CONFIDENTIAL
HRS PRELIMINARY SCORE
for the
Cement Creek
San Juan County, Colorado

The Cement Creek site in the Upper Animas River drainage has been evaluated by Quickscore using the Hazard Ranking System scoring strategy of Level II releases of dissolved metals in surface water to wetlands and sensitive environments along Cement Creek and the Animas River and the occurrence of a downstream fishery in the Animas River 15-mile TDL below its confluence with Cement Creek in Silverton, Colorado. The score is based on data gathered during the October 2010 SI field sampling event.

Background Determination

Historic mining activity is pervasive in this area of the San Juan Mountains. Mining and mineral extraction was always the major economic activity in the area until the recent rise of tourism. The background surface water values should represent as closely as possible the values for dissolved metals in the surface water that existed prior to mining activity. A representative background level of dissolved metals in surface water was determined by selecting four sample locations which are hydrologically upgradient of significant historic mining activity or mine/mill wastes. The fifth background sample location was selected from a similar stream, the Animas River prior to its confluence with Cement Creek.

A description of the five sample locations selected to determine a representative background are:

1. Sample location UASW003 (A68) located on the Animas River immediately prior to the confluence with Cement Creek was Selected because the Animas River is the next drainage east of Cement Creek, originates in the area immediately east of the headwaters of Cement Creek and is the location of moderate mineralization and mining activity.
2. Sample location UASW005 (CC17) was selected as the most upstream sample location on the South Fork of Cement Creek.
3. Sample location UASW012 was selected as the most upstream sample location on the North Fork of Cement Creek.
4. Sample location UASW030 (CC01F) was selected as the most upstream location in the Lower Ross Basin.
5. Sample location USSW045 was selected from Minnesota Gulch, a tributary stream from the western side of the Cement Creek Basin that is located in mineralized terrain with minimal mining activity.

The highest analyte value of the five selections was selected to provide a conservative background level which should more closely reflect pre-mining activity. The Table presenting the determination of the background value is attached.

Sources

The Cement Creek site was evaluated based on the presence of contaminants from 7 of an initial estimate of 9 potential sources that were identified in the 2011 ARR. Seven of these sources have documented analyses of mine or adit discharge water. Since Level I contamination was documented in the wetlands of Cement Creek where the discharge of Mogul Mine flows through wetlands (UASW019 for cadmium 72.8 ug/L and zinc 27,600 ug/l) the default value of 100 for source waste quantity was used for scoring purposes. Analytical data from the samples documents the presence of arsenic, barium, cadmium, chromium, copper, manganese, nickel, and zinc in the sources. A Table presenting the source analytical results is attached. Fourteen additional mine waste rock samples were collected in 2010, but their exact relationship to the surface water pathway in not completely documented and understood at this time.

The nine potential sources have been tentatively identified at this stage of the investigation from the ARR of the 2010 sampling event are:

1. Gold King Level 7 Mine (UAAD002/CC06
2. Red and Bonita Mine (UAAD003/CC03C)
3. Mogul Mine (UAAD004/CC02D
4. Mogul North Mine (Mogul sublevel 1) (UASW022/CC02A)
5. Grand Mogul Mine (UASW059)
6. Queen Anne Mine (UASW024/CC01S)
7. Columbia Mine – no sample
8. Adelphin Mine – no sample
9. American Tunnel - (UAAD001/CC19)

Groundwater Pathway

Background or target groundwater samples were not collected as a part of the October 2010 SI field effort. A lack of documented groundwater wells and groundwater users in the area preclude the effective sampling and evaluation of this pathway.

Soil Exposure and Air Pathway

Residential soil samples were not collected as a part of the October 2010 SI field effort. The upper reaches of Cement Creek is sparsely populated and there is insufficient evidence to indicate that further evaluation of this pathway would contribute to the overall site score.

Air Pathway

Air samples were not collected as a part of the October 2010 SI field effort. The area is covered with snow much of the year, and was covered by approximately 8-24 inches of snow in October 2010.

Surface Water Pathway

Release samples document elevated concentrations of aluminum, beryllium, cadmium, copper, iron, lead, manganese, nickel, sodium, and zinc in the surface water of Cement Creek. Aluminium, iron, and sodium are not evaluated because they do not have elevated toxicity values. Of the remaining elevated concentrations cadmium, copper, manganese, and zinc are the best choice to score the site because of their frequent occurrence in elevated concentrations and their toxicity in the surface water environmental and human food chain pathways. A table showing the realease samples arranged from most upstream to downstream is attached.

Environmental and human food chain targets are known to be present along Cement Creek and the Animas River below Silverton, but are not well documented. Wetlands and sensitive environments are located along Cement Creek and have been mentioned in the literature. The Wetlands Inventory Map for Cement Creek has just been released within the past week and shows many small wetland areas along Cement Creek. These wetlands maps are produced from interpretations of aerial photographs and since the wetlands designations have not been field checked for obligate wetland vegetation or soil profiles indicative of wetlands the wetland frontage figures taken from these maps can be challenged. Not all wetlands met the qualification as defined in 40 CFR 230.3 so the type of wetland should also be field documented. Sensitive environments and threatened and endangered species in the Cement Creek drainage are being studies by researchers from Colorado Universities. A wetland that is also used by an endangered species is evaluated as two separate environments garnering addition points.

For the Quickscore evaluation it was assumed that a minimum of 0.15 mile of stream side wetland w documented to be impacted by the Level II concentrations of cadmium, copper, manganese, and zinc which extend through a large section of Cement Creek.

Anecdotal accounts report that sport fishing for mountain trout occurs in the Animas River below Silverton. It is also likely that tourists and vacationers recreate along the Animas River below Silverton. The Colorado Department of Wildlife reports incidences of fishing along the Animas River. There are currently no documented reports of fishermen catching and eating fish from the Animas River within the 15-mile target distance limit. A field presence would likely yield the necessary testimony and photographs to document that fish caught in the river are consumed.

For the Quickscore evaluation it was assumed that one person ate one meal of fish caught in the Animas River within the 15-mile downstream target distance limit.

Sediment samples contained documented Level II concentrations of arsenic, barium, silver, and zinc. Silver dominated the upper reach of Cement Creek, zinc and arsenic the middle reach, and barium the lower reach of the stream. The low toxicities of arsenic, barium, silver, and zinc precluded a significant contribution to the site score by the sediment samples. The analytical data from the sediment samples was not included in this QuickScore evaluation of the Cement Creek site.

The site Quickscore developed for two scenarios is as follows:

Wetlands Contamination alone – from existing data-Level II

Groundwater Pathway:	0.00
Surface Water Pathway	42.67
Soil Exposure	0.00
Air Pathway	0.00
Site Score:	**21.34**

Wetlands Contamination plus 1 consumed fish – from existing data plus documentation of at least one fish from the Animas River being consumed

Groundwater Pathway:	0.00
Surface Water Pathway	106.67
Soil Exposure	0.00
Air Pathway	0.00
Site Score:	**50.00**

****** CONFIDENTIAL ******
******PRE-DECISIONAL DOCUMENT ******
****** SUMMARY SCORESHEET ******
****** FOR COMPUTING PROJECTED HRS SCORE ******

****** Do Not Cite or Quote ******

Site Name: Cement Creek

Region: 8

City, County, State: San Juan CO

Evaluator: START

EPA ID#: CO0001411347

Date: 6/21/2011

Lat/Long: 38.9 N, 107.75 W

T/R/S:

Congressional District:

This Scoresheet is for: ESI

Scenario Name: Level II

Description: Wetlands& sensitive environments in Cement Ck. And Animias River, and a fishery in the Animas River below Silverton.

	S pathway	S^2 pathway
Ground Water Migration Pathway Score (S_{gw})		
Surface Water Migration Pathway Score (S_{sw})	100	10000
Soil Exposure Pathway Score (S_s)		
Air Migration Score (S_a)		
$S^2_{gw} + S^2_{sw} + S^2_s + S^2_a$		10000
$(S^2_{gw} + S^2_{sw} + S^2_s + S^2_a)/4$		2500
$\sqrt{(S^2_{gw} + S^2_{sw} + S^2_s + S^2_a)/4}$		50

* Pathways not assigned a score (explain):

TABLE 4-1 --SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORESHEET

Factor categories and factors	Maximum Value	Value Assigned	
Watershed Evaluated:			
Drinking Water Threat			
Likelihood of Release:			
1. Observed Release	550	550	
2. Potential to Release by Overland Flow:			
2a. Containment	10	10	
2b. Runoff	10	1	
2c. Distance to Surface Water	5	25	
2d. Potential to Release by Overland Flow [lines 2a(2b + 2c)]	35	260	
3.Potential to Release by Flood:			
3a. Containment (Flood)	10	10	
3b. Flood Frequency	50	50	
3c. Potential to Release by Flood (lines 3a x 3b)	500	500	
4. Potential to Release (lines 2d + 3c, subject to a maximum of 500)	500	500	
5. Likelihood of Release (higher of lines 1 and 4)	550		0
Waste Characteristics:			
6. Toxicity/Persistence	(a)		
7. Hazardous Waste Quantity	(a)	100	
8. Waste Characteristics	100		0
Targets:			
9. Nearest Intake	50		
10. Population:			
10a. Level I Concentrations	(b)		
10b. Level II Concentrations	(b)		
10c. Potential Contamination	(b)		
10d. Population (lines 10a + 10b + 10c)	(b)		
11. Resources	5		
12. Targets (lines 9 + 10d + 11)	(b)		
Drinking Water Threat Score:			
13. Drinking Water Threat Score [(lines 5x8x12)/82,500, subject to a max of 100]	100		0
Human Food Chain Threat			
Likelihood of Release:			
14. Likelihood of Release (same value as line 5)	550		550
Waste Characteristics:			
15. Toxicity/Persistence/Bioaccumulation	(a)	500000000	
16. Hazardous Waste Quantity	(a)	100	
17. Waste Characteristics	1000		320
Targets:			
18. Food Chain Individual	50	50	
19. Population			
19a. Level I Concentration	(b)	0	
19b. Level II Concentration	(b)	10	
19c. Potential Human Food Chain Contamination	(b)	1	
19d. Population (lines 19a + 19b + 19c)	(b)		
20. Targets (lines 18 + 19d)	(b)		50
Human Food Chain Threat Score:			
21. Human Food Chain Threat Score [(lines 14x17x20)/82500, subject to max of 100]	100		100
Environmental Threat			
Likelihood of Release:			
22. Likelihood of Release (same value as line 5)	550		550
Waste Characteristics:			

23. Ecosystem Toxicity/Persistence/Bioaccumulation	(a)	500000000	
24. Hazardous Waste Quantity	(a)	100	
25. Waste Characteristics	1000		320
Targets:			
26. Sensitive Environments			
26a. Level I Concentrations	(b)	0	
26b. Level II Concentrations	(b)	100	
26c. Potential Contamination	(b)	10	
26d. Sensitive Environments (lines 26a + 26b + 26c)	(b)	110	
27. Targets (value from line 26d)	(b)		110
Environmental Threat Score:			
28. Environmental Threat Score [(lines 22x25x27)/82,500 subject to a max of 60]	60		60
Surface Water Overland/Flood Migration Component Score for a Watershed			
29. Watershed Score[c] (lines 13+21+28, subject to a max of 100}	100		100
Surface Water Overland/Flood Migration Component Score			
30. Component Score (S_{sw})[c] (highest score from line 29 for all watersheds evaluated)	100		100

[a] Maximum value applies to waste characteristics category
[b] Maximum value not applicable
[c] Do not round to nearest integer