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June 18, 2014

RE: Thompson Creek Mine Draft Environmental Impact Statement: Mine Expansion, 404 Permit, Land Use Plan Amendment, and Federal Land Disposal

Thank you for considering our comments on the Thompson Creek Mine Draft Environmental Impact Statement: Mine Expansion, 404 Permit, Land Use Plan Amendment, and Federal Land Disposal submitted on behalf of the Idaho Conservation League and the Mineral Policy Center.

Since 1973, the Idaho Conservation League has worked to protect and Idaho's clean water, wilderness, and quality of life through citizen action, public education, and professional advocacy. The Idaho Conservation League has a long history of involvement with mining and water quality issues. As Idaho's largest statewide conservation organization, ICL represents members from around the who have a deep personal interest in ensuring that mining operations and reclamation are protective of our land, water, fish, and wildlife.

We have a long history of involvement in the TCM DEIS. Our members use the surrounding and downstream areas for hiking, hunting, fishing, camping, boating, botanizing and enjoy touring the area. We have toured the project site several times on the ground, flown over it, and toured the Broken Wing Ranch as well. We appreciate the Thompson Creek Mine Company and the BLM for having hosted us on the site visits. We have three main concerns regarding the EIS and have specific recommendations to address these should the project proceed.

Earthworks is a national non-profit organization dedicated to protecting communities and the environment against the adverse impacts of mineral development. Earthworks has a long history of engaging in hardrock mining issues in Idaho and on federal public lands nation-wide, and we seek to promote responsible mining practices that protect public health, fish, wildlife, and clean water.

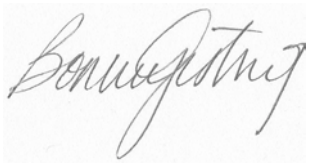
Our primary concerns with these proposals relate to the long-term protection of water quality. We want to ensure that the water treatment plant and related infrastructure are properly engineered, that funding is available to cover costs as long as treatment is needed, and that the entities in charge of the financial mechanism have the necessary regulatory authority. We believe that the bonding calculations need to be part of the NEPA analysis and that a broader discussion of the regulatory framework is needed.

We are also concerned about the lack of alternatives in the DEIS with respect to primary issues. This is an extremely complex project with many complicated and interacting variables. We point out that the Blackfoot Bridge Mine had 3 different action alternatives that were fully developed and 15 other alternatives that were considered but not fully developed. Other examples of EIS documents, with a more full range of alternatives, include the Montanore Mine SDEIS in Montana, which included three fully developed mine alternatives, and another four alternatives for location of the transmission line, and the Rock Creek Mine (SDEIS), which included four fully developed alternatives, and multiple alternatives that were evaluated, but not fully developed. Additional alternatives are required because the modeling provided in the EIS predicts spikes of a variety of Contaminants of Concern (COCs) in Thompson Creek, Squaw Creek or the Salmon River under a range of flow conditions and for prolonged periods of time that would result in numerous violations of Idaho's antidegradation and/or federal Clean Water Act regulations (CWA Section 313 and 228). In our own scoping comments, we had suggested that the BLM develop additional alternatives that are more protective of water quality in both near and long term and that will further minimize the need for post-closure water treatment. We believe that there are lessons learned from the Blackfoot Bridge mine that may be pertinent here and that a further discussion of covers, caps, and Geosynthetic Clay Laminate Liners is needed. In addition, the long-term stability of the Tailings Storage Facility is of tremendous concern to us and we believe that additional clarification and analysis is needed here. As all the proposed action alternatives result in Water Quality Standard exceedances or degradations of Tier II streams, the BLM needs to develop alternatives that are actually consistent with state and federal regulations.

Third, we believe that additional analysis is needed on how the Broken Wing Ranch may be managed under BLM administration. We believe there is potential for meaningful public benefits but that significant restoration work will first be needed in order to realize these.

Our specific comments are below. We would also appreciate the opportunity to discuss our comments with the BLM at your convenience. Please keep us on the mailing list for all public notices regarding this proposal. We are hoping to tour the project area on July 14, 2014. Let me know if BLM staff are available to join us.

Sincerely,



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Idaho Conservation League and Earthworks comments on the Thompson Creek Mine Environmental Impact Statement: Mine Expansion, 404 Permit, Land Use Plan Amendment, and Federal Land Disposal

Development of Alternatives for the Modified Mine Plan of Operations

Need for additional alternatives
The BLM analyzed only two action alternatives for the Modified Mine Plan of Operations, M2 and M3, with the difference being the development of an additional mine waste rock storage facility (waste rock dump) in No Name Creek in Alternative M2. This alternative was developed because of the potential cost savings of utilizing a closer dump area and one that is down gradient for haul trucks. This alternative would also reduce the final size of the Pat Hughes and Buckskin dumps which are already in use and have the capacity to expand. However, a new waste dump as described in M3 would adversely impact an undeveloped valley, bury an additional 5,563 feet of waters of the United States in No Name Creek and require significant new infrastructure for water management that would need to be maintained. As such, we do not support M3. We note that this alternative does little to address the suite of pertinent issues raised by the BLM on page 1-26 to 1-38 and that the effects comparison table ES-1 shows very few differences between Alternative M2 and Alternative M3. In fact, we note that the Thompson Creek Mining Company's Clean Water Act Section 404(b)(1), Appendix 2A) states the following:

> In comparing the two action alternatives (M2 and M3), neither stands out as the least environmentally damaging practicable alternative (LEDPA) for the tailings impoundment expansion element of the proposed action. Since all of the alternatives would result in similar impacts, but Alternative M2 has fewer wetland and stream impacts than the Alternative M3, M2 is the preferred alternative. (Thompson Creek Mining Company Clean Water Act Section 404(b)(1) Alternatives Analysis, page 1, January 2014, DEIS Appendix 1.)

The BLM identified 17 major issues related to the MMPO (Modified Mining Plan of Operations) and indicators related to each so that the BLM could assess the significance of the potential effects:

- Irretrievable loss of the mineral resource
- Soil resources
- Vegetation patterns and productivity
- Livestock grazing
- Long-term changes to quantity and quality of surface water or groundwater
- Effects to terrestrial wildlife, special status species and Management Indicator Species
- Bull trout, Chinook salmon, steelhead trout, sockeye salmon and their critical habitat
- Effects to wetlands, floodplains and riparian areas
- Air quality effects
- Visual (aesthetic) resources
- Recreation and public access
- Effects on local, State and national economics from decreased production or closure of the mine
- Adequacy of current reclamation bond

- Tribal treaty rights and interests
- Cultural resources
- Potential for molybdenum spills
- Contamination of water, soil and air from chemical spills and disposal

In spite of having identified this list of pertinent, major issues, the DEIS does not present or develop alternatives to address any one of these issues beyond the proposed action alternative, M2. Alternative M3 appears designed primarily to address profitability. While economic practicality is a factor that the BLM should consider, the BLM is not mandated to develop the most profitable alternative for the company. As such, the BLM needs to develop additional alternatives to address the substantive issues.

In fact, NEPA regulations also require that environmental impacts "shall be discussed in proportion to their significance." 40 C.F.R. § 1502.2(b). "Significance" is measured in terms of context and intensity and includes "[w]hether the action threatens a violation of Federal, State, or local law or requirements imposed for the protection of the environment." 40 C.F.R. § 1508.27(b)(10). *See* WildEarth Guardians v. Salazar, 880 F.Supp.2d 77, 93 (D.D.C. 2012)(Section 1508.27(b) (10) requires that an EIS analyze compliance with "laws imposed for the protection of the environment"). *See also* Coal. on Sensible Transp. Inc. v. Dole*,* 642 F.Supp. 573, 590 (D.D.C.1986) (characterizing 40 C.F.R. § 1508.27(b)(10) as "requir[ing] consideration of whether a project threatens a violation of federal, state, or local environmental laws."), *aff'd,* 826 F.2d 60 (D.C.Cir.1987). The current action alternatives fail to comply with necessary water quality protective requirements.

We realize that alternatives need to be consistent with the project purpose and need, but believe that there are a suite of alternatives that simply have not been pursued. We point out that the BLM has a legal obligation to develop additional alternatives for the EIS. NEPA requires the agency to "study, develop, and describe appropriate alternatives to recommended courses of action in any proposal that involves unresolved conflicts concerning alternative uses of available resources." 42 U.S.C. § 4332(E); 40 CFR § 1508.9(b). It must "rigorously explore and objectively evaluate all reasonable alternatives" to the proposed action. City of Tenakee Springs v. Clough, 915 F.2d 1308, 1310 (9th Cir. 1990). Indeed, NEPA's implementing regulations recognize that the consideration of alternatives is "the heart of the environmental impact statement." 40 CFR 1502.14, *quoted in* Alaska Wilderness Recreation and Tourism Ass'n v. Morrison, 67 F.3d 723, 729 (9th Cir. 1995).

Alternative needed for a modified M1

The No Action Alternative, M1, refers to the completion of Phase 7, which was analyzed and selected in the previous EISs (1980 and 1999). The BLM also states that M1/Phase 7 will be modified in order to address the need to treat mine-affected water in perpetuity. These are conflicting mandates. Phase 7 specifically calls for the reclamation of infrastructure and lands, some of it related to water capture and treatment. However, both the BLM and the company realize the need to adjust the plan to facilitate post-closure water treatment and call for the retention of water management and treatment infrastructure:

> Active water treatment is not describe in the approved reclamation plan for Alternative M1, but would have to be incorporated into the current reclamation plan even if TCMC were to withdraw the proposed MMPO. That is, the approved reclamation plan requires discharged water to meet all applicable laws and regulations, and active water treatment would be required.

> Therefore, active water treatment (described in Section 2.1.3.6) is implicitly required. (DEIS Executive Summary, p. 2-3.)

We point out that the current reclamation plan does not address the issue of active water treatment and this factor was not evaluated in the 1980 or 1999 EISs. The changed conditions (mine-affected water) and the revision of the EIS/Reclamation Plan are still not adequately described in the current EIS, in violation of NEPA. 40 C.F.R. § 1500.1(a). NEPA requires the agencies to carefully consider detailed information concerning significant environmental impacts. By focusing agencies' attentions on the environmental consequences of their actions, NEPA "ensures that important effects will not be overlooked or underestimated only to be discovered after resources have been committed or the die otherwise cast." *Id*.

An additional alternative (M1B, for example) is needed to describe how M1A will be adapted to the new, changed circumstance of dealing with mine-affected water. How this issue is dealt with has the potential to affect public resources, including water quality, beneficial uses of waterways, and listed fish species, among others. A discussion of the bonding and financial mechanism for long-term water treatment is also needed as part of this analysis.

Alternatives related to AMD and metals
As one of the driving issues, the BLM should show how water quality issues such as acid mine drainage and exceedances of metals can be better addressed through additional alternatives. We are particularly concerned about the potential for exceedances in selenium, copper and cadmium which may adversely affect listed fish species such as Snake River steelhead and Chinook salmon. While individual exceedance events may be temporary, they are likely to reoccur again and again in perpetuity and perhaps worsen in intensity. We believe that a reinvestigation of caps, covers, liners, water diversions and interception/pumpback stations is warranted.

Alternatives needed regarding the minimization of fill material
40 CFR 230.10[a] states the following:

> No discharge of dredged or fill material shall be permitted if there is a practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences (40 CFR 230.10[a].

We appreciate using existing waste and tailings storage facilities instead of affecting undisturbed drainages, but we believe that some additional exploration of ways to reduce fill material is warranted. For example, using sand to backfill the waste rock buttress of the tailings facility may result in fewer impacts to upper Bruno Creek.

The EIS should disclose the failure rate of these mitigation measures, and how those failures will be addressed. For example, the EPA estimated potential water collection and treatment failure rates for mine seepage for a proposed porphyry mine, based on the track record of operating porphyry mines in its peer-reviewed Bristol Bay Watershed Assessment (USEPA, 2014):

> "Based on a review of historical and currently operating mines, some failure of water collection

> and treatment systems would be expected to occur during operation or post-closure periods. A variety of water collection and treatment failures are possible, ranging from operational failures that result in short-term releases of untreated or partially treated leachates to long-term failures to operate water collection and treatment systems in perpetuity. A reasonable but severe failure scenario would involve a complete loss of water treatment and release of average untreated wastewater flows into average dilution flows."
>
> "Reviews of mine records found that 93% of operating porphyry copper mines in the United States reported a water collection or treatment failure (Earthworks 2012). Improved design and practices should result in lower failure rates, but given this record it is unlikely that failure rates would be lower than 10% over the life of a mine. During operation, failures should be brief (less than 1 week) unless they involve a faulty system design or parts that are difficult to replace."

Given the record of seepage collection and treatment failures at other operating porphyry mines in the U.S., the EIS should fully evaluate the potential impacts to the resource from this failure mode, and mitigation measures should be incorporated into the project and reflected in the financial assurance.

Alternatives related to increasing the long-term stability of the Tailings Storage Facility
We note that the BLM dismissed an alternative which would have used Type 1 (non-reactive) waste rock to buttress the tailings storage facility embankment. This alternative would help decrease the steepness of the face of the "sand dam" tailings impoundment and help stabilize the structure. However, this alternative was dismissed because the Type 1 waste rock that would be used is in limited supply and is needed to reclaim the Pat Hughes and Buckskin Waste Rock Storage Facilities. We point out that the BLM has not considered alternative covers and caps for the waste dumps that may reduce the amount of Type 1 waste rock needed to provide a relatively impermeable cover.

The BLM states that the stability of the sand dam is not an issue. While the likelihood of a catastrophic failure may be relatively low, the environmental costs of a collapse would be extremely high and are not covered financially under any proposed scenario. We are concerned about the potential liquefaction of the sand dam during large-scale seismic events. We point out that this area is seismically active and that the sand dam will be a feature on the landscape for millennia. The fact that some land management agencies also mentioned this during the scoping period means that this is a shared concern. A collapse would lead to both massive sedimentation issues in the Bruno and Squaw Creek drainages and into the Salmon River, smothering riparian areas, listed fish species and their critical habitat. The displaced material would be distributed on top of the streambed, riparian areas and access roads over a considerable distance, making clean up extremely difficult. Reconstructing a proper storage facility and rehandling the material would be exceedingly expensive. In the interim, the material from the sand dam embankment would present acid generation issues.

In disregarding a buttress alternative, the BLM also mentions the lack of sand to fill the area behind the buttress. We point out that the proposed action would increase the final reclaimed height of tailings impoundment by 96 feet, implying that there is no shortage of material. The BLM also mentions the higher capital and operation costs for this alternative. Again, while practicality and short term cost need to be considered, so do long-term costs in the event of a catastrophic failure in the tailings facility. The BLM also dismisses this alternative because it would entail disturbing substantial new area, but this did not prevent the BLM from developing alternative M3 which would also disturb a

substantial new area. We point out that the area that would be disturbed is already impacted by the Seepage Return Dam and is not a high priority for stream restoration.

Alternatives relating to isolation of Waste Rock Storage Facilities
The proper closure and subsequent management of waste rock dumps covers several issues, including water quality, fisheries, wildlife, wetlands, water treatment needs, water treatment costs, adequacy of bonding, and Tribal treaty rights. The quantity and quality of water seeping from the waste rock dumps and affecting the above issues can be directly related to the amount of meteoric water allowed to infiltrate the dumps and exit via the toe of the dump or seep into the groundwater. Technologies regarding cover and cap designs has improved greatly in the last several years. For example, geosynthetic clay laminate liners (GCLLs) appear to provide substantial benefits over previous designs. In fact, we specifically mentioned GCLLs in our scoping comments.

According to the Blackfoot Bride FEIS, the GCLL cover system for the Blackfoot Bridge Project is comprised of the following materials (from surface to base):

> 18 inches of topsoil;
> 1 foot of weathered alluvium cover material;
> Approximately 6 inches of drainage/protective layer material (actual thickness is dependent On slope and aspect);
> Geosynthetic Clay Laminate Liner;
> 6 inches of a protective sub-grade layer (weathered alluvium or other earthen material); and
> Run of Mine (ROM) overburden.
>
> The GCLL itself includes a thin layer of powdered sodium bentonite clay sandwiched between two geotextile layers. A geotextile is a woven or nonwoven sheet material that is resistant to penetration damage. The top geotextile layer is laminated with a polyethylene geomembrane layer, providing an additional layer of protection (hence the name, Geosynthetic Clay Liner Laminate). Federal Register Volume 74, Number 156 (Friday, August 14, 2009)] [Pages 41157-41158] [FR Doc No: E9-19416].

We realize that each project is unique and that technologies that work for one project may not be directly applicable to others, but we believe this is a relevant issue in this case. The BLM needs to develop alternative(s) concerning caps, covers and impermeable layers for waste rock storage facilities and examine the need to further stabilize the tailings facility so that it can withstand significant seismic events beyond the foreseeable future. We are also concerned that the tailings facility currently leaks small but unquantified amounts of water into groundwater with small but unquantified effects on water quality. The EIS needs to provide additional information on the current and future trends and ways to address this as needed.

Alternative related to liner/groundwater control for the Pat Hughes Waste Rock Dump
Alternative M3 anticipates increased flow from the Pat Hughes waste rock dump into the shallow aquifer. This is largely due to the fact that the layer of relatively impermeable Challis volcanics which is beneath the existing waste rock dump does not extend out underneath the expanded waste rock boundary (Figure 4.6-5). Without this geologic liner, meteoric water and groundwater traveling

through the waste rock can more easily enter the metasediment layer and the aquifer, bringing with it mine contaminants. Although the planned cutoff trenches are expected to capture much of the water, some water will still seep around these intercept points. Long term predictions for M3 show the possibility of spikes on copper concentrations that exceed CCC values and these intermittent exceedances are expected to occur in perpetuity with potentially detrimental impacts to listed fish species at some scale.

The EIS states that capping is not expected to alter the behavior of the affected seepage or performance of cutoff walls within the groundwater systems below these facilities (EIS p. 4-34) but provides no analysis of this reasoning. We note that the proposed for the Pat Hughes waste dump would be a slightly different design than the one at Buckskin to further reduce water infiltration (EIS p 4-55). The BLM should analyze additional alternatives to address this issue. Possibilities include reengineering the waste rock facilities so that their boundaries are constrained by the ability to contact the volcanics, moving some of the volcanics underneath the Phase 8 expansion, placing an impermeable clay-based liner underneath the footprint of the waste rock in advance of waste rock construction, or placing an array of groundwater-intercept pumps (in addition to PW 13, 14, 15) beyond the toe to capture this contaminated seepage.

Alternative relating to backfilling pits and other disturbed areas
We also recommended developing an alternative in which the tailings and/or waste rock are relocated back into the main pit (or other geologically stable area). While rehandling this material would require additional expense, the BLM should compare this with the cost of dealing with a catastrophic dam failure, renewed acid generation, and effects of downstream public health and fisheries issues. The BLM initially dismissed this alternative because of cost issues but did not analyze the potential cost-savings benefits and reduced environmental risks.

Alternatives related to the long-term water treatment plant and waste rock design
The DEIS is unclear with regard to how and where mine-affected water will be treated post-closure:

> TCMC would either construct a long-term water treatment facility or modify the existing process water treatment plant. (EIS p. ES-4).

Water treatment is one of the major unresolved issues related to this project and the outcome will affect the environment of the area beyond the foreseeable future. The details regarding water treatment will also determine the ultimate cost for long-term water treatment and the adequacy of the financial mechanism needed so that taxpayer dollars are not needed. It appears that both construction of a new long-term water treatment facility and the modification of the existing water treatment plant are viable options, but a more detailed analysis is needed with respect to cost, efficacy, long-term viability, maintenance, power needs, ease of repair, filter removal, pond mucking, waste disposal, treatment methods (passive vs. active), replacement schedule, upgrades, staffing needs, etc. It is not even clear what entity would maintain the TCM Access Bridge which may be necessary to replace or upgrade water treatment infrastructure into the future. In addition, the BLM should develop alternatives regarding the design and engineering of the waste rock and tailings facilities to see if the quantity of water contacting mine waste and needing treatment can be further minimized.

In the environmental review of a proposed copper porphyry mine, the EPA highlights the uncertainties associated with long term water treatment systems for mines, saying, "Seepage and leachate monitoring and collection systems, as well as the WWTP, might need to be maintained for hundreds to thousands of years. It is impossible to evaluate the success of such long-term collection and treatment systems for mines. No examples exist, because these timeframes exceed both existing systems and most human institutions." (USEPA, 2014)

The EIS should evaluate the potential impacts from water treatment system failure, and provide alternatives that evaluate additional mitigation measures to ensure that contaminated water isn't released in the event of a water treatment plant failure, and that financial assurance is in place to cover the full cost of these back-up systems, regular replacement of water treatment systems during post-closure, etc.

This facility is going to need to be fully functional for centuries in order to protect public resources, and, even, then, failures are likely:

> …[T]he water management system consists of a series of collection points, pipelines, pump stations, and treatment plants. These facilities, during operations of 100s of years or more, could be subject to equipment failures (e.g. pipeline rupture), human error (e.g., a valve improperly opened), or extended power outages (e.g., earthquake damages to the regional electricity grid). Such problems may be inevitable over the course of 100s of years or more, and could result in the release of untreated water to the environment.
>
> It s not possible to predict how such problems would occur or what the consequences would be, as such would depend on what water was released, where and how much water was released, and the duration and timing of release. However, in the worst case, the release of untreated water could cause exceedances of acute WQSs in sections of Thompson Creek, S. Creek, and Bruno Creek. There would be no material difference in such risk (probability and consequence) between Alternative M1 and Alternative M2 for which waster with similar chemistry would be treated by slightly different facilities. (DEIS, p. 2-50 to 2-51).
>
> Unanticipated problems with the water management system, particularly the collection and transportation of mine-affected water from Buckskin Creek and Pat Hughes Creek to the treatment system could lead to exceedances of WQS (with exceedance of the selenium standard being the most likely) and potential effects to aquatic life in Thompson Creek. (DEIS . 4-101).

The current two action alternatives offer the public no difference between the end results of a treatment failure in the future, as there is are material differences in the probability of consequence of these risks. As such, the EIS has failed to develop meaningful alternatives regarding the most significant environmental risk. We appreciate the commitment from TCMC "to implement and maintain, in perpetuity, whatever types of treatments are needed to maintain ambient water quality in the Salmon River" (EIS, p. 4-103) but the BLM needs to design alternatives so that the need for these treatments are minimized and that water quality is also protected in tributaries such as Thompson Creek and S. Creek. The public deserves an opportunity to review and compare alternatives for the probability and consequence of future water contamination. The selected alternative should do the best job of protect public resources far into the future.

Care and Maintenance Procedures need to be developed for each alternative
In the event of a short-term halt to mining or suspension of production, "care and maintenance" procedures need to be spelled out for each alternative. This temporary suspension does not fit the category of daily operations or the category of reclamation and closure. Major pieces of infrastructure need to be retained and maintained for future start up, but daily procedures such as water use for milling and dust control may be discontinued. As such, the BLM needs to describe how water balance will be affected, how capture, treatment and disposal of water will be affected, and what level of work force is needed to assist in site management. We point out that approximately 2,500 gallons per minute of water are currently used during operations but it is unclear what quantity would be used during "care and maintenance." This "Twilight Zone" of mine management leaves many uncertainties that are best addressed in advance of the actual event. Because different alternatives may have different ways of managing water balance or treatment, care and maintenance procedures should be spelled out for each alternative.

The maximum duration of care and maintenance before reclamation is triggered needs to be described. We note that the Idaho Cobalt Project on the Salmon-Challis National Forest is in a "care and maintenance" phase, although the mine was only partially developed. The Forest Service and the mining company, Formation Capital, may well have different opinions on when to "pull the plug" and have the disturbed areas reclaimed and soil productivity restored.

Review of the original 1980 and 1999 EIS
The EIS presents a unique opportunity to review changed conditions since the original 1980 and 1999 EIS. These analyses had underestimated the negative impacts to water quality, the time of onset of these impacts, the duration of these impacts, and the final reclamation and water treatment costs. These analyses also overestimated the effectiveness of measures to avoid, minimize and mitigate these problems. In the intervening time, TCMC made plan modifications and adapted to these changed conditions by developing an integrated water management and treatment system. We believe the BLM has an obligation to the public to review the history of site, disclose the past challenges in making accurate predictions, describe how the BLM and TCMC adapted to new conditions, disclose the assumptions and uncertainties with the present analysis, and describe how these issues are being addressed in the present analysis. The EIS states that the probably effects of the mine on the natural flow of Buckskin and Pat Hughes Creeks was described in the 1980 EIS, but the EIS does not state what those predicted effects were and what the actual results were. We present excerpts from the Comparison of Predicted and Actual Water Quality at Hardrock Mines (Appendix A) and EPA's Technical Document on Acid Mine Drainage Prediction (Appendix B). We believe the BLM should review these documents as part of this analysis and specifically describe how these issues are currently being addressed and will be managed into the future through the different alternatives.

Acid Mine Drainage
We note that the BLM refers to the term Acid Rock Drainage instead of Acid Mine Drainage (DEIS, p 3-50). Acid Rock Drainage usually refers to natural situations where naturally exposed sulfides lead to decreased pH; whereas Acid Mine Drainage usually refers to manmade situations where mining activities have increased the exposure and/or surface area of ore, waste rock or tailings resulting in acid generating conditions. We believe that the situation at the Thompson Creek Mine is best described as Acid Mine Drainage. We also note that the discussion of Acid Rock Drainage on p. 3-50 contained no

information on how this phenomenon was related to Thompson Creek Mine and this should be corrected. In a separate chapter, the EIS does note that lowered pH and increased metals from Acid Rock Drainage can be acutely toxic to aquatic life. The EIS also mentions that mixtures of metals can have interactive effects with potentially increased toxicity (EIS p. 4-104).

To address acid-mine drainage issues, waste rock and ore need to be more carefully evaluated, segregated and handled. We note that the BLM anticipates increasing acid generation in the face of the tailings storage facility (EIS at p. 4-34) and at Pat Hughes dump. We note that the sulfate levels in the tailings pond, MW10 and the Main Drain all exceed Idaho groundwater standard. We believe that additional design features need to be developed to reduce or reverse this trend rather than simply relying on the water capture and treatment system. A limited number of samples was collected (only one sample was collected form MW10 in 2010) and the BLM needs to provide a diversity of samples at different flow rates or times of year. Redundant water capture systems need to be in place in the event that water contamination continues to be an issue. Waste rock pits need to be covered (we suggest geosynthetic clay liner laminate as one option) and double-lined with water capture, pumping and treatment capabilities. In addition, redundant downgradient water capture systems should be developed.

Water Balance

The DEIS states that the mine currently uses 2,500 gallons per minute for various mine operations. It is unclear how this volume of water is going to be handled post-closure. We believe that there are opportunities to redirect much of this flow around waste rock and tailings facilities into natural stream channels for improved fish habitat. However, the increased flows may prose additional challenges related to preventing seepage into waste rock and tailings facilities. The BLM needs to provide more information on how the pros and cons of post-closure water flows will be handled.

Regulatory environment

Different management scenarios

As noted in our scoping comments, an aspect that the BLM has not identified as a scoping issue is the regulatory environment under different management scenarios. The environmental effects of unplanned issues such as acid mine drainage, accidental leaks and spills, and failure of design features can be greatly reduced if there is a monitoring program to detect and respond to these situations earlier rather than later. As such, the EIS should compare the following factors under different management scenarios: number of agency inspections, the thoroughness of these inspections, the ability to review the adequacy of the reclamation bond and adjust it as needed, the frequency of bonding review, bonding amounts, the past history of bonding increases, past history of calculating the correct bond, the amount of potential fines for violations, and the ability to require and manage a fund for long term water treatment.

Inspections

The EIS maintains that public safety and transportation issues will not change between Alternatives M2 and M3, however, with the number of land-managing agencies being reduced from three to two (IDL and FS), the number of annual inspections would decrease by 4. This reduction could have real impacts on the detection and response to situations needing attention. We note that the mine is regularly inspected by an interagency taskforce consisting of the BLM, Forest Service, IDWR, IDEQ, IDL and the Idaho Department of Fish and Game (the DEIS incorrectly refers to this agency at Idaho

Department of Fish and Wildlife on p. 2-25). We request that the level of inspections remain the same or be increased in the future. We also strongly recommend keeping the provision that tours may be offered to the public upon request. These tours have been extremely helpful in inform ICL staff and community members about the actual conditions on site.

Bond adjustments
The EIS states that the reclamation cost estimate will be periodically adjusted but does not provide any timeframe (every three years, every 10 years) for this review and adjustment. Our past experience with other mining operations has led us to conclude that bonds are not reviewed as frequently as needed.

Financial Mechanism
We appreciate the intent of having a financial mechanism in place as a term and condition for the ROD to be signed. However, we point out that the Idaho Department of Lands currently lacks the statutory authority to manage funds to cover water treatment costs in perpetuity for mining-related projects. We believe that Idaho code may need to be amended to provide the Idaho Department of Lands with this authority. Such an amendment could actually be beneficial for the long-term management of both this project and others.

We disagree with to the concept that the specific amounts of financial guarantees are part of the BLM administrative process and are not NEPA issues (EIS, p. 1-19). According to the EIS, such review will only occur **after** the NEPA process is closed. This violates NEPA's requirement for a full discussion of all mitigation measures and impacts.

NEPA requires that mitigation measures be fully reviewed in the FEIS, not in the future. "[O]mission of a reasonably complete discussion of possible mitigation measures would undermine the 'action-forcing' function of NEPA. Without such a discussion, neither the agency nor other interested groups and individuals can properly evaluate the severity of the adverse effects." Robertson v. Methow Valley Citizens Council, 490 U.S. 332, 353 (1989). NEPA requires that documents: (1) "include appropriate mitigation measures not already included in the proposed action or alternatives," and (2) "include discussion of . . . Means to mitigate adverse environmental impacts (if not already covered under 1502.14(f))." 40 C.F.R. § 1502.14(f); 40 C.F.R. § 1502.16(h). "Mitigation" is defined as a way to avoid, minimize, rectify, or compensate for the impact of a potentially harmful action. 40 C.F.R. §§ 1508.20 (a)-(e). Mitigation measures must be discussed with "sufficient detail to ensure that environmental consequences have been fairly evaluated." Robertson, 490 U.S. at 352. The discussion of mitigation measures must also assess their effectiveness. "An essential component of a reasonably complete mitigation discussion is an assessment of whether the proposed mitigation measures can be effective." South Fork Band Council v. Dept. of Interior, 588 F.3d 718, 726 (9th Cir. 2009).

In this case, the public has no idea as to how "effective" the mitigation/reclamation bond would be for any of the action alternatives – because neither TCMC nor the BLM have divulged this information. Such elimination of the public's rights to fully participate in the NEPA process cannot stand.

> NEPA establishes "action-forcing" procedures that require agencies to take a "hard look" at environmental consequences.
> …
> An EIS serves two purposes:

> First, [i]t ensures that the agency, in reaching its decision, will have available, and will carefully consider, detailed information concerning significant environmental impacts. Second, it guarantees that the relevant information will be made available to the larger audience that may also play a role in both the decisionmaking process and the implementation of that decision.

Center for Biological Diversity v. Dept. of Interior, 623 F.3d 633, 642 (9th Cir. 2010). Such public review is required in this case.

The US EPA specifically notified the USFS that bonding must be discussed and reviewed as part of the NEPA process:

> EPA believes that financial assurance is an important element of the proposed action and must be disclosed in the EIS. FA is an important component of the mitigation plan, and disclosing information on the costs and form of FA is essential for the public to understand and comment on the adequacy of mitigation, risks to the environment, and financial risks to the public. EPA believe it is not possible to fully evaluate anticipated effectiveness of the mine and reclamation plan and associated risks to the environment without this type of information. (Letter from Lynne McWhorter, EPA Environmental Review and Sediment Management Unit to Dave Rosenkrance, Challis BLM, dated September 27, 2010)

The EIS must contain a review of bonding levels for the action alternatives.

Air Quality
As mentioned in our scoping comments, the BLM work with the operator to further minimize air pollution risks. We have already provided comments with regard to TCM's latest air quality permit.

Water Usage
As mentioned in our scoping comments, the BLM should incorporate additional measures related to water conservation. Upon final mine closure, water will no longer be needed for mine production and would be extremely beneficial if returned to the creeks to help restore fish habitat. We point out that some of the potentially adverse environmental effects from metals are projected to occur during low water periods. In addition, increased water flows, particularly during summer, are expected to benefit listed fish species.

We recommend that TCMC transfer its water rights from the beneficial uses of mining, domestic, industrial, irrigation and any other stated beneficial use during TCMC's use of the mine to the beneficial uses of fish habitat and/or minimum stream flows. This will ensure that in-stream benefits are maintained over the long term and that some future development in the project area cannot claim this water. We appreciate the fact that Idaho has water rights for a portion of S. Creek for fish propagation and believe that all parties should pursue additional water rights for fish restoration. Should the BLM no longer needs the water rights for stock watering in the project area, these should also be reassigned toward fish recovery. This transfer of water rights would also be consistent with TCMC's wetlands mitigation work and the purpose of the conservation easements along S. Creek and Thompson Creek.

We want to highlight the fact that low summer base flows are a limiting factor for fish species in Thompson Creek and S. Creek and that additional in stream flows would help address this. Many climate models predict reduced summer flows. Agricultural diversions could also be redirected with benefits for fish. The tributary streams to the Salmon River also may serve as thermal refugia for bull trout, Chinook salmon and steelhead.

Because such a transfer will require advance coordination with the Idaho Dep't of Water Resources and the Idaho Water Resource Board, TCMC should initiate conversations with the IDWR and the IWRB as early as possible.

Cutoff Walls and Groundwater

We appreciate the use of three groundwater cutoff walls at the base of Pat Hughes waste rock dump but are concerned that high rates of snowmelt appear to initiate acid generation with the waste dump (EIS, p. 3-80 and 85):

> The year 2003 is considered to be the onset of perennial ARD conditions from the Pat Hughes WRSF. (EIS, p. 85).

We are also concerned that water may be leaking from the Pat Hughes sedimentation pond into the groundwater (EIS, p. 3-79). Of added concern is the apparent high permeability of the bedrock, allowing for mixing between shallow and intermediate groundwater flows. Furthermore, it appears that "some seepage from the Pat Hughes WRSF passes under the collection system and eventually reaches Thompson Creek, but apparently with no discernible effect of the water quality of Thompson Creek." (EIS, p. 3-79). Depending on the amount of water, the degree of contaminants, and where this water surfaces, this could represent a violation of Idaho's antidegradation laws. Furthermore, the total load of COCs is expected to increase under Alternative M3:

> There would be an order-of-magnitude increase in total loads to Thompson Creek for most constituents compared to Alternative M1, with much of the increase occurring after reclamation because Cutoff Wall #3 would be anchored in metasedimentary rock rather than volcanic rock (long term, minor effect).(EIS p. 4-78).

Additional information is needed on both the current and potential future seepage rates and the quality of the groundwater. In addition to the three groundwater cutoff walls, additional groundwater monitoring, capture and pumpback wells should also added to prevent and/or capture seepage below the Pat Hughes waste dump.

Regarding Buckskin Creek, we appreciate that the groundwater flow patterns appear to serve as a hydraulic trap, but are interested in knowing the possibility for the groundwater flow rates to change into the future. The Buckskin waste storage facility does have the potential for acid mine generation at some point in the future and warrants additional monitoring than proposed. Adequate groundwater monitoring, capture and pumpback wells should also considered to capture seepage below the Buckskin waste dumps.

Additional groundwater monitoring is needed, particularly at springs that occur on the site and at different times of the year.

Tailings in Bruno Creek
With the expansion of the tailings storage facility, we are concerned about the loss of wetlands, floodplains, riparian and fish habitat in Bruno Creek both upstream and downstream of the tailings dam. We believe that this action entails dumping potentially toxic waste material into water of the United States and are concerned that this is inconsistent with the Clean Water Act. If Bruno Creek or other waterways are not meeting beneficial uses, the disposal of any pollutants (including sediment) in these waterways needs to be consistent with any established TMDLs or alternate sources of disposal need to be identified.

Fish restoration in Upper Bruno Creek
We understand that a population of westslope cutthroat trout in Upper Bruno Creek that were isolated by the tailings facility were recently extirpated. We believe that there is value in reestablishing and maintaining a fish population in this isolated waterway. We understand that Bruno Creek will be engineered to flow across the surface or along the side of the reclaimed tailings facility. We recommend designing the reclamation and closure plan so that fish habitat is restored across the surface or along the side of the tailings storage facility. We understand the importance of keeping surface water from infiltrating the tailings facility so some form of liner will be required. Actually reestablishing fish would likely entail engineering a riverbed capable of supporting macroinvertebrates, providing in-stream structures for fish habitat, placing sufficient growth media to support riparian vegetation without compromising the tailings cap, planting riparian vegetation for shade, and transferring native westslope cutthroat trout from lower Bruno or S. Creek into this upper drainage. We understand that reconnecting fish passage across the face of the tailings facility may be challenging but is still worth investigating. It is unclear whether the reclaimed tailings facility will have any discharge to middle or lower Bruno Creek, which could affect the quality of the water for fish. Reestablishing a fish population in an isolated area is an insurance policy in the event that a stochastic event wipes out a nearby population. The isolated population can then be used to repopulate the extirpated area. The discovery of an isolated Lahontan cutthroat population has enabled the recovery of a population to a significant portion of its historic range where it had formerly been considered extinct. Using native fish species with a unique genetics that evolved with this particular environment is important. In addition, successfully reestablishing a fish population in Upper Bruno Creek and around the tailings facility would be groundbreaking from a mine reclamation perspective and a conservation biology perspective. Aquatic insects, amphibians, birds and mammals would also benefit from the improved habitat.

Wildlife and water quality
The DEIS states that biological surveys for active bird nests and avoidance plans would be developed before these areas are disturbed. However, we point out that the purpose of NEPA is to disclose and address impacts to the public before a decision is reached. As such, we are concerned that this represents a NEPA violation and recommend that the BLM commence these surveys in advance of finalizing the ROD:

> NEPA is not designed to postpone analysis of an environmental consequence to the last possible moment. Rather, it is designed to require such analysis as soon as it can reasonably be done. *See* Save Our Ecosystems v. Clark, 747 F.2d 1240, 1246 n. 9 (9th Cir.1984) ("Reasonable forecasting and speculation is ... implicit in NEPA, and we must reject any attempt by agencies to shirk their responsibilities under NEPA by labeling any and all

discussion of future environmental effects as 'crystal ball inquiry,'" quoting Scientists' Inst. for Pub. Info., Inc. v. Atomic Energy Comm'n, 481 F.2d 1079, 1092 (D.C.Cir.1973)).

We appreciate the plans to restore riparian areas and wetlands where feasible. Regarding the waste rock and tailings facilities, we recommend adding clusters of logs and/or rocks to serve as habitat for pikas and other animals. We note that pikas are a Forest Service sensitive species. This technique has been used with some success in phosphate mine reclamation.

Land exchange

We appreciate the development of a suite of alternatives regarding the land exchange issue but are not convinced that the exchange is of fair and equal value given the disparity in acreage and may be in violation of FLPMA. We ask that the BLM reassess these to make sure the exchange is based on fair-market values and in the public interest.

We are concerned that the road accessing the Lyon Creek property from the south is in poor condition. The main access road that parallels the river crosses several high-gradient streambeds which regularly wash out the road. Continued use of this road contributes to sedimentation to the Salmon River. We suggest reconstructing and reengineering these routes, developing alternative routes to access this property, and potentially closing the existing routes or converting them to trails.

Regarding the existing private bridge which accesses the Lyon Creek property, we realize that engineering and liability issues likely preclude use by the public in full-sized vehicles. One alternative might be allowing pedestrian or mountain bike use of this bridge.

We support the exclusion of livestock from the upper meadow above the Lyon Creek property and recommend that the current two-track road that crosses Lyon Creek be converted into a non-motorized, single-track trail. This would help reduce sedimentation issues and while allowing high quality non-motorized opportunities in the field office.

If the land exchange proceeds, we believe that a mineral withdrawal for any acquired property such as the Broken Wing Ranch should be mandatory. As such, the best case scenario is for the TCMC to donate the mineral estate to the BLM. We would like to have additional assurances that the BLM would not open the estate to mineral entry in the future. The BLM should also make an RMP amendment which designates this area as a Research Natural Area, Special Resource Management Area, or some other complimentary protection that precludes non-conforming mineral development.

We point out that one of the driving reasons for this exchange is the fact that the Thompson Creek Mine area is not and will likely never be managed for multiple uses in the future in the same way it was available prior to mining. While some uses such as livestock grazing can be accommodated, this area will permanently characterized as a mineral development project. It would be entirely inappropriate for "offsets" to benefit displaced multiple uses to also be converted for mineral development, which again would exclude most other uses. We believe that the Broken Wing Ranch is of greater public benefit than the Garden Creek Property and advise the BLM to prioritize that property and the Lyon Creek/Graham Field Meadow in particular.

We understand that liability concerns may preclude the BLM and/or Custer County from allowing public vehicles on the Lyon Creek Bridge. However, we believe that this bridge could be maintained for pedestrian public access. We point out the benefits of the historic Guffey Bridge near Celebration Park within the Morley Nelson Snake River Birds of Prey National Conservation Area. We would advocate for an easement or similar arrangement in this case. We do not support motorized public access across this bridge.

We believe that alternative L2-B, which actively restore native habitat, best meets the long-term public interest and the specific purposes of the exchange. We believe that the public values of the Broken Wing Ranch area are best served by retiring livestock grazing in the area. The EIS provides a fairly stark but accurate portrayal of livestock grazing in the larger cumulative effects study area which bears repeating:

> Livestock grazing may affect soil by decreasing the vegetation cover, destroying the microbiotic crust, increasing compaction, and thereby increasing the surface erosion of soils. Localized damage in riparian areas from compaction and vegetation removal by cattle can occur, allowing sediment to enter the waterway and contributing to the destruction of the stream banks. This past and present vegetation and soil loss condition due to grazing uses in the BLM Challis Field Office area and SCNF is applicable to the CESA and *is expected to continue into the foreseeable future.* (EIS p. 5-17, emphasis added).
>
> And to put this in perspective:
>
> "The allotments in the CESA are in good condition and meeting rangeland health standards." (EIS, p. 5-20).

We believe that there are some unique opportunities within both the offered and selected lands to retire grazing allotments where it is likely to result in improved water quality and fish and wildlife habitat. We point out that livestock grazing will be allowed to continue within much the selected lands affected by mining operations. As such, we do not support any livestock grazing in the Broken Wing Ranch area. One exception might be the targeted and carefully-managed use of goats to reduce noxious weeds, provided that adequate separation from bighorn sheep can be guaranteed.

One of the reasons for the land exchange was that, with the exception of mining and livestock grazing, other multiple uses could not be readily accommodated within the project area. These include the prioritization of fish and wildlife habitat, particularly for listed fish species. Within the offered lands, there are a number of activities that can harm fish and fish habitat. These include livestock grazing in riparian areas, agricultural practices such as irrigation that can reduce stream flows, Off Highway Vehicle use in sensitive areas, and the ford across Lyon Creek for motorized vehicle access. If the selected areas are going to be dedicated to mining infrastructure over fish habitat (particularly the unrecoverable stretches of Bruno Creek, Buckskin Creek, Pat Hughes Creek), then the offered areas need to be prioritized for fish and wildlife recovery.

While we greatly appreciate conservation easements on portions of Squaw and Thompson Creeks, we note that other stretches of the selected lands, including riparian areas, have been and will be

permanently converted to mine infrastructure and buried under expanding waste rock facilities or tailings storage facilities, in direct contradiction to the Challis 1999 RMP:

> Retain public lands under BLM administration unless the receiving parties agree to continue to maintain or restore (if degraded) and permanently maintain floodplains and wetland functions" (BLM Challis RMP, 1999, p. 33)

and

> Riparian areas, floodplains, and wetlands transferred out of public ownership would contain covenant language in the deed to protect the wetland resource values from degradation (BLM Challis RMP, 1999, p. 34).

As such, we are concerned that the proposed land exchange is inconsistent with the direction of the Challis RMP 1999. Ways to possibly address this include prioritizing the offered lands for fish, riparian, floodplains, and wetlands and for TCMC to conduct additional restoration activities on site in advance of the exchange.

We fully support the active restoration of the cultivated fields back into native vegetation and advise that it may take more than three years. The irrigation system should be upgraded and utilized as need for this restoration process. Upon the successful restoration of native vegetation, the irrigation facilities should be removed, water rights should be reallocated to benefit for fish recovery, and the in-stream water flows should increase.

We disagree with L2-B on one important issue, however. We do not believe that motorized access in the Lyon Creek drainage to near the western edge of the BWR-1 is justified or consistent with fish and water quality goals. According to one ICL member, the Graham Field Meadow is "one of the prettiest places in Idaho" and is particularly well-suited for wildlife watching. Activities such as motorized recreation should only be accommodated where compatible with fish and wildlife recovery. Under Alternative L2B the additional vehicle crossing the Lyon Creek ford would cause additional turbidity and sediment deposition for approximately 50 feet downstream." (EIS p. 4-115). As such, we do not believe that public motorized use into Graham Creek is justified but can support administrative use of a UTV across a bridge if warranted for restoration and management purposes.

We do have concerns about the development of a campground or park on the Broken Wing Ranch by the Idaho Department of Parks and Recreation or other agency for profit. We are particularly concerned about impacts to cultural resources from developments and recreational use in the area. There already is a wheelchair accessible campground immediately upstream at the confluence of the Salmon River and the East Fork Salmon River. Before a new campground is considered, the negative effects of increasing use, particularly increased motorized use, in the area should be carefully considered. Any drive-in campground should be on the river right or east side of the Salmon River and not on the west side. We recommend developing only a small, dispersed camping area outside of sensitive areas, similar to the Bayhorse camping area on Highway 93. We also recommend the consideration of a few walk-in campsites where visitors park their vehicles and walk in a few hundred yards to a designated tent camping area. A management plan for the entire property is needed and should be analyzed through an EA or EIS. This plan should examine the sustainability of designating

the east or west side of the river as a non-motorized trail. The plan should prohibit cross-country motorized travel and designate trails for OHVs only if these trails can be sustainably managed. The need for a boat ramp needs to be assessed with respect to the availability and functionality of existing boat ramps.

We fully support the utilization of the Broken Wing ranch facilities for a Boise State University field research station. In fact, we recommend that the Challis RMP be amended so that the acquired Broken Wing Ranch properties are designated as a Research Natural Area. The focus of this research area should be the study of active restoration of agricultural fields to native vegetation and of how anadromous fish recolonize restored habitat.

We appreciate the work that TCMC has already undertaken to improve the habitat on the Broken Wing Ranch, which has included the installation of a fish screen on one of the four diversions and increases in water efficiency of some of the irrigation systems, fencing along the Salmon River, and off-stream livestock watering systems. We support the implementation of the additional restoration projects described, including the removal of the pond and the repair of fences as needed. We also recommend that the following steps be taken at the Broken Wing Ranch: treating noxious weeds (Canada thistle, Russian knapweed, Musk thistle and Oxeye daisy), replacing of the ford with a bridge engineered for administrative use with a UTV, outfitting the remaining diversions with fish screens, and increasing other efficiencies in the irrigation system. We point out that irrigation water will likely be needed successful restoration of the upland habitat but that these irrigation features need to be decommissioned to allow for increased stream flows for fish. As such, investments in the irrigation system need to be weighed against the decommissioning of these same features in the near term. In order to best guarantee that the public receives these benefits, we recommend that TCMC complete these restoration projects in advance of the land exchange actually occurring.

L5, Reduced Area Land Exchange, Easement

Although Lyon Creek has clear benefits for fish, wildlife and the public, the EIS clearly states that, if restored and protected, the lower stretches of Squaw Creek and Thompson Creek have greater potential benefits for listed fish. As such, we believe that the public interest is best served by Alternative L5, Reduced Area Land Exchange, Easement. In this alternative, the BLM would hold 1,500 acres of selected lands in a conservation easement to ensure that restoration investments in these areas would be protected. In terms of the offered lands, we recommend prioritizing acquisition of the Graham Meadows and riparian/riverfront stretches of the Broken Wing Ranch over the other offered areas. We also recommend revisiting the proposed easement area on S. Creek and consider extending it north of the Easement Exclusion Area, through the Existing Mine Disturbance Area, past the Redbird Mine and the confluence of Redbird Creek to the proposed land exchange boundary (Figure 2.2-1). We also recommend that a baseline monitoring program be established to assess if Properly Functioning Condition Indicators are improving over time. We appreciate the additional water quality monitoring sites at Redbird and Bruno Creeks. Given the interesting hydrological connection between the tailings facility and Redbird Creek, a groundwater monitoring well and pumpback station may be warranted where the active groundwater flow zone intercepts the high groundwater flow zone (See Figure 3.6-14).

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404 Permit

Please place us on the mailing list to review and comment on the 404 permit. We currently have significant concerns about the failure to consider alternatives.

Mixing zones
Additional information is needed regarding the parameters of the mixing zones and how NPDES conditions will be met. We not that the required Salmon River mixing zone ratio for NPDES Outfall 005 may not be met during certain low flow periods (EIS, p. 4-46), in violation of the NPDES permit. Although the EIS states that "isolated instances of instream water quality exceeding a numeric WQS, in and of themselves, may not be considered a violation of State law" (EIS, p. 4-42), the information presented in the EIS demonstrates a consistent pattern of predicted violations of Idaho's antidegradation law that is projected to continue beyond the foreseeable future.

Points of Compliance
We request the opportunity to review the proposed Points of Compliance for the Groundwater Quality Rule. Points of compliance should be on the near side of streams and valleys and as close to the boundary of the mine as practicable. We note that throughout the document are multiple examples of where predicted maximum concentrations of COCs results in exceedances of Idaho groundwater standards (see Table 4.6-25 for an example). In some area, groundwater flows reach 20+ feet per day with the result that contaminated groundwater will likely leave the project area in violation of the Idaho groundwater regulations for mining.

Powerline
The Powerline (both retained and relocated segments) should be inspected to ensure that there is no risk of electrocution to raptors and modified if needed.

Transportation and fuel haul
We appreciate that the current transportation and fuel haul plan is designed to reduce accidents and spills and understand that no changes are proposed. However, we believe it is always useful to reexamine systems and procedures to see if there are improvements to be added. For example, there are improvements in technologies related to braking systems, sensors that can alert drivers to icy conditions, cameras that drivers can use when backing up, and ways to deter big game from roadways. There may also be ways to further improve carpooling services to minimize individual vehicle trips or to improve the fuel efficiency of the onsite vehicle fleet. Likewise, there have been improvements in fuel haul planning for other projects that are relevant to this one. We refer to the *Petroleum Risk Assessment and Risk Reduction Procedures, Golden Meadows Exploration Project Valley County, Idaho* in Appendix C. While we still believe that improvements in this particular plan are needed, there are several design features which are pertinent to this project. These include the use of SPOT messengers, pilot cars, triggers, and communications plans to prevent accidents and facilitate spill cleanup. The BLM and TCMC should use this current opportunity to revisit these issues and incorporate changes in the MPOO.

Buckskin sedimentation pond
The EIS states that the Buckskin sedimentation pond currently leaks and will be lined in the future. It is unclear when this renovation will happen, what type of liner will be used, and what type of monitoring system will be in place to assess the effectiveness of the liner. We recommend that TCMC

line the pond as a required component before the project proceeds. The BLM should require a monitoring, capture and pump back system in the event of a leak.

Decommissioning of water management system
The DEIS states that the water management system would be decommissioned in phases but does not describe the sequence of events or how the Buckskin and Pat Hughes sedimentation ponds may be handled.

Power Usage
The BLM and TCMC should also examine whether there are ways to further improve the energy efficiencies on site.

Pit Lake Issues
We understand that with the selection of M2, it will take approximately 30 years post-closure for the pit lake to rise to the maximum allowable level. We are concerned about the exposure of acid-generating materials in the pit wall for this duration of time (30 years for Phase 7 and 70 years for Phase 8). In addition, significant portions of the pit wall would remain above high water permanently. The DEIS notes that long-term weathering of the pit slope would continue above the water level. We are also concerned about the new exposure of material from slumping during this time. The BLM should examine if there is a way to accelerate the filling of the pit if this would reduce the probability of acid formation. The BLM should also describe the final depth of the pit lake, what type of seasonal stratification is expected, and how this may affect the chemistry of the water. It is also unclear how the increasing water pressure in the rising pit lake will affect groundwater flows and groundwater quality. We are concerned that there appears to be substantial groundwater movement between rock formations (EIS, p. 3-72). The EIS points out that pit water may eventually flow into Buckskin Creek, Pat Hughes Creek or Thompson Creek. We believe additional studies are warranted and that monitoring wells and points of compliance should be selected to further study this.

As mentioned in our scoping comments, we are concerned about impacts to wildlife from exposure to contaminated water sources after mining operations have ceased. As mentioned elsewhere, mine operations need to be designed to prevent water contamination and to have a contingency plan to treat water in perpetuity after mine closure. We are particularly concerned about adverse impacts to wildlife and request a full evaluation of the pit lake water. The current alternatives do not address this issue. The BLM needs to describe what mitigation measures will be used to ensure that birds and wildlife are protected if the water quality does not meet predictions.

We are also concerned about the eventual configuration of the pit lake shores. We are concerned about mammals falling into the pit and becoming trapped. We recommend the retention of benches and (decompacted) haul roads to serve as exits. Eventually, pit wall sloughing and mass wasting will likely convert the benches and haul roads into talus slopes, but these will still be usable as egress points. The BLM needs to weigh in the risks of these egress points promoting access to contaminated waters. We note an inconsistency regarding the final configuration of the open pit. Page 2-27 of the DEIS states that the open pit would be fenced but page 2-30 states that the fence would not be installed. The BLM should examine the effects of both fencing and not fencing this pit and what type of fencing should be most appropriate. We would recommend a similar design to fences used to divert elk and deer around roadways. These fences have one-way ramps placed every few hundred yards which enable big game

to climb up the ramp but discourage animals from going the other direction. Such a design could be helpful around the pit to discourage animals from entering the area but allowing egress if needed.

The EIS must demonstrate that the pit lake will meet water quality standards in perpetuity, and what mitigation measures will be taken if water quality in the lake does not meet standards. In particular, the EIS must demonstrate that the mine would comply with the Migratory Bird Treaty Act (MBTA), 16 U.S.C. §§ 703-712, the Bald and Golden Eagle Protection Act (BGEPA), 16 U.S.C. §§ 668-668d, or Executive Order 13186 (January 11, 2001) (requiring protection of migratory birds).

It is accepted practice for federal and state land management agencies to impose mitigation and other measures to prevent the formation of a contaminated pit lake, or if the lake is predicted to form, to require mitigation to prevent any contamination. The U.S. BLM, for example, requires the completion of a detailed Ecological Risk Analysis (ERA) for all pit lakes.

> Ecological Risk Assessment (ERA) is a process that analyzes the likelihood that adverse ecological effects may occur as a result of exposure to one or more stressors. Since 1996, the Bureau of Land Management (BLM) has been utilizing ERAs in Nevada to evaluate pit lake effects. In recent year's new ecological screening information, criteria and tools have been provided by the U.S. Fish and Wildlife Service (USFWS), U.S. Environmental Protection Agency (EPA), U.S. Department of Energy (DOE), national laboratories, state universities, and state agencies.
>
> An ERA is a useful tool to aid in analyzing the current and future environmental impacts of mining pit lakes on wildlife and the ecosystem. When the BLM is preparing a National Environmental Policy Act (NEPA) analysis and it is predicted there is potential water quality problem with the future pit lake, an ERA should also be prepared.

It is not only practicable, reasonable, and feasible, but an accepted regulatory practice, to prevent the formation of a contaminated pit lake through perpetual pumping and treating of the water. In considering such an alternative and mitigation measure as required under NEPA and other applicable requirements noted herein, it should be noted that such pumped water must meet all standards and must be distributed so as to eliminate or greatly reduce any adverse impacts on the resources dependent on groundwater in the area (e.g., such as surface waters, springs/seeps, etc.). The failure of the EIS to consider a reasonable alternative of pit lake prevention/remediation is a violation of NEPA's mandate that the agency fully consider all reasonable alternatives.

The U.S. EPA has recognized the need for long-term water treatment reclamation bonding for mine pit lakes in the West. *See, Management and Treatment of Water from Hard Rock Mines*, US EPA (2006)(attached). The EPA report details both the need for treatment of mine pit lakes, as well as a number of ways to minimize and/or prevent the contamination in the lakes. Id. at pp. 28-36.

Tailings Storage Facility

We are concerned about dust generation from the tailings storage facility and ask for more information on the public health risks and how this will be addressed. The final vegetation goals for the tailings storage facility should be described. Healthy vegetative cover can help address water infiltration concerns, but vegetation can change due to noxious weeds or wildfires. We believe that a Geosynthetic

Clay Laminate Liner, discussed earlier, should be considered here. We also understand that the current reclamation plan calls for this area to be tree-free so that root growth and tip ups do not compromise the integrity of the cap. However, the DEIS states that forests are expected to regenerate in this area in 150 to 200 years. Lodgepole pine will likely recolonize the reclaimed surface of the tailings facility and will present a risk to the integrity of the cap. We believe that the BLM has two options to address this eventuality. First, the post-closure plan can require the regular removal of all tree seedlings, along with perpetual water treatment. This would entail staff physically monitoring and maintaining the tree-free status of the storage facility at least once every three years in perpetuity. Alternatively, the BLM can design the cap of the tailings facility so it is adapted to the expected tree growth, anticipated root depth and designed to withstand tip ups. This could entail utilizing a GCLL and increasing the depth of the growth material on the surface. Alternatively, the EIS must disclose the effects of a compromised tailings cap in years 150 and beyond, increased infiltration into the tailings facility, anticipated changes in water quantity and quality leaving the tailings facility, and revised costs for addressing these in years 150 and beyond so that water quality standards are still maintained into the future.

We understand that IDWR does not approve reclamation design plans until the actual time of final reclamation, but we believe the BLM has an obligation to present its version of the reclamation plan to the public as part of this EIS as public resources downstream of the tailings storage facility area are managed by the BLM.

Roads

We support the plan to reclaim 25 miles of roads and recommend that the BLM look for other opportunities to reduce the final area of Total Soil Resource Commitment. The BLM should also provide a map of the final road configuration for the project.

Reclamation Plan

As noted in the USFS's *Anatomy of a Mine* regulatory guidance report, reclamation is a critical and required component of a logical, complete and reasonable mining plan:

> Satisfactory reclamation should emphasize three major objectives:
> 1. The productivity of the reclaimed land should at least equal that of the premine surface. This does not necessarily mean that the site must be restored to an approximation of its original condition, or that surface uses after mining will be the same as those existing prior to mining. For example, an area used for marginal grazing prior to mining may be changed to a useful and attractive recreational complex, or perhaps in another case to a housing area.
> 2. Satisfactory reclamation should leave the mined area in a condition that will not contribute to environmental degradation either in the form of air- or water-borne materials, or from chemical pollution.
> 3. The reclaimed area should be esthetically acceptable and it should be safe for the uses intended.

"*Anatomy of a Mine, From Prospect to Production,"* USDA Forest Service, General Technical Report INT-GTR-35, Revised February 1995, at 68-69.

Post-Reclamation Monitoring

One stated difference between Alternatives M1 and M2 is that "some monitoring could continue for longer durations" (EIS, Executive Summary, p. ES-5). While the exact monitoring locations and points of compliance may differ between alternatives, water treatment in perpetuity is going to be needed under all alternatives so long-term monitoring will also need to be conducted in perpetuity. The EIS should be revised to reflect this.

Reclamation Plan and Flood Events
The Reclamation Plan needs to be incorporated into the EIS as it determines the effects on a number of public resources. Because many of these facilities are effectively permanent features on the landscape, they should be designed to withstand more than the estimated 500-year/24 hour storm event. We propose looking at the 5,000 year event. The BLM should assess the potential impacts to the facility during particularly large events.

Waste Rock Segregation
We appreciate the segregation of Type 1 and Type 2 waste rock.

Climate Change
The BLM should review the latest climate change models to see how temperatures, precipitation amounts, timing and form may change over time. The water balance for the project, water quality, water quantity, evaporation rates from the pit lake, anticipated performance of the water treatment plant and impacts on fisheries are dependent on these inputs. We suggest reviewing these calculations based on these climate change models.

Timber Harvest
We understand that mine expansion would entail the harvest of approximately 3 million board feet of timber from 460 acres. Although these lands would ultimately be converted for mine development, the logging methods can determine the short-term impacts of sedimentation in the watershed and may affect the future quality of the soils for growth media. As such, we recommend that TCMC and BLM develop specific design features for the harvest program that minimizes erosion and maximizes retention of nutrients and soils for future reclamation purposes. These design features should be described in the EIS.

Sewage
The DEIS states that sewage from the mill is disposed in the tailings storage facility but it is unclear if the sewage is treated at all and to what degree. The EIS needs to ensure that waste material is properly treated and disposed of.

Values of S. Creek, Bruno Creek, Thompson Creek and the Salmon River
We wish to emphasize the value of all the streams in the area as critical habitat for listed fish species, and in particular for the Salmon River which is designated as a domestic water supply. The Salmon River is also the longest undammed river in the lower 48 states, provides critical habitat for listed fish species and has intrinsic value in and of itself. We note that the stretch of the Salmon River between Thompson Creek and S. Creek is 303(d) listed due to sedimentation/siltation and water temperature. It is unclear whether a TMDL has been established for this segment of river. If not, the BLM cannot allow additional contaminants in the form of elevated water temperature and sediment. We note that all action alternatives contribute to additional sediment in streams, in potential violation of the Clean

Water Act. As such, additional design features or alternatives are needed to prevent further degradation. Thompson Creek, S. Creek, and the Salmon River are Tier II streams which are not necessarily available for additional pollutant loads. We point out that M1, M2 and M3 all have the potential to increase pollutants (even in relatively isolated incidents) in the form of metals, sediment or temperature over the short or long term and thus are in potential violation of Idaho's antidegradation policy as no public review of the social and economic tradeoffs has been conducted.

While the water quality of Thompson Creek and S. Creek may meet numeric WQSs, certain flow conditions would result in spikes in copper, cadmium levels or sediment which would result in a degradation of the resource under IDEQ regulations (EIS, p. 4-40, 4-42). The required Salmon River mixing zone ratio for NPDES Outfall 005 may not be met during certain low flow periods (EIS, p. 4-46), in violation of the NPDES permit. Although the EIS states that "isolated instances of instream water quality exceeding a numeric WQS, in and of themselves, may not be considered a violation of State law" (EIS, p. 4-42), the information presented in the EIS demonstrates a consistent pattern of predicted violations of Idaho's antidegradation law that is projected to continue beyond the foreseeable future. For example, with regard to S. Creek, "[c]oncentrations would be greater than the threshold for all years 6+ scenarios" for metals such as copper and cadmium at low flows and high flows under both idealized conditions. We point out that years 6+ are projected to continue beyond the foreseeable future. While the EIS states that discharges into Thompson Creek would "typically comply with all NPDES permit requirements," modeling shows that "there could be occasional permit limit exceedances at these outfalls during spring runoff" (EIS, p. 4-68). As another example, the EIS states that Alternative M2 may lead to slight increases in concentrations of constituents in the Salmon River compared to Alternative M1 but would still meet WQSs (EIS p. 4-107) but this increase in a Tier II stream would likely violate Idaho's antidegradation regulations. Even though these effects may be relatively minor, they are anticipated to be long-term and reoccurring:

> Although individual "events" would be short-term, the potential for them is long-term. (EIS, p. 4-105).

EPA's antidegradation standards, which the BLM must ensure compliance with, requires that: "Existing instream water uses and the level of water quality necessary to protect the existing uses shall be maintained." 40 CFR § 131.12 (a)(1). As detailed herein, the agency has not ensured that all instream uses and water quality "shall be maintained." The BLM needs to develop additional design features to ensure that all aspects of the project comply with state and federal laws.

We also note that the studies analyzing fine sediment percentages at monitoring sites were based on the wrong set of standards and, perhaps while potentially comparable, still may underestimate sediment (EIS p, 3-135). While lower water flows result in elevated levels of metals, high water can be associated with elevated levels of sediment or selenium. Even when selenium WQS standards are met, bioaccumulation with the potential to affect listed fish species can occur (EIS, p, 3-136), in potential violation of the Endangered Species Act.

The Cumulative Effects analysis points out that WQSs for metals in Thompson Creek and S. Creek would be exceeded during lowest streamflows in upper estimate scenarios (EIS p. 5-40). We point out that it low streamflows and high temperatures are some of the limiting factors for fish in these areas. During periods of low flow, high temperatures, fish would also be subject to elevated metal

concentrations. Fish populations in Thompson Creek, S. Creek, Bruno Creek and the Salmon River would likely be affected at the same time. Because these tributaries also serve as the best available thermal refuge for bull trout, Chinook salmon and Snake River steelhead in the Salmon River, negative effects of increased metals could affect more than resident fish of these tributaries. While the EIS states that effects could result in short-term decreases in population sizes, we point out that steelhead, Chinook salmon and bull trout are listed fish species. As such, the BLM additional design features or alternatives are needed to control pollutants at both high and low flow regimes to ensure that fish populations are protected.

We also believe it is critical for the BLM to assess No Name Creek and Redbird Creek, as some of these areas may be contaminated by mine affected water or historic mining issues. We point out that sulfate concentrations in Redbird Creek have increased by a factor of three over the last 10+ years (DEIS, p. 3-61). The assumption that beneficial uses are being fully supported here because it is within the S. Creek drainage (p. 3-53) is clearly not warranted. This monitoring is also necessary to establish a baseline and to determine the streams' assimilative capacity, if any. It appears that only one sample has been taken of the discharge from the Twin Apex mine and that this discharge contained elevated metals concentrations. In order to understand the role that the Twin Apex mine plays in the larger system, additional water samples are necessary and at a variety of flow conditions.

We are particularly concerned about current and future selenium levels in Buckskin Creek and believe that additional steps are needed to reduce selenium discharges at the source. We are also concerned that TCMC is proposing to reduce the overall thickness of the Buckskin cap in Alternative M2 compared to M1, the existing plan:

> TCMC would save $1,000,000 of dollars by reclaiming the surface of the Buckskin WRSF with less soil cover than for Alternative M1. EIS p. 4-154.

While there may be cost savings for reducing the cap thickness, this reduction may result in increased water infiltration, increased contaminants and increased treatment costs. We disagree with IDEQ's intent to place the stream assessment units in Category 4c, streams impaired by pollution, not pollutants. Relegating Buckskin Creek as a "permanently highly perturbed, flow-altered stream whose flow and water quality is a result of mine operations in compliance with the NPDES permit" belies the risk that a certain biaccumulating pollutant – selenium - poses to the environment. We also oppose categorizing sediment in Pat Hughes Creek as pollution consistent with the NPDES permit rather than a pollutant which needs to be managed.

Dust

We understand that a wind fence has been constructed around the coarse ore stockpile. We are concerned that the dust from this and other areas may contain contaminants of concern. The EIS should address this issue.

Topsoil and Growth Material

It is unclear from the DEIS if there is or will be sufficient topsoil salvaged for adequate soil recovery during site reclamation. There may be opportunities for additional organic material produced as a byproduct of hazardous fuels thinning projects in Custer and Lemhi County. We recommend working with the Lemhi County Forest Restoration Collaborative Group on potential opportunities.

Grazing on waste rock and tailings facilities and in the Thompson Creek Allotment
Our experience with the reclamation of the Bear Track Mine is that livestock grazing should not be allowed on areas under active restoration such as waste rock and tailings facilities until the vegetation has reached pre-determined, sustainable targets. We also point out that selenium contamination of forage has been an enormously challenging issue in the phosphate patch in southeast Idaho and has led to scores of livestock deaths. We are also concerned about impacts to big game. We recommend that plant material and any watering sources be tested regularly for selenium contamination to ensure that selenium levels do not pose a threat to livestock or wild ungulates. Regarding grazing in the Thompson Creek Allotment, we support the continued suspension of the permit to benefit listed fish species. We note that bank erosion is occurring within S. Creek due in part to livestock grazing in the riparian area and suggest that additional steps be taken to address this. We appreciate the mention of additional, wildlife-friendly fencing along S. Creek sometime in the future (EIS p. 4-172) but a specific timeline is needed.

Wildfires
The BLM should ensure that mine plans, reclamation plans and the final restoration configuration are adapted for wildfires. Fires can melt important infrastructure such as piping, valves, liners, caps and culverts and remove vegetation relied upon for removal of water from waste rock and tailings facilities. We note that permanent diversion ditches are planned around the margins of the waste rock storage facilities and will likely pass through culverts under any remaining roadways. The EIS needs to describe how the site will be fire resilient.

Visual Resources
We appreciate the potential use of feathering of vegetation during reclamation and natural staining of exposed minerals to better protect visual resources. We recommend that these components be required in the reclamation plan. We also recommend planting scattered clumps of vegetation along the faces of the tailings facility and waste rock faces where compatible with engineering designs. We support including whitebark pine seedlings in the higher elevation restoration efforts. Aspen stands should also be prioritized for restoration. Noxious weed monitoring and treatment will have to be conducted for extended periods of time as part of the long term reclamation of the site.

To help guide these plantings, the closure and reclamation plan needs to include additional information on the vegetation type, pattern and projected ecological succession on all reclaimed areas. Where external waste rock pits will remain, we suggest recontouring them with some degree of irregularity so that they blend into the surrounding environment.

Light and Noise Pollution
Although lights are needed for safety during mine operations, the BLM and TCMC should utilize this opportunity to see if there are ways to minimize light pollution without compromising site safety. We note that the lights from Thompson Creek Mine are highly visible from the White Cloud Mountains. Efforts might include additional shielding, redirecting lights downward, upgrading the types of lighting used, replacing sodium vapor lights with acceptable alternatives, and simply turning off lights when not in use. The long-term, post-closure plan for the site should be consistent with Dark Sky principles. This site represents one of the few places in the world where light pollution can be expected to

decrease over time. The proximity of the Frank Church River of No Return Wilderness Area would make this entire area more intact and significant as a Dark Sky Resource.

Regarding noise pollution, the EIS is an excellent opportunity for the BLM and TCMC to discuss potential measures to reduce noise pollution on a daily or seasonal basis.

Cumulative Effects Analysis

S. Creek Grazing Allotment, Saturday Mountain Pasture

We understand that TCMC may grant administrative access to the BLM and its permittees to areas that are now essentially inaccessible to these parties due to rugged topography and lack of legal access on existing roads. We are concerned about how increased access to these areas may result in increased grazing impacts, litter, human-caused ignitions, and other cumulative effects. These need to be analyzed as part of the Cumulative Effects analysis.

Future land exchanges

While the proposed land exchange would involve BLM property, there is likely a similar interest in exchanging Forest Service property. As with the proposed exchange, there is value in the Forest Service retaining a conservation easement on sensitive areas within the selected land and for the offered lands to have strong conservation benefits for fish and wildlife. As these are reasonably foreseeable activities, the EIS should address them to the extent possible.

Twin Apex Mine, Redbird mine, Tungsten Jim mine, Bruno Exploration

We are concerned about ongoing pollution from these and other mines in the CESA. Additional information is needed regarding the current, potential, and cumulative effects of metals contamination, particularly during low water events. The cumulative effects analysis should disclose monitoring results, any development or clean up plans for these sites and what water quality improvements may be seen. The EIS should clarify whether there is a NPDES permit for these discharges and who the responsible parties are. As the Ninth Circuit has further held:

> Our cases firmly establish that a cumulative effects analysis "must be more than perfunctory; it must provide a *useful analysis* of the cumulative impacts of past, present, and future projects." Klamath–Siskiyou, 387 F.3d at 994 (emphasis added) (quoting Ocean Advocates v. U.S. Army Corps of Eng'rs, 361 F.3d 1108, 1128 (9th Cir.2004)). To this end, we have recently noted two critical features of a cumulative effects analysis. First, it must not only describe related projects but also enumerate the environmental effects of those projects. *See* Lands Council v. Powell, 395 F.3d 1019, 1028 (9th Cir.2005) (holding a cumulative effects analysis violated NEPA because it failed to provide "adequate data of the time, place, and scale" and did not explain in detail "how different project plans and harvest methods affected the environment"). Second, it must consider the interaction of multiple activities and cannot focus exclusively on the environmental impacts of an individual project. *See* Klamath–Siskiyou, 387 F.3d at 996 (finding a cumulative effects analysis inadequate when "it only considers the effects of the very project at issue" and does not "take into account the combined effects that can be expected as a result of undertaking" multiple projects).

Oregon Natural Resources Council Fund v. Brong, 492 F.3d 1120, 1133 (9th Cir. 2007)(emphasis added).

The Ninth Circuit has rejected the agency's attempt to avoid reviewing cumulative impacts by simply discussing general effects (and even that was not done in the FEIS):

> As we have observed on multiple occasions, "general statements about possible effects and some risk do not constitute a hard look absent a justification regarding why more definitive information could not be provided." *Klamath–Siskiyou,* 387 F.3d at 993–94 (quoting *Ocean Advocates,* 361 F.3d at 1128). Even if the BLM was unable to indicate with any great degree of certainty the results of the Project, because the cumulative effects analysis requires an agency to predict future conditions, uncertainty is an inherent part of the process. Therefore, a general statement about uncertainty does not satisfy the procedural requirement that an agency take a hard look at the environmental effects of an action. The BLM can certainly explain specific projections with reference to uncertainty; however, it may not rely on a statement of uncertainty to avoid even attempting the requisite analysis.

Oregon Natural Resources Council Fund v. Brong, 492 F.3d 1120, 1134 (9th Cir. 2007).

A description of the potential groundwater impacts from the Bruno Exploration Project is also warranted.

Three Rivers Quarry and Idaho Cobalt Project
It is our understanding that the Three Rivers Quarry and Idaho Cobalt Project are both currently on hold, in care and maintenance or closed. The EIS should clarify this.

Observation on Objectivity
On an issue of objectivity regarding different resources, we note that the only time the term "adversely affect" is utilized in section 1.13 is with reference to local, State and national economies and social conditions in local communities from decreased production or closure of the mine. However, with regard to other extremely important issues, including water quality, fisheries, wildlife, etc., the DEIS refers to "effects" of expanded and continued mining with no such qualifier, although the impacts would certainly be adverse in most cases. This use of language represents a potential bias in the document favoring economic considerations over environmental and human-safety related issues and should be rectified.

Tour opportunity
We appreciate the opportunity to tour the project area on July 24 with Thompson Creek Mining Company representatives and hope that representatives from the BLM can join us on this tour to discuss the project in more detail.

References

USEPA (U.S. Environmental Protection Agency). 2014. An Assessment of Potential Mining Impacts on Salmon Ecosystems of Bristol Bay, Alaska. Region 10, Seattle, WA. EPA 910-R-14-001.

Earthworks. 2012. *U.S. Copper Porphyry Mines Report: The Track Record of Water Quality Impacts Resulting from Pipeline Spills, Tailings Failures and Water Collection and Treatment Failure*. Washington, DC.

Appendix A.

http://www.mineralpolicy.org/pubs/ComparisonsReportFinal.pdf

Comparison of Predicted and Actual Water Quality at Hardrock Mines
The reliability of predictions in Environmental Impact Statements

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6.3.11. THOMPSON CREEK, IDAHO

The Thompson Creek Mine, owned by Thompson Creek Mining Company, has been in operation since 1983. The primary commodity mined is molybdenum from open pit mining and flotation processing operations. It

disturbs 2,100 acres on Salmon-Challis National Forest lands in U.S. Forest Service Region 4, BLM administered land, and private land. It has a current financial assurance amount of $11.3 million.

6.3.11.1. WATER QUALITY PREDICTIONS SUMMARY

The Salmon-Challis National Forest has been the lead agency for all NEPA actions at the Thompson Creek Mine. NEPA was required for the new project to be permitted, and an EIS was completed in 1980. NEPA was not required for the NPDES discharge permit. In 1999 a Supplemental EIS was conducted for a plan of operation change dealing with tailings disposal. The following sections summarize the water quality information and predictions made in the NEPA documents reviewed.

1980 EIS

The 1980 EIS cites laboratory tests to characterize leachate, determine weathering effects over 20 years, and determine the quantity of acid the waste rock would consume. The specific nature of the tests and test results were not provided. The tests indicated that there was sufficient buffering capacity to neutralize acid drainage and that leachate would not contain significant concentrations of contaminants. The EIS stated that such conditions would continue for 20 years, but no basis is provided for the prediction.

The 1980 EIS did note a concern that water infiltrating waste dumps will leach materials in toxic concentrations from waste rock and that these will reach surface water. The EIS also noted that infiltration from the tailings impoundment could exceed EPA drinking water standards for iron, manganese, nitrate TDS, and zinc, which could cause Bruno Creek to exceed water quality criteria during low flow.

No acid drainage characterization tests were conducted for tailings, and according to the EIS, the tailings would be similar to low-grade ore, which did not indicate potential for acid drainage. However, tailings leachate tests showed potential for elevated levels of iron and manganese in excess of drinking water standards, and iron and zinc concentrations in excess of EPA criteria for protection of aquatic life. According to the EIS, the areal extent of potential groundwater contamination was unknown, and potential increases of metal concentrations in surface water could occur but would be similar to background levels due to dilution and biological activity. The general prediction of the 1980 EIS was that acid drainage would not occur at the Thompson Creek mine.

1999 EIS

According to the 1999 EIS, in 1988 visual signs of acid drainage were observed in the mine pit and the face of the tailings impoundment. The presence of acid drainage was subsequently confirmed in the mine pit and tailings impoundment, and in 1990 a geochemical characterization program was initiated.

Tailings Impoundment

Tailings and tailings embankment samples were collected and subjected to total sulfur, pyrite sulfur and neutralization potential analyses. In addition, selected samples were subjected to kinetic testing. Static testing results showed an average sulfur content of 0.8%, average acid neutralization potential (ANP) of 6 tons/kiloton (t/kt), acid generation potential (AGP) of 24 t/kt , net neutralizing potential (NNP) of 19 t/kt, and the average ANP/AGP ratio was 0.3 in embankment samples. Slimes (interior tailings) samples had an average ANP of 8 t/kt, NNP of 0.4 t/kt and an ANP/AGP ratio of 1.0. The EIS concluded that the static tests indicated the potential for acid drainage in embankment tailings and less potential in slimes tailings due to saturated conditions in the tailings impoundment. The acid drainage potential was confirmed by kinetic testing, with several samples producing acid drainage during the initial test cycles.

The Draft EIS contained predictions of tailings effluent water quality based on various mitigation for periods of up to 1,500 years. The potential for impacts to Squaw Creek were noted. The final EIS predictions were limited to a 100-year period and were based on results from the PYROX model. The predictions were based on assumptions that the interior slimes tailings would remain saturated (immersed in water) and the tailings would therefore not be reactive and produce acid drainage. The exterior (sand) embankment materials were expected to

have excess neutralization capacity at the end of the 100-year simulation, although they could produce acid drainage beyond the 100-year period. The model results are based on the assumption that 140 feet of pyrite-depleted flotation tailings would be placed over the entire embankment surface (with pyrite enriched tailings located in the interior of the embankment). The Draft EIS predictions showed potential for acid drainage generation in 300 to 1500 years, but no impact on surface water quality was predicted, based on PHREEQE surface water quality modeling results.

Waste Rock
Waste rock samples representing various geologic units were collected and subjected to static and kinetic testing. Static testing indicated that volcanic waste rock was not acid generating, with average ANP/AGP ratio of 30:1 and an NNP of 20.6 t/kt. Static and kinetic testing on metasedimentary and intrusive rocks indicated the potential for acid drainage generation. Long-term water quality of waste rock leachate was predicted based on geochemical testing, seepage rate predictions and existing water chemistry. HELP model simulations were used to predict the rate of seepage from the waste rock dumps. No significant acid drainage, metals leaching or impacts to surface water were expected. According to the EIS, based on existing water quality of dump effluent, the "excess" neutralization potential (from calculations on a "tonnage weighted basis," the NP:AP ratio of the waste rock is 1.5 to 3.1) and assuming mixing in surface waters. According to the EIS, any acid-producing rock would be mitigated by special handling (segregation) and isolation techniques that are "demonstrated by their use throughout the mining industry." Potentially acid-generating waste material will be identified, placed in zones within the waste dumps and covered with compacted covers, with a final graded cap placed over the dump to reduce infiltration. Based on the mitigation employed, water quality impacts are not anticipated for either groundwater or surface water at the Thompson Creek Mine, according to the EIS.

Pit Lake
The EIS acknowledged that pit water quality may be characteristic of acid drainage and have high concentrations of molybdenum, iron and manganese. No studies had been conducted at the time of the EIS to quantitatively predict pit lake water quality. The EIS suggests that the pit will act as a terminal groundwater sink, thereby resulting in no impacts to local groundwater or surface water.

6.3.11.2. ACTUAL WATER QUALITY CONDITIONS

According to the 1999 EIS, water quality sampling errors from 1981 to 1990 prevented a reliable baseline water quality evaluation. More recent data (1991 to 1995), the interpretation of which is highly qualified in the EIS, indicated elevated levels of cadmium, copper, lead, sulfate and zinc in surface water, possibly at levels exceeding acute or chronic aquatic life standards. Tailings seepage water quality showed increases in iron, zinc and alkalinity, which, according to the 1999 EIS, were predicted in the 1980 EIS.

According to the 1999 EIS, from 1989 to 1995, sulfate concentrations in creeks downgradient of the waste rock dumps increased from 100 mg/l to 500 mg/l in one case and from 300 mg/l to 1,000 mg/l in another case. No significant changes in other parameters were so far indicated.

Monitoring of seepage from the Buckskin and Pat Hughes waste dumps indicated sulfate and selenium levels were rising since 1991. Selenium concentrations exceeded water quality standards in the seepage from both waste dumps.

Thompson Creek has been ordered to meet water quality standards for selenium by the expiration date of its present NPDES permit (Dave Chambers, Center for Science in Public Participation, personal communication, 2005).

6.3.11.3. COMPARISON OF PREDICTED AND ACTUAL WATER QUALITY

Table 6.16 provides a summary and comparison of potential, predicted and actual water quality information for the Thompson Creek Mine. The accuracy of the predictions is discussed in this section.

Acid Drainage and Metal Leaching from Tailings and Waste Rock, Including the Open Pit: The 1980 EIS did not indicate acid drainage potential for either tailings or waste rock but did indicate metals leaching potential in tailings and waste rock. Pit lake water quality was predicted to be typical of oligotrophic mountain lakes. The 1999 EIS indicated acid drainage potential in tailings and waste rock, but acid drainage from tailings was not predicted for at least 100 years. The pit lake was predicted to be contaminated by acid drainage but was expected to act as a terminal sink and create no impacts on local water resources. Therefore, the potential for acid drainage was initially underestimated and subsequently predicted to take longer to develop than it did. However, the potential for metal leaching was noted in both EISs.

Elevated Concentrations of Metals and Sulfate in Surface Water: The 1980 EIS stated that water infiltrating the waste dumps could potentially leach materials in toxic concentrations that would reach surface water, and infiltration from the tailings impoundment could cause Bruno Creek to exceed water quality criteria during low flow. This EIS predicted moderate surface water quality impacts after mitigation were in place. The 1999 EIS noted potential impacts to water quality in Squaw Creek, but predicted no impacts to surface water after mitigation were in place. Therefore, potential (pre-mitigation) impacts were closer to actual impacts, and the degree of success of mitigation measures was overestimated, especially in the 1999 EIS.

Appendix B

http://www.epa.gov/osw/nonhaz/industrial/special/mining/techdocs/amd.pdf

EPA 530-R-94-036
NTIS PB94-201829

TECHNICAL DOCUMENT
ACID MINE DRAINAGE PREDICTION

December 1994
U.S. Environmental Protection Agency
p. 35-38

3.2 Cyprus Thompson Creek, Challis, ID

3.2.1 Introduction: EPA conducted a site visit of the Cyprus Minerals Corporation Thompson Creek (Cyprus) facility in September 1991 (U.S. EPA 1992c). Cyprus mines molybdenite (molybdenum disulfide, MOS_2) an open pit mine near Challis in central Idaho. Cyprus staked its first mineral claims at Thompson Creek in 1967. In 1981, mining operations began and the first concentrates were produced in 1983. In late 1991, the Cyprus Thompson Creek Mine site consisted of (1) an open pit mine and two waste rock dumps; (2) a primary in-pit crusher; (3) a mill with grinding and flotation, and (4) a tailings impoundment.

Cyprus has been conducting a study to investigate the potential for the waste dumps and the tailings impoundment to generate AMD. The results of the AMD study of the waste rock and tailings were to be provided to USFS by March 1, 1992. Proposed revisions to the facility's reclamation plan were also to be submitted to the U.S. Forest Service (U.S.FS). According to USFS personnel, the revisions to the Plan of Operations were to be subjected to the environmental review requirements of National Environmental Policy Act (NEPA). This review may include preparation of a supplemental Environmental Impact Statement (U.S. EPA 1992c). The AMD study has been requested.

3.2.2 Waste Rock

When mining began in 1981, approximately 130 million tons of overburden were initially removed as "pre- production stripping." Most of the overburden was placed in two waste rock dumps (the Buckskin and Pat Hughes dumps) located adjacent to the pit. In 1990, approximately 16.2 million cubic yards of waste rock were generated, consisting mainly of metasediment, quartz monzonite, challis volcanics, and clayey rock (i.e., decomposed volcanics).

3.2.3 Acid Generation Prediction

Both intrusive and metasedimentary rocks have high sulfur content (up to 1.13 and 1.66 percent, respectively). Therefore, in 1990, Cyprus began a study of the potential for AMD generation from the waste rock and tailings, using both static and kinetic test methods. As of late 1991, static testing had been performed on twenty intrusive rock, and 58 metasedimentary rock samples collected from both the lower

and upper benches of the pit. For each sample, Cyprus calculated the neutralization potential (NP) and the acid generation potential (AP) to determine the net neutralization potential (NNP) and the NP/AP ratio. The NNP represents the neutralization potential (the tons of calcium carbonate required to neutralize 1,000 tons of waste rock) minus acid generation potential (calculated based on the total sulfur content). According to Cyprus personnel, waste rock with an NP/AP ratio in excess of 3:1 was considered non-acid generating. According to USFS personnel, a NP/AP ratio of at least 5:1 should be required before a material is determined to be non-acid forming (U.S. EPA 1992c).

Static testing of eight intrusive rock samples from the lower benches of the pit, close to the ore zone, yielded an average net neutralization potential (NNP), and neutralization ratio (NP/AP) of 0.53 and 1.88:1, respectively. These results exhibited more AMD potential than the average NNP (4.93) and average NP/AP (3.80:1) values obtained from 12 intrusive rock samples from the upper bench. They indicate a greater potential for AMD with intrusive waste rock in the vicinity of the ore zone. The AMD potential decreased with distance from the ore zone. The difference between intrusive rock samples collected from the upper and lower benches was believed to be caused by a relatively predictable pattern of mineralization and alteration zoning around the ore body.

According to Cyprus, the metasedimentary rocks did not appear to be sources of AMD. Cyprus has performed static testing on the metasedimentary rock in the lower benches and found average NNP and NP/AP values of 24.95 and 3.11:1, respectively. It should be noted that, while the metasedimentary rocks are considered non-acid forming by Cyprus (NP/AP greater than 3:1), the average NP/AP ratio is less than the minimum (5:1) ratio suggested by the USFS. Metasedimentary rock samples obtained from the upper benches showed average NNP and NP/AP values of 19.02 and 8.52:1, respectively. Though the average NNP value did not increase in samples from the upper bench, the NP/AP ratio increased significantly, supporting the theory that AMD potential decreases with distance from the ore zone.

Kinetic testing of intrusive and metasedimentary rock was ongoing in 1991 for those static test samples showing acid generating potential. Results of these tests were to be incorporated into the AMD study as they became available.

3.2.4 Tailings

During the ongoing acid drainage study, indications of acid generation were found in the tailings. As of late 1991, the tailings impoundment covered a total of approximately 150 acres with the embankment covering about 60-70 acres and the tailings pond behind the embankment approximately 90 acres. According to Cyprus personnel, tailings oxidation to a depth of several feet had been evident for over two years (U.S. EPA 1992c).

3.2.5 Acid Generation Prediction

In October 1990, ten hollow stem auger borings were completed in the tailings embankment. Samples collected from the these borings were subjected to humidity cell testing, and showed that the average sulfur content of the tailings sands was 0.79 percent and the pH ranged from 3.5 to 7.3 s.u. (Analyses of tailings sands have shown pH levels as low as 3.0 s.u.) In addition, of eight samples tested, six produced elevated iron and sulfate concentrations, and associated increased acidity, within a 15-week test period. The kinetic tests affirm the reactive nature of the tailings found in static test results.

According to Cyprus personnel, the tailings pond and the seepage return pond were not a problem (pH > 5.7 s.u.). However, in 1991, Cyprus conducted a water quality trend analysis for six surface water quality

monitoring locations in the tailings impoundment area. These locations included the main drain of the rock toe, springs located on the left and right abutments of the rock toe, the discharge from the rock toe, the sump below the seepage return pond dam, and Bruno Creek (immediately downstream of the sump). This analysis found that during the period 1981-1990, (1) pH decreased at four locations (but not at the left and right abutment springs), (2) sulfate had increased at all locations, (3) iron had increased at four locations (not at the left and right abutment springs), and (4) no trends in zinc, copper, or arsenic were recognized. The increase in sulfate concentrations was attributed to tailings oxidation and acid generation.

3.2.6 Treatment

Cyprus applied trisodium phosphate (TSP) to tailings embankment sand to address the AMD problem. Previous column testing had found that TSP addition increased the pH, and reduced iron concentrations in leachate samples. According to Cyprus's consultant, two TSP tests, humidity cell tests and large scale tests, were being conducted in 1991 to determine TSP's effectiveness in controlling AMD from the embankment, and maintaining impoundment water quality. However, because the tailings impoundment unit has no discharge and water from the impoundment, seepage return pond, and pump back system is returned to the mill, the TSP application were expected to cause elevated phosphorus levels in the reclaim water. Cyprus personnel indicated these levels may adversely affect flotation operations and that this issue was being studied.

Cyprus' original plan for reclamation of the tailings impoundment indicates that Cyprus initially anticipated that water quality standards could be met by diluting impoundment seepage with natural runoff. No water treatment beyond sediment control was expected to be required. However, the original reclamation plan did not consider the AMD issue. According to Cyprus personnel, the AMD problem could extend well beyond the life of the mine and perpetual care/treatment may be necessary. Therefore, Cyprus was evaluating remedial alternatives (other than perpetual care) and was preparing to submit a revised tailings pond reclamation plan (as a modification to their operating plan).

Alternatives to be considered included installing an additional flotation unit to remove pyrite and/or in-place treatment of tailings with trisodium phosphate as a buffer. Preliminary flotation tests have been conducted to investigate the possibility of removing sulfides from the tailings prior to disposal in the impoundment. Test results indicated that a high percentage of pyrite may be recovered. Limited static testing performed on a whole tailings sample from which pyrite was recovered indicated a NP/AP ratio in excess of 4:1 compared to an average value of 0.84:1 for all tailings analyses.

According to Cyprus personnel, oxidation had only been found to occur in the top two to three feet of tailings (despite the results of analyses of the 1990 borehole samples that showed oxidation at all depths down to 150 feet). Therefore, an additional alternative under consideration was to encapsulate the tailings. Information on specific types of cover materials was not provided. Additionally, Cyprus was investigating the potential use of wetlands treatment.

Appendix C.

Petroleum Risk Assessment and Risk Reduction Procedures

http://a123.g.akamai.net/7/123/11558/abc123/forestservic.download.akamai.com/11558/www/nepa/84125_FSPLT3_1448410.pdf

Golden Meadows Exploration Project Valley County, Idaho

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D.1 INTRODUCTION

Activities associated with the Golden Meadows Exploration Project require large quantities of fuel (on-road and off-road diesel, gasoline, Jet-A) to operate drill rigs and vehicles, fly helicopters, and conduct day-to-day operations. Due to the remote location, fuel needs to be delivered to the site on a regular basis on Valley County and National Forest System (NFS) roads through Boise National Forest (BOI) and Payette National Forest (PAF) lands. Fuel hauling activities to this area presents some risk of accidents and the potential for petroleum products spilling into local waterways. Helicopter flights over area waterways to service drilling activities also present some risk of a helicopter accident and subsequent petroleum spill into local waterways. Both vehicle and helicopter fuel transport activities are discussed in this document. This document supplements Midas Gold, Inc.'s (MGI, project proponent) standard operating procedures (SOP) fuel transportation document, by assessing the potential causes of accidents and petroleum spills and identifying risk reduction procedures.

D.2 BACKGROUND

MGI proposes to conduct mineral exploration activities over three years after project approval in the Stibnite-Yellow Pine Mining District (District) in central Idaho as part of the company's Golden Meadows exploration project. The objective of exploration activities is to better define mineral deposit potential in the District. The project area is located about 38 miles east of McCall, Idaho, in the East Fork of the South Fork Salmon River (EFSFSR) drainage (**Figure 1**).

The project area is in remote, rugged, high-relief terrain on both private property, and public lands administered by the Krassel Ranger District of the PAF (Forest Service). EFSFSR is the major drainage in the area, which flows south to north. Tributaries of the EFSFSR in the project area include: Meadow Creek, Garnet Creek, Fiddle Creek, Midnight Creek, Unnamed Creek, and Sugar Creek.

D.3 SUMMARY OF PROPOSED FUEL TRANSPORTATION PROCEDURES

MGI has developed an SOP for fuel transportation. Fuel would be transported from Cascade, Idaho, to the temporary camp site near the former Stibnite town site. The camp site and petroleum storage area are on private land. Fuel would be stored in aboveground storage tanks (ASTs) (current capacity is 45,000 gallons and MGI plans to expand the storage capacity to approximately 55,000 gallons). The ASTs have secondary containment and are constructed, managed, and monitored in accordance with a spill prevention control and countermeasure (SPCC) plan as per 40 Code of Federal Register (CFR) 112.

The following routes provide fuel hauling access to the project site (**Figure 1**):

- From the Cascade: Warm Lake Road (FS 579) for 37 miles to Landmark, then north on Johnson Creek Road (FS 413) for 28 miles to Yellow Pine, and 14 miles on Stibnite Road (FS 412) to the project sites. (This is the preferred route for transporting fuel during snow-free months.)
- From the Cascade: Warm Lake Road (FS 579) for 35 miles to Knox, then north on South Fork Road (FS 474/674) for 32 miles to East Fork Road (FS412), 16 miles east on East Fork Road (FS 412) to Yellow Pine, and 14 miles on Stibnite Road (FS 412)

Fuel convoys would generally consist of two to four 4,000-gallon tanker trucks, depending on fuel requirements at the site and the availability of transport trucks. No fuel trailer pups would be used. The trucks would be accompanied by a pilot vehicle and an emergency response truck. Convoys would normally travel on back-to-back days (one convoy each day on two consecutive days in a given week). Specific convoy procedures and accident mitigation measures are described in the SOP and presented below.

Johnson Creek is the preferred route for transporting fuel in large trucks during snow-free conditions because it is generally wider and further from adjacent waterways than the other roads. Johnson Creek Road is normally closed during the winter (approximately mid-December through mid-May), and the only open route to the site is the South Fork Road, which is plowed by Valley County. If future logistics, weather conditions, fish and wildlife protection needs, or other conditions dictate that snow removal take place on Johnson Creek Road throughout the winter, then the SOP would be revised accordingly.

During spring break-up conditions (usually late March to late May), when roadbeds are often slushy and soft, vehicle weight restrictions are imposed by the Forest Service on the South Fork Road and by Valley County on county roads (East Fork Road, Stibnite Road and Johnson Creek Road, if open). Since the 4,000-gallon trucks exceed the weight limit on these roads during this period, fuel would be transported in a single truck containing a 500-gallon tank using the South Fork Road route. A pilot car would accompany the truck. Specific procedures and mitigation measures are described in the SOP.

Table 1 presents a summary of proposed fuel hauling routes, frequency of trips, and fuel volume deliveries. MGI has estimated their fuel needs based on the 3-year plan of operations (POO) at approximately 2000 gallons per day during the snow-free period and approximately 500 gallons per day during winter months. This equates to approximately 500,000 to 600,000 gallons per year. Based

on fuel needs, MGI will attempt to conduct the majority of fuel hauling during the snow-free period so that winter hauling and spring breakup hauling are limited.

Table 1. Fuel Hauling Summary

Fuel Hauling Period and Route	Convoy Trips	Fuel Delivery to Project Site
Snow-free Period (June through November, may vary depending upon weather conditions) – Johnson Creek Road Route	Two convoy trips per week. Two to four fuel trucks per convoy (4,000 gallons per truck).	16,000 to 32,000 gallons per week. Total of approximately 416,000 to 832,000 gallons over a 26 week period.
Winter Period (December through March, may vary depending upon weather conditions) – South Fork Road Route	Two convoy trips per month. Two to four fuel trucks (4,000 gallons per truck).	16,000 to 32,000 gallons per month. Total of approximately 64,000 to 128,000 gallons based on four month period.
Spring Break-up Period (Mid- March through May, may vary depending upon weather conditions) – South Fork Road Route	One convoy per day. Limited hauling due to road weight restrictions, 500-gallon limit per truck.	3,500 gallons per week but will attempt to limit trips (10,000 to 40,000 gallons over a 10 week period).

Once fuel reaches the project site, it is often transported by helicopter to facilitate drilling activities such as servicing drill rigs and exploration sites or to conduct reconnaissance activities on both sides of the valley. Twenty three of the 26 drill areas would be accessed via helicopter and equipment and crew would be transported to the drill pads by helicopter.

The quantity of fuel associated with helicopter flights depends on the activity being conducted. Helicopters that aren't hauling fuel still require fuel for operation of the helicopter. As a result, any helicopter flight over area waterways can present some risk of a helicopter accident and subsequent petroleum spill into local waterways.

The use of a helicopter for exploration drilling activities was selected to minimize the land disturbance required to access drilling areas (cutting roads) and to decrease the footprint of drilling activities. Moreover, helicopter flight was believed to present a smaller risk of a fuel spill into local waterways than vehicle travel due to the ability to travel increased distances from waterways. Despite the higher costs of using a helicopter to support drilling activities, the benefits are believed to outweigh the risks.

Specific helicopter flight procedures and accident mitigation measures are described in the SOP and presented below. Due to the ongoing need for supplies and materials at various locations of the drill sites and reconnaissance areas, specific helicopter flight routes do not exist. Instead, high risk travel routes will be avoided as outlined below.

D.4 FUEL HAULING RISK

Vehicle travel on NFS and county roads in the Valley County area present some risk for accidents due to the narrow, winding nature of these mountain roads and periodic inclement

weather conditions. Furthermore, many of the routes described above travel parallel to streams and make numerous stream crossings. The figures in Attachment A illustrate the travel routes to the project site, the proximity of roads to the streams, and the location of anadromous fish spawning areas on the South Fork of the Salmon River (SFSR), EFSFSR, and Johnson Creek. **Table 2** presents a summary of miles of road for each route that is within 300 feet of a stream. The Johnson Creek Road route has 140,457 feet of roadway within 300 feet of the anadromous streams compared to 270,168 feet for the South Fork Road Route. As summarized in **Table 1**, emphasis for fuel hauling will be during the snow-free months, which uses the Johnson Creek Road route.

Table 2. Summary of Road Segments within 300 Feet of Streams Supporting Anadromous Fish Populations

Road	Total Length (feet)	Length within 300 feet of stream	Percent of Road within 300 feet of Stream
Johnson Creek Road Route			
Johnson Creek Road (FS 413)	133,458	75,479	57
Stibnite Road (FS 412)	83,845	64,978	78
Total	**217,303**	**140,457**	**65**
South Fork Road Route			
South Fork Road (FS474.674)	167,416	128,466	77
East Fork Road (FS 412)	82,845	76,724	93
Stibnite Road (FS 412)	83,845	64,978	78
Total	**304,106**	**270,168**	**89**

Traffic accident data for the routes described above are incomplete and do not allow for statistical evaluation of accident probability. Rather, the approach used here is to identify causes of accidents and then to describe procedures to be taken to minimize risk of accidents.

The following is a list of causes of accidents, based on a review of accident report summaries for rural and Forest Service roads:

Driver - Human Error

- Speed too fast for road conditions
- Following too close behind another vehicles
- Inattentiveness (distracted)
- Fatigue
- Miss-shifting gears on grades
- Failure to share road
- Inexperienced driver

Mechanical – Vehicle Factors

- Brake failure
- Structural breakdown (engine failure)
- Tire troubles

- No tire chain use in ice or snow conditions or miss-use of chains

Environmental -Weather and Road Conditions

- Snow and ice
- Flooding
- Soft shoulders
- Poor visibility (fog, snow storm, rain)
- Wildlife

Helicopter flight in the project area requires occasional flight over area streams and waterways. Strictly avoiding flight over waterways is not always possible, although excessive flight time over waterways can be avoided. Helicopter accident data is not statistically representative of project area conditions and is unlikely to represent reasonable accident probability. As a result, the potential causes of helicopter accidents are described and the procedures to minimize risk of accidents are identified.

Similar to the vehicle accident evaluation, the potential causes of helicopter accidents are often related to driver or human error, mechanical failures, or environmental or weather conditions. Different conditions can affect helicopter flight, but generally inattentiveness, engine failure, or weather-related visibility or extreme conditions are the primary causes of potential helicopter accidents.

D.5 TRANSPORTATION RISK REDUCTION MEASURES D.5.1 Objective

The objective of these risk reduction measures is to develop a coordinated road and helicopter use policy for the Golden Meadows exploration project and to minimize environmental and public safety risks related to transporting fuel to and within the project site. To reduce potential accidents, the following SOP will be conducted for fuel transport.

D.5.2 Standard Operating Procedures

A fuel management plan has been created for the project that analyzes measures for minimizing the potential for fuel spills along the main routes into the activity area. The fuel management plan also outlines the times of year and the routes that will be used to deliver fuel into the project area. The fuel plan will be followed for all activities associated with fuel delivery.

For non-winter conditions, the Johnson Creek Road route will be used:

o From Cascade: Warm Lake Road (FS 579) for 37 miles to Landmark, then north on Johnson Creek Road (FS 413) for 28 miles to Yellow Pine, and 14 miles on Stibnite Road (FS 412) to the project sites.

Road clearing and maintenance activities will be coordinated with Valley County as necessary.

The Forest Service project administrator and Valley County sheriff dispatch will be notified a minimum of 48 hours in advance of the fuel convoy.

Adequate support personnel will be scheduled, including a minimum of three 40-hour hazardous waste operations and emergency response (HAZWOPER)-trained spill responders.

• The day of the convoy:
o Prior to the convoy leaving Cascade, a health and safety meeting will be

conducted with the convoy staff. Topics to be discussed at a minimum include:

i. Anticipated road conditions and weather forecast.
ii. Roles and responsibilities of all participants.
iii. Communication plan protocols (including truck to truck radios, satellite phones, site communication when the convoy reaches Yellow Pine and notification protocol in event of accident or fuel release).
iv. Emergency response procedures and available equipment. Goals of on-site first responders, safety issues, and protocols.
v. Emergency numbers and call order.
vi. SPOTTM GPS Messenger operation (provides satellite tracking of convoy location and has emergency notification capabilities).
vii. Discussion of proper pace (speed), driver fatigue, scheduled, and unscheduled stops.

o Setup and confirmation of caches for spill response equipment will occur along portions of Johnson Creek Road and the Stibnite Road.

o Road signs will be established at the Landmark and the Yellow Pine ends of Johnson Creek Road indicating to the public that a fuel convoy is in progress and to use caution.

• During the convoy:

o A safe speed of travel will be maintained. Speed will be determined by the convoy leader, will not exceed posted speed limits and will be based on road conditions.

o Communication with management will occur by using the SPOTTMGPS Messenger – signal check-in/OK at least hourly, and signal arrival (custom message) upon reaching the site camp, and upon safely returning to Cascade. The Forest Service project administrator will be notified upon safe return to Cascade.

o A SPOTTMGPS Messenger button will be used in an emergency to alert emergency responders.

o Site security will clear all oncoming traffic before proceeding up or down Stibnite Road between the Yellow Pine guard station and the site. Convoy progress will be radioed to security according to established protocols.

• During winter, when Johnson Creek Road is closed, the route from Cascade to Yellow Pine and Stibnite using the South Fork Road will be used:

o From Cascade: Warm Lake Road (FS 579) for 35 miles to Knox, then north on South Fork Road (FS 474/674) for 32 miles to East Fork Road (FS 412), 16 miles east on East Fork Road (FS 412) to Yellow Pine, and 14 miles on Stibnite Road (FS 412) to the project site.

• During winter, the following activities will also occur:
o Convoy travel to the intersection of the South Fork Road and Warm Lake Road

on the trip back to Cascade from the site must be accomplished during daylight

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hours. Every truck will carry properly sized chains for both steering and drive tires.

o Road monitors will be placed at both ends of the South Fork Road while the convoy is operating. The monitors will notify traffic entering the road from both directions that a fuel convoy is in progress, and that if the convoy is encountered on the South Fork Road, they, not the convoy trucks, will be required to find a pull-out location to allow the convoy to pass. The monitors will also notify the convoy pilot car of any traffic on the road.

o Site security (Yellow Pine and Sugar Creek guard shacks) will clear oncoming traffic before proceeding up or down Stibnite Road between the Yellow Pine guard station and the site. Convoy progress will be radioed to security according to established protocols.

o It may be necessary to sand the road in advance of the convoy (3/8inch washed rock, no fine sand is allowed).

o If round-trip travel cannot be completed during daylight hours (e.g., due to a mechanical breakdown or other incident) it may become necessary to spend the night at the Yellow Pine camp.

- During the spring break-up period, fuel hauling will consist of two four-wheel drive vehicles – one small dump truck carrying a 500-gallon, double-wall tank with a lead pilot truck. Both trucks will be equipped with appropriate tire chains and radios to maintain communication with each other while traveling, and will make one round trip to deliver fuel to the site per day, 7 days per week. The pilot car will also carry a satellite phone and an assortment of spill response equipment (pads, booms, etc.) in case of emergency. At least two personnel (drivers and/or

passengers) will have current HAZWOPER training and will be first responders in the event of an accident.
- Helicopter flight times will be minimized over area waterways, especially flights over Meadow Creek, EFSFSR, and the Glory Hole to the greatest extent possible. Stream corridors will not be used as helicopter flyways.

D.5.3 Additional Requirements to Reduce Accident Risk

1.

Driver Awareness Training and Safe Driving Course: All fuel transport drivers will be required to have spill response, safety, and resource awareness training. In this program, drivers will be informed of the Idaho State Emergency Medical Service (EMS), first hazardous materials responder actions, and the importance of anadromous fisheries that must be protected. In addition, each driver will participate in a safe-driver training course that is specific for the MGI fuel convoy. The course will cover the SOP as well as discuss causes of accidents and how to minimize risk:

Driver - Human Error

• • • • •

Safe speed based on road conditions, dry, wet, snow, and ice Safe distance behind other vehicles
Inattentiveness
Fatigue

Shifting gears on grades

• Sharing the road ***Mechanical – Vehicle Factors***

- Brake failure
- Structural breakdown
- Tire troubles
- Chain use

Environmental -Weather and Road Conditions

- Snow and Ice
- Flooding
- Soft shoulders
- Night versus daylight driving conditions
- Wildlife

2. ***Pilot and Emergency Response Vehicles: A two-axle four-wheel drive vehicle equipped with an operating CB radio, 40-watt or 5-watt VHF radio, a satellite phone, a SPOTTM GPS Messenger system, a flashing cab light, and a "pilot vehicle" sign attached to the front of the vehicle will be required for each convoy. Letter size for pilot vehicle signs will be at least 6 inches in height.***

   For both the pilot and emergency response vehicles, a qualified driver (or passenger) trained in spill response, safety, and first aid will participate in each convoy. The pilot vehicle will travel in advance of the fuel trucks at a distance not greater than 1 mile and not less than 1/4 mile. The pilot vehicle will advise oncoming traffic to park until the convoy passes and will regulate the speed of the transporting vehicle so that it does not exceed posted speed limits and safety conditions inherent to the road. The emergency response vehicle will follow in between or behind fuel trucks offering road use controls and quick breakdown or accident response.

3. ***Required On-Board Spill Containment Equipment: Pilot and emergency response vehicles will carry appropriate containment and first aid equipment. Each convoy (between the two vehicles) will carry at least one gallon of dry plug-n-dike; three oil sorbent booms; one bundle of sorbent pads; shovels; 96-inch by 96-inch piece of plastic sheeting; a bucket; a 55-gallon drum; and a small trash pump (or equivalent) and generator.***
4. ***No Weekend Use of Johnson Creek or South Fork Roads: Except during the spring breakup period, to minimize disruption to the traveling public, no fuel convoys will be permitted into the project area after 9:00 a.m. on Fridays, and no transport on Saturdays or Sundays, unless permitted under special request by the Forest Service.***
5. ***Equipment Checks: Documented annual inspections of commercial transport vehicles are required in 49 Code of Federal Regulations [CFR] 396.17-23. Inspections will be conducted by a qualified U.S. Department of Transportation (DOT) inspector. Commercial transport vehicles will also be inspected at Knox or Landmark by the driver prior to accessing Johnson Creek or South Fork Road. Transport companies are required to document DOT annual inspections and Landmark vehicle inspections.***
6. ***Helicopter Emergency Response: In the unlikely event of a helicopter crash into water, Midas emergency responders will be notified by radio. One group will immediately respond***

to the crash site, to render assistance, medical aid, and employ environmental precautions including stabilization of the site, deploying booms, and absorbent pads, and pumping off excess fuel from the helicopter. A second Midas emergency response team will also mobilize and head to the outlet areas of the Glory Hole, or to the junction with Sugar Creek, to deploy secondary absorbent booms across the river. Midas also maintains a section of "sea curtain" boom on site, which is designed for use in the relatively quiet water of the Glory Hole. This boom acts as a barrier to fuel and is designed to be used in conjunction with absorbent booms. The Emergency response team leader will notify senior Midas personnel, and emergency medical or fire responders, as appropriate.

Table 3 presents a summary of accident causes and measures to reduce risk of accidents that are specific for this project. With implementation of the measures, the chances of accidents and the potential for spilling fuels into surface water is greatly reduced.

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Table 3. Summary of Factors Leading to Accidents and Measures to Reduce Risk

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Cause of Accidents	Measures to Reduce Risk
Driver - Human Error	
Speed too fast for road conditions	Convoy leader will set convoy travel speed based on posted speed limits and anticipated road conditions. A SPOTTMGPS Messenger system will be used for each convoy and will provide GPS measured data on overall speed of convoy. This information will be reviewed by MGI management and is available to Forest Service to ensure convoys are traveling at appropriate speeds. Expected travel speeds will be discussed during pre-convoy meetings and there will be communication between trucks during the convoy to adjust travel speed as warranted.
Following too close behind another vehicles	Convoy trucks will maintains safe distances between trucks based on speed, road conditions, and stopping distances. Convoy leader will be responsible for ensuring safe separation between trucks. Separation distance requirements will be discussed in driver training and during the pre-convoy meeting.
Inattentiveness	Importance of attentive driving will be emphasized during driver training and at the pre-convoy meeting. Frequent radio communication between trucks will help maintain driver attention and alert them to potential road hazards including oncoming traffic, wildlife, etc. Similar activities and meetings will occur with helicopter pilots to encourage them to remain attentive and to notify them of potential hazards.
Fatigue	Drivers will be DOT-licensed and adhere to driver log and driving time restrictions as set by DOT. Helicopter pilots will be licensed and will adhere to Federal Aviation Administration requirements as appropriate. Driving will be during daylight hours. The convoy lead will be responsible for assessing driver physical condition. Rest stops will occur during the convoy and the frequency of stops will be determined by the convoy lead as well as request by drivers.
Miss-shifting gears on grades	Drivers will be experienced in fuel truck hauling on NFS roads and will be familiar with the travel routes including locations of steep slopes that require downshifting (for vehicles with manual transmissions). Radio communication will be used to warn drivers of upcoming steep grades and also of any oncoming traffic that may require trucks to slow down or stop.
Failure to share road	The convoy pilot truck will warn oncoming traffic of the convoy and request that oncoming traffic pull aside (or wait) for the convoy. The convoy will be made aware of any oncoming traffic through radio communication with the pilot truck. Radio communication will be maintained between trucks and pilot vehicle. For winter operations, road monitors will be placed at both ends of the South Fork Road while the convoy is operating. The monitors will notify traffic entering the road from both directions that a fuel convoy is in progress, and that if the convoy is encountered on the South Fork Road, they, not the convoy trucks, will be required to find a pull-out location to allow the convoy to pass. The monitors will also notify the convoy pilot car of any traffic on the road.
Inexperienced driver	Fuel haul drivers will be experienced in fuel hauling on NFS roads (or similar roads). Helicopter pilots will be experienced and licensed.
Mechanical – Vehicle Factors	
Brake failure	Documented annual inspections of commercial transport vehicles are required in 49 CFR 396.17-23. Inspections will be conducted by a qualified DOT inspector. Commercial transport vehicles will also be inspected at Knox or Landmark by the driver prior to accessing Johnson Creek or South Fork Road. Transport companies are required to document DOT
Structural breakdown (engine failure)	

Table 3. Summary of Factors Leading to Accidents and Measures to Reduce Risk

Cause of Accidents	Measures to Reduce Risk
Tire troubles	annual inspections and Landmark vehicle inspections. Documented inspections will also occur for helicopters as appropriate to ensure safe operating conditions.
No tire chain use in ice or snow conditions or miss-use of chains	Tire chains will be required for snow or ice road conditions. The need for chains will be determined by the convoy lead. All trucks will be equipped with properly sized chains for both steering and drive tires.
Environmental -Weather and Road Conditions	
Snow and Ice	Emphasis on timing of convoy trips will be during snow-free conditions with limited trips during snow/ice conditions. During winter, convoys will occur only when road conditions are deemed passable and safe. Weather forecast will be evaluated and incorporated into travel "go/no go" decisions. All trucks will be equipped with properly sized chains for both steering and drive tires. Drivers will be experienced in winter time travel on NFS type roads and also be experienced with tire chain operations. Helicopter flights will be discouraged during heavy snow or icy conditions.
Flooding	Convoys will not occur if there are flooding conditions on roads or the immanent threat of a flood.
Soft shoulders	The convoy lead will be responsible for knowing road conditions prior to convoy travel, including areas of road hazards such as soft shoulders and wash out areas. During the convoy, the pilot truck will be responsible for communicating to the fuel trucks locations of road hazards and if necessary placing flagging around the hazards.
Poor visibility (fog, snow storm, rain)	A scheduled convoy will be delayed if driving visibility is poor. Helicopters will be temporarily grounded if visibility is poor.
Wildlife	To minimize wildlife collision risk, the convoy will travel at posted speed limits or lower and travel during daylight hours. In addition, all convoy vehicles will be equipped with radio communication to warn other convoy members of wildlife near the travel route.