Five-Year Review Report

First Five-Year Review Report
for
French Gulch
EPA ID CO0001093392

Breckenridge
Summit County, Colorado

September 2015

Prepared By:
United States Environmental Protection Agency
Region 8
Denver, Colorado

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Office of Ecosystems, Protection
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Date: 9/30/15

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List of Acronyms

AGS	American Geological Services, Inc.
ARAR	Applicable or Relevant and Appropriate Requirement
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CD	Consent Decree
CDPHE	Colorado Department of Public Health and Environment
CFR	Code of Federal Regulations
CIC	Community Involvement Coordinator
COC	Contaminant of Concern
CWQCC	Colorado Water Quality Control Commission
EPA	United States Environmental Protection Agency
FYR	Five-Year Review
gpm	gallons per minute
IC	Institutional Control
MCL	Maximum Contaminant Level
mg/L	milligrams per liter (equal to parts per million)
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPS	Non-Point Source
O&M	Operation and Maintenance
OU	Operable Unit
PRP	Potentially Responsible Party
RAO	Remedial Action Objective
RPM	Remedial Project Manager
TDS	Total Dissolved Solids
USBOR	United States Bureau of Reclamation
USGS	United States Geological Survey
WTP	Water Treatment Plant
µg/L	microgram per liter (equal to parts per billion)

Executive Summary

Introduction

The French Gulch site (the Site) includes mine wastes and the flooded mine pool associated with the former Wellington-Oro Mine. The Site is located near the town of Breckenridge, Colorado, along French Creek about two miles upstream and to the east of the confluence of French Creek with the Blue River. Extensive underground mining occurred in the French Gulch valley from the late 1850s to the 1970s. Lode mining recovered lead-zinc-silver sulfide and gold ores from an extensive network of tunnels and adits originating on the steep valley sides. Large floating dredge boats were used to placer-mine the valley floor for gold. The placer dredging disrupted French Creek and its associated alluvial valley material. This resulted in large dredge piles covering the French Gulch valley floor and extending upstream approximately one mile east of the former Wellington-Oro mine. Ground water flowing through the mine workings becomes acidic and highly contaminated with dissolved metals including cadmium and zinc, seeps out of the mine via fractures and faults, and enters French Creek. Elevated zinc concentrations in the seep water are primarily responsible for the absence of fish populations in the downstream portion of French Creek and in the Blue River below the confluence with French Creek. U.S. Environmental Protection Agency (EPA) investigations in the late 1980s determined that the Wellington-Oro mine pool was the major contributor of cadmium and zinc loading from French Creek into the Blue River.

In 1989, the United States Bureau of Reclamation (USBOR) identified several locations where acidic mine discharges seeped into French Gulch (Stover, 1989). In 1991, the USBOR delineated the mine waste areas around the Wellington-Oro mine complex and identified mill tailings, roaster fines, and mine water as potential sources of contaminated surface waters in French Gulch (Stover, 1991).

On September 23, 1998, the EPA issued an action memorandum selecting the actions required to address the surface wastes (1998 action memo). The proposed action was the consolidation and capping of the mine waste, including waste rock and roaster fines, located at the Wellington-Oro Mine, the Mine Tailings, and the X-10-U-8 Dump. The mine wastes were moved to an area in French Gulch with reduced potential for human contact and capped with impermeable clay and clean gravel. Drainage ditches were installed to reduce infiltration of rain and snow melt into the mine wastes. This work was completed on June 18, 1999. B&B Mines conducted much of this work under Unilateral Administrative Order, Docket No. CERCLA-VIII-99-13, issued by the EPA on July 12, 1999. The capped mine wastes provide little or no contribution to the zinc and cadmium contamination of French Creek and the Blue River (August 3, 1998 EECA, Surface Waste Removal Action; May 29, 2002, EECA, Mine Pool Removal Action).

On November 24, 2002, the EPA issued an action memorandum (2002 action memo) selecting the actions necessary to address water quality impacts to French Creek and the Blue River from metals and acidity that is being released from the Wellington-Oro Mine.

In May 2003, the Summit Water Quality Committee, a group of local governments and major municipal dischargers in Summit County, Colorado, submitted a report: *Use-*

Attainability Analysis, Lower French Gulch and the Blue River Downstream from French Gulch near Breckenridge, Summit County, Colorado, to the Colorado Water Quality Control Commission (CWQCC). The water quality standards proposed in the report were approved by the CWQCC on September 8, 2003, and were included in the 2004 addendum #1 to the 2002 action memo (2004 addendum), which established site-specific removal action objectives for dissolved cadmium and zinc in the portion of the Blue River (Segments 2a and 2b) impacted by discharge from the Wellington-Oro Mine. These removal action objectives limit concentrations of dissolved cadmium and zinc in the Blue River to 4.0 microgram per liter (µg/L) and 225 µg/L, respectively, in order to support a sustainable brown trout fishery directly downstream of the confluence with French Creek.

In November 2001, the Town of Breckenridge (Town) and Summit County (County) entered into a Purchase and Sale Agreement with B &B Mines to purchase 1,800 acres including the Wellington Oro Site, the Jessie Mine and Mill Site, and the XL/Royal Tiger Site as part of Summit County Open Space Programs. In December 2003, the Town and County issued a request for proposal for alternative treatment technologies to treat water discharging from the Wellington Oro Mine. The proposals received were reviewed by the Town, County, the EPA and Colorado Department of Public Health and Environment (CDPHE). In April 2005, there was concurrence among all reviewers that the proposal from BioteQ Environmental Technologies (BioteQ) best met the goals of the project at the lowest cost, which incorporated a sulfide precipitation plant for the selective removal of zinc, cadmium and lead into a saleable sulfide concentrated product, for transport off-site.

The EPA entered into a Consent Decree (CD) in May, 2005 with B & B Mines Group, Town of Breckenridge, Summit County and Colorado Department of Public Health and Environment (CDPHE). As required in the CD, the Town and County constructed the Wellington-Oro water treatment plant (WTP). The CD provided a Statement of Work outlining the actions to be taken to address water quality issues at the site, which included collecting and treating water discharging from the Wellington Oro Mine at Seep FG-6C at a maximum pumping rate of 150 gallons per minute (gpm). Construction was complete in 2008, and the WTP was operational in November 2008. The plant operations are continuing to be refined and adjusted to maximize efficiencies. These were such that the EPA commissioned and implemented an Optimization Study of the WTP in 2012. (See *Optimization Review for the French Gulch/Wellington-Oro Mine Site Water Treatment Plant*, May 2013). The EPA also contracted with URS to complete a summary report of water quality data associated with the project. Some of the issues identified in the Optimization Study include:

- Water from Seep FG-6C flowed at a rate of approximately 50 gpm from 2009-2012. At the time of the 2002 action memo, FG-6C flows were approximately 100 gpm, and the WTP was designed to treat a maximum of 150 gpm. Currently, the WTP typically operates at less than 50% of capacity and could handle additional mine water discharges. Further investigations should be completed to determine if there is additional flow that can be captured near FG-6C to help meet the removal action objectives outlined in the 2002 EE/CA to limit the concentrations of dissolved Cd and Zn to 4.0 µg/L and 225 µg/L, respectively, in the Blue River.

- The plant is often in recycle mode, due to discharge standards not being met or mechanical issues with the plant. The WTP treated and discharged water approximately 36 percent of the days during 2009 through 2012. Recycling water back to the mine may be causing active generation of additional contaminant loading into the mine pool. It may be beneficial with respect to achievement of water quality standards for the plant to discharge treated water, even if it slightly exceeds discharge limits. The objective of treated water recycling should be reevaluated.
- The mechanical problems with the plant should be addressed. The soda ash system could be replaced with a caustic soda feed system. The filtration system should be modified, replaced or improved.

The triggering action for this five-year review (FYR) was the issuance of the Discharge Control Mechanism required in the 2005 CD, which became effective November 18, 2008. This first FYR focuses on the WTP operations and achievement of removal action objectives established in the 2002 action memo, as amended by 2004 addendum. Other removal actions conducted at the Site that dealt with mine wastes are not reviewed as part of this FYR.

Conclusion

The response action at the Site is not protective of the environment, as the cleanup goals established in the 2004 addendum and incorporated into the 2005 CD are not being met. This FYR addresses water quality issues, as they relate to the 2002 action memo. No human health risks were identified relating to water quality at the Site. Human health concerns related to contaminated sediment were dealt with under the 1998 action memo. The numeric water quality standards for cadmium and zinc in segments 2a and 2b of the Blue River downstream of French Gulch, identified as ARARs, have not been met. There has been no consistent reduction in dissolved cadmium or zinc concentrations in the Blue River since the WTP began operation in late 2008. The WTP operations have not resulted in consistent discharges of treated water to the designated discharge point, and the volume of water treated is significantly lower than the maximum design capacity.

The following actions are recommended:

- Continue efforts to optimize the WTP operation and consider additional response action modifications, as appropriate;
- Continue to monitor water quality in French Creek and the Blue River;
- Review monitoring schedule and location to determine if sampling during additional time periods or at additional locations would be helpful in the evaluation of the Site;
- Evaluate other potential seeps including alluvial seeps from Wellington Oro Mine, which may be adding cadmium and zinc loads into French Creek;
- Complete an evaluation or focused feasibility study to determine if the WTP could more fully utilize current design capacities by capturing and treating additional flow from seeps near FG-6C including the seep identified as Opp-2;

- Evaluate the threshold criteria and procedures for pumping flow back into the Wellington-Oro Mine;
- Review the Discharge Control Mechanism (DCM) for any possible adjustments in the limits set on the WTP discharges, and evaluate the 2005 CD with regard to implementing any necessary changes to the DCM;
- Evaluate whether manganese should be added as a contaminant of concern (COC) for the Site, and pursue next steps, as appropriate;
- Amend action memo to document these actions; and
- Evaluate response alternatives for the impoundments known as the red ponds, although this does not affect protectiveness, but would alleviate a potential safety hazard at the site.

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site Name: French Gulch		
EPA ID: CO0001093392		
Region: 8	**State:** CO	**City/County:** Breckenridge/Summit
SITE STATUS		
NPL Status: Non-NPL		
Multiple OUs? No	**Has the site achieved construction completion?** No	
REVIEW STATUS		
Lead agency: EPA **If "Other Federal Agency" selected above, enter Agency name:** Click here to enter text.		
Author name: Elizabeth Fagen and Amanda Goyne		
Author affiliation: EPA Region 8 and Skeo Solutions		
Review period: 04/23/2013 – 11/18/2013		
Date of site inspection: 05/08/2013		
Type of review: Discretionary		
Review number: 1		
Triggering action date: 11/18/2008		
Due date ***(five years after triggering action date)***: 11/18/2013		

Issues/Recommendations

Issues and Recommendations Identified in the Five-Year Review:

OU(s): OU1	Issue Category: Remedy Performance			
	Issue: There has been no consistent reduction in dissolved cadmium and zinc concentrations in the Blue River since the WTP began operation in late 2008. The WTP operations have not resulted in consistent discharges of treated water to the designated discharge point, and the volume of water treated is significantly lower than the maximum design capacity.			
	Recommendation: Optimize WTP operation and consider additional rsponse action modifications, as appropriate.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Implementing Party**	**Oversight Party**	**Milestone Date**
Yes	Yes	Other	EPA	04/01/2016

OU(s): OU1	Issue Category: Remedy Performance			
	Issue: The WTP is treating a flow rate of 50 gpm, which is lower than the maximum design flow of 150 gpm.			
	Recommendation: Complete an evaluation or focused feasibility study to determine if the WTP could more fully utilize current design capacities by capturing and treating additional flow from the seeps near FG-6C including the seep identified as Opp-2.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Implementing Party**	**Oversight Party**	**Milestone Date**
Yes	Yes	Other	EPA	10/01/2016

OU(s): OU1	Issue Category: Changed Site Conditions			
	Issue: Monitoring data indicate that there are likely other potential seeps from Wellington Oro Mine adding sources of cadmium and zinc loading to French Creek, but these sources have not been identified.			
	Recommendation: Complete an evaluation of other potential seeps adding cadmium and zinc loads to French Creek.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Implementing Party**	**Oversight Party**	**Milestone Date**
Yes	Yes	EPA	EPA	10/01/2016

OU(s): OU1	Issue Category: Remedy Performance			
	Issue: Recycling water back to the mine, due to standards not being met or mechanical issues with the plant, may be causing active generation of additional contaminants.			
	Recommendation: Review the Discharge Control Mechanism for possible modifications.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Implementing Party**	**Oversight Party**	**Milestone Date**
Yes	Yes	All	EPA	04/01/2016

OU(s): OU1	Issue Category: Changed Site Conditions			
	Issue: Manganese is not listed as a COC, but it is monitored, and concentrations consistently exceed water quality standards in French Creek and Blue River.			
	Recommendation: Evaluate whether manganese should be added as a site COC, and pursue next steps, as appropriate.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Implementing Party**	**Oversight Party**	**Milestone Date**
No	Yes	EPA/State	EPA	02/01/2016

Protectiveness Statement(s)

Operable Unit:	*Protectiveness Determination:*	*Addendum Due Date (if applicable):*
OU1	Short-term Protective	Click here to enter date.

- *Protectiveness Statement:* The response action at the Site is not protective of the environment, as the cleanup goals established in the 2004 addendum and incorporated into the 2005 CD are not being met. This FYR is addressing water quality issues, as they relate to the 2002 action memo. No human health risks were identified relating to water quality at the Site. Human health concerns related to contaminated sediment were dealt with under the 1998 action memo. The numeric water quality standards for cadmium and zinc in segments 2a and 2b of the Blue River downstream of French Gulch, identified as ARARs, have not been met. There has been no consistent reduction in dissolved cadmium or zinc concentrations in the Blue River since the WTP began operation in late 2008. The WTP operations have not resulted in consistent discharges of treated water to the designated discharge point, and the volume of water treated is significantly lower than the maximum design capacity. The following actions need to be taken: • Continue efforts to optimize the WTP operation and consider additional response action modification as appropriate. • Continue to monitor water quality in French Creek and the Blue River. • Review monitoring schedule and locations to determine if sampling during additional seasons or at additional seeps would be helpful in the evaluation of the Site. • Evaluate other potential seeps including alluvial seeps from Wellington Oro Mine, which may be adding cadmium and zinc loads into to French Creek. • Complete an evaluation or focused feasibility study to determine if the WTP could more fully utilize current design capacities by capturing and treating additional flow from the seeps near FG-6C including the seep identified as Opp-2. • Evaluate the threshold criteria and procedures for pumping flow back into the Wellington-Oro Mine. • Review the Discharge Control Mechanism (DCM) for any possible adjustments in the limits set on the WTP discharges, and evaluate the 2005 CD with regard to implementing any necessary changes to the DCM. • Evaluate whether manganese should be added as a contaminant of concern (COC) for the Site, and pursue next steps, as appropriate. • Amend action memo to document these actions. • Evaluate response alternatives for the impoundments known as the red ponds, although this does not affect protectiveness, but would alleviate a potential safety hazard at the site.

First Five-Year Review Report
for
French Gulch

1.0 Introduction

The purpose of a five-year review (FYR) is to evaluate the implementation and performance of a remedial action in order to determine if the remedial action is, or will be, protective of human health and the environment. FYR reports document FYR methods, findings and conclusions. In addition, FYR reports identify issues found during the reviews, if any, and document recommendations to address them.

The United States Environmental Protection Agency (EPA) prepares FYRs pursuant to the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) section 121(c) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). CERCLA section 121(c) states:

> If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each 5 years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section [104] or [106] of this title, the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.

The EPA interpreted this requirement further in the NCP, 40 Code of Federal Regulations (CFR) section 300.430(f)(4)(ii), which states:

> If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after initiation of the selected remedial action.

Skeo Solutions, an EPA Region 8 contractor, conducted the FYR and prepared this report regarding the water treatment response action implemented at the French Gulch Site (the Site), located in the Town of Breckenridge (Town), Summit County (County), Colorado. Early response actions at the Site included removal actions to address mining related surface wastes. The Site is not currently included on EPA's National Priorities List. EPA's contractor conducted this FYR from April to November 2013. The Town and County are implementing the water treatment response action, with oversight from the EPA and Colorado Department of Public Health and Environment (CDPHE). CDPHE, as the support agency representing the State of Colorado, has reviewed all supporting documentation and provided input to the EPA during the FYR process. The EPA also provided extensive opportunity for the Town and County to review the draft FYR report and to provide input to EPA and CDPHE regarding its content.

This is the first FYR for the Site. The basis for this discretionary review is the Discharge Control Mechanism, which became effective November 18, 2008. This FYR is required as part of the 2005 Consent Decree, as discussed in Section 4.0, below. The Site consists of one operable unit (OU).

2.0 Site Chronology

Table 1 lists the dates of important events for the Site.

Table 1: Chronology of Site Events

Event	Date
Mining and milling operations	1850s – 1970s
B & B Mines Group, Diamond Dick Co., Eckart Patch Co., French Gulch Mines, Inc., Little Lizzie Limited Liability Co., and Wire Patch Limited Liability Co., collectively referred to as B&B Mines, acquired Wellington-Oro properties	1940s
Initial discovery of contamination	March 27, 1995
Preliminary assessment	September 18, 1995
Investigation Report released	July 1996
Notice Letters issued to residents	February 18, 1997
Site inspection	April 16, 1997
Unilateral Administrative Order issued to B&B Mines for Surface Waste Engineering Evaluation and Cost Analysis (EECA)	April 27, 1998
Prospective Purchasers Agreement negotiations conducted	June 4, 1998
Enforcement Addendum to Action Memo issued	July 4, 1998
Action Memo for Request for Removal Action for Surface Waste	September 23, 1998
Administrative Order for Surface Waste Removal Action signed	September 25, 1998
PRP began removal actions for Surface Waste	October 2, 1998
Community Advisory Group formed	January 1, 1999
PRP completed removal actions for Surface Waste	June 18, 1999
UAO issued for Mine Pool EECA	July 12, 1999
Prospective Purchasers Agreement and Covenant Not To Sue signed	October 21, 1999
Final Report and Notice of Completion of Work submitted	November 5, 1999
Ecological Risk Assessment started	November 10, 1999
EPA notifies PRP that EPA will complete EECA for Mine Pool	April 22, 2002
EECA for Mine Pool complete	May 29, 2002
Action Memo for Request for Removal Action for Mine Pool treatment signed	November 24, 2002
Use Attainability Analysis complete	May 5, 2003
Removal Action began for passive treatment of water from Mine Pool	June 10, 2003
Colorado Water Quality Control Commission revised water quality standards for French Creek and the Blue River	September 8, 2003
Report on Water Quality Cleanup Goals and Objectives issued	October 4, 2004
Removal Action Memorandum amended for active treatment of water from mine pool	November 30, 2004
Settlement Agreement, Covenants Not To Sue and Consent Decree signed	May 31, 2005
ARARs Compliance Document for Water Treatment Plant complete	December 2, 2005
Environmental Covenant filed by Summit County with Colorado Department of Public Health and Environment Accepted	September 28, 2007
Amended Removal Action for Wellington-Oro Mine signed	November 15, 2008
Optimization Review for French Gulch/Wellington-Oro Mine Site Water Treatment Plant	May 16, 2013
Water Quality and Treatment Plant Data Summary Report released	June 5, 2013

3.0 Background

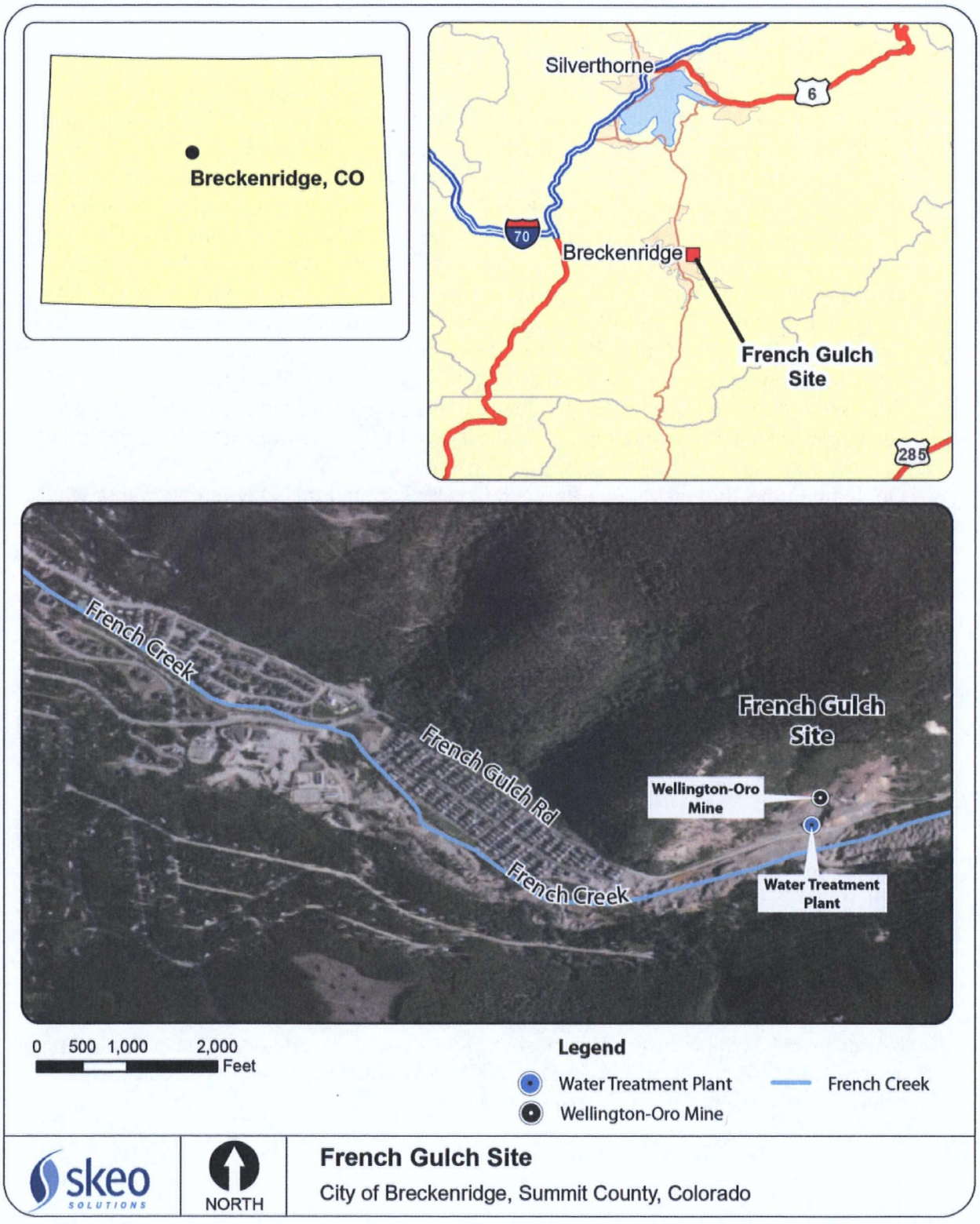
3.1 Physical Characteristics

The French Gulch Site, which includes the former Wellington-Oro Mine, is located along French Creek in the Rocky Mountains about two miles upstream and east of the confluence of French Creek with the Blue River near the town of Breckenridge, Colorado (Figure 1). For the purposes of the 2002 action memorandum for a non-time critical removal action, the Site was defined as the areas occupied by the Wellington-Oro Mine and the downstream areas of French Creek and the Blue River affected by cadmium and zinc contamination. The Wellington-Oro Mine is considered the primary contaminant source for the Site. The water treatment plant (WTP), which is the focus of this FYR, is located at 1501 French Gulch Road in Breckenridge, Colorado. The Wellington Neighborhood borders the Site to the west, the Country Boy Mine property borders the Site to the south, and open space borders the Site to the north and east. The Site and the adjacent open space land are owned by the Town of Breckenridge and Summit County.

Dredging in the alluvial valley of French Creek disrupted the alluvial material down to the top of the bedrock, leaving large dredge tailing piles covering most of the valley floor from the Blue River to more than a mile east of the Wellington-Oro Mine. Large piles of waste rock and fines remain uncovered on the surface of the site area. Studies suggest that regional groundwater, fed by snowmelt, is the major source of inflow to the Wellington-Oro mine pool, which is believed to be the major source of metal contamination to French Creek and the Blue River (Adrian Brown, 1997; Adrian Brown, 1999; Kimball, 1999; AGS, 1999). The difference in hydraulic head between the mine pool and the alluvial valley drives water out of the mine workings, into the French Gulch alluvium, and ultimately to French Creek. The mine pool discharge is expressed in several locations as seeps, not just at one location.

French Creek flows approximately from east to west in the vicinity of the mine complex and drains into the Blue River just north of Breckenridge. The Blue River flows into Dillon Reservoir, a municipal water supply for the Denver Metropolitan area, approximately 10 miles north of Breckenridge and the confluence of French Creek and the Blue River. Due to physical habitat limitations from dredge mining and elevated metal concentrations, fish are not present in French Creek downstream of the Site; however, a healthy cutthroat trout population is present upstream of the Site. A fish barrier, which was identified as part of the Site's surface waste non-time critical removal action (EPA, 1998a), is present in French Creek to prevent non-native species from migrating into the upper reaches of French Creek.

Figure 1: Site Location Map



Disclaimer: This map and any boundary lines within the map are approximate and subject to change. The map is not a survey. The map is for informational purposes only regarding EPA's response actions at the Site.

3.2 Land and Resource Use

Extensive underground mining occurred in the French Gulch valley from the late 1850s to the 1970s. Lode mining recovered sulfidic ores of lead-zinc-silver and gold composition from an extensive network of tunnels and adits originating on the steep valley sides. Large floating dredge boats were used to placer-mine the valley floor for gold. The placer dredging disrupted French Creek and its associated alluvial valley material. This resulted in large dredge piles covering the French Gulch valley floor and extending upstream approximately one mile east of the former Wellington-Oro Mine.

Ore veins targeted by the underground mines are commonly associated with faults and fractures that serve as a conduit for groundwater flow. In 1934, the mine workings were reported to consist of more than 12 miles of tunnels.

In the 1940s, B & B Mines Group, Diamond Dick Co., Eckart Patch Co., French Gulch Mines, Inc., Little Lizzie Limited Liability Co., and Wire Patch Limited Liability Co. (collectively referred to as B&B Mines) acquired the Wellington-Oro properties. In November 2001, Summit County and the Town of Breckenridge entered into a Purchase and Sale Agreement with B &B Mines to purchase 1,800 acres including the Wellington Oro Site, the Jessie Mine and Mill Site, and the XL/Royal Tiger Site as part of Summit County Open Space Programs. The EPA entered into a Consent Decree in May, 2005 with B & B Mines Group, Town of Breckenridge, Summit County and Colorado Department of Public Health and Environment (CDPHE). This area is now part of the Golden Horseshoe Open Space, which is used primarily for recreation and other open space values.

The neighboring developer, Wellington Neighborhood LLC, entered into a Prospective Purchasers Agreement (PPA) in October 1999, with B & B Mines Group and the EPA for an 85-acre parcel to the west of the Wellington-Oro Mine. The PPA limited Wellington Neighborhood LLC's liability for existing contamination. As part of the PPA, Wellington Neighborhood LLC was required to complete restoration activities at the Union Mill Area and the Neighborhood Fill and Cover Area, including construction of a cover of a minimum of two feet of clean fill. Wellington Neighborhood LLC was to also implement institutional controls at this property to ensure that future activity does not occur in a manner that would uncover any contaminated material. Groundwater and surface water are not used for potable purposes in this area. The Wellington Neighborhood LLC property is not being evaluated as this FYR.

3.3 History of Contamination

Sporadic mining and milling operations occurred at the mine from the late 1940s to the early 1970s. The mine workings remain open and are interconnected with a bedrock fault and fracture system. Since this area contains a large quantity of sulfide-bearing minerals, these conditions promote the formation of acid mine drainage. Acid mine drainage is generated by the oxidation of sulfur in the presence of water, forming sulfuric acid in the mine pool water. Metals, such as cadmium and zinc, solubilize in the acidic water. As a result, acid mine water flowing through the mine workings becomes highly contaminated

with dissolved metals, exits the mine in the form of seeps (FG-6C, FG-8A, Opp-1, Opp-2, Opp-4, Opp-5, and Deep-Seep-1), and enters French Creek(Figure 2). The zinc concentration in these seeps is approximately 5,000 times the background concentration in French Creek upstream of the mine and is primarily responsible for the absence of fish populations in the downstream portion of French Creek and segments 2a and 2b of the Blue River. In Blue River sediment samples collected downstream of French Creek, concentrations of metals exceed benchmark levels protective of benthic invertebrates.

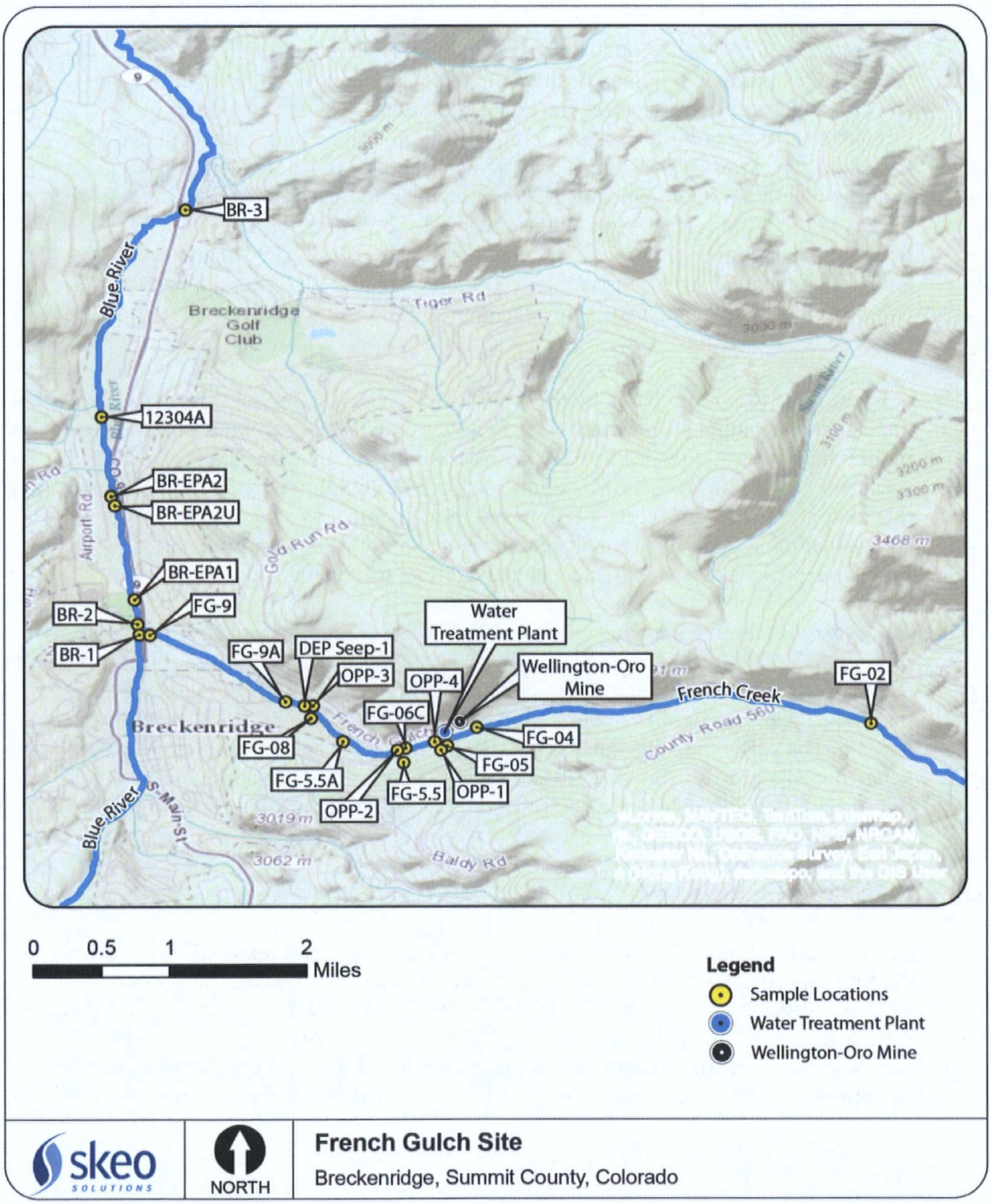
Since 1986, the CDPHE, EPA, United States Geological Survey (USGS), Upper Blue Sanitation District (UBSD), Northwest Colorado Council of Governments (NWCCOG), and Adrian Brown have collected surface water samples from French Creek and the Blue River. Full-scale investigations into the metal contamination of French Gulch and the Blue River were initiated in the late 1980's after observed fish kills of newly stocked fingerlings in the Blue River. Subsequent investigations examining the source and fate of the metals contamination were completed by the multiple parties listed above.

In 1989, the United States Bureau of Reclamation (USBOR) identified several locations where acidic mine discharges seeped into French Gulch (Stover, 1989). In 1991, the USBOR delineated the mine waste areas around the Wellington Oro mine complex and identified mill tailings, roaster fines, and mine water as potential sources of contaminated surface waters in French Gulch (Stover, 1991). In addition, ground water monitoring wells were installed to evaluate the hydrology of the mine site.

The French Gulch Non-Point Source (NPS) Project was initiated in 1990 by the State of Colorado to address non-point source discharges from the Wellington Oro mine and mill site into French Creek. The project was jointly conducted by the Colorado Division of Minerals and Geology (CDMG) and the USEPA Region VIII Water Management Division (Morrissey, 1995). NPS programs are authorized under Section 319 of the Federal Clean Water Act. The Colorado Water Quality Control Division is the responsible agency for administering Colorado's non-point source program. CDMG was designated as the "operating agency" for the French Gulch NPS Project (Morrissey, 1995).

Beginning in the late 1980's, the EPA conducted numerous investigations into surface wastes, groundwater, surface water, geology, ecology and precipitation (AGS, 1999; Morrissey, 1995; EPA, 2002a). Surface water and groundwater sampling was initiated in an attempt to determine the source(s) and magnitude of metal contamination present in the water and migration pathways leading to French Creek and the Blue River. CDPHE and the EPA collected surface water samples from several locations on French Gulch (FG-0 to FG-9) and the Blue River (BR-1 to BR-3) on eight separate occasions from May 1989 to July 1996. The USGS conducted a comprehensive evaluation of the Wellington Oro mine, which resulted in a report titled *Quantification of Metal Loading in French Gulch*, issued in July 1996. This study included a tracer injection study of the French Gulch, which was conducted to quantify metal loading from abandoned mines to French Creek (Kimball, 1996). The loading analysis indicated that metals affecting aquatic life in the stream originated from seepage from the Wellington-Oro Mine pool, except during storm runoff when additional sources may contribute metals.

Figure 2: Detailed Site Map



Disclaimer: This map and any boundary lines within the map are approximate and subject to change. The map is not a survey. The map is for informational purposes only regarding EPA's response actions at the Site.

3.4 Basis for Taking Action

Two primary public health and environmental issues were identified at the Site. The first was the potential risk to human health from exposure to elevated levels of lead and arsenic in the surface wastes (see Section 3.5); these risks were addressed in 1998 through a separate non-time critical removal action. The second environmental issue at the Site is the exposure of fish and aquatic invertebrates to heavy metals downstream from the Site. EPA's Ecological Risk Assessment, completed in May 2002 found that dissolved metals in surface water downstream of the Wellington-Oro Mine are acutely toxic to fish and invertebrates. The contaminants of concern (COCs) are cadmium and zinc. The human health risk assessment completed by the EPA found no adverse effects to human health associated with elevated concentrations of dissolved metals in French Creek or the Blue River.

A Hydrologic Report prepared by the American Geological Services, Inc. (AGS) in 1999 documented a natural seep identified as FG-6C as the primary conduit of mine pool water into French Creek (AGS, 1999; EPA, 2002a). Additional unidentified seeps were also suspected. At the time of the investigations, Seep FG-6C flowed year round at an average rate of approximately 100 gpm (gallons per minute) and was a significant source of metals loading. Of all metals analyzed, the concentrations of cadmium and zinc in the FG-6C seep water have the greatest negative effect on aquatic species in the creek.

The average cadmium and zinc concentrations at FG-6C were 59 µg/L (micrograms per liter) and 123,000 µg/L, respectively, and much higher than brown trout can tolerate (EPA, 2002b). The Superfund Chemical Data Matrix (SCDM) benchmark for Cd is 2.0 µg/L acute and 0.25 µg/L chronic. The SCDM benchmark for Zn is 120 µg/L acute and chronic. The pH of the seep water is 6.4, which is slightly acidic. The water is initially acidic due to sulfuric acid, which dissolves high levels of metals at the mine. Subsequently, the seep water is neutralized by the presence of limestone formations (AGS, 1999).

3.5 Initial Response

In 1995, CDPHE notified the EPA that the scope and the complexity of the problems at the Site exceeded the capacity and resources of the non-point source program. Concurrently, the EPA completed a Preliminary Assessment/Site Investigation and other investigations under CERCLA (Kimball 1999; USBOR, 1997; Morrissey, 1995). The conclusion of these investigations was that this Site was appropriate for continued investigation and remediation under CERCLA authorities.

In 1996 and 1997, under an interagency agreement with EPA, the Bureau of Reclamation, U.S. Department of the Interior, sampled the surface wastes at the Site. As a result of these investigations, the EPA determined that surface wastes at the Site presented a sufficient risk such that a non-time critical removal action was warranted (AGS, 1999). In 1998, an engineering evaluation/cost analysis was completed by B&B Mines that focused on surface wastes containing elevated levels of lead and arsenic. Subsequently, on

September 23, 1998, an action memorandum was signed to select the actions required to address the surface wastes. The proposed action selected in the action memorandum was the consolidation and capping of the mine waste including waste rock and roaster fines, located at the Wellington-Oro Mine, the Mine Tailings, and the X-10-U-8 Dump. The mine wastes were moved to an area with reduced potential for human contact and capped with impermeable clay and clean gravel. Drainage ditches were installed to reduce infiltration of rain and snow melt into the mine wastes. This work was completed on June 18, 1999. B&B Mines conducted much of this work under Unilateral Administrative Order, Docket No. CERCLA-VIII-99-13, issued by the EPA on July 12, 1999. The capped mine wastes provide little or no contribution to the zinc and cadmium contamination of French Creek and the Blue River (August 3, 1998 EECA, Surface Waste Removal Action; May 29, 2002, EECA, Mine Pool Removal Action).

The water treatment response action addressing the contamination emanating from the mine pool is the focus of this report and is the only action subject to the Five Year Review (FYR). The subsequent sections of this FYR address this response action.

4.0 Response Action

The EPA issued an action memorandum on November 24, 2002 documenting the request for a removal action at the French Gulch/Wellington Oro Site. The purpose of the response action was to address water quality impacts to the French Creek and the Blue River from metals and acidity that is being released from the Wellington Oro Mine. In the action memorandum, the EPA outlined semi-passive water treatment with settling ponds as the preferred response action based on information contained in the *Wellington Oro Mine Pool, Draft Engineering Evaluation/Cost Analysis, French Gulch Site,* dated May 29, 2002. The proposed response action activities outlined in the action memorandum included:

- Water discharging from the Wellington Oro Mine at Seep FG-6C will be collected. This seep is the primary source of acid mine drainage discharging from the Mine.
- The collected water will be pumped to a treatment building. There, lime and a flocculent will be added and mixed with the water. By addition of these chemicals, the acidity of the water will be neutralized and the metals will precipitate out of solution as solids. The need for pretreatment will be evaluated during the design phase of this action.
- The treated water will be discharged to one of two ponds to allow the solids to settle out of the water.
- The clean water will then overflow out of the ponds and into the French Creek alluvium.
- The metal sludge collected in the ponds will be either disposed of into the abandoned mine workings or an offsite landfill.
- A physical barrier in French Creek that will prevent non-native trout from migrating from the Blue River into upper French Creek will be constructed.

- This water treatment system will be operated 24 hours per day, 7 days per week until water discharges from FG-6C no longer pose a risk to the environment.

In May 2003, the Summit Water Quality Committee submitted a *Use-Attainability Analysis, Lower French Gulch and the Blue River Downstream from French Gulch near Breckenridge, Summit County, Colorado* report to the CWQCC. Based in part on this report, the CWQCC re-segmented the Blue River downstream of French Creek into segments 2a and 2b. Habitat in the upper portion (segment 2a) had been modified by historic dredge mining and the construction of a kayak course, resulting in an absence of spawning and rearing habitat for aquatic species. . Although sections of the Blue River have been restored, habitat in segment 2a is limited to supporting adult brown trout. Downstream of the Town of Breckenridge (segment 2b) habitat improves markedly allowing for a reproducing population of brown trout.

The CWQCC adopted site-specific standards for cadmium and zinc in Blue River segments 2a, 2b and 11. The standards are based on cadmium and zinc toxicity to the different life stages of brown trout that are expected to occur in the Blue River below French Creek.

The revisions to the water quality standards were approved by the CWQCC on September 8, 2003. In addition, the CWQCC established the water quality standards for French Creek below the Wellington-Oro Mine (Blue River Segment 11) as existing water quality. The 2003 standards are summarized in Table 2.

Table 2: Site-specific Standards Adopted by the CWQCC

Blue River Segment	Cadmium (µg/L)	Zinc (µg/L)
2a	4	$e^{(1.25(\ln(\text{hardness})+0.799))}$
2b	$1/2e^{(1.016(\ln(\text{hardness})-3.132)}$	$e^{(0.9805(\ln(\text{hardness})+1.402))}$
11	Ambient	Ambient
Ambient = ambient water quality standards		

The newly propagated standards were included in the 2004 action memorandum addendum #1 (2004 addendum), which established site-specific standards for dissolved cadmium and zinc in the portion of the Blue River (Segments 2a and 2b) impacted by discharge from the Wellington-Oro Mine.

The EPA adopted the water quality goal of attaining an adult brown trout fishery in the Blue River segment 2a. An established sampling point (BR2) located in segment 2a was identified as the point of compliance. The EPA determined that attaining the standards in Segment 2a would result in also achieving the standards in subsequent downstream segments. Therefore, in the 2004 addendum the EPA adopted the standards for Blue River Segment 2a as the removal action objectives for the water treatment response action at the Site.

The dissolved water quality standard for zinc in segment 2a is approximately 618 ug/L based on an average stream hardness of 90.2 mg/L as $CaCO_3$. However, the *Aquatic Habitat Analysis for French Creek and the Blue River*, prepared by the Colorado Division of Wildlife in 2003, concluded that "zinc concentrations would need to be less than 225 micrograms per liter (µg/L) before all chronic toxic impacts to brown trout would disappear."

The 2004 addendum incorporated the removal action objectives as:

- Limit the concentration of dissolved cadmium in the Blue River to 4.0 µg/L, as measured at the USGS gauging station BR-2 located 115 feet downstream of the confluence with French Creek; and
- Limit the concentration of dissolved zinc in the Blue River to 225 µg/L, as measured at the USGS gauging station BR-2 located 115 feet downstream of the confluence with French Creek.

A reevaluation of the water treatment requirements based on the newly adopted water quality standards resulted in changes in volume of water to be treated during spring runoff in the proposed action to a maximum of 150 gpm.

It was determined in 2004 that two large existing culverts in French Creek act as the fish barriers. No additional barriers were constructed to prevent the movement of non-native fish in French Creek.

In 2005, after several years of negotiations and related work, the EPA, CDPHE, the local governments of Town of Breckenridge and Summit County (Town and County), and B&B Mines entered into a complex consent decree (CD), which provided that the Town and County would build and operate a treatment plant to address the contaminated flow from the mine. The Town and County also agreed to receive lands transferred from B&B Mines and to restrict development on and administer the lands as open space.

Other response actions under the CD

The CD also provided for a purchase/transfer of 1,800 acres of lands from B&B Mines to the Town and County. The Wellington-Oro Mine was included as part of the lands purchased. The CD provided that these lands should be managed as open space and that the Town and County would set up both restrictive and environmental covenants. The CD required that the restrictive covenant be filed to ensure that the site property and surrounding areas remain public open space in perpetuity. This covenant became effective September 20, 2005. The CD also required the Town and County to execute an environmental covenant to limit uses on the site property. This covenant was fully executed on September 28, 2007 and was recorded with the county on November 1, 2007. The environmental use restrictions included in this covenant prohibit use of the Site (Figure 3) for residential or agricultural use; excavation; use of water; and well construction. The 2005 CD also required the EPA to perform FYRs for the Site.

4.1 Response Action Selection and Design Process

Requirements for the treatment plant

The Statement of Work (SOW) included as part of the Consent Decree describes the work to be completed to implement the action memorandum for the non-time critical removal action to address water quality issues at the Site, as amended by addendum #1 and to satisfy the requirements of the Consent Decree. The selected action is required to include the following:

- Water discharging from the Wellington Oro Mine at Seep FG-6C will be collected.
- The collected water will be pumped to the treatment system at a maximum pumping rate of 150 gpm. During times of high flows, flows exceeding 150 gpm will bypass the treatment process.
- A physical/chemical process will be utilized to remove zinc and cadmium from the water. The treatment process will be selected based on cost, performance, reliability, sludge disposal, and operator preferences. Water quality will be monitored at the point of effluent discharge. The effluent water quality discharged is to have a 30-day average cadmium concentration of less than 4 µg/l and a 30-day average zinc concentration of less than 225 µg/l.
- Solids generated from the treatment process will be separated from the water prior to discharge.
- The treated water will be discharged into the French Creek alluvium.
- The metal sludge generated will be either pumped into the abandoned mine working, sold as a metal concentrate, placed into an onsite repository, or disposed at a solid waste landfill or other appropriate waste management facility.
- The water treatment system will be operated 24 hours per day, 7 days per week, until water discharges from FG-6C no longer pose an unacceptable risk to the environment as determined by the EPA and CDPHE pursuant to the CD.
- Water quality will be monitored in Segment 2a of the Blue River for cadmium, zinc, pH, conductivity, alkalinity, and temperature.

Response Action Selection

Summit County issued a request for proposal for alternative treatment technologies to treat water discharging from the Wellington Oro Mine in December 2003. The purpose of this request for proposal was to identify alternative water treatment technologies that could provide the same quality treatment at an equal or lower cost than the alternative selected in action memorandum (see Section 4.0). Four proposals were received in 2004 for alternative water treatment technologies. The technologies proposed included: 1) Passive/Wetlands Treatment; 2) Ceramic Filtration; 3) Sulfide Precipitation; and 4) Lime Treatment with a Settling Tank. The proposals received were reviewed by the Town and

County, the EPA and CDPHE. In April 2005, there was concurrence among all reviewers that the proposal for sulfide precipitation, received from BioteQ Environmental Technologies Inc. (BioteQ), best met the goals of the project at the lowest cost.

BioteQ, in a partnership with the local engineering firm Lyntek Inc., proposed to build a dedicated water treatment facility located near the FG-6C seep. The proposal incorporated a sulfide precipitation plant for the selective removal of zinc and cadmium into a saleable sulfide concentrated product, for transport off-site.

The Town and County submitted plans for the Design and Construction of the Water Treatment System at the Wellington Oro Mine to the EPA in December 2005, per the CD. Pre-final and Final designs for the treatment plan were submitted as well and approved by the EPA and CDPHE in 2006 and 2007. Work began in early 2008 on the construction of the Wellington Oro Mine Water Treatment Plant (WTP). The plant became operational in November 2008. In accordance with the Wellington Oro Mine Water Treatment Plant ARARs Compliance Document dated November 15, 2008, the Discharge Control Mechanism outlined the discharge requirements of the treatment plant. Water quality of treated, discharged water would be required to meet thirty-day average concentrations of less than 4 µg/1 for cadmium and less than 225 µg/1 for zinc and several other parameters. See table 3, below.

Table 3: Summary of the Treatment Plant Discharge Effluent Limits

Parameter	30-day average[a]	Daily Maximum[a]
Oil and Grease	NA	10 mg/L
pH	NA	6.5 to 9.0
Total Suspended Solids	20 mg/L	NA
Cadmium	4 µg/L	NA
Zinc	225 µg/L	NA
a. EPA's Wellington Oro Mine Water Treatment Plant ARARS Compliance Document Discharge Control Mechanism, dated November 18, 2008.		

Water would be recycled back to the mine in the case of upsets. However, in both the 2002 action memorandum and 2004 addendum, it was recognized that this would be undesirable and increase the volume of water that must be treated and could cause increases in discharges from unknown locations.

The Town and County were to continuously sample the plant effluent to track compliance. There were also several sample locations in the Blue River near and below its confluence with French Creek to provide data on whether the entire water treatment response action was effective.

Plant startup and operation

Construction of the treatment plant was completed in 2008 and operation began in the fall of that year. The treatment plant uses a sulfide precipitation process to precipitate cadmium and zinc sulfides. A small amount of soda ash is added to the collected seep

water to change the pH to the optimal range for sulfide precipitation. Sulfide, in the form of sodium hydrosulfide, is added in a controlled dose. Dosing is controlled to allow removal of sufficient quantities of cadmium and zinc to meet discharge limits, while ensuring that excess sulfide is not present to precipitate iron or form dangerous hydrogen sulfide gas. The precipitated solids settle to the bottom of a clarification tank while the treated water flows off the top. The underflow solids from the clarifier are contained in a liquid sludge and are pumped to a plate and frame filter press for dewatering. Solids generated from the treatment process are separated from the water prior to discharge and sold for zinc recovery. The treated water is discharged into the French Gulch alluvium through Outfall 001.

Unfortunately, there have been several problems with the operation of the plant. The EPA conducted an Optimization study in 2012. (See, *Optimization Review for the French Gulch/Wellington-Oro Mine Site Water Treatment Plant*, May 2013). The EPA also contracted with URS to complete a summary report of water quality data associated with the project. These reports identified the following key issues:

- Water from FG-6C flows year-round at only about 50 gpm, much less than the 150 gpm for which the plant was designed. The plant therefore operates at 33 percent capacity. The treatment plant has experienced a series of mechanical problems. Equipment is experiencing corrosion due to chemical wear. The sand filters are problematic, and effective back flushing is not possible due to inadequate controls. There are also problems with the system providing soda ash. The WTP discharged treated water approximately 36 percent of the days during 2009 through 2012.
- During upset conditions, flows are directed back to the Wellington Oro Mine Shaft. During 2012, the plant recycled partially-treated water (which didn't quite meet the standard of 225 µg/L, but from which 99 percent of the zinc had been removed) to the mine for approximately 50 percent of the time it was operating. This recycling of effluent with 99 per cent of the zinc removed could simply dilute contamination already in the mine. However, the mine is actively generating acid drainage, and waters discharged to the mine may actually be contributing to the generation of that drainage and resulting metals contamination.

The above problems have caused frequent and extended periods of failure to meet the effluent standards (recycle) or shutdown. The original premise of the plant was that if enough contamination coming out of the mine was removed from French Creek and the French Gulch watershed, the Blue River would come into compliance with water quality standards, especially for cadmium and zinc. This premise has yet to be tested as the plant has not operated effectively and continuously over any extended period of time. The problems listed above must therefore be addressed, before the premise can be tested.

Several steps to improve operation of the plant should be considered, which were set forth in the Optimization Review, as follows:

- Water from Seep FG-6C flowed at a rate of approximately 50 gpm from 2009-2012. At the time 2002 action memorandum, FG-6C flows were approximately 100 gpm, and the WTP was designed to treat a maximum of 150 gpm. Currently the WTP typically operates at less than 50% of capacity and could handle additional mine water discharges. Further investigations should be completed to determine if there is additional flow that can be captured near FG-6C to help meet the removal action objectives outlined in the 2002 EE/CA to limit the concentrations of dissolved Cd and Zn to 4.0 µg/L and 225 µg/L, respectively, in the Blue River.
- The plant is often in recycle mode, due to standards not being met or mechanical issues with the plant. The WTP treated and discharged water approximately 36 percent of the days during 2009 through 2012. Recycling water back to the mine may be causing active generation of additional contaminant loading into the mine pool. It may be beneficial with respect to achievement of water quality standards to discharge treated water, even if it slightly exceeds discharge limits. The objective of treated water recycling should be reevaluated.
- The mechanical problems with the plant should be addressed. The soda ash system could be replaced with a caustic soda feed system. The filtration system should be modified, replaced or improved.

A summary of the costs of implementing various proposed changes to the plant is set forth below.

Table 4: Summary of Recommendations and Estimated Associated Costs

Recommendation	Reason	Change in Cost
Consider Alternative Filters or Improve Existing	Effectiveness	$30,000
Consider modifying Soda Ash System to use Caustic Soda instead	Effectiveness	$10,000
Develop Plan for Meeting Standards at Point of Compliance	Effectiveness	Not Quantified
Provide Natural Gas Service for Heating	Cost Reduction	($5,500)/year
Improve Tank Level Controls	Technical Improvement	$2,500 per tank
Improve Building Ventilation to Reduce H_2S	Technical Improvement	$50,000+
Standardize Controls, Maintenance, and Parts	Technical Improvement	Not Quantified

Many of the recommendations outlined in the Optimization Review have been implemented by the Town of Breckenridge. The actual expenditures are outlined in Appendix B. Once the recommendations above have been fully implemented and the plant has been running smoothly for a year or so, the effluent and Blue River data should be analyzed to determine whether plant operation is improving Blue River water quality.

The *Optimization Review, French Gulch/Wellington-Oro Mine Site Water Treatment Plant* provides of a full review of operation and maintenance. According to the 2002 action memorandum, the annual O&M costs in 2002 were estimated as $192,000, and the actual average annual costs are $260,000. Table 5 shows the summary of actual annual operating costs. The increased costs are associated unanticipated maintenance expenses.

Table 5: Summary of 2012 Annual O&M Costs

Item	Approximate Annual Cost
Project Management and Labor	$104,000*
Maintenance/Subcontractors (repairs, parts, media replacement)	$80,000
Process and Surface Water In-house Laboratory Analysis	$4,000
Outside Laboratory Analysis	$6,000
Propane Heat	$7,000
Electricity	$17,000
Telephone	$500
NaHS	$23,000
Soda Ash	$16,000
Flocculent	$2,500
Total (excluding labor)	**$156,000**
Total* (including equivalent labor cost)	**$260,000**

5.0 Progress Since the Last Five-Year Review

This is the first FYR for the Site.

6.0 Five-Year Review Process

6.1 Administrative Components

EPA Region 8 initiated the FYR in April 2013 and scheduled its completion for November 2013. The EPA remedial project manager (RPM) Elizabeth Fagen led the EPA site review team, which also included the EPA site attorney Andy Lensink, the EPA community involvement coordinator (CIC) Jennifer Lane and contractor support provided to the EPA by Skeo Solutions. In April 2013, the EPA held a scoping call with the review team to discuss the Site and items of interest as they related to the protectiveness of the water treatment response action currently in place. The review schedule established consisted of the following activities:

- Community notification.
- Document review.
- Data collection and review.
- Site inspection.
- Local interviews.
- FYR Report development and review.

6.2 Community Involvement

In April 2013, the EPA published a public notice in the Summit Daily newspaper announcing the commencement of the FYR process for the Site, providing contact information for Elizabeth Fagen (EPA RPM), Jennifer Lane (EPA CIC), Mary Boardman (CDPHE Project Manager), and Warren Smith (CDPHE Community Involvement Manager) and inviting community participation. The public notice is available in Appendix C. One person contacted the EPA to provide input as a result of the advertisement.

Following resolution of public comments received in response to the above advertisement and completion of internal Agency review, the EPA provided the Town and County an additional opportunity to review the FYR prior to publishing the final FYR Report. This review prompted additional changes to the FYR and required further internal Agency review. Upon completion of the FYR, the EPA will place a public notice in Summit Daily newspaper to announce the availability of the final FYR Report.

6.3 Document Review

This FYR included a review of relevant, site-related documents including the CD, response action reports and recent monitoring data. A complete list of the documents reviewed can be found in Appendix A.

Applicable or Relevant and Appropriate Requirements (ARARs) Review

Response actions are required to comply with the ARARs identified in the action memorandum addendum #1, which the EPA signed on November 30, 2004. In performing the FYR, any newly promulgated standards including revised chemical-specific requirements [such as maximum contaminant levels (MCLs), ambient water quality criteria], revised action and location-specific requirements, and state standards, if they were considered ARARs in the decision documents, are reviewed to establish whether the new requirement indicates that the response action is no longer protective.

Surface Water

Although the State of Colorado classifies the Blue River and French Creek for use as Clean Water Act Class 1 Cold Water Fishery, the existing habitat constraints were not considered when designating the classification. The EPA and the CWQCC concurred that it would be impractical to restore water quality to pre-mining conditions, due to the extensive mining impacts within the watershed and the diffuse nature of water

discharging from the Wellington-Oro Mine. Therefore, the EPA worked with the State of Colorado to develop site-specific water quality standards for the Site's surface water that are protective of an adult brown trout fishery downstream of the French Creek confluence (Colorado Water Quality Regulation 33, Blue River Stream Segments 2a and 2b). The standards listed for each stream segment are combined acute/chronic standards for dissolved cadmium and zinc (Table 6). The EPA adopted these standards as the Site's surface water cleanup goals in the action memorandum addendum #1, issued on November 30, 2004. See Section 6.4 for the review of water quality in the Blue River. Although cadmium and zinc were the specified COCs in the 2005 Consent Decree, in 2012 manganese was added to the state of Colorado's Clean Water Act water body list [the 2012 Clean Water Act section 303(d) list], which the EPA approved on March 20, 2013, as meeting the requirements of section 303(d) of the Clean Water Act and the EPA's implementation regulations. Although the 303(d) list priority for manganese in Blue River Segment 2a is low, manganese has been included in the water quality analysis for both the Blue River and French Creek sampling locations.

Table 6: Summary of Surface Water ARARs

Contaminant	Blue River Segment 2a (µg/L)	Blue River Segment 2b (µg/L)
Cadmium[a]	4	$1/2e^{(1.0166*\ln(\text{hardness})-3.132}$
Zinc[a]	$e^{1.25*\ln(\text{hardness})+0.799}$	$e^{0.9805*\ln(\text{hardness})+1.402}$
Manganese[b] (acute/chronic)	2,890/1,590[c]	2,730/1,500[c]
Manganese – Water Supply[b]	50	50

a. Site-specific water quality criteria presented in *"The Wellington Oro/French Gulch Site Site Cleanup Goals and Objectives"* by Victor Ketellapper, U.S. EPA Region 8, October 4, 2004
b. Colorado Department of Public Health and Environment, Water Quality Control Commission 5 CCR 1002-93, Regulation #93. Colorado's Section 303(d) List of Impaired Waters and Monitoring and Evaluation List. Effective March 30, 2012 (http://www.colorado.gov/cs/Satellite/CDPHE-WQCC/CBON/1251590894055)
c. Values obtained from EPA's Draft Water Quality/Water Treatment Plant and Data Summary Report, June 3, 2013

As part of the selected water treatment response action, the effluent from the water treatment plant must meet the following discharge limits (Table 7). If the effluent does not meet the standards, it is recycled to the mine.

Table 7: Summary of the Wellington-Oro Mine Treated Discharge Effluent Limits

Parameter	30-day average[a]	Daily Maximum[a]
Oil and Grease	NA	10 mg/L
pH	NA	6.5 to 9.0
Total Suspended Solids	20 mg/L	NA
Cadmium	4 µg/L	NA
Zinc	225 µg/L	NA

a. EPA's Wellington Oro Mine Water Treatment Plant ARARS Compliance Document Discharge Control Mechanism, dated November 18, 2008.

Groundwater
The action memorandum addendum #1 did not include chemical-specific ARARs for groundwater.

Institutional Control Review

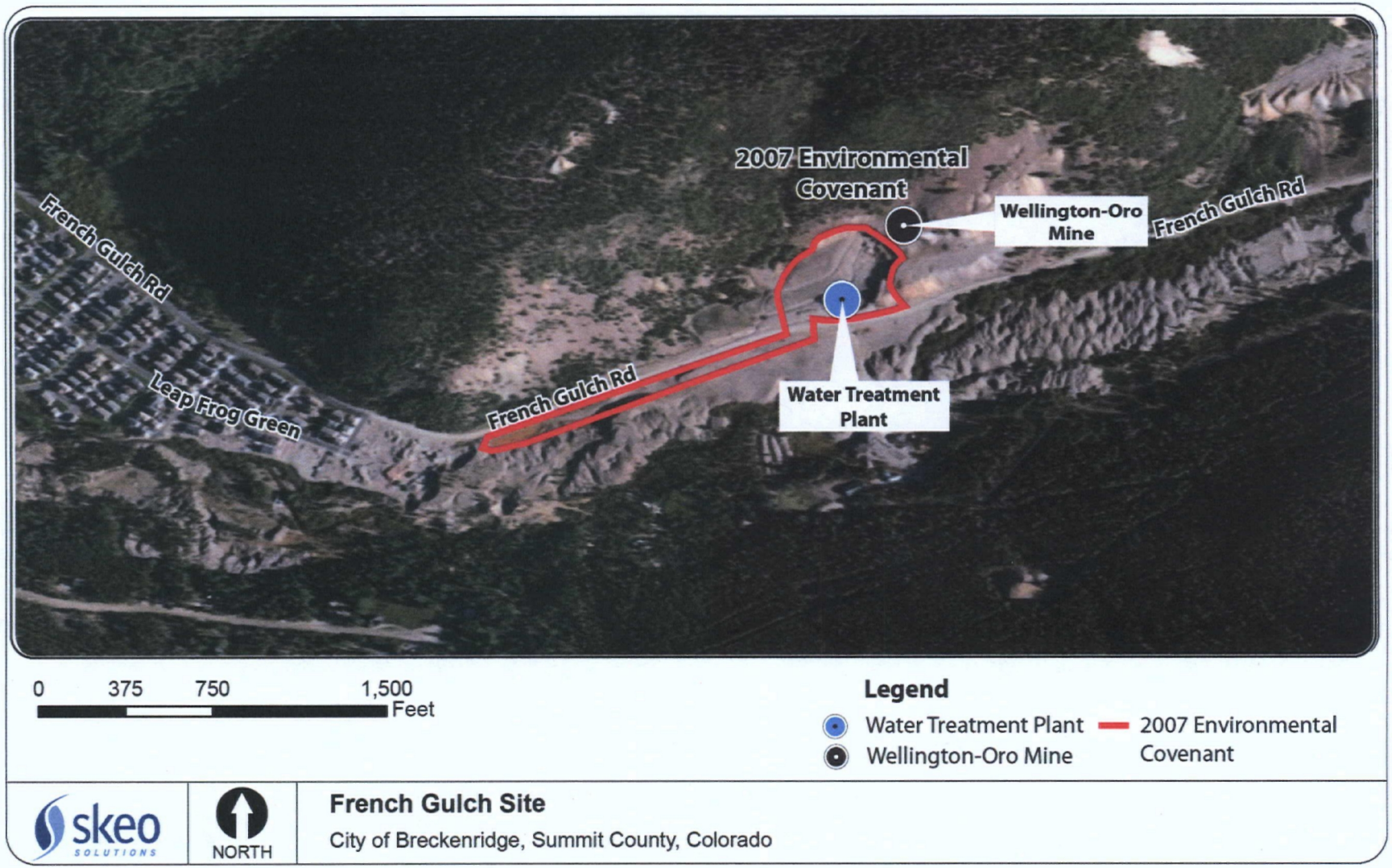
Table 8 lists the institutional controls associated with areas of interest at the Site, and Figure 3 shows the location of the 2007 environmental covenant, as required by the CD. The environmental use restrictions included in this environmental covenant restrict use of the Site for residential or agricultural use; excavation; use of water; and well construction. Additional ICs are in place in the Wellington-Oro Neighborhood.

Table 8: Institutional Control (IC) Summary Table

Area of Interest –French Gulch Site					
Media	**ICs Needed**	**ICs Called for in the Decision Documents**	**Impacted Area**	**IC Objective**	**Instrument in Place[1]**
Surface Water	Yes	Yes	See Figure 3	No water use	2007 Environmental Covenant Instrument ID: HMCOV00044
Ground Water	Yes	No	See Figure 3	No water use or well construction	2007 Environmental Covenant Instrument ID: HMCOV00044
Soil	Yes	No	See Figure 3	No residential or agricultural use, no excavation	2007 Environmental Covenant Instrument ID: HMCOV00044

1. 2007 Environmental Covenant available online at: http://www.colorado.gov/cdphedir/hm/envcovenants/covenants/hmcov00044.pdf

Figure 3: Institutional Control Base Map



Disclaimer: This map and any boundary lines within the map are approximate and subject to change. The map is not a survey. The map is for informational purposes only regarding EPA's response actions at the Site.

6.4 Data Review and Evaluation

On June 5, 2013, EPA contractors completed a Draft Water Quality/Water Treatment Plant Data Summary Report. This report compiles all available surface water and groundwater data associated with the Site and evaluates the data to determine the effectiveness of the Wellington-Oro WTP. According to this report, the Site's data indicate:

Blue River Water Quality

- Blue River water quality gradually improves downstream of the French Creek confluence, but does not consistently meet the cadmium (or manganese) water quality standards in stream Segment 2a until sampling location BREPA-2. The zinc water quality standards are not consistently met at any point in stream Segment 2a. Water quality standards for stream Segment 2b are consistently met at sampling location BR-3.
- There has been no consistent reduction in dissolved cadmium, manganese and zinc concentrations in the Blue River since the WTP began operation in late 2008.
- Water quality is highly variable based on seasons and weather conditions.

French Creek Water Quality

- Cadmium and zinc concentrations are low in French Creek upstream of the influence of the Wellington-Oro Mine. Concentrations sharply increase where the influence of water from the Wellington-Oro Mine on French Creek is thought to begin; increase again near Dead Elk Pond; and decrease slightly near the mouth of French Creek. Concentration increases indicate inflows of contaminants.
- Loading estimates indicate that the wetland at FG-5.5A and the seep at Opp-2 are locations of significant cadmium and zinc loading to French Creek, in addition to FG-6C. Flows from various other seeps have not been measured, so the relative contribution of these sources to contamination in French Creek is unknown.

Operation of WTP

- The WTP has met discharge criteria since early 2009 and currently achieves a 99.6 to 99.9 percent reduction in cadmium and zinc concentrations for the water that is treated and discharged.
- There are times when the WTP is operational, but only reaching 99% reduction in cadmium and zinc. When the discharge criteria are not met, the water is recycled back to the Wellington-Oro mine.
- The WTP treated and discharged water approximately 36 percent of the days during 2009 through 2012. The plant has operated at a maximum flow rate of 72.9 gpm, much lower than the maximum design capacity of 150 gpm.

- Overall, the WTP reduced loading in French Creek by an average 0.026 pounds per day of cadmium and 45 pounds per day of zinc. When the plant was treating and discharging water, the WTP reduced loading in French Creek by an average of 0.049 pounds per day of cadmium and 86.3 pounds per day of zinc.

6.5 Site Inspection

EPA representatives (Elizabeth Fagen, EPA RPM, and Jennifer Lane, EPA CIC) and Skeo Solutions (Johnny Zimmerman-Ward and Kristin Sprinkle) met on May 8, 2013, approximately two miles from the Site. The temperature was roughly 30 degrees Fahrenheit, and it was cloudy with frequent snow showers. The focus of the FYR site inspection was the WTP and nearby surface water bodies. Skeo Solutions did not observe any groundwater monitoring locations. The complete site inspection checklist is available in Appendix E, and photographs taken during the site inspection are available in Appendix F.

EPA and Skeo Solutions began the site inspection with a tour of the WTP. Photographs were not allowed in the WTP, because of the proprietary design of the treatment processes. WTP employees walked the site inspection participants through the treatment process. Water is pumped in from FC-6C, and a sulfide precipitation process is used to remove cadmium and zinc. After clarification, the treated water is sent to a finishing filter to remove total dissolved solids (TDS). The zinc content prior to filtration is roughly 1 to 2 milligrams per liter (mg/L). The filters are designed to handle a rate of 48 gpm each, and are frequently clogged due to the high levels of iron. WTP operators monitor the zinc concentration in the system effluent. If the effluent zinc concentration is 225 µg/L or lower, the treated water is discharged to the French Creek alluvium below the groundwater table approximately 20 feet underground, to prevent iron oxidation and precipitation. If the effluent zinc concentration is higher than 225 µg/L, the treated water is re-injected into the mine workings. The zinc concentration of the re-injected water is about 0.5 to 1 mg/L. Treated water has been returned approximately two/fifths of the past five years due to exceeding the 225 µg/L level.

At the time of the site inspection, the WTP was operating at 53 gpm, which is indicative of a typical flow rate of FG-6C. WTP operators indicated that the facility pump rates are between 35 and 85 gpm.

After viewing the WTP, EPA and contractors viewed the surrounding area, which includes capped waste rock and fine piles, the Country Boy Mine, and the exterior of the Wellington-Oro Mine. During the walk toward the Wellington Neighborhood, inspection participants noted a reddish-orange water flowing toward the neighborhood on the South side of the road. This surface water flow is adjacent to the piles of waste rock and fines consolidated and capped under the surface waste removal actions. The water moves toward a pond, and the water color improves slightly after seeping out of the other side of the pond. Water seeping out of the pond is diverted from the Wellington Neighborhood through a French drain to French Creek, which runs behind the neighborhood. Rocks and surface water on the other (North) side of the road (to the right as walking toward

Wellington Neighborhood or to the left when facing the WTP) were not stained or discolored.

EPA and Skeo Solutions drove around the Wellington Neighborhood to observe conditions in the neighborhood and nearby French Creek. There was still a considerable amount of snow on the ground and vegetation was not yet growing. Behind the neighborhood, French Creek had several sections of stained reddish-orange rocks and some areas where the water appeared reddish-orange. Some of these areas seemed to emanate from groundwater sources. The reddish-orange staining continued to areas around Dead Elk Pond. Participants observed a possible groundwater seep in Dead Elk Pond; rocks near the discharge area were stained.

Skeo Solutions did not observe additional seeps during the site inspection. During each of the sampling events conducted by EPA's contractor, Techlaw, hydrologists look for new or periodic seeps to French Creek. No additional seeps have been observed to date.

6.6 Interviews

The FYR process included interviews with parties affected by the Site, including the current landowners and regulatory agencies involved in site activities or aware of the Site. The purpose was to document the perceived status of the Site and any perceived problems or successes with the phases of the remedial action implemented to date. The interviews are summarized below. Appendix D provides the complete interviews.

Carl Johnson: Carl Johnson completed his interview on May 16, 2013, through email communications. Mr. Johnson is a Certified Industrial Operator with the City of Breckenridge and supervises O&M at the Site. He reports that the zinc removal process is functioning smoothly, despite occasional maintenance issues with filters and strainers. The primary problem is deteriorating equipment due to chemical wearing from corrosive materials. An outside contractor resolves maintenance issues that arise, as a result, O&M costs are higher than anticipated. According to Mr. Johnson, all zinc removed from influent water is properly recycled at a zinc smelter. Monthly monitoring data indicates decreasing levels of influent iron over the last five years. Mr. Johnson stated that WTP operators perform daily, weekly, monthly and yearly monitoring activities. In response to the aforementioned maintenance issues, daily and weekly checklists now include more preventive equipment inspections. According to Mr. Johnson, investments in new pumps, computerized systems and replacement parts will increase overall efficiency. Mr. Johnson suggests that O&M activities follow the recommendations made in the BioteQ Optimization Review. He also recommends a few changes to improve the reagent tank and flow meters.

Mary Boardman: Mary Boardman completed her interview on June 10, 2013, through email communications. She works for CDPHE. Ms. Boardman indicated that, at the time of the interview, insufficient data existed to fully evaluate the remedial action for the French Gulch site, but EPA contractors are consolidating data to perform an evaluation of the WTP. The CDPHE receives and reviews monthly water monitoring reports. Ms.

Boardman mentioned that in 2010, the CDPHE Solid Waste Unit approved the transportation of filtercake to another state for reuse. In addition, Ms. Boardman mentioned that coordinating information about the Site is challenging due to the number of RPMs assigned to the Site, resulting in a lack of continuity and loss of institutional knowledge. One nearby residential developer expressed concerns about the Site's appearance. According to Ms. Boardman, the developer is responsible for providing information to residents about allowable site uses.

Lane Wyatt: Lane Wyatt is the Co-Director of the Northwest Colorado Council of Governments, Water Quality/Quantity Committee. The Northwest Colorado Council of Governments worked toward finding a solution at the French Gulch site. Mr. Wyatt is not involved with the operations, but participated during the remedial action selection phase. Mr. Wyatt found the project to be three legs of a stool, the WTP, the Wellington Oro Neighborhood Development, and the 1800 acres of open space. Mr. Wyatt indicated the WTP works well (99.9 percent removal), but may not be capturing the full extent of releases. The chemical barrier prevents migration of other trout into the cutthroat population. Mr. Wyatt found the project to be innovative, cost-effective, community-based and successful on many fronts. Mr. Wyatt believes the community should be kept more informed about the water quality.

Brian Lorch: Brian Lorch is the Summit County Open Space and Trails Director. Mr. Lorch was involved in the remedial action decision process, as well as with the Consent Decree. Mr. Lorch would like to see if there is a way to optimize the system, if it is effective, and best use resources. Mr. Lorch would like the area restored, although there could be a problem with the Wellington Neighborhood perception as gravel is moved out of the area. He believes the open space created with the purchase of the property is great.

Scott Reid: Scott Reid is a Town of Breckenridge Open Trails Planner. Mr. Reid is aware of the Site as he lives in the Wellington Neighborhood and has participated in the project since the time of the Consent Decree and construction of the WTP. Mr. Reid is concerned that if the WTP is not working properly, is the money being spent appropriately? It would be great to use the money to restore the land and repair the riparian area. Mr. Reid would like to have the orange ponds remediated as there is a problem with the perception of the ponds. Mr. Reid indicated the Town and County are committed to the cleanup and would like to consider the big picture of open space and water quality if the remedial action has to be altered.

Nearby Residents: The residents are aware of the Site and cleanup activities and believe the project is well run. The residents would like the two ponds more secluded and not as exposed to the road, as most people do not understand that the orange is just metals or iron precipitating out. The residents believe the Site has had a positive effect on the community with the affordable housing, open space and cleanup. The residents would like to see the remaining money used to improve the Site and include the community in that process.

7.0 Technical Assessment

7.1 Question A: Is the remedial action functioning as intended by the decision documents?

No, the water treatment response action is not functioning as intended. Although the WTP has effectively met the discharge criteria since early 2009, there has been no consistent reduction in dissolved cadmium and zinc concentrations in the Blue River since the WTP began operation in late 2008. Monitoring data indicate that there are likely other potential locations of cadmium and zinc loading to French Creek, such as the wetland at FG-5.5A and the seep at Opp-2; however, flow from various other sources has not been measured, so the relative contribution of these sources to contamination in French Creek is unknown. Institutional controls in the form of an environmental covenant are in place to restrict human exposure to contaminated surface water, groundwater and soils.

The 2002 action memorandum and 2004 addendum specified that the WTP operate 24 hours a day, 7 days a week. However, the WTP treated and discharged water for only approximately 36 percent of the days from 2009 through 2012, due to mechanical issues and shutdowns. The plant operated at a maximum flow rate of 72.9 gpm, which is much lower than the maximum design capacity of 150 gpm. O&M costs have been higher than anticipated due to chemical wearing of WTP system components and associated maintenance. On April 8, 2013, EPA released an Optimization Review for the French Gulch/Wellington-Oro Mine Site Water Treatment Plant. The Optimization Review provided several recommendations to improve the WTP's effectiveness, cost and technical operation. The parties involved are currently considering the recommendations.

Although the water treatment response action is not making expected progress toward meeting the cleanup goals for the WTP, EPA, CDPHE, the City of Breckenridge and Summit County are actively working together to develop and implement strategies to improve WTP operation, so that it meets response action goals and will achieve significant contaminant decreases in French Creek and the Blue River.

7.2 Question B: Are the exposure assumptions, toxicity data, cleanup levels and remedial action objectives (RAOs) used at the time of remedial action selection still valid?

Yes, the exposure assumptions, toxicity data cleanup levels and RAOs (in the form of removal action objectives) remain valid.

Monitoring data indicate that there are likely other potential seeps from Wellington Oro Mine adding sources of cadmium and zinc loading to French Creek; however, flow from various other seeps has not been measured, so the relative contribution of these sources to contamination in French Creek is unknown.

7.3 Question C: Has any other information come to light that could call into question the protectiveness of the remedial action?

Manganese was added to the state of Colorado's Clean Water Act water body list [the 2012 CWA Section 303(d) list] in March 2012 and approved by EPA on March 20, 2013, as meeting the requirements of Section 303(d) of the Clean Water Act. Manganese has been included in the monitoring program and the concentrations in stream Segment 2a of the Blue River consistently exceed the water quality standard. Therefore, EPA should consider adding manganese as a final COC for the Site.

No other information has come to light that could call into question the protectiveness of the water treatment response action.

7.4 Technical Assessment Summary

The water treatment response action is not functioning as intended in the 2005 CD. Although the WTP has effectively met the discharge criteria since early 2009, there has been no consistent reduction in dissolved cadmium and zinc concentrations in the Blue River since the WTP began operation in late 2008. Monitoring data indicate that there are likely other potential locations of cadmium and zinc loading to French Creek; however, flow at these other locations has not been measured, so the relative contribution of these sources to contamination in French Creek is unknown. Institutional controls in the form of an environmental covenant are in place to restrict human exposure to contaminated surface water, groundwater and soils at the site.

The 2002 action memorandum and 2004 addendum specified that the WTP operate 24 hours a day, 7 days a week. However, the WTP treated and discharged water approximately 36 percent of the days from 2009 through 2012, due to mechanical issues and shutdowns. The plant has operated at a maximum flow rate that is much lower than the maximum design capacity. O&M costs have been higher than anticipated.

The exposure assumptions, toxicity data and cleanup levels remain valid. Although cadmium and zinc were the specified COCs in the 2005 Consent Decree, manganese was added to the state of Colorado's Clean Water Act water body list [the 2012 303(d) list] in March 2012 and approved by EPA on March 20, 2013, as meeting the requirements of Section 303(d) of the Clean Water Act. Manganese has been included in the monitoring program and the concentrations in stream Segment 2a of the Blue River consistently exceeds the water quality standard in French Gulch or the Blue River. Therefore, EPA should consider adding manganese as a final COC for the Site.

On April 8, 2013, EPA released an Optimization Review for the French Gulch/Wellington-Oro Mine Site Water Treatment Plant. The Optimization Review provided several recommendations to improve the water treatment plant's effectiveness, cost and technical operation, which are currently being considered by the parties involved. EPA, CDPHE, the Town of Breckenridge and Summit County are actively working together to develop and implement strategies for improving operation of the

WTP, so that it meets goals and will achieve significant contaminant decreases in French Creek and the Blue River.

8.0 Issues

Table 9 summarizes the current site issues.

Table 9: Current Site Issues

Issue	Affects Current Protectiveness?	Affects Future Protectiveness?
There has been no consistent reduction in dissolved cadmium and zinc concentrations in the Blue River since the WTP began operation in late 2008. The WTP operations have not resulted in consistent discharges of treated water to the designated discharge point and the volume of water treated is significantly lower than the maximum design capacity.	Yes	Yes
The WTP is treating an approximate flow rate of 50 gpm, which is lower than the maximum design flow of 150 gpm. Therefore, the load being captured is less than anticipated.	Yes	Yes
Monitoring data indicate that there are likely other potential seeps from Wellington Oro Mine adding sources of cadmium and zinc loading to French Creek, but these sources have not been identified	Yes	Yes
Recycling water back to the mine, due to standards not being met or mechanical issues with the plant, may be causing active generation of additional contaminants.	Yes	Yes
Manganese is not listed as a COC, but it is monitored and concentrations consistently exceed water quality standards in French Creek and the Blue River.	No	Yes
The red ponds that remain at the site are a potential safety hazard and a perceived human health hazard.	No	No

9.0 Recommendations and Follow-up Actions

Table 10 provides recommendations to address the current site issues. As part of the follow-up actions, the EPA will create an addendum to the 2004 action memo.

Table 10: Recommendations to Address Current Site Issues

Issue	Recommendation / Follow-Up Action	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness?	
					Current	Future
There has been no consistent reduction in dissolved cadmium and zinc concentrations in the Blue River since the WTP began operation in late 2008. The WTP operations have not resulted in consistent discharges of treated water to the designated discharge point and the volume of water treated is significantly lower than the maximum design capacity.	Optimize WTP operation and consider additional rsponse action modifications, as appropriate.	Town of Breckenridge, Summit County	EPA	04/01/2016	Yes	Yes
The WTP is treating a flow rate of 50 gpm, which is lower than the maximum design flow of 150 gpm.	Complete an evaluation or focused feasibility study to determine if the WTP could more fully utilize current design capacities by capturing and treating additional flow from the seeps near FG-6C including the seep identified as Opp-2.	Town of Breckenridge, Summit County	EPA	10/01/2016	Yes	Yes
Monitoring data indicate that there are likely other potential seeps from Wellington Oro Mine adding sources of cadmium and zinc loading to French Creek, but these sources have not been identified.	Complete an evaluation of other potential seeps adding cadmium and zinc loads to French Creek.	EPA	EPA	10/01/2016	Yes	Yes
Recycling water back to the mine, due to standards not being met or mechanical issues with the plant, may be causing active generation of additional contaminants.	Review the Discharge Control Mechanism for possible modifications	EPA, CDPHE, Town of Breckenridge, Summit County	EPA	04/01/2016	Yes	Yes

Issue	Recommendation / Follow-Up Action	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness?	
					Current	Future
Manganese is not listed as a COC, but it is monitored and concentrations consistently exceed water quality standards in French Creek and the Blue River.	Evaluate whether manganese should be added as a site COC and pursue next steps, as appropriate.	EPA, CDPHE	EPA	02/01/2016	No	Yes

10.0 Protectiveness Statements

The water treatment response action at the Site is not protective of the environment, as the cleanup goals established in the 2004 addendum and incorporated into the 2005 CD are not being met. This FYR is addressing water quality issues, as they relate to the 2002 action memo. No human health risks were identified relating to water quality at the Site. Human health concerns related to contaminated sediment were dealt with under the 1998 action memorandum. The numeric water quality standards for cadmium and zinc in segments 2a and 2b of the Blue River downstream of French Gulch, identified as ARARs, have not been met. There has been no consistent reduction in dissolved cadmium or zinc concentrations in the Blue River since the WTP began operation in late 2008. The WTP operations have not resulted in consistent discharges of treated water to the designated discharge point, and the volume of water treated is significantly lower than the maximum design capacity.

The following actions are recommended:

- Continue efforts to optimize the WTP operation and consider additional response action modification as appropriate;
- Continue to monitor water quality in French Creek and the Blue River;
- Review monitoring schedule and locations to determine if sampling during additional seasons or at additional seeps would be helpful in the evaluation of the Site;
- Evaluate other potential seeps including alluvial seeps from Wellington Oro Mine, which may be adding cadmium and zinc loads into French Creek;
- Complete an evaluation or focused feasibility study to determine if the WTP could more fully utilize current design capacities by capturing and treating additional flow from the seeps near FG-6C including the seep identified as Opp-2;
- Evaluate the threshold criteria and procedures for pumping flow back to the Wellington-Oro Mine;

- Review the Discharge Control Mechanisms (DCM) for any possible adjustments in the limits set on the WTP discharges, and evaluate the 2005 CD with regard to implementing any necessary changes to the DCM;
- Evaluate whether manganese should be added as a contaminant of concern (COC) for the Site, and pursue next steps, as appropriate;
- Amend action memo to document these actions; and
- Evaluate response alternatives for the impoundments known as the red ponds, although this does not affect protectiveness, but would alleviate a potential safety hazard at the site.

11.0 Next Review

The next FYR will be due within five years of the signature/approval date of this FYR.

Appendix A: List of Documents Reviewed

Adrian Brown, 1999a. Sediments at Proposed Wellington Neighborhood Report. Prepared by Adrian Brown Consultants. July 2, 1999.

Adrian Brown. 1999b, Wellington-Oro Mine Pool EE/CA Data Summary Report. Report 1490A.990511. May 11, 1999.

Adrian Brown. 1997. Wellington-Oro Mine Remedial Evaluation for Acid Mine Drainage. Report No. 1490A. September 30, 1997.

American Geological Services, Inc. (AGS). 1999. Final Hydrogeologic Report, Wellington-Oro Mine and Mill Site, French Gulch near Breckenridge, Colorado. Prepared for the U.S. Bureau of Reclamation. May, 1999. Parts 1 and 2.

Brynn Grey, 1999. Final Report and Request for Notice of Completion of Work for French Gulch/Wellington Oro Site. Prepared by Brynn Grey Partners, Ltd. and Wellington Neighborhood, LLC. November 5, 1999.

CDPHE, 2000. Summary of Results of Capping Material Characterization Sampling for the Wellington Neighborhood. Prepared by the Colorado Department of Public Health and Environment. June 19, 2000.

CDPHE, 1999. State Review and Approval of the Final Report for Notice of Completion of Work at the French Gulch/Wellington Oro Site. Prepared by the Colorado Department of Public Health and Environment. November 12, 1999.

EPA, 2008. Wellington Oro Mine Water Treatment Plant ARARs Compliance Document. Prepared by EPA Region 8. November 15, 2008.

EPA, 2004a. Approval of Addendum #1 of the November 24, 2002 Action Memorandum for a Non-Time Critical Removal Action at the French Gulch/Wellington Oro Site, Summit County, Colorado. Prepared by EPA Region 8. November 30, 2004.

EPA, 2004b. The Wellington Oro/French Gulch Site Cleanup Goals and Objectives. Prepared by EPA Region 8. October 4, 2004.

EPA, 2003. Use-Attainability Analysis, Lower French Gulch and the Blue River Downstream from French Gulch near Breckenridge, Colorado, May 2003

EPA, 2002. Removal Action for the French Gulch/Wellington Oro Site, Summit County, Colorado. Prepared by EPA Region 8. November 24, 2002.

EPA, 2002. Ecological Risk Assessment for French Gulch/Wellington-Oro Mine Site, Prepared by Region 8 EPA, May 2002.

EPA, 1999a. Notice of Completion of Work at Union Mill Fill and Cover Area near Breckenridge, Colorado Pursuant to Prospective Purchaser Agreement. Prepared by EPA Region 8. November 9, 1999.

EPA, 1999b. Prospective Purchaser Agreement and Covenant Not To Sue in the matter of French Gulch/Wellington Oro Site. EPA Docket No. CERCLA-8-2000-01. October 14, 1999.

EPA, 1999c. Statement of Work for Engineering Evaluation/Cost Analysis, Mine Pool and Surface and Groundwater, French Gulch/Wellington-Oro Site, Breckenridge, Colorado. Prepared by EPA Region 8. January 29, 1999.

EPA, 1998a. Administrative Order for Non-Time Critical Removal Action in the matter of French Gulch/Wellington-Oro Mine Site. Docket No. CERCLA-VIII-98-6754. September 24, 1998.

EPA, 1998b. Enforcement Addendum to Action Memorandum for French Gulch/Wellington Oro Non-Time Critical Removal Action. Prepared by EPA Region 8. June 4, 1998.

EPA, 1998c. Approval Memorandum for the Engineering Evaluation/Cost Assessment for the French Gulch/Wellington-Oro Site. Prepared by EPA Region 8. May 12, 1998.

Kimball, B.A., R.L. Runkel, and L.J. Gerner. 1999. Quantification of metal loading in French Gulch, Summit County, Colorado, using a tracer-injection study, July 1996. USGS Water-Resources Investigations Report 98-4078.

L.F. Brown, 1998. French Gulch Surface Waste Removal Action, Engineering Evaluation/Cost Analysis. Prepared for French Gulch Mines, Inc. by L.F. Brown & Associates, Inc. August 3, 1998.

Morrissey, A.M. 1995. Ground-Water Hydrology Characterization French Gulch Mine Pool Breckenridge, Colorado. Prepared for the US Environmental Protection Agency Region VIII. April 1995.

Stover, B. 1991. Interim Report of Site Characterization, French Gulch NPS Project. State of Colorado, Mined Land Reclamation Division, Department of Natural Resources (DNR). Unpublished. Cited in Adrian Brown, 1999c.

Stover, B. 1989. Reconnaissance Report, Mine Drainage Problems and Hydrology of French Gulch, Breckenridge Mining District. State of Colorado, Mined Land Reclamation Division, Department of Natural Resources. Unpublished. Cited in Adrian Brown, 1999c.

Tetra Tech, 2013. Optimization Review for French Gulch/Wellington-Oro Mine Site Water Treatment Plant. Prepared by Tetra Tech. April 8, 2013.

United States Bureau of Reclamation (USBOR). 1997. Geologic Investigations for Conceptual

Evaluation of Surface Waste Cleanup, Wellington-Oro Mine Complex, Breckenridge, Colorado. USBOR Report, July, 1997.

United States Geological Survey (USGS). 1996a. Unpublished data. U.S. Geological Survey Macroinvertebrate Results from French Gulch and Blue River Sampling Sites. Collected as part of the Upper Colorado River Basin National Water-Quality Assessment (NAWQA) program.

USGS, 1996b. Quantification Study of Metal Loading Using a Tracer-Injection in French Gulch, Summit County, Colorado. Prepared by the U.S. Geological Survey and the Colorado Division of Minerals and Geology. July 1996.

URS, 2013. Water Quality/Water Treatment Plant Data Summary Report for French Gulch/Wellington Oro. Prepared by URS Operating Services, Inc. and EPA Region 8. June 5, 2013.

URS, 2002. Wellington-Oro Mine Pool Engineering Evaluation/Cost Analysis, Prepared by URS Operating Services, Inc. for EPA Region 8. May 29, 2002.

Appendix B: Town of Breckenridge Expenditures

EPA recommendations	Recommendations/Changes Implemented in 2014 by Town of Breckenridge	Additional Optimizations Completed by Town of Breckenridge
Alternative filter/improve existing filters	Removed garnet/sand layer because of obvious buildup/rock formation. Observation: quarterly acid washes removes buildup - **$3500**	Could injection well be plugging up more often because of removal of garnet? Cost to clean injection well – **$2,000**
Adjust pH after filters	Additional soda ash injection point after filters to reduce iron precipitation and carbonate formation - **$3000**	Tested soda ash point. Preliminary testing showed stable soda ash reading. Programming done, need further testing.
Plan to meet standards at point of compliance	Monthly river samples continued at FG9, BR1, BR2	Sampling has been done voluntarily by plant for at least 2 years. **$2,000/year**
Improve building ventilation to reduce H2S fumes	Blocked off ventilation between plant and electrical room - **$100**	NaHS tank directly piped to outside – Recommended by NaHS supplier Testing level of H2S with test strips to determine correctly sized scrubber needed in electrical room
Improved heating in chemical storage area	Insulated overhead doors - **$200**	
Stock parts/spare parts.	Spare motor sized for pump to mine, spare pumps changeable for influent, plant process soda ash, NaHS, Floc, Yardneys (filtration media), and back to mine - **$12,000**	
Standardize process equipment, chemical feed, and control components	Spare pumps and motors, ORP, pH probes, and level sensors on shelf.	
		Installed process water seal water for soda ash pump and pump after Yardneys (filtration media). May improve seal life - **$500**
		Soda ash lines cleaned annually with slightly acidic acid solution to remove soda ash buildup that causes plant issues - **$200**
		Replaced original air dryer with more corrosive resistant one - **$4000**
		Switched soda ash flush 3 way valve to fail the opposite way. Prevent hot water from filling Soda ash tank - **$200**
		Inspect/Clean line to mine: Suspected blockage - **$4700**

EPA recommendations	Recommendations/Changes Planned to be Implemented by Town of Breckenridge	Additional Optimizations to be Completed by Town of Breckenridge
Use caustic soda instead of Soda ash for pH adjustment	Caustic soda addition budgeted for 2015 - **$4500**	Tested ability to add caustic soda without affecting process – natural buffering capacity in water.
Improve tank level controls	Will look into cheaper level indicator options in 2015 - **$5000**	Alarms occur when tanks are close to overflowing
Discharge/Recycle to Mine automation	Discharge/Recycle to Mine automation Planned and Budgeted to be done in 2015 - **$3500**	
Natural gas instead of propane	Not considered this year due to cost. Other needs – town water, internet, and gas may support need for digging a line in the future **–$65-70,000**	Locked in a lower winter propane rate, Assumed cheaper price than fluctuating winter rate when demand is higher.

Appendix C: Press Notice

EPA Five-Year Review Planned for the French Gulch Site

Colorado Department of Public Health and Environment

The U.S. Environmental Protection Agency is conducting the first Five-Year Review of cleanup actions performed at the French Gulch site near Breckenridge, Colorado. The purpose of the review is to make sure the selected cleanup actions effectively protect human health and the environment and is scheduled to be completed by December 2013.

The site, which includes the former Wellington-Oro Mine, is located about 2.2 miles upstream of the confluence of French Creek and the Blue River near Breckenridge. Sporadic mining and milling operations occurred at the mine from the late 1940s to the early 1970s. Since this area contains a large quantity of sulfide-bearing minerals, these conditions promote the formation of acid mine drainage. As a result, acid mine water flowing through the mine workings becomes highly contaminated with dissolved metals, exits the mine in the form of seeps and enters French Creek. Elevated zinc concentrations in the seep water are primarily responsible for the absence of fish populations in the downstream portion of French Creek and a segment of the Blue River. EPA investigations in the late 1980s determined that the Wellington-Oro Mine pool was the major contributor of zinc and cadmium load from French Creek into the Blue River.

In October 2002, the EPA signed an Action Memorandum to address water quality issues at the site. The cleanup goal is to reduce metals loading from French Creek into the Blue River to support a sustainable brown trout fishery in the Blue River directly downstream of the confluence with French Creek. A water treatment plant at the Wellington-Oro Mine collects and treats water from the mine and discharges it into the French Creek watershed. Both the Town of Breckenridge and Summit County assumed responsibility for implementing the cleanup of contaminated water from the Wellington-Oro Mine.

EPA invites community participation in the Five-Year Review process: community members are encouraged to contact EPA staff with any information that may help the Agency make its determination regarding the protectiveness and effectiveness of the remedies at the site.

For additional site information, visit the EPA website, http://www.epa.gov/region8/superfund/co/frenchgulch.

Site Contacts:

U.S. Environmental	**Colorado Dept. of Public Health**

Appendix D: Interview Forms

French Gulch Site — **Five-Year Review Interview Form**

Site Name: French Gulch
EPA ID No.: CO0001093392
Interviewer Name: _____
Affiliation: Certified Industrial Operator
Subject Name: Carl Johnson
Affiliation: _____
Subject Contact Information: carlj@townofbreckenridge.com
Time: _____
Date: 06/13/2013
Interview Location: email

Interview Format (circle one): **In Person** **Phone** **Mail** **Other:**

Interview Category: O&M

1. What is your overall impression of the project, including cleanup, maintenance and reuse activities (as appropriate)?
   Overall the process is removing zinc product from the influent water when the process is running. Water from FG6C mine seep has been contained and is being processed during operation or bypassed back to the mine seep. Maintenance issues are occurring much more frequently than anticipated due to the chemistry of the influent water and tight tolerances required to discharge. All product is being recycled to a zinc smelter and none is going to a landfill.

2. What is your assessment of the current performance of the remedial action in place at the Site?
   When the plant is in a stable state, every parameter is balanced (Sodium hydro sulfide, soda ash addition, well running filters); the plant removes zinc to the required levels in the discharge control mechanism. The plant performs well and runs smoothly in this state.

3. What are the findings from the monitoring data? What are the key trends in contaminant levels that are being documented over time at the Site?
   Influent zinc and iron increase during the runoff season (150 mg/L) zinc compared to normal flows during the winter (100 mg/L.) Influent iron has decreased over the last five years (125 to 80 mg/L.) Flow rates range between 30 gpm in the winter up to 80 gpm during runoff. The plant has never seen flow up to 150 gpm at any point in time from FG6C.

4. Is there a continuous on-site O&M presence? If so, please describe staff responsibilities and activities. Alternatively, please describe staff responsibilities and the frequency of site inspections and activities if there is not a continuous on-site O&M presence.
   O&M has been ongoing since commissioning the plant. There is a daily, weekly, monthly and yearly checklist that staff are required to perform and monitor. Outside contractors are hired for some yearly PM maintenance such as pump and VFD checks. .

5. Have there been any significant changes in site O&M requirements, maintenance schedules or sampling routines since start-up or in the last five years? If so, do they affect the protectiveness or effectiveness of the remedial action? Please describe changes and impacts.
   Equipment is malfunctioning or lasting a shorter period of time than expected primarily due to process chemistry. More preventative maintenance has been added to the daily and weekly checklist than originally suggested. Maintenance schedules for reagent tank, filter media, and strainers have all been shortened due to unseen process chemistry changes. PM for electrical components has been increased due to the corrosivity of the H2S gas present at low concentrations (<2 mg/L) in the plant. These changes are done to allow greater time the plant is in discharge and to increase the effectiveness of the remedial action. River sampling for zinc and cadmium have been increased to monthly instead of only during high and low flows to gather more data. This is done on a voluntary basis.

6. Have there been unexpected O&M difficulties or costs at the Site since start-up or in the last five years? If so, please provide details.
   Corrosion and wear of influent pumps caused FG6C to overflow due to poor pump performance. Iron fouling, poor backwash performance has caused media filters to work inefficiently and increase frequency of filter media. Corrosiveness of Soda ash and incorrect seal water has caused more frequent replacements of the soda ash pump. All of these issues are being resolved at an unexpected additional O&M cost. I do not know the actual cost, but it should be in the Optimization report from Tetra Tech.

7. Have there been opportunities to optimize O&M activities or sampling efforts? Please describe changes and any resulting or desired cost savings or improved efficiencies.
   Plumbing changes have been made to increase ease of maintenance, replacement of parts, extend life of equipment, flush lines with greater ease, re-valving to prevent overflow of tanks. Critical spares are on a shelf or can be shipped within days if the part is a big ticket item. Critical spares of influent pumps with stainless steel impellers, new soda ash pump, smaller chemical feed pumps, automatic flow meters, new plumbing, filter media replacement, computer programming fixes, pump rebuilds have all been O&M changes since the commissioning of the plant. These changes have increased the efficiencies and decreased replacement cost.

8. Do you have any comments, suggestions or recommendations regarding O&M activities and schedules at the Site?
   My suggestions follow the recommendations of the Optimization Review and the BioteQ optimization proposal. In addition I suggest a spare agitator and impeller for the Soda ash reagent tank, re-plumbing the influent meter to record flow when the plant is in emergency recycle instead of just when the process is running.

French Gulch Site		**Five-Year Review Interview Form**	
Site Name:	**French Gulch**	**EPA ID No.:**	**CO0001093392**
Interviewer Name:		**Affiliation:**	
Subject Name:	Mary Boardman	**Affiliation:**	CDPHE
Subject Contact Information:			
Time:		**Date:**	June 10, 2013
Interview Location:			

Interview Format (circle one): **In Person** **Phone** **Mail** **Other: email**

Interview Category: **State Agency**

1. What is your overall impression of the project, including cleanup, maintenance and reuse activities (as appropriate)?
   Little has occurred at the Site since the inception of the WTP. Current data consolidation efforts are underway, and should assist in determining if additional activities are warranted.

2. What is your assessment of the current performance of the remedial action in place at the Site?
   Insufficient data exists to fully evaluate the performance of the remedial action.

3. Are you aware of any complaints or inquiries regarding site-related environmental issues or remedial activities from residents in the past five years?
   David O'Neill, nearby residential developer, has expressed concern over the appearance of French Gulch.

4. Has your office conducted any site-related activities or communications in the past five years? If so, please describe the purpose and results of these activities.
   Activities have been limited since the WTP began operating in late 2008. CDPHE has received and reviewed monthly discharge monitoring reports. In 2010 the CDPHE Solid Waste Unit worked with the WTP to allow for filtercake to be transported out of state for reuse.

5. Are you aware of any changes to state laws that might affect the protectiveness of the Site's remedial action?
   No.

6. Are you comfortable with the status of the institutional controls at the Site? If not, what are the associated outstanding issues?

No - the agencies are relying on the developer to convey information about the Site. Example correspondence has not been provided to ensure sufficient information is conveyed to residents.

7. Are you aware of any changes in projected land use(s) at the Site?
   No.

8. Do you have any comments, suggestions or recommendations regarding the management or operation of the Site's remedial action?
   The Site has had several RPM's assigned to it, resulting in a lack of continuity and loss of institutional knowledge.

French Gulch Site		Five-Year Review Interview Form	
Site Name:	French Gulch	**EPA ID No.:**	CO0001093392
Interviewer Name:	Jennifer Lane	**Affiliation:**	EPA
Subject Name:	Lane Wyatt	**Affiliation:**	Northwest Colorado Council of Governments
Subject Contact Information:	qqlane@nwccog.org		
Time:	10:30AM MDT	**Date:**	13MAY2013
Interview Location:	Phone		

Interview Format (circle one): In Person **Phone** Mail Other:

1. Are you aware of the former environmental issues at the Site and the cleanup activities that have taken place to date?
   Our organization worked towards finding a solution in the area. We got a 319 grant with Mine Land Reclamation (now DRMS), and started to build a repository up there. Realized it was a bigger problem than initially thought. DRMS came in and characterized the situation and we were involved earlier than later. Worked with Director of Water Quality group and developed FROG. Tried to start get funding and contacting landowners and hired facilitator. Took a while to figure out problem and how to fix it. Superfund listing loomed over process. Summit County and Town got together to negotiate sale of property to pay for remediation. Consent Decree was formed; Town and County would purchase property and built the treatment plant. Our involvement was on the front end and trying to get a solution in place. We were not involved in operations and participated as technical advisor for County and Town, but once it was more involved with CERCLA, we stepped back at that point.

2. What is your overall impression of the project, including cleanup, maintenance and reuse activities (as appropriate)?
   In my mind it's more than the WTP at the mine. To me it includes all 1800 acres and the development. I see it as three legs of a stool; one was protecting the large area which includes abandoned mines to prevent encroachment. Two other mines in the area that had successful VOC cleanups. In that part of the region, housing is expensive and it was crafted well enough hat down valley property was available and used for subdivision development. That was highly successful. Then there is the mine cleanup itself. There were studies to determine exposure and mine treatment plant was successful from standpoint that EPA worked really well with community to step away from regular design and work with community to make a smaller footprint. Waste material could be sold on market if waste moved off site. WTP is excellent. 99.9% removal, though there is a problem that I don't think it captures full extent of pollution. But I suspect that you can't really see how the water moves and gets into French Creek. We did a Use Attainability Analysis, working with Division of Wildlife because there is a clean strain of cutthroat upstream. Concern that other trout would migrate upstream. In some ways it's not terrific that mine isn't completely cleaned up, but the chemical barrier prevents migration of other trout into cutthroat trout population. The project was innovative, cost-effective, community based and successful on many fronts.

3. What have been the effects of this Site on the surrounding community, if any?
   The tradeoff was water quality and trophy homes, and it was a hugely successful open space and recreational area. Water quality wasn't completely remediated, but may have been worth the compromise.

4. Have there been any problems with unusual or unexpected activities at the Site, such as emergency response, vandalism or trespassing?
   Not that I'm aware of.

5. Has EPA kept involved parties and surrounding neighbors informed of activities at the Site? How can EPA best provide site-related information in the future?
   In the past, there was more communication. It would be helpful to share sampling results information with community. The WTP is not meeting zinc concentration target at Blue Creek all of the time and I'm not sure how well the sampling information is being shared with community. Community isn't sure what it means that the water is still impaired. If the target is not being met, what are next steps?

6. Do you own a private well in addition to or instead of accessing city/municipal water supplies? If so, for what purpose(s) is your private well used?
   There are domestic wells across French Gulch and downstream up on a bluff within Breckenridge. They are up gradient, across river and probably well insulated from mine site.

7. Do you have any comments, suggestions or recommendations regarding any aspects of the project?
   No, I think it was really great. Sometimes I wonder about EPA's perspective on the water quality piece of it. I think it's a great case study of working with a community.

French Gulch Site **Five-Year Review Interview Form**

Site Name: French Gulch **EPA ID No.:** CO0001093392
Interviewer Name: Jennifer Lane **Affiliation:** EPA
Subject Name: Brian Lorch **Affiliation:** Summit County
Subject Contact Information: BrianL@co.summit.co.us
Time: 11:00 AM **Date:** 5/8/2013
Interview Location: Breckenridge Department of Public Works

Interview Format (circle one): In Person Phone Mail Other:

1. Are you aware of the former environmental issues at the Site and the cleanup activities that have taken place to date?
   Yes, both. I was involved in the remedial action decision and worked on the CD. Several studies and cleanups have taken place which lead to many discussions and decisions that I participated in.

2. Do you feel well-informed regarding the Site's activities and remedial progress? If not, how might EPA convey site-related information in the future?
   Yes, as a party to it, I have been well informed. There has been a transfer of staff at EPA, which has resulted in a loss of some communication in time, but with remedial we've stayed informed.

3. Have there been any problems with unusual or unexpected activities at the Site, such as emergency response, vandalism or trespassing?
   Not that I'm aware of.

4. Are you aware of any changes to state laws or local regulations that might affect the protectiveness of the Site's remedial action?
   No, we want to work to see if there is a way to optimize the system. The question is how to better use our money.

5. Are you aware of any changes in projected land use(s) at the Site?
   It is set aside as open space and there has been quite a bit of talk with EPA to try to do restoration in the area. We haven't moved that far. The Wellington Neighborhood is moving closer to the site. We have talked with EPA about what to do with the orange ponds which are now at the edge of the neighborhood. We've asked each of the RPMs if there is anything that can be done. There is a perception issue as it doesn't look good. Need to keep the drainage in mind. Harvard did a charrette about reuse in the area. I had always assumed we should try to reclaim to the natural situation. Could be an issue with neighbors being concerned about moving material through the neighborhood though; it may be difficult to move the gravel out. There are always concerns about what may be dug up as well.

6. Has EPA kept involved parties and surrounding neighbors informed of activities at the Site? How can EPA best provide site-related information in the future?

One thing we have, which may be unique, is that throughout the process we tend to not get a lot of the public involved. We really either have the trust of the local government, or people don't have time for public involvement. We had approximately 6 open houses with no attendance. The only time we had feedback was after the remedial action decision was made and people were worried about contaminates moving through the neighborhood to the repository. The developer had concerns, but other than that, no negative response.

7. Do you have any comments, suggestions or recommendations regarding the project?
One of our hopes is that we can come to a point to decide if we're doing the right thing and confirm we're doing the right thing. We spend about $200,000 annually and $4 million to install the WTP. We want to know if it's having any impact. We are waiting on results from the optimization report to know what we're discharging and affecting the point of compliance. We want to ensure it is effective and if not, what can be done to make it effective. The open space is great. Fish are nonexistent from Wellington-Oro mine to the Blue River confluence. When the confluence has water, there are fish down to the reservoir and above the plant, there is a cutthroat fishery.

French Gulch Site		Five-Year Review Interview Form	
Site Name:	French Gulch	**EPA ID No.:**	CO0001093392
Interviewer Name:	Jennifer Lane	**Affiliation:**	EPA
Subject Name:	Scott Reid	**Affiliation:**	Town of Breckenridge
Subject Contact Information:	scottr@townofbreckenridge.com		
Time:	2:00 PM	**Date:**	5/8/2013
Interview Location:	Breckenridge Department of Public Works		

Interview Format (circle one): In Person Phone Mail Other:

1. Are you aware of the former environmental issues at the Site and the cleanup activities that have taken place to date?
   Yes, I live in the Wellington Neighborhood and my background is in forestry. I am the open space and trails planner. I adopted and inherited the project around the time of the CD. I have been here 10 years; I was not involved in the FROG, but have been involved in the execution of the WTP. And I am involved in trail work in the area.

2. Do you feel well-informed regarding the Site's activities and remedial progress? If not, how might EPA convey site-related information in the future?
   I am better informed than most. As a homebuyer, I got lots of information related to the development. I was involved in Claimjumper; where we bought space in the area; we took hot piles from Claimjumper and stored it in the repository at Wellington-Oro about five years ago. EPA did it on behalf of forest service so the town could acquire the property. There was concern in the neighborhoods. If EPA hadn't done it, it wouldn't have been done as well. There were PR problems with the project. The WTP flies under the radar. It makes me a little nervous that people don't know about the orange ponds in the area. There was not much big picture process thoughts with Claimjumper and Wellington-Oro. I think there is still a big picture issue. We don't know if the cleanup is working, and if not, then what should we do? If it's not accomplishing improved water quality downstream, why would we dump money into the WTP? It would be great to use that money to protect county values, such as repairing the riparian area and restoring the land.

3. Have there been any problems with unusual or unexpected activities at the Site, such as emergency response, vandalism or trespassing?
   No, it is a public open space and nothing malicious occurs there. There are problems with the exposures to the orange ponds. It would be great to determine if there was anything that could be done to remove the ponds and not adversely affect the hydrology. The perception of the ponds is a concern in the long term. I would like the project reviewed in a holistic manner and not eat up the budget. It would be preferable to use the annual WTP money for river restoration if the WTP is not effective. The report focused on the plant, but if it's not affecting the whole, then it's just draining money away. The CD makes things a bit tricky, but there are two main concerns: the orange ponds and the WTP. It's not clear what other options there are if WTP is ineffective. And there is no clear cut answer. City and county are committed to cleanup and like to consider the big picture of open space and water quality goals.

4. Are you aware of any changes to state laws or local regulations that might affect the protectiveness of the Site's remedial action?
   Nothing statewide.

5. Are you aware of any changes in projected land use(s) at the Site?
   None, as it's open space.

6. Has EPA kept involved parties and surrounding neighbors informed of activities at the Site? How can EPA best provide site-related information in the future?
   Claimjumper could have been dealt with better. Staff changes at EPA and it has been challenging to keep continuity. If WTP is removing cadmium and zinc, but there is no change in the water quality, then why are we paying for it? We get lots of questions about the orange ponds. If we dry out the piles, and dredge rock, we could cell to pay for riparian restoration. Protection of historical resources is also important. Some in valley are good candidates for National Historic Landmark. The dredge and boarding houses are still in place at one part. State historical fund is interested but also interested in keeping the mining landscape. Four-mile bridge is a good model of how that would work.

7. Do you have any comments, suggestions or recommendations regarding the project?
   We just want to move ahead with a good decision, within a reasonable timeframe. We want to protect the water quality and open spaces.

French Gulch Site	Five-Year Review Interview Form
Site Name: French Gulch	**EPA ID No.:** CO0001093392
Interviewer Name: Jennifer Lane	**Affiliation:** EPA
Subject Name: Nearby Residents	
Time: 10:00 AM	**Date:** 5/8/2013
Interview Format (circle one): In Person	**Phone** **Mail**

1. Are you aware of the former environmental issues at the Site and the cleanup activities that have taken place to date?
   Yes.

2. What is your overall impression of the project, including cleanup, maintenance and reuse activities (as appropriate)?
   The project is well run. It would be nice if the 2 ponds were more secluded and weren't as exposed to the road. People don't understand that orange just means there are irons/metals precipitating out.

3. What have been the effects of this Site on the surrounding community, if any?
   It has resulted in affordable housing, open space and cleanup. Everything is interconnected and there have been benefits to pulling it all together.

4. Have there been any problems with unusual or unexpected activities at the Site, such as emergency response, vandalism or trespassing?
   No.

5. Has EPA kept involved parties and surrounding neighbors informed of activities at the Site? How can EPA best provide site-related information in the future?
   It has been just the right amount, not too much and not too little communicated. There are questions on the orange ponds. Perception is that the WTP is in but, from a layman's perspective, it's unclear why they ponds are still orange.

6. Do you own a private well in addition to or instead of accessing city/municipal water supplies? If so, for what purpose(s) is your private well used?
   Private wells are not allowed in city limits and there are none in our neighborhood.

7. Do you have any comments, suggestions or recommendations regarding any aspects of the project?
   It's our understanding that there is $2 million to spend on improving the site. There should be a community process on what to do with it. Don't want it to get used on something else because of budget problems/sequestration. It should be used on remediation/revitalization of the Site possibly on trails.

French Gulch Site	**Five-Year Review Interview Form**
Site Name: French Gulch	**EPA ID No.:** CO0001093392
Interviewer Name: Jennifer Lane	**Affiliation:** EPA
Subject Name: Nearby Residents	
Time: 2:45 PM	**Date:** 5/8/2013
Interview Format (circle one): In Person	**Phone** **Mail**

1. Are you aware of the former environmental issues at the Site and the cleanup activities that have taken place to date?
   Yes. In 1975, I started a public utility job with Frisco and I've been involved with water and waste utilities for the bulk of my time since. I am part of a watershed group in the area. Blue Creek may be the most impaired water (primarily from Pennsylvania Mine).

2. What is your overall impression of the project, including cleanup, maintenance and reuse activities (as appropriate)?
   I was not involved with the actual process and negotiations. I think the solution was very acceptable. I haven't been monitoring the effluent, but I think I would've heard about it if it wasn't acceptable. Overall my opinion is positive. Hopefully something similar could happen at Pennsylvania Mine. It is a win-win for everyone with open space, housing development, which is extremely critical as the area needs low income housing.

3. What have been the effects of this Site on the surrounding community, if any?
   All positive as the river was restored where in the past no fish were seen below French Gulch.

4. Have there been any problems with unusual or unexpected activities at the Site, such as emergency response, vandalism or trespassing?
   I wouldn't be aware of any as I don't live right there, but haven't heard of any.

5. Has EPA kept involved parties and surrounding neighbors informed of activities at the Site? How can EPA best provide site-related information in the future?
   Someone should do more education an outreach. I would like the positive story told.

6. Do you own a private well in addition to or instead of accessing city/municipal water supplies? If so, for what purpose(s) is your private well used?
   My understanding is that part of the negotiations eliminated any wells and there would be no future wells or drilling.

7. Do you have any comments, suggestions or recommendations regarding any aspects of the project?
   No, let's do this at other locations.

Appendix E: Site Inspection Checklist

FIVE-YEAR REVIEW SITE INSPECTION CHECKLIST

I. SITE INFORMATION

Site Name: French Gulch	**Date of Inspection: 5/8/2013**
Location and Region: Breckenridge CO, Region 8	**EPA ID: CO0001093392**
Agency, Office or Company Leading the Five-Year Review: EPA Region 8	**Weather/Temperature: 30s, overcast with intermittent snow**

Response Action Includes: (Check all that apply)

- ☒ Landfill cover/containment
- ☐ Access controls
- ☒ Institutional controls
- ☒ Ground water pump and treatment
- ☐ Surface water collection and treatment
- ☐ Other: _____
- ☐ Monitored natural attenuation
- ☐ Ground water containment
- ☐ Vertical barrier walls

Attachments: ☒ Inspection team roster attached ☐ Site map attached

II. INTERVIEWS (check all that apply)

1. **O&M Site Manager** _____ (Name) _____ (Title) mm/dd /yyyy (Date)
   Interviewed ☐ at site ☐ at office ☐ by phone Phone: _____
   Problems, suggestions ☐ Report attached: _____

2. **O&M Staff** Carl Johnson (Name) Certified Industrial Operator (Title) 06/13 /2013 (Date)
   Interviewed ☐ at site ☐ at office ☐ by phone Phone: _____
   Problems/suggestions ☐ Report attached: See Appendix D

3. **Local Regulatory Authorities and Response Agencies** (i.e., state and tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices). Fill in all that apply.

Agency CDPHE

Contact	Mary Boardman (Name)	Project Manager (Title)	6/10/2013 (Date)	_____ (Phone No.)

Problems/suggestions ☐ Report attached: D

Agency Northwest Colorado Council of Governments

Contact	Lane Wyatt (Name)	_____ (Title)	05/13/2013 (Date)	_____ (Phone No.)

Problems/suggestions ☐ Report attached: D

Agency Town of Breckenridge

Contact	Scott Reid (Name)	_____ (Title)	05/08/52013 (Date)	_____ (Phone No.)

Problems/suggestions ☐ Report attached: D

Agency Summit County

Contact	Brian Lorch (Name)	_____ (Title)	05/08/2013 (Date)	_____ (Phone No.)

Problems/suggestions ☐ Report attached: D

Agency _____

Contact	_____ (Name)	_____ (Title)	_____ (Date)	_____ (Phone No.)

Problems/suggestions ☐ Report attached: _____

4. **Other Interviews** (optional) ☐ Report attached: _____

III. ON-SITE DOCUMENTS AND RECORDS VERIFIED (check all that apply)

1. **O&M Documents**

☒ O&M manual	☒ Readily available	☒ Up to date	☐ N/A
☒ As-built drawings	☒ Readily available	☒ Up to date	☐ N/A
☒ Maintenance logs	☒ Readily available	☒ Up to date	☐ N/A

Remarks: _____

2.	**Site-Specific Health and Safety Plan**	☒ Readily available	☒ Up to date	☐ N/A
	☒ Contingency plan/emergency response plan	☒ Readily available	☒ Up to date	☐ N/A

Remarks: _____

3.	**O&M and OSHA Training Records**	☒ Readily available	☒ Up to date	☐ N/A

Remarks: _____

4.	**Permits and Service Agreements**			
	☐ Air discharge permit	☐ Readily available	☐ Up to date	☒ N/A
	☒ Effluent discharge	☒ Readily available	☒ Up to date	☐ N/A
	☐ Waste disposal, POTW	☐ Readily available	☐ Up to date	☒ N/A
	☐ Other permits: _____	☐ Readily available	☐ Up to date	☒ N/A
	Remarks: _____			
5.	**Gas Generation Records**	☐ Readily available	☐ Up to date	☒ N/A
	Remarks: _____			
6.	**Settlement Monument Records**	☐ Readily available	☐ Up to date	☒ N/A
	Remarks: _____			
7.	**Ground Water Monitoring Records**	☒ Readily available	☒ Up to date	☐ N/A
	Remarks: _____			
8.	**Leachate Extraction Records**	☐ Readily available	☐ Up to date	☒ N/A
	Remarks: _____			
9.	**Discharge Compliance Records**			
	☐ Air	☐ Readily available	☐ Up to date	☒ N/A
	☒ Water (effluent)	☒ Readily available	☒ Up to date	☐ N/A
	Remarks: _____			
10.	**Daily Access/Security Logs**	☒ Readily available	☒ Up to date	☐ N/A
	Remarks: _____			

IV. O&M COSTS

1.	**O&M Organization**		
	☐ State in-house	☐ Contractor for state	
	☒ PRP in-house	☐ Contractor for PRP	
	☐ Federal facility in-house	☐ Contractor for Federal facility	
	☐ _____		

2. **O&M Cost Records**

☒ Readily available ☒ Up to date

☒ Funding mechanism/agreement in place ☐ Unavailable

Original O&M cost estimate: The 2002 Action Memorandum estimated annual O&M costs of $192,000/year ☒ Breakdown attached (see Section 4.3 of FYR)

Total annual cost by year for review period if available

Approximately $260,000 per year

From: mm/dd/yyyy Date	To: mm/dd/yyyy Date	_____ Total cost	☐ Breakdown attached
From: mm/dd/yyyy Date	To: mm/dd/yyyy Date	_____ Total cost	☐ Breakdown attached
From: mm/dd/yyyy Date	To: mm/dd/yyyy Date	_____ Total cost	☐ Breakdown attached
From: mm/dd/yyyy Date	To: mm/dd/yyyy Date	_____ Total cost	☐ Breakdown attached
From: mm/dd/yyyy Date	To: mm/dd/yyyy Date	_____ Total cost	☐ Breakdown attached

3. **Unanticipated or Unusually High O&M Costs during Review Period**

Describe costs and reasons: Chemical wear from corrosive materials has resulted in maintenance issues with filters and strainers. An outside contractor resolves any maintenance issues that arise, yet as a result, O&M costs are higher than anticipated.

V. ACCESS AND INSTITUTIONAL CONTROLS ☒ Applicable ☐ N/A

A. Fencing

1. **Fencing Damaged** ☐ Location shown on site map ☐ Gates secured ☒ N/A

Remarks: _____

B. Other Access Restrictions

1. **Signs and Other Security Measures** ☐ Location shown on site map ☐ N/A

Remarks: The water treatment plant is secure.

C. Institutional Controls (ICs)

1. **Implementation and Enforcement**

Site conditions imply ICs not properly implemented ☐ Yes ☒ No ☐ N/A

Site conditions imply ICs not being fully enforced ☐ Yes ☒ No ☐ N/A

Type of monitoring (e.g., self-reporting, drive by): _____

Frequency: _____

Responsible party/agency: _____

Contact _____ _____ mm/dd/yyyy _____

Name Title Date Phone no.

Reporting is up to date ☐ Yes ☐ No ☒ N/A

Reports are verified by the lead agency ☐ Yes ☐ No ☒ N/A

Specific requirements in deed or decision documents have been met ☒ Yes ☐ No ☐ N/A

Violations have been reported ☐ Yes ☒ No ☒ N/A

Other problems or suggestions: ☐ Report attached

2. **Adequacy** ☒ ICs are adequate ☐ ICs are inadequate ☐ N/A

Remarks: _____

D. General

1. **Vandalism/Trespassing** ☐ Location shown on site map ☒ No vandalism evident

Remarks: _____

2. **Land Use Changes On Site** ☐ N/A

Remarks: The Wellington Neighborhood is requesting that a portion of the Site be used as a bus turn around area. The Town of Breckenridge would like the Site regraded and riparian zones restored and trails added.

3. **Land Use Changes Off Site** ☐ N/A

Remarks: _____

VI. GENERAL SITE CONDITIONS

A. Roads ☒ Applicable ☐ N/A

1. **Roads Damaged** ☐ Location shown on site map ☒ Roads adequate ☐ N/A

Remarks: _____

B. Other Site Conditions

Remarks: _____

VII. LANDFILL COVERS ☐ Applicable ☒ N/A

A. Landfill Surface

1.	**Settlement** (low spots)	☐ Location shown on site map	☐ Settlement not evident
	Arial extent: _____		Depth: _____
	Remarks: _____		
2.	**Cracks**	☐ Location shown on site map	☐ Cracking not evident
	Lengths: _____	Widths: _____	Depths: _____
	Remarks: _____		
3.	**Erosion**	☐ Location shown on site map	☐ Erosion not evident
	Arial extent: _____		Depth: _____
	Remarks: _____		
4.	**Holes**	☐ Location shown on site map	☐ Holes not evident
	Arial extent: _____		Depth: _____
	Remarks: _____		
5.	**Vegetative Cover**	☐ Grass	☐ Cover properly established
	☐ No signs of stress	☐ Trees/shrubs (indicate size and locations on a diagram)	
	Remarks: _____		
6.	**Alternative Cover** (e.g., armored rock, concrete)		☐ N/A
	Remarks: _____		
7.	**Bulges**	☐ Location shown on site map	☐ Bulges not evident
	Arial extent: _____		Height: _____
	Remarks: _____		
8.	**Wet Areas/Water Damage**	☐ Wet areas/water damage not evident	
	☐ Wet areas	☐ Location shown on site map	Arial extent: _____
	☐ Ponding	☐ Location shown on site map	Arial extent: _____
	☐ Seeps	☐ Location shown on site map	Arial extent: _____
	☐ Soft subgrade	☐ Location shown on site map	Arial extent: _____
	Remarks: _____		
9.	**Slope Instability**	☐ Slides	☐ Location shown on site map
	☐ No evidence of slope instability		
	Arial extent: _____		
	Remarks: _____		

B. Benches ☐ Applicable ☐ N/A

(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)

1.	**Flows Bypass Bench**	☐ Location shown on site map	☐ N/A or okay
	Remarks: _____		
2.	**Bench Breached**	☐ Location shown on site map	☐ N/A or okay
	Remarks: _____		
3.	**Bench Overtopped**	☐ Location shown on site map	☐ N/A or okay
	Remarks: _____		
C. Letdown Channels		☐ Applicable	☐ N/A
	(Channel lined with erosion control mats, riprap, grout bags or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)		
1.	**Settlement** (Low spots)	☐ Location shown on site map	☐ No evidence of settlement
	Arial extent: _____		Depth: _____
	Remarks: _____		
2.	**Material Degradation**	☐ Location shown on site map	☐ No evidence of degradation
	Material type:_____		Arial extent: _____
	Remarks: _____		
3.	**Erosion**	☐ Location shown on site map	☐ No evidence of erosion
	Arial extent: _____		Depth: _____
	Remarks: _____		
4.	**Undercutting**	☐ Location shown on site map	☐ No evidence of undercutting
	Arial extent: _____		Depth: _____
	Remarks: _____		
5.	**Obstructions**	Type: _____	☐ No obstructions
	☐ Location shown on site map	Arial extent: _____	
	Size: _____		
	Remarks: _____		
6.	**Excessive Vegetative Growth**	Type: _____	
	☐ No evidence of excessive growth		
	☐ Vegetation in channels does not obstruct flow		
	☐ Location shown on site map	Arial extent: _____	
	Remarks: _____		
D. Cover Penetrations		☐ Applicable	☐ N/A

1. **Gas Vents** ☐ Active ☐ Passive
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs maintenance ☐ N/A
Remarks: _____

2. **Gas Monitoring Probes**
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs maintenance ☐ N/A
Remarks: _____

3. **Monitoring Wells** (within surface area of landfill)
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs maintenance ☐ N/A
Remarks: _____

4. **Extraction Wells Leachate**
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs maintenance ☐ N/A
Remarks: _____

5. **Settlement Monuments** ☐ Located ☐ Routinely surveyed ☐ N/A
Remarks: _____

E. Gas Collection and Treatment ☐ Applicable ☐ N/A

1. **Gas Treatment Facilities**
☐ Flaring ☐ Thermal destruction ☐ Collection for reuse
☐ Good condition ☐ Needs maintenance
Remarks: _____

2. **Gas Collection Wells, Manifolds and Piping**
☐ Good condition ☐ Needs maintenance
Remarks: _____

3. **Gas Monitoring Facilities** (e.g., gas monitoring of adjacent homes or buildings)
☐ Good condition ☐ Needs maintenance ☐ N/A
Remarks: _____

F. Cover Drainage Layer ☐ Applicable ☐ N/A

1. **Outlet Pipes Inspected** ☐ Functioning ☐ N/A
Remarks: _____

2. **Outlet Rock Inspected** ☐ Functioning ☐ N/A
Remarks: _____

G. Detention/Sedimentation Ponds ☐ Applicable ☐ N/A

1.	**Siltation**	Area extent: _____	Depth: _____	☐ N/A
	☐ Siltation not evident			
	Remarks: _____			
2.	**Erosion**	Area extent: _____	Depth: _____	
	☐ Erosion not evident			
	Remarks: _____			
3.	**Outlet Works**	☐ Functioning		☐ N/A
	Remarks: _____			
4.	**Dam**	☐ Functioning		☐ N/A
	Remarks: _____			
H. Retaining Walls		☐ Applicable	☐ N/A	
1.	**Deformations**	☐ Location shown on site map		☐ Deformation not evident
	Horizontal displacement: _____		Vertical displacement: _____	
	Rotational displacement: _____			
	Remarks: _____			
2.	**Degradation**	☐ Location shown on site map		☐ Degradation not evident
	Remarks: _____			
I. Perimeter Ditches/Off-Site Discharge		☐ Applicable	☐ N/A	
1.	**Siltation**	☐ Location shown on site map		☐ Siltation not evident
	Area extent: _____			Depth: _____
	Remarks: _____			
2.	**Vegetative Growth**	☐ Location shown on site map		☐ N/A
	☐ Vegetation does not impede flow			
	Area extent: _____			Type: _____
	Remarks: _____			
3.	**Erosion**	☐ Location shown on site map		☐ Erosion not evident
	Area extent: _____			Depth: _____
	Remarks: _____			
4.	**Discharge Structure**	☐ Functioning		☐ N/A
	Remarks: _____			
VIII. VERTICAL BARRIER WALLS		☐ Applicable	☒ N/A	
1.	**Settlement**	☐ Location shown on site map		☐ Settlement not evident
	Area extent: _____			Depth: _____
	Remarks: _____			

2. **Performance Monitoring** Type of monitoring: _____

☐ Performance not monitored

Frequency: _____ ☐ Evidence of breaching

Head differential: _____

Remarks: _____

IX. GROUND WATER/SURFACE WATER REMEDIES ☒ Applicable ☐ N/A

A. Ground Water Extraction Wells, Pumps and Pipelines ☒ Applicable ☐ N/A

1. **Pumps, Wellhead Plumbing and Electrical**

☒ Good condition ☐ All required wells properly operating ☐ Needs maintenance ☐ N/A

Remarks: _____

2. **Extraction System Pipelines, Valves, Valve Boxes and Other Appurtenances**

☒ Good condition ☐ Needs maintenance

Remarks: _____

3. **Spare Parts and Equipment**

☒ Readily available ☒ Good condition ☐ Requires upgrade ☐ Needs to be provided

Remarks: _____

B. Surface Water Collection Structures, Pumps and Pipelines ☐ Applicable ☒ N/A

1. **Collection Structures, Pumps and Electrical**

☐ Good condition ☐ Needs maintenance

Remarks: _____

2. **Surface Water Collection System Pipelines, Valves, Valve Boxes and Other Appurtenances**

☐ Good condition ☐ Needs maintenance

Remarks: _____

3. **Spare Parts and Equipment**

☐ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided

Remarks: _____

C. Treatment System ☒ Applicable ☐ N/A

1. **Treatment Train** (check components that apply)

☒ Metals removal ☐ Oil/water separation ☐ Bioremediation

☒ Air stripping ☐ Carbon adsorbers

☒ Filters: _____

☒ Additive (e.g., chelation agent, flocculent): _____

☐ Others: _____

☒ Good condition ☐ Needs maintenance

☒ Sampling ports properly marked and functional

☒ Sampling/maintenance log displayed and up to date

☒ Equipment properly identified

☐ Quantity of ground water treated annually: _____

☐ Quantity of surface water treated annually: _____

Remarks: The WTP treated and discharged water approximately 36 percent of the days during 2009 through 2012. The plant has operated at a maximum flow rate of 72.9 gpm, much lower than the design capacity of 150 gpm.

2. **Electrical Enclosures and Panels** (properly rated and functional)

☐ N/A ☒ Good condition ☐ Needs maintenance

Remarks: _____

3. **Tanks, Vaults, Storage Vessels**

☐ N/A ☒ Good condition ☒ Proper secondary containment ☐ Needs maintenance

Remarks: _____

4. **Discharge Structure and Appurtenances**

☐ N/A ☒ Good condition ☐ Needs maintenance

Remarks: _____

5. **Treatment Building(s)**

☐ N/A ☒ Good condition (esp. roof and doorways) ☐ Needs repair

☒ Chemicals and equipment properly stored

Remarks: _____

6. **Monitoring Wells** (pump and treatment response action)

☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition

☐ All required wells located ☐ Needs maintenance ☐ N/A

Remarks: _____

D. Monitoring Data

1. **Monitoring Data**

☒ Is routinely submitted on time ☒ Is of acceptable quality

2. **Monitoring Data Suggests:**

☐ Ground water plume is effectively contained ☐ Contaminant concentrations are declining

E. Monitored Natural Attenuation

1. **Monitoring Wells** (natural attenuation response action)

☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition

☐ All required wells located ☐ Needs maintenance ☐ N/A

Remarks: _____

X. OTHER REMEDIES

If there are remedies applied at the site and not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the response action. An example would be soil vapor extraction.

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedial action

Describe issues and observations relating to whether the remedial action is effective and functioning as designed. Begin with a brief statement of what the remedial action is designed to accomplish (e.g., to contain contaminant plume, minimize infiltration and gas emissions).

In October 2002, EPA signed an action memorandum to address water quality issues at the Site. The cleanup goal is to reduce metals loading from French Creek into the Blue River to support a sustainable brown trout fishery in the Blue River directly downstream of the confluence with French Creek. There has been no consistent reduction in dissolved cadmium, manganese and zinc concentrations in the Blue River since the WTP began operation in late 2008. The WTP operations have not resulted in consistent discharges of treated water to the designated discharge point and the volume of water treated is significantly lower than the maximum design capacity. It is unclear if the seep that is being captured is the only source of contamination to river. Additional investigations are being performed to determine this.

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedial action.

The zinc removal process is functioning smoothly, despite occasional maintenance issues with filters and strainers. The primary problem is weakening equipment due to chemical wear from corrosive materials. An outside contractor resolves any maintenance issues that arise, yet as a result, O&M costs are higher than anticipated.

C. Early Indicators of Potential Response Action Problems

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedial action may be compromised in the future.

The WTP system is often down and does not run as much as intended.

D.	Opportunities for Optimization
	Describe possible opportunities for optimization in monitoring tasks or the operation of the remedial action. On April 8, 2013, EPA released an Optimization Review for the French Gulch/Wellington-Oro Mine Site Water Treatment Plant. The Optimization Review provided several recommendations to improve the water treatment plant's effectiveness, cost and technical operation (Table 3 of the FYR).

Site Inspection Team Roster:
Elizabeth Fagen, EPA RPM
Jennifer Lane, EPA CIC
Johnny Zimmerman-Ward, Skeo Solutions
Kristin Sprinkle, Skeo Solutions
Carl Johnson, Town of Breckenridge

Appendix F: Photographs from Site Inspection Visit

Entrance to the Wellington-Oro Mine located adjacent to the WTP.

WTP with Wellington-Oro Mine in background and local residents recreating. Several joggers were observed during the site inspection.

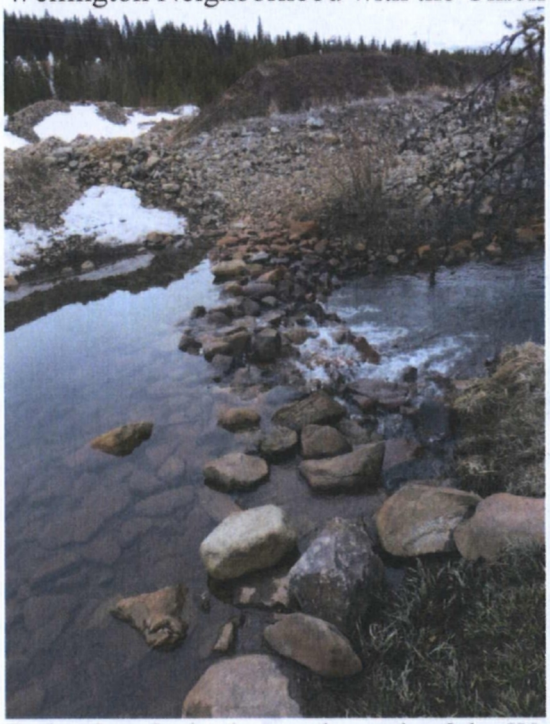
J Pipes indicating discharge location. Treated effluent is discharged below groundwater table.

FG-6, which is pumped to the WTP for treatment.

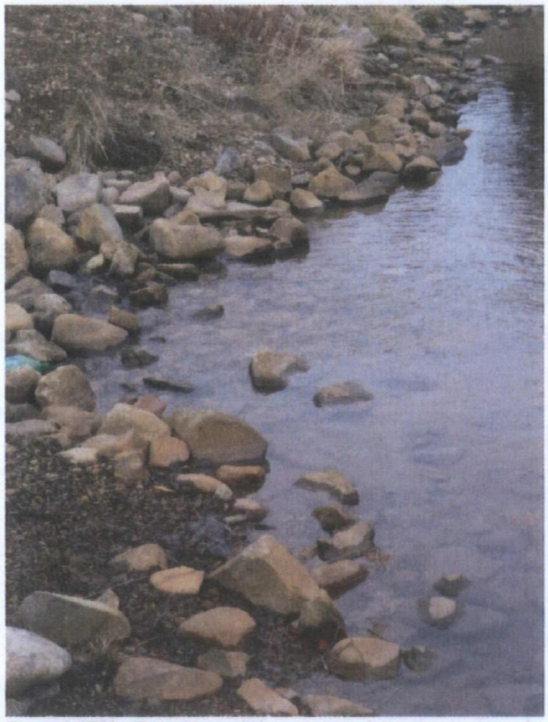
Surface water located adjacent to the road on the right when facing the WTP. Surface water here is red and is staining the rocks. This water discharges into ponds. Waste rock and fines in the background.

Ponds containing surface water flow with the Wellington Neighborhood in the background. Water seeps out the end toward the neighborhood.

Wellington Neighborhood with the Union Mine in the background.



Stained rocks in the creek south of the Wellington Oro Neighborhood.



Dead Elk Pond, with ground water entering the pond under the stained rocks in the middle-left section of the photo.

Fish barrier downstream of the Site and WTP.