Alaska Miners Association

Technical Review of the 2nd Draft (April 2013 "Revised" Draft) of the EPA Bristol Bay Assessment

In July 2012, the Alaska Miners Association (AMA) submitted a detailed 30-page technical review of the first draft of EPA's Bristol Bay Watershed Assessment. The assessment also attached an academic analysis by the University of Alaska.

This document is a brief review of EPA's "Revised" draft, published April 2013.

Inadequate time for review. EPA allowed only 24 business days for review. In addition, EPA released the document without warning, so that AMA's reviewers could not clear their calendars for the review. Twenty-four days is clearly an inadequate time to review an over 1,300-page series of documents. The review was made significantly more difficult because EPA did not provide a response to comments, and did not summarize the changes made. In addition, EPA changed the organization of the document, further complicating efforts to track down any response to AMA's original comments.

In short, EPA's token public comment effort appears designed to thwart reasonable review.

Description of AMA's Technical Review. Given the short review time, AMA was only able to trace down how EPA responded (or failed to respond) to AMA's original comments. It was not able to spend the time to identify new errors introduced. Because EPA failed to acknowledge, respond to, or change the document in response to most of AMA's detailed, technical comments, it seems pointless to repeat the original AMA comments. Therefore, we are including a copy of the original comments, and referencing the relevant page numbers of the original document.

Abbreviations and references used in this Technical Review. The 2012 AMA Technical review of EPA's May 2012 draft is referenced as 2012 TR. The AMA Technical Review numbered the errors it documented from 1 to 26. Thus, 2012 TR, Error #1, page 3-6, would reference Error #1 on page 3-6 AMA's 2012 AMA Technical Review.

Executive Summary

Cosmetic Changes Only: *Lipstick on a Pig*. Overall, EPA made only cosmetic changes to its 2012 draft. The 2012 draft was fundamentally flawed in numerous ways. AMA's first technical review documented and explained 26 major errors, and referenced an University of Alaska, Anchorage (UAA) academic publication that pointed out the EPA's methodology was flawed and gave unreliable results.

Many of EPA's own appointed peer reviewers were similarly critical. Some reviewers noted that the hypothetical mine included no mitigation. Mitigation will be required by the permitting process and will change the impacts. Another reviewer indicated that without a reclamation plan (which the Assessment lacks), one could not determine the final impacts. Two others called the Assessment a good first screen. In fact, it appeared that over half of the reviewers at one point or another said that the report identified *potential* impacts, but the report would have to be followed up with a much greater level of engineering design and mitigation before it could adequately represent *realistic* mine impacts. EPA ignored these comments from the peer reviewers.

EPA ignored most comments made in AMA's 2012 Technical Review. EPA did not change their document in a manner that responded to the serious and fundamental errors AMA pointed out. Further, it completely ignored the UAA academic critique that applied to their methodology. In short, EPA made cosmetic changes to a fundamentally flawed document: *lipstick on a pig*.

Ignoring Adverse Comment: *EPA ignored three quarters of AMA's 2012 comments.* In 2012, AMA identified 26 significant errors in EPA's draft. Each of these errors is serious enough to question the validity of major conclusions in the draft. Of the 26 comments, EPA completely ignored 19 in their 2013 draft. For these serious charges, EPA made no change in the Assessment and gave no explanation. Four of AMA's comments were partially addressed. We cannot determine the status of the remaining three comments, because we cannot determine what the hypothetical mine is intended to represent.

Obviously Biased: *Incorporating suspect reports from anti-mining groups, but ignoring reports from others.* Pebble Limited Partnership, groups opposing the Pebble Mine, and the AMA all submitted professionally researched reports with conclusions relevant to the Assessment.

EPA decided to use seven reports, all written by individuals and organizations with obvious and very public stances opposing the Pebble Mine. EPA sent these reports to peer reviewers and incorporated their conclusions in the 2013 draft. However, Pebble Limited Partnership also submitted seven reports by highly credentialed individuals and organizations. AMA submitted one academic report. EPA ignored these reports. EPA did not submit them to peer review; EPA ignored their conclusions and EPA gives no explanation for why they did this.

Further, some of the EPA's peer reviewers were critical of the reports (the ones submitted by avowed Pebble opponents). EPA ignored the critical peer reviewer comments. They used the reports conclusions even when peer reviewers advised them not to.

It is biased to use only those reports submitted by anti-Pebble groups and to ignore all others. There is no excuse to peer review and use only those reports that support EPA's conclusions and to ignore those that contradict the conclusions. Yet, that is what EPA did. EPA compounded the bias problem by ignoring peer review comments that failed to support their conclusions as well.

Fundamental Flaw: *EPA's hypothetical mine does not represent any large mine. It doesn't represent Pebble.* AMA cannot determine what the hypothetical mine is intended to represent. AMA research demonstrates that copper porphyry deposits are not representative of other deposits in the region, and that even copper porphyry deposits vary greatly. Further the hypothetical mine uses a non-representative geochemical make-up, uses a location that is not representative of Bristol Bay, and omits mitigation and prevention strategies likely to be used by other large mines in Bristol Bay. For those reasons, EPA's hypothetical mine cannot pretend to represent any large mine – they are all different. In addition, it cannot even represent any copper porphyry mine. The differences between them are too great. Therefore, the hypothetical mine cannot reasonably represent any mine except Pebble.

But the hypothetical mine does not represent Pebble either. Pebble Limited Partnership has publically stated that they will not propose the mine that EPA is using as its hypothetical mine. The State of Alaska, AMA, and others have told EPA that its hypothetical mine fails to meet Alaska's permitting standards and would not be allowed. EPA's mine omits prevention and mitigation strategies that Pebble would likely propose and that the government would certainly require. It is not reasonable to forecast Pebble's impacts from a mine that Pebble won't propose, that the state would not permit if they did propose it, and that lacks strategies to prevent and mitigate impacts. The hypothetical mine does not represent the impacts from Pebble.

If EPA's hypothetical mine does represent all large mines that could be proposed in Bristol Bay; if EPA's hypothetical mine does not represent any porphyry copper mine that could be proposed in Bristol Bay; and if EPA's hypothetical mine does not represent Pebble, then what does it represent? ***The answer: the EPA's hypothetical mine represents <u>nothing</u>.*** The impacts are not necessarily representative of any mine in the region, any porphyry copper mine, or Pebble. Therefore, predictions from the Bristol Bay Watershed Assessment are meaningless.

EPA's methodology fails. *The Assessment cannot be fixed.* This technical review concludes that EPA's methodology is misapplied and conceptually flawed. It does not follow the requirements of an ecological risk assessment. It cannot be fixed. A pre-design ecological risk assessment is an unsupportable methodology that cannot produce

reliable conclusions. A University of Alaska paper included in the AMA 2012 technical review documents why a pre-design ecological risk assessment is a failed methodology.

General Comments on EPA's 2013 Revised Bristol Bay Assessment

The Fundamental Problem: ***A review of a hypothetical mine – especially EPA's hypothetical mine -- does not represent anything meaningful. Predicted impacts from the review are meaningless.*** The purpose of the document is unclear. Some of EPA's own reviewers said this about the 2012 document, and EPA failed to address those criticisms. By remaining vague about what the hypothetical mine represents, EPA is avoiding a critique that would come with a forthright explanation.

- *Is the hypothetical mine supposed to represent any large mine that is reasonably foreseeable in the region?* The Assessment implies that it is. Specifically it reads, "This is not an in-depth assessment of a specific mine, but rather an examination of impacts of reasonably foreseeable mining activities in the Bristol Bay region…" (page ES-4). Also, "…much of the discussion of mining methods…applies to all types of disseminated ore deposits…" (page 4-1).

  If the Assessment is intended to represent any large mine, or any large mine with a disseminated deposit, it is in error. See 2012 TR, Introduction, p. 1; and Errors 1-7, pages 3-14; but especially Error 1: Copper porphyry deposits are not representative of other mineral deposits in the Bristol Bay Watershed.

- *Is the hypothetical mine supposed to represent any copper porphyry mine that might be developed in Bristol Bay?* The assessment implies this conclusion as well. While the Assessment never tells the reader that it is limited to porphyry copper deposits, the fact that it reviews only copper porphyry characteristics (Chapter 4) and uses only porphyry deposits and mining practices to develop the hypothetical mining scenario (page 6-1) indicates that the real application of the assessment is to a copper porphyry deposit.

  If the Assessment is intended to represent the impacts of any copper porphyry mine, it is in error. See 2012 TR, Errors 1-7, pages 3-14.

- *If the hypothetical mine is not supposed to represent any mine in Bristol Bay, or any copper porphyry mine in Bristol Bay, then the hypothetical mine must, by process of elimination, be intended to represent Pebble. But it doesn't.* Disclaimers that the mine does not represent Pebble are sprinkled throughout the document. "This is not an in-depth assessment of a specific mine…" (page ES-4). Or, "The scenarios are not mine plans: they are not based on a specific mine permit application, and are not intended to be the detailed plans by which the components of a mine would be would be designed. (page 6-1).

  Despite the Assessment's protests to the contrary, if the Assessment cannot realistically represent any mine, or even any copper porphyry mine, EPA must

intend the hypothetical mine to represent Pebble. There is really no other realistic choice. The fact that the Assessment is intended to predict the impacts of Pebble is what the public, the press, and peer reviewers believe. The commentary and editorials in newspapers and advertisements all assume the Assessment predicts Pebble. All of the public comment during 2012 reflected that belief. Advertisements by anti-mining groups reflect this belief. The peer reviewers' comments did not pretend to evaluate whether it predicted any other mine. EPA has spent no time or energy contradicting these beliefs. Therefore, despite EPA's protests to the contrary, which are written into the document, it appears that EPA is trying to predict the impacts of Pebble.

But the hypothetical mine used in the Assessment does not represent Pebble:

- Pebble Limited Partnership said publically that they would not propose the mine design that EPA is considering.[1]
- The State of Alaska and various reviewers — including AMA — have said that this mine could not be permitted under state law.
- As peer reviewers indicated, this mine has no prevention or mitigation strategies.[2] Many of these strategies would be a part of a realistic mine design and others would be required by government permitting agencies.
- As peer reviewers indicated, this mine has no reclamation plan, which is necessary to assess the long-term risk.

If EPA wishes to assess the effects of the Pebble Mine, it should wait until Pebble proposes a design and then evaluate that under existing permitting processes. A hypothetical mine that Pebble Limited Partnership is not planning to propose, that would not meet permitting standards if it were proposed, that lacks prevention and mitigation strategies which would be a part of a reasonable mine design and required by government, and which has no reclamation plan, cannot be logically said to represent the likely or inevitable impacts of Pebble.

If EPA's hypothetical mine does represent any mine that could be proposed in Bristol Bay; if EPA's hypothetical mine does not represent any porphyry copper mine that could be proposed in Bristol Bay; and if EPA's hypothetical mine does not represent Pebble, then what does it represent? **The answer: the EPA's hypothetical mine represents <u>nothing</u>.** The impacts are not necessarily representative of any mine in the region, any porphyry copper mine, or Pebble. Therefore, predictions from the Bristol Bay Watershed Assessment are meaningless.

[1] Testimony of John Shively, CEO Pebble Limited Partnership to the EPA Peer Reviewers, July 2012.

[2] . In this paper, the word *prevention* is used to describe a strategy to prevent a problem from occurring, and *mitigation* is used to contain the severity of a problem after it occurs. For example, drivers may prevent a car crash (the problem) by maintaining their cars in good working order, keeping tires inflated, and driving the speed limit, but if a crash happens anyway, airbags and seatbelts can mitigate the severity of a crash. In the world of mining, some activities have characteristics of both. For example an intensive inspection regime may keep a tailings facility working properly thereby helping prevent leaks (prevention) and also it may detect leakage early to limit its effects (mitigation).

Evidence of Bias: *EPA incorporates reports from Pebble opponents; they ignore technical reports from others.*

Incorporating suspect reports in a suspect manner. EPA's 2012 Assessment lacked support for some of its conclusions. To gather that support, EPA augmented its record with reports written by publicly committed opponents of the Pebble Mine.

Earthworks wrote one report. Earthworks was described in Kuipers, 2006 as "a non-profit organization dedicated to protecting communities and the environment from the destructive impact of mineral development in the U.S. and worldwide."

Two reports were written in part by Ms. Woody. Ms. Woody is the author of numerous articles in local papers, video productions, etc. advocating against the Pebble Mine.

Two reports were written in part by Dave Chambers. Mr. Chambers is president of the Center for Science in Public Participation, which opposes mining in general and the Pebble project specifically. From the organization website, "Since 2007, CSP2 has been providing technical support to a loose coalition of groups opposed to the proposed [Pebble] mine."

Three reports were authored in part by Ann Maest or Cam Wobson who are former or current employees of Stratus Consulting. Unfortunately, Stratus consulting has a record of falsifying records to oppose resource development. Specifically, Chevron discovered that Stratus Consulting had been involved in falsifying environmental research. (See New York Times, April 12, 2013 and other articles). Chevron sued Stratus Consulting for racketeering and fraud. In response, Ms. Maest and Stratus Consulting filed a 28-page affidavit and 16 pages of individual declarations disavowing the research it had produced.

Failing to Incorporate Reports from anyone who was NOT opposed. AMA is not contending that because the individuals described above oppose Pebble that their scientific work is necessarily wrong. However, EPA had a responsibility to investigate all of the reports submitted to them, not just those from Pebble opponents. Pebble Limited Partnership submitted seven reports from individuals and consulting firms with excellent credentials and reputations. They are listed below.

No.	Title of Paper	Company
1	Mitigating Risk in the Design and Construction of Tailings Dams in Alaska	Knight Piesold
2	Development of Stable Waste Rock Piles in Alaska	Knight Piesold
3	Active Metal Mines of the Fraser River Basin and Fish – Case Studies	Knight Piesold
4	Fraser River Salmon and Mining Review	AECOM
5	Offsetting Potential Wetlands Impacts through the Environmental Permitting Process	HDR, Inc.
6	Summary Review of Fish Habitat: Flow Dependencies and Methods for Evaluating Flow Alteration Effects	R2 Resource Consultants
7	Aquatic Habitat and Fish Population Recovery in the Toutle River following the 1980 Eruption of Mount St. Helens	R2 Resource Consultants

In addition, AMA submitted a report published by UAA that was published prior to the EPA Assessment by was relevant to their methodology.

EPA peer reviewed and used only reports submitted by Pebble opponents. They completely ignored and failed to peer review or use any reports submitted by others.

Ignoring critical peer review comments. Not only did EPA peer review and use only reports from Pebble opponents, they also ignored peer review comments of those reports when the comments were critical.

For example, the three of the four peer reviewers[3] of the Earthworks 2012 report were critical of using the results of the report. Reviewer #1 indicated, "…the results of the presentation should be considered only in a broad sense when considering a new copper porphyry mining project…The conclusion that we can expect a similar or worse track record for a new mine is, however, not supported by the information presented."

Reviewer #2 said, "While not challenging the facts as presented, I find the report, by its nature, to be very biased…. Such reports, which attempt to paint the world as black or white, inevitably come across as one-sided because they are. While it is appropriate to consider potential environmental issues and problems associated with mining when making a decision with respect to Bristol Bay, such decisions should be made based on the site-specific conditions, along with appropriate risk management analysis."

Reviewer #4 said, "…there are limitations if the results of the Earthworks report are applied to the EPA assessment… Based on Table 2 – their results – one might assume that an environmental sound large-scale mining operation without failures is impossible. Yet this is not the case as many incidents are of only minor importance and modern day mining has more stringent requirements than the older mines investigated."

Despite the fact that three of the four reviewers told EPA not to apply the conclusions directly to the Bristol Bay Assessment, EPA did just that. It used the statistics in the report to directly calculate the expectation of water treatment failure for their hypothetical mine. EPA made no concession, and did not even inform the readers that Peer Reviewers had recommended against using the Earthworks conclusions that way.

Hand picking data sets to support their conclusions. EPA used data sets that supported their conclusions, even when more modern and geographically relevant data was available. However, that more relevant data contradicted EPA conclusions.

For example, the analysis in the 2012 draft indicated that likely frequency water treatment failure could not be calculated. The 2013 draft calculated a frequency, but based it on work by an anti-mining group Earthworks, 2012[4] that evaluated only the results of legacy mines (a fact that EPA neglected to inform the readers). Specifically, the Earthworks publication

[3] The third reviewer was somewhat more positive, though she had criticisms as well.
[4] EPA also references Kuipers et al, 2006 (also sponsored by an anti-mining group). However, that report does not discuss water treatment failures.

evaluated 13 mines in the arid southwest United States. Most of the mines were designed and began operation in the early 1900s, some in the 1800s. All began open-pit operation before 1967. Therefore, *all of these mines were designed and put into operation before the advent of modern environmental laws.* Mines designed before modern environmental laws do not represent the safety of today's mines.

Use of this data would not be so egregious if other, more recent data were unavailable. But more recent data is available – EPA just chose not to use it. Alaska's mines are all modern. None has had any significant failure that affected downstream water quality or fish in the last 20 years[5], and only one event in modern history of Alaska's large mines.[6] EPA decided against using this data, which was available, was much more relevant (i.e., Alaska data), and was offered to them in AMA's and others comments, but would have contradicted their conclusion. Instead, they used data exclusively from legacy mines.

More relevant data is also available from British Columbia. This data is also more modern, and more geographically relevant, but would have contradicted EPA's conclusion and was not used.[7]

Similarly, the Alaska Department of Fish and Game has a large volume of monitoring reports documenting water quality and fish habitat downstream from Alaska's mines. None of that data was used. It too would have contradicted EPA's conclusions. It would have shown that there has been no significant long-term degradation of water quality or fish habitat at any of Alaska's mines.

Taken together, these show extreme bias by EPA. The agency uses anti-Pebble reports; they ignore reports submitted by others. EPA uses conclusions when their peer reviewers tell them not to. They use old data sets that support their conclusions, yet they ignore modern and more geographically relevant data sets that would contradict them. This is a biased report.

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[5] In Box 8.1 on page 8-20 of the 2013 report, EPA tries to buttress its conclusions by focusing on an accidental release from the Nixon Fork Mine in 2012. They omit an important fact, however. DEC and others concluded that the release did not reach and had no effect on downstream water or fish habitat. We find it curious that EPA used the incident to buttress their claim that a failure could affect fish without mentioning to readers that this incident did not have that effect. We read the incident to reach a conclusion that is opposite from that reached by EPA. We conclude that the level of protection required by government permitting agencies is proportional to the potential risk. Nixon Fork did not pose a high risk and so was not required to have a high level of protection. Other mines in Alaska closer to fish-bearing waters, such as Red Dog or Pogo, have a higher level of protection. Readers could have come to this conclusion, except that EPA left out the crucial data that the Nixon Fork incident affected no water of fish.

[6] That event was not actually a water treatment failure. It is documented in footnote 30 on page 23 of AMA's 2012 Technical Review.

[7] EPA could argue that their data – even though it is from legacy mines and from an arid part of the country -- comes from copper porphyry mines. However, there is no reason why water treatment failure from a copper porphyry mine is more likely than water treatment failure from any other open-pit mine. A water collection system is a water collection system. The fact that one is from a copper porphyry mine and another is from a massive sulfur gold mine is not important.

Specific Comments

This section of the technical review describes the original 26 comments made in AMA's 2012 Technical Review of the draft Bristol Bay Watershed Assessment (cited as 2012 TR). Most of the comments remain relevant. Rather than repeat the comments, this review references them. AMA comments that EPA failed to address in its 2013 draft are labeled "not addressed;" others are labeled "partially addressed" or "status unclear." EPA's 2013 draft failed to fully address any of the 26 errors that AMA pointed out in 2012.

EPA's Hypothetical Mine is not typical of any mine in Bristol Bay: Not any large mine, not any porphyry copper mine, and not necessarily Pebble.

Error #1: status unclear. Copper Porphyry deposits are not representative of other mineral deposits in the Bristol Bay Watershed (2012 TR pages 3-5). The 2012 technical review documented the number and diversity of potential deposits in Bristol Bay. The EPA's 2013 draft is ambiguous about whether the hypothetical mine could represent the impacts of any large mine, any mine with disseminated ore, or Pebble. (As noted previously, in fact, it represents none). However, Error 1 in the AMA 2012 review describes why copper porphyry deposits are not representative of other mineral deposits in the Bristol Bay Watershed. We could find no response in the 2013 draft to this critique. We cannot determine the significance of this error, because we cannot determine whether the EPA draft asserts that the impacts from its hypothetical mine is intended to represent those from all potential mines, all copper porphyry mines, or just Pebble.

Error #2: partially addressed. EPA's hypothetical mine overestimates the size of likely mines in the Bristol Bay watershed. (2012 TR, pages 6-8.). AMA's review of EPA's 2012 hypothetical mine documented that is more than 5 times larger than the average open-pit mine in Alaska and British Columbia, and more than 4 times larger than the average copper mine in Alaska and British Columbia. It may or may not accurately represent the disturbance area of Pebble, but it is unlikely to accurately represent the disturbance area of any other large mine that may be proposed in the Bristol Bay watershed at some future date. We appreciate that EPA added a smaller alternative, though their write-up de-emphasized that alterative. The vast majority of impacts and discussion in the 2013 draft is focused on the larger alternatives. EPA's 2013 draft should be changed to emphasize that likely smaller size, at least for mines other than Pebble.

Error #3: not addressed. EPA's hypothetical mine uses a non-representative location (2012 TR, page 8). A simple GIS analysis completed for AMA's 2012 technical review indicates that the location selected for the EPA hypothetical mine, including tailings and waste rock, is likely to impact significantly more anadromous fish stream habitat than other potential locations in the Bristol Bay watershed. Therefore, EPA's hypothetical mine cannot be used to estimate impacts for any potential mines in Bristol Bay, including Pebble if they should use different locations for tailings or waste rock. That is, if the hypothetical

mine uses a non-representative location, then the impacts are incorrect. We could find no response to this critique in EPA's 2013 draft. EPA ignored this important source of error.

Error #4: not addressed. EPA's hypothetical mine uses a non-representative geochemical make-up (2012 TR page, 9-11). There is no "typical" geochemical make-up for a metal ore that would be representative of all ores within the region. Therefore, the geochemistry of the Pebble deposit cannot be used to represent the geochemistry or geochemical risks of other deposits in the area. In addition, as the Assessment itself indicates, the geochemical risk is dependent on particular design parameters. Therefore, the geochemical risks of the hypothetical mine may not even represent Pebble, and definitely not represent other potential projects. We have mentioned previously that we cannot figure out what the hypothetical mine is supposed to represent. But if it is intended to represent any mine other than Pebble, using a non-representative geochemical make-up is a serious source of error. EPA completely ignored this critique in the 2013 draft.

Error #5: not addressed. EPA's hypothetical mine omits mitigation and prevention strategies likely to be used by other large mines in Bristol Bay (2012 TR page 11). It is not possible to predict the design including mitigation and prevention techniques that will be used to protect the environment from mining of an ore deposit that has not yet been discovered. Given the large variety of techniques, it would be impossible for any as-yet undesigned mine to use exactly the set of mitigation/prevention strategies that EPA assumes in its hypothetical mine (although EPA used few strategies in its mine). Therefore the hypothetical mine cannot represent other mines in the Bristol Bay watershed. To the extent that EPA's hypothetical mine is intended to represent any mine other than Pebble, this is a significant source of error, yet EPA ignored this critique in their 2013 draft.

Error #6: not addressed. EPA omits mitigation and prevention strategies that would eliminate or significantly reduce the impacts it predicts for its hypothetical mine (2012 TR, pages 11-13). The 2012 technical review references some design changes that would eliminate or reduce impacts that the Assessment predicts. These include dry tailings closure and moving the location of the product pipeline, among others. Indeed, some of the recommendations in EPA's own draft noted prevention/mitigation strategies that would eliminate or reduce some of the risks. Yet EPA failed to include those prevention/mitigation strategies, and only presented the risk without them. The 2013 draft also failed to include these. In addition, AMA's 2012 review showed that many as-yet-unknown prevention and mitigation strategies would likely be developed through the permitting process. Impacts predicted prior to the imposition of these strategies would not be accurate. This is a huge source of error in EPA's predictions and yet EPA continues to ignore this critique.

Error #7: not addressed. EPA's hypothetical mine does not meet permitting standards. Therefore, it cannot represent realistic mine impacts for the watershed (2012 TR, page 13-14). AMA's 2012 technical review documented the reasons why the hypothetical mine does not meet Alaska's permitting standards and would not be authorized. Clearly, impacts from an unpermittable mine are not accurate. This error has been repeatedly pointed out, yet EPA's 2013 document ignores it.

Risk Assessment – No Failure; Habitat Modification & Water Withdrawal.

Errors #8-11 discuss problems in EPA's methodology and conclusions with the analysis habitat modification and water withdrawal that result from routine operation (i.e., assuming no failure).

Error #8: partially addressed. EPA overestimated the realistic mine size (2012 TR, page 15). The Assessment's description of habitat modification impacts is a direct consequence of the mine size and location. We appreciate that EPA included a smaller mine size in the 2013 draft. However, their discussion of impacts de-emphasized that mine size. The draft should be changed to give equal weight to that size of a mine.

Error #9: not addressed. EPA uses a particular location that overestimates impacts to anadromous fish habitat (2012 TR, page 15.)[8] AMA's 2012 technical review referenced a simple GIS analysis that determined that the location of EPA's hypothetical mine may not be representative of other locations in the Bristol Bay watershed with respect to anadromous fish habitat. That is, other locations may affect less fish habitat. This non-representative location means that the impacts are likely incorrect for other mines, and may be incorrect for other tailings and waste rock locations chosen for Pebble. EPA ignored this critique and failed to acknowledge this significant source of error in their 2013 draft.

Error #10: not addressed. EPA forecasts impacts from a mine that is not permittable (2012 TR, page 15). It is not reasonable to describe impacts as typical impacts from mining Bristol Bay using a hypothetical mine that does not meet permitting standards. If the mine does not meet permit standards, then either the ultimate design will be different (and the impacts different), or the mine has no impacts because it will not be built. AMA and many others pointed out this problem in the 2012 draft; yet, EPA's 2013 draft was no different with respect to this issue.

Error #11: partially addressed. The Assessment lacks a realistic water budget. AMA's 2012 technical review pointed out that EPA's 2012 draft lacked a realistic water budget. EPA did include a water budget in their 2013 draft. While the summary appears reasonable, the water budget is not in the detail that is typical of an actual mine proposal water budget. More importantly, it does not allow for innovative strategies that would reduce or mitigate for the water withdrawal, and therefore may not be representative of either Pebble or any other mine in the region. (See also 2012 TR, page 15-16).

Risk Assessment – No Failure; Roads and Stream Crossings.

Errors #12-14 discuss problems in EPA's methodology and conclusions with the analysis of impacts from a transportation corridor from routine operations. The predicted impacts for EPA's hypothetical mine road do not represent impacts from mines in Bristol Bay, and not even for their hypothetical mine, because other mines in Bristol Bay may not use a road,

[8] Error 9 in AMA's 2012 Technical Review included an incorrect reference. It referenced analysis in Section 1.D of the technical review. It should have read Section 1.C on page 8-9.

and because the road design omits some obvious and some as yet unknown design changes that could reduce the impacts it predicts. Finally, we note that EPA came to different conclusions for other mine roads in Alaska.

Error #12: status unclear. Assumption of a Road (2012 TR, page 16). A road may be required to develop the Pebble Mine. However, it is quite possible that other mines within the watershed would not be developed using a road, would use a shorter road, or would use a road in a less (or more) sensitive area. Thus, the road impacts may not be representative of non-Pebble mines in Bristol Bay. As we cannot determine whether the Assessment is focused on Pebble or on any mine in Bristol Bay, we cannot determine the potential significance of this error. However, we do note that EPA ignored the critique in their 2013 draft.

Error #13: not addressed. Omission of Prevention and Mitigation Strategies — design changes for the road (2012 TR, pages 16-17). As AMA's 2012 review pointed out, EPA proposes a specific road alignment and by implication road construction techniques and then disparages them because of the environmental impacts they will cause. The obvious solution is to provide a higher level of design/construction standards and a robust monitoring program to catch problems before they cause these problems.

Error #14: not addressed. A check on conclusions: EPA came to different conclusions for other mine roads (2012 TR, pages 17-18). AMA's 2012 review pointed out that EPA came to different conclusions in this watershed assessment than it did for similar mine roads in Environmental Impacts Statements in which it was the lead agency. EPA's 2013 draft failed to respond to this critique.

Risk Assessment – Assume an Operations Failure.

Error #15: not addressed. **The Fallacy of Statistical Prediction from Legacy Mines (2012 TR, pages 18-21).** AMA's 2012 Technical Review pointed out the significant source of error introduced by predicting based on the record of legacy mines. EPA's 2013 draft ignored this critique.

Water Collection and Treatment Failure

Error #16: not addressed. The lack of design details makes the EPA's failure analysis meaningless (2012 TR, pages 21-22). The 2012 AMA Technical Review described why the lack of design detail made EPA's 2012 analysis meaningless. It provided examples that illustrated the problem. EPA's 2013 draft did not include any further design details (most likely, because they do not know them, the mine has not been designed). Some designs are more protective than others. EPA's 2013 draft ignored this critique.

Error #17: not addressed. The (lack of) design and the analysis omit prevention and mitigation strategies (2012 TR, pages 22-23). This error is related to the one above.

AMA's 2012 analysis provided examples of the type of prevention and mitigation strategies that would decrease the risk. It also indicated that Alaska mines have strategies which EPA's hypothetical mine ignored. EPA's 2013 draft ignored this critique.

Error #18: not addressed. The analysis ignores Alaska's record (2012 TR, page 23). EPA predicts a very specific incidence of treatment failure. Yet EPA fails to discuss the fact that Alaska mines do not correspond to their prediction. See also discussion under "Hand picked data sets" on pages 7-8.

Error #19: partially addressed. Assertions about risk are unsupported (2012 TR, page 23-24). AMA's 2012 analysis pointed out many assertions about risk in the 2012 document that are unsupported. EPA apparently eliminated some of the offending analysis (without changing the conclusions they contradicted). Some contradictions remain.

Error #20: partially addressed. The conclusions in the Assessment's Executive Summary contradict the conclusions in the body of the Assessment (2012 TR, page 24-25). EPA took out the accurate statements in the 2012 draft that concluded that the incidence of water treatment failures could not be calculated. Instead, they substituted the legacy data from anti-mining groups described under Error #15, and ignored more geographically relevant, modern-mine data from Alaska and British Columbia, which would have contradicted their conclusion. (We note that Appendix J of EPA's 2013 draft still indicates that failures from properly constructed waste rock piles are unlikely, a fact that contradicts the analysis in the body of the Assessment.)

Error #21. A check on conclusions: EPA came to different conclusions for other mine analyses (2012 TR, page25). EPA's 2013 draft failed to answer why the Watershed Assessment comes to a particular conclusion about water treatment failure, but environmental impact statements that EPA recently wrote comes to different conclusions on the same issue.

Pipeline Failure

Error #22: status unclear. Assumption of a Product Pipeline (2012 TR, page 26). A product pipeline may be required to develop the Pebble Mine. However, no other mine in Alaska uses such a pipeline. In fact, very few gold mines have a need for a pipeline because the gold is so much more compact than copper concentrate. Thus, it is statistically likely that other mines within the watershed would not use a pipeline. The predicted pipeline impacts are unlikely to be representative of non-Pebble mines in Bristol Bay. As we cannot tell what EPA's hypothetical mine is supposed to represent (Pebble, copper porphyry mines, all mines?), we cannot determine the significance of this error. We do note that AMA pointed out this the error in their 2012 comments, and the 2013 made no changes with respect to this issue.

Error #23: not addressed. Omission of Pipeline-related Prevention and Mitigation Strategies (2012 TR, page 26-27). EPA calculates that the probability of a spill occurring and entering a stream is such that one would *expect* stream-contaminating spills over the

duration of the project. This frequency is obviously unacceptable (as EPA points out). It is unclear why EPA believes it would be allowed. In fact, the government would obviously require prevention and mitigation strategies to lower the risk before allowing such a pipeline to be operated. Thus, the risks are obviously overestimated. See AMA 2012 comments, pages 26-27.

Error #24: not addressed. A check on conclusions: EPA came to a different conclusion for a potential mine pipeline at the Red Dog Mine (2012 TR, page 27). AMA's 2012 review pointed out that EPA came to different conclusions about pipeline failure in its 2009 Red Dog EIS than it did in the watershed assessment. In the 2013 draft, EPA failed to explain why one conclusion was appropriate for a pipeline at Red Dog, but another concluson on the exact same issue was appropriate for a pipeline in Bristol Bay.

Post-Closure Road and Culvert Failure. While AMA did not provide specific errors concerning EPA's post-closure analysis of potential road and culvert failures, it did provide some comments. See 2012 TR, analysis on page 27, especially footnote 35.

Dam Failure

Error #25: not addressed. Assumption of a dam; assumption of a wet closure reclamation plan. **(2012 TR, page 28).** AMA noted mine designs that would eliminate the potential for dam failures, and noted that the 2012 Assessment acknowledged this possibility. EPA's 2012 and 2013 drafts fail to include the possibility of those potential designs in its assessment without explaining why.

Error #26: not addressed. Some locations are less risky than that of the hypothetical mine (2012 TR, page 28). The 2012 AMA review noted that some locations are less risky and have less consequence than those of EPA's hypothetical mine. Therefore, the impacts from dam failure in EPA's hypothetical mine do not represent the impacts of other locations. This means that the watershed assessment does not represent the potential impacts of other mines in the region, and does not represent the impacts of other locations that could be potentially chosen by Pebble. Despite the fact that this is a serious source of error and AMA pointed it out in its 2012 comments, EPA's 2013 draft failed to acknowledge this source of error or make any changes.

EPA's methodology is flawed; the Assessment cannot be fixed (not addressed). In January 2012, the University of Alaska, Institute of Social and Economic Research published a working paper titled "Assessing Ecological Risk of Proposed Mines: Can Valid Assessments be Done Pre-Mine?" That paper concluded that a pre-design ecological risk assessment was a faulty methodology and results in unreliable conclusions. EPA ignored working paper, and failed to address or acknowledge the implications for their methodology.

Specifically, the UAA working paper concluded:

- Post-design ecological risk assessments use detailed project-specific and site-specific data to come to credible conclusions. Without that information, a pre-design risk assessment makes assumptions that are often either unreliable or incorrect.

- Hard-rock mines are unique, and data from one mine is unlikely to represent another.

- A pre-design ecological risk assessment is likely to omit mitigation and prevention strategies that an actual mine will use to decrease risk. It omits them because they are unknown.

As this technical review has documented, the Watershed Assessment makes all of the errors predicted in the UAA working paper. It makes assumptions that are not necessarily accurate (or in some cases obviously inaccurate), and it omits design and prevention strategies that an operation may use to decrease ecological risk.

In addition, the Watershed Assessment takes the theoretical errors beyond what was considered in the UAA working paper. The Assessment attempts not just to predict the impacts from a single not-yet-designed mine, but it attempts to use ecological risk assessment methodology to predict impacts that would occur from any other mine in the watershed.

As the UAA paper and this technical review both indicate, mines are unique, and mine sites are unique. It is certain that other non-Pebble mines in the watershed would not resemble EPA's hypothetical mine. It is probable that whatever is finally proposed for Pebble will also use design details and mitigation/prevention techniques that are different from EPA's hypothetical mine. Given this, the results of an ecological risk assessment would be different.

For all the reasons given above and those in the UAA Working Paper, ecological risk assessment methodology is inappropriate for a not-yet-designed mine. The UAA Working Paper was attached as Appendix B to the 2012 AMA Technical Review. EPA ignored this critique.