

# Attachment A

## List of documents reviewed by the Team

Animas River Stakeholders Group, January 2015, Meeting Summary, 3 p.

Animas River Stakeholders Group, May 2015, Meeting Summary, 3 p.

Colorado Division of Reclamation, Mining & Safety, 2008, Project Summary: Gold King Bond Forfeiture M-1986-013, Phase I – 2008, Permanent Portal Discharge Diversion Structure, 2 p.

Colorado Division of Reclamation, Mining & Safety, 2009, Project Summary: Gold King Bond Forfeiture M-1986-013, Phase II – 2009 Reclamation at the Sampson, Number One, and Level Seven Portals, 4 p.

Colorado Division of Reclamation, Mining & Safety, 2014, Approximation of Mine Portal Elevations and Mine Pool Elevations Map, 1 p.

Colorado Division of Reclamation, Mining & Safety, 2015, Red and Bonita, Sunnyside, Gold King, and Mogul and Grand Mogul Mine Workings Map, 1 p.

Environmental Protection Agency, September 2014, POLREP#1 (Initial Pollution Report) – Removal Assessment, Gold King Mine Site, 9 p.

Environmental Protection Agency, August 2015, Gold King – EPA Working Assumptions, 2 p.

Environmental Restoration, LLC, July 2014, Request for Proposal, Gold King Mine, 16 p.

Environmental Restoration, LLC, May 2015, Action/Work Plan, Gold King Mine, 6 p.

# Attachment B

## List of key personnel interviewed EPA Internal Review Team of the Gold King Mine Spill, Colorado

The EPA Internal Review Team conducted a series of interviews with key personnel involved in deciding how to proceed with the removal assessment at the site and or who were present at the site prior to the release at the Gold King Mine site in Colorado. The team asked these key personnel about what information they reviewed and considered prior to making the decision to proceed with the removal assessment at the site and what kind of actual field conditions they encountered just prior to the spill. The list below provides the names and affiliations of the key personnel interviewed by the EPA's Internal Review Team.

### **Key Personnel Interviewed**

Formal interviews were held on August 17, 2015, were held at the Recreation Center in Durango, Colorado. The personnel included:

(b) (6) - Program Director, USEPA Region 8 Preparedness, Assessment and Emergency Response Program

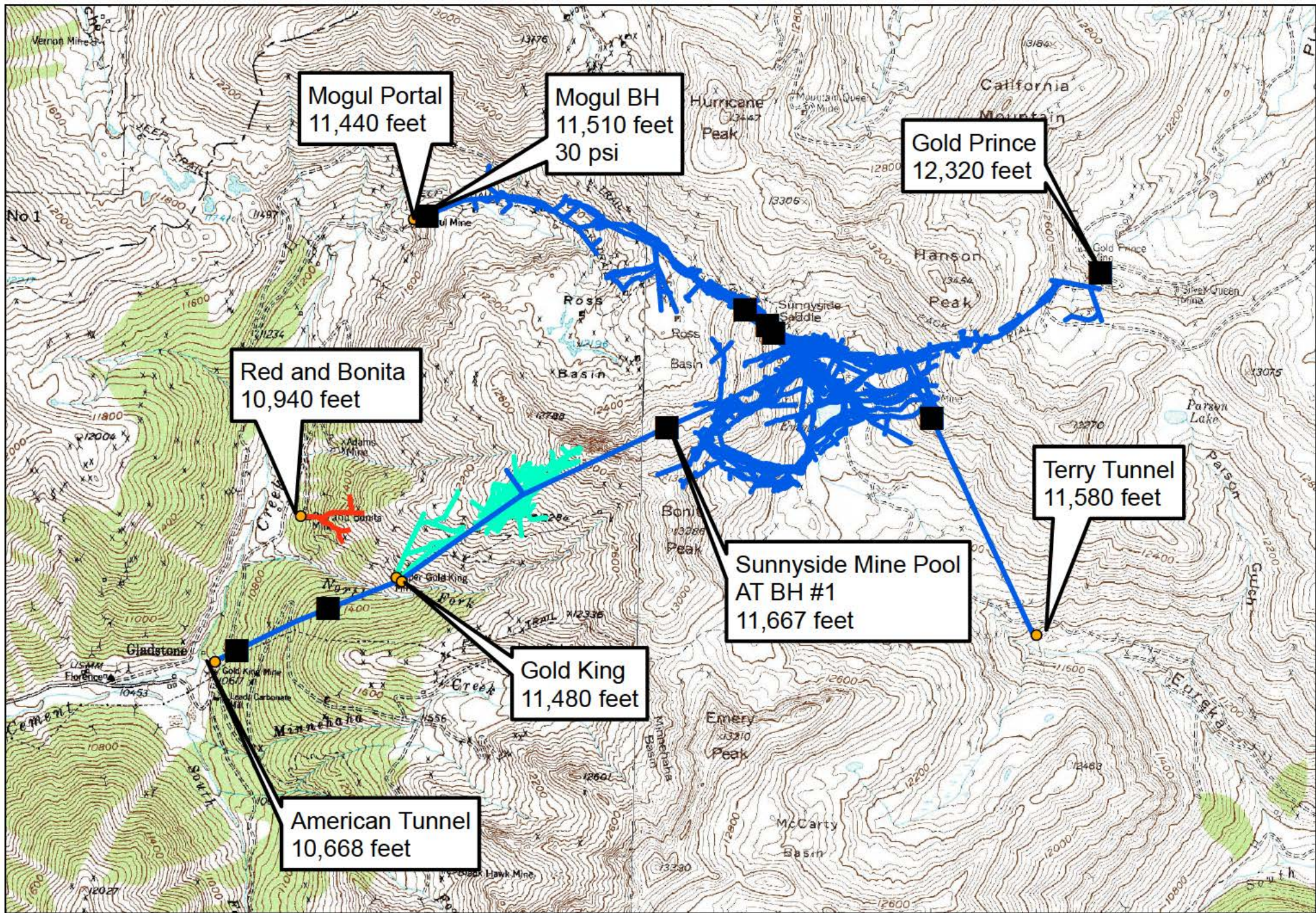
(b) (6) USEPA Region 8 On-Scene Coordinator

(b) (6) (by phone) - USEPA Region 8 On-Scene Coordinator

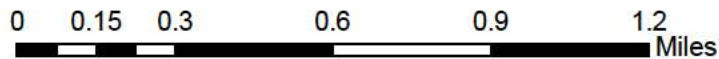
During the site visit to the Gold King Mine site on August 18, 2015, the EPA Internal Review Team talked (informal discussions) with the following personnel:

(b) (6) Colorado Division of Reclamation Mining and Safety

(b) (6) Colorado Division of Reclamation Mining and Safety



**Mine and Pool Elevations**



Approximation of Mine Portal Elevations  
and Mine Pool Elevations  
Created for ARSG  
(b) (6)  
4/17/2014



**Gold King Mine**

**2015**

**EPA Working Assumptions**

CLIENT/SUBJECT GOLD KING MINE

TASK DESCRIPTION EPA WORKING ASSUMPTIONS

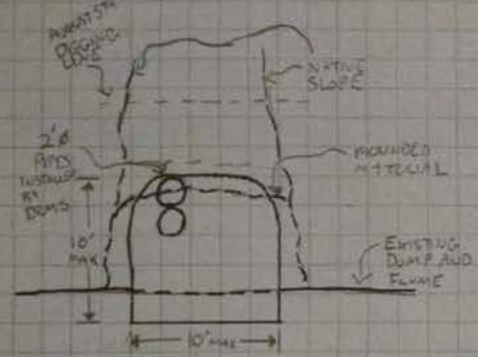
PREPARED BY (b) (6) DEPT START RS DATE

MATH CHECKED BY (b) (6) DEPT START RS DATE

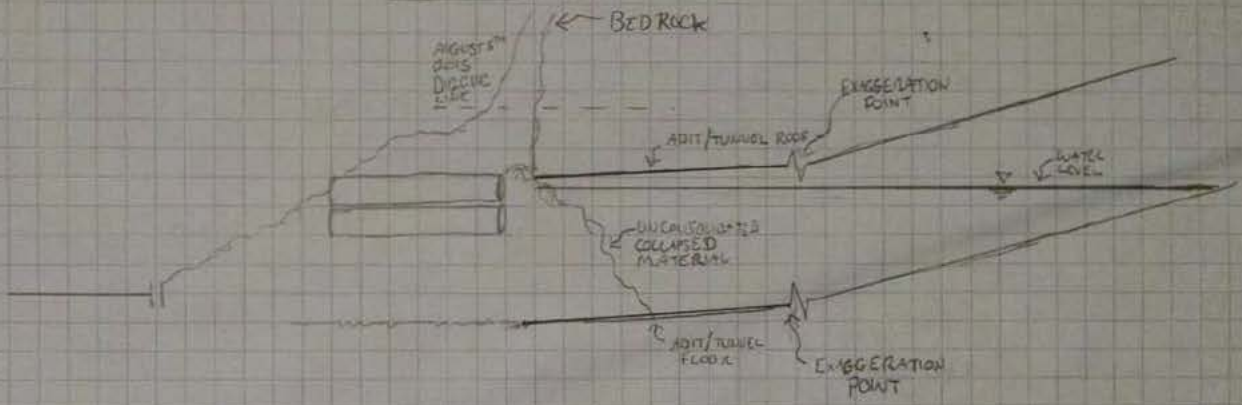
METHOD REV. BY DEPT DATE

SHEET \_\_\_\_\_ of \_\_\_\_\_  
 W.O. NO. \_\_\_\_\_  
 TASK NO. \_\_\_\_\_  
 APPROVED BY \_\_\_\_\_  
 DEPT \_\_\_\_\_ DATE \_\_\_\_\_

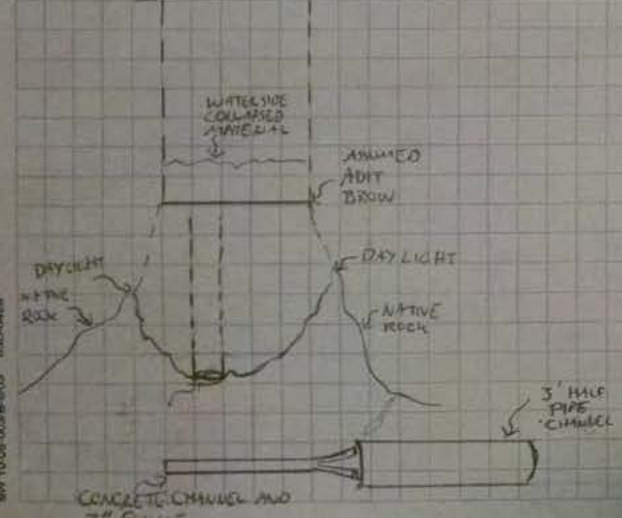
FRONT VIEW N.T.S.



SIDE VIEW N.T.S.



TOP VIEW N.T.S.



REV 10-06-0038 000 0100-0428

# Attachment E

## Gold King Mine Flow Data and Chart

### Flow from Gladstone Area Mines

The annual discharge of water from the Gold King Mine and 3 nearby mines (Mogul, Red and Bonita, and American Tunnel) was estimated using ESAT data from 2009 through 2014 (Table 1). The average annual runoff flow and the average annual non-runoff flows were weighted to estimate overall annual flow. The four mines discharge approximately 330 million gallons of water per year (based on 2009-2014 flow data). Additional mines in the area also release acid mine drainage. The recent release of 3 million gallons is less than 1 percent of the annual discharge from the four mines.

**TABLE 1**  
**Historic Annual Flows from 4 Mines (Mogul, Red and Bonita, Gold King and American Tunnel)**  
**2009-2012**

	4 Mines Flow			CC06 Flow			
	Flow (cfs)	Days	Annual Flow (gpy)	Flow (cfs)	Days	Annual Flow (gpy)	% of Total
<b>Average of Yearly Average Flow*</b>							
Non-Runoff	1.364	273	240,700,000	0.270	273	47,600,000	20%
Runoff	1.474	92	87,700,000	0.391	92	23,300,000	27%
	<b>Total</b>		328,400,000	<b>Total</b>		70,900,000	22%
<b>2009</b>							
Non-Runoff	1.477	273	260,500,000	0.426	273	75,100,000	29%
Runoff	1.623	92	96,500,000	0.452	92	26,900,000	28%
	<b>Total</b>		357,000,000	<b>Total</b>		102,000,000	29%
<b>2010</b>							
Non-Runoff	1.227	273	216,400,000	0.418	273	73,800,000	34%
Runoff	1.381	92	82,100,000	0.522	92	31,000,000	38%
	<b>Total</b>		298,500,000	<b>Total</b>		104,800,000	35%
<b>2011</b>							
Non-Runoff	1.365	273	240,800,000	0.313	273	55,200,000	23%
Runoff	1.389	92	82,600,000	0.313	92	18,600,000	23%
	<b>Total</b>		323,400,000	<b>Total</b>		73,800,000	23%
<b>2012</b>							
Non-Runoff	1.562	273	275,600,000	0.313	273	55,200,000	20%
Runoff	1.389	92	82,600,000	0.313	92	18,600,000	23%
	<b>Total</b>		358,200,000	<b>Total</b>		73,800,000	21%

cfs cubic feet per second

gpy gallons per year

Calculations based on EPA/ESAT flow monitoring data from 2009-2014. Overall flows for 2013 and 2014 are not shown because spring flows are not available for either year due to snowpack conditions. The average annual runoff flows from 2009-2012 and the average non-runoff flows from 2009-2014 were averaged to calculate the overall average runoff flow. Runoff averages included measurements made during May, June, July. Non-runoff averages included measurements made during other months of the year.

## **Variability of Gold King Mine Flow**

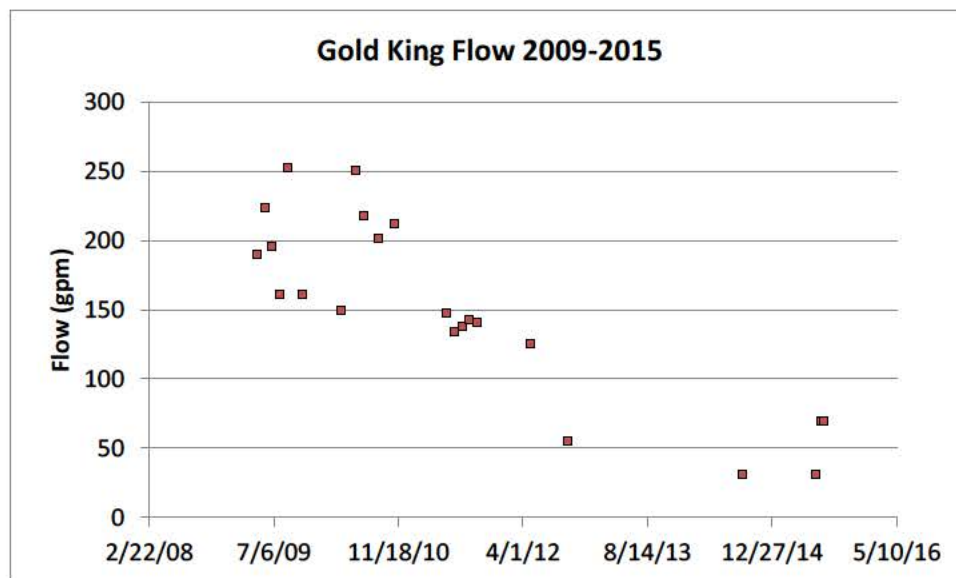
Gold King Mine flow data is available from 2009 through 2014, with multiple sampling events from 2009-2011 and fall sampling from 2012-2014. Gold King Mine spring flow was not measured from 2012 to the present due to high snow and potential avalanche conditions, and flow was not measured during fall 2013 due to the government shutdown. Flow was also measured by START during 2014 and 2015 site visits.

For years with multiple flow measurements (2009, 2010, 2011), the Gold King Mine discharge varied by up to 45 percent within 1 year (2009), when the November flow was 45 percent greater than the August flow.

The Gold King Mine discharge annual average runoff flow varied from the annual average non-runoff flow by up to 22 percent (2010).

Older historic data from START showed flow was 42 gpm in July 2005, 135 gpm in September 2005, and 314 gpm in October 2006. This widely variable flow may have been due to backup of water behind the American Tunnel reaching the elevation of the Gold King rather than an indication of the variability of flow from the Gold King Mine.

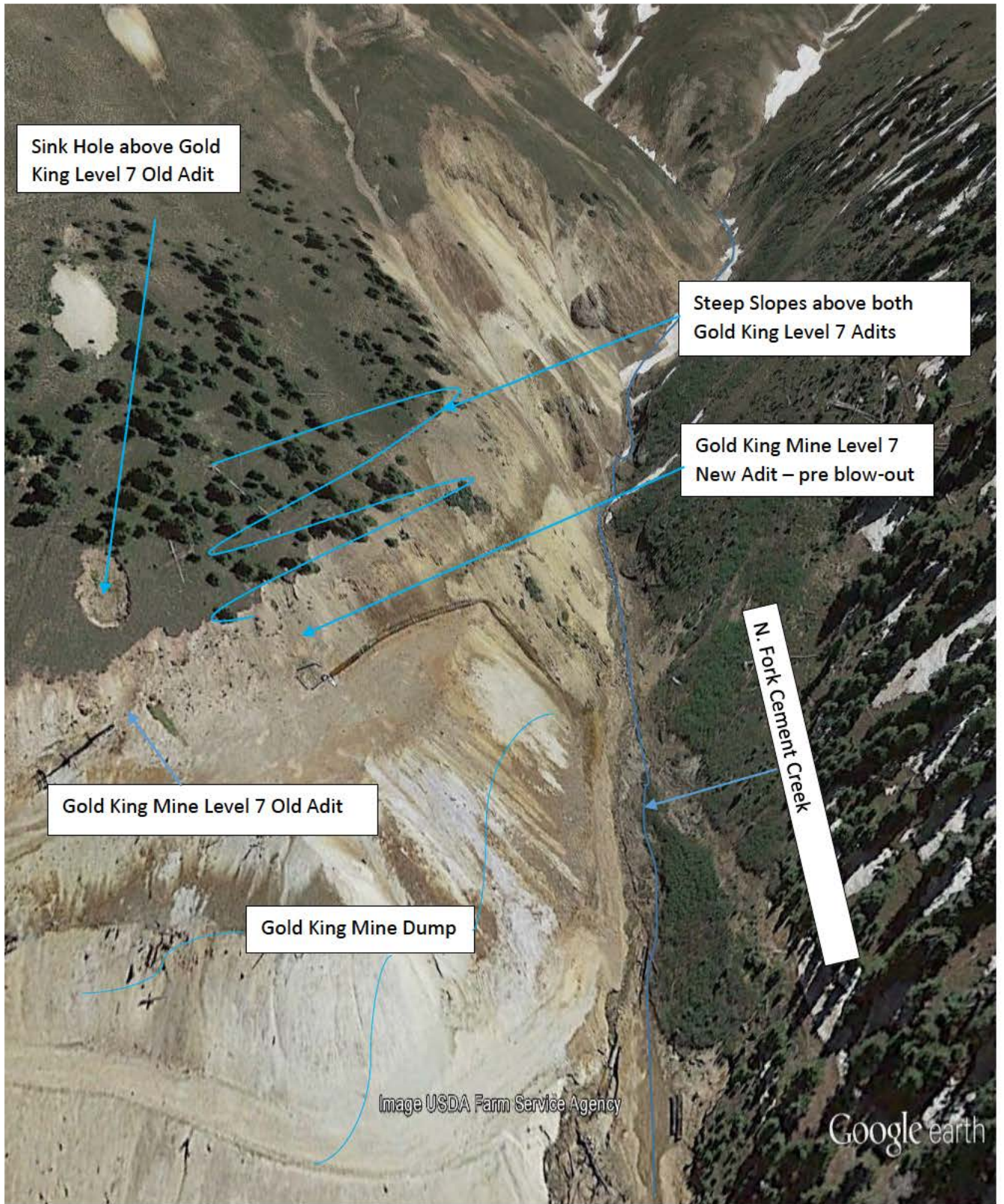
Measurements in 2015 included 31 gallons per minute (gpm) on June 24 (similar to Fall 2014), and 69 gpm on both July 15 and July 23.



# Appendix F

Photos and Google Earth Images





**Photo 1 Google Earth June 2015 Image - Gold King Level 7 Adits and Mine Dump**



Photo 2 Google Earth June 2015 Image - Gold King Level 7 and Red & Bonita Mine Adits



**Photo 3 August 18, 2015 – Sink Hole and Slope above Gold King Mine Old Adit**



**Photo 4 August 18, 2015 – Gold King Mine Level 7 Adit post-blowout**

**Attachment G: Gold King Assessment – Photo Log from Epaosc.org**

## Attachment G: Gold King Assessment – Photo Log from Epaosc.org

Description: Collapsed timbers uncovered.

Category: 2015

Latitude: 37.894578

Date Taken: 8/5/2015

Longitude: -107.63832

Tags:



Description: Ongoing 2015 investigation work.

Category: 2015

Latitude: 37.894578

Date Taken: 8/4/2015

Longitude: -107.63832

Tags:



Description: 2015 investigation progress check

Category: 2015

Latitude: 37.894578

Date Taken: 8/4/2015

Longitude: -107.63832

Tags:



Description: Adit excavation work 2015.

Category: 2015

Latitude: 37.894578

Date Taken: 8/4/2015

Longitude: -107.63832

Tags:



Description: Initial investigation work in 2015.

Category: 2015

Latitude: 37.894578

Date Taken: 7/29/2015

Longitude: -107.63832

Tags:



# Gold King Assessment

## Photo Log

Description: 2015 initial site conditions, facing northeast

Category: 2015

Latitude: 37.894578

Date Taken: 7/28/2015

Longitude: -107.63832

Tags:



Description: 2015 initial site conditions, facing west.

Category: 2015

Latitude: 37.894518

Date Taken: 7/14/2015

Longitude: -107.63863

Tags:



Description: Restored berm 2014 with added drainage pipes in foreground.

Category: 2014

Latitude: 37.8944933333333

Date Taken: 9/12/2014

Longitude: -107.6383883333333

Tags:



Description: Installation of new pipes to collect adit discharge.

Category: 2014

Latitude: 37.894615

Date Taken: 9/12/2014

Longitude: -107.63838

Tags:



Description: Excavation progress 2014. Metal pipes that previously conveyed water to the concrete channel are exposed.

Category: 2014

Latitude: 37.895345

Date Taken: 9/12/2014

Longitude: -107.6381633333333

Tags:



# Gold King Assessment

## Photo Log

Description: 2014 excavation work.

Category: 2014

Latitude: 37.89361

Date Taken: 9/11/2014

Longitude: -107.638153333333

Tags:



Description: 2014 excavation work.

Category: 2014

Latitude: 37.893685

Date Taken: 9/11/2014

Longitude: -107.638411666667

Tags:



Description: Gold King Mine discharge flowing east in half pipe channel during preparations for 2014 site work.

Category: 2014

Latitude: 37.89451

Date Taken: 9/11/2014

Longitude: -107.638383333333

Tags:



Description: Water flowing slowly from opening 100 feet west of main Gold King Mine adit.

Category: 2014

Latitude: 37.894629

Date Taken: 9/11/2014

Longitude: -107.638679

Tags:



Description: Gold King Mine prior to 2014 site work

Category: 2014

Latitude: 37.89454

Date Taken: 9/11/2014

Longitude: -107.638261666667

Tags:



Description:



# Gold King Assessment

## Photo Log

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Gold King Mine prior to 2014 site work. Water flowed to a concrete channel, through a flume (by white plastic structure at right), to a half pipe channel, and down the east face of the waste rock dump to North Fork Cement

Category: 2014

Latitude: 37.894561

Date Taken: 8/27/2014

Longitude: -107.638486

Tags:

