Table C1
Workman Creek Watershed Surface Water Sample Results[1]

Analyte	Sample Date	Surface Water Sample IDs														Action Levels								
																	Arizona AWQS (18 A.A.C. Chapter 11, Appendix A)							
		WC Headwaters (Bkgd) 081004-1W (PA/SI)	WC Above Main Weir (Bkgd) 081004-3W (PA/SI) SW-3W (April 2008)	WC Below Falls CG (Bkgd) 081004-4W (PA/SI) SW-4W (April 2008)	WC Above Cascade CG 081004-5W (PA/SI) SW-5W (April 2008)	WC Below Cascade CG 081004-6W (PA/SI) SW-6W (April 2008)	WC Above Creekside CG 081004-7W (PA/SI) SW-7W (April 2008)	WC Above Creekside CG 081104-8W (PA/SI) SW-8W (April 2008)	WC Below Creekside CG 081104-9W (PA/SI) SW-9W (April 2008)	WC Below Elks Camp 081104-10W (PA/SI) SW-10W (April 2008)	WC Above Hwy 288 Bridge 081104-11W (PA/SI) SW-11W (April 2008)	WC Above WC/RC Confluence 081104-12W (PA/SI) SW-12W (April 2008)	Jon Adit Pool 081104-13W (PA/SI) SW-13W (April 2008)	John Adit Pool (Dup) 081104-14W (PA/SI) SW-13D (April 2008)	Coldwater Drain Spring (Bkgd) 081204-16W (PA/SI)	Mean Background	A&Wc Acute Chronic	FC	FBC	AgI	AgL	DOE Ecological PRG	AWQS DWS	BLM RMC Camper
Surface Water – Field Parameter																								
pH	Aug-04	7.26	7.71	8.14	8.11	8	7.57	7.86	NA	7.57	7.07	7.23	7.32	7.32	6.69	--	--	--	--	--	--	--	--	--
	Apr-08	NS	7.14	7.51	7.93	7.73	7.34	7.35	7.38	7.38	7.3	7.56	7.42	7.42	NS	--	--	--	--	--	--	--	--	--
Gamma Scintillator (microR/hr)	Aug-04	5	16	14	17	17	14	12	15	NA	12	10	475	475	12	--	--	--	--	--	--	--	--	--
	Apr-08	NS	--	--	--	--	--	--	--	--	--	--	--	--	NS	--	--	--	--	--	--	--	--	--
Surface Water – Wet Chemistry (mg/L)																								
Hardness as $CaCO_3$	Aug-04	160	181	187	192	196	190	195	202	228	259	297	220	213	60	--	--	--	--	--	--	--	--	--
	Apr-08	NS	123	96	106	106	114	114	113	114	121	132	87	86	NS		--	--	--	--	--	--	--	--
Residue, Non-Filterable TSS	Aug-04	18B	6B	6	6B	6B	6B	<5	6B	<5	6B	<5	8BH	<5	8BH	--	--	--	--	--	--	--	--	--
	Apr-08	NS	1	<1	2	7	12	4	3	2	<1	416	5	5	NS									
Total Alkalinity	Aug-04	183	200	209	207	210	293	201	207	228	273	298	156	148	128	--	--	--	--	--	--	--	--	--
	Apr-08	NS	120	93	102	104	108	108	107	109	114	127	76	76	NS		--	--	--	--	--	--	--	--
Surface Water – Metals (mg/L)																								
Antimony, dissolved	Aug-04	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.0002B	<0.0002	0.0063	0.088	--	--	--	--	--	--	0.124
	Apr-08	NS	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	NS		0.03							
Antimony, total	Aug-04	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.0063	--	4.3	0.560	--	--	--	0.006	--
	Apr-08	NS	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	NS									
Arsenic, dissolved	Aug-04	<0.0005	<0.0005	0.0011B	0.0011B	0.0012B	0.0007B	<0.0005	0.0006B	<0.0005	0.0006B	0.0008B	0.0005B	0.0006B	<0.0005	0.0005	0.36	--	--	--	--	--	--	0.093
	Apr-08	NS	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	NS		0.19							
Arsenic, total	Aug-04	<0.0005	0.0005B	0.0011B	0.0012B	0.001B	0.0007B	0.0008B	0.0007B	<0.0005	<0.001	0.0009B	0.0007B	0.0007B	<0.003	0.0007	--	1.450	0.050	2.0	0.200	--	0.01	--
	Apr-08	NS	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	0.001	0.001	0.001	<0.001	0.001	<0.001	NS									
Barium, dissolved	Aug-04	0.01	0.02	0.023	0.022	0.024	0.025	0.022	0.026	0.027	0.031	0.47	0.015	0.014	0.015	0.0264	--	--	--	--	--	--	--	--
	Apr-08	NS	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NS									
Barium, total	Aug-04	0.009B	0.019	0.021	0.022	0.022	0.024	0.022	0.025	0.025	0.028	0.044	0.016	0.014	0.016	0.0256	--	--	9.800	--	--	--	2	--
	Apr-08	NS	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NS									
Beryllium, dissolved	Aug-04	<0.0001	<0.0001	0.0001B	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0013	0.065	--	--	--	--	--	--	--
	Apr-08	NS	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	NS		0.0053							
Beryllium, total	Aug-04	<0.0001	<0.0001	<0.0001	<0.0005	<0.0001	<0.0005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0013	--	1.130	2.800	--	--	--	0.004	--
	Apr-08	NS	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	NS									
Cadmium, dissolved	Aug-04	0.0001B	<0.0001	0.0001B	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0013	0.00714	--	--	--	--	--	--	0.155
	Apr-08	NS	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	NS		0.00318							
Cadmium, total	Aug-04	<0.0001	<0.0001	<0.0001	<0.0005	<0.0001	<0.0005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0013	--	0.084	0.700	0.050	0.050	--	0.005	--
	Apr-08	NS	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	NS									
Calcium, total	Aug-04	30.7	35.5	40.4	42.4	43.4	41.7	43.6	45.6	50.3	55.1	62	48.8	47.3	15.2	30.4750	--	--	--	--	--	--	--	--
	Apr-08	NS	24.3	21.8	24.6	24.4	26.4	26.3	26.4	26.4	27.4	29.1	18.6	18.3	NS									

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																	Arizona AWQS (18 A.A.C. Chapter 11, Appendix A)							
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Chromium, dissolved	Aug-04	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.0100	--	--	--	--	--	--	--	--
	Apr-08	NS	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	NS									
Chromium, total	Aug-04	<0.01	<0.01	<0.01	<0.02	<0.01	<0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.0100	--	--	0.100	1.0	1.0	--	0.1	--
	Apr-08	NS	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	NS									
Copper, dissolved	Aug-04	0.01B	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.02	<0.01	0.0056	0.02105	--	--	--	--	--	--	11.49
	Apr-08	NS	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	NS		0.01345							
Copper, total	Aug-04	<0.01	<0.01	<0.01	<0.02	<0.01	<0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.0050	--	--	1.300	5.0	0.500	--	1.3	--
	Apr-08	NS	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	NS									
Iron, dissolved	Aug-04	0.01B	0.03B	0.02B	0.02B	0.02B	<0.01	<0.01	<0.01	<0.01	0.02B	0.02B	0.02B	0.02B	0.01B	0.0244	--	--	--	--	--	--	--	--
	Apr-08	NS	0.06	<0.03	0.1	<0.03	0.08	<0.03	<0.03	<0.03	<0.03	<0.03	0.03	0.03	NS									
Iron, total	Aug-04	0.39	0.43	0.27	0.21	0.27	0.1	0.03B	0.14	0.06	0.12	0.05	0.42	0.3	0.26	0.2925	--	--	--	--	--	--	--	--
	Apr-08	NS	0.14	0.15	<0.03	0.11	<0.03	0.07	0.06	0.04	0.03	<0.03	0.22	0.2	NS									
Lead, dissolved	Aug-04	0.0002B	<0.0001	0.0002B	0.0003B	0.0002B	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0002B	0.0064	0.10802	--	--	--	--	--	--	0.05
	Apr-08	NS	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	NS		0.00421							
Lead, total	Aug-04	0.0003B	0.0002B	0.0003B	0.0006B	0.0004B	0.0008B	0.0001B	0.0002B	0.0001B	0.0002B	0.0002B	0.0014	0.0013	0.0009	0.0065	--	--	0.015	10	0.100	--	0.015	--
	Apr-08	NS	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	NS									
Magnesium, total	Aug-04	20.2	22.5	20.9	20.9	21.2	20.8	20.9	21.4	24.9	29.5	34.5	23.9	23.1	5.4	17.1875	--	--	--	--	--	--	--	--
	Apr-08	NS	15.1	10.0	10.8	10.9	11.7	11.8	11.6	11.7	12.7	14.5	9.9	9.8	NS									
Manganese, dissolved	Aug-04	0.01B	0.015B	0.027B	0.009B	0.023B	<0.005	0.007B	0.006B	0.01B	0.046	0.055	0.032	0.012B	<0.005	0.0133	--	--	--	--	--	--	--	1.548
	Apr-08	NS	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	NS									
Manganese, total	Aug-04	0.022B	0.021B	0.035	0.02B	0.029B	<0.01	0.007B	0.009B	0.012B	0.041	0.058	0.056	0.034	<0.005	0.0183	--	--	196	10	--	--	--	--
	Apr-08	NS	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	0.01	NS									
Mercury, dissolved	Aug-04	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.0001	0.0024	--	--	--	--	--	--	0.093
	Apr-08	NS	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	NS		0.00001							
Mercury, total	Aug-04	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.0001	--	0.0006	0.42	10	--	--	0.002	--
	Apr-08	NS	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	NS									
Molybdenum, dissolved	Aug-04	<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.0050	--	--	--	--	--	--	--	--
	Apr-08	NS	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NS									
Molybdenum, total	Aug-04	<0.01	<0.01	<0.01	<0.02	<0.01	<0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.02	0.0056	--	--	--	--	--	--	--	--
	Apr-08	NS	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NS									
Nickel, dissolved	Aug-04	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0..01	<0.01	<0.01	0.0100	0.701	--	--	--	--	--	--	6.194
	Apr-08	NS	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	NS		0.07781							
Nickel, total	Aug-04	<0.01	<0.01	<0.01	<0.02	<0.01	<0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.02	0.0106	--	4.6	28	--	--	--	--	--
	Apr-08	NS	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	NS									
Selenium, dissolved	Aug-04	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001B	0.0006	--	--	--	--	--	--	--	1.548
	Apr-08	NS	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	NS									
Selenium, total	Aug-04	<0.001	<0.001	<0.001	<0.005	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0005	0.02	9	7	0.020	0.050	--	0.05	--
	Apr-08	NS	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	NS		0.002							
Silver, dissolved	Aug-04	0.00006B	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.0001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0.0013	0.00783	--	--	--	--	--	--	1.548
	Apr-08	NS	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	NS		NE							

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Silver, total	Aug-04	<0.00005	<0.00005	<0.001	<0.0003	<0.00005	<0.0003	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0.0014	--	--	--	--	--	--	--	--
	Apr-08	NS	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	NS									
Uranium, dissolved	Aug-04	0.00008B	0.00013B	0.0004	0.00033	0.00123	0.00175	0.00254	0.00345	0.00275	0.0027B	0.0033B	0.0691	0.0703	0.00008B	0.0002	--	--	--	--	--	0.0026	0.035	--
	Apr-08	NS	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	0.0006	0.0007	0.0008	0.0009	0.003	0.0026	NS									
Uranium, total	Aug-04	<0.00005	0.00006B	0.00032	0.0004B	0.00137	0.0013B	0.00369	0.0043	0.0035	0.0037	0.00384	0.0758	0.0917	<0.0005	0.0002	--	--	--	--	--	--	--	--
	Apr-08	NS	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	0.0003	0.0007	0.0007	0.0008	0.001	0.0034	0.0028	NS									
Vanadium, dissolved	Aug-04	<0.005	<0.005	<0.005	<0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.005	0.0144	--	--	--	--	--	0.02	--	--
	Apr-08	NS	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NS									
Vanadium, total	Aug-04	0.006B	<0.005	<0.005	<0.01	<0.005	<0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.0148	--	--	--	--	--	--	--	--
	Apr-08	NS	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NS									
Zinc, dissolved	Aug-04	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01B	0.01B	0.01B	<0.01	0.0050	0.1754	--	--	--	--	--	--	92.909
	Apr-08	NS	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	NS		0.1754							
Zinc, total	Aug-04	<0.01	<0.01	<0.01	<0.02	<0.01	<0.02	<0.01	<0.01	<0.01	<0.01	<0.01	0.01B	0.01B	<0.01	0.0056	--	69	420	10	25	--	--	--
	Apr-08	NS	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	NS									

Surface Water – Radiological (pCi/L)																Radiological Action Levels				
																Mean Bkgd	DOE BCG (aquatic)	DOE BCG (riparian)	DOE BCG (terrestrial)	AWQS DWS
Gross Alpha	Aug-04	1.48±3.1	7.39±4.1	9.88±4.4	13.8±5.2	12.2±4.9	2.36±2.2	3.7±2.5	2.99±2.3	3.05±2.4	3.73±2.5	2.69±2.3	51.1±8.4	55.4±7.8	1.75±1.6	4.47	--	--	--	15
	Apr-08	NS	-1.0±0.08	-1.0±0.7	-1.0±0.7	-1.0±0.8	-1.0±0.7	-0.3±0.8	-0.6±0.8	-0.8±0.8	-1.0±0.8	-0.5±0.9	3.2±1.0	2.9±1.0	NS					
Gross Beta	Aug-04	3.09±3.3	12.5±3.5	9.64±3.5	16.2±3.9	14±3.6	6.1±2.9	3.24±2.7	3.93±2.8	3.13±2.8	1.54±2.7	3.11±2.5	32.6±4.6	29.3±4.3	5.71±3.2	6.40	--	--	--	--[2]
	Apr-08	NS	-0.9±1.5	-1.0±1.5	-0.1±1.5	-0.6±1.5	-6.0±1.4	-1.0±1.5	-2.0±1.5	-2.0±1.5	-2.0±1.5	-1.0±1.5	-0.2±1.5	0.4±1.5	NS					
Radium 226	Aug-04	0.05±0.1	0.08±0.1	0.04±0.1	0.06±0.1	0.2±0.2	0.09±0.1	0.05±0.1	0.07±0.1	0.12±0.2	0.2±0.3	0.12±0.2	3.1±0.5	2.87±0.4	0.03±0.1	0.03	--	5.4	8,100	5[3]
	Apr-08	NS	-0.1±0.1	-0.01±0.1	-0.2±0.09	-0.1±0.1	-0.2±0.09	-0.2±0.09	0.03±0.1	-0.1±0.1	-0.2±0.09	-0.03±0.1	0.6±0.2	0.5±0.2	NS					
Radium 228	Aug-04	0.08±0.2	0±0.25	0.08±0.3	0.11±0.2	0.06±0.2	0±0.25	0.55±0.3	0.33±0.3	0.17±0.3	0.31±0.3	0.25±0.3	0.53±0.3	0.06±0.3	0±0.28	0.03	--	5.4	8,100	
	Apr-08	NS	-0.01±0.5	-0.1±0.5	-0.02±0.6	0.3±0.6	1.9±0.6	0.3±0.6	0.1±0.6	0.01±0.6	1.4±0.6	0.08±0.6	1.3±0.6	0.2±0.6	NS					
Thorium 228	Aug-04	0.68±0.29	0.98±0.33	0.33	0.58±0.28	0.92±0.33	0.82±0.3	0.55±0.28	0.72±0.29	0.4±0.25	0.8±0.29	0.55±0.27	0.6±0.28	0.68±0.29	NA	0.38	--	--	--	--
	Apr-08	NS	-0.2±0.2	0.1±0.2	0.2±0.2	0.2±0.3	0.2±0.3	0.0±0.2	0.1±0.2	-0.1±0.5	0.1±0.1	0.0±0.2	0.1±0.2	0.1±0.2	NS					
Thorium 230	Aug-04	-0.65±0.25	-0.54±0.27	1.24±0.53	0.16±0.4	-0.43±0.27	-0.71±0.26	0.2±0.38	0±0.39	-0.11±0.39	-0.33±0.38	-0.49±0.33	0.39±0.45	-0.51±0.31	0.12±0.4	0.25	--	--	--	--
	Apr-08	NS	0.1±0.2	0.1±0.1	0.1±0.2	0.2±0.3	0.2±0.2	0.1±0.2	0.2±0.3	0.1±0.3	0.1±0.1	0.1±0.2	0.4±0.3	0.1±0.1	NS					
Thorium 232	Aug-04	0.21±0.36	-0.1±0.31	0.13±0.35	0.11±0.35	-0.02±0.3	0.3±0.39	-0.1±0.29	-0.11±0.33	-0.03±0.35	-0.21±0.35	0.09±0.38	0.19±0.38	0.11±0.38	NA	0.09	270	--	54,000	--
	Apr-08	NS	0.2±0.2	0.0±0.1	0.0±0.1	0.0±0.1	0.2±0.2	0.1±0.1	0.1±0.2	0.0±0.2	0.0±0.1	0.0±0.1	0.1±0.2	0.0±0.1	NS					

[1] PA/SI Sample Results Source: SAIC, 2005. *Workman Creek Watershed Final Combined Preliminary Assessment/Site Inspection Report* . January 15, 2005. (Samples collected August 2004.)

[2] The EPA MCL for gross beta is 4 millirems per year. A direct conversion of gross beta in pCi/L to mrem/yr does not exist as the conversion depends on the individual radionuclides present. The gross beta screening level for drinking water system monitoring requirements is 50pCi/L.

[3] The EPA MCL for radium 226 and radium 228 is set at a combined concentration of 5 pCi/L

microR/hr = microroentgen per hour
mg/L = milligrams per liter
pCi/L = picocuries per liter
AWQS = Ambient Water Quality Standard
A&Wc = aquatic & wildlife (coldwater)
FC = fish consumption
FBC = full body contact

AgI = agricultural watering (irrigation)
AgL = agricultural watering (livestock)
Bkgd UCL = Background Upper Confidence Limit
DOE PRG = Department of Energy Ecological Preliminary Remediation Goal
AWQS DWS = Ambient Water Quality Standard Drinking Water Source
BLM RMC = Bureau of Land Management Risk Management Criteria
DOE BCG = Department of Energy Biota Concentration Guides
B = Analyte concentration detected at a value between MDL and Practical Quantitation Limit (PQL)

H = Analysis exceeded the maximum holding time
NS = Not sampled
NA = Not analyzed
"--" = None established
Human Health Criteria Exceeded
Ecological Screening Criteria Exceeded

Table C2
Workman Creek Sediment Sample Results[1]

Analyte	Workman Creek Sample IDs (2004 Samples)									
	WC Above Main Weir (Bkgd) 081004-07	WC Below Falls CG (Bkgd) 081004-08	WC Above Cascade CG 081004-09	WC Below Cascade CG 081004-10	WC Above Creekside CG 081104-11	WC Above Creekside CG 081104-13	WC Below Creekside CG 081104-14	WC Below Elks Camp 081104-15	WC Above Hwy 288 Bridge 081104-16	WC Above WC/RC Confluence 081104-17
Sediment – Field Parameter										
Gamma Scintillator (microR/hr)	16	14	17	17	14	NA	15	NA	12	10
Sediment Metals (mg/kg)										
Antimony	<0.1	<0.1	<0.1	0.1B	<0.1	<0.1	0.2B	<0.1	<0.1	<0.1
Arsenic	3	3	3.4	3.4	4.1	3.2	3	3.7	2.9	1.8
Barium	74.7	73.7	68	78.4	74.7	58.5	66.2	65.4	55.6	56
Beryllium	0.36	0.45	0.46	0.5	0.67	0.39	0.56	0.56	0.43	0.35
Cadmium	0.13B	0.12B	0.12B	0.15B	0.14B	0.09B	0.11B	0.14B	0.13B	0.16B
Chromium	110	100	80	55	52	66	49	49	36	72
Copper	20B	20B	30B	21	24	18	29	32	21	19
Iron	60,300	56,300	57,700	37,800	38,300	36,100	36,800	39,500	33,200	41,700
Lead	<40	<40	<40	14B	9B	8B	13B	13B	15B	10B
Manganese	815	967	723	698	593	478	492	513	521	593
Mercury	<0.05H	<0.04H	<0.04H	<0.05H	<0.05H	<0.04H	<0.04H	<0.05H	<0.04H	<0.04H
Molybdenum	<10	<10	<10	<1	<1	<1	<1	<1	<1	<1
Nickel	120	100	90	69	61	58	55	57	46	46
Selenium	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Silver	<5	<5	<5	1.4B	1.2B	1.2B	1.1B	1.1B	0.7B	1.3B
Uranium	0.27	0.31	0.38	2.32	0.8	0.62	2	1.17	0.69	0.53
Vanadium	115	108	95	66.1	173	74	83.4	90.3	70.6	142
Zinc	70	70	70	55	54	44	54	59	89	64
Sediment – Radiological (pCi/g)										
Gross Alpha	2.91±2	2.88±2.1	0.25±2.2	6.78±2.4	2.33±2.1	4.08±2.4	7.75±3.4	2.18±2.2	4.23±2.2	2.06±2.5
Gross Beta	2.89±1.6	1.98±1.8	4.03±2	4.5±1.6	3.02±1.4	4.09±1.7	9.82±2.2	3.36±2.1	7.51±1.7	3.88±1.8
Radium 226	1.21±0.4	0.67±0.4	0.52±0.3	1.4±0.4	0.92±0.4	0.47±0.4	1.05±0.5	1.71±0.6	1.25±0.5	0.92±0.5
Radium 228	0.42±1.3	1.51±1.4	1.06±1.4	1.45±1.3	1.71±1.3	1.3±1.3	1.15±1.3	0.03±1.4	0.8±1.4	1.12±1.3
Thorium 228	0.23±0.25	0.05±0.21	0.18±0.23	0±0.2	0.24±0.22	0.2±0.24	0.08±0.21	0.47±0.27	0.11±0.22	0.16±0.23
Thorium 230	0.79±0.4	0.17±0.36	0.61±0.44	0.34±0.37	-0.47±0.78	-0.12±0.27	0.26±0.4	0.45±0.44	0.93±0.44	0±0.34
Thorium 232	0.12±0.28	0.21±0.34	0.35±0.37	0.13±0.31	-0.18±0.73	0.24±0.29	0.1±0.34	-0.76±0.15	0.11±0.3	0.47±0.37
Natural	0.18	0.21	0.25	1.55	0.53	0.41	1.33	0.78	0.46	0.35

Analyte	Ephemeral Drainage Sample IDs (2004 Samples)										
	W Fork Creekside CG 081104-12	Below Elks Youth Camp 081504-73	Below Workman Group 081504-74	Below Workman Group 081504-75 (Dup of 74)	Below Workman Group 081504-77	Lucky Stop Group (Bkgd) 081404-45	Lucky Stop Group 081404-48	Lucky Stop Group 081404-49	Hope Group 081404-57	Hope Group 081404-61	Little Joe Group 081004-06
Sediment – Field Parameter											
Gamma Scintillator (microR/hr)	12	10	20	NA	12	70	115	45	60	60	200
Sediment Metals (mg/kg)											
Antimony	<0.1	<0.1	0.2B	<0.1	<0.1	<0.1	<0.1	0.2B	0.2B	<0.1	0.1B
Arsenic	4.6	2.5	4	4.2	3.4	5.5	7.8	4	12.5	8.6	8.9
Barium	32.8	55.8	48.5	48.9	38.8	58.3	52	37	102	65.7	64.6
Beryllium	0.77	0.35	0.51	0.48	0.4	1.1	1.39	0.89	1.92	1.11	1.08
Cadmium	0.07B	0.12B	0.18B	0.18B	0.12B	0.86	0.97	1.28	1.71	1.3	0.29B
Chromium	25	41	86	97	59	27	33	22	37	31	23
Copper	11	55	83	77	20	86	328	95	195	94	170
Iron	24,600	42,200	39,900	36,600	28,800	35,500	39,900	31,600	41,000	40,200	29,400
Lead	24	10B	21	19B	13B	110	183	57	38	67	47
Manganese	233	463	439	446	373	1,170	1030	425	915	535	617
Mercury	0.12B	<0.04H	<0.05H	<0.05H	<0.05H	<0.05	<0.05	<0.05	0.23	0.08B	0.04BH
Molybdenum	<1	1B	2B	2B	<1	1B	10	4B	3B	6	6
Nickel	18	68	52	52	45	24	47	23	79	47	28
Selenium	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6B	<0.5	0.8B	<0.5	<0.5
Silver	<0.5	<1	<1	<0.5	<0.5	1.4B	2B	<0.5	<0.5	<0.5	0.7B
Uranium	0.37	1.55	7.01	7.89	0.67	18.8	100	17.2	34.5	107	57.1
Vanadium	77.8	155	182	140	92.1	61.4	73.2	79.6	86.8	119	57.9
Zinc	31	50	56	54	38	281	343	147	45	95	79
Sediment – Radiological (pCi/g)											
Gross Alpha	3.69±1.8	8.23±2.2	15.6±2.2	15.1±2.6	3.64±1.3	28.3±3	96.6±5.8	32.8±3.2	40.4±3.9	128±7.6	132±7.3
Gross Beta	2.34±1.4	5.33±1.3	10.8±1.2	9.55±1.3	3.11±0.9	16.5±1.3	66.3±2.4	25.6±1.8	33.1±2.3	98.6±3.9	77.6±2.9
Radium 226	0.07±0.3	1±0.4	4.95±0.9	5.43±0.9	0.45±0.4	7.63±0.8	34.3±1.5	10.2±0.9	18.4±1.6	32.2±1.6	26.3±1.6
Radium 228	2.58±1.3	1.67±1.4	2.67±1.4	2.59±1.4	1.72±1.5	5.61±1.7	2.75±1.6	2.2±1.6	2.3±1.4	0±1.4	2.64±1.4
Thorium 228	0.06±0.2	0.05±0.21	0.08±0.21	0.29±0.24	0.15±0.22	0.51±0.28	1.11±0.35	0.6±0.29	0.66±0.3	0.98±0.33	0.33±0.24
Thorium 230	-0.55±0.8	0.83±0.48	2.87±0.7	2.16±0.63	1.8±0.63	6.35±0.87	27.5±1.8	10.5±1.2	10.2±1.1	28±1.8	17±1
Thorium 232	0.56±0.88	0.26±0.37	0.16±0.37	0.45±0.4	0.12±0.39	0.42±0.36	0.67±0.41	0.52±0.41	0.56±0.4	0.1±0.34	0.66±0.33
Natural	0.25	1.03	4.67	5.26	0.45	12.53	67	11.47	23	71	38.07

Analyte	Action Levels						
	Mean Background	AZ NR SRLs	BLM RMC Camper	DOE PRG Short-tailed Shrew	BLM Mule Deer	BLM Robin	NOAA TEL (aquatic life)
Sediment – Field Parameter							
Gamma Scintillator (microR/hr)	--	--	--	--	--	--	--
Sediment Metals (mg/kg)							
Antimony	0.05	410	62	--	--	--	--
Arsenic	3	10	46	9.9	200	4	5.9
Barium	74.2	170,000	--	329	--	--	--
Beryllium	0.405	1,900	--	--	--	--	--
Cadmium	0.125	510	155	6.0	3	0.3	0.596
Chromium	**105**	65	--	110	--	--	37.3
Copper	**20**	41,000	5,745	370	102	7	35.7
Iron	58,300	--	--	--	--	--	--
Lead	**20**	800	1,000	740	106	6	35
Manganese	891	32,000	21,679	--	--	--	--
Mercury	0.045	310	46	0.146	9	1	174
Molybdenum	**5**	5,100	--	4.75	--	--	--
Nickel	**110**	20,000	3,094	246	--	--	18.0
Selenium	0.25	5,100	774	--	--	--	--
Silver	2.5	5,100	774	--	--	--	--
Uranium	0.29	200	--	92	--	--	--
Vanadium	**112**	1,000	--	55	--	--	--
Zinc	**70**	310,000	46,455	1,600	222	43	123.1

Analyte	Radiological Action Levels			
	Mean Bkgd	EPA SSLs	DOE BCG (riparian animal)	DOE BCG (terrestrial animal)
Sediment – Radiological (pCi/g)				
Gross Alpha	2.9	--	--	--
Gross Beta	2.4	--	--	--
Radium 226	0.94	5.94	110	54
Radium 228	1	--	81	54
Thorium 228	0.14	--	--	--
Thorium 230	0.48	--	--	--
Thorium 232	0.17	3.2	1,400	1,600
Natural	0.19	167	2,400	1,600

[1] PA/SI Sample Results Source: SAIC, 2005. *Workman Creek Watershed Final Combined Preliminary Assessment/Site Inspection Report*, January 15, 2005. (Samples collected August 2004.)

[2] Natural uranium concentrations were calculated based on mass uranium results (1 pCi/g = 1.5 mg/kg).

Only two background samples were collected therefore the mean, rather than the 95% upper confidence interval limit was calculated for data screening purposes.

WC indicates sample collected from Workman Creek. All other sediment samples collected from ephemeral drainages in or coming from the mine groups.

Bold = Background (Bkgd) exceeds one or more action level

BLM RMC = Bureau of Land Management Risk Management Criteria

DOE PRG = U.S. Department of Energy Preliminary Remediation Goals

NOAA = National Oceanic and Atmospheric Administration

DOE BCG = U.S. Department of Energy Biota Concentration Guides

mg/kg = milligrams per kilogram

pCi/g = picocuries per gram

"--" = None established

TEL = Threshold effects level

H = Analysis exceeded the maximum holding time

U = Analyte analyzed for but not detected at the Method Detection Limit (MDL)

B = Analyte concentration detected at a value between MDL and Practical Quantitation Limit (PQL)

Human Health Criteria Exceeded

Minimum Ecological Screening Criteria Exceeded

Table C3
Summary of Groundwater Sample Results
Workman Creek Uranium Mines[1]

Analyte	Groundwater Sample IDs		Action Levels					
	Pederson Well 081004-2W	Elks Camp Well 081204-15W	AWQS	EPA MCL	BLM RMC Resident	BLM RMC Camper	BLM RMC Worker	AgL
Groundwater Field Parameters								
pH	6.5	6.82	--	--	--	--	--	--
Gamma Scintillator (cpm/mR/hr)	8	12	--	--	--	--	--	--
Groundwater Metals, Total (mg/L)								
Antimony	0.0023	<0.0002	0.006	0.006	0.0002	0.001	0.003	NNS
Arsenic	0.002B	<0.0005	0.05	0.01	0.0001	0.001	0.0007	0.2
Barium	0.069	0.024	2.0	2.0	--	--	--	NNS
Beryllium	<0.0002	<0.0001	0.004	0.004	--	--	--	NNS
Cadmium	<0.0002	<0.0001	0.005	0.005	0.0002	0.002	0.004	0.05
Chromium	<0.01	<0.01	0.1	0.1	--	--	--	1
Copper	<0.01	NA	--	1.3	0.018	0.137	0.287	0.5
Fluoride	NA	<0.1	4.0	4.0	--	--	--	NNS
Cyanide, free	NA	<0.1	0.2	0.2	--	--	--	0.2
Iron	19.7	NA	--	--	--	--	--	--
Lead	0.0512	0.0011	0.05	0.015	0.015	0.015	0.015	0.1
Manganese	0.371	NA	--	--	0.002	0.018	0.039	NNS
Mercury	<0.0002	<0.0002	0.002	0.002	0.0001	0.001	0.002	0.01
Molybdenum	<0.01	NA	--	--	--	--	--	--
Nickel	0.01B	<0.05	0.1	--	0.009	0.074	0.155	NNS
Selenium	0.002B	<0.001	0.05	0.05	0.002	0.018	0.039	0.05
Silver	<0.0001	NA	--	--	0.002	0.018	0.039	NNS
Thallium	NA	<0.0005	0.002	0.002	--	--	--	NNS
Uranium	<0.0001	NA	--	0.03	--	--	--	NNS
Vanadium	0.013	NA	--	--	--	--	--	--
Zinc	0.03	NA	--	--	0.142	1.106	2.323	25
Groundwater – Radiological (pCi/L)								
Gross Alpha	2.54±2.6	2.68±2.3	15	15	--	--	--	--
Gross Beta[2]	9.72±3.3	2.39±2.6	--	--	--	--	--	--
Radium 226	0.1±0.2	0.01±0.1	5	5	--	--	--	--
Radium 228	0±0.23	0.05±0.3			--	--	--	--
Thorium 228	0.74±0.3	NA	--	--	--	--	--	--
Thorium 230	0.21±0.39	NA	--	--	--	--	--	--
Thorium 232	0.05±0.33	NA	--	--	--	--	--	--

[1] PA/SI Sample Results Source: SAIC, 2005. *Workman Creek Watershed Final Combined Preliminary Assessment/Site Inspection Report* . January 15, 2005. (Samples collected August 2004.)

[2] The AWQS and the EPA MCL for gross beta is based on an annual dosage rate of 4 millirem per year.

Bold = Exceeds one or more action level

U = Analyte analyzed for but not detected at the Method Detection Limit (MDL)

B = Analyte concentration detected at a value between MDL and Practical Quantitation Limit (PQL)

AWQS = Arizona Aquifer Water Quality Standards (A.A.C. R18-11-406)

EPA MCL = EPA Maximum Contaminant Level (National Primary Drinking Water Standards)

BLM RMC = Bureau of Land Management Risk Management Criteria

NA = Not Analyzed

"--" = None established

mg/L = milligrams per liter

pCi/L = pico curies per liter

Human Health Criteria Exceeded

Table C4
PA/SI Campground Soil Sample Results

Analyte	PA/SI Sample IDs (August 2004)															Action Levels							
	Creekside CG 081104-28	Creekside CG 081104-29	Creekside CG (Bkgd) 081104-30	Creekside CG 081104-31	Creekside CG 081104-32	Cascade CG 081104-21	Cascade CG 081104-22	Cascade CG 081104-24	Cascade CG 081104-25	Cascade CG 081104-26	Cascade CG (Bkgd) 081104-23	Cascade CG (Bkgd) 081104-27	Falls CG 081104-18	Falls CG 081104-19	Falls CG 081104-20	Mean Background	AZ NR SRLs	BLM RMC Camper	BLM RMC ATV Driver	BLM RMC Worker	DOE PRG Short-tailed Shrew	BLM Mule Deer	BLM Robin
Field Parameters																							
Gamma (microR/hr)	100	31	18	22	26	60	60	47	25	21	33	16	15	15	NA	--	--	--	--	--	--	--	--
Metals (mg/kg)																							
Antimony	0.1B	0.1B	<0.1	<0.1	0.1B	0.1B	0.2B	0.2B	0.2B	0.2B	0.2B	0.1B	<0.1	<0.1	<0.1	0.1	410	50	750	100	--	--	--
Arsenic	11.2	7.1	4.9	3.6	5.4	3.1	3.8	3.1	2.7	3.5	15.9	3.4	5.7	15.5	4.3	**8.1**	10	20	300	12	9.9	200	4
Barium	71.1	59	84.4	106	127	49.3	22.4	96.4	36.6	73.6	54	74.2	129	50	101	70.9	170,000	--	--	--	329	--	--
Beryllium	0.92	0.62	0.81	0.76	1.14	0.77	0.52	0.54	0.45	0.51	0.73	0.41	1.27	0.97	0.87	0.65	1,900	--	--	--	--	--	--
Cadmium	0.39	0.18B	0.29B	0.18B	0.3B	1.17	0.14B	0.12B	0.11B	0.29B	0.26B	0.24B	0.16B	0.1B	0.1B	0.26	510	70	950	100	6.0	3	0.3
Chromium	43	41	38	46	31	16	13	14	26	32	100	8	15	13	12	49	1,000,000	--	--	--	110	--	--
Copper	345	64	38	46	58	29	12	11	11	16	30B	11	21	25	16	**26**	41,000	5,000	70,000	7,400	370	102	7
Iron	45,200	35,800	41,400	43,700	36,400	19,900	17,900	16,200	21,400	25,200	47,500	11,300	24,800	29,500	21,900	33,400	--	--	--	--	--	--	--
Lead	54	23	18B	10B	28	81	48	15B	14B	30	60B	14B	12B	14B	9B	**31**	800	1,000	1,000	2,000	740	106	6
Manganese	537	392	533	742	900	431	169	469	305	435	189	354	1,320	689	903	359	32,000	19,000	250,000	28,000	--	--	--
Mercury	<0.05H	<0.05H	<0.04H	<0.05H	0.06BH	<0.05H	<0.05H	0.05BH	<0.05H	<0.04H	<0.04H	<0.04UH	0.06BH	<0.04H	<0.05H	0.02	310	40	550	60	0.146	9	1
Molybdenum	3B	33	<1	1B	2B	2B	2B	<1	<1	<1	<10	<1	<1	<1	<1	2	5,100	--	--	--	4.75	--	--
Nickel	53	41	43	48	33	23	8	14	23	38	<10	8	11	8	12	19	20,000	2,700	38,000	4,000	246	--	--
Selenium	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.025	5,100	700	9,600	1,000	--	--	--
Silver	<0.5	1.2B	<0.5	1.1B	0.6B	<0.5	<0.5	<0.5	0.8B	<0.5	<5	<0.5	0.6B	0.7B	0.8B	0.85	5,100	700	9,600	1,000	--	--	--
Uranium	95.9	22.4	0.84	1.56	3.7	128	20.9	4.6	6.83	4.66	4.6	0.76	0.53	0.4	0.72	2.07	200	--	--	--	92	--	--
Vanadium	109	114	120	116	80	29.3	28.8	29.5	38.3	40.3	29.5	18.7	42.9	45.2	36.1	**56**	1,000	--	--	--	55	--	--
Zinc	52	54	49	68	94	181	44	30	34	60	30B	35	353	28	32	38	310,000	40,000	550,000	60,000	1,600	222	43

Radiological (pCi/g)	Creekside CG 081104-28	Creekside CG 081104-29	Creekside CG (Bkgd) 081104-30	Creekside CG 081104-31	Creekside CG 081104-32	Cascade CG 081104-21	Cascade CG 081104-22	Cascade CG 081104-24	Cascade CG 081104-25	Cascade CG 081104-26	Cascade CG (Bkgd) 081104-23	Cascade CG (Bkgd) 081104-27	Falls CG 081104-18	Falls CG 081104-19	Falls CG 081104-20	Radiological Action Levels: Mean Bkgd	UMTRCA (40 CFR 192)	EPA SSLs	DOE BCG (riparian animal)	DOE BCG (terrestrial animal)
Gross Alpha	228±10	18.8±3.6	7.35±2	5.79±2.6	21.8±4.2	104±5.8	30.6±3	12.8±2.1	11.8±2	9.51±1.8	12.5±2.8	4.95±1.4	2.59±1.7	2.61±1.4	2.46±1.6	8.27	--	--	--	--
Gross Beta	116±3.7	15.7±2.1	8.66±1.2	10.3±2	17±2.1	76±2.6	18.5±1.4	8.6±1	6.88±1	7.49±1.1	10.3±1.6	4.38±0.8	5.36±1.6	3.27±1.1	6.24±1.3	7.78	--	--	--	--
Radium 226	63±3.2	4.44±0.8	2.63±0.8	2.53±0.7	3.33±0.7	17.1±1.7	7.95±0.9	2.45±0.7	1.58±0.5	4.82±1	3.54±0.9	1.54±0.7	0.77±0.4	0.35±0.3	1.21±0.4	2.57	5 [2]	7.57	110	54
Radium 228	1.4±1.3	3.69±1.4	4.63±1.4	2.91±1.4	2.35±1.4	4.15±1.4	2.49±1.4	1.69±1.3	2.03±1.3	1.39±1.3	1.74±1.3	1.46±1.5	2.38±1.4	3.77±1.4	2.34±1.5	2.61		--	81	54
Thorium 228	0.5±0.27	0.45±0.28	0.3±0.24	0.48±0.3	1.14±0.37	0.23±0.24	0.41±0.27	0.32±0.26	0.2±0.24	0.22±0.23	0.44±0.26	0.29±0.25	0.38±0.27	0.43±0.27	0.33±0.26	0.34	--	--	--	--
Thorium 230	74.6±2.9	2.32±0.57	0.09±0.44	0.44±0.32	0.57±0.39	7.24±0.97	2.92±0.63	1.43±0.47	0.38±0.31	2.16±0.64	0.47±0.46	-0.07±0.34	0.32±0.39	-0.34±0.27	-0.02±0.31	0.16	--	--	--	--
Thorium 232	0.28±0.36	0.27±0.32	0.33±0.43	0.4±0.29	0.33±0.33	0.33±0.38	0.18±0.31	2±0.51	0.5±0.3	-0.08±0.33	0.66±0.44	0.15±0.33	0.29±0.35	0.34±0.34	0.27±0.32	0.38	--	3.38	1,400	1,600
Natural Uranium[3]	64	14.9	0.56	1.04	2.5	85	13.9	3.1	4.55	3.11	3.1	0.51	0.35	0.3	0.48	1.38	--	168	--	1,600

[1] PA/SI Sample Results Source: SAIC, 2005. *Workman Creek Watershed Final Combined Preliminary Assessment/Site Inspection Report*. January 15, 2005. (Samples collected August 2004)

[2] UMTRCA soil standard is a combined concentration of radium-226 and radium-228 and is calculated over background.

[3] Natural uranium concentrations were calculated based on mass uranium results (1 pCi/g = 1.5 mg/kg).

Bold background (bkgd) exceeds one or more action level
microR/hr = microroentgen per hour
mg/kg = milligrams per kilogram
pCi/g = pico curies per gram
U = Analyte analyzed for but not detected at the Method Detection Limit (MDL)
B = Analyte concentration detected at a value between MDL and Practical Quantitation Limit (PQL)

H = Analysis exceeded the maximum holding time
AZ NR SRL = Arizona Non-Residential Soil Remediation Level
BLM RMC = Bureau of Land Management Risk Management Criteria
DOE PRG = U.S. Department of Energy Preliminary Remediation Goal
UMTRCA = Uranium Mill Tailings Radiation Control Act
EPA SSL = U.S. Environmental Protection Agency Soil Screening Levels (for external exposure)

DOE BCG = DOE Biota Concentration Guide
"--" = None established
Human Health Criteria Exceeded
Ecological Criteria Exceeded

Table C5
Creekside Campground Sub-Surface Soil Sample Results[1]

Analyte	Soil Sample IDs (April 2008)																		Action Levels							
	Creekside CG CrCG-1-02	Creekside CG CrCG-1-04	Creekside CG CrCG-1-06	Creekside CG CrCG-2-02	Creekside CG CrCG-2-04	Creekside CG CrCG-2-06	Creekside CG CrCG-3-02	Creekside CG CrCG-3-04	Creekside CG CrCG-3-06	Creekside CG CrCG-4-02	Creekside CG CrCG-4-02 DUPE	Creekside CG CrCG-4-04	Creekside CG CrCG-4-06	Creekside CG CrCG-5-02	Creekside CG CrCG-5-04	Creekside CG CrCG-5-05	Lucky Stop/Lost Dog Hot Spot LS/LD-1	Lucky Stop/Lost Dog Hot Spot LS/LD-2	Mean Bkgd	AZ NR SRLs	BLM RMC Camper	BLM RMC ATV Driver	BLM RMC Worker	Short-tailed Shrew	BLM Mule Deer	BLM Robin
Gamma (microR/hr)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	--
Metals (mg/kg)																										
Antimony	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.1	410	50	750	100	--	--	--
Arsenic	1.5	5.4	1.9	2.8	2.5	2.8	2.9	2.8	2.1	2.9	3.3	3.1	15.2	6.5	7.3	3.1	12.7	20.3	**8.1**	10	20	300	12	9.9	200	4
Barium	57.3	71.8	60.1	50.9	33.8	31.3	85.5	98.7	76.7	78.6	63.8	34.7	46.3	98.5	36.9	45.7	52.1	51.9	70.9	170,000	--	--	--	329	--	--
Beryllium	<0.5	0.6	<0.5	0.6	<0.5	<0.5	0.6	0.8	0.7	0.6	0.7	0.6	0.7	0.9	1.0	<0.5	1.8	0.9	0.65	1,900	--	--	--	--	--	--
Cadmium	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.1	<0.5	0.26	510	70	950	100	6.0	3	0.3
Chromium	20.4	27.9	26.1	19.1	16.9	16.1	38.4	43.4	39.3	30.9	29.8	13.2	21.2	27.7	19.8	15.5	23.2	19.8	49	1,000,000	--	--	--	110	--	--
Copper	35.5	53.4	26.8	21.0	17.1	18.9	34.9	28.6	46.2	23.9	54.9	24.6	296	36.4	20.3	29.6	217	234	**26**	41,000	5,000	70,000	7,400	370	102	7
Iron	24,200	31,100	26,600	27,400	19,100	16,500	40,200	41,000	53,400	31,600	39,100	15,200	35,200	33,400	25,700	22,400	33,400	39,400	33,400	--	--	--	--	--	--	--
Lead	6.5	10.7	6.5	7.1	7.3	6.2	10.8	10	7.9	8.2	10.4	7.2	82.7	14.6	13.2	11.2	364	371	**31**	800	1,000	1,000	2,000	740	106	6
Manganese	301	452	409	325	220	205	539	594	672	421	400	337	265	606	247	408	429	96.4	359	32,000	19,000	250,000	28,000	--	--	--
Mercury	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.02	310	40	550	60	0.146	9	1
Molybdenum	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2	5,100	--	--	--	4.75	--	--
Nickel	26.0	36.7	38.2	33.9	20.2	17.7	50.6	38.9	50.9	35.0	28.2	17.6	40.6	38.8	21.0	25.6	39	21.7	19	20,000	2,700	38,000	4,000	246	--	--
Selenium	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.8	<0.5	0.025	5,100	700	9,600	1,000	--	--	--
Silver	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.85	5,100	700	9,600	1,000	--	--	--
Uranium	2.8	10.8	1.5	1.3	1.9	1.6	1.2	1.3	0.7	1.0	17.8	4.2	114	4.4	1.9	2.5	72.2	<0.5	2.07	200	--	--	--	92	--	--
Vanadium	39.4	59.4	45.6	50.8	46.7	35.3	98.1	90.6	120	78.5	67.6	35.0	64.1	84.7	73.7	56.7	78.8	61.1	**56**	1,000	--	--	--	55	--	--
Zinc	31.1	42.2	38.5	27.3	20.1	35.8	45	41.8	52.5	38.2	30.0	17.8	28.7	41.9	30.7	28.4	130	88.5	38	310,000	40,000	550,000	60,000	1,600	222	43
Radiological (pCi/g)																			**Radiological Action Levels**							
																			Mean Bkgd	**UMTRCA (40 CFR 192)**		**EPA SSLs**	**DOE BCG (riparian animal)**		**DOE BCG (terrestrial**	
Gross Alpha	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8.27	--		--	--		--	
Gross Beta	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.78	--		--	--		--	
Gross Gamma	3.6±0.4	63.7±4.3	24.8±2.5	16.7±4.6	43.2±3.3	15.8±3.9	4.8±0.9	35.8±3.5	12.1±1.8	3.4±0.9	199.0±12.3	3.9±0.4	76.4±10.5	63.7±5.7	58.1±4.3	61.7±4.2	172±12.8	529±21.1	--	--		--	--		--	
Actinium 228	ND	1.1±0.3	ND	ND	ND	ND	1.2±0.4	ND	ND	1.1±0.4	ND	ND	ND	ND	1.3±0.4	1.6±0.4	NA	NA	--	--		--	--		--	
Bismuth 214	1.8±0.2	3.2±0.3	0.6±0.2	1.0±0.2	0.9±0.2	1.1±0.2	1.5±0.2	1.0±0.2	ND	0.8±0.2	57.8±1.2	1.9±0.2	10.2±0.7	3.0±0.3	1.4±0.2	1.0±0.2	39.3±1.0	170±2.1	--	--		--	--		--	
Lead 212	ND	0.7±0.1	ND	ND	ND	ND	0.8±0.1	ND	ND	0.5±0.1	ND	ND	ND	ND	0.7±0.1	0.1±0.1	NA	NA	--	--		--	--		--	
Lead 214	1.8±0.2	3.1±0.2	0.7±0.1	0.9±0.1	1.0±0.2	1.0±0.1	1.3±0.2	1.0±0.2	.04±0.1	1.0±0.2	59.7±0.9	2.0±0.2	11.1±0.6	3.3±0.2	1.6±0.2	1.9±0.2	41.1±0.8	175±1.6	--	--		--	--		--	
Potassium 40	ND	55.6±3.4	23.5±2.2	14.8±4.3	41.3±2.9	13.7±3.6	ND	33.8±3.1	11.7±1.7	ND	40.8±4.3	ND	44.7±4.5	54.8±3.6	53.1±3.4	57.1±3.3	57.5±4.6	103±6.9	--	--		--	--		--	
Radium 226	1.8±0.2	3.2±0.3	0.6±0.2	1.0±0.2	0.9±0.2	1.5±0.2	1.5±0.2	1.0±0.2	0.0	0.8±0.2	57.8±1.2	1.9±0.2	10.2±0.7	3.0±0.3	1.4±0.2	1.0±0.2	39.3±1.0	170±2.1	2.57	5[1]		7.57	110		54	
Radium 228	ND	1.1±0.3	ND	ND	ND	ND	1.2±0.4	ND	ND	1.1±0.4	ND	ND	ND	ND	1.3±0.4	1.6±0.4	ND	ND	2.61			--	81		54	
Thorium 228	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.34	--		--	--		--	
Thorium 230	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.16	--		--	--		--	
Thorium 232	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.38	--		3.38	1,400		1,600	
Thorium 234	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	40.4±5.9	ND	10.4±4.7	2.6±1.6	ND	ND	33.7±6.4	81.0±10.5	--	--		--	--		--	
Natural Uranium[2]	1.9	7.2	1.0	0.9	1.3	1.1	0.8	0.9	0.5	0.7	11.9	2.8	76	2.9	1.3	1.7	48.1	<0.5	1.38	--		168	--		1,600	

[1] Uranium Mill Tailings Radiation Control Act (UMTRCA) soil standard is a combined concentration of radium-226 and radium-228 and is calculated over background.

[2] Natural uranium concentrations were calculated based on mass uranium results (1 pCi/g = 1.5 mg/kg).

Bold background (bkgd) exceeds one or more action level
microR/hr = microroentgen per hour
mg/kg = milligrams per kilogram
pCi/g = pico curies per gram
B = Analyte concentration detected at a value between MDL and Practical Quantitation Limit (PQL)

U = Analyte analyzed for but not detected at the Method Detection Limit (MDL)
H = Analysis exceeded the maximum holding time
AZ NR SRL = Arizona Non-Residential Soil Remediation Level
BLM RMC = Bureau of Land Management Risk Management Criteria
DOE PRG = U.S. Department of Energy Preliminary Remediation Goal

EPA SSL = Soil Screening Levels
DOE BCG = Biota Concentration Guide
"--" = None established
Human Health Criteria Exceeded
Ecological Criteria Exceeded

Table C6
Cascade Campground Surface and Subsurface Soil Sample Results

Analyte	Soil Sample IDs (April 2008)														Action Levels							
	Cascade CG CaCG-1-02	Cascade CG CaCG-1-04	Cascade CG CaCG-1-06	Cascade CG CaCG-2-02	Cascade CG CaCG-2-04	Cascade CG CaCG-2-06	Cascade CG CaCG-3-02	Cascade CG CaCG-3-04	Cascade CG CaCG-3-06	Cascade CG CaCG-4-02	Cascade CG CaCG-5-02	Cascade CG CaCG-5-02 DUPE	Cascade CG CaCG-5-04	Cascade CG CaCG-5-06	Mean	AZ NR SRLs	BLM RMC Camper	BLM RMC ATV Driver	BLM RMC Worker	Short-tailed Shrew	BLM Mule Deer	BLM Robin
Field Parameters																						
Gamma (microR/hr)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	--
Metals (mg/kg)																						
Antimony	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.1	410	50	750	100	--	--	--
Arsenic	2.1	1.4	1.9	1.4	0.9	1.6	2.0	1.9	1.6	1.9	1.1	1.9	1.6	0.9	**8.1**	10	20	300	12	9.9	200	4
Barium	81.6	61.0	35	26.4	18.1	23.2	26.7	39.4	31.6	88.4	27.4	45.0	30.0	31.9	70.9	170,000	--	--	--	329	--	--
Beryllium	1.0	0.6	<0.5	<0.5	<0.5	<0.5	0.5	0.6	<0.5	<0.5	<0.5	<0.5	<0.5	0.5	0.65	1,900	--	--	--	--	--	--
Cadmium	<0.5	0.6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.5	<0.5	0.26	510	70	950	100	6.0	3	0.3
Chromium	32.2	33.3	22.9	8.1	16.8	23.7	10.0	35.2	78.0	11.2	16.0	30.6	22.4	9.2	49	1,000,000	--	--	--	110	--	--
Copper	16.9	10.9	9.7	3.9	5.5	7.9	8.7	14.6	11.3	7.3	7.4	12.4	8.9	8.3	**26**	41,000	5,000	70,000	7,400	370	102	7
Iron	32,000	24,700	23,700	8,700	14,200	21,000	32,800	25,500	33,000	11,500	12,400	34,000	22,700	40,300	33,400	--	--	--	--	--	--	--
Lead	27	5.4	9.1	4.3	2.3	2.5	4.1	4.4	3.6	7.1	29.0	4.4	13.3	7.9	**31**	800	1,000	1,000	2,000	740	106	6
Manganese	445	814	260	48.0	240	369	306	328	318	493	214	399	331	350	359	32,000	19,000	250,000	28,000	--	--	--
Mercury	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.02	310	40	550	60	0.146	9	1
Molybdenum	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2	5,100	--	--	--	4.75	--	--
Nickel	33.2	52.0	21.4	6.3	22.6	32.7	51.0	35.2	54.9	24.7	20.5	62.6	20.7	13.6	19	20,000	2,700	38,000	4,000	246	--	--
Selenium	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	0.025	5,100	700	9,600	1,000	--	--	--
Silver	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.85	5,100	700	9,600	1,000	--	--	--
Uranium	49.5	17.0	2.8	8.0	<0.5	1.0	1.4	<0.5	1.3	1.1	13.4	0.6	11.4	5.6	2.07	200	--	--	--	92	--	--
Vanadium	48.7	45.6	39.3	17.3	20.6	32.5	32.4	42.9	88.6	20.7	19.0	50.7	44.6	69.1	**56**	1,000	--	--	--	55	--	--
Zinc	43.1	50.1	22.8	12.6	18.8	19.1	21.1	19.3	30.4	200	102	257	125	51.2	38	310,000	40,000	550,000	60,000	1,600	222	43

Radiological (pCi/g)															Radiological Action Levels				
															Mean Bkgd	UMTRCA (40 CFR 192)	EPA SSLs	DOE BCG (riparian animal)	DOE BCG (terrestrial animal)
Gross Alpha	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8.27	--	--	--	--
Gross Beta	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.78	--	--	--	--
Gross Gamma	158±8.6	40.9±3.5	39.7±3.6	43.2±5.8	37.9±3.6	35.1±3.3	56.5±4.0	51.8±3.6	24.3±2.7	40.8±3.9	18.7±3.4	28.2±3.4	29.0±3.8	26.2±3.9	--	--	--	--	--
Actinium 228	ND	ND	1.1±0.2	0.9±0.4	1.0±0.4	0.8±0.3	ND	ND	ND	0.9±0.3	ND	ND	ND	ND	--	--	--	--	--
Bismuth 214	47.9±1.3	4.1±0.3	0.8±0.2	0.6±0.2	ND	0.5±0.2	0.9±0.2	0.6±0.2	0.7±0.2	0.8±0.2	5.7±0.4	0.8±0.2	1.6±0.2	1.6±0.2	--	--	--	--	--
Lead 212	0.6±0.2	ND	0.5±0.1	ND	0.6±0.1	0.5±0.1	ND	ND	ND	ND	ND	ND	ND	ND	--	--	--	--	--
Lead 214	51.0±1.0	4.2±0.3	0.8±0.2	0.8±0.2	0.6±0.1	0.4±0.1	1.0±0.2	0.5±0.1	0.8±0.1	0.8±0.2	5.9±0.3	0.7±0.2	1.6±0.2	1.4±0.2	--	--	--	--	--
Potassium 40	58.9±6.1	32.6±2.9	36.5±2.9	33.4±2.9	35.7±3.0	32.9±2.6	54.6±3.6	50.7±3.3	22.8±2.4	38.3±3.2	ND	26.7±3.0	23.9±2.2	20.0±2.0	--	--	--	--	--
Radium 226	47.9±1.3	4.1±0.3	0.8±0.2	0.6±0.2	ND	0.5±0.2	0.9±0.2	0.6±0.2	0.7±0.2	0.8±0.2	5.7±0.4	0.8±0.2	1.6±0.2	1.6±0.2	2.57	5 [1]	7.57	110	54
Radium 228	ND	ND	1.1±0.2	0.9±0.4	1.0±0.4	0.8±0.3	ND	ND	ND	0.9±0.3	ND	ND	ND	ND	2.61		--	81	54
Thorium 228	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.34	--	--	--	--
Thorium 230	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.16	--	--	--	--
Thorium 232	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.38	--	3.38	1,400	1,600
Thorium 234	ND	ND	ND	7.5±2.1	ND	ND	ND	ND	ND	ND	7.1±2.7	ND	1.9±1.2	3.2±1.5	--	--	--	--	--
Natural Uranium[3]	33.0	11.3	1.9	5.3	<0.5	0.7	0.9	<0.5	0.9	0.7	8.9	0.4	7.6	3.7	1.38	--	168	--	1,600

[1] Uranium Mill Tailings Radiation Control Act (UMTRCA) soil standard is a combined concentration of radium-226 and radium-228 and is calculated over background.

[2] Natural uranium concentrations were calculated based on mass uranium results (1 pCi/g = 1.5 mg/kg).

Bold background (bkgd) exceeds one or more action level

microR/hr = microroentgen per hour

mg/kg = milligrams per kilogram

pCi/g = pico curies per gram

B = Analyte concentration detected at a value between MDL and Practical Quantitation Limit (PQL)

U = Analyte analyzed for but not detected at the Method Detection Limit (MDL)

H = Analysis exceeded the maximum holding time

AZ NR SRL = Arizona Non-Residential Soil Remediation Level

BLM RMC = Bureau of Land Management Risk Management Criteria

DOE PRG = U.S. Department of Energy Preliminary Remediation Goal

EPA SSL = Soil Screening Levels

DOE BCG = Biota Concentration Guide

"--" = None established

Human Health Criteria Exceeded

Ecological Criteria Exceeded

Table C7

Little Joe and Workman Mine Groups Waste Rock Sample Results[1]

Analyte	Waste Rock Sample IDs (August 2004)						Bkgd UCL_{95}	Action Levels						
	Little Joe 081304-19	Workman 081304-27	Workman 081304-28	Little Joe 081304-21 (Bkgd)	Little Joe 081304-24 (Bkgd)	Workman 081304-26 (Bkgd)		AZ NR SRLs	BLM RMC Camper	BLM RMC ATV Driver	BLM RMC Worker	PRG Short-tailed Shrew	BLM Mule Deer	BLM Robin
Field Parameters														
Gamma Scintillator (microR/hr)	150	110	48	210	850	38	850.2	--	--	--	--		--	--
Metals (mg/kg)														
Antimony	0.1B	<0.1	<0.1	0.2B	0.2B	0.2B	0.3	410	50	750	100	--	--	--
Arsenic	8.1	10.2	6.6	15	17	14.7	**24.2**	10	20	300	12	9.9	200	4
Barium	89	44.6	87	108	73.1	91	156.1	170,000	--	--	--	329	--	--
Beryllium	2.25	0.63	1.22	2.98	1.76	3.73	2.6	1,900	--	--	--	--	--	--
Cadmium	0.11B	0.08B	0.2B	0.49	0.28B	0.29B	**1.3**	510	70	950	100	6	3	0.3
Chromium	15	57	71	50B	32	60	**53**	65	--	--	--	10	--	--
Copper	421	132	114	1,390	1,040	1,070	**704**	41,000	5,000	70,000	7,400	370	102	7
Iron	44,500	48,700	56,700	81,300	42,800	82,400	81,575	--	--	--	--	--	--	--
Lead	75	31	19B	390	79	<40	**239**	800	1,000	1,000	2,000	740	106	6
Manganese	445	200	587	2,510	731	677	2,795	32,000	19,000	250,000	28,000	--	--	--
Mercury	0.05B	<0.04	<0.05	<0.05	<0.04	<0.04	0.1	310	40	550	60	0.146	9	1
Molybdenum	4B	5B	3B	20B	11	<10	**24.9**	5,100	--	--	--	4.75	--	--
Nickel	26	30	56	50	42	70	64.3	20,000	2,700	38,000	4,000	246	--	--
Selenium	0.9B	<0.5	<0.5	0.8B	0.6B	0.9B	0.9	5,100	700	9,600	1,000	--	--	--
Silver	<0.5	<0.5	<0.5	<5	<0.5	<5	2.6	5,100	700	9,600	1,000	--	--	--
Uranium	97.5	8.11	2.41	403	254	4.24	196	200	--	--	--	92	--	--
Vanadium	65.2	107	156	105	94.6	170	138	1,000	--	--	--	55	--	--
Zinc	182	48	72	180	72	110	**485**	310,000	40,000	550,000	60,000	1,600	222	43

Radiological (pCi/g)							Radiological Action Levels				
							Bkgd UCL_{95}	UMTRCA (40 CFR 192)	EPA SSLs	DOE BCG (riparian animal)	DOE BCG (terrestrial animal)
Gross Alpha	109±8.3	16.3±3.2	5.99±2.8	631±19	250±11	14.2±3.3	292.1	--	--	--	--
Gross Beta	66.9±3.6	11.4±1.6	5.11±2.2	333±7.3	189±5.2	15.6±2	160.7	--	--	--	--
Radium 226	19±1.4	2.23±0.4	1.75±0.4	122±3.5	34.8±1.9	5.11±0.7	**62.4**	5[2]	67.4	110	54
Radium 228	3.24±1.4	4.47±1.4	3.21±1.4	3.01±1.4	2.02±1.3	3.74±1.4	4.8		--	81	54
Thorium 228	0.86±0.31	0.53±0.28	0.19±0.24	0.83±0.31	0.75±0.29	0.97±0.33	1.5	--	--	--	--
Thorium 230	25±1.8	1.98±0.59	0.4±0.39	116±3.6	29.3±2.1	2.16±0.63	57.9	--	--	--	--
Thorium 232	0.84±0.48	0.51±0.4	0.38±0.35	0.85±0.45	0.13±0.43	0.89±0.47	1.1	--	4.1	1,400	1,600
Natural Uranium[2]	65.0	5.41	1.61	269	169	2.83	131	--	298	--	1,600

Table C7

Little Joe and Workman Mine Groups Waste Rock Sample Results[1]

Analyte	Waste Rock Sample IDs (August 2004)							Action Levels						
	Little Joe 081304-19	Workman 081304-27	Workman 081304-28	Little Joe 081304-21 (Bkgd)	Little Joe 081304-24 (Bkgd)	Workman 081304-26 (Bkgd)	Bkgd UCL_{95}	AZ NR SRLs	BLM RMC Camper	BLM RMC ATV Driver	BLM RMC Worker	PRG Short-tailed Shrew	BLM Mule Deer	BLM Robin
SPLP (mg/L)							Mean Bkgd	RCRA TCLP Limits						
Antimony	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.0001	--						
Arsenic	<0.0005	<0.0005	<0.0005	<0.0005	0.0008B	0.0028B	0.0013	5.0						
Barium	<0.003	<0.003	<0.003	0.004	<0.003	<0.003	0.0023	100.0						
Beryllium	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	--						
Cadmium	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	1.0						
Chromium	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.0050	5.0						
Copper	<0.01	<0.01	<0.01	0.03	0.04B	0.04B	0.0367	--						
Iron	0.16	<0.01	0.22	0.37	0.21	0.29	0.2900	--						
Lead	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	0.0200	5.0						
Manganese	<0.005	0.097	<0.005	0.013	<0.005	<0.005	0.0060	--						
Mercury	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.0001	0.2						
Molybdenum	<0.01	<0.01	<0.01	<0.01	0.01B	<0.01	0.0067	--						
Nickel	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.0050	--						
Selenium	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0005	1.0						
Silver	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.0025	5.0						
Uranium	0.00013	0.00006B	<0.00005	0.11315	0.00148	0.00006B	0.0382	--						
Vanadium	<0.005	<0.005	<0.005	<0.005	<0.005	0.009B	0.0047	--						
Zinc	<0.01	<0.01	<0.01	0.02	<0.01	<0.01	0.01	--						
SPLP (pCi/L)														
Gross Alpha	0.46±1.7	3.03±2	0±1.6	12.5±3.1	3.22±2.3	8.14±2.7	7.95	--	--	--	--	--	--	--
Gross Beta	5.13±3	4.7±2.9	2.25±2.9	10.9±3.4	6.22±3.6	20.5±3.9	12.54	--	--	--	--	--	--	--
Radium 226	0.13±1.5	0±2	0±1.4	1.88±2.2	1.08±1.6	0±1	0.99	--	--	--	--	--	--	--
Radium 228	15.4±7.7	11.2±7.1	2.22±7.2	13.4±7.6	16.3±7.2	10.4±6.9	13.37	--	--	--	--	--	--	--
Thorium 228	0.32±0.26	1.14±0.37	0.68±1	0.2±0.24	0.45±0.28	0.48±0.3	0.38	--	--	--	--	--	--	--
Thorium 230	1.43±0.47	0.57±0.39	-2.67±2.8	0.38±0.31	2.32±0.57	0.44±0.32	1.05	--	--	--	--	--	--	--
Thorium 232	2±0.51	0.33±0.33	0.45±2.9	0.5±0.3	0.27±0.32	0.4±0.29	0.39	--	--	--	--	--	--	--

Table C7

Little Joe and Workman Mine Groups Waste Rock Sample Results[1]

Analyte	Waste Rock Sample IDs (August 2004)							Action Levels						
	Little Joe 081304-19	Workman 081304-27	Workman 081304-28	Little Joe 081304-21 (Bkgd)	Little Joe 081304-24 (Bkgd)	Workman 081304-26 (Bkgd)	Bkgd UCL_{95}	AZ NR SRLs	BLM RMC Camper	BLM RMC ATV Driver	BLM RMC Worker	PRG Short-tailed Shrew	BLM Mule Deer	BLM Robin
Acid Generation Potential (calc t CaCo3/Kt)	0	12	1	1	2	1	1.33	--	--	--	--	--	--	--
Acid Neutralization Potential (t CaCo3/Kt)	9	0	13	6	9	11	8.67	--	--	--	--	--	--	--
Acid-Base Potential (calc t $CaCo_3$/Kt)	9	-12	12	5	7	10	7.33	--	--	--	--	--	--	--
Neutralization Potential (%Ca)	0.9	<0.1	1.3	0.6	0.9	1.1	0.87	--	--	--	--	--	--	--
pH, Saturated Paste (units)	5.4	3.9	6.5	5.5	6.2	6.9	6.20	--	--	--	--	--	--	--
Sulfur Organic (%)	0.02	0.28	0.03B	0.04	0.07B	0.03	0.04	--	--	--	--	--	--	--
Sulfur Pyritic (HNO3 extractable - %)	<0.01	0.04B	<0.01	<0.01	<0.01	<0.01	0.005	--	--	--	--	--	--	--
Sulfur Sulfate (HCl extractable %)	<0.01	0.08B	<0.01	0.01	0.01B	<0.01	0.01	--	--	--	--	--	--	--
Sulfur Total (%)	<0.01	0.4	0.02B	0.03	0.06B	0.03	0.04	--	--	--	--	--	--	--

[1] Source: SAIC, 2005. *Workman Creek Watershed Final Combined Preliminary Assessment/Site Inspection Report* . January 15, 2005. (Samples collected August 2004.)

[2] Natural uranium concentrations were calculated based on mass uranium results (1 pCi/g = 1.5 mg/kg).

Bkgd UCL_{95} = Background 95% Upper Confidence Limit

Bold = Background (Bkgd) exceeds one or more action level

U = Analyte analyzed for but not detected at the Method Detection Limit (MDL)

B = Analyte concentration detected at a value between MDL and Practical Quantitation Limit (PQL)

H = Analysis exceeded the maximum holding time

"--" = None established

AZ NR SRL = Arizona Non-Residential Soil Remediation Level

Bkgd UCL_{95} = background 95% Upper Confidence Limit

BLM RMC = Bureau of Land Management Risk Management Criteria

EPA TCLP = US Environmental Protection Agency Toxicity Leaching Characteristic

Human Health Criteria Exceeded

Ecological Criteria Exceeded

Table C8
Little Joe and Workman Mine Groups Soil Sample Results[1]

Analyte	Soil Sample IDs (August 2004)															Action Levels						
	Little Joe 081004-01	Little Joe 081004-02	Little Joe 081004-04	Little Joe 081304-22	Workman 081304-25	Workman 081304-29	Workman 081304-32	Workman 081304-33	Little Joe 081004-03 (Bkgd)	Little Joe 081004-05 (Bkgd)	Little Joe 081304-20 (Bkgrd)	Little Joe 081304-23 (Bkgrd)	Workman 081304-30 (Bkgd)	Workman 081304-31 (Bkgd)	Bkgd UCL_{95}	AZ NR SRLs	BLM RMC Camper	BLM RMC ATV Driver	BLM RMC Worker	PRG Short-tailed Shrew	BLM Mule Deer	BLM Robin
Field Parameters																						
Gamma Scintillator (microR/hr)	150	100	600	300	200	120	105	60	400	30	150	110	42	42	129.0	--	--	--	--	--	--	--
Metals (mg/kg)																						
Antimony	0.1B	0.2B	0.2B	0.1B	0.1B	<0.1	0.3B	0.7	0.2B	0.1B	0.1B	0.2B	0.4B	0.4B	0.3	410	50	750	100	--	--	
Arsenic	11.8	32	27.5	16	11.1	4.8	9.3	10.4	18.4	20.3	11.3	17.1	14.2	15.5	**24.2**	10	20	300	12	9.9	200	4
Barium	52.6	29.8	71	34.6	104	57.9	61.5	42.1	59.5	115	131	70	78	83	156.1	170,000	--	--	--	329	--	--
Beryllium	1	3.75	1.06	2.24	2.16	0.89	1.55	1.88	1.69	2.54	1.86	2.67	1.78	2.04	2.6	1,900	--	--	--	--	--	--
Cadmium	0.31	0.88	0.2B	0.44	0.45	0.14B	0.58	0.71	0.44	0.33	0.2B	0.71	0.87	0.93	**1.3**	510	70	950	100	6	3	0.3
Chromium	21	5	60	48	59	31	29	29	40B	50B	28	57	40B	40B	**53**	65	--	--	--	10	--	--
Copper	71	266	530	667	1,570	146	176	327	140	220	189	396	440	500	**704**	41,000	5,000	70,000	7,400	370	102	7
Iron	23,100	7,460	67,800	54,700	56,200	44,600	41,600	44,000	57,300	85,600	39,600	71,700	75,200	85,300	81,575	--	--	--	--	--	--	--
Lead	36	30	380	147	97	19B	180	285	110B	90B	57	180	230	240	**239**	800	1,000	1,000	2,000	740	106	6
Manganese	398	49.9	192	481	1070	372	640	716	928	728	945	1,080	1,260	1,270	2,795	32,000	19,000	250,000	28,000	--	--	--
Mercury	<0.05H	0.07BH	<0.04H	<0.05	<0.04	<0.04	<0.04	<0.05	0.08BH	0.05BH	0.06B	0.06B	0.05B	0.06B	0.1	310	40	550	60	0.146	9	1
Molybdenum	<1	7	50B	7	11	3B	5B	9	<10	<10	7	<5	10B	10B	**24.9**	5,100	--	--	--	4.75	--	--
Nickel	18	11	20B	61	77	41	32	42	40B	80	22	86	60	60	64.3	20,000	2,700	38,000	4,000	246	--	--
Selenium	<0.5	3	1.5B	0.7B	0.8B	<0.5	0.6B	0.7B	0.7B	0.8B	<0.5	0.9B	1B	1.2B	0.9	5,100	700	9,600	1,000	--	--	--
Silver	<0.5	<0.5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<5	<0.5	<3	<5	<5	2.6	5,100	700	9,600	1,000	--	--	--
Uranium	4.31	2,500	354	132	102	19.3	53.6	59.7	18.2	9.55	52.7	14	13.7	16.7	**196**	200	--	--	--	92	--	--
Vanadium	55.1	10.4	106	112	117	154	66.7	62	103	169	76.3	149	99	106	**138**	1,000	--	--	--	55	--	--
Zinc	69	23	160	330	170	56	283	716	200	260	121	365	390	410	**485**	310,000	40,000	550,000	60,000	1,600	222	43

Radiological (pCi/g)															Radiological Action Levels				
															Bkgd UCL_{95}	UMTRCA (40 CFR 192)	EPA SSLs	DOE BCG (riparian animal)	DOE BCG (terrestrial animal)
Gross Alpha	17.4±2.7	2,450±45	1,100±24	180±10	229±13	31.3±4.6	111±9	114±9.8	56.9±6.1	22.8±5.5	88.2±7.5	41.4±5.4	48.8±6.5	54.6±6.8	292.1	--	--	--	--
Gross Beta	11.3±1.2	1,750±19	673±9.8	116±4.4	112±4.9	20.8±2.3	49.3±3.5	74.2±4.3	49.7±3.1	12.4±2.9	53.2±3.2	24.8±2.4	28.7±2.9	31.7±3	160.7	--	--	--	--
Radium 226	4.48±0.7	216±4	375±6	22±1.4	32.6±1.6	5.55±0.7	23±1.5	25.8±1.6	17.7±1.4	4.32±0.7	16.1±1.4	3.42±0.6	16.9±1.2	22.4±1.6	**62.4**	5[2]	67.4	110	54
Radium 228	1.62±1.4	3.9±1.5	3.26±1.6	27.6±1.4	5.08±1.6	4.43±1.5	2.27±1.4	4.72±1.4	3.06±1.5	2.13±1.5	2.89±1.4	4.35±1.4	4.37±1.5	5.45±1.5	4.8		--	81	54
Thorium 228	0.58±0.28	0.56±0.3	1.04±0.36	1.02±0.34	0.96±0.3	0.5±0.28	1±0.32	2.15±0.42	0.83±0.34	0.96±0.34	1.09±0.31	1.02±0.35	1.96±0.43	1.86±0.42	1.5	--	--	--	--
Thorium 230	3.35±0.72	424±6.5	243±4.9	31.7±1.9	26.7±2.1	2.5±0.63	19.6±1.6	28.1±1.9	5.78±0.76	3.58±0.74	11.1±1.4	6.05±0.85	4.15±0.75	5.84±0.87	57.9	--	--	--	--
Thorium 232	0.58±0.42	0.94±0.41	0.9±0.41	0.51±0.4	0.78±0.57	0.47±0.39	0.78±0.47	1.39±0.55	0.85±0.37	0.8±0.45	0.6±0.54	0.65±0.39	0.96±0.45	1.63±0.52	1.1	--	4.1	1,400	1,600
Natural Uranium[3]	2.87	1,667	236	88	68	12.9	35.7	39.8	12.1	6.37	35.1	9	9.1	11.1	131	--	298	--	1,600

[1] Source: SAIC, 2005. *Workman Creek Watershed Final Combined Preliminary Assessment/Site Inspection Report* . January 15, 2005. (Samples collected August 2004.)

[2] Uranium Mill Tailings Radiation Control Act (UMTRCA) soil standard is a combined concentration of radium-226 and radium-228 and is calculated over background.

[3] Natural uranium concentrations were calculated based on mass uranium results (1 pCi/g = 1.5 mg/kg).

Bkgd UCL_{95} = Background 95% Upper Confidence Limit

Bold = Background (bkgd) exceeds one or more action level

U = Analyte analyzed for but not detected at the Method Detection Limit (MDL)

B = Analyte concentration detected at a value between MDL and Practical Quantitation Limit (PQL)

H = Analysis exceeded the maximum holding time

AZ NR SRL = Arizona Non-Residential Soil Remediation Level

BLM RMC = Bureau of Land Management Risk Management Criteria

"--" = None established

Human Health Criteria Exceeded

Ecological Criteria Exceeded

Table C9
Hope Mine Group Waste Rock Sample Results

Analyte	le IDs (2008 Samples)											Action Levels						
	Hope Mine HMWR-1	Hope Mine HMWR-2	Hope Mine HMWR-3	Hope Mine HMWR-4	Hope Mine HMWR-5-ADT1	Hope Mine HMWR-6-STR-OP	Hope Mine HMWR-7	Hope Mine HMWR-8	Hope Mine Hot Spot HMHS-WR-1	Hope Mine Hot Spot HMHS-WR-2	Bkgd UCL_{95}	AZ NR SRLs	BLM RMC Camper	BLM RMC ATV Driver	BLM RMC Worker	Short-tailed Shrew	BLM Mule Deer	BLM Robin
Metals (mg/kg)																		
Antimony	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.3	410	50	750	100	--	--	--
Arsenic	18.5	13.9	22.9	6.4	40.1	2.3	7.1	16.1	1.7	9.2	**24.2**	10	20	300	12	9.9	200	4
Barium	43.8	43.3	75.3	25.3	59.1	28.5	25.5	23.2	67.4	55.4	156.1	170,000	--	--	--	329	--	--
Beryllium	1.6	1.1	0.6	0.7	2.9	<0.5	0.6	<0.5	<0.5	0.6	2.6	1,900	--	--	--	--	--	--
Cadmium	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**1.3**	510	70	950	100	6	3	0.3
Chromium	47.7	27.1	36.3	32.2	53.7	24.9	25.2	23.1	24.8	22.6	**53**	1,000,000	--	--	--	10	--	--
Copper	229	99	115	66.3	134	45.2	146	239	40.1	211	**704**	41,000	5,000	70,000	7,400	370	102	7
Iron	59,800	26,100	36,300	29,700	102,000	9,090	21,200	21,900	42,200	48,200	81,575	--	--	--	--	--	--	--
Lead	77.6	25.1	543	21.8	11.6	4	79.5	307	8.4	138	**239**	800	1,000	1,000	2,000	740	106	6
Manganese	282	283	288	130	700	165	166	91.2	502	422	2,795	32,000	19,000	250,000	28,000	--	--	--
Mercury	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.1	310	40	550	60	0.146	9	1
Molybdenum	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**24.9**	5,100	--	--	--	4.75	--	--
Nickel	40.2	30.5	8	6.9	65	17.3	14.2	22.2	76.1	70.9	64.3	20,000	2,700	38,000	4,000	246	--	--
Selenium	0.7	0.5	1.3	<0.5	0.7	<0.5	<0.5	0.6	<0.5	<0.5	0.9	5,100	700	9,600	1,000	--	--	--
Silver	0.6	<0.5	0.7	<0.5	<0.5	<0.5	<0.5	0.7	<0.5	<0.5	2.6	5,100	700	9,600	1,000	--	--	--
Uranium	191	92.8	407	81.9	7.6	16.6	47.7	553	4.9	326	**196**	200	--	--	--	92	--	--
Vanadium	87.5	45.6	63	42.6	168	41.3	35.9	40	66.4	74.1	**138**	1,000	--	--	--	55	--	--
Zinc	17.1	14.5	61.1	1.4	20.2	0.8	49.5	20.6	41.9	36.7	**485**	310,000	40,000	550,000	60,000	1,600	222	43

Radiological (pCi/g)											Bkgd UCL_{95}	Radiological Action Levels			
												UMTRCA (40 CFR 192)	EPA SSLs	DOE BCG (riparian animal)	DOE BCG (terrestrial animal)
Gross Gamma	538±23.2	349±19.7	619±24.4	289±16.9	92.4±6.1	139±12.2	221±15.4	4690±39.4	38.7±3.6	510±19.8	--	--	--	--	--
Actinium 228	NA	NA	NA	NA	2.1±0.6	1.7±0.7	NA	NA	0.8±0.3	NA	--	--	--	--	--
Bismuth 214	171±2.2	88.0±1.7	234±2.3	69.4±1.4	5.2±0.4	8.9±0.6	47.5±1.2	661±4.2	3.4±0.3	179±2.2	--	--	--	--	--
Lead 212	NA	NA	NA	NA	1.2±0.2	1.1±0.2	NA	NA	0.5±0.1	NA	--	--	--	--	--
Lead 214	179±1.7	91.7±1.3	243±1.8	72.8±1.1	5.3±0.3	8.9±0.5	50.2±1.0	687±3.3	3.6±0.2	186±1.6	--	--	--	--	--
Potassium 40	113±7.5	111±6.7	61.8±7.7	107±6.4	78.6±4.6	108±6.1	90.8±6.2	105±11.2	30.4±2.7	51.7±6.0	--	--	--	--	--
Radium 226	171±2.2	88.0±1.7	234±2.3	69.4±1.4	5.2±0.4	8.9±0.6	47.5±1.2	661±4.2	3.4±0.3	179±2.2	**62.4**	5 [1]	67.4	110	54
Radium 228	NA	NA	NA	NA	2.1±0.6	1.7±0.7	NA	NA	0.8±0.3	NA	4.8		--	81	54
Thorium 228	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.5	--	--	--	--
Thorium 230	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	57.9	--	--	--	--
Thorium 232	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.1	--	4.1	1,400	1,600
Thorium 234	75.4±11.8	58.0±10.0	80.4±12.6	39.7±8.0	NA	10.2±4.1	32.3±7.0	238±20.7	NA	94.3±10.0	--	--	--	--	--
Natural Uranium[2]	127	61.9	271	54.6	5.1	11.1	31.8	369	3.3	217	131	--	298	--	1,600

Table C9
Hope Mine Group Waste Rock Sample Results

Analyte	le IDs (2008 Samples)											Action Levels						
	Hope Mine HMWR-1	Hope Mine HMWR-2	Hope Mine HMWR-3	Hope Mine HMWR-4	Hope Mine HMWR-5-ADT1	Hope Mine HMWR-6-STR-OP	Hope Mine HMWR-7	Hope Mine HMWR-8	Hope Mine Hot Spot HMHS-WR-1	Hope Mine Hot Spot HMHS-WR-2	Bkgd UCL_{95}	AZ NR SRLs	BLM RMC Camper	BLM RMC ATV Driver	BLM RMC Worker	Short-tailed Shrew	BLM Mule Deer	BLM Robin
TCLP Metals (mg/L)											**RCRA TCLP Limits (mg/L)**							
Antimony	<0.5	<0.5	NA	NA	<0.5	NA	NA	<0.5	NA	<0.5	--							
Arsenic	<0.5	<0.5	NA	NA	<0.5	NA	NA	<0.5	NA	<0.5	5.0							
Barium	<0.5	<0.5	NA	NA	<0.5	NA	NA	<0.5	NA	<0.5	100							
Beryllium	<0.5	<0.5	NA	NA	<0.5	NA	NA	<0.5	NA	<0.5	--							
Cadmium	<0.5	<0.5	NA	NA	<0.5	NA	NA	<0.5	NA	<0.5	1.0							
Chromium	<0.5	<0.5	NA	NA	<0.5	NA	NA	<0.5	NA	<0.5	5.0							
Copper	<0.5	<0.5	NA	NA	<0.5	NA	NA	<0.5	NA	<0.5	--							
Iron	1,290	649	NA	NA	1,990	NA	NA	598	NA	1,190	--							
Lead	<0.5	<0.5	NA	NA	<0.5	NA	NA	<0.5	NA	<0.5	5.0							
Manganese	7.1	7.5	NA	NA	15.8	NA	NA	2.7	NA	0.9	--							
Mercury	<0.02	<0.02	NA	NA	<0.02	NA	NA	NA	NA	<0.02	0.2							
Molybdenum	<0.5	<0.5	NA	NA	<0.5	NA	NA	NA	NA	<0.5	--							
Nickel	<0.5	<0.5	NA	NA	<0.5	NA	NA	<0.5	NA	<0.5	--							
Selenium	<0.5	<0.5	NA	NA	<0.5	NA	NA	<0.5	NA	<0.5	1.0							
Silver	<0.5	<0.5	NA	NA	<0.5	NA	NA	<0.5	NA	<0.5	5.0							
Uranium	<0.5	1.4	NA	NA	<0.5	NA	NA	4.5	NA	3.3	--							
Vanadium	<0.5	<0.5	NA	NA	<0.5	NA	NA	<0.5	NA	<0.5	--							
Zinc	<0.5	<0.5	NA	NA	<0.5	NA	NA	<0.5	NA	<0.5	--							

[1] UMTRCA soil standard is a combined concentration of radium-226 and radium-228 and is calculated over background.

[2] Natural uranium concentrations were calculated based on mass uranium results (1 pCi/g = 1.5 mg/kg).

Bold = Background (Bkgd) exceeds one or more action level.

Bkgd UCL_{95} = Background 95% Upper Confidence Limit

U = Analyte analyzed for but not detected at the Method Detection Limit (MDL)

B = Analyte concentration detected at a value between MDL and Practical Quantitation Limit (PQL)

H = Analysis exceeded the maximum holding time

"--" = None established

AZ NR SRL = Arizona Non-Residential Soil Remediation Level

BLM RMC = Bureau of Land Management Risk Management Criteria

EPA SSL = U.S. Environmental Protection Agency Soil Screening Level

DOE BCG = U.S. Department of Energy Biota Concentration Guide

Human Health Criteria Exceeded

Ecological Screening Criteria Exceeded

Table C10
Hope Mine Group Soil Sample Results[1]

Analyte	Soil Sample IDs																	Bkgd UCL_{95}	Action Levels						
	PA/SI Samples[1]								April 2008 Samples																
	Hope Group 081304-37	Hope Group 081404-59	Hope Group 081404-60	Hope Group 081404-62	Hope Group 081304-34 (Bkgd)	Hope Group 081304-35 (Bkgd)	Hope Group 081304-36 (Bkgd)	Hope Group 081404-58 (Bkgd)	Hope Mine Hot Spot HMHS-1-02	Hope Mine Hot Spot HMHS-1-04	Hope Mine Hot Spot HMHS-1-05	Hope Mine Hot Spot HMHS-2-02	Hope Mine Hot Spot HMHS-2-04	Hope Mine Hot Spot HMHS-2-06	Hope Mine Hot Spot HMHS-3-02	Hope Mine Hot Spot HMHS-3-04	Hope Mine Hot Spot HMHS-3-06		AZ NR SRLs	BLM RMC Camper	BLM RMC ATV Driver	BLM RMC Worker	Short-tailed Shrew	BLM Mule Deer	BLM Robin
Gamma Scintillator (microR/hr)	1000	90	66	65	115	30	30	34	NA	NA	NA	NA	NA	NA	NA	NA	NA	--	--	--	--	--		--	--
Metals (mg/kg)																									
Antimony	<0.1	0.4B	<0.1	0.2B	0.1B	0.1B	0.1B	0.2B	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.3	410	50	750	100	--	--	--
Arsenic	6B	26.7	12.1	72.8	28.2	19	17.6	17.7	4.3	4.5	2.3	14.2	4.3	4.4	10.7	3.5	3.4	**24.2**	10	20	300	12	9.9	200	4
Barium	59.3	51.6	10.8	75	94.4	94	93	94.5	93.9	106	53.5	72.4	90	68.2	62.6	81.7	71.4	156.1	170,000	--	--	--	329	--	--
Beryllium	0.47	1.99	0.46	1.54	2.06	2.15	2.27	1.64	0.7	0.8	0.7	0.6	0.6	0.6	0.8	0.7	0.7	2.6	1,900	--	--	--	--	--	--
Cadmium	0.88	1.4	1.12	2.84	0.23B	0.15B	0.12B	0.7	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**1.3**	510	70	950	100	6	3	0.3
Chromium	17	38	25	80	43	46	40B	43	31.7	28.8	9.8	27	21	34.6	26	17.7	22.4	**53**	1,000,000	--	--	--	10	--	--
Copper	90	126	80	250	169	143	150	75	69.8	36.2	66.3	112	28.3	23.8	92.8	28.3	27.8	**704**	41,000	5,000	70,000	7,400	370	102	7
Iron	46,700	46,000	17,500	112,000	56,800	71,100	74,700	43,900	45,100	41,200	35,900	36,300	31,700	24,300	33,500	34,100	34,600	81,575	--	--	--	--	--	--	--
Lead	66	101	65	120B	28	20B	<40	15B	22.4	14.3	27.3	110	11.8	11.8	34	10.3	12.5	**239**	800	1,000	1,000	2,000	740	106	6
Manganese	591	458	167	256	1060	1050	1020	501	396	499	405	218	334	211	271	445	424	2,795	32,000	19,000	250,000	28,000	--	--	--
Mercury	<0.04	0.06B	0.34	0.06B	<0.05	0.05B	<0.05	0.07B	<0.05	<0.05	<0.05	0.06	<0.05	<0.05	<0.05	<0.05	<0.05	0.1	310	40	550	60	0.146	9	1
Molybdenum	11	5	5B	20B	5B	5B	<10	2B	NA	NA	NA	NA	NA	NA	NA	NA	NA	**24.9**	5,100	--	--	--	4.75	--	--
Nickel	100	40	14	50	72	45	50	32	66.9	56.7	17.5	40.5	48.8	<0.5	46.4	39.2	40.9	64.3	20,000	2,700	38,000	4,000	246	--	--
Selenium	<0.5	0.5B	<0.5	1B	<1	0.8B	0.8B	<0.5	<0.5	<0.5	0.5	0.7	<0.5	<0.5	0.6	<0.5	<0.5	0.9	5,100	700	9,600	1,000	--	--	--
Silver	<0.5	<0.5	<0.5	<5	<0.5	<3	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	2.6	5,100	700	9,600	1,000	--	--	--
Uranium	167	53.5	33.7	641	91.2	2.93	3.23	2.57	89	2.6	153	407	1.1	22.8	275	0.6	8.1	**196**	200	--	--	--	92	--	--
Vanadium	55.9	86.9	42.9	149	101	118	119	90	68.7	74	161	58.5	46.7	50.1	69.4	59.8	72.7	**138**	1,000	--	--	--	55	--	--
Zinc	54	111	40	40B	49	40	50B	33	43.4	41.2	14.2	32.3	35.6	23.5	31	30.6	27.9	**485**	310,000	40,000	550,000	60,000	1,600	222	43
Radiological (pCi/g)																		Bkgd UCL_{95}	Radiological Action Levels			
																			UMTRCA (40 CFR 192)	EPA SSLs	DOE BCG (riparian animal)	DOE BCG (terrestrial animal)
Gross Alpha	322±13	56.8±4.4	45.4±2.5	1700±31	137±10	18.9±4.5	27.2±5.5	9.55±1.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	292.1	--	--	--	--
Gross Beta	255±7	54.5±2.5	32.3±1.3	1160±15	94.6±4.7	14.3±2.3	15.9±2.8	10.5±1	NA	NA	NA	NA	NA	NA	NA	NA	NA	160.7	--	--	--	--
Gross Gamma	NA	NA	NA	NA	NA	NA	NA	NA	261±21.9	5.4±1.7	290±17.1	258±15.6	59.4±4.3	96.5±8.1	137±10.9	52.1±4.0	60.4±6.8	NA	--	--	--	--
Actinium 228	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	1.1±0.4	1.2±0.4	ND	0.8±0.3	1.4±0.6	NA	--	--	--	--
Bismuth 214	NA	NA	NA	NA	NA	NA	NA	NA	111±2.2	1.8±0.2	92.7±1.6	59.5±1.2	1.6±0.2	8.8±0.5	30.4±0.9	0.7±0.2	7.6±0.5	NA	--	--	--	--
Lead 212	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	0.6±0.1	0.6±0.1	ND	0.7±0.1	0.7±0.1	NA	--	--	--	--
Lead 214	NA	NA	NA	NA	NA	NA	NA	NA	1.2±0.2	1.8±0.2	99.4±1.2	63.3±1.0	1.3±0.2	8.6±0.4	31.9±0.7	0.8±0.1	7.7±0.4	NA	--	--	--	--
Potassium 40	NA	NA	NA	NA	NA	NA	NA	NA	69.3±8.7	ND	49.0±6.5	74.8±5.4	54.8±3.4	71.6±4.1	52.7±4.1	49.1±3.3	38.6±2.9	NA	--	--	--	--
Radium 226	107±3.2	16.3±1.4	12.9±1.1	616±9.3	14.9±1.2	8.62±0.9	10.2±1	3.02±0.8	111±2.2	1.8±0.2	92.7±1.6	59.5±1.2	1.6±0.2	8.8±0.5	30.4±0.9	0.7±0.2	7.6±0.5	**62.4**	5[2]	67.4	110	54
Radium 228	5.3±1.6	4.34±1.4	4.38±1.5	2.89±1.4	3.9±1.4	3.43±1.5	4.25±1.4	1.26±1.3	ND	ND	ND	ND	1.1±0.4	1.2±0.4	ND	0.8±0.3	1.4±0.6	4.8		--	81	54
Thorium 228	0.28±0.25	1.1±0.34	1.59±0.38	1.67±0.42	0.89±0.32	1.73±0.38	1.14±0.35	1.32±0.35	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.5	--	--	--	--
Thorium 230	136±3.7	9.9±1.2	15.4±1.4	288±5.5	37.6±2	2.2±0.68	1.24±0.51	0.46±0.49	ND	ND	ND	ND	ND	ND	ND	ND	ND	57.9	--	--	--	--
Thorium 232	0.62±0.38	0.58±0.44	1.17±0.5	1.01±0.44	0.69±0.41	0.97±0.51	0.69±0.42	0.51±0.46	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.1	--	4.1	1,400	1,600
Thorium 234	NA	NA	NA	NA	NA	NA	NA	NA	79.4±10.8	1.8±1.3	290±17.1	60.6±8.0	ND	5.7±2.6	22.5±5.2	ND	4.4±2.3	NA	--	--	--	--
Natural Uranium[3]	111	35.7	22.5	427	60.8	1.95	2.15	1.71	59	1.7	102	271	0.7	15.2	183	0.4	5.4	131	--	298	--	1,600

[1] PA/SI Sample Results Source: SAIC, 2005. *Workman Creek Watershed Final Combined Preliminary Assessment/Site Inspection Report* . January 15, 2005. (Samples collected August 2004.)

[2] UMTRCA soil standard is a combined concentration of radium-226 and radium-228 and is calculated over background.

[3] Natural uranium concentrations were calculated based on mass uranium results (1 pCi/g = 1.5 mg/kg).

Bkgd UCL_{95} = Background 95% Upper Confidence Limit

Bold = background (bkgd) exceeds one or more action level

AZ NR SRL = Arizona Non-Residential Soil Remediation Level

BLM RMC = Bureau of Land Management Risk Management Criteria

EPA SSL = U.S. Environmental Protection Agency Soil Screening Level

DOE BCG = U.S. Department of Energy Biota Concentration Guide

U = Analyte analyzed for but not detected at the Method Detection Limit (MDL)

B = Analyte concentration detected at a value between MDL and Practical Quantitation Limit (PQL)

H = Analysis exceeded the maximum holding time

"--" = None established

Human Health Criteria Exceeded

Ecological Screening Criteria Exceeded

Table C11

Lucky Stop Mine Group Waste Rock Sample Results[1]

Analyte	Waste Rock Sample IDs (2004 Samples)				Action Levels						
	Lucky Stop 081404-46	Lucky Stop 081404-47	Lucky Stop 081404-38 (Bkgd)	Bkgd UCL_{95}	AZ NR SRLs	BLM RMC Camper	BLM RMC ATV Driver	BLM RMC Worker	PRG Short-tailed Shrew	BLM Mule Deer	BLM Robin
Field Parameters											
Gamma Scintillator (microR/hr)	55	NA	290	--	--	--	--	--	--	--	--
Metals (mg/kg)											
Antimony	0.2B	0.4B	0.5B	0.3	410	50	750	100	--	--	--
Arsenic	8.6	7	**30**	**24.2**	10	20	300	12	9.9	200	4
Barium	74.5	82	61.5	156.1	170,000	--	--	--	329	--	--
Beryllium	1.4	1.19	1.1B	2.6	1,900	--	--	--	--	--	--
Cadmium	0.39	1.96	0.13B	**1.3**	510	70	950	100	6	3	0.3
Chromium	31	28	49	**53**	1,000,000	--	--	--	10	--	--
Copper	355	318	**475**	**704**	41,000	5,000	70,000	7,400	370	102	7
Iron	37,900	35,100	38,300	81,575	--	--	--	--	--	--	--
Lead	132	119	**180**	**239**	800	1,000	1,000	2,000	740	106	6
Manganese	1,070	768	60.3	2,795	32,000	19,000	250,000	28,000	--	--	--
Mercury	<0.04	<0.05	<0.04	0.1	310	40	550	60	0.146	9	1
Molybdenum	17	20	**12**	**24.9**	5,100	--	--	--	4.75	--	--
Nickel	29	22	17	64.3	20,000	2,700	38,000	4,000	246	--	--
Selenium	0.6B	<0.5	0.7B	0.9	5,100	700	9,600	1,000	--	--	--
Silver	1.9B	<0.5	1.5B	2.6	5,100	700	9,600	1,000	--	--	--
Uranium	167	175	**310**	196	200	--	--	--	92	--	--
Vanadium	63	57.7	**79.2**	138	1,000	--	--	--	55	--	--
Zinc	230	200	21	**485**	310,000	40,000	550,000	60,000	1,600	222	43

Radiological (pCi/g)				Bkgd UCL_{95}	Radiological Action Levels			
					UMTRCA (40 CFR 192)	EPA SSLs	DOE BCG (riparian animal)	DOE BCG (terrestrial animal)
Gross Alpha	224±9.3	168±6.3	420±11	292.1	--	--	--	--
Gross Beta	158±4	146±3.3	195±4	160.7	--	--	--	--
Radium 226	59.6±2.5	59.2±2.3	136±3.2	**62.4**	5 [2]	67.4	110	54
Radium 228	3.48±1.7	4.87±1.6	4.42±1.7	4.8		--	81	54
Thorium 228	0.93±0.33	0.8±0.32	1.95±0.42	1.5	--	--	--	--
Thorium 230	45.9±2.2	54.4±2.4	99.4±3.4	57.9	--	--	--	--
Thorium 232	1.17±0.46	0.85±0.42	1.27±0.49	1.1	--	4.1	1,400	1,600
Natural Uranium[2]	111	117	207	131	--	298	--	1,600

Table C11

Lucky Stop Mine Group Waste Rock Sample Results[1]

Analyte	Waste Rock Sample IDs (2004 Samples)				Action Levels						
	Lucky Stop 081404-46	Lucky Stop 081404-47	Lucky Stop 081404-38 (Bkgd)	Bkgd UCL_{95}	AZ NR SRLs	BLM RMC Camper	BLM RMC ATV Driver	BLM RMC Worker	PRG Short-tailed Shrew	BLM Mule Deer	BLM Robin
SPLP (mg/L)				**RCRA TCLP Limits (mg/L)**							
Antimony	<0.0002	<0.0002	0.0002B	--							
Arsenic	<0.0005	<0.0005	<0.0005	5.0							
Barium	<0.003	<0.003	0.004B	100							
Beryllium	<0.0001	<0.0001	<0.0001	--							
Cadmium	<0.0001	<0.0001	<0.00001	1.0							
Chromium	<0.01	<0.01	<0.01	5.0							
Copper	<0.01	<0.01	<0.01	--							
Iron	0.43	0.19	0.43	--							
Lead	<0.04	<0.04	<0.04	5.0							
Manganese	0.008B	<0.005	<0.005	--							
Mercury	<0.0002	<0.0002	<0.0002	0.2							
Molybdenum	<0.01	<0.01	<0.01	--							
Nickel	<0.01	<0.01	<0.01	--							
Selenium	<0.001	<0.001	<0.001	1.0							
Silver	<0.005	<0.005	<0.005	5.0							
Uranium	0.00268	0.00175	0.00377	--							
Vanadium	<0.005	<0.005	<0.005	--							
Zinc	<0.01	<0.01	<0.01	--							
SPLP (pCi/L)											
Gross Alpha	5.15±2.4	0.12±1.8	10.4±2.9	--	--	--	--	--	--	--	--
Gross Beta	9.98±3.4	3.88±3.2	11.4±3.4	--	--	--	--	--	--	--	--
Radium 226	0.93±1.3	1.35±1.4	5.16±2.5	--	--	--	--	--	--	--	--
Radium 228	11.5±6.9	8.05±6.7	3.72±6.7	--	--	--	--	--	--	--	--
Thorium 228	-0.39±0.89	0±0.99	-0.58±0.87	--	--	--	--	--	--	--	--
Thorium 230	-0.48±1.3	-1.06±1.5	-1.25±1.4	--	--	--	--	--	--	--	--
Thorium 232	-0.2±1.2	-0.36±1.4	-0.35±1.4	--	--	--	--	--	--	--	--

Table C11

Lucky Stop Mine Group Waste Rock Sample Results[1]

Analyte	Waste Rock Sample IDs (2004 Samples)				Action Levels						
	Lucky Stop 081404-46	Lucky Stop 081404-47	Lucky Stop 081404-38 (Bkgd)	Bkgd UCL_{95}	AZ NR SRLs	BLM RMC Camper	BLM RMC ATV Driver	BLM RMC Worker	PRG Short-tailed Shrew	BLM Mule Deer	BLM Robin
Acid Generation Potential (calc t CaCo3/Kt)	6	4	1	--	--	--	--	--	--	--	--
Acid Neutralization Potential (t CaCo3/Kt)	5	12	0	--	--	--	--	--	--	--	--
Acid-Base Potential (calc t $CaCo_3$/Kt)	-1	8	-1	--	--	--	--	--	--	--	--
Neutralization Potential (%Ca)	0.5B	1.2	<0.1	--	--	--	--	--	--	--	--
pH, Saturated Paste (units)	5.2	5.7	5.7	--	--	--	--	--	--	--	--
Sulfur Organic (%)	0.16	0.1	0.03B	--	--	--	--	--	--	--	--
Sulfur Pyritic (HNO3 extractable - %)	0.01B	<0.01	<0.01	--	--	--	--	--	--	--	--
Sulfur Sulfate (HCl extractable %)	0.03B	0.02B	<0.01	--	--	--	--	--	--	--	--
Sulfur Total (%)	0.2	0.12	0.03B	--	--	--	--	--	--	--	--

[1] PA/SI Sample Results Source: SAIC, 2005. Workman Creek Watershed Final Combined Preliminary Assessment/Site Inspection Report. January 15, 2005.

[2] Natural uranium concentrations were calculated based on mass uranium results (1 pCi/g = 1.5 mg/kg).

Bkgd UCL_{95} = Background 95% Upper Confidence Limit

Bold = Background (Bkgd) exceeds one or more action level

U = Analyte analyzed for but not detected at the Method Detection Limit (MDL)

B = Analyte concentration detected at a value between MDL and Practical Quantitation Limit (PQL)

H = Analysis exceeded the maximum holding time

"--" = None established

AZ NR SRL = Arizona Non-Residential Soil Remediation Level

BLM RMC = Bureau of Land Management Risk Management Criteria

EPA TCLP = US Environmental Protection Agency Toxicity Leaching Characteristic

Human Health Criteria Exceeded

Ecological Screening Criteria Exceeded

Table C12
Lucky Stop and Lost Dog Mine Groups Soil Sample Results[1]

Analyte	Soil Sample IDs (August 2004)													Bkgd UCL_{95}	Action Levels						
	Lucky Stop 081404-40	Lucky Stop 081404-41	Lucky Stop 081404-43	Lost Dog 081404-50	Lost Dog 081404-51	Lost Dog 081404-52	Lost Dog 081404-53	Lost Dog 081404-54	Lost Dog 081404-56	Lucky Stop 081404-39 (Bkgd)	Lucky Stop 081404-42 (Bkgd)	Lucky Stop 081404-44 (Bkgd)	Lost Dog 081404-55 (Bkgd)		AZ NR SRLs	BLM RMC Camper	BLM RMC ATV Driver	BLM RMC Worker	DOE PRG Short-tailed Shrew	BLM Mule Deer	BLM Robin
Field Parameters																					
Gamma Scintillator (cpm/microR/hr)	180	200	80	140	150	80	70	380	180	360	40	32	60	123	--	--	--	--	--	--	--
Alpha Counting (cpm)	5	9	2	3	15	3	5	27	30	11	1	0	4	4	--	--	--	--	--	--	--
Beta + Gamma Counting (cpm)	151	196	120	121	192	119	105	380	380	227	80	74	102	121	--	--	--	--	--	--	--
Metals (mg/kg)																					
Antimony	0.1B	0.3B	0.2B	0.2B	0.2B	0.1B	0.2B	0.4B	0.9	0.4B	0.2B	<0.1	0.2B	0.3	410	50	750	100	--	--	--
Arsenic	8.3	33.4	15.4	15.6	24.1	17.5	20.3	60.3	109	37.6	3.9	9	15.2	**24.2**	10	20	300	12	9.9	200	4
Barium	37.7	152	123	52.1	42.5	35.5	47.9	46.6	77	29.7	342	97.2	89.1	156.1	170,000	--	--	--	329	--	--
Beryllium	0.9B	1.3	1.47	2.85	1.29	1.8	1.23	2.12	2.94	0.7B	1.89	0.56	0.84	2.6	1,900	--	--	--	--	--	--
Cadmium	0.18B	0.46	0.18B	0.8	1.34	0.78	1.34	2.77	5.78	0.22B	2.37	0.1B	1.18	**1.3**	510	70	950	100	6	3	0.3
Chromium	28	40B	37	40B	43	52	25	38	40B	29	70	19	24	**53**	1,000,000	--	--	--	10	--	--
Copper	128	830	288	680	386	135	187	724	890	333	190	27	67	**704**	41,000	5,000	70,000	7,400	370	102	7
Iron	31,100	68,300	44,600	57,600	59,500	69,900	35,400	70,100	88,000	37,900	107,000	20,900	25,100	81,575	--	--	--	--	--	--	--
Lead	69	160B	88	100B	84	15B	66	324	700	150	1,570	14B	48	**239**	800	1,000	1,000	2,000	740	106	6
Manganese	418	1420	537	1320	213	162	302	405	777	217	7,990	255	317	2,795	32,000	19,000	250,000	28,000	--	--	--
Mercury	<0.04	<0.05	<0.05	<0.04	<0.05	<0.05	<0.04	0.06B	0.09B	0.05B	0.11B	<0.04	<0.05	0.1	310	40	550	60	0.146	9	1
Molybdenum	10	70	5	<10	17	3B	6	21	20B	78	<10	<1	1B	**24.9**	5,100	--	--	--	4.75	--	--
Nickel	32	50B	35	50B	28	21	26	124	110	24	30B	14	20	64.3	20,000	2,700	38,000	4,000	246	--	--
Selenium	0.6B	1.2B	0.9B	0.9B	<0.5	<0.5	<0.5	1.1B	1B	0.6B	<0.5	<0.5	<0.5	0.9	5,100	700	9,600	1,000	--	--	--
Silver	1.3B	<5	2B	<5	<0.5	<0.5	<0.5	<0.5	<5	3	<5	1B	<0.5	2.6	5,100	700	9,600	1,000	--	--	--
Uranium	145	309	80.2	76.7	155	9.8	37.7	635	201	313	8.25	2.43	18.6	**196**	200	--	--	--	92	--	--
Vanadium	60.4	123	86	124	97.7	122	69.6	100	160	69.6	133	49	55.9	**138**	1,000	--	--	--	55	--	--
Zinc	69	140	60	220	20	26	68	100	450	56	930	37	80	**485**	310,000	40,000	550,000	60,000	1,600	222	43

Radiological (pCi/g)														Bkgd UCL_{95}	Radiological Action Levels			
															UMTRCA (40 CFR 192)	EPA SSLs	DOE BCG (riparian animal)	DOE BCG (terrestrial animal)
Gross Alpha	160±7.1	312±10	112±6	109±6.3	161±5.9	13.9±1.5	61.8±3.7	373±9.1	408±11	506±12	19.8±3.4	15.3±2.2	46.8±3.2	292.1	--	--	--	--
Gross Beta	104±3.1	252±4.8	64.4±2.4	56.3±2.4	129±3.1	9.59±0.8	42.5±1.8	366±5.2	310±5.3	276±4.7	16.4±2.3	8.95±1	32.8±1.7	160.7	--	--	--	--
Radium 226	39.5±1.7	126±3.2	53.1±2.3	42.6±2	70.6±2.6	5.27±0.7	25.6±1.7	5.37±0.8	157±3.6	76.5±2.4	4.93±0.7	5.78±0.8	16.8±1.5	**62.4**	5[2]	67.4	110	54
Radium 228	5.05±1.7	3.88±1.7	0.88±1.7	5.64±1.5	2.79±1.5	3.21±1.7	3.66±1.6	7.27±1.7	2.59±1.4	0.69±1.6	8.16±1.7	0.15±1.6	2.64±1.5	4.8		--	81	54
Thorium 228	0.88±0.35	2.05±0.48	1.31±0.38	2.84±0.51	1.21±0.37	0.93±0.33	1.72±0.37	1.54±0.39	2.39±0.42	1.43±0.4	0.87±0.32	0.44±0.27	1.03±0.34	1.5	--	--	--	--
Thorium 230	39.6±1.9	106±3	20.9±1.5	37.5±2	43.1±2.1	3.32±0.68	13.7±1.5	158±4.4	75.8±3.3	111±3.2	3.79±0.79	0.68±0.4	4.74±0.79	57.9	--	--	--	--
Thorium 232	0.42±0.32	1.08±0.39	1.17±0.45	1.5±0.5	1.11±0.45	0.71±0.41	1.11±0.56	0.84±0.46	1.24±0.57	1.11±0.42	1.18±0.52	0.5±0.35	0.55±0.39	1.1	--	4.1	1,400	1,600
Natural Uranium[3]	96.7	206	53.5	51.1	103	6.5	25.1	423	134	209	5.50	1.62	12.4	131	--	298	--	1,600

[1] PA/SI Sample Results Source: SAIC, 2005. *Workman Creek Watershed Final Combined Preliminary Assessment/Site Inspection Report* . January 15, 2005. (Samples collect August 2004.)

[2] UMTRCA soil standard is a combined concentration of radium-226 and radium-228 and is calculated over background.

[3] Natural uranium concentrations were calculated based on mass uranium results (1 pCi/g = 1.5 mg/kg).

Bkgd UCL_{95} = Background 95% Upper Confidence Limit

Bold = Background (Bkgd) exceeds one or more action level

U = Analyte analyzed for but not detected at the Method Detection Limit (MDL)

B = Analyte concentration detected at a value between MDL and Practical Quantitation Limit (PQL)

H = Analysis exceeded the maximum holding time

"--" = None established

AZ NR SRL = Arizona Non-Residential Soil Remediation Level

BLM RMC = Bureau of Land Management Risk Management Criteria

DOE = U.S. Department of Energy Preliminary Remediation Goal

EPA SSL = U.S. Environmental Protection Agency Soil Screening Level

DOE BCG = U.S. Department of Energy Biota Concentration Guide

Human Health Criteria Exceeded

Ecological Screening Criteria Exceeded

Table C13

Jon and "Unknown" Mine Groups Soil Sample Results[1]

Analyte	Soil Sample IDs (August 2004)				Bkgd UCL_{95}	Action Levels						
	Jon Mine 081504-71	Jon Mine 081504-76	Unknown Mine 081204-18	Jon Mine 081504-72 (Bkgrd)		AZ NR SRLs	BLM RMC Camper	BLM RMC ATV Driver	BLM RMC Worker	PRG Short-tailed Shrew	BLM Mule Deer	BLM Robin
Gamma Scintillator (microR/hr)	20	85	15	22	--	--	--	--	--	--	--	--
Metals (mg/kg)												
Antimony	<0.1	0.1B	<0.1	0.2B	0.3	410	50	750	100	--	--	--
Arsenic	2.8	13.2	14.1	2.7	**24.2**	10	20	300	12	9.9	200	4
Barium	36.5	34.7	80	47.8	156.1	170000	--	--	--	329	--	--
Beryllium	0.51	0.99	2.11	0.42	2.6	1900	--	--	--	--	--	--
Cadmium	0.06B	0.22	0.27B	0.08B	**1.3**	510	70	950	100	6	3	0.3
Chromium	8	49	11	12	**53**	65	--	--	--	10	--	--
Copper	7	48	61	9	**704**	41000	5,000	70,000	7,400	370	102	7
Iron	18,400	49,800	23,600	13,800	81,575	--	--	--	--	--	--	--
Lead	6B	255	27	14B	**239**	800	1,000	1,000	2,000	740	106	6
Manganese	263	243	1,240	316	2,795	32000	19,000	250,000	28,000	--	--	--
Mercury	0.21	<0.04H	0.22	<0.05	0.1	310	40	550	60	0.146	9	1
Molybdenum	<1	32	1B	<1	**24.9**	5100	--	--	--	4.75	--	--
Nickel	12	26	10	8	64.3	20000	2,700	38,000	4,000	246	--	--
Selenium	<0.5	<10	0.5B	<0.5	0.9	5100	700	9,600	1,000	--	--	--
Silver	0.7B	<0.5	2B	0.6B	2.6	5100	700	9,600	1,000	--	--	--
Uranium	1.1	965	0.44	1.7	196	200	--	--	--	92	--	--
Vanadium	31.1	62.6	47.8	25.9	138	1000	--	--	--	55	--	--
Zinc	15	22	75	19	**485**	310000	40,000	550,000	60,000	1,600	222	43

Radiological (pCi/g)					Bkgd UCL_{95}	Radiological Action Levels			
						UMTRCA (40 CFR 192)	EPA SSLs	DOE BCG (riparian animal)	DOE BCG (terrestrial animal)
Gross Alpha	5.81±1.5	1380±21	6.09±4.7	8.16	292.1	--	--	--	--
Gross Beta	4.01±0.8	945±9	7.43±4.2	5.35	160.7	--	--	--	--
Radium 226	0.67±0.3	421±7	0.52±0.4	0.54	**62.4**	5[2]	67.4	110	54
Radium 228	2.11±1.4	3.88±1.6	0.77±1.3	1.26	4.8		--	81	54
Thorium 228	0.39±0.27	1.14±0.34	0.22±0.24	0.48	1.5	--	--	--	--
Thorium 230	0.05±0.32	411±6.9	0.33±0.4	-0.27±0.25	57.9	--	--	--	--
Thorium 232	0.17±0.3	1.88±0.57	0.5±0.39	0.33	1.1	--	4.1	1,400	1,600
Natural Uranium[3]	0.7	643	0.29	1.13	131	--	298	--	1,600

[1] PA/SI Sample Result Source: SAIC, 2005. *Workman Creek Watershed Final Combined Preliminary Assessment/Site Inspection Report*. January 15, 2005. (Samples collected August 2004.)

[2] UMTRCA soil standard is a combined concentration of radium-226 and radium-228 and is calculated over background.

[3] Natural uranium concentrations were calculated based on mass uranium results (1 pCi/g = 1.5 mg/kg).

Bkgd UCL_{95} = Background 95% Upper Confidence Limit

Bold = Background (Bdgrd) exceeds one or more action level

U = Analyte analyzed for but not detected at the Method Detection Limit (MDL)

B = Analyte concentration detected at a value between MDL and Practical Quantitation Limit (PQL)

H = Analysis exceeded the maximum holding time

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DOE BCG = Dept. of Energy Bioconcentration Guide

AZ NR SRL = Arizona Non-Residential Soil Remediation Level

BLM RMC = Bureau of Land Management Risk Management Criteria

Human Health Criteria Exceeded

Ecological Screening Criteria Exceeded

Table C14
Suckerite Mine Group Soil Sample Results[1]

Analyte	Soil Sample IDs (August 2004)								Mean Background	Action Levels						
	Suckerite Group 081504-63	Suckerite Group 081504-64	Suckerite Group 081504-66	Suckerite Group 081504-68	Suckerite Group (Duplicate) 081504-69	Suckerite Group 081504-70	Suckerite Group 081504-65 (Bkgd)	Suckerite Group 081504-67 (Bkgd)		AZ NR SRLs	BLM RMC Camper	BLM RMC ATV Driver	BLM RMC Worker	PRG Short-tailed Shrew	BLM Mule Deer	BLM Robin
Gamma (microR/hr)	105	100	34	8	8	7	30	100	--	--	--	--	--	--	--	--
Metals (mg/kg)																
Antimony	0.1B	<0.1	<0.1	0.1B	0.1B	0.1B	0.2B	0.1B	0.3	410	50	750	100	--	--	--
Arsenic	6.7	3.7	2.8	9.1	12.8	7.4	12.1	5.9	**24.2**	10	20	300	12	9.9	200	4
Barium	77.8	87	93.4	54.6	41.7	136	133	66.4	156.1	170,000	--	--	--	329	--	--
Beryllium	1	0.4	0.38	0.71	0.7	1.97	2.36	0.69	2.6	1,900	--	--	--	--	--	--
Cadmium	1.48	0.27B	0.41	1.08	1.01	0.48	1.76	1.33	**1.3**	510	70	950	100	6	3	0.3
Chromium	50B	40B	110	<10	<10	20B	30B	30B	**53**	65	--	--	--	10	--	--
Copper	210	70	50B	<10	<10	20B	60	150	**704**	41,000	5,000	70,000	7,400	370	102	7
Iron	58,100	67,300	66,300	231,000	291,000	126,000	57,300	56,700	81,575	--	--	--	--	--	--	--
Lead	190B	<40	<40	110B	90	40B	410	130B	**239**	800	1,000	1,000	2,000	740	106	6
Manganese	1,030	496	744	1,410	1,160	3,140	1,950	799	2,795	32,000	19,000	250,000	28,000	--	--	--
Mercury	<0.04	<0.05	0.05B	1.15	2.31	<0.05	<0.04	<0.05	0.1	310	40	550	60	0.146	9	1
Molybdenum	<10	<10	<10	<10	<10	<10	<10	<10	**24.9**	5,100	--	--	--	4.75	--	--
Nickel	60	30B	70	<10	<10	20B	30B	50	64.3	20,000	2,700	38,000	4,000	246	--	--
Selenium	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.7B	<0.5	0.9	5,100	700	9,600	1,000	--	--	--
Silver	<5	<5	<5	<5	<5	<5	<5	<5	2.6	5,100	700	9,600	1,000	--	--	--
Uranium	133	28.2	14.4	0.77	0.75	0.61	1.85	72.9	**196**	200	--	--	--	92	--	--
Vanadium	150	215	187	33	35	120	113	135	138	1,000	--	--	--	55	--	--
Zinc	550	90	140	160	170	170	860	420	**485**	310,000	40,000	550,000	60,000	1,600	222	43

Radiological (pCi/g)									Bkgd UCL_{-95}	Radiological Action Levels			
										UMTRCA (40 CFR 192)	EPA SSLs	DOE BCG (riparian animal)	DOE BCG (terrestrial animal)
Gross Alpha	122±8.9	19.6±3.6	72.8±6.8	11.8±5	12.7±4	16.5±6	10.6±2.5	133±10	292.1	--	--	--	--
Gross Beta	66.2±3.5	12.4±1.9	37.9±2.8	8.27±3.4	7.61±2.6	8.63±3.9	10.1±1.6	64.3±3.9	160.7	--	--	--	--
Radium 226	37.7±1.7	3.17±0.6	2.43±0.5	1.33±0.4	0.86±0.3	0.57±0.3	1.45±0.4	28.9±1.5	**62.4**	5[2]	67.4	110	54
Radium 228	2.62±1.4	1.01±1.4	3.98±1.5	3.84±1.5	2.25±1.6	3.03±1.5	3±1.4	1±1.5	4.8		--	81	54
Thorium 228	0.54±0.29	0.16±0.24	0.13±0.22	1.73±0.4	1.21±0.38	1.14±0.36	0.56±0.3	0.49±0.27	1.5	--	--	--	--
Thorium 230	15.5±1.3	0.66±0.38	1.61±0.56	0.03±0.42	0.14±0.35	-0.13±0.36	0.65±0.4	18.8±1.6	57.9	--	--	--	--
Thorium 232	0.4±0.36	0.12±0.28	0.18±0.35	1.32±0.56	1.28±0.47	0.96±0.47	0.65±0.37	0.52±0.42	1.1	--	4.1	1,400	1,600
Natural Uranium[3]	89	18.8	9.6	0.51	0.50	0.41	1.23	48.6	131	--	298	--	1,600

Table C14

Suckerite Mine Group Soil Sample Results[1]

Analyte	Soil Sample IDs (August 2004)								Mean Background	Action Levels						
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[1] PA/SI Sampling Results Source: SAIC, 2005. *Workman Creek Watershed Final Combined Preliminary Assessment/Site Inspection Report* . January 15, 2005. (Samples collected August 2004.)

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microR/hr = microroentgen per hour

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Human Health Criteria Exceeded

Ecological Screening Criteria Exceeded