

EAGLE MINE NEWS

EAGLE MINE SUPERFUND SITE • Fall 2015



COLORADO
Department of Public
Health & Environment



Gold King Mine blowout:

Could it happen at Eagle Mine?

On Aug. 5, 2015, a crew working at the Gold King Mine in southwestern Colorado accidentally triggered a blowout that sent 3 million gallons of contaminated water into the Animas River. The event brought new attention to the problems associated with abandoned mines around Colorado, including the Eagle Mine. Could a similar blowout happen here? Here are some questions and answers to shed light on the issue:

Q: Is there water impounded in the Eagle Mine workings as part of the remedy? If so, how much water?

A: Yes. The quantity of water in the mine pool is quite large, on the order of many millions of gallons of water.

Q: How do we know how much water?

A: Based on the amount of water that is withdrawn from the mine for treatment, the rate of inflow to the mine pool and the height of the mine pool measured with pressure gauges, a rough estimate could be made of the amount of water in the pool.

Q: How is the water impounded?

A: The water is impounded behind six engineered concrete bulkheads constructed between 1986 and 1990 in mine tunnels (adits). Two additional bulkheads are dry. See the table below for additional details.

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Eagle Mine Adit Bulkhead Construction Information

Bulkhead Location	Bulkhead Thickness	Bulkhead Height	Bulkhead Width	Bulkhead Gauge Elevation (ft msl)	Hydrostatic Head Design (ft)	Mine Pool Elevation 8/2015 (ft msl)	Design Mine Water Elevation (ft msl)
Bleakhouse Workings							
Adit No. 5	6 ft 9 in	8 ft 8 in	7 ft 6 in	8434	327	8462	8761
Adit No.6	8 ft 4 in	8 ft 0 in	8 ft 0 in	8300	500	8462	8800
Adit No.7*	5 ft 0 in	Varies 7 to 8 ft	5 ft ±	8524	152	8462	8676
Adit No.140*	6 ft 9 in	Varies 7 to 8 ft 6 ft 9 in	9 ft ±	8496	208	8462	8704
Tip Top/Ben Butler Workings							
Ben Butler	8 ft 0 in	5 ft 10 in	5 ft ±	8426	348	8436	8774
Tip Top #1	7 ft 6in	6 ft 2 in	7 ft ±	NA	360	8436	8780
Tip Top #2	9 ft 2 in	7 ft 6 in	7 ft ±	NA	360	8436	8780
Tip Top #3	3 ft 8 in	6 ft 10 in	7 ft ±	8420	360	8436	8780

***Note: Adit 7 and Adit No. 140 (Newhouse Tunnel) are both dry at the current mine pool elevation of 8,462 feet.*

Q: How does the state and EPA inspect the remedy to ensure the impoundments holding back the water continue to be secure?



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Project Managers' Letter

Dear Friends:

This issue of *Eagle Mine News* addresses concerns about mine blowouts in the wake of last August's incident at the Gold King Mine in southwestern Colorado. The release of 3 million gallons of contaminated mine water into the Animas River attracted international media coverage and shines a spotlight on cleanup of abandoned mines throughout Colorado and the Rocky Mountain West.

A catastrophic blowout at the Eagle Mine is unlikely. Because seeps can occur when the mine pool reaches 8,520 feet, a gravity line at Adit 5, at an elevation of 8,443 feet, transports water from the mine pool to the water treatment plant, where metals are removed before treated water is discharged to the Eagle River.

This issue also introduces the Board of Directors for Eagle Mine Ltd., the Technical Assistance Grant (TAG) group for the Eagle Mine. TAG groups are an important community resource, and are charged with helping the public understand Superfund site information to ensure that the community can participate in decisions about site cleanup. Community members are fortunate to have such a dedicated group of people working on their behalf.

Pages 4 and 5 of this newsletter discuss arsenic in surface water of the Eagle River. The agencies have received sampling reports from CBS identifying potential arsenic sources, and there will be an opportunity to comment on the proposed plan in the coming months.

As always, if you have questions, please don't hesitate to contact Wendy Naugle, Les Sims, Warren Smith or Jennifer Chergo. You'll find our contact information on the back page of this newsletter.

Wendy Naugle, Colorado Department of Public Health and Environment

Les Sims, U.S. Environmental Protection Agency

A: The integrity of the concrete bulkheads is monitored by the amount of seepage at the bulkhead and by pressure readings at Adit 5 and Tip Top. Bulkheads cannot be physically inspected because they are located within unsafe and/or collapsed mine tunnels with the back or interior portion submerged.

The water treatment plant is staffed seven days per week and site inspections are performed five days per week. The inspections include observation of the piping at Adits 5, 6 and the Tip Top Adit. If a problem were to occur at these bulkheads, it would be noted during the inspections.

Q: Will new remedial work at the Eagle Mine, as described in the forthcoming proposed plan, entail work that could trigger a blowout?

A: No. The majority of the proposed alternatives do not involve the mine pool and would not entail any work that could trigger a blowout. The one alternative that involves the mine pool is "in-mine treatment in the Bleakhouse Workings." This alternative does not meet the criteria for selection and it will not be selected in the proposed plan as the preferred alternative.

Q: What is the government's communication and notification plan in the event of a catastrophic release of contaminated water from the mine?

A: The Eagle Mine site has a rigorous and effective emergency response plan in place that details the procedures for notification in the case of a release at the site. Under the plan, downstream users would be notified, along with the CDPHE Spill Line. (Notice to the Spill Line triggers redundant notification to downstream users.) The Eagle River Water and Sanitation District, which maintains the emergency call-down list, also can implement an automated call-out system once they receive notification of an emergency at the site.



Emergency procedures in place at the Eagle Mine include timely notification of downstream users as well as the CDPHE Spill Line.

Eagle Mine Ltd. a community resource

Eagle Mine Ltd. is the Technical Assistance Grant (TAG) recipient for the Eagle Mine Superfund Site. A Technical Assistance Grant from the US EPA helps communities participate in Superfund cleanup decision-making. It provides funding to community groups to contract their own technical advisor to interpret and explain technical reports, site information, and the agencies' proposed cleanup proposals and decisions.

Meet the Eagle Mine Ltd. Board of Directors:

Todd Fessenden

Todd Fessenden is director of operations with Eagle River Water and Sanitation District (ERWSD), the largest water drinking water and wastewater provider directly downstream of the Eagle Mine. Todd has worked in the water treatment field since 1997 and holds multiple water treatment and distribution licenses in Colorado and California. Todd holds an associate's degree in water science from Ventura College and is interested in protecting public health and preserving the environment for current and future generations. Todd lives in Eagle with his wife, Laura, and three sons, Charlie, Dylan and James. His interests include spending time with his family, martial arts, songwriting and surfing.

Susan Pollack

Born and raised in Pueblo, Susan attended the University of Colorado, where she received a bachelor of science degree in business with an emphasis in marketing in 1966. In 1970 Susan returned to CU where she received an MBE (master's in business education), which prepared her to teach at a community college. She also earned a finance degree, which she used for 20 years at Public Service Company of Colorado, where she managed the sale of more than \$2 billion worth of long-term securities, the daily investment of cash, the pension fund, shareholder services and investor relations. Susan moved to Vail in June 1992. Along with her daughter, she purchased a property management business. She sold the business in 1996 and now does financial management and bookkeeping for several small businesses. Susan is a member of the Vail-Eagle Valley Rotary Club. She served as secretary, president and membership chairperson and as assistant governor for the three Eagle Valley Rotary Clubs. Susan is a past member of Board of Walking Mountains, a natural science school in Eagle County, and the Eagle River Watershed Council. She is currently a member of the Eagle River Watershed Council and Eagle Mine Ltd. board, serving as grant administrator. Susan loves to participate in outdoor activities in the Vail Valley including skiing, snowshoeing, hiking and bicycle riding. Susan's daughter, son-in-law and two granddaughters live in Edwards.

Mercedes Quesada-Embid, Ph.D.,

Associate Professor, Colorado Mountain College

Mercedes joined Eagle Mine Ltd. as a board member in 2015. She believes in the importance of participating in community initiatives that inform the public and help to improve the health of socio-ecological systems. She is currently an associate professor of sustainability studies at Colorado Mountain College's Vail-Eagle Campus. She joined the college in 2011 to help to build the school's new bachelor's program. Mercedes works with faculty, staff and students toward continuous enhancements of the sustainability studies degree and the expansion of a culture of sustainability across all of CMC's campuses. Mercedes has been teaching at the university and college level since 2004, nationally and abroad, and believes that service, experiential learning and critical inquiry are key elements to successful knowledge acquisition. Mercedes holds a doctorate in environmental studies, a master's degree in history, and two bachelor's degrees: one in Spanish and the other in the biological sciences. Her professional and personal background help keep her attuned to the search for whole-picture solutions for social, ecological and economic justice. She has a strong desire to have a positive impact on the injustices prevalent in our communities and larger societal framework. Her forthcoming book and journal article publications reflect this perspective. She holds active memberships in several national and international associations in the sustainability and environmental studies fields. Mercedes loves being with her family. On the weekends she can often be found playing table-top games with her husband and reading some intriguing nonfiction. They most revel in spending time with their daughter, who was born in spring 2014.

Keith Kepler

Keith has more than 30 years of experience in water resources and water quality engineering. He is a registered professional engineer with a bachelor of science degree in agricultural engineering and a master of science degree in bio-environmental engineering. Keith's career began with water quality planning studies conducted after passage of the Clean Water Act. He initially served as project manager for an intensive study of the water quality impacts of irrigation return flow in Larimer and Weld counties. Subsequently, he led water quality planning activities for a six-county area surrounding Montrose. In this role, he prepared a study of mining impacts in Ouray County. Keith subsequently joined the Colorado Division of Water Resources, where he spent 24 years. During this time he analyzed water rights applications, supervised state involvement in the designated groundwater basins, and led engineers and

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Agencies seek site-specific standard

CBS conducts additional sampling of arsenic sources

What happens when a Superfund remedy is complete, but still does not meet remediation goals? That's the situation at the Eagle Mine Superfund site. Remedy construction was completed in 2001, but a 2008 change in water quality standards meant the remedy is not consistently protective of human health and the environment.

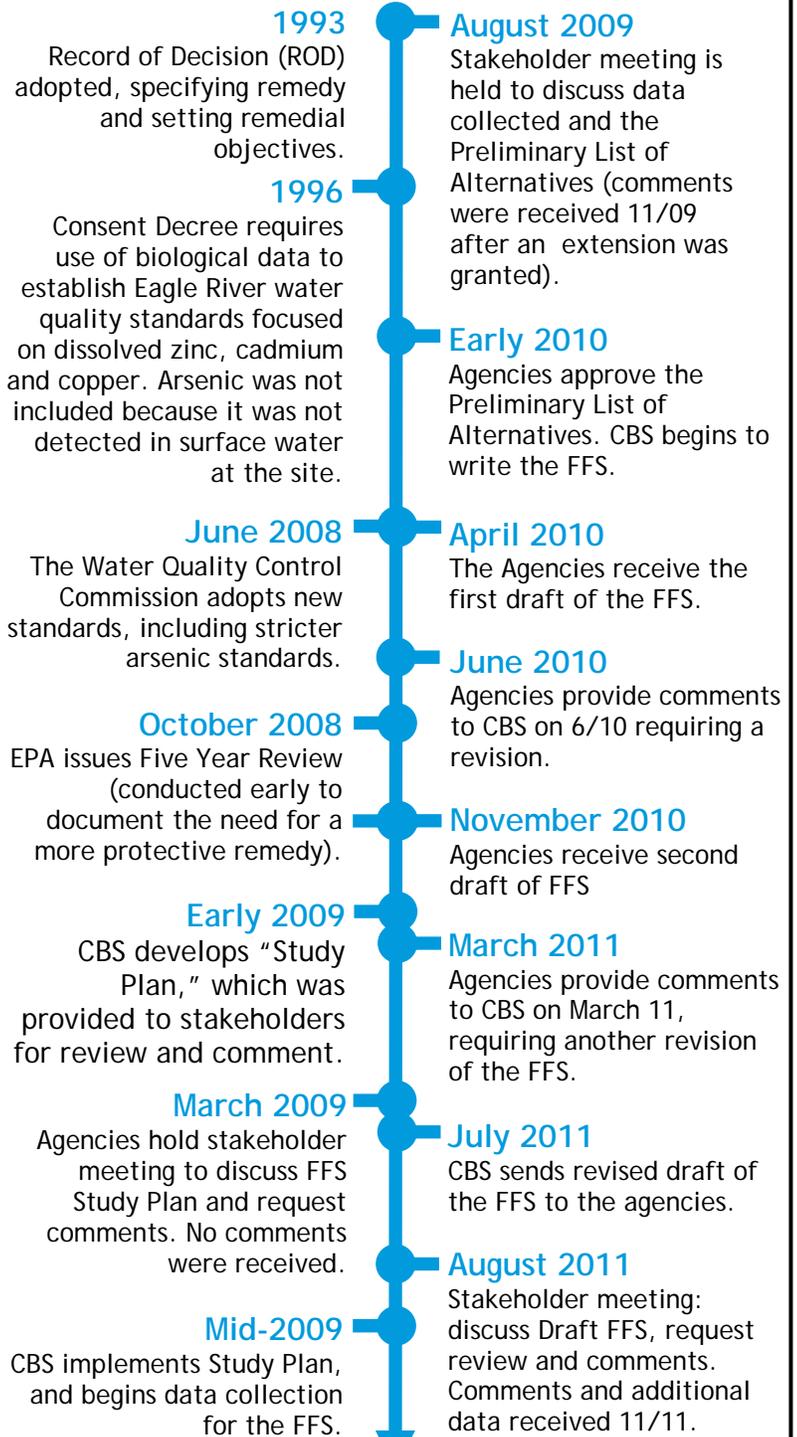
Water quality standards for cadmium, copper and zinc are not being attained by the remedy in all years during March and April – a fact addressed through a focused feasibility study in 2013 that evaluated additional cleanup alternatives to meet the standards.

Since the completion of the focused feasibility study, additional surface water data for the Eagle River became available, indicating that arsenic exceeds the surface water standards. The original remedy did not address arsenic because it could not be detected in surface water with instruments available at that time. Technological improvements now allow us to detect it, and the new data delayed the process of selecting additional remediation alternatives for a proposed plan.

In August 2014, the agencies directed CBS to augment existing surface water data on arsenic by conducting additional sampling to identify potential sources of arsenic loading during the following spring melt-out period (March/April 2015). CBS collected the required data and submitted it to the agencies in June 2015.

The agencies used the data to support a Technical Impracticability (TI) Evaluation Report, which was submitted to EPA headquarters for review in late October. The TI waiver is necessary because existing remediation technology cannot attain the standard for arsenic in surface water. The waiver will allow the agencies to replace the stringent water quality standard with a protective, site-specific, risk-based standard that will be used as the remedial goal for arsenic in surface water. Once EPA headquarters approves the TI Evaluation Report, CBS will prepare an addendum to the focused feasibility study that addresses arsenic. When that report has been completed, the agencies can proceed with a proposed plan for cleanup. There will be a formal public comment period on the plan as well as a public meeting.

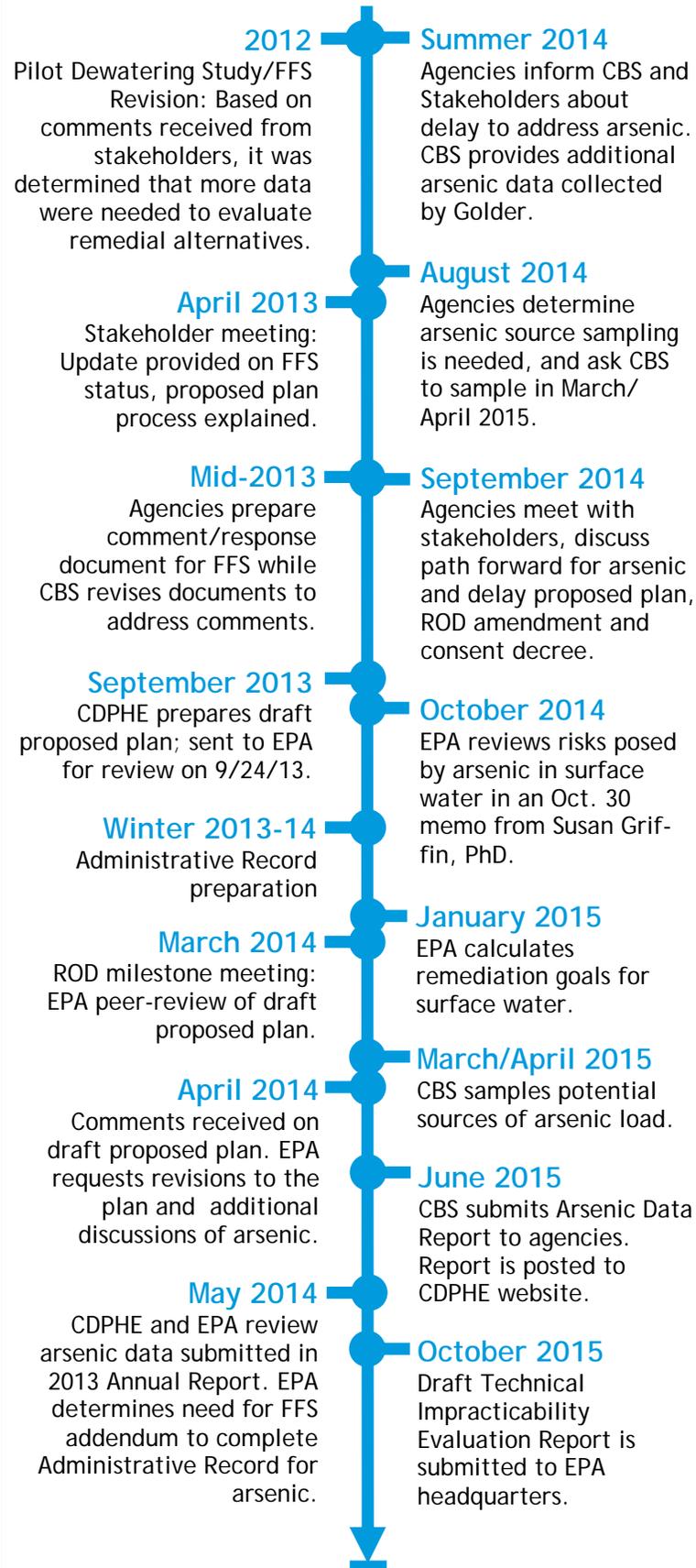
Eagle River Arsenic Timeline, 1993-2015



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Arsenic Timeline

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Report cites WQCC temporary mods in requesting TI waiver

Arsenic is a naturally occurring element found in geologic formations, surface water and groundwater. Natural processes, such as groundwater movement, erosion, and volcanic and geothermal influence, can mobilize arsenic. Industrial activities such as mining and smelting can introduce soluble arsenic into the environment. Arsenic also enters the environment as a pollutant from agricultural and residential pesticides and industrial products, such as wood preservatives, paints, dyes and soaps. The pervasiveness of arsenic in the environment greatly affects the restoration potential at the Eagle Mine Superfund Site.

In April 2013, after Colorado dischargers cited difficulties complying with the arsenic standard, the Colorado Water Quality Control Commission (WQCC), adopted statewide temporary modifications for arsenic for all stream segments with current discharge permits. The modification is set to expire on Dec. 31, 2021. The temporary modification was applied to the Eagle River Segment 5b because the Eagle Mine Water Treatment Plant discharges to this segment under a discharge permit. The temporary standard relaxes the arsenic criteria to "current condition." For the remaining segments at the Eagle Mine Site (Segments 5a, 5c and 7b) the 0.02 µg/l standard is still in effect and has not been modified by the WQCC.

The technical reasons cited by the WQCC for adopting the temporary modifications included: laboratory detection, natural contributions, technical infeasibility and perceived unfairness regarding the arsenic standard. In a report submitted to EPA in October 2015, the Colorado Department of Public Health and Environment cited these reasons to demonstrate it is technically impracticable to meet the 0.02 µg/l standard at the Eagle Mine Site. The EPA is reviewing the TI waiver report.



CBS collected additional samples from potential sources of arsenic loading in the spring of 2015.

Board

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technicians in the administration of water rights. His final assignment was to lead a team charged with bringing groundwater use in the Arkansas River Basin into compliance with the Arkansas River Compact. Keith retired to Eagle County in 2004. He served on the board of the Eagle River Watershed Council for two terms, and has served on the board of ERWC-Eagle Mine Ltd. since its inception. Keith enjoys skiing, golf and other outdoor activities.

Darell Wegert

Darell has been involved in town of Minturn government for 20 years, serving as town councilman, planning and zoning and mayor. He was the assistant track coach for Battle Mountain High School for 10 years and a Buddy Werner ski coach for 12 years. Darrel served on the Board of Directors for Eagle River Water and Sanitation over a period of 12 years before he was term-limited in April 2014 and was a board member for Eagle Valley Community Fund, known as The Rummage Sale, for 15 years. He served on the Eagle County Open Space Advisory Committee for two years and is currently serving on the board for Eagle River Fire Protection District for

three years. A current board member for Swift Eagle Charitable Foundation, he has served for 10 years. He's been a board member of the Eagle Mine Ltd. since the fall of 2014. Darrell has lived in Minturn (on the Eagle River) for 39 years with his wife Valerie and three sons. For the past 23 years, his family lived less than a quarter of a mile from the Eagle Mine tailings pond, so he is familiar with the history of the mine, its closing and the subsequent contamination of the Eagle River.

Seth Mason

Seth received his master of science degree in Land Resources and Environmental Sciences from Montana State University and his bachelor's degree in Environmental Studies from the University of Colorado, Boulder. He specializes in hydrological modeling; stream characterization; deployment and operation of data collection and management systems; and development and coordination of water quality monitoring and assessment activities. Seth works extensively with city and county governments, federal agencies and 501(c)3 organizations. He currently serves on the Board of Directors of Eagle Mine Ltd., the United States Rafting Association and the Mount Sopris Nordic Council.

Timm Paxson

Retired Chemist with Royal Dutch Shell
Past Board Member of Eagle River Watershed Council (ERWC) and Eagle River Water & Sanitation District
Volunteer Betty Ford Alpine Gardens

Timm earned his doctorate at the University of California, Los Angeles (UCLA) in 1974 and subsequently was hired by Shell Chemical Company (a subsidiary of Royal Dutch Shell) at its technical center in Houston. Initially, Timm was part of a basic research group and published several technical articles, was awarded more than 10 patents, and spoke frequently at American Institute of Chemical Engineers conferences. Timm finished his 30-year career as a technical consultant for several chemical processes located in the US, France, England and the Netherlands.

Timm and his wife, Elizabeth, retired in 2004 and moved to Vail, where they have resided for 10 years. Both soon got involved in volunteer work, and Timm's chemical and scientific background readily lent itself to technically related ERWC projects. These included water quality below the Eagle Mine Superfund site and monitoring selected sites along the Eagle River Restoration Project (ERWC sponsored and coordinated) below Edwards.

He and Elizabeth enjoy skiing, gardening, hiking, backpacking and travel. Since moving to Vail, Timm has climbed all of Colorado's 14ers, an endeavor begun in 1971 when he was stationed at a physiology lab in Denver while serving in the U.S. Army.

Joe Macey

Information about Mr. Macey was not available at press time.

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