REMEDIAL ACTION COMPLETION REPORT
OPERABLE UNIT 5

WATER TREATMENT PLANT, SDI EMERGENCY SPILLWAY, WIGHTMAN FORK DIVERSION AND SDI SPILLWAY CHANNEL IMPROVEMENTS, PENSTOCK AND POWER HOUSE, SDI TOE SEEP PUMPBACK SYSTEM AND A3 TURNOUTS, GROUND WATER INTERCEPTOR DRAINS AND DITCH TURNOUTS, AND REYNOLDS ADIT REHABILITATION

SUMMITVILLE MINE SUPERFUND SITE
RIO GRANDE COUNTY, COLORADO

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LIST OF ACRONYMS

ACC	American Civil Constructors, Inc.
ACI	American Concrete Institute
ARD	Acid Rock Drainage
AWS	American Welding Society
CDPHE	Colorado Department of Public Health and Environment
CMGC	Construction Management / General Contractor
D&A	Deere and Ault Consultants, Inc.
ER	Environmental Restoration, LLC
GMP	Guaranteed Maximum Price
gpm	Gallons per Minute
HDS	High Density Sludge
HLP	Heap Leach Pad
HMWMD	Hazardous Materials and Waste Management Division
HVAC	Heating, Ventilation and Air Conditioning
IFC	Issued for Construction
NCP	National Contingency Plan
NRRB	National Remedy Review Board
NWD	North Waste Dump
O&F	Operational and Functional
O&M	Operations and Maintenance
OU5	Operable Unit 5
PEMB	Pre-Engineered Metal Building
RA	Remedial Action
RD	Remedial Design
RFI	Request for Information
RFP	Request for Proposals
RI/FS	Remedial Investigation/Feasibility Study
RJH	RJH Consultants, Inc.
ROD	Record of Decision
RTG	Resource Technologies Group, Inc.
S&W	Shannon and Wilson Consultants, Inc.
SCMCI	Summitville Consolidated Mining Company, Inc.
SDI	Summitville Dam Impoundment
SEO	State Engineers Office
SMSS	Summitville Mine Superfund Site
UAA	Use Attainability Analysis
URS	URS Operating Services
U.S. BOR	United States Bureau of Reclamation
U.S. EPA	United States Environmental Protection Agency

WFD	Wightman Fork Diversion
WLH	WLH Construction
WQCD	Water Quality Control Division
WTP	Water Treatment Plant
WTS	Water Treatment System

1.0 INTRODUCTION

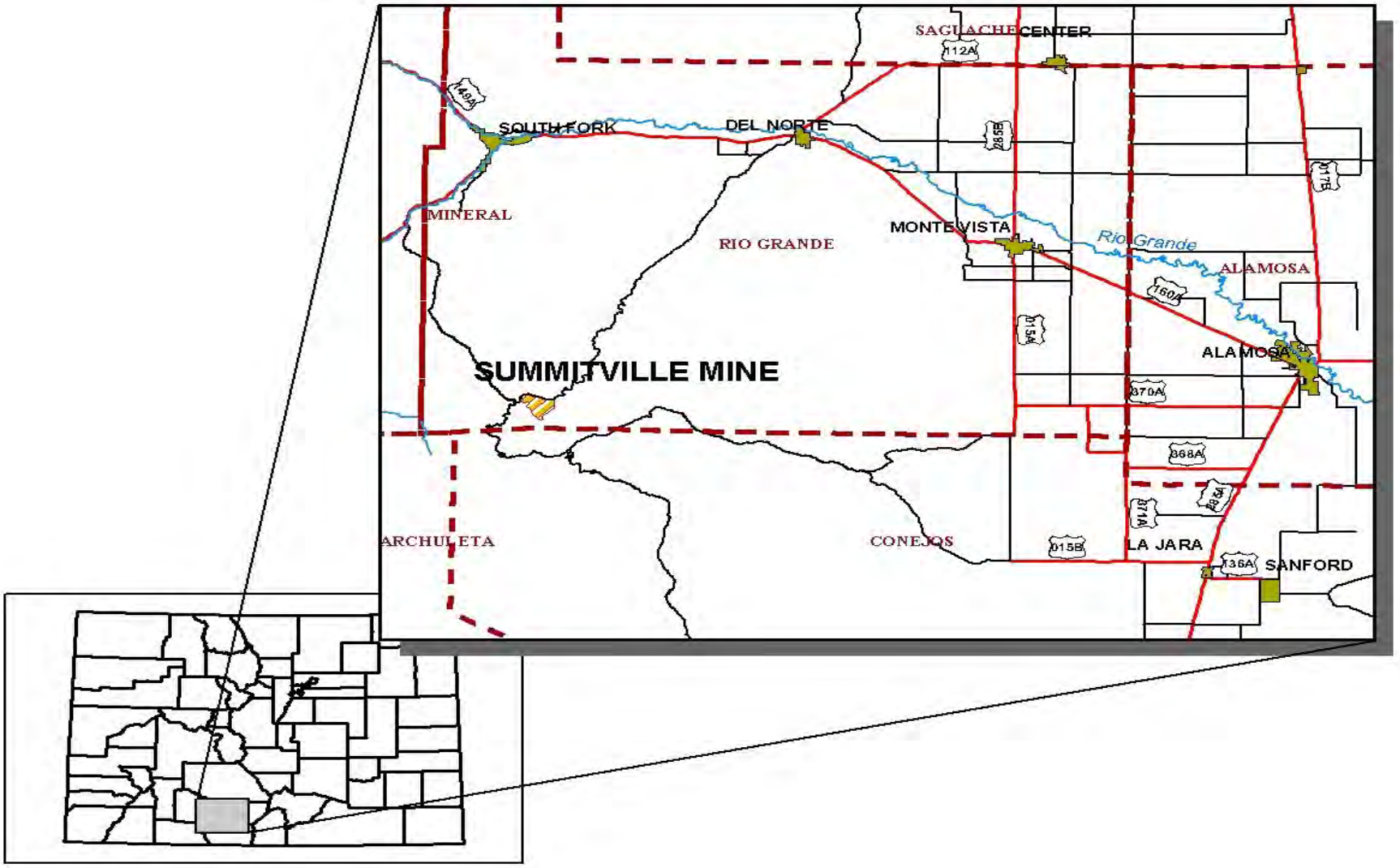
The Summitville Mine Superfund Site (SMSS) is located approximately 18 miles southwest of Del Norte, Colorado (Figure 1).

Water discharges from the SMSS are acidic in nature with significant concentrations of heavy metals, and are of particular concern in the nearby Alamosa River which is used extensively for recreation and agriculture. There are also significant concerns with respect to aquatic life and migratory wildlife habitats in the Alamosa River watershed. The *Record of Decision for Summitville Mine Final Site-Wide Remedy Operable Unit 5* (ROD) (CDPHE, 2001) signed on September 28, 2001 prescribed the final site-wide remedy for the SMSS. One of the major components of the ROD is the capability to control and treat contaminated water prior to discharge. This project's goal was to replace the existing water treatment plant, and include the construction of a highly automated and cost effective facility including conveyance from the contaminated water storage impoundment (known as the Summitville Dam Impoundment, or SDI), effluent discharge, and infrastructure modifications.

The ROD and precursor engineering and feasibility analyses identified a single stage lime High Density Sludge (HDS) process as the preferred treatment method. The existing water treatment plant operates similar to a single stage lime-HDS plant. Additional study on the feasibility of lime-HDS (both single stage and two stage) was performed by URS Operating Services during a series of pilot plant studies conducted at the Summitville Mine Superfund Site in October 2002. Golder Associates Inc. (Golder) formerly Resource Technologies Group, Inc. (RTG), initially reviewed projected influent water quality and target treatment goals in order to develop an understanding on required contaminant removal. Based on this understanding, several alternative approaches to the use of basic lime-HDS process were identified, previous bench and pilot studies and existing plant operations data reviewed, and additional bench and vendor studies conducted in order to develop an understanding of achievable effluent quality and performance characteristics of alternative process configurations. The ROD also identified improvements to water-related infrastructure at the SMSS to enhance water management and to improve safety and reliability.

This report documents construction activities leading to the completion of the overall site remedy including the construction of: 1) the new water treatment plant, 2) SDI emergency spillway, 3) Wightman Fork Diversion (WFD) and SDI spillway channel improvements, 4) penstock and power house, 5) SDI toe seep pumpback system and A3 Turnout, 6) Ground water interceptor drains and ditch turnouts, and 7) Reynolds Adit rehabilitation. The scope of work documented in this report includes the design and construction of each of these construction activities.

FIGURE 1: VICINITY MAP



2.0 SITE DESCRIPTION AND BACKGROUND

This 1,400-acre SMSS is located in Rio Grande County, approximately 18 miles southwest of Del Norte (Figure 1). The SMSS is located on the northern flanks of South Mountain in the San Juan Mountains at an elevation of 11, 300 feet, surrounded by the Rio Grande National Forest. The Alamosa River and its tributaries flow from the SMSS through forest and agricultural land in Rio Grande and Conejos Counties and past the San Luis Valley towns of Capulin and La Jara. The Terrace Reservoir, used for irrigation, is on the Alamosa River 18 miles downstream from the SMSS.

Gold and silver mining began on South Mountain around 1870. The latest mining operator, Summitville Consolidated Mining Company, Inc. (SCMCI), mined the site from July 1986 through October 1991 and abandoned the site in December 1992. The company opened a pit heap leach gold mining operation, using cyanide to extract the gold. Following the departure of SCMCI the U.S. Environmental Protection Agency (U.S. EPA) Emergency Response Branch assumed responsibility of the site on December 16, 1992. The site was placed on the National Priorities List of Superfund sites on May 31, 1994.

Since December 1992, U.S. EPA and the Colorado Department of Public Health and Environment (CDPHE) have initiated several interim projects designed to slow the amount of acid mine drainage originating from the SMSS. These interim projects have included: detoxifying, capping and revegetating the heap leach pad; removing waste rock piles and filling the mine pits; plugging the adits or underground mine entrances; and expanding the water runoff holding ponds, as well as operating a water treatment plant on-site. The water treatment plant treated the chemicals of concern including heavy metals (copper, cadmium, manganese, zinc, lead, nickel, aluminum, iron) in the acid mine drainage.

CDPHE led the largest interim measure to be implemented: Site-wide Reclamation and Revegetation. In addition, CDPHE led the Site-Wide (OU5) Remedial Investigation and Feasibility Study (RI/FS), which began in 1998. The OU5 RI/FS evaluated the effectiveness of the interim measures that have been completed or that remain on-going at the SMSS, and determined what final construction projects or long-term measures must be added to complete the Summitville cleanup. The study culminated with a site-wide ROD issued in the fall of 2001. Major objectives of the ROD include:

- Intercept contaminated ground water for treatment;
- Collect acid rock drainage (ARD) from the exposed, sulfidic South Mountain pit-highwall for treatment;
- Improve/upgrade the undersized Wightman Fork Diversion and SDI spillway;
- Establish an ARD-reservoir of adequate capacity;
- Build a new water treatment plant; and

- Stabilize the Reynolds adit for long-term.

These objectives were designed to manage/treat discharges of SMSS waters into the Wightman Fork resulting in downstream Alamosa River waters meeting State water quality standards.

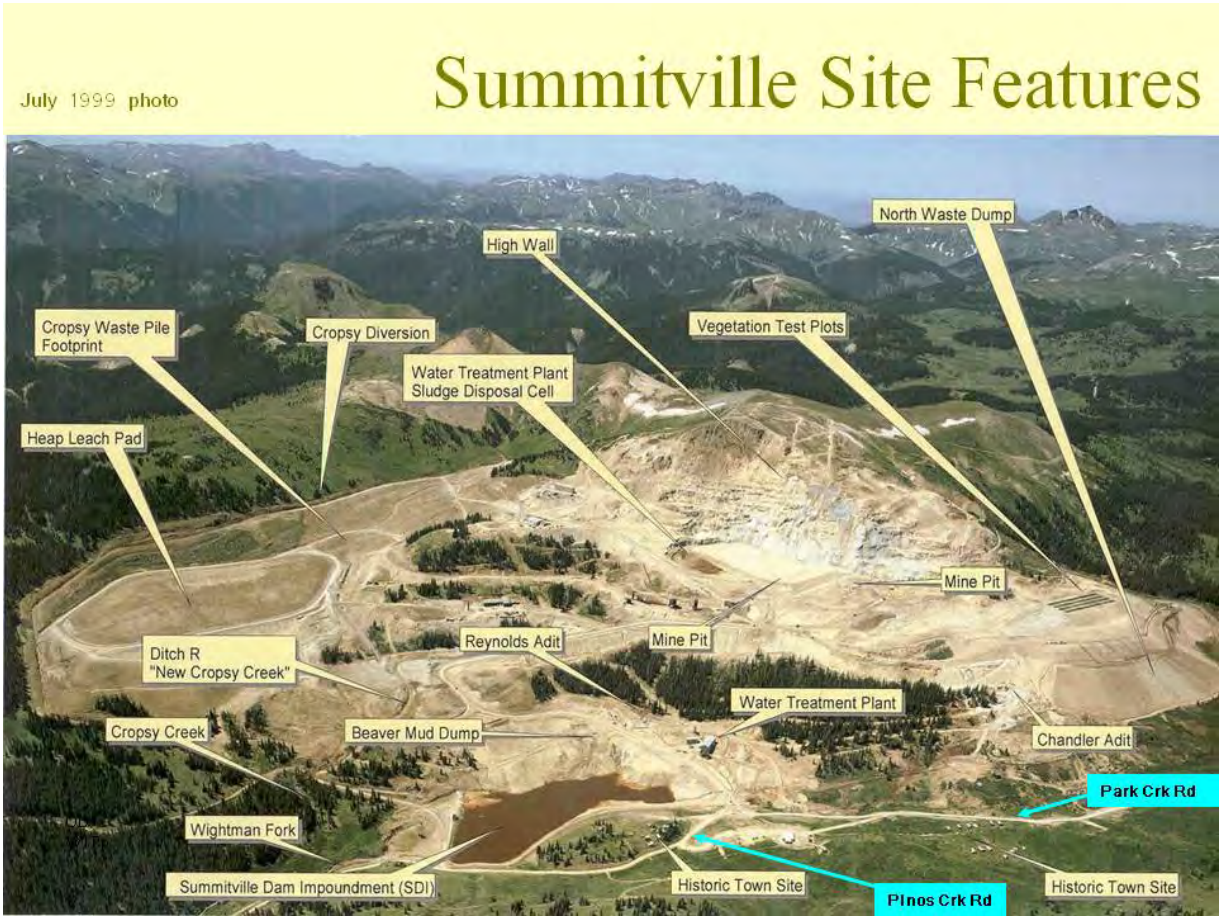
As ARD management at the SMSS developed, CDPHE-U.S. EPA in 2003-2004 completed the design of a new two-stage lime-HDS water treatment plant. Based on hydrologic modeling available at the time the design capacity of the plant was 1,400 gpm. Two stages were required to ensure effective removal of aluminum (first stage) and other metals including copper, iron, and zinc (second stage). The purpose of the first stage was to extract aluminum to reduce Wightman Fork concentrations to levels that would achieve aluminum standards in the Alamosa River. It was known that, besides the Summitville site, other large areas of the Alamosa headwaters (like Alum Creek) also generated large, naturally occurring metal loads into the river. Accordingly, after review, the U.S. EPA-NRRB remanded the WTP project back to Region 8 for further consideration so that CDPHE could undertake a load-study and updated Use-Attainability Analysis (UAA).

Because of natural and irreversible human-induced sources in the Alamosa River watershed, the UAA concluded that the existing aluminum standards in the Alamosa River segments 3a, 3b, 3c, 3d and 8 could not be met under any circumstance. Natural sources include highly mineralized terrain in the Stunner, Summitville and Jasper altered areas. Human-induced sources include, besides Summitville, legacy mines in these other areas as well.

After accounting for reversible human-induced sources at the SMSS, CDPHE calculated aluminum values that could be adopted as site-specific standards. The State Water Quality Control Commission accepted the proposed (relaxed) aluminum standards in 2007. Ambient (or existing conditions) standards now apply to the Alamosa River segment upstream of Wightman Fork (3a). Technology-based standards (which take into account the achievable aluminum removal using a water treatment plant) apply to Alamosa River segments downstream of Wightman Fork into and including Terrace Reservoir (3b, 3c, 3d and 8).

As a result of the standards modification process in 2007, use of a two-stage water treatment plant is not required. The State's design engineers, Golder, designed the treatment process with the objective of efficiently utilizing plant capabilities during extremes of flow and influent chemistry conditions and designed a single-stage plant to provide the necessary ARD treatment consistent with the revised discharge standards. The design included the removal of aluminum to the extent practicable. As a result of maturing surface water management practices, more accurate hydrologic modeling has been performed that also takes into account the remedial elements discussed in this report. The modeling combined with increased storage capacity in the ARD-reservoir indicates that a 1,600 gpm plant is required to manage all site-generated impacted water.

Figure 2: Summitville Mine Superfund Site with HLP (left center), SDI (bottom center), Mine Pits (center), NWD (right center), and interim WTP (right of SDI) during 1999.



3.0 CONSTRUCTION ACTIVITIES

The following sub-sections summarize the construction of the remedial elements designed to achieve the major objectives of the OU5 ROD (Section 2).

3.1 Water Treatment Plant

The contractor, Moltz Construction, Inc. (Moltz), mobilized to the SMSS on September 8, 2009, construction was initiated on September 14, 2009, and construction was substantially completed August 31, 2011 with the issuance of a Notice of Substantial Completion and construction punchlists (Appendix A). Construction stretched across three seasons due to the site's inaccessibility during the winter. The CDPHE and contractors have constructed the WTP remedy in accordance with the ROD, national contingency plan (NCP), and remedial design (RD) specifications. The project was inspected and accepted as complete on November 22, 2011.

The WTP construction project encompasses collection and conveyance of contaminated surface water from the SDI, treatment of the liquid stream, bulk chemical handling, liquid/solids separation, processing of solid residuals including disposal, and neutralization and discharge of the treated effluent to Wightman Fork. The water treatment plant is designed such that the treated effluent meets the discharge standards criteria established by the State Water Quality Control Division (WQCD) for the Alamosa River.

The treatment plant is designed for a flow rate of 1,600 gpm. The facility was designed for a minimum of 50-year life span requiring little exterior maintenance and incorporated Best Available Technology to treat the range of metals (aluminum, copper, iron, etc.) in the plant influent. The treatment process consists of a state-of-the-art lime-HDS process with appropriate pre- and post-treatment systems. A description of the treatment process flowsheet can be found in Appendix A.

Major elements of the project include the following:

- New lift station and conveyance piping modifications from the ARD-reservoir (SDI) to the treatment plant;
- Site work including parking facilities and grading for drainage control;
- Foundation system consisting of drilled piers, grade beams and floor slab;
- Upgraded electrical service for the facility including a backup generator;
- Connection of existing site utilities including potable water and natural gas;
- Process system including chemical reaction tanks, chemical feed systems, and a single stage clarifier;
- Sludge dewatering and management equipment;
- Precast concrete building designed to withstand harsh site climates (11, 300 foot elevation, 29-foot average snowfalls). Building includes process

equipment areas, control rooms, laboratory, offices, a maintenance garage for site vehicles, and equipment maintenance areas;

- HVAC and sanitary facilities to support a full-time site staff size of approximately 10 employees; and
- New effluent piping for treated water.

Due to the climate conditions, construction is only practical in the March through November timeframe. Therefore, three construction seasons were required to complete facility construction and commissioning. Basic work sequences during the three seasons are described in Sections 3.1.1 through 3.1.3.

3.1.1 Season 1 – Late 2009

This phase began immediately after notice-to-proceed and included the following:

- General site mobilization;
- Initial clearing and grubbing;
- Establishment of construction access, and equipment and material laydown areas;
- Rough grading of project site;
- Concrete batch plant erection; and
- Installation of building and clarifier foundation piers and grade beams.
- Design development was complete in late 2009 (for the entire project) and the guaranteed maximum price (GMP) for the project established.

Following establishment of the GMP, long-lead items were put out for bid and ordered. Offsite manufacturing efforts were initiated including the clarifier tank and mechanism, large process tanks, filter press equipment, and engineering and initiation of fabrication for the building frame, mezzanine frame, and building wall systems. Off-site staging and storage of some materials occurred, as necessary to support remobilization to the SMSS.

3.1.2 Season 2 – 2010

This phase included the following activities:

- Completion of rough civil work including grading and drainage systems and parking areas;
- Completion of building foundations and slab;
- Completion and erection of clarifier and clarifier mechanism;
- Erection of building main process area framing;
- Erection of mezzanine framing system;

- Completion of main process area roof structure;
- Framing and wall panel installation for support areas;
- Installation of main process area wall panels;
- Installation of field erected tanks;
- Installation of main process equipment;
- Utility rough-in connections; and
- Process piping and electrical installation.

3.1.3 Season 3 - 2011

This phase included the following activities:

- Complete installation of all mechanical and electrical systems;
- Complete all finishes and ancillary work; completing SDI work except for final connections;
- Final utility connections;
- Facility commissioning; and
- Punchlist and closeout.

No significant problems occurred during construction. As questions occurred during construction, the construction management/general contractor (CMGC) issued 128 Request for Information (RFI) to provide clarification to the design documents. Sixty-three Field Design Changes were issued to provide direction to the CMGC for the successful communication of design requirements covering changed conditions and details that were required for the successful completion of construction.

3.2 SDI Emergency Labyrinth Spillway

The SDI serves as the storage structure for acid mine drainage-impacted water at the SMSS. Historically, the storage capacity of the SDI had been insufficient to hold all of the water generated on-site during the spring snowmelt. Controlled releases of untreated site water were necessary via the ditch turnouts located upstream of the SDI during the spring snowmelt to prohibit releases through the SDI emergency spillway. Raising the SDI emergency spillway elevation by three feet via a new labyrinth spillway increased the storage capacity of the reservoir an estimated 11 percent from 90 million gallons to 100 million gallons. The increase in storage capacity allows the CDPHE more flexibility in managing surface water and decreases the volume of contaminated water from being turned offsite.

Moltz mobilized to the SMSS and began construction activities on August 16, 2010, and construction was substantially completed June 30, 2011 with the issuance of a Notice of Substantial Completion and construction punchlist issued on November 9, 2010 and

July 12, 2011 (Appendix B). Construction stretched across two seasons due to the site's inaccessibility during the winter. The CDPHE and contractors have constructed the SDI emergency spillway in accordance with the ROD, national contingency plan (NCP), and remedial design (RD) specifications. The SEO, CDPHE, and U.S.EPA performed a final inspection of the SDI emergency spillway on July 20, 2011. The remedy received SEO Final Acceptance on August 15, 2011 and CDPHE final acceptance on October 5, 2011.

3.3 Wightman Fork Diversion and SDI Spillway Channel Improvements

The Wightman Fork Diversion channel improvements project included the upgrade of the WFD to safely convey flows generated by the 100-year rainfall event. Components of the project included modifications/improvements to the upstream channel crossing (Site entrance), main channel and levee (including overflow spillways), downstream channel crossing (U.S. Forest Service Road 244), and the WFD return channel and plunge pool. Modifications/improvements included channel widening, rip-rap armoring, levee raising, construction of sheetpile weirs, installation of arch pipe culverts set on concrete, and channel stabilization.

American Civil Constructors, Inc. (ACC) mobilized to the SMSS and began construction activities on June 12, 2008, and construction was substantially completed September 10, 2009 with the issuance of a Notice of Substantial Completion and construction punchlist (Appendix C). Construction stretched across two seasons due to the site's inaccessibility during the winter. The CDPHE and contractors have constructed the SDI spillway channel and WFD improvements in accordance with the ROD, national contingency plan (NCP), and remedial design (RD) specifications. The CDPHE, U.S.EPA, and Tetra Tech performed a final inspection of the SDI spillway channel improvements and WFD on September 30, 2009 at which time the remedy became operational and functional (O&F).

Between 2009 and 2012, CDPHE noted some issues with the performance of a portion of the remedy, notably the Wightman Fork rundown structure from the arch culvert discharge to the plunge pool. On June 19, 2012, the CDPHE invited U.S. EPA to a conceptual design meeting to reconstruct the Wightman Fork rundown structure. U.S. EPA had concerns with the proposed design and consulted with the U.S. BOR to explore options and identify a technical solution to reconstruct a stable and durable dropdown structure.

At a July 17, 2012, meeting between U.S. EPA, U.S. BOR and CDPHE, the technical team determined that the original design for the culvert discharge channel is too steep and narrow, and resulting surface water flow depths and velocities are too high for riprap on geotextile to be stable. As a result, a significant storm would likely result in severe erosion, rapidly striping the riprap from the rundown structure channel and erode the underlying soil; potentially compromising the culvert headwall. If the culvert headwall should collapse, it would threaten the integrity of the Summitville Dam Impoundment. The northern berm of the rundown structure would also likely be washed

away, cutting a new channel in the direction of the power house and potentially threatening the power house.

For these reasons, U.S. EPA and CDPHE decided to reconstruct the rundown structure under removal action authority (U.S. EPA, September 25, 2012). U.S. EPA mobilized to the Site and began to reconstruction of the structure on August 6, 2012. Construction is targeted to be complete by October 31, 2012.

3.4 Penstock and Power House

The U.S. EPA funded the design and construction of a 16-inch penstock and power house. The penstock directs flows from Wightman Fork, upstream of the arch culverts to power a micro-hydroelectric turbine located near the base of the SDI. The micro-hydroelectric turbine provides supplemental power for the WTP.

Construction of the penstock and power house was performed in two phases by ACC (Phase I) and Saint Andrews Construction Services (Phase II). Phase I consisted of the construction of the diversion structure, penstock pipeline and power house foundation. Phase II consisted of the construction and installation of a power house structure, and turbine's electrical components. Phase I was performed concurrently with the WFD and SDI spillway improvements project (Section 3.3). ACC began Phase I construction activities on June 12, 2008 and construction was substantially completed on September 10, 2009 with the issuance of a Notice of Substantial Completion. Saint Andrews began Phase II construction activities on August 2, 2010 and construction was substantially completed on October 4, 2011 with the issuance of a Notice of Substantial Completion. Construction punchlists were issued for Phase I and II on September 30, 2009 and October 4, 2011, respectively (Appendix D). Construction stretched across five seasons due to the Site's inaccessibility during the winter and monsoonal flows during the summer and limited funding. The CDPHE and contractors have integrated and constructed the penstock and power house in accordance with the ROD provisions for the upgrade of the WFD, national contingency plan (NCP), and remedial design (RD) specifications. The CDPHE, U.S.EPA, and Tetra Tech performed a final inspection of the penstock and power house on July 27, 2012 at which time the remedy became operational and functional (O&F).

3.5 SDI Toe Seep Pumpback System and A3 Turnout

Non-point source metals loading to Wightman Fork occurs as a result of seepage through the SDI embankment. Seepage is channeled from the base of the embankment and joins Wightman Fork above monitoring location WF5.5. Recognizing the deleterious impact of the SDI embankment seepage on metals concentrations in Wightman Fork and the Alamosa River, the CDPHE and U.S. EPA funded the construction of a SDI seepage capture system. Additionally, the new A3 Ditch Turnout was constructed to help the CDPHE better manage surface water at the SMSS. The new A3 Ditch Turnout was constructed to route clean water from the North Waste Dump (NWD) offsite prior to contacting contaminated water sources and to minimize clean water directed towards the SDI.

Moltz mobilized to the SMSS and began construction activities on August 6, 2011, and construction was substantially completed August 23, 2012 with the issuance of a Notice of Substantial Completion and a construction punchlist on August 23, 2012 (Appendix E). The CDPHE and contractor have constructed the SDI toe seep pumpback system and the A3 Turnout in accordance with the ROD, national contingency plan (NCP), and remedial design (RD) specifications. The CDPHE, U.S. EPA, and Moltz performed a final inspection of the SDI toe seep pumpback system and the A3 Turnout structure on September 21, 2012 at which time the remedy became operational and functional (O&F).

3.6 Ground Water Interceptor Drains and Ditch Turnouts

A series of turnout structures were constructed on select ditches throughout the SMSS to provide options for effectively managing surface water flow during spring runoff and storm events. Contaminated shallow ground water and seeps are collected in a network of interceptor drains called alignments which eventually discharge into the SDI. Alignments are located in the vicinity of the North Waste Dump, the Chandler Bowl, Missionary seeps area and downstream of the Heap Leach Pad.

SLV Earth Movers mobilized to the Site beginning construction activities on July 7, 2003. Phase I construction was substantially completed on January 22, 2004 and Phase II on October 25, 2005 with the issuance of a Notice of Substantial Completion and construction punchlist (Appendix A). The CDPHE and contractor have performed the turnouts and ground water interceptor drains construction in accordance with the ROD, national contingency plan (NCP), and remedial design (RD) specifications. The CDPHE, U.S.EPA, and contractors performed a final inspection of the ground water interceptor drains and ditch turnouts accepting themt as complete on January 3, 2006 at which time the remedy became operational and functional (O&F).

3.7 Reynolds Adit Rehabilitation

The Reynolds Adit was plugged in February 1994 as part of the U.S. EPA emergency response actions to minimize acid mine drainage from the SMSS. The Reynolds Adit pipeline and associated valves were installed during emergency response actions. In December 1994 and October 2000, support timbers were replaced in the Reynolds Adit. Over the years, the support timbers continued to decay and fail, ground loss increased, and the condition of the valves and piping degraded. In April 2010, the CDPHE issued a Request for Qualifications for the design and construction oversight of the Reynolds Adit Improvement Project. Deere and Ault Consultants, Inc. was selected as the design and construction oversight contractor. Construction services for the rehabilitation of the Reynolds Adit were provided by Moltz and WLH Construction.

Moltz/WLH Construction mobilized to the Site and began construction activities on June 27, 2011. Construction was substantially completed on November 17, 2011 with the issuance of a Notice of Substantial Completion and construction punchlist (Appendix G). The CDPHE and contractor have performed the Reynolds Adit rehabilitation in

accordance with the ROD, national contingency plan (NCP), and remedial design (RD) specifications. The CDPHE, U.S.EPA, and contractors performed a final inspection of the Reynolds Adit rehabilitation and accepted it as complete on November 17, 2011 at which time the remedy became operational and functional (O&F).

4.0 CONSTRUCTION CHRONOLOGY

A chronology of the OU5 remedial action construction activities as they relate to the water treatment plant, SDI emergency spillway, Wightman Fork Diversion and SDI spillway channel improvements, penstock and power house, SDI toe seep pumpback system and A3 Turnout, ground water interceptor drains and ditch turnouts, and Reynolds Adit rehabilitation are presented in the following table.

Table 1: Project Design and Construction Event Chronology

EVENT	INITIATION	COMPLETION
Record of Decision		9/28/2001
Water Treatment Plant		
Design 2-stage WTP	2003	2004
WQCD-standards modified		6/2007
Initiate WTP redesign to single stage process		5/7/2009
CMGC Contractor Proposals submitted		7/20/2009
CMGC contracted		8/3/2009
CMGC Notice to Proceed	8/2009	9/4/2009
CMGC Mobilization	9/8/2009	
Site clearing started	9/14/2009	
1A- Batch plant mobilized	9/16/2009	
Golder resident engineer on-site	9/22/2009	
1B-Caissons- drilling and placement	9/28/2009	10/6/2009
Grade beam forming and placing	10/17/2009	11/25/2009
1A contractor demobilized from Site	11/25/2009	
CMGC demobilize from Site-end of season 1 construction	11/30/2009	
Drafting contracts for Pre-Engineered Metal Building (PEMB) and long-lead equipment; preparing RFPs; CMP schedule; submittal reviews	12/7/2009	4/2/2010
100% IFC Package issued by Golder	2/18/2010	
CMGC mobilized to site for season 2	4/5/2010	
Backfilling grade beam cells; prepare for structural slab	4/21/2010	5/10/2010
Structural slab and clarifier slab placement	5/10/2010	7/28/2010
Yard piping	6/1/2010	12/22/2010
PEMB construction	6/23/2010	9/16/2010
Set tanks and equipment	6/28/2010	12/22/2010
Pre-cast wall panels installation	7/14/2010	10/6/2010
SDI tower installation	8/2/2010	
Rough in electrical commenced	7/12/2010	12/22/2010
Underground utilities installation	7/26/2010	9/14/2010
Metal siding panel installation	9/7/2010	11/15/2010
Interior framing/finish	8/24/2010	11/9/2010
Interior plumbing	9/1/2010	11/1/2010
Painting	10/5/2010	11/18/2010
Glazing	10/12/2010	11/12/2010
Install HVAC	8/24/2010	12/16/2010
Masonry work	7/26/2010	9/10/2010
CMGC demobilization from Site –end season 2	12/22/2010	
CMGC mobilized to Site for season 3	3/7/2011	
Electrical subcontractor- mobilized	3/21/2011	8/31/2011
Glazing subcontractor mobilized	3/23/2011	8/31/2011
HVAC subcontractor mobilized	3/25/2011	8/31/2011
Interior finish subcontractor mobilized	3/31/2011	8/31/2011
Plumbing subcontractor mobilized	4/1/2011	8/31/2011
Painting subcontractor mobilized	4/11/2011	8/31/2011
Notice of Substantial Completion and O&F determination		11/22/2011
WTP start-up and commissioning	7/18/2011	11/22/2011
CMGC demobilization	11/3/2011	

EVENT	INITIATION	COMPLETION
Demobilization of operations staff for season	11/22/2011	
Final inspection		11/22/2012
Approval of Occupancy		12/13/2012
SDI Emergency Spillway		
Moltz mobilization	8/16/2010	
Construction initiated	8/16/2010	
Notice of Substantial Completion issued		6/30/2011
Punchlist issued	11/9/2010	
Punchlist issued	7/12/2011	
Final inspection		7/20/2011
Notice of Final Acceptance from SEO		8/15/2011
Notice of Final Acceptance from CDPHE		10/05/2011
Wightman Fork Diversion and SDI Spillway Channel Improvements		
ACC mobilization	6/12/2008	
Construction initiated	6/12/2008	
Notice of Substantial Completion issued		9/10/2009
Punchlist issued	9/10/2009	9/29/2009
Final inspection and O&F determination		9/30/2009
Penstock and Power House		
Phase I construction (ACC)	6/12/2008	
Notice of Substantial Completion issued for Phase I		9/10/2009
Phase I punchlist issued	9/30/2009	
St. Andrews mobilization	8/2/2010	
Phase II construction (St. Andrews)	8/2/2010	5/22/2012
Notice of Substantial Completion issued for Phase II	10/4/2011	
Phase II punchlist issued	10/4/2012	5/22/2012
Final inspection and O&F determination		7/27/2012
SDI Toe Seep Capture System and A3 Turnout		
Moltz mobilization	8/6/2012	
Construction initiated	8/6/2012	
Notice of Substantial Completion issued		8/23/2012
Punchlist issued	8/23/2012	
Final inspection and O&F determination		9/28/2012
Ground Water Interceptor Drains and Ditch Turnouts		
SLV Construction	07/07/2003	
SLV construction activities	07/07/2003	01/22/2004
Notice of Substantial Completion issued	01/22/2004	01/03/2006
Punchlist issued	10/10/2003	10/25/2005
Reynolds Adit Rehabilitation		
Moltz/WLH mobilization	6/27/2011	
Moltz/WLH construction activities	6/27/2011	11/4/2011
Notice of Substantial Completion issued	11/17/2011	
Punchlist issued	11/7/2011	11/17/2011
Final Inspection and O&F determination		11/17/2011

The chronology is documented through daily construction observation reports, weekly reports, and various contractor submittals provided in the documents referenced in Section 9.0.

5.0 PERFORMANCE STANDARDS AND CONSTRUCTION QUALITY CONTROL

The following sub-sections summarize the oversight and quality control activities performed during the construction of the OU5 remedial elements described in Section 3.

5.1 Water Treatment Plant

Quality control was provided for the construction by four resources: CTL Thompson; C-West Code Consultants; Golder and its sub-consultants; and State Inspectors.

CTL Thompson was contracted directly by CDPHE to provide independent construction inspection and testing services necessary to support the construction efforts at the SMSS. Their scope included the following elements with reports provided directly to CDPHE and copies provided to Golder and the CMGC.

- Fill placement including:
  - Determination of moisture/density characteristics of soil and fill materials;
  - Classification of soil, rock and fill materials;
  - Nuclear Density field testing of compacted fill materials; and
  - Related services as appropriate to assure conformance with project plans and specifications.
- Concrete inspection and testing including:
  - Inspection of reinforcing steel for conformance with contract drawings and ACI standards;
  - Field sampling and testing and laboratory compression testing of concrete;
  - Preparation and review of concrete mix designs;
  - Inspection of concrete form-work; and
  - Related services as appropriate to assure conformance with project plans and specifications.
- Structural steel including:
  - Field and shop inspection of steel;
  - Field and shop inspection of welded (AWS certified) connections; and
  - Related services as appropriate to assure conformance with project plans and specifications.
- Masonry inspection services including:
  - Inspection of masonry systems;

- Field sampling and testing and laboratory testing of sand, mortar, masonry units; and
- Related services as appropriate to assure conformance with project plans and specifications.

C-West Code Consultants was contracted directly by the CDPHE to provide code review and code compliance Plan Review Authorization and approval of the design as it pertains to compliance with the codes. C-West also performed code compliance inspections during construction. C-West inspected the building including the framing; lath and gypsum board; fire-resistant penetration; and mechanical/energy efficiency.

Golder provided daily construction oversight and was responsible for construction observations to monitor the CMGC's progress and adherence to the project's plans and specifications. Golder and its sub-consultants visited the site at various stages of the construction to provide observations and monitor compliance with the project's plans and specifications. Construction observation reports are contained in the Summitville Mine OU5 Water Treatment Plant Remedial Action Construction Completion Report (Golder, 2012).

5.2 SDI Emergency Spillway

The design was reviewed by the CDPHE, U.S. EPA, and the Colorado SEO. Construction quality control was provided by Tetra Tech. Tetra Tech provided daily construction oversight and was responsible for construction observations to monitor the contractor's progress and adherence to the project's plans and specifications. Construction observation reports are contained in the SDI Emergency Spillway Improvements Construction Completion Report (Tetra Tech, 2011).

5.3 Wightman Fork Diversion and SDI Spillway Channel Improvements

The design was reviewed by the CDPHE, U.S. EPA, Colorado SEO, and U.S. Forest Service. Construction quality control was provided by Tetra Tech. Tetra Tech provided daily construction oversight and was responsible for construction observations to monitor the contractor's progress and adherence to the project's plans and specifications. Construction observation reports are contained in the WFD and SDI Improvements Final Construction Completion Report (Tetra Tech, 2010).

5.4 Penstock and Power House

The design was reviewed by the CDPHE, U.S. EPA, Colorado SEO, U.S. Forest Service, and U.S. BOR. Construction quality control for Phase I was provided by Tetra Tech. Tetra Tech provided daily construction oversight and was responsible for construction observations to monitor the contractor's progress and adherence to the project's plans and specifications. Construction observation reports are contained in the WFD and SDI Improvements Final Construction Completion Report (Tetra Tech, 2010).

Construction quality control for Phase II was provided by the U.S. BOR. The U.S. BOR provided construction oversight and was responsible for construction observations to monitor the contractor's progress and adherence to the project's plans and specifications. Construction observation reports are contained in the Summitville Micro-Hydro Power plant Final Construction Report (U.S BOR, 2012).

5.5 SDI Toe Seep Pumpback System and A3 Turnout

The design was reviewed by the CDPHE, U.S. EPA, and the Colorado SEO. Construction quality control was provided by RJH Consultants, Inc (RJH) and CTL Thompson. RJH provided construction oversight and were responsible for construction observations to monitor the contractor's progress and adherence to the project's plans and specifications.

5.6 Ground Water Interceptor Drains and Ditch Turnouts

The design was reviewed by the CDPHE and U.S. EPA. Knight Piésold provided construction quality control, daily construction oversight and were responsible for construction observations to monitor the contractor's progress and adherence to the project's plans and specifications. A construction completion report for the ground water interceptor drains were documented in the Phase I Report March 19, 2004 and Phase II Report July 11, 2006.

5.7 Reynolds Adit Rehabilitation

The design was reviewed by the CDPHE and U.S. EPA. Construction quality control was provided by Shannon and Wilson, Inc. (S&W) and Deere and Ault Consultants, Inc. (D&A). S&W and D&A provided daily construction oversight and were responsible for construction observations to monitor the contractor's progress and adherence to the project's plans and specifications. A construction completion report for the Reynolds Adit rehabilitation activities was not produced; however, construction observation and as-built documentation is available from D&A (Appendix G).

6.0 FINAL INSPECTION

Final inspections were performed on all of the individual work packages generated as part of the OU5 site-wide remedial actions. Each work element was inspected for compliance with the plans and specifications. All work was completed satisfactorily and is in compliance with the plans and specifications for the project. Final inspection documentation for completed OU5 remedial actions are provided in Appendices A through G.

A final inspection of the removal action on reconstruction of the Wightman Fork rundown structure will likely occur in November 2012 and the results will be reported on the PCOR for Summitville Mine Superfund Site.

7.0 OPERATIONS AND MAINTENANCE ACTIVITIES

Operation and maintenance (O&M), and monitoring of the Water Treatment System (WTS) will be conducted to demonstrate that the remedy is functioning as designed and is in compliance with the final ROD. O&M activities associated with the WTS involve routine inspections of processes, equipment, controls, instrumentation, data collection tasks, and procedures to ensure successful operation of the treatment system. The data generated will provide information to verify that the water treatment systems is operating properly and meeting the remedial action objectives and remediation goals specified in the ROD. The data will also assist the agencies to determine if operational refinements are necessary to optimize system performance.

At Summitville, EPA and CDPHE are committed to the long-term operation and maintenance (O&M) for the OU5 remedial actions. Specifically, EPA and CDPHE will cost share during the years 2012 through 2021. In year 2022, CDPHE will assume full responsibility for the operation, maintenance and monitoring of the Summitville Mine Superfund Site. CDPHE is developing a site-wide operation, monitoring, and maintenance (OMM) plan for all constructed facilities and features. The OMM Plan is expected to be complete in early 2013.

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