type	Analyte	Fraction	Units	Observations	Detects	Detected	Non-detect	Non-detect	Detect	Detect	Detects	Detects	Detects	Detects				
AF-03	Surface water		Lead	Total	mg/L	14	9	64%	0.000021	0.001	0.00021	0.28	0.0526	0.0044	0.0104	0.102	0.263	99% KM (Chebyshev) UCL	0.263	99% KM (Chebyshev) UCL
AF-03	Surface water		Manganese	Total	mg/L	14	14	100%	N/A	N/A	0.0013	22.1	2.42	0.0516	39.92	6.318	19.22	99% Chebyshev (Mean, Sd) UCL	19.22	99% Chebyshev (Mean, Sd) UCL
AF-03	Surface water		Mercury	Total	mg/L	14	4	29%	0.000091	0.0002	0.000072	0.002	0.0007405	0.000445	8.0211E-07	0.0008956	0.00054695	95% KM (t) UCL	0.00054695	95% KM (t) UCL
AF-03	Surface water		Nickel	Total	mg/L	14	14	100%	N/A	N/A	0.0026	0.0844	0.0168	0.0053	0.00067352	0.026	0.047	95% Chebyshev (Mean, Sd) UCL	0.047	95% Chebyshev (Mean, Sd) UCL
AF-03	Surface water		Nitrate As N	Total	mg/L	2	2	100%	N/A	N/A	6.5	9.4	7.95	7.95	4.205	2.051	N/A	N/A	9.4	Max Detect
AF-03	Surface water		Nitrite As N	Total	mg/L	2	1	50%	0.5	0.5	0.06	0.06	0.06	0.06	N/A	N/A	N/A	N/A	0.06	Max Detect
AF-03	Surface water		Selenium	Total	mg/L	14	3	21%	0.00025	0.005	0.0015	0.0072	0.00467	0.0053	8.4233E-06	0.0029	0.00244	95% KM (t) UCL	0.00244	95% KM (t) UCL
AF-03	Surface water		Silver	Total	mg/L	14	2	14%	0.0000026	0.002	0.00065	0.0014	0.00103	0.00103	2.8125E-07	0.00053033	0.00050775	95% KM (t) UCL	0.00050775	95% KM (t) UCL
AF-03	Surface water		Thallium	Total	mg/L	14	3	21%	0.0000089	0.002	0.0000088	0.002	0.00117	0.0015	1.0731E-06	0.00104	0.00063398	95% KM (t) UCL	0.00063398	95% KM (t) UCL
AF-03	Surface water		Total Silica	Total	mg/L	4	4	100%	N/A	N/A	22.5	215	101.8	84.9	9.047	95.11	213.7	95% Student's-t UCL	213.7	95% Student's-t UCL
AF-03	Surface water		Vanadium	Total	mg/L	14	14	100%	N/A	N/A	0.0037	0.426	0.065	0.00645	0.0203	0.142	0.444	99% Chebyshev (Mean, Sd) UCL	0.426	Max Detect
AF-03	Surface water		Zinc	Total	mg/L	14	14	100%	N/A	N/A	0.0015	1.34	0.247	0.0443	0.156	0.395	0.719	95% Adjusted Gamma UCL	0.719	95% Adjusted Gamma UCL
REF-AF	Surface water	I	Aluminum	Total	mg/L	2	2	100%	N/A	N/A	0.0365	0.238	0.137	0.137	0.0203	0.142	N/A	N/A	0.238	Max Detect
REF-AF	Surface water	I	Arsenic	Total	mg/L	2	2	100%	N/A	N/A	0.0036	0.0051	0.00435	0.00435	1.13E-06	0.00106	N/A	N/A	0.0051	Max Detect
REF-AF	Surface water	I	Barium	Total	mg/L	2	2	100%	N/A	N/A	0.105	0.111	0.108	0.108	1.80E-05	0.00424	N/A	N/A	0.111	Max Detect
REF-AF	Surface water	I	Bromide	Total	mg/L	1	1	100%	N/A	N/A	0.16	0.16	0.16	0.16	N/A	N/A	N/A	N/A	0.16	Max Detect
REF-AF	Surface water	I	Calcium	Total	mg/L	3	3	100%	N/A	N/A	65	81.4	71.8	69	73.12	8.551	N/A	N/A	81.4	Max Detect
REF-AF	Surface water	I	Chloride	Total	mg/L	1	1	100%	N/A	N/A	61	61	61	61	N/A	N/A	N/A	N/A	61	Max Detect
REF-AF	Surface water	I	Chromium	Total	mg/L	2	2	100%	N/A	N/A	0.0016	0.0037	0.00265	0.00265	2.21E-06	0.00148	N/A	N/A	0.0037	Max Detect
REF-AF	Surface water	I	Cobalt	Total	mg/L	2	2	100%	N/A	N/A	6.20E-04	0.0013	9.60E-04	9.60E-04	2.31E-07	4.81E-04	N/A	N/A	0.0013	Max Detect
REF-AF	Surface water	I	Copper	Total	mg/L	2	1	50%	0.0019	0.0019	0.004	0.004	0.004	0.004	N/A	N/A	N/A	N/A	0.004	Max Detect
REF-AF	Surface water	I	Cyanide	Total	mg/L	2	1	50%	0.01	0.01	0.0056	0.0056	0.0056	0.0056	N/A	N/A	N/A	N/A	0.0056	Max Detect
REF-AF	Surface water	I	Fluoride	Total	mg/L	1	1	100%	N/A	N/A	0.24	0.24	0.24	0.24	N/A	N/A	N/A	N/A	0.24	Max Detect
REF-AF	Surface water	I	Iron	Total	mg/L	3	3	100%	N/A	N/A	0.066	0.192	0.123	0.111	0.00408	0.0639	N/A	N/A	0.192	Max Detect
REF-AF	Surface water	I	Lead	Total	mg/L	2	1	50%	2.70E-04	2.70E-04	9.80E-05	9.80E-05	9.80E-05	9.80E-05	N/A	N/A	N/A	N/A	9.80E-05	Max Detect
REF-AF	Surface water	I	Magnesium	Total	mg/L	3	3	100%	N/A	N/A	15	17.8	16.37	16.3	1.963	1.401	N/A	N/A	17.8	Max Detect
REF-AF	Surface water	I	Manganese	Total	mg/L	2	2	100%	N/A	N/A	0.0223	0.0271	0.0247	0.0247	1.15E-05	0.00339	N/A	N/A	0.0271	Max Detect
REF-AF	Surface water	I	Nickel	Total	mg/L	2	2	100%	N/A	N/A	0.0038	0.0156	0.0097	0.0097	6.96E-05	0.00834	N/A	N/A	0.0156	Max Detect
REF-AF	Surface water	I	Nitrate As N	Total	mg/L	1	1	100%	N/A	N/A	9.6	9.6	9.6	9.6	N/A	N/A	N/A	N/A	9.6	Max Detect
REF-AF	Surface water	I	Nitrite As N	Total	mg/L	1	1	100%	N/A	N/A	0.08	0.08	0.08	0.08	N/A	N/A	N/A	N/A	0.08	Max Detect
REF-AF	Surface water	I	O-Phosphate, As P	Total	mg/L	1	1	100%	N/A	N/A	1.2	1.2	1.2	1.2	N/A	N/A	N/A	N/A	1.2	Max Detect
REF-AF	Surface water	I	Potassium	Total	mg/L	3	3	100%	N/A	N/A	1.4	5.4	4.003	5.21	5.092	2.257	N/A	N/A	5.4	Max Detect
REF-AF	Surface water	I	Sodium	Total	mg/L	3	3	100%	N/A	N/A	51.6	58	55	55.4	10.36	3.219	N/A	N/A	58	Max Detect
REF-AF	Surface water	I	Sulfate	Total	mg/L	1	1	100%	N/A	N/A	52	52	52	52	N/A	N/A	N/A	N/A	52	Max Detect
REF-AF	Surface water	I	Vanadium	Total	mg/L	2	2	100%	N/A	N/A	0.0053	0.0093	0.0073	0.0073	8.00E-06	0.00283	N/A	N/A	0.0093	Max Detect
REF-AF	Surface water	I	Zinc	Total	mg/L	2	2	100%	N/A	N/A	0.0038	0.0134	0.0086	0.0086	4.61E-05	0.00679	N/A	N/A	0.0134	Max Detect
REF-West	Surface water	I	Aluminum	Total	mg/L	3	2	67%	0.222	0.222	0.175	0.531	0.353	0.353	0.0634	0.252	N/A	N/A	0.531	Max Detect
REF-West	Surface water	I	Arsenic	Total	mg/L	3	3	100%	N/A	N/A	0.0027	0.0181	0.0127	0.0172	7.47E-05	0.00864	N/A	N/A	0.0181	Max Detect
REF-West	Surface water	I	Barium	Total	mg/L	3	3	100%	N/A	N/A	0.0631	0.0883	0.0761	0.0769	1.59E-04	0.0126	N/A	N/A	0.0883	Max Detect
REF-West	Surface water	I	Calcium	Total	mg/L	3	3	100%	N/A	N/A	42.2	77.7	54.17	42.6	415.4	20.38	N/A	N/A	77.7	Max Detect
REF-West	Surface water	I	Chromium	Total	mg/L	3	2	67%	0.002	0.002	0.003	0.0032	0.0031	0.0031	2.00E-08	1.41E-04	N/A	N/A	0.0032	Max Detect
REF-West	Surface water	I	Cobalt	Total	mg/L	3	3	100%	N/A	N/A	3.10E-04	7.70E-04	4.70E-04	3.30E-04	6.76E-08	2.60E-04	N/A	N/A	7.70E-04	Max Detect
REF-West	Surface water	I	Copper	Total	mg/L	3	2	67%	0.0011	0.0011	0.0022	0.0048	0.0035	0.0035	3.38E-06	0.00184	N/A	N/A	0.0048	Max Detect
REF-West	Surface water	I	Cyanide	Total	mg/L	3	1	33%	0.01	0.01	0.0039	0.0039	0.0039	0.0039	N/A	N/A	N/A	N/A	0.0039	Max Detect
REF-West	Surface water	I	Iron	Total	mg/L	3	3	100%	N/A	N/A	0.111	0.583	0.297	0.197	0.0632	0.251	N/A	N/A	0.583	Max Detect
REF-West	Surface water	I	Lead	Total	mg/L	3	2	67%	0.001	0.001	1.60E-04	7.70E-04	4.65E-04	4.65E-04	1.86E-07	4.31E-04	N/A	N/A	7.70E-04	Max Detect
REF-West	Surface water	I	Magnesium	Total	mg/L	3	3	100%	N/A	N/A	14	22.1	19.23	21.6	20.6	4.539	N/A	N/A	22.1	Max Detect
REF-West	Surface water	I	Manganese	Total	mg/L	3	3	100%	N/A	N/A	0.0094	0.0572	0.0355	0.0398	5.85E-04	0.0242	N/A	N/A	0.0572	Max Detect
REF-West	Surface water	I	Nickel	Total	mg/L	3	3	100%	N/A	N/A	0.0019	0.0025	0.0022	0.0022	9.00E-08	3.00E-04	N/A	N/A	0.0025	Max Detect
REF-West	Surface water	I	Potassium	Total	mg/L	3	3	100%	N/A	N/A	1.31	4.42	2.883	2.92	2.419	1.555	N/A	N/A	4.42	Max Detect
REF-West	Surface water	I	Sodium	Total	mg/L	3	3	100%	N/A	N/A	45.3	47.3	46.6	47.2	1.27	1.127	N/A	N/A	47.3	Max Detect
REF-West	Surface water	I	Vanadium	Total	mg/L	3	3	100%	N/A	N/A	0.0035	0.0167	0.0114	0.0141	4.89E-05	0.00699	N/A	N/A	0.0167	Max Detect
REF-West	Surface water	I	Zinc	Total	mg/L	3	3	100%	N/A	N/A	0.002	0.0068	0.00387	0.0028	6.61E-06	0.00257	N/A	N/A	0.0068	Max Detect

Notes:

<sup>a</sup> When more than one recommended UCL was given the lowest was selected as the EPC. If the recommended UCL exceeded the maximum detect, the maximum detect was selected as the EPC.

BCA = bias-corrected accelerated bootstrap method

EPC = exposure point concentration

KM = Kaplan Meier

Max = maximum

mg/L = milligram per liter

UCL = upper confidence limit

TABLE M-4

## Ecological Screening Values for Soil Exposures

Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona

Variable	Background 95/95 UTL (mg/kg)	Terrestrial Plants and Soil Invertebrates			Birds and Mammals		
		ESV (mg/kg)	Notes	Source	ESV (mg/kg)	Notes	Source
Aluminum	35,600	--	--	--	--	--	--
Antimony	2.42	78	EcoSSL	EPA, 2005a	0.27	EcoSSL	EPA, 2005a
Arsenic	112	18	EcoSSL	EPA, 2005b	43	EcoSSL	EPA, 2005b
Barium	271	330	EcoSSL	EPA, 2005c	2000	EcoSSL	EPA, 2005c
Beryllium	1.7	40	EcoSSL	EPA, 2005d	21	EcoSSL	EPA, 2005d
Cadmium	0.824	32	EcoSSL	EPA, 2005e	0.36	EcoSSL	EPA, 2005e
Chloride	--	--	--	--	--	--	--
Chromium	145	64	SQG <sub>E</sub>	CCME, 2011	26	EcoSSL	EPA, 2008
Chromium, Hexavalent	--	0.34	No Effect ESL	LANL, 2014	130	EcoSSL	EPA, 2008
Cobalt	43.6	13	EcoSSL	EPA, 2005f	120	EcoSSL	EPA, 2005f
Copper	182	70	EcoSSL	EPA, 2007a	28	EcoSSL	EPA, 2007a
Cyanide	--	0.9	SQG <sub>E</sub>	CCME, 2011	1.3	Reg5 ESL	EPA, 2003
Iron	71,900	--	--	--	--	--	--
Lead	34.8	120	EcoSSL	EPA, 2005g	11	EcoSSL	EPA, 2005g
Manganese	1,600	220	EcoSSL	EPA, 2007b	4000	EcoSSL	EPA, 2007b
Mercury	0.0795	6.6	SQG <sub>E</sub>	CCME, 2011	0.013	No Effect ESL	LANL, 2014
Nickel	89	38	EcoSSL	EPA, 2007c	130	EcoSSL	EPA, 2007c
Nitrate as N	--	--	--	--	--	--	--
Selenium	4.4	0.52	EcoSSL	EPA, 2007d	0.63	EcoSSL	EPA, 2007d
Silver	--	560	EcoSSL	EPA, 2006	4.2	EcoSSL	EPA, 2006
Sulfate	--	--	--	--	--	--	--
Thallium	2.8	1	SQG <sub>E</sub>	CCME, 2011	0.0569	Reg5 ESL	EPA, 2003
Vanadium	231	330	SQG <sub>E</sub>	CCME, 2011	7.8	EcoSSL	EPA, 2005h
Zinc	136	120	EcoSSL	EPA, 2007e	46	EcoSSL	EPA, 2007e
1,2,3,4,6,7,8-Hepta CDD	--	0.000004	SQG <sub>E</sub>	CCME, 2011	--	see TEQ	--
1,2,3,4,6,7,8-Hepta CDF	--	0.000004	SQG <sub>E</sub>	CCME, 2011	--	see TEQ	--
1,2,3,4,7,8,9-Hepta CDF	--	0.000004	SQG <sub>E</sub>	CCME, 2011	--	see TEQ	--
1,2,3,4,7,8-Hexa CDD	--	0.000004	SQG <sub>E</sub>	CCME, 2011	--	see TEQ	--
1,2,3,4,7,8-Hexa CDF	--	0.000004	SQG <sub>E</sub>	CCME, 2011	--	see TEQ	--
1,2,3,6,7,8-Hexa CDD	--	0.000004	SQG <sub>E</sub>	CCME, 2011	--	see TEQ	--
1,2,3,6,7,8-Hexa CDF	--	0.000004	SQG <sub>E</sub>	CCME, 2011	--	see TEQ	--
1,2,3,7,8,9-Hexa CDD	--	0.000004	SQG <sub>E</sub>	CCME, 2011	--	see TEQ	--
1,2,3,7,8,9-Hexa CDF	--	0.000004	SQG <sub>E</sub>	CCME, 2011	--	see TEQ	--
1,2,3,7,8-Penta CDD	--	0.000004	SQG <sub>E</sub>	CCME, 2011	--	see TEQ	--
1,2,3,7,8-Penta CDF	--	0.000004	SQG <sub>E</sub>	CCME, 2011	--	see TEQ	--
2,3,4,6,7,8-Hexa CDF	--	0.000004	SQG <sub>E</sub>	CCME, 2011	--	see TEQ	--
2,3,4,7,8-Penta CDF	--	0.000004	SQG <sub>E</sub>	CCME, 2011	--	see TEQ	--
2,3,7,8-Tetra CDD	--	0.000004	SQG <sub>E</sub>	CCME, 2011	--	see TEQ	--
2,3,7,8-Tetra CDF	--	0.000004	SQG <sub>E</sub>	CCME, 2011	--	see TEQ	--
4,4'-DDD	--	0.7	total, SQG <sub>E</sub>	CCME, 2011	0.021	EcoSSL	EPA, 2007f
4,4'-DDE	--	0.7	total, SQG <sub>E</sub>	CCME, 2011	0.021	EcoSSL	EPA, 2007f
4,4'-DDT	--	0.7	total, SQG <sub>E</sub>	CCME, 2011	0.021	EcoSSL	EPA, 2007f
4-Chloroaniline	--	--	--	--	1.1	Reg5 ESL	EPA, 2003
Acenaphthene	--	29	Low MW PAH EcoSSL	EPA, 2007g	100	Low MW PAH EcoSSL	EPA, 2007g
Acetone	--	--	--	--	2.5	Reg5 ESL	EPA, 2003
Acetophenone	--	--	--	--	300	Reg5 ESL	EPA, 2003
Alpha-Chlordane	--	--	--	--	0.27	--	LANL, 2014
Anthracene	--	29	Low MW PAH EcoSSL	EPA, 2007g	100	Low MW PAH EcoSSL	EPA, 2007g
Aroclor-1242	--	0.5	interim, SQG <sub>E</sub>	CCME, 2011	0.041	No Effect ESL	LANL, 2014
Aroclor-1248	--	0.5	interim, SQG <sub>E</sub>	CCME, 2011	0.0072	No Effect ESL	LANL, 2014
Aroclor-1254	--	0.5	interim, SQG <sub>E</sub>	CCME, 2011	0.041	No Effect ESL	LANL, 2014
Aroclor-1260	--	0.5	interim, SQG <sub>E</sub>	CCME, 2011	0.88	No Effect ESL	LANL, 2014
Benzaldehyde	--	--	--	--	--	--	--
Benzo[a]anthracene	--	18	High MW PAH EcoSSL	EPA, 2007g	1.1	High MW PAH EcoSSL	EPA, 2007g
Benzo[a]pyrene	--	18	High MW PAH EcoSSL	EPA, 2007g	1.1	High MW PAH EcoSSL	EPA, 2007g
Benzo[b]fluoranthene	--	18	High MW PAH EcoSSL	EPA, 2007g	1.1	High MW PAH EcoSSL	EPA, 2007g
Benzo[g,h,i]perylene	--	18	High MW PAH EcoSSL	EPA, 2007g	1.1	High MW PAH EcoSSL	EPA, 2007g
Benzo[k]fluoranthene	--	18	High MW PAH EcoSSL	EPA, 2007g	1.1	High MW PAH EcoSSL	EPA, 2007g
Benzyl butyl phthalate	--	--	--	--	90	No Effect ESL	LANL, 2014
Beta-BHC	--	--	--	--	0.27	No Effect ESL	LANL, 2014
bis(2-Ethylhexyl)phthalate	--	--	--	--	0.02	No Effect ESL	LANL, 2014
Caprolactam	--	--	--	--	--	--	--
Carbazole	--	--	--	--	80	No Effect ESL	LANL, 2014
Carbon disulfide	--	--	--	--	0.82	No Effect ESL	LANL, 2014



TABLE M-4

**Ecological Screening Values for Soil Exposures***Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona*

Variable	Background 95/95 UTL (mg/kg)	Terrestrial Plants and Soil Invertebrates			Birds and Mammals		
		ESV (mg/kg)	Notes	Source	ESV (mg/kg)	Notes	Source
Chloroform	--	5	SQG <sub>E</sub>	CCME, 2011	8	No Effect ESL	LANL, 2014
Chrysene	--	18	High MW PAH EcoSSL	EPA, 2007g	1.1	High MW PAH EcoSSL	EPA, 2007g
Delta-BHC	--	--	--	--	9.94	Reg5 ESL	EPA, 2003
Dibenzo[a,h]anthracene	--	18	High MW PAH EcoSSL	EPA, 2007g	1.1	High MW PAH EcoSSL	EPA, 2007g
Dieldrin	--	--	--	--	0.0045	No Effect ESL	LANL, 2014
Dimethyl phthalate	--	10	No Effect ESL	LANL, 2014	734	Reg5 ESL	EPA, 2003
Di-n-butyl phthalate	--	--	--	--	0.15	Reg5 ESL	EPA, 2003
Endosulfan I	--	--	--	--	0.64	endosulfan	LANL, 2014
Endrin Ketone	--	--	--	--	0.0101	Reg5 ESL	EPA, 2003
Ethylbenzene	--	55	coarse soil SQG <sub>E</sub>	CCME, 2011	5.16	Reg5 ESL	EPA, 2003
Fluoranthene	--	29	Low MW PAH EcoSSL	EPA, 2007g	100	Low MW PAH EcoSSL	EPA, 2007g
Gamma-Chlordane	--	2.2	No Effect ESL	LANL, 2014	2.2	No Effect ESL	LANL, 2014
Heptachlor	--	--	--	--	0.059	No Effect ESL	LANL, 2014
Heptachlor Epoxide	--	--	--	--	0.152	Reg5 ESL	EPA, 2003
Indeno[1,2,3-cd]pyrene	--	18	High MW PAH EcoSSL	EPA, 2007g	1.1	High MW PAH EcoSSL	EPA, 2007g
Methyl ethyl ketone	--	--	--	--	89.6	Reg5 ESL	EPA, 2003
OCDD	--	0.000004	SQG <sub>E</sub>	CCME, 2011	--	see TEQ	--
OCDF	--	0.000004	SQG <sub>E</sub>	CCME, 2011	--	see TEQ	--
p- & m-Xylenes	--	65	SQG <sub>E</sub>	CCME, 2011	10	total xylene, Reg5 ESL	EPA, 2003
Perchlorate	--	--	--	--	--	--	--
Phenanthrene	--	29	Low MW PAH EcoSSL	EPA, 2007g	100	Low MW PAH EcoSSL	EPA, 2007g
Phenol	--	0.79	No Effect ESL	LANL, 2014	120	Reg5 ESL	EPA, 2003
Pyrene	--	18	High MW PAHs	EPA, 2007g	1.1	High MW PAH EcoSSL	EPA, 2007g
Styrene	--	1.2	No Effect ESL	LANL, 2014	4.69	Reg5 ESL	EPA, 2003
TEQBird	--	--	not applicable	--	2.9E-07	No Effect ESL	LANL, 2014
TEQMammal	--	--	not applicable	--	2.9E-07	No Effect ESL	LANL, 2014

## Notes:

-- - not available or not applicable

95/95 UTL - 95% upper tolerance limit with 95% coverage

CDD - chlorodibenzodioxin

CDF - chlorodibenzo furan

EcoSSL - ecological soil screening level

ESL - ecological screening level

ESV - ecological screening value

MW - molecular weight

PAH - polycyclic aromatic hydrocarbon

Reg5 - Region 5

SQG<sub>E</sub> - soil quality guideline for ecological receptors

TEQ - toxicity equivalent

TABLE M-5

**Ecological Screening Values for Sediment Exposures***Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona*

Variable	Benthic Macroinvertebrates			Terrestrial and Aquatic Rooted Plants			Birds and Mammals		
	ESV (mg/kg)	Endpoint	Source	ESV (mg/kg)	Endpoint	Source	ESV (mg/kg)	Endpoint	Source
Aluminum	25,500	TEL	Buchman, 2008	--	--	--	--	--	--
Antimony	2	Region III FSSB	EPA, 2011	20	SQG <sub>E</sub>	CCME, 2011	0.27	EcoSSL	EPA, 2005a
Arsenic	9.79	TEC	MacDonald et al., 2000	18	EcoSSL	EPA, 2005b	43	EcoSSL	EPA, 2005b
Barium	130	TEL	Buchman, 2008	750	SQG <sub>E</sub>	CCME, 2011	2000	EcoSSL	EPA, 2005c
Beryllium	--	--	--	4	SQG <sub>E</sub>	CCME, 2011	21	EcoSSL	EPA, 2005d
Cadmium	0.99	TEC	MacDonald et al., 2000	32	EcoSSL	EPA, 2005e	0.36	EcoSSL	EPA, 2005e
Chromium	43.4	TEC	MacDonald et al., 2000	64	SQGE	CCME, 2011	26	EcoSSL	EPA, 2008
Cobalt	50	LEL	Buchman, 2008	13	EcoSSL	EPA, 2005f	120	EcoSSL	EPA, 2005f
Copper	31.6	TEC	MacDonald et al., 2000	70	EcoSSL	EPA, 2007a	28	EcoSSL	EPA, 2007a
Cyanide	--	--	--	0.9	SQGE	CCME, 2011	1.3	Reg5 ESL	EPA, 2003
Iron	20,000	Region III FSSB	EPA, 2011	--	--	--	--	--	--
Lead	35.8	TEC	MacDonald et al., 2000	120	EcoSSL	EPA, 2005g	11	EcoSSL	EPA, 2005g
Manganese	630	TEL	Buchman, 2008	220	EcoSSL	EPA, 2007b	4000	EcoSSL	EPA, 2007b
Mercury	0.18	TEC	MacDonald et al., 2000	6.6	SQGE	CCME, 2011	0.013	No Effect	LANL, 2014
Nickel	22.7	TEC	MacDonald et al., 2000	38	EcoSSL	EPA, 2007c	130	EcoSSL	EPA, 2007c
Selenium	2.5	Low	USDI, 1998	0.52	EcoSSL	EPA, 2007d	0.63	EcoSSL	EPA, 2007d
Silver	1	Region III FSSB	EPA, 2011	560	EcoSSL	EPA, 2006	4.2	EcoSSL	EPA, 2006
Thallium	--	--	--	1	SQGE	CCME, 2011	0.0569	Reg5 ESL	EPA, 2003
Vanadium	57	AETm	Buchman, 2008	330	SQGE	CCME, 2011	7.8	EcoSSL	EPA, 2005h
Zinc	121	TEC	MacDonald et al., 2000	160	EcoSSL	EPA, 2007e	46	EcoSSL	EPA, 2007e
Chloride	--	--	--	--	--	--	--	--	--
Nitrate as N	--	--	--	--	--	--	--	--	--
Sulfate	--	--	--	--	--	--	--	--	--
1,2,3,4,6,7,8-Hepta CDD	0.00000085	TEL	Buchman, 2008	0.000004	SQGE	CCME, 2011	--	see TEQ	--
1,2,3,4,6,7,8-Hepta CDF	0.00000085	TEL	Buchman, 2008	0.000004	SQGE	CCME, 2011	--	see TEQ	--
1,2,3,4,7,8-Hexa CDD	0.00000085	TEL	Buchman, 2008	0.000004	SQGE	CCME, 2011	--	see TEQ	--
1,2,3,6,7,8-Hexa CDD	0.00000085	TEL	Buchman, 2008	0.000004	SQGE	CCME, 2011	--	see TEQ	--
1,2,3,7,8-Penta CDF	0.00000085	TEL	Buchman, 2008	0.000004	SQGE	CCME, 2011	--	see TEQ	--
2,3,4,7,8-Penta CDF	0.00000085	TEL	Buchman, 2008	0.000004	SQGE	CCME, 2011	--	see TEQ	--
Acetophenone	--	--	--	--	--	--	300	Reg5 ESL	EPA, 2003
bis(2-Ethylhexyl)phthalate	0.18	TELm	Buchman, 2008	--	--	--	0.02	No Effect	LANL, 2014
OCDD	0.00000085	TEL	Buchman, 2008	0.000004	SQGE	CCME, 2011	--	see TEQ	--
OCDF	0.00000085	TEL	Buchman, 2008	0.000004	SQGE	CCME, 2011	--	see TEQ	--
TEQBird	--	--	--	--	not	--	0.00000029	No Effect	LANL, 2014
TEQMammal	--	--	--	--	not	--	0.00000029	No Effect	LANL, 2014



TABLE M-5

**Ecological Screening Values for Sediment Exposures***Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona*

Variable	Benthic Macroinvertebrates			Terrestrial and Aquatic Rooted Plants			Birds and Mammals		
	ESV (mg/kg)	Endpoint	Source	ESV (mg/kg)	Endpoint	Source	ESV (mg/kg)	Endpoint	Source

Notes:

-- - not available or not applicable

AET - apparent effect threshold

CDD - chlorodibenzodioxin

CDF - chlorodibenzo furan

EcoSSL - ecological soil screening level

ESL - ecological screening level

ESV - ecological screening value

ESV - ecological screening value

FSSB - freshwater sediment screening benchmark

MW - molecular weight

SQG<sub>E</sub> - soil quality guideline for ecological receptors

TEC - threshold effect concentration

TEL - threshold effect level

TELM - threshold effect level (marine)

TEQ - toxicity equivalent

TABLE M-6

**Ecological Screening Values for Surface Water***Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona*

Variable	Fraction <sup>a</sup>	ESV (mg/L)	ESV (µg/L)	Hardness Dependent Criteria <sup>b,c</sup> (µg/L)	Notes	Endpoint	Source
Aluminum	Total	0.087	87	--		CCC NRWQC	EPA, 2009
Antimony	Total	0.03	30	--	T (CF=1)	A&Ww chronic	ADEQ, 2009
Arsenic	Dissolved	0.15	150	--	D	CCC NRWQC	EPA, 2009
Barium	Total	0.004	4	--		Tier II value	Suter and Tsao, 1996
Beryllium	Total	0.00066	0.66	--		Tier II value	Suter and Tsao, 1996
Cadmium	Dissolved	0.00052	0.52	=EXP(0.7409*LN(297)-4.719)*(1.101672-(LN(297)*0.041838))	D,H	CCC NRWQC	EPA, 2009
Chloride	Total	230	230000	--		CCC NRWQC	EPA, 2009
Chromium	Dissolved	0.181	181	=EXP(0.819*LN(297)+0.6848)*0.86	D,H	CCC NRWQC	EPA, 2009
Cobalt	Total	0.023	23	--		Tier II value	Suter and Tsao, 1996
Copper	Dissolved	0.023	23	=EXP(0.8545*LN(297)-1.702)*0.96	D,H	CCC NRWQC	EPA, 2009
Cyanide	Total	0.0052	5.2	--		CCC NRWQC	EPA, 2009
Fluoride	Total	--	--	--		--	--
Iron	Total	1	1000	--		CCC NRWQC	EPA, 2009
Lead	Dissolved	0.0080	8.0	=EXP(1.273*LN(297)-4.705)*(1.46203-(LN(297)*0.145712))	D,H	CCC NRWQC	EPA, 2009
Manganese	Total	0.12	120	--		Tier II value	Suter and Tsao, 1996
Mercury	Dissolved	0.00001	0.01	--	D	A&Ww chronic	ADEQ, 2009
Nickel	Dissolved	0.131	131	=EXP(0.846*LN(297)+0.0584)*0.997	D,H	CCC NRWQC	EPA, 2009
Selenium	Total	0.002	2	--	T	A&Ww chronic	ADEQ, 2009
Silver	Dissolved	0.00209	2.09	=EXP(1.72*LN(297)-6.59)*0.85/10	D,H, CMC/10	CMC NRWQC	EPA, 2009
Thallium	Total	0.15	150	--	T (CF=1)	A&Ww chronic	ADEQ, 2009
Vanadium	Total	0.02	20	--		Tier II value	
Zinc	Dissolved	0.297	297	=EXP(0.8473*LN(297)+0.884)*0.986	D,H	CCC NRWQC	EPA, 2009
Nitrate As N	Total	--	--	--		--	--
Nitrite As N	Total	--	--	--		--	--

Notes:

<sup>a</sup> Fraction listed that is the basis of the criteria.<sup>b</sup> Hardness dependent criteria are calculated as follows: CCC (µg/L dissolved) = (exp(m<sub>c</sub>(ln(hardness)+b<sub>c</sub>))\*CF where:

analyte	m <sub>c</sub>	b <sub>c</sub>	CF
cadmium	0.7409	-4.719	1.101672[ln(hardness)*0.041838]
chromium III	0.819	0.6848	0.86
copper	0.8545	-1.702	0.96
lead	1.273	-4.705	1.46203[ln(hardness)*0.145712]
nickel	0.846	0.0584	0.997
silver (CMC)	1.72	-6.59	0.85
zinc	0.8473	0.884	0.986

<sup>c</sup> Average hardness for AF-01, AF-02, and AF-03 is 297 mg/L CaCO<sub>3</sub>.

-- - not available

A&amp;Ww - aquatic and wildlife (warm water) standard

CCC - criterion continuous concentration

CF - conversion factor

CMC - criterion maximum concentration

D - criterion is expressed as a dissolved fraction

ESV - ecological screening value

H - criterion is hardness based

NRWQC - national recommended water quality criteria

T - criterion is expressed as a total recoverable concentration

TABLE M-7

**Soil Screening - Identification of COPECs***Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona*

Exposure						Background Screen			Terrestrial Plants and Soil			Birds and Mammals			Retain as COPEC <sup>a</sup> ?
									Invertebrates						
									ESV	Screening	Exceed?	ESV	Screening	Exceed?	
Area	Matrix	Type	Variable	Units	Maximum Detect (mg/kg)	BTV	BQ	Exceed?	(mg/kg)	HQ	Exceed?	(mg/kg)	HQ	Exceed?	
3001	Soil	I	Aluminum	mg/kg	26200	35600	7E-01	No	--	--	--	--	--	--	No
3001	Soil	I	Arsenic	mg/kg	132	112	1E+00	Yes	18	7E+00	Yes	43	3E+00	Yes	Yes
3001	Soil	I	Barium	mg/kg	196	271	7E-01	No	330	6E-01	No	2000	1E-01	No	No
3001	Soil	I	Beryllium	mg/kg	0.93	1.7	5E-01	No	40	2E-02	No	21	4E-02	No	No
3001	Soil	I	Cadmium	mg/kg	3.3	0.824	4E+00	Yes	32	1E-01	No	0.36	9E+00	Yes	Yes
3001	Soil	I	Chromium	mg/kg	84	145	6E-01	No	64	1E+00	Yes	26	3E+00	Yes	No
3001	Soil	I	Cobalt	mg/kg	32.5	43.6	7E-01	No	13	3E+00	Yes	120	3E-01	No	No
3001	Soil	I	Copper	mg/kg	626	182	3E+00	Yes	70	9E+00	Yes	28	2E+01	Yes	Yes
3001	Soil	I	Iron	mg/kg	85700	71900	1E+00	Yes	--	--	--	--	--	--	Yes
3001	Soil	I	Lead	mg/kg	187	34.8	5E+00	Yes	120	2E+00	Yes	11	2E+01	Yes	Yes
3001	Soil	I	Manganese	mg/kg	1460	1600	9E-01	No	220	7E+00	Yes	4000	4E-01	No	No
3001	Soil	I	Mercury	mg/kg	0.31	0.0795	4E+00	Yes	6.6	5E-02	No	0.013	2E+01	Yes	Yes
3001	Soil	I	Nickel	mg/kg	63.4	89	7E-01	No	38	2E+00	Yes	130	5E-01	No	No
3001	Soil	I	Selenium	mg/kg	1.8	4.4	4E-01	No	0.52	3E+00	Yes	0.63	3E+00	Yes	No
3001	Soil	I	Vanadium	mg/kg	131	231	6E-01	No	330	4E-01	No	7.8	2E+01	Yes	No
3001	Soil	I	Zinc	mg/kg	366	136	3E+00	Yes	120	3E+00	Yes	46	8E+00	Yes	Yes
NE-02	Soil	I	Aluminum	mg/kg	22100	35600	6E-01	No	--	--	--	--	--	--	No
NE-02	Soil	I	Antimony	mg/kg	1.6	2.42	7E-01	No	78	2E-02	No	0.27	6E+00	Yes	No
NE-02	Soil	I	Arsenic	mg/kg	58.3	112	5E-01	No	18	3E+00	Yes	43	1E+00	Yes	No
NE-02	Soil	I	Barium	mg/kg	132	271	5E-01	No	330	4E-01	No	2000	7E-02	No	No
NE-02	Soil	I	Beryllium	mg/kg	0.67	1.7	4E-01	No	40	2E-02	No	21	3E-02	No	No
NE-02	Soil	I	Cadmium	mg/kg	2	0.824	2E+00	Yes	32	6E-02	No	0.36	6E+00	Yes	Yes
NE-02	Soil	I	Chromium	mg/kg	21.4	145	1E-01	No	64	3E-01	No	26	8E-01	No	No
NE-02	Soil	I	Cobalt	mg/kg	13.7	43.6	3E-01	No	13	1E+00	Yes	120	1E-01	No	No
NE-02	Soil	I	Copper	mg/kg	117	182	6E-01	No	70	2E+00	Yes	28	4E+00	Yes	No
NE-02	Soil	I	Iron	mg/kg	38600	71900	5E-01	No	--	--	--	--	--	--	No
NE-02	Soil	I	Lead	mg/kg	89.5	34.8	3E+00	Yes	120	7E-01	No	11	8E+00	Yes	Yes
NE-02	Soil	I	Manganese	mg/kg	822	1600	5E-01	No	220	4E+00	Yes	4000	2E-01	No	No
NE-02	Soil	I	Mercury	mg/kg	0.18	0.0795	2E+00	Yes	6.6	3E-02	No	0.013	1E+01	Yes	Yes
NE-02	Soil	I	Nickel	mg/kg	18.3	89	2E-01	No	38	5E-01	No	130	1E-01	No	No
NE-02	Soil	I	Selenium	mg/kg	2.9	4.4	7E-01	No	0.52	6E+00	Yes	0.63	5E+00	Yes	No
NE-02	Soil	I	Silver	mg/kg	2.6	--	--	--	560	5E-03	No	4.2	6E-01	No	No
NE-02	Soil	I	Vanadium	mg/kg	53.3	231	2E-01	No	330	2E-01	No	7.8	7E+00	Yes	No
NE-02	Soil	I	Zinc	mg/kg	227	136	2E+00	Yes	120	2E+00	Yes	46	5E+00	Yes	Yes
NE-04	Soil	I	Aluminum	mg/kg	23000	35600	6E-01	No	--	--	--	--	--	--	No
NE-04	Soil	I	Arsenic	mg/kg	30.3	112	3E-01	No	18	2E+00	Yes	43	7E-01	No	No
NE-04	Soil	I	Barium	mg/kg	109	271	4E-01	No	330	3E-01	No	2000	5E-02	No	No
NE-04	Soil	I	Beryllium	mg/kg	0.55	1.7	3E-01	No	40	1E-02	No	21	3E-02	No	No
NE-04	Soil	I	Cadmium	mg/kg	0.67	0.824	8E-01	No	32	2E-02	No	0.36	2E+00	Yes	No
NE-04	Soil	I	Chromium	mg/kg	17.7	145	1E-01	No	64	3E-01	No	26	7E-01	No	No
NE-04	Soil	I	Cobalt	mg/kg	10.7	43.6	2E-01	No	13	8E-01	No	120	9E-02	No	No
NE-04	Soil	I	Copper	mg/kg	92.3	182	5E-01	No	70	1E+00	Yes	28	3E+00	Yes	No

TABLE M-7

**Soil Screening - Identification of COPECs***Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona*

Exposure						Maximum Detect (mg/kg)	Background Screen			Terrestrial Plants and Soil			Birds and Mammals			Retain as COPEC <sup>a</sup> ?
										Invertebrates						
							Area	Matrix	Type	Variable	Units	BTV	BQ	Exceed?	ESV (mg/kg)	
NE-04	Soil	I	Iron	mg/kg	35400	71900	5E-01	No	--	--	--	--	--	--	No	
NE-04	Soil	I	Lead	mg/kg	34.3	34.8	1E+00	No	120	3E-01	No	11	3E+00	Yes	No	
NE-04	Soil	I	Manganese	mg/kg	910	1600	6E-01	No	220	4E+00	Yes	4000	2E-01	No	No	
NE-04	Soil	I	Nickel	mg/kg	14.9	89	2E-01	No	38	4E-01	No	130	1E-01	No	No	
NE-04	Soil	I	Selenium	mg/kg	0.76	4.4	2E-01	No	0.52	1E+00	Yes	0.63	1E+00	Yes	No	
NE-04	Soil	I	Vanadium	mg/kg	40.8	231	2E-01	No	330	1E-01	No	7.8	5E+00	Yes	No	
NE-04	Soil	I	Zinc	mg/kg	124	136	9E-01	No	120	1E+00	Yes	46	3E+00	Yes	No	
NE-06	Soil	I	Aluminum	mg/kg	35900	35600	1E+00	Yes	--	--	--	--	--	--	Yes	
NE-06	Soil	I	Antimony	mg/kg	7.3	2.42	3E+00	Yes	78	9E-02	No	0.27	3E+01	Yes	Yes	
NE-06	Soil	I	Arsenic	mg/kg	558	112	5E+00	Yes	18	3E+01	Yes	43	1E+01	Yes	Yes	
NE-06	Soil	I	Barium	mg/kg	918	271	3E+00	Yes	330	3E+00	Yes	2000	5E-01	No	Yes	
NE-06	Soil	I	Beryllium	mg/kg	1.7	1.7	1E+00	No	40	4E-02	No	21	8E-02	No	No	
NE-06	Soil	I	Cadmium	mg/kg	2.6	0.824	3E+00	Yes	32	8E-02	No	0.36	7E+00	Yes	Yes	
NE-06	Soil	I	Chromium	mg/kg	85.7	145	6E-01	No	64	1E+00	Yes	26	3E+00	Yes	No	
NE-06	Soil	I	Cobalt	mg/kg	27.9	43.6	6E-01	No	13	2E+00	Yes	120	2E-01	No	No	
NE-06	Soil	I	Copper	mg/kg	201	182	1E+00	Yes	70	3E+00	Yes	28	7E+00	Yes	Yes	
NE-06	Soil	I	Cyanide	mg/kg	0.83	--	--	--	0.9	9E-01	No	1.3	6E-01	No	No	
NE-06	Soil	I	Iron	mg/kg	66900	71900	9E-01	No	--	--	--	--	--	--	No	
NE-06	Soil	I	Lead	mg/kg	337	34.8	1E+01	Yes	120	3E+00	Yes	11	3E+01	Yes	Yes	
NE-06	Soil	I	Manganese	mg/kg	7880	1600	5E+00	Yes	220	4E+01	Yes	4000	2E+00	Yes	Yes	
NE-06	Soil	I	Mercury	mg/kg	0.24	0.0795	3E+00	Yes	6.6	4E-02	No	0.013	2E+01	Yes	Yes	
NE-06	Soil	I	Nickel	mg/kg	76.6	89	9E-01	No	38	2E+00	Yes	130	6E-01	No	No	
NE-06	Soil	I	Selenium	mg/kg	3.8	4.4	9E-01	No	0.52	7E+00	Yes	0.63	6E+00	Yes	No	
NE-06	Soil	I	Silver	mg/kg	0.23	--	--	--	560	4E-04	No	4.2	5E-02	No	No	
NE-06	Soil	I	Sulfate	mg/kg	7.8	--	--	--	--	--	--	--	--	--	Yes	
NE-06	Soil	I	Thallium	mg/kg	6.1	2.8	2E+00	Yes	1	6E+00	Yes	0.0569	1E+02	Yes	Yes	
NE-06	Soil	I	Vanadium	mg/kg	131	231	6E-01	No	330	4E-01	No	7.8	2E+01	Yes	No	
NE-06	Soil	I	Zinc	mg/kg	404	136	3E+00	Yes	120	3E+00	Yes	46	9E+00	Yes	Yes	
NE-07	Soil	I	Aluminum	mg/kg	105000	35600	3E+00	Yes	--	--	--	--	--	--	Yes	
NE-07	Soil	I	Antimony	mg/kg	39.4	2.42	2E+01	Yes	78	5E-01	No	0.27	1E+02	Yes	Yes	
NE-07	Soil	I	Arsenic	mg/kg	377	112	3E+00	Yes	18	2E+01	Yes	43	9E+00	Yes	Yes	
NE-07	Soil	I	Barium	mg/kg	784	271	3E+00	Yes	330	2E+00	Yes	2000	4E-01	No	Yes	
NE-07	Soil	I	Beryllium	mg/kg	11.4	1.7	7E+00	Yes	40	3E-01	No	21	5E-01	No	No	
NE-07	Soil	I	Cadmium	mg/kg	18.3	0.824	2E+01	Yes	32	6E-01	No	0.36	5E+01	Yes	Yes	
NE-07	Soil	I	Chromium	mg/kg	441	145	3E+00	Yes	64	7E+00	Yes	26	2E+01	Yes	Yes	
NE-07	Soil	I	Cobalt	mg/kg	29	43.6	7E-01	No	13	2E+00	Yes	120	2E-01	No	No	
NE-07	Soil	I	Copper	mg/kg	4830	182	3E+01	Yes	70	7E+01	Yes	28	2E+02	Yes	Yes	
NE-07	Soil	I	Cyanide	mg/kg	0.64	--	--	--	0.9	7E-01	No	1.3	5E-01	No	No	
NE-07	Soil	I	Iron	mg/kg	107000	71900	1E+00	Yes	--	--	--	--	--	--	Yes	
NE-07	Soil	I	Lead	mg/kg	1430	34.8	4E+01	Yes	120	1E+01	Yes	11	1E+02	Yes	Yes	
NE-07	Soil	I	Manganese	mg/kg	4700	1600	3E+00	Yes	220	2E+01	Yes	4000	1E+00	Yes	Yes	
NE-07	Soil	I	Mercury	mg/kg	1.5	0.0795	2E+01	Yes	6.6	2E-01	No	0.013	1E+02	Yes	Yes	

TABLE M-7

**Soil Screening - Identification of COPECs***Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona*

Exposure						Maximum Detect (mg/kg)	Background Screen			Terrestrial Plants and Soil			Birds and Mammals			Retain as COPEC <sup>a</sup> ?
										Invertebrates						
							Area	Matrix	Type	Variable	Units	BTV	BQ	Exceed?	ESV (mg/kg)	
NE-07	Soil	I	Nickel	mg/kg	253	89	3E+00	Yes	38	7E+00	Yes	130	2E+00	Yes	Yes	
NE-07	Soil	I	Selenium	mg/kg	5.5	4.4	1E+00	Yes	0.52	1E+01	Yes	0.63	9E+00	Yes	Yes	
NE-07	Soil	I	Silver	mg/kg	10.1	--	--	--	560	2E-02	No	4.2	2E+00	Yes	Yes	
NE-07	Soil	I	Thallium	mg/kg	0.44	2.8	2E-01	No	1	4E-01	No	0.0569	8E+00	Yes	No	
NE-07	Soil	I	Vanadium	mg/kg	117	231	5E-01	No	330	4E-01	No	7.8	2E+01	Yes	No	
NE-07	Soil	I	Zinc	mg/kg	4800	136	4E+01	Yes	120	4E+01	Yes	46	1E+02	Yes	Yes	
NE-08	Soil	I	Aluminum	mg/kg	58300	35600	2E+00	Yes	--	--	--	--	--	--	Yes	
NE-08	Soil	I	Antimony	mg/kg	3.1	2.42	1E+00	Yes	78	4E-02	No	0.27	1E+01	Yes	Yes	
NE-08	Soil	I	Arsenic	mg/kg	406	112	4E+00	Yes	18	2E+01	Yes	43	9E+00	Yes	Yes	
NE-08	Soil	I	Barium	mg/kg	2860	271	1E+01	Yes	330	9E+00	Yes	2000	1E+00	Yes	Yes	
NE-08	Soil	I	Beryllium	mg/kg	1.9	1.7	1E+00	Yes	40	5E-02	No	21	9E-02	No	No	
NE-08	Soil	I	Cadmium	mg/kg	5.5	0.824	7E+00	Yes	32	2E-01	No	0.36	2E+01	Yes	Yes	
NE-08	Soil	I	Chromium	mg/kg	140	145	1E+00	No	64	2E+00	Yes	26	5E+00	Yes	No	
NE-08	Soil	I	Cobalt	mg/kg	33.1	43.6	8E-01	No	13	3E+00	Yes	120	3E-01	No	No	
NE-08	Soil	I	Copper	mg/kg	774	182	4E+00	Yes	70	1E+01	Yes	28	3E+01	Yes	Yes	
NE-08	Soil	I	Cyanide	mg/kg	4.6	--	--	--	0.9	5E+00	Yes	1.3	4E+00	Yes	Yes	
NE-08	Soil	I	Iron	mg/kg	166000	71900	2E+00	Yes	--	--	--	--	--	--	Yes	
NE-08	Soil	I	Lead	mg/kg	234	34.8	7E+00	Yes	120	2E+00	Yes	11	2E+01	Yes	Yes	
NE-08	Soil	I	Manganese	mg/kg	6850	1600	4E+00	Yes	220	3E+01	Yes	4000	2E+00	Yes	Yes	
NE-08	Soil	I	Mercury	mg/kg	2.4	0.0795	3E+01	Yes	6.6	4E-01	No	0.013	2E+02	Yes	Yes	
NE-08	Soil	I	Nickel	mg/kg	150	89	2E+00	Yes	38	4E+00	Yes	130	1E+00	Yes	Yes	
NE-08	Soil	I	Selenium	mg/kg	3.7	4.4	8E-01	No	0.52	7E+00	Yes	0.63	6E+00	Yes	No	
NE-08	Soil	I	Silver	mg/kg	3.1	--	--	--	560	6E-03	No	4.2	7E-01	No	No	
NE-08	Soil	I	Thallium	mg/kg	3	2.8	1E+00	Yes	1	3E+00	Yes	0.0569	5E+01	Yes	Yes	
NE-08	Soil	I	Vanadium	mg/kg	175	231	8E-01	No	330	5E-01	No	7.8	2E+01	Yes	No	
NE-08	Soil	I	Zinc	mg/kg	480	136	4E+00	Yes	120	4E+00	Yes	46	1E+01	Yes	Yes	
NE-09	Soil	I	Aluminum	mg/kg	38400	35600	1E+00	Yes	--	--	--	--	--	--	Yes	
NE-09	Soil	I	Antimony	mg/kg	2	2.42	8E-01	No	78	3E-02	No	0.27	7E+00	Yes	No	
NE-09	Soil	I	Arsenic	mg/kg	571	112	5E+00	Yes	18	3E+01	Yes	43	1E+01	Yes	Yes	
NE-09	Soil	I	Barium	mg/kg	588	271	2E+00	Yes	330	2E+00	Yes	2000	3E-01	No	Yes	
NE-09	Soil	I	Beryllium	mg/kg	0.88	1.7	5E-01	No	40	2E-02	No	21	4E-02	No	No	
NE-09	Soil	I	Cadmium	mg/kg	0.68	0.824	8E-01	No	32	2E-02	No	0.36	2E+00	Yes	No	
NE-09	Soil	I	Chromium	mg/kg	129	145	9E-01	No	64	2E+00	Yes	26	5E+00	Yes	No	
NE-09	Soil	I	Cobalt	mg/kg	45.8	43.6	1E+00	Yes	13	4E+00	Yes	120	4E-01	No	Yes	
NE-09	Soil	I	Copper	mg/kg	158	182	9E-01	No	70	2E+00	Yes	28	6E+00	Yes	No	
NE-09	Soil	I	Iron	mg/kg	300000	71900	4E+00	Yes	--	--	--	--	--	--	Yes	
NE-09	Soil	I	Lead	mg/kg	60.2	34.8	2E+00	Yes	120	5E-01	No	11	5E+00	Yes	Yes	
NE-09	Soil	I	Manganese	mg/kg	17500	1600	1E+01	Yes	220	8E+01	Yes	4000	4E+00	Yes	Yes	
NE-09	Soil	I	Mercury	mg/kg	0.09	0.0795	1E+00	Yes	6.6	1E-02	No	0.013	7E+00	Yes	Yes	
NE-09	Soil	I	Nickel	mg/kg	69.8	89	8E-01	No	38	2E+00	Yes	130	5E-01	No	No	
NE-09	Soil	I	Selenium	mg/kg	1	4.4	2E-01	No	0.52	2E+00	Yes	0.63	2E+00	Yes	No	
NE-09	Soil	I	Thallium	mg/kg	0.24	2.8	9E-02	No	1	2E-01	No	0.0569	4E+00	Yes	No	

TABLE M-7

**Soil Screening - Identification of COPECs***Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona*

Exposure						Maximum Detect (mg/kg)	Background Screen			Terrestrial Plants and Soil			Birds and Mammals			Retain as COPEC <sup>a</sup> ?
										Invertebrates						
							Area	Matrix	Type	Variable	Units	BTV	BQ	Exceed?	ESV (mg/kg)	
NE-09	Soil	I	Vanadium	mg/kg	248	231	1E+00	Yes	330	8E-01	No	7.8	3E+01	Yes	Yes	
NE-09	Soil	I	Zinc	mg/kg	265	136	2E+00	Yes	120	2E+00	Yes	46	6E+00	Yes	Yes	
NE-11	Soil	I	Aluminum	mg/kg	45500	35600	1E+00	Yes	--	--	--	--	--	--	Yes	
NE-11	Soil	I	Antimony	mg/kg	5.2	2.42	2E+00	Yes	78	7E-02	No	0.27	2E+01	Yes	Yes	
NE-11	Soil	I	Arsenic	mg/kg	388	112	3E+00	Yes	18	2E+01	Yes	43	9E+00	Yes	Yes	
NE-11	Soil	I	Barium	mg/kg	2300	271	8E+00	Yes	330	7E+00	Yes	2000	1E+00	Yes	Yes	
NE-11	Soil	I	Beryllium	mg/kg	1.5	1.7	9E-01	No	40	4E-02	No	21	7E-02	No	No	
NE-11	Soil	I	Cadmium	mg/kg	7.7	0.824	9E+00	Yes	32	2E-01	No	0.36	2E+01	Yes	Yes	
NE-11	Soil	I	Chromium	mg/kg	288	145	2E+00	Yes	64	5E+00	Yes	26	1E+01	Yes	Yes	
NE-11	Soil	I	Cobalt	mg/kg	58.9	43.6	1E+00	Yes	13	5E+00	Yes	120	5E-01	No	Yes	
NE-11	Soil	I	Copper	mg/kg	508	182	3E+00	Yes	70	7E+00	Yes	28	2E+01	Yes	Yes	
NE-11	Soil	I	Cyanide	mg/kg	0.8	--	--	--	0.9	9E-01	No	1.3	6E-01	No	No	
NE-11	Soil	I	Iron	mg/kg	160000	71900	2E+00	Yes	--	--	--	--	--	--	Yes	
NE-11	Soil	I	Lead	mg/kg	253	34.8	7E+00	Yes	120	2E+00	Yes	11	2E+01	Yes	Yes	
NE-11	Soil	I	Manganese	mg/kg	9630	1600	6E+00	Yes	220	4E+01	Yes	4000	2E+00	Yes	Yes	
NE-11	Soil	I	Mercury	mg/kg	0.3	0.0795	4E+00	Yes	6.6	5E-02	No	0.013	2E+01	Yes	Yes	
NE-11	Soil	I	Nickel	mg/kg	193	89	2E+00	Yes	38	5E+00	Yes	130	1E+00	Yes	Yes	
NE-11	Soil	I	Nitrate as N	mg/kg	3.3	--	--	--	--	--	--	--	--	--	Yes	
NE-11	Soil	I	Selenium	mg/kg	1.8	4.4	4E-01	No	0.52	3E+00	Yes	0.63	3E+00	Yes	No	
NE-11	Soil	I	Silver	mg/kg	1.6	--	--	--	560	3E-03	No	4.2	4E-01	No	No	
NE-11	Soil	I	Sulfate	mg/kg	8.6	--	--	--	--	--	--	--	--	--	Yes	
NE-11	Soil	I	Thallium	mg/kg	1.6	2.8	6E-01	No	1	2E+00	Yes	0.0569	3E+01	Yes	No	
NE-11	Soil	I	Vanadium	mg/kg	343	231	1E+00	Yes	330	1E+00	Yes	7.8	4E+01	Yes	Yes	
NE-11	Soil	I	Zinc	mg/kg	388	136	3E+00	Yes	120	3E+00	Yes	46	8E+00	Yes	Yes	
NE-11	Soil	O	bis(2-Ethylhexyl)phthalate	mg/kg	0.061	--	--	--	--	--	--	0.02	3E+00	Yes	Yes	
NR3	Soil	I	Aluminum	mg/kg	17500	35600	5E-01	No	--	--	--	--	--	--	No	
NR3	Soil	I	Antimony	mg/kg	13.4	2.42	6E+00	Yes	78	2E-01	No	0.27	5E+01	Yes	Yes	
NR3	Soil	I	Arsenic	mg/kg	991	112	9E+00	Yes	18	6E+01	Yes	43	2E+01	Yes	Yes	
NR3	Soil	I	Barium	mg/kg	233	271	9E-01	No	330	7E-01	No	2000	1E-01	No	No	
NR3	Soil	I	Beryllium	mg/kg	0.79	1.7	5E-01	No	40	2E-02	No	21	4E-02	No	No	
NR3	Soil	I	Cadmium	mg/kg	4.8	0.824	6E+00	Yes	32	2E-01	No	0.36	1E+01	Yes	Yes	
NR3	Soil	I	Chromium	mg/kg	38.8	145	3E-01	No	64	6E-01	No	26	1E+00	Yes	No	
NR3	Soil	I	Cobalt	mg/kg	16.9	43.6	4E-01	No	13	1E+00	Yes	120	1E-01	No	No	
NR3	Soil	I	Copper	mg/kg	496	182	3E+00	Yes	70	7E+00	Yes	28	2E+01	Yes	Yes	
NR3	Soil	I	Cyanide	mg/kg	0.49	--	--	--	0.9	5E-01	No	1.3	4E-01	No	No	
NR3	Soil	I	Iron	mg/kg	61800	71900	9E-01	No	--	--	--	--	--	--	No	
NR3	Soil	I	Lead	mg/kg	3080	34.8	9E+01	Yes	120	3E+01	Yes	11	3E+02	Yes	Yes	
NR3	Soil	I	Manganese	mg/kg	910	1600	6E-01	No	220	4E+00	Yes	4000	2E-01	No	No	
NR3	Soil	I	Mercury	mg/kg	4.1	0.0795	5E+01	Yes	6.6	6E-01	No	0.013	3E+02	Yes	Yes	
NR3	Soil	I	Nickel	mg/kg	39.3	89	4E-01	No	38	1E+00	Yes	130	3E-01	No	No	
NR3	Soil	I	Nitrate as N	mg/kg	1	--	--	--	--	--	--	--	--	--	Yes	
NR3	Soil	I	Selenium	mg/kg	12.3	4.4	3E+00	Yes	0.52	2E+01	Yes	0.63	2E+01	Yes	Yes	

TABLE M-7

**Soil Screening - Identification of COPECs***Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona*

Exposure						Background Screen			Terrestrial Plants and Soil Invertebrates			Birds and Mammals			Retain as COPEC <sup>a</sup> ?
									ESV (mg/kg)	Screening HQ	Exceed?	ESV (mg/kg)	Screening HQ	Exceed?	
NR3	Soil	I	Silver	mg/kg	8	--	--	--	560	1E-02	No	4.2	2E+00	Yes	Yes
NR3	Soil	I	Sulfate	mg/kg	4200	--	--	--	--	--	--	--	--	--	Yes
NR3	Soil	I	Thallium	mg/kg	1.5	2.8	5E-01	No	1	2E+00	Yes	0.0569	3E+01	Yes	No
NR3	Soil	I	Vanadium	mg/kg	97.2	231	4E-01	No	330	3E-01	No	7.8	1E+01	Yes	No
NR3	Soil	I	Zinc	mg/kg	1250	136	9E+00	Yes	120	1E+01	Yes	46	3E+01	Yes	Yes
NR4/NR5	Soil	I	Aluminum	mg/kg	12900	35600	4E-01	No	--	--	--	--	--	--	No
NR4/NR5	Soil	I	Antimony	mg/kg	25.5	2.42	1E+01	Yes	78	3E-01	No	0.27	9E+01	Yes	Yes
NR4/NR5	Soil	I	Arsenic	mg/kg	2270	112	2E+01	Yes	18	1E+02	Yes	43	5E+01	Yes	Yes
NR4/NR5	Soil	I	Barium	mg/kg	146	271	5E-01	No	330	4E-01	No	2000	7E-02	No	No
NR4/NR5	Soil	I	Beryllium	mg/kg	0.4	1.7	2E-01	No	40	1E-02	No	21	2E-02	No	No
NR4/NR5	Soil	I	Cadmium	mg/kg	8.1	0.824	1E+01	Yes	32	3E-01	No	0.36	2E+01	Yes	Yes
NR4/NR5	Soil	I	Chromium	mg/kg	16.9	145	1E-01	No	64	3E-01	No	26	7E-01	No	No
NR4/NR5	Soil	I	Cobalt	mg/kg	15.9	43.6	4E-01	No	13	1E+00	Yes	120	1E-01	No	No
NR4/NR5	Soil	I	Copper	mg/kg	192	182	1E+00	Yes	70	3E+00	Yes	28	7E+00	Yes	Yes
NR4/NR5	Soil	I	Iron	mg/kg	54800	71900	8E-01	No	--	--	--	--	--	--	No
NR4/NR5	Soil	I	Lead	mg/kg	16400	34.8	5E+02	Yes	120	1E+02	Yes	11	1E+03	Yes	Yes
NR4/NR5	Soil	I	Manganese	mg/kg	825	1600	5E-01	No	220	4E+00	Yes	4000	2E-01	No	No
NR4/NR5	Soil	I	Nickel	mg/kg	18.7	89	2E-01	No	38	5E-01	No	130	1E-01	No	No
NR4/NR5	Soil	I	Selenium	mg/kg	24	4.4	5E+00	Yes	0.52	5E+01	Yes	0.63	4E+01	Yes	Yes
NR4/NR5	Soil	I	Silver	mg/kg	13.7	--	--	--	560	2E-02	No	4.2	3E+00	Yes	Yes
NR4/NR5	Soil	I	Thallium	mg/kg	1.1	2.8	4E-01	No	1	1E+00	Yes	0.0569	2E+01	Yes	No
NR4/NR5	Soil	I	Vanadium	mg/kg	60.1	231	3E-01	No	330	2E-01	No	7.8	8E+00	Yes	No
NR4/NR5	Soil	I	Zinc	mg/kg	5970	136	4E+01	Yes	120	5E+01	Yes	46	1E+02	Yes	Yes
NR6	Soil	I	Aluminum	mg/kg	23500	35600	7E-01	No	--	--	--	--	--	--	No
NR6	Soil	I	Antimony	mg/kg	7.8	2.42	3E+00	Yes	78	1E-01	No	0.27	3E+01	Yes	Yes
NR6	Soil	I	Arsenic	mg/kg	3400	112	3E+01	Yes	18	2E+02	Yes	43	8E+01	Yes	Yes
NR6	Soil	I	Barium	mg/kg	464	271	2E+00	Yes	330	1E+00	Yes	2000	2E-01	No	Yes
NR6	Soil	I	Beryllium	mg/kg	0.94	1.7	6E-01	No	40	2E-02	No	21	4E-02	No	No
NR6	Soil	I	Cadmium	mg/kg	4.3	0.824	5E+00	Yes	32	1E-01	No	0.36	1E+01	Yes	Yes
NR6	Soil	I	Chromium	mg/kg	31.2	145	2E-01	No	64	5E-01	No	26	1E+00	Yes	No
NR6	Soil	I	Cobalt	mg/kg	20.6	43.6	5E-01	No	13	2E+00	Yes	120	2E-01	No	No
NR6	Soil	I	Copper	mg/kg	388	182	2E+00	Yes	70	6E+00	Yes	28	1E+01	Yes	Yes
NR6	Soil	I	Iron	mg/kg	46300	71900	6E-01	No	--	--	--	--	--	--	No
NR6	Soil	I	Lead	mg/kg	3420	34.8	1E+02	Yes	120	3E+01	Yes	11	3E+02	Yes	Yes
NR6	Soil	I	Manganese	mg/kg	40800	1600	3E+01	Yes	220	2E+02	Yes	4000	1E+01	Yes	Yes
NR6	Soil	I	Mercury	mg/kg	0.22	0.0795	3E+00	Yes	6.6	3E-02	No	0.013	2E+01	Yes	Yes
NR6	Soil	I	Nickel	mg/kg	60.6	89	7E-01	No	38	2E+00	Yes	130	5E-01	No	No
NR6	Soil	I	Nitrate as N	mg/kg	0.5	--	--	--	--	--	--	--	--	--	Yes
NR6	Soil	I	Selenium	mg/kg	9.7	4.4	2E+00	Yes	0.52	2E+01	Yes	0.63	2E+01	Yes	Yes
NR6	Soil	I	Silver	mg/kg	6.5	--	--	--	560	1E-02	No	4.2	2E+00	Yes	Yes
NR6	Soil	I	Sulfate	mg/kg	8800	--	--	--	--	--	--	--	--	--	Yes
NR6	Soil	I	Thallium	mg/kg	0.46	2.8	2E-01	No	1	5E-01	No	0.0569	8E+00	Yes	No



TABLE M-7

**Soil Screening - Identification of COPECs***Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona*

Exposure						Background Screen			Terrestrial Plants and Soil Invertebrates			Birds and Mammals			Retain as COPEC <sup>a</sup> ?
									ESV	Screening	Exceed?	ESV	Screening	Exceed?	
Area	Matrix	Type	Variable	Units	Maximum Detect (mg/kg)	BTV	BQ	Exceed?	(mg/kg)	HQ		(mg/kg)	HQ		
NR6	Soil	I	Vanadium	mg/kg	82.5	231	4E-01	No	330	3E-01	No	7.8	1E+01	Yes	No
NR6	Soil	I	Zinc	mg/kg	3570	136	3E+01	Yes	120	3E+01	Yes	46	8E+01	Yes	Yes
NR7	Soil	I	Aluminum	mg/kg	86200	35600	2E+00	Yes	--	--	--	--	--	--	Yes
NR7	Soil	I	Antimony	mg/kg	22	2.42	9E+00	Yes	78	3E-01	No	0.27	8E+01	Yes	Yes
NR7	Soil	I	Arsenic	mg/kg	1100	112	1E+01	Yes	18	6E+01	Yes	43	3E+01	Yes	Yes
NR7	Soil	I	Barium	mg/kg	925	271	3E+00	Yes	330	3E+00	Yes	2000	5E-01	No	Yes
NR7	Soil	I	Beryllium	mg/kg	3	1.7	2E+00	Yes	40	8E-02	No	21	1E-01	No	No
NR7	Soil	I	Cadmium	mg/kg	59.1	0.824	7E+01	Yes	32	2E+00	Yes	0.36	2E+02	Yes	Yes
NR7	Soil	I	Chloride	mg/kg	25	--	--	--	--	--	--	--	--	--	Yes
NR7	Soil	I	Chromium	mg/kg	185	145	1E+00	Yes	64	3E+00	Yes	26	7E+00	Yes	Yes
NR7	Soil	I	Cobalt	mg/kg	51.9	43.6	1E+00	Yes	13	4E+00	Yes	120	4E-01	No	Yes
NR7	Soil	I	Copper	mg/kg	5250	182	3E+01	Yes	70	8E+01	Yes	28	2E+02	Yes	Yes
NR7	Soil	I	Cyanide	mg/kg	0.76	--	--	--	0.9	8E-01	No	1.3	6E-01	No	No
NR7	Soil	I	Iron	mg/kg	154000	71900	2E+00	Yes	--	--	--	--	--	--	Yes
NR7	Soil	I	Lead	mg/kg	971	34.8	3E+01	Yes	120	8E+00	Yes	11	9E+01	Yes	Yes
NR7	Soil	I	Manganese	mg/kg	3830	1600	2E+00	Yes	220	2E+01	Yes	4000	1E+00	No	Yes
NR7	Soil	I	Mercury	mg/kg	1.5	0.0795	2E+01	Yes	6.6	2E-01	No	0.013	1E+02	Yes	Yes
NR7	Soil	I	Nickel	mg/kg	162	89	2E+00	Yes	38	4E+00	Yes	130	1E+00	Yes	Yes
NR7	Soil	I	Nitrate as N	mg/kg	25	--	--	--	--	--	--	--	--	--	Yes
NR7	Soil	I	Selenium	mg/kg	37.7	4.4	9E+00	Yes	0.52	7E+01	Yes	0.63	6E+01	Yes	Yes
NR7	Soil	I	Silver	mg/kg	24.6	--	--	--	560	4E-02	No	4.2	6E+00	Yes	Yes
NR7	Soil	I	Sulfate	mg/kg	38000	--	--	--	--	--	--	--	--	--	Yes
NR7	Soil	I	Thallium	mg/kg	5.7	2.8	2E+00	Yes	1	6E+00	Yes	0.0569	1E+02	Yes	Yes
NR7	Soil	I	Vanadium	mg/kg	77.5	231	3E-01	No	330	2E-01	No	7.8	1E+01	Yes	No
NR7	Soil	I	Zinc	mg/kg	4660	136	3E+01	Yes	120	4E+01	Yes	46	1E+02	Yes	Yes
NR7	Soil	O	Acetophenone	mg/kg	0.071	--	--	--	--	--	--	300	2E-04	No	Yes
NR7	Soil	O	bis(2-Ethylhexyl)phthalate	mg/kg	0.33	--	--	--	--	--	--	0.02	2E+01	Yes	Yes
NR7	Soil	O	Di-n-butyl phthalate	mg/kg	0.049	--	--	--	--	--	--	0.15	3E-01	No	Yes
NR7	Soil	O	Perchlorate	mg/kg	0.013	--	--	--	--	--	--	--	--	--	Yes
NR8	Soil	I	Aluminum	mg/kg	28100	35600	8E-01	No	--	--	--	--	--	--	No
NR8	Soil	I	Antimony	mg/kg	6.6	2.42	3E+00	Yes	78	8E-02	No	0.27	2E+01	Yes	Yes
NR8	Soil	I	Arsenic	mg/kg	3500	112	3E+01	Yes	18	2E+02	Yes	43	8E+01	Yes	Yes
NR8	Soil	I	Barium	mg/kg	521	271	2E+00	Yes	330	2E+00	Yes	2000	3E-01	No	Yes
NR8	Soil	I	Beryllium	mg/kg	0.66	1.7	4E-01	No	40	2E-02	No	21	3E-02	No	No
NR8	Soil	I	Cadmium	mg/kg	9.4	0.824	1E+01	Yes	32	3E-01	No	0.36	3E+01	Yes	Yes
NR8	Soil	I	Chromium	mg/kg	64.8	145	4E-01	No	64	1E+00	Yes	26	2E+00	Yes	No
NR8	Soil	I	Cobalt	mg/kg	35.5	43.6	8E-01	No	13	3E+00	Yes	120	3E-01	No	No
NR8	Soil	I	Copper	mg/kg	1560	182	9E+00	Yes	70	2E+01	Yes	28	6E+01	Yes	Yes
NR8	Soil	I	Cyanide	mg/kg	0.3	--	--	--	0.9	3E-01	No	1.3	2E-01	No	No
NR8	Soil	I	Iron	mg/kg	87400	71900	1E+00	Yes	--	--	--	--	--	--	Yes
NR8	Soil	I	Lead	mg/kg	12300	34.8	4E+02	Yes	120	1E+02	Yes	11	1E+03	Yes	Yes
NR8	Soil	I	Manganese	mg/kg	65500	1600	4E+01	Yes	220	3E+02	Yes	4000	2E+01	Yes	Yes

TABLE M-7

**Soil Screening - Identification of COPECs***Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona*

Exposure						Maximum Detect (mg/kg)	Background Screen			Terrestrial Plants and Soil			Birds and Mammals			Retain as COPEC <sup>a</sup> ?
										Invertebrates						
							Area	Matrix	Type	Variable	Units	BTV	BQ	Exceed?	ESV (mg/kg)	
NR8	Soil	I	Mercury	mg/kg	10.1	0.0795	1E+02	Yes	6.6	2E+00	Yes	0.013	8E+02	Yes	Yes	
NR8	Soil	I	Nickel	mg/kg	124	89	1E+00	Yes	38	3E+00	Yes	130	1E+00	No	Yes	
NR8	Soil	I	Selenium	mg/kg	14	4.4	3E+00	Yes	0.52	3E+01	Yes	0.63	2E+01	Yes	Yes	
NR8	Soil	I	Silver	mg/kg	18.9	--	--	--	560	3E-02	No	4.2	5E+00	Yes	Yes	
NR8	Soil	I	Sulfate	mg/kg	74000	--	--	--	--	--	--	--	--	--	Yes	
NR8	Soil	I	Thallium	mg/kg	4.7	2.8	2E+00	Yes	1	5E+00	Yes	0.0569	8E+01	Yes	Yes	
NR8	Soil	I	Vanadium	mg/kg	53	231	2E-01	No	330	2E-01	No	7.8	7E+00	Yes	No	
NR8	Soil	I	Zinc	mg/kg	14700	136	1E+02	Yes	120	1E+02	Yes	46	3E+02	Yes	Yes	
NR9	Soil	I	Aluminum	mg/kg	26800	35600	8E-01	No	--	--	--	--	--	--	No	
NR9	Soil	I	Antimony	mg/kg	44.3	2.42	2E+01	Yes	78	6E-01	No	0.27	2E+02	Yes	Yes	
NR9	Soil	I	Arsenic	mg/kg	4140	112	4E+01	Yes	18	2E+02	Yes	43	1E+02	Yes	Yes	
NR9	Soil	I	Barium	mg/kg	280	271	1E+00	Yes	330	8E-01	No	2000	1E-01	No	No	
NR9	Soil	I	Beryllium	mg/kg	0.41	1.7	2E-01	No	40	1E-02	No	21	2E-02	No	No	
NR9	Soil	I	Cadmium	mg/kg	6.7	0.824	8E+00	Yes	32	2E-01	No	0.36	2E+01	Yes	Yes	
NR9	Soil	I	Chromium	mg/kg	119	145	8E-01	No	64	2E+00	Yes	26	5E+00	Yes	No	
NR9	Soil	I	Cobalt	mg/kg	51.4	43.6	1E+00	Yes	13	4E+00	Yes	120	4E-01	No	Yes	
NR9	Soil	I	Copper	mg/kg	1610	182	9E+00	Yes	70	2E+01	Yes	28	6E+01	Yes	Yes	
NR9	Soil	I	Cyanide	mg/kg	0.17	--	--	--	0.9	2E-01	No	1.3	1E-01	No	No	
NR9	Soil	I	Iron	mg/kg	53800	71900	7E-01	No	--	--	--	--	--	--	No	
NR9	Soil	I	Lead	mg/kg	6060	34.8	2E+02	Yes	120	5E+01	Yes	11	6E+02	Yes	Yes	
NR9	Soil	I	Manganese	mg/kg	2570	1600	2E+00	Yes	220	1E+01	Yes	4000	6E-01	No	Yes	
NR9	Soil	I	Mercury	mg/kg	0.6	0.0795	8E+00	Yes	6.6	9E-02	No	0.013	5E+01	Yes	Yes	
NR9	Soil	I	Nickel	mg/kg	116	89	1E+00	Yes	38	3E+00	Yes	130	9E-01	No	Yes	
NR9	Soil	I	Selenium	mg/kg	34.8	4.4	8E+00	Yes	0.52	7E+01	Yes	0.63	6E+01	Yes	Yes	
NR9	Soil	I	Silver	mg/kg	36	--	--	--	560	6E-02	No	4.2	9E+00	Yes	Yes	
NR9	Soil	I	Thallium	mg/kg	2.6	2.8	9E-01	No	1	3E+00	Yes	0.0569	5E+01	Yes	No	
NR9	Soil	I	Vanadium	mg/kg	166	231	7E-01	No	330	5E-01	No	7.8	2E+01	Yes	No	
NR9	Soil	I	Zinc	mg/kg	8140	136	6E+01	Yes	120	7E+01	Yes	46	2E+02	Yes	Yes	
NR10	Soil	I	Aluminum	mg/kg	23900	35600	7E-01	No	--	--	--	--	--	--	No	
NR10	Soil	I	Arsenic	mg/kg	4640	112	4E+01	Yes	18	3E+02	Yes	43	1E+02	Yes	Yes	
NR10	Soil	I	Barium	mg/kg	261	271	1E+00	No	330	8E-01	No	2000	1E-01	No	No	
NR10	Soil	I	Cadmium	mg/kg	0.85	0.824	1E+00	Yes	32	3E-02	No	0.36	2E+00	Yes	Yes	
NR10	Soil	I	Chromium	mg/kg	112	145	8E-01	No	64	2E+00	Yes	26	4E+00	Yes	No	
NR10	Soil	I	Cobalt	mg/kg	40.7	43.6	9E-01	No	13	3E+00	Yes	120	3E-01	No	No	
NR10	Soil	I	Copper	mg/kg	127	182	7E-01	No	70	2E+00	Yes	28	5E+00	Yes	No	
NR10	Soil	I	Iron	mg/kg	42100	71900	6E-01	No	--	--	--	--	--	--	No	
NR10	Soil	I	Lead	mg/kg	11500	34.8	3E+02	Yes	120	1E+02	Yes	11	1E+03	Yes	Yes	
NR10	Soil	I	Manganese	mg/kg	1410	1600	9E-01	No	220	6E+00	Yes	4000	4E-01	No	No	
NR10	Soil	I	Mercury	mg/kg	0.084	0.0795	1E+00	Yes	6.6	1E-02	No	0.013	6E+00	Yes	Yes	
NR10	Soil	I	Nickel	mg/kg	85.2	89	1E+00	No	38	2E+00	Yes	130	7E-01	No	No	
NR10	Soil	I	Selenium	mg/kg	1	4.4	2E-01	No	0.52	2E+00	Yes	0.63	2E+00	Yes	No	
NR10	Soil	I	Silver	mg/kg	1.9	--	--	--	560	3E-03	No	4.2	5E-01	No	No	

TABLE M-7

**Soil Screening - Identification of COPECs***Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona*

Exposure						Maximum Detect (mg/kg)	Background Screen			Terrestrial Plants and Soil			Birds and Mammals			Retain as COPEC <sup>a</sup> ?
										Invertebrates						
							Area	Matrix	Type	Variable	Units	BTV	BQ	Exceed?	ESV (mg/kg)	
NR10	Soil	I	Thallium	mg/kg	2.8	2.8	1E+00	No	1	3E+00	Yes	0.0569	5E+01	Yes	No	
NR10	Soil	I	Vanadium	mg/kg	108	231	5E-01	No	330	3E-01	No	7.8	1E+01	Yes	No	
NR10	Soil	I	Zinc	mg/kg	7550	136	6E+01	Yes	120	6E+01	Yes	46	2E+02	Yes	Yes	
NR11	Soil	I	Aluminum	mg/kg	254000	35600	7E+00	Yes	--	--	--	--	--	--	Yes	
NR11	Soil	I	Antimony	mg/kg	118	2.42	5E+01	Yes	78	2E+00	Yes	0.27	4E+02	Yes	Yes	
NR11	Soil	I	Arsenic	mg/kg	15100	112	1E+02	Yes	18	8E+02	Yes	43	4E+02	Yes	Yes	
NR11	Soil	I	Barium	mg/kg	652	271	2E+00	Yes	330	2E+00	Yes	2000	3E-01	No	Yes	
NR11	Soil	I	Beryllium	mg/kg	60.3	1.7	4E+01	Yes	40	2E+00	Yes	21	3E+00	Yes	Yes	
NR11	Soil	I	Cadmium	mg/kg	85.7	0.824	1E+02	Yes	32	3E+00	Yes	0.36	2E+02	Yes	Yes	
NR11	Soil	I	Chloride	mg/kg	130	--	--	--	--	--	--	--	--	--	Yes	
NR11	Soil	I	Chromium	mg/kg	1790	145	1E+01	Yes	64	3E+01	Yes	26	7E+01	Yes	Yes	
NR11	Soil	I	Chromium, Hexavalent	mg/kg	1.7	--	--	--	0.34	5E+00	Yes	130	1E-02	No	Yes	
NR11	Soil	I	Cobalt	mg/kg	46	43.6	1E+00	Yes	13	4E+00	Yes	120	4E-01	No	Yes	
NR11	Soil	I	Copper	mg/kg	28100	182	2E+02	Yes	70	4E+02	Yes	28	1E+03	Yes	Yes	
NR11	Soil	I	Cyanide	mg/kg	1.5	--	--	--	0.9	2E+00	Yes	1.3	1E+00	Yes	Yes	
NR11	Soil	I	Iron	mg/kg	251000	71900	3E+00	Yes	--	--	--	--	--	--	Yes	
NR11	Soil	I	Lead	mg/kg	56600	34.8	2E+03	Yes	120	5E+02	Yes	11	5E+03	Yes	Yes	
NR11	Soil	I	Manganese	mg/kg	2110	1600	1E+00	Yes	220	1E+01	Yes	4000	5E-01	No	Yes	
NR11	Soil	I	Mercury	mg/kg	8.1	0.0795	1E+02	Yes	6.6	1E+00	Yes	0.013	6E+02	Yes	Yes	
NR11	Soil	I	Nickel	mg/kg	1240	89	1E+01	Yes	38	3E+01	Yes	130	1E+01	Yes	Yes	
NR11	Soil	I	Nitrate as N	mg/kg	81	--	--	--	--	--	--	--	--	--	Yes	
NR11	Soil	I	Selenium	mg/kg	22.4	4.4	5E+00	Yes	0.52	4E+01	Yes	0.63	4E+01	Yes	Yes	
NR11	Soil	I	Silver	mg/kg	397	--	--	--	560	7E-01	No	4.2	9E+01	Yes	Yes	
NR11	Soil	I	Sulfate	mg/kg	580	--	--	--	--	--	--	--	--	--	Yes	
NR11	Soil	I	Thallium	mg/kg	3.8	2.8	1E+00	Yes	1	4E+00	Yes	0.0569	7E+01	Yes	Yes	
NR11	Soil	I	Vanadium	mg/kg	89.9	231	4E-01	No	330	3E-01	No	7.8	1E+01	Yes	No	
NR11	Soil	I	Zinc	mg/kg	17600	136	1E+02	Yes	120	1E+02	Yes	46	4E+02	Yes	Yes	
NR11	Soil	O	1,2,3,4,6,7,8-Hepta CDD	mg/kg	0.00182	--	--	--	0.000004	5E+02	Yes	--	--	--	Yes	
NR11	Soil	O	1,2,3,4,6,7,8-Hepta CDF	mg/kg	0.00692	--	--	--	0.000004	2E+03	Yes	--	--	--	Yes	
NR11	Soil	O	1,2,3,4,7,8,9-Hepta CDF	mg/kg	0.00133	--	--	--	0.000004	3E+02	Yes	--	--	--	Yes	
NR11	Soil	O	1,2,3,4,7,8-Hexa CDD	mg/kg	0.0001	--	--	--	0.000004	3E+01	Yes	--	--	--	Yes	
NR11	Soil	O	1,2,3,4,7,8-Hexa CDF	mg/kg	0.00222	--	--	--	0.000004	6E+02	Yes	--	--	--	Yes	
NR11	Soil	O	1,2,3,6,7,8-Hexa CDD	mg/kg	0.000199	--	--	--	0.000004	5E+01	Yes	--	--	--	Yes	
NR11	Soil	O	1,2,3,6,7,8-Hexa CDF	mg/kg	0.00162	--	--	--	0.000004	4E+02	Yes	--	--	--	Yes	
NR11	Soil	O	1,2,3,7,8,9-Hexa CDD	mg/kg	0.000159	--	--	--	0.000004	4E+01	Yes	--	--	--	Yes	
NR11	Soil	O	1,2,3,7,8,9-Hexa CDF	mg/kg	0.000573	--	--	--	0.000004	1E+02	Yes	--	--	--	Yes	
NR11	Soil	O	1,2,3,7,8-Penta CDD	mg/kg	0.000107	--	--	--	0.000004	3E+01	Yes	--	--	--	Yes	
NR11	Soil	O	1,2,3,7,8-Penta CDF	mg/kg	0.00072	--	--	--	0.000004	2E+02	Yes	--	--	--	Yes	
NR11	Soil	O	2,3,4,6,7,8-Hexa CDF	mg/kg	0.0014	--	--	--	0.000004	4E+02	Yes	--	--	--	Yes	
NR11	Soil	O	2,3,4,7,8-Penta CDF	mg/kg	0.000771	--	--	--	0.000004	2E+02	Yes	--	--	--	Yes	
NR11	Soil	O	2,3,7,8-Tetra CDD	mg/kg	0.0000259	--	--	--	0.000004	6E+00	Yes	--	--	--	Yes	
NR11	Soil	O	2,3,7,8-Tetra CDF	mg/kg	0.000394	--	--	--	0.000004	1E+02	Yes	--	--	--	Yes	

TABLE M-7

**Soil Screening - Identification of COPECs***Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona*

Exposure						Maximum Detect (mg/kg)	Background Screen			Terrestrial Plants and Soil			Birds and Mammals			Retain as COPEC <sup>a</sup> ?
										Invertebrates						
							Area	Matrix	Type	Variable	Units	BTV	BQ	Exceed?	ESV (mg/kg)	
NR11	Soil	O	4,4'-DDE	mg/kg	0.0097	--	--	--	0.7	1E-02	No	0.021	5E-01	No	No	
NR11	Soil	O	4,4'-DDT	mg/kg	0.0024	--	--	--	0.7	3E-03	No	0.021	1E-01	No	No	
NR11	Soil	O	Acenaphthene	mg/kg	0.08	--	--	--	29	3E-03	No	100	8E-04	No	No	
NR11	Soil	O	Acetophenone	mg/kg	0.14	--	--	--	--	--	--	300	5E-04	No	Yes	
NR11	Soil	O	Anthracene	mg/kg	0.18	--	--	--	29	6E-03	No	100	2E-03	No	No	
NR11	Soil	O	Aroclor-1248	mg/kg	0.97	--	--	--	0.5	2E+00	Yes	0.0072	1E+02	Yes	Yes	
NR11	Soil	O	Aroclor-1254	mg/kg	0.076	--	--	--	0.5	2E-01	No	0.041	2E+00	Yes	Yes	
NR11	Soil	O	Aroclor-1260	mg/kg	0.03	--	--	--	0.5	6E-02	No	0.88	3E-02	No	No	
NR11	Soil	O	Benzo[a]anthracene	mg/kg	0.71	--	--	--	18	4E-02	No	1.1	6E-01	No	No	
NR11	Soil	O	Benzo[a]pyrene	mg/kg	0.54	--	--	--	18	3E-02	No	1.1	5E-01	No	No	
NR11	Soil	O	Benzo[b]fluoranthene	mg/kg	0.72	--	--	--	18	4E-02	No	1.1	7E-01	No	No	
NR11	Soil	O	Benzo[g,h,i]perylene	mg/kg	0.16	--	--	--	18	9E-03	No	1.1	1E-01	No	No	
NR11	Soil	O	Benzo[k]fluoranthene	mg/kg	0.45	--	--	--	18	3E-02	No	1.1	4E-01	No	No	
NR11	Soil	O	bis(2-Ethylhexyl)phthalate	mg/kg	0.083	--	--	--	--	--	--	0.02	4E+00	Yes	Yes	
NR11	Soil	O	Carbazole	mg/kg	0.1	--	--	--	--	--	--	80	1E-03	No	Yes	
NR11	Soil	O	Chrysene	mg/kg	0.72	--	--	--	18	4E-02	No	1.1	7E-01	No	No	
NR11	Soil	O	Delta-BHC	mg/kg	0.017	--	--	--	--	--	--	9.94	2E-03	No	Yes	
NR11	Soil	O	Dibenzo[a,h]anthracene	mg/kg	0.11	--	--	--	18	6E-03	No	1.1	1E-01	No	No	
NR11	Soil	O	Dieldrin	mg/kg	0.0023	--	--	--	--	--	--	0.0045	5E-01	No	Yes	
NR11	Soil	O	Di-n-butyl phthalate	mg/kg	0.065	--	--	--	--	--	--	0.15	4E-01	No	Yes	
NR11	Soil	O	Endosulfan I	mg/kg	0.002	--	--	--	--	--	--	0.64	3E-03	No	Yes	
NR11	Soil	O	Fluoranthene	mg/kg	1.3	--	--	--	29	4E-02	No	100	1E-02	No	No	
NR11	Soil	O	Heptachlor	mg/kg	0.0073	--	--	--	--	--	--	0.059	1E-01	No	Yes	
NR11	Soil	O	Heptachlor Epoxide	mg/kg	0.025	--	--	--	--	--	--	0.152	2E-01	No	Yes	
NR11	Soil	O	Indeno[1,2,3-cd]pyrene	mg/kg	0.5	--	--	--	18	3E-02	No	1.1	5E-01	No	No	
NR11	Soil	O	OCDD	mg/kg	0.0093	--	--	--	0.000004	2E+03	Yes	--	--	--	Yes	
NR11	Soil	O	OCDF	mg/kg	0.012	--	--	--	0.000004	3E+03	Yes	--	--	--	Yes	
NR11	Soil	O	Phenanthrene	mg/kg	0.7	--	--	--	29	2E-02	No	100	7E-03	No	No	
NR11	Soil	O	Pyrene	mg/kg	1.1	--	--	--	18	6E-02	No	1.1	1E+00	No	No	
NR11	Soil	O	TEQBird	mg/kg	0.00206	--	--	--	--	--	--	2.9E-07	7E+03	Yes	Yes	
NR11	Soil	O	TEQMammal	mg/kg	0.00116	--	--	--	--	--	--	2.9E-07	4E+03	Yes	Yes	
NR12	Soil	I	Aluminum	mg/kg	181000	35600	5E+00	Yes	--	--	--	--	--	--	Yes	
NR12	Soil	I	Antimony	mg/kg	125	2.42	5E+01	Yes	78	2E+00	Yes	0.27	5E+02	Yes	Yes	
NR12	Soil	I	Arsenic	mg/kg	20200	112	2E+02	Yes	18	1E+03	Yes	43	5E+02	Yes	Yes	
NR12	Soil	I	Barium	mg/kg	1540	271	6E+00	Yes	330	5E+00	Yes	2000	8E-01	No	Yes	
NR12	Soil	I	Beryllium	mg/kg	7.8	1.7	5E+00	Yes	40	2E-01	No	21	4E-01	No	No	
NR12	Soil	I	Cadmium	mg/kg	41.4	0.824	5E+01	Yes	32	1E+00	Yes	0.36	1E+02	Yes	Yes	
NR12	Soil	I	Chromium	mg/kg	807	145	6E+00	Yes	64	1E+01	Yes	26	3E+01	Yes	Yes	
NR12	Soil	I	Chromium, Hexavalent	mg/kg	18	--	--	--	0.34	5E+01	Yes	130	1E-01	No	Yes	
NR12	Soil	I	Cobalt	mg/kg	59.2	43.6	1E+00	Yes	13	5E+00	Yes	120	5E-01	No	Yes	
NR12	Soil	I	Copper	mg/kg	14200	182	8E+01	Yes	70	2E+02	Yes	28	5E+02	Yes	Yes	
NR12	Soil	I	Cyanide	mg/kg	0.85	--	--	--	0.9	9E-01	No	1.3	7E-01	No	No	

TABLE M-7

**Soil Screening - Identification of COPECs***Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona*

Exposure						Background Screen			Terrestrial Plants and Soil Invertebrates			Birds and Mammals			Retain as COPEC <sup>a</sup> ?
									ESV	Screening	Exceed?	ESV	Screening	Exceed?	
Area	Matrix	Type	Variable	Units	Maximum Detect (mg/kg)	BTV	BQ	Exceed?	(mg/kg)	HQ		(mg/kg)	HQ		
NR12	Soil	I	Iron	mg/kg	238000	71900	3E+00	Yes	--	--	--	--	--	--	Yes
NR12	Soil	I	Lead	mg/kg	13100	34.8	4E+02	Yes	120	1E+02	Yes	11	1E+03	Yes	Yes
NR12	Soil	I	Manganese	mg/kg	46000	1600	3E+01	Yes	220	2E+02	Yes	4000	1E+01	Yes	Yes
NR12	Soil	I	Mercury	mg/kg	7	0.0795	9E+01	Yes	6.6	1E+00	Yes	0.013	5E+02	Yes	Yes
NR12	Soil	I	Nickel	mg/kg	803	89	9E+00	Yes	38	2E+01	Yes	130	6E+00	Yes	Yes
NR12	Soil	I	Nitrate as N	mg/kg	28	--	--	--	--	--	--	--	--	--	Yes
NR12	Soil	I	Selenium	mg/kg	35.7	4.4	8E+00	Yes	0.52	7E+01	Yes	0.63	6E+01	Yes	Yes
NR12	Soil	I	Silver	mg/kg	41	--	--	--	560	7E-02	No	4.2	1E+01	Yes	Yes
NR12	Soil	I	Sulfate	mg/kg	300	--	--	--	--	--	--	--	--	--	Yes
NR12	Soil	I	Thallium	mg/kg	9.2	2.8	3E+00	Yes	1	9E+00	Yes	0.0569	2E+02	Yes	Yes
NR12	Soil	I	Vanadium	mg/kg	108	231	5E-01	No	330	3E-01	No	7.8	1E+01	Yes	No
NR12	Soil	I	Zinc	mg/kg	58900	136	4E+02	Yes	120	5E+02	Yes	46	1E+03	Yes	Yes
NR12	Soil	O	1,2,3,4,6,7,8-Hepta CDD	mg/kg	0.00032	--	--	--	0.000004	8E+01	Yes	--	--	--	Yes
NR12	Soil	O	1,2,3,4,6,7,8-Hepta CDF	mg/kg	0.0015	--	--	--	0.000004	4E+02	Yes	--	--	--	Yes
NR12	Soil	O	1,2,3,4,7,8,9-Hepta CDF	mg/kg	0.00019	--	--	--	0.000004	5E+01	Yes	--	--	--	Yes
NR12	Soil	O	1,2,3,4,7,8-Hexa CDD	mg/kg	0.000012	--	--	--	0.000004	3E+00	Yes	--	--	--	Yes
NR12	Soil	O	1,2,3,4,7,8-Hexa CDF	mg/kg	0.00077	--	--	--	0.000004	2E+02	Yes	--	--	--	Yes
NR12	Soil	O	1,2,3,6,7,8-Hexa CDD	mg/kg	0.000024	--	--	--	0.000004	6E+00	Yes	--	--	--	Yes
NR12	Soil	O	1,2,3,6,7,8-Hexa CDF	mg/kg	0.00022	--	--	--	0.000004	6E+01	Yes	--	--	--	Yes
NR12	Soil	O	1,2,3,7,8,9-Hexa CDD	mg/kg	0.000028	--	--	--	0.000004	7E+00	Yes	--	--	--	Yes
NR12	Soil	O	1,2,3,7,8,9-Hexa CDF	mg/kg	0.00001	--	--	--	0.000004	3E+00	Yes	--	--	--	Yes
NR12	Soil	O	1,2,3,7,8-Penta CDD	mg/kg	0.000081	--	--	--	0.000004	2E+00	Yes	--	--	--	Yes
NR12	Soil	O	1,2,3,7,8-Penta CDF	mg/kg	0.000096	--	--	--	0.000004	2E+01	Yes	--	--	--	Yes
NR12	Soil	O	2,3,4,6,7,8-Hexa CDF	mg/kg	0.00018	--	--	--	0.000004	5E+01	Yes	--	--	--	Yes
NR12	Soil	O	2,3,4,7,8-Penta CDF	mg/kg	0.00017	--	--	--	0.000004	4E+01	Yes	--	--	--	Yes
NR12	Soil	O	2,3,7,8-Tetra CDD	mg/kg	0.0000022	--	--	--	0.000004	6E-01	No	--	--	--	No
NR12	Soil	O	2,3,7,8-Tetra CDF	mg/kg	0.00014	--	--	--	0.000004	4E+01	Yes	--	--	--	Yes
NR12	Soil	O	OCDD	mg/kg	0.0017	--	--	--	0.000004	4E+02	Yes	--	--	--	Yes
NR12	Soil	O	OCDF	mg/kg	0.0023	--	--	--	0.000004	6E+02	Yes	--	--	--	Yes
NR12	Soil	O	TEQBird	mg/kg	0.000469	--	--	--	--	--	--	2.9E-07	2E+03	Yes	Yes
NR12	Soil	O	TEQMammal	mg/kg	0.000224	--	--	--	--	--	--	2.9E-07	8E+02	Yes	Yes
NR13	Soil	I	Aluminum	mg/kg	15200	35600	4E-01	No	--	--	--	--	--	--	No
NR13	Soil	I	Antimony	mg/kg	4.8	2.42	2E+00	Yes	78	6E-02	No	0.27	2E+01	Yes	Yes
NR13	Soil	I	Arsenic	mg/kg	164	112	1E+00	Yes	18	9E+00	Yes	43	4E+00	Yes	Yes
NR13	Soil	I	Barium	mg/kg	497	271	2E+00	Yes	330	2E+00	Yes	2000	2E-01	No	Yes
NR13	Soil	I	Beryllium	mg/kg	0.86	1.7	5E-01	No	40	2E-02	No	21	4E-02	No	No
NR13	Soil	I	Cadmium	mg/kg	8.3	0.824	1E+01	Yes	32	3E-01	No	0.36	2E+01	Yes	Yes
NR13	Soil	I	Chromium	mg/kg	58.9	145	4E-01	No	64	9E-01	No	26	2E+00	Yes	No
NR13	Soil	I	Cobalt	mg/kg	34.7	43.6	8E-01	No	13	3E+00	Yes	120	3E-01	No	No
NR13	Soil	I	Copper	mg/kg	950	182	5E+00	Yes	70	1E+01	Yes	28	3E+01	Yes	Yes
NR13	Soil	I	Iron	mg/kg	29000	71900	4E-01	No	--	--	--	--	--	--	No
NR13	Soil	I	Lead	mg/kg	424	34.8	1E+01	Yes	120	4E+00	Yes	11	4E+01	Yes	Yes

TABLE M-7

**Soil Screening - Identification of COPECs***Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona*

Exposure						Maximum Detect (mg/kg)	Background Screen			Terrestrial Plants and Soil			Birds and Mammals			Retain as COPEC <sup>a</sup> ?
										Invertebrates						
							Area	Matrix	Type	Variable	Units	BTV	BQ	Exceed?	ESV (mg/kg)	
NR13	Soil	I	Manganese	mg/kg	1090	1600	7E-01	No	220	5E+00	Yes	4000	3E-01	No	No	
NR13	Soil	I	Nickel	mg/kg	116	89	1E+00	Yes	38	3E+00	Yes	130	9E-01	No	Yes	
NR13	Soil	I	Selenium	mg/kg	4.9	4.4	1E+00	Yes	0.52	9E+00	Yes	0.63	8E+00	Yes	Yes	
NR13	Soil	I	Silver	mg/kg	4.9	--	--	--	560	9E-03	No	4.2	1E+00	Yes	Yes	
NR13	Soil	I	Vanadium	mg/kg	52.8	231	2E-01	No	330	2E-01	No	7.8	7E+00	Yes	No	
NR13	Soil	I	Zinc	mg/kg	568	136	4E+00	Yes	120	5E+00	Yes	46	1E+01	Yes	Yes	
NR14	Soil	I	Aluminum	mg/kg	36000	35600	1E+00	Yes	--	--	--	--	--	--	Yes	
NR14	Soil	I	Antimony	mg/kg	43.9	2.42	2E+01	Yes	78	6E-01	No	0.27	2E+02	Yes	Yes	
NR14	Soil	I	Arsenic	mg/kg	3810	112	3E+01	Yes	18	2E+02	Yes	43	9E+01	Yes	Yes	
NR14	Soil	I	Barium	mg/kg	122	271	5E-01	No	330	4E-01	No	2000	6E-02	No	No	
NR14	Soil	I	Beryllium	mg/kg	0.39	1.7	2E-01	No	40	1E-02	No	21	2E-02	No	No	
NR14	Soil	I	Cadmium	mg/kg	6.7	0.824	8E+00	Yes	32	2E-01	No	0.36	2E+01	Yes	Yes	
NR14	Soil	I	Chromium	mg/kg	97.7	145	7E-01	No	64	2E+00	Yes	26	4E+00	Yes	No	
NR14	Soil	I	Cobalt	mg/kg	27.2	43.6	6E-01	No	13	2E+00	Yes	120	2E-01	No	No	
NR14	Soil	I	Copper	mg/kg	147	182	8E-01	No	70	2E+00	Yes	28	5E+00	Yes	No	
NR14	Soil	I	Cyanide	mg/kg	0.09	--	--	--	0.9	1E-01	No	1.3	7E-02	No	No	
NR14	Soil	I	Iron	mg/kg	103000	71900	1E+00	Yes	--	--	--	--	--	--	Yes	
NR14	Soil	I	Lead	mg/kg	13400	34.8	4E+02	Yes	120	1E+02	Yes	11	1E+03	Yes	Yes	
NR14	Soil	I	Manganese	mg/kg	1800	1600	1E+00	Yes	220	8E+00	Yes	4000	5E-01	No	Yes	
NR14	Soil	I	Mercury	mg/kg	0.85	0.0795	1E+01	Yes	6.6	1E-01	No	0.013	7E+01	Yes	Yes	
NR14	Soil	I	Nickel	mg/kg	35.9	89	4E-01	No	38	9E-01	No	130	3E-01	No	No	
NR14	Soil	I	Nitrate as N	mg/kg	4	--	--	--	--	--	--	--	--	--	Yes	
NR14	Soil	I	Selenium	mg/kg	17.6	4.4	4E+00	Yes	0.52	3E+01	Yes	0.63	3E+01	Yes	Yes	
NR14	Soil	I	Silver	mg/kg	4.9	--	--	--	560	9E-03	No	4.2	1E+00	Yes	Yes	
NR14	Soil	I	Sulfate	mg/kg	2700	--	--	--	--	--	--	--	--	--	Yes	
NR14	Soil	I	Thallium	mg/kg	9.5	2.8	3E+00	Yes	1	1E+01	Yes	0.0569	2E+02	Yes	Yes	
NR14	Soil	I	Vanadium	mg/kg	171	231	7E-01	No	330	5E-01	No	7.8	2E+01	Yes	No	
NR14	Soil	I	Zinc	mg/kg	2370	136	2E+01	Yes	120	2E+01	Yes	46	5E+01	Yes	Yes	
NR15	Soil	I	Aluminum	mg/kg	21300	35600	6E-01	No	--	--	--	--	--	--	No	
NR15	Soil	I	Antimony	mg/kg	1.6	2.42	7E-01	No	78	2E-02	No	0.27	6E+00	Yes	No	
NR15	Soil	I	Arsenic	mg/kg	110	112	1E+00	No	18	6E+00	Yes	43	3E+00	Yes	No	
NR15	Soil	I	Barium	mg/kg	226	271	8E-01	No	330	7E-01	No	2000	1E-01	No	No	
NR15	Soil	I	Beryllium	mg/kg	0.62	1.7	4E-01	No	40	2E-02	No	21	3E-02	No	No	
NR15	Soil	I	Cadmium	mg/kg	2.7	0.824	3E+00	Yes	32	8E-02	No	0.36	8E+00	Yes	Yes	
NR15	Soil	I	Chromium	mg/kg	19.2	145	1E-01	No	64	3E-01	No	26	7E-01	No	No	
NR15	Soil	I	Cobalt	mg/kg	24.3	43.6	6E-01	No	13	2E+00	Yes	120	2E-01	No	No	
NR15	Soil	I	Copper	mg/kg	68.4	182	4E-01	No	70	1E+00	No	28	2E+00	Yes	No	
NR15	Soil	I	Cyanide	mg/kg	0.06	--	--	--	0.9	7E-02	No	1.3	5E-02	No	No	
NR15	Soil	I	Iron	mg/kg	36600	71900	5E-01	No	--	--	--	--	--	--	No	
NR15	Soil	I	Lead	mg/kg	86.6	34.8	2E+00	Yes	120	7E-01	No	11	8E+00	Yes	Yes	
NR15	Soil	I	Manganese	mg/kg	1170	1600	7E-01	No	220	5E+00	Yes	4000	3E-01	No	No	
NR15	Soil	I	Mercury	mg/kg	0.17	0.0795	2E+00	Yes	6.6	3E-02	No	0.013	1E+01	Yes	Yes	

TABLE M-7

**Soil Screening - Identification of COPECs***Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona*

Exposure						Background Screen			Terrestrial Plants and Soil Invertebrates			Birds and Mammals			Retain as COPEC <sup>a</sup> ?
									ESV	Screening	Exceed?	ESV	Screening	Exceed?	
Area	Matrix	Type	Variable	Units	Maximum Detect (mg/kg)	BTV	BQ	Exceed?	(mg/kg)	HQ		(mg/kg)	HQ		
NR15	Soil	I	Nickel	mg/kg	21.3	89	2E-01	No	38	6E-01	No	130	2E-01	No	No
NR15	Soil	I	Nitrate as N	mg/kg	2	--	--	--	--	--	--	--	--	--	Yes
NR15	Soil	I	Selenium	mg/kg	1.1	4.4	3E-01	No	0.52	2E+00	Yes	0.63	2E+00	Yes	No
NR15	Soil	I	Silver	mg/kg	1.4	--	--	--	560	3E-03	No	4.2	3E-01	No	No
NR15	Soil	I	Sulfate	mg/kg	100	--	--	--	--	--	--	--	--	--	Yes
NR15	Soil	I	Thallium	mg/kg	2.9	2.8	1E+00	Yes	1	3E+00	Yes	0.0569	5E+01	Yes	Yes
NR15	Soil	I	Vanadium	mg/kg	68.5	231	3E-01	No	330	2E-01	No	7.8	9E+00	Yes	No
NR15	Soil	I	Zinc	mg/kg	321	136	2E+00	Yes	120	3E+00	Yes	46	7E+00	Yes	Yes
NR16	Soil	I	Aluminum	mg/kg	45300	35600	1E+00	Yes	--	--	--	--	--	--	Yes
NR16	Soil	I	Antimony	mg/kg	125	2.42	5E+01	Yes	78	2E+00	Yes	0.27	5E+02	Yes	Yes
NR16	Soil	I	Arsenic	mg/kg	4730	112	4E+01	Yes	18	3E+02	Yes	43	1E+02	Yes	Yes
NR16	Soil	I	Barium	mg/kg	342	271	1E+00	Yes	330	1E+00	Yes	2000	2E-01	No	Yes
NR16	Soil	I	Beryllium	mg/kg	0.55	1.7	3E-01	No	40	1E-02	No	21	3E-02	No	No
NR16	Soil	I	Cadmium	mg/kg	37.3	0.824	5E+01	Yes	32	1E+00	Yes	0.36	1E+02	Yes	Yes
NR16	Soil	I	Chromium	mg/kg	99.9	145	7E-01	No	64	2E+00	Yes	26	4E+00	Yes	No
NR16	Soil	I	Cobalt	mg/kg	35.1	43.6	8E-01	No	13	3E+00	Yes	120	3E-01	No	No
NR16	Soil	I	Copper	mg/kg	660	182	4E+00	Yes	70	9E+00	Yes	28	2E+01	Yes	Yes
NR16	Soil	I	Cyanide	mg/kg	7.4	--	--	--	0.9	8E+00	Yes	1.3	6E+00	Yes	Yes
NR16	Soil	I	Iron	mg/kg	121000	71900	2E+00	Yes	--	--	--	--	--	--	Yes
NR16	Soil	I	Lead	mg/kg	65700	34.8	2E+03	Yes	120	5E+02	Yes	11	6E+03	Yes	Yes
NR16	Soil	I	Manganese	mg/kg	7880	1600	5E+00	Yes	220	4E+01	Yes	4000	2E+00	Yes	Yes
NR16	Soil	I	Mercury	mg/kg	63.9	0.0795	8E+02	Yes	6.6	1E+01	Yes	0.013	5E+03	Yes	Yes
NR16	Soil	I	Nickel	mg/kg	32.7	89	4E-01	No	38	9E-01	No	130	3E-01	No	No
NR16	Soil	I	Nitrate as N	mg/kg	12	--	--	--	--	--	--	--	--	--	Yes
NR16	Soil	I	Selenium	mg/kg	61.8	4.4	1E+01	Yes	0.52	1E+02	Yes	0.63	1E+02	Yes	Yes
NR16	Soil	I	Silver	mg/kg	102	--	--	--	560	2E-01	No	4.2	2E+01	Yes	Yes
NR16	Soil	I	Sulfate	mg/kg	42000	--	--	--	--	--	--	--	--	--	Yes
NR16	Soil	I	Thallium	mg/kg	4.4	2.8	2E+00	Yes	1	4E+00	Yes	0.0569	8E+01	Yes	Yes
NR16	Soil	I	Vanadium	mg/kg	125	231	5E-01	No	330	4E-01	No	7.8	2E+01	Yes	No
NR16	Soil	I	Zinc	mg/kg	10400	136	8E+01	Yes	120	9E+01	Yes	46	2E+02	Yes	Yes
NR16	Soil	O	4,4'-DDD	mg/kg	0.0049	--	--	--	0.7	7E-03	No	0.021	2E-01	No	No
NR16	Soil	O	4,4'-DDE	mg/kg	0.0049	--	--	--	0.7	7E-03	No	0.021	2E-01	No	No
NR16	Soil	O	4,4'-DDT	mg/kg	0.0034	--	--	--	0.7	5E-03	No	0.021	2E-01	No	No
NR16	Soil	O	4-Chloroaniline	mg/kg	0.043	--	--	--	--	--	--	1.1	4E-02	No	Yes
NR16	Soil	O	Acetophenone	mg/kg	0.04	--	--	--	--	--	--	300	1E-04	No	Yes
NR16	Soil	O	Alpha-Chlordane	mg/kg	0.0044	--	--	--	--	--	--	0.27	2E-02	No	Yes
NR16	Soil	O	Aroclor-1242	mg/kg	0.17	--	--	--	0.5	3E-01	No	0.041	4E+00	Yes	Yes
NR16	Soil	O	Aroclor-1254	mg/kg	0.067	--	--	--	0.5	1E-01	No	0.041	2E+00	Yes	Yes
NR16	Soil	O	Aroclor-1260	mg/kg	0.22	--	--	--	0.5	4E-01	No	0.88	3E-01	No	No
NR16	Soil	O	Benzaldehyde	mg/kg	0.09	--	--	--	--	--	--	--	--	--	Yes
NR16	Soil	O	Benzo[a]anthracene	mg/kg	0.076	--	--	--	18	4E-03	No	1.1	7E-02	No	No
NR16	Soil	O	Benzo[a]pyrene	mg/kg	0.07	--	--	--	18	4E-03	No	1.1	6E-02	No	No

TABLE M-7

**Soil Screening - Identification of COPECs***Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona*

Exposure						Background Screen			Terrestrial Plants and Soil			Birds and Mammals			Retain as COPEC <sup>a</sup> ?
									Invertebrates						
									ESV	Screening		ESV	Screening		
Area	Matrix	Type	Variable	Units	Detect (mg/kg)	BTV	BQ	Exceed?	(mg/kg)	HQ	Exceed?	(mg/kg)	HQ	Exceed?	
NR16	Soil	O	Benzo[b]fluoranthene	mg/kg	0.055	--	--	--	18	3E-03	No	1.1	5E-02	No	No
NR16	Soil	O	Benzo[g,h,i]perylene	mg/kg	0.022	--	--	--	18	1E-03	No	1.1	2E-02	No	No
NR16	Soil	O	Benzo[k]fluoranthene	mg/kg	0.056	--	--	--	18	3E-03	No	1.1	5E-02	No	No
NR16	Soil	O	Benzyl butyl phthalate	mg/kg	0.028	--	--	--	--	--	--	90	3E-04	No	Yes
NR16	Soil	O	Beta-BHC	mg/kg	0.0017	--	--	--	--	--	--	0.27	6E-03	No	Yes
NR16	Soil	O	bis(2-Ethylhexyl)phthalate	mg/kg	0.09	--	--	--	--	--	--	0.02	5E+00	Yes	Yes
NR16	Soil	O	Caprolactam	mg/kg	0.08	--	--	--	--	--	--	--	--	--	Yes
NR16	Soil	O	Chloroform	mg/kg	0.0088	--	--	--	5	2E-03	No	8	1E-03	No	No
NR16	Soil	O	Chrysene	mg/kg	0.11	--	--	--	18	6E-03	No	1.1	1E-01	No	No
NR16	Soil	O	Dieldrin	mg/kg	0.0026	--	--	--	--	--	--	0.0045	6E-01	No	Yes
NR16	Soil	O	Dimethyl phthalate	mg/kg	0.072	--	--	--	10	7E-03	No	734	1E-04	No	No
NR16	Soil	O	Endrin Ketone	mg/kg	0.0032	--	--	--	--	--	--	0.0101	3E-01	No	Yes
NR16	Soil	O	Fluoranthene	mg/kg	0.099	--	--	--	29	3E-03	No	100	1E-03	No	No
NR16	Soil	O	Gamma-Chlordane	mg/kg	0.0039	--	--	--	2.2	2E-03	No	2.2	2E-03	No	No
NR16	Soil	O	Indeno[1,2,3-cd]pyrene	mg/kg	0.025	--	--	--	18	1E-03	No	1.1	2E-02	No	No
NR16	Soil	O	Phenanthrene	mg/kg	0.023	--	--	--	29	8E-04	No	100	2E-04	No	No
NR16	Soil	O	Phenol	mg/kg	0.027	--	--	--	0.79	3E-02	No	120	2E-04	No	No
NR16	Soil	O	Pyrene	mg/kg	0.1	--	--	--	18	6E-03	No	1.1	9E-02	No	No
NR17	Soil	I	Aluminum	mg/kg	26600	35600	7E-01	No	--	--	--	--	--	--	No
NR17	Soil	I	Antimony	mg/kg	143	2.42	6E+01	Yes	78	2E+00	Yes	0.27	5E+02	Yes	Yes
NR17	Soil	I	Arsenic	mg/kg	12000	112	1E+02	Yes	18	7E+02	Yes	43	3E+02	Yes	Yes
NR17	Soil	I	Barium	mg/kg	175	271	6E-01	No	330	5E-01	No	2000	9E-02	No	No
NR17	Soil	I	Beryllium	mg/kg	0.42	1.7	2E-01	No	40	1E-02	No	21	2E-02	No	No
NR17	Soil	I	Cadmium	mg/kg	54.3	0.824	7E+01	Yes	32	2E+00	Yes	0.36	2E+02	Yes	Yes
NR17	Soil	I	Chromium	mg/kg	61.4	145	4E-01	No	64	1E+00	No	26	2E+00	Yes	No
NR17	Soil	I	Chromium, Hexavalent	mg/kg	1.4	--	--	--	0.34	4E+00	Yes	130	1E-02	No	Yes
NR17	Soil	I	Cobalt	mg/kg	29.5	43.6	7E-01	No	13	2E+00	Yes	120	2E-01	No	No
NR17	Soil	I	Copper	mg/kg	1180	182	6E+00	Yes	70	2E+01	Yes	28	4E+01	Yes	Yes
NR17	Soil	I	Cyanide	mg/kg	6.5	--	--	--	0.9	7E+00	Yes	1.3	5E+00	Yes	Yes
NR17	Soil	I	Iron	mg/kg	193000	71900	3E+00	Yes	--	--	--	--	--	--	Yes
NR17	Soil	I	Lead	mg/kg	7500	34.8	2E+02	Yes	120	6E+01	Yes	11	7E+02	Yes	Yes
NR17	Soil	I	Manganese	mg/kg	1590	1600	1E+00	No	220	7E+00	Yes	4000	4E-01	No	No
NR17	Soil	I	Mercury	mg/kg	65	0.0795	8E+02	Yes	6.6	1E+01	Yes	0.013	5E+03	Yes	Yes
NR17	Soil	I	Nickel	mg/kg	23.7	89	3E-01	No	38	6E-01	No	130	2E-01	No	No
NR17	Soil	I	Nitrate as N	mg/kg	2	--	--	--	--	--	--	--	--	--	Yes
NR17	Soil	I	Selenium	mg/kg	51.8	4.4	1E+01	Yes	0.52	1E+02	Yes	0.63	8E+01	Yes	Yes
NR17	Soil	I	Silver	mg/kg	29.9	--	--	--	560	5E-02	No	4.2	7E+00	Yes	Yes
NR17	Soil	I	Sulfate	mg/kg	120000	--	--	--	--	--	--	--	--	--	Yes
NR17	Soil	I	Thallium	mg/kg	15.4	2.8	6E+00	Yes	1	2E+01	Yes	0.0569	3E+02	Yes	Yes
NR17	Soil	I	Vanadium	mg/kg	100	231	4E-01	No	330	3E-01	No	7.8	1E+01	Yes	No
NR17	Soil	I	Zinc	mg/kg	16400	136	1E+02	Yes	120	1E+02	Yes	46	4E+02	Yes	Yes



TABLE M-7

**Soil Screening - Identification of COPECs***Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona*

Exposure						Background Screen			Terrestrial Plants and Soil			Birds and Mammals			Retain as COPEC <sup>a</sup> ?
									Invertebrates						
									ESV	Screening		ESV	Screening		
Area	Matrix	Type	Variable	Units	Maximum Detect (mg/kg)	BTV	BQ	Exceed?	(mg/kg)	HQ	Exceed?	(mg/kg)	HQ	Exceed?	
NR18	Soil	I	Aluminum	mg/kg	30200	35600	8E-01	No	--	--	--	--	--	--	No
NR18	Soil	I	Antimony	mg/kg	32.8	2.42	1E+01	Yes	78	4E-01	No	0.27	1E+02	Yes	Yes
NR18	Soil	I	Arsenic	mg/kg	3090	112	3E+01	Yes	18	2E+02	Yes	43	7E+01	Yes	Yes
NR18	Soil	I	Barium	mg/kg	177	271	7E-01	No	330	5E-01	No	2000	9E-02	No	No
NR18	Soil	I	Beryllium	mg/kg	0.76	1.7	4E-01	No	40	2E-02	No	21	4E-02	No	No
NR18	Soil	I	Cadmium	mg/kg	24.6	0.824	3E+01	Yes	32	8E-01	No	0.36	7E+01	Yes	Yes
NR18	Soil	I	Chromium	mg/kg	140	145	1E+00	No	64	2E+00	Yes	26	5E+00	Yes	No
NR18	Soil	I	Cobalt	mg/kg	59.3	43.6	1E+00	Yes	13	5E+00	Yes	120	5E-01	No	Yes
NR18	Soil	I	Copper	mg/kg	470	182	3E+00	Yes	70	7E+00	Yes	28	2E+01	Yes	Yes
NR18	Soil	I	Cyanide	mg/kg	0.26	--	--	--	0.9	3E-01	No	1.3	2E-01	No	No
NR18	Soil	I	Iron	mg/kg	95500	71900	1E+00	Yes	--	--	--	--	--	--	Yes
NR18	Soil	I	Lead	mg/kg	16693	34.8	5E+02	Yes	120	1E+02	Yes	11	2E+03	Yes	Yes
NR18	Soil	I	Manganese	mg/kg	1350	1600	8E-01	No	220	6E+00	Yes	4000	3E-01	No	No
NR18	Soil	I	Mercury	mg/kg	26	0.0795	3E+02	Yes	6.6	4E+00	Yes	0.013	2E+03	Yes	Yes
NR18	Soil	I	Nickel	mg/kg	115	89	1E+00	Yes	38	3E+00	Yes	130	9E-01	No	Yes
NR18	Soil	I	Nitrate as N	mg/kg	970	--	--	--	--	--	--	--	--	--	Yes
NR18	Soil	I	Selenium	mg/kg	26.7	4.4	6E+00	Yes	0.52	5E+01	Yes	0.63	4E+01	Yes	Yes
NR18	Soil	I	Silver	mg/kg	13	--	--	--	560	2E-02	No	4.2	3E+00	Yes	Yes
NR18	Soil	I	Sulfate	mg/kg	19000	--	--	--	--	--	--	--	--	--	Yes
NR18	Soil	I	Thallium	mg/kg	2.9	2.8	1E+00	Yes	1	3E+00	Yes	0.0569	5E+01	Yes	Yes
NR18	Soil	I	Vanadium	mg/kg	127	231	5E-01	No	330	4E-01	No	7.8	2E+01	Yes	No
NR18	Soil	I	Zinc	mg/kg	7580	136	6E+01	Yes	120	6E+01	Yes	46	2E+02	Yes	Yes
NR19	Soil	I	Aluminum	mg/kg	37600	35600	1E+00	Yes	--	--	--	--	--	--	Yes
NR19	Soil	I	Antimony	mg/kg	11.1	2.42	5E+00	Yes	78	1E-01	No	0.27	4E+01	Yes	Yes
NR19	Soil	I	Arsenic	mg/kg	1980	112	2E+01	Yes	18	1E+02	Yes	43	5E+01	Yes	Yes
NR19	Soil	I	Barium	mg/kg	292	271	1E+00	Yes	330	9E-01	No	2000	1E-01	No	No
NR19	Soil	I	Beryllium	mg/kg	1.1	1.7	6E-01	No	40	3E-02	No	21	5E-02	No	No
NR19	Soil	I	Cadmium	mg/kg	12	0.824	1E+01	Yes	32	4E-01	No	0.36	3E+01	Yes	Yes
NR19	Soil	I	Chromium	mg/kg	88.6	145	6E-01	No	64	1E+00	Yes	26	3E+00	Yes	No
NR19	Soil	I	Cobalt	mg/kg	28	43.6	6E-01	No	13	2E+00	Yes	120	2E-01	No	No
NR19	Soil	I	Copper	mg/kg	308	182	2E+00	Yes	70	4E+00	Yes	28	1E+01	Yes	Yes
NR19	Soil	I	Cyanide	mg/kg	0.55	--	--	--	0.9	6E-01	No	1.3	4E-01	No	No
NR19	Soil	I	Iron	mg/kg	93600	71900	1E+00	Yes	--	--	--	--	--	--	Yes
NR19	Soil	I	Lead	mg/kg	4270	34.8	1E+02	Yes	120	4E+01	Yes	11	4E+02	Yes	Yes
NR19	Soil	I	Manganese	mg/kg	2100	1600	1E+00	Yes	220	1E+01	Yes	4000	5E-01	No	Yes
NR19	Soil	I	Mercury	mg/kg	15.5	0.0795	2E+02	Yes	6.6	2E+00	Yes	0.013	1E+03	Yes	Yes
NR19	Soil	I	Nickel	mg/kg	27.8	89	3E-01	No	38	7E-01	No	130	2E-01	No	No
NR19	Soil	I	Nitrate as N	mg/kg	59	--	--	--	--	--	--	--	--	--	Yes
NR19	Soil	I	Selenium	mg/kg	90.1	4.4	2E+01	Yes	0.52	2E+02	Yes	0.63	1E+02	Yes	Yes
NR19	Soil	I	Silver	mg/kg	14.5	--	--	--	560	3E-02	No	4.2	3E+00	Yes	Yes
NR19	Soil	I	Sulfate	mg/kg	64000	--	--	--	--	--	--	--	--	--	Yes
NR19	Soil	I	Thallium	mg/kg	3.1	2.8	1E+00	Yes	1	3E+00	Yes	0.0569	5E+01	Yes	Yes

TABLE M-7

**Soil Screening - Identification of COPECs***Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona*

Exposure						Maximum Detect (mg/kg)	Background Screen			Terrestrial Plants and Soil			Birds and Mammals			Retain as COPEC <sup>a</sup> ?
										Invertebrates						
							Area	Matrix	Type	Variable	Units	BTV	BQ	Exceed?	ESV (mg/kg)	
NR19	Soil	I	Vanadium	mg/kg	137	231	6E-01	No	330	4E-01	No	7.8	2E+01	Yes	No	
NR19	Soil	I	Zinc	mg/kg	6620	136	5E+01	Yes	120	6E+01	Yes	46	1E+02	Yes	Yes	
NR19	Soil	O	4,4'-DDD	mg/kg	0.014	--	--	--	0.7	2E-02	No	0.021	7E-01	No	No	
NR19	Soil	O	4,4'-DDE	mg/kg	0.0024	--	--	--	0.7	3E-03	No	0.021	1E-01	No	No	
NR19	Soil	O	4,4'-DDT	mg/kg	0.0025	--	--	--	0.7	4E-03	No	0.021	1E-01	No	No	
NR19	Soil	O	Acetone	mg/kg	0.033	--	--	--	--	--	--	2.5	1E-02	No	Yes	
NR19	Soil	O	Acetophenone	mg/kg	0.06	--	--	--	--	--	--	300	2E-04	No	Yes	
NR19	Soil	O	Alpha-Chlordane	mg/kg	0.001	--	--	--	--	--	--	0.27	4E-03	No	Yes	
NR19	Soil	O	Aroclor-1260	mg/kg	0.035	--	--	--	0.5	7E-02	No	0.88	4E-02	No	No	
NR19	Soil	O	Benzyl butyl phthalate	mg/kg	0.25	--	--	--	--	--	--	90	3E-03	No	Yes	
NR19	Soil	O	bis(2-Ethylhexyl)phthalate	mg/kg	0.28	--	--	--	--	--	--	0.02	1E+01	Yes	Yes	
NR19	Soil	O	Caprolactam	mg/kg	0.072	--	--	--	--	--	--	--	--	--	Yes	
NR19	Soil	O	Carbon disulfide	mg/kg	0.002	--	--	--	--	--	--	0.82	2E-03	No	Yes	
NR19	Soil	O	Dieldrin	mg/kg	0.0036	--	--	--	--	--	--	0.0045	8E-01	No	Yes	
NR19	Soil	O	Ethylbenzene	mg/kg	0.0043	--	--	--	55	8E-05	No	5.16	8E-04	No	No	
NR19	Soil	O	Gamma-Chlordane	mg/kg	0.0014	--	--	--	2.2	6E-04	No	2.2	6E-04	No	No	
NR19	Soil	O	Methyl ethyl ketone	mg/kg	0.01	--	--	--	--	--	--	89.6	1E-04	No	Yes	
NR19	Soil	O	p- & m-Xylenes	mg/kg	0.0017	--	--	--	65	3E-05	No	10	2E-04	No	No	
NR19	Soil	O	Styrene	mg/kg	0.0038	--	--	--	1.2	3E-03	No	4.69	8E-04	No	No	
NR20	Soil	I	Aluminum	mg/kg	34200	35600	1E+00	No	--	--	--	--	--	--	No	
NR20	Soil	I	Antimony	mg/kg	3.3	2.42	1E+00	Yes	78	4E-02	No	0.27	1E+01	Yes	Yes	
NR20	Soil	I	Arsenic	mg/kg	609	112	5E+00	Yes	18	3E+01	Yes	43	1E+01	Yes	Yes	
NR20	Soil	I	Barium	mg/kg	248	271	9E-01	No	330	8E-01	No	2000	1E-01	No	No	
NR20	Soil	I	Beryllium	mg/kg	2.7	1.7	2E+00	Yes	40	7E-02	No	21	1E-01	No	No	
NR20	Soil	I	Cadmium	mg/kg	2.6	0.824	3E+00	Yes	32	8E-02	No	0.36	7E+00	Yes	Yes	
NR20	Soil	I	Chromium	mg/kg	35.5	145	2E-01	No	64	6E-01	No	26	1E+00	Yes	No	
NR20	Soil	I	Cobalt	mg/kg	16.2	43.6	4E-01	No	13	1E+00	Yes	120	1E-01	No	No	
NR20	Soil	I	Copper	mg/kg	86.5	182	5E-01	No	70	1E+00	Yes	28	3E+00	Yes	No	
NR20	Soil	I	Iron	mg/kg	60600	71900	8E-01	No	--	--	--	--	--	--	No	
NR20	Soil	I	Lead	mg/kg	318	34.8	9E+00	Yes	120	3E+00	Yes	11	3E+01	Yes	Yes	
NR20	Soil	I	Manganese	mg/kg	2030	1600	1E+00	Yes	220	9E+00	Yes	4000	5E-01	No	Yes	
NR20	Soil	I	Mercury	mg/kg	2.5	0.0795	3E+01	Yes	6.6	4E-01	No	0.013	2E+02	Yes	Yes	
NR20	Soil	I	Nickel	mg/kg	16.7	89	2E-01	No	38	4E-01	No	130	1E-01	No	No	
NR20	Soil	I	Selenium	mg/kg	5.2	4.4	1E+00	Yes	0.52	1E+01	Yes	0.63	8E+00	Yes	Yes	
NR20	Soil	I	Silver	mg/kg	3.9	--	--	--	560	7E-03	No	4.2	9E-01	No	No	
NR20	Soil	I	Thallium	mg/kg	1.6	2.8	6E-01	No	1	2E+00	Yes	0.0569	3E+01	Yes	No	
NR20	Soil	I	Vanadium	mg/kg	98.3	231	4E-01	No	330	3E-01	No	7.8	1E+01	Yes	No	
NR20	Soil	I	Zinc	mg/kg	821	136	6E+00	Yes	120	7E+00	Yes	46	2E+01	Yes	Yes	
NW-01	Soil	I	Aluminum	mg/kg	27700	35600	8E-01	No	--	--	--	--	--	--	No	
NW-01	Soil	I	Arsenic	mg/kg	212	112	2E+00	Yes	18	1E+01	Yes	43	5E+00	Yes	Yes	
NW-01	Soil	I	Barium	mg/kg	204	271	8E-01	No	330	6E-01	No	2000	1E-01	No	No	
NW-01	Soil	I	Beryllium	mg/kg	0.94	1.7	6E-01	No	40	2E-02	No	21	4E-02	No	No	

TABLE M-7

**Soil Screening - Identification of COPECs***Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona*

Exposure						Background Screen			Terrestrial Plants and Soil			Birds and Mammals			Retain as COPEC <sup>a</sup> ?
									Invertebrates						
									ESV	Screening		ESV	Screening		
Area	Matrix	Type	Variable	Units	Maximum Detect (mg/kg)	BTV	BQ	Exceed?	(mg/kg)	HQ	Exceed?	(mg/kg)	HQ	Exceed?	
NW-01	Soil	I	Cadmium	mg/kg	1.4	0.824	2E+00	Yes	32	4E-02	No	0.36	4E+00	Yes	Yes
NW-01	Soil	I	Chromium	mg/kg	28.9	145	2E-01	No	64	5E-01	No	26	1E+00	Yes	No
NW-01	Soil	I	Cobalt	mg/kg	19.1	43.6	4E-01	No	13	1E+00	Yes	120	2E-01	No	No
NW-01	Soil	I	Copper	mg/kg	114	182	6E-01	No	70	2E+00	Yes	28	4E+00	Yes	No
NW-01	Soil	I	Iron	mg/kg	78700	71900	1E+00	Yes	--	--	--	--	--	--	Yes
NW-01	Soil	I	Lead	mg/kg	159	34.8	5E+00	Yes	120	1E+00	Yes	11	1E+01	Yes	Yes
NW-01	Soil	I	Manganese	mg/kg	1670	1600	1E+00	Yes	220	8E+00	Yes	4000	4E-01	No	Yes
NW-01	Soil	I	Mercury	mg/kg	0.4	0.0795	5E+00	Yes	6.6	6E-02	No	0.013	3E+01	Yes	Yes
NW-01	Soil	I	Nickel	mg/kg	19.2	89	2E-01	No	38	5E-01	No	130	1E-01	No	No
NW-01	Soil	I	Selenium	mg/kg	1.8	4.4	4E-01	No	0.52	3E+00	Yes	0.63	3E+00	Yes	No
NW-01	Soil	I	Vanadium	mg/kg	87.5	231	4E-01	No	330	3E-01	No	7.8	1E+01	Yes	No
NW-01	Soil	I	Zinc	mg/kg	471	136	3E+00	Yes	120	4E+00	Yes	46	1E+01	Yes	Yes
NW-03	Soil	I	Aluminum	mg/kg	26300	35600	7E-01	No	--	--	--	--	--	--	No
NW-03	Soil	I	Antimony	mg/kg	1.8	2.42	7E-01	No	78	2E-02	No	0.27	7E+00	Yes	No
NW-03	Soil	I	Arsenic	mg/kg	123	112	1E+00	Yes	18	7E+00	Yes	43	3E+00	Yes	Yes
NW-03	Soil	I	Barium	mg/kg	168	271	6E-01	No	330	5E-01	No	2000	8E-02	No	No
NW-03	Soil	I	Beryllium	mg/kg	0.66	1.7	4E-01	No	40	2E-02	No	21	3E-02	No	No
NW-03	Soil	I	Cadmium	mg/kg	1.4	0.824	2E+00	Yes	32	4E-02	No	0.36	4E+00	Yes	Yes
NW-03	Soil	I	Chromium	mg/kg	30.9	145	2E-01	No	64	5E-01	No	26	1E+00	Yes	No
NW-03	Soil	I	Cobalt	mg/kg	15.8	43.6	4E-01	No	13	1E+00	Yes	120	1E-01	No	No
NW-03	Soil	I	Copper	mg/kg	112	182	6E-01	No	70	2E+00	Yes	28	4E+00	Yes	No
NW-03	Soil	I	Iron	mg/kg	72400	71900	1E+00	Yes	--	--	--	--	--	--	Yes
NW-03	Soil	I	Lead	mg/kg	179	34.8	5E+00	Yes	120	1E+00	Yes	11	2E+01	Yes	Yes
NW-03	Soil	I	Manganese	mg/kg	3610	1600	2E+00	Yes	220	2E+01	Yes	4000	9E-01	No	Yes
NW-03	Soil	I	Mercury	mg/kg	0.32	0.0795	4E+00	Yes	6.6	5E-02	No	0.013	2E+01	Yes	Yes
NW-03	Soil	I	Nickel	mg/kg	20.9	89	2E-01	No	38	6E-01	No	130	2E-01	No	No
NW-03	Soil	I	Selenium	mg/kg	3.4	4.4	8E-01	No	0.52	7E+00	Yes	0.63	5E+00	Yes	No
NW-03	Soil	I	Silver	mg/kg	2.5	--	--	--	560	4E-03	No	4.2	6E-01	No	No
NW-03	Soil	I	Vanadium	mg/kg	93.3	231	4E-01	No	330	3E-01	No	7.8	1E+01	Yes	No
NW-03	Soil	I	Zinc	mg/kg	312	136	2E+00	Yes	120	3E+00	Yes	46	7E+00	Yes	Yes
RSAR-A	Soil	I	Aluminum	mg/kg	25200	35600	7E-01	No	--	--	--	--	--	--	No
RSAR-A	Soil	I	Antimony	mg/kg	2.1	2.42	9E-01	No	78	3E-02	No	0.27	8E+00	Yes	No
RSAR-A	Soil	I	Arsenic	mg/kg	96	112	9E-01	No	18	5E+00	Yes	43	2E+00	Yes	No
RSAR-A	Soil	I	Barium	mg/kg	117	271	4E-01	No	330	4E-01	No	2000	6E-02	No	No
RSAR-A	Soil	I	Beryllium	mg/kg	0.64	1.7	4E-01	No	40	2E-02	No	21	3E-02	No	No
RSAR-A	Soil	I	Cadmium	mg/kg	1.3	0.824	2E+00	Yes	32	4E-02	No	0.36	4E+00	Yes	Yes
RSAR-A	Soil	I	Chromium	mg/kg	21.7	145	1E-01	No	64	3E-01	No	26	8E-01	No	No
RSAR-A	Soil	I	Cobalt	mg/kg	15.2	43.6	3E-01	No	13	1E+00	Yes	120	1E-01	No	No
RSAR-A	Soil	I	Copper	mg/kg	111	182	6E-01	No	70	2E+00	Yes	28	4E+00	Yes	No
RSAR-A	Soil	I	Iron	mg/kg	44900	71900	6E-01	No	--	--	--	--	--	--	No
RSAR-A	Soil	I	Lead	mg/kg	81	34.8	2E+00	Yes	120	7E-01	No	11	7E+00	Yes	Yes
RSAR-A	Soil	I	Manganese	mg/kg	1050	1600	7E-01	No	220	5E+00	Yes	4000	3E-01	No	No

TABLE M-7

**Soil Screening - Identification of COPECs***Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona*

Exposure						Background Screen			Terrestrial Plants and Soil Invertebrates			Birds and Mammals			Retain as COPEC <sup>a</sup> ?
									ESV (mg/kg)	Screening HQ	Exceed?	ESV (mg/kg)	Screening HQ	Exceed?	
Area	Matrix	Type	Variable	Units	Maximum Detect (mg/kg)	BTV	BQ	Exceed?							
RSAR-A	Soil	I	Mercury	mg/kg	0.097	0.0795	1E+00	Yes	6.6	1E-02	No	0.013	7E+00	Yes	Yes
RSAR-A	Soil	I	Nickel	mg/kg	15.4	89	2E-01	No	38	4E-01	No	130	1E-01	No	No
RSAR-A	Soil	I	Selenium	mg/kg	4.7	4.4	1E+00	Yes	0.52	9E+00	Yes	0.63	7E+00	Yes	Yes
RSAR-A	Soil	I	Silver	mg/kg	3.5	--	--	--	560	6E-03	No	4.2	8E-01	No	No
RSAR-A	Soil	I	Vanadium	mg/kg	85.5	231	4E-01	No	330	3E-01	No	7.8	1E+01	Yes	No
RSAR-A	Soil	I	Zinc	mg/kg	272	136	2E+00	Yes	120	2E+00	Yes	46	6E+00	Yes	Yes
RSAR-B	Soil	I	Aluminum	mg/kg	17100	35600	5E-01	No	--	--	--	--	--	--	No
RSAR-B	Soil	I	Arsenic	mg/kg	61.7	112	6E-01	No	18	3E+00	Yes	43	1E+00	Yes	No
RSAR-B	Soil	I	Barium	mg/kg	120	271	4E-01	No	330	4E-01	No	2000	6E-02	No	No
RSAR-B	Soil	I	Beryllium	mg/kg	0.62	1.7	4E-01	No	40	2E-02	No	21	3E-02	No	No
RSAR-B	Soil	I	Cadmium	mg/kg	0.14	0.824	2E-01	No	32	4E-03	No	0.36	4E-01	No	No
RSAR-B	Soil	I	Chromium	mg/kg	19	145	1E-01	No	64	3E-01	No	26	7E-01	No	No
RSAR-B	Soil	I	Cobalt	mg/kg	14.1	43.6	3E-01	No	13	1E+00	Yes	120	1E-01	No	No
RSAR-B	Soil	I	Copper	mg/kg	31.7	182	2E-01	No	70	5E-01	No	28	1E+00	Yes	No
RSAR-B	Soil	I	Iron	mg/kg	42700	71900	6E-01	No	--	--	--	--	--	--	No
RSAR-B	Soil	I	Lead	mg/kg	63.7	34.8	2E+00	Yes	120	5E-01	No	11	6E+00	Yes	Yes
RSAR-B	Soil	I	Manganese	mg/kg	906	1600	6E-01	No	220	4E+00	Yes	4000	2E-01	No	No
RSAR-B	Soil	I	Nickel	mg/kg	16.2	89	2E-01	No	38	4E-01	No	130	1E-01	No	No
RSAR-B	Soil	I	Selenium	mg/kg	0.56	4.4	1E-01	No	0.52	1E+00	Yes	0.63	9E-01	No	No
RSAR-B	Soil	I	Vanadium	mg/kg	54.3	231	2E-01	No	330	2E-01	No	7.8	7E+00	Yes	No
RSAR-B	Soil	I	Zinc	mg/kg	179	136	1E+00	Yes	120	1E+00	Yes	46	4E+00	Yes	Yes
RSAR-D	Soil	I	Aluminum	mg/kg	13700	35600	4E-01	No	--	--	--	--	--	--	No
RSAR-D	Soil	I	Arsenic	mg/kg	58.3	112	5E-01	No	18	3E+00	Yes	43	1E+00	Yes	No
RSAR-D	Soil	I	Barium	mg/kg	142	271	5E-01	No	330	4E-01	No	2000	7E-02	No	No
RSAR-D	Soil	I	Beryllium	mg/kg	0.41	1.7	2E-01	No	40	1E-02	No	21	2E-02	No	No
RSAR-D	Soil	I	Cadmium	mg/kg	1.9	0.824	2E+00	Yes	32	6E-02	No	0.36	5E+00	Yes	Yes
RSAR-D	Soil	I	Chromium	mg/kg	16.3	145	1E-01	No	64	3E-01	No	26	6E-01	No	No
RSAR-D	Soil	I	Cobalt	mg/kg	13.2	43.6	3E-01	No	13	1E+00	Yes	120	1E-01	No	No
RSAR-D	Soil	I	Copper	mg/kg	167	182	9E-01	No	70	2E+00	Yes	28	6E+00	Yes	No
RSAR-D	Soil	I	Cyanide	mg/kg	0.39	--	--	--	0.9	4E-01	No	1.3	3E-01	No	No
RSAR-D	Soil	I	Iron	mg/kg	47600	71900	7E-01	No	--	--	--	--	--	--	No
RSAR-D	Soil	I	Lead	mg/kg	216	34.8	6E+00	Yes	120	2E+00	Yes	11	2E+01	Yes	Yes
RSAR-D	Soil	I	Manganese	mg/kg	1140	1600	7E-01	No	220	5E+00	Yes	4000	3E-01	No	No
RSAR-D	Soil	I	Mercury	mg/kg	0.46	0.0795	6E+00	Yes	6.6	7E-02	No	0.013	4E+01	Yes	Yes
RSAR-D	Soil	I	Nickel	mg/kg	15.7	89	2E-01	No	38	4E-01	No	130	1E-01	No	No
RSAR-D	Soil	I	Selenium	mg/kg	0.45	4.4	1E-01	No	0.52	9E-01	No	0.63	7E-01	No	No
RSAR-D	Soil	I	Vanadium	mg/kg	42.6	231	2E-01	No	330	1E-01	No	7.8	5E+00	Yes	No
RSAR-D	Soil	I	Zinc	mg/kg	438	136	3E+00	Yes	120	4E+00	Yes	46	1E+01	Yes	Yes
RSAR-H	Soil	I	Aluminum	mg/kg	28200	35600	8E-01	No	--	--	--	--	--	--	No
RSAR-H	Soil	I	Arsenic	mg/kg	227	112	2E+00	Yes	18	1E+01	Yes	43	5E+00	Yes	Yes
RSAR-H	Soil	I	Barium	mg/kg	159	271	6E-01	No	330	5E-01	No	2000	8E-02	No	No
RSAR-H	Soil	I	Beryllium	mg/kg	0.51	1.7	3E-01	No	40	1E-02	No	21	2E-02	No	No

TABLE M-7

**Soil Screening - Identification of COPECs***Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona*

Exposure						Background Screen			Terrestrial Plants and Soil			Birds and Mammals			Retain as COPEC <sup>a</sup> ?
									Invertebrates						
									ESV	Screening	Exceed?	ESV	Screening	Exceed?	
Area	Matrix	Type	Variable	Units	Maximum Detect (mg/kg)	BTV	BQ	Exceed?	(mg/kg)	HQ	Exceed?	(mg/kg)	HQ	Exceed?	
RSAR-H	Soil	I	Cadmium	mg/kg	0.64	0.824	8E-01	No	32	2E-02	No	0.36	2E+00	Yes	No
RSAR-H	Soil	I	Chromium	mg/kg	67.5	145	5E-01	No	64	1E+00	Yes	26	3E+00	Yes	No
RSAR-H	Soil	I	Cobalt	mg/kg	32	43.6	7E-01	No	13	2E+00	Yes	120	3E-01	No	No
RSAR-H	Soil	I	Copper	mg/kg	110	182	6E-01	No	70	2E+00	Yes	28	4E+00	Yes	No
RSAR-H	Soil	I	Iron	mg/kg	59700	71900	8E-01	No	--	--	--	--	--	--	No
RSAR-H	Soil	I	Lead	mg/kg	38.3	34.8	1E+00	Yes	120	3E-01	No	11	3E+00	Yes	Yes
RSAR-H	Soil	I	Manganese	mg/kg	1320	1600	8E-01	No	220	6E+00	Yes	4000	3E-01	No	No
RSAR-H	Soil	I	Mercury	mg/kg	0.045	0.0795	6E-01	No	6.6	7E-03	No	0.013	3E+00	Yes	No
RSAR-H	Soil	I	Nickel	mg/kg	48.2	89	5E-01	No	38	1E+00	Yes	130	4E-01	No	No
RSAR-H	Soil	I	Selenium	mg/kg	0.74	4.4	2E-01	No	0.52	1E+00	Yes	0.63	1E+00	Yes	No
RSAR-H	Soil	I	Vanadium	mg/kg	167	231	7E-01	No	330	5E-01	No	7.8	2E+01	Yes	No
RSAR-H	Soil	I	Zinc	mg/kg	147	136	1E+00	Yes	120	1E+00	Yes	46	3E+00	Yes	Yes
SE-01	Soil	I	Aluminum	mg/kg	54400	35600	2E+00	Yes	--	--	--	--	--	--	Yes
SE-01	Soil	I	Antimony	mg/kg	4.5	2.42	2E+00	Yes	78	6E-02	No	0.27	2E+01	Yes	Yes
SE-01	Soil	I	Arsenic	mg/kg	434	112	4E+00	Yes	18	2E+01	Yes	43	1E+01	Yes	Yes
SE-01	Soil	I	Barium	mg/kg	159	271	6E-01	No	330	5E-01	No	2000	8E-02	No	No
SE-01	Soil	I	Beryllium	mg/kg	0.58	1.7	3E-01	No	40	1E-02	No	21	3E-02	No	No
SE-01	Soil	I	Cadmium	mg/kg	5.9	0.824	7E+00	Yes	32	2E-01	No	0.36	2E+01	Yes	Yes
SE-01	Soil	I	Chromium	mg/kg	250	145	2E+00	Yes	64	4E+00	Yes	26	1E+01	Yes	Yes
SE-01	Soil	I	Cobalt	mg/kg	53	43.6	1E+00	Yes	13	4E+00	Yes	120	4E-01	No	Yes
SE-01	Soil	I	Copper	mg/kg	1930	182	1E+01	Yes	70	3E+01	Yes	28	7E+01	Yes	Yes
SE-01	Soil	I	Iron	mg/kg	108000	71900	2E+00	Yes	--	--	--	--	--	--	Yes
SE-01	Soil	I	Lead	mg/kg	694	34.8	2E+01	Yes	120	6E+00	Yes	11	6E+01	Yes	Yes
SE-01	Soil	I	Manganese	mg/kg	2740	1600	2E+00	Yes	220	1E+01	Yes	4000	7E-01	No	Yes
SE-01	Soil	I	Mercury	mg/kg	3.1	0.0795	4E+01	Yes	6.6	5E-01	No	0.013	2E+02	Yes	Yes
SE-01	Soil	I	Nickel	mg/kg	104	89	1E+00	Yes	38	3E+00	Yes	130	8E-01	No	Yes
SE-01	Soil	I	Selenium	mg/kg	5.3	4.4	1E+00	Yes	0.52	1E+01	Yes	0.63	8E+00	Yes	Yes
SE-01	Soil	I	Silver	mg/kg	6.1	--	--	--	560	1E-02	No	4.2	1E+00	Yes	Yes
SE-01	Soil	I	Vanadium	mg/kg	327	231	1E+00	Yes	330	1E+00	No	7.8	4E+01	Yes	Yes
SE-01	Soil	I	Zinc	mg/kg	633	136	5E+00	Yes	120	5E+00	Yes	46	1E+01	Yes	Yes
SE-02	Soil	I	Aluminum	mg/kg	40900	35600	1E+00	Yes	--	--	--	--	--	--	Yes
SE-02	Soil	I	Antimony	mg/kg	3.4	2.42	1E+00	Yes	78	4E-02	No	0.27	1E+01	Yes	Yes
SE-02	Soil	I	Arsenic	mg/kg	311	112	3E+00	Yes	18	2E+01	Yes	43	7E+00	Yes	Yes
SE-02	Soil	I	Barium	mg/kg	158	271	6E-01	No	330	5E-01	No	2000	8E-02	No	No
SE-02	Soil	I	Beryllium	mg/kg	0.43	1.7	3E-01	No	40	1E-02	No	21	2E-02	No	No
SE-02	Soil	I	Cadmium	mg/kg	3.9	0.824	5E+00	Yes	32	1E-01	No	0.36	1E+01	Yes	Yes
SE-02	Soil	I	Chromium	mg/kg	184	145	1E+00	Yes	64	3E+00	Yes	26	7E+00	Yes	Yes
SE-02	Soil	I	Cobalt	mg/kg	50.9	43.6	1E+00	Yes	13	4E+00	Yes	120	4E-01	No	Yes
SE-02	Soil	I	Copper	mg/kg	772	182	4E+00	Yes	70	1E+01	Yes	28	3E+01	Yes	Yes
SE-02	Soil	I	Iron	mg/kg	103000	71900	1E+00	Yes	--	--	--	--	--	--	Yes
SE-02	Soil	I	Lead	mg/kg	241	34.8	7E+00	Yes	120	2E+00	Yes	11	2E+01	Yes	Yes
SE-02	Soil	I	Manganese	mg/kg	2630	1600	2E+00	Yes	220	1E+01	Yes	4000	7E-01	No	Yes

TABLE M-7

**Soil Screening - Identification of COPECs***Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona*

Exposure						Background Screen			Terrestrial Plants and Soil Invertebrates			Birds and Mammals			Retain as COPEC <sup>a</sup> ?
									ESV (mg/kg)	Screening HQ	Exceed?	ESV (mg/kg)	Screening HQ	Exceed?	
Area	Matrix	Type	Variable	Units	Maximum Detect (mg/kg)	BTV	BQ	Exceed?							
SE-02	Soil	I	Mercury	mg/kg	0.23	0.0795	3E+00	Yes	6.6	3E-02	No	0.013	2E+01	Yes	Yes
SE-02	Soil	I	Nickel	mg/kg	92.8	89	1E+00	Yes	38	2E+00	Yes	130	7E-01	No	Yes
SE-02	Soil	I	Selenium	mg/kg	9.7	4.4	2E+00	Yes	0.52	2E+01	Yes	0.63	2E+01	Yes	Yes
SE-02	Soil	I	Silver	mg/kg	7.8	--	--	--	560	1E-02	No	4.2	2E+00	Yes	Yes
SE-02	Soil	I	Thallium	mg/kg	0.6	2.8	2E-01	No	1	6E-01	No	0.0569	1E+01	Yes	No
SE-02	Soil	I	Vanadium	mg/kg	272	231	1E+00	Yes	330	8E-01	No	7.8	3E+01	Yes	Yes
SE-02	Soil	I	Zinc	mg/kg	346	136	3E+00	Yes	120	3E+00	Yes	46	8E+00	Yes	Yes

Notes:

<sup>a</sup> Chemicals exceeding background (or for which a BTV was not available) and at least one ESV were identified as COPECs.

Dioxins and furans were evaluated on the congener level for plants and invertebrates and using TEQs for birds and mammal.

-- not available

BQ - background quotient

BTV - background threshold value

COPEC - chemical of potential ecological concern

ESV - ecological screening value

HQ - hazard quotient

mg/kg - milligram per kilogram

TEQ - toxicity equivalent

TABLE M-8

**Sediment Screening - Identification of COPECs***Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona*

Exposure		Variable	Units	Maximum Detect (mg/kg)	Benthic Macroinvertebrates			Terrestrial and Aquatic Rooted Plants			Semi-aquatic Birds and Mammals			Retain as COPEC <sup>a</sup> ?
					ESV (mg/kg)	Screening HQ	Exceed?	ESV (mg/kg)	Screening HQ	Exceed?	ESV (mg/kg)	Screening HQ	Exceed?	
AF-01	Sediment	Aluminum	mg/kg	24800	25500	1E+00	No	--	--	--	--	--	--	Yes
AF-01	Sediment	Arsenic	mg/kg	20.6	9.79	2E+00	Yes	18	1E+00	Yes	43	5E-01	No	Yes
AF-01	Sediment	Barium	mg/kg	238	130	2E+00	Yes	750	3E-01	No	2000	1E-01	No	Yes
AF-01	Sediment	Beryllium	mg/kg	0.89	--	--	--	4	2E-01	No	21	4E-02	No	Yes
AF-01	Sediment	Cadmium	mg/kg	0.27	0.99	3E-01	No	32	8E-03	No	0.36	8E-01	No	No
AF-01	Sediment	Chromium	mg/kg	43.7	43.4	1E+00	Yes	64	7E-01	No	26	2E+00	Yes	Yes
AF-01	Sediment	Cobalt	mg/kg	13.5	50	3E-01	No	13	1E+00	Yes	120	1E-01	No	Yes
AF-01	Sediment	Copper	mg/kg	44.6	31.6	1E+00	Yes	70	6E-01	No	28	2E+00	Yes	Yes
AF-01	Sediment	Iron	mg/kg	31100	20000	2E+00	Yes	--	--	--	--	--	--	Yes
AF-01	Sediment	Lead	mg/kg	14.1	35.8	4E-01	No	120	1E-01	No	11	1E+00	Yes	Yes
AF-01	Sediment	Manganese	mg/kg	535	630	8E-01	No	220	2E+00	Yes	4000	1E-01	No	Yes
AF-01	Sediment	Mercury	mg/kg	0.035	0.18	2E-01	No	6.6	5E-03	No	0.013	3E+00	Yes	Yes
AF-01	Sediment	Nickel	mg/kg	26	22.7	1E+00	Yes	38	7E-01	No	130	2E-01	No	Yes
AF-01	Sediment	Selenium	mg/kg	1.5	2.5	6E-01	No	0.52	3E+00	Yes	0.63	2E+00	Yes	Yes
AF-01	Sediment	Silver	mg/kg	0.13	1	1E-01	No	560	2E-04	No	4.2	3E-02	No	No
AF-01	Sediment	Sulfate	mg/kg	66	--	--	--	--	--	--	--	--	--	Yes
AF-01	Sediment	Vanadium	mg/kg	73.6	57	1E+00	Yes	330	2E-01	No	7.8	9E+00	Yes	Yes
AF-01	Sediment	Zinc	mg/kg	89	121	7E-01	No	160	6E-01	No	46	2E+00	Yes	Yes
AF-01	Sediment	1,2,3,4,6,7,8-Hepta CDD	mg/kg	1.29E-05	8.5E-07	2E+01	Yes	0.000004	3E+00	Yes	--	--	--	Yes
AF-01	Sediment	1,2,3,4,7,8-Hexa CDD	mg/kg	2.50E-07	8.5E-07	3E-01	No	0.000004	6E-02	No	--	--	--	No
AF-01	Sediment	1,2,3,6,7,8-Hexa CDD	mg/kg	1.96E-07	8.5E-07	2E-01	No	0.000004	5E-02	No	--	--	--	No
AF-01	Sediment	OCDD	mg/kg	1.48E-04	8.5E-07	2E+02	Yes	0.000004	4E+01	Yes	--	--	--	Yes
AF-01	Sediment	OCDF	mg/kg	5.09E-06	8.5E-07	6E+00	Yes	0.000004	1E+00	Yes	--	--	--	Yes
AF-01	Sediment	TEQBird	mg/kg	4.27E-08	--	--	--	--	--	--	2.9E-07	1E-01	No	No
AF-01	Sediment	TEQMammal	mg/kg	2.20E-07	--	--	--	--	--	--	2.9E-07	8E-01	No	No
AF-02	Sediment	Aluminum	mg/kg	110000	25500	4E+00	Yes	--	--	--	--	--	--	Yes
AF-02	Sediment	Antimony	mg/kg	3.3	2	2E+00	Yes	20	2E-01	No	0.27	1E+01	Yes	Yes
AF-02	Sediment	Arsenic	mg/kg	163	9.79	2E+01	Yes	18	9E+00	Yes	43	4E+00	Yes	Yes
AF-02	Sediment	Barium	mg/kg	207	130	2E+00	Yes	750	3E-01	No	2000	1E-01	No	Yes
AF-02	Sediment	Beryllium	mg/kg	5.7	--	--	--	4	1E+00	Yes	21	3E-01	No	Yes
AF-02	Sediment	Cadmium	mg/kg	12.7	0.99	1E+01	Yes	32	4E-01	No	0.36	4E+01	Yes	Yes
AF-02	Sediment	Chromium	mg/kg	1160	43.4	3E+01	Yes	64	2E+01	Yes	26	4E+01	Yes	Yes
AF-02	Sediment	Cobalt	mg/kg	28.1	50	6E-01	No	13	2E+00	Yes	120	2E-01	No	Yes
AF-02	Sediment	Copper	mg/kg	8030	31.6	3E+02	Yes	70	1E+02	Yes	28	3E+02	Yes	Yes
AF-02	Sediment	Cyanide	mg/kg	0.11	--	--	--	0.9	1E-01	No	1.3	8E-02	No	Yes
AF-02	Sediment	Iron	mg/kg	32300	20000	2E+00	Yes	--	--	--	--	--	--	Yes
AF-02	Sediment	Lead	mg/kg	709	35.8	2E+01	Yes	120	6E+00	Yes	11	6E+01	Yes	Yes
AF-02	Sediment	Manganese	mg/kg	1010	630	2E+00	Yes	220	5E+00	Yes	4000	3E-01	No	Yes
AF-02	Sediment	Mercury	mg/kg	0.77	0.18	4E+00	Yes	6.6	1E-01	No	0.013	6E+01	Yes	Yes
AF-02	Sediment	Nickel	mg/kg	877	22.7	4E+01	Yes	38	2E+01	Yes	130	7E+00	Yes	Yes

TABLE M-8

**Sediment Screening - Identification of COPECs***Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona*

Exposure		Variable	Units	Maximum Detect (mg/kg)	Benthic Macroinvertebrates			Terrestrial and Aquatic Rooted Plants			Semi-aquatic Birds and Mammals			Retain as COPEC <sup>a</sup> ?
					ESV (mg/kg)	Screening HQ	Exceed?	ESV (mg/kg)	Screening HQ	Exceed?	ESV (mg/kg)	Screening HQ	Exceed?	
AF-02	Sediment	Nitrate as N	mg/kg	6.6	--	--	--	--	--	--	--	--	--	Yes
AF-02	Sediment	Selenium	mg/kg	7.1	2.5	3E+00	Yes	0.52	1E+01	Yes	0.63	1E+01	Yes	Yes
AF-02	Sediment	Silver	mg/kg	27.1	1	3E+01	Yes	560	5E-02	No	4.2	6E+00	Yes	Yes
AF-02	Sediment	Sulfate	mg/kg	220	--	--	--	--	--	--	--	--	--	Yes
AF-02	Sediment	Thallium	mg/kg	1.5	--	--	--	1	2E+00	Yes	0.0569	3E+01	Yes	Yes
AF-02	Sediment	Vanadium	mg/kg	85.2	57	1E+00	Yes	330	3E-01	No	7.8	1E+01	Yes	Yes
AF-02	Sediment	Zinc	mg/kg	4130	121	3E+01	Yes	160	3E+01	Yes	46	9E+01	Yes	Yes
AF-02	Sediment	1,2,3,7,8-Penta CDF	mg/kg	0.000000188	8.5E-07	2E-01	No	0.000004	5E-02	No	--	--	--	No
AF-02	Sediment	2,3,4,7,8-Penta CDF	mg/kg	0.000000104	8.5E-07	1E-01	No	0.000004	3E-02	No	--	--	--	No
AF-02	Sediment	OCDD	mg/kg	0.00000937	8.5E-07	1E+01	Yes	0.000004	2E+00	Yes	--	--	--	Yes
AF-02	Sediment	TEQBird	mg/kg	0.000000123	--	--	--	--	--	--	2.9E-07	4E-01	No	No
AF-02	Sediment	TEQMammal	mg/kg	3.68E-08	--	--	--	--	--	--	2.9E-07	1E-01	No	No
AF-03	Sediment	Aluminum	mg/kg	16400	25500	6E-01	No	--	--	--	--	--	--	Yes
AF-03	Sediment	Antimony	mg/kg	1.8	2	9E-01	No	20	9E-02	No	0.27	7E+00	Yes	Yes
AF-03	Sediment	Arsenic	mg/kg	206	9.79	2E+01	Yes	18	1E+01	Yes	43	5E+00	Yes	Yes
AF-03	Sediment	Barium	mg/kg	174	130	1E+00	Yes	750	2E-01	No	2000	9E-02	No	Yes
AF-03	Sediment	Beryllium	mg/kg	0.57	--	--	--	4	1E-01	No	21	3E-02	No	Yes
AF-03	Sediment	Cadmium	mg/kg	3.9	0.99	4E+00	Yes	32	1E-01	No	0.36	1E+01	Yes	Yes
AF-03	Sediment	Chromium	mg/kg	29.4	43.4	7E-01	No	64	5E-01	No	26	1E+00	Yes	Yes
AF-03	Sediment	Cobalt	mg/kg	16	50	3E-01	No	13	1E+00	Yes	120	1E-01	No	Yes
AF-03	Sediment	Copper	mg/kg	423	31.6	1E+01	Yes	70	6E+00	Yes	28	2E+01	Yes	Yes
AF-03	Sediment	Cyanide	mg/kg	0.18	--	--	--	0.9	2E-01	No	1.3	1E-01	No	Yes
AF-03	Sediment	Iron	mg/kg	30700	20000	2E+00	Yes	--	--	--	--	--	--	Yes
AF-03	Sediment	Lead	mg/kg	361	35.8	1E+01	Yes	120	3E+00	Yes	11	3E+01	Yes	Yes
AF-03	Sediment	Manganese	mg/kg	3020	630	5E+00	Yes	220	1E+01	Yes	4000	8E-01	No	Yes
AF-03	Sediment	Mercury	mg/kg	1.2	0.18	7E+00	Yes	6.6	2E-01	No	0.013	9E+01	Yes	Yes
AF-03	Sediment	Nickel	mg/kg	27.2	22.7	1E+00	Yes	38	7E-01	No	130	2E-01	No	Yes
AF-03	Sediment	Nitrate as N	mg/kg	1	--	--	--	--	--	--	--	--	--	Yes
AF-03	Sediment	Selenium	mg/kg	0.42	2.5	2E-01	No	0.52	8E-01	No	0.63	7E-01	No	No
AF-03	Sediment	Silver	mg/kg	2.1	1	2E+00	Yes	560	4E-03	No	4.2	5E-01	No	Yes
AF-03	Sediment	Sulfate	mg/kg	37	--	--	--	--	--	--	--	--	--	Yes
AF-03	Sediment	Vanadium	mg/kg	66.2	57	1E+00	Yes	330	2E-01	No	7.8	8E+00	Yes	Yes
AF-03	Sediment	Zinc	mg/kg	1060	121	9E+00	Yes	160	7E+00	Yes	46	2E+01	Yes	Yes



TABLE M-8

Sediment Screening - Identification of COPECs

Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona

					Benthic Macroinvertebrates			Terrestrial and Aquatic Rooted Plants			Semi-aquatic Birds and Mammals			Retain as COPEC <sup>a</sup> ?
					ESV (mg/kg)	Screening HQ	Exceed?	ESV (mg/kg)	Screening HQ	Exceed?	ESV (mg/kg)	Screening HQ	Exceed?	
Exposure Area	Media	Variable	Units	Maximum Detect (mg/kg)										

Notes:

<sup>a</sup> Chemicals exceeding at least one ESV or for which ESVs were not available were identified as COPECs.

Dioxins and furans were evaluated on the congener level for benthic macroinvertebrates and using TEQs for birds and mammal.

-- not available

COPEC - chemical of potential ecological concern

ESV - ecological screening value

HQ - hazard quotient

mg/kg - milligram per kilogram

TEQ - toxicity equivalency

TABLE M-9

**Surface Water Screening - Identification of COPECs***Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona*

Name	Media	Type	Analyte	Fraction	Units	Maximum Detect <sup>a</sup>	Aquatic Organisms		
							ESV (mg/L)	Screening HQ	Retain as a COPEC?
AF-01	Surface water		Aluminum	Total	mg/L	1.65	0.087	2E+01	Yes
AF-01	Surface water		Arsenic	Dissolved	mg/L	0.0058	0.15	4E-02	No
AF-01	Surface water		Arsenic	Total	mg/L	0.0061	0.15	4E-02	No
AF-01	Surface water		Barium	Total	mg/L	0.113	0.004	3E+01	Yes
AF-01	Surface water		Cadmium	Dissolved	mg/L	0.00002	0.001	4E-02	No
AF-01	Surface water		Chromium	Dissolved	mg/L	0.0014	0.18	8E-03	No
AF-01	Surface water		Chromium	Total	mg/L	0.0031	0.21	1E-02	No
AF-01	Surface water		Cobalt	Total	mg/L	0.0019	0.023	8E-02	No
AF-01	Surface water		Copper	Dissolved	mg/L	0.0042	0.023	2E-01	No
AF-01	Surface water		Copper	Total	mg/L	0.0068	0.024	3E-01	No
AF-01	Surface water		Cyanide	Total	mg/L	0.0056	0.0052	1E+00	Yes
AF-01	Surface water		Fluoride	Total	mg/L	0.21	--	--	Yes
AF-01	Surface water		Iron	Total	mg/L	1.57	1	2E+00	Yes
AF-01	Surface water		Manganese	Total	mg/L	0.0667	0.12	6E-01	No
AF-01	Surface water		Nickel	Dissolved	mg/L	0.005	0.13	4E-02	No
AF-01	Surface water		Nickel	Total	mg/L	0.0053	0.13	4E-02	No
AF-01	Surface water		Nitrate As N	Total	mg/L	9.3	--	--	Yes
AF-01	Surface water		Nitrite As N	Total	mg/L	0.07	--	--	Yes
AF-01	Surface water		Vanadium	Total	mg/L	0.012	0.02	6E-01	No
AF-01	Surface water		Zinc	Dissolved	mg/L	0.0241	0.30	8E-02	No
AF-01	Surface water		Zinc	Total	mg/L	0.0241	0.30	8E-02	No
AF-02	Surface water		Aluminum	Total	mg/L	97.2	0.087	1E+03	Yes
AF-02	Surface water		Arsenic	Dissolved	mg/L	0.0144	0.15	1E-01	No
AF-02	Surface water		Arsenic	Total	mg/L	0.0579	0.15	4E-01	No
AF-02	Surface water		Barium	Total	mg/L	1.53	0.004	4E+02	Yes
AF-02	Surface water		Beryllium	Total	mg/L	0.0068	0.00066	1E+01	Yes
AF-02	Surface water		Cadmium	Dissolved	mg/L	0.000061	0.00052	1E-01	No
AF-02	Surface water		Cadmium	Total	mg/L	0.0012	0.00061	2E+00	Yes
AF-02	Surface water		Chromium	Dissolved	mg/L	0.0015	0.18	8E-03	No
AF-02	Surface water		Chromium	Total	mg/L	0.23	0.21	1E+00	Yes
AF-02	Surface water		Cobalt	Total	mg/L	0.0434	0.023	2E+00	Yes
AF-02	Surface water		Copper	Dissolved	mg/L	0.0043	0.023	2E-01	No
AF-02	Surface water		Copper	Total	mg/L	0.0997	0.024	4E+00	Yes
AF-02	Surface water		Cyanide	Total	mg/L	0.0077	0.0052	1E+00	Yes
AF-02	Surface water		Fluoride	Total	mg/L	0.29	--	--	Yes
AF-02	Surface water		Iron	Total	mg/L	57.4	1	6E+01	Yes
AF-02	Surface water		Lead	Dissolved	mg/L	0.00014	0.0080	2E-02	No
AF-02	Surface water		Lead	Total	mg/L	0.12	0.013	9E+00	Yes
AF-02	Surface water		Manganese	Total	mg/L	9.17	0.12	8E+01	Yes
AF-02	Surface water		Mercury	Dissolved	mg/L	0.000081	0.00001	8E+00	Yes
AF-02	Surface water		Mercury	Total	mg/L	0.00047	0.00001	4E+01	Yes
AF-02	Surface water		Nickel	Dissolved	mg/L	0.0055	0.13	4E-02	No
AF-02	Surface water		Nickel	Total	mg/L	0.0692	0.13	5E-01	No
AF-02	Surface water		Nitrate As N	Total	mg/L	7.9	--	--	Yes
AF-02	Surface water		Selenium	Total	mg/L	0.0059	0.002	3E+00	Yes
AF-02	Surface water		Silver	Total	mg/L	0.00027	0.0025	1E-01	No
AF-02	Surface water		Thallium	Total	mg/L	0.0014	0.15	9E-03	No
AF-02	Surface water		Vanadium	Total	mg/L	0.356	0.02	2E+01	Yes
AF-02	Surface water		Zinc	Dissolved	mg/L	0.0186	0.30	6E-02	No
AF-02	Surface water		Zinc	Total	mg/L	0.633	0.30	2E+00	Yes
AF-03	Surface water		Aluminum	Total	mg/L	103	0.087	1E+03	Yes
AF-03	Surface water		Antimony	Total	mg/L	0.002	0.03	7E-02	No
AF-03	Surface water		Arsenic	Dissolved	mg/L	0.0124	0.15	8E-02	No
AF-03	Surface water		Arsenic	Total	mg/L	0.144	0.15	1E+00	No
AF-03	Surface water		Barium	Total	mg/L	2.24	0.004	6E+02	Yes

TABLE M-9

**Surface Water Screening - Identification of COPECs***Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona*

Name	Media	Type	Analyte	Fraction	Units	Maximum Detect <sup>a</sup>	Aquatic Organisms		
							ESV (mg/L)	Screening HQ	Retain as a COPEC?
AF-03	Surface water		Beryllium	Total	mg/L	0.0083	0.00066	1E+01	Yes
AF-03	Surface water		Cadmium	Dissolved	mg/L	0.0023	0.00052	4E+00	Yes
AF-03	Surface water		Cadmium	Total	mg/L	0.0029	0.00061	5E+00	Yes
AF-03	Surface water		Chromium	Dissolved	mg/L	0.0023	0.18	1E-02	No
AF-03	Surface water		Chromium	Total	mg/L	0.238	0.21	1E+00	Yes
AF-03	Surface water		Cobalt	Total	mg/L	0.0675	0.023	3E+00	Yes
AF-03	Surface water		Copper	Dissolved	mg/L	0.0523	0.023	2E+00	Yes
AF-03	Surface water		Copper	Total	mg/L	0.267	0.024	1E+01	Yes
AF-03	Surface water		Cyanide	Total	mg/L	0.0083	0.0052	2E+00	Yes
AF-03	Surface water		Fluoride	Total	mg/L	0.33	--	--	Yes
AF-03	Surface water		Iron	Total	mg/L	60	1	6E+01	Yes
AF-03	Surface water		Lead	Dissolved	mg/L	0.00015	0.0080	2E-02	No
AF-03	Surface water		Lead	Total	mg/L	0.28	0.013	2E+01	Yes
AF-03	Surface water		Manganese	Total	mg/L	22.1	0.12	2E+02	Yes
AF-03	Surface water		Mercury	Dissolved	mg/L	0.000034	0.00001	3E+00	Yes
AF-03	Surface water		Mercury	Total	mg/L	0.002	0.00001	2E+02	Yes
AF-03	Surface water		Nickel	Dissolved	mg/L	0.0062	0.13	5E-02	No
AF-03	Surface water		Nickel	Total	mg/L	0.0844	0.13	6E-01	No
AF-03	Surface water		Nitrate As N	Total	mg/L	9.4	--	--	Yes
AF-03	Surface water		Nitrite As N	Total	mg/L	0.06	--	--	Yes
AF-03	Surface water		Selenium	Total	mg/L	0.0072	0.002	4E+00	Yes
AF-03	Surface water		Silver	Total	mg/L	0.0014	0.0025	6E-01	No
AF-03	Surface water		Thallium	Total	mg/L	0.002	0.15	1E-02	No
AF-03	Surface water		Vanadium	Total	mg/L	0.426	0.02	2E+01	Yes
AF-03	Surface water		Zinc	Dissolved	mg/L	0.52	0.30	2E+00	Yes
AF-03	Surface water		Zinc	Total	mg/L	1.34	0.30	4E+00	Yes

Notes:

<sup>a</sup> Data are presented for the fraction matching the ESV. Data for which there were no detections for the required fraction are not used.

-- not available

COPEC - chemical of potential ecological concern

ESV - ecological screening value

HQ - hazard quotient

mg/L - milligrams per liter

TABLE M-10

**Exposure Factors for Representative Birds and Mammals***Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona*

	Endpoint Species	Species Exposure Factors				Dietary Intake (fraction) <sup>c</sup>				Soil/ Sediment Fraction <sup>d</sup>	Foraging Range	
		Mean Body weight (kg)	Source	Ingestion Rate - Food <sup>a</sup> (kg/kgbw-d)	Ingestion Rate - Water <sup>b</sup> (L/kgbw-d)	Plant	Invert	Mammal	Fish		Hectares	Source
Birds												
Herbivore	Gambel's quail	0.175	Lee et al., 2013	0.05	0.105	1	--	--	--	0.105	8 - 38	Lee et al., 2013
Insectivore	Western kingbird	0.038	Gamble and Bergin, 2012	0.199	0.174	--	1	--	--	0.07	5	Gamble and Bergin, 2012
Omnivore	Song sparrow	0.025	Cal-EPA, 2015	0.227	0.199	0.65	0.35	--	--	0.105	0.175	Cal-EPA, 2015
Carnivore	Red-tailed hawk	1.224	EPA, 1993	0.077	0.055	--	--	1	--	0.01	957	USACHPPM, 2004
Omnivore	Mallard	1.134	EPA, 1993	0.049	0.057	0.3	0.7	--	--	0.033	468	EPA, 1993
Piscivore	Great blue heron	2.229	USACHPPM, 2004	0.051	0.045	--	--	--	1	0.02	750	EPA, 1993
Mammals												
Herbivore	Pocket gopher	0.235	USACHPPM, 2004	0.097	0.114	1	--	--	--	0.027	0.77	USACHPPM, 2004
Insectivore	Desert shrew	0.004	USACHPPM, 2004	0.221	0.172	--	1	--	--	0.13	0.72	USACHPPM, 2004
Omnivore	Raccoon	6.9	EPA, 1993	0.035	0.082	0.45	0.45	0.1	0.1	0.094	156	EPA, 1993
Piscivore	River otter	8.55	EPA, 1993	0.034	0.076	--	0.15	--	0.85	0.084	2900	EPA, 1993
Carnivore	Coyote	10	USACHPPM, 2004	0.033	0.079	--	--	1	--	0.028	1430	USACHPPM, 2004

**Notes:**

-- = not applicable

kg - kilogram

kg/kgbw-d - kilograms per kilogram body weight per day

L/kgbw-d - liters per kilogram body weight per day

TABLE M-10

**Exposure Factors for Representative Birds and Mammals***Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona*<sup>a</sup> Ingestion rates for food (Nagy, 2001) based on dry matter ---->  $FI(kg_{\text{food}}/kg_{\text{bw}}/\text{day}) = a \text{ (grams body weight)}^b / \text{grams body weight}$ 

\*surrogate used for ciconiiformes (great blue heron)

<b>Functional Group</b>	<b>Receptor</b>	<b>a</b>	<b>b</b>
<b>Birds</b>			
passeriformes	sparrow, kingbird	0.63	0.683
galliformes	Gambel's quail	0.088	0.891
carnivore	red-tailed hawk	0.849	0.663
omnivore	mallard	0.67	0.627
procellariiformes*	great blue heron	0.997	0.613
<b>Mammals</b>			
rodentia	pocket gopher	0.332	0.774
insectivora	desert shrew	0.373	0.622
carnivora	raccoon, coyote	0.153	0.834

<sup>b</sup> Water ingestion rates (Calder and Braun, 1983) -->  $WI(L/kgbw/\text{day}) = a \text{ (kilograms body weight)}^b / \text{kilograms body weight}$ 

<b>Group</b>	<b>a</b>	<b>b</b>
birds	0.059	0.67
mammals	0.099	0.9

<sup>c</sup> The raccoon is evaluated under both terrestrial (soil) and semi-aquatic (sediment) food chain uptake pathways:

-For terrestrial exposure, uptake is from plants, invertebrates, and small mammals.

-For semi-aquatic exposure, uptake is from aquatic plants, invertebrates (crayfish), and fish.

<sup>d</sup> Fraction of soil/sediment in diet was estimated using surrogate/functional groups (Beyer et al., 1994 or USACHPPM, 2004).

<b>Birds</b>	<b>Surrogate species</b>	<b>Source</b>
song sparrow	woodcock	Beyer et al., 1994
western kingbird	estimated	--
Gambrel's quail	woodcock	Beyer et al., 1994
Red-tailed hawk	estimated	--
<b>Mammals</b>		
pocket gopher	prairie dog	Beyer et al., 1994
desert shrew	short-tailed shrew	USACHPPM, 2004
raccoon	--	Beyer et al., 1994
coyote	red fox	Beyer et al., 1994

TABLE M-11

**Bioaccumulation Factors, Bioavailability, and Uptake Regression Models for Terrestrial Exposures***Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona*

COPEC	Terrestrial Plants				Soil Invertebrate				Small Mammals				LogKow		Iron King Mine Soil Bioavailability
	BAF	B0	B1	Source	BAF	B0	B1	Source	BAF	B0	B1	Source	LogKow	Source	
Aluminum	0.064	--	--	Iron King Mine site data	0.043	--	--	Sample et al., 1998a	0.0263	--	--	Sample et al., 1998b	0.33	EPA, 2012	--
Antimony	0.295	--	--	Iron King Mine site	1	--	--	EPA, 2007h	1	--	--	Default	0.73	EPA, 2012	--
Arsenic	0.076	--	--	Iron King Mine site	regression	-1.421	0.706	EPA, 2007h	regression	-4.8471	0.8188	EPA, 2007h	0.68	EPA, 2012	--
Barium	0.166	--	--	Iron King Mine site data	0.091	--	--	EPA, 2007h	0.0566	--	--	Sample et al., 1998b	0.23	EPA, 2012	--
Beryllium	regression	-0.5361	0.7345	EPA, 2007h	0.045	--	--	EPA, 2007h	0.05*[invert]	--	--	EPA, 2007h	-0.57	EPA, 2012	--
Cadmium	0.297	--	--	Iron King Mine site	regression	2.114	0.795	EPA, 2007h	regression	-1.2571	0.4723	EPA, 2007h	-0.07	EPA, 2012	--
Chloride	1	--	--	Default	1	--	--	Default	1	--	--	Default	0.54	EPA, 2012	--
Chromium, Hexavalent	0.0075	--	--	LANL, 2014	0.06	--	--	LANL, 2014	regression	-1.4599	0.7338	EPA, 2007h	0.23	EPA, 2012	--
Chromium	0.065	--	--	Iron King Mine site	0.161	--	--	LANL, 2014	regression	-1.4599	0.7338	EPA, 2007h	0.23	EPA, 2012	--
Cobalt	0.081	--	--	Iron King Mine site	0.122	--	--	EPA, 2007h	regression	-4.4669	1.307	EPA, 2007h	0.23	EPA, 2012	--
Copper	0.111	--	--	Iron King Mine site	0.515	--	--	EPA, 2007h	regression	2.042	0.1444	EPA, 2007h	-0.57	EPA, 2012	--
Cyanide	1	--	--	Default	1	--	--	Default	0.501	--	--	LANL, 2014	-0.69	EPA, 2012	--
Iron	0.053	--	--	Iron King Mine site data	0.036	--	--	Sample et al. 1998a	0.00053	--	--	LANL, 2014	-0.77	EPA, 2012	--
Lead	0.103	--	--	Iron King Mine site	regression	-0.218	0.807	EPA, 2007h	regression	0.0761	0.4422	EPA, 2007h	0.73	EPA, 2012	0.225
Manganese	0.122	--	--	Iron King Mine site	regression	-0.809	0.682	EPA, 2007h	0.0205	--	--	EPA, 2007h	0.23	EPA, 2012	--
Mercury	0.099	--	--	Iron King Mine site data	regression	-0.684	0.118	Sample et al. 1998a	0.0543	--	--	Sample et al., 1998b	0.62	EPA, 2012	--
Nickel	0.169	--	--	Iron King Mine site	0.7778	--	--	LANL, 2014	regression	-0.2462	0.4658	EPA, 2007h	-0.57	EPA, 2012	--
Nitrate as N	1	--	--	Default	1	--	--	Default	1	--	--	Default	0.21	EPA, 2012	--
Selenium	0.104	--	--	Iron King Mine site	regression	-0.075	0.733	EPA, 2007h	regression	-0.4158	0.3764	EPA, 2007h	0.24	EPA, 2012	--
Silver	0.052	--	--	Iron King Mine site	2.045	--	--	EPA, 2007h	0.004	--	--	EPA, 2007h	0.23	EPA, 2012	--
Sulfate	1	--	--	Default	1	--	--	Default	1	--	--	Default	-2.2	EPA, 2012	--
Thallium	0.004	--	--	Baes et al., 1984	0.0541	--	--	LANL, 2014	0.1124	--	--	Sample et al., 1998a	0.23	EPA, 2012	--
Vanadium	0.046	--	--	Iron King Mine site	0.042	--	--	EPA, 2007h	0.0123	--	--	EPA, 2007h	0.23	EPA, 2012	--
Zinc	0.184	--	--	Iron King Mine site	regression	4.449	0.328	EPA, 2007h	regression	4.3632	0.0706	EPA, 2007h	-0.47	EPA, 2012	--
TEQBird	0.105	--	--	LANL, 2014	regression	3.533	1.182	Sample et al. 1998a	regression	0.8113	1.0993	Sample et al., 1998b	6.92	EPA, 2012	--
TEQMammal	0.105	--	--	LANL, 2014	regression	3.533	1.182	Sample et al. 1998a	regression	0.8113	1.0993	Sample et al., 1998b	6.92	EPA, 2012	--
4-Chloroaniline	1	--	--	Default	1	--	--	Default	0.00459	--	--	LANL, 2014	1.72	EPA, 2012	--
Acetone	1	--	--	Default	1	--	--	Default	0.00041	--	--	LANL, 2014	-0.24	EPA, 2012	--
Acetophenone	1	--	--	Default	1	--	--	Default	1	--	--	Default	1.67	EPA, 2012	--
Alpha-Chlordane	0.202	--	--	LANL, 2014	LogKow model	--	--	LogKow model from EPA, 2007**	0.390	--	--	LANL, 2014	6.26	EPA, 2012	--
Aroclor-1242	0.17	--	--	LANL, 2014	regression	1.41	1.361	Sample et al. 1998a	0.114	--	--	LANL, 2014	6.34	EPA, 2012	--
Aroclor-1248	0.17	--	--	LANL, 2014	regression	1.41	1.361	Sample et al., 1998b	0.112	--	--	LANL, 2014	6.34	EPA, 2012	--
Aroclor-1254	0.106	--	--	LANL, 2014	regression	1.41	1.361	Sample et al., 1998b	0.088	--	--	LANL, 2014	6.98	EPA, 2012	--

TABLE M-11

**Bioaccumulation Factors, Bioavailability, and Uptake Regression Models for Terrestrial Exposures***Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona*

	Terrestrial Plants				Soil Invertebrate				Small Mammals				LogKow		Iron King Mine Soil Bioavailability
	BAF	B0	B1	Source	BAF	B0	B1	Source	BAF	B0	B1	Source	LogKow	Source	
COPEC															
Beta-BHC	1.26	--	--	LANL, 2014	LogKow model	--	--	LogKow model from EPA, 2007h**	0.103	--	--	LANL, 2014	4.26	EPA, 2012	--
bis(2-Ethylhexyl)phthalate	0.05	--	--	LANL, 2014	1	--	--	Default	1.03	--	--	LANL, 2014	8.39	EPA, 2012	--
Benzyl butyl phthalate	0.728	--	--	LANL, 2014	LogKow model	--	--	LogKow model from EPA, 2007h**	0.159	--	--	LANL, 2014	4.84	EPA, 2012	--
Benzaldehyde	1	--	--	Default	1	--	--	Default	1	--	--	Default	1.71	EPA, 2012	--
Caprolactam	1	--	--	Default	1	--	--	Default	1	--	--	Default	0.66	EPA, 2012	--
Carbazole	1.87	--	--	LANL, 2014	LogKow model	--	--	LogKow model from EPA, 2007h**	0.010	--	--	LANL, 2014	3.23	EPA, 2012	--
Carbon disulfide	2.01	--	--	LANL, 2014	1	--	--	Default	0.001	--	--	LANL, 2014	1.94	EPA, 2012	--
Chloroform	1	--	--	Default	1	--	--	Default	0.124	--	--	LANL, 2014	1.52	EPA, 2012	--
Delta-BHC	1.12	--	--	LogKow model from EPA, 2007h**	LogKow model	--	--	LogKow model from EPA, 2007h**	0.103	--	--	LANL, 2014	4.26	EPA, 2012	--
Dieldrin	0.41	--	--	EPA, 2007h	14.7	--	--	EPA, 2007h	regression	1.9582	0.6076	EPA, 2007h	5.45	EPA, 2012	--
Di-n-butyl phthalate	0.929	--	--	LogKow model from EPA, 2007h**	LogKow model	--	--	LogKow model from EPA, 2007h**	0.593	--	--	LANL, 2014	4.61	EPA, 2012	--
Endosulfan I	1.67	--	--	LogKow model from EPA, 2007h**	LogKow model	--	--	LogKow model from EPA, 2007h**	0.00763	--	--	LANL, 2014	3.5	EPA, 2012	--
Endrin Ketone	0.760	--	--	LogKow model from EPA, 2007h**	LogKow model	--	--	LogKow model from EPA, 2007h**	0.387	--	--	LANL, 2014	4.99	EPA, 2012	--
Heptachlor	0.481	--	--	LogKow model from EPA, 2007h**	LogKow model	--	--	LogKow model from EPA, 2007h**	0.151	--	--	LANL, 2014	5.86	EPA, 2012	--
Heptachlor Epoxide	0.954	--	--	LogKow model from EPA, 2007h**	LogKow model	--	--	LogKow model from EPA, 2007h**	0.151	--	--	LANL, 2014	4.56	EPA, 2012	--
Methyl ethyl ketone	1	--	--	Default	1	--	--	Default	0.000918	--	--	LANL, 2014	0.26	EPA, 2012	--
Perchlorate	regression	2.41	0.5891	CH2M HILL, 2005	0.281	--	--	CH2M HILL, 2005	1	--	--	Default	--	EPA, 2012	--

Notes:

\*\* Receptor group log Kow models were used as noted below:

-Soil to plant: BAF for organics with log Kows between 3 and 8 were derived using  $\log \text{BAF} = -0.229 * (\log \text{Kow}) + 1.0237$  (unrinsed plants, EPA, 2007h)

-Soil to invertebrate: Concentration in worm calculated for organics with LogKows (2 to 8) using model from EPA (2007), where Koc is estimated from Kow using general chemical model from Gerstl (1990) and Foc = 0.01.

 $\text{C}_{\text{worm}} = 10^{((0.87 * \log \text{Kow}) - 2) * (\text{C}_{\text{soil}} / (\text{foc} * 10^{((0.679 * \log \text{Kow}) + 0.663)))}$ .

-- - not applicable

BAF - bioaccumulation factor

BHC - benzene hexachloride

EPA - U.S. Environmental Protection Agency

Kow - octanol-water partition coefficient

TEQ - toxicity equivalent



TABLE M-12

**Bioaccumulation Factors, Bioavailability, and Uptake Regression Models for Semi-aquatic Exposures***Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona*

COPEC	Aquatic Plants				Benthic Invertebrates				Fish			
	<i>Sediment</i> BSAF	B0	B1	Source	<i>Sediment</i> BSAF	B0	B1	Source	<i>Surface Water</i> BCF	Source	<i>Sediment</i> BSAF	Source
Aluminum	0.064	--	--	Iron King Mine site data	1	--	--	Default	2.7	EPA, 1999	1	Default
Antimony	0.295	--	--	Iron King Mine site data	1	--	--	Default	1	Sample et al., 1996	1	Default
Arsenic	0.076	--	--	Iron King Mine site data	regression	-0.292	0.754	Bechtel Jacobs, 1998	17	Sample et al., 1996	0.126	Pascoe et al., 1996
Barium	0.166	--	--	Iron King Mine site data	0.137	--	--	Hamilton et al., 2002	4	ORNL, 2015	1	Default
Beryllium	regression	-0.5361	0.7345	EPA, 2007h	1	--	--	Default	19	Sample et al., 1996	1	Default
Cadmium	0.297	--	--	Iron King Mine site data	regression	-0.314	0.513	Bechtel Jacobs, 1998	200	ORNL, 2015	0.164	Pascoe et al., 1996
Chromium	0.065	--	--	Iron King Mine site data	regression	0.209	0.365	Bechtel Jacobs, 1998	12	Sample et al., 1996	0.038	Krantzberg and Boyd, 1992
Cobalt	0.081	--	--	Iron King Mine site data	1	--	--	Default	1	Default		
Copper	0.111	--	--	Iron King Mine site data	0.824	--	--	Bechtel Jacobs, 1998	200	ORNL, 2015	0.1	Krantzberg and Boyd, 1992
Cyanide	1	--	--	Default	1	--	--	Default	0	Sample et al., 1996	1	Default
Iron	0.053	--	--	Iron King Mine site data	1	--	--	Default	1	Default	1	Default
Lead	0.103	--	--	Iron King Mine site data	regression	-0.515	0.653	Bechtel Jacobs, 1998	45	Sample et al., 1996	0.07	Krantzberg and Boyd, 1992
Manganese	0.122	--	--	Iron King Mine site data	1	--	--	Default	1	default	1	Default
Mercury	0.099	--	--	Iron King Mine site data	1.186	--	--	Bechtel Jacobs, 1998	1000	ORNL, 2015	3.25	Cope et al., 1990
Nickel	0.169	--	--	Iron King Mine site data	regression	-0.44	0.695	Bechtel Jacobs, 1998	106	Sample et al., 1996	1	Default
Nitrate as N	1	--	--	Default	1	--	--	Default	1	default	1	Default
Selenium	0.104	--	--	Iron King Mine site data	1	--	--	Default	129	EPA, 1999	1	Default
Silver	0.052	--	--	Iron King Mine site data	0.18	--	--	Hirsch, 1998	87.75	EPA, 1999	1	Default
Sulfate	1	--	--	Default	1	--	--	Default	1	Default	1	Default
Thallium	0.004	--	--	Baes et al., 1984	1	--	--	Default	34	Sample et al., 1996	1	Default
Vanadium	0.046	--	--	Iron King Mine site data	0.153	--	--	Bechtel Jacobs, 1998	1	Default	0.153	Ward et al., 2009
Zinc	0.184	--	--	Iron King Mine site data	regression	1.89	0.126	Bechtel Jacobs, 1998	966	Sample et al., 1996	0.147	Pascoe et al., 1996

TABLE M-12  
**Bioaccumulation Factors, Bioavailability, and Uptake Regression Models for Semi-aquatic Exposures**

*Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona*

COPEC	Aquatic Plants				Benthic Invertebrates				Fish			
	<i>Sediment</i>				<i>Sediment</i>				<i>Surface Water</i>		<i>Sediment</i>	
	<i>BSAF</i>	<i>B0</i>	<i>B1</i>	<i>Source</i>	<i>BSAF</i>	<i>B0</i>	<i>B1</i>	<i>Source</i>	<i>BCF</i>	<i>Source</i>	<i>BSAF</i>	<i>Source</i>
TEQBird	0.105	--	--	LANL, 2014	1	--	--	Default	4235	EPA, 1999	1.416	EPA, 1997
TEQMammal	0.105	--	--	LANL, 2014	1	--	--	Default	4235	EPA, 1999	1.416	EPA, 1997

Notes:

\* - BCF was reported as wet weight. Converted to dry weight assuming 75% moisture content.

BCF - bioconcentration factor

BSAF - biota sediment accumulation factor

TABLE M-13

**Site-Specific Soil-to-Plant Bioaccumulation Factors***Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona*

Location ID	Analyte	Plant Tissue		Soil Result		Sample-specific BAF	Median Analyte BAF	90th Percentile BAF
		mg/kg	Detect	(mg/kg)	Detect			
BIO-01	Aluminum	365	Y	23800	Y	0.0153	0.064	0.097
BIO-02	Aluminum	1600	Y	20800	Y	0.0769		
BIO-03	Aluminum	699	Y	17100	Y	0.0409		
BIO-04	Aluminum	1850	Y	28600	Y	0.0647		
BIO-05	Aluminum	1800	Y	22300	Y	0.0807		
BIO-06	Aluminum	1950	Y	30700	Y	0.0635		
BIO-07	Aluminum	6540	Y	26600	Y	0.2459		
BIO-08	Aluminum	1690	Y	22100	Y	0.0765		
BIO-09	Aluminum	418	Y	21700	Y	0.0193		
BIO-10	Aluminum	720	Y	18200	Y	0.0396		
BIO-01	Antimony	0.44	Y	10.1	Y	0.0436	0.295	0.573
BIO-02	Antimony	0.82	Y	1.8	Y	0.4556		
BIO-03	Antimony	0.41	Y	4.9	Y	0.0837		
BIO-04	Antimony	1.8	Y	6.1	Y	0.2951		
BIO-05	Antimony	0.44	Y	0.16	N	--		
BIO-06	Antimony	1.2	Y	1.6	Y	0.7500		
BIO-07	Antimony	0.82	Y	0.16	N	--		
BIO-08	Antimony	0.36	Y	0.15	N	--		
BIO-09	Antimony	1.4	Y	5.4	Y	0.2593		
BIO-10	Antimony	1.2	Y	3.1	Y	0.3871		
BIO-01	Arsenic	7.2	Y	813	Y	0.0089	0.076	0.247
BIO-02	Arsenic	13.9	Y	139	Y	0.1000		
BIO-03	Arsenic	5.1	Y	453	Y	0.0113		
BIO-04	Arsenic	28.6	Y	612	Y	0.0467		
BIO-05	Arsenic	9.4	Y	42.1	Y	0.2233		
BIO-06	Arsenic	32.9	Y	467	Y	0.0704		
BIO-07	Arsenic	32	Y	70	Y	0.4571		
BIO-08	Arsenic	10.4	Y	68.1	Y	0.1527		
BIO-09	Arsenic	23.6	Y	816	Y	0.0289		
BIO-10	Arsenic	51.3	Y	624	Y	0.0822		
BIO-01	Barium	5.6	Y	109	Y	0.0514	0.166	0.294
BIO-02	Barium	23.6	Y	129	Y	0.1829		
BIO-03	Barium	13.8	Y	78.5	Y	0.1758		
BIO-04	Barium	18.4	Y	63.8	Y	0.2884		
BIO-05	Barium	26.2	Y	111	Y	0.2360		
BIO-06	Barium	19.5	Y	148	Y	0.1318		
BIO-07	Barium	60.3	Y	175	Y	0.3446		
BIO-08	Barium	24.5	Y	156	Y	0.1571		
BIO-09	Barium	6.5	Y	107	Y	0.0607		
BIO-10	Barium	9.4	Y	94.1	Y	0.0999		
BIO-01	Beryllium	0.073	N	0.027	N	--	--	--
BIO-02	Beryllium	0.096	N	0.028	N	--		
BIO-03	Beryllium	0.1	N	0.028	N	--		
BIO-04	Beryllium	0.13	N	0.025	N	--		
BIO-05	Beryllium	0.065	N	0.026	N	--		
BIO-06	Beryllium	0.09	N	0.026	N	--		
BIO-07	Beryllium	0.15	Y	0.026	N	--		
BIO-08	Beryllium	0.068	N	0.026	N	--		
BIO-09	Beryllium	0.086	N	0.026	N	--		
BIO-10	Beryllium	0.094	N	0.025	N	--		
BIO-01	Cadmium	1.3	Y	7.4	Y	0.1757	0.297	0.336
BIO-02	Cadmium	2.2	Y	0.016	N	--		

TABLE M-13

**Site-Specific Soil-to-Plant Bioaccumulation Factors***Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona*

Location ID	Analyte	Plant Tissue		Soil Result		Sample-specific BAF	Median Analyte BAF	90th Percentile BAF
		mg/kg	Detect	(mg/kg)	Detect			
BIO-03	Cadmium	1.6	Y	5.1	Y	0.3137		
BIO-04	Cadmium	4	Y	11.2	Y	0.3571		
BIO-05	Cadmium	0.35	Y	0.015	N	--		
BIO-06	Cadmium	1.1	Y	3.5	Y	0.3143		
BIO-07	Cadmium	0.72	Y	0.015	N	--		
BIO-08	Cadmium	0.34	Y	0.015	N	--		
BIO-09	Cadmium	3.2	Y	11.4	Y	0.2807		
BIO-10	Cadmium	1.9	Y	7.3	Y	0.2603		
BIO-01	Chromium	0.8	Y	47.7	Y	0.0168	0.065	0.121
BIO-02	Chromium	2.8	Y	41.5	Y	0.0675		
BIO-03	Chromium	1.2	Y	99.9	Y	0.0120		
BIO-04	Chromium	2.7	Y	31.3	Y	0.0863		
BIO-05	Chromium	2.4	Y	24.3	Y	0.0988		
BIO-06	Chromium	1.6	Y	25.2	Y	0.0635		
BIO-07	Chromium	5.1	Y	23.6	Y	0.2161		
BIO-08	Chromium	2	Y	18.1	Y	0.1105		
BIO-09	Chromium	1.1	Y	38.3	Y	0.0287		
BIO-10	Chromium	1.1	Y	19.3	Y	0.0570		
BIO-01	Cobalt	0.26	Y	12.1	Y	0.0215	0.081	0.138
BIO-02	Cobalt	1.2	Y	10	Y	0.1200		
BIO-03	Cobalt	0.43	Y	11.2	Y	0.0384		
BIO-04	Cobalt	1.5	Y	20.3	Y	0.0739		
BIO-05	Cobalt	1.4	Y	11.4	Y	0.1228		
BIO-06	Cobalt	1.1	Y	12.4	Y	0.0887		
BIO-07	Cobalt	3.8	Y	13.6	Y	0.2794		
BIO-08	Cobalt	1.1	Y	12.1	Y	0.0909		
BIO-09	Cobalt	0.4	Y	13.1	Y	0.0305		
BIO-10	Cobalt	0.88	Y	12.6	Y	0.0698		
BIO-01	Copper	10.2	Y	229	Y	0.0445	0.111	0.329
BIO-02	Copper	14.6	Y	166	Y	0.0880		
BIO-03	Copper	5.5	Y	285	Y	0.0193		
BIO-04	Copper	16.9	Y	184	Y	0.0918		
BIO-05	Copper	8.4	Y	27.4	Y	0.3066		
BIO-06	Copper	14.5	Y	59.5	Y	0.2437		
BIO-07	Copper	19.2	Y	36.4	Y	0.5275		
BIO-08	Copper	7.6	Y	33.7	Y	0.2255		
BIO-09	Copper	10.8	Y	142	Y	0.0761		
BIO-10	Copper	9.1	Y	69.8	Y	0.1304		
BIO-01	Iron	803	Y	69800	Y	0.0115	0.053	0.113
BIO-02	Iron	3050	Y	38800	Y	0.0786		
BIO-03	Iron	1120	Y	44100	Y	0.0254		
BIO-04	Iron	4070	Y	83800	Y	0.0486		
BIO-05	Iron	3580	Y	36400	Y	0.0984		
BIO-06	Iron	3850	Y	67400	Y	0.0571		
BIO-07	Iron	9920	Y	40200	Y	0.2468		
BIO-08	Iron	3080	Y	39300	Y	0.0784		
BIO-09	Iron	1280	Y	55300	Y	0.0231		
BIO-10	Iron	2160	Y	47000	Y	0.0460		
BIO-01	Lead	24.9	Y	2900	Y	0.0086	0.103	0.502
BIO-02	Lead	31.8	Y	276	Y	0.1152		
BIO-03	Lead	13.4	Y	1520	Y	0.0088		
BIO-04	Lead	87.6	Y	2830	Y	0.0310		

TABLE M-13

**Site-Specific Soil-to-Plant Bioaccumulation Factors***Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona*

Location ID	Analyte	Plant Tissue		Soil Result		Sample-specific BAF	Median Analyte BAF	90th Percentile BAF
		mg/kg	Detect	(mg/kg)	Detect			
BIO-05	Lead	16.1	Y	32.9	Y	0.4894	0.122	0.204
BIO-06	Lead	62.4	Y	400	Y	0.1560		
BIO-07	Lead	36.6	Y	59.8	Y	0.6120		
BIO-08	Lead	12.2	Y	46.2	Y	0.2641		
BIO-09	Lead	66.8	Y	1700	Y	0.0393		
BIO-10	Lead	54.1	Y	600	Y	0.0902		
BIO-01	Manganese	30.2	Y	703	Y	0.0430	0.099	0.311
BIO-02	Manganese	104	Y	595	Y	0.1748		
BIO-03	Manganese	40.2	Y	542	Y	0.0742		
BIO-04	Manganese	116	Y	983	Y	0.1180		
BIO-05	Manganese	95.5	Y	726	Y	0.1315		
BIO-06	Manganese	92.2	Y	737	Y	0.1251		
BIO-07	Manganese	224	Y	946	Y	0.2368		
BIO-08	Manganese	108	Y	975	Y	0.1108		
BIO-09	Manganese	122	Y	609	Y	0.2003		
BIO-10	Manganese	60.9	Y	793	Y	0.0768		
BIO-01	Mercury	0.05	Y	9.6	Y	0.0052	0.169	0.285
BIO-02	Mercury	0.05	Y	0.61	Y	0.0820		
BIO-03	Mercury	0.06	Y	3.5	Y	0.0171		
BIO-04	Mercury	0.22	Y	11.2	Y	0.0196		
BIO-05	Mercury	0.05	Y	0.18	Y	0.2778		
BIO-06	Mercury	0.3	Y	2.6	Y	0.1154		
BIO-07	Mercury	0.07	Y	0.17	Y	0.4118		
BIO-08	Mercury	0.06	Y	0.2	Y	0.3000		
BIO-09	Mercury	1.1	Y	6.8	Y	0.1618		
BIO-10	Mercury	0.16	Y	4.1	Y	0.0390		
BIO-01	Nickel	0.64	Y	13.9	Y	0.0460	0.104	0.150
BIO-02	Nickel	4	Y	15.1	Y	0.2649		
BIO-03	Nickel	4.5	Y	32.7	Y	0.1376		
BIO-04	Nickel	3.3	Y	13.3	Y	0.2481		
BIO-05	Nickel	3.2	Y	13.9	Y	0.2302		
BIO-06	Nickel	1.2	Y	10.4	Y	0.1154		
BIO-07	Nickel	5	Y	10.7	Y	0.4673		
BIO-08	Nickel	2	Y	10	Y	0.2000		
BIO-09	Nickel	0.49	Y	14	Y	0.0350		
BIO-10	Nickel	0.98	Y	13.2	Y	0.0742		
BIO-01	Selenium	0.54	Y	21.8	Y	0.0248	0.052	0.067
BIO-02	Selenium	0.87	Y	7.1	Y	0.1225		
BIO-03	Selenium	0.59	Y	9.7	Y	0.0608		
BIO-04	Selenium	2.1	Y	20.1	Y	0.1045		
BIO-05	Selenium	0.32	Y	0.13	N	--		
BIO-06	Selenium	0.73	Y	5.1	Y	0.1431		
BIO-07	Selenium	0.45	Y	0.13	N	--		
BIO-08	Selenium	0.34	N	0.13	N	--		
BIO-09	Selenium	1.2	Y	12.7	Y	0.0945		
BIO-10	Selenium	0.92	Y	5.7	Y	0.1614		
BIO-01	Silver	0.15	Y	11	Y	0.0136	0.0032	N
BIO-02	Silver	0.18	Y	0.0032	N	--		
BIO-03	Silver	0.1	N	4.1	Y	--		
BIO-04	Silver	0.46	Y	10.3	Y	0.0447		
BIO-05	Silver	0.1	Y	0.003	N	--		
BIO-06	Silver	0.38	Y	0.003	N	--		

TABLE M-13

**Site-Specific Soil-to-Plant Bioaccumulation Factors***Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona*

Location ID	Analyte	Plant Tissue		Soil Result		Sample-specific BAF	Median Analyte BAF	90th Percentile BAF
		mg/kg	Detect	(mg/kg)	Detect			
BIO-07	Silver	0.2	Y	0.003	N	--		
BIO-08	Silver	0.08	Y	0.0029	N	--		
BIO-09	Silver	0.38	Y	6.4	Y	0.0594		
BIO-10	Silver	0.24	Y	3.4	Y	0.0706		
BIO-01	Thallium	0.073	N	0.47	Y	--	--	--
BIO-02	Thallium	0.096	N	0.024	N	--		
BIO-03	Thallium	0.1	N	0.024	N	--		
BIO-04	Thallium	0.13	N	0.36	Y	--		
BIO-05	Thallium	0.065	N	0.023	N	--		
BIO-06	Thallium	0.09	N	0.023	N	--		
BIO-07	Thallium	0.069	N	0.023	N	--		
BIO-08	Thallium	0.068	N	0.022	N	--		
BIO-09	Thallium	0.063	N	0.29	Y	--		
BIO-10	Thallium	0.094	N	0.022	N	--		
BIO-01	Vanadium	1.1	Y	125	Y	0.0088	0.046	0.084
BIO-02	Vanadium	4.6	Y	76	Y	0.0605		
BIO-03	Vanadium	1.9	Y	53.8	Y	0.0353		
BIO-04	Vanadium	5.7	Y	106	Y	0.0538		
BIO-05	Vanadium	5.9	Y	80.2	Y	0.0736		
BIO-06	Vanadium	4.5	Y	115	Y	0.0391		
BIO-07	Vanadium	18	Y	100	Y	0.1800		
BIO-08	Vanadium	5.1	Y	90.7	Y	0.0562		
BIO-09	Vanadium	1.2	Y	88.4	Y	0.0136		
BIO-10	Vanadium	2	Y	61.9	Y	0.0323		
BIO-01	Zinc	343	Y	3260	Y	0.1052	0.184	0.555
BIO-02	Zinc	250	Y	547	Y	0.4570		
BIO-03	Zinc	227	Y	2030	Y	0.1118		
BIO-04	Zinc	544	Y	6620	Y	0.0822		
BIO-05	Zinc	118	Y	177	Y	0.6667		
BIO-06	Zinc	340	Y	1800	Y	0.1889		
BIO-07	Zinc	159	Y	293	Y	0.5427		
BIO-08	Zinc	79.2	Y	290	Y	0.2731		
BIO-09	Zinc	537	Y	5060	Y	0.1061		
BIO-10	Zinc	581	Y	3260	Y	0.1782		

## Notes:

-- not available

Median and/or 90th percentile BAFs were computed from sample-specific BAFs.

Regression models for plant uptake were not significant, so median BAF was used to estimate BERA risks.

BAF = bioaccumulation factor

BERA = baseline ecological risk assessment

TABLE M-14  
Area Use Factors  
Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona

Exposure Areas				Area Use Factors for Refined Risk Calculations												
				Site Size	Receptor -->	Gambel's quail	Western kingbird	Song sparrow	Red-tailed hawk	Mallard	Great blue heron	Pocket gopher	Desert shrew	Raccoon	River otter	Coyote
Exposure Area ID	Exposure Area Name	Acres	Hectares	Foraging Range (ha) -->	8	5	0.175	957	468	750	0.77	0.72	156	2900	1430	
Upland																
3001	3001	10.2	4.1335		0.5167	0.8267	1	0.00432	--	--	1	1	0.02650	--	0.00289	
NE-02	NE-02	20.9	8.4664		1	1	1	0.0088	--	--	1	1	0.0543	--	0.0059	
NE-04	NE-04	16.0	6.5143		0.8143	1	1	0.0068	--	--	1	1	0.0418	--	0.0046	
NE-06	NE-06	36.6	14.8408		1	1	1	0.0155	--	--	1	1	0.0951	--	0.0104	
NE-07	NE-07	27.4	11.1123		1	1	1	0.0116	--	--	1	1	0.0712	--	0.0078	
NE-08	NE-08	45.6	18.5237		1	1	1	0.0194	--	--	1	1	0.1187	--	0.0130	
NE-09	NE-09	41.2	16.7150		1	1	1	0.0175	--	--	1	1	0.1071	--	0.0117	
NE-11	NE-11	37.0	15.0119		1	1	1	0.0157	--	--	1	1	0.0962	--	0.0105	
NR3	NR3 Upper Gulch++	10.5	4.2768		0.5346	0.8554	1	0.0045	--	--	1	1	0.0274	--	0.0030	
NR4/NR5	NR4 JT Septic and NR5 Blowout Path	3.7	1.5081		0.1885	0.3016	1	0.0016	--	--	1	1	0.0097	--	0.0011	
NR6	NR6 Middle Gulch	9.0	3.6701		0.4588	0.7340	1	0.0038	--	--	1	1	0.0235	--	0.0026	
NR7	NR7 Smelter Tailings Swale	17.1	6.9463		0.8683	1	1	0.0073	--	--	1	1	0.0445	--	0.0049	
NR8	NR8 Tailings Flood Plain	14.8	6.0008		0.7501	1	1	0.0063	--	--	1	1	0.0385	--	0.0042	
NR9	NR9 Lower Gulch	5.7	2.3000		0.2875	0.4600	1	0.0024	--	--	1	1	0.0147	--	0.0016	
NR10	NR10 Agua Fria Tailings	1.1	0.4535		0.0567	0.0907	1	0.0005	--	--	0.5889	0.6298	0.0029	--	0.0003	
NR11	NR11 Dross/Smelter Pyrometallurgical Operations	36.4	14.7757		1	1	1	0.0154	--	--	1	1	0.0947	--	0.0103	
NR12	NR12 Smelter Plateau	34.7	14.1065		1	1	1	0.0147	--	--	1	1	0.0904	--	0.0099	
NR13	NR13 Smelter East of River	8.4	3.4246		0.4281	0.6849	1	0.0036	--	--	1	1	0.0220	--	0.0024	
NR14	NR14 South of MTP	80.7	32.7788		1	1	1	0.0343	--	--	1	1	0.2101	--	0.0229	
NR15	NR15 Auto Yard	18.0	7.3127		0.9141	1	1	0.0076	--	--	1	1	0.0469	--	0.0051	
NR16	NR16 Mineworks	31.1	12.6256		1	1	1	0.0132	--	--	1	1	0.0809	--	0.0088	
NR17	NR17 MTP	73.4	29.8127		1	1	1	0.0312	--	--	1	1	0.1911	--	0.0208	
NR18	NR18 NAI	20.0	8.1242		1	1	1	0.0085	--	--	1	1	0.0521	--	0.0057	
NR19	NR19 North of MTP	99.5	40.3936		1	1	1	0.0422	--	--	1	1	0.2589	--	0.0282	
NR20	NR20 Upslope North of MTP	99.3	40.3183		1	1	1	0.0421	--	--	1	1	0.2585	--	0.0282	
NW-01	NW-01	41.2	16.7307		1	1	1	0.0175	--	--	1	1	0.1072	--	0.0117	
NW-03	NW-03	32.0	13.0054		1	1	1	0.0136	--	--	1	1	0.0834	--	0.0091	
RSAR-A	RSAR-A	28.8	11.6750		1	1	1	0.0122	--	--	1	1	0.0748	--	0.0082	
RSAR-B	RSAR-B	14.8	6.0287		0.7536	1	1	0.0063	--	--	1	1	0.0386	--	0.0042	
RSAR-D	RSAR-D	36.1	14.6750		1	1	1	0.0153	--	--	1	1	0.0941	--	0.0103	
RSAR-H	RSAR-H	20.8	8.4607		1	1	1	0.0088	--	--	1	1	0.0542	--	0.0059	
SE-01	SE-01	25.7	10.4214		1	1	1	0.0109	--	--	1	1	0.0668	--	0.0073	
SE-02	SE-02	10.0	4.0702		0.5088	0.8140	1	0.0043	--	--	1	1	0.0261	--	0.0028	
Aquatic																
AF-01	AF-01	5.3	2.1577		--	--	--	--	0.0046	0.0029	--	--	0.0138	0.00074	--	
AF-02	AF-02	13.6	5.5232		--	--	--	--	0.0118	0.0074	--	--	0.0354	0.00190	--	
AF-03	AF-03	17.2	6.9963		--	--	--	--	0.0149	0.0093	--	--	0.0448	0.00241	--	

Notes:  
Area Use Factor determined by dividing site size by the foraging range. If the foraging range was less than the site size, then the Area Use Factor defaulted to 1.  
-- - not evaluated in this exposure area  
ha = hectares

Upland Receptors:		Aquatic/Semi-aquatic receptors:	
Primary producer	Terrestrial plants	Primary producer	Aquatic plants
Primary consumer	Soil invertebrates	Primary consumer	Aquatic organisms (invertebrates and fish)
Herbivore	Gambel's quail	Primary consumer	Benthic macroinvertebrates
Insectivore	Western kingbird	Omnivore	Mallard
Omnivore	Song sparrow	Piscivore	Great blue heron
Carnivore	Red-tailed hawk	Omnivore	Raccoon
Herbivore	Pocket gopher	Piscivore	River otter
Insectivore	Desert shrew		
Omnivore	Raccoon		
Carnivore	Coyote		



TABLE M-15

**Ecological Effects Benchmarks for Terrestrial/Aquatic Plants***Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona*

COPEC	Surrogate	Benchmark (mg/kg)	Endpoint	Source
Aluminum	--	50	LOEC	Efroymson et al., 1997a
Antimony	--	58	Low Effect BM	LANL, 2014
Arsenic	--	91	Low Effect BM	LANL, 2014
Barium	--	500	LOEC	Efroymson et al., 1997a
Beryllium	--	25	Low Effect BM	LANL, 2014
Cadmium	--	160	Low Effect BM	LANL, 2014
Chloride	--	--	--	--
		600	MAC	Kabata-Pendias and Pendias, 1992
Chromium	--			
Chromium, Hexavalent	--	30	LOEC	Efroymson et al., 1997a
Cobalt	--	130	Low Effect BM	LANL, 2014
Copper	--	490	Low Effect BM	LANL, 2014
Cyanide	--	0.9	SQG <sub>E</sub>	CCME, 2011
Iron	--	--	--	--
Lead	--	570	Low Effect BM	LANL, 2014
Manganese	--	1100	Low Effect BM	LANL, 2014
Mercury	--	64	Low Effect BM	LANL, 2014
Nickel	--	270	Low Effect BM	LANL, 2014
Nitrate as N	--	--	--	--
Selenium	--	3	Low Effect BM	LANL, 2014
Silver	--	2800	Low Effect BM	LANL, 2014
Sulfate	--	--	--	--
Thallium	--	1	SQG <sub>E</sub>	CCME, 2011
Vanadium	--	330	SQG <sub>E</sub>	CCME, 2011
Zinc	--	810	Low Effect BM	LANL, 2014
1,2,3,4,6,7,8-Hepta CDD	--	0.000004	SQG <sub>E</sub>	CCME, 2011
1,2,3,4,6,7,8-Hepta CDF	--	0.000004	SQG <sub>E</sub>	CCME, 2011
1,2,3,4,7,8,9-Hepta CDF	--	0.000004	SQG <sub>E</sub>	CCME, 2011
1,2,3,4,7,8-Hexa CDD	--	0.000004	SQG <sub>E</sub>	CCME, 2011
1,2,3,4,7,8-Hexa CDF	--	0.000004	SQG <sub>E</sub>	CCME, 2011
1,2,3,6,7,8-Hexa CDD	--	0.000004	SQG <sub>E</sub>	CCME, 2011
1,2,3,6,7,8-Hexa CDF	--	0.000004	SQG <sub>E</sub>	CCME, 2011
1,2,3,7,8,9-Hexa CDD	--	0.000004	SQG <sub>E</sub>	CCME, 2011
1,2,3,7,8,9-Hexa CDF	--	0.000004	SQG <sub>E</sub>	CCME, 2011
1,2,3,7,8-Penta CDD	--	0.000004	SQG <sub>E</sub>	CCME, 2011
1,2,3,7,8-Penta CDF	--	0.000004	SQG <sub>E</sub>	CCME, 2011
2,3,4,6,7,8-Hexa CDF	--	0.000004	SQG <sub>E</sub>	CCME, 2011
2,3,4,7,8-Penta CDF	--	0.000004	SQG <sub>E</sub>	CCME, 2011
2,3,7,8-Tetra CDD	--	0.000004	SQG <sub>E</sub>	CCME, 2011
2,3,7,8-Tetra CDF	--	0.000004	SQG <sub>E</sub>	CCME, 2011
4-Chloroaniline	--	10	Low Effect BM	LANL, 2014
Acetone	--	--	--	--
Acetophenone	--	--	--	--
Alpha-Chlordane	--	22	Low Effect BM	LANL, 2014
Aroclor-1242	Aroclor 1254	620	Low Effect BM	LANL, 2014
Aroclor-1248	Aroclor 1254	620	Low Effect BM	LANL, 2014
Aroclor-1254	--	620	Low Effect BM	LANL, 2014
Benzaldehyde	--	--	--	--
Benzyl butyl phthalate	--	--	--	--
Beta-BHC	--	1000	EC <sub>50</sub>	Hulzebos et al., 1993
bis(2-Ethylhexyl)phthalate	--	1000	EC <sub>50</sub>	Hulzebos et al., 1993
Caprolactam	--	--	--	--
Carbazole	anthracene	100	LOAEC	Leyval and Binet, 1998
Carbon disulfide	--	--	--	--

TABLE M-15

**Ecological Effects Benchmarks for Terrestrial/Aquatic Plants***Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona*

COPEC	Surrogate	Benchmark (mg/kg)	Endpoint	Source
Chloroform	--	5	SQG <sub>E</sub>	CCME, 2011
Delta-BHC	beta BHC	1000	EC <sub>50</sub>	Hulzebos et al., 1993
Dieldrin	--	100	Low Effect BM	LANL, 2014
Di-n-butyl phthalate	--	200	LOEC	Efroymson et al., 1997a
Endosulfan I	endosulfan	1000	EC <sub>50</sub>	Hulzebos et al., 1993
Endrin Ketone	endrin	0.034	Low Effect BM	LANL, 2014
Heptachlor	--	4	Low Effect BM	LANL, 2014
Heptachlor Epoxide	heptaclor	4	Low Effect BM	LANL, 2014
Methyl ethyl ketone	--	--	--	--
OCDD	--	0.000004	SQG <sub>E</sub>	CCME, 2011
OCDF	--	0.000004	SQG <sub>E</sub>	CCME, 2011
Perchlorate	--	107	EC <sub>50</sub>	Adema and Henzen, 1989

## Notes:

-- not available or not applicable

EcoSSL - ecological soil screening level

LOAEC - lowest observed adverse effect concentration

LOEC - lowest observed effect concentration

MAC - maximum acceptable concentration

MATC - maximum acceptable threshold concentration

SQG<sub>E</sub> - ecological soil quality criteria

TABLE M-16

**Ecological Effects Benchmarks for Soil Invertebrates***Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona*

COPEC	Surrogate	Benchmark (mg/kg)	Endpoint	Source
Aluminum	--	--	--	--
Antimony	--	780	Low Effect BM	LANL, 2014
Arsenic	--	68	Low Effect BM	LANL, 2014
Barium	--	3200	Low Effect BM	LANL, 2014
Beryllium	--	400	Low Effect BM	LANL, 2014
Cadmium	--	760	Low Effect BM	LANL, 2014
Chloride	--	--	--	--
Chromium	--	64	SQG <sub>E</sub>	CCME, 2011
Chromium, Hexavalent	--	3.4	Low Effect BM	LANL, 2014
Cobalt	--	300	Low BM	Hartenstein et al., 1981
Copper	--	530	Low Effect BM	LANL, 2014
Cyanide	--	0.9	SQG <sub>E</sub>	CCME, 2011
Iron	--	--	--	--
Lead	--	8400	Low Effect BM	LANL, 2014
Manganese	--	4500	Low Effect BM	LANL, 2014
Mercury	--	6.6	SQG <sub>E</sub>	CCME, 2011
Nickel	--	1300	Low Effect BM	LANL, 2014
Nitrate as N	--	--	--	--
Selenium	--	70	EC50	Efroymson et al., 1997b
Silver	--	--	--	--
Sulfate	--	--	--	--
Thallium	--	1	SQG <sub>E</sub>	CCME, 2011
Vanadium	--	330	SQG <sub>E</sub>	CCME, 2011
Zinc	--	930	Low Effect BM	LANL, 2014
1,2,3,4,6,7,8-Hepta CDD	--	5	NOEC	Reinecke and Nash, 1984
1,2,3,4,6,7,8-Hepta CDF	--	5	NOEC	Reinecke and Nash, 1984
1,2,3,4,7,8,9-Hepta CDF	--	5	NOEC	Reinecke and Nash, 1984
1,2,3,4,7,8-Hexa CDD	--	5	NOEC	Reinecke and Nash, 1984
1,2,3,4,7,8-Hexa CDF	--	5	NOEC	Reinecke and Nash, 1984
1,2,3,6,7,8-Hexa CDD	--	5	NOEC	Reinecke and Nash, 1984
1,2,3,6,7,8-Hexa CDF	--	5	NOEC	Reinecke and Nash, 1984
1,2,3,7,8,9-Hexa CDD	--	5	NOEC	Reinecke and Nash, 1984
1,2,3,7,8,9-Hexa CDF	--	5	NOEC	Reinecke and Nash, 1984
1,2,3,7,8-Penta CDD	--	5	NOEC	Reinecke and Nash, 1984
1,2,3,7,8-Penta CDF	--	5	NOEC	Reinecke and Nash, 1984
2,3,4,6,7,8-Hexa CDF	--	5	NOEC	Reinecke and Nash, 1984
2,3,4,7,8-Penta CDF	--	5	NOEC	Reinecke and Nash, 1984
2,3,7,8-Tetra CDD	--	5	NOEC	Reinecke and Nash, 1984
2,3,7,8-Tetra CDF	--	5	NOEC	Reinecke and Nash, 1984
4-Chloroaniline	--	30	LOEC	Efroymson et al., 1997b
Acetone	--	--	--	--
Acetophenone	--	--	--	--
Alpha-Chlordane	--	--	--	--
Anthracene	Low MW PAHs	29	EcoSSL	EPA, 2008
Aroclor-1242	Aroclor 1254	500	NOEC	Parmelee et al., 1997
Aroclor-1248	Aroclor 1254	500	NOEC	Parmelee et al., 1997
Aroclor-1254	--	500	NOEC	Parmelee et al., 1997
Benzaldehyde	--	--	--	--
Benzyl butyl phthalate	--	--	--	--
Beta-BHC	--	--	--	--
bis(2-Ethylhexyl)phthalate	--	--	--	--
Caprolactam	--	--	--	--
Carbazole	--	--	--	--
Carbon disulfide	--	--	--	--
Chloroform	--	--	--	--
Delta-BHC	--	--	--	--

TABLE M-16

**Ecological Effects Benchmarks for Soil Invertebrates***Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona*

COPEC	Surrogate	Benchmark (mg/kg)	Endpoint	Source
Dieldrin	--	--	--	--
Di-n-butyl phthalate	--	--	--	--
Endosulfan I	--	--	--	--
Endrin Ketone	--	--	--	--
Heptachlor	--	--	--	--
Heptachlor Epoxide	--	--	--	--
Methyl ethyl ketone	--	--	--	--
OCDD	--	5	NOEC	Reinecke and Nash, 1984
OCDF	--	5	NOEC	Reinecke and Nash, 1984
Perchlorate	--	--	--	--

## Notes:

-- not available or not applicable

EcoSSL - ecological soil screening level

LOAEC - lowest observed adverse effect concentration

LOEC - lowest observed effect concentration

MAC - maximum acceptable concentration

MATC - maximum acceptable threshold concentration

BM - benchmark

EC50 - effective concentration where 50% test population showed effect being measured

EcoSSL - ecological soil screening level

MATC - maximum acceptable threshold concentration

SQC<sub>E</sub> - ecological soil quality criteria

TABLE M-17  
Toxicity Reference Values for Birds  
Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona

COPEC	Surrogate Used	Derivation of Low TRV								Derivation of High TRV							
		Toxicity Information						Uncertainty Factor <sup>a</sup>	Final Low TRV (mg/kg-d)	Toxicity Information						Uncertainty Factor <sup>a</sup>	Final High TRV (mg/kg-d)
		Test Species	Toxicity Value (mg/kgbw/d)	Study Endpoint	Type	Effects	Source			Test Species	Toxicity Value (mg/kgbw/d)	Study Endpoint	Type	Effects	Source		
Aluminum	--	Ringed Dove	109.7	NOAEL	chronic	Reproduction, critical life stage	Sample et al., 1996	1	109.7	Upward conversion from Low TRV performed.	--	--	--	--	--	0.2	549
Antimony	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Arsenic	--	Mallard Duck	9.3	NOAEL	chronic	reduced duckling production critical life stage, study used as basis for DTSC BTAG values	Stanley et al., 1994	1	9.3	Mallard Duck	40.3	LOAEL	chronic	reduced duckling production critical life stage, study used as basis for DTSC BTAG values	Stanley et al., 1994	1	40.3
Barium	--	Chicken	208.26	NOAEL	subchronic	Mortality	Sample et al., 1996	1	208.26	Chicken	416.53	LOAEL	subchronic	Mortality	Sample et al., 1996	1	416.5
Beryllium	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	--	Mallard, quail, chicken	1.47	NOAEL	chronic	geometric mean of studies for growth, reproduction, survival - used as TRV for EcoSSL value	EPA, 2005e	1	1.47	Mallard Duck	10.4	High BTAG TRV	chronic	reproduction critical life stage	DTSC, 2009	1	10.4
Chloride	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chromium	--	Chicken, duck, turkey	2.66	NOAEL	chronic	geometric mean of studies for growth, reproduction, survival - used as TRV for EcoSSL value	EPA, 2008	1	2.66	chicken/ duck/ turkey	16	LOAEL	chronic	geometric mean of studies for growth and reproduction	EPA, 2008	1	16.0
Chromium, Hexavalent	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cobalt	--	Chicken and duck	7.61	NOAEL	chronic	geometric mean of studies for growth, reproduction, survival - used as TRV for EcoSSL value	EPA, 2005f	1	7.61	chicken/ duck	18	LOAEL	chronic	geometric mean of studies for growth and reproduction	EPA, 2005f	1	18.0
Copper	--	Chicken, turkey, duck	4.05	NOAEL	chronic	geometric mean of studies for growth, reproduction, survival - used as TRV for EcoSSL value	EPA, 2007a	1	4.05	Chicken	52.3	LOAEL	chronic	Growth, gizzard erosion, study used for DTSC BTAG value	DTSC, 2009	1	52.3
Cyanide		American kestrel	4	LD <sub>50</sub>	acute	Mortality	EPA, 1999	100	0.04	American kestrel	4	LD <sub>50</sub>	acute	Mortality	EPA, 1999	10	0.4
Iron	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lead	--	Japanese quail, chicken	1.63	NOAEL	chronic	geometric mean of studies for growth, reproduction, survival, used as TRV for EcoSSL value	EPA, 2005g	1	1.63	Chicken	8.75	High BTAG TRV	chronic	reproduction, survival critical life stage	DTSC, 2009	1	8.75
Manganese	--	Chicken, turkey, quail	179	NOAEL	chronic	geometric mean of studies for growth/reproduction - used as TRV for EcoSSL value	EPA, 2007b	1	179	quail	776	High BTAG TRV	chronic	Neurobehavioral	DTSC, 2009	1	776
Mercury	--	Japanese quail	0.45	NOAEL	chronic	Reproductive	Sample et al., 1996	1	0.45	Japanese quail	0.9	LOAEL	chronic	Reproductive	Sample et al., 1996	1	0.9
Nickel	--	Chicken, duck	6.71	NOAEL	chronic	geometric mean of studies for growth/reproduction - used as TRV for EcoSSL value	EPA, 2007c	1	6.71	Mallard	56.3	High BTAG TRV	chronic	growth	DTSC, 2009	1	56.3
Nitrate as N	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

TABLE M-17  
Toxicity Reference Values for Birds  
Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona

COPEC	Surrogate Used	Derivation of Low TRV								Derivation of High TRV							
		Toxicity Information						Uncertainty Factor <sup>a</sup>	Final Low TRV (mg/kg-d)	Toxicity Information						Uncertainty Factor <sup>a</sup>	Final High TRV (mg/kg-d)
		Test Species	Toxicity Value (mg/kgbw/d)	Study Endpoint	Type	Effects	Source			Test Species	Toxicity Value (mg/kgbw/d)	Study Endpoint	Type	Effects	Source		
Selenium	--	Chicken	0.29	NOAEL	chronic	reproduction, growth, survival TRV study used as basis for EcoSSL value	EPA, 2007d	1	0.29	Mallard	0.93	High BTAG TRV	chronic	reproduction	DTSC, 2009	1	0.93
Silver	--	Turkey	20.2	LOAEL	chronic	NOAEL dosage basis for EcoSSL value	EPA, 2006	5	4.04	turkey/ chicken	60	LOAEL	chronic	geometric mean of studies for growth and reproduction	EPA, 2006	1	60
Sulfate	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Thallium	Thallium sulfate	Starling	34.6	LD <sub>50</sub>	acute	Mortality	Schafer et al., 1983	100	0.346	Starling	34.6	LD <sub>50</sub>	acute	Mortality	Schafer et al., 1983	10	3.5
Vanadium	--	Mallard	11.4	NOAEL	chronic	mortality, body weight, blood chemistry	Sample et al., 1996	1	11.4	Upward conversion from Low TRV performed.	--	--	--	--	--	0.2	57.0
Zinc	--	Chicken, quail, duck	66.1	NOAEL	chronic	geometric mean of studies for growth, reproduction, survival - used as TRV for EcoSSL value	EPA, 2007e	1	66.1	Chicken, quail, duck	187	LOAEL	chronic	geometric mean of LOAELs from studies for growth, reproduction, survival used for EcoSSL value	EPA, 2007e	1	187.0
4-Chloroaniline	--	Coturnix quail	237	LD <sub>50</sub>	acute	Mortality	Schafer et al., 1983	100	2.37	Coturnix quail	237	LD <sub>50</sub>	acute	Mortality	Schafer et al., 1983	10	23.7
Acetone	--	Japanese Quail	5464	NOAEL	acute	No overt signs of toxicity. Dietary concentration 20000 mg/kg	Hill and Camardese, 1986	5	1093	Upward conversion from Low TRV performed.	--	--	--	--	--	0.2	27321
Acetophenone	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Alpha-Chlordane	Chlordane	Red-Winged Blackbird	2.14	NOAEL	chronic	Mortality	Sample et al., 1996	1	2.14	Red-Winged Blackbird	10.7	LOAEL	chronic	Mortality	Sample et al., 1996	1	10.7
Aroclor-1242	PCBs	Ring-necked pheasant	0.18	NOAEL	chronic	Reproduction	Sample et al., 1996	1	0.18	Ring-necked pheasant	1.8	LOAEL	chronic	Reproduction	Sample et al., 1996	1	1.8
Aroclor-1248		Ring-necked pheasant	0.18	NOAEL	chronic	Reproduction	Sample et al., 1996	1	0.18	Ring-necked pheasant	1.8	LOAEL	chronic	Reproduction	Sample et al., 1996	1	1.8
Aroclor-1254	PCBs	Ring-necked pheasant	0.18	NOAEL	chronic	Reproduction	Sample et al., 1996	1	0.18	Ring-necked pheasant	1.8	LOAEL	chronic	Reproduction	Sample et al., 1996	1	1.8
Benzaldehyde	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzyl butyl phthalate	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Beta-BHC	BHC-mixed isomers	Japanese Quail	0.56	NOAEL	chronic	reproduction - egg hatchability and egg volume	Sample et al., 1996	1	0.56	Japanese Quail	2.25	LOAEL	chronic	reproduction - egg hatchability and egg volume	Sample et al., 1996	1	2.3
bis(2-Ethylhexyl)phthalate	--	Ringed dove	1.1	NOAEL	chronic	No significant reproductive effects, critical life stage	Sample et al., 1996	1	1.1	Upward conversion from Low TRV performed.	--	--	--	--	--	0.2	6
Caprolactam	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Carbazole	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Carbon disulfide	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloroform	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Delta-BHC	BHC-mixed isomers	Japanese Quail	0.56	NOAEL	chronic	reproduction - egg hatchability and egg volume	Sample et al., 1996	1	0.56	Japanese Quail	2.25	LOAEL	chronic	reproduction - egg hatchability and egg volume	Sample et al., 1996	1	2.3
Dieldrin	--	Mallard Duck	0.0709	NOAEL	chronic	NOAEL dosage basis for EcoSSL value	EPA, 2007i	1	0.0709	chicken/ duck	0.8	LOAEL	chronic	geometric mean of studies for growth and reproduction	EPA, 2007i	1	0.8
Di-n-butyl phthalate	--	Ringed dove	1.1	LOAEL	chronic	reproductive - eggshell thickness and permeability	Sample et al., 1996	5	0.22	Ringed dove	1.1	LOAEL	chronic	reproductive - eggshell thickness and permeability	Sample et al., 1996	1	1.1

TABLE M-17

Toxicity Reference Values for Birds

Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona

COPEC	Surrogate Used	Derivation of Low TRV								Derivation of High TRV							
		Toxicity Information						Uncertainty Factor <sup>a</sup>	Final Low TRV (mg/kg-d)	Toxicity Information						Uncertainty Factor <sup>a</sup>	Final High TRV (mg/kg-d)
		Test Species	Toxicity Value (mg/kgbw/d)	Study Endpoint	Type	Effects	Source			Test Species	Toxicity Value (mg/kgbw/d)	Study Endpoint	Type	Effects	Source		
Endosulfan I	Endosulfan	Gray Partridge	10	NOAEL	chronic	Reproduction, critical life stage	Sample et al., 1996	1	10	Upward conversion from Low TRV	--	--	--	--	--	0.2	50
Endrin Ketone	Endrin	Screech Owl	0.1	LOAEL	chronic	Reproductive success, critical life stage	Sample et al., 1996	5	0.02	Screech Owl	0.1	LOAEL	chronic	Reproductive success, critical life stage	Sample et al., 1996	1	0.1
Heptachlor	--	Japanese Quail	13	LOAEL	acute	signs of toxicity at dietary concentration = 50 mg/kg	Hill and Camardese, 1986	10	1.3	Japanese Quail	13.1	LOAEL	acute	signs of toxicity at dietary concentration = 50 mg/kg	Hill and Camardese, 1986	5	2.6
Heptachlor Epoxide	Heptachlor	Japanese Quail	13	LOAEL	acute	signs of toxicity at dietary concentration = 50 mg/kg	Hill and Camardese, 1986	10	1.3	Japanese Quail	13.1	LOAEL	acute	signs of toxicity at dietary concentration = 50 mg/kg	Hill and Camardese, 1986	5	2.6
Methyl ethyl ketone	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Perchlorate	--	Bob white quail	13	NOAEL	subchronic	decreased tibia length	USACHPPM, 2007	1	13	Bob white quail	26	LOAEL	subchronic	decreased tibia length	USACHPPM, 2007	1	26.0
TEQBird	2,3,7,8-TCDD	Ring-necked pheasant	0.000014	NOAEL	chronic	reproduction	Sample et al., 1996	1	0.000014	Ring-necked pheasant	0.00014	LOAEL	chronic	reproduction	Sample et al., 1996	1	0.00014

Notes:  
<sup>a</sup> Uncertainty factors were applied to normalize the endpoint to a Low or High Toxicity Reference Value (TRV) as follows:

Endpoint	Type	To Chronic Low TRV	To Chronic High TRV
No Effect Endpoints			
NOAEL	Acute	5	--
NOAEL	Chronic, Subchronic	1	--
Mid Level Effect Endpoints			
LOAEL	Acute	10	5
LOAEL	Chronic, Subchronic	5	1
High BTAG TRV	Chronic	5	1
Acute Lethal Endpoint			
LD50	Acute	100	10

-- not available or not applicable  
BHC = benzene hexachloride  
BTAG = Biological Technical Assistance Group  
COPEC = chemical of potential ecological concern  
DTSC = Department of Toxic Substances Control  
EcoSSL = ecological soil screening level  
EPA = U.S. Environmental Protection Agency  
LD50 = lethal dose to 50% of test population  
LOAEL = lowest observed adverse effect level  
mg/kg = milligram(s) per kilogram  
mg/kgbw/d = milligram(s) per kilogram body weight per day  
NOAEL = no observed adverse effect level  
TRV = toxicity reference value  
UF = uncertainty factor  
VOC = volatile organic compound



TABLE M-18  
**Toxicity Reference Values for Mammals**  
*Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona*

COPEC	Surrogate Used	Derivation of Low TRV								Derivation of High TRV							
		Toxicity Information						Uncertainty Factor <sup>a</sup>	Final Low TRV (mg/kg-d)	Toxicity Information						Uncertainty Factor <sup>a</sup>	Final High TRV (mg/kg-d)
		Test Species	Low Toxicity Value (mg/kgbw/d)	Endpoint	Type	Effects	Source			Test Species	High Toxicity Value (mg/kgbw/d)	Endpoint	Type	Effects	Source		
Aluminum	--	mouse	19.30	LOAEL	Chronic	reproduction	Sample et al., 1996	5	3.86	mouse	19.30	LOAEL	Chronic	reproduction	Sample et al., 1996	1	19.3
Antimony	--	Rat	0.0590	NOAEL	Chronic	reproduction - progeny weight	EPA, 2005a	1	0.059	rat/mouse	2.8	LOAEL	Chronic	Geometric mean of LOAEL for reproduction and growth	EPA, 2005a	1	2.8
Arsenic	--	Dog	1.04	NOAEL	Chronic	Reproductive effects - study used as TRV for EcoSSL value	EPA, 2005b	1	1.04	rat	4.7	High TRV	Chronic	kidney, pulmonary	DTSC, 2009	1	4.7
Barium	--	rat/mouse	51.8	NOAEL	Chronic	Survival, NOAEL from study used as TRV for EcoSSL	EPA, 2005c	1	51.8	rat/mouse	83	LOAEL	Chronic	Geometric mean of LOAEL for reproduction and growth	EPA, 2005c	1	83
Beryllium	--	rat	0.532	NOAEL	Chronic	Survival, NOAEL from study used as TRV for EcoSSL	EPA, 2005d	1	0.532	dog	1.4	LOAEL	Chronic	small intestinal lesions	EPA, 2015	1	1.4
Cadmium	--	rat	0.77	NOAEL	Chronic	reproduction/growth - geometric mean TRV used for EcoSSL value	EPA, 2005e	1	0.77	rat	7.7	LOAEL	Chronic	growth - LOAEL from study used as TRV for EcoSSL value	EPA, 2005e	1	7.7
Chloride	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chromium	--	mouse, rat, pig, cattle	2.40	NOAEL	Chronic	Geometric mean of NOAEL for growth - used as TRV for EcoSSL	EPA, 2008	1	2.4	mouse, rat, pig, cattle	58	LOAEL	Chronic	Geometric mean of LOAEL for reproduction and growth	EPA, 2008	1	58
Chromium, Hexavalent		rat/mouse	9.24	NOAEL	Chronic	Geometric mean of NOAEL for growth and reproduction	EPA, 2008	1	9.24	rat/mouse	38.00	LOAEL	Chronic	Geometric mean of LOAEL for growth and reproduction	EPA, 2008	1	38
Cobalt	--	rat	7.33	NOAEL	Chronic	reproduction/growth - geometric mean TRV used for EcoSSL value	EPA, 2005f	1	7.33	rat	20	High TRV	Chronic	reproductive	DTSC, 2009	1	20
Copper	--	rat	5.6	NOAEL	Chronic	reproduction/growth - geometric mean TRV used for EcoSSL value	EPA, 2007a	1	5.6	mouse	632	High TRV	Chronic	mortality, growth, water consumption	DTSC, 2009	1	632
Cyanide		rat	68.7	NOAEL	Chronic	reproduction	Sample et al., 1996	1	68.7	Upward conversion from Low TRV performed.	--	--	--	--	--	0.2	344
Iron	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lead	--	rat	4.7	NOAEL	Chronic	reproduction/growth - geometric mean TRV used for EcoSSL value	EPA, 2005g	1	4.7	mouse	241	High TRV	Chronic	growth, liver, kidney	DTSC, 2009	1	241
Manganese	--	mouse	51.5	NOAEL	Chronic	reproduction/growth - geometric mean TRV used for EcoSSL value	EPA, 2007h	1	51.5	rat	284	LOAEL	Chronic	Reproductive	Sample et al., 1996	1	284
Mercury	--	mink	1.0	NOAEL	Chronic	reproduction	Sample et al., 1996	1	1	rat	4.0	High TRV	Chronic	reproduction, developmental	DTSC, 2009	1	4.0
Nickel	--	rat	1.7	NOAEL	Chronic	reproduction/growth - geometric mean TRV used for EcoSSL value	EPA, 2007c	1	1.7	rat	80	LOAEL	Chronic	Reproductive	Sample et al., 1996	1	80
Nitrate as N		guinea pig	507	NOAEL	Chronic	reproduction	Sample et al., 1996	1	507	guinea pig	507	LOAEL	Chronic	reproduction	Sample et al., 1996	1	507

TABLE M-18  
Toxicity Reference Values for Mammals  
Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona

COPEC	Surrogate Used	Derivation of Low TRV								Derivation of High TRV							
		Toxicity Information						Uncertainty Factor <sup>a</sup>	Final Low TRV (mg/kg-d)	Toxicity Information						Uncertainty Factor <sup>a</sup>	Final High TRV (mg/kg-d)
		Test Species	Low Toxicity Value (mg/kgbw/d)	Endpoint	Type	Effects	Source			Test Species	High Toxicity Value (mg/kgbw/d)	Endpoint	Type	Effects	Source		
Selenium	--	rat, mouse, pig	0.143	NOAEL	Chronic	reproduction/growth - geometric mean TRV used for EcoSSL value	EPA, 2007d	1	0.143	mouse	1.21	High TRV	Chronic	Reproductive	DTSC, 2009	1	1.21
Silver	--	pig	60.2	LOAEL	Subchronic	Growth - body weight	EPA, 2006	5	12.04	pig/rat	119	LOAEL	Chronic	Geometric mean of LOAEL for reproduction and growth	EPA, 2006	1	119
Sulfate	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Thallium	--	rat	0.48	Low TRV	Chronic	hair loss	DTSC, 2009	1	0.48	rat	1.43	High TRV	Chronic	hair loss	DTSC, 2009	1	1.4
Vanadium	--	mouse	4.16	NOAEL	Chronic	reproduction/growth - geometric mean TRV used for EcoSSL value	EPA, 2005h	1	4.16	mouse/rat/s heep/pig	9.4	LOAEL	Chronic	Geometric mean of LOAEL for reproduction and growth	EPA, 2005h	1	9.4
Zinc	--	mouse	75.4	NOAEL	Chronic	reproduction/growth - geometric mean TRV used for EcoSSL value	EPA, 2007e	1	75.4	rat	411	High TRV	Chronic	developmental	DTSC, 2009	1	411
4-Chloroaniline	--	rat	12.5	LOAEL	Chronic	growth, histology	EPA, 2015	5	2.5	rat	12.5	LOAEL	Chronic	growth, histology	EPA, 2015	1	12.5
Acetone	--	rat	100	NOAEL	Subchronic	kidney and liver toxicity	Sample et al., 1996	1	100	rat	500	LOAEL	Subchronic	kidney and liver toxicity	Sample et al., 1996	1	500
Acetophenone		rat	423	NOAEL	Subchronic	no effects	EPA, 2015	1	423	Upward conversion from Low TRV performed.	--	--	--	--	--	0.2	2115
Alpha-Chlordane	Chlordane	mouse	4.58	NOAEL	Chronic	reproduction	Sample et al., 1996	1	4.58	mouse	9.16	LOAEL	Chronic	reproduction	Sample et al., 1996	1	9.16
Aroclor-1242	Aroclors	mouse	0.36	Low TRV	Chronic	reproduction	DTSC, 2009	1	0.36	mouse	1.28	High TRV	Chronic	reproduction	DTSC, 2009	1	1.28
Aroclor-1248	Aroclors	mouse	0.36	Low TRV	Chronic	reproduction	DTSC, 2009	1	0.36	mouse	1.28	High TRV	Chronic	reproduction	DTSC, 2009	1	1.28
Aroclor-1254	Aroclors	mouse	0.36	Low TRV	Chronic	reproduction	DTSC, 2009	1	0.36	mouse	1.28	High TRV	Chronic	reproduction	DTSC, 2009	1	1.28
Benzaldehyde		rat	143	NOAEL	Subchronic	kidney toxicity	EPA, 2015	1	143	rat	286	LOAEL	Subchronic	kidney toxicity	EPA, 2015	1	286
Benzyl butyl phthalate		rat	159	NOAEL	Subchronic	increased liver to body weight ratio	EPA, 2015	1	159	rat	470	LOAEL	Subchronic	increased liver to body weight ratio	EPA, 2015	1	470
Beta-BHC	--	rat	4	NOAEL	Subchronic	growth, blood chemistry, organ histology	Sample et al., 1996	1	4	rat	20	LOAEL	Subchronic	growth, blood chemistry, organ histology	Sample et al., 1996	1	20
bis(2-Ethylhexyl)phthalate	--	mouse	18.3	NOAEL	Chronic	reproduction	Sample et al., 1996	1	18.3	mouse	183	LOAEL	Chronic	reproduction	Sample et al., 1996	1	183
Caprolactam	--	rat	50	NOAEL	Chronic	reproduction	EPA, 2015	1	50	rat	250	LOAEL	Chronic	reproduction	EPA, 2015	1	250
Carbazole	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Carbon disulfide	--	rabbit	11	NOAEL	Chronic	fetal toxicity/malformations	EPA, 2015	1	11	Upward conversion from Low TRV	--	--	--	--	--	0.2	55
Chloroform	--	rat	150	NOAEL	Subchronic	liver, kidney and gonad condition	Sample et al., 1996	1	150	rat	410	LOAEL	Subchronic	liver, kidney and gonad condition	Sample et al., 1996	1	410
Delta-BHC	beta-BHC	rat	4	NOAEL	Subchronic	growth, blood chemistry, organ histology	Sample et al., 1996	1	4	rat	20	LOAEL	Subchronic	growth, blood chemistry, organ histology	Sample et al., 1996	1	20
Dieldrin	--	rat	0.015	NOAEL	Chronic	reproduction - progeny numbers - NOAEL used as TRV for EcoSSL	EPA, 2007i	1	0.015	mouse/rat/deer/dog/rabbit	1.3	LOAEL	Chronic	Geometric mean of LOAEL for reproduction and growth	EPA, 2007i	1	1.3

TABLE M-18  
Toxicity Reference Values for Mammals  
Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona

COPEC	Surrogate Used	Derivation of Low TRV								Derivation of High TRV							
		Toxicity Information						Uncertainty Factor <sup>a</sup>	Final Low TRV (mg/kg-d)	Toxicity Information						Uncertainty Factor <sup>a</sup>	Final High TRV (mg/kg-d)
		Test Species	Low Toxicity Value (mg/kgbw/d)	Endpoint	Type	Effects	Source			Test Species	High Toxicity Value (mg/kgbw/d)	Endpoint	Type	Effects	Source		
Di-n-butyl phthalate	--	mouse	550	NOAEL	Chronic	reproduction - reduced litters/pairs, live pups/litter, etc.	Sample et al., 1996	1	550	mouse	1833	LOAEL	Chronic	reproduction - reduced litters/pairs, live pups/litter, etc.	Sample et al., 1996	1	1833
Endosulfan I	Endosulfan	rat	1.5	NOAEL	Subchronic	reproduction, blood chemistry (not during gestation)	Sample et al., 1996	1	1.5	rat	2.9	LOAEL	Chronic	reduced body weight gain, increased incidence of glomerulonephrosis and blood vessel aneurysms	EPA, 2015	1	2.9
Endrin Ketone	Endrin	mouse	0.92	LOAEL	Chronic	reproduction - parental survival, litter size and number of young per day	Sample et al., 1996	5	0.184	mouse	0.92	LOAEL	Chronic	reproduction - parental survival, litter size and number of young per day	Sample et al., 1996	1	0.9
Heptachlor	--	rat	0.13	Low TRV	Chronic	reproductive	DTSC, 2009	1	0.13	rat	6.8	High TRV	Chronic	developmental	DTSC, 2009	1	6.8
Heptachlor Epoxide	--	dog	0.0125	LEL	Subchronic	increased liver to body weight ratio	EPA, 2015	5	0.0025	dog	0.0125	LEL	Subchronic	increased liver to body weight ratio	EPA, 2015	1	0.0125
Methyl ethyl ketone	--	rat	1,771	NOAEL	Chronic	reproduction - number of pups/liter, pup survivorship and pup body weight	Sample et al., 1996	1	1771	rat	4,571	LOAEL	Chronic	reproduction - number of pups/liter, pup survivorship and pup body weight	Sample et al., 1996	1	4571
Perchlorate		rabbit	6.4	NOAEL	Chronic	nervous system effects	USACHPPM, 2007	1	6.4	rabbit	32	LOAEL	Chronic	nervous system effects	USACHPPM, 2007	1	32
TEQMammal	2,3,7,8-TCDD	rat	0.000001	NOAEL	Chronic	reproduction	Sample et al., 1996	1	0.000001	rat	0.00001	LOAEL	Chronic	reproduction	Sample et al., 1996	1	0.00001

Notes:  
<sup>a</sup> Analytes detected in soil or sediment from the Former Galena FOL  
<sup>b</sup> Uncertainty factors were applied to normalize the endpoint to a Low or High Toxicity Reference Value (TRV) as follows:  
  
<sup>a</sup> Analytes detected in soil or sediment from the Former Galena FOL  
<sup>b</sup> Uncertainty factors were applied to normalize the endpoint to a Low or High Toxicity Reference Value (TRV) as follows:

Endpoint	Type	To Chronic Low TRV	To Chronic High TRV
No Effect Endpoints			
NOAEL	Acute	5	--
NOAEL	Chronic, Subchror	1	--
Mid Level Effect Endpoints			
LOAEL	Acute	10	5
LOAEL	Chronic, Subchror	5	1
High BTAG TRV	Chronic	5	1
Acute Lethal Endpoint			
LD50	Acute	100	10

-- not available or not applicable

BHC = benzene hexachloride  
BTAG = Biological Technical Assistance Group  
DTSC = Department of Toxic Substances Control  
EcoSSL = ecological soil screening level  
EPA = U.S. Environmental Protection Agency  
LOAEL = lowest observed adverse effect level  
mg/kgbw/d = milligram(s) per kilogram body weight per day  
NOAEL = no observed adverse effect level  
TRV = toxicity reference value  
UF = uncertainty factor  
USACHPPM = U.S. Army Center for Health Promotion and Preventive Medicine

TABLE M-19

**Toxicity Benchmarks for Intertidal and Freshwater Benthic Macroinvertebrates***Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona*

Variable	Low Benchmark (mg/kg)	Effect	Source	High Benchmark (mg/kg)	Effect	Source
Aluminum	25,500	TEL	Buchman, 2008	51000	--	Low BM *2
Antimony	2	Region III FSSB	EPA, 2011	3	UET	Buchman, 2008
Arsenic	9.79	TEC	MacDonald et al., 2000	33	PEC	MacDonald et al., 2000
Barium	130	TEL	Buchman, 2008	260	--	Low BM *2
Beryllium	--	--	--	--	--	--
Cadmium	0.99	TEC	MacDonald et al., 2000	4.98	PEC	MacDonald et al., 2000
Chromium	43.4	TEC	MacDonald et al., 2000	111	PEC	MacDonald et al., 2000
Cobalt	50	LEL	Buchman, 2008	100	--	Low BM *2
Copper	31.6	TEC	MacDonald et al., 2000	149	PEC	MacDonald et al., 2000
Cyanide	--	--	--	--	--	--
Iron	20,000	Region III FSSB	EPA, 2011	40000	--	Low BM *2
Lead	35.8	TEC	MacDonald et al., 2000	128	PEC	MacDonald et al., 2000
Manganese	630	TEL	Buchman, 2008	1100	UET	Buchman, 2008
Mercury	0.18	TEC	MacDonald et al., 2000	1.06	PEC	MacDonald et al., 2000
Nickel	22.7	TEC	MacDonald et al., 2000	48.6	PEC	MacDonald et al., 2000
Nitrate as N	--	--	--	--	--	--
Selenium	2.5	Low	USDI, 1998	4	High	USDI, 1998
Silver	1	Region III FSSB	EPA, 2006	4.5	UET	Buchman, 2008
Sulfate	--	--	--	--	--	--
Thallium	--	--	--	--	--	--
Vanadium	57	AETm	Buchman, 2008	114	--	Low BM *2
Zinc	121	TEC	MacDonald et al., 2000	459	PEC	MacDonald et al., 2000
1,2,3,4,6,7,8-Hepta CDD	8.5E-07	TEL	Buchman, 2008	0.0000215	PEL	Buchman, 2008
1,2,3,4,7,8-Hexa CDD	8.5E-07	TEL	Buchman, 2008	0.0000215	PEL	Buchman, 2008
1,2,3,6,7,8-Hexa CDD	8.5E-07	TEL	Buchman, 2008	0.0000215	PEL	Buchman, 2008
1,2,3,7,8-Penta CDF	8.5E-07	TEL	Buchman, 2008	0.0000215	PEL	Buchman, 2008
2,3,4,7,8-Penta CDF	8.5E-07	TEL	Buchman, 2008	0.0000215	PEL	Buchman, 2008
OCDD	8.5E-07	TEL	Buchman, 2008	0.0000215	PEL	Buchman, 2008
OCDF	8.5E-07	TEL	Buchman, 2008	0.0000215	PEL	Buchman, 2008

## Notes:

-- - not applicable or not available

If a High BM was not available, the Low BM was multiplied by an uncertainty factor of 2.

AETm - apparent effects threshold for marine exposures

BM - benchmark

FSSB - freshwater sediment screening benchmark

TEC - threshold effect concentration

TEL - threshold effects level

PEC - probable effect concentration

PEL - probable effect level

ESV - ecological screening value

UET - upper effects threshold

TABLE M-20

Estimation of Background Risks to Birds and Mammals

*Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona*

Site Data					Exposure Parameters					Plant Uptake					Invertebrate Uptake					Vertebrate Uptake					Soil Uptake			Total Dose	Background Risks							
Exposure Area	Matrix	Type	Analyte	BKGD Soil (mg/kg)	Receptor	Body Weight (kg)	Food Intake (kg/kg/d)	Water Intake (L/kgbw/d)	AUF	Diet Proportion	Soil to Plant BAF	Regression		Plant Concentration (mg/kg)	Plant Dose (mg/kg/day)	Diet Proportion	Soil to Invert BAF	Regression		Invert Concentration (mg/kg)	Invert Dose (mg/kg/d)	Diet Proportion	Soil to Vertebrate BAF	Regression		Vertebrate Concentration (mg/kg)	Vertebrate Dose (mg/kg/d)	Diet Proportion	Iron King Mine Bioavailability	Incidental Soil Dose (mg/kg/d)	(mg/kg/d)	TRVs (mg/kg/d)		Background HQs		
												B0	B1					B0	B1					B0	B1							NOAEL-based	LOAEL-based	NOAEL-based	LOAEL-based	
background	Soil	I	Aluminum	35600	Gambel's quail	0.175	0.05	0.105	1	1	0.0640	--	--	2.28E+03	1.14E+02	--	0.0430	--	--	--	1.53E+03	--	--	0.0263	--	--	9.4E+02	--	0.105	--	1.87E+02	3.01E+02	109.7	548.5	2.74	0.55
background	Soil	I	Aluminum	35600	Western kingbird	0.038	0.199	0.174	1	--	0.0640	--	--	2.28E+03	--	1	0.0430	--	--	--	1.53E+03	3.05E+02	--	0.0263	--	--	9.4E+02	--	0.07	--	4.96E+02	8.01E+02	109.7	548.5	7.30	1.46
background	Soil	I	Aluminum	35600	Song sparrow	0.025	0.227	0.199	1	0.65	0.0640	--	--	2.28E+03	3.36E+02	0.35	0.0430	--	--	--	1.53E+03	1.22E+02	--	0.0263	--	--	9.4E+02	--	0.105	--	8.49E+02	1.31E+03	109.7	548.5	11.91	2.38
background	Soil	I	Aluminum	35600	Red-tailed hawk	1.224	0.077	0.055	1	--	0.0640	--	--	2.28E+03	--	--	0.0430	--	--	--	1.53E+03	--	1	0.0263	--	--	9.4E+02	7.21E+01	0.01	--	2.74E+01	9.95E+01	109.7	548.5	0.90707	0.18141
background	Soil	I	Aluminum	35600	Pocket gopher	0.235	0.097	0.114	1	1	0.0640	--	--	2.28E+03	2.21E+02	--	0.0430	--	--	--	1.53E+03	--	--	0.0263	--	--	9.4E+02	--	0.027	--	9.32E+01	3.14E+02	3.86	19.3	81.41	16.28
background	Soil	I	Aluminum	35600	Desert shrew	0.004	0.221	0.172	1	--	0.0640	--	--	2.28E+03	--	1	0.0430	--	--	--	1.53E+03	3.38E+02	--	0.0263	--	--	9.4E+02	--	0.13	--	1.02E+03	1.36E+03	3.86	19.3	352.62	70.52
background	Soil	I	Aluminum	35600	Raccoon	6.9	0.035	0.082	1	0.45	0.0640	--	--	2.28E+03	3.59E+01	0.45	0.0430	--	--	--	1.53E+03	2.41E+01	0.1	0.0263	--	--	9.4E+02	3.28E+00	0.094	--	1.17E+02	1.80E+02	3.86	19.3	46.735	9.347
background	Soil	I	Aluminum	35600	Coyote	10	0.033	0.079	1	--	0.0640	--	--	2.28E+03	--	--	0.0430	--	--	--	1.53E+03	--	1	0.0263	--	--	9.4E+02	3.09E+01	0.028	--	3.29E+01	6.38E+01	3.86	19.3	16.5263	3.3053
background	Soil	I	Antimony	2.42	Gambel's quail	0.175	0.05	0.105	1	1	0.2950	--	--	7.14E-01	3.57E-02	--	1.0000	--	--	--	2.42E+00	--	--	1.0000	--	--	2.4E+00	--	0.105	--	1.27E-02	4.84E-02	--	--	--	--
background	Soil	I	Antimony	2.42	Western kingbird	0.038	0.199	0.174	1	--	0.2950	--	--	7.14E-01	--	1	1.0000	--	--	--	2.42E+00	4.82E-01	--	1.0000	--	--	2.4E+00	--	0.07	--	3.37E-02	5.15E-01	--	--	--	--
background	Soil	I	Antimony	2.42	Song sparrow	0.025	0.227	0.199	1	0.65	0.2950	--	--	7.14E-01	1.05E-01	0.35	1.0000	--	--	--	2.42E+00	1.92E-01	--	1.0000	--	--	2.4E+00	--	0.105	--	5.77E-02	3.55E-01	--	--	--	--
background	Soil	I	Antimony	2.42	Red-tailed hawk	1.224	0.077	0.055	1	--	0.2950	--	--	7.14E-01	--	--	1.0000	--	--	--	2.42E+00	--	--	1.0000	--	--	2.4E+00	1.86E-01	0.01	--	1.86E-03	1.88E-01	--	--	--	--
background	Soil	I	Antimony	2.42	Pocket gopher	0.235	0.097	0.114	1	1	0.2950	--	--	7.14E-01	6.92E-02	--	1.0000	--	--	--	2.42E+00	--	--	1.0000	--	--	2.4E+00	--	0.027	--	6.34E-03	7.56E-02	0.059	2.8	1.28	0.03
background	Soil	I	Antimony	2.42	Desert shrew	0.004	0.221	0.172	1	--	0.2950	--	--	7.14E-01	--	1	1.0000	--	--	--	2.42E+00	5.35E-01	--	1.0000	--	--	2.4E+00	--	0.13	--	6.95E-02	6.04E-01	0.059	2.8	10.24	0.22
background	Soil	I	Antimony	2.42	Raccoon	6.9	0.035	0.082	1	0.45	0.2950	--	--	7.14E-01	1.12E-02	0.45	1.0000	--	--	--	2.42E+00	3.81E-02	0.1	1.0000	--	--	2.4E+00	8.47E-03	0.094	--	7.96E-03	6.58E-02	0.059	2.8	1.115	0.023
background	Soil	I	Antimony	2.42	Coyote	10	0.033	0.079	1	--	0.2950	--	--	7.14E-01	--	--	1.0000	--	--	--	2.42E+00	--	--	1.0000	--	--	2.4E+00	7.99E-02	0.028	--	2.24E-03	8.21E-02	0.059	2.8	1.3915	0.0293
background	Soil	I	Arsenic	112	Gambel's quail	0.175	0.05	0.105	1	1	0.0760	--	--	8.51E+00	4.26E-01	--	regression	-1.4210	0.7060	--	6.75E+00	--	--	regression	-4.8471	0.8188	3.7E-01	--	0.105	--	5.88E-01	1.01E+00	9.3	40.3	0.11	0.03
background	Soil	I	Arsenic	112	Western kingbird	0.038	0.199	0.174	1	--	0.0760	--	--	8.51E+00	--	1	regression	-1.4210	0.7060	--	6.75E+00	1.34E+00	--	regression	-4.8471	0.8188	3.7E-01	--	0.07	--	1.56E+00	2.90E+00	9.3	40.3	0.31	0.07
background	Soil	I	Arsenic	112	Song sparrow	0.025	0.227	0.199	1	0.65	0.0760	--	--	8.51E+00	1.26E+00	0.35	regression	-1.4210	0.7060	--	6.75E+00	5.37E-01	--	regression	-4.8471	0.8188	3.7E-01	--	0.105	--	2.67E+00	4.46E+00	9.3	40.3	0.48	0.11
background	Soil	I	Arsenic	112	Red-tailed hawk	1.224	0.077	0.055	1	--	0.0760	--	--	8.51E+00	--	--	regression	-1.4210	0.7060	--	6.75E+00	--	--	regression	-4.8471	0.8188	3.7E-01	2.88E-02	0.01	--	8.62E-02	1.15E-01	9.3	40.3	0.01237	0.00285
background	Soil	I	Arsenic	112	Pocket gopher	0.235	0.097	0.114	1	1	0.0760	--	--	8.51E+00	8.26E-01	--	regression	-1.4210	0.7060	--	6.75E+00	--	--	regression	-4.8471	0.8188	3.7E-01	--	0.027	--	2.93E-01	1.12E+00	1.04	4.7	1.08	0.24
background	Soil	I	Arsenic	112	Desert shrew	0.004	0.221	0.172	1	--	0.0760	--	--	8.51E+00	--	1	regression	-1.4210	0.7060	--	6.75E+00	1.49E+00	--	regression	-4.8471	0.8188	3.7E-01	--	0.13	--	3.22E+00	4.71E+00	1.04	4.7	4.53	1.00
background	Soil	I	Arsenic	112	Raccoon	6.9	0.035	0.082	1	0.45	0.0760	--	--	8.51E+00	1.34E-01	0.45	regression	-1.4210	0.7060	--	6.75E+00	1.06E-01	0.1	regression	-4.8471	0.8188	3.7E-01	1.31E-03	0.094	--	3.68E-01	6.10E-01	1.04	4.7	0.587	0.130
background	Soil	I	Arsenic	112	Coyote	10	0.033	0.079	1	--	0.0760	--	--	8.51E+00	--	--	regression	-1.4210	0.7060	--	6.75E+00	--	--	regression	-4.8471	0.8188	3.7E-01	1.23E-02	0.028	--	1.03E-01	1.16E-01	1.04	4.7	0.1114	0.0246
background	Soil	I	Barium	271	Gambel's quail	0.175	0.05	0.105	1	1	0.1660	--	--	4.50E+01	2.25E+00	--	0.0910	--	--	--	2.47E+01	--	--	--	0.0566	--	--	1.5E+01	--	0.105	--	1.42E+00	3.67E+00			

TABLE M-20  
Estimation of Background Risks to Birds and Mammals  
Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona

Site Data					Exposure Parameters					Plant Uptake					Invertebrate Uptake					Vertebrate Uptake					Soil Uptake			Total Dose	Background Risks							
Exposure Area	Matrix	Type	Analyte	BKGD Soil (mg/kg)	Receptor	Body Weight (kg)	Food Intake (kg/kg/d)	Water Intake (L/kgbw/d)	AUF	Diet Proportion	Soil to Plant BAF	Regression		Plant Concentration (mg/kg)	Plant Dose (mg/kg/day)	Diet Proportion	Soil to Invert BAF	Regression			Invert Concentration (mg/kg)	Invert Dose (mg/kg/d)	Diet Proportion	Soil to Vertebrate BAF	Regression		Vertebrate Concentration (mg/kg)	Vertebrate Dose (mg/kg/d)	Diet Proportion	Iron King Mine Bioavailability	Incidental Soil Dose (mg/kg/d)	(mg/kg/d)	TRVs (mg/kg/d)		Background HQs	
												B0	B1					B0	B1	LogKow					B0	B1							NOAEL-based	LOAEL-based	NOAEL-based	LOAEL-based
background	Soil	I	Manganese	1,600	Song sparrow	0.025	0.227	0.199	1	0.65	0.1220	--	--	1.95E+02	2.88E+01	0.35	regression	-0.8090	0.6820	--	6.82E+01	5.42E+00	--	0.0205	--	--	3.3E+01	--	0.105	--	3.81E+01	7.24E+01	179	776	0.40	0.09
background	Soil	I	Manganese	1,600	Red-tailed hawk	1.224	0.077	0.055	1	--	0.1220	--	--	1.95E+02	--	--	regression	-0.8090	0.6820	--	6.82E+01	--	1	0.0205	--	--	3.3E+01	2.53E+00	0.01	--	1.23E+00	3.76E+00	179	776	0.02099	0.00484
background	Soil	I	Manganese	1,600	Pocket gopher	0.235	0.097	0.114	1	1	0.1220	--	--	1.95E+02	1.89E+01	--	regression	-0.8090	0.6820	--	6.82E+01	--	--	0.0205	--	--	3.3E+01	--	0.027	--	4.19E+00	2.31E+01	51.5	284	0.45	0.08
background	Soil	I	Manganese	1,600	Desert shrew	0.004	0.221	0.172	1	--	0.1220	--	--	1.95E+02	--	1	regression	-0.8090	0.6820	--	6.82E+01	1.51E+01	--	0.0205	--	--	3.3E+01	--	0.13	--	4.60E+01	6.10E+01	51.5	284	1.19	0.21
background	Soil	I	Manganese	1,600	Raccoon	6.9	0.035	0.082	1	0.45	0.1220	--	--	1.95E+02	3.07E+00	0.45	regression	-0.8090	0.6820	--	6.82E+01	1.07E+00	0.1	0.0205	--	--	3.3E+01	1.15E-01	0.094	--	5.26E+00	9.53E+00	51.5	284	0.185	0.034
background	Soil	I	Manganese	1,600	Coyote	10	0.033	0.079	1	--	0.1220	--	--	1.95E+02	--	--	regression	-0.8090	0.6820	--	6.82E+01	--	1	0.0205	--	--	3.3E+01	1.08E+00	0.028	--	1.48E+00	2.56E+00	51.5	284	0.0497	0.0090
background	Soil	I	Mercury	0.0795	Gambel's quail	0.175	0.05	0.105	1	1	0.0990	--	--	7.87E-03	3.94E-04	--	regression	-0.6840	0.1180	--	3.74E-01	--	--	0.0543	--	--	4.3E-03	--	0.105	--	4.17E-04	8.11E-04	0.45	0.9	0.00	0.00
background	Soil	I	Mercury	0.0795	Western kingbird	0.038	0.199	0.174	1	--	0.0990	--	--	7.87E-03	--	1	regression	-0.6840	0.1180	--	3.74E-01	7.45E-02	--	0.0543	--	--	4.3E-03	--	0.07	--	1.11E-03	7.56E-02	0.45	0.9	0.17	0.08
background	Soil	I	Mercury	0.0795	Song sparrow	0.025	0.227	0.199	1	0.65	0.0990	--	--	7.87E-03	1.16E-03	0.35	regression	-0.6840	0.1180	--	3.74E-01	2.97E-02	--	0.0543	--	--	4.3E-03	--	0.105	--	1.89E-03	3.28E-02	0.45	0.9	0.07	0.04
background	Soil	I	Mercury	0.0795	Red-tailed hawk	1.224	0.077	0.055	1	--	0.0990	--	--	7.87E-03	--	--	regression	-0.6840	0.1180	--	3.74E-01	--	1	0.0543	--	--	4.3E-03	3.32E-04	0.01	--	6.12E-05	3.94E-04	0.45	0.9	0.00087	0.00044
background	Soil	I	Mercury	0.0795	Pocket gopher	0.235	0.097	0.114	1	1	0.0990	--	--	7.87E-03	7.63E-04	--	regression	-0.6840	0.1180	--	3.74E-01	--	--	0.0543	--	--	4.3E-03	--	0.027	--	2.08E-04	9.72E-04	1	4	0.00	0.00
background	Soil	I	Mercury	0.0795	Desert shrew	0.004	0.221	0.172	1	--	0.0990	--	--	7.87E-03	--	1	regression	-0.6840	0.1180	--	3.74E-01	8.27E-02	--	0.0543	--	--	4.3E-03	--	0.13	--	2.28E-03	8.50E-02	1	4	0.08	0.02
background	Soil	I	Mercury	0.0795	Raccoon	6.9	0.035	0.082	1	0.45	0.0990	--	--	7.87E-03	1.24E-04	0.45	regression	-0.6840	0.1180	--	3.74E-01	5.89E-03	0.1	0.0543	--	--	4.3E-03	1.51E-05	0.094	--	2.62E-04	6.30E-03	1	4	0.006	0.002
background	Soil	I	Mercury	0.0795	Coyote	10	0.033	0.079	1	--	0.0990	--	--	7.87E-03	--	--	regression	-0.6840	0.1180	--	3.74E-01	--	1	0.0543	--	--	4.3E-03	1.42E-04	0.028	--	7.35E-05	2.16E-04	1	4	0.0002	0.0001
background	Soil	I	Nickel	89	Gambel's quail	0.175	0.05	0.105	1	1	0.1690	--	--	1.50E+01	7.52E-01	--	0.7778	--	--	--	6.92E+01	--	--	regression	-0.2462	0.4658	6.3E+00	--	0.105	--	4.67E-01	1.22E+00	6.71	56.3	0.18	0.02
background	Soil	I	Nickel	89	Western kingbird	0.038	0.199	0.174	1	--	0.1690	--	--	1.50E+01	--	1	0.7778	--	--	--	6.92E+01	1.38E+01	--	regression	-0.2462	0.4658	6.3E+00	--	0.07	--	1.24E+00	1.50E+01	6.71	56.3	2.24	0.27
background	Soil	I	Nickel	89	Song sparrow	0.025	0.227	0.199	1	0.65	0.1690	--	--	1.50E+01	2.22E+00	0.35	0.7778	--	--	--	6.92E+01	5.50E+00	--	regression	-0.2462	0.4658	6.3E+00	--	0.105	--	2.12E+00	9.84E+00	6.71	56.3	1.47	0.17
background	Soil	I	Nickel	89	Red-tailed hawk	1.224	0.077	0.055	1	--	0.1690	--	--	1.50E+01	--	--	0.7778	--	--	--	6.92E+01	--	1	regression	-0.2462	0.4658	6.3E+00	4.87E-01	0.01	--	6.85E-02	5.56E-01	6.71	56.3	0.08280	0.00987
background	Soil	I	Nickel	89	Pocket gopher	0.235	0.097	0.114	1	1	0.1690	--	--	1.50E+01	1.46E+00	--	0.7778	--	--	--	6.92E+01	--	--	regression	-0.2462	0.4658	6.3E+00	--	0.027	--	2.33E-01	1.69E+00	1.7	80	1.00	0.02
background	Soil	I	Nickel	89	Desert shrew	0.004	0.221	0.172	1	--	0.1690	--	--	1.50E+01	--	1	0.7778	--	--	--	6.92E+01	1.53E+01	--	regression	-0.2462	0.4658	6.3E+00	--	0.13	--	2.56E+00	1.79E+01	1.7	80	10.50	0.22
background	Soil	I	Nickel	89	Raccoon	6.9	0.035	0.082	1	0.45	0.1690	--	--	1.50E+01	2.37E-01	0.45	0.7778	--	--	--	6.92E+01	1.09E+00	0.1	regression	-0.2462	0.4658	6.3E+00	2.21E-02	0.094	--	2.93E-01	1.64E+00	1.7	80	0.966	0.021
background	Soil	I	Nickel	89	Coyote	10	0.033	0.079	1	--	0.1690	--	--	1.50E+01	--	--	0.7778	--	--	--	6.92E+01	--	1	regression	-0.2462	0.4658	6.3E+00	2.09E-01	0.028	--	8.22E-02	2.91E-01	1.7	80	0.1712	0.0036
background	Soil	I	Selenium	4.4	Gambel's quail	0.175	0.05	0.105	1	1	0.1040	--	--	4.58E-01	2.29E-02	--	regression	-0.0750	0.7330	--	2.75E+00	--	--	regression	-0.4158	0.3764	1.2E+00	--	0.105	--	2.31E-02	4.60E-02	0.29	0.93	0.16	0.05
background	Soil	I	Selenium	4.4	Western kingbird	0.038	0.199	0.174	1	--	0.1040	--	--	4.58E-01	--	1	regression	-0.0750	0.7330	--	2.75E+00	5.47E-01	--	regression	-0.4158	0.3764	1.2E+00	--	0.07	--	6.13E-02	6.08E-01	0.29	0.93	2.10	0.65
background	Soil	I	Selenium	4.4	Song sparrow	0.025	0.227	0.199	1	0.65	0.1040	--	--	4.58E-01	6.75E-02	0.35	regression	-0.0750	0.7330	--	2.75E+00	2.18E-01	--	regression	-0.4158	0.3764	1.2E+00	--	0.105	--	1.05E-01	3.91E-01	0.29	0.93	1.35	0.42
background	Soil	I	Selenium	4.4	Red-tailed hawk	1.224	0.077	0.055	1	--	0.1040	--	--	4.58E-01	--	--	regression	-0.0750	0.7330	--	2.75E+00	--	1	regression	-0.4158	0.3764	1.2E+00	8.87E-02	0.01	--	3.39E-03	9.21E-02	0.29	0.93	0.31767	0.09906
background	Soil	I	Selenium	4.4	Pocket gopher	0.235	0.097	0.114	1	1	0.1040	--	--	4.58E-01	4.44E-02	--	regression	-0.0750	0.7330	--	2.75E+00	--	--	regression	-0.4158	0.3764	1.2E+00	--	0.027	--	1.15E-02	5.59E-02	0.143	1.21	0.39	0.05
background	Soil	I	Selenium	4.4	Desert shrew	0.004	0.221	0.172	1	--	0.1040	--	--	4.58E-01	--	1	regression	-0.0750	0.7330	--	2.75E+00	6.07E-01	--	regression	-0.4158	0.3764	1.2E+00	--	0.13	--	1.26E-01	7.34E-01	0.143	1.21	5.13	0.61
background	Soil	I	Selenium	4.4	Raccoon	6.9	0.035	0.082	1	0.45	0.1040	--	--	4.58E-01	7.21E-03	0.45	regression	-0.0750	0.7330	--	2.75E+00	4.33E-02	0.1	regression	-0.4158	0.3764	1.2E+00	4.03E-03	0.094	--	1.45E-02	6.90E-02	0.143	1.21	0.483	0.057
background	Soil	I	Selenium	4.4	Coyote	10	0.033	0.079	1	--	0.1040	--	--	4.58E-01	--	--	regression	-0.0750	0.7330	--	2.75E+00	--	1													

TABLE M-21

**Estimation of Potential Risks to Terrestrial Plants***Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona*

				Site Risk			Incremental Risk <sup>a</sup>			Weight of Evidence	
Exposure		COPEC	Units	RME EPC	Benchmark	Tier 2 HQ	BTV	BKGD	INCR	Site or INCR	Retain for
Area	Matrix			(mg/kg)	(mg/kg)			HQ	HQ	HQ <sup>b</sup>	WOE <sup>c</sup> ?
3001	Soil	Arsenic	mg/kg	69.01	91	8E-01	112	1E+00	-5E-01	<1	No
3001	Soil	Cadmium	mg/kg	3.3	160	2E-02	0.824	5E-03	2E-02	<1	No
3001	Soil	Copper	mg/kg	626	490	1E+00	182	4E-01	9E-01	<1	No
3001	Soil	Iron	mg/kg	61746	--	--	71900	--	--	--	Uncertainty
3001	Soil	Lead	mg/kg	98.58	570	2E-01	34.8	6E-02	1E-01	<1	No
3001	Soil	Mercury	mg/kg	0.31	64	5E-03	0.0795	1E-03	4E-03	<1	No
3001	Soil	Zinc	mg/kg	207.3	810	3E-01	136	2E-01	9E-02	<1	No
NE-02	Soil	Cadmium	mg/kg	2	160	1E-02	0.824	5E-03	7E-03	<1	No
NE-02	Soil	Lead	mg/kg	41.59	570	7E-02	34.8	6E-02	1E-02	<1	No
NE-02	Soil	Mercury	mg/kg	0.18	64	3E-03	0.0795	1E-03	2E-03	<1	No
NE-02	Soil	Zinc	mg/kg	132.1	810	2E-01	136	2E-01	-5E-03	<1	No
NE-06	Soil	Aluminum	mg/kg	19814	50	<b>4E+02</b>	35600	<b>7E+02</b>	-3E+02	<1	No
NE-06	Soil	Antimony	mg/kg	0.693	58	1E-02	2.42	4E-02	-3E-02	<1	No
NE-06	Soil	Arsenic	mg/kg	46.17	91	5E-01	112	1E+00	-7E-01	<1	No
NE-06	Soil	Barium	mg/kg	247.8	500	5E-01	271	5E-01	-5E-02	<1	No
NE-06	Soil	Cadmium	mg/kg	0.796	160	5E-03	0.824	5E-03	-2E-04	<1	No
NE-06	Soil	Copper	mg/kg	75.75	490	2E-01	182	4E-01	-2E-01	<1	No
NE-06	Soil	Lead	mg/kg	22.63	570	4E-02	34.8	6E-02	-2E-02	<1	No
NE-06	Soil	Manganese	mg/kg	939.1	1100	9E-01	1600	1E+00	-6E-01	<1	No
NE-06	Soil	Mercury	mg/kg	0.0472	64	7E-04	0.0795	1E-03	-5E-04	<1	No
NE-06	Soil	Sulfate	mg/kg	5.67	--	--	--	--	--	--	Uncertainty
NE-06	Soil	Thallium	mg/kg	1.391	1	1E+00	2.8	<b>3E+00</b>	-1E+00	<1	No
NE-06	Soil	Zinc	mg/kg	91.53	810	1E-01	136	2E-01	-5E-02	<1	No
NE-07	Soil	Aluminum	mg/kg	30133	50	<b>6E+02</b>	35600	<b>7E+02</b>	-1E+02	<1	No
NE-07	Soil	Antimony	mg/kg	8.798	58	2E-01	2.42	4E-02	1E-01	<1	No
NE-07	Soil	Arsenic	mg/kg	104	91	1E+00	112	1E+00	-9E-02	<1	No
NE-07	Soil	Barium	mg/kg	353	500	7E-01	271	5E-01	2E-01	<1	No
NE-07	Soil	Cadmium	mg/kg	5.697	160	4E-02	0.824	5E-03	3E-02	<1	No
NE-07	Soil	Chromium	mg/kg	75.21	600	1E-01	145	2E-01	-1E-01	<1	No
NE-07	Soil	Copper	mg/kg	1141	490	<b>2E+00</b>	182	4E-01	<b>2E+00</b>	<b>2E+00</b>	<b>Yes</b>
NE-07	Soil	Iron	mg/kg	38281	--	--	71900	--	--	--	Uncertainty
NE-07	Soil	Lead	mg/kg	268.7	570	5E-01	34.8	6E-02	4E-01	<1	No
NE-07	Soil	Manganese	mg/kg	1001	1100	9E-01	1600	1E+00	-5E-01	<1	No
NE-07	Soil	Mercury	mg/kg	0.341	64	5E-03	0.0795	1E-03	4E-03	<1	No
NE-07	Soil	Nickel	mg/kg	78.43	270	3E-01	89	3E-01	-4E-02	<1	No
NE-07	Soil	Selenium	mg/kg	1.846	3	6E-01	4.4	1E+00	-9E-01	<1	No
NE-07	Soil	Silver	mg/kg	2.378	2800	8E-04	--	--	8E-04	<1	No
NE-07	Soil	Zinc	mg/kg	675.5	810	8E-01	136	2E-01	7E-01	<1	No
NE-08	Soil	Aluminum	mg/kg	21680	50	<b>4E+02</b>	35600	<b>7E+02</b>	-3E+02	<1	No
NE-08	Soil	Antimony	mg/kg	0.772	58	1E-02	2.42	4E-02	-3E-02	<1	No
NE-08	Soil	Arsenic	mg/kg	61.5	91	7E-01	112	1E+00	-6E-01	<1	No
NE-08	Soil	Barium	mg/kg	588.9	500	1E+00	271	5E-01	6E-01	<1	No
NE-08	Soil	Cadmium	mg/kg	1.485	160	9E-03	0.824	5E-03	4E-03	<1	No



TABLE M-21

## Estimation of Potential Risks to Terrestrial Plants

Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona

				Site Risk			Incremental Risk <sup>a</sup>			Weight of Evidence	
Exposure		COPEC	Units	RME EPC	Benchmark	Tier 2 HQ	BTV	BKGD	INCR	Site or INCR	Retain for
Area	Matrix			(mg/kg)	(mg/kg)			HQ	HQ	HQ <sup>b</sup>	WOE <sup>c</sup> ?
NE-08	Soil	Copper	mg/kg	216.8	490	4E-01	182	4E-01	7E-02	<1	No
NE-08	Soil	Cyanide	mg/kg	0.643	0.9	7E-01	--	--	7E-01	<1	No
NE-08	Soil	Iron	mg/kg	49894	--	--	71900	--	--	--	Uncertainty
NE-08	Soil	Lead	mg/kg	46.98	570	8E-02	34.8	6E-02	2E-02	<1	No
NE-08	Soil	Manganese	mg/kg	2163	1100	<b>2E+00</b>	1600	1E+00	5E-01	<1	No
NE-08	Soil	Mercury	mg/kg	0.206	64	3E-03	0.0795	1E-03	2E-03	<1	No
NE-08	Soil	Nickel	mg/kg	62.01	270	2E-01	89	3E-01	-1E-01	<1	No
NE-08	Soil	Thallium	mg/kg	1	1	1E+00	2.8	<b>3E+00</b>	-2E+00	<1	No
NE-08	Soil	Zinc	mg/kg	140.6	810	2E-01	136	2E-01	6E-03	<1	No
NE-09	Soil	Aluminum	mg/kg	27588	50	<b>6E+02</b>	35600	<b>7E+02</b>	-2E+02	<1	No
NE-09	Soil	Arsenic	mg/kg	115	91	1E+00	112	1E+00	3E-02	<1	No
NE-09	Soil	Barium	mg/kg	288.1	500	6E-01	271	5E-01	3E-02	<1	No
NE-09	Soil	Cobalt	mg/kg	30.45	130	2E-01	43.6	3E-01	-1E-01	<1	No
NE-09	Soil	Iron	mg/kg	85461	--	--	71900	--	--	--	Uncertainty
NE-09	Soil	Lead	mg/kg	20.78	570	4E-02	34.8	6E-02	-2E-02	<1	No
NE-09	Soil	Manganese	mg/kg	3773	1100	<b>3E+00</b>	1600	1E+00	<b>2E+00</b>	<b>2E+00</b>	Yes
NE-09	Soil	Mercury	mg/kg	0.0432	64	7E-04	0.0795	1E-03	-6E-04	<1	No
NE-09	Soil	Vanadium	mg/kg	158.8	330	5E-01	231	7E-01	-2E-01	<1	No
NE-09	Soil	Zinc	mg/kg	105.2	810	1E-01	136	2E-01	-4E-02	<1	No
NE-11	Soil	Aluminum	mg/kg	26511	50	<b>5E+02</b>	35600	<b>7E+02</b>	-2E+02	<1	No
NE-11	Soil	Antimony	mg/kg	0.979	58	2E-02	2.42	4E-02	-2E-02	<1	No
NE-11	Soil	Arsenic	mg/kg	79.17	91	9E-01	112	1E+00	-4E-01	<1	No
NE-11	Soil	Barium	mg/kg	635.4	500	1E+00	271	5E-01	7E-01	<1	No
NE-11	Soil	Cadmium	mg/kg	2.512	160	2E-02	0.824	5E-03	1E-02	<1	No
NE-11	Soil	Chromium	mg/kg	79.46	600	1E-01	145	2E-01	-1E-01	<1	No
NE-11	Soil	Cobalt	mg/kg	30.71	130	2E-01	43.6	3E-01	-1E-01	<1	No
NE-11	Soil	Copper	mg/kg	161.7	490	3E-01	182	4E-01	-4E-02	<1	No
NE-11	Soil	Iron	mg/kg	66005	--	--	71900	--	--	--	Uncertainty
NE-11	Soil	Lead	mg/kg	42.38	570	7E-02	34.8	6E-02	1E-02	<1	No
NE-11	Soil	Manganese	mg/kg	2163	1100	<b>2E+00</b>	1600	1E+00	5E-01	<1	No
NE-11	Soil	Mercury	mg/kg	0.077	64	1E-03	0.0795	1E-03	-4E-05	<1	No
NE-11	Soil	Nickel	mg/kg	91.12	270	3E-01	89	3E-01	8E-03	<1	No
NE-11	Soil	Nitrate as N	mg/kg	3.3	--	--	--	--	--	--	Uncertainty
NE-11	Soil	Sulfate	mg/kg	8.6	--	--	--	--	--	--	Uncertainty
NE-11	Soil	Vanadium	mg/kg	147.6	330	4E-01	231	7E-01	-3E-01	<1	No
NE-11	Soil	Zinc	mg/kg	127.7	810	2E-01	136	2E-01	-1E-02	<1	No
NE-11	Soil	bis(2-Ethylhexyl)phthalate	mg/kg	0.061	1000	6E-05	--	--	6E-05	<1	No
NR3	Soil	Antimony	mg/kg	2.135	58	4E-02	2.42	4E-02	-5E-03	<1	No
NR3	Soil	Arsenic	mg/kg	166	91	<b>2E+00</b>	112	1E+00	6E-01	<1	No
NR3	Soil	Cadmium	mg/kg	2.319	160	1E-02	0.824	5E-03	9E-03	<1	No
NR3	Soil	Copper	mg/kg	69.79	490	1E-01	182	4E-01	-2E-01	<1	No
NR3	Soil	Lead	mg/kg	252.9	570	4E-01	34.8	6E-02	4E-01	<1	No
NR3	Soil	Mercury	mg/kg	1.236	64	2E-02	0.0795	1E-03	2E-02	<1	No

TABLE M-21

**Estimation of Potential Risks to Terrestrial Plants***Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona*

				Site Risk			Incremental Risk <sup>a</sup>			Weight of Evidence	
Exposure		COPEC	Units	RME EPC	Benchmark	Tier 2 HQ	BTV	BKGD	INCR	Site or INCR	Retain for
Area	Matrix			(mg/kg)	(mg/kg)			HQ	HQ	HQ <sup>b</sup>	WOE <sup>c</sup> ?
NR3	Soil	Nitrate as N	mg/kg	1	--	--	--	--	--	--	Uncertainty
NR3	Soil	Selenium	mg/kg	2.188	3	7E-01	4.4	1E+00	-7E-01	<1	No
NR3	Soil	Silver	mg/kg	1.312	2800	5E-04	--	--	5E-04	<1	No
NR3	Soil	Sulfate	mg/kg	4200	--	--	--	--	--	--	Uncertainty
NR3	Soil	Zinc	mg/kg	424.4	810	5E-01	136	2E-01	4E-01	<1	No
NR4/NR5	Soil	Antimony	mg/kg	25.5	58	4E-01	2.42	4E-02	4E-01	<1	No
NR4/NR5	Soil	Arsenic	mg/kg	591.1	91	<b>6E+00</b>	112	1E+00	<b>5E+00</b>	<b>5E+00</b>	<b>Yes</b>
NR4/NR5	Soil	Cadmium	mg/kg	8.1	160	5E-02	0.824	5E-03	5E-02	<1	No
NR4/NR5	Soil	Copper	mg/kg	192	490	4E-01	182	4E-01	2E-02	<1	No
NR4/NR5	Soil	Lead	mg/kg	2052	570	<b>4E+00</b>	34.8	6E-02	<b>4E+00</b>	<b>4E+00</b>	<b>Yes</b>
NR4/NR5	Soil	Selenium	mg/kg	24	3	<b>8E+00</b>	4.4	1E+00	<b>7E+00</b>	<b>7E+00</b>	<b>Yes</b>
NR4/NR5	Soil	Silver	mg/kg	13.7	2800	5E-03	--	--	5E-03	<1	No
NR4/NR5	Soil	Zinc	mg/kg	921	810	1E+00	136	2E-01	1E+00	<1	No
NR6	Soil	Antimony	mg/kg	7.8	58	1E-01	2.42	4E-02	9E-02	<1	No
NR6	Soil	Arsenic	mg/kg	395.2	91	<b>4E+00</b>	112	1E+00	<b>3E+00</b>	<b>3E+00</b>	<b>Yes</b>
NR6	Soil	Barium	mg/kg	464	500	9E-01	271	5E-01	4E-01	<1	No
NR6	Soil	Cadmium	mg/kg	4.3	160	3E-02	0.824	5E-03	2E-02	<1	No
NR6	Soil	Copper	mg/kg	388	490	8E-01	182	4E-01	4E-01	<1	No
NR6	Soil	Lead	mg/kg	632.6	570	1E+00	34.8	6E-02	1E+00	<1	No
NR6	Soil	Manganese	mg/kg	11898	1100	<b>1E+01</b>	1600	1E+00	<b>9E+00</b>	<b>9E+00</b>	<b>Yes</b>
NR6	Soil	Mercury	mg/kg	0.22	64	3E-03	0.0795	1E-03	2E-03	<1	No
NR6	Soil	Nitrate as N	mg/kg	0.5	--	--	--	--	--	--	Uncertainty
NR6	Soil	Selenium	mg/kg	9.7	3	<b>3E+00</b>	4.4	1E+00	<b>2E+00</b>	<b>2E+00</b>	<b>Yes</b>
NR6	Soil	Silver	mg/kg	6.5	2800	2E-03	--	--	2E-03	<1	No
NR6	Soil	Sulfate	mg/kg	8800	--	--	--	--	--	--	Uncertainty
NR6	Soil	Zinc	mg/kg	711.8	810	9E-01	136	2E-01	7E-01	<1	No
NR7	Soil	Aluminum	mg/kg	20755	50	<b>4E+02</b>	35600	<b>7E+02</b>	-3E+02	<1	No
NR7	Soil	Antimony	mg/kg	8.477	58	1E-01	2.42	4E-02	1E-01	<1	No
NR7	Soil	Arsenic	mg/kg	258.4	91	<b>3E+00</b>	112	1E+00	<b>2E+00</b>	<b>2E+00</b>	<b>Yes</b>
NR7	Soil	Barium	mg/kg	379.4	500	8E-01	271	5E-01	2E-01	<1	No
NR7	Soil	Cadmium	mg/kg	21.41	160	1E-01	0.824	5E-03	1E-01	<1	No
NR7	Soil	Chloride	mg/kg	25	--	--	--	--	--	--	Uncertainty
NR7	Soil	Chromium	mg/kg	76.03	600	1E-01	145	2E-01	-1E-01	<1	No
NR7	Soil	Cobalt	mg/kg	23.35	130	2E-01	43.6	3E-01	-2E-01	<1	No
NR7	Soil	Copper	mg/kg	2184	490	<b>4E+00</b>	182	4E-01	<b>4E+00</b>	<b>4E+00</b>	<b>Yes</b>
NR7	Soil	Iron	mg/kg	50037	--	--	71900	--	--	--	Uncertainty
NR7	Soil	Lead	mg/kg	263.1	570	5E-01	34.8	6E-02	4E-01	<1	No
NR7	Soil	Manganese	mg/kg	1284	1100	1E+00	1600	1E+00	-3E-01	<1	No
NR7	Soil	Mercury	mg/kg	0.743	64	1E-02	0.0795	1E-03	1E-02	<1	No
NR7	Soil	Nickel	mg/kg	70.47	270	3E-01	89	3E-01	-7E-02	<1	No
NR7	Soil	Nitrate as N	mg/kg	25	--	--	--	--	--	--	Uncertainty
NR7	Soil	Selenium	mg/kg	16.43	3	<b>5E+00</b>	4.4	1E+00	<b>4E+00</b>	<b>4E+00</b>	<b>Yes</b>
NR7	Soil	Silver	mg/kg	14.32	2800	5E-03	--	--	5E-03	<1	No

TABLE M-21

**Estimation of Potential Risks to Terrestrial Plants***Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona*

				Site Risk			Incremental Risk <sup>a</sup>			Weight of Evidence	
Exposure		COPEC	Units	RME EPC	Benchmark	Tier 2 HQ	BTV	BKGD HQ	INCR HQ	Site or INCR	Retain for
Area	Matrix			(mg/kg)	(mg/kg)					HQ <sup>b</sup>	WOE <sup>c</sup> ?
NR7	Soil	Sulfate	mg/kg	24530	--	--	--	--	--	--	Uncertainty
NR7	Soil	Thallium	mg/kg	2.717	1	3E+00	2.8	3E+00	-8E-02	<1	No
NR7	Soil	Zinc	mg/kg	866.5	810	1E+00	136	2E-01	9E-01	<1	No
NR7	Soil	Acetophenone	mg/kg	0.071	--	--	--	--	--	--	Uncertainty
NR7	Soil	bis(2-Ethylhexyl)phthalate	mg/kg	0.33	1000	3E-04	--	--	3E-04	<1	No
NR7	Soil	Di-n-butyl phthalate	mg/kg	0.049	200	2E-04	--	--	2E-04	<1	No
NR7	Soil	Perchlorate	mg/kg	0.013	107	1E-04	--	--	1E-04	<1	No
NR8	Soil	Antimony	mg/kg	4.131	58	7E-02	2.42	4E-02	3E-02	<1	No
NR8	Soil	Arsenic	mg/kg	549.6	91	6E+00	112	1E+00	5E+00	5E+00	Yes
NR8	Soil	Barium	mg/kg	253.5	500	5E-01	271	5E-01	-4E-02	<1	No
NR8	Soil	Cadmium	mg/kg	5.217	160	3E-02	0.824	5E-03	3E-02	<1	No
NR8	Soil	Copper	mg/kg	1279	490	3E+00	182	4E-01	2E+00	2E+00	Yes
NR8	Soil	Iron	mg/kg	47631	--	--	71900	--	--	--	Uncertainty
NR8	Soil	Lead	mg/kg	1338	570	2E+00	34.8	6E-02	2E+00	2E+00	Yes
NR8	Soil	Manganese	mg/kg	9222	1100	8E+00	1600	1E+00	7E+00	7E+00	Yes
NR8	Soil	Mercury	mg/kg	10.1	64	2E-01	0.0795	1E-03	2E-01	<1	No
NR8	Soil	Nickel	mg/kg	58.82	270	2E-01	89	3E-01	-1E-01	<1	No
NR8	Soil	Selenium	mg/kg	9.788	3	3E+00	4.4	1E+00	2E+00	2E+00	Yes
NR8	Soil	Silver	mg/kg	9.412	2800	3E-03	--	--	3E-03	<1	No
NR8	Soil	Sulfate	mg/kg	74000	--	--	--	--	--	--	Uncertainty
NR8	Soil	Thallium	mg/kg	2.838	1	3E+00	2.8	3E+00	4E-02	<1	No
NR8	Soil	Zinc	mg/kg	1722	810	2E+00	136	2E-01	2E+00	2E+00	Yes
NR9	Soil	Antimony	mg/kg	44.3	58	8E-01	2.42	4E-02	7E-01	<1	No
NR9	Soil	Arsenic	mg/kg	1415	91	2E+01	112	1E+00	1E+01	1E+01	Yes
NR9	Soil	Cadmium	mg/kg	6.7	160	4E-02	0.824	5E-03	4E-02	<1	No
NR9	Soil	Cobalt	mg/kg	51.4	130	4E-01	43.6	3E-01	6E-02	<1	No
NR9	Soil	Copper	mg/kg	1610	490	3E+00	182	4E-01	3E+00	3E+00	Yes
NR9	Soil	Lead	mg/kg	1869	570	3E+00	34.8	6E-02	3E+00	3E+00	Yes
NR9	Soil	Manganese	mg/kg	2570	1100	2E+00	1600	1E+00	9E-01	<1	No
NR9	Soil	Mercury	mg/kg	0.6	64	9E-03	0.0795	1E-03	8E-03	<1	No
NR9	Soil	Nickel	mg/kg	116	270	4E-01	89	3E-01	1E-01	<1	No
NR9	Soil	Selenium	mg/kg	34.8	3	1E+01	4.4	1E+00	1E+01	1E+01	Yes
NR9	Soil	Silver	mg/kg	36	2800	1E-02	--	--	1E-02	<1	No
NR9	Soil	Zinc	mg/kg	1512	810	2E+00	136	2E-01	2E+00	2E+00	Yes
NR10	Soil	Arsenic	mg/kg	3150	91	3E+01	112	1E+00	3E+01	3E+01	Yes
NR10	Soil	Cadmium	mg/kg	0.85	160	5E-03	0.824	5E-03	2E-04	<1	No
NR10	Soil	Lead	mg/kg	5579	570	1E+01	34.8	6E-02	1E+01	1E+01	Yes
NR10	Soil	Mercury	mg/kg	0.084	64	1E-03	0.0795	1E-03	7E-05	<1	No
NR10	Soil	Zinc	mg/kg	3886	810	5E+00	136	2E-01	5E+00	5E+00	Yes
NR11	Soil	Aluminum	mg/kg	124216	50	2E+03	35600	7E+02	2E+03	2E+03	Yes
NR11	Soil	Antimony	mg/kg	15.04	58	3E-01	2.42	4E-02	2E-01	<1	No
NR11	Soil	Arsenic	mg/kg	542.8	91	6E+00	112	1E+00	5E+00	5E+00	Yes
NR11	Soil	Barium	mg/kg	272.3	500	5E-01	271	5E-01	3E-03	<1	No

TABLE M-21

**Estimation of Potential Risks to Terrestrial Plants***Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona*

				Site Risk			Incremental Risk <sup>a</sup>			Weight of Evidence	
Exposure		COPEC	Units	RME EPC	Benchmark	Tier 2 HQ	BTV	BKGD	INCR	Site or INCR	Retain for
Area	Matrix			(mg/kg)	(mg/kg)					HQ <sup>b</sup>	WOE <sup>c</sup>
NR11	Soil	Beryllium	mg/kg	11.41	25	5E-01	1.7	7E-02	4E-01	<1	No
NR11	Soil	Cadmium	mg/kg	14.56	160	9E-02	0.824	5E-03	9E-02	<1	No
NR11	Soil	Chloride	mg/kg	130	--	--	--	--	--	--	Uncertainty
NR11	Soil	Chromium	mg/kg	587	600	1E+00	145	2E-01	7E-01	<1	No
NR11	Soil	Chromium, Hexavalent	mg/kg	1.7	30	6E-02	--	--	6E-02	<1	No
NR11	Soil	Cobalt	mg/kg	19.23	130	1E-01	43.6	3E-01	-2E-01	<1	No
NR11	Soil	Copper	mg/kg	6955	490	<b>1E+01</b>	182	4E-01	<b>1E+01</b>	<b>1E+01</b>	<b>Yes</b>
NR11	Soil	Cyanide	mg/kg	0.893	0.9	1E+00	--	--	1E+00	<1	No
NR11	Soil	Iron	mg/kg	39660	--	--	71900	--	--	--	Uncertainty
NR11	Soil	Lead	mg/kg	2093	570	<b>4E+00</b>	34.8	6E-02	<b>4E+00</b>	<b>4E+00</b>	<b>Yes</b>
NR11	Soil	Manganese	mg/kg	886.6	1100	8E-01	1600	1E+00	-6E-01	<1	No
NR11	Soil	Mercury	mg/kg	1.351	64	2E-02	0.0795	1E-03	2E-02	<1	No
NR11	Soil	Nickel	mg/kg	285.6	270	1E+00	89	3E-01	7E-01	<1	No
NR11	Soil	Nitrate as N	mg/kg	56.33	--	--	--	--	--	--	Uncertainty
NR11	Soil	Selenium	mg/kg	8.862	3	<b>3E+00</b>	4.4	1E+00	1E+00	<1	No
NR11	Soil	Silver	mg/kg	34.75	2800	1E-02	--	--	1E-02	<1	No
NR11	Soil	Sulfate	mg/kg	263.2	--	--	--	--	--	--	Uncertainty
NR11	Soil	Thallium	mg/kg	0.74	1	7E-01	2.8	<b>3E+00</b>	-2E+00	<1	No
NR11	Soil	Zinc	mg/kg	2711	810	<b>3E+00</b>	136	2E-01	<b>3E+00</b>	<b>3E+00</b>	<b>Yes</b>
NR11	Soil	Acetophenone	mg/kg	0.134	--	--	--	--	--	--	Uncertainty
NR11	Soil	Aroclor-1248	mg/kg	0.97	620	2E-03	--	--	2E-03	<1	No
NR11	Soil	Aroclor-1254	mg/kg	0.076	620	1E-04	--	--	1E-04	<1	No
NR11	Soil	bis(2-Ethylhexyl)phthalate	mg/kg	0.0601	1000	6E-05	--	--	6E-05	<1	No
NR11	Soil	Carbazole	mg/kg	0.1	100	1E-03	--	--	1E-03	<1	No
NR11	Soil	Delta-BHC	mg/kg	0.017	1000	2E-05	--	--	2E-05	<1	No
NR11	Soil	Dieldrin	mg/kg	0.0023	100	2E-05	--	--	2E-05	<1	No
NR11	Soil	Di-n-butyl phthalate	mg/kg	0.065	200	3E-04	--	--	3E-04	<1	No
NR11	Soil	Endosulfan I	mg/kg	0.002	1000	2E-06	--	--	2E-06	<1	No
NR11	Soil	Heptachlor	mg/kg	0.0073	4	2E-03	--	--	2E-03	<1	No
NR11	Soil	Heptachlor Epoxide	mg/kg	0.025	4	6E-03	--	--	6E-03	<1	No
NR11	Soil	1,2,3,4,6,7,8-Hepta CDD	mg/kg	0.0006772	0.000004	<b>2E+02</b>	--	--	<b>2E+02</b>	<b>2E+02</b>	<b>Yes</b>
NR11	Soil	1,2,3,4,6,7,8-Hepta CDF	mg/kg	0.00221	0.000004	<b>6E+02</b>	--	--	<b>6E+02</b>	<b>6E+02</b>	<b>Yes</b>
NR11	Soil	1,2,3,4,7,8,9-Hepta CDF	mg/kg	0.00133	0.000004	<b>3E+02</b>	--	--	<b>3E+02</b>	<b>3E+02</b>	<b>Yes</b>
NR11	Soil	1,2,3,4,7,8-Hexa CDD	mg/kg	0.0001	0.000004	<b>3E+01</b>	--	--	<b>3E+01</b>	<b>3E+01</b>	<b>Yes</b>
NR11	Soil	1,2,3,4,7,8-Hexa CDF	mg/kg	0.00172	0.000004	<b>4E+02</b>	--	--	<b>4E+02</b>	<b>4E+02</b>	<b>Yes</b>
NR11	Soil	1,2,3,6,7,8-Hexa CDD	mg/kg	0.000061651	0.000004	<b>2E+01</b>	--	--	<b>2E+01</b>	<b>2E+01</b>	<b>Yes</b>
NR11	Soil	1,2,3,6,7,8-Hexa CDF	mg/kg	0.00162	0.000004	<b>4E+02</b>	--	--	<b>4E+02</b>	<b>4E+02</b>	<b>Yes</b>
NR11	Soil	1,2,3,7,8,9-Hexa CDD	mg/kg	0.000052879	0.000004	<b>1E+01</b>	--	--	<b>1E+01</b>	<b>1E+01</b>	<b>Yes</b>
NR11	Soil	1,2,3,7,8,9-Hexa CDF	mg/kg	0.00026954	0.000004	<b>7E+01</b>	--	--	<b>7E+01</b>	<b>7E+01</b>	<b>Yes</b>
NR11	Soil	1,2,3,7,8-Penta CDD	mg/kg	0.000107	0.000004	<b>3E+01</b>	--	--	<b>3E+01</b>	<b>3E+01</b>	<b>Yes</b>
NR11	Soil	1,2,3,7,8-Penta CDF	mg/kg	0.00072	0.000004	<b>2E+02</b>	--	--	<b>2E+02</b>	<b>2E+02</b>	<b>Yes</b>
NR11	Soil	2,3,4,6,7,8-Hexa CDF	mg/kg	0.00046143	0.000004	<b>1E+02</b>	--	--	<b>1E+02</b>	<b>1E+02</b>	<b>Yes</b>
NR11	Soil	2,3,4,7,8-Penta CDF	mg/kg	0.0002346	0.000004	<b>6E+01</b>	--	--	<b>6E+01</b>	<b>6E+01</b>	<b>Yes</b>

TABLE M-21

**Estimation of Potential Risks to Terrestrial Plants***Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona*

				Site Risk			Incremental Risk <sup>a</sup>			Weight of Evidence	
Exposure		COPEC	Units	RME EPC	Benchmark	Tier 2 HQ	BTV	BKGD HQ	INCR HQ	Site or INCR	Retain for
Area	Matrix			(mg/kg)	(mg/kg)					HQ <sup>b</sup>	WOE <sup>c</sup> ?
NR11	Soil	2,3,7,8-Tetra CDD	mg/kg	7.4828E-06	0.000004	2E+00	--	--	2E+00	2E+00	Yes
NR11	Soil	2,3,7,8-Tetra CDF	mg/kg	0.000394	0.000004	1E+02	--	--	1E+02	1E+02	Yes
NR11	Soil	OCDD	mg/kg	0.00378	0.000004	9E+02	--	--	9E+02	9E+02	Yes
NR11	Soil	OCDF	mg/kg	0.0034	0.000004	9E+02	--	--	9E+02	9E+02	Yes
NR12	Soil	Aluminum	mg/kg	66525	50	1E+03	35600	7E+02	6E+02	6E+02	Yes
NR12	Soil	Antimony	mg/kg	21.7	58	4E-01	2.42	4E-02	3E-01	<1	No
NR12	Soil	Arsenic	mg/kg	1280	91	1E+01	112	1E+00	1E+01	1E+01	Yes
NR12	Soil	Barium	mg/kg	623.1	500	1E+00	271	5E-01	7E-01	<1	No
NR12	Soil	Cadmium	mg/kg	15.47	160	1E-01	0.824	5E-03	9E-02	<1	No
NR12	Soil	Chromium	mg/kg	217.5	600	4E-01	145	2E-01	1E-01	<1	No
NR12	Soil	Chromium, Hexavalent	mg/kg	18	30	6E-01	--	--	6E-01	<1	No
NR12	Soil	Cobalt	mg/kg	23.01	130	2E-01	43.6	3E-01	-2E-01	<1	No
NR12	Soil	Copper	mg/kg	4318	490	9E+00	182	4E-01	8E+00	8E+00	Yes
NR12	Soil	Iron	mg/kg	51843	--	--	71900	--	--	--	Uncertainty
NR12	Soil	Lead	mg/kg	1029	570	2E+00	34.8	6E-02	2E+00	2E+00	Yes
NR12	Soil	Manganese	mg/kg	6458	1100	6E+00	1600	1E+00	4E+00	4E+00	Yes
NR12	Soil	Mercury	mg/kg	2.223	64	3E-02	0.0795	1E-03	3E-02	<1	No
NR12	Soil	Nickel	mg/kg	161.5	270	6E-01	89	3E-01	3E-01	<1	No
NR12	Soil	Nitrate as N	mg/kg	28	--	--	--	--	--	--	Uncertainty
NR12	Soil	Selenium	mg/kg	7.081	3	2E+00	4.4	1E+00	9E-01	<1	No
NR12	Soil	Silver	mg/kg	13.47	2800	5E-03	--	--	5E-03	<1	No
NR12	Soil	Sulfate	mg/kg	300	--	--	--	--	--	--	Uncertainty
NR12	Soil	Thallium	mg/kg	1.586	1	2E+00	2.8	3E+00	-1E+00	<1	No
NR12	Soil	Zinc	mg/kg	2733	810	3E+00	136	2E-01	3E+00	3E+00	Yes
NR12	Soil	1,2,3,4,6,7,8-Hepta CDD	mg/kg	0.00032	0.000004	8E+01	--	--	8E+01	8E+01	Yes
NR12	Soil	1,2,3,4,6,7,8-Hepta CDF	mg/kg	0.0015	0.000004	4E+02	--	--	4E+02	4E+02	Yes
NR12	Soil	1,2,3,4,7,8,9-Hepta CDF	mg/kg	0.00019	0.000004	5E+01	--	--	5E+01	5E+01	Yes
NR12	Soil	1,2,3,4,7,8-Hexa CDD	mg/kg	0.000012	0.000004	3E+00	--	--	3E+00	3E+00	Yes
NR12	Soil	1,2,3,4,7,8-Hexa CDF	mg/kg	0.00077	0.000004	2E+02	--	--	2E+02	2E+02	Yes
NR12	Soil	1,2,3,6,7,8-Hexa CDD	mg/kg	0.000024	0.000004	6E+00	--	--	6E+00	6E+00	Yes
NR12	Soil	1,2,3,6,7,8-Hexa CDF	mg/kg	0.00022	0.000004	6E+01	--	--	6E+01	6E+01	Yes
NR12	Soil	1,2,3,7,8,9-Hexa CDD	mg/kg	0.000028	0.000004	7E+00	--	--	7E+00	7E+00	Yes
NR12	Soil	1,2,3,7,8,9-Hexa CDF	mg/kg	0.00001	0.000004	3E+00	--	--	3E+00	3E+00	Yes
NR12	Soil	1,2,3,7,8-Penta CDD	mg/kg	0.0000081	0.000004	2E+00	--	--	2E+00	2E+00	Yes
NR12	Soil	1,2,3,7,8-Penta CDF	mg/kg	0.000096	0.000004	2E+01	--	--	2E+01	2E+01	Yes
NR12	Soil	2,3,4,6,7,8-Hexa CDF	mg/kg	0.00018	0.000004	5E+01	--	--	5E+01	5E+01	Yes
NR12	Soil	2,3,4,7,8-Penta CDF	mg/kg	0.00017	0.000004	4E+01	--	--	4E+01	4E+01	Yes
NR12	Soil	2,3,7,8-Tetra CDF	mg/kg	0.00014	0.000004	4E+01	--	--	4E+01	4E+01	Yes
NR12	Soil	OCDD	mg/kg	0.0017	0.000004	4E+02	--	--	4E+02	4E+02	Yes
NR12	Soil	OCDF	mg/kg	0.0023	0.000004	6E+02	--	--	6E+02	6E+02	Yes
NR13	Soil	Antimony	mg/kg	4.8	58	8E-02	2.42	4E-02	4E-02	<1	No
NR13	Soil	Arsenic	mg/kg	111.2	91	1E+00	112	1E+00	-9E-03	<1	No
NR13	Soil	Barium	mg/kg	497	500	1E+00	271	5E-01	5E-01	<1	No

TABLE M-21

**Estimation of Potential Risks to Terrestrial Plants***Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona*

				Site Risk			Incremental Risk <sup>a</sup>			Weight of Evidence	
Exposure		COPEC	Units	RME EPC	Benchmark	Tier 2 HQ	BTV	BKGD	INCR	Site or INCR	Retain for
Area	Matrix			(mg/kg)	(mg/kg)			HQ	HQ	HQ <sup>b</sup>	WOE <sup>c</sup> ?
NR13	Soil	Cadmium	mg/kg	8.3	160	5E-02	0.824	5E-03	5E-02	<1	No
NR13	Soil	Copper	mg/kg	950	490	<b>2E+00</b>	182	4E-01	<b>2E+00</b>	<b>2E+00</b>	Yes
NR13	Soil	Lead	mg/kg	282.8	570	5E-01	34.8	6E-02	4E-01	<1	No
NR13	Soil	Nickel	mg/kg	116	270	4E-01	89	3E-01	1E-01	<1	No
NR13	Soil	Selenium	mg/kg	4.9	3	<b>2E+00</b>	4.4	1E+00	2E-01	<1	No
NR13	Soil	Silver	mg/kg	4.9	2800	2E-03	--	--	2E-03	<1	No
NR13	Soil	Zinc	mg/kg	382.4	810	5E-01	136	2E-01	3E-01	<1	No
NR14	Soil	Aluminum	mg/kg	36000	50	<b>7E+02</b>	35600	<b>7E+02</b>	<b>8E+00</b>	<b>8E+00</b>	Yes
NR14	Soil	Antimony	mg/kg	43.9	58	8E-01	2.42	4E-02	7E-01	<1	No
NR14	Soil	Arsenic	mg/kg	516.8	91	<b>6E+00</b>	112	1E+00	<b>4E+00</b>	<b>4E+00</b>	Yes
NR14	Soil	Cadmium	mg/kg	6.7	160	4E-02	0.824	5E-03	4E-02	<1	No
NR14	Soil	Iron	mg/kg	66284	--	--	71900	--	--	--	Uncertainty
NR14	Soil	Lead	mg/kg	1748	570	<b>3E+00</b>	34.8	6E-02	<b>3E+00</b>	<b>3E+00</b>	Yes
NR14	Soil	Manganese	mg/kg	1088	1100	1E+00	1600	1E+00	-5E-01	<1	No
NR14	Soil	Mercury	mg/kg	0.85	64	1E-02	0.0795	1E-03	1E-02	<1	No
NR14	Soil	Nitrate as N	mg/kg	4	--	--	--	--	--	--	Uncertainty
NR14	Soil	Selenium	mg/kg	17.6	3	<b>6E+00</b>	4.4	1E+00	<b>4E+00</b>	<b>4E+00</b>	Yes
NR14	Soil	Silver	mg/kg	4.9	2800	2E-03	--	--	2E-03	<1	No
NR14	Soil	Sulfate	mg/kg	2700	--	--	--	--	--	--	Uncertainty
NR14	Soil	Thallium	mg/kg	9.5	1	<b>1E+01</b>	2.8	<b>3E+00</b>	<b>7E+00</b>	<b>7E+00</b>	Yes
NR14	Soil	Zinc	mg/kg	892.8	810	1E+00	136	2E-01	9E-01	<1	No
NR15	Soil	Cadmium	mg/kg	1.18	160	7E-03	0.824	5E-03	2E-03	<1	No
NR15	Soil	Lead	mg/kg	44.65	570	8E-02	34.8	6E-02	2E-02	<1	No
NR15	Soil	Mercury	mg/kg	0.0543	64	8E-04	0.0795	1E-03	-4E-04	<1	No
NR15	Soil	Nitrate as N	mg/kg	2	--	--	--	--	--	--	Uncertainty
NR15	Soil	Sulfate	mg/kg	100	--	--	--	--	--	--	Uncertainty
NR15	Soil	Thallium	mg/kg	2.9	1	<b>3E+00</b>	2.8	<b>3E+00</b>	1E-01	<1	No
NR15	Soil	Zinc	mg/kg	144.2	810	2E-01	136	2E-01	1E-02	<1	No
NR16	Soil	Aluminum	mg/kg	20965	50	<b>4E+02</b>	35600	<b>7E+02</b>	-3E+02	<1	No
NR16	Soil	Antimony	mg/kg	72.82	58	1E+00	2.42	4E-02	1E+00	<1	No
NR16	Soil	Arsenic	mg/kg	1143	91	<b>1E+01</b>	112	1E+00	<b>1E+01</b>	<b>1E+01</b>	Yes
NR16	Soil	Barium	mg/kg	132.9	500	3E-01	271	5E-01	-3E-01	<1	No
NR16	Soil	Cadmium	mg/kg	12.95	160	8E-02	0.824	5E-03	8E-02	<1	No
NR16	Soil	Copper	mg/kg	235	490	5E-01	182	4E-01	1E-01	<1	No
NR16	Soil	Cyanide	mg/kg	2.081	0.9	<b>2E+00</b>	--	--	<b>2E+00</b>	<b>2E+00</b>	Yes
NR16	Soil	Iron	mg/kg	54455	--	--	71900	--	--	--	Uncertainty
NR16	Soil	Lead	mg/kg	8726	570	<b>2E+01</b>	34.8	6E-02	<b>2E+01</b>	2E+01	Yes
NR16	Soil	Manganese	mg/kg	1280	1100	1E+00	1600	1E+00	-3E-01	<1	No
NR16	Soil	Mercury	mg/kg	20.05	64	3E-01	0.0795	1E-03	3E-01	<1	No
NR16	Soil	Nitrate as N	mg/kg	5.888	--	--	--	--	--	--	Uncertainty
NR16	Soil	Selenium	mg/kg	24.31	3	<b>8E+00</b>	4.4	1E+00	<b>7E+00</b>	<b>7E+00</b>	Yes
NR16	Soil	Silver	mg/kg	29.47	2800	1E-02	--	--	1E-02	<1	No
NR16	Soil	Sulfate	mg/kg	16564	--	--	--	--	--	--	Uncertainty

TABLE M-21

**Estimation of Potential Risks to Terrestrial Plants***Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona*

				Site Risk			Incremental Risk <sup>a</sup>			Weight of Evidence	
Exposure		COPEC	Units	RME EPC	Benchmark	Tier 2 HQ	BTV	BKGD HQ	INCR HQ	Site or INCR	Retain for
Area	Matrix			(mg/kg)	(mg/kg)					HQ <sup>b</sup>	WOE <sup>c</sup> ?
NR16	Soil	Thallium	mg/kg	1.978	1	2E+00	2.8	3E+00	-8E-01	<1	No
NR16	Soil	Zinc	mg/kg	2737	810	3E+00	136	2E-01	3E+00	3E+00	Yes
NR16	Soil	4-Chloroaniline	mg/kg	0.043	10	4E-03	--	--	4E-03	<1	No
NR16	Soil	Acetophenone	mg/kg	0.04	--	--	--	--	--	--	Uncertainty
NR16	Soil	Alpha-Chlordane	mg/kg	0.0044	22	2E-04	--	--	2E-04	<1	No
NR16	Soil	Aroclor-1242	mg/kg	0.17	620	3E-04	--	--	3E-04	<1	No
NR16	Soil	Aroclor-1254	mg/kg	0.067	620	1E-04	--	--	1E-04	<1	No
NR16	Soil	Benzaldehyde	mg/kg	0.09	--	--	--	--	--	--	Uncertainty
NR16	Soil	Benzyl butyl phthalate	mg/kg	0.028	--	--	--	--	--	--	Uncertainty
NR16	Soil	Beta-BHC	mg/kg	0.0017	1000	2E-06	--	--	2E-06	<1	No
NR16	Soil	bis(2-Ethylhexyl)phthalate	mg/kg	0.09	1000	9E-05	--	--	9E-05	<1	No
NR16	Soil	Caprolactam	mg/kg	0.08	--	--	--	--	--	--	Uncertainty
NR16	Soil	Dieldrin	mg/kg	0.0026	100	3E-05	--	--	3E-05	<1	No
NR16	Soil	Endrin Ketone	mg/kg	0.0032	0.034	9E-02	--	--	9E-02	<1	No
NR17	Soil	Antimony	mg/kg	55.61	58	1E+00	2.42	4E-02	9E-01	<1	No
NR17	Soil	Arsenic	mg/kg	4194	91	5E+01	112	1E+00	4E+01	4E+01	Yes
NR17	Soil	Cadmium	mg/kg	24.76	160	2E-01	0.824	5E-03	1E-01	<1	No
NR17	Soil	Chromium, Hexavalent	mg/kg	1.4	30	5E-02	--	--	5E-02	<1	No
NR17	Soil	Copper	mg/kg	346.2	490	7E-01	182	4E-01	3E-01	<1	No
NR17	Soil	Cyanide	mg/kg	1.548	0.9	2E+00	--	--	2E+00	2E+00	Yes
NR17	Soil	Iron	mg/kg	108793	--	--	71900	--	--	--	Uncertainty
NR17	Soil	Lead	mg/kg	3150	570	6E+00	34.8	6E-02	5E+00	5E+00	Yes
NR17	Soil	Mercury	mg/kg	22.45	64	4E-01	0.0795	1E-03	3E-01	<1	No
NR17	Soil	Nitrate as N	mg/kg	2	--	--	--	--	--	--	Uncertainty
NR17	Soil	Selenium	mg/kg	25.73	3	9E+00	4.4	1E+00	7E+00	7E+00	Yes
NR17	Soil	Silver	mg/kg	13.23	2800	5E-03	--	--	5E-03	<1	No
NR17	Soil	Sulfate	mg/kg	89441	--	--	--	--	--	--	Uncertainty
NR17	Soil	Thallium	mg/kg	3.554	1	4E+00	2.8	3E+00	8E-01	<1	No
NR17	Soil	Zinc	mg/kg	6822	810	8E+00	136	2E-01	8E+00	8E+00	Yes
NR18	Soil	Antimony	mg/kg	10.48	58	2E-01	2.42	4E-02	1E-01	<1	No
NR18	Soil	Arsenic	mg/kg	547.8	91	6E+00	112	1E+00	5E+00	5E+00	Yes
NR18	Soil	Cadmium	mg/kg	9.459	160	6E-02	0.824	5E-03	5E-02	<1	No
NR18	Soil	Cobalt	mg/kg	26.99	130	2E-01	43.6	3E-01	-1E-01	<1	No
NR18	Soil	Copper	mg/kg	181.7	490	4E-01	182	4E-01	-6E-04	<1	No
NR18	Soil	Iron	mg/kg	49375	--	--	71900	--	--	--	Uncertainty
NR18	Soil	Lead	mg/kg	2738	570	5E+00	34.8	6E-02	5E+00	5E+00	Yes
NR18	Soil	Mercury	mg/kg	5.864	64	9E-02	0.0795	1E-03	9E-02	<1	No
NR18	Soil	Nickel	mg/kg	30.89	270	1E-01	89	3E-01	-2E-01	<1	No
NR18	Soil	Nitrate as N	mg/kg	970	--	--	--	--	--	--	Uncertainty
NR18	Soil	Selenium	mg/kg	9.555	3	3E+00	4.4	1E+00	2E+00	2E+00	Yes
NR18	Soil	Silver	mg/kg	4.987	2800	2E-03	--	--	2E-03	<1	No
NR18	Soil	Sulfate	mg/kg	19000	--	--	--	--	--	--	Uncertainty



TABLE M-21

**Estimation of Potential Risks to Terrestrial Plants***Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona*

				Site Risk			Incremental Risk <sup>a</sup>			Weight of Evidence	
Exposure		COPEC	Units	RME EPC	Benchmark	Tier 2 HQ	BTV	BKGD	INCR	Site or INCR	Retain for
Area	Matrix			(mg/kg)	(mg/kg)			HQ	HQ	HQ <sup>b</sup>	WOE <sup>c</sup> ?
NR18	Soil	Thallium	mg/kg	2.9	1	3E+00	2.8	3E+00	1E-01	<1	No
NR18	Soil	Zinc	mg/kg	1869	810	2E+00	136	2E-01	2E+00	2E+00	Yes
NR19	Soil	Aluminum	mg/kg	17674	50	4E+02	35600	7E+02	-4E+02	<1	No
NR19	Soil	Antimony	mg/kg	3.457	58	6E-02	2.42	4E-02	2E-02	<1	No
NR19	Soil	Arsenic	mg/kg	288.4	91	3E+00	112	1E+00	2E+00	2E+00	Yes
NR19	Soil	Cadmium	mg/kg	2.17	160	1E-02	0.824	5E-03	8E-03	<1	No
NR19	Soil	Copper	mg/kg	104	490	2E-01	182	4E-01	-2E-01	<1	No
NR19	Soil	Iron	mg/kg	48139	--	--	71900	--	--	--	Uncertainty
NR19	Soil	Lead	mg/kg	486.8	570	9E-01	34.8	6E-02	8E-01	<1	No
NR19	Soil	Manganese	mg/kg	735.8	1100	7E-01	1600	1E+00	-8E-01	<1	No
NR19	Soil	Mercury	mg/kg	3.849	64	6E-02	0.0795	1E-03	6E-02	<1	No
NR19	Soil	Nitrate as N	mg/kg	59	--	--	--	--	--	--	Uncertainty
NR19	Soil	Selenium	mg/kg	11.72	3	4E+00	4.4	1E+00	2E+00	2E+00	Yes
NR19	Soil	Silver	mg/kg	3.762	2800	1E-03	--	--	1E-03	<1	No
NR19	Soil	Sulfate	mg/kg	64000	--	--	--	--	--	--	Uncertainty
NR19	Soil	Thallium	mg/kg	1.277	1	1E+00	2.8	3E+00	-2E+00	<1	No
NR19	Soil	Zinc	mg/kg	735.1	810	9E-01	136	2E-01	7E-01	<1	No
NR19	Soil	Acetone	mg/kg	0.033	--	--	--	--	--	--	Uncertainty
NR19	Soil	Acetophenone	mg/kg	0.06	--	--	--	--	--	--	Uncertainty
NR19	Soil	Alpha-Chlordane	mg/kg	0.001	22	5E-05	--	--	5E-05	<1	No
NR19	Soil	Benzyl butyl phthalate	mg/kg	0.25	--	--	--	--	--	--	Uncertainty
NR19	Soil	bis(2-Ethylhexyl)phthalate	mg/kg	0.28	1000	3E-04	--	--	3E-04	<1	No
NR19	Soil	Caprolactam	mg/kg	0.072	--	--	--	--	--	--	Uncertainty
NR19	Soil	Carbon disulfide	mg/kg	0.002	--	--	--	--	--	--	Uncertainty
NR19	Soil	Dieldrin	mg/kg	0.0036	100	4E-05	--	--	4E-05	<1	No
NR19	Soil	Methyl ethyl ketone	mg/kg	0.01	--	--	--	--	--	--	Uncertainty
NR20	Soil	Antimony	mg/kg	2.968	58	5E-02	2.42	4E-02	9E-03	<1	No
NR20	Soil	Arsenic	mg/kg	136	91	1E+00	112	1E+00	3E-01	<1	No
NR20	Soil	Cadmium	mg/kg	0.703	160	4E-03	0.824	5E-03	-8E-04	<1	No
NR20	Soil	Lead	mg/kg	61.69	570	1E-01	34.8	6E-02	5E-02	<1	No
NR20	Soil	Manganese	mg/kg	697.1	1100	6E-01	1600	1E+00	-8E-01	<1	No
NR20	Soil	Mercury	mg/kg	0.78	64	1E-02	0.0795	1E-03	1E-02	<1	No
NR20	Soil	Selenium	mg/kg	3.758	3	1E+00	4.4	1E+00	-2E-01	<1	No
NR20	Soil	Zinc	mg/kg	304.5	810	4E-01	136	2E-01	2E-01	<1	No
NW-01	Soil	Arsenic	mg/kg	60.49	91	7E-01	112	1E+00	-6E-01	<1	No
NW-01	Soil	Cadmium	mg/kg	0.373	160	2E-03	0.824	5E-03	-3E-03	<1	No
NW-01	Soil	Iron	mg/kg	39888	--	--	71900	--	--	--	Uncertainty
NW-01	Soil	Lead	mg/kg	34.78	570	6E-02	34.8	6E-02	-4E-05	<1	No
NW-01	Soil	Manganese	mg/kg	721.5	1100	7E-01	1600	1E+00	-8E-01	<1	No
NW-01	Soil	Mercury	mg/kg	0.238	64	4E-03	0.0795	1E-03	2E-03	<1	No
NW-01	Soil	Zinc	mg/kg	161.8	810	2E-01	136	2E-01	3E-02	<1	No
NW-03	Soil	Arsenic	mg/kg	41.82	91	5E-01	112	1E+00	-8E-01	<1	No
NW-03	Soil	Cadmium	mg/kg	0.452	160	3E-03	0.824	5E-03	-2E-03	<1	No

TABLE M-21

**Estimation of Potential Risks to Terrestrial Plants***Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona*

				Site Risk			Incremental Risk <sup>a</sup>			Weight of Evidence	
Exposure		COPEC	Units	RME EPC	Benchmark	Tier 2 HQ	BTV	BKGD	INCR	Site or INCR	Retain for
Area	Matrix			(mg/kg)	(mg/kg)			HQ	HQ	HQ <sup>b</sup>	WOE <sup>c</sup> ?
NW-03	Soil	Iron	mg/kg	38262	--	--	71900	--	--	--	Uncertainty
NW-03	Soil	Lead	mg/kg	30.06	570	5E-02	34.8	6E-02	-8E-03	<1	No
NW-03	Soil	Manganese	mg/kg	735.4	1100	7E-01	1600	1E+00	-8E-01	<1	No
NW-03	Soil	Mercury	mg/kg	0.123	64	2E-03	0.0795	1E-03	7E-04	<1	No
NW-03	Soil	Zinc	mg/kg	125.2	810	2E-01	136	2E-01	-1E-02	<1	No
RSAR-A	Soil	Cadmium	mg/kg	1.3	160	8E-03	0.824	5E-03	3E-03	<1	No
RSAR-A	Soil	Lead	mg/kg	46.43	570	8E-02	34.8	6E-02	2E-02	<1	No
RSAR-A	Soil	Mercury	mg/kg	0.097	64	2E-03	0.0795	1E-03	3E-04	<1	No
RSAR-A	Soil	Selenium	mg/kg	4.7	3	<b>2E+00</b>	4.4	1E+00	1E-01	<1	No
RSAR-A	Soil	Zinc	mg/kg	165	810	2E-01	136	2E-01	4E-02	<1	No
RSAR-B	Soil	Lead	mg/kg	42.91	570	8E-02	34.8	6E-02	1E-02	<1	No
RSAR-B	Soil	Zinc	mg/kg	132.6	810	2E-01	136	2E-01	-4E-03	<1	No
RSAR-D	Soil	Cadmium	mg/kg	0.822	160	5E-03	0.824	5E-03	-1E-05	<1	No
RSAR-D	Soil	Lead	mg/kg	54.11	570	9E-02	34.8	6E-02	3E-02	<1	No
RSAR-D	Soil	Mercury	mg/kg	0.223	64	3E-03	0.0795	1E-03	2E-03	<1	No
RSAR-D	Soil	Zinc	mg/kg	148.3	810	2E-01	136	2E-01	2E-02	<1	No
RSAR-H	Soil	Arsenic	mg/kg	98.81	91	1E+00	112	1E+00	-1E-01	<1	No
RSAR-H	Soil	Lead	mg/kg	27.9	570	5E-02	34.8	6E-02	-1E-02	<1	No
RSAR-H	Soil	Zinc	mg/kg	94.1	810	1E-01	136	2E-01	-5E-02	<1	No
SE-01	Soil	Aluminum	mg/kg	39747	50	<b>8E+02</b>	35600	<b>7E+02</b>	<b>8E+01</b>	<b>8E+01</b>	<b>Yes</b>
SE-01	Soil	Antimony	mg/kg	1.444	58	2E-02	2.42	4E-02	-2E-02	<1	No
SE-01	Soil	Arsenic	mg/kg	116.7	91	1E+00	112	1E+00	5E-02	<1	No
SE-01	Soil	Cadmium	mg/kg	2.754	160	2E-02	0.824	5E-03	1E-02	<1	No
SE-01	Soil	Chromium	mg/kg	160.7	600	3E-01	145	2E-01	3E-02	<1	No
SE-01	Soil	Cobalt	mg/kg	43.73	130	3E-01	43.6	3E-01	1E-03	<1	No
SE-01	Soil	Copper	mg/kg	797.3	490	<b>2E+00</b>	182	4E-01	1E+00	<1	No
SE-01	Soil	Iron	mg/kg	64223	--	--	71900	--	--	--	Uncertainty
SE-01	Soil	Lead	mg/kg	133.3	570	2E-01	34.8	6E-02	2E-01	<1	No
SE-01	Soil	Manganese	mg/kg	1307	1100	1E+00	1600	1E+00	-3E-01	<1	No
SE-01	Soil	Mercury	mg/kg	2.769	64	4E-02	0.0795	1E-03	4E-02	<1	No
SE-01	Soil	Nickel	mg/kg	74.93	270	3E-01	89	3E-01	-5E-02	<1	No
SE-01	Soil	Selenium	mg/kg	2.519	3	8E-01	4.4	1E+00	-6E-01	<1	No
SE-01	Soil	Silver	mg/kg	6.1	2800	2E-03	--	--	2E-03	<1	No
SE-01	Soil	Vanadium	mg/kg	237.5	330	7E-01	231	7E-01	2E-02	<1	No
SE-01	Soil	Zinc	mg/kg	191.6	810	2E-01	136	2E-01	7E-02	<1	No
SE-02	Soil	Aluminum	mg/kg	36357	50	<b>7E+02</b>	35600	<b>7E+02</b>	<b>2E+01</b>	<b>2E+01</b>	<b>Yes</b>
SE-02	Soil	Antimony	mg/kg	3.4	58	6E-02	2.42	4E-02	2E-02	<1	No
SE-02	Soil	Arsenic	mg/kg	121.6	91	1E+00	112	1E+00	1E-01	<1	No
SE-02	Soil	Cadmium	mg/kg	1.948	160	1E-02	0.824	5E-03	7E-03	<1	No
SE-02	Soil	Chromium	mg/kg	126.3	600	2E-01	145	2E-01	-3E-02	<1	No
SE-02	Soil	Cobalt	mg/kg	41.51	130	3E-01	43.6	3E-01	-2E-02	<1	No
SE-02	Soil	Copper	mg/kg	429.6	490	9E-01	182	4E-01	5E-01	<1	No
SE-02	Soil	Iron	mg/kg	70434	--	--	71900	--	--	--	Uncertainty

TABLE M-21

**Estimation of Potential Risks to Terrestrial Plants***Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona*

				Site Risk			Incremental Risk <sup>a</sup>			Weight of Evidence	
Exposure		COPEC	Units	RME EPC	Benchmark	Tier 2 HQ	BTV	BKGD	INCR	Site or INCR	Retain for
Area	Matrix			(mg/kg)	(mg/kg)			HQ	HQ	HQ <sup>b</sup>	WOE <sup>c</sup> ?
SE-02	Soil	Lead	mg/kg	88.86	570	2E-01	34.8	6E-02	9E-02	<1	No
SE-02	Soil	Manganese	mg/kg	1329	1100	1E+00	1600	1E+00	-2E-01	<1	No
SE-02	Soil	Mercury	mg/kg	0.14	64	2E-03	0.0795	1E-03	9E-04	<1	No
SE-02	Soil	Nickel	mg/kg	68.75	270	3E-01	89	3E-01	-8E-02	<1	No
SE-02	Soil	Selenium	mg/kg	7.765	3	<b>3E+00</b>	4.4	1E+00	1E+00	<1	No
SE-02	Soil	Silver	mg/kg	2.793	2800	1E-03	--	--	1E-03	<1	No
SE-02	Soil	Vanadium	mg/kg	234.6	330	7E-01	231	7E-01	1E-02	<1	No
SE-02	Soil	Zinc	mg/kg	184.8	810	2E-01	136	2E-01	6E-02	<1	No

Notes:

<sup>a</sup> Incremental risk calculated as the site risk minus the risk due to background (Site HQ - BKGD HQ). Incremental risks shown as negative values are the result of background risk exceeding the site risk for that exposure area..

<sup>u</sup> Incremental risk HQ is presented where available, otherwise site risk HQ is presented.

<sup>c</sup> Chemicals retained for weight of evidence evaluation are those with INCR HQ>1 (where BTV is available) or where Site HQ>1 (rounded to one significant figure).

-- not available

BTV - background threshold value

COPEC - chemical of potential ecological concern

EPC - exposure point concentration

HQ - hazard quotient

INCR - incremental risk

WOE - weight of evidence

TABLE M-22

**Estimation of Potential Risks to Soil Invertebrates***Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona*

				Site Risk			Incremental Risk <sup>a</sup>			Weight of Evidence	
Exposure		COPEC	Units	RME EPC	Benchmark	Tier 2 HQ	BTV	BKGD	INCR	Site or INCR	Retain for
Area	Matrix			(mg/kg)	(mg/kg)			HQ	HQ	HQ <sup>b</sup>	WOE <sup>c</sup> ?
3001	Soil	Arsenic	mg/kg	69.01	68	1E+00	112	<b>2E+00</b>	-6E-01	<1	No
3001	Soil	Cadmium	mg/kg	3.3	760	4E-03	0.824	1E-03	3E-03	<1	No
3001	Soil	Copper	mg/kg	626	530	1E+00	182	3E-01	8E-01	<1	No
3001	Soil	Iron	mg/kg	61746	--	--	71900	--	--	--	Uncertainty
3001	Soil	Lead	mg/kg	98.58	8400	1E-02	34.8	4E-03	8E-03	<1	No
3001	Soil	Mercury	mg/kg	0.31	6.6	5E-02	0.0795	1E-02	3E-02	<1	No
3001	Soil	Zinc	mg/kg	207.3	930	2E-01	136	1E-01	8E-02	<1	No
NE-02	Soil	Cadmium	mg/kg	2	760	3E-03	0.824	1E-03	2E-03	<1	No
NE-02	Soil	Lead	mg/kg	41.59	8400	5E-03	34.8	4E-03	8E-04	<1	No
NE-02	Soil	Mercury	mg/kg	0.18	6.6	3E-02	0.0795	1E-02	2E-02	<1	No
NE-02	Soil	Zinc	mg/kg	132.1	930	1E-01	136	1E-01	-4E-03	<1	No
NE-06	Soil	Aluminum	mg/kg	19814	--	--	35600	--	--	--	Uncertainty
NE-06	Soil	Antimony	mg/kg	0.693	780	9E-04	2.42	3E-03	-2E-03	<1	No
NE-06	Soil	Arsenic	mg/kg	46.17	68	7E-01	112	<b>2E+00</b>	-1E+00	<1	No
NE-06	Soil	Barium	mg/kg	247.8	3200	8E-02	271	8E-02	-7E-03	<1	No
NE-06	Soil	Cadmium	mg/kg	0.796	760	1E-03	0.824	1E-03	-4E-05	<1	No
NE-06	Soil	Copper	mg/kg	75.75	530	1E-01	182	3E-01	-2E-01	<1	No
NE-06	Soil	Lead	mg/kg	22.63	8400	3E-03	34.8	4E-03	-1E-03	<1	No
NE-06	Soil	Manganese	mg/kg	939.1	4500	2E-01	1600	4E-01	-1E-01	<1	No
NE-06	Soil	Mercury	mg/kg	0.0472	6.6	7E-03	0.0795	1E-02	-5E-03	<1	No
NE-06	Soil	Sulfate	mg/kg	5.67	--	--	--	--	--	--	Uncertainty
NE-06	Soil	Thallium	mg/kg	1.391	1	1E+00	2.8	<b>3E+00</b>	-1E+00	<1	No
NE-06	Soil	Zinc	mg/kg	91.53	930	1E-01	136	1E-01	-5E-02	<1	No
NE-07	Soil	Aluminum	mg/kg	30133	--	--	35600	--	--	--	Uncertainty
NE-07	Soil	Antimony	mg/kg	8.798	780	1E-02	2.42	3E-03	8E-03	<1	No
NE-07	Soil	Arsenic	mg/kg	104	68	<b>2E+00</b>	112	<b>2E+00</b>	-1E-01	<1	No
NE-07	Soil	Barium	mg/kg	353	3200	1E-01	271	8E-02	3E-02	<1	No
NE-07	Soil	Cadmium	mg/kg	5.697	760	7E-03	0.824	1E-03	6E-03	<1	No
NE-07	Soil	Chromium	mg/kg	75.21	64	1E+00	145	<b>2E+00</b>	-1E+00	<1	No
NE-07	Soil	Copper	mg/kg	1141	530	<b>2E+00</b>	182	3E-01	<b>2E+00</b>	<b>2E+00</b>	Yes
NE-07	Soil	Iron	mg/kg	38281	--	--	71900	--	--	--	Uncertainty
NE-07	Soil	Lead	mg/kg	268.7	8400	3E-02	34.8	4E-03	3E-02	<1	No
NE-07	Soil	Manganese	mg/kg	1001	4500	2E-01	1600	4E-01	-1E-01	<1	No
NE-07	Soil	Mercury	mg/kg	0.341	6.6	5E-02	0.0795	1E-02	4E-02	<1	No
NE-07	Soil	Nickel	mg/kg	78.43	1300	6E-02	89	7E-02	-8E-03	<1	No
NE-07	Soil	Selenium	mg/kg	1.846	70	3E-02	4.4	6E-02	-4E-02	<1	No
NE-07	Soil	Silver	mg/kg	2.378	--	--	--	--	--	--	Uncertainty
NE-07	Soil	Zinc	mg/kg	675.5	930	7E-01	136	1E-01	6E-01	<1	No
NE-08	Soil	Aluminum	mg/kg	21680	--	--	35600	--	--	--	Uncertainty
NE-08	Soil	Antimony	mg/kg	0.772	780	1E-03	2.42	3E-03	-2E-03	<1	No
NE-08	Soil	Arsenic	mg/kg	61.5	68	9E-01	112	<b>2E+00</b>	-7E-01	<1	No
NE-08	Soil	Barium	mg/kg	588.9	3200	2E-01	271	8E-02	1E-01	<1	No
NE-08	Soil	Cadmium	mg/kg	1.485	760	2E-03	0.824	1E-03	9E-04	<1	No

TABLE M-22

**Estimation of Potential Risks to Soil Invertebrates***Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona*

				Site Risk			Incremental Risk <sup>a</sup>			Weight of Evidence	
Exposure		COPEC	Units	RME EPC	Benchmark	Tier 2 HQ	BTV	BKGD	INCR	Site or INCR	Retain for
Area	Matrix			(mg/kg)	(mg/kg)			HQ	HQ	HQ <sup>b</sup>	WOE <sup>c</sup> ?
NE-08	Soil	Copper	mg/kg	216.8	530	4E-01	182	3E-01	7E-02	<1	No
NE-08	Soil	Cyanide	mg/kg	0.643	0.9	7E-01	--	--	7E-01	<1	No
NE-08	Soil	Iron	mg/kg	49894	--	--	71900	--	--	--	Uncertainty
NE-08	Soil	Lead	mg/kg	46.98	8400	6E-03	34.8	4E-03	1E-03	<1	No
NE-08	Soil	Manganese	mg/kg	2163	4500	5E-01	1600	4E-01	1E-01	<1	No
NE-08	Soil	Mercury	mg/kg	0.206	6.6	3E-02	0.0795	1E-02	2E-02	<1	No
NE-08	Soil	Nickel	mg/kg	62.01	1300	5E-02	89	7E-02	-2E-02	<1	No
NE-08	Soil	Thallium	mg/kg	1	1	1E+00	2.8	<b>3E+00</b>	-2E+00	<1	No
NE-08	Soil	Zinc	mg/kg	140.6	930	2E-01	136	1E-01	5E-03	<1	No
NE-09	Soil	Aluminum	mg/kg	27588	--	--	35600	--	--	--	Uncertainty
NE-09	Soil	Arsenic	mg/kg	115	68	<b>2E+00</b>	112	<b>2E+00</b>	4E-02	<1	No
NE-09	Soil	Barium	mg/kg	288.1	3200	9E-02	271	8E-02	5E-03	<1	No
NE-09	Soil	Cobalt	mg/kg	30.45	300	1E-01	43.6	1E-01	-4E-02	<1	No
NE-09	Soil	Iron	mg/kg	85461	--	--	71900	--	--	--	Uncertainty
NE-09	Soil	Lead	mg/kg	20.78	8400	2E-03	34.8	4E-03	-2E-03	<1	No
NE-09	Soil	Manganese	mg/kg	3773	4500	8E-01	1600	4E-01	5E-01	<1	No
NE-09	Soil	Mercury	mg/kg	0.0432	6.6	7E-03	0.0795	1E-02	-6E-03	<1	No
NE-09	Soil	Vanadium	mg/kg	158.8	330	5E-01	231	7E-01	-2E-01	<1	No
NE-09	Soil	Zinc	mg/kg	105.2	930	1E-01	136	1E-01	-3E-02	<1	No
NE-11	Soil	Aluminum	mg/kg	26511	--	--	35600	--	--	--	Uncertainty
NE-11	Soil	Antimony	mg/kg	0.979	780	1E-03	2.42	3E-03	-2E-03	<1	No
NE-11	Soil	Arsenic	mg/kg	79.17	68	1E+00	112	<b>2E+00</b>	-5E-01	<1	No
NE-11	Soil	Barium	mg/kg	635.4	3200	2E-01	271	8E-02	1E-01	<1	No
NE-11	Soil	Cadmium	mg/kg	2.512	760	3E-03	0.824	1E-03	2E-03	<1	No
NE-11	Soil	Chromium	mg/kg	79.46	64	1E+00	145	<b>2E+00</b>	-1E+00	<1	No
NE-11	Soil	Cobalt	mg/kg	30.71	300	1E-01	43.6	1E-01	-4E-02	<1	No
NE-11	Soil	Copper	mg/kg	161.7	530	3E-01	182	3E-01	-4E-02	<1	No
NE-11	Soil	Iron	mg/kg	66005	--	--	71900	--	--	--	Uncertainty
NE-11	Soil	Lead	mg/kg	42.38	8400	5E-03	34.8	4E-03	9E-04	<1	No
NE-11	Soil	Manganese	mg/kg	2163	4500	5E-01	1600	4E-01	1E-01	<1	No
NE-11	Soil	Mercury	mg/kg	0.077	6.6	1E-02	0.0795	1E-02	-4E-04	<1	No
NE-11	Soil	Nickel	mg/kg	91.12	1300	7E-02	89	7E-02	2E-03	<1	No
NE-11	Soil	Nitrate as N	mg/kg	3.3	--	--	--	--	--	--	Uncertainty
NE-11	Soil	Sulfate	mg/kg	8.6	--	--	--	--	--	--	Uncertainty
NE-11	Soil	Vanadium	mg/kg	147.6	330	4E-01	231	7E-01	-3E-01	<1	No
NE-11	Soil	Zinc	mg/kg	127.7	930	1E-01	136	1E-01	-9E-03	<1	No
NE-11	Soil	bis(2-Ethylhexyl)phthalate	mg/kg	0.061	--	--	--	--	--	--	Uncertainty
NR3	Soil	Antimony	mg/kg	2.135	780	3E-03	2.42	3E-03	-4E-04	<1	No
NR3	Soil	Arsenic	mg/kg	166	68	<b>2E+00</b>	112	<b>2E+00</b>	8E-01	<1	No
NR3	Soil	Cadmium	mg/kg	2.319	760	3E-03	0.824	1E-03	2E-03	<1	No
NR3	Soil	Copper	mg/kg	69.79	530	1E-01	182	3E-01	-2E-01	<1	No
NR3	Soil	Lead	mg/kg	252.9	8400	3E-02	34.8	4E-03	3E-02	<1	No
NR3	Soil	Mercury	mg/kg	1.236	6.6	2E-01	0.0795	1E-02	2E-01	<1	No

TABLE M-22

**Estimation of Potential Risks to Soil Invertebrates***Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona*

				Site Risk			Incremental Risk <sup>a</sup>			Weight of Evidence	
Exposure		COPEC	Units	RME EPC	Benchmark	Tier 2 HQ	BTV	BKGD	INCR	Site or INCR	Retain for
Area	Matrix			(mg/kg)	(mg/kg)			HQ	HQ		
NR3	Soil	Nitrate as N	mg/kg	1	--	--	--	--	--	--	Uncertainty
NR3	Soil	Selenium	mg/kg	2.188	70	3E-02	4.4	6E-02	-3E-02	<1	No
NR3	Soil	Silver	mg/kg	1.312	--	--	--	--	--	--	Uncertainty
NR3	Soil	Sulfate	mg/kg	4200	--	--	--	--	--	--	Uncertainty
NR3	Soil	Zinc	mg/kg	424.4	930	5E-01	136	1E-01	3E-01	<1	No
NR4/NR5	Soil	Antimony	mg/kg	25.5	780	3E-02	2.42	3E-03	3E-02	<1	No
NR4/NR5	Soil	Arsenic	mg/kg	591.1	68	9E+00	112	2E+00	7E+00	7E+00	Yes
NR4/NR5	Soil	Cadmium	mg/kg	8.1	760	1E-02	0.824	1E-03	1E-02	<1	No
NR4/NR5	Soil	Copper	mg/kg	192	530	4E-01	182	3E-01	2E-02	<1	No
NR4/NR5	Soil	Lead	mg/kg	2052	8400	2E-01	34.8	4E-03	2E-01	<1	No
NR4/NR5	Soil	Selenium	mg/kg	24	70	3E-01	4.4	6E-02	3E-01	<1	No
NR4/NR5	Soil	Silver	mg/kg	13.7	--	--	--	--	--	--	Uncertainty
NR4/NR5	Soil	Zinc	mg/kg	921	930	1E+00	136	1E-01	8E-01	<1	No
NR6	Soil	Antimony	mg/kg	7.8	780	1E-02	2.42	3E-03	7E-03	<1	No
NR6	Soil	Arsenic	mg/kg	395.2	68	6E+00	112	2E+00	4E+00	4E+00	Yes
NR6	Soil	Barium	mg/kg	464	3200	1E-01	271	8E-02	6E-02	<1	No
NR6	Soil	Cadmium	mg/kg	4.3	760	6E-03	0.824	1E-03	5E-03	<1	No
NR6	Soil	Copper	mg/kg	388	530	7E-01	182	3E-01	4E-01	<1	No
NR6	Soil	Lead	mg/kg	632.6	8400	8E-02	34.8	4E-03	7E-02	<1	No
NR6	Soil	Manganese	mg/kg	11898	4500	3E+00	1600	4E-01	2E+00	2E+00	Yes
NR6	Soil	Mercury	mg/kg	0.22	6.6	3E-02	0.0795	1E-02	2E-02	<1	No
NR6	Soil	Nitrate as N	mg/kg	0.5	--	--	--	--	--	--	Uncertainty
NR6	Soil	Selenium	mg/kg	9.7	70	1E-01	4.4	6E-02	8E-02	<1	No
NR6	Soil	Silver	mg/kg	6.5	--	--	--	--	--	--	Uncertainty
NR6	Soil	Sulfate	mg/kg	8800	--	--	--	--	--	--	Uncertainty
NR6	Soil	Zinc	mg/kg	711.8	930	8E-01	136	1E-01	6E-01	<1	No
NR7	Soil	Aluminum	mg/kg	20755	--	--	35600	--	--	--	Uncertainty
NR7	Soil	Antimony	mg/kg	8.477	780	1E-02	2.42	3E-03	8E-03	<1	No
NR7	Soil	Arsenic	mg/kg	258.4	68	4E+00	112	2E+00	2E+00	2E+00	Yes
NR7	Soil	Barium	mg/kg	379.4	3200	1E-01	271	8E-02	3E-02	<1	No
NR7	Soil	Cadmium	mg/kg	21.41	760	3E-02	0.824	1E-03	3E-02	<1	No
NR7	Soil	Chloride	mg/kg	25	--	--	--	--	--	--	Uncertainty
NR7	Soil	Chromium	mg/kg	76.03	64	1E+00	145	2E+00	-1E+00	<1	No
NR7	Soil	Cobalt	mg/kg	23.35	300	8E-02	43.6	1E-01	-7E-02	<1	No
NR7	Soil	Copper	mg/kg	2184	530	4E+00	182	3E-01	4E+00	4E+00	Yes
NR7	Soil	Iron	mg/kg	50037	--	--	71900	--	--	--	Uncertainty
NR7	Soil	Lead	mg/kg	263.1	8400	3E-02	34.8	4E-03	3E-02	<1	No
NR7	Soil	Manganese	mg/kg	1284	4500	3E-01	1600	4E-01	-7E-02	<1	No
NR7	Soil	Mercury	mg/kg	0.743	6.6	1E-01	0.0795	1E-02	1E-01	<1	No
NR7	Soil	Nickel	mg/kg	70.47	1300	5E-02	89	7E-02	-1E-02	<1	No
NR7	Soil	Nitrate as N	mg/kg	25	--	--	--	--	--	--	Uncertainty
NR7	Soil	Selenium	mg/kg	16.43	70	2E-01	4.4	6E-02	2E-01	<1	No
NR7	Soil	Silver	mg/kg	14.32	--	--	--	--	--	--	Uncertainty

TABLE M-22

**Estimation of Potential Risks to Soil Invertebrates***Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona*

				Site Risk			Incremental Risk <sup>a</sup>			Weight of Evidence	
Exposure		COPEC	Units	RME EPC	Benchmark	Tier 2 HQ	BTV	BKGD	INCR	Site or INCR	Retain for
Area	Matrix			(mg/kg)	(mg/kg)			HQ	HQ	HQ <sup>b</sup>	WOE <sup>c</sup> ?
NR7	Soil	Sulfate	mg/kg	24530	--	--	--	--	--	--	Uncertainty
NR7	Soil	Thallium	mg/kg	2.717	1	3E+00	2.8	3E+00	-8E-02	<1	No
NR7	Soil	Zinc	mg/kg	866.5	930	9E-01	136	1E-01	8E-01	<1	No
NR7	Soil	Acetophenone	mg/kg	0.071	--	--	--	--	--	--	Uncertainty
NR7	Soil	bis(2-Ethylhexyl)phthalate	mg/kg	0.33	--	--	--	--	--	--	Uncertainty
NR7	Soil	Di-n-butyl phthalate	mg/kg	0.049	--	--	--	--	--	--	Uncertainty
NR7	Soil	Perchlorate	mg/kg	0.013	--	--	--	--	--	--	Uncertainty
NR8	Soil	Antimony	mg/kg	4.131	780	5E-03	2.42	3E-03	2E-03	<1	No
NR8	Soil	Arsenic	mg/kg	549.6	68	8E+00	112	2E+00	6E+00	6E+00	Yes
NR8	Soil	Barium	mg/kg	253.5	3200	8E-02	271	8E-02	-5E-03	<1	No
NR8	Soil	Cadmium	mg/kg	5.217	760	7E-03	0.824	1E-03	6E-03	<1	No
NR8	Soil	Copper	mg/kg	1279	530	2E+00	182	3E-01	2E+00	2E+00	Yes
NR8	Soil	Iron	mg/kg	47631	--	--	71900	--	--	--	Uncertainty
NR8	Soil	Lead	mg/kg	1338	8400	2E-01	34.8	4E-03	2E-01	<1	No
NR8	Soil	Manganese	mg/kg	9222	4500	2E+00	1600	4E-01	2E+00	2E+00	Yes
NR8	Soil	Mercury	mg/kg	10.1	6.6	2E+00	0.0795	1E-02	2E+00	2E+00	Yes
NR8	Soil	Nickel	mg/kg	58.82	1300	5E-02	89	7E-02	-2E-02	<1	No
NR8	Soil	Selenium	mg/kg	9.788	70	1E-01	4.4	6E-02	8E-02	<1	No
NR8	Soil	Silver	mg/kg	9.412	--	--	--	--	--	--	Uncertainty
NR8	Soil	Sulfate	mg/kg	74000	--	--	--	--	--	--	Uncertainty
NR8	Soil	Thallium	mg/kg	2.838	1	3E+00	2.8	3E+00	4E-02	<1	No
NR8	Soil	Zinc	mg/kg	1722	930	2E+00	136	1E-01	2E+00	2E+00	Yes
NR9	Soil	Antimony	mg/kg	44.3	780	6E-02	2.42	3E-03	5E-02	<1	No
NR9	Soil	Arsenic	mg/kg	1415	68	2E+01	112	2E+00	2E+01	2E+01	Yes
NR9	Soil	Cadmium	mg/kg	6.7	760	9E-03	0.824	1E-03	8E-03	<1	No
NR9	Soil	Cobalt	mg/kg	51.4	300	2E-01	43.6	1E-01	3E-02	<1	No
NR9	Soil	Copper	mg/kg	1610	530	3E+00	182	3E-01	3E+00	3E+00	Yes
NR9	Soil	Lead	mg/kg	1869	8400	2E-01	34.8	4E-03	2E-01	<1	No
NR9	Soil	Manganese	mg/kg	2570	4500	6E-01	1600	4E-01	2E-01	<1	No
NR9	Soil	Mercury	mg/kg	0.6	6.6	9E-02	0.0795	1E-02	8E-02	<1	No
NR9	Soil	Nickel	mg/kg	116	1300	9E-02	89	7E-02	2E-02	<1	No
NR9	Soil	Selenium	mg/kg	34.8	70	5E-01	4.4	6E-02	4E-01	<1	No
NR9	Soil	Silver	mg/kg	36	--	--	--	--	--	--	Uncertainty
NR9	Soil	Zinc	mg/kg	1512	930	2E+00	136	1E-01	1E+00	<1	No
NR10	Soil	Arsenic	mg/kg	3150	68	5E+01	112	2E+00	4E+01	4E+01	Yes
NR10	Soil	Cadmium	mg/kg	0.85	760	1E-03	0.824	1E-03	3E-05	<1	No
NR10	Soil	Lead	mg/kg	5579	8400	7E-01	34.8	4E-03	7E-01	<1	No
NR10	Soil	Mercury	mg/kg	0.084	6.6	1E-02	0.0795	1E-02	7E-04	<1	No
NR10	Soil	Zinc	mg/kg	3886	930	4E+00	136	1E-01	4E+00	4E+00	Yes
NR11	Soil	Aluminum	mg/kg	124216	--	--	35600	--	--	--	Uncertainty
NR11	Soil	Antimony	mg/kg	15.04	780	2E-02	2.42	3E-03	2E-02	<1	No
NR11	Soil	Arsenic	mg/kg	542.8	68	8E+00	112	2E+00	6E+00	6E+00	Yes
NR11	Soil	Barium	mg/kg	272.3	3200	9E-02	271	8E-02	4E-04	<1	No

TABLE M-22

**Estimation of Potential Risks to Soil Invertebrates***Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona*

				Site Risk			Incremental Risk <sup>a</sup>			Weight of Evidence	
Exposure		COPEC	Units	RME EPC	Benchmark	Tier 2 HQ	BTV	BKGD HQ	INCR HQ	Site or INCR	Retain for
Area	Matrix			(mg/kg)	(mg/kg)					HQ <sup>b</sup>	WOE <sup>c</sup> ?
NR11	Soil	Beryllium	mg/kg	11.41	400	3E-02	1.7	4E-03	2E-02	<1	No
NR11	Soil	Cadmium	mg/kg	14.56	760	2E-02	0.824	1E-03	2E-02	<1	No
NR11	Soil	Chloride	mg/kg	130	--	--	--	--	--	--	Uncertainty
NR11	Soil	Chromium	mg/kg	587	64	9E+00	145	2E+00	7E+00	7E+00	Yes
NR11	Soil	Chromium, Hexavalent	mg/kg	1.7	3.4	5E-01	--	--	5E-01	<1	No
NR11	Soil	Cobalt	mg/kg	19.23	300	6E-02	43.6	1E-01	-8E-02	<1	No
NR11	Soil	Copper	mg/kg	6955	530	1E+01	182	3E-01	1E+01	1E+01	Yes
NR11	Soil	Cyanide	mg/kg	0.893	0.9	1E+00	--	--	1E+00	<1	No
NR11	Soil	Iron	mg/kg	39660	--	--	71900	--	--	--	Uncertainty
NR11	Soil	Lead	mg/kg	2093	8400	2E-01	34.8	4E-03	2E-01	<1	No
NR11	Soil	Manganese	mg/kg	886.6	4500	2E-01	1600	4E-01	-2E-01	<1	No
NR11	Soil	Mercury	mg/kg	1.351	6.6	2E-01	0.0795	1E-02	2E-01	<1	No
NR11	Soil	Nickel	mg/kg	285.6	1300	2E-01	89	7E-02	2E-01	<1	No
NR11	Soil	Nitrate as N	mg/kg	56.33	--	--	--	--	--	--	Uncertainty
NR11	Soil	Selenium	mg/kg	8.862	70	1E-01	4.4	6E-02	6E-02	<1	No
NR11	Soil	Silver	mg/kg	34.75	--	--	--	--	--	--	Uncertainty
NR11	Soil	Sulfate	mg/kg	263.2	--	--	--	--	--	--	Uncertainty
NR11	Soil	Thallium	mg/kg	0.74	1	7E-01	2.8	3E+00	-2E+00	<1	No
NR11	Soil	Zinc	mg/kg	2711	930	3E+00	136	1E-01	3E+00	3E+00	Yes
NR11	Soil	Acetophenone	mg/kg	0.134	--	--	--	--	--	--	Uncertainty
NR11	Soil	Aroclor-1248	mg/kg	0.97	500	2E-03	--	--	2E-03	<1	No
NR11	Soil	Aroclor-1254	mg/kg	0.076	500	2E-04	--	--	2E-04	<1	No
NR11	Soil	bis(2-Ethylhexyl)phthalate	mg/kg	0.0601	--	--	--	--	--	--	Uncertainty
NR11	Soil	Carbazole	mg/kg	0.1	--	--	--	--	--	--	Uncertainty
NR11	Soil	Delta-BHC	mg/kg	0.017	--	--	--	--	--	--	Uncertainty
NR11	Soil	Dieldrin	mg/kg	0.0023	--	--	--	--	--	--	Uncertainty
NR11	Soil	Di-n-butyl phthalate	mg/kg	0.065	--	--	--	--	--	--	Uncertainty
NR11	Soil	Endosulfan I	mg/kg	0.002	--	--	--	--	--	--	Uncertainty
NR11	Soil	Heptachlor	mg/kg	0.0073	--	--	--	--	--	--	Uncertainty
NR11	Soil	Heptachlor Epoxide	mg/kg	0.025	--	--	--	--	--	--	Uncertainty
NR11	Soil	1,2,3,4,6,7,8-Hepta CDD	mg/kg	0.0006772	5	1E-04	--	--	1E-04	<1	No
NR11	Soil	1,2,3,4,6,7,8-Hepta CDF	mg/kg	0.00221	5	4E-04	--	--	4E-04	<1	No
NR11	Soil	1,2,3,4,7,8,9-Hepta CDF	mg/kg	0.00133	5	3E-04	--	--	3E-04	<1	No
NR11	Soil	1,2,3,4,7,8-Hexa CDD	mg/kg	0.0001	5	2E-05	--	--	2E-05	<1	No
NR11	Soil	1,2,3,4,7,8-Hexa CDF	mg/kg	0.00172	5	3E-04	--	--	3E-04	<1	No
NR11	Soil	1,2,3,6,7,8-Hexa CDD	mg/kg	0.000061651	5	1E-05	--	--	1E-05	<1	No
NR11	Soil	1,2,3,6,7,8-Hexa CDF	mg/kg	0.00162	5	3E-04	--	--	3E-04	<1	No
NR11	Soil	1,2,3,7,8,9-Hexa CDD	mg/kg	0.000052879	5	1E-05	--	--	1E-05	<1	No
NR11	Soil	1,2,3,7,8,9-Hexa CDF	mg/kg	0.00026954	5	5E-05	--	--	5E-05	<1	No
NR11	Soil	1,2,3,7,8-Penta CDD	mg/kg	0.000107	5	2E-05	--	--	2E-05	<1	No
NR11	Soil	1,2,3,7,8-Penta CDF	mg/kg	0.00072	5	1E-04	--	--	1E-04	<1	No
NR11	Soil	2,3,4,6,7,8-Hexa CDF	mg/kg	0.00046143	5	9E-05	--	--	9E-05	<1	No
NR11	Soil	2,3,4,7,8-Penta CDF	mg/kg	0.0002346	5	5E-05	--	--	5E-05	<1	No



TABLE M-22

**Estimation of Potential Risks to Soil Invertebrates***Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona*

				Site Risk			Incremental Risk <sup>a</sup>			Weight of Evidence	
Exposure		COPEC	Units	RME EPC	Benchmark	Tier 2 HQ	BTV	BKGD	INCR	Site or INCR	Retain for
Area	Matrix			(mg/kg)	(mg/kg)			HQ	HQ	HQ <sup>b</sup>	WOE <sup>c</sup> ?
NR11	Soil	2,3,7,8-Tetra CDD	mg/kg	7.4828E-06	5	1E-06	--	--	1E-06	<1	No
NR11	Soil	2,3,7,8-Tetra CDF	mg/kg	0.000394	5	8E-05	--	--	8E-05	<1	No
NR11	Soil	OCDD	mg/kg	0.00378	5	8E-04	--	--	8E-04	<1	No
NR11	Soil	OCDF	mg/kg	0.0034	5	7E-04	--	--	7E-04	<1	No
NR12	Soil	Aluminum	mg/kg	66525	--	--	35600	--	--	--	Uncertainty
NR12	Soil	Antimony	mg/kg	21.7	780	3E-02	2.42	3E-03	2E-02	<1	No
NR12	Soil	Arsenic	mg/kg	1280	68	<b>2E+01</b>	112	<b>2E+00</b>	<b>2E+01</b>	<b>2E+01</b>	Yes
NR12	Soil	Barium	mg/kg	623.1	3200	2E-01	271	8E-02	1E-01	<1	No
NR12	Soil	Cadmium	mg/kg	15.47	760	2E-02	0.824	1E-03	2E-02	<1	No
NR12	Soil	Chromium	mg/kg	217.5	64	<b>3E+00</b>	145	<b>2E+00</b>	1E+00	<1	No
NR12	Soil	Chromium, Hexavalent	mg/kg	18	3.4	<b>5E+00</b>	--	--	<b>5E+00</b>	<b>5E+00</b>	Yes
NR12	Soil	Cobalt	mg/kg	23.01	300	8E-02	43.6	1E-01	-7E-02	<1	No
NR12	Soil	Copper	mg/kg	4318	530	<b>8E+00</b>	182	3E-01	<b>8E+00</b>	<b>8E+00</b>	Yes
NR12	Soil	Iron	mg/kg	51843	--	--	71900	--	--	--	Uncertainty
NR12	Soil	Lead	mg/kg	1029	8400	1E-01	34.8	4E-03	1E-01	<1	No
NR12	Soil	Manganese	mg/kg	6458	4500	1E+00	1600	4E-01	1E+00	<1	No
NR12	Soil	Mercury	mg/kg	2.223	6.6	3E-01	0.0795	1E-02	3E-01	<1	No
NR12	Soil	Nickel	mg/kg	161.5	1300	1E-01	89	7E-02	6E-02	<1	No
NR12	Soil	Nitrate as N	mg/kg	28	--	--	--	--	--	--	Uncertainty
NR12	Soil	Selenium	mg/kg	7.081	70	1E-01	4.4	6E-02	4E-02	<1	No
NR12	Soil	Silver	mg/kg	13.47	--	--	--	--	--	--	Uncertainty
NR12	Soil	Sulfate	mg/kg	300	--	--	--	--	--	--	Uncertainty
NR12	Soil	Thallium	mg/kg	1.586	1	<b>2E+00</b>	2.8	<b>3E+00</b>	-1E+00	<1	No
NR12	Soil	Zinc	mg/kg	2733	930	<b>3E+00</b>	136	1E-01	<b>3E+00</b>	<b>3E+00</b>	Yes
NR12	Soil	1,2,3,4,6,7,8-Hepta CDD	mg/kg	0.00032	5	6E-05	--	--	6E-05	<1	No
NR12	Soil	1,2,3,4,6,7,8-Hepta CDF	mg/kg	0.0015	5	3E-04	--	--	3E-04	<1	No
NR12	Soil	1,2,3,4,7,8,9-Hepta CDF	mg/kg	0.00019	5	4E-05	--	--	4E-05	<1	No
NR12	Soil	1,2,3,4,7,8-Hexa CDD	mg/kg	0.000012	5	2E-06	--	--	2E-06	<1	No
NR12	Soil	1,2,3,4,7,8-Hexa CDF	mg/kg	0.00077	5	2E-04	--	--	2E-04	<1	No
NR12	Soil	1,2,3,6,7,8-Hexa CDD	mg/kg	0.000024	5	5E-06	--	--	5E-06	<1	No
NR12	Soil	1,2,3,6,7,8-Hexa CDF	mg/kg	0.00022	5	4E-05	--	--	4E-05	<1	No
NR12	Soil	1,2,3,7,8,9-Hexa CDD	mg/kg	0.000028	5	6E-06	--	--	6E-06	<1	No
NR12	Soil	1,2,3,7,8,9-Hexa CDF	mg/kg	0.00001	5	2E-06	--	--	2E-06	<1	No
NR12	Soil	1,2,3,7,8-Penta CDD	mg/kg	0.0000081	5	2E-06	--	--	2E-06	<1	No
NR12	Soil	1,2,3,7,8-Penta CDF	mg/kg	0.000096	5	2E-05	--	--	2E-05	<1	No
NR12	Soil	2,3,4,6,7,8-Hexa CDF	mg/kg	0.00018	5	4E-05	--	--	4E-05	<1	No
NR12	Soil	2,3,4,7,8-Penta CDF	mg/kg	0.00017	5	3E-05	--	--	3E-05	<1	No
NR12	Soil	2,3,7,8-Tetra CDF	mg/kg	0.00014	5	3E-05	--	--	3E-05	<1	No
NR12	Soil	OCDD	mg/kg	0.0017	5	3E-04	--	--	3E-04	<1	No
NR12	Soil	OCDF	mg/kg	0.0023	5	5E-04	--	--	5E-04	<1	No
NR13	Soil	Antimony	mg/kg	4.8	780	6E-03	2.42	3E-03	3E-03	<1	No
NR13	Soil	Arsenic	mg/kg	111.2	68	<b>2E+00</b>	112	<b>2E+00</b>	-1E-02	<1	No
NR13	Soil	Barium	mg/kg	497	3200	2E-01	271	8E-02	7E-02	<1	No

TABLE M-22

**Estimation of Potential Risks to Soil Invertebrates***Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona*

				Site Risk			Incremental Risk <sup>a</sup>			Weight of Evidence	
Exposure		COPEC	Units	RME EPC	Benchmark	Tier 2 HQ	BTV	BKGD	INCR	Site or INCR	Retain for
Area	Matrix			(mg/kg)	(mg/kg)			HQ	HQ	HQ <sup>b</sup>	WOE <sup>c</sup> ?
NR13	Soil	Cadmium	mg/kg	8.3	760	1E-02	0.824	1E-03	1E-02	<1	No
NR13	Soil	Copper	mg/kg	950	530	<b>2E+00</b>	182	3E-01	1E+00	<1	No
NR13	Soil	Lead	mg/kg	282.8	8400	3E-02	34.8	4E-03	3E-02	<1	No
NR13	Soil	Nickel	mg/kg	116	1300	9E-02	89	7E-02	2E-02	<1	No
NR13	Soil	Selenium	mg/kg	4.9	70	7E-02	4.4	6E-02	7E-03	<1	No
NR13	Soil	Silver	mg/kg	4.9	--	--	--	--	--	--	Uncertainty
NR13	Soil	Zinc	mg/kg	382.4	930	4E-01	136	1E-01	3E-01	<1	No
NR14	Soil	Aluminum	mg/kg	36000	--	--	35600	--	--	--	Uncertainty
NR14	Soil	Antimony	mg/kg	43.9	780	6E-02	2.42	3E-03	5E-02	<1	No
NR14	Soil	Arsenic	mg/kg	516.8	68	<b>8E+00</b>	112	<b>2E+00</b>	<b>6E+00</b>	<b>6E+00</b>	<b>Yes</b>
NR14	Soil	Cadmium	mg/kg	6.7	760	9E-03	0.824	1E-03	8E-03	<1	No
NR14	Soil	Iron	mg/kg	66284	--	--	71900	--	--	--	Uncertainty
NR14	Soil	Lead	mg/kg	1748	8400	2E-01	34.8	4E-03	2E-01	<1	No
NR14	Soil	Manganese	mg/kg	1088	4500	2E-01	1600	4E-01	-1E-01	<1	No
NR14	Soil	Mercury	mg/kg	0.85	6.6	1E-01	0.0795	1E-02	1E-01	<1	No
NR14	Soil	Nitrate as N	mg/kg	4	--	--	--	--	--	--	Uncertainty
NR14	Soil	Selenium	mg/kg	17.6	70	3E-01	4.4	6E-02	2E-01	<1	No
NR14	Soil	Silver	mg/kg	4.9	--	--	--	--	--	--	Uncertainty
NR14	Soil	Sulfate	mg/kg	2700	--	--	--	--	--	--	Uncertainty
NR14	Soil	Thallium	mg/kg	9.5	1	<b>1E+01</b>	2.8	<b>3E+00</b>	<b>7E+00</b>	<b>7E+00</b>	<b>Yes</b>
NR14	Soil	Zinc	mg/kg	892.8	930	1E+00	136	1E-01	8E-01	<1	No
NR15	Soil	Cadmium	mg/kg	1.18	760	2E-03	0.824	1E-03	5E-04	<1	No
NR15	Soil	Lead	mg/kg	44.65	8400	5E-03	34.8	4E-03	1E-03	<1	No
NR15	Soil	Mercury	mg/kg	0.0543	6.6	8E-03	0.0795	1E-02	-4E-03	<1	No
NR15	Soil	Nitrate as N	mg/kg	2	--	--	--	--	--	--	Uncertainty
NR15	Soil	Sulfate	mg/kg	100	--	--	--	--	--	--	Uncertainty
NR15	Soil	Thallium	mg/kg	2.9	1	<b>3E+00</b>	2.8	<b>3E+00</b>	1E-01	<1	No
NR15	Soil	Zinc	mg/kg	144.2	930	2E-01	136	1E-01	9E-03	<1	No
NR16	Soil	Aluminum	mg/kg	20965	--	--	35600	--	--	--	Uncertainty
NR16	Soil	Antimony	mg/kg	72.82	780	9E-02	2.42	3E-03	9E-02	<1	No
NR16	Soil	Arsenic	mg/kg	1143	68	<b>2E+01</b>	112	<b>2E+00</b>	<b>2E+01</b>	<b>2E+01</b>	<b>Yes</b>
NR16	Soil	Barium	mg/kg	132.9	3200	4E-02	271	8E-02	-4E-02	<1	No
NR16	Soil	Cadmium	mg/kg	12.95	760	2E-02	0.824	1E-03	2E-02	<1	No
NR16	Soil	Copper	mg/kg	235	530	4E-01	182	3E-01	1E-01	<1	No
NR16	Soil	Cyanide	mg/kg	2.081	0.9	<b>2E+00</b>	--	--	<b>2E+00</b>	<b>2E+00</b>	<b>Yes</b>
NR16	Soil	Iron	mg/kg	54455	--	--	71900	--	--	--	Uncertainty
NR16	Soil	Lead	mg/kg	8726	8400	1E+00	34.8	4E-03	1E+00	<1	No
NR16	Soil	Manganese	mg/kg	1280	4500	3E-01	1600	4E-01	-7E-02	<1	No
NR16	Soil	Mercury	mg/kg	20.05	6.6	<b>3E+00</b>	0.0795	1E-02	<b>3E+00</b>	<b>3E+00</b>	<b>Yes</b>
NR16	Soil	Nitrate as N	mg/kg	5.888	--	--	--	--	--	--	Uncertainty
NR16	Soil	Selenium	mg/kg	24.31	70	3E-01	4.4	6E-02	3E-01	<1	No
NR16	Soil	Silver	mg/kg	29.47	--	--	--	--	--	--	Uncertainty
NR16	Soil	Sulfate	mg/kg	16564	--	--	--	--	--	--	Uncertainty

TABLE M-22

**Estimation of Potential Risks to Soil Invertebrates***Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona*

				Site Risk			Incremental Risk <sup>a</sup>			Weight of Evidence	
Exposure		COPEC	Units	RME EPC	Benchmark	Tier 2 HQ	BTV	BKGD	INCR	Site or INCR	Retain for
Area	Matrix			(mg/kg)	(mg/kg)			HQ	HQ	HQ <sup>b</sup>	WOE <sup>c</sup> ?
NR16	Soil	Thallium	mg/kg	1.978	1	2E+00	2.8	3E+00	-8E-01	<1	No
NR16	Soil	Zinc	mg/kg	2737	930	3E+00	136	1E-01	3E+00	3E+00	Yes
NR16	Soil	4-Chloroaniline	mg/kg	0.043	30	1E-03	--	--	1E-03	<1	No
NR16	Soil	Acetophenone	mg/kg	0.04	--	--	--	--	--	--	Uncertainty
NR16	Soil	Alpha-Chlordane	mg/kg	0.0044	--	--	--	--	--	--	Uncertainty
NR16	Soil	Aroclor-1242	mg/kg	0.17	500	3E-04	--	--	3E-04	<1	No
NR16	Soil	Aroclor-1254	mg/kg	0.067	500	1E-04	--	--	1E-04	<1	No
NR16	Soil	Benzaldehyde	mg/kg	0.09	--	--	--	--	--	--	Uncertainty
NR16	Soil	Benzyl butyl phthalate	mg/kg	0.028	--	--	--	--	--	--	Uncertainty
NR16	Soil	Beta-BHC	mg/kg	0.0017	--	--	--	--	--	--	Uncertainty
NR16	Soil	bis(2-Ethylhexyl)phthalate	mg/kg	0.09	--	--	--	--	--	--	Uncertainty
NR16	Soil	Caprolactam	mg/kg	0.08	--	--	--	--	--	--	Uncertainty
NR16	Soil	Dieldrin	mg/kg	0.0026	--	--	--	--	--	--	Uncertainty
NR16	Soil	Endrin Ketone	mg/kg	0.0032	--	--	--	--	--	--	Uncertainty
NR17	Soil	Antimony	mg/kg	55.61	780	7E-02	2.42	3E-03	7E-02	<1	No
NR17	Soil	Arsenic	mg/kg	4194	68	6E+01	112	2E+00	6E+01	6E+01	Yes
NR17	Soil	Cadmium	mg/kg	24.76	760	3E-02	0.824	1E-03	3E-02	<1	No
NR17	Soil	Chromium, Hexavalent	mg/kg	1.4	3.4	4E-01	--	--	4E-01	<1	No
NR17	Soil	Copper	mg/kg	346.2	530	7E-01	182	3E-01	3E-01	<1	No
NR17	Soil	Cyanide	mg/kg	1.548	0.9	2E+00	--	--	2E+00	2E+00	Yes
NR17	Soil	Iron	mg/kg	108793	--	--	71900	--	--	--	Uncertainty
NR17	Soil	Lead	mg/kg	3150	8400	4E-01	34.8	4E-03	4E-01	<1	No
NR17	Soil	Mercury	mg/kg	22.45	6.6	3E+00	0.0795	1E-02	3E+00	3E+00	Yes
NR17	Soil	Nitrate as N	mg/kg	2	--	--	--	--	--	--	Uncertainty
NR17	Soil	Selenium	mg/kg	25.73	70	4E-01	4.4	6E-02	3E-01	<1	No
NR17	Soil	Silver	mg/kg	13.23	--	--	--	--	--	--	Uncertainty
NR17	Soil	Sulfate	mg/kg	89441	--	--	--	--	--	--	Uncertainty
NR17	Soil	Thallium	mg/kg	3.554	1	4E+00	2.8	3E+00	8E-01	<1	No
NR17	Soil	Zinc	mg/kg	6822	930	7E+00	136	1E-01	7E+00	7E+00	Yes
NR18	Soil	Antimony	mg/kg	10.48	780	1E-02	2.42	3E-03	1E-02	<1	No
NR18	Soil	Arsenic	mg/kg	547.8	68	8E+00	112	2E+00	6E+00	6E+00	Yes
NR18	Soil	Cadmium	mg/kg	9.459	760	1E-02	0.824	1E-03	1E-02	<1	No
NR18	Soil	Cobalt	mg/kg	26.99	300	9E-02	43.6	1E-01	-6E-02	<1	No
NR18	Soil	Copper	mg/kg	181.7	530	3E-01	182	3E-01	-6E-04	<1	No
NR18	Soil	Iron	mg/kg	49375	--	--	71900	--	--	--	Uncertainty
NR18	Soil	Lead	mg/kg	2738	8400	3E-01	34.8	4E-03	3E-01	<1	No
NR18	Soil	Mercury	mg/kg	5.864	6.6	9E-01	0.0795	1E-02	9E-01	<1	No
NR18	Soil	Nickel	mg/kg	30.89	1300	2E-02	89	7E-02	-4E-02	<1	No
NR18	Soil	Nitrate as N	mg/kg	970	--	--	--	--	--	--	Uncertainty
NR18	Soil	Selenium	mg/kg	9.555	70	1E-01	4.4	6E-02	7E-02	<1	No
NR18	Soil	Silver	mg/kg	4.987	--	--	--	--	--	--	Uncertainty
NR18	Soil	Sulfate	mg/kg	19000	--	--	--	--	--	--	Uncertainty

TABLE M-22

**Estimation of Potential Risks to Soil Invertebrates***Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona*

				Site Risk			Incremental Risk <sup>a</sup>			Weight of Evidence	
Exposure		COPEC	Units	RME EPC	Benchmark	Tier 2 HQ	BTV	BKGD HQ	INCR HQ	Site or INCR	Retain for
Area	Matrix			(mg/kg)	(mg/kg)					HQ <sup>b</sup>	WOE <sup>c</sup> ?
NR18	Soil	Thallium	mg/kg	2.9	1	3E+00	2.8	3E+00	1E-01	<1	No
NR18	Soil	Zinc	mg/kg	1869	930	2E+00	136	1E-01	2E+00	2E+00	Yes
NR19	Soil	Aluminum	mg/kg	17674	--	--	35600	--	--	--	Uncertainty
NR19	Soil	Antimony	mg/kg	3.457	780	4E-03	2.42	3E-03	1E-03	<1	No
NR19	Soil	Arsenic	mg/kg	288.4	68	4E+00	112	2E+00	3E+00	3E+00	Yes
NR19	Soil	Cadmium	mg/kg	2.17	760	3E-03	0.824	1E-03	2E-03	<1	No
NR19	Soil	Copper	mg/kg	104	530	2E-01	182	3E-01	-1E-01	<1	No
NR19	Soil	Iron	mg/kg	48139	--	--	71900	--	--	--	Uncertainty
NR19	Soil	Lead	mg/kg	486.8	8400	6E-02	34.8	4E-03	5E-02	<1	No
NR19	Soil	Manganese	mg/kg	735.8	4500	2E-01	1600	4E-01	-2E-01	<1	No
NR19	Soil	Mercury	mg/kg	3.849	6.6	6E-01	0.0795	1E-02	6E-01	<1	No
NR19	Soil	Nitrate as N	mg/kg	59	--	--	--	--	--	--	Uncertainty
NR19	Soil	Selenium	mg/kg	11.72	70	2E-01	4.4	6E-02	1E-01	<1	No
NR19	Soil	Silver	mg/kg	3.762	--	--	--	--	--	--	Uncertainty
NR19	Soil	Sulfate	mg/kg	64000	--	--	--	--	--	--	Uncertainty
NR19	Soil	Thallium	mg/kg	1.277	1	1E+00	2.8	3E+00	-2E+00	<1	No
NR19	Soil	Zinc	mg/kg	735.1	930	8E-01	136	1E-01	6E-01	<1	No
NR19	Soil	Acetone	mg/kg	0.033	--	--	--	--	--	--	Uncertainty
NR19	Soil	Acetophenone	mg/kg	0.06	--	--	--	--	--	--	Uncertainty
NR19	Soil	Alpha-Chlordane	mg/kg	0.001	--	--	--	--	--	--	Uncertainty
NR19	Soil	Benzyl butyl phthalate	mg/kg	0.25	--	--	--	--	--	--	Uncertainty
NR19	Soil	bis(2-Ethylhexyl)phthalate	mg/kg	0.28	--	--	--	--	--	--	Uncertainty
NR19	Soil	Caprolactam	mg/kg	0.072	--	--	--	--	--	--	Uncertainty
NR19	Soil	Carbon disulfide	mg/kg	0.002	--	--	--	--	--	--	Uncertainty
NR19	Soil	Dieldrin	mg/kg	0.0036	--	--	--	--	--	--	Uncertainty
NR19	Soil	Methyl ethyl ketone	mg/kg	0.01	--	--	--	--	--	--	Uncertainty
NR20	Soil	Antimony	mg/kg	2.968	780	4E-03	2.42	3E-03	7E-04	<1	No
NR20	Soil	Arsenic	mg/kg	136	68	2E+00	112	2E+00	4E-01	<1	No
NR20	Soil	Cadmium	mg/kg	0.703	760	9E-04	0.824	1E-03	-2E-04	<1	No
NR20	Soil	Lead	mg/kg	61.69	8400	7E-03	34.8	4E-03	3E-03	<1	No
NR20	Soil	Manganese	mg/kg	697.1	4500	2E-01	1600	4E-01	-2E-01	<1	No
NR20	Soil	Mercury	mg/kg	0.78	6.6	1E-01	0.0795	1E-02	1E-01	<1	No
NR20	Soil	Selenium	mg/kg	3.758	70	5E-02	4.4	6E-02	-9E-03	<1	No
NR20	Soil	Zinc	mg/kg	304.5	930	3E-01	136	1E-01	2E-01	<1	No
NW-01	Soil	Arsenic	mg/kg	60.49	68	9E-01	112	2E+00	-8E-01	<1	No
NW-01	Soil	Cadmium	mg/kg	0.373	760	5E-04	0.824	1E-03	-6E-04	<1	No
NW-01	Soil	Iron	mg/kg	39888	--	--	71900	--	--	--	Uncertainty
NW-01	Soil	Lead	mg/kg	34.78	8400	4E-03	34.8	4E-03	-2E-06	<1	No
NW-01	Soil	Manganese	mg/kg	721.5	4500	2E-01	1600	4E-01	-2E-01	<1	No
NW-01	Soil	Mercury	mg/kg	0.238	6.6	4E-02	0.0795	1E-02	2E-02	<1	No
NW-01	Soil	Zinc	mg/kg	161.8	930	2E-01	136	1E-01	3E-02	<1	No
NW-03	Soil	Arsenic	mg/kg	41.82	68	6E-01	112	2E+00	-1E+00	<1	No
NW-03	Soil	Cadmium	mg/kg	0.452	760	6E-04	0.824	1E-03	-5E-04	<1	No

TABLE M-22

**Estimation of Potential Risks to Soil Invertebrates***Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona*

				Site Risk			Incremental Risk <sup>a</sup>			Weight of Evidence	
Exposure		COPEC	Units	RME EPC	Benchmark	Tier 2 HQ	BTV	BKGD	INCR	Site or INCR	Retain for
Area	Matrix			(mg/kg)	(mg/kg)			HQ	HQ	HQ <sup>b</sup>	WOE <sup>c</sup> ?
NW-03	Soil	Iron	mg/kg	38262	--	--	71900	--	--	--	Uncertainty
NW-03	Soil	Lead	mg/kg	30.06	8400	4E-03	34.8	4E-03	-6E-04	<1	No
NW-03	Soil	Manganese	mg/kg	735.4	4500	2E-01	1600	4E-01	-2E-01	<1	No
NW-03	Soil	Mercury	mg/kg	0.123	6.6	2E-02	0.0795	1E-02	7E-03	<1	No
NW-03	Soil	Zinc	mg/kg	125.2	930	1E-01	136	1E-01	-1E-02	<1	No
RSAR-A	Soil	Cadmium	mg/kg	1.3	760	2E-03	0.824	1E-03	6E-04	<1	No
RSAR-A	Soil	Lead	mg/kg	46.43	8400	6E-03	34.8	4E-03	1E-03	<1	No
RSAR-A	Soil	Mercury	mg/kg	0.097	6.6	1E-02	0.0795	1E-02	3E-03	<1	No
RSAR-A	Soil	Selenium	mg/kg	4.7	70	7E-02	4.4	6E-02	4E-03	<1	No
RSAR-A	Soil	Zinc	mg/kg	165	930	2E-01	136	1E-01	3E-02	<1	No
RSAR-B	Soil	Lead	mg/kg	42.91	8400	5E-03	34.8	4E-03	1E-03	<1	No
RSAR-B	Soil	Zinc	mg/kg	132.6	930	1E-01	136	1E-01	-4E-03	<1	No
RSAR-D	Soil	Cadmium	mg/kg	0.822	760	1E-03	0.824	1E-03	-3E-06	<1	No
RSAR-D	Soil	Lead	mg/kg	54.11	8400	6E-03	34.8	4E-03	2E-03	<1	No
RSAR-D	Soil	Mercury	mg/kg	0.223	6.6	3E-02	0.0795	1E-02	2E-02	<1	No
RSAR-D	Soil	Zinc	mg/kg	148.3	930	2E-01	136	1E-01	1E-02	<1	No
RSAR-H	Soil	Arsenic	mg/kg	98.81	68	1E+00	112	<b>2E+00</b>	-2E-01	<1	No
RSAR-H	Soil	Lead	mg/kg	27.9	8400	3E-03	34.8	4E-03	-8E-04	<1	No
RSAR-H	Soil	Zinc	mg/kg	94.1	930	1E-01	136	1E-01	-5E-02	<1	No
SE-01	Soil	Aluminum	mg/kg	39747	--	--	35600	--	--	--	Uncertainty
SE-01	Soil	Antimony	mg/kg	1.444	780	2E-03	2.42	3E-03	-1E-03	<1	No
SE-01	Soil	Arsenic	mg/kg	116.7	68	<b>2E+00</b>	112	<b>2E+00</b>	7E-02	<1	No
SE-01	Soil	Cadmium	mg/kg	2.754	760	4E-03	0.824	1E-03	3E-03	<1	No
SE-01	Soil	Chromium	mg/kg	160.7	64	<b>3E+00</b>	145	<b>2E+00</b>	2E-01	<1	No
SE-01	Soil	Cobalt	mg/kg	43.73	300	1E-01	43.6	1E-01	4E-04	<1	No
SE-01	Soil	Copper	mg/kg	797.3	530	<b>2E+00</b>	182	3E-01	1E+00	<1	No
SE-01	Soil	Iron	mg/kg	64223	--	--	71900	--	--	--	Uncertainty
SE-01	Soil	Lead	mg/kg	133.3	8400	2E-02	34.8	4E-03	1E-02	<1	No
SE-01	Soil	Manganese	mg/kg	1307	4500	3E-01	1600	4E-01	-7E-02	<1	No
SE-01	Soil	Mercury	mg/kg	2.769	6.6	4E-01	0.0795	1E-02	4E-01	<1	No
SE-01	Soil	Nickel	mg/kg	74.93	1300	6E-02	89	7E-02	-1E-02	<1	No
SE-01	Soil	Selenium	mg/kg	2.519	70	4E-02	4.4	6E-02	-3E-02	<1	No
SE-01	Soil	Silver	mg/kg	6.1	--	--	--	--	--	--	Uncertainty
SE-01	Soil	Vanadium	mg/kg	237.5	330	7E-01	231	7E-01	2E-02	<1	No
SE-01	Soil	Zinc	mg/kg	191.6	930	2E-01	136	1E-01	6E-02	<1	No
SE-02	Soil	Aluminum	mg/kg	36357	--	--	35600	--	--	--	Uncertainty
SE-02	Soil	Antimony	mg/kg	3.4	780	4E-03	2.42	3E-03	1E-03	<1	No
SE-02	Soil	Arsenic	mg/kg	121.6	68	<b>2E+00</b>	112	<b>2E+00</b>	1E-01	<1	No
SE-02	Soil	Cadmium	mg/kg	1.948	760	3E-03	0.824	1E-03	1E-03	<1	No
SE-02	Soil	Chromium	mg/kg	126.3	64	<b>2E+00</b>	145	<b>2E+00</b>	-3E-01	<1	No
SE-02	Soil	Cobalt	mg/kg	41.51	300	1E-01	43.6	1E-01	-7E-03	<1	No
SE-02	Soil	Copper	mg/kg	429.6	530	8E-01	182	3E-01	5E-01	<1	No
SE-02	Soil	Iron	mg/kg	70434	--	--	71900	--	--	--	Uncertainty

TABLE M-22

**Estimation of Potential Risks to Soil Invertebrates***Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona*

				Site Risk			Incremental Risk <sup>a</sup>			Weight of Evidence	
Exposure		COPEC	Units	RME EPC	Benchmark	Tier 2 HQ	BTV	BKGD	INCR	Site or INCR	Retain for
Area	Matrix			(mg/kg)	(mg/kg)			HQ	HQ	HQ <sup>b</sup>	WOE <sup>c</sup> ?
SE-02	Soil	Lead	mg/kg	88.86	8400	1E-02	34.8	4E-03	6E-03	<1	No
SE-02	Soil	Manganese	mg/kg	1329	4500	3E-01	1600	4E-01	-6E-02	<1	No
SE-02	Soil	Mercury	mg/kg	0.14	6.6	2E-02	0.0795	1E-02	9E-03	<1	No
SE-02	Soil	Nickel	mg/kg	68.75	1300	5E-02	89	7E-02	-2E-02	<1	No
SE-02	Soil	Selenium	mg/kg	7.765	70	1E-01	4.4	6E-02	5E-02	<1	No
SE-02	Soil	Silver	mg/kg	2.793	--	--	--	--	--	--	Uncertainty
SE-02	Soil	Vanadium	mg/kg	234.6	330	7E-01	231	7E-01	1E-02	<1	No
SE-02	Soil	Zinc	mg/kg	184.8	930	2E-01	136	1E-01	5E-02	<1	No

Notes:

<sup>a</sup> Incremental risk calculated as the site risk minus the risk due to background (Site HQ - BKGD HQ). Incremental risks shown as negative values are the result of background risk exceeding the site risk for that exposure area..

<sup>u</sup> Incremental risk HQ is presented where available, otherwise site risk HQ is presented.

<sup>c</sup> Chemicals retained for weight of evidence evaluation are those with INCR HQ>1 (where BTV is available) or where Site HQ>1 (rounded to one significant figure).

-- not available

BTV - background threshold value

COPEC - chemical of potential ecological concern

EPC - exposure point concentration

HQ - hazard quotient

INCR - incremental risk

WOE - weight of evidence

TABLE M-23

Estimation of Potential Risks to Birds and Mammals - Soil

Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona

Site Data				Exposure Parameters					Plant Uptake					Invertebrate Uptake					Vertebrate Uptake					Soil Uptake			Total Dose	Site Risk				Incremental Risk <sup>a</sup>				Retain for Evaluation in <sup>b</sup>						
Exposure Area	Matrix	COPEC	RME Soil (mg/kg)	Receptor	Body Weight (kg)	Food Intake (kg/kg/d)	Water Intake (L/kgbw/d)	AUF	Diet Proportion	Soil to Plant BAF	Regression		Plant Concentration (mg/kg)	Plant Dose (mg/kg/day)	Diet Proportion	Soil to Invert BAF	Regression		Invert Concentration (mg/kg)	Invert Dose (mg/kg/day)	Diet Proportion	Soil to Vertebrate BAF	Regression		Vertebrate Concentration (mg/kg)	Vertebrate Dose (mg/kg/d)	Diet Proportion	Iron King Mine Bioavailability	Incidental Soil Dose (mg/kg/d)	(mg/kg/d)	TRVs	Site HQs		Background HQ		Incremental HQ		NOAA-based	LOAEL-based			
											B0	B1					B0	B1					LogKow	B0								B1	NOAA-based	LOAEL-based	NOAA-based	LOAEL-based	NOAA-based			LOAEL-based	NOAA-based	LOAEL-based
3001	Soil	Arsenic	69.01	Gambel's quail	0.175	0.05	0.105	0.51668	1	0.0760	--	--	5.24E+00	2.62E-01	--	regression	-1.4210	0.7060	--	4.80E+00	--	--	regression	-4.8471	0.8188	2.5E-01	--	0.105	--	3.62E-01	6.25E-01	9.3	40.3	3E-02	8E-03	1E-01	3E-02	-7E-02	-2E-02	No	No	
3001	Soil	Arsenic	69.01	Western kingbird	0.038	0.199	0.174	0.82669	--	0.0760	--	--	5.24E+00	--	1	regression	-1.4210	0.7060	--	4.80E+00	9.55E-01	--	--	regression	-4.8471	0.8188	2.5E-01	--	0.07	--	9.61E-01	1.92E+00	9.3	40.3	2E-01	4E-02	3E-01	7E-02	-1E-01	-3E-02	No	No
3001	Soil	Arsenic	69.01	Song sparrow	0.025	0.227	0.199	1	0.65	0.0760	--	--	5.24E+00	7.74E-01	0.35	regression	-1.4210	0.7060	--	4.80E+00	3.81E-01	--	--	regression	-4.8471	0.8188	2.5E-01	--	0.105	--	1.64E+00	2.80E+00	9.3	40.3	3E-01	7E-02	5E-01	1E-01	-2E-01	-4E-02	No	No
3001	Soil	Arsenic	69.01	Red-tailed hawk	1.224	0.077	0.055	0.00432	--	0.0760	--	--	5.24E+00	--	--	regression	-1.4210	0.7060	--	4.80E+00	--	1	regression	-4.8471	0.8188	2.5E-01	1.94E-02	0.01	--	5.31E-02	7.25E-02	9.3	40.3	3E-05	8E-06	1E-02	3E-03	-1E-02	-3E-03	No	No	
3001	Soil	Arsenic	69.01	Pocket gopher	0.235	0.097	0.114	1	1	0.0760	--	--	5.24E+00	5.09E-01	--	regression	-1.4210	0.7060	--	4.80E+00	--	--	regression	-4.8471	0.8188	2.5E-01	--	0.027	--	1.81E-01	6.89E-01	1.04	4.7	7E-01	1E-01	1E+00	2E-01	-4E-01	-9E-02	No	No	
3001	Soil	Arsenic	69.01	Desert shrew	0.004	0.221	0.172	1	--	0.0760	--	--	5.24E+00	--	1	regression	-1.4210	0.7060	--	4.80E+00	1.06E+00	--	--	regression	-4.8471	0.8188	2.5E-01	--	0.13	--	1.98E+00	3.04E+00	1.04	4.7	<b>3E+00</b>	6E-01	5E+00	1E+00	-2E+00	-4E-01	No	No
3001	Soil	Arsenic	69.01	Raccoon	6.9	0.035	0.082	0.0265	0.45	0.0760	--	--	5.24E+00	8.26E-02	0.45	regression	-1.4210	0.7060	--	4.80E+00	7.56E-02	0.1	regression	-4.8471	0.8188	2.5E-01	8.80E-04	0.094	--	2.27E-01	3.86E-01	1.04	4.7	1E-02	2E-03	6E-01	1E-01	-6E-01	-1E-01	No	No	
3001	Soil	Arsenic	69.01	Coyote	10	0.033	0.079	0.00289	--	0.0760	--	--	5.24E+00	--	--	regression	-1.4210	0.7060	--	4.80E+00	--	1	regression	-4.8471	0.8188	2.5E-01	8.30E-03	0.028	--	6.38E-02	7.21E-02	1.04	4.7	2E-04	4E-05	1E-01	2E-02	-1E-01	-2E-02	No	No	
3001	Soil	Cadmium	3.3	Gambel's quail	0.175	0.05	0.105	0.51668	1	0.2970	--	--	9.80E-01	4.90E-02	--	regression	2.1140	0.7950	--	2.14E+01	--	--	regression	-1.2571	0.4723	5.0E-01	--	0.105	--	1.73E-02	6.63E-02	1.47	10.4	2E-02	3E-03	1E-02	2E-03	1E-02	2E-03	No	No	
3001	Soil	Cadmium	3.3	Western kingbird	0.038	0.199	0.174	0.82669	--	0.2970	--	--	9.80E-01	--	1	regression	2.1140	0.7950	--	2.14E+01	4.26E+00	--	--	regression	-1.2571	0.4723	5.0E-01	--	0.07	--	4.60E-02	4.30E+00	1.47	10.4	<b>2E+00</b>	3E-01	1E+00	1E-01	1E+00	2E-01	No	No
3001	Soil	Cadmium	3.3	Song sparrow	0.025	0.227	0.199	1	0.65	0.2970	--	--	9.80E-01	1.45E-01	0.35	regression	2.1140	0.7950	--	2.14E+01	1.70E+00	--	--	regression	-1.2571	0.4723	5.0E-01	--	0.105	--	7.87E-02	1.92E+00	1.47	10.4	1E+00	2E-01	4E-01	6E-02	9E-01	1E-01	No	No
3001	Soil	Cadmium	3.3	Red-tailed hawk	1.224	0.077	0.055	0.00432	--	0.2970	--	--	9.80E-01	--	--	regression	2.1140	0.7950	--	2.14E+01	--	1	regression	-1.2571	0.4723	5.0E-01	3.85E-02	0.01	--	2.54E-03	4.10E-02	1.47	10.4	1E-04	2E-05	1E-02	2E-03	-1E-02	-2E-03	No	No	
3001	Soil	Cadmium	3.3	Pocket gopher	0.235	0.097	0.114	1	1	0.2970	--	--	9.80E-01	9.51E-02	--	regression	2.1140	0.7950	--	2.14E+01	--	--	regression	-1.2571	0.4723	5.0E-01	--	0.027	--	8.64E-03	1.04E-01	0.77	7.7	1E-01	1E-02	3E-02	3E-03	1E-01	1E-02	No	No	
3001	Soil	Cadmium	3.3	Desert shrew	0.004	0.221	0.172	1	--	0.2970	--	--	9.80E-01	--	1	regression	2.1140	0.7950	--	2.14E+01	4.73E+00	--	--	regression	-1.2571	0.4723	5.0E-01	--	0.13	--	9.48E-02	4.82E+00	0.77	7.7	<b>6E+00</b>	6E-01	2E+00	2E-01	<b>4E+00</b>	4E-01	Yes	No
3001	Soil	Cadmium	3.3	Raccoon	6.9	0.035	0.082	0.0265	0.45	0.2970	--	--	9.80E-01	1.54E-02	0.45	regression	2.1140	0.7950	--	2.14E+01	3.37E-01	0.1	regression	-1.2571	0.4723	5.0E-01	1.75E-03	0.094	--	1.09E-02	3.65E-01	0.77	7.7	1E-02	1E-03	2E-01	2E-02	-1E-01	-1E-02	No	No	
3001	Soil	Cadmium	3.3	Coyote	10	0.033	0.079	0.00289	--	0.2970	--	--	9.80E-01	--	--	regression	2.1140	0.7950	--	2.14E+01	--	1	regression	-1.2571	0.4723	5.0E-01	1.65E-02	0.028	--	3.05E-03	1.95E-02	0.77	7.7	7E-05	7E-06	1E-02	1E-03	-1E-02	-1E-03	No	No	
3001	Soil	Copper	626	Gambel's quail	0.175	0.05	0.105	0.51668	1	0.1110	--	--	6.95E+01	3.47E+00	--	0.5150	--	--	--	3.22E+02	--	--	regression	2.0420	0.1444	2.0E+01	--	0.105	--	3.29E+00	6.76E+00	4.05	52.3	9E-01	7E-02	5E-01	4E-02	4E-01	3E-02	No	No	
3001	Soil	Copper	626	Western kingbird	0.038	0.199	0.174	0.82669	--	0.1110	--	--	6.95E+01	--	1	0.5150	--	--	--	3.22E+02	6.42E+01	--	--	regression	2.0420	0.1444	2.0E+01	--	0.07	--	8.72E+00	7.29E-01	4.05	52.3	<b>1E+01</b>	1E+00	5E+00	4E-01	<b>1E+01</b>	7E-01	Yes	No
3001	Soil	Copper	626	Song sparrow	0.025	0.227	0.199	1	0.65	0.1110	--	--	6.95E+01	1.03E+01	0.35	0.5150	--	--	--	3.22E+02	2.56E+01	--	--	regression	2.0420	0.1444	2.0E+01	--	0.105	--	1.49E+01	5.08E+01	4.05	52.3	<b>1E+01</b>	1E+00	4E+00	3E-01	<b>9E+00</b>	7E-01	Yes	No
3001	Soil	Copper	626	Red-tailed hawk	1.224	0.077	0.055	0.00432	--	0.1110	--	--	6.95E+01	--	--	0.5150	--	--	--	3.22E+02	--	1	regression	2.0420	0.1444	2.0E+01	1.50E+00	0.01	--	4.82E-01	1.99E+00	4.05	52.3	2E-03	2E-04	3E-01	3E-02	-3E-01	-3E-02	No	No	
3001	Soil	Copper	626	Pocket gopher	0.235	0.097	0.114	1	1	0.1110	--	--	6.95E+01	6.74E+00	--	0.5150	--	--	--	3.22E+02	--	--	regression	2.0420	0.1444	2.																



Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona

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TABLE M-23

Estimation of Potential Risks to Birds and Mammals - Soil

Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona

Site Data				Exposure Parameters							Plant Uptake					Invertebrate Uptake					Vertebrate Uptake					Soil Uptake			Total Dose	Site Risk		Incremental Risk <sup>a</sup>				Retain for Evaluation in Weight of Evidence <sup>b</sup>								
Exposure Area	Matrix	COPEC	RME Soil (mg/kg)	Receptor	Body Weight (kg)	Food Intake (kg/kg/d)	Water Intake (L/kgbw/d)	AUF	Diet Proportion	Soil to Plant BAF	Regression		Plant Concentration (mg/kg)	Plant Dose (mg/kg/day)	Diet Proportion	Soil to Invert BAF	Regression		Invert Concentration (mg/kg)	Invert Dose (mg/kg/d)	Diet Proportion	Soil to Vertebrate BAF	Regression		Vertebrate Concentration (mg/kg)	Vertebrate Dose (mg/kg/d)	Diet Proportion	Iron King Mine Bioavailability		Incidental Soil Dose (mg/kg/d)	(mg/kg/d)	TRVs	Site HQs		Background HQ		Incremental HQ		NOAAE-based	LOAEL-based				
											B0	B1					B0	B1					B0	B1					B0				B1	NOAAE-based	LOAEL-based	NOAAE-based	LOAEL-based	NOAAE-based			LOAEL-based	NOAAE-based	LOAEL-based	
NE-07	Soil	Arsenic	104	Gambel's quail	0.175	0.05	0.105	1	1	0.0760	--	--	7.90E+00	3.95E-01	--	regression	-1.4210	0.7060	--	6.41E+00	--	--	regression	-4.8471	0.8188	3.5E-01	--	0.105	--	5.46E-01	9.41E-01	9.3	40.3	1E-01	2E-02	1E-01	3E-02	--8E-03	--2E-03	No	No			
NE-07	Soil	Arsenic	104	Western kingbird	0.038	0.199	0.174	1	--	0.0760	--	--	7.90E+00	--	1	regression	-1.4210	0.7060	--	6.41E+00	1.28E+00	--	--	regression	-4.8471	0.8188	3.5E-01	--	0.07	--	1.45E+00	2.72E+00	9.3	40.3	3E-01	7E-02	3E-01	7E-02	--2E-02	--4E-03	No	No		
NE-07	Soil	Arsenic	104	Song sparrow	0.025	0.227	0.199	1	0.65	0.0760	--	--	7.90E+00	1.17E+00	0.35	regression	-1.4210	0.7060	--	6.41E+00	5.09E-01	--	--	regression	-4.8471	0.8188	3.5E-01	--	0.105	--	2.48E+00	4.15E+00	9.3	40.3	4E-01	1E-01	5E-01	1E-01	--3E-02	--8E-03	No	No		
NE-07	Soil	Arsenic	104	Red-tailed hawk	1.224	0.077	0.055	0.01161	--	0.0760	--	--	7.90E+00	--	--	regression	-1.4210	0.7060	--	6.41E+00	--	1	regression	-4.8471	0.8188	3.5E-01	2.71E-02	0.01	--	8.01E-02	1.07E-01	9.3	40.3	1E-04	3E-05	1E-02	3E-03	--1E-02	--3E-03	No	No			
NE-07	Soil	Arsenic	104	Pocket gopher	0.235	0.097	0.114	1	1	0.0760	--	--	7.90E+00	7.67E-01	--	regression	-1.4210	0.7060	--	6.41E+00	--	--	regression	-4.8471	0.8188	3.5E-01	--	0.027	--	2.72E-01	1.04E+00	1.04	4.7	1E+00	2E-01	1E+00	2E-01	--8E-02	--2E-02	No	No			
NE-07	Soil	Arsenic	104	Desert shrew	0.004	0.221	0.172	1	--	0.0760	--	--	7.90E+00	--	1	regression	-1.4210	0.7060	--	6.41E+00	1.42E+00	--	--	regression	-4.8471	0.8188	3.5E-01	--	0.13	--	2.99E+00	4.40E+00	1.04	4.7	<b>4E+00</b>	9E-01	5E+00	1E+00	--3E-01	--7E-02	No	No		
NE-07	Soil	Arsenic	104	Raccoon	6.9	0.035	0.082	0.07123	0.45	0.0760	--	--	7.90E+00	1.24E-01	0.45	regression	-1.4210	0.7060	--	6.41E+00	1.01E-01	0.1	regression	-4.8471	0.8188	3.5E-01	1.23E-03	0.094	--	3.42E-01	5.69E-01	1.04	4.7	4E-02	9E-03	6E-01	1E-01	--5E-01	--1E-01	No	No			
NE-07	Soil	Arsenic	104	Coyote	10	0.033	0.079	0.00777	--	0.0760	--	--	7.90E+00	--	--	regression	-1.4210	0.7060	--	6.41E+00	--	1	regression	-4.8471	0.8188	3.5E-01	1.16E-02	0.028	--	9.61E-02	1.08E-01	1.04	4.7	8E-04	2E-04	1E-01	2E-02	--1E-01	--2E-02	No	No			
NE-07	Soil	Barium	353	Gambel's quail	0.175	0.05	0.105	1	1	0.1660	--	--	5.86E+01	2.93E+00	--	0.0910	--	--	--	3.21E+01	--	--	0.0566	--	--	2.0E+01	--	0.105	--	1.85E+00	4.78E+00	208.26	416.53	2E-02	1E-02	2E-02	9E-03	5E-03	3E-03	--	--	No	No	
NE-07	Soil	Barium	353	Western kingbird	0.038	0.199	0.174	1	--	0.1660	--	--	5.86E+01	--	1	0.0910	--	--	--	3.21E+01	6.39E+00	--	--	0.0566	--	--	2.0E+01	--	0.07	--	4.92E+00	1.13E+01	208.26	416.53	5E-02	3E-02	4E-02	2E-02	1E-02	6E-03	--	--	No	No
NE-07	Soil	Barium	353	Song sparrow	0.025	0.227	0.199	1	0.65	0.1660	--	--	5.86E+01	8.65E+00	0.35	0.0910	--	--	--	3.21E+01	2.55E+00	--	--	0.0566	--	--	2.0E+01	--	0.105	--	8.41E+00	1.96E+01	208.26	416.53	9E-02	5E-02	7E-02	4E-02	2E-02	1E-02	--	--	No	No
NE-07	Soil	Barium	353	Red-tailed hawk	1.224	0.077	0.055	0.01161	--	0.1660	--	--	5.86E+01	--	--	0.0910	--	--	--	3.21E+01	--	1	0.0566	--	--	2.0E+01	1.54E+00	0.01	--	2.72E-01	1.81E+00	208.26	416.53	1E-04	5E-05	7E-03	3E-03	--7E-03	--3E-03	No	No			
NE-07	Soil	Barium	353	Pocket gopher	0.235	0.097	0.114	1	1	0.1660	--	--	5.86E+01	5.68E+00	--	0.0910	--	--	--	3.21E+01	--	--	0.0566	--	--	2.0E+01	--	0.027	--	9.25E-01	6.61E+00	51.8	83	1E-01	8E-02	1E-01	6E-02	3E-02	2E-02	--	--	No	No	
NE-07	Soil	Barium	353	Desert shrew	0.004	0.221	0.172	1	--	0.1660	--	--	5.86E+01	--	1	0.0910	--	--	--	3.21E+01	7.10E+00	--	--	0.0566	--	--	2.0E+01	--	0.13	--	1.01E+01	1.72E+01	51.8	83	3E-01	2E-01	3E-01	2E-01	--8E-02	--5E-02	No	No		
NE-07	Soil	Barium	353	Raccoon	6.9	0.035	0.082	0.07123	0.45	0.1660	--	--	5.86E+01	9.23E-01	0.45	0.0910	--	--	--	3.21E+01	5.06E-01	0.1	0.0566	--	--	2.0E+01	6.99E-02	0.094	--	1.16E+00	2.66E+00	51.8	83	4E-03	2E-03	4E-02	2E-02	--4E-02	--2E-02	No	No			
NE-07	Soil	Barium	353	Coyote	10	0.033	0.079	0.00777	--	0.1660	--	--	5.86E+01	--	--	0.0910	--	--	--	3.21E+01	--	1	0.0566	--	--	2.0E+01	6.99E-01	0.028	--	3.26E-01	9.86E-01	51.8	83	1E-04	9E-05	1E-02	9E-03	--1E-02	--9E-03	No	No			
NE-07	Soil	Cadmium	5.697	Gambel's quail	0.175	0.05	0.105	1	1	0.2970	--	--	1.69E+00	8.46E-02	--	regression	2.1140	0.7950	--	3.30E+01	--	--	regression	-1.2571	0.4723	6.5E-01	--	0.105	--	2.99E-02	1.15E-01	1.47	10.4	8E-02	1E-02	1E-02	2E-03	7E-02	9E-03	--	--	No	No	
NE-07	Soil	Cadmium	5.697	Western kingbird	0.038	0.199	0.174	1	--	0.2970	--	--	1.69E+00	--	1	regression	2.1140	0.7950	--	3.30E+01	6.57E+00	--	--	regression	-1.2571	0.4723	6.5E-01	--	0.07	--	7.94E-02	6.65E+00	1.47	10.4	<b>5E+00</b>	6E-01	1E+00	1E-01	<b>4E+00</b>	5E-01	--	--	Yes	No
NE-07	Soil	Cadmium	5.697	Song sparrow	0.025	0.227	0.199	1	0.65	0.2970	--	--	1.69E+00	2.50E-01	0.35	regression	2.1140	0.7950	--	3.30E+01	2.62E+00	--	--	regression	-1.2571	0.4723	6.5E-01	--	0.105	--	1.36E-01	3.01E+00	1.47	10.4	<b>2E+00</b>	3E-01	4E-01	6E-02	<b>2E+00</b>	2E-01	--	--	Yes	No
NE-07	Soil	Cadmium	5.697	Red-tailed hawk	1.224	0.077	0.055	0.01161	--	0.2970	--	--	1.69E+00	--	--	regression	2.1140	0.7950	--	3.30E+01	--	1	regression	-1.2571	0.4723	6.5E-01	4.98E-02	0.01	--	4.39E-03	5.42E-02	1.47	10.4	4E-04	6E-05	1E-02	2E-03	--1E-02	--2E-03	No	No			
NE-07	Soil	Cadmium	5.697	Pocket gopher	0.235	0.097	0.114	1	1	0.2970	--	--	1.69E+00	1.64E-01	--	regression	2.1140	0.7950	--	3.30E+01	--	--	regression	-1.2571	0.4723	6.5E-01	--	0.027	--	1.49E-02	1.79E-01	0.77	7.7	2E-01	2E-02	3E-02	3E-03	2E-01	2E-02	--	--	No	No	
NE-07	Soil	Cadmium	5.697	Desert shrew	0.004	0.221	0.172	1	--	0.2970	--	--	1.69E+00	--	1	regression	2.1140	0.7950	--	3.30E+01	7.30E+00	--	--	regression	-1.2571	0.4723	6.5E-01	--	0.															

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TABLE M-23

Estimation of Potential Risks to Birds and Mammals - Soil

Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona

Site Data			Exposure Parameters					Plant Uptake					Invertebrate Uptake					Vertebrate Uptake					Soil Uptake			Total Dose	Site Risk		Incremental Risk <sup>a</sup>				Retain for Evaluation in Weight of Evidence <sup>b</sup>									
Exposure Area	Matrix	COPEC	RME Soil (mg/kg)	Receptor	Body Weight (kg)	Food Intake (kg/kg/d)	Water Intake (L/kgbw/d)	AUF	Regression		Plant Concentration (mg/kg)	Plant Dose (mg/kg/day)	Regression		Invert Concentration (mg/kg)	Invert Dose (mg/kg/d)	Regression		Vertebrate Concentration (mg/kg)	Vertebrate Dose (mg/kg/d)	Diet Proportion	Soil to Vertebrate BAF	Iron King Mine Bioavailability	Incidental Soil Dose (mg/kg/d)	(mg/kg/d)	TRVs	Site HQs		Background HQ		Incremental HQ		NOAEL-based	LOAEL-based								
									B0	B1			B0	B1			B0	B1									NOAEL-based	LOAEL-based	NOAEL-based	LOAEL-based	NOAEL-based	LOAEL-based										
NE-11	Soil	Aluminum	26,511	Red-tailed hawk	1.224	0.077	0.055	0.01569	--	0.0640	--	--	1.70E+03	--	--	--	0.0430	--	--	1.14E+03	--	1	0.0263	--	--	7.0E+02	5.37E+01	0.01	--	2.04E+01	7.41E+01	109.7	548.5	1E-02	2E-03	9E-01	2E-01	-9E-01	-2E-01	No	No	
NE-11	Soil	Aluminum	26,511	Pocket gopher	0.235	0.097	0.114	1	1	0.0640	--	--	1.70E+03	1.65E+02	--	--	0.0430	--	--	1.14E+03	--	--	0.0263	--	--	7.0E+02	--	0.027	--	6.94E+01	2.34E+02	3.86	19.3	6E+01	1E+01	8E+01	2E+01	-2E+01	-4E+00	No	No	
NE-11	Soil	Aluminum	26,511	Desert shrew	0.004	0.221	0.172	1	--	0.0640	--	--	1.70E+03	--	--	1	0.0430	--	--	1.14E+03	2.52E+02	--	--	0.0263	--	--	7.0E+02	--	0.13	--	7.62E+02	1.01E+03	3.86	19.3	3E+02	5E+01	4E+02	7E+01	-9E+01	-2E+01	No	No
NE-11	Soil	Aluminum	26,511	Raccoon	6.9	0.035	0.082	0.09623	0.45	0.0640	--	--	1.70E+03	2.67E+01	0.45	0.0430	--	--	--	1.14E+03	1.80E+01	0.1	0.0263	--	--	7.0E+02	2.44E+00	0.094	--	8.72E+01	1.34E+02	3.86	19.3	3E+00	7E-01	5E+01	9E+00	-4E+01	-9E+00	No	No	
NE-11	Soil	Aluminum	26,511	Coyote	10	0.033	0.079	0.0105	--	0.0640	--	--	1.70E+03	--	--	--	0.0430	--	--	1.14E+03	--	1	0.0263	--	--	7.0E+02	2.30E+01	0.028	--	2.45E+01	4.75E+01	3.86	19.3	1E-01	3E-02	2E+01	3E+00	-2E+01	-3E+00	No	No	
NE-11	Soil	Antimony	0.979	Gambel's quail	0.175	0.05	0.105	1	1	0.2950	--	--	2.89E-01	1.44E-02	--	1.0000	--	--	--	9.79E-01	--	--	1.0000	--	--	9.8E-01	--	0.105	--	5.14E-03	1.96E-02	--	--	--	--	--	--	Uncertainty	Uncertainty			
NE-11	Soil	Antimony	0.979	Western kingbird	0.038	0.199	0.174	1	--	0.2950	--	--	2.89E-01	--	--	1	1.0000	--	--	9.79E-01	1.95E-01	--	1.0000	--	--	9.8E-01	--	0.07	--	1.36E-02	2.08E-01	--	--	--	--	--	--	Uncertainty	Uncertainty			
NE-11	Soil	Antimony	0.979	Song sparrow	0.025	0.227	0.199	1	0.65	0.2950	--	--	2.89E-01	4.26E-02	0.35	1.0000	--	--	--	9.79E-01	7.78E-02	--	1.0000	--	--	9.8E-01	--	0.105	--	2.33E-02	1.44E-01	--	--	--	--	--	--	Uncertainty	Uncertainty			
NE-11	Soil	Antimony	0.979	Red-tailed hawk	1.224	0.077	0.055	0.01569	--	0.2950	--	--	2.89E-01	--	--	1.0000	--	--	--	9.79E-01	--	1	1.0000	--	--	9.8E-01	7.54E-02	0.01	--	7.54E-04	7.61E-02	--	--	--	--	--	--	Uncertainty	Uncertainty			
NE-11	Soil	Antimony	0.979	Pocket gopher	0.235	0.097	0.114	1	1	0.2950	--	--	2.89E-01	2.80E-02	--	1.0000	--	--	--	9.79E-01	--	--	1.0000	--	--	9.8E-01	--	0.027	--	2.56E-03	3.06E-02	0.059	2.8	5E-01	1E-02	1E+00	3E-02	-8E-01	-2E-02	No	No	
NE-11	Soil	Antimony	0.979	Desert shrew	0.004	0.221	0.172	1	--	0.2950	--	--	2.89E-01	--	--	1	1.0000	--	--	9.79E-01	2.16E-01	--	1.0000	--	--	9.8E-01	--	0.13	--	2.81E-02	2.44E-01	0.059	2.8	4E+00	9E-02	1E+01	2E-01	-6E+00	-1E-01	No	No	
NE-11	Soil	Antimony	0.979	Raccoon	6.9	0.035	0.082	0.09623	0.45	0.2950	--	--	2.89E-01	4.55E-03	0.45	1.0000	--	--	--	9.79E-01	1.54E-02	0.1	1.0000	--	--	9.8E-01	3.43E-03	0.094	--	3.22E-03	2.66E-02	0.059	2.8	4E-02	9E-04	1E+00	2E-02	-1E+00	-2E-02	No	No	
NE-11	Soil	Antimony	0.979	Coyote	10	0.033	0.079	0.0105	--	0.2950	--	--	2.89E-01	--	--	--	1.0000	--	--	9.79E-01	--	1	1.0000	--	--	9.8E-01	3.23E-02	0.028	--	9.05E-04	3.32E-02	0.059	2.8	6E-03	1E-04	1E+00	3E-02	-1E+00	-3E-02	No	No	
NE-11	Soil	Arsenic	79.17	Gambel's quail	0.175	0.05	0.105	1	1	0.0760	--	--	6.02E+00	3.01E-01	--	regression	-1.4210	0.7060	--	5.29E+00	--	--	regression	-4.8471	0.8188	2.8E-01	--	0.105	--	4.16E-01	7.16E-01	9.3	40.3	8E-02	2E-02	1E-01	3E-02	-3E-02	-7E-03	No	No	
NE-11	Soil	Arsenic	79.17	Western kingbird	0.038	0.199	0.174	1	--	0.0760	--	--	6.02E+00	--	--	1	regression	-1.4210	0.7060	--	5.29E+00	1.05E+00	--	regression	-4.8471	0.8188	2.8E-01	--	0.07	--	1.10E+00	2.16E+00	9.3	40.3	2E-01	5E-02	3E-01	7E-02	-8E-02	-2E-02	No	No
NE-11	Soil	Arsenic	79.17	Song sparrow	0.025	0.227	0.199	1	0.65	0.0760	--	--	6.02E+00	8.88E-01	0.35	regression	-1.4210	0.7060	--	5.29E+00	4.20E-01	--	regression	-4.8471	0.8188	2.8E-01	--	0.105	--	1.89E+00	3.19E+00	9.3	40.3	3E-01	8E-02	5E-01	1E-01	-1E-01	-3E-02	No	No	
NE-11	Soil	Arsenic	79.17	Red-tailed hawk	1.224	0.077	0.055	0.01569	--	0.0760	--	--	6.02E+00	--	--	regression	-1.4210	0.7060	--	5.29E+00	--	1	regression	-4.8471	0.8188	2.8E-01	2.17E-02	0.01	--	6.10E-02	8.26E-02	9.3	40.3	1E-04	3E-05	1E-02	3E-03	-1E-02	-3E-03	No	No	
NE-11	Soil	Arsenic	79.17	Pocket gopher	0.235	0.097	0.114	1	1	0.0760	--	--	6.02E+00	5.84E-01	--	regression	-1.4210	0.7060	--	5.29E+00	--	--	regression	-4.8471	0.8188	2.8E-01	--	0.027	--	2.07E-01	7.91E-01	1.04	4.7	8E-01	2E-01	1E+00	2E-01	-3E-01	-7E-02	No	No	
NE-11	Soil	Arsenic	79.17	Desert shrew	0.004	0.221	0.172	1	--	0.0760	--	--	6.02E+00	--	--	1	regression	-1.4210	0.7060	--	5.29E+00	1.17E+00	--	regression	-4.8471	0.8188	2.8E-01	--	0.13	--	2.27E+00	3.44E+00	1.04	4.7	3E+00	7E-01	5E+00	1E+00	-1E+00	-3E-01	No	No
NE-11	Soil	Arsenic	79.17	Raccoon	6.9	0.035	0.082	0.09623	0.45	0.0760	--	--	6.02E+00	9.48E-02	0.45	regression	-1.4210	0.7060	--	5.29E+00	8.33E-02	0.1	regression	-4.8471	0.8188	2.8E-01	9.85E-04	0.094	--	2.60E-01	4.39E-01	1.04	4.7	4E-02	9E-03	6E-01	1E-01	-5E-01	-1E-01	No	No	
NE-11	Soil	Arsenic	79.17	Coyote	10	0.033	0.079	0.0105	--	0.0760	--	--	6.02E+00	--	--	regression	-1.4210	0.7060	--	5.29E+00	--	1	regression	-4.8471	0.8188	2.8E-01	9.29E-03	0.028	--	7.32E-02	8.24E-02	1.04	4.7	8E-04	2E-04	1E-01	2E-02	-1E-01	-2E-02	No	No	
NE-11	Soil	Barium	635.4	Gambel's quail	0.175	0.05	0.105	1	1	0.1660	--	--	1.05E+02	5.27E+00	--	0.0910	--	--	--	5.78E+01	--	--	0.0566	--	--	3.6E+01	--	0.105	--	3.34E+00	8.61E+00	208.26	416.53	4E-02	2E-02	2E-02						

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Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona

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TABLE M-23

Estimation of Potential Risks to Birds and Mammals - Soil

Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona

Site Data				Exposure Parameters					Plant Uptake					Invertebrate Uptake					Vertebrate Uptake					Soil Uptake			Total Dose	Site Risk		Incremental Risk <sup>a</sup>				Retain for Evaluation <sup>b</sup>						
Exposure Area	Matrix	COPEC	RME Soil (mg/kg)	Receptor	Body Weight (kg)	Food Intake (kg/kg/d)	Water Intake (L/kgbw/d)	AUF	Diet Proportion	Soil to Plant BAF	Regression		Plant Concentration (mg/kg)	Plant Dose (mg/kg/day)	Diet Proportion	Soil to Invert BAF	Regression		Invert Concentration (mg/kg)	Invert Dose (mg/kg/d)	Diet Proportion	Soil to Vertebrate BAF	Regression		Vertebrate Concentration (mg/kg)	Vertebrate Dose (mg/kg/d)	Diet Proportion	Iron King Mine Bioavailability	Incidental Soil Dose (mg/kg/d)	(mg/kg/d)	TRVs		Site HQs		Background HQ		Incremental HQ		NOAEL-based	LOAEL-based
											B0	B1					B0	B1					B0	B1							NOAEL-based	LOAEL-based	NOAEL-based	LOAEL-based	NOAEL-based	LOAEL-based				
NR11	Soil	Carbazole	0.1	Song sparrow	0.025	0.227	0.199	1	0.65	1.8700	--	--	1.87E-01	2.76E-02	0.35	LogKow model	--	--	3.2300	8.99E-02	7.15E-03	--	0.0103	--	--	1.0E-03	--	0.105	--	2.38E-03	3.71E-02	--	--	--	--	--	--	Uncertainty	Uncertainty	
NR11	Soil	Carbazole	0.1	Red-tailed hawk	1.224	0.077	0.055	0.01544	--	1.8700	--	--	1.87E-01	--	--	LogKow model	--	--	3.2300	8.99E-02	--	1	0.0103	--	--	1.0E-03	7.93E-05	0.01	--	7.70E-05	1.56E-04	--	--	--	--	--	--	Uncertainty	Uncertainty	
NR11	Soil	Carbazole	0.1	Pocket gopher	0.235	0.097	0.114	1	1	1.8700	--	--	1.87E-01	1.81E-02	--	LogKow model	--	--	3.2300	8.99E-02	--	--	0.0103	--	--	1.0E-03	--	0.027	--	2.62E-04	1.84E-02	--	--	--	--	--	--	Uncertainty	Uncertainty	
NR11	Soil	Carbazole	0.1	Desert shrew	0.004	0.221	0.172	1	--	1.8700	--	--	1.87E-01	--	1	LogKow model	--	--	3.2300	8.99E-02	1.99E-02	--	0.0103	--	--	1.0E-03	--	0.13	--	2.87E-03	2.27E-02	--	--	--	--	--	--	Uncertainty	Uncertainty	
NR11	Soil	Carbazole	0.1	Raccoon	6.9	0.035	0.082	0.09472	0.45	1.8700	--	--	1.87E-01	2.95E-03	0.45	LogKow model	--	--	3.2300	8.99E-02	1.42E-03	0.1	0.0103	--	--	1.0E-03	3.61E-06	0.094	--	3.29E-04	4.69E-03	--	--	--	--	--	--	Uncertainty	Uncertainty	
NR11	Soil	Carbazole	0.1	Coyote	10	0.033	0.079	0.01033	--	1.8700	--	--	1.87E-01	--	--	LogKow model	--	--	3.2300	8.99E-02	--	1	0.0103	--	--	1.0E-03	3.40E-05	0.028	--	9.24E-05	1.26E-04	--	--	--	--	--	--	Uncertainty	Uncertainty	
NR11	Soil	Delta-BHC	0.017	Gambel's quail	0.175	0.05	0.105	1	1	1.1173	--	--	1.90E-02	9.50E-04	--	LogKow model	--	--	4.2600	2.40E-02	--	--	0.1030	--	--	1.8E-03	--	0.105	--	8.93E-05	1.04E-03	0.56	2.25	2E-03	5E-04	--	--	No	No	
NR11	Soil	Delta-BHC	0.017	Western kingbird	0.038	0.199	0.174	1	--	1.1173	--	--	1.90E-02	--	1	LogKow model	--	--	4.2600	2.40E-02	4.79E-03	--	0.1030	--	--	1.8E-03	--	0.07	--	2.37E-04	5.02E-03	0.56	2.25	9E-03	2E-03	--	--	No	No	
NR11	Soil	Delta-BHC	0.017	Song sparrow	0.025	0.227	0.199	1	0.65	1.1173	--	--	1.90E-02	2.80E-03	0.35	LogKow model	--	--	4.2600	2.40E-02	1.91E-03	--	0.1030	--	--	1.8E-03	--	0.105	--	4.05E-04	5.12E-03	0.56	2.25	9E-03	2E-03	--	--	No	No	
NR11	Soil	Delta-BHC	0.017	Red-tailed hawk	1.224	0.077	0.055	0.01544	--	1.1173	--	--	1.90E-02	--	--	LogKow model	--	--	4.2600	2.40E-02	--	1	0.1030	--	--	1.8E-03	1.35E-04	0.01	--	1.31E-05	1.48E-04	0.56	2.25	4E-06	1E-06	--	--	No	No	
NR11	Soil	Delta-BHC	0.017	Pocket gopher	0.235	0.097	0.114	1	1	1.1173	--	--	1.90E-02	1.84E-03	--	LogKow model	--	--	4.2600	2.40E-02	--	--	0.1030	--	--	1.8E-03	--	0.027	--	4.45E-05	1.89E-03	4	20	5E-04	9E-05	--	--	No	No	
NR11	Soil	Delta-BHC	0.017	Desert shrew	0.004	0.221	0.172	1	--	1.1173	--	--	1.90E-02	--	1	LogKow model	--	--	4.2600	2.40E-02	5.31E-03	--	0.1030	--	--	1.8E-03	--	0.13	--	4.88E-04	5.80E-03	4	20	1E-03	3E-04	--	--	No	No	
NR11	Soil	Delta-BHC	0.017	Raccoon	6.9	0.035	0.082	0.09472	0.45	1.1173	--	--	1.90E-02	2.99E-04	0.45	LogKow model	--	--	4.2600	2.40E-02	3.79E-04	0.1	0.1030	--	--	1.8E-03	6.13E-06	0.094	--	5.59E-05	7.40E-04	4	20	2E-05	4E-06	--	--	No	No	
NR11	Soil	Delta-BHC	0.017	Coyote	10	0.033	0.079	0.01033	--	1.1173	--	--	1.90E-02	--	--	LogKow model	--	--	4.2600	2.40E-02	--	1	0.1030	--	--	1.8E-03	5.78E-05	0.028	--	1.57E-05	7.35E-05	4	20	2E-07	4E-08	--	--	No	No	
NR11	Soil	Dieldrin	0.0023	Gambel's quail	0.175	0.05	0.105	1	1	0.4100	--	--	9.43E-04	4.72E-05	--	14.7000	--	--	3.38E-02	--	--	regression	1.9582	0.6076	1.8E-01	--	0.105	--	1.21E-05	5.92E-05	0.0709	0.8	8E-04	7E-05	--	--	No	No		
NR11	Soil	Dieldrin	0.0023	Western kingbird	0.038	0.199	0.174	1	--	0.4100	--	--	9.43E-04	--	1	14.7000	--	--	3.38E-02	6.73E-03	--	regression	1.9582	0.6076	1.8E-01	--	0.07	--	3.20E-05	6.76E-03	0.0709	0.8	1E-01	8E-03	--	--	No	No		
NR11	Soil	Dieldrin	0.0023	Song sparrow	0.025	0.227	0.199	1	0.65	0.4100	--	--	9.43E-04	1.39E-04	0.35	14.7000	--	--	3.38E-02	2.69E-03	--	regression	1.9582	0.6076	1.8E-01	--	0.105	--	5.48E-05	2.88E-03	0.0709	0.8	4E-02	4E-03	--	--	No	No		
NR11	Soil	Dieldrin	0.0023	Red-tailed hawk	1.224	0.077	0.055	0.01544	--	0.4100	--	--	9.43E-04	--	--	14.7000	--	--	3.38E-02	--	1	regression	1.9582	0.6076	1.8E-01	1.36E-02	0.01	--	1.77E-06	1.36E-02	0.0709	0.8	3E-03	3E-04	--	--	No	No		
NR11	Soil	Dieldrin	0.0023	Pocket gopher	0.235	0.097	0.114	1	1	0.4100	--	--	9.43E-04	9.15E-05	--	14.7000	--	--	3.38E-02	--	--	regression	1.9582	0.6076	1.8E-01	--	0.027	--	6.02E-06	9.75E-05	0.015	1.3	6E-03	7E-05	--	--	No	No		
NR11	Soil	Dieldrin	0.0023	Desert shrew	0.004	0.221	0.172	1	--	0.4100	--	--	9.43E-04	--	1	14.7000	--	--	3.38E-02	7.47E-03	--	regression	1.9582	0.6076	1.8E-01	--	0.13	--	6.61E-05	7.54E-03	0.015	1.3	5E-01	6E-03	--	--	No	No		
NR11	Soil	Dieldrin	0.0023	Raccoon	6.9	0.035	0.082	0.09472	0.45	0.4100	--	--	9.43E-04	1.49E-05	0.45	14.7000	--	--	3.38E-02	5.33E-04	0.1	regression	1.9582	0.6076	1.8E-01	6.19E-04	0.094	--	7.57E-06	1.17E-03	0.015	1.3	7E-03	9E-05	--	--	No	No		
NR11	Soil	Dieldrin	0.0023	Coyote	10	0.033	0.079	0.01033	--	0.4100	--	--	9.43E-04	--	--	14.7000	--	--	3.38E-02	--	1	regression	1.9582	0.6076	1.8E-01	5.83E-03	0.028	--	2.13E-06	5.84E-03	0.015	1.3	4E-03	5E-05	--	--	No	No		
NR11	Soil	Di-n-butyl phthalate	0.065	Gambel's quail	0.175	0.05	0.105	1	1	0.9290	--	--	6.04E-02	3.02E-03	--	LogKow model	--	--	4.6100	1.07E-01	--	--	0.5930	--	--	3.9E-02	--	0.105	--	3.41E-04	3.36E-03	0.22	1.1	2E-02	3E-03	--	--	No	No	
NR11	Soil	Di-n-butyl phthalate	0.065	Western kingbird	0.038	0.199	0.174	1	--	0.9290	--	--	6.04E-02	--	1																									



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TABLE M-23

Estimation of Potential Risks to Birds and Mammals - Soil

Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona

Site Data				Exposure Parameters					Plant Uptake					Invertebrate Uptake					Vertebrate Uptake					Soil Uptake					Total Dose	Site Risk		Incremental Risk <sup>a</sup>				Retain for Evaluation in <sup>b</sup>						
Exposure Area	Matrix	COPEC	RME Soil (mg/kg)	Receptor	Body Weight (kg)	Food Intake (kg/kg/d)	Water Intake (L/kgbw/d)	AUF	Diet Proportion	Soil to Plant BAF	Regression		Plant Concentration (mg/kg)	Plant Dose (mg/kg/day)	Diet Proportion	Soil to Invert BAF	Regression		Invert Concentration (mg/kg)	Invert Dose (mg/kg/d)	Diet Proportion	Soil to Vertebrate BAF	Regression		Vertebrate Concentration (mg/kg)	Vertebrate Dose (mg/kg/d)	Diet Proportion	Iron King Mine Bioavailability	Incidental Soil Dose (mg/kg/d)	(mg/kg/d)	NOAA-based TRVs	Site HQs		Background HQ		Incremental HQ		NOAA-based	LOAEL-based			
											B0	B1					B0	B1					LogKow	B0								B1	B0	B1								
NR13	Soil	Silver	4.9	Raccoon	6.9	0.035	0.082	0.02195	0.45	0.0520	--	--	2.55E-01	4.01E-03	0.45	2.0450	--	--	1.00E+01	1.58E-01	0.1	0.0040	--	--	2.0E-02	6.86E-05	0.094	--	1.61E-02	1.78E-01	12.04	119	3E-04	3E-05	--	--	--	--	No	No		
NR13	Soil	Silver	4.9	Coyote	10	0.033	0.079	0.00239	--	0.0520	--	--	2.55E-01	--	--	2.0450	--	--	1.00E+01	--	1	0.0040	--	--	2.0E-02	6.47E-04	0.028	--	4.53E-03	5.17E-03	12.04	119	1E-06	1E-07	--	--	--	--	No	No		
NR13	Soil	Zinc	382.4	Gambel's quail	0.175	0.05	0.105	0.42807	1	0.1840	--	--	7.04E+01	3.52E+00	--	regression	4.4490	0.3280	--	6.02E+02	--	--	regression	4.3632	0.0706	1.2E+02	--	0.105	--	2.01E+00	5.53E+00	66.1	187	4E-02	1E-02	3E-02	1E-02	6E-03	2E-03	No	No	
NR13	Soil	Zinc	382.4	Western kingbird	0.038	0.199	0.174	0.68491	--	0.1840	--	--	7.04E+01	--	1	regression	4.4490	0.3280	--	6.02E+02	1.20E+02	--	--	regression	4.3632	0.0706	1.2E+02	--	0.07	--	5.33E+00	1.25E+02	66.1	187	1E+00	5E-01	1E+00	5E-01	-2E-02	-8E-03	No	No
NR13	Soil	Zinc	382.4	Song sparrow	0.025	0.227	0.199	1	0.65	0.1840	--	--	7.04E+01	1.04E+01	0.35	regression	4.4490	0.3280	--	6.02E+02	4.78E+01	--	--	regression	4.3632	0.0706	1.2E+02	--	0.105	--	9.11E+00	6.73E+01	66.1	187	1E+00	4E-01	6E-01	2E-01	4E-01	1E-01	No	No
NR13	Soil	Zinc	382.4	Red-tailed hawk	1.224	0.077	0.055	0.00358	--	0.1840	--	--	7.04E+01	--	--	regression	4.4490	0.3280	--	6.02E+02	--	1	regression	4.3632	0.0706	1.2E+02	9.20E+00	0.01	--	2.94E-01	9.49E+00	66.1	187	5E-04	2E-04	1E-01	5E-02	-1E-01	-5E-02	No	No	
NR13	Soil	Zinc	382.4	Pocket gopher	0.235	0.097	0.114	1	1	0.1840	--	--	7.04E+01	6.83E+00	--	regression	4.4490	0.3280	--	6.02E+02	--	--	regression	4.3632	0.0706	1.2E+02	--	0.027	--	1.00E+00	7.83E+00	75.4	411	1E-01	2E-02	4E-02	7E-03	7E-02	1E-02	No	No	
NR13	Soil	Zinc	382.4	Desert shrew	0.004	0.221	0.172	1	--	0.1840	--	--	7.04E+01	--	1	regression	4.4490	0.3280	--	6.02E+02	1.33E+02	--	--	regression	4.3632	0.0706	1.2E+02	--	0.13	--	1.10E+01	1.44E+02	75.4	411	2E+00	4E-01	1E+00	2E-01	6E-01	1E-01	No	No
NR13	Soil	Zinc	382.4	Raccoon	6.9	0.035	0.082	0.02195	0.45	0.1840	--	--	7.04E+01	1.11E+00	0.45	regression	4.4490	0.3280	--	6.02E+02	9.47E+00	0.1	regression	4.3632	0.0706	1.2E+02	4.18E-01	0.094	--	1.26E+00	1.23E+01	75.4	411	4E-03	7E-04	1E-01	2E-02	-1E-01	-2E-02	No	No	
NR13	Soil	Zinc	382.4	Coyote	10	0.033	0.079	0.00239	--	0.1840	--	--	7.04E+01	--	--	regression	4.4490	0.3280	--	6.02E+02	--	1	regression	4.3632	0.0706	1.2E+02	3.94E+00	0.028	--	3.53E-01	4.30E+00	75.4	411	1E-04	3E-05	5E-02	9E-03	-5E-02	-9E-03	No	No	
NR14	Soil	Aluminum	36,000	Gambel's quail	0.175	0.05	0.105	1	1	0.0640	--	--	2.30E+03	1.15E+02	--	0.0430	--	--	1.55E+03	--	--	0.0263	--	--	9.5E+02	--	0.105	--	1.89E+02	3.04E+02	109.7	548.5	3E+00	6E-01	3E+00	5E-01	3E-02	6E-03	No	No		
NR14	Soil	Aluminum	36,000	Western kingbird	0.038	0.199	0.174	1	--	0.0640	--	--	2.30E+03	--	1	0.0430	--	--	1.55E+03	3.08E+02	--	0.0263	--	--	9.5E+02	--	0.07	--	5.01E+02	8.10E+02	109.7	548.5	7E+00	1E+00	7E+00	1E+00	8E-02	2E-02	No	No		
NR14	Soil	Aluminum	36,000	Song sparrow	0.025	0.227	0.199	1	0.65	0.0640	--	--	2.30E+03	3.40E+02	0.35	0.0430	--	--	1.55E+03	1.23E+02	--	0.0263	--	--	9.5E+02	--	0.105	--	8.58E+02	1.32E+03	109.7	548.5	1E+01	2E+00	1E+01	2E+00	1E-01	3E-02	No	No		
NR14	Soil	Aluminum	36,000	Red-tailed hawk	1.224	0.077	0.055	0.03425	--	0.0640	--	--	2.30E+03	--	--	0.0430	--	--	1.55E+03	--	1	0.0263	--	--	9.5E+02	7.29E+01	0.01	--	2.77E+01	1.01E+02	109.7	548.5	3E-02	6E-03	9E-01	2E-01	-9E-01	-2E-01	No	No		
NR14	Soil	Aluminum	36,000	Pocket gopher	0.235	0.097	0.114	1	1	0.0640	--	--	2.30E+03	2.23E+02	--	0.0430	--	--	1.55E+03	--	--	0.0263	--	--	9.5E+02	--	0.027	--	9.43E+01	3.18E+02	3.86	19.3	8E+01	2E+01	8E+01	2E+01	9E-01	2E-01	No	No		
NR14	Soil	Aluminum	36,000	Desert shrew	0.004	0.221	0.172	1	--	0.0640	--	--	2.30E+03	--	1	0.0430	--	--	1.55E+03	3.42E+02	--	0.0263	--	--	9.5E+02	--	0.13	--	1.03E+03	1.38E+03	3.86	19.3	4E+02	7E+01	4E+02	7E+01	4E+00	8E-01	Yes	No		
NR14	Soil	Aluminum	36,000	Raccoon	6.9	0.035	0.082	0.21012	0.45	0.0640	--	--	2.30E+03	3.63E+01	0.45	0.0430	--	--	1.55E+03	2.44E+01	0.1	0.0263	--	--	9.5E+02	3.31E+00	0.094	--	1.18E+02	1.82E+02	3.86	19.3	1E+01	2E+00	5E+01	9E+00	-4E+01	-7E+00	No	No		
NR14	Soil	Aluminum	36,000	Coyote	10	0.033	0.079	0.02292	--	0.0640	--	--	2.30E+03	--	--	0.0430	--	--	1.55E+03	--	1	0.0263	--	--	9.5E+02	3.12E+01	0.028	--	3.33E+01	6.45E+01	3.86	19.3	4E-01	8E-02	2E+01	3E+00	-2E+01	-3E+00	No	No		
NR14	Soil	Antimony	43.9	Gambel's quail	0.175	0.05	0.105	1	1	0.2950	--	--	1.30E+01	6.48E-01	--	1.0000	--	--	4.39E+01	--	--	1.0000	--	--	4.4E+01	--	0.105	--	2.30E-01	8.78E-01	--	--	--	--	--	--	Uncertainty	Uncertainty				
NR14	Soil	Antimony	43.9	Western kingbird	0.038	0.199	0.174	1	--	0.2950	--	--	1.30E+01	--	1	1.0000	--	--	4.39E+01	8.74E+00	--	1.0000	--	--	4.4E+01	--	0.07	--	6.12E-01	9.35E+00	--	--	--	--	--	--	Uncertainty	Uncertainty				
NR14	Soil	Antimony	43.9	Song sparrow	0.025	0.227	0.199	1	0.65	0.2950	--	--	1.30E+01	1.91E+00	0.35	1.0000	--	--	4.39E+01	3.49E+00	--	1.0000	--	--	4.4E+01	--	0.105	--	1.05E+00	6.45E+00	--	--	--	--	--	--	Uncertainty	Uncertainty				
NR14	Soil	Antimony	43.9	Red-tailed hawk	1.224	0.077	0.055	0.03425	--	0.2950	--	--	1.30E+01	--	--	1.0000	--	--	4.39E+01	--	1	1.0000	--	--	4.4E+01	3.38E+00	0.01	--	3.38E-02	3.41E+00	--	--	--	--	--	--	Uncertainty	Uncertainty				



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TABLE M-23

Estimation of Potential Risks to Birds and Mammals - Soil

Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona

Site Data			Exposure Parameters										Plant Uptake				Invertebrate Uptake				Vertebrate Uptake				Soil Uptake				Total Dose	Site Risk				Incremental Risk <sup>a</sup>				Retain for Evaluation <sup>b</sup>			
Exposure Area	Matrix	COPEC	RME Soil (mg/kg)	Receptor	Body Weight (kg)	Food Intake (kg/kg/d)	Water Intake (L/kgbw/d)	AUF	Diet Proportion	Soil to Plant BAF	Regression		Plant Concentration (mg/kg)	Plant Dose (mg/kg/day)	Diet Proportion	Soil to Invert BAF	Regression		Invert Concentration (mg/kg)	Invert Dose (mg/kg/d)	Diet Proportion	Soil to Vertebrate BAF	Regression		Vertebrate Concentration (mg/kg)	Vertebrate Dose (mg/kg/d)	Diet Proportion	Iron King Mine Bioavailability	Incidental Soil Dose (mg/kg/d)	(mg/kg/d)	TRVs		Site HQs		Background HQ		Incremental HQ		NOAA-based	LOAL-based	
											B0	B1					B0	B1					LogKow	B0							B1	B0	B1								
NR16	Soil	Thallium	1.978	Western kingbird	0.038	0.199	0.174	1	--	0.0040	--	--	7.91E-03	--	1	0.0541	--	--	1.07E-01	2.13E-02	--	0.1124	--	--	2.2E-01	--	0.07	--	2.76E-02	4.88E-02	0.346	3.46	1E-01	1E-02	2E-01	2E-02	-6E-02	-6E-03	No	No	
NR16	Soil	Thallium	1.978	Song sparrow	0.025	0.227	0.199	1	0.65	0.0040	--	--	7.91E-03	1.17E-03	0.35	0.0541	--	--	1.07E-01	8.50E-03	--	0.1124	--	--	2.2E-01	--	0.105	--	4.71E-02	5.68E-02	0.346	3.46	2E-01	2E-02	2E-01	2E-02	-7E-02	-7E-03	No	No	
NR16	Soil	Thallium	1.978	Red-tailed hawk	1.224	0.077	0.055	0.01319	--	0.0040	--	--	7.91E-03	--	--	0.0541	--	--	1.07E-01	--	1	0.1124	--	--	2.2E-01	1.71E-02	0.01	--	1.52E-03	1.86E-02	0.346	3.46	7E-04	7E-05	8E-02	8E-03	-8E-02	-8E-03	No	No	
NR16	Soil	Thallium	1.978	Pocket gopher	0.235	0.097	0.114	1	1	0.0040	--	--	7.91E-03	7.67E-04	--	0.0541	--	--	1.07E-01	--	--	0.1124	--	--	2.2E-01	--	0.027	--	5.18E-03	5.95E-03	0.48	1.43	1E-02	4E-03	2E-02	6E-03	-5E-03	-2E-03	No	No	
NR16	Soil	Thallium	1.978	Desert shrew	0.004	0.221	0.172	1	--	0.0040	--	--	7.91E-03	--	1	0.0541	--	--	1.07E-01	2.63E-02	--	0.1124	--	--	2.2E-01	--	0.13	--	5.68E-02	8.05E-02	0.48	1.43	2E-01	6E-02	2E-01	8E-02	-7E-02	-2E-02	No	No	
NR16	Soil	Thallium	1.978	Raccoon	6.9	0.035	0.082	0.08093	0.45	0.0040	--	--	7.91E-03	1.25E-04	0.45	0.0541	--	--	1.07E-01	1.69E-03	0.1	0.1124	--	--	2.2E-01	7.78E-04	0.094	--	6.51E-03	9.10E-03	0.48	1.43	2E-03	5E-04	3E-02	9E-03	-3E-02	-8E-03	No	No	
NR16	Soil	Thallium	1.978	Coyote	10	0.033	0.079	0.00883	--	0.0040	--	--	7.91E-03	--	--	0.0541	--	--	1.07E-01	--	1	0.1124	--	--	2.2E-01	7.34E-03	0.028	--	1.83E-03	9.16E-03	0.48	1.43	2E-04	6E-05	3E-02	9E-03	-3E-02	-9E-03	No	No	
NR16	Soil	Zinc	2.737	Gambel's quail	0.175	0.05	0.105	1	1	0.1840	--	--	5.04E+02	2.52E+01	--	regression	4.4490	0.3280	--	1.15E+03	--	regression	4.3632	0.0706	1.4E+02	--	0.105	--	1.44E+01	3.95E+01	66.1	187	6E-01	2E-01	3E-02	1E-02	6E-01	2E-01	No	No	
NR16	Soil	Zinc	2.737	Western kingbird	0.038	0.199	0.174	1	--	0.1840	--	--	5.04E+02	--	1	regression	4.4490	0.3280	--	1.15E+03	2.28E+02	--	regression	4.3632	0.0706	1.4E+02	--	0.07	--	3.81E+01	2.66E+02	66.1	187	4E+00	1E+00	1E+00	5E-01	3E+00	1E+00	Yes	No
NR16	Soil	Zinc	2.737	Song sparrow	0.025	0.227	0.199	1	0.65	0.1840	--	--	5.04E+02	7.43E+01	0.35	regression	4.4490	0.3280	--	1.15E+03	9.11E+01	--	regression	4.3632	0.0706	1.4E+02	--	0.105	--	6.52E+01	2.31E+02	66.1	187	3E+00	1E+00	6E-01	2E-01	3E+00	1E+00	Yes	No
NR16	Soil	Zinc	2.737	Red-tailed hawk	1.224	0.077	0.055	0.01319	--	0.1840	--	--	5.04E+02	--	--	regression	4.4490	0.3280	--	1.15E+03	--	1	regression	4.3632	0.0706	1.4E+02	1.06E+01	0.01	--	2.11E+00	1.27E+01	66.1	187	3E-03	9E-04	1E-01	5E-02	-1E-01	-5E-02	No	No
NR16	Soil	Zinc	2.737	Pocket gopher	0.235	0.097	0.114	1	1	0.1840	--	--	5.04E+02	4.88E+01	--	regression	4.4490	0.3280	--	1.15E+03	--	regression	4.3632	0.0706	1.4E+02	--	0.027	--	7.17E+00	5.60E+01	75.4	411	7E-01	1E-01	4E-02	7E-03	7E-01	1E-01	No	No	
NR16	Soil	Zinc	2.737	Desert shrew	0.004	0.221	0.172	1	--	0.1840	--	--	5.04E+02	--	1	regression	4.4490	0.3280	--	1.15E+03	2.54E+02	--	regression	4.3632	0.0706	1.4E+02	--	0.13	--	7.86E+01	3.32E+02	75.4	411	4E+00	8E-01	1E+00	2E-01	3E+00	6E-01	Yes	No
NR16	Soil	Zinc	2.737	Raccoon	6.9	0.035	0.082	0.08093	0.45	0.1840	--	--	5.04E+02	7.93E+00	0.45	regression	4.4490	0.3280	--	1.15E+03	1.81E+01	0.1	regression	4.3632	0.0706	1.4E+02	4.80E-01	0.094	--	9.00E+00	3.55E+01	75.4	411	4E-02	7E-03	1E-01	2E-02	-7E-02	-1E-02	No	No
NR16	Soil	Zinc	2.737	Coyote	10	0.033	0.079	0.00883	--	0.1840	--	--	5.04E+02	--	--	regression	4.4490	0.3280	--	1.15E+03	--	1	regression	4.3632	0.0706	1.4E+02	4.53E+00	0.028	--	2.53E+00	7.06E+00	75.4	411	8E-04	2E-04	5E-02	9E-03	-5E-02	-9E-03	No	No
NR16	Soil	4-Chloroaniline	0.043	Gambel's quail	0.175	0.05	0.105	1	1	1.0000	--	--	4.30E-02	2.15E-03	--	1.0000	--	--	4.30E-02	--	--	0.0046	--	--	2.0E-04	--	0.105	--	2.26E-04	2.38E-03	2.37	23.7	1E-03	1E-04	--	--	--	--	No	No	
NR16	Soil	4-Chloroaniline	0.043	Western kingbird	0.038	0.199	0.174	1	--	1.0000	--	--	4.30E-02	--	1	1.0000	--	--	4.30E-02	8.56E-03	--	--	0.0046	--	--	2.0E-04	--	0.07	--	5.99E-04	9.16E-03	2.37	23.7	4E-03	4E-04	--	--	--	--	No	No
NR16	Soil	4-Chloroaniline	0.043	Song sparrow	0.025	0.227	0.199	1	0.65	1.0000	--	--	4.30E-02	6.34E-03	0.35	1.0000	--	--	4.30E-02	3.42E-03	--	--	0.0046	--	--	2.0E-04	--	0.105	--	1.02E-03	1.08E-02	2.37	23.7	5E-03	5E-04	--	--	--	--	No	No
NR16	Soil	4-Chloroaniline	0.043	Red-tailed hawk	1.224	0.077	0.055	0.01319	--	1.0000	--	--	4.30E-02	--	--	1.0000	--	--	4.30E-02	--	1	0.0046	--	--	2.0E-04	1.52E-05	0.01	--	3.31E-05	4.83E-05	2.37	23.7	3E-07	3E-08	--	--	--	--	No	No	
NR16	Soil	4-Chloroaniline	0.043	Pocket gopher	0.235	0.097	0.114	1	1	1.0000	--	--	4.30E-02	4.17E-03	--	1.0000	--	--	4.30E-02	--	--	0.0046	--	--	2.0E-04	--	0.027	--	1.13E-04	4.28E-03	2.5	12.5	2E-03	3E-04	--	--	--	--	No	No	
NR16	Soil	4-Chloroaniline	0.043	Desert shrew	0.004	0.221	0.172	1	--	1.0000	--	--	4.30E-02	--	1	1.0000	--	--	4.30E-02	9.50E-03	--	--	0.0046	--	--	2.0E-04	--	0.13	--	1.24E-03	1.07E-02	2.5	12.5	4E-03	9E-04	--	--	--	--	No	No
NR16	Soil	4-Chloroaniline	0.043	Raccoon	6.9	0.035	0.082	0.08093	0.45	1.0000	--	--	4.30E-02	6.77E-04	0.45	1.0000	--	--	4.30E-02	6.77E-04	0.1	0.0046	--	--	2.0																



TABLE M-23

Estimation of Potential Risks to Birds and Mammals - Soil

Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona

Site Data			Exposure Parameters					Plant Uptake					Invertebrate Uptake					Vertebrate Uptake					Soil Uptake			Total Dose	Site Risk		Incremental Risk <sup>a</sup>				Retain for Evaluation in																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
Exposure Area	Matrix	COPEC	RME Soil (mg/kg)	Receptor	Body Weight (kg)	Food Intake (kg/kg/d)	Water Intake (L/kgbw/d)	AUF	Regression				Plant Concentration (mg/kg)	Plant Dose (mg/kg/day)	Regression				Invert Concentration (mg/kg)	Invert Dose (mg/kg/d)	Regression				Vertebrate Concentration (mg/kg)	Vertebrate Dose (mg/kg/d)	Diet Proportion	Iron King Mine Bioavailability	Incidental Soil Dose (mg/kg/d)	(mg/kg/d)	TRVs	Site HQs		Background HQ		Incremental HQ		NOAA-based	LOAEL-based																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
									Diet Proportion	Soil to Plant BAF	B0	B1			Diet Proportion	Soil to Invert BAF	B0	B1			LogKow	Diet Proportion	Soil to Vertebrate BAF	B0								B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion			Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0	B1	Diet Proportion	Soil to Vertebrate BAF	B0

TABLE M-23

Estimation of Potential Risks to Birds and Mammals - Soil

Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona

Site Data			Exposure Parameters					Plant Uptake					Invertebrate Uptake					Vertebrate Uptake					Soil Uptake					Total Dose	Site Risk				Incremental Risk <sup>a</sup>				Retain for Evaluation in					
Exposure Area	Matrix	COPEC	RME Soil (mg/kg)	Receptor	Body Weight (kg)	Food Intake (kg/kg/d)	Water Intake (L/kgbw/d)	AUF	Diet Proportion	Soil to Plant BAF	Regression		Plant Concentration (mg/kg)	Plant Dose (mg/kg/day)	Diet Proportion	Soil to Invert BAF	Regression		Invert Concentration (mg/kg)	Invert Dose (mg/kg/d)	Diet Proportion	Soil to Vertebrate BAF	Regression		Vertebrate Concentration (mg/kg)	Vertebrate Dose (mg/kg/d)	Diet Proportion	Iron King Mine Bioavailability	Incidental Soil Dose (mg/kg/d)	(mg/kg/d)	TRVs		Site HQs		Background HQ		Incremental HQ		NOAA-based	LOAEL-based		
											B0	B1					B0	B1					LogKow	B0							B1	B0	B1									
NR17	Soil	Silver	13.23	Western kingbird	0.038	0.199	0.174	1	--	0.0520	--	--	6.88E-01	--	1	2.0450	--	--	--	2.71E+01	5.38E+00	--	0.0040	--	--	5.3E-02	--	0.07	--	1.84E-01	5.57E+00	4.04	60	1E+00	9E-02	--	--	--	--	No	No	
NR17	Soil	Silver	13.23	Song sparrow	0.025	0.227	0.199	1	0.65	0.0520	--	--	6.88E-01	1.02E-01	0.35	2.0450	--	--	--	2.71E+01	2.15E+00	--	0.0040	--	--	5.3E-02	--	0.105	--	3.15E-01	2.57E+00	4.04	60	6E-01	4E-02	--	--	--	--	No	No	
NR17	Soil	Silver	13.23	Red-tailed hawk	1.224	0.077	0.055	0.03115	--	0.0520	--	--	6.88E-01	--	--	2.0450	--	--	--	2.71E+01	--	--	1	0.0040	--	--	5.3E-02	4.07E-03	0.01	--	1.02E-02	1.43E-02	4.04	60	1E-04	7E-06	--	--	--	--	No	No
NR17	Soil	Silver	13.23	Pocket gopher	0.235	0.097	0.114	1	1	0.0520	--	--	6.88E-01	6.67E-02	--	2.0450	--	--	--	2.71E+01	--	--	0.0040	--	--	5.3E-02	--	0.027	--	3.46E-02	1.01E-01	12.04	119	8E-03	9E-04	--	--	--	--	No	No	
NR17	Soil	Silver	13.23	Desert shrew	0.004	0.221	0.172	1	--	0.0520	--	--	6.88E-01	--	1	2.0450	--	--	--	2.71E+01	5.98E+00	--	0.0040	--	--	5.3E-02	--	0.13	--	3.80E-01	6.36E+00	12.04	119	5E-01	5E-02	--	--	--	--	No	No	
NR17	Soil	Silver	13.23	Raccoon	6.9	0.035	0.082	0.19111	0.45	0.0520	--	--	6.88E-01	1.08E-02	0.45	2.0450	--	--	--	2.71E+01	4.26E-01	0.1	0.0040	--	--	5.3E-02	1.85E-04	0.094	--	4.35E-02	4.81E-01	12.04	119	8E-03	8E-04	--	--	--	--	No	No	
NR17	Soil	Silver	13.23	Coyote	10	0.033	0.079	0.02085	--	0.0520	--	--	6.88E-01	--	--	2.0450	--	--	--	2.71E+01	--	1	0.0040	--	--	5.3E-02	1.75E-03	0.028	--	1.22E-02	1.40E-02	12.04	119	2E-05	2E-06	--	--	--	--	No	No	
NR17	Soil	Sulfate	89.441	Gambel's quail	0.175	0.05	0.105	1	1	1.0000	--	--	8.94E+04	4.47E+03	--	1.0000	--	--	--	8.94E+04	--	--	1.0000	--	--	8.9E+04	--	0.105	--	4.70E+02	4.94E+03	--	--	--	--	--	--	Uncertainty	Uncertainty			
NR17	Soil	Sulfate	89.441	Western kingbird	0.038	0.199	0.174	1	--	1.0000	--	--	8.94E+04	--	1	1.0000	--	--	--	8.94E+04	1.78E+04	--	1.0000	--	--	8.9E+04	--	0.07	--	1.25E+03	1.90E+04	--	--	--	--	--	--	Uncertainty	Uncertainty			
NR17	Soil	Sulfate	89.441	Song sparrow	0.025	0.227	0.199	1	0.65	1.0000	--	--	8.94E+04	1.32E+04	0.35	1.0000	--	--	--	8.94E+04	7.11E+03	--	1.0000	--	--	8.9E+04	--	0.105	--	2.13E+03	2.24E+04	--	--	--	--	--	--	Uncertainty	Uncertainty			
NR17	Soil	Sulfate	89.441	Red-tailed hawk	1.224	0.077	0.055	0.03115	--	1.0000	--	--	8.94E+04	--	--	1.0000	--	--	--	8.94E+04	--	1	1.0000	--	--	8.9E+04	6.89E+03	0.01	--	6.89E+01	6.96E+03	--	--	--	--	--	--	Uncertainty	Uncertainty			
NR17	Soil	Sulfate	89.441	Pocket gopher	0.235	0.097	0.114	1	1	1.0000	--	--	8.94E+04	8.68E+03	--	1.0000	--	--	--	8.94E+04	--	--	1.0000	--	--	8.9E+04	--	0.027	--	2.34E+02	8.91E+03	--	--	--	--	--	--	Uncertainty	Uncertainty			
NR17	Soil	Sulfate	89.441	Desert shrew	0.004	0.221	0.172	1	--	1.0000	--	--	8.94E+04	--	1	1.0000	--	--	--	8.94E+04	1.98E+04	--	1.0000	--	--	8.9E+04	--	0.13	--	2.57E+03	2.23E+04	--	--	--	--	--	--	Uncertainty	Uncertainty			
NR17	Soil	Sulfate	89.441	Raccoon	6.9	0.035	0.082	0.19111	0.45	1.0000	--	--	8.94E+04	1.41E+03	0.45	1.0000	--	--	--	8.94E+04	1.41E+03	0.1	1.0000	--	--	8.9E+04	3.13E+02	0.094	--	2.94E+02	3.42E+03	--	--	--	--	--	--	Uncertainty	Uncertainty			
NR17	Soil	Sulfate	89.441	Coyote	10	0.033	0.079	0.02085	--	1.0000	--	--	8.94E+04	--	--	1.0000	--	--	--	8.94E+04	--	1	1.0000	--	--	8.9E+04	2.95E+03	0.028	--	8.26E+01	3.03E+03	--	--	--	--	--	--	Uncertainty	Uncertainty			
NR17	Soil	Thallium	3.554	Gambel's quail	0.175	0.05	0.105	1	1	0.0040	--	--	1.42E-02	7.11E-04	--	0.0541	--	--	--	1.92E-01	--	--	0.1124	--	--	4.0E-01	--	0.105	--	1.87E-02	1.94E-02	0.346	3.46	6E-02	6E-03	4E-02	4E-03	1E-02	1E-03	No	No	
NR17	Soil	Thallium	3.554	Western kingbird	0.038	0.199	0.174	1	--	0.0040	--	--	1.42E-02	--	1	0.0541	--	--	--	1.92E-01	3.83E-02	--	0.1124	--	--	4.0E-01	--	0.07	--	4.95E-02	8.78E-02	0.346	3.46	3E-01	3E-02	2E-01	2E-02	5E-02	5E-03	No	No	
NR17	Soil	Thallium	3.554	Song sparrow	0.025	0.227	0.199	1	0.65	0.0040	--	--	1.42E-02	2.10E-03	0.35	0.0541	--	--	--	1.92E-01	1.53E-02	--	0.1124	--	--	4.0E-01	--	0.105	--	8.47E-02	1.02E-01	0.346	3.46	3E-01	3E-02	2E-01	2E-02	6E-02	6E-03	No	No	
NR17	Soil	Thallium	3.554	Red-tailed hawk	1.224	0.077	0.055	0.03115	--	0.0040	--	--	1.42E-02	--	--	0.0541	--	--	--	1.92E-01	--	1	0.1124	--	--	4.0E-01	3.08E-02	0.01	--	2.74E-03	3.35E-02	0.346	3.46	3E-03	3E-04	8E-02	8E-03	-7E-02	-7E-03	No	No	
NR17	Soil	Thallium	3.554	Pocket gopher	0.235	0.097	0.114	1	1	0.0040	--	--	1.42E-02	1.38E-03	--	0.0541	--	--	--	1.92E-01	--	--	0.1124	--	--	4.0E-01	--	0.027	--	9.31E-03	1.07E-02	0.48	1.43	2E-02	7E-03	2E-02	6E-03	5E-03	2E-03	No	No	
NR17	Soil	Thallium	3.554	Desert shrew	0.004	0.221	0.172	1	--	0.0040	--	--	1.42E-02	--	1	0.0541	--	--	--	1.92E-01	4.25E-02	--	0.1124	--	--	4.0E-01	--	0.13	--	1.02E-01	1.45E-01	0.48	1.43	3E-01	1E-01	2E-01	8E-02	6E-02	2E-02	No	No	
NR17	Soil	Thallium	3.554	Raccoon	6.9	0.035	0.082	0.19111	0.45	0.0040	--	--	1.42E-02	2.24E-04	0.45	0.0541	--	--	--	1.92E-01	3.03E-03	0.1	0.1124	--	--	4.0E-01	1.40E-03	0.094	--	1.17E-02	1.63E-02	0.48	1.43	7E-03	2E-03	3E-02	9E-03	-2E-02	-7E-03	No	No	
NR17	Soil	Thallium	3.554	Coyote	10	0.033	0.079	0.02085	--	0.0040	--	--	1.42E-02	--	--	0.0541	--	--	--	1.92E-01	--	1	0.1124	--	--	4.0E-01	1.32E-02	0.028	--	3.28E-03	1.65E-02	0.48	1.43	7E-04	2E-04	3E-02	9E-03	-3E				



TABLE M-23

Estimation of Potential Risks to Birds and Mammals - Soil

Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona

Site Data				Exposure Parameters				Plant Uptake				Invertebrate Uptake				Vertebrate Uptake				Soil Uptake				Total Dose	Site Risk				Incremental Risk <sup>a</sup>				Retain for Evaluation in <sup>b</sup>								
Exposure Area	Matrix	COPEC	RME Soil (mg/kg)	Receptor	Body Weight (kg)	Food Intake (kg/kg/d)	Water Intake (L/kgbw/d)	AUF	Diet Proportion	Soil to Plant BAF	Regression		Plant Concentration (mg/kg)	Plant Dose (mg/kg/day)	Diet Proportion	Soil to Invert BAF	Regression		Invert Concentration (mg/kg)	Invert Dose (mg/kg/d)	Diet Proportion	Soil to Vertebrate BAF	Regression		Vertebrate Concentration (mg/kg)	Vertebrate Dose (mg/kg/d)	Diet Proportion	Iron King Mine Bioavailability	Incidental Soil Dose (mg/kg/d)	(mg/kg/d)	TRVs		Site HQs		Background HQ		Incremental HQ		NOAEL-based	LOAEL-based	
											B0	B1					B0	B1					B0	B1							NOAEL-based	LOAEL-based	NOAEL-based	LOAEL-based	NOAEL-based	LOAEL-based	NOAEL-based	LOAEL-based			
NR18	Soil	Nickel	30.89	Desert shrew	0.004	0.221	0.172	1	--	0.1690	--	--	5.22E+00	--	1	0.7778	--	--	2.40E+01	5.31E+00	--	regression	-0.2462	0.4658	3.9E+00	--	0.13	--	8.87E-01	6.20E+00	1.7	80	4E+00	8E-02	1E+01	2E-01	-7E+00	-1E-01	No	No	
NR18	Soil	Nickel	30.89	Raccoon	6.9	0.035	0.082	0.05208	0.45	0.1690	--	--	5.22E+00	8.22E-02	0.45	0.7778	--	--	2.40E+01	3.78E-01	0.1	regression	-0.2462	0.4658	3.9E+00	1.35E-02	0.094	--	1.02E-01	5.76E-01	1.7	80	2E-02	4E-04	1E+00	2E-02	-9E-01	-2E-02	No	No	
NR18	Soil	Nickel	30.89	Coyote	10	0.033	0.079	0.00568	--	0.1690	--	--	5.22E+00	--	--	0.7778	--	--	2.40E+01	--	1	regression	-0.2462	0.4658	3.9E+00	1.28E-01	0.028	--	2.85E-02	1.56E-01	1.7	80	5E-04	1E-05	2E-01	4E-03	-2E-01	-4E-03	No	No	
NR18	Soil	Nitrate as N	970	Gambel's quail	0.175	0.05	0.105	1	1	1.0000	--	--	9.70E+02	4.85E+01	--	1.0000	--	--	9.70E+02	--	--	1.0000	--	--	9.7E+02	--	0.105	--	5.09E+00	5.36E+01	--	--	--	--	Uncertainty	Uncertainty					
NR18	Soil	Nitrate as N	970	Western kingbird	0.038	0.199	0.174	1	--	1.0000	--	--	9.70E+02	--	1	1.0000	--	--	9.70E+02	1.93E+02	--	1.0000	--	--	9.7E+02	--	0.07	--	1.35E+01	2.07E+02	--	--	--	--	Uncertainty	Uncertainty					
NR18	Soil	Nitrate as N	970	Song sparrow	0.025	0.227	0.199	1	0.65	1.0000	--	--	9.70E+02	1.43E+02	0.35	1.0000	--	--	9.70E+02	7.71E+01	--	1.0000	--	--	9.7E+02	--	0.105	--	2.31E+01	2.43E+02	--	--	--	--	Uncertainty	Uncertainty					
NR18	Soil	Nitrate as N	970	Red-tailed hawk	1.224	0.077	0.055	0.00849	--	1.0000	--	--	9.70E+02	--	--	1.0000	--	--	9.70E+02	--	1	1.0000	--	--	9.7E+02	7.47E+01	0.01	--	7.47E-01	7.54E+01	--	--	--	--	Uncertainty	Uncertainty					
NR18	Soil	Nitrate as N	970	Pocket gopher	0.235	0.097	0.114	1	1	1.0000	--	--	9.70E+02	9.41E+01	--	1.0000	--	--	9.70E+02	--	--	1.0000	--	--	9.7E+02	--	0.027	--	2.54E+00	9.66E+01	507	507	2E-01	2E-01	--	--	No	No			
NR18	Soil	Nitrate as N	970	Desert shrew	0.004	0.221	0.172	1	--	1.0000	--	--	9.70E+02	--	1	1.0000	--	--	9.70E+02	2.14E+02	--	1.0000	--	--	9.7E+02	--	0.13	--	2.79E+01	2.42E+02	507	507	5E-01	5E-01	--	--	No	No			
NR18	Soil	Nitrate as N	970	Raccoon	6.9	0.035	0.082	0.05208	0.45	1.0000	--	--	9.70E+02	1.53E+01	0.45	1.0000	--	--	9.70E+02	1.53E+01	0.1	1.0000	--	--	9.7E+02	3.40E+00	0.094	--	3.19E+00	3.71E+01	507	507	4E-03	4E-03	--	--	No	No			
NR18	Soil	Nitrate as N	970	Coyote	10	0.033	0.079	0.00568	--	1.0000	--	--	9.70E+02	--	--	1.0000	--	--	9.70E+02	--	1	1.0000	--	--	9.7E+02	3.20E+01	0.028	--	8.96E-01	3.29E+01	507	507	4E-04	4E-04	--	--	No	No			
NR18	Soil	Selenium	9.555	Gambel's quail	0.175	0.05	0.105	1	1	0.1040	--	--	9.94E-01	4.97E-02	--	regression	-0.0750	0.7330	--	4.85E+00	--	--	regression	-0.4158	0.3764	1.5E+00	--	0.105	--	5.02E-02	9.98E-02	0.29	0.93	3E-01	1E-01	2E-01	5E-02	2E-01	6E-02	No	No
NR18	Soil	Selenium	9.555	Western kingbird	0.038	0.199	0.174	1	--	0.1040	--	--	9.94E-01	--	1	regression	-0.0750	0.7330	--	4.85E+00	9.66E-01	--	regression	-0.4158	0.3764	1.5E+00	--	0.07	--	1.33E-01	1.10E+00	0.29	0.93	4E+00	1E+00	2E+00	7E-01	2E+00	5E-01	Yes	No
NR18	Soil	Selenium	9.555	Song sparrow	0.025	0.227	0.199	1	0.65	0.1040	--	--	9.94E-01	1.47E-01	0.35	regression	-0.0750	0.7330	--	4.85E+00	3.86E-01	--	regression	-0.4158	0.3764	1.5E+00	--	0.105	--	2.28E-01	7.60E-01	0.29	0.93	3E+00	8E-01	1E+00	4E-01	1E+00	4E-01	No	No
NR18	Soil	Selenium	9.555	Red-tailed hawk	1.224	0.077	0.055	0.00849	--	0.1040	--	--	9.94E-01	--	--	regression	-0.0750	0.7330	--	4.85E+00	--	1	regression	-0.4158	0.3764	1.5E+00	1.19E-01	0.01	--	7.36E-03	1.26E-01	0.29	0.93	4E-03	1E-03	3E-01	1E-01	-3E-01	-1E-01	No	No
NR18	Soil	Selenium	9.555	Pocket gopher	0.235	0.097	0.114	1	1	0.1040	--	--	9.94E-01	9.64E-02	--	regression	-0.0750	0.7330	--	4.85E+00	--	--	regression	-0.4158	0.3764	1.5E+00	--	0.027	--	2.50E-02	1.21E-01	0.143	1.21	8E-01	1E-01	4E-01	5E-02	5E-01	5E-02	No	No
NR18	Soil	Selenium	9.555	Desert shrew	0.004	0.221	0.172	1	--	0.1040	--	--	9.94E-01	--	1	regression	-0.0750	0.7330	--	4.85E+00	1.07E+00	--	regression	-0.4158	0.3764	1.5E+00	--	0.13	--	2.75E-01	1.35E+00	0.143	1.21	9E+00	1E+00	5E+00	6E-01	4E+00	5E-01	Yes	No
NR18	Soil	Selenium	9.555	Raccoon	6.9	0.035	0.082	0.05208	0.45	0.1040	--	--	9.94E-01	1.57E-02	0.45	regression	-0.0750	0.7330	--	4.85E+00	7.64E-02	0.1	regression	-0.4158	0.3764	1.5E+00	5.40E-03	0.094	--	3.14E-02	1.29E-01	0.143	1.21	5E-02	6E-03	5E-01	6E-02	-4E-01	-5E-02	No	No
NR18	Soil	Selenium	9.555	Coyote	10	0.033	0.079	0.00568	--	0.1040	--	--	9.94E-01	--	--	regression	-0.0750	0.7330	--	4.85E+00	--	1	regression	-0.4158	0.3764	1.5E+00	5.09E-02	0.028	--	8.83E-03	5.97E-02	0.143	1.21	2E-03	3E-04	3E-01	3E-02	-3E-01	-3E-02	No	No
NR18	Soil	Silver	4.987	Gambel's quail	0.175	0.05	0.105	1	1	0.0520	--	--	2.59E-01	1.30E-02	--	2.0450	--	--	1.02E+01	--	--	0.0040	--	--	2.0E-02	--	0.105	--	2.62E-02	3.91E-02	4.04	60	1E-02	7E-04	--	--	--	--	No	No	
NR18	Soil	Silver	4.987	Western kingbird	0.038	0.199	0.174	1	--	0.0520	--	--	2.59E-01	--	1	2.0450	--	--	1.02E+01	2.03E+00	--	0.0040	--	--	2.0E-02	--	0.07	--	6.95E-02	2.10E+00	4.04	60	5E-01	3E-02	--	--	--	--	No	No	
NR18	Soil	Silver	4.987	Song sparrow	0.025	0.227	0.199	1	0.65	0.0520	--	--	2.59E-01	3.83E-02	0.35	2.0450	--	--	1.02E+01	8.10E-01	--	0.0040	--	--	2.0E-02	--	0.105	--	1.19E-01	9.67E-01	4.04	60	2E-01	2E-02	--	--	--	--	No	No	
NR18	Soil	Silver	4.987	Red-tailed hawk	1.224	0.077	0.0.																																		

TABLE M-23

Estimation of Potential Risks to Birds and Mammals - Soil

Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona

Site Data			Exposure Parameters					Plant Uptake					Invertebrate Uptake					Vertebrate Uptake					Soil Uptake					Total Dose	Site Risk				Incremental Risk <sup>a</sup>				Retain for Evaluation in Weight of Evidence <sup>b</sup>					
Exposure Area	Matrix	COPEC	RME Soil (mg/kg)	Receptor	Body Weight (kg)	Food Intake (kg/kg/d)	Water Intake (L/kgbw/d)	AUF	Diet Proportion	Soil to Plant BAF	Regression		Plant Concentration (mg/kg)	Plant Dose (mg/kg/day)	Diet Proportion	Soil to Invert BAF	Regression		LogKow	Invert Concentration (mg/kg)	Invert Dose (mg/kg/d)	Diet Proportion	Soil to Vertebrate BAF	Regression		Vertebrate Concentration (mg/kg)	Vertebrate Dose (mg/kg/d)	Diet Proportion	Iron King Mine Bioavailability	Incidental Soil Dose (mg/kg/d)	(mg/kg/d)	TRVs	Site HQs		Background HQ		Incremental HQ		NOAEL-based	LOAEL-based		
											B0	B1					B0	B1						B0	B1								NOAEL-based	LOAEL-based	NOAEL-based	LOAEL-based	NOAEL-based	LOAEL-based				
NR19	Soil	Lead	486.8	Western kingbird	0.038	0.199	0.174	1	--	0.1030	--	--	5.01E+01	--	1	regression	-0.2180	0.8070	--	1.19E+02	2.36E+01	--	regression	0.0761	0.4422	1.7E+01	--	0.07	--	6.78E+00	3.04E+01	1.63	8.75	2E+01	3E+00	2E+00	4E-01	2E+01	3E+00	Yes	Yes	
NR19	Soil	Lead	486.8	Song sparrow	0.025	0.227	0.199	1	0.65	0.1030	--	--	5.01E+01	7.40E+00	0.35	regression	-0.2180	0.8070	--	1.19E+02	9.42E+00	--	regression	0.0761	0.4422	1.7E+01	--	0.105	--	1.16E+01	2.84E+01	1.63	8.75	2E+01	3E+00	2E+00	3E-01	2E+01	3E+00	Yes	Yes	
NR19	Soil	Lead	486.8	Red-tailed hawk	1.224	0.077	0.055	0.04221	--	0.1030	--	--	5.01E+01	--	--	regression	-0.2180	0.8070	--	1.19E+02	--	1	regression	0.0761	0.4422	1.7E+01	1.28E+00	0.01	--	3.75E-01	1.66E+00	1.63	8.75	4E-02	8E-03	3E-01	5E-02	-2E-01	-4E-02	No	No	
NR19	Soil	Lead	486.8	Pocket gopher	0.235	0.097	0.114	1	1	0.1030	--	--	5.01E+01	4.86E+00	--	regression	-0.2180	0.8070	--	1.19E+02	--	--	regression	0.0761	0.4422	1.7E+01	--	0.027	0.2250	2.87E-01	5.15E+00	4.7	241	1E+00	2E-02	8E-02	2E-03	1E+00	2E-02	No	No	
NR19	Soil	Lead	486.8	Desert shrew	0.004	0.221	0.172	1	--	0.1030	--	--	5.01E+01	--	1	regression	-0.2180	0.8070	--	1.19E+02	2.62E+01	--	regression	0.0761	0.4422	1.7E+01	--	0.13	0.2250	3.15E+00	2.94E+01	4.7	241	6E+00	1E-01	7E-01	1E-02	6E+00	1E-01	Yes	No	
NR19	Soil	Lead	486.8	Raccoon	6.9	0.035	0.082	0.25893	0.45	0.1030	--	--	5.01E+01	7.90E-01	0.45	regression	-0.2180	0.8070	--	1.19E+02	1.87E+00	0.1	regression	0.0761	0.4422	1.7E+01	5.83E-02	0.094	0.2250	3.60E-01	3.08E+00	4.7	241	2E-01	3E-03	7E-02	1E-03	1E-01	2E-03	No	No	
NR19	Soil	Lead	486.8	Coyote	10	0.033	0.079	0.02825	--	0.1030	--	--	5.01E+01	--	--	regression	-0.2180	0.8070	--	1.19E+02	--	1	regression	0.0761	0.4422	1.7E+01	5.49E-01	0.028	0.2250	1.01E-01	6.51E-01	4.7	241	4E-03	8E-05	4E-02	7E-04	-3E-02	-7E-04	No	No	
NR19	Soil	Manganese	735.8	Gambel's quail	0.175	0.05	0.105	1	1	0.1220	--	--	8.98E+01	4.49E+00	--	regression	-0.8090	0.6820	--	4.02E+01	--	--	0.0205	--	--	1.5E+01	--	0.105	--	3.86E+00	8.35E+00	179	776	5E-02	1E-02	1E-01	2E-02	-5E-02	-1E-02	No	No	
NR19	Soil	Manganese	735.8	Western kingbird	0.038	0.199	0.174	1	--	0.1220	--	--	8.98E+01	--	1	regression	-0.8090	0.6820	--	4.02E+01	7.99E+00	--	--	0.0205	--	--	1.5E+01	--	0.07	--	1.02E+01	1.82E+01	179	776	1E-01	2E-02	2E-01	5E-02	-1E-01	-2E-02	No	No
NR19	Soil	Manganese	735.8	Song sparrow	0.025	0.227	0.199	1	0.65	0.1220	--	--	8.98E+01	1.32E+01	0.35	regression	-0.8090	0.6820	--	4.02E+01	3.19E+00	--	--	0.0205	--	--	1.5E+01	--	0.105	--	1.75E+01	3.40E+01	179	776	2E-01	4E-02	4E-01	9E-02	-2E-01	-5E-02	No	No
NR19	Soil	Manganese	735.8	Red-tailed hawk	1.224	0.077	0.055	0.04221	--	0.1220	--	--	8.98E+01	--	--	regression	-0.8090	0.6820	--	4.02E+01	--	1	0.0205	--	--	1.5E+01	1.16E+00	0.01	--	5.67E-01	1.73E+00	179	776	4E-04	9E-05	2E-02	5E-03	-2E-02	-5E-03	No	No	
NR19	Soil	Manganese	735.8	Pocket gopher	0.235	0.097	0.114	1	1	0.1220	--	--	8.98E+01	8.71E+00	--	regression	-0.8090	0.6820	--	4.02E+01	--	--	0.0205	--	--	1.5E+01	--	0.027	--	1.93E+00	1.06E+01	51.5	284	2E-01	4E-02	4E-01	8E-02	-2E-01	-4E-02	No	No	
NR19	Soil	Manganese	735.8	Desert shrew	0.004	0.221	0.172	1	--	0.1220	--	--	8.98E+01	--	1	regression	-0.8090	0.6820	--	4.02E+01	8.88E+00	--	--	0.0205	--	--	1.5E+01	--	0.13	--	2.11E+01	3.00E+01	51.5	284	6E-01	1E-01	1E+00	2E-01	-6E-01	-1E-01	No	No
NR19	Soil	Manganese	735.8	Raccoon	6.9	0.035	0.082	0.25893	0.45	0.1220	--	--	8.98E+01	1.41E+00	0.45	regression	-0.8090	0.6820	--	4.02E+01	6.33E-01	0.1	0.0205	--	--	1.5E+01	5.28E-02	0.094	--	2.42E+00	4.52E+00	51.5	284	2E-02	4E-03	2E-01	3E-02	-2E-01	-3E-02	No	No	
NR19	Soil	Manganese	735.8	Coyote	10	0.033	0.079	0.02825	--	0.1220	--	--	8.98E+01	--	--	regression	-0.8090	0.6820	--	4.02E+01	--	1	0.0205	--	--	1.5E+01	4.98E-01	0.028	--	6.80E-01	1.18E+00	51.5	284	6E-04	1E-04	5E-02	9E-03	-5E-02	-9E-03	No	No	
NR19	Soil	Mercury	3.849	Gambel's quail	0.175	0.05	0.105	1	1	0.0990	--	--	3.81E-01	1.91E-02	--	regression	-0.6840	0.1180	--	5.92E-01	--	--	0.0543	--	--	2.1E-01	--	0.105	--	2.02E-02	3.93E-02	0.45	0.9	9E-02	4E-02	2E-03	9E-04	9E-02	4E-02	No	No	
NR19	Soil	Mercury	3.849	Western kingbird	0.038	0.199	0.174	1	--	0.0990	--	--	3.81E-01	--	1	regression	-0.6840	0.1180	--	5.92E-01	1.18E-01	--	--	0.0543	--	--	2.1E-01	--	0.07	--	5.36E-02	1.75E-01	0.45	0.9	4E-01	2E-01	2E-01	8E-02	2E-01	1E-01	No	No
NR19	Soil	Mercury	3.849	Song sparrow	0.025	0.227	0.199	1	0.65	0.0990	--	--	3.81E-01	5.62E-02	0.35	regression	-0.6840	0.1180	--	5.92E-01	4.70E-02	--	--	0.0543	--	--	2.1E-01	--	0.105	--	9.17E-02	1.95E-01	0.45	0.9	4E-01	2E-01	7E-02	4E-02	4E-01	2E-01	No	No
NR19	Soil	Mercury	3.849	Red-tailed hawk	1.224	0.077	0.055	0.04221	--	0.0990	--	--	3.81E-01	--	--	regression	-0.6840	0.1180	--	5.92E-01	--	1	0.0543	--	--	2.1E-01	1.61E-02	0.01	--	2.96E-03	1.91E-02	0.45	0.9	2E-03	9E-04	9E-04	4E-04	9E-04	5E-04	No	No	
NR19	Soil	Mercury	3.849	Pocket gopher	0.235	0.097	0.114	1	1	0.0990	--	--	3.81E-01	3.70E-02	--	regression	-0.6840	0.1180	--	5.92E-01	--	--	0.0543	--	--	2.1E-01	--	0.027	--	1.01E-02	4.70E-02	1	4	5E-02	1E-02	1E-03	2E-04	5E-02	1E-02	No	No	
NR19	Soil	Mercury	3.849	Desert shrew	0.004	0.221	0.172	1	--	0.0990	--	--	3.81E-01	--	1	regression	-0.6840	0.1180	--	5.92E-01	1.31E-01	--	--	0.0543	--	--	2.1E-01	--	0.13	--	1.11E-01	2.41E-01	1	4	2E-01							

TABLE M-23

Estimation of Potential Risks to Birds and Mammals - Soil

Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona

Site Data				Exposure Parameters					Plant Uptake					Invertebrate Uptake					Vertebrate Uptake					Soil Uptake					Total Dose	Site Risk				Incremental Risk <sup>a</sup>				Retain for Evaluation <sup>b</sup>			
Exposure Area	Matrix	COPEC	RME Soil (mg/kg)	Receptor	Body Weight (kg)	Food Intake (kg/kg/d)	Water Intake (L/kgbw/d)	AUF	Diet Proportion	Soil to Plant BAF	Regression		Plant Concentration (mg/kg)	Plant Dose (mg/kg/day)	Diet Proportion	Soil to Invert BAF	Regression		Invert Concentration (mg/kg)	Invert Dose (mg/kg/d)	Diet Proportion	Soil to Vertebrate BAF	Regression		Vertebrate Concentration (mg/kg)	Vertebrate Dose (mg/kg/d)	Diet Proportion	Iron King Mine Bioavailability	Incidental Soil Dose (mg/kg/d)	(mg/kg/d)	TRVs		Site HQs		Background HQ		Incremental HQ		NOAEL-based	LOAEL-based	
											B0	B1					B0	B1					LogKow	B0							B1	NOAEL-based	LOAEL-based	NOAEL-based	LOAEL-based	NOAEL-based	LOAEL-based				
NR19	Soil	Benzyl butyl phthalate	0.25	Desert shrew	0.004	0.221	0.172	1	--	0.7280	--	--	1.82E-01	--	1	LogKow model	--	--	4.8400	4.56E-01	1.01E-01	--	0.1590	--	--	4.0E-02	--	0.13	--	7.18E-03	1.08E-01	159	470	7E-04	2E-04	--	--	--	--	No	No
NR19	Soil	Benzyl butyl phthalate	0.25	Raccoon	6.9	0.035	0.082	0.25893	0.45	0.7280	--	--	1.82E-01	2.87E-03	0.45	LogKow model	--	--	4.8400	4.56E-01	7.19E-03	0.1	0.1590	--	--	4.0E-02	1.39E-04	0.094	--	8.23E-04	1.10E-02	159	470	2E-05	6E-06	--	--	--	--	No	No
NR19	Soil	Benzyl butyl phthalate	0.25	Coyote	10	0.033	0.079	0.02825	--	0.7280	--	--	1.82E-01	--	--	LogKow model	--	--	4.8400	4.56E-01	--	1	0.1590	--	--	4.0E-02	1.31E-03	0.028	--	2.31E-04	1.54E-03	159	470	3E-07	9E-08	--	--	--	--	No	No
NR19	Soil	bis(2-Ethylhexyl)phthalat	0.28	Gambel's quail	0.175	0.05	0.105	1	1	0.0500	--	--	2.80E-01	7.00E-04	--	1.0000	--	--	--	2.80E-01	--	--	1.0300	--	--	2.9E-01	--	0.105	--	1.47E-03	2.17E-03	1.1	5.5	2E-03	4E-04	--	--	--	--	No	No
NR19	Soil	bis(2-Ethylhexyl)phthalat	0.28	Western kingbird	0.038	0.199	0.174	1	--	0.0500	--	--	1.40E-02	--	1	1.0000	--	--	--	2.80E-01	5.57E-02	--	1.0300	--	--	2.9E-01	--	0.07	--	3.90E-03	5.96E-02	1.1	5.5	5E-02	1E-02	--	--	--	--	No	No
NR19	Soil	bis(2-Ethylhexyl)phthalat	0.28	Song sparrow	0.025	0.227	0.199	1	0.65	0.0500	--	--	1.40E-02	2.07E-03	0.35	1.0000	--	--	--	2.80E-01	2.22E-02	--	1.0300	--	--	2.9E-01	--	0.105	--	6.67E-03	3.10E-02	1.1	5.5	3E-02	6E-03	--	--	--	--	No	No
NR19	Soil	bis(2-Ethylhexyl)phthalat	0.28	Red-tailed hawk	1.224	0.077	0.055	0.04221	--	0.0500	--	--	1.40E-02	--	--	1.0000	--	--	--	2.80E-01	--	1	1.0300	--	--	2.9E-01	2.22E-02	0.01	--	2.16E-04	2.24E-02	1.1	5.5	9E-04	2E-04	--	--	--	--	No	No
NR19	Soil	bis(2-Ethylhexyl)phthalat	0.28	Pocket gopher	0.235	0.097	0.114	1	1	0.0500	--	--	1.40E-02	1.36E-03	--	1.0000	--	--	--	2.80E-01	--	--	1.0300	--	--	2.9E-01	--	0.027	--	7.33E-04	2.09E-03	18.3	183	1E-04	1E-05	--	--	--	--	No	No
NR19	Soil	bis(2-Ethylhexyl)phthalat	0.28	Desert shrew	0.004	0.221	0.172	1	--	0.0500	--	--	1.40E-02	--	1	1.0000	--	--	--	2.80E-01	6.19E-02	--	1.0300	--	--	2.9E-01	--	0.13	--	8.04E-03	6.99E-02	18.3	183	4E-03	4E-04	--	--	--	--	No	No
NR19	Soil	bis(2-Ethylhexyl)phthalat	0.28	Raccoon	6.9	0.035	0.082	0.25893	0.45	0.0500	--	--	1.40E-02	2.21E-04	0.45	1.0000	--	--	--	2.80E-01	4.41E-03	0.1	1.0300	--	--	2.9E-01	1.01E-03	0.094	--	9.21E-04	6.56E-03	18.3	183	9E-05	9E-06	--	--	--	--	No	No
NR19	Soil	bis(2-Ethylhexyl)phthalat	0.28	Coyote	10	0.033	0.079	0.02825	--	0.0500	--	--	1.40E-02	--	--	1.0000	--	--	--	2.80E-01	--	1	1.0300	--	--	2.9E-01	9.52E-03	0.028	--	2.59E-04	9.78E-03	18.3	183	2E-05	2E-06	--	--	--	--	No	No
NR19	Soil	Caprolactam	0.072	Gambel's quail	0.175	0.05	0.105	1	1	1.0000	--	--	7.20E-02	3.60E-03	--	1.0000	--	--	--	7.20E-02	--	--	1.0000	--	--	7.2E-02	--	0.105	--	3.78E-04	3.98E-03	--	--	--	--	Uncertainty	Uncertainty	Uncertainty	Uncertainty		
NR19	Soil	Caprolactam	0.072	Western kingbird	0.038	0.199	0.174	1	--	1.0000	--	--	7.20E-02	--	1	1.0000	--	--	--	7.20E-02	1.43E-02	--	1.0000	--	--	7.2E-02	--	0.07	--	1.00E-03	1.53E-02	--	--	--	--	Uncertainty	Uncertainty	Uncertainty	Uncertainty		
NR19	Soil	Caprolactam	0.072	Song sparrow	0.025	0.227	0.199	1	0.65	1.0000	--	--	7.20E-02	1.06E-02	0.35	1.0000	--	--	--	7.20E-02	5.72E-03	--	1.0000	--	--	7.2E-02	--	0.105	--	1.72E-03	1.81E-02	--	--	--	--	Uncertainty	Uncertainty	Uncertainty	Uncertainty		
NR19	Soil	Caprolactam	0.072	Red-tailed hawk	1.224	0.077	0.055	0.04221	--	1.0000	--	--	7.20E-02	--	--	1.0000	--	--	--	7.20E-02	--	1	1.0000	--	--	7.2E-02	5.54E-03	0.01	--	5.54E-05	5.60E-03	--	--	--	--	Uncertainty	Uncertainty	Uncertainty	Uncertainty		
NR19	Soil	Caprolactam	0.072	Pocket gopher	0.235	0.097	0.114	1	1	1.0000	--	--	7.20E-02	6.98E-03	--	1.0000	--	--	--	7.20E-02	--	--	1.0000	--	--	7.2E-02	--	0.027	--	1.89E-04	7.17E-03	50	250	1E-04	3E-05	--	--	--	--	No	No
NR19	Soil	Caprolactam	0.072	Desert shrew	0.004	0.221	0.172	1	--	1.0000	--	--	7.20E-02	--	1	1.0000	--	--	--	7.20E-02	1.59E-02	--	1.0000	--	--	7.2E-02	--	0.13	--	2.07E-03	1.80E-02	50	250	4E-04	7E-05	--	--	--	--	No	No
NR19	Soil	Caprolactam	0.072	Raccoon	6.9	0.035	0.082	0.25893	0.45	1.0000	--	--	7.20E-02	1.13E-03	0.45	1.0000	--	--	--	7.20E-02	1.13E-03	0.1	1.0000	--	--	7.2E-02	2.52E-04	0.094	--	2.37E-04	2.76E-03	50	250	1E-05	3E-06	--	--	--	--	No	No
NR19	Soil	Caprolactam	0.072	Coyote	10	0.033	0.079	0.02825	--	1.0000	--	--	7.20E-02	--	--	1.0000	--	--	--	7.20E-02	--	1	1.0000	--	--	7.2E-02	2.38E-03	0.028	--	6.65E-05	2.44E-03	50	250	1E-06	3E-07	--	--	--	--	No	No
NR19	Soil	Carbon disulfide	0.002	Gambel's quail	0.175	0.05	0.105	1	1	2.0100	--	--	4.02E-03	2.01E-04	--	1.0000	--	--	--	2.00E-03	--	--	0.0013	--	--	2.6E-06	--	0.105	--	1.05E-05	2.12E-04	--	--	--	--	Uncertainty	Uncertainty	Uncertainty	Uncertainty		
NR19	Soil	Carbon disulfide	0.002	Western kingbird	0.038	0.199	0.174	1	--	2.0100	--	--	4.02E-03	--	1	1.0000	--	--	--	2.00E-03	3.98E-04	--	0.0013	--	--	2.6E-06	--	0.07	--	2.79E-05	4.26E-04	--	--	--	--	Uncertainty	Uncertainty	Uncertainty	Uncertainty		
NR19	Soil	Carbon disulfide	0.002	Song sparrow	0.025	0.227	0.199	1	0.65	2.0100	--	--	4.02E-03	5.93E-04	0.35	1.0000	--	--	--	2.00E-03	1.59E-04	--	0.0013	--	--	2.6E-06	--	0.105	--	4.77E-05	8.00E-04	--	--	--	--	Uncertainty	Uncertainty	Uncertainty	Uncertainty		
NR19	Soil	Carbon disulfide	0.002	Red-tailed hawk	1.224	0.077	0.055	0.04221	--	2.0100	--	--	4.02E-03	--	--	1.0000	--	--	--	2.00E-03	--	1	0.0013	--	--	2.6E-06	2.03E-07	0.01	--	1.54E-06	1.74E-06	--	--	--	--						



TABLE M-23

Estimation of Potential Risks to Birds and Mammals - Soil

Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona

Site Data				Exposure Parameters				Plant Uptake				Invertebrate Uptake				Vertebrate Uptake				Soil Uptake				Total Dose	Site Risk				Incremental Risk <sup>a</sup>				Retain for Evaluation in Weight of Evidence <sup>b</sup>								
Exposure Area	Matrix	COPEC	RME Soil (mg/kg)	Receptor	Body Weight (kg)	Food Intake (kg/kg/d)	Water Intake (L/kgbw/d)	AUF	Diet Proportion	Soil to Plant BAF	Regression		Plant Concentration (mg/kg)	Plant Dose (mg/kg/day)	Diet Proportion	Soil to Invert BAF	Regression		Invert Concentration (mg/kg)	Invert Dose (mg/kg/d)	Diet Proportion	Soil to Vertebrate BAF	Regression		Vertebrate Concentration (mg/kg)	Vertebrate Dose (mg/kg/d)	Diet Proportion	Iron King Mine Bioavailability	Incidental Soil Dose (mg/kg/d)	(mg/kg/d)	TRVs		Site HQs		Background HQ		Incremental HQ		NOAA-based	LOAEL-based	
											B0	B1					B0	B1					B0	B1							NOAA-based	LOAEL-based	NOAA-based	LOAEL-based	NOAA-based	LOAEL-based	NOAA-based	LOAEL-based			
NR20	Soil	Zinc	304.5	Western kingbird	0.038	0.199	0.174	1	--	0.1840	--	--	5.60E+01	--	1	regression	4.4490	0.3280	--	5.58E+02	1.11E+02	--	regression	4.3632	0.0706	1.2E+02	--	0.07	--	4.24E+00	1.15E+02	66.1	187	2E+00	6E-01	1E+00	5E-01	4E-01	2E-01	No	No
NR20	Soil	Zinc	304.5	Song sparrow	0.025	0.227	0.199	1	0.65	0.1840	--	--	5.60E+01	8.27E+00	0.35	regression	4.4490	0.3280	--	5.58E+02	4.43E+01	--	regression	4.3632	0.0706	1.2E+02	--	0.105	--	7.26E+00	5.99E+01	66.1	187	9E-01	3E-01	6E-01	2E-01	3E-01	1E-01	No	No
NR20	Soil	Zinc	304.5	Red-tailed hawk	1.224	0.077	0.055	0.04213	--	0.1840	--	--	5.60E+01	--	--	regression	4.4490	0.3280	--	5.58E+02	--	1	regression	4.3632	0.0706	1.2E+02	9.05E+00	0.01	--	2.34E-01	9.29E+00	66.1	187	6E-03	2E-03	1E-01	5E-02	-1E-01	-4E-02	No	No
NR20	Soil	Zinc	304.5	Pocket gopher	0.235	0.097	0.114	1	1	0.1840	--	--	5.60E+01	5.43E+00	--	regression	4.4490	0.3280	--	5.58E+02	--	--	regression	4.3632	0.0706	1.2E+02	--	0.027	--	7.97E-01	6.23E+00	75.4	411	8E-02	2E-02	4E-02	7E-03	5E-02	8E-03	No	No
NR20	Soil	Zinc	304.5	Desert shrew	0.004	0.221	0.172	1	--	0.1840	--	--	5.60E+01	--	1	regression	4.4490	0.3280	--	5.58E+02	1.23E+02	--	regression	4.3632	0.0706	1.2E+02	--	0.13	--	8.75E+00	1.32E+02	75.4	411	2E+00	3E-01	1E+00	2E-01	4E-01	8E-02	No	No
NR20	Soil	Zinc	304.5	Raccoon	6.9	0.035	0.082	0.25845	0.45	0.1840	--	--	5.60E+01	8.82E-01	0.45	regression	4.4490	0.3280	--	5.58E+02	8.79E+00	0.1	regression	4.3632	0.0706	1.2E+02	4.11E-01	0.094	--	1.00E+00	1.11E+01	75.4	411	4E-02	7E-03	1E-01	2E-02	-7E-02	-1E-02	No	No
NR20	Soil	Zinc	304.5	Coyote	10	0.033	0.079	0.02819	--	0.1840	--	--	5.60E+01	--	--	regression	4.4490	0.3280	--	5.58E+02	--	1	regression	4.3632	0.0706	1.2E+02	3.88E+00	0.028	--	2.81E-01	4.16E+00	75.4	411	2E-03	3E-04	5E-02	9E-03	-5E-02	-9E-03	No	No
NR3	Soil	Antimony	2.135	Gambel's quail	0.175	0.05	0.105	0.53459	1	0.2950	--	--	6.30E-01	3.15E-02	--	1.0000	--	--	--	2.14E+00	--	--	1.0000	--	--	2.1E+00	--	0.105	--	1.12E-02	4.27E-02	--	--	--	--	--	--	Uncertainty	Uncertainty		
NR3	Soil	Antimony	2.135	Western kingbird	0.038	0.199	0.174	0.85535	--	0.2950	--	--	6.30E-01	--	1	1.0000	--	--	--	2.14E+00	4.25E-01	--	1.0000	--	--	2.1E+00	--	0.07	--	2.97E-02	4.55E-01	--	--	--	--	--	--	Uncertainty	Uncertainty		
NR3	Soil	Antimony	2.135	Song sparrow	0.025	0.227	0.199	1	0.65	0.2950	--	--	6.30E-01	9.29E-02	0.35	1.0000	--	--	--	2.14E+00	1.70E-01	--	1.0000	--	--	2.1E+00	--	0.105	--	5.09E-02	3.13E-01	--	--	--	--	--	--	Uncertainty	Uncertainty		
NR3	Soil	Antimony	2.135	Red-tailed hawk	1.224	0.077	0.055	0.00447	--	0.2950	--	--	6.30E-01	--	--	1.0000	--	--	--	2.14E+00	--	1	1.0000	--	--	2.1E+00	1.64E-01	0.01	--	1.64E-03	1.66E-01	--	--	--	--	--	--	Uncertainty	Uncertainty		
NR3	Soil	Antimony	2.135	Pocket gopher	0.235	0.097	0.114	1	1	0.2950	--	--	6.30E-01	6.11E-02	--	1.0000	--	--	--	2.14E+00	--	--	1.0000	--	--	2.1E+00	--	0.027	--	5.59E-03	6.67E-02	0.059	2.8	1E+00	2E-02	1E+00	3E-02	-2E-01	-3E-03	No	No
NR3	Soil	Antimony	2.135	Desert shrew	0.004	0.221	0.172	1	--	0.2950	--	--	6.30E-01	--	1	1.0000	--	--	--	2.14E+00	4.72E-01	--	1.0000	--	--	2.1E+00	--	0.13	--	6.13E-02	5.33E-01	0.059	2.8	9E+00	2E-01	1E+01	2E-01	-1E+00	-3E-02	No	No
NR3	Soil	Antimony	2.135	Raccoon	6.9	0.035	0.082	0.02742	0.45	0.2950	--	--	6.30E-01	9.92E-03	0.45	1.0000	--	--	--	2.14E+00	3.36E-02	0.1	1.0000	--	--	2.1E+00	7.47E-03	0.094	--	7.02E-03	5.80E-02	0.059	2.8	3E-02	6E-04	1E+00	2E-02	-1E+00	-2E-02	No	No
NR3	Soil	Antimony	2.135	Coyote	10	0.033	0.079	0.00299	--	0.2950	--	--	6.30E-01	--	--	1.0000	--	--	--	2.14E+00	--	1	1.0000	--	--	2.1E+00	7.05E-02	0.028	--	1.97E-03	7.24E-02	0.059	2.8	4E-03	8E-05	1E+00	3E-02	-1E+00	-3E-02	No	No
NR3	Soil	Arsenic	166	Gambel's quail	0.175	0.05	0.105	0.53459	1	0.0760	--	--	1.26E+01	6.31E-01	--	regression	-1.4210	0.7060	--	8.92E+00	--	--	regression	-4.8471	0.8188	5.2E-01	--	0.105	--	8.72E-01	1.50E+00	9.3	40.3	9E-02	2E-02	1E-01	3E-02	-2E-02	-5E-03	No	No
NR3	Soil	Arsenic	166	Western kingbird	0.038	0.199	0.174	0.85535	--	0.0760	--	--	1.26E+01	--	1	regression	-1.4210	0.7060	--	8.92E+00	1.77E+00	--	regression	-4.8471	0.8188	5.2E-01	--	0.07	--	2.31E+00	4.09E+00	9.3	40.3	4E-01	9E-02	3E-01	7E-02	6E-02	1E-02	No	No
NR3	Soil	Arsenic	166	Song sparrow	0.025	0.227	0.199	1	0.65	0.0760	--	--	1.26E+01	1.86E+00	0.35	regression	-1.4210	0.7060	--	8.92E+00	7.09E-01	--	regression	-4.8471	0.8188	5.2E-01	--	0.105	--	3.96E+00	6.53E+00	9.3	40.3	7E-01	2E-01	5E-01	1E-01	2E-01	5E-02	No	No
NR3	Soil	Arsenic	166	Red-tailed hawk	1.224	0.077	0.055	0.00447	--	0.0760	--	--	1.26E+01	--	--	regression	-1.4210	0.7060	--	8.92E+00	--	1	regression	-4.8471	0.8188	5.2E-01	3.97E-02	0.01	--	1.28E-01	1.68E-01	9.3	40.3	8E-05	2E-05	1E-02	3E-03	-1E-02	-3E-03	No	No
NR3	Soil	Arsenic	166	Pocket gopher	0.235	0.097	0.114	1	1	0.0760	--	--	1.26E+01	1.22E+00	--	regression	-1.4210	0.7060	--	8.92E+00	--	--	regression	-4.8471	0.8188	5.2E-01	--	0.027	--	4.35E-01	1.66E+00	1.04	4.7	2E+00	4E-01	1E+00	2E-01	5E-01	1E-01	No	No
NR3	Soil	Arsenic	166	Desert shrew	0.004	0.221	0.172	1	--	0.0760	--	--	1.26E+01	--	1	regression	-1.4210	0.7060	--	8.92E+00	1.97E+00	--	regression	-4.8471	0.8188	5.2E-01	--	0.13	--	4.77E+00	6.74E+00	1.04	4.7	6E+00	1E+00	5E+00	1E+00	2E+00	4E-01	Yes	No
NR3	Soil	Arsenic	166	Raccoon	6.9	0.035	0.082	0.02742	0.45	0.0760	--	--	1.26E+01	1.99E-01	0.45	reg																									

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TABLE M-23

Estimation of Potential Risks to Birds and Mammals - Soil

Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona

Site Data			Exposure Parameters					Plant Uptake					Invertebrate Uptake					Vertebrate Uptake					Soil Uptake					Total Dose	Site Risk				Incremental Risk <sup>a</sup>				Retain for Evaluation in Weight of Evidence <sup>b</sup>					
Exposure Area	Matrix	COPEC	RME Soil (mg/kg)	Receptor	Body Weight (kg)	Food Intake (kg/kg/d)	Water Intake (L/kgbw/d)	AUF	Diet Proportion	Soil to Plant BAF	Regression		Plant Concentration (mg/kg)	Plant Dose (mg/kg/day)	Diet Proportion	Soil to Invert BAF	Regression		Invert Concentration (mg/kg)	Invert Dose (mg/kg)	Diet Proportion	Soil to Vertebrate BAF	Regression		Vertebrate Concentration (mg/kg)	Vertebrate Dose (mg/kg/d)	Diet Proportion	Iron King Mine Bioavailability	Incidental Soil Dose (mg/kg/d)	(mg/kg/d)	NOAA-based TRVs	Site HQs		Background HQ		Incremental HQ		NOAA-based	LOAEL-based			
											B0	B1					B0	B1					LogKow	B0								B1	B0	B1	NOAA-based	LOAEL-based	NOAA-based			LOAEL-based	NOAA-based	LOAEL-based
NR6	Soil	Lead	632.6	Gambel's quail	0.175	0.05	0.105	0.45876	1	0.1030	--	--	6.52E+01	3.26E+00	--	regression	-0.2180	0.8070	--	1.46E+02	--	--	regression	0.0761	0.4422	1.9E+01	--	0.105	--	3.32E+00	6.58E+00	1.63	8.75	2E+00	3E-01	2E-01	4E-02	2E+00	3E-01	Yes	No	
NR6	Soil	Lead	632.6	Western kingbird	0.038	0.199	0.174	0.73402	--	0.1030	--	--	6.52E+01	--	1	regression	-0.2180	0.8070	--	1.46E+02	2.92E+01	--	--	regression	0.0761	0.4422	1.9E+01	--	0.07	--	8.81E+00	3.80E+01	1.63	8.75	2E+01	3E+00	2E+00	4E-01	2E+01	3E+00	Yes	Yes
NR6	Soil	Lead	632.6	Song sparrow	0.025	0.227	0.199	1	0.65	0.1030	--	--	6.52E+01	9.61E+00	0.35	regression	-0.2180	0.8070	--	1.46E+02	1.16E+01	--	--	regression	0.0761	0.4422	1.9E+01	--	0.105	--	1.51E+01	3.63E+01	1.63	8.75	2E+01	4E+00	2E+00	3E-01	2E+01	4E+00	Yes	Yes
NR6	Soil	Lead	632.6	Red-tailed hawk	1.224	0.077	0.055	0.00384	--	0.1030	--	--	6.52E+01	--	--	regression	-0.2180	0.8070	--	1.46E+02	--	1	regression	0.0761	0.4422	1.9E+01	1.44E+00	0.01	--	4.87E-01	1.93E+00	1.63	8.75	5E-03	8E-04	3E-01	5E-02	-3E-01	-5E-02	No	No	
NR6	Soil	Lead	632.6	Pocket gopher	0.235	0.097	0.114	1	1	0.1030	--	--	6.52E+01	6.32E+00	--	regression	-0.2180	0.8070	--	1.46E+02	--	--	regression	0.0761	0.4422	1.9E+01	--	0.027	0.2250	3.73E-01	6.69E+00	4.7	241	1E+00	3E-02	8E-02	2E-03	1E+00	3E-02	No	No	
NR6	Soil	Lead	632.6	Desert shrew	0.004	0.221	0.172	1	--	0.1030	--	--	6.52E+01	--	1	regression	-0.2180	0.8070	--	1.46E+02	3.24E+01	--	--	regression	0.0761	0.4422	1.9E+01	--	0.13	0.2250	4.09E+00	3.65E+01	4.7	241	8E+00	2E-01	7E-01	1E-02	7E+00	1E-01	Yes	No
NR6	Soil	Lead	632.6	Raccoon	6.9	0.035	0.082	0.02353	0.45	0.1030	--	--	6.52E+01	1.03E+00	0.45	regression	-0.2180	0.8070	--	1.46E+02	2.31E+00	0.1	regression	0.0761	0.4422	1.9E+01	6.54E-02	0.094	0.2250	4.68E-01	3.87E+00	4.7	241	2E-02	4E-04	7E-02	1E-03	-5E-02	-1E-03	No	No	
NR6	Soil	Lead	632.6	Coyote	10	0.033	0.079	0.00257	--	0.1030	--	--	6.52E+01	--	--	regression	-0.2180	0.8070	--	1.46E+02	--	1	regression	0.0761	0.4422	1.9E+01	6.17E-01	0.028	0.2250	1.32E-01	7.48E-01	4.7	241	4E-04	8E-06	4E-02	7E-04	-4E-02	-7E-04	No	No	
NR6	Soil	Manganese	11,898	Gambel's quail	0.175	0.05	0.105	0.45876	1	0.1220	--	--	1.45E+03	7.26E+01	--	regression	-0.8090	0.6820	--	2.68E+02	--	--	0.0205	--	--	2.4E+02	--	0.105	--	6.25E+01	1.35E+02	179	776	3E-01	8E-02	1E-01	2E-02	2E-01	6E-02	No	No	
NR6	Soil	Manganese	11,898	Western kingbird	0.038	0.199	0.174	0.73402	--	0.1220	--	--	1.45E+03	--	1	regression	-0.8090	0.6820	--	2.68E+02	5.33E+01	--	0.0205	--	--	2.4E+02	--	0.07	--	1.66E+02	2.19E+02	179	776	9E-01	2E-01	2E-01	5E-02	7E-01	2E-01	No	No	
NR6	Soil	Manganese	11,898	Song sparrow	0.025	0.227	0.199	1	0.65	0.1220	--	--	1.45E+03	2.14E+02	0.35	regression	-0.8090	0.6820	--	2.68E+02	2.13E+01	--	0.0205	--	--	2.4E+02	--	0.105	--	2.84E+02	5.19E+02	179	776	3E+00	7E-01	4E-01	9E-02	2E+00	6E-01	Yes	No	
NR6	Soil	Manganese	11,898	Red-tailed hawk	1.224	0.077	0.055	0.00384	--	0.1220	--	--	1.45E+03	--	--	regression	-0.8090	0.6820	--	2.68E+02	--	1	0.0205	--	--	2.4E+02	1.88E+01	0.01	--	9.16E+00	2.79E+01	179	776	6E-04	1E-04	2E-02	5E-03	-2E-02	-5E-03	No	No	
NR6	Soil	Manganese	11,898	Pocket gopher	0.235	0.097	0.114	1	1	0.1220	--	--	1.45E+03	1.41E+02	--	regression	-0.8090	0.6820	--	2.68E+02	--	--	0.0205	--	--	2.4E+02	--	0.027	--	3.12E+01	1.72E+02	51.5	284	3E+00	6E-01	4E-01	8E-02	3E+00	5E-01	Yes	No	
NR6	Soil	Manganese	11,898	Desert shrew	0.004	0.221	0.172	1	--	0.1220	--	--	1.45E+03	--	1	regression	-0.8090	0.6820	--	2.68E+02	5.92E+01	--	0.0205	--	--	2.4E+02	--	0.13	--	3.42E+02	4.01E+02	51.5	284	8E+00	1E+00	1E+00	2E-01	7E+00	1E+00	Yes	No	
NR6	Soil	Manganese	11,898	Raccoon	6.9	0.035	0.082	0.02353	0.45	0.1220	--	--	1.45E+03	2.29E+01	0.45	regression	-0.8090	0.6820	--	2.68E+02	4.22E+00	0.1	0.0205	--	--	2.4E+02	8.54E-01	0.094	--	3.91E+01	6.71E+01	51.5	284	3E-02	6E-03	2E-01	3E-02	-2E-01	-3E-02	No	No	
NR6	Soil	Manganese	11,898	Coyote	10	0.033	0.079	0.00257	--	0.1220	--	--	1.45E+03	--	--	regression	-0.8090	0.6820	--	2.68E+02	--	1	0.0205	--	--	2.4E+02	8.05E+00	0.028	--	1.10E+01	1.90E+01	51.5	284	9E-04	2E-04	5E-02	9E-03	-5E-02	-9E-03	No	No	
NR6	Soil	Mercury	0.22	Gambel's quail	0.175	0.05	0.105	0.45876	1	0.0990	--	--	2.18E-02	1.09E-03	--	regression	-0.6840	0.1180	--	4.22E-01	--	--	0.0543	--	--	1.2E-02	--	0.105	--	1.16E-03	2.24E-03	0.45	0.9	2E-03	1E-03	2E-03	9E-04	5E-04	2E-04	No	No	
NR6	Soil	Mercury	0.22	Western kingbird	0.038	0.199	0.174	0.73402	--	0.0990	--	--	2.18E-02	--	1	regression	-0.6840	0.1180	--	4.22E-01	8.40E-02	--	0.0543	--	--	1.2E-02	--	0.07	--	3.06E-03	8.70E-02	0.45	0.9	1E-01	7E-02	2E-01	8E-02	-3E-02	-1E-02	No	No	
NR6	Soil	Mercury	0.22	Song sparrow	0.025	0.227	0.199	1	0.65	0.0990	--	--	2.18E-02	3.21E-03	0.35	regression	-0.6840	0.1180	--	4.22E-01	3.35E-02	--	0.0543	--	--	1.2E-02	--	0.105	--	5.24E-03	4.20E-02	0.45	0.9	9E-02	5E-02	7E-02	4E-02	2E-02	1E-02	No	No	
NR6	Soil	Mercury	0.22	Red-tailed hawk	1.224	0.077	0.055	0.00384	--	0.0990	--	--	2.18E-02	--	--	regression	-0.6840	0.1180	--	4.22E-01	--	1	0.0543	--	--	1.2E-02	9.20E-04	0.01	--	1.69E-04	1.09E-03	0.45	0.9	9E-06	5E-06	9E-04	4E-04	-9E-04	-4E-04	No	No	
NR6	Soil	Mercury	0.22	Pocket gopher	0.235	0.097	0.114	1	1	0.0990	--	--	2.18E-02	2.11E-03	--	regression	-0.6840	0.1180	--	4.22E-01	--	--	0.0543	--	--	1.2E-02	--	0.														



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TABLE M-23  
Estimation of Potential Risks to Birds and Mammals - Soil  
Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona

Site Data				Exposure Parameters					Plant Uptake					Invertebrate Uptake					Vertebrate Uptake					Soil Uptake					Total Dose	Site Risk				Incremental Risk <sup>a</sup>				Retain for Evaluation <sup>b</sup>				
Exposure Area	Matrix	COPEC	RME Soil (mg/kg)	Receptor	Body Weight (kg)	Food Intake (kg/kg/d)	Water Intake (L/kgbw/d)	AUF	Diet Proportion	Soil to Plant BAF	Regression		Plant Concentration (mg/kg)	Plant Dose (mg/kg/day)	Diet Proportion	Soil to Invert BAF	Regression		Invert Concentration (mg/kg)	Invert Dose (mg/kg/d)	Diet Proportion	Soil to Vertebrate BAF	Regression		Vertebrate Concentration (mg/kg)	Vertebrate Dose (mg/kg/d)	Diet Proportion	Iron King Mine Bioavailability	Incidental Soil Dose (mg/kg/d)	(mg/kg/d)	TRVs		Site HQs		Background HQ		Incremental HQ		NOAAE-based	LOAEL-based		
											B0	B1					B0	B1					LogKow	B0							B1	B0	B1	NOAAE-based	LOAEL-based	NOAAE-based	LOAEL-based	NOAAE-based			LOAEL-based	NOAAE-based
RSAR-A	Soil	Lead	46.43	Coyote	10	0.033	0.079	0.00816	--	0.1030	--	--	4.78E+00	--	--	regression	-0.2180	0.8070	--	1.78E+01	--	1	regression	0.0761	0.4422	5.9E+00	1.94E-01	0.028	0.2250	9.65E-03	2.04E-01	4.7	241	4E-04	7E-06	4E-02	7E-04	-4E-02	-7E-04	No	No	
RSAR-A	Soil	Mercury	0.097	Gambel's quail	0.175	0.05	0.105	1	1	0.0990	--	--	9.60E-03	4.80E-04	--	regression	-0.6840	0.1180	--	3.83E-01	--	--	0.0543	--	--	5.3E-03	--	0.105	--	5.09E-04	9.89E-04	0.45	0.9	3E-03	2E-03	1E-03	9E-04	4E-04	2E-04	2E-04	No	No
RSAR-A	Soil	Mercury	0.097	Western kingbird	0.038	0.199	0.174	1	--	0.0990	--	--	9.60E-03	--	1	regression	-0.6840	0.1180	--	3.83E-01	7.62E-02	--	--	0.0543	--	--	5.3E-03	--	0.07	--	1.35E-03	7.76E-02	0.45	0.9	2E-01	9E-02	2E-01	8E-02	4E-03	2E-03	No	No
RSAR-A	Soil	Mercury	0.097	Song sparrow	0.025	0.227	0.199	1	0.65	0.0990	--	--	9.60E-03	1.42E-03	0.35	regression	-0.6840	0.1180	--	3.83E-01	3.04E-02	--	--	0.0543	--	--	5.3E-03	--	0.105	--	2.31E-03	3.42E-02	0.45	0.9	8E-02	4E-02	7E-02	4E-02	3E-03	2E-03	No	No
RSAR-A	Soil	Mercury	0.097	Red-tailed hawk	1.224	0.077	0.055	0.0122	--	0.0990	--	--	9.60E-03	--	--	regression	-0.6840	0.1180	--	3.83E-01	--	1	0.0543	--	--	5.3E-03	4.06E-04	0.01	--	7.47E-05	4.80E-04	0.45	0.9	1E-05	7E-06	9E-04	4E-04	-9E-04	-4E-04	No	No	
RSAR-A	Soil	Mercury	0.097	Pocket gopher	0.235	0.097	0.114	1	1	0.0990	--	--	9.60E-03	9.31E-04	--	regression	-0.6840	0.1180	--	3.83E-01	--	--	0.0543	--	--	5.3E-03	--	0.027	--	2.54E-04	1.19E-03	1	4	1E-03	3E-04	1E-03	2E-04	2E-04	5E-05	No	No	
RSAR-A	Soil	Mercury	0.097	Desert shrew	0.004	0.221	0.172	1	--	0.0990	--	--	9.60E-03	--	1	regression	-0.6840	0.1180	--	3.83E-01	8.47E-02	--	--	0.0543	--	--	5.3E-03	--	0.13	--	2.79E-03	8.75E-02	1	4	9E-02	2E-02	8E-02	2E-02	2E-03	6E-04	No	No
RSAR-A	Soil	Mercury	0.097	Raccoon	6.9	0.035	0.082	0.07484	0.45	0.0990	--	--	9.60E-03	1.51E-04	0.45	regression	-0.6840	0.1180	--	3.83E-01	6.03E-03	0.1	0.0543	--	--	5.3E-03	1.84E-05	0.094	--	3.19E-04	6.52E-03	1	4	5E-04	1E-04	6E-03	2E-03	-6E-03	-1E-03	No	No	
RSAR-A	Soil	Mercury	0.097	Coyote	10	0.033	0.079	0.00816	--	0.0990	--	--	9.60E-03	--	--	regression	-0.6840	0.1180	--	3.83E-01	--	1	0.0543	--	--	5.3E-03	1.74E-04	0.028	--	8.96E-05	2.63E-04	1	4	2E-06	5E-07	2E-04	5E-05	-2E-04	-5E-05	No	No	
RSAR-A	Soil	Selenium	4.7	Gambel's quail	0.175	0.05	0.105	1	1	0.1040	--	--	4.89E-01	2.44E-02	--	regression	-0.0750	0.7330	--	2.88E+00	--	--	regression	-0.4158	0.3764	1.2E+00	--	0.105	--	2.47E-02	4.91E-02	0.29	0.93	2E-01	5E-02	2E-01	5E-02	1E-02	3E-03	No	No	
RSAR-A	Soil	Selenium	4.7	Western kingbird	0.038	0.199	0.174	1	--	0.1040	--	--	4.89E-01	--	1	regression	-0.0750	0.7330	--	2.88E+00	5.74E-01	--	--	regression	-0.4158	0.3764	1.2E+00	--	0.07	--	6.55E-02	6.39E-01	0.29	0.93	<b>2E+00</b>	7E-01	2E+00	7E-01	1E-01	3E-02	No	No
RSAR-A	Soil	Selenium	4.7	Song sparrow	0.025	0.227	0.199	1	0.65	0.1040	--	--	4.89E-01	7.21E-02	0.35	regression	-0.0750	0.7330	--	2.88E+00	2.29E-01	--	--	regression	-0.4158	0.3764	1.2E+00	--	0.105	--	1.12E-01	4.13E-01	0.29	0.93	1E+00	4E-01	1E+00	4E-01	8E-02	2E-02	No	No
RSAR-A	Soil	Selenium	4.7	Red-tailed hawk	1.224	0.077	0.055	0.0122	--	0.1040	--	--	4.89E-01	--	--	regression	-0.0750	0.7330	--	2.88E+00	--	1	regression	-0.4158	0.3764	1.2E+00	9.10E-02	0.01	--	3.62E-03	9.46E-02	0.29	0.93	4E-03	1E-03	3E-01	1E-01	-3E-01	-1E-01	No	No	
RSAR-A	Soil	Selenium	4.7	Pocket gopher	0.235	0.097	0.114	1	1	0.1040	--	--	4.89E-01	4.74E-02	--	regression	-0.0750	0.7330	--	2.88E+00	--	--	regression	-0.4158	0.3764	1.2E+00	--	0.027	--	1.23E-02	5.97E-02	0.143	1.21	4E-01	5E-02	4E-01	5E-02	3E-02	3E-03	No	No	
RSAR-A	Soil	Selenium	4.7	Desert shrew	0.004	0.221	0.172	1	--	0.1040	--	--	4.89E-01	--	1	regression	-0.0750	0.7330	--	2.88E+00	6.37E-01	--	--	regression	-0.4158	0.3764	1.2E+00	--	0.13	--	1.35E-01	7.73E-01	0.143	1.21	<b>5E+00</b>	6E-01	5E+00	6E-01	3E-01	3E-02	No	No
RSAR-A	Soil	Selenium	4.7	Raccoon	6.9	0.035	0.082	0.07484	0.45	0.1040	--	--	4.89E-01	7.70E-03	0.45	regression	-0.0750	0.7330	--	2.88E+00	4.54E-02	0.1	regression	-0.4158	0.3764	1.2E+00	4.13E-03	0.094	--	1.55E-02	7.27E-02	0.143	1.21	4E-02	4E-03	5E-01	6E-02	-4E-01	-5E-02	No	No	
RSAR-A	Soil	Selenium	4.7	Coyote	10	0.033	0.079	0.00816	--	0.1040	--	--	4.89E-01	--	--	regression	-0.0750	0.7330	--	2.88E+00	--	1	regression	-0.4158	0.3764	1.2E+00	3.90E-02	0.028	--	4.34E-03	4.33E-02	0.143	1.21	2E-03	3E-04	3E-01	3E-02	-3E-01	-3E-02	No	No	
RSAR-A	Soil	Zinc	165	Gambel's quail	0.175	0.05	0.105	1	1	0.1840	--	--	3.04E+01	1.52E+00	--	regression	4.4490	0.3280	--	4.57E+02	--	--	regression	4.3632	0.0706	1.1E+02	--	0.105	--	8.66E-01	2.38E+00	66.1	187	4E-02	1E-02	3E-02	1E-02	6E-03	2E-03	No	No	
RSAR-A	Soil	Zinc	165	Western kingbird	0.038	0.199	0.174	1	--	0.1840	--	--	3.04E+01	--	1	regression	4.4490	0.3280	--	4.57E+02	9.09E+01	--	--	regression	4.3632	0.0706	1.1E+02	--	0.07	--	2.30E+00	9.32E+01	66.1	187	1E+00	5E-01	1E+00	5E-01	9E-02	3E-02	No	No
RSAR-A	Soil	Zinc	165	Song sparrow	0.025	0.227	0.199	1	0.65	0.1840	--	--	3.04E+01	4.48E+00	0.35	regression	4.4490	0.3280	--	4.57E+02	3.63E+01	--	--	regression	4.3632	0.0706	1.1E+02	--	0.105	--	3.93E+00	4.47E+01	66.1	187	7E-01	2E-01	6E-01	2E-01	6E-02	2E-02	No	No
RSAR-A	Soil	Zinc	165	Red-tailed hawk	1.224	0.077	0.055	0.0122	--	0.1840	--	--	3.04E+01	--	--	regression	4.4490	0.3280	--	4.57E+02	--	1	regression	4.3632	0.0706																	

TABLE M-23

Estimation of Potential Risks to Birds and Mammals - Soil

Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona

Site Data			Exposure Parameters					Plant Uptake					Invertebrate Uptake					Vertebrate Uptake					Soil Uptake			Total Dose	Site Risk		Incremental Risk <sup>a</sup>				Retain for Evaluation <sup>b</sup>								
Exposure Area	Matrix	COPEC	RME Soil (mg/kg)	Receptor	Body Weight (kg)	Food Intake (kg/kg/d)	Water Intake (L/kgbw/d)	AUF	Diet Proportion	Soil to Plant BAF	Regression		Plant Concentration (mg/kg)	Plant Dose (mg/kg/day)	Diet Proportion	Soil to Invert BAF	Regression		Invert Concentration (mg/kg)	Invert Dose (mg/kg/d)	Diet Proportion	Soil to Vertebrate BAF	Regression		Vertebrate Concentration (mg/kg)	Vertebrate Dose (mg/kg/d)	Diet Proportion	Iron King Mine Bioavailability	Incidental Soil Dose (mg/kg/d)	(mg/kg/d)	TRVs	Site HQs		Background HQ		Incremental HQ		NOAEL-based	LOAEL-based		
											B0	B1					B0	B1					LogKow	B0								B1	B0	B1							
SE-01	Soil	Aluminum	39,747	Song sparrow	0.025	0.227	0.199	1	0.65	0.0640	--	--	2.54E+03	3.75E+02	0.35	--	--	--	--	1.71E+03	1.36E+02	--	0.0263	--	--	1.0E+03	--	0.105	--	9.47E+02	1.46E+03	109.7	548.5	1E+01	3E+00	1E+01	2E+00	1E+00	3E-01	No	No
SE-01	Soil	Aluminum	39,747	Red-tailed hawk	1.224	0.077	0.055	0.01089	--	0.0640	--	--	2.54E+03	--	--	--	--	--	--	1.71E+03	--	1	0.0263	--	--	1.0E+03	8.05E+01	0.01	--	3.06E+01	1.11E+02	109.7	548.5	1E-02	2E-03	9E-01	2E-01	-9E-01	-2E-01	No	No
SE-01	Soil	Aluminum	39,747	Pocket gopher	0.235	0.097	0.114	1	1	0.0640	--	--	2.54E+03	2.47E+02	--	--	--	--	--	1.71E+03	--	--	0.0263	--	--	1.0E+03	--	0.027	--	1.04E+02	3.51E+02	3.86	19.3	9E+01	2E+01	8E+01	2E+01	9E+00	2E+00	Yes	Yes
SE-01	Soil	Aluminum	39,747	Desert shrew	0.004	0.221	0.172	1	--	0.0640	--	--	2.54E+03	--	1	0.0430	--	--	--	1.71E+03	3.78E+02	--	0.0263	--	--	1.0E+03	--	0.13	--	1.14E+03	1.52E+03	3.86	19.3	4E+02	8E+01	4E+02	7E+01	4E+01	8E+00	Yes	Yes
SE-01	Soil	Aluminum	39,747	Raccoon	6.9	0.035	0.082	0.0668	0.45	0.0640	--	--	2.54E+03	4.01E+01	0.45	0.0430	--	--	--	1.71E+03	2.69E+01	0.1	0.0263	--	--	1.0E+03	3.66E+00	0.094	--	1.31E+02	2.01E+02	3.86	19.3	3E+00	7E-01	5E+01	9E+00	-4E+01	-9E+00	No	No
SE-01	Soil	Aluminum	39,747	Coyote	10	0.033	0.079	0.00729	--	0.0640	--	--	2.54E+03	--	--	--	--	--	--	1.71E+03	--	1	0.0263	--	--	1.0E+03	3.45E+01	0.028	--	3.67E+01	7.12E+01	3.86	19.3	1E-01	3E-02	2E+01	3E+00	-2E+01	-3E+00	No	No
SE-01	Soil	Antimony	1.444	Gambel's quail	0.175	0.05	0.105	1	1	0.2950	--	--	4.26E-01	2.13E-02	--	1.0000	--	--	--	1.44E+00	--	--	1.0000	--	--	1.4E+00	--	0.105	--	7.58E-03	2.89E-02	--	--	--	--	--	--	Uncertainty	Uncertainty		
SE-01	Soil	Antimony	1.444	Western kingbird	0.038	0.199	0.174	1	--	0.2950	--	--	4.26E-01	--	1	1.0000	--	--	--	1.44E+00	2.87E-01	--	1.0000	--	--	1.4E+00	--	0.07	--	2.01E-02	3.07E-01	--	--	--	--	--	--	Uncertainty	Uncertainty		
SE-01	Soil	Antimony	1.444	Song sparrow	0.025	0.227	0.199	1	0.65	0.2950	--	--	4.26E-01	6.29E-02	0.35	1.0000	--	--	--	1.44E+00	1.15E-01	--	1.0000	--	--	1.4E+00	--	0.105	--	3.44E-02	2.12E-01	--	--	--	--	--	--	Uncertainty	Uncertainty		
SE-01	Soil	Antimony	1.444	Red-tailed hawk	1.224	0.077	0.055	0.01089	--	0.2950	--	--	4.26E-01	--	--	1.0000	--	--	--	1.44E+00	--	1	1.0000	--	--	1.4E+00	1.11E-01	0.01	--	1.11E-03	1.12E-01	--	--	--	--	--	--	Uncertainty	Uncertainty		
SE-01	Soil	Antimony	1.444	Pocket gopher	0.235	0.097	0.114	1	1	0.2950	--	--	4.26E-01	4.13E-02	--	1.0000	--	--	--	1.44E+00	--	--	1.0000	--	--	1.4E+00	--	0.027	--	3.78E-03	4.51E-02	0.059	2.8	8E-01	2E-02	1E+00	3E-02	-5E-01	-1E-02	No	No
SE-01	Soil	Antimony	1.444	Desert shrew	0.004	0.221	0.172	1	--	0.2950	--	--	4.26E-01	--	1	1.0000	--	--	--	1.44E+00	3.19E-01	--	1.0000	--	--	1.4E+00	--	0.13	--	4.15E-02	3.61E-01	0.059	2.8	6E+00	1E-01	1E+01	2E-01	-4E+00	-9E-02	No	No
SE-01	Soil	Antimony	1.444	Raccoon	6.9	0.035	0.082	0.0668	0.45	0.2950	--	--	4.26E-01	6.71E-03	0.45	1.0000	--	--	--	1.44E+00	2.27E-02	0.1	1.0000	--	--	1.4E+00	5.05E-03	0.094	--	4.75E-03	3.93E-02	0.059	2.8	4E-02	9E-04	1E+00	2E-02	-1E+00	-2E-02	No	No
SE-01	Soil	Antimony	1.444	Coyote	10	0.033	0.079	0.00729	--	0.2950	--	--	4.26E-01	--	--	1.0000	--	--	--	1.44E+00	--	1	1.0000	--	--	1.4E+00	4.77E-02	0.028	--	1.33E-03	4.90E-02	0.059	2.8	6E-03	1E-04	1E+00	3E-02	-1E+00	-3E-02	No	No
SE-01	Soil	Arsenic	116.7	Gambel's quail	0.175	0.05	0.105	1	1	0.0760	--	--	8.87E+00	4.43E-01	--	regression	-1.4210	0.7060	--	6.95E+00	--	--	regression	-4.8471	0.8188	3.9E-01	--	0.105	--	6.13E-01	1.06E+00	9.3	40.3	1E-01	3E-02	1E-01	3E-02	5E-03	1E-03	No	No
SE-01	Soil	Arsenic	116.7	Western kingbird	0.038	0.199	0.174	1	--	0.0760	--	--	8.87E+00	--	1	regression	-1.4210	0.7060	--	6.95E+00	1.38E+00	--	regression	-4.8471	0.8188	3.9E-01	--	0.07	--	1.63E+00	3.01E+00	9.3	40.3	3E-01	7E-02	3E-01	7E-02	1E-02	3E-03	No	No
SE-01	Soil	Arsenic	116.7	Song sparrow	0.025	0.227	0.199	1	0.65	0.0760	--	--	8.87E+00	1.31E+00	0.35	regression	-1.4210	0.7060	--	6.95E+00	5.52E-01	--	regression	-4.8471	0.8188	3.9E-01	--	0.105	--	2.78E+00	4.64E+00	9.3	40.3	5E-01	1E-01	5E-01	1E-01	2E-02	4E-03	No	No
SE-01	Soil	Arsenic	116.7	Red-tailed hawk	1.224	0.077	0.055	0.01089	--	0.0760	--	--	8.87E+00	--	--	regression	-1.4210	0.7060	--	6.95E+00	--	1	regression	-4.8471	0.8188	3.9E-01	--	0.01	--	8.99E-02	1.20E-01	9.3	40.3	1E-04	3E-05	1E-02	3E-03	-1E-02	-3E-03	No	No
SE-01	Soil	Arsenic	116.7	Pocket gopher	0.235	0.097	0.114	1	1	0.0760	--	--	8.87E+00	8.60E-01	--	regression	-1.4210	0.7060	--	6.95E+00	--	--	regression	-4.8471	0.8188	3.9E-01	--	0.027	--	3.06E-01	1.17E+00	1.04	4.7	1E+00	2E-01	1E+00	2E-01	5E-02	1E-02	No	No
SE-01	Soil	Arsenic	116.7	Desert shrew	0.004	0.221	0.172	1	--	0.0760	--	--	8.87E+00	--	1	regression	-1.4210	0.7060	--	6.95E+00	1.54E+00	--	regression	-4.8471	0.8188	3.9E-01	--	0.13	--	3.35E+00	4.89E+00	1.04	4.7	5E+00	1E+00	5E+00	1E+00	2E-01	4E-02	No	No
SE-01	Soil	Arsenic	116.7	Raccoon	6.9	0.035	0.082	0.0668	0.45	0.0760	--	--	8.87E+00	1.40E-01	0.45	regression	-1.4210	0.7060	--	6.95E+00	1.10E-01	0.1	regression	-4.8471	0.8188	3.9E-01	1.35E-03	0.094	--	3.84E-01	6.35E-01	1.04	4.7	4E-02	9E-03	6E-01	1E-01	-5E-01	-1E-01	No	No
SE-01	Soil	Arsenic	116.7	Coyote	10	0.033	0.079	0.00729	--	0.0760	--	--	8.87E+00	--	--	regression	-1.4210	0.7060	--	6.95E+00	--	1	regression	-4.8471	0.8188	3.9E-01	1.28E-02	0.028	--	1.08E-01	1.21E-01	1.04	4.7	8E-04	2E-04	1E-01	2E-02	-1E-01	-2E-02	No	No
SE-01	Soil	Cadmium	2.754	Gambel's quail	0.175	0.05	0.105	1	1	0.2970	--	--	8.18E-01	4.09E-02	--	regression	2.1140	0.7950	--	1.85E+01	--	--	regression	-1.2571	0.4723	4.6E-01	--	0.													

Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona

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Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona

Notes:

<sup>a</sup> Incremental risk calculated as the site risk minus the risk due to background (Site HQ - BKGd HQ). Incremental risks shown as negative values are the result

<sup>b</sup> Chemicals retained for weight of evidence evaluation are those with INCR HQ>1 (where BTV is available) or where Site HQ>1 (rounded to one significant figure).

-- not available

BAF - bioaccumulation factor

BTV - background threshold value

COPEC - chemical of potential ecological concern

EPC - exposure point concentration

HQ - hazard quotient

INCR - incremental risk

NOAEL - no observed adverse effect level

LOAEL - lowest observed adverse effect level

HQ - hazard quotient

TABLE M-24

**Estimation of Potential Risks to Aquatic Plants***Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona*

				Tier 2 Risk Estimate			Retain for WOE <sup>a</sup> ?
Exposure		Sediment RME					
Area	Media	COPEC	Units	EPC (mg/kg)	Benchmark (mg/kg)	Tier 2 HQ	
AF-01	Sediment	Aluminum	mg/kg	24800	50	5E+02	Yes
AF-01	Sediment	Arsenic	mg/kg	20.6	91	2E-01	No
AF-01	Sediment	Barium	mg/kg	238	500	5E-01	No
AF-01	Sediment	Beryllium	mg/kg	0.89	25	4E-02	No
AF-01	Sediment	Chromium	mg/kg	43.7	600	7E-02	No
AF-01	Sediment	Cobalt	mg/kg	13.5	130	1E-01	No
AF-01	Sediment	Copper	mg/kg	44.6	490	9E-02	No
AF-01	Sediment	Iron	mg/kg	31100	--	--	Uncertainty
AF-01	Sediment	Lead	mg/kg	14.1	570	2E-02	No
AF-01	Sediment	Manganese	mg/kg	535	1100	5E-01	No
AF-01	Sediment	Mercury	mg/kg	0.035	64	5E-04	No
AF-01	Sediment	Nickel	mg/kg	26	270	1E-01	No
AF-01	Sediment	Selenium	mg/kg	1.5	3	5E-01	No
AF-01	Sediment	Sulfate	mg/kg	66	--	--	Uncertainty
AF-01	Sediment	Vanadium	mg/kg	73.6	330	2E-01	No
AF-01	Sediment	Zinc	mg/kg	89	810	1E-01	No
AF-01	Sediment	1,2,3,4,6,7,8-Hepta CDD	mg/kg	0.0000129	0.000004	3E+00	Yes
AF-01	Sediment	OCDD	mg/kg	0.000148	0.000004	4E+01	Yes
AF-01	Sediment	OCDF	mg/kg	0.00000509	0.000004	1E+00	No
AF-02	Sediment	Aluminum	mg/kg	47731	50	1E+03	Yes
AF-02	Sediment	Antimony	mg/kg	2.038	58	4E-02	No
AF-02	Sediment	Arsenic	mg/kg	83.22	91	9E-01	No
AF-02	Sediment	Barium	mg/kg	122.7	500	2E-01	No
AF-02	Sediment	Beryllium	mg/kg	3.09	25	1E-01	No
AF-02	Sediment	Cadmium	mg/kg	8.852	160	6E-02	No
AF-02	Sediment	Chromium	mg/kg	404.6	600	7E-01	No
AF-02	Sediment	Cobalt	mg/kg	13.71	130	1E-01	No
AF-02	Sediment	Copper	mg/kg	5576	490	1E+01	Yes
AF-02	Sediment	Cyanide	mg/kg	0.11	0.9	1E-01	No
AF-02	Sediment	Iron	mg/kg	23469	--	--	Uncertainty
AF-02	Sediment	Lead	mg/kg	336.9	570	6E-01	No
AF-02	Sediment	Manganese	mg/kg	562.8	1100	5E-01	No
AF-02	Sediment	Mercury	mg/kg	0.154	64	2E-03	No
AF-02	Sediment	Nickel	mg/kg	326.7	270	1E+00	No
AF-02	Sediment	Nitrate as N	mg/kg	6.6	--	--	Uncertainty
AF-02	Sediment	Selenium	mg/kg	3.789	3	1E+00	No
AF-02	Sediment	Silver	mg/kg	6.301	2800	2E-03	No
AF-02	Sediment	Sulfate	mg/kg	220	--	--	Uncertainty
AF-02	Sediment	Thallium	mg/kg	1.5	1	2E+00	Yes
AF-02	Sediment	Vanadium	mg/kg	54.19	330	2E-01	No
AF-02	Sediment	Zinc	mg/kg	1468	810	2E+00	Yes
AF-02	Sediment	OCDD	mg/kg	0.00000937	0.000004	2E+00	Yes
AF-03	Sediment	Aluminum	mg/kg	11074	50	2E+02	Yes
AF-03	Sediment	Antimony	mg/kg	0.909	58	2E-02	No
AF-03	Sediment	Arsenic	mg/kg	104.4	91	1E+00	No
AF-03	Sediment	Barium	mg/kg	106.2	500	2E-01	No
AF-03	Sediment	Beryllium	mg/kg	0.368	25	1E-02	No
AF-03	Sediment	Cadmium	mg/kg	3.307	160	2E-02	No
AF-03	Sediment	Chromium	mg/kg	18.8	600	3E-02	No
AF-03	Sediment	Cobalt	mg/kg	12.46	130	1E-01	No
AF-03	Sediment	Copper	mg/kg	241.9	490	5E-01	No
AF-03	Sediment	Cyanide	mg/kg	0.18	0.9	2E-01	No
AF-03	Sediment	Iron	mg/kg	24032	--	--	Uncertainty
AF-03	Sediment	Lead	mg/kg	171	570	3E-01	No

TABLE M-24

**Estimation of Potential Risks to Aquatic Plants***Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona*

Exposure			Units	Sediment RME EPC (mg/kg)	Tier 2 Risk Estimate		Retain for WOE <sup>a</sup> ?
					Benchmark (mg/kg)	Tier 2 HQ	
AF-03	Sediment	Manganese	mg/kg	1601	1100	1E+00	No
AF-03	Sediment	Mercury	mg/kg	0.347	64	5E-03	No
AF-03	Sediment	Nickel	mg/kg	18.39	270	7E-02	No
AF-03	Sediment	Nitrate as N	mg/kg	1	--	--	Uncertainty
AF-03	Sediment	Silver	mg/kg	0.628	2800	2E-04	No
AF-03	Sediment	Sulfate	mg/kg	37	--	--	Uncertainty
AF-03	Sediment	Vanadium	mg/kg	49.33	330	1E-01	No
AF-03	Sediment	Zinc	mg/kg	703.6	810	9E-01	No

Notes:

<sup>a</sup> Chemicals retained for weight of evidence evaluation are those with HQs>1 (rounded to one significant figure).

-- not available

COPEC - chemical of potential ecological concern

EPC - exposure point concentration

HQ - hazard quotient

WOE - weight of evidence

TABLE M-25

**Estimation of Potential Risks to Benthic Macroinvertebrates***Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona*

										Retain for Evaluation in	
					Benchmarks		Tier 2 Risk Estimates		Weight of Evidence		
Exposure				RME EPC	No Effect	Low Effect	No	Low Effect	No Effect	Low Effect	
Area	Media	COPEC	Units	(mg/kg)	Benchmark	Benchmark	Effect	Effect			
					(mg/kg)	(mg/kg)	HQ	HQ			
AF-01	Sediment	Aluminum	mg/kg	24800	25500	51000	1E+00	5E-01	No	No	
AF-01	Sediment	Arsenic	mg/kg	20.6	9.79	33	2E+00	6E-01	Yes	No	
AF-01	Sediment	Barium	mg/kg	238	130	260	2E+00	9E-01	Yes	No	
AF-01	Sediment	Beryllium	mg/kg	0.89	--	--	--	--	Uncertainty	Uncertainty	
AF-01	Sediment	Chromium	mg/kg	43.7	43.4	111	1E+00	4E-01	No	No	
AF-01	Sediment	Cobalt	mg/kg	13.5	50	100	3E-01	1E-01	No	No	
AF-01	Sediment	Copper	mg/kg	44.6	31.6	149	1E+00	3E-01	No	No	
AF-01	Sediment	Iron	mg/kg	31100	20000	40000	2E+00	8E-01	Yes	No	
AF-01	Sediment	Lead	mg/kg	14.1	35.8	128	4E-01	1E-01	No	No	
AF-01	Sediment	Manganese	mg/kg	535	630	1100	8E-01	5E-01	No	No	
AF-01	Sediment	Mercury	mg/kg	0.035	0.18	1.06	2E-01	3E-02	No	No	
AF-01	Sediment	Nickel	mg/kg	26	22.7	48.6	1E+00	5E-01	No	No	
AF-01	Sediment	Selenium	mg/kg	1.5	2.5	4	6E-01	4E-01	No	No	
AF-01	Sediment	Sulfate	mg/kg	66	--	--	--	--	Uncertainty	Uncertainty	
AF-01	Sediment	Vanadium	mg/kg	73.6	57	114	1E+00	6E-01	No	No	
AF-01	Sediment	Zinc	mg/kg	89	121	459	7E-01	2E-01	No	No	
AF-01	Sediment	1,2,3,4,6,7,8-Hepta CDD	mg/kg	0.0000129	0.00000085	0.0000215	2E+01	6E-01	Yes	No	
AF-01	Sediment	OCDD	mg/kg	0.000148	0.00000085	0.0000215	2E+02	7E+00	Yes	Yes	
AF-01	Sediment	OCDF	mg/kg	0.00000509	0.00000085	0.0000215	6E+00	2E-01	Yes	No	
AF-02	Sediment	Aluminum	mg/kg	47731	25500	51000	2E+00	9E-01	Yes	No	
AF-02	Sediment	Antimony	mg/kg	2.038	2	3	1E+00	7E-01	No	No	
AF-02	Sediment	Arsenic	mg/kg	83.22	9.79	33	9E+00	3E+00	Yes	Yes	
AF-02	Sediment	Barium	mg/kg	122.7	130	260	9E-01	5E-01	No	No	
AF-02	Sediment	Beryllium	mg/kg	3.09	--	--	--	--	Uncertainty	Uncertainty	
AF-02	Sediment	Cadmium	mg/kg	8.852	0.99	4.98	9E+00	2E+00	Yes	Yes	
AF-02	Sediment	Chromium	mg/kg	404.6	43.4	111	9E+00	4E+00	Yes	Yes	
AF-02	Sediment	Cobalt	mg/kg	13.71	50	100	3E-01	1E-01	No	No	
AF-02	Sediment	Copper	mg/kg	5576	31.6	149	2E+02	4E+01	Yes	Yes	
AF-02	Sediment	Cyanide	mg/kg	0.11	--	--	--	--	Uncertainty	Uncertainty	
AF-02	Sediment	Iron	mg/kg	23469	20000	40000	1E+00	6E-01	No	No	
AF-02	Sediment	Lead	mg/kg	336.9	35.8	128	9E+00	3E+00	Yes	Yes	
AF-02	Sediment	Manganese	mg/kg	562.8	630	1100	9E-01	5E-01	No	No	
AF-02	Sediment	Mercury	mg/kg	0.154	0.18	1.06	9E-01	1E-01	No	No	
AF-02	Sediment	Nickel	mg/kg	326.7	22.7	48.6	1E+01	7E+00	Yes	Yes	
AF-02	Sediment	Nitrate as N	mg/kg	6.6	--	--	--	--	Uncertainty	Uncertainty	
AF-02	Sediment	Selenium	mg/kg	3.789	2.5	4	2E+00	9E-01	Yes	No	
AF-02	Sediment	Silver	mg/kg	6.301	1	4.5	6E+00	1E+00	Yes	No	
AF-02	Sediment	Sulfate	mg/kg	220	--	--	--	--	Uncertainty	Uncertainty	
AF-02	Sediment	Thallium	mg/kg	1.5	--	--	--	--	Uncertainty	Uncertainty	
AF-02	Sediment	Vanadium	mg/kg	54.19	57	114	1E+00	5E-01	No	No	

TABLE M-25

**Estimation of Potential Risks to Benthic Macroinvertebrates***Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona*

Exposure Area	Media	COPEC	Units	RME EPC (mg/kg)	Benchmarks		Tier 2 Risk Estimates		Retain for Evaluation in Weight of Evidence	
					No Effect Benchmark (mg/kg)	Low Effect Benchmark (mg/kg)	No Effect HQ	Low Effect HQ	No Effect	Low Effect
AF-02	Sediment	Zinc	mg/kg	1468	121	459	1E+01	3E+00	Yes	Yes
AF-02	Sediment	OCDD	mg/kg	0.00000937	0.00000085	0.0000215	1E+01	4E-01	Yes	No
AF-03	Sediment	Aluminum	mg/kg	11074	25500	51000	4E-01	2E-01	No	No
AF-03	Sediment	Antimony	mg/kg	0.909	2	3	5E-01	3E-01	No	No
AF-03	Sediment	Arsenic	mg/kg	104.4	9.79	33	1E+01	3E+00	Yes	Yes
AF-03	Sediment	Barium	mg/kg	106.2	130	260	8E-01	4E-01	No	No
AF-03	Sediment	Beryllium	mg/kg	0.368	--	--	--	--	Uncertainty	Uncertainty
AF-03	Sediment	Cadmium	mg/kg	3.307	0.99	4.98	3E+00	7E-01	Yes	No
AF-03	Sediment	Chromium	mg/kg	18.8	43.4	111	4E-01	2E-01	No	No
AF-03	Sediment	Cobalt	mg/kg	12.46	50	100	2E-01	1E-01	No	No
AF-03	Sediment	Copper	mg/kg	241.9	31.6	149	8E+00	2E+00	Yes	Yes
AF-03	Sediment	Cyanide	mg/kg	0.18	--	--	--	--	Uncertainty	Uncertainty
AF-03	Sediment	Iron	mg/kg	24032	20000	40000	1E+00	6E-01	No	No
AF-03	Sediment	Lead	mg/kg	171	35.8	128	5E+00	1E+00	Yes	No
AF-03	Sediment	Manganese	mg/kg	1601	630	1100	3E+00	1E+00	Yes	No
AF-03	Sediment	Mercury	mg/kg	0.347	0.18	1.06	2E+00	3E-01	Yes	No
AF-03	Sediment	Nickel	mg/kg	18.39	22.7	48.6	8E-01	4E-01	No	No
AF-03	Sediment	Nitrate as N	mg/kg	1	--	--	--	--	Uncertainty	Uncertainty
AF-03	Sediment	Silver	mg/kg	0.628	1	4.5	6E-01	1E-01	No	No
AF-03	Sediment	Sulfate	mg/kg	37	--	--	--	--	Uncertainty	Uncertainty
AF-03	Sediment	Vanadium	mg/kg	49.33	57	114	9E-01	4E-01	No	No
AF-03	Sediment	Zinc	mg/kg	703.6	121	459	6E+00	2E+00	Yes	Yes

## Notes:

<sup>a</sup> The maximum estimated site risk HQ is presented if it exceeds 1 (rounded to one significant figure).<sup>u</sup> Chemicals retained for weight of evidence evaluation are those with either the No Effect or Low Effect HQs>1 (rounded to one significant figure).

-- not available

BTV - background threshold value

COPEC - chemical of potential ecological concern

EPC - exposure point concentration

HQ - hazard quotient

WOE - weight of evidence

TABLE M-26

**Comparison of Potential Risks to Benthic Macroinvertebrates - Upstream Reference vs. Site Exposure Areas***Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona*

COPEC	Low Effect Benchmark (mg/kg)	Maximum Detect - Upstream Reference Segments <sup>a</sup> (mg/kg)			RME Agua Fria Exposure Areas (mg/kg)			Tier 2 Low Effect Risk Estimates						Retain for Evaluation in Weight of Evidence
		REF-AF	REF-West	REF-East	AF-01	AF-02	AF-03	REF-AF	REF-West	REF-East	AF-01	AF-02	AF-03	
Aluminum	51000	4270	8240	11600	24800	47731	11074	8E-02	2E-01	2E-01	5E-01	9E-01	2E-01	No
Antimony	3	--	--	--	not COPEC	2.038	0.909	--	--	--	--	7E-01	3E-01	No
Arsenic	33	7.1	11.9	41.3	20.6	83.22	104.4	2E-01	4E-01	1E+00	6E-01	<b>3E+00</b>	<b>3E+00</b>	Yes
Barium	260	68.5	99.4	322	238	122.7	106.2	3E-01	4E-01	1E+00	9E-01	5E-01	4E-01	No
Beryllium	--	0.19	--	--	0.89	3.09	0.368	--	--	--	--	--	--	Uncertainty
Cadmium	4.98	0.08	--	--	not COPEC	8.852	3.307	2E-02	--	--	--	<b>2E+00</b>	7E-01	Yes
Chromium	111	9.3	16.5	27.5	43.7	404.6	18.8	8E-02	1E-01	2E-01	4E-01	<b>4E+00</b>	2E-01	Yes
Cobalt	100	4.2	10.5	19.7	13.5	13.71	12.46	4E-02	1E-01	2E-01	1E-01	1E-01	1E-01	No
Copper	149	13.9	32.8	45.8	44.6	5576	241.9	9E-02	2E-01	3E-01	3E-01	<b>4E+01</b>	<b>2E+00</b>	Yes
Cyanide	--	--	--	--	not COPEC	0.11	0.18	--	--	--	--	--	--	Uncertainty
Iron	40000	9450	18700	24400	31100	23469	24032	2E-01	5E-01	6E-01	8E-01	6E-01	6E-01	No
Lead	128	5.5	16.1	13.6	14.1	336.9	171	4E-02	1E-01	1E-01	1E-01	<b>3E+00</b>	1E+00	Yes
Manganese	1100	255	518	1370	535	562.8	1601	2E-01	5E-01	1E+00	5E-01	5E-01	1E+00	No
Mercury	1.06	--	--	--	0.035	0.154	0.347	--	--	--	3E-02	1E-01	3E-01	No
Nickel	48.6	7.9	13.3	34.5	26	326.7	18.39	2E-01	3E-01	7E-01	5E-01	<b>7E+00</b>	4E-01	Yes
Nitrate as N	--	--	--	--	not COPEC	6.6	1	--	--	--	--	--	--	Uncertainty
Selenium	4	1	0.64	--	1.5	3.789	not COPEC	3E-01	2E-01	--	4E-01	9E-01	--	No
Silver	4.5	--	--	--	not COPEC	6.301	0.628	--	--	--	--	1E+00	1E-01	No
Sulfate	--	--	--	--	66	220	37	--	--	--	--	--	--	Uncertainty
Thallium	--	--	--	--	not COPEC	1.5	not COPEC	--	--	--	--	--	--	Uncertainty
Vanadium	114	19.4	40	48.8	73.6	54.19	49.33	2E-01	4E-01	4E-01	6E-01	5E-01	4E-01	No
Zinc	459	24.3	58.2	63.2	89	1468	703.6	5E-02	1E-01	1E-01	2E-01	<b>3E+00</b>	<b>2E+00</b>	Yes
1,2,3,4,6,7,8-Hepta CDD	0.0000215	--	--	--	0.0000129	--	--	--	--	--	6E-01	--	--	Uncertainty
OCDD	0.0000215	--	--	--	0.000148	9.37E-06	--	--	--	--	<b>7E+00</b>	4E-01	--	No
OCDF	0.0000215	--	--	--	5.09E-06	--	--	--	--	--	2E-01	--	--	Uncertainty

Notes:

<sup>a</sup> Upstream reference segments include: the following upstream sample locations:

Segment	Sample Locations	Description
REF-AF	BKG-AF-3, BKG-AF-4	Main channel of the Agua Fria upstream from AF-01 and other reference segments.
REF-West	BKG-AF-8, BKG-AF-9, BKG-AF-10	Drainage entering the Agua Fria from the West just downstream from REF-AF and upstream of REF-East
REF-East	BKG-AF-5, BKG-AF-6, BKG-AF-7	Drainage entering the Agua Fria from the East just downstream from REF-West and upstream of AF-01

-- not detected or not analyzed (dioxin/furans only)

BTV - background threshold value

COPEC - chemical of potential ecological concern

EPC - exposure point concentration

HQ - hazard quotient

RME - reasonable maximum exposure

WOE - weight of evidence



*Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona*

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TABLE M-27

Estimation of Potential Risks to Birds and Mammals - Sediment and Surface Water  
Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona

Site Data				Exposure Parameters				Plant Uptake				Invertebrate Uptake				Fish Uptake				Sediment Ingestion		Surface Water Ingestion		Total Daily	Site Risk				Weight of Evidence <sup>b</sup>										
Exposure Area	Matrix	COPEC	RME Sediment (mg/kg)	Receptor	Body Weight (kg)	Food Intake (kg/kg/d)	Water Intake (L/kgbw/d)	AUF	Diet Proportion	Plant BSAF	Regression		Diet Proportion	Invert BSAF	Regression		Diet Proportion	Fraction	Surface Water EPC		RME EPC (mg/L)	Fish BCF (L/mg)	Fish Concentration (mg/kg)	Fish Dose (mg/kg/d)	Diet Proportion	Iron King Mine Bioavailability	Incidental Sediment Dose (mg/kg/d)	RME Surface Water (mg/L)	Incidental Surface Water Dose (mg/kg/d)	Dose (mg/kg/d)	NOAEL-based	LOAEL-based	NOAEL-based	LOAEL-based	NOAEL-based	LOAEL-based			
											B0	B1			B0	B1			LogKow	B0																	B1	RME EPC (mg/L)	Fish BCF (L/mg)
AF-02	Sediment	Cadmium	8.852	River otter	8.55	0.034	0.076	0.0019	--	0.2970	--	--	2.63E+00	--	0.15	regression	-0.3140	0.5130	--	2.24E+00	1.14E-02	0.85	Dissolved	3.06E-05	200	6.1E-03	1.77E-04	0.084	--	2.53E-02	0.000351	2.66E-05	3.69E-02	0.77	7.7	9E-05	9E-06	No	No
AF-02	Sediment	Chromium	404.6	Mallard	1.134	0.049	0.057	0.0118	0.3	0.0650	--	--	2.63E+01	3.87E-01	0.7	regression	0.2090	0.3650	--	1.10E+01	3.78E-01	--	Dissolved	0.00085	12	1.0E-02	--	0.033	--	6.54E-01	0.175	9.98E-03	1.43E+00	2.66	16	6E-03	1E-03	No	No
AF-02	Sediment	Chromium	404.6	Great blue heron	2.229	0.0505	0.045	0.00736	--	0.0650	--	--	2.63E+01	--	--	regression	0.2090	0.3650	--	1.10E+01	--	1	Dissolved	0.00085	12	1.0E-02	5.15E-04	0.02	--	4.09E-01	0.175	7.88E-03	4.17E-01	2.66	16	1E-03	2E-04	No	No
AF-02	Sediment	Chromium	404.6	Raccoon	6.9	0.035	0.082	0.03541	0.45	0.0650	--	--	2.63E+01	4.14E-01	0.45	regression	0.2090	0.3650	--	1.10E+01	1.74E-01	0.1	Dissolved	0.00085	12	1.0E-02	3.57E-05	0.094	--	1.33E+00	0.175	1.44E-02	1.93E+00	2.4	58	3E-02	1E-03	No	No
AF-02	Sediment	Chromium	404.6	River otter	8.55	0.034	0.076	0.0019	--	0.0650	--	--	2.63E+01	--	0.15	regression	0.2090	0.3650	--	1.10E+01	5.62E-02	0.85	Dissolved	0.00085	12	1.0E-02	2.95E-04	0.084	--	1.16E+00	0.175	1.33E-02	1.23E+00	2.4	58	1E-03	4E-05	No	No
AF-02	Sediment	Cobalt	13.71	Mallard	1.134	0.049	0.057	0.0118	0.3	0.0810	--	--	1.11E+00	1.63E-02	0.7	1	--	--	--	1.37E+01	4.70E-01	--	Total	0.0254	1	2.5E-02	--	0.033	--	2.22E-02	0.0254	1.45E-03	5.10E-01	7.61	18	8E-04	3E-04	No	No
AF-02	Sediment	Cobalt	13.71	Great blue heron	2.229	0.0505	0.045	0.00736	--	0.0810	--	--	1.11E+00	--	--	1	--	--	--	1.37E+01	--	1	Total	0.0254	1	2.5E-02	1.28E-03	0.02	--	1.38E-02	0.0254	1.14E-03	1.63E-02	7.61	18	2E-05	7E-06	No	No
AF-02	Sediment	Cobalt	13.71	Raccoon	6.9	0.035	0.082	0.03541	0.45	0.0810	--	--	1.11E+00	1.75E-02	0.45	1	--	--	--	1.37E+01	2.16E-01	0.1	Total	0.0254	1	2.5E-02	8.89E-05	0.094	--	4.51E-02	0.0254	2.08E-03	2.81E-01	7.33	20	1E-03	5E-04	No	No
AF-02	Sediment	Cobalt	13.71	River otter	8.55	0.034	0.076	0.0019	--	0.0810	--	--	1.11E+00	--	0.15	1	--	--	--	1.37E+01	6.99E-02	0.85	Total	0.0254	1	2.5E-02	7.34E-04	0.084	--	3.92E-02	0.0254	1.93E-03	1.12E-01	7.33	20	3E-05	1E-05	No	No
AF-02	Sediment	Copper	5576	Mallard	1.134	0.049	0.057	0.0118	0.3	0.1110	--	--	6.19E+02	9.10E+00	0.7	0.824	--	--	--	4.59E+03	1.58E+02	--	Dissolved	0.0018	200	3.6E-01	--	0.033	--	9.02E+00	0.0517	2.95E-03	1.76E+02	4.05	52.3	5E-01	4E-02	No	No
AF-02	Sediment	Copper	5576	Great blue heron	2.229	0.0505	0.045	0.00736	--	0.1110	--	--	6.19E+02	--	--	0.824	--	--	--	4.59E+03	--	1	Dissolved	0.0018	200	3.6E-01	1.82E-02	0.02	--	5.63E+00	0.0517	2.33E-03	5.65E+00	4.05	52.3	1E-02	8E-04	No	No
AF-02	Sediment	Copper	5576	Raccoon	6.9	0.035	0.082	0.03541	0.45	0.1110	--	--	6.19E+02	9.75E+00	0.45	0.824	--	--	--	4.59E+03	7.24E+01	0.1	Dissolved	0.0018	200	3.6E-01	1.26E-03	0.094	--	1.83E+01	0.0517	4.24E-03	1.00E+02	5.6	632	6E-01	6E-03	No	No
AF-02	Sediment	Copper	5576	River otter	8.55	0.034	0.076	0.0019	--	0.1110	--	--	6.19E+02	--	0.15	0.824	--	--	--	4.59E+03	2.34E+01	0.85	Dissolved	0.0018	200	3.6E-01	1.04E-02	0.084	--	1.59E+01	0.0517	3.93E-03	3.94E+01	5.6	632	1E-02	1E-04	No	No
AF-02	Sediment	Cyanide	0.11	Mallard	1.134	0.049	0.057	0.0118	0.3	1.0000	--	--	1.10E-01	1.62E-03	0.7	1	--	--	--	1.10E-01	3.77E-03	--	Total	0.0077	0	0.0E+00	--	0.033	--	1.78E-04	0.0077	4.39E-04	6.01E-03	0.04	0.4	2E-03	2E-04	No	No
AF-02	Sediment	Cyanide	0.11	Great blue heron	2.229	0.0505	0.045	0.00736	--	1.0000	--	--	1.10E-01	--	--	1	--	--	--	1.10E-01	--	1	Total	0.0077	0	0.0E+00	0.00E+00	0.02	--	1.11E-04	0.0077	3.47E-04	4.58E-04	0.04	0.4	8E-05	8E-06	No	No
AF-02	Sediment	Cyanide	0.11	Raccoon	6.9	0.035	0.082	0.03541	0.45	1.0000	--	--	1.10E-01	1.73E-03	0.45	1	--	--	--	1.10E-01	1.73E-03	0.1	Total	0.0077	0	0.0E+00	0.00E+00	0.094	--	3.62E-04	0.0077	6.31E-04	4.46E-03	68.7	343.5	2E-06	5E-07	No	No
AF-02	Sediment	Cyanide	0.11	River otter	8.55	0.034	0.076	0.0019	--	1.0000	--	--	1.10E-01	--	0.15	1	--	--	--	1.10E-01	5.61E-04	0.85	Total	0.0077	0	0.0E+00	0.00E+00	0.084	--	3.14E-04	0.0077	5.85E-04	1.46E-03	68.7	343.5	4E-08	8E-09	No	No
AF-02	Sediment	Iron	23469	Mallard	1.134	0.049	0.057	0.0118	0.3	0.0530	--	--	1.24E+03	1.83E+01	0.7	1	--	--	--	2.35E+04	8.05E+02	--	Total	42.07	1	4.2E+01	--	0.033	--	3.79E+01	42.07	2.40E+00	8.64E+02	--	--	--	--	Uncertainty	Uncertainty
AF-02	Sediment	Iron	23469	Great blue heron	2.229	0.0505	0.045	0.00736	--	0.0530	--	--	1.24E+03	--	--	1	--	--	--	2.35E+04	--	1	Total	42.07	1	4.2E+01	2.12E+00	0.02	--	2.37E+01	42.07	1.89E+00	2.77E+01	--	--	--	--	Uncertainty	Uncertainty
AF-02	Sediment	Iron	23469	Raccoon	6.9	0.035	0.082	0.03541	0.45	0.0530	--	--	1.24E+03	1.96E+01	0.45	1	--	--	--	2.35E+04	3.70E-02	0.1	Total	42.07	1	4.2E+01	1.47E-01	0.094	--	7.72E+01	42.07	3.45E+00	4.70E+02	--	--	--	--	Uncertainty	Uncertainty
AF-02	Sediment	Iron	23469	River otter	8.55	0.034	0.076	0.0019	--	0.0530	--	--	1.24E+03	--	0.15	1	--	--	--	2.35E+04	1.20E+02	0.85	Total	42.07	1	4.2E+01	1.22E+00	0.084	--	6.70E+01	42.07	3.20E+00	1.91E+02	--	--	--	--	Uncertainty	Uncertainty
AF-02	Sediment	Lead	336.9	Mallard	1.134	0.049	0.057	0.0118	0.3	0.1030	--	--	3.47E+01	5.10E-01	0.7	regression	-0.5150	0.6530	--	2.67E+01	9.16E-01	--	Dissolved	5.41E-05	45	2.4E													

TABLE M-27

Estimation of Potential Risks to Birds and Mammals - Sediment and Surface Water

Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona

Site Data				Exposure Parameters					Plant Uptake					Invertebrate Uptake					Fish Uptake					Sediment Ingestion			Surface Water Ingestion		Total Daily	Site Risk				Weight of Evidence <sup>a</sup>					
Exposure Area	Matrix	COPEC	RME Sediment (mg/kg)	Receptor	Regression				Regression				Surface Water EPC					Diet Proportion	Iron King Mine Bioavailability	Incidental Sediment Dose (mg/kg/d)	RME Surface Water - Total (mg/L)	Incidental Surface Water Dose (mg/kg/d)	Dose (mg/kg/d)	TRVs	Site HQs		NOAEL-based	LOAEL-based											
					Body Weight (kg)	Food Intake (kg/kg/d)	Water Intake (L/kgbw/d)	AUF	Diet Proportion	Plant BSAF	B0	B1	Plant Concentration (mg/kg)	Plant Dose (mg/kg/day)	Diet Proportion	Invert BSAF	B0								B1	LogKow			Invert Concentration (mg/kg)	Invert Dose (mg/kg/d)	Fish BCF (L/mg)	Fish Concentration (mg/kg)	Fish Dose (mg/kg/d)	NOAEL-based	LOAEL-based				
AF-03	Sediment	Cadmium	3.307	Raccoon	6.9	0.035	0.082	0.04485	0.45	0.2970	--	--	9.82E-01	1.55E-02	0.45	regression	-0.3140	0.5130	--	1.35E+00	2.13E-02	0.1	Dissolved	0.0023	200	4.6E-01	1.61E-03	0.094	--	1.09E-02	0.00119	9.76E-05	4.93E-02	0.77	7.7	3E-03	3E-04	No	No
AF-03	Sediment	Cadmium	3.307	River otter	8.55	0.034	0.076	0.00241	--	0.2970	--	--	9.82E-01	--	0.15	regression	-0.3140	0.5130	--	1.35E+00	6.88E-03	0.85	Dissolved	0.0023	200	4.6E-01	1.33E-02	0.084	--	9.44E-03	0.00119	9.04E-05	2.97E-02	0.77	7.7	9E-05	9E-06	No	No
AF-03	Sediment	Chromium	18.8	Mallard	1.134	0.049	0.057	0.01495	0.3	0.0650	--	--	1.22E+00	1.80E-02	0.7	regression	0.2090	0.3650	--	3.60E+00	1.23E-01	--	Dissolved	0.00127	12	1.5E-02	--	0.033	--	3.04E-02	0.238	1.36E-02	1.85E-01	2.66	16	1E-03	2E-04	No	No
AF-03	Sediment	Chromium	18.8	Great blue heron	2.229	0.0505	0.045	0.00933	--	0.0650	--	--	1.22E+00	--	--	regression	0.2090	0.3650	--	3.60E+00	--	1	Dissolved	0.00127	12	1.5E-02	7.70E-04	0.02	--	1.90E-02	0.238	1.07E-02	3.05E-02	2.66	16	1E-04	2E-05	No	No
AF-03	Sediment	Chromium	18.8	Raccoon	6.9	0.035	0.082	0.04485	0.45	0.0650	--	--	1.22E+00	1.92E-02	0.45	regression	0.2090	0.3650	--	3.60E+00	5.66E-02	0.1	Dissolved	0.00127	12	1.5E-02	5.33E-05	0.094	--	6.19E-02	0.238	1.95E-02	1.57E-01	2.4	58	3E-03	1E-04	No	No
AF-03	Sediment	Chromium	18.8	River otter	8.55	0.034	0.076	0.00241	--	0.0650	--	--	1.22E+00	--	0.15	regression	0.2090	0.3650	--	3.60E+00	1.83E-02	0.85	Dissolved	0.00127	12	1.5E-02	4.40E-04	0.084	--	5.37E-02	0.238	1.81E-02	9.06E-02	2.4	58	9E-05	4E-06	No	No
AF-03	Sediment	Cobalt	12.46	Mallard	1.134	0.049	0.057	0.01495	0.3	0.0810	--	--	1.01E+00	1.48E-02	0.7	1	--	--	--	1.25E+01	4.27E-01	--	Total	0.0675	1	6.8E-02	--	0.033	--	2.01E-02	0.0675	3.85E-03	4.66E-01	7.61	18	9E-04	4E-04	No	No
AF-03	Sediment	Cobalt	12.46	Great blue heron	2.229	0.0505	0.045	0.00933	--	0.0810	--	--	1.01E+00	--	--	1	--	--	--	1.25E+01	--	1	Total	0.0675	1	6.8E-02	3.41E-03	0.02	--	1.26E-02	0.0675	3.04E-03	1.90E-02	7.61	18	2E-05	1E-05	No	No
AF-03	Sediment	Cobalt	12.46	Raccoon	6.9	0.035	0.082	0.04485	0.45	0.0810	--	--	1.01E+00	1.59E-02	0.45	1	--	--	--	1.25E+01	1.96E-01	0.1	Total	0.0675	1	6.8E-02	2.36E-04	0.094	--	4.10E-02	0.0675	5.54E-03	2.59E-01	7.33	20	2E-03	6E-04	No	No
AF-03	Sediment	Cobalt	12.46	River otter	8.55	0.034	0.076	0.00241	--	0.0810	--	--	1.01E+00	--	0.15	1	--	--	--	1.25E+01	6.35E-02	0.85	Total	0.0675	1	6.8E-02	1.95E-03	0.084	--	3.56E-02	0.0675	5.13E-03	1.06E-01	7.33	20	3E-05	1E-05	No	No
AF-03	Sediment	Copper	241.9	Mallard	1.134	0.049	0.057	0.01495	0.3	0.1110	--	--	2.69E+01	3.95E-01	0.7	0.824	--	--	--	1.99E+02	6.84E+00	--	Dissolved	0.0279	200	5.6E+00	--	0.033	--	3.91E-01	0.147	8.38E-03	7.63E+00	4.05	52.3	3E-02	2E-03	No	No
AF-03	Sediment	Copper	241.9	Great blue heron	2.229	0.0505	0.045	0.00933	--	0.1110	--	--	2.69E+01	--	--	0.824	--	--	--	1.99E+02	--	1	Dissolved	0.0279	200	5.6E+00	2.82E-01	0.02	--	2.44E-01	0.147	6.62E-03	5.33E-01	4.05	52.3	1E-03	1E-04	No	No
AF-03	Sediment	Copper	241.9	Raccoon	6.9	0.035	0.082	0.04485	0.45	0.1110	--	--	2.69E+01	4.23E-01	0.45	0.824	--	--	--	1.99E+02	3.14E+00	0.1	Dissolved	0.0279	200	5.6E+00	1.95E-02	0.094	--	7.96E-01	0.147	1.21E-02	4.39E+00	5.6	632	4E-02	3E-04	No	No
AF-03	Sediment	Copper	241.9	River otter	8.55	0.034	0.076	0.00241	--	0.1110	--	--	2.69E+01	--	0.15	0.824	--	--	--	1.99E+02	1.02E+00	0.85	Dissolved	0.0279	200	5.6E+00	1.61E-01	0.084	--	6.91E-01	0.147	1.12E-02	1.88E+00	5.6	632	8E-04	7E-06	No	No
AF-03	Sediment	Cyanide	0.18	Mallard	1.134	0.049	0.057	0.01495	0.3	1.0000	--	--	1.80E-01	2.65E-03	0.7	1	--	--	--	1.80E-01	6.17E-03	--	Total	0.0083	0	0.0E+00	--	0.033	--	2.91E-04	0.0083	4.73E-04	9.58E-03	0.04	0.4	4E-03	4E-04	No	No
AF-03	Sediment	Cyanide	0.18	Great blue heron	2.229	0.0505	0.045	0.00933	--	1.0000	--	--	1.80E-01	--	--	1	--	--	--	1.80E-01	--	1	Total	0.0083	0	0.0E+00	0.00E+00	0.02	--	1.82E-04	0.0083	3.74E-04	5.55E-04	0.04	0.4	1E-04	1E-05	No	No
AF-03	Sediment	Cyanide	0.18	Raccoon	6.9	0.035	0.082	0.04485	0.45	1.0000	--	--	1.80E-01	2.84E-03	0.45	1	--	--	--	1.80E-01	2.84E-03	0.1	Total	0.0083	0	0.0E+00	0.00E+00	0.094	--	5.92E-04	0.0083	6.81E-04	6.94E-03	68.7	343.5	5E-06	9E-07	No	No
AF-03	Sediment	Cyanide	0.18	River otter	8.55	0.034	0.076	0.00241	--	1.0000	--	--	1.80E-01	--	0.15	1	--	--	--	1.80E-01	9.18E-04	0.85	Total	0.0083	0	0.0E+00	0.00E+00	0.084	--	5.14E-04	0.0083	6.31E-04	2.06E-03	68.7	343.5	7E-08	1E-08	No	No
AF-03	Sediment	Iron	24032	Mallard	1.134	0.049	0.057	0.01495	0.3	0.0530	--	--	1.27E+03	1.87E+01	0.7	1	--	--	--	2.40E+04	8.24E+02	--	Total	38.17	1	3.8E+01	--	0.033	--	3.89E+01	38.17	2.18E+00	8.84E+02	--	--	--	--	Uncertainty	Uncertainty
AF-03	Sediment	Iron	24032	Great blue heron	2.229	0.0505	0.045	0.00933	--	0.0530	--	--	1.27E+03	--	--	1	--	--	--	2.40E+04	--	1	Total	38.17	1	3.8E+01	1.93E+00	0.02	--	2.43E+01	38.17	1.72E+00	2.79E+01	--	--	--	--	Uncertainty	Uncertainty
AF-03	Sediment	Iron	24032	Raccoon	6.9	0.035	0.082	0.04485	0.45	0.0530	--	--	1.27E+03	2.01E+01	0.45	1	--	--	--	2.40E+04	3.79E+02	0.1	Total	38.17	1	3.8E+01	1.34E-01	0.094	--	7.91E+01	38.17	3.13E+00	4.81E+02	--	--	--	--	Uncertainty	Uncertainty
AF-03	Sediment	Iron	24032	River otter	8.55	0.034	0.076	0.00241	--	0.0530	--	--	1.27E+03	--	0.15	1	--	--	--	2.40E+04	1.23E+02	0.85	Total	38.17	1	3.8E+01	1.10E+00	0.084	--	6.86E+01	38.17	2.90E+00	1.95E+02	--	--	--	--	Uncertainty	Uncertainty
AF-03	Sediment	Lead	171	Mallard	1.134	0.049	0.057	0.01495	0.3	0.1030	--	--	1.76E+01	2.59E-01	0.7	regression	-0.5150	0.6530	--	1.72E+01	5.89E-01	--	Dissolved	9.81E-05	45	4.4E-03	--	0.033	--	2.77E-01	0.263	1.50E-02	1.14E+00	1.63	8.75	1E-02	2E-03	No	No
AF-03	Sediment	Lead	171	Great blue heron	2.229	0.0505	0.045	0.00933	--	0.1030	--	--	1.76E+01	--	--	regression	-0.5150	0.6530	--	1.72E+01	--	1	Dissolved	9.81E-05	45	4.4E-03	2.23E-04	0.02	--	1.73E-01	0.263	1.18E-02	1.85E-01	1.63	8.75	1E-03	2E-04	No	No
AF-03	Sediment	Lead	171	Raccoon	6.9	0.035	0.082	0.04485	0.45	0.1030	--	--	1.76E+01	2.77E-01	0.45	regression	-0.5150	0.6530	--	1.72E+01	2.70E-01	0.1	Dissolved	9.81E-05	45	4.4E-03	1.55E-05	0.094	0.225	1.27E-01	0.263	2.16E-02	6.96E-01	4.7	241	7E-03	1E-04	No	No
AF-03	Sediment	Lead	171	River otter	8.55	0.034	0.076	0.00241	--	0.1030	--	--	1.76E+01	--	0.15	regression	-0.5150	0.6530	--	1.72E+01	8.75E-02	0.85	Dissolved	9.81E-05	45	4.4E-03	1.28E-04	0.084	0.225	1.10E-01	0.263	2.00E-02	2.18E-01	4.7	241				

TABLE M-28

**Estimation of Potential Risks to Aquatic Organisms***Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona*

Name	Media	Type	COPEC	Fraction	Units	RME EPC (mg/L)	Tier 2 Risk Estimate		Retain for WOE <sup>b</sup> ?
							Chronic Benchmark (mg/L)	Tier 2 HQ	
AF-01	Surface water	Aluminum		Total	mg/L	1.65	0.087	<b>2E+01</b>	Yes
AF-01	Surface water	Barium		Total	mg/L	0.113	0.004	<b>3E+01</b>	Yes
AF-01	Surface water	Cyanide		Total	mg/L	0.0056	0.0052	1E+00	No
AF-01	Surface water	Fluoride		Total	mg/L	0.21	--	--	Uncertainty
AF-01	Surface water	Iron		Total	mg/L	1.57	1	<b>2E+00</b>	Yes
AF-01	Surface water	Nitrate As N		Total	mg/L	9.3	--	--	Uncertainty
AF-01	Surface water	Nitrite As N		Total	mg/L	0.07	--	--	Uncertainty
AF-02	Surface water	Aluminum		Total	mg/L	77.76	0.087	<b>9E+02</b>	Yes
AF-02	Surface water	Barium		Total	mg/L	0.669	0.004	<b>2E+02</b>	Yes
AF-02	Surface water	Beryllium		Total	mg/L	0.00171	0.00066	<b>3E+00</b>	Yes
AF-02	Surface water	Cobalt		Total	mg/L	0.0254	0.023	1E+00	No
AF-02	Surface water	Cyanide		Total	mg/L	0.0077	0.0052	1E+00	No
AF-02	Surface water	Fluoride		Total	mg/L	0.264	--	--	Uncertainty
AF-02	Surface water	Iron		Total	mg/L	42.07	1	<b>4E+01</b>	Yes
AF-02	Surface water	Manganese		Total	mg/L	6.912	0.12	<b>6E+01</b>	Yes
AF-02	Surface water	Mercury		Dissolved	mg/L	0.000081	0.00001	<b>8E+00</b>	Yes
AF-02	Surface water	Nitrate As N		Total	mg/L	7.9	--	--	Uncertainty
AF-02	Surface water	Selenium		Total	mg/L	0.00175	0.002	9E-01	No
AF-02	Surface water	Vanadium		Total	mg/L	0.14	0.02	<b>7E+00</b>	Yes
AF-03	Surface water	Aluminum		Total	mg/L	66.9	0.087	<b>8E+02</b>	Yes
AF-03	Surface water	Barium		Total	mg/L	1.219	0.004	<b>3E+02</b>	Yes
AF-03	Surface water	Beryllium		Total	mg/L	0.00263	0.00066	<b>4E+00</b>	Yes
AF-03	Surface water	Cadmium		Dissolved	mg/L	0.0023	0.00052	<b>4E+00</b>	Yes
AF-03	Surface water	Cobalt		Total	mg/L	0.0675	0.023	<b>3E+00</b>	Yes
AF-03	Surface water	Copper		Dissolved	mg/L	0.0279	0.023	1E+00	No
AF-03	Surface water	Cyanide		Total	mg/L	0.0083	0.0052	<b>2E+00</b>	Yes
AF-03	Surface water	Fluoride		Total	mg/L	0.315	--	--	Uncertainty
AF-03	Surface water	Iron		Total	mg/L	38.17	1	<b>4E+01</b>	Yes
AF-03	Surface water	Manganese		Total	mg/L	19.22	0.12	<b>2E+02</b>	Yes
AF-03	Surface water	Mercury		Dissolved	mg/L	0.000034	0.00001	<b>3E+00</b>	Yes
AF-03	Surface water	Nitrate As N		Total	mg/L	9.4	--	--	Uncertainty
AF-03	Surface water	Nitrite As N		Total	mg/L	0.06	--	--	Uncertainty
AF-03	Surface water	Selenium		Total	mg/L	0.00244	0.002	1E+00	No
AF-03	Surface water	Vanadium		Total	mg/L	0.426	0.02	<b>2E+01</b>	Yes
AF-03	Surface water	Zinc		Dissolved	mg/L	0.52	0.30	<b>2E+00</b>	Yes

## Notes:

<sup>a</sup> The maximum estimated site risk HQ is presented if it exceeds 1 (rounded to one significant figure).<sup>b</sup> Chemicals retained for weight of evidence evaluation are those with either the No Effect or Low Effect HQs>1 (rounded to one significant figure).

-- not available

BTV - background threshold value

COPEC - chemical of potential ecological concern

EPC - exposure point concentration

HQ - hazard quotient

WOE - weight of evidence

TABLE M-29

**Comparison of Potential Risks to Aquatic Organisms - Upstream Reference vs. Site Exposure Areas***Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona*

COPEC <sup>a</sup>	Fraction	Low Effect Benchmark (mg/L)	Upstream Reference Segments <sup>b</sup> (mg/L)		Agua Fria Exposure Areas RME (mg/L)			Tier 2 Low Effect Risk Estimates					Retain for Evaluation in Weight of Evidence
			REF-AF	REF-West	AF-01	AF-02	AF-03	REF-AF	REF-West	AF-01	AF-02	AF-03	
Aluminum	Total	0.087	0.238	0.531	1.65	77.76	66.9	3E+00	6E+00	2E+01	9E+02	8E+02	Yes
Barium	Total	0.004	0.111	0.0883	0.113	0.669	1.219	3E+01	2E+01	3E+01	2E+02	3E+02	Yes
Beryllium	Total	0.00066	--	--	not COPEC	0.00171	0.00263	--	--	--	3E+00	4E+00	Yes
Cadmium	Dissolved	0.00052	--	--	not COPEC	not COPEC	0.0023	--	--	--	--	4E+00	Yes
Cobalt	Total	0.023	0.0013	0.00077	not COPEC	0.0254	0.0675	6E-02	3E-02	--	1E+00	3E+00	Yes
Cyanide	Total	0.0052	0.0056	0.0039	0.0056	0.0077	0.0083	1E+00	8E-01	1E+00	1E+00	2E+00	Yes
Iron	Total	1	0.192	0.583	1.57	42.07	38.17	2E-01	6E-01	2E+00	4E+01	4E+01	Yes
Manganese	Total	0.12	0.0271	--	not COPEC	6.912	19.22	2E-01	--	--	6E+01	2E+02	Yes
Mercury	Dissolved	0.0000	--	--	not COPEC	0.000081	0.000034	--	--	--	8E+00	3E+00	Yes
Vanadium	Total	0.02	0.0093	--	not COPEC	0.14	0.426	5E-01	--	--	7E+00	2E+01	Yes
Zinc	Dissolved	0.30	0.0158	0.0073	not COPEC	not COPEC	0.52	5E-02	2E-02	--	--	2E+00	Yes

Notes:

<sup>a</sup> COPECs for which site HQs>1 are listed.<sup>b</sup> Upstream reference segments include: the following upstream sample locations:

Segment	Sample Locations	Description
REF-AF	BKG-AF-3, BKG-AF-4	Main channel of the Agua Fria upstream from AF-01 and other reference segments.
REF-West	BKG-AF-8, BKG-AF-9, BKG-AF-10	Drainage entering the Agua Fria from the West just downstream from REF-AF and upstream of REF-East
REF-East	BKG-AF-5, BKG-AF-6, BKG-AF-7	No water present for collection

-- not detected

COPEC - chemical of potential ecological concern

HQ - hazard quotient

RME - reasonable maximum exposure

WOE - weight of evidence

TABLE M-30

Risk Summary - Soil

Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona

			Site or Incremental Risk <sup>a</sup>																	
Exposure Area	Matrix	COPEC	Plants	Soil Invertebrates	Gambel's quail		Western kingbird		Song sparrow		Red-tailed hawk		Pocket gopher		Desert shrew		Raccoon		Coyote	
					NOAEL based	LOAEL based	NOAEL based	LOAEL based	NOAEL based	LOAEL based	NOAEL based	LOAEL based	NOAEL based	LOAEL based	NOAEL based	LOAEL based	NOAEL based	LOAEL based	NOAEL based	LOAEL based
3001	Soil	Arsenic	-5E-01	-6E-01	-7E-02	-2E-02	-1E-01	-3E-02	-2E-01	-4E-02	-1E-02	-3E-03	-4E-01	-9E-02	-2E+00	-4E-01	-6E-01	-1E-01	-1E-01	-2E-02
3001	Soil	Cadmium	2E-02	3E-03	1E-02	2E-03	1E+00	2E-01	9E-01	1E-01	-1E-02	-2E-03	1E-01	1E-02	4E+00	4E-01	-1E-01	-1E-02	-1E-02	-1E-03
3001	Soil	Copper	9E-01	8E-01	4E-01	3E-02	1E+01	7E-01	9E+00	7E-01	-3E-01	-3E-02	1E+00	9E-03	1E+01	1E-01	-4E-01	-4E-03	-1E-01	-1E-03
3001	Soil	Iron	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3001	Soil	Lead	1E-01	8E-03	1E-01	2E-02	2E+00	4E-01	2E+00	5E-01	-3E-01	-5E-02	1E-01	3E-03	1E+00	2E-02	-6E-02	-1E-03	-4E-02	-7E-04
3001	Soil	Mercury	4E-03	3E-02	2E-03	9E-04	6E-04	3E-04	3E-02	2E-02	-9E-04	-4E-04	3E-03	7E-04	2E-02	5E-03	-6E-03	-2E-03	-2E-04	-5E-05
3001	Soil	Zinc	9E-02	8E-02	-6E-03	-2E-03	-6E-02	-2E-02	1E-01	5E-02	-1E-01	-5E-02	2E-02	4E-03	2E-01	4E-02	-1E-01	-2E-02	-5E-02	-9E-03
NE-02	Soil	Cadmium	7E-03	2E-03	2E-02	2E-03	1E+00	1E-01	4E-01	6E-02	-1E-02	-2E-03	5E-02	5E-03	2E+00	2E-01	-1E-01	-1E-02	-1E-02	-1E-03
NE-02	Soil	Lead	1E-02	8E-04	4E-02	8E-03	3E-01	6E-02	3E-01	5E-02	-3E-01	-5E-02	2E-02	3E-04	1E-01	2E-03	-6E-02	-1E-03	-4E-02	-7E-04
NE-02	Soil	Mercury	2E-03	2E-02	2E-03	1E-03	2E-02	1E-02	2E-02	8E-03	-9E-04	-4E-04	1E-03	3E-04	1E-02	3E-03	-6E-03	-1E-03	-2E-04	-5E-05
NE-02	Soil	Zinc	-5E-03	-4E-03	-9E-04	-3E-04	-1E-02	-5E-03	-8E-03	-3E-03	-1E-01	-5E-02	-1E-03	-2E-04	-1E-02	-2E-03	-1E-01	-2E-02	-5E-02	-9E-03
NE-06	Soil	Aluminum	-3E+02	--	-1E+00	-2E-01	-3E+00	-6E-01	-5E+00	-1E+00	-9E-01	-2E-01	-4E+01	-7E+00	-2E+02	-3E+01	-4E+01	-9E+00	-2E+01	-3E+00
NE-06	Soil	Antimony	-3E-02	-2E-03	--	--	--	--	--	--	--	--	-9E-01	-2E-02	-7E+00	-2E-01	-1E+00	-2E-02	-1E+00	-3E-02
NE-06	Soil	Arsenic	-7E-01	-1E+00	-6E-02	-1E-02	-2E-01	-4E-02	-3E-01	-6E-02	-1E-02	-3E-03	-6E-01	-1E-01	-2E+00	-6E-01	-6E-01	-1E-01	-1E-01	-2E-02
NE-06	Soil	Barium	-5E-02	-7E-03	-2E-03	-8E-04	-4E-03	-2E-03	-6E-03	-3E-03	-7E-03	-3E-03	-8E-03	-5E-03	-2E-02	-1E-02	-4E-02	-2E-02	-1E-02	-9E-03
NE-06	Soil	Cadmium	-2E-04	-4E-05	-4E-04	-5E-05	-3E-02	-4E-03	-1E-02	-2E-03	-1E-02	-2E-03	-1E-03	-1E-04	-6E-02	-6E-03	-1E-01	-1E-02	-1E-02	-1E-03
NE-06	Soil	Copper	-2E-01	-2E-01	-3E-01	-2E-02	-3E+00	-2E-01	-2E+00	-2E-01	-3E-01	-3E-02	-3E-01	-2E-03	-3E+00	-2E-02	-4E-01	-4E-03	-1E-01	-1E-03
NE-06	Soil	Lead	-2E-02	-1E-03	-8E-02	-1E-02	-6E-01	-1E-01	-5E-01	-9E-02	-3E-01	-5E-02	-3E-02	-5E-04	-2E-01	-4E-03	-6E-02	-1E-03	-4E-02	-7E-04
NE-06	Soil	Manganese	-6E-01	-1E-01	-4E-02	-1E-02	-7E-02	-2E-02	-2E-01	-4E-02	-2E-02	-5E-03	-2E-01	-3E-02	-5E-01	-8E-02	-2E-01	-3E-02	-5E-02	-9E-03
NE-06	Soil	Mercury	-5E-04	-5E-03	-7E-04	-4E-04	-1E-02	-5E-03	-7E-03	-3E-03	-9E-04	-4E-04	-4E-04	-1E-04	-6E-03	-1E-03	-6E-03	-1E-03	-2E-04	-5E-05
NE-06	Soil	Sulfate	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
NE-06	Soil	Thallium	-1E+00	-1E+00	-2E-02	-2E-03	-1E-01	-1E-02	-1E-01	-1E-02	-8E-02	-8E-03	-9E-03	-3E-03	-1E-01	-4E-02	-3E-02	-9E-03	-3E-02	-9E-03
NE-06	Soil	Zinc	-5E-02	-5E-02	-1E-02	-3E-03	-2E-01	-6E-02	-1E-01	-3E-02	-1E-01	-5E-02	-1E-02	-2E-03	-2E-01	-3E-02	-1E-01	-2E-02	-5E-02	-9E-03
NE-07	Soil	Aluminum	-1E+02	--	-4E-01	-8E-02	-1E+00	-2E-01	-2E+00	-4E-01	-9E-01	-2E-01	-1E+01	-3E+00	-5E+01	-1E+01	-4E+01	-9E+00	-2E+01	-3E+00
NE-07	Soil	Antimony	1E-01	8E-03	--	--	--	--	--	--	--	--	3E+00	7E-02	3E+01	6E-01	-8E-01	-2E-02	-1E+00	-3E-02
NE-07	Soil	Arsenic	-9E-02	-1E-01	-8E-03	-2E-03	-2E-02	-4E-03	-3E-02	-8E-03	-1E-02	-3E-03	-8E-02	-2E-02	-3E-01	-7E-02	-5E-01	-1E-01	-1E-01	-2E-02
NE-07	Soil	Barium	2E-01	3E-02	5E-03	3E-03	1E-02	6E-03	2E-02	1E-02	-7E-03	-3E-03	3E-02	2E-02	8E-02	5E-02	-4E-02	-2E-02	-1E-02	-9E-03
NE-07	Soil	Cadmium	3E-02	6E-03	7E-02	9E-03	4E+00	5E-01	2E+00	2E-01	-1E-02	-2E-03	2E-01	2E-02	8E+00	8E-01	-1E-01	-1E-02	-1E-02	-1E-03
NE-07	Soil	Chromium	-1E-01	-1E+00	-2E-01	-4E-02	-1E+00	-2E-01	-1E+00	-2E-01	-3E-01	-5E-02	-3E-01	-1E-02	-2E+00	-8E-02	-4E-01	-2E-02	-2E-01	-7E-03
NE-07	Soil	Copper	2E+00	2E+00	3E+00	2E-01	3E+01	2E+00	2E+01	1E+00	-3E-01	-3E-02	2E+00	2E-02	2E+01	2E-01	-2E-01	-2E-03	-1E-01	-1E-03
NE-07	Soil	Iron	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
NE-07	Soil	Lead	4E-01	3E-02	1E+00	3E-01	9E+00	2E+00	8E+00	2E+00	-3E-01	-5E-02	5E-01	1E-02	3E+00	6E-02	-4E-02	-8E-04	-4E-02	-7E-04
NE-07	Soil	Manganese	-5E-01	-1E-01	-4E-02	-9E-03	-7E-02	-2E-02	-1E-01	-3E-02	-2E-02	-5E-03	-2E-01	-3E-02	-4E-01	-8E-02	-2E-01	-3E-02	-5E-02	-9E-03
NE-07	Soil	Mercury	4E-03	4E-02	6E-03	3E-03	4E-02	2E-02	3E-02	2E-02	-8E-04	-4E-04	3E-03	8E-04	2E-02	6E-03	-6E-03	-1E-03	-2E-04	-5E-05
NE-07	Soil	Nickel	-4E-02	-8E-03	-2E-02	-3E-03	-3E-01	-3E-02	-2E-01	-2E-02	-8E-02	-1E-02	-1E-01	-3E-03	-1E+00	-3E-02	-9E-01	-2E-02	-2E-01	-4E-03
NE-07	Soil	Selenium	-9E-01	-4E-02	-9E-02	-3E-02	-1E+00	-3E-01	-7E-01	-2E-01	-3E-01	-1E-01	-2E-01	-3E-02	-3E+00	-3E-01	-5E-01	-5E-02	-3E-01	-3E-02
NE-07	Soil	Silver	8E-04	--	5E-03	3E-04	2E-01	2E-02	1E-01	8E-03	7E-06	5E-07	2E-03	2E-04	9E-02	1E-02	5E-04	5E-05	2E-06	2E-07
NE-07	Soil	Zinc	7E-01	6E-01	1E-01	4E-02	1E+00	4E-01	8E-01	3E-01	-1E-01	-5E-02	1E-01	3E-02	1E+00	2E-01	-9E-02	-2E-02	-5E-02	-9E-03
NE-08	Soil	Aluminum	-3E+02	--	-1E+00	-2E-01	-3E+00	-6E-01	-5E+00	-9E-01	-9E-01	-2E-01	-3E+01	-6E+00	-1E+02	-3E+01	-4E+01	-9E+00	-2E+01	-3E+00
NE-08	Soil	Antimony	-3E-02	-2E-03	--	--	--	--	--	--	--	--	-9E-01	-2E-02	-7E+00	-1E-01	-1E+00	-2E-02	-1E+00	-3E-02
NE-08	Soil	Arsenic	-6E-01	-7E-01	-5E-02	-1E-02	-1E-01	-3E-02	-2E-01	-5E-02	-1E-02	-3E-03	-5E-01	-1E-01	-2E+00	-4E-01	-5E-01	-1E-01	-1E-01	-2E-02
NE-08	Soil	Barium	6E-01	1E-01	2E-02	1E-02	5E-02	2E-02	8E-02	4E-02	-6E-03	-3E-03	1E-01	7E-02	3E-01	2E-01	-3E-02	-2E-02	-1E-02	-9E-03
NE-08	Soil	Cadmium	4E-03	9E-04	9E-03	1E-03	6E-01	8E-02	3E-01	4E-02	-1E-02	-2E-03	3E-02	3E-03	1E+00	1E-01	-1E-01	-1E-02	-1E-02	-1E-03
NE-08	Soil	Copper	7E-02	7E-02	9E-02	7E-03	1E+00	8E-02	7E-01	5E-02	-3E-01	-3E-02	8E-02	7E-04	9E-01	8E-03	-4E-01	-3E-03	-1E-01	-1E-03
NE-08	Soil	Cyanide	7E-01	7E-01	9E-01	9E-02	3E+00	3E-01	4E+00	4E-01	1E-02	1E-03	9E-04	2E-04	2E-03	5E-04	4E-05	8E-06	2E-06	4E-07
NE-08	Soil	Iron	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
NE-08	Soil	Lead	2E-02	1E-03	8E-02	1E-02	6E-01	1E-01	5E-01	9E-02	-3E-01	-5E-02	3E-02	5E-04	2E-01	4E-03	-6E-02	-1E-03	-4E-02	-7E-04
NE-08	Soil	Manganese	5E-01	1E-01	4E-02	8E-03	6E-02	1E-02	1E-01	3E-02	-2E-02	-5E-03	2E-01	3E-02	4E-01	7E-02	-2E-01	-3E-02	-5E-02	-9E-03
NE-08	Soil	Mercury	2E-03	2E-02	3E-03	1E-03	2E-02	1E-02	2E-02	9E-03	-8E-04	-4E-04	2E-03	4E-04	1E-02	3E-03	-5E-03	-1E-03	-2E-04	-5E-05
NE-08	Soil	Nickel	-1E-01	-2E-02	-6E-02	-7E-03	-7E-01	-8E-02	-4E-01	-5E-02	-8E-02	-1E-02	-3E-01	-6E-03	-3E+00	-7E-02	-9E-01	-2E-02	-2E-01	-4E-03
NE-08	Soil	Thallium	-2E+00	-2E+00	-3E-02	-3E-03	-1E-01	-1E-02	-1E-01	-1E-02	-8E-02	-8E-03	-1E-02	-4E-03	-2E-01	-5E-02	-3E-02	-9E-03	-3E-02	-9E-03
NE-08	Soil	Zinc	6E-03	5E-03	1E-03	4E-04	2E-02	5E-03	9E-03	3E-03	-1E-01	-5E-02	1E-03	2E-04	2E-02	3E-03	-9E-02	-2E-02	-5E-02	-9E-03



TABLE M-30

Risk Summary - Soil

Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona

			Site or Incremental Risk <sup>a</sup>																	
					Gambel's quail		Western kingbird		Song sparrow		Red-tailed hawk		Pocket gopher		Desert shrew		Raccoon		Coyote	
Exposure			Soil		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Area	Matrix	COPEC	Plants	Invertebra	based	based	based	based	based	based	based	based	based	based	based	based	based	based	based	based
NE-09	Soil	Aluminum	-2E+02	--	-6E-01	-1E-01	-2E+00	-3E-01	-3E+00	-5E-01	-9E-01	-2E-01	-2E+01	-4E+00	-8E+01	-2E+01	-4E+01	-9E+00	-2E+01	-3E+00
NE-09	Soil	Arsenic	3E-02	4E-02	3E-03	7E-04	7E-03	2E-03	1E-02	3E-03	-1E-02	-3E-03	3E-02	6E-03	1E-01	2E-02	-5E-01	-1E-01	-1E-01	-2E-02
NE-09	Soil	Barium	3E-02	5E-03	1E-03	6E-04	3E-03	1E-03	5E-03	2E-03	-7E-03	-3E-03	6E-03	4E-03	2E-02	1E-02	-3E-02	-2E-02	-1E-02	-9E-03
NE-09	Soil	Cobalt	-1E-01	-4E-02	-2E-02	-7E-03	-7E-02	-3E-02	-8E-02	-3E-02	-2E-02	-9E-03	-2E-02	-7E-03	-1E-01	-4E-02	-4E-02	-1E-02	-1E-02	-5E-03
NE-09	Soil	Iron	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
NE-09	Soil	Lead	-2E-02	-2E-03	-9E-02	-2E-02	-7E-01	-1E-01	-6E-01	-1E-01	-3E-01	-5E-02	-3E-02	-6E-04	-2E-01	-5E-03	-6E-02	-1E-03	-4E-02	-7E-04
NE-09	Soil	Manganese	2E+00	5E-01	1E-01	3E-02	2E-01	5E-02	5E-01	1E-01	-2E-02	-5E-03	6E-01	1E-01	1E+00	3E-01	-1E-01	-3E-02	-5E-02	-9E-03
NE-09	Soil	Mercury	-6E-04	-6E-03	-8E-04	-4E-04	-1E-02	-6E-03	-8E-03	-4E-03	-9E-04	-4E-04	-4E-04	-1E-04	-7E-03	-2E-03	-6E-03	-1E-03	-2E-04	-5E-05
NE-09	Soil	Vanadium	-2E-01	-2E-01	-5E-02	-1E-02	-1E-01	-3E-02	-2E-01	-4E-02	-3E-02	-7E-03	-1E-01	-5E-02	-7E-01	-3E-01	-2E-01	-1E-01	-7E-02	-3E-02
NE-09	Soil	Zinc	-4E-02	-3E-02	-7E-03	-2E-03	-1E-01	-4E-02	-7E-02	-2E-02	-1E-01	-5E-02	-8E-03	-2E-03	-1E-01	-2E-02	-1E-01	-2E-02	-5E-02	-9E-03
NE-11	Soil	Aluminum	-2E+02	--	-7E-01	-1E-01	-2E+00	-4E-01	-3E+00	-6E-01	-9E-01	-2E-01	-2E+01	-4E+00	-9E+01	-2E+01	-4E+01	-9E+00	-2E+01	-3E+00
NE-11	Soil	Antimony	-2E-02	-2E-03	--	--	--	--	--	--	--	--	-8E-01	-2E-02	-6E+00	-1E-01	-1E+00	-2E-02	-1E+00	-3E-02
NE-11	Soil	Arsenic	-4E-01	-5E-01	-3E-02	-7E-03	-8E-02	-2E-02	-1E-01	-3E-02	-1E-02	-3E-03	-3E-01	-7E-02	-1E+00	-3E-01	-5E-01	-1E-01	-1E-01	-2E-02
NE-11	Soil	Barium	7E-01	1E-01	2E-02	1E-02	6E-02	3E-02	1E-01	5E-02	-6E-03	-3E-03	1E-01	8E-02	3E-01	2E-01	-3E-02	-2E-02	-1E-02	-9E-03
NE-11	Soil	Cadmium	1E-02	2E-03	2E-02	3E-03	1E+00	2E-01	6E-01	9E-02	-1E-02	-2E-03	7E-02	7E-03	3E+00	3E-01	-1E-01	-1E-02	-1E-02	-1E-03
NE-11	Soil	Chromium	-1E-01	-1E+00	-2E-01	-3E-02	-1E+00	-2E-01	-1E+00	-2E-01	-3E-01	-5E-02	-2E-01	-1E-02	-2E+00	-7E-02	-4E-01	-2E-02	-2E-01	-7E-03
NE-11	Soil	Cobalt	-1E-01	-4E-02	-2E-02	-7E-03	-6E-02	-3E-02	-8E-02	-3E-02	-2E-02	-9E-03	-2E-02	-7E-03	-1E-01	-4E-02	-4E-02	-1E-02	-1E-02	-5E-03
NE-11	Soil	Copper	-4E-02	-4E-02	-5E-02	-4E-03	-6E-01	-5E-02	-4E-01	-3E-02	-3E-01	-3E-02	-5E-02	-4E-04	-5E-01	-5E-03	-4E-01	-4E-03	-1E-01	-1E-03
NE-11	Soil	Iron	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
NE-11	Soil	Lead	1E-02	9E-04	5E-02	9E-03	4E-01	7E-02	3E-01	6E-02	-3E-01	-5E-02	2E-02	3E-04	1E-01	2E-03	-6E-02	-1E-03	-4E-02	-7E-04
NE-11	Soil	Manganese	5E-01	1E-01	4E-02	8E-03	6E-02	1E-02	1E-01	3E-02	-2E-02	-5E-03	2E-01	3E-02	4E-01	7E-02	-2E-01	-3E-02	-5E-02	-9E-03
NE-11	Soil	Mercury	-4E-05	-4E-04	-6E-05	-3E-05	-7E-04	-4E-04	-5E-04	-2E-04	-9E-04	-4E-04	-3E-05	-8E-06	-4E-04	-1E-04	-6E-03	-1E-03	-2E-04	-5E-05
NE-11	Soil	Nickel	8E-03	2E-03	4E-03	5E-04	5E-02	6E-03	3E-02	4E-03	-8E-02	-1E-02	2E-02	5E-04	3E-01	5E-03	-9E-01	-2E-02	-2E-01	-4E-03
NE-11	Soil	Nitrate as N	--	--	--	--	--	--	--	--	--	--	6E-04	6E-04	2E-03	2E-03	2E-05	2E-05	2E-06	2E-06
NE-11	Soil	Sulfate	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
NE-11	Soil	Vanadium	-3E-01	-3E-01	-6E-02	-1E-02	-2E-01	-3E-02	-2E-01	-5E-02	-3E-02	-7E-03	-1E-01	-6E-02	-8E-01	-3E-01	-2E-01	-1E-01	-7E-02	-3E-02
NE-11	Soil	Zinc	-1E-02	-9E-03	-2E-03	-6E-04	-3E-02	-1E-02	-2E-02	-6E-03	-1E-01	-5E-02	-2E-03	-4E-04	-3E-02	-5E-03	-1E-01	-2E-02	-5E-02	-9E-03
NE-11	Soil	bis(2-Ethylhexyl)phthalate	6E-05	--	4E-04	9E-05	1E-02	2E-03	6E-03	1E-03	7E-05	1E-05	2E-05	2E-06	8E-04	8E-05	8E-06	8E-07	1E-06	1E-07
NR3	Soil	Antimony	-5E-03	-4E-04	--	--	--	--	--	--	--	--	-2E-01	-3E-03	-1E+00	-3E-02	-1E+00	-2E-02	-1E+00	-3E-02
NR3	Soil	Arsenic	6E-01	8E-01	-2E-02	-5E-03	6E-02	1E-02	2E-01	5E-02	-1E-02	-3E-03	5E-01	1E-01	2E+00	4E-01	-6E-01	-1E-01	-1E-01	-2E-02
NR3	Soil	Cadmium	9E-03	2E-03	6E-03	8E-04	9E-01	1E-01	6E-01	8E-02	-1E-02	-2E-03	6E-02	6E-03	3E+00	3E-01	-1E-01	-1E-02	-1E-02	-1E-03
NR3	Soil	Copper	-2E-01	-2E-01	-4E-01	-3E-02	-4E+00	-3E-01	-2E+00	-2E-01	-3E-01	-3E-02	-3E-01	-2E-03	-3E+00	-3E-02	-4E-01	-4E-03	-1E-01	-1E-03
NR3	Soil	Lead	4E-01	3E-02	6E-01	1E-01	7E+00	1E+00	8E+00	1E+00	-3E-01	-5E-02	5E-01	1E-02	3E+00	6E-02	-6E-02	-1E-03	-4E-02	-7E-04
NR3	Soil	Mercury	2E-02	2E-01	1E-02	7E-03	6E-02	3E-02	1E-01	6E-02	-8E-04	-4E-04	1E-02	4E-03	6E-02	2E-02	-6E-03	-1E-03	-2E-04	-5E-05
NR3	Soil	Nitrate as N	--	--	--	--	--	--	--	--	--	--	2E-04	2E-04	5E-04	5E-04	2E-06	2E-06	2E-07	2E-07
NR3	Soil	Selenium	-7E-01	-3E-02	-1E-01	-4E-02	-1E+00	-3E-01	-6E-01	-2E-01	-3E-01	-1E-01	-2E-01	-2E-02	-2E+00	-3E-01	-5E-01	-6E-02	-3E-01	-3E-02
NR3	Soil	Silver	5E-04	--	1E-03	9E-05	1E-01	8E-03	6E-02	4E-03	2E-06	1E-07	8E-04	8E-05	5E-02	5E-03	1E-04	1E-05	3E-07	3E-08
NR3	Soil	Sulfate	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
NR3	Soil	Zinc	4E-01	3E-01	2E-02	7E-03	4E-01	1E-01	5E-01	2E-01	-1E-01	-5E-02	8E-02	1E-02	7E-01	1E-01	-1E-01	-2E-02	-5E-02	-9E-03
NR4/NR5	Soil	Antimony	4E-01	3E-02	--	--	--	--	--	--	--	--	1E+01	3E-01	1E+02	2E+00	-1E+00	-2E-02	-1E+00	-3E-02
NR4/NR5	Soil	Arsenic	5E+00	7E+00	-6E-04	-1E-04	1E-01	2E-02	2E+00	4E-01	-1E-02	-3E-03	5E+00	1E+00	2E+01	4E+00	-6E-01	-1E-01	-1E-01	-2E-02
NR4/NR5	Soil	Cadmium	5E-02	1E-02	1E-02	1E-03	8E-01	1E-01	2E+00	3E-01	-1E-02	-2E-03	3E-01	3E-02	1E+01	1E+00	-1E-01	-1E-02	-1E-02	-1E-03
NR4/NR5	Soil	Copper	2E-02	2E-02	-4E-01	-3E-02	-4E+00	-3E-01	2E-01	2E-02	-3E-01	-3E-02	2E-02	2E-04	3E-01	2E-03	-4E-01	-4E-03	-1E-01	-1E-03
NR4/NR5	Soil	Lead	4E+00	2E-01	2E+00	4E-01	2E+01	3E+00	7E+01	1E+01	-3E-01	-5E-02	5E+00	9E-02	2E+01	4E-01	-5E-02	-9E-04	-4E-02	-7E-04
NR4/NR5	Soil	Selenium	7E+00	3E-01	4E-03	1E-03	2E-01	7E-02	5E+00	1E+00	-3E-01	-1E-01	2E+00	2E-01	1E+01	2E+00	-5E-01	-5E-02	-3E-01	-3E-02
NR4/NR5	Soil	Silver	5E-03	--	5E-03	3E-04	4E-01	3E-02	7E-01	4E-02	6E-06	4E-07	9E-03	9E-04	5E-01	6E-02	4E-04	4E-05	1E-06	1E-07
NR4/NR5	Soil	Z																		

TABLE M-30

Risk Summary - Soil

Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona

			Site or Incremental Risk <sup>a</sup>																		
			Soil		Gambel's quail		Western kingbird		Song sparrow		Red-tailed hawk		Pocket gopher		Desert shrew		Raccoon		Coyote		
Exposure	Area	Matrix	COPEC	Plants	Invertebra	NOAEL based	LOAEL based	NOAEL based	LOAEL based	NOAEL based	LOAEL based	NOAEL based	LOAEL based	NOAEL based	LOAEL based	NOAEL based	LOAEL based	NOAEL based	LOAEL based	NOAEL based	LOAEL based
NR6	Soil	Lead		1E+00	7E-02	2E+00	3E-01	2E+01	3E+00	2E+01	4E+00	-3E-01	-5E-02	1E+00	3E-02	7E+00	1E-01	-5E-02	-1E-03	-4E-02	-7E-04
NR6	Soil	Manganese		9E+00	2E+00	2E-01	6E-02	7E-01	2E-01	2E+00	6E-01	-2E-02	-5E-03	3E+00	5E-01	7E+00	1E+00	-2E-01	-3E-02	-5E-02	-9E-03
NR6	Soil	Mercury		2E-03	2E-02	5E-04	2E-04	-3E-02	-1E-02	2E-02	1E-02	-9E-04	-4E-04	2E-03	4E-04	1E-02	4E-03	-6E-03	-2E-03	-2E-04	-5E-05
NR6	Soil	Nitrate as N		--	--	--	--	--	--	--	--	--	--	1E-04	1E-04	2E-04	2E-04	9E-07	9E-07	9E-08	9E-08
NR6	Soil	Selenium		2E+00	8E-02	2E-03	6E-04	7E-01	2E-01	1E+00	4E-01	-3E-01	-1E-01	5E-01	6E-02	4E+00	5E-01	-5E-01	-5E-02	-3E-01	-3E-02
NR6	Soil	Silver		2E-03	--	6E-03	4E-04	5E-01	3E-02	3E-01	2E-02	7E-06	4E-07	4E-03	4E-04	3E-01	3E-02	5E-04	5E-05	1E-06	1E-07
NR6	Soil	Sulfate		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
NR6	Soil	Zinc		7E-01	6E-01	4E-02	1E-02	4E-01	1E-01	8E-01	3E-01	-1E-01	-5E-02	2E-01	3E-02	1E+00	2E-01	-1E-01	-2E-02	-5E-02	-9E-03
NR7	Soil	Aluminum		-3E+02	--	-1E+00	-3E-01	-3E+00	-6E-01	-5E+00	-1E+00	-9E-01	-2E-01	-3E+01	-7E+00	-1E+02	-3E+01	-5E+01	-9E+00	-2E+01	-3E+00
NR7	Soil	Antimony		1E-01	8E-03	--	--	--	--	--	--	--	--	3E+00	7E-02	3E+01	5E-01	-9E-01	-2E-02	-1E+00	-3E-02
NR7	Soil	Arsenic		2E+00	2E+00	1E-01	3E-02	3E-01	8E-02	6E-01	1E-01	-1E-02	-3E-03	1E+00	3E-01	5E+00	1E+00	-5E-01	-1E-01	-1E-01	-2E-02
NR7	Soil	Barium		2E-01	3E-02	4E-03	2E-03	2E-02	8E-03	3E-02	1E-02	-7E-03	-3E-03	4E-02	2E-02	1E-01	6E-02	-4E-02	-2E-02	-1E-02	-9E-03
NR7	Soil	Cadmium		1E-01	3E-02	2E-01	3E-02	1E+01	2E+00	6E+00	8E-01	-1E-02	-2E-03	8E-01	8E-02	3E+01	3E+00	-6E-02	-6E-03	-1E-02	-1E-03
NR7	Soil	Chloride		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
NR7	Soil	Chromium		-1E-01	-1E+00	-3E-01	-4E-02	-1E+00	-2E-01	-1E+00	-2E-01	-3E-01	-5E-02	-3E-01	-1E-02	-2E+00	-8E-02	-4E-01	-2E-02	-2E-01	-7E-03
NR7	Soil	Cobalt		-2E-01	-7E-02	-3E-02	-1E-02	-1E-01	-4E-02	-1E-01	-5E-02	-2E-02	-9E-03	-3E-02	-1E-02	-2E-01	-6E-02	-4E-02	-1E-02	-1E-02	-5E-03
NR7	Soil	Copper		4E+00	4E+00	5E+00	4E-01	6E+01	4E+00	4E+01	3E+00	-3E-01	-3E-02	5E+00	4E-02	5E+01	5E-01	-2E-01	-2E-03	-1E-01	-1E-03
NR7	Soil	Iron		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
NR7	Soil	Lead		4E-01	3E-02	1E+00	2E-01	9E+00	2E+00	8E+00	2E+00	-3E-01	-5E-02	5E-01	1E-02	3E+00	6E-02	-5E-02	-1E-03	-4E-02	-7E-04
NR7	Soil	Manganese		-3E-01	-7E-02	-3E-02	-7E-03	-4E-02	-8E-03	-8E-02	-2E-02	-2E-02	-5E-03	-9E-02	-2E-02	-2E-01	-4E-02	-2E-01	-3E-02	-5E-02	-9E-03
NR7	Soil	Mercury		1E-02	1E-01	1E-02	6E-03	7E-02	4E-02	8E-02	4E-02	-8E-04	-4E-04	8E-03	2E-03	4E-02	1E-02	-6E-03	-1E-03	-2E-04	-5E-05
NR7	Soil	Nickel		-7E-02	-1E-02	-6E-02	-7E-03	-5E-01	-6E-02	-3E-01	-4E-02	-8E-02	-1E-02	-2E-01	-4E-03	-2E+00	-5E-02	-9E-01	-2E-02	-2E-01	-4E-03
NR7	Soil	Nitrate as N		--	--	--	--	--	--	--	--	--	--	5E-03	5E-03	1E-02	1E-02	8E-05	8E-05	8E-06	8E-06
NR7	Soil	Selenium		4E+00	2E-01	4E-01	1E-01	4E+00	1E+00	3E+00	9E-01	-3E-01	-1E-01	1E+00	1E-01	9E+00	1E+00	-4E-01	-5E-02	-3E-01	-3E-02
NR7	Soil	Silver		5E-03	--	2E-02	2E-03	1E+00	1E-01	7E-01	5E-02	3E-05	2E-06	9E-03	9E-04	6E-01	6E-02	2E-03	2E-04	6E-06	6E-07
NR7	Soil	Sulfate		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
NR7	Soil	Thallium		-8E-02	-8E-02	-7E-03	-7E-04	-6E-03	-6E-04	-7E-03	-7E-04	-8E-02	-8E-03	-5E-04	-2E-04	-7E-03	-2E-03	-3E-02	-9E-03	-3E-02	-9E-03
NR7	Soil	Zinc		9E-01	8E-01	1E-01	5E-02	1E+00	4E-01	1E+00	4E-01	-1E-01	-5E-02	2E-01	4E-02	1E+00	2E-01	-1E-01	-2E-02	-5E-02	-9E-03
NR7	Soil	Acetophenone		--	--	--	--	--	--	--	--	--	--	2E-05	3E-06	4E-05	8E-06	3E-07	6E-08	3E-08	6E-09
NR7	Soil	bis(2-Ethylhexyl)phthalate		3E-04	--	2E-03	4E-04	6E-02	1E-02	3E-02	7E-03	2E-04	3E-05	1E-04	1E-05	5E-03	5E-04	2E-05	2E-06	3E-06	3E-07
NR7	Soil	Di-n-butyl phthalate		2E-04	--	1E-02	2E-03	8E-02	2E-02	7E-02	1E-02	8E-05	2E-05	8E-06	2E-06	4E-05	1E-05	2E-07	5E-08	9E-09	3E-09
NR7	Soil	Perchlorate		1E-04	--	3E-03	1E-03	7E-05	3E-05	1E-02	5E-03	6E-07	3E-07	1E-02	3E-03	2E-04	4E-05	1E-04	2E-05	3E-07	7E-08
NR8	Soil	Antimony		3E-02	2E-03	--	--	--	--	--	--	--	--	9E-01	2E-02	7E+00	2E-01	-1E+00	-2E-02	-1E+00	-3E-02
NR8	Soil	Arsenic		5E+00	6E+00	3E-01	7E-02	1E+00	2E-01	2E+00	4E-01	-1E-02	-3E-03	4E+00	9E-01	2E+01	3E+00	-5E-01	-1E-01	-1E-01	-2E-02
NR8	Soil	Barium		-4E-02	-5E-03	-5E-03	-3E-03	-3E-03	-1E-03	-5E-03	-2E-03	-7E-03	-3E-03	-6E-03	-4E-03	-2E-02	-1E-02	-4E-02	-2E-02	-1E-02	-9E-03
NR8	Soil	Cadmium		3E-02	6E-03	4E-02	6E-03	3E+00	5E-01	1E+00	2E-01	-1E-02	-2E-03	2E-01	2E-02	7E+00	7E-01	-1E-01	-1E-02	-1E-02	-1E-03
NR8	Soil	Copper		2E+00	2E+00	2E+00	2E-01	3E+01	2E+00	2E+01	2E+00	-3E-01	-3E-02	3E+00	2E-02	3E+01	2E-01	-3E-01	-3E-03	-1E-01	-1E-03
NR8	Soil	Iron		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
NR8	Soil	Lead		2E+00	2E-01	6E+00	1E+00	4E+01	8E+00	4E+01	8E+00	-2E-01	-5E-02	3E+00	6E-02	1E+01	3E-01	-7E-03	-1E-04	-4E-02	-7E-04
NR8	Soil	Manganese		7E+00	2E+00	3E-01	8E-02	8E-01	2E-01	2E+00	4E-01	-2E-02	-5E-03	2E+00	4E-01	5E+00	9E-01	-1E-01	-3E-02	-5E-02	-9E-03
NR8	Soil	Mercury		2E-01	2E+00	2E-01	8E-02	4E-01	2E-01	9E-01	5E-01	-2E-04	-9E-05	1E-01	3E-02	4E-01	9E-02	-4E-03	-1E-03	-1E-04	-3E-05
NR8	Soil	Nickel		-1E-01	-2E-02	-9E-02	-1E-02	-8E-01	-9E-02	-5E-01	-6E-02	-8E-02	-1E-02	-3E-01	-7E-03	-4E+00	-8E-02	-9E-01	-2E-02	-2E-01	-4E-03
NR8	Soil	Selenium		2E+00	8E-02	1E-01	3E-02	2E+00	5E-01	1E+00	4E-01	-3E-01	-1E-01	5E-01	6E-02	4E+00	5E-01	-4E-01	-5E-02	-3E-01	-3E-02
NR8	Soil	Silver		3E-03	--	1E-02	9E-04	1E+00	7E-02	5E-01	3E-02	2E-05	1E-06	6E-03	6E-04	4E-01	4E-02	1E-03	1E-04	3E-06	4E-07
NR8	Soil	Sulfate		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
NR8	Soil	Thallium		4E-02	4E-02	-1E-02	-1E-03	3E-03	3E-04	3E-03	3E-04	-8E-02	-8E-03	2E-04	8E-05	3E-03	1E-03	-3E-02	-9E-03	-3E-02	-9E-03
NR8	Soil	Zinc		2E+00	2E+00	3E-01	9E-02	2E+00	7E-01	2E+00	7E-01	-1E-01	-5E-02	4E-01	8E-02	2E+00	4E-01	-9E-02	-2E-02	-5E-02	-9E-03
NR9	Soil	Antimony		7E-01	5E-02	--	--	--	--	--	--	--	--	2E+01	5E-01	2E+02	4E+00	-8E-01	-2E-02	-1E+00	-3E-02
NR9	Soil	Arsenic		1E+01	2E+01	3E-01	7E-02	1E+00	2E-01	5E+00	1E+00	-1E-02	-3E-03	1E+01	3E+00	4E+01	1E+01	-5E-01	-1E-01	-1E-01	-2E-02
NR9	Soil</																				

TABLE M-30

Risk Summary - Soil

Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona

			Site or Incremental Risk <sup>a</sup>																		
			Soil		Gambel's quail		Western kingbird		Song sparrow		Red-tailed hawk		Pocket gopher		Desert shrew		Raccoon		Coyote		
Exposure	Area	Matrix	COPEC	Plants	Invertebra	NOAEL based	LOAEL based	NOAEL based	LOAEL based	NOAEL based	LOAEL based	NOAEL based	LOAEL based	NOAEL based	LOAEL based	NOAEL based	LOAEL based	NOAEL based	LOAEL based	NOAEL based	LOAEL based
NR9	Soil	Lead		3E+00	2E-01	3E+00	6E-01	3E+01	5E+00	6E+01	1E+01	-3E-01	-5E-02	4E+00	8E-02	2E+01	4E-01	-4E-02	-7E-04	-4E-02	-7E-04
NR9	Soil	Manganese		9E-01	2E-01	-5E-02	-1E-02	-6E-02	-1E-02	2E-01	5E-02	-2E-02	-5E-03	3E-01	5E-02	7E-01	1E-01	-2E-01	-3E-02	-5E-02	-9E-03
NR9	Soil	Mercury		8E-03	8E-02	2E-03	1E-03	-6E-02	-3E-02	6E-02	3E-02	-9E-04	-4E-04	6E-03	2E-03	4E-02	9E-03	-6E-03	-2E-03	-2E-04	-5E-05
NR9	Soil	Nickel		1E-01	2E-02	-1E-01	-1E-02	-9E-01	-1E-01	4E-01	5E-02	-8E-02	-1E-02	3E-01	6E-03	3E+00	7E-02	-9E-01	-2E-02	-2E-01	-4E-03
NR9	Soil	Selenium		1E+01	4E-01	2E-01	6E-02	3E+00	8E-01	7E+00	2E+00	-3E-01	-1E-01	3E+00	3E-01	2E+01	3E+00	-4E-01	-5E-02	-3E-01	-3E-02
NR9	Soil	Silver		1E-02	--	2E-02	1E-03	2E+00	1E-01	2E+00	1E-01	2E-05	2E-06	2E-02	2E-03	1E+00	1E-01	2E-03	2E-04	5E-06	5E-07
NR10	Soil	Arsenic		3E+01	4E+01	6E-02	1E-02	3E-01	6E-02	1E+01	3E+00	-1E-02	-3E-03	2E+01	4E+00	6E+01	1E+01	-5E-01	-1E-01	-1E-01	-2E-02
NR10	Soil	Cadmium		2E-04	3E-05	-1E-02	-1E-03	-9E-01	-1E-01	1E-02	2E-03	-1E-02	-2E-03	-1E-02	-1E-03	-7E-01	-7E-02	-2E-01	-2E-02	-1E-02	-1E-03
NR10	Soil	Lead		1E+01	7E-01	2E+00	3E-01	1E+01	2E+00	2E+02	3E+01	-3E-01	-5E-02	7E+00	1E-01	3E+01	6E-01	-5E-02	-1E-03	-4E-02	-7E-04
NR10	Soil	Mercury		7E-05	7E-04	-2E-03	-8E-04	-2E-01	-8E-02	8E-04	4E-04	-9E-04	-4E-04	-4E-04	-9E-05	-3E-02	-8E-03	-6E-03	-2E-03	-2E-04	-5E-05
NR10	Soil	Zinc		5E+00	4E+00	2E-02	7E-03	-9E-01	-3E-01	4E+00	1E+00	-1E-01	-5E-02	6E-01	1E-01	2E+00	4E-01	-1E-01	-2E-02	-5E-02	-9E-03
NR11	Soil	Aluminum		2E+03	--	7E+00	1E+00	2E+01	4E+00	3E+01	6E+00	-9E-01	-2E-01	2E+02	4E+01	9E+02	2E+02	-3E+01	-6E+00	-2E+01	-3E+00
NR11	Soil	Antimony		2E-01	2E-02	--	--	--	--	--	--	--	--	7E+00	1E-01	5E+01	1E+00	-5E-01	-1E-02	-1E+00	-3E-02
NR11	Soil	Arsenic		5E+00	6E+00	4E-01	1E-01	9E-01	2E-01	2E+00	4E-01	-1E-02	-3E-03	4E+00	9E-01	1E+01	3E+00	-3E-01	-7E-02	-1E-01	-2E-02
NR11	Soil	Barium		3E-03	4E-04	8E-05	4E-05	2E-04	1E-04	3E-04	2E-04	-7E-03	-3E-03	5E-04	3E-04	1E-03	8E-04	-4E-02	-2E-02	-1E-02	-9E-03
NR11	Soil	Beryllium		4E-01	2E-02	--	--	--	--	--	--	--	--	5E-01	2E-01	7E-01	3E-01	-2E-02	-8E-03	-3E-03	-1E-03
NR11	Soil	Cadmium		9E-02	2E-02	2E-01	3E-02	9E+00	1E+00	4E+00	6E-01	-1E-02	-2E-03	6E-01	6E-02	2E+01	2E+00	-5E-03	-5E-04	-1E-02	-1E-03
NR11	Soil	Chloride		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
NR11	Soil	Chromium		7E-01	7E+00	1E+00	2E-01	8E+00	1E+00	8E+00	1E+00	-3E-01	-5E-02	2E+00	7E-02	1E+01	5E-01	-3E-01	-1E-02	-2E-01	-7E-03
NR11	Soil	Chromium, Hexavalent		6E-02	5E-01	--	--	--	--	--	--	--	--	6E-04	1E-04	8E-03	2E-03	9E-05	2E-05	1E-05	4E-06
NR11	Soil	Cobalt		-2E-01	-8E-02	-3E-02	-1E-02	-1E-01	-5E-02	-1E-01	-6E-02	-2E-02	-9E-03	-3E-02	-1E-02	-2E-01	-7E-02	-4E-02	-1E-02	-1E-02	-5E-03
NR11	Soil	Copper		1E+01	1E+01	2E+01	1E+00	2E+02	2E+01	1E+02	1E+01	-3E-01	-2E-02	2E+01	1E-01	2E+02	2E+00	1E+00	1E-02	-1E-01	-1E-03
NR11	Soil	Cyanide		1E+00	1E+00	1E+00	1E-01	5E+00	5E-01	6E+00	6E-01	1E-02	1E-03	1E-03	3E-04	3E-03	6E-04	4E-05	9E-06	2E-06	5E-07
NR11	Soil	Iron		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
NR11	Soil	Lead		4E+00	2E-01	1E+01	2E+00	6E+01	1E+01	7E+01	1E+01	-2E-01	-4E-02	5E+00	9E-02	2E+01	4E-01	2E-01	3E-03	-3E-02	-7E-04
NR11	Soil	Manganese		-6E-01	-2E-01	-5E-02	-1E-02	-8E-02	-2E-02	-2E-01	-4E-02	-2E-02	-5E-03	-2E-01	-4E-02	-5E-01	-9E-02	-2E-01	-3E-02	-5E-02	-9E-03
NR11	Soil	Mercury		2E-02	2E-01	3E-02	1E-02	1E-01	5E-02	1E-01	7E-02	-6E-04	-3E-04	2E-02	4E-03	7E-02	2E-02	-5E-03	-1E-03	-2E-04	-4E-05
NR11	Soil	Nickel		7E-01	2E-01	4E-01	5E-02	5E+00	6E-01	3E+00	4E-01	-8E-02	-1E-02	2E+00	5E-02	2E+01	5E-01	-7E-01	-1E-02	-2E-01	-4E-03
NR11	Soil	Nitrate as N		--	--	--	--	--	--	--	--	--	--	1E-02	1E-02	3E-02	3E-02	4E-04	4E-04	4E-05	4E-05
NR11	Soil	Selenium		1E+00	6E-02	2E-01	5E-02	1E+00	5E-01	1E+00	3E-01	-3E-01	-1E-01	4E-01	5E-02	4E+00	4E-01	-4E-01	-5E-02	-3E-01	-3E-02
NR11	Soil	Silver		1E-02	--	7E-02	5E-03	4E+00	2E-01	2E+00	1E-01	1E-04	1E-05	2E-02	2E-03	1E+00	1E-01	1E-02	1E-03	3E-05	3E-06
NR11	Soil	Sulfate		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
NR11	Soil	Thallium		-2E+00	-2E+00	-3E-02	-3E-03	-1E-01	-1E-02	-2E-01	-2E-02	-8E-02	-8E-03	-1E-02	-4E-03	-2E-01	-6E-02	-3E-02	-9E-03	-3E-02	-9E-03
NR11	Soil	Zinc		3E+00	3E+00	6E-01	2E-01	3E+00	1E+00	3E+00	1E+00	-1E-01	-5E-02	7E-01	1E-01	3E+00	6E-01	-6E-02	-1E-02	-5E-02	-9E-03
NR11	Soil	Acetophenone		--	--	--	--	--	--	--	--	--	--	3E-05	6E-06	8E-05	2E-05	1E-06	2E-07	1E-07	2E-08
NR11	Soil	Aroclor-1248		2E-03	2E-03	7E-02	7E-03	4E+00	4E-01	2E+00	2E-01	8E-04	8E-05	5E-02	1E-02	2E+00	7E-01	2E-02	5E-03	1E-04	4E-05
NR11	Soil	Aroclor-1254		1E-04	2E-04	4E-03	4E-04	1E-01	1E-02	7E-02	7E-03	5E-05	5E-06	3E-03	8E-04	8E-02	2E-02	6E-04	2E-04	8E-06	2E-06
NR11	Soil	bis(2-Ethylhexyl)phthalate		6E-05	--	4E-04	8E-05	1E-02	2E-03	6E-03	1E-03	7E-05	1E-05	2E-05	2E-06	8E-04	8E-05	7E-06	7E-07	1E-06	1E-07
NR11	Soil	Carbazole		1E-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
NR11	Soil	Delta-BHC		2E-05	--	2E-03	5E-04	9E-03	2E-03	9E-03	2E-03	4E-06	1E-06	5E-04	9E-05	1E-03	3E-04	2E-05	4E-06	2E-07	4E-08
NR11	Soil	Dieldrin		2E-05	--	8E-04	7E-05	1E-01	8E-03	4E-02	4E-03	3E-03	3E-04	6E-03	7E-05	5E-01	6E-03	7E-03	9E-05	4E-03	5E-05
NR11	Soil	Di-n-butyl phthalate		3E-04	--	2E-02	3E-03	1E-01	2E-02	9E-02	2E-02	2E-04	4E-05	1E-05	3E-06	5E-05	1E-05	5E-07	2E-07	3E-08	8E-09
NR11	Soil	Endosulfan I		2E-06	--	2E-05	4E-06	4E-05	9E-06	7E-05	1E-05	4E-09	8E-10	2E-04	1E-04	3E-04	2E-04	6E-06	3E-06	2E-08	8E-09
NR11	Soil	Heptachlor		2E-03	--	2E-04	8E-05	3E-03	2E-03	2E-03	9E-04	1E-06	5E-07	3E-03	5E-05	4E-02	7E-04	3E-04	6E-06	3E-06	7E-08
NR11	Soil	Heptachlor Epoxide		6E-03	--	1E-03	5E-04	6E-03	3E-03	6E-03	3E-03	4E-06	2E-06	1E+00	2E-01	4E+00	8E-01	4E-02	8E-03	6E-04	1E-04
NR11	Soil	1,2,3,4,6,7,8-Hepta CDD		2E+02	1E-04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
NR11	Soil	1,2,3,4,6,7,8-Hepta CDF		6E+02	4E-04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
NR11	Soil	1,2,3,4,7,8,9-Hepta CDF		3E+02	3E-04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
NR11	Soil	1,2,3,4,7,8-Hexa CDD		3E+01	2E-05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
NR11	Soil	1,2,3,4,7,8-Hexa CDF		4E+02	3E-04	--	--	--	--	--											

TABLE M-30

Risk Summary - Soil

Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona

			Site or Incremental Risk <sup>a</sup>																		
			Soil		Gambel's quail		Western kingbird		Song sparrow		Red-tailed hawk		Pocket gopher		Desert shrew		Raccoon		Coyote		
Exposure	Area	Matrix	COPEC	Plants	Invertebra	NOAEL based	LOAEL based	NOAEL based	LOAEL based	NOAEL based	LOAEL based	NOAEL based	LOAEL based	NOAEL based	LOAEL based	NOAEL based	LOAEL based	NOAEL based	LOAEL based	NOAEL based	LOAEL based
NR11	Soil		1,2,3,7,8,9-Hexa CDD	1E+01	1E-05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
NR11	Soil		1,2,3,7,8,9-Hexa CDF	7E+01	5E-05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
NR11	Soil		1,2,3,7,8-Penta CDD	3E+01	2E-05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
NR11	Soil		1,2,3,7,8-Penta CDF	2E+02	1E-04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
NR11	Soil		2,3,4,6,7,8-Hexa CDF	1E+02	9E-05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
NR11	Soil		2,3,4,7,8-Penta CDF	6E+01	5E-05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
NR11	Soil		2,3,7,8-Tetra CDD	2E+00	1E-06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
NR11	Soil		2,3,7,8-Tetra CDF	1E+02	8E-05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
NR11	Soil		OCDD	9E+02	8E-04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
NR11	Soil		OCDF	9E+02	7E-04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
NR11	Soil		TEQBird	--	--	2E+00	2E-01	3E+02	3E+01	1E+02	1E+01	2E-01	2E-02	--	--	--	--	--	--	--	--
NR11	Soil		TEQMammal	--	--	--	--	--	--	--	--	--	--	1E+01	1E+00	3E+03	3E+02	2E+01	2E+00	5E-01	5E-02
NR12	Soil		Aluminum	6E+02	--	2E+00	5E-01	6E+00	1E+00	1E+01	2E+00	-9E-01	-2E-01	7E+01	1E+01	3E+02	6E+01	-4E+01	-8E+00	-2E+01	-3E+00
NR12	Soil		Antimony	3E-01	2E-02	--	--	--	--	--	--	--	--	1E+01	2E-01	8E+01	2E+00	-2E-01	-4E-03	-1E+00	-3E-02
NR12	Soil		Arsenic	1E+01	2E+01	1E+00	3E-01	2E+00	6E-01	5E+00	1E+00	-1E-02	-2E-03	1E+01	2E+00	4E+01	9E+00	-3E-02	-8E-03	-1E-01	-2E-02
NR12	Soil		Barium	7E-01	1E-01	2E-02	1E-02	5E-02	3E-02	9E-02	5E-02	-6E-03	-3E-03	1E-01	8E-02	3E-01	2E-01	-3E-02	-2E-02	-1E-02	-9E-03
NR12	Soil		Cadmium	9E-02	2E-02	2E-01	3E-02	9E+00	1E+00	4E+00	6E-01	-1E-02	-2E-03	6E-01	6E-02	2E+01	2E+00	-5E-03	-5E-04	-1E-02	-1E-03
NR12	Soil		Chromium	1E-01	1E+00	2E-01	4E-02	1E+00	2E-01	1E+00	2E-01	-3E-01	-5E-02	3E-01	1E-02	2E+00	8E-02	-4E-01	-2E-02	-2E-01	-7E-03
NR12	Soil		Chromium, Hexavalent	6E-01	5E+00	--	--	--	--	--	--	--	--	7E-03	2E-03	8E-02	2E-02	8E-04	2E-04	9E-05	2E-05
NR12	Soil		Cobalt	-2E-01	-7E-02	-3E-02	-1E-02	-1E-01	-4E-02	-1E-01	-5E-02	-2E-02	-9E-03	-3E-02	-1E-02	-2E-01	-6E-02	-4E-02	-1E-02	-1E-02	-5E-03
NR12	Soil		Copper	8E+00	8E+00	1E+01	9E-01	1E+02	9E+00	8E+01	6E+00	-3E-01	-3E-02	1E+01	9E-02	1E+02	9E-01	5E-01	4E-03	-1E-01	-1E-03
NR12	Soil		Iron	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
NR12	Soil		Lead	2E+00	1E-01	6E+00	1E+00	3E+01	6E+00	3E+01	6E+00	-2E-01	-4E-02	2E+00	4E-02	1E+01	2E-01	5E-02	9E-04	-4E-02	-7E-04
NR12	Soil		Manganese	4E+00	1E+00	3E-01	7E-02	5E-01	1E-01	1E+00	3E-01	-2E-02	-5E-03	1E+00	2E-01	3E+00	6E-01	-1E-01	-2E-02	-5E-02	-9E-03
NR12	Soil		Mercury	3E-02	3E-01	5E-02	2E-02	1E-01	7E-02	2E-01	1E-01	-5E-04	-3E-04	3E-02	7E-03	1E-01	3E-02	-4E-03	-1E-03	-2E-04	-4E-05
NR12	Soil		Nickel	3E-01	6E-02	1E-01	2E-02	2E+00	2E-01	1E+00	1E-01	-8E-02	-1E-02	8E-01	2E-02	9E+00	2E-01	-8E-01	-2E-02	-2E-01	-4E-03
NR12	Soil		Nitrate as N	--	--	--	--	--	--	--	--	--	--	6E-03	6E-03	1E-02	1E-02	2E-04	2E-04	2E-05	2E-05
NR12	Soil		Selenium	9E-01	4E-02	1E-01	3E-02	9E-01	3E-01	7E-01	2E-01	-3E-01	-1E-01	2E-01	3E-02	2E+00	3E-01	-4E-01	-5E-02	-3E-01	-3E-02
NR12	Soil		Silver	5E-03	--	3E-02	2E-03	1E+00	9E-02	6E-01	4E-02	5E-05	4E-06	9E-03	9E-04	5E-01	5E-02	4E-03	4E-04	1E-05	1E-06
NR12	Soil		Sulfate	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
NR12	Soil		Thallium	-1E+00	-1E+00	-2E-02	-2E-03	-9E-02	-9E-03	-1E-01	-1E-02	-8E-02	-8E-03	-8E-03	-3E-03	-1E-01	-3E-02	-3E-02	-9E-03	-3E-02	-9E-03
NR12	Soil		Zinc	3E+00	3E+00	6E-01	2E-01	3E+00	1E+00	3E+00	1E+00	-1E-01	-5E-02	7E-01	1E-01	3E+00	6E-01	-6E-02	-1E-02	-5E-02	-9E-03
NR12	Soil		1,2,3,4,6,7,8-Hepta CDD	8E+01	6E-05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
NR12	Soil		1,2,3,4,6,7,8-Hepta CDF	4E+02	3E-04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
NR12	Soil		1,2,3,4,7,8,9-Hepta CDF	5E+01	4E-05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
NR12	Soil		1,2,3,4,7,8-Hexa CDD	3E+00	2E-06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
NR12	Soil		1,2,3,4,7,8-Hexa CDF	2E+02	2E-04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
NR12	Soil		1,2,3,6,7,8-Hexa CDD	6E+00	5E-06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
NR12	Soil		1,2,3,6,7,8-Hexa CDF	6E+01	4E-05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
NR12	Soil		1,2,3,7,8,9-Hexa CDD	7E+00	6E-06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
NR12	Soil		1,2,3,7,8,9-Hexa CDF	3E+00	2E-06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
NR12	Soil		1,2,3,7,8-Penta CDD	2E+00	2E-06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
NR12	Soil		1,2,3,7,8-Penta CDF	2E+01	2E-05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
NR12	Soil		2,3,4,6,7,8-Hexa CDF	5E+01	4E-05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
NR12	Soil		2,3,4,7,8-Penta CDF	4E+01	3E-05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
NR12	Soil		2,3,7,8-Tetra CDF	4E+01	3E-05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
NR12	Soil		OCDD	4E+02	3E-04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
NR12	Soil		OCDF	6E+02	5E-04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
NR12	Soil		TEQBird	--	--	4E-01	4E-02	6E+01	6E+00	2E+01	2E+00	4E-02	4E-03	--	--	--	--	--	--	--	--
NR12	Soil		TEQMammal	--	--	--	--	--	--	--	--	--	--	3E+00	3E-01	4E+02	4E+01	3E+00	3E-01	7E-02	7E-03
NR13	Soil		Antimony	4E-02	3E-03	--	--	--	--	--	--	--	--	1E+00	3E-02	1E+01	2E-01	-1E+00	-2E-02	-1E+00	-3E-02
NR13	Soil		Arsenic	-9E-03	-1E-02	-6E-02	-1E-02	-1E-01	-2E-02	-3E-03	-8E-04	-1E-02	-3E-03	-8E-03	-2E-03	-3E-02	-6E-03	-6E-01	-1E-01	-1E-01	-2E-02

TABLE M-30

Risk Summary - Soil

Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona

			Site or Incremental Risk <sup>a</sup>																		
			Soil		Gambel's quail		Western kingbird		Song sparrow		Red-tailed hawk		Pocket gopher		Desert shrew		Raccoon		Coyote		
Exposure	Area	Matrix	COPEC	Plants	Invertebra	NOAEL based	LOAEL based	NOAEL based	LOAEL based	NOAEL based	LOAEL based	NOAEL based	LOAEL based	NOAEL based	LOAEL based	NOAEL based	LOAEL based	NOAEL based	LOAEL based	NOAEL based	LOAEL based
NR13	Soil	Barium		5E-01	7E-02	-4E-03	-2E-03	1E-02	5E-03	6E-02	3E-02	-7E-03	-3E-03	8E-02	5E-02	2E-01	1E-01	-4E-02	-2E-02	-1E-02	-9E-03
NR13	Soil	Cadmium		5E-02	1E-02	4E-02	5E-03	3E+00	5E-01	2E+00	3E-01	-1E-02	-2E-03	3E-01	3E-02	1E+01	1E+00	-1E-01	-1E-02	-1E-02	-1E-03
NR13	Soil	Copper		2E+00	1E+00	6E-01	5E-02	1E+01	1E+00	2E+01	1E+00	-3E-01	-3E-02	2E+00	2E-02	2E+01	2E-01	-4E-01	-3E-03	-1E-01	-1E-03
NR13	Soil	Lead		4E-01	3E-02	6E-01	1E-01	6E+00	1E+00	9E+00	2E+00	-3E-01	-5E-02	6E-01	1E-02	3E+00	6E-02	-6E-02	-1E-03	-4E-02	-7E-04
NR13	Soil	Nickel		1E-01	2E-02	-8E-02	-1E-02	-2E-01	-3E-02	4E-01	5E-02	-8E-02	-1E-02	3E-01	6E-03	3E+00	7E-02	-9E-01	-2E-02	-2E-01	-4E-03
NR13	Soil	Selenium		2E-01	7E-03	-8E-02	-3E-02	-5E-01	-2E-01	1E-01	4E-02	-3E-01	-1E-01	4E-02	5E-03	4E-01	5E-02	-5E-01	-6E-02	-3E-01	-3E-02
NR13	Soil	Silver		2E-03	--	4E-03	3E-04	3E-01	2E-02	2E-01	2E-02	5E-06	3E-07	3E-03	3E-04	2E-01	2E-02	3E-04	3E-05	1E-06	1E-07
NR13	Soil	Zinc		3E-01	3E-01	6E-03	2E-03	-2E-02	-8E-03	4E-01	1E-01	-1E-01	-5E-02	7E-02	1E-02	6E-01	1E-01	-1E-01	-2E-02	-5E-02	-9E-03
NR14	Soil	Aluminum		8E+00	--	3E-02	6E-03	8E-02	2E-02	1E-01	3E-02	-9E-01	-2E-01	9E-01	2E-01	4E+00	8E-01	-4E+01	-7E+00	-2E+01	-3E+00
NR14	Soil	Antimony		7E-01	5E-02	--	--	--	--	--	--	--	--	2E+01	5E-01	2E+02	4E+00	3E+00	7E-02	-8E-01	-2E-02
NR14	Soil	Arsenic		4E+00	6E+00	4E-01	9E-02	9E-01	2E-01	2E+00	4E-01	-1E-02	-2E-03	4E+00	9E-01	1E+01	3E+00	-5E-02	-1E-02	-1E-01	-2E-02
NR14	Soil	Cadmium		4E-02	8E-03	8E-02	1E-02	4E+00	6E-01	2E+00	3E-01	-1E-02	-2E-03	2E-01	2E-02	9E+00	9E-01	2E-02	2E-03	-1E-02	-1E-03
NR14	Soil	Iron		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
NR14	Soil	Lead		3E+00	2E-01	1E+01	2E+00	5E+01	1E+01	6E+01	1E+01	-2E-01	-3E-02	4E+00	8E-02	2E+01	3E-01	4E-01	7E-03	-3E-02	-6E-04
NR14	Soil	Manganese		-5E-01	-1E-01	-3E-02	-7E-03	-6E-02	-1E-02	-1E-01	-3E-02	-2E-02	-5E-03	-1E-01	-3E-02	-4E-01	-6E-02	-2E-01	-3E-02	-5E-02	-9E-03
NR14	Soil	Mercury		1E-02	1E-01	2E-02	9E-03	8E-02	4E-02	9E-02	4E-02	-6E-04	-3E-04	9E-03	2E-03	5E-02	1E-02	-4E-03	-9E-04	-2E-04	-4E-05
NR14	Soil	Nitrate as N		--	--	--	--	--	--	--	--	--	--	8E-04	8E-04	2E-03	2E-03	6E-05	6E-05	6E-06	6E-06
NR14	Soil	Selenium		4E+00	2E-01	5E-01	1E-01	4E+00	1E+00	3E+00	1E+00	-3E-01	-9E-02	1E+00	1E-01	1E+01	1E+00	-2E-01	-2E-02	-3E-01	-3E-02
NR14	Soil	Silver		2E-03	--	1E-02	6E-04	5E-01	3E-02	2E-01	2E-02	4E-05	3E-06	3E-03	3E-04	2E-01	2E-02	3E-03	3E-04	1E-05	1E-06
NR14	Soil	Sulfate		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
NR14	Soil	Thallium		7E+00	7E+00	1E-01	1E-02	5E-01	5E-02	6E-01	6E-02	-7E-02	-7E-03	4E-02	1E-02	6E-01	2E-01	-8E-03	-3E-03	-2E-02	-8E-03
NR14	Soil	Zinc		9E-01	8E-01	2E-01	6E-02	1E+00	4E-01	1E+00	4E-01	-1E-01	-4E-02	2E-01	4E-02	1E+00	2E-01	-5E-02	-1E-02	-5E-02	-9E-03
NR15	Soil	Cadmium		2E-03	5E-04	3E-03	5E-04	3E-01	5E-02	1E-01	2E-02	-1E-02	-2E-03	1E-02	1E-03	7E-01	7E-02	-1E-01	-1E-02	-1E-02	-1E-03
NR15	Soil	Lead		2E-02	1E-03	4E-02	7E-03	5E-01	9E-02	4E-01	7E-02	-3E-01	-5E-02	2E-02	4E-04	2E-01	3E-03	-6E-02	-1E-03	-4E-02	-7E-04
NR15	Soil	Mercury		-4E-04	-4E-03	-7E-04	-3E-04	-8E-03	-4E-03	-5E-03	-3E-03	-9E-04	-4E-04	-3E-04	-8E-05	-4E-03	-1E-03	-6E-03	-2E-03	-2E-04	-5E-05
NR15	Soil	Nitrate as N		--	--	--	--	--	--	--	--	--	--	4E-04	4E-04	1E-03	1E-03	7E-06	7E-06	7E-07	7E-07
NR15	Soil	Sulfate		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
NR15	Soil	Thallium		1E-01	1E-01	-2E-03	-2E-04	7E-03	7E-04	8E-03	8E-04	-8E-02	-8E-03	6E-04	2E-04	8E-03	3E-03	-3E-02	-9E-03	-3E-02	-9E-03
NR15	Soil	Zinc		1E-02	9E-03	-9E-04	-3E-04	3E-02	9E-03	2E-02	6E-03	-1E-01	-5E-02	2E-03	4E-04	3E-02	5E-03	-1E-01	-2E-02	-5E-02	-9E-03
NR16	Soil	Aluminum		-3E+02	--	-1E+00	-2E-01	-3E+00	-6E-01	-5E+00	-1E+00	-9E-01	-2E-01	-3E+01	-7E+00	-1E+02	-3E+01	-4E+01	-9E+00	-2E+01	-3E+00
NR16	Soil	Antimony		1E+00	9E-02	--	--	--	--	--	--	--	--	4E+01	8E-01	3E+02	6E+00	2E+00	3E-02	-1E+00	-2E-02
NR16	Soil	Arsenic		1E+01	2E+01	1E+00	2E-01	2E+00	5E-01	4E+00	1E+00	-1E-02	-3E-03	1E+01	2E+00	3E+01	8E+00	-1E-01	-3E-02	-1E-01	-2E-02
NR16	Soil	Barium		-3E-01	-4E-02	-9E-03	-4E-03	-2E-02	-1E-02	-4E-02	-2E-02	-7E-03	-3E-03	-5E-02	-3E-02	-1E-01	-8E-02	-4E-02	-2E-02	-1E-02	-9E-03
NR16	Soil	Cadmium		8E-02	2E-02	2E-01	2E-02	8E+00	1E+00	4E+00	5E-01	-1E-02	-2E-03	5E-01	5E-02	2E+01	2E+00	-4E-02	-4E-03	-1E-02	-1E-03
NR16	Soil	Copper		1E-01	1E-01	1E-01	1E-02	2E+00	1E-01	1E+00	8E-02	-3E-01	-3E-02	1E-01	1E-03	1E+00	1E-02	-4E-01	-3E-03	-1E-01	-1E-03
NR16	Soil	Cyanide		2E+00	2E+00	3E+00	3E-01	1E+01	1E+00	1E+01	1E+00	3E-02	3E-03	3E-03	6E-04	8E-03	2E-03	9E-05	2E-05	5E-06	9E-07
NR16	Soil	Iron		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
NR16	Soil	Lead		2E+01	1E+00	6E+01	1E+01	2E+02	4E+01	3E+02	5E+01	-2E-01	-3E-02	2E+01	4E-01	7E+01	1E+00	6E-01	1E-02	-3E-02	-6E-04
NR16	Soil	Manganese		-3E-01	-7E-02	-2E-02	-5E-03	-4E-02	-8E-03	-8E-02	-2E-02	-2E-02	-5E-03	-9E-02	-2E-02	-2E-01	-4E-02	-2E-01	-3E-02	-5E-02	-9E-03
NR16	Soil	Mercury		3E-01	3E+00	5E-01	2E-01	8E-01	4E-01	2E+00	9E-01	2E-03	1E-03	2E-01	6E-02	6E-01	2E-01	3E-03	7E-04	3E-04	7E-05
NR16	Soil	Nitrate as N		--	--	--	--	--	--	--	--	--	--	1E-03	1E-03	3E-03	3E-03	4E-05	4E-05	3E-06	3E-06
NR16	Soil	Selenium		7E+00	3E-01	7E-01	2E-01	6E+00	2E+00	5E+00	1E+00	-3E-01	-1E-01	2E+00	2E-01	1E+01	2E+00	-3E-01	-4E-02	-3E-01	-3E-02
NR16	Soil	Silver		1E-02	--	6E-02	4E-03	3E+00	2E-01	1E+00	1E-01	1E-04	7E-06	2E-02	2E-03	1E+00	1E-01	7E-03	7E-04	2E-05	2E-06
NR16	Soil	Sulfate		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
NR16	Soil	Thallium		-8E-01	-8E-01	-1E-02	-1E-03	-6E-02	-6E-03	-7E-02	-7E-03	-8E-02	-8E-03	-5E-03	-2E-03	-7E-02	-2E-02	-3E-02	-8E-03	-3E-02	-9E-03
NR16	Soil	Zinc		3E+00	3E+00	6E-01	2E-01	3E+00	1E+00	3E+00	1E+00	-1E-01	-5E-02	7E-01	1E-01	3E+00	6E-01	-7E-02	-1E-02	-5E-02	-9E-03
NR16	Soil	4-Chloroaniline		4E-03	1E-03	1E-03	1E-04	4E-03	4E-04	5E-03	5E-04	3E-07	3E-08	2E-03	3E-04	4E-03	9E-04	5E-05	1E-05	2E-07	3E-08
NR16	Soil	Acetophenone		--	--	--	--	--	--	--	--	--	--	9E-06	2E-06	2E-05	5E-06	3E-07	6E-08	3E-03	

TABLE M-30

Risk Summary - Soil

Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona

			Site or Incremental Risk <sup>a</sup>																	
			Plants	Soil	Gambel's quail		Western kingbird		Song sparrow		Red-tailed hawk		Pocket gopher		Desert shrew		Raccoon		Coyote	
Exposure	Area	Matrix		Invertebra	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
		COPEC		tes	based	based	based	based	based	based	based	based	based	based	based	based	based	based	based	based
NR16	Soil	Benzyl butyl phthalate	--	--	--	--	--	--	--	--	--	--	1E-05	4E-06	8E-05	3E-05	6E-07	2E-07	1E-08	3E-09
NR16	Soil	Beta-BHC	2E-06	--	2E-04	5E-05	9E-04	2E-04	1E-03	2E-04	3E-07	9E-08	5E-05	1E-05	1E-04	3E-05	2E-06	3E-07	2E-08	3E-09
NR16	Soil	bis(2-Ethylhexyl)phthalate	9E-05	--	6E-04	1E-04	2E-02	3E-03	9E-03	2E-03	9E-05	2E-05	4E-05	4E-06	1E-03	1E-04	9E-06	9E-07	2E-06	2E-07
NR16	Soil	Caprolactam	--	--	--	--	--	--	--	--	--	--	2E-04	3E-05	4E-04	8E-05	5E-06	1E-06	5E-07	1E-07
NR16	Soil	Dieldrin	3E-05	--	9E-04	8E-05	1E-01	1E-02	5E-02	4E-03	3E-03	2E-04	7E-03	8E-05	6E-01	7E-03	7E-03	8E-05	4E-03	4E-05
NR16	Soil	Endrin Ketone	9E-02	--	7E-03	1E-03	6E-02	1E-02	5E-02	9E-03	6E-05	1E-05	1E-03	3E-04	8E-03	2E-03	7E-05	1E-05	2E-06	4E-07
NR17	Soil	Antimony	9E-01	7E-02	--	--	--	--	--	--	--	--	<b>3E+01</b>	6E-01	<b>2E+02</b>	<b>5E+00</b>	<b>4E+00</b>	8E-02	-7E-01	-2E-02
NR17	Soil	Arsenic	<b>4E+01</b>	<b>6E+01</b>	<b>4E+00</b>	9E-01	<b>8E+00</b>	<b>2E+00</b>	<b>2E+01</b>	<b>4E+00</b>	3E-04	7E-05	<b>4E+01</b>	<b>9E+00</b>	<b>1E+02</b>	<b>3E+01</b>	<b>3E+00</b>	7E-01	-3E-02	-6E-03
NR17	Soil	Cadmium	1E-01	3E-02	3E-01	5E-02	<b>1E+01</b>	<b>2E+00</b>	<b>6E+00</b>	9E-01	-1E-02	-2E-03	1E+00	1E-01	<b>3E+01</b>	<b>3E+00</b>	3E-01	3E-02	-1E-02	-1E-03
NR17	Soil	Chromium, Hexavalent	5E-02	4E-01	--	--	--	--	--	--	--	--	5E-04	1E-04	6E-03	2E-03	1E-04	4E-05	3E-05	6E-06
NR17	Soil	Copper	3E-01	3E-01	4E-01	3E-02	<b>5E+00</b>	4E-01	<b>3E+00</b>	3E-01	-3E-01	-3E-02	4E-01	3E-03	<b>4E+00</b>	4E-02	-3E-01	-2E-03	-1E-01	-1E-03
NR17	Soil	Cyanide	<b>2E+00</b>	<b>2E+00</b>	<b>2E+00</b>	2E-01	<b>8E+00</b>	8E-01	<b>1E+01</b>	1E+00	5E-02	5E-03	2E-03	4E-04	6E-03	1E-03	2E-04	3E-05	8E-06	2E-06
NR17	Soil	Iron	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
NR17	Soil	Lead	<b>5E+00</b>	4E-01	<b>2E+01</b>	<b>4E+00</b>	<b>9E+01</b>	<b>2E+01</b>	<b>1E+02</b>	<b>2E+01</b>	-2E-01	-3E-02	<b>7E+00</b>	1E-01	<b>3E+01</b>	6E-01	6E-01	1E-02	-3E-02	-6E-04
NR17	Soil	Mercury	3E-01	<b>3E+00</b>	5E-01	3E-01	8E-01	4E-01	<b>2E+00</b>	1E+00	7E-03	3E-03	3E-01	7E-02	7E-01	2E-01	2E-02	4E-03	1E-03	3E-04
NR17	Soil	Nitrate as N	--	--	--	--	--	--	--	--	--	--	4E-04	4E-04	1E-03	1E-03	3E-05	3E-05	3E-06	3E-06
NR17	Soil	Selenium	<b>7E+00</b>	3E-01	8E-01	2E-01	<b>6E+00</b>	<b>2E+00</b>	<b>5E+00</b>	<b>2E+00</b>	-3E-01	-9E-02	<b>2E+00</b>	2E-01	<b>2E+01</b>	<b>2E+00</b>	-9E-02	-1E-02	-3E-01	-3E-02
NR17	Soil	Silver	5E-03	--	3E-02	2E-03	1E+00	9E-02	6E-01	4E-02	1E-04	7E-06	8E-03	9E-04	5E-01	5E-02	8E-03	8E-04	2E-05	2E-06
NR17	Soil	Sulfate	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
NR17	Soil	Thallium	8E-01	8E-01	1E-02	1E-03	5E-02	5E-03	6E-02	6E-03	-7E-02	-7E-03	5E-03	2E-03	6E-02	2E-02	-2E-02	-7E-03	-3E-02	-9E-03
NR17	Soil	Zinc	<b>8E+00</b>	<b>7E+00</b>	1E+00	5E-01	<b>5E+00</b>	<b>2E+00</b>	<b>7E+00</b>	<b>2E+00</b>	-1E-01	-4E-02	<b>2E+00</b>	3E-01	<b>6E+00</b>	1E+00	6E-02	1E-02	-5E-02	-9E-03
NR18	Soil	Antimony	1E-01	1E-02	--	--	--	--	--	--	--	--	<b>4E+00</b>	9E-02	<b>3E+01</b>	7E-01	-9E-01	-2E-02	-1E+00	-3E-02
NR18	Soil	Arsenic	<b>5E+00</b>	<b>6E+00</b>	4E-01	1E-01	1E+00	2E-01	<b>2E+00</b>	4E-01	-1E-02	-3E-03	<b>4E+00</b>	9E-01	<b>2E+01</b>	<b>3E+00</b>	-4E-01	-1E-01	-1E-01	-2E-02
NR18	Soil	Cadmium	5E-02	1E-02	1E-01	2E-02	<b>6E+00</b>	8E-01	<b>3E+00</b>	4E-01	-1E-02	-2E-03	4E-01	4E-02	<b>1E+01</b>	1E+00	-1E-01	-1E-02	-1E-02	-1E-03
NR18	Soil	Cobalt	-1E-01	-6E-02	-2E-02	-9E-03	-8E-02	-4E-02	-1E-01	-4E-02	-2E-02	-9E-03	-2E-02	-9E-03	-1E-01	-5E-02	-4E-02	-1E-02	-1E-02	-5E-03
NR18	Soil	Copper	-6E-04	-6E-04	-8E-04	-6E-05	-9E-03	-7E-04	-6E-03	-5E-04	-3E-01	-3E-02	-7E-04	-6E-06	-8E-03	-7E-05	-4E-01	-4E-03	-1E-01	-1E-03
NR18	Soil	Iron	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
NR18	Soil	Lead	<b>5E+00</b>	3E-01	<b>2E+01</b>	<b>3E+00</b>	<b>8E+01</b>	<b>1E+01</b>	<b>9E+01</b>	<b>2E+01</b>	-2E-01	-4E-02	<b>6E+00</b>	1E-01	<b>3E+01</b>	5E-01	9E-02	2E-03	-4E-02	-7E-04
NR18	Soil	Mercury	9E-02	9E-01	1E-01	7E-02	3E-01	1E-01	5E-01	3E-01	-3E-04	-2E-04	7E-02	2E-02	2E-01	6E-02	-4E-03	-1E-03	-1E-04	-3E-05
NR18	Soil	Nickel	-2E-01	-4E-02	-1E-01	-1E-02	-1E+00	-2E-01	-1E+00	-1E-01	-8E-02	-1E-02	-6E-01	-1E-02	-7E+00	-1E-01	-9E-01	-2E-02	-2E-01	-4E-03
NR18	Soil	Nitrate as N	--	--	--	--	--	--	--	--	--	--	2E-01	2E-01	5E-01	5E-01	4E-03	4E-03	4E-04	4E-04
NR18	Soil	Selenium	<b>2E+00</b>	7E-02	2E-01	6E-02	<b>2E+00</b>	5E-01	1E+00	4E-01	-3E-01	-1E-01	5E-01	5E-02	<b>4E+00</b>	5E-01	-4E-01	-5E-02	-3E-01	-3E-02
NR18	Soil	Silver	2E-03	--	1E-02	7E-04	5E-01	3E-02	2E-01	2E-02	1E-05	8E-07	3E-03	3E-04	2E-01	2E-02	8E-04	8E-05	2E-06	3E-07
NR18	Soil	Sulfate	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
NR18	Soil	Thallium	1E-01	1E-01	2E-03	2E-04	7E-03	7E-04	8E-03	8E-04	-8E-02	-8E-03	6E-04	2E-04	8E-03	3E-03	-3E-02	-9E-03	-3E-02	-9E-03
NR18	Soil	Zinc	<b>2E+00</b>	<b>2E+00</b>	4E-01	1E-01	<b>2E+00</b>	8E-01	<b>2E+00</b>	7E-01	-1E-01	-5E-02	5E-01	9E-02	<b>2E+00</b>	4E-01	-9E-02	-2E-02	-5E-02	-9E-03
NR19	Soil	Aluminum	-4E+02	--	-1E+00	-3E-01	-4E+00	-7E-01	-6E+00	-1E+00	-9E-01	-2E-01	-4E+01	-8E+00	-2E+02	-4E+01	-4E+01	-8E+00	-2E+01	-3E+00
NR19	Soil	Antimony	2E-02	1E-03	--	--	--	--	--	--	--	--	5E-01	1E-02	<b>4E+00</b>	9E-02	-7E-01	-1E-02	-1E+00	-3E-02
NR19	Soil	Arsenic	<b>2E+00</b>	<b>3E+00</b>	2E-01	4E-02	4E-01	9E-02	7E-01	2E-01	-1E-02	-3E-03	<b>2E+00</b>	4E-01	<b>6E+00</b>	1E+00	-2E-01	-5E-02	-1E-01	-2E-02
NR19	Soil	Cadmium	8E-03	2E-03	2E-02	3E-03	1E+00	2E-01	5E-01	7E-02	-1E-02	-2E-03	5E-02	5E-03	<b>2E+00</b>	2E-01	-7E-02	-7E-03	-1E-02	-1E-03
NR19	Soil	Copper	-2E-01	-1E-01	-2E-01	-2E-02	-2E+00	-2E-01	-2E+00	-1E-01	-3E-01	-3E-02	-2E-01	-2E-03	-2E+00	-2E-02	-4E-01	-3E-03	-1E-01	-1E-03
NR19	Soil	Iron	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
NR19	Soil	Lead	8E-01	5E-02	<b>3E+00</b>	5E-01	<b>2E+01</b>	<b>3E+00</b>	<b>2E+01</b>	<b>3E+00</b>	-2E-01	-4E-02	1E+00	2E-02	<b>6E+00</b>	1E-01	1E-01	2E-03	-3E-02	-7E-04
NR19	Soil	Manganese	-8E-01	-2E-01	-5E-02	-1E-02	-1E-01	-2E-02	-2E-01	-5E-02	-2E-02	-5E-03	-2E-01	-4E-02	-6E-01	-1E-01	-2E-01	-3E-02	-5E-02	-9E-03
NR19	Soil	Mercury	6E-02	6E-01	9E-02	4E-02	2E-01	1E-01	4E-01	2E-01	9E-04	5E-04	5E-02	1E-02	2E-01	4E-02	1E-03	3E-04	8E-05	2E-05
NR19	Soil	Nitrate as N	--	--	--	--	--	--	--	--	--	--	1E-02	1E-02	3E-02	3E-02	1E-03	1E-03	1E-04	1E-04
NR19	Soil	Selenium	<b>2E+00</b>	1E-01	3E-01	8E-02	<b>2E+00</b>	7E-01	<b>2E+00</b>	6E-01	-3E-01	-9E-02	7E-01	8E-02	<b>6E+00</b>	7E-01	-2E-01	-2E-02	-3E-01	-3E-02
NR19	Soil	Silver	1E-03	--	7E-03	5E-04	4E-01	3E-02	2E-01	1E-02	4E-05	3E-06	2E-03	2E-04	2E-01	2E-02	3E-03	3E-04	9E-06	9E-07
NR19	Soil	Sulfate	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
NR19	Soil	Thallium	-2E+00	-2E+00	-2E-02	-2E-03	-1E-01	-1E-02	-1E-01	-1E-02	-7E-02	-7E-03	-1E-02	-3E-03	-1E-01	-4E-02	-2E-02	-8E-03	-3E-02	-9E-03
NR19	Soil	Zinc	7E-01	6E-01	1E-01	5E-02	1E+00	4E-01	8E-01	3E-01	-1E-01	-4E-02	2E-01	3E-02	1E+00	2E-01	-5E-02	-9E-03	-5E-02	-9E-03
NR19	Soil	Acetone	--	--	2E-06	7E-08	6E-06	3E-07	8E-06	3E-07	1E-09	4E-11	3E-05	7E-06	8E-05	2E-05	3E-06	6E-07	9E-09	2E-09



TABLE M-30

Risk Summary - Soil

Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona

			Site or Incremental Risk <sup>a</sup>																	
					Gambel's quail		Western kingbird		Song sparrow		Red-tailed hawk		Pocket gopher		Desert shrew		Raccoon		Coyote	
Exposure			Soil																	
Area	Matrix	COPEC	Plants	Invertebra	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
				tes	based	based	based	based	based	based	based	based	based	based	based	based	based	based	based	based
NR19	Soil	Acetophenone	--	--	--	--	--	--	--	--	--	--	1E-05	3E-06	4E-05	7E-06	1E-06	3E-07	1E-07	3E-08
NR19	Soil	Alpha-Chlordane	5E-05	--	7E-06	1E-06	3E-04	6E-05	2E-04	3E-05	6E-07	1E-07	5E-06	2E-06	2E-04	9E-05	3E-06	2E-06	9E-08	4E-08
NR19	Soil	Benzyl butyl phthalate	--	--	--	--	--	--	--	--	--	--	1E-04	4E-05	7E-04	2E-04	2E-05	6E-06	3E-07	9E-08
NR19	Soil	bis(2-Ethylhexyl)phthalate	3E-04	--	2E-03	4E-04	5E-02	1E-02	3E-02	6E-03	9E-04	2E-04	1E-04	1E-05	4E-03	4E-04	9E-05	9E-06	2E-05	2E-06
NR19	Soil	Caprolactam	--	--	--	--	--	--	--	--	--	--	1E-04	3E-05	4E-04	7E-05	1E-05	3E-06	1E-06	3E-07
NR19	Soil	Carbon disulfide	--	--	--	--	--	--	--	--	--	--	4E-05	7E-06	5E-05	9E-06	2E-06	5E-07	5E-09	1E-09
NR19	Soil	Dieldrin	4E-05	--	1E-03	1E-04	1E-01	1E-02	6E-02	6E-03	1E-02	9E-04	1E-02	1E-04	8E-01	9E-03	3E-02	3E-04	1E-02	2E-04
NR19	Soil	Methyl ethyl ketone	--	--	--	--	--	--	--	--	--	--	6E-07	2E-07	1E-06	5E-07	5E-08	2E-08	2E-10	6E-11
NR20	Soil	Antimony	9E-03	7E-04	--	--	--	--	--	--	--	--	3E-01	6E-03	2E+00	5E-02	-8E-01	-2E-02	-1E+00	-3E-02
NR20	Soil	Arsenic	3E-01	4E-01	2E-02	5E-03	6E-02	1E-02	1E-01	2E-02	-1E-02	-3E-03	2E-01	5E-02	9E-01	2E-01	-4E-01	-9E-02	-1E-01	-2E-02
NR20	Soil	Cadmium	-8E-04	-2E-04	-2E-03	-2E-04	-1E-01	-2E-02	-5E-02	-7E-03	-1E-02	-2E-03	-5E-03	-5E-04	-2E-01	-2E-02	-1E-01	-1E-02	-1E-02	-1E-03
NR20	Soil	Lead	5E-02	3E-03	2E-01	3E-02	1E+00	2E-01	1E+00	2E-01	-2E-01	-5E-02	6E-02	1E-03	4E-01	8E-03	-4E-02	-8E-04	-4E-02	-7E-04
NR20	Soil	Manganese	-8E-01	-2E-01	-6E-02	-1E-02	-1E-01	-2E-02	-2E-01	-5E-02	-2E-02	-5E-03	-3E-01	-5E-02	-6E-01	-1E-01	-2E-01	-3E-02	-5E-02	-9E-03
NR20	Soil	Mercury	1E-02	1E-01	2E-02	8E-03	7E-02	4E-02	8E-02	4E-02	-5E-04	-3E-04	9E-03	2E-03	5E-02	1E-02	-3E-03	-8E-04	-2E-04	-4E-05
NR20	Soil	Selenium	-2E-01	-9E-03	-2E-02	-7E-03	-2E-01	-7E-02	-2E-01	-5E-02	-3E-01	-1E-01	-6E-02	-7E-03	-6E-01	-7E-02	-4E-01	-4E-02	-3E-01	-3E-02
NR20	Soil	Zinc	2E-01	2E-01	4E-02	1E-02	4E-01	2E-01	3E-01	1E-01	-1E-01	-4E-02	5E-02	8E-03	4E-01	8E-02	-7E-02	-1E-02	-5E-02	-9E-03
NW-01	Soil	Arsenic	-6E-01	-8E-01	-5E-02	-1E-02	-1E-01	-3E-02	-2E-01	-5E-02	-1E-02	-3E-03	-5E-01	-1E-01	-2E+00	-4E-01	-6E-01	-1E-01	-1E-01	-2E-02
NW-01	Soil	Cadmium	-3E-03	-6E-04	-6E-03	-9E-04	-5E-01	-6E-02	-2E-01	-3E-02	-1E-02	-2E-03	-2E-02	-2E-03	-1E+00	-1E-01	-1E-01	-1E-02	-1E-02	-1E-03
NW-01	Soil	Iron	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
NW-01	Soil	Lead	-4E-05	-2E-06	-1E-04	-2E-05	-1E-03	-2E-04	-8E-04	-1E-04	-3E-01	-5E-02	-5E-05	-9E-07	-3E-04	-7E-06	-6E-02	-1E-03	-4E-02	-7E-04
NW-01	Soil	Manganese	-8E-01	-2E-01	-6E-02	-1E-02	-1E-01	-2E-02	-2E-01	-5E-02	-2E-02	-5E-03	-2E-01	-4E-02	-6E-01	-1E-01	-2E-01	-3E-02	-5E-02	-9E-03
NW-01	Soil	Mercury	2E-03	2E-02	4E-03	2E-03	3E-02	1E-02	2E-02	1E-02	-8E-04	-4E-04	2E-03	5E-04	2E-02	4E-03	-5E-03	-1E-03	-2E-04	-5E-05
NW-01	Soil	Zinc	3E-02	3E-02	6E-03	2E-03	8E-02	3E-02	5E-02	2E-02	-1E-01	-5E-02	7E-03	1E-03	8E-02	2E-02	-9E-02	-2E-02	-5E-02	-9E-03
NW-03	Soil	Arsenic	-8E-01	-1E+00	-7E-02	-2E-02	-2E-01	-4E-02	-3E-01	-7E-02	-1E-02	-3E-03	-7E-01	-1E-01	-3E+00	-6E-01	-6E-01	-1E-01	-1E-01	-2E-02
NW-03	Soil	Cadmium	-2E-03	-5E-04	-5E-03	-7E-04	-4E-01	-5E-02	-2E-01	-2E-02	-1E-02	-2E-03	-2E-02	-2E-03	-8E-01	-8E-02	-1E-01	-1E-02	-1E-02	-1E-03
NW-03	Soil	Iron	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
NW-03	Soil	Lead	-8E-03	-6E-04	-3E-02	-6E-03	-2E-01	-4E-02	-2E-01	-4E-02	-3E-01	-5E-02	-1E-02	-2E-04	-8E-02	-2E-03	-6E-02	-1E-03	-4E-02	-7E-04
NW-03	Soil	Manganese	-8E-01	-2E-01	-5E-02	-1E-02	-1E-01	-2E-02	-2E-01	-5E-02	-2E-02	-5E-03	-2E-01	-4E-02	-6E-01	-1E-01	-2E-01	-3E-02	-5E-02	-9E-03
NW-03	Soil	Mercury	7E-04	7E-03	1E-03	5E-04	1E-02	5E-03	7E-03	4E-03	-9E-04	-4E-04	5E-04	1E-04	6E-03	1E-03	-6E-03	-1E-03	-2E-04	-5E-05
NW-03	Soil	Zinc	-1E-02	-1E-02	-2E-03	-8E-04	-4E-02	-1E-02	-2E-02	-8E-03	-1E-01	-5E-02	-3E-03	-5E-04	-4E-02	-7E-03	-1E-01	-2E-02	-5E-02	-9E-03
RSAR-A	Soil	Cadmium	3E-03	6E-04	7E-03	9E-04	4E-01	6E-02	2E-01	3E-02	-1E-02	-2E-03	2E-02	2E-03	9E-01	9E-02	-1E-01	-1E-02	-1E-02	-1E-03
RSAR-A	Soil	Lead	2E-02	1E-03	7E-02	1E-02	6E-01	1E-01	5E-01	9E-02	-3E-01	-5E-02	3E-02	5E-04	2E-01	4E-03	-6E-02	-1E-03	-4E-02	-7E-04
RSAR-A	Soil	Mercury	3E-04	3E-03	4E-04	2E-04	4E-03	2E-03	3E-03	2E-03	-9E-04	-4E-04	2E-04	5E-05	2E-03	6E-04	-6E-03	-1E-03	-2E-04	-5E-05
RSAR-A	Soil	Selenium	1E-01	4E-03	1E-02	3E-03	1E-01	3E-02	8E-02	2E-02	-3E-01	-1E-01	3E-02	3E-03	3E-01	3E-02	-4E-01	-5E-02	-3E-01	-3E-02
RSAR-A	Soil	Zinc	4E-02	3E-02	6E-03	2E-03	9E-02	3E-02	6E-02	2E-02	-1E-01	-5E-02	8E-03	1E-03	9E-02	2E-02	-1E-01	-2E-02	-5E-02	-9E-03
RSAR-B	Soil	Lead	1E-02	1E-03	-2E-02	-3E-03	4E-01	7E-02	3E-01	6E-02	-3E-01	-5E-02	2E-02	4E-04	1E-01	3E-03	-7E-02	-1E-03	-4E-02	-7E-04
RSAR-B	Soil	Zinc	-4E-03	-4E-03	-8E-03	-3E-03	-1E-02	-4E-03	-7E-03	-2E-03	-1E-01	-5E-02	-9E-04	-2E-04	-1E-02	-2E-03	-1E-01	-2E-02	-5E-02	-9E-03
RSAR-D	Soil	Cadmium	-1E-05	-3E-06	-3E-05	-4E-06	-2E-03	-3E-04	-8E-04	-1E-04	-1E-02	-2E-03	-8E-05	-8E-06	-4E-03	-4E-04	-1E-01	-1E-02	-1E-02	-1E-03
RSAR-D	Soil	Lead	3E-02	2E-03	1E-01	2E-02	9E-01	2E-01	8E-01	1E-01	-3E-01	-5E-02	4E-02	8E-04	3E-01	6E-03	-6E-02	-1E-03	-4E-02	-7E-04
RSAR-D	Soil	Mercury	2E-03	2E-02	3E-03	2E-03	3E-02	1E-02	2E-02	1E-02	-8E-04	-4E-04	2E-03	4E-04	1E-02	4E-03	-6E-03	-1E-03	-2E-04	-5E-05
RSAR-D	Soil	Zinc	2E-02	1E-02	3E-03	1E-03	4E-02	1E-02	2E-02	9E-03	-1E-01	-5E-02	3E-03	6E-04	4E-02	7E-03	-1E-01	-2E-02	-5E-02	-9E-03
RSAR-H	Soil	Arsenic	-1E-01	-2E-01	-1E-02	-3E-03	-3E-02	-7E-03	-5E-02	-1E-02	-1E-02	-3E-03	-1E-01	-3E-02	-5E-01	-1E-01	-6E-01	-1E-01	-1E-01	-2E-02
RSAR-H	Soil	Lead	-1E-02	-8E-04	-4E-02	-8E-03	-3E-01	-6E-02	-3E-01	-5E-02	-3E-01	-5E-02	-2E-02	-3E-04	-1E-01	-2E-03	-7E-02	-1E-03	-4E-02	-7E-04
RSAR-H	Soil	Zinc	-5E-02	-5E-02	-9E-03	-3E-03	-2E-01	-6E-02	-9E-02	-3E-02	-1E-01	-5E-02	-1E-02	-2E-03	-2E-01	-3E-02	-1E-01	-2E-02	-5E-02	-9E-03
SE-01	Soil	Aluminum	8E+01	--	3E-01	6E-02	9E-01	2E-01	1E+00	3E-01	-9E-01	-2E-01	9E+00	2E+00	4E+01	8E+00	-4E+01	-9E+00	-2E+01	-3E+00
SE-01	Soil	Antimony	-2E-02	-1E-03	--	--	--	--	--	--	--	--	-5E-01	-1E-02	-4E+00	-9E-02	-1E+00	-2E-02	-1E+00	-3E-0

TABLE M-30

Risk Summary - Soil

Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona

			Site or Incremental Risk <sup>a</sup>																		
			Soil		Gambel's quail		Western kingbird		Song sparrow		Red-tailed hawk		Pocket gopher		Desert shrew		Raccoon		Coyote		
Exposure	Area	Matrix	COPEC	Plants	Invertebra	NOAEL based	LOAEL based	NOAEL based	LOAEL based	NOAEL based	LOAEL based	NOAEL based	LOAEL based	NOAEL based	LOAEL based	NOAEL based	LOAEL based	NOAEL based	LOAEL based	NOAEL based	LOAEL based
SE-01	Soil	Lead		2E-01	1E-02	6E-01	1E-01	4E+00	8E-01	4E+00	7E-01	-3E-01	-5E-02	2E-01	4E-03	1E+00	3E-02	-5E-02	-1E-03	-4E-02	-7E-04
SE-01	Soil	Manganese		-3E-01	-7E-02	-2E-02	-4E-03	-3E-02	-8E-03	-7E-02	-2E-02	-2E-02	-5E-03	-8E-02	-1E-02	-2E-01	-4E-02	-2E-01	-3E-02	-5E-02	-9E-03
SE-01	Soil	Mercury		4E-02	4E-01	6E-02	3E-02	2E-01	8E-02	3E-01	1E-01	-5E-04	-3E-04	3E-02	8E-03	1E-01	3E-02	-5E-03	-1E-03	-2E-04	-4E-05
SE-01	Soil	Nickel		-5E-02	-1E-02	-3E-02	-3E-03	-4E-01	-4E-02	-2E-01	-3E-02	-8E-02	-1E-02	-2E-01	-3E-03	-2E+00	-4E-02	-9E-01	-2E-02	-2E-01	-4E-03
SE-01	Soil	Selenium		-6E-01	-3E-02	-7E-02	-2E-02	-7E-01	-2E-01	-5E-01	-2E-01	-3E-01	-1E-01	-2E-01	-2E-02	-2E+00	-2E-01	-5E-01	-5E-02	-3E-01	-3E-02
SE-01	Soil	Silver		2E-03	--	1E-02	8E-04	6E-01	4E-02	3E-01	2E-02	2E-05	1E-06	4E-03	4E-04	2E-01	2E-02	1E-03	1E-04	4E-06	4E-07
SE-01	Soil	Vanadium		2E-02	2E-02	4E-03	9E-04	1E-02	3E-03	2E-02	4E-03	-3E-02	-7E-03	1E-02	5E-03	6E-02	3E-02	-2E-01	-1E-01	-7E-02	-3E-02
SE-01	Soil	Zinc		7E-02	6E-02	1E-02	4E-03	2E-01	6E-02	1E-01	4E-02	-1E-01	-5E-02	2E-02	3E-03	2E-01	3E-02	-1E-01	-2E-02	-5E-02	-9E-03
SE-02	Soil	Aluminum		2E+01	--	-1E+00	-3E-01	-1E+00	-2E-01	3E-01	5E-02	-9E-01	-2E-01	2E+00	3E-01	7E+00	1E+00	-5E+01	-9E+00	-2E+01	-3E+00
SE-02	Soil	Antimony		2E-02	1E-03	--	--	--	--	--	--	--	--	5E-01	1E-02	4E+00	9E-02	-1E+00	-2E-02	-1E+00	-3E-02
SE-02	Soil	Arsenic		1E-01	1E-01	-5E-02	-1E-02	-4E-02	-9E-03	4E-02	9E-03	-1E-02	-3E-03	9E-02	2E-02	4E-01	8E-02	-6E-01	-1E-01	-1E-01	-2E-02
SE-02	Soil	Cadmium		7E-03	1E-03	2E-03	3E-04	6E-01	8E-02	4E-01	6E-02	-1E-02	-2E-03	5E-02	5E-03	2E+00	2E-01	-1E-01	-1E-02	-1E-02	-1E-03
SE-02	Soil	Chromium		-3E-02	-3E-01	-3E-01	-4E-02	-7E-01	-1E-01	-3E-01	-5E-02	-3E-01	-5E-02	-7E-02	-3E-03	-5E-01	-2E-02	-4E-01	-2E-02	-2E-01	-7E-03
SE-02	Soil	Cobalt		-2E-02	-7E-03	-3E-02	-1E-02	-5E-02	-2E-02	-1E-02	-5E-03	-2E-02	-9E-03	-3E-03	-1E-03	-2E-02	-6E-03	-4E-02	-1E-02	-1E-02	-5E-03
SE-02	Soil	Copper		5E-01	5E-01	1E-01	8E-03	5E+00	4E-01	5E+00	4E-01	-3E-01	-3E-02	6E-01	5E-03	6E+00	6E-02	-4E-01	-4E-03	-1E-01	-1E-03
SE-02	Soil	Iron		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SE-02	Soil	Lead		9E-02	6E-03	7E-02	1E-02	2E+00	3E-01	2E+00	4E-01	-3E-01	-5E-02	1E-01	2E-03	8E-01	2E-02	-6E-02	-1E-03	-4E-02	-7E-04
SE-02	Soil	Manganese		-2E-01	-6E-02	-6E-02	-1E-02	-6E-02	-1E-02	-7E-02	-2E-02	-2E-02	-5E-03	-8E-02	-1E-02	-2E-01	-3E-02	-2E-01	-3E-02	-5E-02	-9E-03
SE-02	Soil	Mercury		9E-04	9E-03	-2E-04	-9E-05	-2E-02	-1E-02	1E-02	5E-03	-9E-04	-4E-04	7E-04	2E-04	7E-03	2E-03	-6E-03	-2E-03	-2E-04	-5E-05
SE-02	Soil	Nickel		-8E-02	-2E-02	-1E-01	-1E-02	-8E-01	-1E-01	-3E-01	-4E-02	-8E-02	-1E-02	-2E-01	-5E-03	-2E+00	-5E-02	-9E-01	-2E-02	-2E-01	-4E-03
SE-02	Soil	Selenium		1E+00	5E-02	-2E-02	-5E-03	5E-01	2E-01	8E-01	3E-01	-3E-01	-1E-01	3E-01	4E-02	3E+00	3E-01	-5E-01	-5E-02	-3E-01	-3E-02
SE-02	Soil	Silver		1E-03	--	3E-03	2E-04	2E-01	2E-02	1E-01	9E-03	3E-06	2E-07	2E-03	2E-04	1E-01	1E-02	2E-04	2E-05	7E-07	7E-08
SE-02	Soil	Vanadium		1E-02	1E-02	-7E-02	-1E-02	-8E-02	-2E-02	1E-02	2E-03	-3E-02	-7E-03	6E-03	3E-03	3E-02	1E-02	-3E-01	-1E-01	-7E-02	-3E-02
SE-02	Soil	Zinc		6E-02	5E-02	-9E-03	-3E-03	-1E-01	-4E-02	9E-02	3E-02	-1E-01	-5E-02	1E-02	2E-03	2E-01	3E-02	-1E-01	-2E-02	-5E-02	-9E-03

Notes:  
<sup>a</sup> Incremental risk reported for analytes with background threshold values available to compute incremental risks. Otherwise, site risk is reported. Negative HQs indicate that site risk was below background risk.  
-- not available  
NOAEL - no observed adverse effect level  
LOAEL - lowest observed adverse effect level  
HQ - hazard quotient

TABLE M-31

**Risk Summary - Sediment***Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona*

Exposure Area	Matrix	COPEC	Aquatic Plants	Site Risk <sup>a</sup>									
				Macroinvertebrates		Mallard		Great blue heron		Raccoon		River Otter	
				No Effect based	Low Effect based	NOAEL based	LOAEL based	NOAEL based	LOAEL based	NOAEL based	LOAEL based	NOAEL based	LOAEL based
AF-01	Sediment	Aluminum	5E+02	1E+00	5E-01	4E-02	8E-03	7E-04	1E-04	2E+00	4E-01	4E-02	8E-03
AF-01	Sediment	Arsenic	2E-01	2E+00	6E-01	2E-04	4E-05	8E-06	2E-06	3E-03	6E-04	7E-05	2E-05
AF-01	Sediment	Barium	5E-01	2E+00	9E-01	5E-05	2E-05	4E-06	2E-06	5E-04	3E-04	1E-05	8E-06
AF-01	Sediment	Beryllium	4E-02	--	--	--	--	--	--	7E-04	3E-04	1E-05	4E-06
AF-01	Sediment	Chromium	7E-02	1E+00	4E-01	5E-04	8E-05	5E-05	8E-06	2E-03	6E-05	5E-05	2E-06
AF-01	Sediment	Cobalt	1E-01	3E-01	1E-01	3E-04	1E-04	5E-06	2E-06	5E-04	2E-04	1E-05	4E-06
AF-01	Sediment	Copper	9E-02	1E+00	3E-01	2E-03	1E-04	6E-05	5E-06	2E-03	2E-05	5E-05	4E-07
AF-01	Sediment	Iron	--	2E+00	8E-01	--	--	--	--	--	--	--	--
AF-01	Sediment	Lead	2E-02	4E-01	1E-01	5E-04	8E-05	3E-05	5E-06	3E-04	5E-06	4E-06	8E-08
AF-01	Sediment	Manganese	5E-01	8E-01	5E-01	5E-04	1E-04	9E-06	2E-06	3E-03	5E-04	6E-05	1E-05
AF-01	Sediment	Mercury	5E-04	2E-01	3E-02	2E-05	8E-06	2E-07	1E-07	1E-05	3E-06	2E-07	6E-08
AF-01	Sediment	Nickel	1E-01	1E+00	5E-01	2E-04	3E-05	2E-05	3E-06	2E-03	4E-05	5E-05	1E-06
AF-01	Sediment	Selenium	5E-01	6E-01	4E-01	9E-04	3E-04	2E-05	5E-06	3E-03	4E-04	6E-05	7E-06
AF-01	Sediment	Sulfate	--	--	--	--	--	--	--	--	--	--	--
AF-01	Sediment	Vanadium	2E-01	1E+00	6E-01	2E-04	4E-05	2E-05	4E-06	2E-03	7E-04	5E-05	2E-05
AF-01	Sediment	Zinc	1E-01	7E-01	2E-01	5E-05	2E-05	6E-05	2E-05	2E-04	3E-05	1E-05	2E-06
AF-01	Sediment	1,2,3,4,6,7,8-Hepta CDD	3E+00	2E+01	6E-01	--	--	--	--	--	--	--	--
AF-01	Sediment	OCDD	4E+01	2E+02	7E+00	--	--	--	--	--	--	--	--
AF-01	Sediment	OCDF	1E+00	6E+00	2E-01	--	--	--	--	--	--	--	--
AF-01	Sediment	TEQBird	--	--	--	5E-07	5E-08	9E-09	9E-10	--	--	--	--
AF-01	Sediment	TEQMammal	--	--	--	--	--	--	--	6E-05	6E-06	1E-06	1E-07
AF-02	Sediment	Aluminum	1E+03	2E+00	9E-01	2E-01	4E-02	4E-03	8E-04	9E+00	2E+00	2E-01	4E-02
AF-02	Sediment	Antimony	4E-02	1E+00	7E-01	--	--	--	--	3E-02	6E-04	5E-04	1E-05
AF-02	Sediment	Arsenic	9E-01	9E+00	3E+00	1E-03	3E-04	7E-05	2E-05	2E-02	5E-03	6E-04	1E-04
AF-02	Sediment	Barium	2E-01	9E-01	5E-01	6E-05	3E-05	1E-05	5E-06	7E-04	4E-04	2E-05	1E-05
AF-02	Sediment	Beryllium	1E-01	--	--	--	--	--	--	5E-03	2E-03	9E-05	3E-05
AF-02	Sediment	Cadmium	6E-02	9E+00	2E+00	1E-03	1E-04	5E-05	7E-06	5E-03	5E-04	9E-05	9E-06
AF-02	Sediment	Chromium	7E-01	9E+00	4E+00	6E-03	1E-03	1E-03	2E-04	3E-02	1E-03	1E-03	4E-05
AF-02	Sediment	Cobalt	1E-01	3E-01	1E-01	8E-04	3E-04	2E-05	7E-06	1E-03	5E-04	3E-05	1E-05
AF-02	Sediment	Copper	1E+01	2E+02	4E+01	5E-01	4E-02	1E-02	8E-04	6E-01	6E-03	1E-02	1E-04
AF-02	Sediment	Cyanide	1E-01	--	--	2E-03	2E-04	8E-05	8E-06	2E-06	5E-07	4E-08	8E-09
AF-02	Sediment	Iron	--	1E+00	6E-01	--	--	--	--	--	--	--	--
AF-02	Sediment	Lead	6E-01	9E+00	3E+00	1E-02	3E-03	2E-03	3E-04	9E-03	2E-04	1E-04	3E-06
AF-02	Sediment	Manganese	5E-01	9E-01	5E-01	1E-03	3E-04	5E-05	1E-05	9E-03	2E-03	2E-04	3E-05
AF-02	Sediment	Mercury	2E-03	9E-01	1E-01	2E-04	9E-05	7E-05	3E-05	1E-04	3E-05	7E-06	2E-06
AF-02	Sediment	Nickel	1E+00	1E+01	7E+00	5E-03	5E-04	4E-04	5E-05	5E-02	1E-03	1E-03	3E-05
AF-02	Sediment	Nitrate as N	--	--	--	--	--	--	--	6E-05	6E-05	3E-06	3E-06
AF-02	Sediment	Selenium	1E+00	2E+00	9E-01	6E-03	2E-03	4E-04	1E-04	2E-02	2E-03	5E-04	6E-05
AF-02	Sediment	Silver	2E-03	6E+00	1E+00	2E-04	1E-05	1E-05	8E-07	1E-04	1E-05	4E-06	4E-07
AF-02	Sediment	Sulfate	--	--	--	--	--	--	--	--	--	--	--
AF-02	Sediment	Thallium	2E+00	--	--	2E-03	2E-04	5E-05	5E-06	2E-03	7E-04	5E-05	2E-05
AF-02	Sediment	Vanadium	2E-01	1E+00	5E-01	4E-04	9E-05	4E-05	9E-06	3E-03	1E-03	1E-04	4E-05
AF-02	Sediment	Zinc	2E+00	1E+01	3E+00	1E-03	4E-04	2E-04	7E-05	4E-03	8E-04	1E-04	2E-05
AF-02	Sediment	OCDD	2E+00	1E+01	4E-01	--	--	--	--	--	--	--	--

TABLE M-31

**Risk Summary - Sediment***Iron King Mine – Humboldt Smelter Superfund Site, Dewey-Humboldt, Yavapai County, Arizona*

Exposure Area	Matrix	COPEC	Site Risk <sup>a</sup>										
			Aquatic Plants	Macroinvertebrates		Mallard		Great blue heron		Raccoon		River Otter	
				No Effect based	Low Effect based	NOAEL based	LOAEL based	NOAEL based	LOAEL based	NOAEL based	LOAEL based	NOAEL based	LOAEL based
AF-02	Sediment	TEQBird	--	--	--	4E-06	4E-07	7E-08	7E-09	--	--	--	--
AF-02	Sediment	TEQMammal	--	--	--	--	--	--	--	3E-05	3E-06	6E-07	6E-08
AF-03	Sediment	Aluminum	<b>2E+02</b>	4E-01	2E-01	6E-02	1E-02	2E-03	4E-04	<b>3E+00</b>	5E-01	6E-02	1E-02
AF-03	Sediment	Antimony	2E-02	5E-01	3E-01	--	--	--	--	2E-02	3E-04	3E-04	6E-06
AF-03	Sediment	Arsenic	1E+00	<b>1E+01</b>	<b>3E+00</b>	2E-03	4E-04	1E-04	3E-05	4E-02	8E-03	1E-03	2E-04
AF-03	Sediment	Barium	2E-01	8E-01	4E-01	7E-05	4E-05	2E-05	9E-06	8E-04	5E-04	3E-05	2E-05
AF-03	Sediment	Beryllium	1E-02	--	--	--	--	--	--	1E-03	4E-04	2E-05	8E-06
AF-03	Sediment	Cadmium	2E-02	<b>3E+00</b>	7E-01	7E-04	1E-04	2E-04	2E-05	3E-03	3E-04	9E-05	9E-06
AF-03	Sediment	Chromium	3E-02	4E-01	2E-01	1E-03	2E-04	1E-04	2E-05	3E-03	1E-04	9E-05	4E-06
AF-03	Sediment	Cobalt	1E-01	2E-01	1E-01	9E-04	4E-04	2E-05	1E-05	2E-03	6E-04	3E-05	1E-05
AF-03	Sediment	Copper	5E-01	<b>8E+00</b>	<b>2E+00</b>	3E-02	2E-03	1E-03	1E-04	4E-02	3E-04	8E-04	7E-06
AF-03	Sediment	Cyanide	2E-01	--	--	4E-03	4E-04	1E-04	1E-05	5E-06	9E-07	7E-08	1E-08
AF-03	Sediment	Iron	--	1E+00	6E-01	--	--	--	--	--	--	--	--
AF-03	Sediment	Lead	3E-01	<b>5E+00</b>	1E+00	1E-02	2E-03	1E-03	2E-04	7E-03	1E-04	1E-04	2E-06
AF-03	Sediment	Manganese	1E+00	<b>3E+00</b>	1E+00	5E-03	1E-03	2E-04	4E-05	3E-02	6E-03	7E-04	1E-04
AF-03	Sediment	Mercury	5E-03	<b>2E+00</b>	3E-01	5E-04	3E-04	4E-05	2E-05	4E-04	9E-05	1E-05	2E-06
AF-03	Sediment	Nickel	7E-02	8E-01	4E-01	5E-04	7E-05	6E-05	8E-06	5E-03	1E-04	1E-04	3E-06
AF-03	Sediment	Nitrate as N	--	--	--	--	--	--	--	7E-05	7E-05	5E-06	5E-06
AF-03	Sediment	Silver	2E-04	6E-01	1E-01	2E-05	1E-06	2E-06	1E-07	2E-05	2E-06	5E-07	5E-08
AF-03	Sediment	Sulfate	--	--	--	--	--	--	--	--	--	--	--
AF-03	Sediment	Vanadium	1E-01	9E-01	4E-01	5E-04	1E-04	7E-05	1E-05	4E-03	2E-03	1E-04	6E-05
AF-03	Sediment	Zinc	9E-01	<b>6E+00</b>	<b>2E+00</b>	8E-04	3E-04	4E-03	1E-03	4E-03	7E-04	5E-04	1E-04

Notes:

<sup>a</sup> Site risks presented as background threshold values for sediment were not available to compute incremental risks.

-- not available

NOAEL - no observed adverse effect level

LOAEL - lowest observed adverse effect level

HQ - hazard quotient