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Gold King Mine Spill Response

Surface Water Quality Bureau

8/12/15

Preliminary Water Quality Results for Animas Spill

- Water sampling for heavy metals and other important constituents related to the Gold King Mine spill began on Friday August 7, 2015.
- There are two sampling stations on the Animas River and one sampling station on the San Juan River.
- "The results indicate that the limited parameters tested between Friday August 7 and Sunday August 9, 2015 were below the applicable state water quality standards. This does not mean there are no longer any concerns as re-suspension and additional water chemistry parameters need to be considered".

DISSOLVED METALS - FILTERED

Sample ID	2487451	2487456	2479354
Station	**Animas abv Estes**	**Animas at Boyd**	**San Juan at Lions Park**
Date/time	8/9/15 0545	8/9/15 0630	8/9/15 0720
Sample Type/Method	**SWQB Dissolved Metals** (200.7/.8/.9/245.1): Al Sb As Ba Be B Cd Ca Cr Co Cu Pb Mg Mn Hg Mo Ni Se Ag Tl U V Zn	**SWQB Dissolved Metals** (200.7/.8/.9/245.1): Al Sb As Ba Be B Cd Ca Cr Co Cu Pb Mg Mn Hg Mo Ni Se Ag Tl U V Zn	**SWQB Dissolved Metals** (200.7/.8/.9/245.1): Al Sb As Ba Be B Cd Ca Cr Co Cu Pb Mg Mn Hg Mo Ni Se Ag Tl U V Zn
Element	Results mg/L (ppm)	Results mg/L (ppm)	Results mg/L (ppm)
Aluminum	0.03	0.02	0.01
Antimony	Non-Detect	Non-Detect	Non-Detect
Arsenic	Non-Detect	Non-Detect	Non-Detect
Barium	Non-Detect	Non-Detect	Non-Detect
Beryllium	Non-Detect	Non-Detect	Non-Detect
Boron	Non-Detect	Non-Detect	Non-Detect
Cadmium	Non-Detect	Non-Detect	Non-Detect
Chromium	Non-Detect	Non-Detect	Non-Detect
Cobalt	Non-Detect	Non-Detect	Non-Detect
Copper	Non-Detect	Non-Detect	Non-Detect
Lead	Non-Detect	Non-Detect	Non-Detect
Manganese	0.009	0.01	0.004
Mercury	Non-Detect	Non-Detect	Non-Detect
Molybdenum	0.001	0.001	0.002
Nickel	Non-Detect	Non-Detect	Non-Detect
Selenium	Non-Detect	Non-Detect	Non-Detect
Silver	Non-Detect	Non-Detect	Non-Detect
Thallium	Non-Detect	Non-Detect	Non-Detect
Uranium	Non-Detect	Non-Detect	Non-Detect
Vanadium	Non-Detect	Non-Detect	Non-Detect
Zinc	Non-Detect	Non-Detect	Non-Detect
Calcium	56	63	45
Magnesium	9	10	7
Hardness (calculated)	*177*	*198*	*141*

TOTAL RECOVERABLE ALUMINUM - FILTERED TO MINIMIZE MINERAL PHASES

Sample ID	2487452	2487457	2479355
Station	**Animas abv Estes**	**Animas at Boyd**	**San Juan at Lions Park**
Date/time	8/9/15 0545	8/9/15 0630	8/9/15 0720
Sample Type/Method	**Total Aluminum**-individual analysis (EPA 200.7 ICP-OES/200.8 ICP-MS)	**Total Aluminum**-individual analysis (EPA 200.7 ICP-OES/200.8 ICP-MS)	**Total Aluminum**-individual analysis (EPA 200.7 ICP-OES/200.8 ICP-MS)
Element	Results mg/L (ppm)	Results mg/L (ppm)	Results mg/L (ppm)
Aluminum	0.07	0.07	1.4 (OCR)

"OCR" = over calibration range

TOTAL METALS - UNFILTERED

Sample ID	2487450	2487455	2479353
Station	**Animas abv Estes**	**Animas at Boyd**	**San Juan at Lions Park**

Date/time	8/9/15 0545	8/9/15 0630	8/9/15 0720
Sample Type/Method	**SWQB Total Metals** (200.7/.8/.9/245.1): Al Sb As Ba Be B Cd Ca Cr Co Cu Pb Mg Mn Hg Mo Ni Se Ag Tl U V Zn	**SWQB Total Metals** (200.7/.8/.9/245.1): Al Sb As Ba Be B Cd Ca Cr Co Cu Pb Mg Mn Hg Mo Ni Se Ag Tl U V Zn	**SWQB Total Metals** (200.7/.8/.9/245.1): Al Sb As Ba Be B Cd Ca Cr Co Cu Pb Mg Mn Hg Mo Ni Se Ag Tl U V Zn
Element	Results mg/L (ppm)	Results mg/L (ppm)	Results mg/L (ppm)
Aluminum	1.6	2.8	36
Antimony	Non-Detect	Non-Detect	Non-Detect
Arsenic	0.003	0.004	0.005
Barium	Non-Detect	0.1	0.4
Beryllium	Non-Detect	Non-Detect	0.002
Boron	Non-Detect	Non-Detect	Non-Detect
Cadmium	Non-Detect	Non-Detect	Non-Detect
Chromium	Non-Detect	0.001	0.019
Cobalt	Non-Detect	0.001	0.013
Copper	0.02	0.02	0.03
Lead	0.057	0.076	0.049
Manganese	0.18	0.24	1
Mercury	Non-Detect	Non-Detect	Non-Detect
Molybdenum	0.002	0.002	0.002
Nickel	Non-Detect	Non-Detect	0.02
Selenium	Non-Detect	Non-Detect	Non-Detect
Silver	Non-Detect	Non-Detect	Non-Detect
Thallium	Non-Detect	Non-Detect	Non-Detect
Uranium	Non-Detect	Non-Detect	0.003
Vanadium	0.003	0.006	0.041
Zinc	0.09	0.1	0.1
Calcium	56	68	63
Magnesium	10	16	10

Sample ID	2487449	2487454	2479357	2487453	2487458	2479356
Station	**Animas abv Estes**	**Animas at Boyd**	**San Juan at Lions Park**	**Animas abv Estes**	**Animas at Boyd**	**San Juan at Lions Park**
Date/time	8/9/15 0545	8/9/15 0630	8/9/15 0720	8/9/15 0545	8/9/15 0630	8/9/15 0720
Sample Type/Method	**TDS & TSS** (SM 2540C Total Dissolved Solids, SM 2540D Total Suspended Solids) + Alkalinity (SM 2320B Alkalinity) + Fluoride (SM 4500F-C Fluoride)	**TDS & TSS** (SM 2540C Total Dissolved Solids, SM 2540D Total Suspended Solids) + Alkalinity (SM 2320B Alkalinity) + Fluoride (SM 4500F-C Fluoride)	**TDS & TSS** (SM 2540C Total Dissolved Solids, SM 2540D Total Suspended Solids) + Alkalinity (SM 2320B Alkalinity) + Fluoride (SM 4500F-C Fluoride)	**Cyanide, Total** (EPA 335.4 Total Cyanide)	**Cyanide, Total** (EPA 335.4 Total Cyanide)	**Cyanide, Total** (EPA 335.4 Total Cyanide)
Element	Results mg/L (ppm)	Results mg/L (ppm)	Results mg/L (ppm)	Results mg/L (ppm)	Results mg/L (ppm)	Results mg/L (ppm)
Alkalinity (mg/L)	92.2	104	107	-	-	-
Fluoride (mg/L)	0.38	0.37	0.34	-	-	-
Total Cyanide (mg/L)	-	-	-	<0.005	<0.005	<0.005
TSS (mg/L)	74.6	142	49.6	-	-	-
TDS (mg/L)	264	294	270	-	-	-

Pollutant	CAS Number	DWS	Irr	LW	WH	Aquatic Life			Type
						Acute	Chronic	HH-OO	
Aluminum, dissolved	7429-90-5		5,000						
Aluminum, total recoverable	7429-90-5					a	a		
Antimony, dissolved	7440-36-0	6						640	P
Arsenic, dissolved	7440-38-2	10	100	200		340	150	9.0	C,P
Barium, dissolved	7440-39-3	2,000							
Beryllium, dissolved	7440-41-7	4							
Boron, dissolved	7440-42-8		750	5,000					
Cadmium, dissolved	7440-43-9	5	10	50		a	a		
Chromium, dissolved	7440-47-3	100	100	1,000					
Cobalt, dissolved	7440-48-4		50	1,000					
Copper, dissolved	7440-50-8	1300	200	500		a	a		
Cyanide, total recoverable	57-12-5	200			5.2	22	5.2	140	
Lead, dissolved	7439-92-1	15	5,000	100		a	a		
Manganese, dissolved	7439-96-5					a	a		
Mercury	7439-97-6	2		10	0.77				
Mercury, dissolved	7439-97-6					1.4	0.77		
Molybdenum, dissolved	7439-98-7		1,000						
Molybdenum, total recoverable	7439-98-7					7,920	1,895		
Nickel, dissolved	7440-02-0	700				a	a	4,600	P
Selenium, dissolved	7782-49-2	50	0.13/0.25 mg/L	50				4,200	P
Selenium, total recoverable	7782-49-2				5.0	20.0	5.0		
Silver, dissolved	7440-22-4					a			
Thallium, dissolved	7440-28-0	2						0.47	P
Uranium, dissolved	7440-61-1	30							
Vanadium, dissolved	7440-62-2		100	100					
Zinc, dissolved	7440-66-6	10,500	2,000	25,000		a	a	26,000	P

Notes applicable to this table of numeric criteria:

(a) Where the letter "a" is indicated in a cell, the criterion is hardness-based (see tables to the right).

(b) Where the letter "b" is indicated in a cell, the criterion can be referenced in Subsection C of 20.6.4.900 NMAC.

(c) Criteria are in µg/L unless otherwise indicated.

(d) Abbreviations are as follows: CAS - chemical abstracts service (see definition for "CAS number" in 20.6.4.7 NMAC); DWS - domestic water supply; Irr - irrigation; LW - livestock watering; WH - wildlife habitat; HH-OO - human health-organism only; C - cancer-causing; P - persistent.

(e) The criteria are based on analysis of an unfiltered sample unless otherwise indicated.

(f) The criteria listed under human health-organism only (HH-OO) are intended to protect human health when aquatic organisms are consumed from waters containing pollutants. These criteria do not protect the aquatic life itself; rather, they protect the health of humans who ingest fish or other aquatic organisms.

Dissolved Metals Hardness-Based Water Quality Criteria (mg/L)

	Hardness (177 mg/L)		Hardness (198 mg/L)		Hardness (141 mg/L)	
	acute AL	chronic AL	acute AL	chronic AL	acute AL	chronic AL
Cadmium	0.0027	0.00068	0.003	0.0007	0.0022	0.00058
Chromium	0.908	0.118	0.998	0.13	0.755	0.098
Copper	0.023	0.0146	0.0256	0.0161	0.019	0.012
Lead	0.119	0.0047	0.135	0.0053	0.094	0.0037
Manganese	3.609	1.994	3.751	2.072	3.348	1.85
Nickel	0.758	0.084	0.836	0.093	0.626	0.07
Silver	0.0086	-	0.01	-	0.0058	-
Zinc	0.269	0.203	0.298	0.226	0.219	0.166

Except for aluminum, the hardness-based criteria are based on analysis of dissolved metal.

Total Recoverable Aluminum Hardness-Based Water Quality Criteria (mg/L)

	Hardness (177 mg/L)		Hardness (198 mg/L)		Hardness (141 mg/L)	
	acute AL	chronic AL	acute AL	chronic AL	acute AL	chronic AL
Aluminum	7.462	2.989	8.737	3.5003	5.48	2.195

For aluminum, the hardness-based criteria are based on analysis of total recover in a sample that is filtered to minimize mineral phases as specified by the Depart

able aluminum
ment.