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Colorado Department
of Public Health
and Environment

July 2, 2013

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Subject: Eagle Mine Superfund Site, Eagle County, Colorado; Stakeholder Comments on the Focused FeasibilityStudy

Dear Eagle Mine Stakeholders:

With this letter, the U.S. Environmental Protection Agency (EPA) and the Colorado Department of Public Health and Environment (CDPHE) are providing formal responses to comments that were provided by the Eagle River Stakeholders regarding the draft Focused Feasibility Study (FFS), dated July 5, 2011, submitted to the agencies on October 3, 2011 and November 4, 2011. As we discussed during our recent meeting in April 2013, EPA and the State have directed NewFields, Inc., the author of the document on behalf of CBS, to modify the report to address comments raised by the stakeholders. The attached document summarizes the changes that we have requested and provide detailed responses to the issues raised by the stakeholders. We anticipate a final version of the FFS document to be completed by August 2013.

Sincerely,

Leslie W. Sims
EPA Project Manager

Wendy Naugle
CDPHE Project Manager

Attachment

cc: Laurianne Jackson, EPA (8ENF-L)
Jason King, Colorado Attorney General's Office
Dave Hinrichs, NewFields
Warren Smith, CDPHE Community Involvement
Jennifer Chergo, EPA Community Involvement

Responses to Stakeholder Comments on the
July 2010 Draft Focused Feasibility Study for the Eagle Mine Superfund Site

The U.S. Environmental Protection Agency (EPA) and the Colorado Department of Public Health and Environment (CDPHE) (jointly referred to "the agencies") thank the stakeholder groups for their detailed review of the July 2010 Draft Focused Feasibility Study (FFS) for the Eagle Mine Superfund Site. The FFS is under revision based on the comments that were received.

Revisions to the FFS include:

- The addition of data tables in an appendix with data for all three metals for each segment from 2009 to 2012 with samples exceeding the Water Quality Standards (WQS) indicated.
- The addition of graphs, known as longitudinal profiles, showing the variation in water quality from upstream to downstream for each metal for each year 2009 to 2012.
- The addition of graphs showing the average loading distribution in each segment for each year 2005 to 2012, to show graphically where metals load enters the river.
- Inclusion of additional data for monitoring station E-22.
- Less emphasis on the estimated "load reduction necessary to meet the WQS" and more emphasis on the characterization of the metals loading sources.
- Improved description of the methods used to estimate the load reduction that may occur from a remedial alternative.

The agencies offer the following responses to comments provided by the stakeholders. The original comment is provided with the response in ***Bold Italic text.***

Eagle River Watershed Council (ERWC)/Eagle Mine Limited (EML) Comments

We believe that any remedy needs to represent a long term solution and be constructed in a manner which will be most effective in reducing the loading of zinc, copper, and cadmium to the Eagle River. ***Agreed. The agencies (EPA and CDPHE) share the same goal.***

ERWC and EML are in agreement that Alternative 2A represents the single best concept for meeting water quality objectives. While we agree with this in concept, we believe that further pre-design analysis is needed before we can fully support this alternative. As stated by Bob Weaver at our meeting in August, the ultimate design needs to be very robust and full consideration needs to made of long term effectiveness, durability and operational requirements. ***We agree that the ultimate design needs to be robust and long-term effectiveness taken into account. The Focused Feasibility Study (FFS) is designed to compare different alternatives against each other. If there is a significant difference between the predicted long-term effectiveness, durability and operational requirements between alternatives, that should be noted. However, the CERCLA regulatory process dictates that the final design will not be completed until after the best alternative is selected in a Record of Decision.***

Beyond the recommended alternative, only alternative 3A and possibly 4A appear to offer any promise. Alternative 3A involves removal of waste rock piles to a controlled on-site facility, the CTP. The study claims alternative 3A would result in a reduction in zinc loading of only 1.9 lbs/day. We have insufficient information to determine the accuracy of this number. ***The revised FFS will attempt to better explain the expected load reduction from waste rock removal.***

Alternative 4A involves collection and treatment of groundwater from the Rex Flats area. The report claims Alternative 4A would remove only 1 to 3 lbs of zinc per day. Thus, it appears that neither alternative 3A or 4A would sufficiently reduce zinc loading either as stand alone projects, or in combination with each other. However, these alternatives may represent options in the future should the proposed alternative fail to meet the Water Quality Standards (WQS) approved by the Water Quality Control Commission effective January 2009. ***Agreed. However, it should be noted that the agencies must consider the nine criteria set forth in the National Contingency Plan (NCP), 40 CFR § 300.430(e)(e)(9)(iii), in selecting additional remedies should they be considered in the future. It may not be cost effective to construct a new stand-alone remedy in the future if only one to three pounds of zinc removal is achieved. The agencies would first look at improving, enhancing or expanding existing remedial components in hopes of capturing additional load to meet the standards. In addition, the contribution from upstream sources is a factor. Even if CBS is successful at capturing/removing load on-site, there will be occasions where contributions from upstream sources, which CBS cannot control, cause exceedances of the standards.***

Section 2.3 of the report concerns Eagle River Segments 5B and 5C. In this section, the FFS states that "The E-15 sample data demonstrate that cadmium, copper, and zinc concentrations were below the WQS in 2009 and 2010." Sampling Site E-15 appears to be located within Minturn at or near the USFS 'Boneyard.' If stream standards are currently being met in these lower reaches and an additional 40 lbs/day of zinc will be removed by implementation of the proposed project, then perhaps the stream standards for these lower reaches could be reconsidered during the next triennial standards review. ***The agencies do not believe that WQS should be reconsidered during the next triennial review for three reasons. First, any new remediation that is conducted at the site under this FFS should be in operation for a sufficient period of time to fully understand the long-term success of that remedy before any new decisions are made. Given what we know about the water quality at the site during dry versus wet years, we need to have at least one extremely wet year to fully test the efficacy of the new remedy. Only after sufficient data have been collected can we evaluate the success of the remedy against the WQS for the long term.***

Second, it is the agencies' intent to fully protect and maintain any water quality improvements that are realized by the remedy. If the remedy results in water quality improvements beyond what is needed to meet the standards, our goal will be to maintain water quality at that level. Changing the standards to more closely match what is actually achieved is not necessarily needed to require CBS to operate the remedy. The agencies also believe that the water quality regulations protect against the possibility of some other discharger polluting the river. At the Dec. 12, 2005 Water Quality Control Commission Hearing, the Commission changed the antidegradation baseline date for the Eagle River segments affected by the Eagle Mine. The effect of this change was to preserve any improvements in water quality that are the result of

remediation at the site. So, if there is to be a new discharge into one of these segments, the antidegradation review would use the ambient water quality at the date of the review as the baseline. See WQCC Regulation 31(section 31.8(3)(c)(ii)(B)).

Finally, the water quality standards are set at levels designed to be protective of brown trout. If CBS meets the standards and the brown trout population shows additional recovery, then the remediation meets the regulatory requirements. No further adjustments to the standards would be needed to protect the brown trout population.

While the report claims that the Water Quality Standards are currently being met in the lower reaches, this claim is countered by the weekly data at station E-22 (downstream of Minturn behind the Johnny's garden nursery) which has been collected by the Eagle River Water and Sanitation District (ERWSD) and/or Upper Eagle Water Users Association (UEWUA). ***This data set was not made available to the agencies or to CBS for use in the draft FFS document. The ERWSD data will be included in the final FFS.***

The main purpose of the water quality data evaluation in the FFS is to identify the source or sources of metals loading to the Eagle River at the site. A secondary purpose is to <u>estimate</u> the amount of load reduction that will be needed to meet the WQS. It is important to note that the data provided by ERWSD does not lead to any new or different conclusions regarding <u>where</u> the loading sources attributable to the Eagle Mine are entering the river. Load reduction in Segment 5a will result in commensurate improvements in both Segments 5b and 5c. The preferred remedy is not changed by the addition of the data set that was provided by ERWSD.

To explain this another way, on days when the WQS are exceeded in Segment 5a, we would expect the water quality in Segments 5b and 5c to be similarly adversely affected and the WQS may be exceeded in the lower segments. When the new remedy improves the water quality in Segment 5a, the water quality in Segment 5b and 5c will be similarly improved. However, because of the more stringent standards in the lower segments, it may take more load reduction to meet the standards if the estimate is based on data from the lower segments. This does not affect the design basis for the remedy (the design will be based on data that characterize the source of the contamination), but does impact the estimated load reduction necessary to meet the standards. The additional data also help to highlight the difficulty in meeting the WQS in all three segments during situations where the background load is high. CBS is not responsible for the background load, so that load may become the cause of exceedances in Segment 5c on some occasions in the future once the new remedy is operational.

Additionally, data collected by ERWC and analyzed through the Riverwatch program indicates occasional exceedance of the zinc standard at the USGS 'Eagle River south of Minturn' stream gauge located near Tigiwon Road. The Riverwatch data further indicates occasional exceedance of cadmium and copper standards at the Tigiwon Road site as well as above Two Elk Creek and at the USFS Boneyard site. The exceedances of standards observed in the Riverwatch data have occurred in the spring when the hardness of the River water is low. The contradiction between the claim of NewFields and the data collected by local agencies illustrates both the need for continued water quality data

collection and possibly the need to review water quality standards to reflect the improvements which may result from implementation of alternative 2A. ***The agencies do not see a contradiction between the claim of NewFields and the data collected by local agencies. The data available to Newfields for the preparation of the FFS was deemed adequate by the agencies. As explained in the comment above, the primary emphasis of the FFS water quality data analysis is to identify sources of loading that cause exceedances of WQS. The additional data provided by the local agencies do not identify additional sources of loading. The FFS addresses the loading sources known to cause WQS exceedances in all three segments, and clearly demonstrates that those loading sources occur in Segment 5a. If the data collected by the local agencies pointed towards additional sources of metal loading that had not been previously identified, then the remedial alternatives in the FFS would need to address those additional sources.***

The Eagle River Watershed Council is currently coordinating an effort to combine water quality data throughout Eagle County into a common database. That database will include data associated with the Eagle Mine to the extent that it is made available. The purpose of the database is to make all water quality data within Eagle County available to all users. ERWSD/UEWUA, Eagle County, and several municipalities are among the several sponsors of this effort. We ask the parties responsible for the Mine to participate in this effort by contributing all data associated with the Mine reclamation effort. ***The Eagle Mine Access database has always been provided to anyone who has requested it in the past, including the USGS, ERWC and ERWSD. In addition, in recent years, the database has been distributed to the stakeholders on an annual basis, generally when the Eagle Mine Annual Report is produced by CBS each spring. The agencies intend to continue furnishing the database to anyone who requests it.***

Under the recommended alternative 2A, groundwater would be collected in the Belden area and from Rock Creek by an interceptor drain and piped to the existing treatment plant. The treated water would then be discharged to a lower section of the River. This raises two issues regarding the effects of alternative 2A in relation to the Water Quality Standards. The first effect of the proposed alternative is that water quality in Segment 5A will be improved simply by the bypass of the most polluted water. The second effect of alternative 2A is the result of water being treated and released at a lower point in the River. Does the treatment plant have sufficient capacity for the additional water, including higher flows expected in March and April? What will the net effect of the proposed project be on the lower reaches of the River, and what level of water quality can we expect in the future? ***The agencies believe the existing water treatment plant has sufficient capacity to treat the water collected under Alternative 2A. Currently there is flexibility in how water is treated because of the additional storage offered by the surge ponds and the mine workings. Additionally, the effects of spring runoff are typically not experienced at the water treatment plant until June. So, during March and April, the plant has extra capacity to treat the additional water.***

As long as the water treatment plant remains in compliance with the discharge limits established in the Colorado Discharge Permit System (CDPS) permit, there will be no adverse impact to the water quality in Segments 5b or 5c because the effluent limits were calculated using the WQS. Because the water treatment plant actually removes metals from the water, alternative 2A is not a "bypass" alternative. In fact, if the water treatment plant were to discharge at the maximum allowable rate, at the maximum

concentration allowed in the permit, the amount of zinc load in the effluent would be on the order of 2.5 lbs/day. Since the plant typically discharges at about half the allowable rate, the zinc load in the effluent currently is less than 1.5 lbs/day.

The effects of collection, bypass of Segment 5A, and release of treated water downstream demonstrate the need for a pre-design analysis to consider the water quality that may be expected through the River to the confluence with Gore Creek at Dowd Junction as a result of the bypass of water collected in the Belden area and the discharge of treated water downstream. ***The effects of Alternative 2A are predicted through the load reduction analysis already contained in the FFS. However, calculations will be added to show how the proposed remedy will address exceedances in Segment 5c. The existing load from the water treatment plant is already accounted for in the load calculations for Segments 5b and 5c. The load from the water treatment plant is low (see comment above) and is restricted by the discharge permit. Because the effluent limits in the permit are calculated based on the WQS, permitted discharge from the plant cannot, by definition, cause exceedances of the WQS.***

ERWC and EML realize that the objective of FFS is limited to the evaluation of alternatives to meet the Water Quality Standards set by the Water Quality Control Commission that became effective in January of 2009. At the same time, we believe that it is important to realize that any project which may be constructed will affect water quality differently through each section of the River. We believe the objective should be to reduce the zinc loading not just at the mine site, but through the entire Eagle River to Dowd Junction. ***CBS is accountable only for loading sources attributable to the Eagle Mine. The FFS has demonstrated that there are no additional metals loading sources in Segments 5b and 5c that would account for exceedances of the WQS. Loading sources that occur upstream of the mine site in Segment 2 further complicate CBS' ability to meet the WQS. The data show that there are additional loading sources in Segment 2 that will not be addressed by the remedy selected under the FFS. Loading from Segment 2 may be a problem in the future and may be the cause of exceedances of the WQS in the future.***

The FFS seems to consider water quality in the lower reaches as meeting the WQS at this time, but this seems to be disproved by the ERWSD / UEWUA data. Therefore, the project must improve water quality all the way to the confluence with Gore Creek. We realize that no treatment process will gain 100% removal. Alternative 2A will achieve a reduction in loading to Reach 5A through the bypass of the worst water, but it may result in seasonal high flows through the treatment plant resulting in a lower level of treatment. Further pre-design analysis is needed. ***If loading sources are removed in Segment 5a and no other sources are identified in Segments 5b or 5c, then the only improvements that can be realized will be through removing sources in Segment 5a. The level of treatment required is determined by the CDPS permit, regardless of what flows are sent to the water treatment plant. There is no plan to relax the permitted effluent limits to allow for a lower level of treatment.***

EML is advised by its technical assistant, Dr. John Woodling, that the current Water Quality Standards for Eagle Rivers Segments 5A, 5B, and 5C are not fully protective of Brown Trout. Even once the WQS are met, the number of Brown Trout will remain reduced from what would be expected if the River could meet Table Value Standards for Cold Water Fishery. ***It is hoped that through the***

implementation of additional remedial measures at the Eagle Mine site that a healthy brown trout fishery will be sustained. This goal will be achieved through the implementation of a remedy that targets compliance with the WQS. However, it is in everyone's best interest to achieve a level of remediation that provides regulatory certainty that the remedy will not violate the WQS, which are Applicable Relevant and Appropriate Requirements (ARARs) under the Superfund law. Therefore, the remedy should not be designed to meet the minimum load reduction necessary to meet the WQS. Instead it should be designed to achieve a greater level of removal so that there is flexibility in how the remedy is operated.

At our meeting, we were advised that Segment 5A is now exceeding stream standards in 50% of the years. It was claimed that the proposed alternative 2A will bring Segment 5A into compliance except in extreme years. What frequency of occurrence represents an extreme year? ***The new remedy will be designed to capture the source or sources of loading that have been identified. The remedy will not be designed based on a load cut-off or specific amount of load. The single biggest problem for the success of the new remedial measures is the uncertainty associated with upstream load. The new remedial measures are not designed to capture load that may enter the river upstream of the Eagle Mine. Yet this "background load" may be the difference between meeting the standards and not meeting the standards because the magnitude of that load has been as high as 125 pounds per day (lbs/day) in the past.***

The load estimates in the document do not necessarily match up perfectly with the identified sources of loading and we would not expect them to. There are errors associated with the surface water sampling methods, mixing in the stream, analytical methods and flow measurements that introduce inherent uncertainty into the loading estimates. There also is a high degree of variability in the data that we rely upon to characterize the sources of loading. For example, the groundwater measurements are limited in both time and space because point samples from a well or wells are then assumed to represent all groundwater that flows into the river in March and April.

In some years, the load reduction predicted for the preferred alternative may be less than what is needed to achieve compliance with the WQS, and the extra load reduction required to meet the WQS would need to come from removing load upstream. This situation is problematic, and is the main reason the FFS acknowledges that there may be years when the WQS are not met.

What is the consequence if the frequency of exceedance is 1 in 5 or 1 in 10 years? ***The consequence of exceedances would depend upon the magnitude and duration of the exceedances, which cannot be predicted, especially given the uncertainty associated with the upstream load. The calculations contained within the FFS are based on the chronic water quality standards. In order to address acute events, an analysis using the acute standards would be needed. We do not believe it is necessary to provide the acute standards calculations, because the chronic standards are more stringent.***

If exceedances of the WQS were to occur once the new remedy is in place and operating as designed, we would expect those exceedances to be less severe than the

current situation. In addition, we will rely on the Water Quality Control Division's assessment methodologies to interpret the water quality data in the future. The methodology uses the 85th percentile of the data to determine attainment. This approach means that 15 percent of the data points can exceed the standard, yet the segment would still be considered in attainment of the standards.

Who will be monitoring to determine the adequacy or inadequacy of the proposed project once it is constructed? ***CBS will be responsible for the long-term compliance monitoring at the site with oversight by CDPHE and EPA.***

While Water Quality Standards are not being considered at this time, they do represent the basis for evaluation of alternatives. We think it is important to view the effect of the proposed alternative all the way to Dowd Junction - and as a minimum to show that WQS will be met throughout this portion of the River. If the project is successful in removing 40 pounds of zinc per day it may be possible to lower the limits for zinc to the levels which result from the successful project. If the project reduces zinc levels by some lesser amount in each reach, then we are faced with the question of which additional remediation measures are necessary. For these reasons, we urge a rigorous pre-design analysis, and a robust design capable of capturing as much polluted water for treatment as possible. ***Agreed. The design basis for the selected alternative will be to optimize the capture of the contaminated source or sources that have been identified in the FFS as the primary culprits.***

Despite the several tables in Section 2.1 and 2.2, we remain a bit confused about the seasonal water quality, flow, and resultant loading through River Segment 5A. The analysis of how seasonal metals loadings are derived from the raw data needs to be more clearly presented in the report, or some pre-design follow-up report. We would recommend a seasonal analysis, with March and April separated into one season, and the remainder of the year separated generally into summer, fall, and winter. The March and April data standing alone would provide the best vision of conditions during this critical time of the year. The remainder of the year could be analyzed seasonally. ***The final FFS will include water quality data for each segment, with a comparison to the standards. In addition, the load calculations will be explained. We would like to emphasize that load calculations are an analytical tool used to identify metals loading sources. This concept was not clear enough in the FFS, given how many comments were received about the load calculations. Load calculations are not exact and should be regarded as estimates. Because load estimates are dependent upon a number of assumptions, they involve inherent uncertainty.***

The report needs to analyze this seasonal data for each sub-segment of Segment 5A. Seasonal averages of loading at each station based upon the data presented and any data used from prior reports need to be presented in a way that shows how the conclusions regarding zinc loading arising from each source are determined. The points of interest are inflow to Segment 5A, groundwater contribution from the well and trench, Station E-10 above Rock Creek, Rock Creek groundwater data, Rock Creek Surface water data, and Station 12A at the downstream end of Segment 5A of the Eagle River. While a quick review of March and April data would seem to support the conclusions the report makes regarding loading, a more clear presentation of how these determinations were made is needed. ***The FFS will be revised to include graphics and loading diagrams to more clearly indicate the loading sources and the seasonality of the data.***

The collection trench system proposed is a perforated pipe collection drain to intercept groundwater in the Belden area. As a part of this system, inflows from the Copper Tipple Trench and the Historic Tunnel would also be captured. Here again, a seasonal analysis of flows and metal concentrations is needed. We do not find analysis in the report to show the seasonality of flows and metals loadings which might be captured. A concern may exist that flows into the collection system from the Copper Tipple Trench and the HistoricTunnel will be substantial during the snowmelt months of March and April. Such analysis is needed to determine the effect of this inflow on the treatment plant, as well as the sizing of the piping and collection system. ***This analysis is already in the FFS, however, it was not made clear enough. The FFS will be revised to more clearly show how the inflows to the collection trench were estimated.***

Interceptor drains typically involve a gravel pack and filtration system to prevent excess solids from entering the system. During times of high water table (March and April) it might be possible for some portion of the ground water to flow over the collection pipe and continue to the River. Conversely, a summer flood might cause River water to flow into the collection system and cause a hydraulic overload, disrupting the treatment plant. Either situation could possibly be prevented by an impermeable barrier between the gravel pack and the River. Pre-design analysis is needed to determine whether this would be needed or beneficial and how it might work. ***Agreed. CBS will include a liner in the description of the collection trench design. The liner also will be included in the cost estimate.***

As with the analysis of total loading, a pre-design analysis of the seasonal flow and loading of zinc which might be captured by the collection system is needed. ***Additional analysis will be provided in the final FFS.***

The FFS determines that the Rock Creek collection system might yield an average of 12 gpm and that an estimated 10 lbs/day of zinc could be delivered to the treatment plant. The Rock Creek system is proposed to consist of wells and possibly an interceptor trench. Here again, the FFS needs to show a seasonal analysis of loading, flow and how much zinc might be captured. ***The FFS focuses on the March/April timeframe when the WQS are exceeded. No additional seasonal analysis is required because the WQS are not exceeded during other times of the year. The discussion of the amount of capture at Rock Creek will be clarified in the final FFS.***

The Report also indicates that the leachate from Rock Pile 8 contributes no more than 1.4 lbs of zinc per day. Is all or some portion of this load expected to be captured by the Rock Creek groundwater collection system? ***Any load from Waste Rock Pile 8 that is not currently collected would be manifested in the T-10 data as load in Rock Creek surface water. This point will be clarified in the final FFS.***

Previous communications between the various parties in this process have indicated that at least 20 pounds per day of zinc originates from Rock Creek. The FFS now indicates that loading from Rock Creek is 12 pounds per day. Rock Pile 8 appears to contribute no more than 1.4 pounds per day according to the FFS. The FFS also indicates that 10 pounds per day zinc would be removed from groundwater at Rock Creek by option 2a. Is the 10 pounds per day of zinc in Rock Creek groundwater part of the total Rock Creek Basin load of 12 pounds per day? Further explanation of the Rock Creek zinc load to the system is needed. What is the total loading from Rock Creek and what are the various components of that load. A simple table would seem to suffice. ***There appears to be quite a bit***

of confusion about the Rock Creek data/discussions in the FFS. The FFS will be revised to clarify the data and conclusions reached. All communications between various parties prior to the production of this FFS were dependent upon the data available at the time. As indicated by the data included in the FFS, there is a high degree of variability in water quality from year to year, month to month and day to day. Data sets spanning different timeframes will result in different conclusions. The data presented in the Metals Loading and Water Quality Standards Attainability Analysis (April 2008) for the Water Quality Control Commission hearing presented an average loading from Rock Creek at 43 lbs/day (Figure 16 and page 51) using data from 2002 to 2007. This statistic was calculated using the water quality data at sampling station E-11 and subtracting the upstream load from station E-10. In the event that data from E-11 were not available, data from E-12A were used. For comparison, this value corresponds to the columns on Table 4 of the draft FFS under the heading "Lower Reach" when E-11 data are not measurable (NM) and "Area E-10 to E-11". These values on Table 4 range from 13.4 to 92.5 lbs/day with an average of 27.6 lbs/day. The difference between the two averages (from the April 2008 document and the draft FFS) results from the variability associated with the different data sets that were used. This difference highlights why it is important to regard the load calculations as estimates and to base the remedy design on data collected for the source of the contamination, rather than basing the design on the load estimates.

Additional issues which may warrant further consideration include the possibility of vegetative stabilization of slopes to prevent erosion of contaminates, and to possibly provide some filtration of these contaminates. Also, should additional work be considered to prevent the increased erosion of contaminates which might follow a catastrophic forest fire? ***The list of alternatives that was considered in the FFS is the same list that was made available for review and comment by the stakeholders prior to the generation of the FFS. The agencies do not see merit in adding new alternatives at this point in the process. We assume that this comment is suggesting that the slopes of the waste rock piles be vegetated, rather than all bare slopes at the site. Vegetation of the waste rock piles was not considered as an alternative for several reasons. With the exception of Waste Rock Piles 8 and 9, waste rock piles at the site are typically very stable with well-cemented surfaces and will not be amenable to planting activities without surface preparation. Such surface preparation may cause additional erosion and contribute to leaching of the waste rock. The areas of contaminated soil at the site are typically not forested. It is unclear where or how a catastrophic forest fire at the site would contribute to the release of contaminated soil. However, if such an event were to occur, temporary measures, such as silt fences could be used to mitigate erosion.***

The Eagle River Watershed Council and ERWC- Eagle Mine Ltd concur with the comment Bob Weaver made at the August presentation of the FFS, that a robust design is needed. Specifically, we offer the following thoughts:

–The design should capture as much of the zinc loading from the Belden and Rock Creek groundwater inflow zones as possible. ***Agreed.***

–A design that is less than highly effective at capturing the zinc laden waters may make it difficult to

expand the system sufficiently to meet WQS, and may require additional higher cost options to be utilized in order to achieve stream standards. ***Agreed.***

–The design should fully consider a barrier to prevent the inflow of River Water and to prevent groundwater flowing over the collection system and into the River during periods of high snowmelt. Also, consideration should be made to determine the need for a barrier at times of high River flow. ***Agreed.***

–The design should give full consideration to issues of potential pipe or filter media clogging due to precipitation of metals, as well as freezing potential. ***These issues cannot be avoided due to the nature of the problem (dissolved metals in low pH water). However, the best design will be considered in terms of future replacement and operation and maintenance. Pursuant to the CERCLA regulatory process, the actual preparation of design documents does not occur until after EPA issues the Record of Decision. Therefore, such design data will not be made part of the FFS.***

–The design needs to consider operations and maintenance requirements, including the need for clean-outs and inspection ports, so that it will be possible to determine the need for maintenance as well as the performance of the system. ***Agreed.***

–An operation and maintenance plan needs to be an integral part of the design. ***The agencies plan to require a revised Operations and Maintenance Plan (O&M) as part of the new Consent Decree. The O&M plan will not be developed until later in the process.***

–The design should focus on the highest practical longevity. ***Agreed.***

–The design should consider the effect of the additional flow and metals loading upon the treatment plant, and whether treatment capacity may need to be expanded. ***Agreed.***

As a part of acceptance of the proposed plan, we urge the HAZMAT Division and EPA to expand the requirements for water quality monitoring to be performed by the responsible party so as to determine the effectiveness of this project and to determine compliance with the Water Quality Standards. ***A Compliance Monitoring Plan will be developed as part of the new Consent Decree. The plan will be comprehensive and site-wide. In the interim, however, the surface and groundwater monitoring plan will remain consistent with the past few years.***

In recent years, monitoring requirements have been relaxed. This has had two effects. First, local entities, have needed to increase monitoring through efforts of the ERWSD/ UEWUA and the Eagle River Watershed Council through the Riverwatch program. Local entities should not have to further expand their cost and involvement in order to determine if the project is effective. ***The monitoring that is currently conducted by CBS is considered an interim program. Data collected during this interim period before the new remedy is constructed, while useful to note year to year variability, has no bearing on long-term compliance or attainment of the WQS.***

Local entities have decided independently to conduct additional surface water monitoring. In consultation with experts from the Water Quality Control Division, the

agencies had decided upon an approach of monitoring at the bottom of each segment, rather than at interim locations within a segment (e.g. the Two Elk site) in order to capture the cumulative effect of all sources within that segment. For Segment 5b, the main loading sources are the water treatment plant (WTP) effluent and Cross Creek. This is why station E-15 was chosen for monitoring in Segment 5b. Monitoring location E-22, below Minturn, has been added back into the CBS monitoring plan.

The importance of continued monitoring is illustrated by the claim in the FFS that the lower reaches (Segments 5B and 5C) are meeting the current water quality standards as indicated by 2009 and 2010 data collected at E-15, while the data collected at E-22 by ERWSD / UEWUA which illustrate that the standards are not being met. ***Data collected at E-22 does not change the selection of the preferred remedy because no additional sources of metals loading attributable to the Eagle Mine are identified based on the E-22 data. There seems to be quite a bit of confusion about the relationship between the loading sources in Segment 5a and the effects of that loading (causing exceedances of the WQS) in both Segments 5b and 5c. As a result, the FFS will be revised in an attempt to make this point more clear.***

The Eagle River Watershed Council and ERWC – Eagle Mine Ltd support the proposal to collect groundwater in the Belden area and at Rock Creek as the most effective single alternative for meeting Water Quality Standards. We hope that implementation will bring water quality in the Eagle River to at least the Standards set by the Water Quality Control Commission effective January 2009. ***We hope that the additional remedial measures will improve the water quality to a point beyond the minimum that is required. This will provide CBS with regulatory certainty that they will not violate the ARARs and will provide them with flexibility in how they operate the remedy. The closer they are to just barely meeting the ARARs, the more difficult it will be to operate the remedy. Instead, it is to their advantage to provide themselves with a buffer between what they actually achieve and what is required for compliance in order to allow for potential variations in the operation of the remedy.***

While we support alternative 2A as the best single alternative, we continue to think that additional treatment of zinc loading from Rock Creek may be a viable additional measure for improving water quality. As discussed in the "Rock Creek Loading" section of this letter, the FFS should be modified or amended to fully detail the total zinc loading from Rock Creek. Statements in the FFS that indicate option 2A will not achieve the current stream standards in all years would seem to indicate that additional options need to be explored so that standards will be achieved. ***The Rock Creek section of the FFS will be clarified. However, alternative 2A does include the extraction of groundwater from an existing well at the base of Rock Creek.***

Ultimately, the effectiveness of the proposed alternative will be governed by a good design of the project based upon a thorough pre-design analysis, and a design process that considers longevity and operation and maintenance. Continued monitoring is necessary to demonstrate the effectiveness of the proposed alternative in meeting the Water Quality Standards. ***Agreed.***

We understand that the FFS process only allows us to comment on the report and alternatives to the extent that the Water Quality Standards set by the Water Quality Control Commission effective January 2009 may be met. At the same time, we hope that additional cleanup beyond that proposed by the FFS will someday be possible and that the Eagle River may some day be able to meet Table Value Standards

for cold water fishery. ***The Superfund Process requires public comment on the Proposed Plan and does not ordinarily allow for public comment on a Feasibility Study document, nor does it allow for public comment on draft documents. The agencies agreed to allow public comment at several additional stages, including the FFS Study Plan, the list of alternatives and the draft FFS, because of the high degree of stakeholder interest at this site.***

With regard to the water quality goals for the site, a Feasibility Study can only be conducted if there is a regulatory goal against which to compare alternatives. This is why the FFS was not produced until after the WQS were established by the WQCD and a Five-Year Review was conducted to document that the existing remedy did not meet the ARARs. While we share the hope that the water quality at the site will be improved beyond the minimum requirements needed to meet the WQS, given the fact that the upstream segment, Segment 2, sometimes exceeds the TVS, it is highly unlikely that TVS could ever be achieved for Segments 5a, 5b or 5c on a consistent basis, especially during March and April.

Eagle River Water Users General Comments

The primary purpose of the FFS is to develop and evaluate additional and/or enhanced cleanup measures needed to meet the water quality standards for Segments 5a, 5b, 5c, and 7b that have been adopted by the Water Quality Control Commission. As discussed in previous meetings with Eagle River Basin stakeholders regarding the scope of the FFS, we have suggested that the FFS also addresses additional work needed to repair, maintain, and improve existing cleanup facilities. EPA's Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA (EPA/540/G-89/004, 1998), states that the Feasibility Study serves as the mechanism for the development, screening, and detailed evaluation of alternative remedial actions. With regard to the evaluation and selection of remedial measures, EPA provides the following guidance:

Section 121 of CERCLA (Cleanup Standards) states a strong statutory preference for remedies that are highly reliable and provide long-term protection. In addition to the requirement for remedies to be both protective of human health and the environment and cost effective, additional remedy selection considerations in § 121 (b) include:

- *A preference for remedial actions that employ treatment that permanently and significantly reduces the volume, toxicity, or mobility of hazardous substances, pollutants, and contaminants as a principal element*
- *The need to assess the use of permanent solutions and alternative treatment technologies or resource recovery technologies and use them to the maximum extent practicable.*

The Alternatives addressed in the FFS appears to be adequate and include most of the remediation measures that were previously suggested by Hydrosphere during the Water Quality Control Commission rulemaking processes in 2005 and 2008 and by other stakeholders. However, we believe

that the FFS does not include sufficient detail and documentation of the analyses of the waste rock removal alternatives (Alternatives 3A, 3B, and 3C) to support the conclusions that chemical-specific ARARs would not be achieved. The waste rock removal actions in combination with seepage collection alternatives will likely be necessary to achieve combined short-term and long-term effectiveness needed to develop a remedy that is highly reliable and provides long-term protection. Previous removal actions at the site have been effective, but for the three waste rock removal alternative the FFS concludes that the chemical-specific ARARs will not be achieved during March and April. No data and no analyses are included in the FFS to explain and document the basis for these conclusions. ***Additional explanation regarding the waste rock removal alternatives will be included in the final FFS.***

The FFS should provide more detailed descriptions of each of the alternatives. We understand that the analysis of feasibility does not require detailed designs for the alternatives considered. However, the alternatives must be sufficiently developed to determine their potential effectiveness and the design requirements needed to achieve the estimated load reductions. More detailed descriptions of each alternative will serve to facilitate discussion of ideas that could result in more refined and effective cleanup measures for inclusion in the Proposed Plan. ***The description of the alternatives in the FFS is considered adequate for comparison between the alternatives in accordance with the NCP, 40 CFR § 300.430(e)(9).***

The only alternatives in the FFS that were found to be individually capable of achieving the metals loading reduction needed to meet the chemical-specific ARARS, were Alternatives 2A Groundwater Collection and Treatment, Belden and Rock Creek and 2C IRM Reaction Wall in Belden. The FFS description of 2A consists of one paragraph, but the information in the Detailed Cost Estimate (Table B2) indicates that additional information should be available to provide a more robust description of this alternative and the assumptions used as the basis for the cost estimate and the conceptual design. The description of 2C consists of one sentence, but again, the information included in the cost estimate indicated that additional information is readily available for disclosure in the FFS. ***The description of the alternatives in the FFS is considered adequate for comparison between the alternatives in accordance with the NCP, 40 CFR § 300.430(e)(9).***

The need for more detailed descriptions of the alternatives and the basis for their evaluation is further supported by comparing the descriptions of Alternative 2A and 2C with Alternatives 4A. Alternative 4A was found not capable of meeting the load reduction necessary to meet ARARs, yet the description of 4A is much more detailed than the descriptions of 2A and 2B. The description of 4A was taken from the Remediation Feasibility Study, Bolts Lake Area and Areas within OU-1 of the Eagle Mine Site (ERM 2007). The FFS is intended primarily to evaluate alternatives for cleanup in areas in Segment 5a that are much larger sources of metals loading to the Eagle River than the areas around Bolts Lakes in Segment 5b. The level of detail for alternatives to address contamination in Segment 5a should be at least as detailed as the alternatives considered in the ERM study for the Bolts Lake area. ***The description of the alternatives in the FFS is considered adequate for comparison between the alternatives in accordance with the NCP, 40 CFR § 300.430(e)(9).***

In addition, as further discussed below, monitoring data collected by the ERWSD shows that the chronic and acute aquatic life standards for dissolved zinc in Segment 5c are frequently exceeded during early spring runoff. It appears that the alternatives addressed in the FFS were designed to achieve the minimum amount of metals loading needed to meet the standards in Segment 5a and that the required loading reduction may have been underestimated because it was based upon data that was insufficient to accurately estimate peak concentrations. Based upon these considerations, we believe that it will be necessary to consider alternatives and combinations of alternatives that are designed to achieve loading reductions much greater than 40 pounds per day and that include an appropriate "margin of safety." ***The agencies agree that the 40 pounds per day (lbs/day) estimate from the draft FFS is a minimum value calculated using a specific data set. Use of different data sets to calculate a similar value results in a different conclusion. The 40 lbs/day value should not be relied upon further. It is very important to make a distinction between the estimated load reduction necessary to meet the WQS and the design basis for the remedy. The design basis for the remedy will not be the removal of a certain amount of load. Instead, the design will be based on knowledge about the source to be captured. For example, a groundwater collection trench design will be based on the known depth to groundwater and saturated thickness, and the length of the pipe will be based on the groundwater quality data and the conductivity profile. The size and depth of the trench, therefore, are not based on collecting a certain amount of load. The trench will collect the groundwater that makes its way to the trench regardless of how much zinc load that water contains. If on any given day the load in the groundwater is 100 lbs/day, that load should be captured, assuming the system is designed correctly. It would be very difficult to design a system that would only capture a certain amount of load; and it would be equally difficult for the agencies to approve such a design. Therefore the design basis will be the characterization of the sources to be captured.***

Metals Loading Comments

We believe the Newfields/CBS load reduction estimate of 40 lbs/day zinc significantly underestimates the reduction needed for zinc water quality standards to be met in Eagle River segments 5a, 5b, and 5c. The Eagle River Water & Sanitation District has been collecting water samples from site E-22 (Segment 5c) since 2008. These samples have been analyzed for dissolved zinc, cadmium, and copper. An analysis was conducted using this data to determine whether zinc water quality standards were being met at site E-22. This analysis found that zinc water quality standards were regularly exceeded at site E-22 in segment 5c during the spring runoff (first flush) season. Results are shown in Table 1. ***The data set referenced in this comment was not made available to the agencies or to CBS for use in the draft FFS document. The ERWSD data will be included in the final FFS.***

The main purpose of the water quality data evaluation in the FFS is to identify the source or sources of metals loading to the Eagle River at the site. A secondary purpose is to <u>estimate</u> the amount of load reduction that will be needed to meet the

WQS. It is important to note that the data provided by ERWSD does not lead to any new or different conclusions regarding where the loading sources attributable to the Eagle Mine are entering the river. Load reduction in Segment 5a will result in commensurate improvements in both Segments 5b and 5c. The preferred remedy is not changed by the addition of the data set that was provided by ERWSD.

When the new remedy improves the water quality in Segment 5a, the water quality in Segments 5b and 5c will be similarly improved. However, because of the more stringent standards in the lower segments, it may take more load reduction to meet the standards if the estimate is based on data from the lower segments. This does not affect the design basis for the remedy (the design will be based on data that characterize the source of the contamination), but it does affect the estimated load reduction necessary to meet the standards. The additional data also help to highlight the difficulty in meeting the WQS in all three segments during situations where the background load is high. CBS is not responsible for the background load, so that load may become the cause of exceedances in Segment 5c on some occasions in the future once the new remedy is operational.

Table 1: Estimated Zinc Load Reduction for Site E 12 A

Site –E22 (ERWSD) – Segment 5c				Site E-12A (CBS) – Segment 5a				
Date of Samples	Dissolved Zinc Exceedance Concentration(mg/L) Actual	Zn (ch) WQS	Zn (ac) WQS	Collection Date of Sample	Dissolved Zn Exceedance Concentration (mg/L) Actual	Dissolved Zinc Concentration (mg/L) Estimated from site E-22	Estimated Load to Meet WQS (lbs/day)	Estimated Zn Load Reduction to meet WQSs (lbs/day)
4/2/2008	0.362	219.2	257.9	---	---	0.796	78	78.0
	---	---	---	4/8/2008	0.802	---	62.5	84.8
4/9/2008	0.523	200.0	235.3	---	---	1.151	59.6	157.9
	---	---	---	4/15/2008	1.060	----	116.0	233.1
4/16/2008	0.519	184.2	216.7	---	---	1.142	117.4	345.0
				4/22/2008	1.0	---	206.0	474.4
4/23/2008	0.341	164.4	193.4	---	---	0.750	232.4	440.1
				4/29/2008	0.438	---	222.5	189.0
5/1/2008	0.143	164.4	193.4	---	---	0.315	345.7	73.9
3/24/2009	0.269	197.6	232.5	---	---	0.592	85.6	77.4
4/7/2009	0.231	216.8	255.1	---	---	0.508	71.7	35.3
				4/8/2009	0.802	---	98.0	84.8
4/14/2009	0.213	156.8	184.5	---	---	0.469	109.5	98.0
4/14/2010	0.244	145.3	171.0	---	---	0.5368	115.7	156.8
4/15/2010	0.188	139.0	163.5	---	---	0.4136	144.9	129.8
4/16/2010	0.132	110.1	129.5	---	---	0.2904	153.4	103.8
3/22/2011	0.358	201.3	236.8	---	---	0.7876	78.9	116.7
3/29/2011	0.298	194.0	228.2	---	---	0.6556	69.4	79.3
4/5/2011	0.371	204.6	240.7	---	---	0.8162	109.6	168.1
4/12/2011	0.357	176.6	207.8	---	---	0.7854	135.2	246.5
4/19/2011	0.291	146.3	172.1	---	---	0.6402	184.1	327.5
4/26/2011	0.306	169.1	199.0	---	---	0.6732	174.0	265.8
5/3/2011	0.272	182.6	214.8	---	---	0.5984	136.6	147.7

An analysis of data from samples collected on the same days at sites E-12A and E-22 shows that zinc concentrations range from 1.4 to nearly 3 times higher at site E-12A than site E-22 and averaged 2.2 times higher. A similar analysis was performed using total hardness values for the same data, which showed that hardness concentrations ranged from 0.5 to 0.9 times lower at site E-12A than site E-22, and averaged 0.74 times lower. ***Given that water quality at E-12A is worse than water quality in the lower segments, the logical conclusion is exceedances in Segment 5c are the result of loading in Segment 5a. This supports the conclusions of the FFS that the new remedy should target load reduction in Segment 5a.***

Using the above described average ratio calculations for zinc and hardness concentrations at sites E-12A and E-22, zinc concentrations and load reductions needed to meet zinc water quality standards at site E-12A were estimated. The estimated load reductions in lbs/day needed to meet zinc water quality standards in segment 5a are shown in Table 1. These estimates are based on actual data from samples collected at E-12A data by Newfields, as well as zinc concentrations that were estimated for site E-12A based on E-22 data. With the exception of April 7, 2009, the estimated zinc load reductions needed to meet standards at site E-12A, ranged from 73.9 to 474.4 lbs/day, or roughly 1.8 to 12 times more than the estimated 40 lbs/day reduction estimated by CBS/Newfields. ***Agreed. Forty lbs/day is a minimum value calculated using a specific data set. This estimate should not be relied upon further.***

The analysis presented in Table 1 shows that exceedances of the zinc water quality standards in Segment 5c occur frequently during the spring "first flush". Also indicated, is that zinc loading reductions required to meet water quality standards in Segment 5c are substantially greater than the estimated 40 lbs/day estimate. The data collected by Newfields most likely misses the peak concentrations because samples were collected too infrequently, or not at all, during the critical peak loading periods. ***Short-term peak concentrations are not the focus of the FFS. We understand that under the current monitoring scheme, the metals loading peak may not be captured by the data. In past years, automatic samplers collected samples on a daily or twice-daily frequency and these data do provide insight with regard to the causes of the peak concentrations. The automatic sampler data suggest that peak concentrations are being caused by the same sources (Belden and Rock Creek) identified in the FFS.***

An intensive monitoring program to capture the peak is not necessary to compare alternatives for load reduction. The magnitude of the peak does not further inform the conclusion regarding the cause or identification of the sources responsible for the peak. If the peak loading is caused by a groundwater surge in Belden and the remediation system is designed to capture that surge, then the magnitude of the peak is irrelevant to solving the problem.

Based on data collected at site E-22 since 2008, and contrary to the FFS statement that "Remedial actions performed in the 1990s have largely addressed metal loading in the lower reaches of the river, Segments 5b and 5c" (page 1), frequent and significant exceedances of zinc water quality standards occur during early spring in Segment 5c. Additional monitoring and analysis is needed to more accurately determine the extent of zinc exceedances in 5a, but our analysis strongly indicates that the estimated load reduction of 40 lbs/day zinc significantly underestimates what is necessary to meet water quality standards in Segments 5a, 5b, and 5c. ***The statement in the FFS that "Remedial actions***

performed in the 1990s have largely addressed metal <u>loading</u> (emphasis added) in the lower reaches" is factual. Prior to 1990, a significant amount of load entered the river in the lower portion of Segment 5a from the Old Tailings Pile area, and in Segment 5b from the Consolidated Tailings Pile (CTP) and Cross Creek. Remediation of the Old Tailings Pile, capping the CTP, remediation of Maloit Park and the remediation of the groundwater at the CTP has lead to a significant reduction in load entering the lower segments. The exceedances of the WQS referenced by the ERWU are the result of remaining loading sources in Segment 5a. In addition, it is important to realize that the WQS are more stringent in Segment 5c, so exceedances may occur more often in this segment because of the more protective WQS.

The FFS demonstrates that the majority of the loading now originates in the upper and middle portions of Segment 5a and that there are no other loading sources in Segment 5b or 5c that cause exceedances of the WQS. Thus, removal of those sources should result in water quality improvement downstream in Segments 5b and 5c. As stated previously, we are not relying on the 40 lbs/day estimate for design purposes. We do not believe that additional monitoring is necessary to more accurately determine the extent of zinc exceedances in Segment 5a.

It is unclear why several sample dates showing substantial zinc water quality standard exceedances were eliminated from the FFS load reduction analysis (Table 3, page 12). Data collected by NewFields/CBS on April 8, 15, and 29, 2008 show estimated zinc load reductions required to meet water quality standards of 84.8, 233.1, and 189 lbs/day, respectively. Table 3 of the FFS does show one sample collected during this period, on April 22, 2008, would have required 474 lbs/day of zinc load reduction to meet standards. This sample is qualified by a footnote that states "Large loads are due primarily to large flows (greater than 100 cfs) rather than high concentrations" (footnote 2 page 11). The April samples collected by Newfields show dissolved zinc concentrations, flows, and estimated load reductions as follows (Note that only the sample collected on 4/22/08 was included in the FFS):

4/8/08: 34 cfs and 0.802 mg/L zinc; estimated load reduction required – 84.8 lbs/day

4/15/08: 61 cfs and 1.060 mg/L zinc; estimated load reduction required – 233.1 lbs/day

4/22/08: 126 cfs and 1.0 mg/L zinc; estimated load reduction required – 474 lbs/day

4/29/08: 174 cfs and 0.438 mg/L zinc; estimated load reduction required – 189/lbs/day

In the final FFS we have requested that NewFields include data tables that show the water quality in each segment and whether or not the WQS are exceeded. Because the WQS were not effective in 2008, these data tables will not contain data from 2008.

In addition, as mentioned in responses above, the load reduction calculations are estimates that are being used to locate and identify the primary sources of metals contamination to the river. As such, not all of the available data for E-12A are used in the tables if data are not available from the other sampling locations within the segment on the same date. On some sampling dates data from station E-10 are not available to help discern if the load enters the river in the Belden reach or if it enters at Rock Creek.

The "estimated load reduction required" varies greatly depending upon the date of sampling and is an estimate. The importance of these estimates is minimal because

they do not provide the design basis for the alternatives. The 4/22/08 data point described above will be used in the final FFS because on that date, data are available for station E-10 and this information does help inform the issue of where the load enters the river. On 4/22/08, 19 percent of the load comes from upstream and 81 percent of the load comes from the Belden reach. However, at the request of EPA, average load reduction estimates will be included in the FFS both with and without this data point.

On April 8th and 15th flows were less than 100 cfs and yet the estimated load reductions of 84.8 and 233.1 lbs/day of zinc, respectively, were required to meet water quality standards on those days. The concentration of 1.0 mg/L from the April 22nd sample, when the flow was 126 cfs, was roughly the same as the 1.06 mg/L dissolved zinc concentration on April 15th, when the flow was only 61 cfs. This would indicate that large loads are not primarily due to flows greater than 100 cfs, and that large loads are due to high concentrations as well as higher flows. It remains unclear why 3 days requiring significant zinc load reductions have been excluded from the FFS analysis.

Also worth noting is that the UERWA's Avon Drinking Water Facility (ADWF) experienced treatment disruptions in mid-April when Zinc, Iron and Manganese loading in the Eagle River were very high at monitoring site E-22 and the ADWF's intake. ***The final FFS will include data provided by ERWSD and the 100 cfs flow cutoff will be eliminated.***

Institutional Controls Comments

Under Section 5.2 of the FFS, there is a list of land use restriction and access controls that are potentially applicable to conditions in the Eagle Mine Superfund Site, including:

- *Surface water access controls, use restrictions, and regulations designed to prevent access to affected surface waters to prevent exposure – Surface water use restrictions include legal controls on the use of surface water, such as prohibiting contact recreation, fishing, and/or use as irrigation or domestic water supplies. (p. 56)*

The FFS should provide an explanation as to how this particular institutional control could be applicable to the site when Eagle River Segment 5a, 5b, and 5c, and Segment 9a immediately downstream from 5c, are classified for the following uses: Aquatic Life Cold 1; Recreation E; Water Supply; and Agriculture (Regulation 33 – Classifications and Numeric Standards for Upper Colorado River Basin and North Platte River). ***The reference to these access controls in the FFS is simply a description of available tools. It is not meant to state that these tools are viable for application at the site, nor are they included in the preferred alternative. The agencies do not believe that restricting access to surface water is a viable control at the Eagle Mine.***

Analysis of Alternatives Comments

Alternative 2A: Groundwater Collection and Treatment, Belden and Rock Creek

Alternative 2A is designed to collect groundwater in Belden and Rock Creek for treatment at the Eagle Mine Wastewater Treatment Plant (WTP). The proposed depth is 7 to 15 feet below ground surface (bgs). The water level data reported in the FFS (FFS Figures 5 & 6) shows that highest water levels occurring in the spring record in Wells BW-9R and BW-10 are 15 feet below top of casing (BTOC). This suggests that the proposed depth may not be deep enough to intercept the higher spring ground water level near these locations. The spring water levels, reported earlier for Wells 3R, 5, & 8, show that the high ground water level ranges from 14 to 18 feet BTOC. The trench needs to be placed at an adequate depth below the ground surface in order to intercept the high ground water levels. ***The FFS will be revised to clarify this point, however, information in the FFS does not constitute an approved design. The actual depth of the trench will be determined during the Remedial Design Process. See also response below.***

Figure 9 of the FFS shows that the trench does intercept the high ground water level and the Historic Tunnel. There is no explanation of how the high ground water level was estimated or what data was used. There is also no indication of how flow from the Historic Tunnel will be prevented from passing the proposed collection trench and spilling into the Eagle River. It is important to note that the design concept for Alternative 2C, IRM Reaction Wall in Belden, includes a 1,000 foot long trench that would be 15 feet deep. Therefore it is not clear why the extraction trench would not need to be at least as deep as the IRM Reaction Wall. ***Figure 9 in the draft FFS showed that the groundwater collection trench is designed to intercept the high water levels that occur during March and April, but would not intercept groundwater year round. The text will be revised to state that the groundwater trench will be set at the static groundwater level, which is generally around 15 to 18 feet below ground surface. In addition, the description of the IRM trench will be consistent with the groundwater extraction trench to achieve same zone of capture.***

The diameter of the perforated pipe appears to be specified at 4 inches in the Detailed Cost Estimate (Table B-2). There is no explanation in the narrative description of 2A as to how it was determined that the pipe would have enough capacity to carry the collected water from the Copper Tipple Trench, the high groundwater level, and additional flows from the Historic Tunnel. Instead it appears that the pipe was sized only to capture sufficient flows needed to achieve the minimum necessary metals load reduction. In order to determine if the capacity of the pipeline is sufficient, an estimate of flows from all of the sources listed above is necessary. ***These are design details that would be resolved during the Remedial Design process. Information in the FFS does not constitute an approved design. The diameter of the pipe was estimated for the purpose of providing a rough cost estimate for comparison of alternatives. The actual design of the system may differ from the information that was used in the cost estimate. The agencies do not believe that predetermining these design details is necessary to allow for an***

objective comparison between alternatives, which is the purpose of the FFS in accordance with the NCP, 40 CFR § 300.430(e)(9).

Alternative 2A does not specify a barrier in the trench to help prevent flow from spring snowmelt from passing the perforated pipe and entering Eagle River. This seems inconsistent with the design concept for Alternative 4A that includes "vertical barrier walls of impermeable liner" on the downgradient walls of the trench. If impermeable barrier walls are appropriated for the OTP and Rex Flats collection systems, why would they not be needed for the Belden and Rock Creek collection systems where the metals loading is much greater? ***Agreed. A liner will be included in the description of the collection trench design. The liner also will be included in the cost estimate.***

We agree with the following statement from the FFS "*This alternative is probably not capable of achieving the metal loading reductions needed to meet the ARAR under all conditions especially during heavy snowpack.*" Additional explanation is needed regarding how the yield and the zinc load reduction (12 gpm/46 lbs/day of zinc) for Alternative 2A was calculated. This result is inconsistent with the *Metals Loading and Water Quality Standards Attainability Analysis for the Eagle Mine Superfund Site* (CDPHE 2008), which states that "the length of the extraction trench would need to be extended the entire length of the Belden reach, or approximately 1000 feet." *(p. 50)* The report also states that the extraction system would need to capture a flow rate of 21 gpm to achieve a load reduction of 33 lbs/day. *(p. 51)* ***As mentioned in the response to a similar ERWC comment above, the data set used in the CDPHE 2008 document is different than the data set used in the FFS. As a result, the load reduction estimates in the two documents are different. The length of the trench is a design detail that would be resolved during the Remedial Design process. The expected yield from the groundwater extraction system will be revised in the FFS based on a more clear description of the calculation.***

There is a very brief description of a proposed groundwater collection system at the base of Rock Creek. The description does not include a proposed method, depth of the collection system, length of the collection system, or any explanation of how yield and zinc load were calculated. More detail is necessary to evaluate this alternative. ***The method used to estimate the expected yield from additional groundwater collection at the base of Rock Creek will be added to the final FFS. The proposed method is by pumping well EDS-3. This will be clarified.***

Lastly, the Detailed Cost Estimate and Present Worth Analysis (Table B-2) is not sufficiently documented to determine if the operating and maintenance costs includes ongoing inspection, maintenance, periodic replacement costs for the groundwater collection system, which is critical to ensure it remains part of a long-term feasible solution. Related to that concern, is the lack of any analysis of the proposed conveyance systems potentially required for the additional flows. Given the excessive scaling and freezing of the conveyance systems between the mine and the wastewater treatment plant that have occurred in the past, this analysis is important to both the true cost and the feasibility of this alternative. ***These are design details that would be resolved during the Remedial Design process. The agencies do not believe that predetermining these***

design details is necessary to allow for an objective comparison between alternatives, which is the purpose of the FFS. The actual design of the selected alternative will occur after the Record of Decision has been issued by EPA. If additional work is required to convey the additional flows to the WTP, then that work will be required as part of the remediation construction. In addition, added O&M costs were included for some alternatives, recognizing that some of the alternatives will require additional O&M.

Potential Variations and Refinements for Alternatives in the FFS

It appears, but there is no clear explanation, that the lack of electrical services at Belden may have limited the design concept for Alternative 2A to a gravity flow system. The lack of on-site electrical power at Belden to operate pumps for the extraction system and larger capacity pumps for mine pool drawdown should be addressed in the FFS. One option is the installation or rental of a generator at the mine to operate during the spring runoff season. ***In a previous draft of the FFS, CBS presented two separate alternatives for groundwater extraction in Belden, one based on a gravity system and the other based on a pumped system. The agencies requested that CBS instead describe the alternative as "groundwater extraction" and not make a distinction between different design alternatives. We were concerned that our options for improving the design of the system would be limited if the remedy selection was specific to a certain type of system design. That is, if the agencies believe that a system of pumping wells is a better design than a trench, this option would still be available during Remedial Design as an option. However, CBS had to use some type of basic design for the cost estimate, and they chose to use the gravity system. The final design of the system may include pumping and the need for electrical service. This will be determined during the Remedial Design process.***

It appears that additional capacity to maintain the mine pool at lower levels could further reduce metals loading to the Eagle River. The capacity of the WTP and holding ponds appear to be undersized. The fill rate of the mine is about 300 gpm on the average and increases by another roughly 350 gpm during spring run off. The WTP design capacity is therefore half the capacity needed to keep mine pool and associated leaching of metals at a minimum. Design requirement for municipal wastewater treatment facilities require adequate capacity to treat peak flows. It is not clear why the Eagle Mine WTP is not designed to meet similar requirements***. When the existing remediation system is functioning properly at the site, the mine pool can be maintained at a low level while allowing for the treatment of other sources of contaminated water. CBS will be required to demonstrate during the design process that the complete system, including any new remedy components, can be operated to meet all regulatory requirements. If any assumption made during this FFS process was in error, then the final design must rectify that error and CBS will be required to construct a system that operates in the manner required to meet ARARs.***

Conclusions

On behalf of the Eagle River Water Users, we appreciate the opportunity to provide these comments. We generally concur with the list of alternatives that have been included in the FFS, but suggest that supplemental information be included to address the other alternatives listed above. In order to

formulate a Proposed Plan that meets the applicable water quality standards, the loading analysis should incorporate the data collected by the ERWSD at site E-22. In addition, more detailed design concept information is needed for each of the alternatives and how each alternative will function to reduce short-term and long-term loading. It will also be necessary to consider combinations of alternatives to achieve the amount of cleanup required to meet the applicable water quality standards with an adequate margin of safety. The alternatives selected for the Proposed Plan should include a monitoring, inspection, and maintenance plan to measure results and assure that the cleanup measures are effectively meeting all applicable water quality standards. ***As mentioned above, the E-22 data will be included in the final FFS. However, more detailed design information will not be included because the agencies do not believe this is necessary to compare between the alternatives in accordance with the NCP, 40 CFR § 300.430(e)(9). The final FFS will provide more clear demonstration of the expected load reduction from an alternative. The Proposed Plan will not include a monitoring plan or updated O&M plan. These plans will be developed at a later date.***