Screening Values

Screening values are taken from Agency for Toxic Substance and Disease Registry (ATSDR) comparison values (CVs) for drinking water when available. When ATSDR values were not available, EPA Regional Screening Levels (RSLs) for residential tap water were used. Total metal data was used for assessment of human-health based effects.

Agricultural Screening Values are derived from National Academy of Science (NAS) Water Quality Criteria, 1972 (the Blue Book). Those guidelines are reprinted in EPA's Guidelines for the Reuse of Waters for Irrigation. Dissolved metal values were used for the assessment of agricultural use waters.

Contaminants that do not exceed screening values are not considered to pose a risk of adverse health effects.

			Drink	ing Water CV (ppb)		Irrigation Waters	(ug/L) [NAS, 1972]	Uta	The second second	indards fo	or San Juan R	iver
Analyte	CAS#	Units	Health-Based Comparison Value for Water Ingestion (CV) [Total Metals]	CV Type and Source	Livestock Water (ug/L)	Long-Term	Short-Term	1C (Domestic)	3B (warm water fish) [1-hour]	3B (warm water fish)	4 (agriculture)	
Hardness	-	mg/L		or type and course	180 mg/L (UA)	Zong Term	SHOIT ZEIM		[x nour]	[au/]		Hardness
Aluminum	7429-90-5	µg/L	10,000	Child Intermediate EMEG	5,000 (NAS)	5.000	20.000		750	87		Aluminum
	7440-36-0	µg/L	4	Child RMEG	No Data Available	No Data Available	No Data Available			191		Antimony
-	7440-38-2	µg/L	3	Child RMEG & Chronic EMEG	200 (NAS)	100	2.000	10	340	150	100	Arsenic
Name and Address of the Owner, where the Owner, which is the Owner, where the Owner, which is the Owner, where the Owner, which is the Owner, which i	7440-39-3	ug/L	2,000	Child Intermediate EMEG	No Data Available	No Data Available	No Data Available	1000				Barium
The second second second second	7440-41-7	ug/L	20	Child RMEG & Chronic EMEG	No Data Available	No Data Available	No Data Available	<4				Bervllium
The second second second	7440-43-9	ug/L	5	Child Intermediate EMEG	50 (NAS)	10	50	10	2	0.25	10	Cadmium
	7440-70-2	µg/L	-	No CVs available	500,000 (UA)	No Data Available	No Data Available					Calcium
A STATE OF THE PARTY OF THE PAR	7440-47-3		60	Child RSL, non-cancer, Cr(VI)	1.000 (NAS)	100	1.000	50	16 (VI);	11 (VI);	100	Chromium
Cobalt	7440-48-4	ug/L	100	Child Intermediate EMEG	1,000 (NAS)	50	5.000			1		Cobalt
Copper	7440-50-8	µg/L	100	Child Intermediate EMEG	500 (NAS)	200	5,000		13	9	200	Copper
	7439-89-6	1.10	14,000	Child RSL, non-cancer	Limit Not Considered Necessary (NAS)	5,000	20,000		1000	1000		Iron
	7439-92-1	µg/L	15	Child non-carcinogenic RSL	100 (NAS)	5,000	10,000	15	65	2.5	(A.S. C. C.	Lead
Magnesium	7439-95-4	µg/L	8	No CVs available	250,000 (UA)	No Data Available	No Data Available				Ť	Magnesium
Manganese		μg/L	500	Child RMEG	Limit Not Considered Necessary (NAS)	200	10,000					Manganese
Molyebdenum		µg/L	50	Child RMEG	No Data Available	10	50					Molyebdenu
Nickel	7440-02-0	µg/L	200	Child RMEG	No Data Available	200	2,000		468	52		Nickel
Potassium	7440-22-4	µg/L		No CVs available	No Data Available	No Data Available	No Data Available					Potassium
	7782-49-2	µg/L	50	Child RMEG	50 (NAS)	20	20	50	18.4	4.6		Selenium
	7440-22-4	µg/L	50	Child RMEG	No Data Available	No Data Available	No Data Available	50	1.6	3.43		Silver
	7440-23-5	µg/L		No CVs available	1,000,000 (UA)	No Data Available	No Data Available					Sodium
	7440-28-0	μg/L	0.2	Child non-carcinogenic RSL	No Data Available	No Data Available	No Data Available					Thallium
Vanadium		µg/L	100	Child Intermediate EMEG	100 (NAS)	100	1,000					Vanadium
Zinc	7440-66-6	µg/L	3,000	Child Intermediate EMEG	25,000 (NAS)	2,000	10,000		120	120		Zinc
	7439-97-6	1.0	0.63	Child non-carcinogenic RSL, elemental Hg, µg/L	10 (NAS)	No Data Available	No Data Available	2	a	0.012		Mercury
TDS		mg/L			1200 (Utah)	500,000-1,0	000,000 (NAS)					
pH					6.5-9 (Utah)	4.5-9	(NAS)		[]			

RSL: EPA Regional Screening Level

Drinking Water Total Metals

	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Molyebdenum	Nickel	Potassium	Selenium	Silver	Sodium	Thallium	Vanadium	Zinc			
			Water MCL		6	10	2,000	4	5	(blank)	100			<u> </u>	lank)			2		(blan	,	50	,	ank)	2	(bla	
	Health Based Comparison Valu			10,000	4	3	2,000	20	5	(blank)	60	1	00	14,000	15	(blank)	500	0.63	50	200	(blank)	50)	(blank)	0.2		3,000
Monitoring Location	Site Description	Collection Date	Time	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	mg/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Location	one beamprion	8/8/2015	5:40 PM	63,400	(16.3	1,540	7.23	1.5	167	29.4	41.5	103	51,900	86.7	30,600	2.800	0.18	0	47.8	14,400	0	0	63,900	0	70.5	261
4953000	San Juan R @ Mexican Hat US163 Xing	8/10/2015	11:53 AM	90,800	(2,300				43.1			43,400	_	57,000		0		70.9	19,700	0	0	46,100	0	80	843
		8/10/2015	4:44 PM	80,600	C	22.7	1,910				36.8			38,100		49,400		0	0	58.4	18,100	0	0	52,600	0	83.3	815
		8/8/2015	4:19 PM	55,700	(15.9	1,090	5.21	1.99	252	32.4	34.3	80.8	47,800	74.7	33,800	1,700	0.158	0	65.8	13,300	2.14	0	58,800	0	64.7	242
4953250	San Juan R @ Sand Island	8/10/2015	11:15 AM	27,000	(13.2	1,530	2.3	0.788	104	15.9	15.6	60	28,500	140	21,200	1,090	0	0	22.1	7,830	0	0	30,900	0	44.3	664
		8/10/2015	3:58 PM	28,700	(10.7	726	2.61	0.713	99.9	16.1	17.3	54.7	27,700	84.7	20,400	1,170	0	0	22.3	7,290	0	0	33,200	0	40.9	960
		8/8/2015	2:54 PM	67,300	0	20.2	1,590	6.36	2.49	390	38.8	41.1	82.4	50,400	91.5	59,100	3,010	0.222	0	75.8	17,700	0	0	51,700	0	82.8	286
4953990	San Juan R @ Town of Montezuma	8/10/2015	10:13 AM	32,300	C	11.5	1,960	2.72	0.707	93.7	17.3	18.3	56.4	29,700	79.3	20,100	1,130	0	0	23.5	7,450	0	0	34,600	0	43.8	821
		8/10/2015	2:58 PM	39,100	C	11.8	,		0.881		22.1			35,800	75.8			0	0	29.6	8,490	0	0	34,900	0	49	658
		8/8/2015	1:23 PM	47,400		12.5	,				23.9			24,800		,	,	0	0	40.5	12,200	0	0	38,600		61.2	147
		8/9/2015	12:02 PM	33,900	C	12.3	702		0.907		17.4			29,400		20,300		0	0	23	9,040	0	0	29,800	0	50.5	160
		8/9/2015	3:05 PM	26,700	(13.5	606	2.08	0.734		14.2		_	28,600	_			0	0	18.2	7,530	0	0	27,000	0	41.6	172
4954000	San Juan R @ US160 Xing in CO	8/9/2015	6:00 PM	24,600	C	10	532	0	0.68		13.7		_	24,100	_	15,800	870	0	0	16.8	7,040	0	0	26,100	0	37.8	138
		8/9/2015	9:02 PM	31,000		9.59	554	2.25			15.5		_	26,500		-,	887	0	0	18.4	7,180	0	0	29,500	0	41.5	137
		8/10/2015	9:11 AM	39,900		11	1,730			90.8	1			35,400		20,200		0	0	29.7	8,240	0	0	36,600	0	48.2	668
	No Exceedence	8/10/2015	2:06 PM	43,700		12.3	889	4.04	0.884	86.7	23.7	25.4	69.7	39,100	69.3	20,100	1,390	0	0	30.8	8,890	0	0	38,500	0	53.4	897
	Above Screening Level		Backgroun Potential P		00000	1																					
	Above Screening Level		Potential P			H																					
L			Piume Pre	sence Li	keiy																	-					

Utah Department of Health (UDOH) uses ATSDR comparison values (CVs), and EPA Regional Screening Levels (RSLs) in the absence of ATSDR values, for assessing environmental contamination. These screening levels are more appropriate than EPA drinking water MCLs when screening environmental exposures (as opposed to one's drinking water).

From August 8-10, levels of contaminants above ATSDR health-based screening levels were detected for aluminum, arsenic, barium, copper, iron, and lead. 95% upper confidence limits (95% UCL) were calculated and compared to screening levels. Calculated contaminant 95% UCLs that fall below screening levels are not considered for further evaluation. For this data set, the 95% UCLs for barium and copper fell below screening levels and were not further evaluated. Value for beryllium exceeded EPA MCLs, but did not exceed ATSDR environmental screening levels and were not further evaluated.

The total metals analysis provides results for metals that are both dissolved and present as very small particles. This result is considered more protective of public health because the sampling data show both the dissolved and particle form of each metal tested.

MCLs (Maximum Contaminant Levels) are standards set by the EPA for drinking water quality and are the legal threshold limit on the amount of a substance that is allowed in public water systems under the Safe Drinking Water Act. The comparison value (CV) is a health-based limit for exposure

through ingestion. These values are typically based on short-term health exposure and are more stringent than an MCL because they are used for immediate exposure.

Drinking water systems can remove metals from the water through a treatment process such as filtration, or metals can be reduced by blending with water that has low or no total metals content.

Residents with a private well can call a <u>certified drinking water lab</u> to get it tested. The laboratories provide the required bottles, sampling instructions and return instructions.

Drinking Water Dissolved Metals

С					Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Molyebdenum	Nickel	Potassium	Selenium	Silver	Sodium	Thallium	Vanadium	Zinc
	National		Drinking Water Regulations		<u> </u>				ank)				,		<u> </u>	ank)	50		`	blank		_	100	(k	olank)		5,000
Manifesta and an an			ah Domestic Source Criteria	(bla	nk)	10	1,000	4	10	(blank)	50		(blank))	15	(bla	nk)	2	(blank	()	5	0		(blai	1k)	
Monitoring Location	Site Description	Collection Date	Collection Time	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	mg/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
		8/8/2015	5:40 PM	264	0	0	308	0	0	49.2	0	0	3.95	144	0	5,750	2.81	0	3.15	0	4,150	0	0	62,600	0	0	14.2
4953000	San Juan R @ Mexican	8/10/2015	11:53 AM	325		0	299		0	44.6	0	0	2.95			7,840			2.43		3,410			43,600		7.59	
	Hat US163 Xing	8/10/2015	4:44 PM	149		0	265		0	44.2	0	0	2.48			7,870			2.63		3,350			41,900		6.67	
		8/8/2015	4:19 PM	214	0	0	294	0	0	73.7	0	0	3.86	104	0	9,240	2.55	0	3.3		4,110		0	51,200	0	0	19
4953250	San Juan R @ Sand Island	8/10/2015	11:15 AM	124	0	0	192	0	0	53.2	0	0	2.07	0	0	8,400	0	0	2.38	0	2,860	0	0	28,400	0	0	13.7
		8/10/2015	3:58 PM	108	0	0	184	0	0	48.4	0	0	0	0	0	7,830	0	0	2.26	0	2,670	0	0	30,600	0	0	13.2
	San Juan R @ Town of	8/8/2015	2:54 PM	136	0	0	223	0	0	71.5	0	0	2.72	0	0	9,920	0	0	2.62	0	3,840	0	0	43,500	0	0	21
4953990	Montezuma	8/10/2015	10:13 AM	218	0	0	262	0	0	49.8	0	0	3.24	144	0	7,700	3.22	0	2.03	0	2,690	0	0	32,100	0	0	17.3
	Montozuma	8/10/2015	2:58 PM	0	0	0	200	0	0	48.6	0	0	2.48	0	0	7,350	0	0	2.32	0	2,590	0	0	31,800	0	0	14.6
		8/8/2015	1:23 PM	217	0	0	222	0	0	51.5	0	0	2.24	0	0	7,850	2.94	0	0	0	2,960	0	0	32,200	0	4.86	15.3
	San Juan R @ US160	8/9/2015	12:02 PM	258	0	0	274	0	0	50.6	0	0	2.48	119	0	6,860	2.69	0	2.01	0	2,610	0	0	28,500	0	0	18.5
4954000	Xing in CO	8/9/2015	9:02 PM	329	0	0	341	0	0	46	0	0	3.47	198	0	6,300	4.14	0	0	0	2,380	0	0	30,000	0	0	15.4
	Ang in 66	8/10/2015	9:11 AM	172	0	0	233	0	0	44.6	0	0	3.21	103	0	6,010	0	0	2.03	0	2,510	0	0	34,100	0	0	19.7
		8/10/2015	2:06 PM	1,050	0	0	220	0	0	44.2	0	0	3.35	732	0	6,020	12.8	0	0	0	2,720	0	0	35,100	0	0	18
	No Exceedence		Background																								
	Above Screening Level		Potential Plume Presence																								Į
			Plume Presence Likely																								

Dissolved metals results should always be less than the total metals result. This is because dissolved metals are a subset of total metals; they make up part of the total metals result. Dissolved metals are usually considered more mobile and biologically available (can be absorbed by the body).

For drinking water quality, it is best to use the total metals analysis result to determine how safe the water is to drink because the MCL is based on the total metals analysis and the total metals results are considered to be more protective of public health.

The <u>Water Quality Interpretation Tool</u> developed by Utah State University Extension Services allows users to enter their water quality data online and receive interpretation of those data pertaining to drinking water, irrigation water, livestock water, and environmental water state standards. The explanation of results from this tool provides information on the analyte health effects, the susceptible populations, and typical routes of exposure.

Agricultural Uses

				Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Геад	Magnesium	Manganese	Mercury	Molyebdenum	Nickel	Potassium	Selenium	Silver	Sodium	Thallium	Vanadium	Zinc
		Lives	stock Water	5,000	(blank)	200	(bla	nk)	50	500	1,	,000	500	(blank)	100	250,000	(blank)	10		(blan			(blank)	1000000	(blank)	100	25000
	Irrigation Wate			_	(blank)	100	_ `	ank)	10	(blank)	-	50	200	500		(blank)		(blank)			(blank)	_		(blank)		100	2000
	Irrigation Wate	r Long-term	NAS, 1972			2,000	00 (blank) 50		(blank)	1,000					(blank)	10,000			2,000	(blank)	20		(blank)		1000	10000	
		1	1	(bl	ank)	100	(bla	nk)	10	(blank)	100	(blank)	200	(blank)	100			(blanl	k)			50		(b	lank)		•
Monitoring Location	Site Description	Collection Date	Collection Time	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	mg/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
	San Juan R @ Mexican	8/8/2015	5:40 PM	264	0	0	308	0	0	49.2	0	0	3.95	144	0	5,750	2.81	0	3.15	0	4,150	0	0	62,600	0	0	14.2
4953000	Hat US163 Xing	8/10/2015	11:53 AM	325	0	0	299	0	0	44.6	0	0	2.95	140	0	7,840	2.55	0	2.43	0	3,410	0	0	43,600	0	7.59	17.6
	Tiat 00100 Airig	8/10/2015	4:44 PM	149	0	0	265	0	0	44.2	0	0	2.48	0	0	7,870	0	0	2.63	0	3,350	0	0	41,900	0	6.67	18.5
	San Juan R @ Sand	8/8/2015	4:19 PM	214	0	0	294	0	0	73.7	0	0	3.86	104	0	9,240	2.55	0	3.3	0	4,110	0	0	51,200	0	0	19
4953250	Island	8/10/2015	11:15 AM	124	0	0	192	0	0	53.2	0	0	2.07	0	0	8,400	0	0	2.38	0	2,860	0	0	28,400	0	0	13.7
	1010110	8/10/2015	3:58 PM	108		0	184	0	0	48.4	0	0	0	0	0	7,830			2.26		2,670	_	0	30,600	0	0	13.2
	San Juan R @ Town of	8/8/2015	2:54 PM	136		0	223	0	0	71.5	_	1	2.72		0	9,920			2.62		3,840	_	0	43,500	0	0	21
4953990	Montezuma	8/10/2015	10:13 AM	218		0	262	0	0	49.8			3.24	144	0	7,700	_		2.03		2,690	_	0	32,100	0	0	17.3
		8/10/2015	2:58 PM	0		0	200	0	0	48.6			2.48	0	0	7,350	_		2.32	0	2,590	_	0	31,800	0	0	14.6
		8/8/2015	1:23 PM	217		0	222	0	0	51.5			2.24	0	0	7,850			0	0	2,960	_	0	32,200	0	4.86	
4054000	San Juan R @ US160	8/9/2015	12:02 PM	258		0	274	0	0	50.6			2.48		0	6,860	2.69		2.01	0	2,610	0	0	28,500	0	0	18.5
4954000	Xing in CO	8/9/2015	9:02 PM	329		0	341	0	0	46	_		3.47	198	0	6,300	4.14		Ŭ	0	2,380	0	0	30,000	0	0	15.4
		8/10/2015	9:11 AM	172		0	233	0	0	44.6			3.21	103	0	6,010	0		2.03	0	2,510	0	0	34,100	0	0	19.7
		8/10/2015	2:06 PM	1,050	0	0	220	0	0	44.2	0	0	3.35	732	0	6,020	12.8	0	0	0	2,720	0	0	35,100	0	0	18
	No Exceedence		Backgroun																								
	Above Screening Level		Potential P Plume Pre																								

For agricultural use, no dissolved metal contaminants exceeded screening values.

Aquatic Life Uses

	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Molyebdenum	Nickel	Potassium	Selenium	Silver	Sodium	Thallium	Vanadium	Zinc			
	Utah Aqu	atic Life Use (Criteria 1-hr	750	(blank)	340	(bla	ank)	2	(blank)	570	(blank)	13	1,000	65		(bl	ank)		468	(blank)	18.4	1.6	(k	olank)		120
	Utah Aqua	tic Life Use Cr		87	(blank)	150	(bla	ank)	0.25	(blank)	74	(blank)	9	1,000	2.5	(bla	nk)	0.01	(blank)	52	(blank)	4.6		(bla	nk)		120
Monitoring Location	Site Description	Collection Date	Collection Time	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	mg/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
	·	8/8/2015	5:40 PM	264	0	0	308	0	0	49	0	0	4	144	0	5,750	3	0	3	0	4,150	0	0	62,600	0	0	14
4953000	San Juan R @ Mexican Hat US163 Xing	8/10/2015	11:53 AM	325	0	0	299		0	45	0	0	3	140		7,840	3	0	2	0	3,410	0		43,600		8	18
	03 163 Allg	8/10/2015	4:44 PM	149	0	0	265	0	0	44	0	0	2	0	0	7,870	0	0	3	0	3,350	0	0	41,900	0	7	19
		8/8/2015	4:19 PM	214	0	0	294	0	0	74	0	0	4	104	0	9,240	3	0	3	0	4,110	0	0	51,200	0	0	19
4953250	San Juan R @ Sand Island	8/10/2015	11:15 AM	124	0	0	192	0	0	53	0	0	2	0	0	8,400	0	0	2	0	2,860	0	0	28,400	0	0	14
		8/10/2015	3:58 PM	108	0	0	184	_	0	48	0	0	0	0	0	7,830	0	0	2	0	2,670	0	0	30,600	0	0	13
	San Juan R @ Town of	8/8/2015	2:54 PM	136	0	0	223	_	0	72	0	0	3	0		9,920	0	0	3	0	3,840	0		43,500	0	0	21
4953990	Montezuma	8/10/2015	10:13 AM	218	0	- ŭ	262		0	50	_	0	3	144		7,700	3	·	2	0	2,690	0		32,100			17
		8/10/2015	2:58 PM	0	0	- ŭ	200		0	49	_	0	2	0	_	7,350	0	·	2	0	2,590	0		31,800		0	15
		8/8/2015	1:23 PM	217	0	0	222	_	0	52	0	0	2	0	0	7,850	3	0	0	0	2,960	0	0	32,200	0	5	15
	San Juan R @ US160 Xing in	8/9/2015	12:02 PM	258	0	0	274	_	0	51	0	0	2	119	0	6,860	3	0	2	0	2,610	0	0	28,500	0	0	19
4954000	CO CO	8/9/2015	9:02 PM	329	0	0	341	0	0	46	0	0	3	198	0	6,300	4	0	0	0	2,380	0	0	30,000	0	0	15
		8/10/2015	9:11 AM	172	0	0	233	0	0	45	0	0	3	103	0	6,010	0	0	2	0	2,510	0	0	34,100	0	0	20
		8/10/2015	2:06 PM	1,050	0	0	220	0	0	44	0	0	3	732	0	6,020	13	0	0	0	2,720	0	0	35,100	0	0	18
	No Exceedence		Backgroun	d																							
	Above Screening Level		Potential P	lume Pre	sence																						
			Plume Pre	sence Lik	ely																						

Most metals were screened against two different standards: the acute criterion that established thresholds that should not be exceeded to protect organisms from short term exposure, and the chronic criterion that protects against long-term exposure. The acute criterion is most relevant to the immediate threat of the plume to fish and wildlife.

One <u>important caveat</u> with respect to interpreting the results is that the criteria have not been adjusted for pH or hardness. Given current conditions in the San Juan River, most metals criteria will become less stringent once these adjustments are made, so these results reflect a worst-case scenario. DEQ will update the table with these adjustments tomorrow.

Based on these results, aluminum is the only metal that is of potential threat to fish and wildlife. With one exception, aluminum concentrations do not exceed the acute criterion. The aluminum concentrations were equally high before and after the presence of the plume at the sample locations.

Overall, based on results received so far, DEQ concludes that any elevated concentration in metals that were caused from the mine release plume is not sufficiently high to threaten fish and wildlife.