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Missoula, MT 59802

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Dear Objector:

This letter is in response to your objection to the *Rock Creek Project Final Supplemental Environmental Impact Statement* (FSEIS) and draft *Record of Decision* (ROD) on the Kootenai National Forest. The Responsible Official, Forest Supervisor Chris Savage, and I as the Objection Reviewing Officer have read your objection and reviewed the FSEIS, draft ROD, and project record.

On October 11, 2017, the responsible official and I held an objection resolution meeting on the Rock Creek project. Several objectors participated in the meeting. While we were unable to resolve specific objection issues, we have changed the decision to be made.

Based on my discussions with the objectors and the responsible official, I have determined the responsible official will sign a Final ROD that approves only Phase I project activities. Presently, the draft ROD (June 2017) proposes the project proceed in two phases, with implementation of Phase II contingent upon a number of requirements being met by the project proponent, RC Resources, Inc. (RCR) and the Forest's evaluation of results from Phase I activities (draft ROD, heading 1.4 *KNF Decision and Rationale for Decision*). I have decided to instruct Supervisor Savage to withhold approval of Phase II unless and until all requirements for Phase II initiation have been met, as described in the draft ROD (heading 1.4.1.2).

My specific concern with signing a Record of Decision approving the entire project is the inherent level of uncertainty in the analysis, based on the current availability of information. Underground mine development occurs in rock formations that are generally hundreds to thousands of feet below the surface, hidden from view, and inaccessible other than through mine development or drill holes. The inaccessibility limits the amount of data initially available which means a degree of uncertainty is inherent in evaluating the specific environmental impacts related to groundwater prior to actual mine development. While models and estimates of groundwater conditions can be developed based on the best available information, actual knowledge of underground conditions may not be fully known, or knowable, until underground operations are underway and additional data can be collected.

Proceeding with Phase I construction of the evaluation adit to the Rock Creek ore body will generate additional hydrologic and geologic data relevant to making an informed decision regarding Phase II. The responsible official shall not approve a decision for Phase II of the project until the information generated during Phase I can be evaluated and a determination whether additional analysis is required is made.

For these reasons, I am instructing Supervisor Savage to issue a final ROD that will approve only Phase I project activities as outlined in the draft ROD. After Phase I is completed, and based

upon the additional data and analysis, Supervisor Savage will make a new decision regarding Phase II.

Response to Objection Issues

Due to the complexity of the issues and the number of objection points reviewed, and due to the timing of the objection resolution meeting, I extended the time for responding to objections, as allowed at 36 CFR 218.26(b). As specified at 36 CFR 218.11(b), I must provide a written response to your objections; however, this written response need not be point-by-point, and I have not responded to issues that I do not believe warranted additional review or explanation, including generally objections regarding air quality, regulatory compliance concerns such as FLPMA, bonding, socioeconomics, public involvement, and technical advisory groups. Many of these and additional issues raised by objectors were not subject to the court remand, and there is little or no new information presented that indicate conditions which would affect the analysis or conclusions have changed. Many objection issues simply did not warrant detailed discussion beyond what has been provided in the response to comments (Appendix S) of the FSEIS. This letter details my response to the objections raised to the Rock Creek FSEIS and draft ROD, based on my review of the project in accordance with 36 CFR 218, *Project Level Predecisional Administrative Review Process*.

Surface Water

Issue: The FSEIS fails to ensure compliance with the Clean Water Act (CWA) and Montana's Water Quality Act.

Response: The FSEIS (p. 4-99 to 4-100) disclosed that the Forest Service is responsible for ensuring that mine operations on National Forest System lands comply with Forest Service locatable minerals regulations for environmental protection (36 CFR 228 Subpart A). Mine operators are responsible for compliance with applicable federal and state water quality standards which include the CWA and the Montana Water Quality Act. The DEQ is responsible for ensuring operations comply with the Montana Water Quality Act and the CWA. DEQ's discussion of compliance with the Montana Water Quality Act is found in the Final EA for the Rock Creek Evaluation Adit (DEQ 2008), the 2001 ROD (USFS and DEQ 2001b), and Montana Pollution Discharge Elimination System (MPDES) permits (MT0030287 and MT0031763 in Appendix D).

Federal code at 36 CFR 228.8(h) states "certification or other approval issued by state agencies or other federal agencies of compliance with laws and regulations relating to mining operations will be accepted as compliance with similar or parallel requirements of these regulations." Therefore, DEQ's permit decision and associated conditions would constitute compliance with Montana water quality requirements and Clean Water Act requirements regarding water quality.

Issue: The FSEIS fails to provide adequate baseline hydrologic data.

Response: All available baseline data are presented in Section 3.7 of the FSEIS. The Forest discussed the adequacy of the baseline hydrologic data at length in Section 4.7.2.1. As the responsible official states, the data available is sufficient to make a reasoned choice among alternatives presented in the FSEIS. Additional information at this point is not likely to affect alternative development.

As stated above, I have determined Phase II project activities shall not be approved in a new decision until all conditions of Phase II initiation have been met. This includes evaluation of any new data resulting from Phase I adit construction and subsequent analysis of surface and groundwater conditions.

The FSEIS (p. 4-37) states that "more information would not change the mitigation measures that would be implemented to minimize impacts" to water resources. I understand the Forest has developed mitigation to protect surface water and groundwater and related resources and to address the uncertainty in the 3D groundwater model predictions. However, mitigation measures should be reviewed, and, if needed and feasible, updated following the collection of additional hydrologic and geologic data in Phase I.

Issue: The Forest fails to ensure compliance with the nondegradation protections in Montana's Water Quality Act.

Response: The Forest disclosed effects of mine dewatering on stream baseflow and wilderness lakes in Section 4.7.3.1 of the FSEIS. Page 4-64 of the FSEIS states "the model predicts no change to baseflows during Phase I evaluation." For Phase II, the predicted effects of the project on stream baseflows were quantified at three locations: in Rock Creek above the confluence of the Clark Fork River, Bull River above the confluence of the Clark Fork River, and East Fork Bull River above the confluence with the Bull River (Figure 4-3, p. 4-54). The effects on streamflows in the wilderness, i.e. outstanding resource waters, are only described qualitatively in the FSEIS due to model uncertainty as described in Section 4.7.2.3.2. Potential effects to wilderness lakes were analyzed quantitatively, and it was determined that they are located well above the regional groundwater table, and not subject to impacts from mining. However, because of uncertainty in the model results, setbacks from the wilderness lakes and faults would be required during Phase I. Potential effects to wilderness lakes and required mitigations would be reevaluated after data collection in Phase I.

Additional data will be collected in Phase I that is needed to refine the 3D groundwater model in order to quantify the effects to stream baseflows and wilderness lakes. The conceptual Water Resources and Aquatics and Fisheries Monitoring Plans were provided in Sections 1.6 and 1.9 of Appendix K of the FSEIS and described additional required characterization of outstanding resource waters that may be affected by the proposed mine. A final monitoring plan for these resources, available to the public, would be submitted by RCR and approved by Forest and DEQ (FSEIS, p. S-136).

Issue: The project lacks authority to discharge into the Clark Fork River via a diffuser.

Response: The diffuser in the Clark Fork River would not be constructed without first obtaining all necessary permits, including a Montana Pollutant Discharge Elimination System (MPDES) permit from DEQ to discharge via the diffuser, a Clean Water Act Section 404 permit from the US Army Corps of Engineers to construct the diffuser below the ordinary high water mark, and if needed, a floodplain permit from Montana Department of Natural Resources and Conservation (DNRC) to construct within the 100-year floodplain. It is standard for necessary permits to be applied for and obtained after NEPA has been completed, but before project activities commence.

The FSEIS (pp. 4-99 to 4-100) disclosed the Forest Service is responsible for ensuring that mine operations on NFS lands comply with Forest Service locatable minerals regulations (36 CFR 228

Subpart A) for environmental protection. Operators must comply with applicable federal and state water quality standards, including regulations issued pursuant to the Clean Water Act. DEQ is responsible for ensuring all mine operations comply with the Montana Water Quality Act and its implementing rules. DEQ has discussed compliance with the Montana Water Quality Act in the Final EA for the Rock Creek Evaluation Adit (DEQ 2008), the 2001 ROD (Forest Service and DEQ 2001b), and MPDES permits (MT0030287 and MT0031763 in Appendix D), or will discuss compliance in any future decisions or permits regarding the Hard Rock Operating Permit or discharges to surface water.

The FSEIS (p. 4-101) disclosed that RCR would be required to avoid or minimize, to the extent practicable, locating the diffuser in a floodplain. If locating the diffuser in the Clark Fork River floodplain could not be avoided, RCR would submit an application for a floodplain permit to the Montana DNRC that provides details on the obstruction or use of a floodplain, and a permit would be required before construction.

If a floodplain permit is needed, the floodplain permit application would need to satisfy all requirements of the DNRC's Floodplain Permit process, including requirements to withstand a 100-year flood.

The effects to water quality from the diffuser are located in Section 4.7.2.6 of the FSEIS. These effects assume that "Any treated water discharged to surface water would be in accordance with MPDES permitted effluent limits and would not exceed water quality standards and applicable nondegradation criteria outside of an approved mixing zone" (p.4-45, FSEIS). These assumptions build off the mine water treatment plan under Alternative V outlined on p. 4-109 of the 2001 FEIS. Adverse effects to water quality would be sufficiently avoided because water discharged via the diffuser would meet permit requirements.

Issue: The timing of mitigations for sediment reductions and the effects of clearing 36 acres for powerlines are not properly analyzed in the FSEIS.

Response: As stated in the FSEIS, the proposal would implement a 400 tons-per-year sediment mitigation requirement (pp. 2-90 to 2-91, and 4-83). This 400 ton/year sediment mitigation requirement was established for this project in the 2001 JFEIS to maintain stream beneficial uses (KNF, 2013, p. 3) in Rock Creek, a stream that is listed on the 303(d) list as being "impaired for substrate alterations due to silvicultural practices that have impaired aquatic life" (FSEIS p. 3-60). This sediment mitigation level was established via modelling and limited model validation data (FSEIS, pp. N-6 and N-7), and was intended to "offset increases in sediment loading that would otherwise be expected to occur and should also minimize any unavoidable short-term increase in fugitive sediment" (JFEIS Appendix B, USFS and DEQ, 2001, p. 16).

The FSEIS states (p. 4-119) that implementation of Phase I sediment mitigation discussed in KNF's 2013 memorandum regarding sediment modeling and mitigation (KNF 2013), Section 2.3.1.12, Erosion and Sediment Control, Appendix N, the SWPPP developed as a requirement of MPDES permit MT0031763, and the Rock Creek Evaluation Adit License Application (RCR 2010) would reduce the current sediment load by about 234 tons-per-year. The specific sediment mitigation activities that have been identified are provided on pages 2-89 through 2-91 of the draft Record of Decision. Potential mitigation activities to satisfy the remaining 165 tons/year for Phase II were not described in the FSEIS.

The draft ROD (p. 2-90) continues:

> To achieve the total estimate of 400 tons per year needed for mitigation of the entire mine project, additional sediment mitigation of about 165 tons per year would be required during Phase II of the Rock Creek Project. Because conditions may change before the start of Phase II of the Rock Creek Project, specific sites for sediment mitigation for Phase II would be chosen late in the Evaluation Phase of the Rock Creek Project, after a field survey was conducted and modeling was updated to quantify the baseline sediment loads and the expected sediment reduction for each site.

Because only Phase I is to be approved, the FSEIS need not identify specific mitigation activities reaching the estimated 400 tons/year now. However, these mitigation activities need to be described prior to issuing a ROD for Phase II project activities so the remaining mitigation can commence with Phase II activities.

To estimate this amount of sediment reduction required for Phase I, the FSEIS (p. N-8) used a ratio of disturbed area for Phase I to total disturbed area for Phases I and II. Based on this ratio, the analysis states a reduction in 17 tons of sediment per year would be needed to mitigate for the effects of Phase I.

It is not clear to me if the rationale used for reaching conclusions about sediment reduction, which is based on a ratio of disturbed acres per project phase, is appropriate. The rationale for using this method to justify sufficient mitigation for Phase I impacts requires clarification in the project record.

Regarding power line clearing and sediment, the FSEIS discloses the effects to surface water quality from power line clearing in Section 4.7.3.4.2 (Phase II Construction, p. 4-79), but this discussion only discloses potential effects to stream temperature. I find no effects analysis concerning sediment and erosion potential in this section, and I find no mention of utility corridors or powerline clearing in Section 4.7.3.4.5 *Erosion, Sedimentation, and Stormwater Control*. This may be an oversight, but it requires clarification before issuing a ROD approving Phase II operations.

The FSEIS states that "increases in sediment would be negligible because less than a fraction of 1% of stream-associated vegetation would be cleared along Engle Creek, Rock Creek, and West Fork Rock Creek" (p. 4-121), but later states "An unaltered vegetation buffer would be left between Rock Creek and the road and utility corridors where possible" (p. 4-121).

This may require only minor clarification in the text. However, the rationale of sediment increases being negligible because less than a fraction of 1% of stream-associated vegetation would be cleared appears not to address the extent or impacts of the exception to retaining such vegetation buffers "where possible."

Instructions: I am instructing the responsible official to evaluate and respond to my concerns regarding the rationale for estimating sufficient Phase I sediment reduction mitigation based on a ratio of disturbed acres per project phase, and the potential for utility corridor vegetation clearing, construction, and maintenance to contribute to sediment and turbidity.

Before the Forest approves Phase I, they should clarify the short and long-term water quality impacts from Phase I activities to account for the proximity of these activities to water resources, including effects from the proposed sediment mitigation activities.

Issue: The Forest Service needs to reconcile the modeling results from the Montanore and Rock Creek analyses and analyze cumulative effects of both mines.

Response: The explanation for different analysis approaches used for the Rock Creek and Montanore projects is described in a memo available in the Rock Creek Project record and referenced in Section 4.7.2.3.1 of the FSEIS. While the Rock Creek and Montanore Projects have similarities, they differ significantly in their elevations, hydrogeologic and structural settings. The Montanore modeling assessment was able to verify at least fundamental hydrologic characteristics through data collected primarily from the Montanore's existing Libby Creek evaluation adit and from other observations. Thus, the Montanore model was calibrated to a greater extent than the Rock Creek model due to baseline data collected from Montanore's existing evaluation adit. This calibration allowed them to disclose potential effects of the proposed Montanore Project on base flows both within and outside the wilderness area.

Conversely, the Rock Creek model cannot undergo more detailed calibration until hydrogeologic data is able to be collected underground at the Rock Creek mine location. Hydrometrics' model report for the Rock Creek project stated that a predictive quantitative assessment of potential impacts for the Rock Creek Project will require further hydrogeologic characterization during the development of the Phase I Evaluation Adit (Hydrometrics 2014c). Until that work is complete, the ability to conduct a conventional calibrated modeling analysis is limited as key hydrologic characteristics of the groundwater system cannot be verified in the immediate ore body area. As such, sub-basin analysis results are qualitative, rather than quantitative. Additional hydrologic characterization in the ore body area during the Phase I Evaluation Adit development will refine the model input assumptions, narrow the uncertainty in the analysis of potential impacts and clarify the need for specific mitigation measures.

Regarding cumulative effects analysis, the FSEIS describes the approach to the cumulative effects analysis on p. 4-92. The FSEIS states the cumulative impact analysis for effects on groundwater assumed that both mines would be in operation at the same time and the period of maximum drawdown would coincide. The predicted cumulative reductions in stream baseflow from the two mines (Table 4-16) were estimated by adding the results from the Montanore and Rock Creek 3D models for the respective periods of greatest groundwater drawdown (Geomatrix 2011; Hydrometrics 2014c). Because the two models present results for slightly different scenarios, the effects are disclosed but require further verification due to underlying model uncertainties.

Issue: The FSEIS fails to properly analyze closure plans and effects on water resources.

Response: The FSEIS disclosed that RCR would use one of three mine closure options (p. 2-76), one of which would be to pump and treat the mine water until such time that it met MPDES permitted effluent limits without treatment. This expected long-term goal is inaccurately described in the FSEIS currently and an instruction has been provided to revise this statement to say "until each water source met appropriate water quality standards or limits without treatment."

The FSEIS adequately discusses each closure option (pp. 4-59 to 4-60). The FSEIS also states the time frame for water management and treatment at Rock Creek currently is unknown, but the Forest and DEQ estimate it may be decades or more. For the Rock Creek Project, the Forest and DEQ have projected the discount cash flow over 100 years. This time frame is in line with federal guidelines contained in the USDA Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies (USDA 1983) (FSEIS, p. 1-29). The FSEIS describes the process for a closure plan (p. 2-76).

Until additional data is obtained during Phase I and during Phase II Operations, the Forest and DEQ have determined that the initial mine closure plan would be to treat the mine water until it met appropriate water quality standards or limits without treatment, rather than in perpetuity as stated in the FSEIS (p. 2-76).

Instruction: I am instructing the responsible official to revise the following phrase throughout the FSEIS, including comment responses, as follows:

> Change "until such time that it met Montana Pollution Discharge Elimination System (MPDES) permitted effluent limits without treatment" to "until each water source met appropriate water quality standards or limits without treatment."

This recommended change is needed to clarify the assumed long-term goal and effects of the project. The recommended language is consistent with the still current 2001 DEQ ROD.

Groundwater

Issue: The project fails to demonstrate groundwater discharge from the tailings facility will comply with the Montana Water Quality Act and Clean Water Act.

Response: Mixing zone requirements are discussed on p. 4-76 of the FSEIS, which says:

> "Discharges to groundwater from mining operations subject to operating permits under the MMRA are not subject to groundwater permit requirements (75-5-401(5), MCA). Because predicted groundwater quality for some parameters would be greater than ambient concentrations, RCR would have to apply to DEQ for a mixing zone *or an authorization to degrade*. RCR has not made such an application. A mixing zone is a limited area of a surface waterbody or a portion of an aquifer where initial dilution of a discharge takes place, where water quality changes may occur, and where certain water quality standards may be exceeded (ARM 17.30.502(6) and 75-5-103(21), MCA). RCR would have to submit information concerning the biological, chemical, and physical characteristics of the receiving water, as specified in ARM 17.30.506 or as requested by DEQ. After submittal of the required information, DEQ would determine if a mixing zone beneath and downgradient of the paste tailings facility would be granted in accordance with ARM 17.30.518 and, if so, would determine its size, configuration, and location. If DEQ granted a mixing zone, water quality changes might occur, but would have to be below applicable nondegradation criteria outside of the mixing zone."

The phrase "or an authorization to degrade" (emphasis added) in the second sentence of the paragraph cited above mischaracterizes the next steps, as it is speculative to suggest that requesting an authorization to degrade is the only option if DEQ did not grant a mixing zone. An instruction is provided below to more accurately disclose the potential next steps.

As stated previously, the FSEIS (p. 4-99 to 4-100) disclosed that the Forest Service is responsible for ensuring that mine operations on National Forest System lands comply with Forest Service locatable minerals regulations for environmental protection (36 CFR 228 Subpart A). Mine operators are responsible for compliance with applicable federal and state water quality standards which include the CWA and the Montana Water Quality Act. The DEQ is responsible for ensuring operations comply with the Montana Water Quality Act. DEQ's discussion of compliance with the Montana Water Quality Act is found in the Final EA for the Rock Creek Evaluation Adit (DEQ 2008), the 2001 ROD (USFS and DEQ 2001b), and MPDES

permits (MT0030287 and MT0031763 in Appendix D). Furthermore the DEQ will discuss compliance with the Montana Water Quality Act in any future decisions or permits regarding the Hard Rock Operating Permit or discharges to surface water.

Federal code at 36 CFR 228.8(h) states "certification or other approval issued by state agencies or other federal agencies of compliance with laws and regulations relating to mining operations will be accepted as compliance with similar or parallel requirements of these regulations." Therefore, DEQ's permit decision and associated conditions would constitute compliance with Montana water quality requirements and Clean Water Act requirements regarding water quality.

Instruction: I am instructing the responsible official to replace the phrase "or an authorization to degrade" in the mixing zone discussion found on FSEIS p. 4-76 with the following text to clarify discussion of the potential to need an authorization to degrade:

> "Because predicted groundwater quality for some parameters would be greater than ambient concentrations, RCR will apply to DEQ for a mixing zone. Should DEQ deny a mixing zone, RCR will develop a revised approach to tailings disposal that does not require a mixing zone. If this occurs, the Forest and the DEQ, with assistance with the PTTAG, will decide if the revised approach to disposal constitutes significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts, as described by 40 CFR 1502.9(c)(1)(ii)."

Issue: The Schafer tailings model is not appropriately used in the FSEIS.

Response: The FSEIS clearly displays the Rock Creek Paste Tailings Seepage Model use, assumptions, limitations, and results on pages 4-44 and 4-45, which incorporates Schafer's "Rock Creek Paste Tailings Seepage Model Memorandum" by reference (2014). Schafer's "Rock Creek Paste Tailings Seepage Model Memorandum" further summarizes effects, methods, and model limitations. An objector points out perceived deficiencies in the model intent, model assumptions, and model input data used and suggests different methods and input data that should be been considered.

Phase I would include implementation of the geochemical sampling and analysis plan described in Section 1.5 of Appendix K, and in particular the paste tailings evaluation discussed in Section 1.5.4.2.5, which would decrease uncertainty associated with predicting paste tailings seepage water quality. As described in Appendix K: "Part of the tailings evaluation would also consist of characterization and modeling of the paste tailings disposal facility that refines the predicted migration of tailings solution and interaction with groundwater within and beneath the facility" (p.K-11, FSEIS). As such, geochemical modeling will be completed during Phase I based on the new information obtained in Phase I to refine the predicted migration of tailings solution and interaction with water resources.

The baseline data and effects analysis provided in the FSEIS based on the Schafer tailings model is considered sufficient to evaluate the potential for adverse effects when considered in light of the model limitations and uncertainties at this time. The objector's suggested approaches of how to improve the modeling should be reviewed and considered when geochemical modeling is completed with the additional information collected during Phase I.

Instructions: The responsible official needs to review and consider the approach suggested by objector #17-01-00-0041 to improve the paste tailing seepage modeling when geochemical modeling is completed with the additional information collected during Phase I.

Issue: The FSEIS analysis about the effects to groundwater quality from tailings seepage is insufficient and does not consider leaching from waste rock. The facility design does not consider a shallow groundwater table.

Response: Specialty Beams sawmill is located adjacent to, but outside of the project study area, southwest of the junction of Forest Service Road 150 and 150B. The saw mill is at a lower elevation than the proposed paste tailings facility and likely has a shallower water table than can be found in the area where the paste tailings would be located. Furthermore, the geology and hydrogeology underlying the paste tailings facility is described in Section 3.7.3.2 (p. 3-100, FSEIS), and a geologic cross-Section through the Paste Tailings facility is shown on Figure 3-11 (p.3-101, FSEIS). "The depth to bedrock varies from surface exposures of bedrock along the western and central portions of the facility (Figure 3-12) to nearly 100 feet in some areas" (p. 3-100, FSEIS). It is speculative to assume the geology and hydrogeology under the saw mill is continuous and consistent with that under the proposed paste tailings facility.

Groundwater monitoring of the paste tailings facility and additional data collection to be conducted in Phase I are discussed in Section 4.7.3.3.4 on pages 4-72 and 4-73, especially the second paragraph on p. 4-73. With specific regard to downgradient domestic wells, "Prior to evaluation adit construction and in accordance with the Rock Creek Evaluation Adit License Application (RCR 2010), the third-party contractor would inventory domestic wells and other water supplies. All water supply wells and springs would be sampled to establish pre-operational conditions, preferably for four quarters to establish seasonal variation. From the sampled locations, the third-party contractor would establish a list of wells to be sampled on a quarterly basis during Phase I" (p. K-27, FSEIS). "Split sample results from domestic wells would be offered to well owners" (FSEIS p. K-32).

Issue: The FSEIS fails to analyze the potential impacts of a pumpback system for the tailings impoundment.

Response: The pumpback well system is identified as one potential mitigation that might be pursued in Phase II (Section 4.7.3.3 of the FSEIS). The description of using the pumpback well system as a mitigation process is provided on p. 4-73, but similar language on p. 4-28 is not consistent with the mitigation process outlined on p. 4-73. Page 4-28 should be updated as directed in the instructions below to make these descriptions consistent.

The need to install pumpback well system is uncertain at this time. The expected need to construct a pumpback well system is less likely in the Rock Creek project than at Troy or Montanore mines. While the Troy and Montanore mines use slurry tailings, Rock Creek will use paste tailings, which will "virtually eliminate decant water, would reduce evapoconcentration, and may affect the percentage of process water recycled" (FSEIS p. 3-54). Therefore a pumpback well system may not be needed at Rock Creek even though it was needed for the Troy Mine.

Otherwise, the FSEIS explains why the Troy mine is a good analog (p.4-68):

> Section 3.5, *Geology* and Section 3.6, *Environmental Geochemistry* describe why the Troy and Montanore mines are good geologic and geochemical analogs for the Rock Creek Mine and, thus, are comparable in terms of expected adit, mine, and tailings water quality. The information in Table 4-10 was used to evaluate the effects on surface water and groundwater quality during the various mine phases and post-mining.

Effects of the pumpback well system have been disclosed in the FSEIS on the following resources: Groundwater levels and springs and seeps (p. 4-58 to 4-59), streamflow reductions (p. 4-67), water rights (p. 4-103 to 4-104), wetlands (p. 4-111), and bull trout (p. 4-159).

Furthermore, the entire project area was sufficiently surveyed for water resources in 2011 (Westech 2012a). The proposed paste tailings facility and the potential mitigation of a pumpback well system are not proposed for locating on top of any surficial water resources based on Figure 4-5 showing Alternative V Permit Area Wetlands and Other Waters in the Paste Tailings Facility Vicinity (p. 4-110, FSEIS, 2017). The location and effects of the proposed paste tailings facility is therefore not directly comparable to Montanore where the Poorman Creek tailings impoundment site was going to be located on top of streams that drained into Poorman Creek and Little Cherry Creek.

As an objector notes, the FSEIS response to comments states "Alternative V, the pumpback wells would be a possible mitigation for effects to water quality. The effects of this contingency mitigation at the tailings facility were not evaluated" (p. S-164, FSEIS, Vol.3). My review finds the response to comments contains an error, as the effects of the pumpback well system have been evaluated, albeit qualitatively. As such, the sentence provided in response to comments on FSEIS p. S-164 is erroneous and should be deleted. I do however find the effects analysis of the pumpback well system on groundwater quality could be made clearer.

I find the effects of the pumpback well system on groundwater quality are inconclusive as currently presented in the FSEIS. The FSEIS (p. 4-73) provides this statement of the effects of the pumpback well system on groundwater quality:

If the measures to be implemented included a proposal to install pumpback wells, the pumpback well system would be designed to capture all groundwater affected by tailings seepage. RCR would be required to demonstrate full capture of any affected groundwater through monitoring.

I understand the intent of groundwater capture is to mitigate potential effects to groundwater quality that would otherwise occur due to tailings seepage. In other words, an operational pumpback well system would prevent adverse effects to groundwater quality outside of an approved mixing zone. The FSEIS could be clearer on this point.

As stated on page 4-67 (FSEIS) streamflow reductions are expected in Rock Creek and Miller Gulch if the pumpback wells are used, because groundwater that would otherwise contribute to streamflow would be intercepted by the pumpback wells. At this time, the amount of streamflow reductions that would be experienced in Miller Gulch and Rock Creek and groundwater drawdown in private wells and springs that may occur if the pumpback well system is operated are uncertain. The amount of reduction would only be quantified if the pumpback well system is determined to be needed via groundwater monitoring. RCR would have to obtain a beneficial water use permit before appropriating any water for beneficial use. The beneficial water use permit application would describe the location, volume, and rate of the diversion and the location, purpose, and period of use. Any beneficial water use permit obtained by RCR would require mitigation for any adverse effects on existing permitted water users (p. 4-67, FSEIS, 2017).

Implementation of the geochemical sampling and analysis plan described in Section 1.5 of Appendix K, and in particular the paste tailings evaluation in Section 1.5.4.2.5, would decrease uncertainty associated with predicting paste tailings seepage water quality. As described in Appendix K, "Part of the tailings evaluation would also consist of characterization and modeling

of the paste tailings disposal facility that refines the predicted migration of tailings solution and interaction with groundwater within and beneath the facility."

As instructed, the Forest will only proceed with Phase II of the project after a Hard Rock Operating Permit has been issued for Phase II. Per 36 CFR 228.8(h), DEQ's permit decision and associated conditions in these decisions or permits, and any other state water quality permits or certification, would constitute compliance with Montana water quality requirements and Clean Water Act requirements regarding water quality (p. 4-99, FSEIS, 2017).

Instructions: I am instructing the responsible official to update the description of using the pumpback well system as a mitigation provided on FSEIS p. 4-28 to be consistent with the mitigation process outlined on p. 4-73. The second sentence below (that has been struck) located on FSEIS p. 4-28 should be replaced with the language provided below:

"A system of pumpback wells (conceptually similar to the pumpback system proposed in Alternatives II, III, and IV) is included in Alternative V as a contingency. ~~If operational monitoring data indicated applicable standards could not be met outside of an approved mixing zone, the pumpback system would be required by the KNF and DEQ to protect downgradient groundwater quality."~~

"If the final approved groundwater quality monitoring action levels were reached, RCR would notify the Agencies within 5 working days (proposed action levels are listed in Table K-9 (Appendix K). RCR would review the mitigation measures described in the Contingency Action Plan and propose to implement one or more of the measures described therein, such as pumpback wells, to ensure that groundwater quality concentrations near the paste tailings facility would not exceed water quality standards and applicable nondegradation criteria outside of an approved mixing zone" (FSEIS, p. 2-39).

Furthermore, the following sentence in the Appendix S response to comments should be deleted: "~~For Alternative V, the pumpback wells would be a possible mitigation for effects to water quality. The effects of this contingency mitigation at the tailings facility were not evaluated~~" (FSEIS p. S-164).

The effects of the pumpback well system on groundwater quality are inconclusive as written. The statement from p. 4-73 (FSEIS) should be updated to make a clear conclusion statement of the effects of the pumpback well system on groundwater quality, i.e. that the pumpback well system would prevent any tailings seepage from adversely affecting groundwater quality outside of an approved mixing zone.

Issue: The FSEIS fails to analyze potential effects of the Phase I infiltration ponds.

Response: I find the FSEIS disclosed the effects of seepage from the Phase I infiltration ponds on groundwater quantity in Section 4.7.3.1 (p. 4-58) and on groundwater quality in Section 4.7.3.3.2 (p.4-71) of the FSEIS (2017). The discharge to the infiltration ponds is required to meet groundwater quality standards at the end of the pipe prior to discharge, therefore groundwater quality at and downgradient of the infiltration ponds site is not expected to be adversely affected (p. 4-71, FSEIS). The FSEIS also disclosed the effects of seepage from the Phase I infiltration ponds to surface water quality in Section 4.7.3.4.1 (p. 4-79); effects on surface water quality would likely be negligible due to sorption, dilution, and dispersion. The effects of the infiltration ponds are adequately disclosed in the FSEIS.

Issue: The FSEIS fails to analyze impacts to groundwater from underground mine storage seepage.

Response: The FSEIS analyzed impacts from underground mine storage during construction, operation, and closure, along with the proposed mitigation and monitoring associated with the underground mine storage, in Section 4.7.3.1.2 (i.e., groundwater quantity, p.4-49), Section 4.7.3.3 (i.e., groundwater quality) (p. 4-72), and in Section 4.17.2.4.2 (i.e., Wild and Scenic Rivers) (p. 4-193). For underground water storage, the intended siting of the sumps or reservoirs below the pre-mine water table would eliminate risk of any seepage. If the sumps or reservoirs were located above the pre-mine water table they would be located in an area with a minimum number of fractures and would be maintained at a shallow water depth to minimize seepage losses.

The planned mitigation of applying limestone or ash to help remove metals from the system is an appropriate mitigation in some cases, but it is unclear whether this mitigation would be appropriate or effective to remove the metals anticipated in this mine, particularly in comparison to Troy Mine water or the values listed on Table 4-10 of the SEIS. As the objector points out, page K-32 of SEIS (Appendix K) states the intended use of this mitigation but does not provide any rationale of its applicability to this mine and the anticipated metal concentrations.

A review of these proposed mitigation measure to avoid impacts from mine seepage will be completed by DEQ as part of the approval of a Hard Rock Operating Permit. The Forest will only proceed with Phase II of the project after a Hard Rock Operating Permit has been issued for Phase II.

Instructions: The proposed mitigation of "adding limestone or soda ash" described on p. K-32 in Appendix K of the Final SEIS) is not consistent with the mitigation discussed in Section 4.7.3.1.2. I am instructing the responsible official to revise the mitigation described in Appendix K, as appropriate, for the water quality impacts expected at this site.

Grizzly Bear

Issue: Mitigation measures for grizzly bear have not proven effective.

Response: Section 3.13.3 (p. 3-173 and 3-174) of the FSEIS provides a detailed discussion about grizzly bear mortality rates, including mortality and population information from Kasworm et al. (2015) discussing variations in survival rates according to 3 different time periods. Kasworm's findings conclude that although grizzly bear survival of all sex and age classes decreased from 0.899 to 0.801 between the first two periods (1983 to 1998, and 1999 to 2006), they rose to 0.964 in the third period (2007 to 2014). According to Kasworm et al. (2015), some of this decrease could be attributed to an increase in point estimates for natural mortality probably related to poor berry production from 1998 to 2004. Population trends reported in Kasworm indicate the probability the grizzly bear population in the CYE was stable or increasing was 62%.

More recent data and conclusions from Kasworm et al. (2016) found the estimated finite rate of increase for 1983 to 2015 was 1.011 and the finite rate of change in the population was an annual 1.1% for the same period. The probability the population was stable or increasing was 61% (Kasworm et al. 2016). The decline from the 2014 calculation (1.014) (Kasworm et al. 2015) to the 2015 calculation (1.011) occurred largely because of new genetics data that indicated an increase in first age of reproduction and birth interval (Kasworm et al. 2016). Adult female

survival and subadult female survival increased to 0.951 and 0.818, respectively, in 2015 and resulted in an improving population trend estimate since 2006 (Kasworm et al. 2016). This corresponds to the time during which mitigation measures have started to be implemented. The project record will be updated to reflect this new information.

Issue: Project activities will lead to an increase in the local human population, which will increase pressure on grizzly bear.

Response: First, the analysis has disclosed the expected increases in human population associated with project activities (2001 FEIS p. 4-221). I find no new information has been provided on objection that warrants reconsideration of this component of the effects analysis.

Second, the 2006 biological opinion (BO) and 2007 BO Supplement determined that the proposed conservation measures under selected Alternative V are reasonably expected to prevent the loss of more than one grizzly bear over the life of the mine, thus more than offsetting the anticipated loss from the project (one grizzly bear). Information on the effectiveness of mitigation for grizzly bears was presented in Section 4.12.8.2 of the Draft SEIS and is presented in the FSEIS. In June 2011, the Ninth Circuit Court of Appeals upheld the U.S. Fish and Wildlife Service's (FWS) 2006 BO and the 2007 BO Supplement on all litigated issues.

Third, as described on FSEIS (p. 2-100 to 2-101) and as stated in the stipulations attached to the draft ROD, RCR will implement mitigation measures prescribed in the mitigation plan in Appendix B of the 2006 BO, plus the Terms and Conditions in the 2006 BO. The mitigation plan requires the Forest to form and lead a grizzly bear Oversight Committee, which would develop a Comprehensive Grizzly Bear Management Plan. The Oversight Committee would oversee implementation of all mitigation requirements, and collect and review new information on grizzly bears and other information relevant to CYE grizzly bears over the life of the mine. The final mitigation plan must be approved by the Forest and the Montana DEQ before construction of the evaluation adit, and several components of the plan would be implemented before or during evaluation adit construction. The US Fish and Wildlife Service (FWS) would advise the Forest in developing the Terrestrial Threatened, Endangered, and Proposed Species Monitoring Plan described in Appendix K.

Fourth and finally, RCR is required to agree that all mortality reduction measures would be subject to modification based on adaptive management, where new information supports changes. Modifications would be reviewed and approved by the Oversight Committee. Additionally, the FWS, in its advisory capacity on the Oversight Committee, would advise the Forest on whether additional consultation may be required to assess new information or changes in the mitigation plan resulting from adaptive management (FSEIS p. 4-177).

I understand there are concerns the projected estimates of population increases are not robust enough. My review of the project record finds the Forest has assessed the risks to grizzly bear individuals and populations, and has mitigations in place to adjust activities according to new information. I find the Forest has satisfied its obligations under NEPA and the Endangered Species Act (ESA) in this regard.

Issue: The Forest Service has miscalculated the zone-of-influence for displacement of grizzly bear.

Response: The analysis presented in Section 4.13.3.2 of the Draft and FSEIS used core area, open motorized route density (OMRD), and total motorized route density (TMRD) to assess the

condition of grizzly bear habitat. A core area is an area of high-quality grizzly bear habitat within a Bear Management Unit (BMU) that is greater than or equal to 0.31 mile from any road (open or restricted) or motorized trail open during the active bear season. Alternative V would be consistent with the Access Amendment standards because it would not decrease core area or increase OMRD or TMRD.

Displacement effects were disclosed in the Threatened and Endangered Species section of Chapter 4 of the 2001 FEIS. Habitat displacement was evaluated based on estimates of the extent of the displacement, or zone of influence of Alternative V activities, and the degree to which suitable grizzly bear habitat would be used. Influence zones, disturbance coefficients, and compensation levels for Alternative V facilities and access roads were determined based on the Cumulative Effects Analysis Process developed by the Interagency Grizzly Bear Committee (USDA Forest Service 1988a; IGBC 1990). The analysis presented in Section 4.13.3.2 of the Draft SEIS and Chapter 4 of the 2001 FEIS was consistent with the FWS 2006 BO and 2007 BO Supplement, which determined that Alternative V would not likely jeopardize the continued existence of grizzly bears, and would result in a net improvement in conditions for grizzly bears (SEIS, Vol. III, p. S-208).

In June 2011, the Ninth Circuit Court of Appeals upheld the FWS's 2006 BO and the 2007 BO Supplement on all litigated issues (FSEIS, p. 1-16).

Issue: Habitat connectivity between the Cabinet and Yaak components of the ecosystem is insufficiently analyzed.

Response: The FSEIS shall be updated to include a discussion of habitat linkages and connectivity.

The Alternative V grizzly bear mitigation plan, discussed in Section 2.3.1.16 of the Draft SEIS and Section 2.3.1.16 of the FSEIS, includes habitat acquisition and protection to mitigate impacts to grizzly bear movement.

Land acquisition would include protecting and improving habitat in key linkage areas, in particular the north-south corridor. In addition to requiring RCR to acquire perpetual conservation easements on or purchase 2,350 acres of replacement grizzly bear habitat, RCR would secure or protect from development and use 100 acres of replacement habitat that would enhance the north to south habitat corridor in the Cabinet Mountains.

The agencies' grizzly bear mitigation plan for the Montanore Project would require MMC to first attempt to acquire mitigation lands in the north south corridor. The first 500 acres of replacement habitat required to offset displacement would be within the north south corridor within impacted BMUs (5, 6 or 2). The remaining 2,573 acres required for displacement could be in or outside the north south corridor within the Cabinet Yaak Recovery Zone, with up to one-half (1,286 acres) in a habitat linkage zone along US 2.

Instruction: I am instructing the responsible official to add information to:

1. Add information to Section 3.13.3 regarding grizzly bear movements in the CYE between the Cabinet Mountains and the Yaak based on Kasworm et al. (2015), Kendall et al. (2015), and Proctor et al. (2012);

2. Add a discussion to Section 4.13.3.2 regarding the impacts of the Rock Creek project on habitat connectivity for grizzly bear, and;

3. Revise Sections 4.13.8.2 and 4.13.9.2 to include additional discussion of cumulative impacts on grizzly bears from the Montanore Project and the effectiveness of mitigation, including a discussion of habitat linkages.

Issue: The cumulative effects analysis of grizzly bear in the biological opinion is inadequate.

Response: The Forest addressed these concerns in response to comments on the Draft EIS. Sections 4.13.9.2 and 4.13.9.3 will be revised in the FSEIS to include additional discussion of cumulative impacts on grizzly bears from the Montanore Project and effectiveness of mitigation.

Under the ESA, cumulative effects only involve future non-Federal actions. Past and present impacts of nonfederal actions are part of the environmental baseline. Future federal actions requiring separate consultation (unrelated to the proposed action) are not considered in the cumulative effects section. Therefore, cumulative effects of the Rock Creek and Montanore projects on grizzly bears were not addressed in the Rock Creek BO, because they were already accounted for during the Section 7 consultation process for the Montanore project. The Forest submitted a final Biological Assessment (BA) for effects of the Montanore Project on federally listed species to the FWS in September 2013. Since other reasonably foreseeable federal actions such as the Rock Creek Mine Project had already undergone Section 7 consultation, they were considered in the baseline conditions for the Montanore Project BA, and therefore the effects of these projects on grizzly bear core habitat, OMRD, TMRD, and habitat displacement have been accounted for.

Issue: Road closures for grizzly bear mitigation are double-counted.

Response: As described in the Montanore BA and BO, MMC would restrict motorized traffic with a berm on the Upper Bear Creek Road (NFS Road #4784) only if it had not already been done during implementation of the Rock Creek mine mitigation prior to the initiation of the Montanore evaluation phase. The Montanore BA and BO state the changes in grizzly bear habitat parameters resulting from this Rock Creek Project mitigation were considered as part of the baseline conditions for the Montanore Mine analysis (as required under ESA); thus, Montanore would take no "credit" for core creation or OMRD/TMRD changes by implementing if it needed to implement the access change on NFS Road #4784. By including the access change on NFS Road #4784 in the mitigation measures for the Montanore Project, the agencies were ensuring the Montanore Mine analysis baseline conditions included the Rock Creek Mine mitigation.

Bull Trout

Issue: The FSEIS does not adequately address the effects of the diffuser on bull trout and bull trout habitat.

Response: The Draft SEIS and FSEIS disclose the in-stream diffuser would discharge treated mine water into the Clark Fork River in accordance with MPDES permitted effluent limits and would not exceed water quality standards and applicable non-degradation criteria outside of an approved mixing zone. Section 4.7.3.4.3 of the FSEIS stated that discharge would be required to meet federal effluent limitation guidelines (ELGs) and MPDES permitted effluent limits. Monitoring of the outfalls would be required as described in the MPDES permits for the project.

As disclosed in Section 4.13.3.1.3 of the FSEIS, wastewater treatment plant discharge would be treated before discharge to meet MPDES permitted effluent limits protective of aquatic life and is not likely to affect the temperature, flow regime, or other factors contributing to the impaired

status of the Clark Fork River because the discharge rate would be less than one percent of even the lowest flows measured in the last 20 years (220 cfs). Additionally, for the same reason, the outfall and diffuser would not be a barrier to fish passage or increase dissolved gas saturation in the river.

The FSEIS (p. 4-99 to 4-100) disclosed that the Forest Service is responsible for ensuring that mine operations on National Forest System lands comply with locatable minerals regulations (36 CFR 228 Subpart A) for environmental protection. Operators must comply with applicable federal and state water quality standards, including regulations issued pursuant to the Clean Water Act. DEQ is responsible for ensuring all mine operations comply with the Montana Water Quality Act and its implementing rules.

ESA compliance would be ensured through Section 7 consultation. In 2011, the Ninth Circuit Court of Appeals upheld the FWS's 2006 BO and the 2007 BO Supplement on all litigated issues.

As described in Section 4.13.8.1 of the FEIS, the Forest would require RCR to implement Terms and Conditions of the 2007 BO Supplement (Appendix E), as approved by the FWS, prior to surface disturbances that are not related to the evaluation adit stage of the Rock Creek Project. This would include the requirement to complete and submit an evaluation of locations for the wastewater diffuser in the Clark Fork River. The evaluation would be completed in consultation with the Forest Service, DEQ, and FWS and focus on recommendations to minimize potential effects on migrating or resident bull trout using the Clark Fork River habitats adjacent to the mouth of Rock Creek and the spring area immediately upstream. The Terms and Conditions of the 2007 BO Supplement are considered appropriate to minimize impacts of incidental take of bull trout.

Issue: The FSEIS did not evaluate the likelihood contaminants from mine water stored in the underground mine may adversely affect water quality in streams designated as critical habitat.

Response: The FSEIS adequately disclosed the effects of storing water underground and the Forest's mitigation and monitoring associated with the reservoir.

During operations, RCR would temporarily store excess water in sump areas or reservoirs constructed in the mine void designed and located to minimize infiltration into the bedrock. The location for the proposed sumps or reservoirs has not been determined and it is not known which portions of the mine void would be above the pre-mine water table or below the water table; the intent would be to locate them below the water table (SEIS p. 4-49). If the proposed sumps or reservoirs were located below the pre-mine water table, the hydraulic gradient would be toward the dewatered mine and no seepage losses would be expected from the reservoir. If the proposed sumps or reservoirs were located above the pre-mine water table, there could be seepage losses from the sumps or reservoirs. The rate of seepage loss would depend on the occurrence and frequency of more permeable fractures in the otherwise very low permeability bedrock. If the sumps or reservoirs were located above the pre-mine water table, seepage losses from the reservoir could be minimized by selecting an area with a minimum number of fractures and maintaining a shallow water depth in the reservoirs.

If the underground sumps or reservoirs were located above the pre-mining water table, underground monitoring wells would be installed to monitor seepage to groundwater. To prevent or minimize mine water flowing to springs if the underground reservoir was located above the pre-mining water table, RCR would be required to maintain a low hydrostatic head for the

impounded water to minimize seepage losses, or line, seal, or grout the underground storage sumps or reservoirs to prevent seepage losses. Details of monitoring the underground storage sumps or reservoirs are provided in Appendix K (SEIS, p. 4-73).

There is a slight possibility that post-closure groundwater seepage from the underground mine reservoir might exit from outcrops in the wilderness, if the mine were plugged. Based on water quality modeling, such effects are unlikely to measurably affect spring water quality (SEIS, p. 4-195).

Issue: The FSEIS fails to analyze the relationship between streamflow and habitat in the analysis area.

Response: Section 4.13.2 of the Draft SEIS disclosed that due to the uncertainty associated with mine-related groundwater and surface water effects described in Section 4.7, and because streamflow-habitat relationships have not been defined for study area streams, the discussion of Rock Creek Project effects on bull trout is largely qualitative. The rationale for the qualitative analysis is described in two memos available in the Rock Creek Project record and referenced in Section 4.13 of the Draft SEIS (KNF 2014b, 2014c).

After more ground water/surface water data become available during phase I evaluation, better calibration and refinement may improve confidence in the projected stream flow change and be evaluated for more locations. This will be used to re-assess qualitative projections and potential affects to bull trout presented the FSEIS and Biological Opinions. A refined look at flow changes in key bull trout production areas in both Rock and Bull River watersheds will occur as dictated by the BO Terms and conditions and the projects adaptive management plan. Should these effects/reductions be of a magnitude not anticipated a more quantitative assessment using the PHABSIM methodology will occur to better evaluate potential effects to key bull trout spawning and rearing habitat and production areas.

Instruction: I am instructing the responsible official to update Section 4.13.2 of the Final SEIS to include a description of relationships between stream discharge and habitat at the mouths of Rock Creek and East Fork Bull River, based on Physical Habitat Simulation (PHABSIM) modeling conducted by the U.S. Geological Survey (USGS) (Maret et al. 2005, 2006, Sutton and Morris 2004, 2005). Four USGS reports were obtained that assessed the effect of streamflow on adult bull trout passage, adult habitat availability, and spawning habitat availability (Maret et al. 2005, 2006, Sutton and Morris 2004, 2005). One report also included data on juvenile habitat availability (Sutton and Morris 2004). The reports provided data from numerous streams in central Idaho within the 7Q10 flow range of bull trout occupied streams in the Action Area.

The studies used the PHABSIM model to assess habitat/discharge relations for bull trout at different discharges. PHABSIM is a major component of the Instream Flow Incremental Methodology. Model results from the report appendices were combined to establish relationships between stream discharge and habitat and applied to an assessment of potential flow reductions in the FSEIS at locations for the mouths of Rock Creek and the Bull River, and the mouth of East Fork Bull River.

The Forest shall evaluate the PHABSIM and WUA literature noted above (Maret et al. 2005, 2006; Sutton and Morris 2004, 2005; and Sutton and Morris 2004). The Forest shall use FEIS 7Q10 flow reduction estimates for the mouth of Rock Creek, Bull River and East Fork of Bull River to project changes in critical fish passage depths for large fluvial bull trout, while recognizing that these adults may not always move at this low flow period.

Secondly, the Forest shall prepare for the next set of adaptive management PHABSIM model runs once more specific data are available at the end of Phase I. It is expected that these flow change estimates will be more reliable and will be available at more locations than just the three evaluated in Phase I, especially known locations important to bull trout spawning and rearing. If flow reductions are greater than generally anticipated in Phase I then use PHABSIM methodologies and models to make refined effects predictions for bull trout spawning and rearing.

Issue: The FSEIS fails to analyze the predicted mining-induced baseflow reductions on bull trout populations and habitat.

Response: The FSEIS disclosed potential effects of baseflow reductions on bull trout in Section 4.13.3.1. Reduction in baseflow could increase the length of impassable stream reaches as well as the frequency and/or duration that existing passage restrictions occur. This impact would be less severe for resident bull trout that are generally smaller and therefore able to pass through narrower and shallower restrictions. As described in Section 3.13.2.2, Resident and Migratory Life Histories, migration barriers may be beneficial to resident bull trout populations such as those predominantly found in the Rock Creek drainage, but detrimental to migratory bull trout (SEIS, p. 4-161).

Baseflow reduction may also indirectly affect bull trout habitat and migration by reducing flows through alluvium and stream substrates, affecting spawning habitats and egg incubation that depend on localized areas of groundwater upwelling to provide fresh flowing water over redds. However, potential changes in localized movement from groundwater to surface water cannot be identified from model-predicted baseflow changes (SEIS, p. 4-161).

The rationale for the qualitative assessment of effects to bull trout due to changes in water quantity and the difference in approach between Montanore and Rock Creek is described in 2 memos prepared by the KNF: 1) *Discussion of Groundwater Modeling and Analysis of Potential Impacts from Changes in Water Quantity for the Rock Creek and Montanore Project* (KNF 2014a), and 2) *Rock Creek Project Analysis Process for Effects to Bull Trout from Changes in Water Quantity and ESA Compliance*, which are adequately summarized in the FSEIS as presented below.

As discussed in Section 4.13.8.1 of the Draft SEIS, RCR has implemented or would implement the Terms and Conditions 2007 BO Supplement (Appendix E of the Draft and Final SEIS) and any subsequent BO Supplements provided by the FWS. These Terms and Conditions are considered appropriate to minimize impacts of incidental take of bull trout. The Conceptual Aquatics and Fisheries Monitoring Plan in Appendix K of the Draft and Final SEIS would be refined prior to Phase II construction, as described in the Terms and Conditions in the 2007 Supplement to the 2006 BO (2007 BO Supplement), would include a metal monitoring plan and groundwater monitoring plan. The FWS would participate as an advisor, as needed, on issues related to water resources, aquatics, and fisheries monitoring and would have approval authority for the Water Resources and Aquatics and Fisheries Monitoring Plans (FSEIS Appendix S, p. S-201).

Hydrometric's model report stated that "a predictive quantitative assessment of potential impacts for the Rock Creek Project will require further detailed hydrogeologic characterization during the development of the Phase I Evaluation Adit. Until that work is complete, the ability to conduct a conventional calibrated modeling analysis is limited as key hydrologic characteristics of the groundwater system cannot be verified in the immediate ore body area." The model report also

says that additional hydrologic characterization in the ore body area during the Phase I will refine the model input assumptions, narrow the uncertainty in the analysis of potential impacts and clarify the need for specific mitigation measures. Until the model was refined and impacts to streamflows near the ore body were quantifiable, a wetted useable area analysis of possible habitat changes cannot be completed (FSEIS Appendix S, p. S-200).

Issue: The Forest fails to demonstrate that fish passage restoration in the Lower Clark Fork bull trout core area has not occurred as the agencies anticipated when FWS issued the 2006 Rock Creek Mine BO and the 2007 Supplement.

Response: As part of the Clark Fork Settlement Agreement, restoring connectivity by providing fish passage is a mandatory condition on Avista's Cabinet and Noxon Dam projects, and Avista has a staff dedicated to implement the trapping and transport programs. Fish passage activities completed by Avista to mitigate obstructions to passage and to implement the Clark River Native Salmonid Restoration Plan include adult capture and upstream transport of fish to appropriate tributary streams based on genetic assignments, juvenile trapping and downstream transport, radiotag tracking, and fish abundance monitoring and redd surveys, all of which are ongoing. Additionally, outstanding issues for the construction and operation of the Cabinet Gorge Permanent Fish Passage Facility are being worked on by representatives from Avista, Montana Fish, Wildlife, and Parks, Idaho Fish and Game, and FWS.

Instructions: I am instructing the responsible official to add a discussion in the cumulative effects section, FSEIS Section 4.11.8, regarding Avista activities, specifically the fish passage program and outcomes. Describe outcomes in terms of the program's original projected benefits and an accounting for how these benefits have been realized during the intervening period (2007 to 2017).

Subsidence

Issue: The risk of subsidence has not been sufficiently analyzed in the FSEIS.

Response: In 2005, two sinkholes developed above the Troy Mine. In 2012, previously unknown evidence of trough subsidence was observed above the Troy Mine. Subsidence risk was identified as a potential concern for the Rock Creek Project.

Mitigation measures outlined in FSEIS page 2-24-25 and the Failure Modes and Effects Analysis (FMEA) were a product of a collaborative effort by experts in underground mines and mine design from the Forest Service, ERO Resources Corp. (ERO), and Agapito Associates, Inc. (AAI). National Institute for Occupational Safety and Health (NIOSH), although not part of the collaboration, presented pillar design concepts and recent research results which were considered in the FMEA and development of mitigation measures by this group of collaborators. Risk is the product of likelihood and consequence: The likelihood and consequence of the underground failure modes were assessed and categorized. The subsidence risks identified in the FMEA were low or inconsequential after the mitigation measures were applied.

The baseline data and methods used are adequate to evaluate and disclose adverse effects on resources in the analysis area potentially affected by geotechnical issues, and to enable the decision maker to make a reasoned choice among alternatives. The Forest used the best available geologic and geotechnical information from the analysis area to perform a FMEA. The FMEA identified contributing factors or "failure modes" that could lead to subsidence affecting the environment. In the FMEA conducted for subsidence, seismic activity was not identified as a

failure mode. It is known that ground motions induced by seismic events at the surface are amplified, sometimes considerably, compared to those measured underground (Aydan, O. et al 2010), hence the forces acting on surface structures are greater than those underground. For this reason in part, earthquake analysis has customarily not been included when evaluating underground mining operations. However, unlike the available body of research and the empirical and numerical means for evaluating the effects from earthquakes on surface structures, the same level of attention has not been directed toward the effects on underground mines. Quantifying the incremental amount of dynamic loading to mine pillars from a seismic event would require numerous assumptions. That said, one means of countering any additional stress to pillars would be to increase pillar size.

The FMEA also identified mitigation measures that would reduce and help manage the risk. The design review and approval requirements explicitly address the Troy Mine subsidence in an effort to avoid similar occurrences at Rock Creek. The Rock Creek project proposal took into account the Troy Mine subsidence (SEIS pages 4-21 to 22) and developed mitigations in light of the assessments of the Troy Mine subsidence. The mitigation to fund biannual surveys of underground workings by an independent underground surveyor was also developed in response to the observed subsidence at the Troy Mine.

For the Rock Creek Project, the currently available information on paste backfill does not represent any significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts, as described by 40 CFR 1502.9(c)(1)(ii). The use of cemented paste backfill at the mine proponent's other operations such as Green's Creek and Lucky Friday is required because it is a key part of the mining methods employed at those operations (long-hole stopping with cut and fill methods, and cut and fill method, respectively), which differ substantially from the method that would be used to mine the Rock Creek deposit.

Based on the record, I find the responsible official adequately considered the risk of subsidence and is consistent with NEPA and APA by taking a hard look at environmental effects needed for reasoned decision making. The FSEIS (p. 2-24-25 and Appendix Q) outlines environmental effects through the FMEA evaluation and mitigation measures relative to subsidence risk. FSEIS Appendix K displays monitoring plan for subsidence risk. With mitigation measures during both phases of the proposed project, subsidence risks identified in the FMEA are low or inconsequential.

Tailings Stability

Issue: Analysis of the tailings facility is inadequate.

Response: The FSEIS provided analysis and identified effects with respect to the stability of the paste tailings facility. The risk assessment (FMEA) was completed for the tailings facility and included in the FSEIS. The assessment identified risk (likelihood and consequences) of possible failure modes for specific components of the design and provides mitigations to manage and reduce the risk of failure. The tailings facility design features remain the same, as do the failure modes and consequences; the passage of time does not negate the validity or relevance of the FMEA. In addition, the FSEIS discusses the use of a third party technical experts and a Technical Advisory Group to review and help insure the adequacy of the engineering analysis of the tailings facility prior to construction.

Concerns about the glaciolacustrine soils in the tailings area adequately discussed in Section 3.5.4.3 of the FSEIS and Appendix G of the 2001 FEIS included discussions of the

glaciolacustrine clays in the tailings area. Section 2.3.1.7.1 of the FSEIS was revised to explain that in Alternative V, lacustrine material would be removed from beneath the structural fill zone and buttress areas shown in Figure 2-8 to increase structural stability, and to allow for installation of a foundation drainage and seepage interception system. The FMEA summarized in Section 4.6.2.4 of the FSEIS and described in detail in Appendix P of the 2001 FEIS included foundation failure as a possible failure mechanism and recommended engineering controls such as partial or complete removal of glaciolacustrine clays, construction of shear keys, installation of wick drains, and controlled loading during construction. The PTTAG described in Section 2.3.1.3.1 of the FSEIS would review potential construction mitigations as part of the final design process. Monitoring and mitigation measures, including collecting additional site specific field data to better define the extent of the clay layers, would be developed during the final design process.

The objector(s) are confused about the design of the paste tailing facility. Neither downstream nor upstream construction design would be used in Alternative V, the selected alternative in the draft ROD. The upstream and downstream construction techniques depicted in Figure 2-3 of the 2001 FEIS apply to impoundments where the tailings would be deposited as a slurry, and where the embankment, whether constructed in an upstream fashion or a downstream fashion, would be composed of the coarse fraction of the tailings and would be impounding water. In Alternative V, the Rock Creek Project, tailings would not be a slurry separated into coarse and fine fractions as it is deposited. Instead the tailings would be deposited as a paste.

The failure of the tailings underdrains was recognized as a possible failure mode in the FMEA (2001 FEIS). The mitigation identified in the FMEA is to address underdrain functionality through engineering designs as an objector suggests.

Issue: The seismic analysis should be based on a 10,000-year earthquake event rather than a 2,500-year earthquake event.

Response: We discussed this issue during our resolution call. The recently modified tailings design requirements under the Metal Mine Reclamation Act provide for using the larger of ground motions generated by either 1) the Maximum Credible Earthquake (MCE) or 2) the 1-in-10,000-year event. However, neither the U.S. Geological Survey (USGS) nor other scientific sources have published a map or estimated peak ground acceleration (pga) for the 10,000 year event. The 2001 FEIS estimated the MCE-generated pga at 0.16g. The 2017 FSEIS disclosed that in 2008 the USGS updated its seismic hazard maps for the northern Rocky Mountain Region and revised the estimate of pgas for various seismic events. Based on these updated maps, a more conservative estimated pga for the Rock Creek site of 0.19g was used in the 2017 FSEIS.

As the draft ROD explains, the Forest further addressed this issue by providing that the paste tailings facility design will undergo additional stability modeling as more information (e.g., paste laboratory tests, seismic conditions) is gathered. The final design process will include an updated stability and deformation analysis using any new available information, and an independent review by the Paste Tailings Technical Advisory Group. The design, construction, operations, and closure of the paste tailings facility must conform to the requirements of the MMRA for tailings storage facilities. These requirements include an analysis showing that the seismic response of the tailings storage facility will not result in the uncontrolled release of impounded materials or other undesirable consequences when subject to the ground motion associated with the 1-in-10,000-year event, or the maximum credible earthquake, whichever is larger. Ongoing stability evaluations during various stages of project development are a common practice, and the Forest will follow a similar design evaluation process.

Issue: The analysis fails to consider the issue of paste backfill into the mine.

Response: The Forest Service did not reject paste backfill as an alternative solely because it would result in a lower rate of return for the applicant as suggested by an objector. The FSEIS expressly found that "*[p]aste backfill would not offer any significant environmental advantages over alternatives considered in this SEIS. . . .*" (p. 2-123). The Forest properly considered and rejected further review of this alternative on the basis that it did not provide greater environmental benefits to alternatives already considered, in addition to increasing project costs. The Forest also rejected reconsideration of this alternative because it found there are technological limits on using paste backfill that would restrict or prohibit its use at Rock Creek.

Issue: The analysis failed to assess the risk of passing trains on pasting facility stability.

Response: Again, this is another issue we discussed during our resolution meeting. My findings are the potential effects to the paste tailings facility from passing trains were not specifically addressed in the 2001 FEIS for three reasons: 1) the effects of such vibrations are typically so small compared to the design seismic event (maximum credible earthquake or the 1-in-10,000-year event) that they are not considered in slope stability assessments, 2) the issue was not raised as an issue during scoping, and 3) train vibrations were not identified as a specific failure mode during the Failure Modes Effects Analysis risk assessment (Appendix P of the 2001 FEIS). However, the FMEA did consider a variety of failure modes that might cause deformation or failure of the tailings paste facility including seismic shaking and recommended appropriate mitigation that would apply regardless of the failure mode or cause.

To provide some context for the possible effects of train traffic on the paste tailings facility stability, the Forest reviewed the analysis in Appendix F of the Draft Supplemental Environmental Impact Statement for the Tongue River Railroad Company, Inc., Construction and Operation of the Western Alignment (Womack and Associates, Inc. 2004). The investigation included measured peak ground acceleration 25 feet from a BNSF rail line, which was 0.02g, well below the pga of 0.19g of the design earthquake discussed in response to Issue 6501. The Rock Creek paste tailings facility would be over 1,000 feet from the BNSF rail line and the peak ground acceleration of passing trains would be less at the paste tailings facility than at 25 feet. The report goes on to say of train-induced ground vibrations, "...the effects of such vibrations are so small that it is not standard practice in the geotechnical engineering professional to consider vibrations generated by rail and highway traffic in slope stability assessments of this type." A new section, 4.6.2.3.3, was added to the FSEIS to address this issue.

Wilderness

Issue: General concerns with overall project effects to the Cabinet Mountain Wilderness and wilderness character.

Response: The Wilderness Act stipulates how Federal agencies are to administer mineral activities within wilderness areas. Forest Service policy is to approve exploration and development of valid mineral rights in wilderness only after ensuring that mineral operations contain stipulations to protect wilderness character consistent with the rights of the mineral owner or operator under the Wilderness Act (FS Manual 2323.7). Forest Service policy is to preserve the wilderness resource to the extent possible: The project follows Wilderness Act requirements.

Section 4.17 of the FSEIS updates the environmental consequences to wilderness as first evaluated in the 2001 FEIS. The primary direct effect to the wilderness resource would occur if an air-intake ventilation adit is needed for mine ventilation during Phase II. This would result in a new surface disturbance within the wilderness. No air intake is needed for Phase I activities. The analysis is clear that other wilderness characteristics may be directly and indirectly adversely affected by mineral development. The project outlines a number of stipulations and mitigations to address these concerns, while clearly recognizing that effects to the wilderness resource cannot entirely be avoided.

Conclusion

My review finds the Forest Service has analyzed project activities and disclosed effects, and has complied with applicable law, policy, and the Forest Plan. I have in several instances instructed the responsible official to clarify information presented in the analysis. I have also determined the responsible official will only approve Phase I of project activities. My review constitutes the final administrative determination of the Department of Agriculture; no further review from any other Forest Service or Department of Agriculture official of my written response to your objection is available (36 CFR 218.11(b)(2)). The responsible official may sign the Record of Decision to approve a Plan of Operations for Phase I of this project once my instructions have been followed. A decision on whether to approve Phase II is held in abeyance but may be made once all requirements of Phase II initiation have been met, as described in the draft ROD (heading 1.4.1.2).

Sincerely,

David E. Schmid
Deputy Regional Forester

cc: Ray G. Smith
Chris Savage