



3440 South 700 West  
Salt Lake City, UT 84119

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Kyle F. Gross  
Laboratory Director

Jose Rocha  
QA Officer

Lenora Sullivan  
Utah Division of Water Quality  
PO Box 144870  
SLC, UT 84114  
TEL: (801) 538-6329

RE: Gold King Mine - San Juan River Sampling

Dear Lenora Sullivan:

Lab Set ID: 1508161

American West Analytical Laboratories received sample(s) on 8/10/2015 for the analyses presented in the following report.

American West Analytical Laboratories (AWAL) is accredited by The National Environmental Laboratory Accreditation Program (NELAP) in Utah and Texas; and is state accredited in Colorado, Idaho, New Mexico, Wyoming, and Missouri.

All analyses were performed in accordance to the NELAP protocols unless noted otherwise. Accreditation scope documents are available upon request. If you have any questions or concerns regarding this report please feel free to call.

The abbreviation "Surr" found in organic reports indicates a surrogate compound that is intentionally added by the laboratory to determine sample injection, extraction, and/or purging efficiency. The "Reporting Limit" found on the report is equivalent to the practical quantitation limit (PQL). This is the minimum concentration that can be reported by the method referenced and the sample matrix. The reporting limit must not be confused with any regulatory limit. Analytical results are reported to three significant figures for quality control and calculation purposes.

This is a revision of a report originally issued 8/17/2015. Pages 1, 4, and 8 have been revised to correct collection times.

Thank You,

Approved by: \_\_\_\_\_  
Laboratory Director or designee





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Jose Rocha  
QA Officer

## INORGANIC ANALYTICAL REPORT

**Client:** Utah Division of Water Quality **Contact:** Lenora Sullivan  
**Project:** Gold King Mine - San Juan River Sampling  
**Lab Sample ID:** 1508161-002  
**Client Sample ID:** San Juan R @ Sand Island (4953250)  
**Collection Date:** 8/8/2015 1619h  
**Received Date:** 8/10/2015 1302h

### Analytical Results

### TOTAL METALS

Compound	CAS	Units	Date Prepared	Date Analyzed	Method Used	MDL	Reporting Limit	Analytical Result	Qual
Aluminum	7429-90-5	mg/kg-dry	8/11/2015 1151h	8/13/2015 1851h	SW6010C	2.25	13.1	<b>7,140</b>	B
Antimony	7440-36-0	mg/kg-dry	8/11/2015 1151h	8/15/2015 1354h	SW6020A	0.380	4.18	< 4.18	U
Arsenic	7440-38-2	mg/kg-dry	8/11/2015 1151h	8/15/2015 1354h	SW6020A	0.0847	2.61	2.13	J
Barium	7440-39-3	mg/kg-dry	8/11/2015 1151h	8/15/2015 1354h	SW6020A	2.83	4.71	<b>232</b>	
Beryllium	7440-41-7	mg/kg-dry	8/11/2015 1151h	8/15/2015 1354h	SW6020A	0.00622	2.09	0.321	J
Cadmium	7440-43-9	mg/kg-dry	8/11/2015 1151h	8/15/2015 1354h	SW6020A	0.0176	0.889	0.127	J
Calcium	7440-70-2	mg/kg-dry	8/11/2015 1151h	8/13/2015 1851h	SW6010C	3.10	131	<b>7,250</b>	B
Chromium	7440-47-3	mg/kg-dry	8/11/2015 1151h	8/15/2015 1354h	SW6020A	2.54	10.5	5.79	J
Cobalt	7440-48-4	mg/kg-dry	8/11/2015 1151h	8/15/2015 1354h	SW6020A	0.159	1.41	<b>2.12</b>	
Copper	7440-50-8	mg/kg-dry	8/11/2015 1151h	8/15/2015 1354h	SW6020A	1.61	16.2	3.73	J
Iron	7439-89-6	mg/kg-dry	8/11/2015 1151h	8/13/2015 1851h	SW6010C	1.49	6.54	<b>6,340</b>	B
Lead	7439-92-1	mg/kg-dry	8/11/2015 1151h	8/15/2015 1354h	SW6020A	3.13	6.80	4.28	J
Magnesium	7439-95-4	mg/kg-dry	8/11/2015 1151h	8/13/2015 1851h	SW6010C	13.7	131	<b>1,740</b>	B
Manganese	7439-96-5	mg/kg-dry	8/11/2015 1151h	8/15/2015 1354h	SW6020A	0.701	4.18	<b>198</b>	
Mercury	7439-97-6	mg/kg-dry	8/12/2015 1138h	8/13/2015 1306h	SW7471B	0.00154	0.0455	< 0.0455	U
Molybdenum	7439-98-7	mg/kg-dry	8/11/2015 1151h	8/15/2015 1354h	SW6020A	0.372	20.9	< 20.9	U
Nickel	7440-02-0	mg/kg-dry	8/11/2015 1151h	8/15/2015 1354h	SW6020A	2.28	20.9	2.85	J
Potassium	7440-09-7	mg/kg-dry	8/11/2015 1151h	8/13/2015 1851h	SW6010C	26.5	131	<b>1,810</b>	
Selenium	7782-49-2	mg/kg-dry	8/11/2015 1151h	8/15/2015 1354h	SW6020A	0.570	8.89	< 8.89	U
Silver	7440-22-4	mg/kg-dry	8/11/2015 1151h	8/15/2015 1354h	SW6020A	0.0234	1.57	0.0553	J
Sodium	7440-23-5	mg/kg-dry	8/11/2015 1151h	8/13/2015 1851h	SW6010C	10.1	131	<b>157</b>	B1
Thallium	7440-28-0	mg/kg-dry	8/11/2015 1151h	8/15/2015 1354h	SW6020A	0.00528	4.18	0.0959	J
Vanadium	7440-62-2	mg/kg-dry	8/11/2015 1151h	8/15/2015 1354h	SW6020A	0.539	10.5	<b>15.2</b>	
Zinc	7440-66-6	mg/kg-dry	8/11/2015 1151h	8/15/2015 1354h	SW6020A	5.28	52.3	18.9	J

*B - The method blank was acceptable, as the method blank result is less than 10% of the lowest reported sample concentration.*

*B1 - This analyte was also detected in the method blank below the PQL.*

*J - Estimated value between the MDL and the reporting limit (PQL).*

*U - This flag indicates the compound was analyzed for but not detected above the MDL.*



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Kyle F. Gross  
Laboratory Director

Jose Rocha  
QA Officer

## INORGANIC ANALYTICAL REPORT

**Client:** Utah Division of Water Quality **Contact:** Lenora Sullivan  
**Project:** Gold King Mine - San Juan River Sampling  
**Lab Sample ID:** 1508161-003  
**Client Sample ID:** San Juan River @ Town of Montezuma  
**Collection Date:** 8/8/2015 1454h  
**Received Date:** 8/10/2015 1302h

### Analytical Results

### TOTAL METALS

Compound	CAS	Units	Date Prepared	Date Analyzed	Method Used	MDL	Reporting Limit	Analytical Result	Qual
Aluminum	7429-90-5	mg/kg-dry	8/11/2015 1151h	8/13/2015 1853h	SW6010C	2.20	12.8	<b>6,140</b>	B
Antimony	7440-36-0	mg/kg-dry	8/11/2015 1151h	8/15/2015 1357h	SW6020A	0.372	4.10	< 4.10	U
Arsenic	7440-38-2	mg/kg-dry	8/11/2015 1151h	8/15/2015 1357h	SW6020A	0.0829	2.56	1.74	J
Barium	7440-39-3	mg/kg-dry	8/11/2015 1151h	8/15/2015 1357h	SW6020A	2.77	4.61	<b>279</b>	
Beryllium	7440-41-7	mg/kg-dry	8/11/2015 1151h	8/15/2015 1357h	SW6020A	0.00609	2.05	0.291	J
Cadmium	7440-43-9	mg/kg-dry	8/11/2015 1151h	8/15/2015 1357h	SW6020A	0.0173	0.870	0.122	J
Calcium	7440-70-2	mg/kg-dry	8/11/2015 1151h	8/13/2015 1924h	SW6010C	30.3	1,280	<b>8,470</b>	B
Chromium	7440-47-3	mg/kg-dry	8/11/2015 1151h	8/15/2015 1357h	SW6020A	2.49	10.2	5.02	J
Cobalt	7440-48-4	mg/kg-dry	8/11/2015 1151h	8/15/2015 1357h	SW6020A	0.156	1.38	<b>1.76</b>	
Copper	7440-50-8	mg/kg-dry	8/11/2015 1151h	8/15/2015 1357h	SW6020A	1.57	15.9	3.43	J
Iron	7439-89-6	mg/kg-dry	8/11/2015 1151h	8/13/2015 1853h	SW6010C	1.46	6.40	<b>5,530</b>	B
Lead	7439-92-1	mg/kg-dry	8/11/2015 1151h	8/15/2015 1357h	SW6020A	3.07	6.66	3.90	J
Magnesium	7439-95-4	mg/kg-dry	8/11/2015 1151h	8/13/2015 1853h	SW6010C	13.4	128	<b>1,900</b>	B
Manganese	7439-96-5	mg/kg-dry	8/11/2015 1151h	8/15/2015 1357h	SW6020A	0.686	4.10	<b>156</b>	
Mercury	7439-97-6	mg/kg-dry	8/12/2015 1138h	8/13/2015 1307h	SW7471B	0.00148	0.0437	< 0.0437	U
Molybdenum	7439-98-7	mg/kg-dry	8/11/2015 1151h	8/15/2015 1357h	SW6020A	0.365	20.5	< 20.5	U
Nickel	7440-02-0	mg/kg-dry	8/11/2015 1151h	8/15/2015 1357h	SW6020A	2.24	20.5	2.80	J
Potassium	7440-09-7	mg/kg-dry	8/11/2015 1151h	8/13/2015 1853h	SW6010C	26.0	128	<b>1,690</b>	
Selenium	7782-49-2	mg/kg-dry	8/11/2015 1151h	8/15/2015 1357h	SW6020A	0.558	8.70	< 8.70	U
Silver	7440-22-4	mg/kg-dry	8/11/2015 1151h	8/15/2015 1357h	SW6020A	0.0229	1.54	< 1.54	U
Sodium	7440-23-5	mg/kg-dry	8/11/2015 1151h	8/13/2015 1853h	SW6010C	9.87	128	<b>145</b>	B1
Thallium	7440-28-0	mg/kg-dry	8/11/2015 1151h	8/15/2015 1357h	SW6020A	0.00517	4.10	0.0677	J
Vanadium	7440-62-2	mg/kg-dry	8/11/2015 1151h	8/15/2015 1357h	SW6020A	0.527	10.2	<b>13.5</b>	
Zinc	7440-66-6	mg/kg-dry	8/11/2015 1151h	8/15/2015 1357h	SW6020A	5.17	51.2	18.5	J

*B - The method blank was acceptable, as the method blank result is less than 10% of the lowest reported sample concentration.*

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*Reissue of a previously generated report. The collection time has been revised. Information herein supersedes that of the previously issued reports.*

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Laboratory Director

Jose Rocha  
QA Officer

## INORGANIC ANALYTICAL REPORT

**Client:** Utah Division of Water Quality **Contact:** Lenora Sullivan  
**Project:** Gold King Mine - San Juan River Sampling  
**Lab Sample ID:** 1508161-004  
**Client Sample ID:** San Juan R @ US160 Xing in CO (4954000)  
**Collection Date:** 8/8/2015 1323h  
**Received Date:** 8/10/2015 1302h

### Analytical Results

### TOTAL METALS

Compound	CAS	Units	Date Prepared	Date Analyzed	Method Used	MDL	Reporting Limit	Analytical Result	Qual
Aluminum	7429-90-5	mg/kg-dry	8/11/2015 1151h	8/13/2015 1926h	SW6010C	23.5	136	<b>16,600</b>	B
Antimony	7440-36-0	mg/kg-dry	8/11/2015 1151h	8/15/2015 1401h	SW6020A	0.397	4.37	< 4.37	U
Arsenic	7440-38-2	mg/kg-dry	8/11/2015 1151h	8/15/2015 1401h	SW6020A	0.0884	2.73	<b>3.76</b>	
Barium	7440-39-3	mg/kg-dry	8/11/2015 1151h	8/15/2015 1401h	SW6020A	2.95	4.91	<b>200</b>	
Beryllium	7440-41-7	mg/kg-dry	8/11/2015 1151h	8/15/2015 1401h	SW6020A	0.00649	2.18	0.675	J
Cadmium	7440-43-9	mg/kg-dry	8/11/2015 1151h	8/15/2015 1401h	SW6020A	0.0184	0.928	0.309	J
Calcium	7440-70-2	mg/kg-dry	8/11/2015 1151h	8/13/2015 1926h	SW6010C	32.3	1,360	<b>21,900</b>	B
Chromium	7440-47-3	mg/kg-dry	8/11/2015 1151h	8/15/2015 1401h	SW6020A	2.65	10.9	<b>14.2</b>	
Cobalt	7440-48-4	mg/kg-dry	8/11/2015 1151h	8/15/2015 1401h	SW6020A	0.166	1.47	<b>4.12</b>	
Copper	7440-50-8	mg/kg-dry	8/11/2015 1151h	8/15/2015 1401h	SW6020A	1.68	16.9	8.65	J
Iron	7439-89-6	mg/kg-dry	8/11/2015 1151h	8/13/2015 1926h	SW6010C	15.6	68.2	<b>11,400</b>	B
Lead	7439-92-1	mg/kg-dry	8/11/2015 1151h	8/15/2015 1401h	SW6020A	3.27	7.09	<b>9.03</b>	
Magnesium	7439-95-4	mg/kg-dry	8/11/2015 1151h	8/13/2015 1856h	SW6010C	14.3	136	<b>7,060</b>	B
Manganese	7439-96-5	mg/kg-dry	8/11/2015 1151h	8/15/2015 1401h	SW6020A	0.731	4.37	<b>280</b>	
Mercury	7439-97-6	mg/kg-dry	8/12/2015 1138h	8/13/2015 1309h	SW7471B	0.00154	0.0456	0.00182	J
Molybdenum	7439-98-7	mg/kg-dry	8/11/2015 1151h	8/15/2015 1401h	SW6020A	0.389	21.8	< 21.8	U
Nickel	7440-02-0	mg/kg-dry	8/11/2015 1151h	8/15/2015 1401h	SW6020A	2.39	21.8	8.11	J
Potassium	7440-09-7	mg/kg-dry	8/11/2015 1151h	8/13/2015 1856h	SW6010C	27.7	136	<b>4,870</b>	
Selenium	7782-49-2	mg/kg-dry	8/11/2015 1151h	8/15/2015 1401h	SW6020A	0.595	9.28	< 9.28	U
Silver	7440-22-4	mg/kg-dry	8/11/2015 1151h	8/15/2015 1401h	SW6020A	0.0245	1.64	0.0443	J
Sodium	7440-23-5	mg/kg-dry	8/11/2015 1151h	8/13/2015 1856h	SW6010C	10.5	136	<b>722</b>	B1
Thallium	7440-28-0	mg/kg-dry	8/11/2015 1151h	8/15/2015 1401h	SW6020A	0.00551	4.37	0.181	J
Vanadium	7440-62-2	mg/kg-dry	8/11/2015 1151h	8/15/2015 1401h	SW6020A	0.562	10.9	<b>29.4</b>	
Zinc	7440-66-6	mg/kg-dry	8/11/2015 1151h	8/15/2015 1401h	SW6020A	5.51	54.6	40.1	J

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## **INORGANIC ANALYTICAL REPORT**

**Client:** Utah Division of Water Quality **Contact:** Lenora Sullivan  
**Project:** Gold King Mine - San Juan River Sampling  
**Lab Sample ID:** 1508161-001  
**Client Sample ID:** San Juan R @ Mexican Hat US163 Xing (4953000)  
**Collection Date:** 8/8/2015 1454h  
**Received Date:** 8/10/2015 1302h

### **Analytical Results**

<b>Compound</b>	<b>CAS</b>	<b>Units</b>	<b>Date Prepared</b>	<b>Date Analyzed</b>	<b>Method Used</b>	<b>MDL</b>	<b>Reporting Limit</b>	<b>Analytical Result</b>	<b>Qual</b>
Hardness (as CaCO <sub>3</sub> )		mg/L		8/14/2015 721h	SM2340B	10.0	10.0	<b>26,500</b>	





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## **INORGANIC ANALYTICAL REPORT**

**Client:** Utah Division of Water Quality **Contact:** Lenora Sullivan  
**Project:** Gold King Mine - San Juan River Sampling  
**Lab Sample ID:** 1508161-003  
**Client Sample ID:** San Juan River @ Town of Montezuma  
**Collection Date:** 8/8/2015 1454h  
**Received Date:** 8/10/2015 1302h

### **Analytical Results**

<b>Compound</b>	<b>CAS</b>	<b>Units</b>	<b>Date Prepared</b>	<b>Date Analyzed</b>	<b>Method Used</b>	<b>MDL</b>	<b>Reporting Limit</b>	<b>Analytical Result</b>	<b>Qual</b>
Hardness (as CaCO <sub>3</sub> )		mg/L		8/14/2015 721h	SM2340B	10.0	10.0	<b>29,000</b>	

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## INORGANIC ANALYTICAL REPORT

**Client:** Utah Division of Water Quality **Contact:** Lenora Sullivan  
**Project:** Gold King Mine - San Juan River Sampling  
**Lab Sample ID:** 1508161-004  
**Client Sample ID:** San Juan R @ US160 Xing in CO (4954000)  
**Collection Date:** 8/8/2015 1323h  
**Received Date:** 8/10/2015 1302h

### Analytical Results

Compound	CAS	Units	Date Prepared	Date Analyzed	Method Used	MDL	Reporting Limit	Analytical Result	Qual
Hardness (as CaCO <sub>3</sub> )		mg/L		8/14/2015 721h	SM2340B	10.0	10.0	<b>83,800</b>	



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## QC SUMMARY REPORT

**Client:** Utah Division of Water Quality

**Lab Set ID:** 1508161

**Project:** Gold King Mine - San Juan River Sampling

**Contact:** Lenora Sullivan

**Dept:** ME

**QC Type:** LCS

Analyte	Result	Units	Method	MDL	Reporting Limit	Amount Spiked	Spike Ref. Amount	%REC	Limits	RPD Ref. Amt	% RPD	RPD Limit	Qual
<b>Lab Sample ID: LCS-38475</b>		Date Analyzed:	08/13/2015 1827h										
Test Code: 6010C-S		Date Prepared:	08/11/2015 1151h										
Aluminum	96.2	mg/kg	SW6010C	1.72	10.0	100.0	0	96.2	80 - 120				
Calcium	1,000	mg/kg	SW6010C	2.37	100	1,000	0	100	80 - 120				
Iron	95.2	mg/kg	SW6010C	1.14	5.00	100.0	0	95.2	80 - 120				
Magnesium	953	mg/kg	SW6010C	10.5	100	1,000	0	95.3	80 - 120				
Potassium	936	mg/kg	SW6010C	20.3	100	1,000	0	93.6	80 - 120				
Sodium	928	mg/kg	SW6010C	7.71	100	1,000	0	92.8	80 - 120				
<b>Lab Sample ID: LCS-38475</b>		Date Analyzed:	08/15/2015 1334h										
Test Code: 6020-S		Date Prepared:	08/11/2015 1151h										
Antimony	19.0	mg/kg	SW6020A	0.291	3.20	20.00	0	95.0	85 - 115				
Arsenic	20.0	mg/kg	SW6020A	0.0648	2.00	20.00	0	99.8	85 - 115				
Barium	18.6	mg/kg	SW6020A	2.16	3.60	20.00	0	93.1	85 - 115				
Beryllium	20.8	mg/kg	SW6020A	0.00476	1.60	20.00	0	104	85 - 115				
Cadmium	18.8	mg/kg	SW6020A	0.0135	0.680	20.00	0	94.1	85 - 115				
Chromium	19.0	mg/kg	SW6020A	1.94	8.00	20.00	0	95.2	85 - 115				
Cobalt	18.6	mg/kg	SW6020A	0.122	1.08	20.00	0	92.8	85 - 115				
Copper	19.8	mg/kg	SW6020A	1.23	12.4	20.00	0	98.8	85 - 115				
Lead	19.0	mg/kg	SW6020A	2.40	5.20	20.00	0	95.1	85 - 115				
Manganese	19.6	mg/kg	SW6020A	0.536	3.20	20.00	0	97.9	85 - 115				
Molybdenum	18.9	mg/kg	SW6020A	0.285	16.0	20.00	0	94.3	85 - 115				
Nickel	18.8	mg/kg	SW6020A	1.75	16.0	20.00	0	93.8	85 - 115				
Selenium	19.4	mg/kg	SW6020A	0.436	6.80	20.00	0	97.2	85 - 115				
Silver	18.0	mg/kg	SW6020A	0.0179	1.20	20.00	0	90.2	85 - 115				
Thallium	18.8	mg/kg	SW6020A	0.00404	3.20	20.00	0	94.0	85 - 115				
Vanadium	19.0	mg/kg	SW6020A	0.412	8.00	20.00	0	95.0	85 - 115				
Zinc	98.1	mg/kg	SW6020A	4.04	40.0	100.0	0	98.1	85 - 115				



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## QC SUMMARY REPORT

**Client:** Utah Division of Water Quality

**Lab Set ID:** 1508161

**Project:** Gold King Mine - San Juan River Sampling

**Contact:** Lenora Sullivan

**Dept:** ME

**QC Type:** LCS

Analyte	Result	Units	Method	MDL	Reporting Limit	Amount Spiked	Spike Ref. Amount	%REC	Limits	RPD Ref. Amt	% RPD	RPD Limit	Qual
<b>Lab Sample ID:</b> LCS-38499	Date Analyzed:	08/13/2015	1216h										
Test Code: HG-S-7471B	Date Prepared:	08/12/2015	1138h										
Mercury	0.440	mg/kg	SW7471B	0.00135	0.0400	0.4000	0	110	80 - 120				



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Kyle F. Gross  
Laboratory Director

Jose Rocha  
QA Officer

## QC SUMMARY REPORT

**Client:** Utah Division of Water Quality

**Contact:** Lenora Sullivan

**Lab Set ID:** 1508161

**Dept:** ME

**Project:** Gold King Mine - San Juan River Sampling

**QC Type:** MBLK

Analyte	Result	Units	Method	MDL	Reporting Limit	Amount Spiked	Spike Ref. Amount	%REC	Limits	RPD Ref. Amt	% RPD	RPD Limit	Qual
<b>Lab Sample ID:</b> MB-38475	Date Analyzed:	08/13/2015	1825h										
Test Code:	6010C-S	Date Prepared:	08/11/2015	1151h									
Aluminum	7.17	mg/kg	SW6010C	1.72	10.0								JB
Calcium	70.3	mg/kg	SW6010C	2.37	100								JB
Iron	1.83	mg/kg	SW6010C	1.14	5.00								JB
Magnesium	12.2	mg/kg	SW6010C	10.5	100								JB
Potassium	< 100	mg/kg	SW6010C	20.3	100								U
Sodium	22.0	mg/kg	SW6010C	7.71	100								JB1
<b>Lab Sample ID:</b> MB-38475	Date Analyzed:	08/15/2015	1331h										
Test Code:	6020-S	Date Prepared:	08/11/2015	1151h									
Antimony	< 3.20	mg/kg	SW6020A	0.291	3.20								U
Arsenic	< 2.00	mg/kg	SW6020A	0.0648	2.00								U
Barium	< 3.60	mg/kg	SW6020A	2.16	3.60								U
Beryllium	< 1.60	mg/kg	SW6020A	0.00476	1.60								U
Cadmium	< 0.680	mg/kg	SW6020A	0.0135	0.680								U
Chromium	< 8.00	mg/kg	SW6020A	1.94	8.00								U
Cobalt	< 1.08	mg/kg	SW6020A	0.122	1.08								U
Copper	< 12.4	mg/kg	SW6020A	1.23	12.4								U
Lead	< 5.20	mg/kg	SW6020A	2.40	5.20								U
Manganese	< 3.20	mg/kg	SW6020A	0.536	3.20								U
Molybdenum	< 16.0	mg/kg	SW6020A	0.285	16.0								U
Nickel	< 16.0	mg/kg	SW6020A	1.75	16.0								U
Selenium	< 6.80	mg/kg	SW6020A	0.436	6.80								U
Silver	< 1.20	mg/kg	SW6020A	0.0179	1.20								U
Thallium	< 3.20	mg/kg	SW6020A	0.00404	3.20								U
Vanadium	< 8.00	mg/kg	SW6020A	0.412	8.00								U
Zinc	< 40.0	mg/kg	SW6020A	4.04	40.0								U



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Jose Rocha  
QA Officer

## QC SUMMARY REPORT

**Client:** Utah Division of Water Quality

**Lab Set ID:** 1508161

**Project:** Gold King Mine - San Juan River Sampling

**Contact:** Lenora Sullivan

**Dept:** ME

**QC Type:** MBLK

Analyte	Result	Units	Method	MDL	Reporting Limit	Amount Spiked	Spike Ref. Amount	%REC	Limits	RPD Ref. Amt	% RPD	RPD Limit	Qual
<b>Lab Sample ID:</b> MB-38499	Date Analyzed:	08/13/2015	1212h										
Test Code: HG-S-7471B	Date Prepared:	08/12/2015	1138h										
Mercury	< 0.0400	mg/kg	SW7471B	0.00135	0.0400								U

*B - The method blank was acceptable, as the method blank result is less than 10% of the lowest reported sample concentration.*

*B1 - This analyte was also detected in the method blank below the PQL.*

*J - Estimated value between the MDL and the reporting limit (PQL).*

*U - This flag indicates the compound was analyzed for but not detected above the MDL.*



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## QC SUMMARY REPORT

**Client:** Utah Division of Water Quality  
**Lab Set ID:** 1508161  
**Project:** Gold King Mine - San Juan River Sampling

**Contact:** Lenora Sullivan  
**Dept:** ME  
**QC Type:** MS

Analyte	Result	Units	Method	MDL	Reporting Limit	Amount Spiked	Spike Ref. Amount	%REC	Limits	RPD Ref. Amt	% RPD	RPD Limit	Qual
<b>Lab Sample ID: 1508161-001AMS</b>													
Date Analyzed:	08/13/2015 1847h												
Test Code:	6010C-S												
Date Prepared:	08/11/2015 1151h												
Iron	7,760	mg/kg-dry	SW6010C	1.50	6.58	131.5	7630	94.3	75 - 125				
Magnesium	3,490	mg/kg-dry	SW6010C	13.8	132	1,315	2190	99.1	75 - 125				
Potassium	3,610	mg/kg-dry	SW6010C	26.7	132	1,315	2280	101	75 - 125				
Sodium	1,470	mg/kg-dry	SW6010C	10.1	132	1,315	291	89.9	75 - 125				
<b>Lab Sample ID: 1508161-001AMS</b>													
Date Analyzed:	08/13/2015 1919h												
Test Code:	6010C-S												
Date Prepared:	08/11/2015 1151h												
Aluminum	9,600	mg/kg-dry	SW6010C	22.6	132	131.5	8780	622	75 - 125				2
Calcium	8,450	mg/kg-dry	SW6010C	31.2	1,320	1,315	6980	112	75 - 125				
<b>Lab Sample ID: 1508161-001AMS</b>													
Date Analyzed:	08/15/2015 1348h												
Test Code:	6020-S												
Date Prepared:	08/11/2015 1151h												
Antimony	23.8	mg/kg-dry	SW6020A	0.382	4.21	26.30	0	90.5	75 - 125				
Arsenic	27.5	mg/kg-dry	SW6020A	0.0852	2.63	26.30	2.7	94.4	75 - 125				
Barium	310	mg/kg-dry	SW6020A	2.85	4.73	26.30	271	146	75 - 125				2
Beryllium	27.1	mg/kg-dry	SW6020A	0.00626	2.10	26.30	0.423	102	75 - 125				
Cadmium	24.4	mg/kg-dry	SW6020A	0.0177	0.894	26.30	0.165	92.1	75 - 125				
Chromium	32.1	mg/kg-dry	SW6020A	2.56	10.5	26.30	7.72	92.5	75 - 125				
Cobalt	26.4	mg/kg-dry	SW6020A	0.160	1.42	26.30	2.65	90.2	75 - 125				
Copper	29.7	mg/kg-dry	SW6020A	1.61	16.3	26.30	5.01	93.7	75 - 125				
Lead	32.3	mg/kg-dry	SW6020A	3.15	6.84	26.30	5.52	102	75 - 125				
Manganese	248	mg/kg-dry	SW6020A	0.705	4.21	26.30	218	117	75 - 125				
Molybdenum	24.5	mg/kg-dry	SW6020A	0.375	21.0	26.30	0.43	91.5	75 - 125				
Nickel	28.2	mg/kg-dry	SW6020A	2.30	21.0	26.30	4.09	91.7	75 - 125				
Selenium	25.2	mg/kg-dry	SW6020A	0.573	8.94	26.30	0	95.9	75 - 125				
Silver	23.1	mg/kg-dry	SW6020A	0.0236	1.58	26.30	0.0679	87.6	75 - 125				
Thallium	24.1	mg/kg-dry	SW6020A	0.00531	4.21	26.30	0.13	91.3	75 - 125				
Vanadium	43.9	mg/kg-dry	SW6020A	0.542	10.5	26.30	18.9	95.2	75 - 125				
Zinc	160	mg/kg-dry	SW6020A	5.31	52.6	131.5	26.1	102	75 - 125				



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## QC SUMMARY REPORT

**Client:** Utah Division of Water Quality  
**Lab Set ID:** 1508161  
**Project:** Gold King Mine - San Juan River Sampling

**Contact:** Lenora Sullivan  
**Dept:** ME  
**QC Type:** MS

Analyte	Result	Units	Method	MDL	Reporting Limit	Amount Spiked	Spike Ref. Amount	%REC	Limits	RPD Ref. Amt	% RPD	RPD Limit	Qual
<b>Lab Sample ID:</b> 1508161-001AMS	Date Analyzed: 08/13/2015 1302h												
Test Code: HG-S-7471B	Date Prepared: 08/12/2015 1138h												
Mercury	0.497	mg/kg-dry	SW7471B	0.00155	0.0460	0.4597	0	108	80 - 120				

<sup>2</sup> - Analyte concentration is too high for accurate matrix spike recovery and/or RPD.



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## QC SUMMARY REPORT

**Client:** Utah Division of Water Quality  
**Lab Set ID:** 1508161  
**Project:** Gold King Mine - San Juan River Sampling

**Contact:** Lenora Sullivan  
**Dept:** ME  
**QC Type:** MSD

Analyte	Result	Units	Method	MDL	Reporting Limit	Amount Spiked	Spike Ref. Amount	%REC	Limits	RPD Ref. Amt	% RPD	RPD Limit	Qual
<b>Lab Sample ID: 1508161-001AMSD</b>													
Date Analyzed:	08/13/2015 1849h												
Test Code:	6010C-S												
Date Prepared:	08/11/2015 1151h												
Iron	6,790	mg/kg-dry	SW6010C	1.45	6.36	127.3	7630	-666	75 - 125	7760	13.4	20	2
Magnesium	3,190	mg/kg-dry	SW6010C	13.4	127	1,273	2190	78.8	75 - 125	3490	8.99	20	
Potassium	3,410	mg/kg-dry	SW6010C	25.8	127	1,273	2280	88.5	75 - 125	3610	5.61	20	
Sodium	1,410	mg/kg-dry	SW6010C	9.81	127	1,273	291	87.5	75 - 125	1470	4.77	20	
<b>Lab Sample ID: 1508161-001AMSD</b>													
Date Analyzed:	08/13/2015 1922h												
Test Code:	6010C-S												
Date Prepared:	08/11/2015 1151h												
Aluminum	9,030	mg/kg-dry	SW6010C	21.9	127	127.3	8780	191	75 - 125	9600	6.17	20	2
Calcium	7,460	mg/kg-dry	SW6010C	30.2	1,270	1,273	6980	37.4	75 - 125	8450	12.5	20	2
<b>Lab Sample ID: 1508161-001AMSD</b>													
Date Analyzed:	08/15/2015 1351h												
Test Code:	6020-S												
Date Prepared:	08/11/2015 1151h												
Antimony	21.1	mg/kg-dry	SW6020A	0.370	4.07	25.46	0	82.9	75 - 125	23.8	12.0	20	
Arsenic	26.4	mg/kg-dry	SW6020A	0.0825	2.55	25.46	2.7	93.0	75 - 125	27.5	4.29	20	
Barium	226	mg/kg-dry	SW6020A	2.75	4.58	25.46	271	-176	75 - 125	310	31.1	20	2
Beryllium	25.9	mg/kg-dry	SW6020A	0.00606	2.04	25.46	0.423	100	75 - 125	27.1	4.80	20	
Cadmium	23.1	mg/kg-dry	SW6020A	0.0172	0.866	25.46	0.165	90.2	75 - 125	24.4	5.32	20	
Chromium	30.1	mg/kg-dry	SW6020A	2.47	10.2	25.46	7.72	87.8	75 - 125	32.1	6.39	20	
Cobalt	25.2	mg/kg-dry	SW6020A	0.155	1.37	25.46	2.65	88.7	75 - 125	26.4	4.51	20	
Copper	27.8	mg/kg-dry	SW6020A	1.56	15.8	25.46	5.01	89.5	75 - 125	29.7	6.46	20	
Lead	28.1	mg/kg-dry	SW6020A	3.05	6.62	25.46	5.52	88.8	75 - 125	32.3	13.8	20	
Manganese	220	mg/kg-dry	SW6020A	0.682	4.07	25.46	218	9.36	75 - 125	248	12.1	20	2
Molybdenum	22.9	mg/kg-dry	SW6020A	0.362	20.4	25.46	0.43	88.4	75 - 125	24.5	6.62	20	
Nickel	26.5	mg/kg-dry	SW6020A	2.22	20.4	25.46	4.09	88.2	75 - 125	28.2	6.04	20	
Selenium	24.2	mg/kg-dry	SW6020A	0.555	8.66	25.46	0	95.0	75 - 125	25.2	4.21	20	
Silver	22.0	mg/kg-dry	SW6020A	0.0228	1.53	25.46	0.0679	86.3	75 - 125	23.1	4.75	20	
Thallium	23.0	mg/kg-dry	SW6020A	0.00514	4.07	25.46	0.13	89.9	75 - 125	24.1	4.72	20	
Vanadium	39.6	mg/kg-dry	SW6020A	0.524	10.2	25.46	18.9	81.1	75 - 125	43.9	10.5	20	
Zinc	141	mg/kg-dry	SW6020A	5.14	50.9	127.3	26.1	90.4	75 - 125	160	12.5	20	



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## QC SUMMARY REPORT

**Client:** Utah Division of Water Quality  
**Lab Set ID:** 1508161  
**Project:** Gold King Mine - San Juan River Sampling

**Contact:** Lenora Sullivan  
**Dept:** ME  
**QC Type:** MSD

Analyte	Result	Units	Method	MDL	Reporting Limit	Amount Spiked	Spike Ref. Amount	%REC	Limits	RPD Ref. Amt	% RPD	RPD Limit	Qual
<b>Lab Sample ID:</b> 1508161-001AMSD	Date Analyzed: 08/13/2015 1304h												
Test Code: HG-S-7471B	Date Prepared: 08/12/2015 1138h												
Mercury	0.498	mg/kg-dry	SW7471B	0.00155	0.0460	0.4597	0	108	80 - 120	0.497	0.0462	20	

<sup>2</sup> - Analyte concentration is too high for accurate matrix spike recovery and/or RPD.

Corrections made to collection times on  
sample #'s 1 and 3 -RW

**WORK ORDER Summary**

Work Order: **1508161** Page 1 of 2

**Client:** Utah Division of Water Quality

Due Date: 8/17/2015

**Client ID:** UTD200

**Contact:** Lenora Sullivan

**Project:** Gold King Mine - San Juan River Sampling

**QC Level:** II+ MDL

WO Type: Standard

**Comments:** 5 Day Rush / QC2+ / Flag any concentrations detected less than RL and at or greater than the MDL with a J flag. Include EDD; CC report to Jim Harris and Trisha Johnson;

Sample ID	Client Sample ID	Collected Date	Received Date	Test Code	Matrix	Sel	Storage
1508161-001A	San Juan R @ Mexican Hat US163 Xing (4953000)	8/8/2015 1740h	8/10/2015 1302h	3051A-ICPMS-PR	Solid	<input type="checkbox"/>	DF-Metals 1
				6010C-S		<input checked="" type="checkbox"/>	DF-Metals
				<i>6 SEL Analytes: AL CA FE MG K NA</i>			
				6020-S		<input checked="" type="checkbox"/>	DF-Metals
				<i>17 SEL Analytes: SB AS BA BE CD CR CO CU PB MN MO NI SE AG TL V ZN</i>			
				HARD-2340B		<input type="checkbox"/>	DF-Metals
				HG-S-7471B		<input type="checkbox"/>	DF-Metals
1508161-002A	San Juan R @ Sand Island (4953250)	8/8/2015 1619h	8/10/2015 1302h	3051A-ICPMS-PR	Solid	<input type="checkbox"/>	DF-Metals 1
				6010C-S		<input checked="" type="checkbox"/>	DF-Metals
				<i>6 SEL Analytes: AL CA FE MG K NA</i>			
				6020-S		<input checked="" type="checkbox"/>	DF-Metals
				<i>17 SEL Analytes: SB AS BA BE CD CR CO CU PB MN MO NI SE AG TL V ZN</i>			
				HARD-2340B		<input type="checkbox"/>	DF-Metals
				HG-S-7471B		<input type="checkbox"/>	DF-Metals
1508161-003A	San Juan River @ Town of Montezuma	8/8/2015 1454h	8/10/2015 1302h	3051A-ICPMS-PR	Solid	<input type="checkbox"/>	DF-Metals 1
				6010C-S		<input checked="" type="checkbox"/>	DF-Metals
				<i>6 SEL Analytes: AL CA FE MG K NA</i>			
				6020-S		<input checked="" type="checkbox"/>	DF-Metals
				<i>17 SEL Analytes: SB AS BA BE CD CR CO CU PB MN MO NI SE AG TL V ZN</i>			
				HARD-2340B		<input type="checkbox"/>	DF-Metals
				HG-S-7471B		<input type="checkbox"/>	DF-Metals

# WORK ORDER Summary

Work Order: **1508161** Page 2 of 2

Client: Utah Division of Water Quality

Due Date: 8/17/2015

Sample ID	Client Sample ID	Collected Date	Received Date	Test Code	Matrix	Sel	Storage	
1508161-003A	San Juan River @ Town of Montezuma	8/8/2015 1454h	8/10/2015 1302h	HG-S-PR-B	Solid	<input type="checkbox"/>	DF-Metals 1	
				PMOIST		<input type="checkbox"/>	DF-Metals	
1508161-004A	San Juan R @ US160 Xing in CO (4954000)	8/8/2015 1323h	8/10/2015 1302h	3051A-ICPMS-PR	Solid	<input type="checkbox"/>	DF-Metals 1	
				6010C-S		<input checked="" type="checkbox"/>	DF-Metals	
				<i>6 SEL Analytes: AL CA FE MG K NA</i>				
				6020-S		<input checked="" type="checkbox"/>	DF-Metals	
				<i>17 SEL Analytes: SB AS BA BE CD CR CO CU PB MN MO NI SE AG TL V ZN</i>				
				HARD-2340B		<input type="checkbox"/>	DF-Metals	
	HG-S-7471B	<input type="checkbox"/>	DF-Metals					
	HG-S-PR-B	<input type="checkbox"/>	DF-Metals					
	PMOIST	<input type="checkbox"/>	DF-Metals					

American West Analytical Laboratories

Chain of Custody

Lab Sample Set # 1508-161

Client: **Utah Division of Water Quality**  
 Address: **PO Box 144870**  
**Salt Lake City, UT 84114-4870**  
 Project Name: **Gold King Mine - San Juan River Sampling**  
 PO#:

Contact: **Lenora Sullivan**  
 Phone: **801-536-4367**  
 Fax: **801-536-4301**  
 Email: **lenoras@utah.gov**  
**jamesharris@utah.gov (please copy on results)**

**S Bay**

QC Level: 2+

TAT - ASAP

*[Handwritten signature]*

Sample ID:	Date Sampled	Time	# of Containers	Sample Matrix	Total Trace Metals: pH, Alkalinity, Anions, TDS, TSS, Conductivity	Total TAL Metals + Mo + Hardness (200.7: Al, Ca, Fe, K, Mg, Ni, 200.8: Sb, As, Ba, Be, Cd, Cr, Co, Cu, Pb, Mn, Mo, N, Ag, Se, Ti, V, Zn, 245.1: Hg)	Dissolved TAL Metals + Mo + Hardness (200.7: Al, Ca, Fe, K, Mg, Ni, 200.8: Sb, As, Ba, Be, Cd, Cr, Co, Cu, Pb, Mn, Mo, N, Ag, Se, Ti, V, Zn, 245.1: Hg)	Laboratory Use Only				
								Comments	Samples Were:			
SAN JUAN R AT MEXICAN HAT US163 XING (4953000)	8/6/15	<del>1454</del>	1	S		X		Dissolved Metals samples have been field filtered.	1 Shipped <input checked="" type="checkbox"/> hand delivered			
SAN JUAN R AT SAND ISLAND (4953250)	8/10/15	1614	1	S		X		Samples collected from river monitoring following a mine waste dump release. Please flag any concentrations detected less than RL and at or greater than the MDL with a J qualifier. Please include EDD.	2 Ambient or Chilled <input checked="" type="checkbox"/>			
San Juan River at Town of Montezuma	8/13/15	<del>1740</del>	1	S		X			3 Temperature <input checked="" type="checkbox"/>			
SAN JUAN R AT US160 XING IN CO (4954000)	8/18/15	1323	1	S		X			4 Received Broken/Leaking (Improperly Sealed)			
									Y	N		
									5 Properly Preserved			
									Y	N		
									6 Received Within Holding Times			
									Y	N		
									COC Tape Was:			
									1 Present on Outer Package	Y	N	NA
									2 Unbroken on Outer Package	Y	N	NA
									3 Present on Sample	Y	N	NA
									4 Unbroken on Sample	Y	N	NA
									Discrepancies Between Sample Labels and COC Record?			
									Y	N		

Sample collection times updated 8/19/2015 per email from Trisha Johnson -RW

Special Instructions:

Relinquished by: Signature <i>[Signature]</i>	Date: 8/10/15	Received by: Signature <i>[Signature]</i>	Date: 8/10/15
Print Name: JAMES HARRIS	Title: 1302	Print Name: Lenora Sullivan	Title: 1302
Relinquished by: Signature	Date:	Received by: Signature	Date:
Print Name	Title:	Print Name	Title: