

EPA Response to comments received on the Phase I EE/CA for the Standard Mine Site, near Crested Butte, CO

The comments received and responses given have been organized according to subject matter where possible. For example, all comments received concerning the Level 2 repository area have been grouped together. Where any comment addressed more than one subject, it was addressed in the “General Comments” section of this response.

1. WETLAND/TES COMMENTS

COMMENT: Page 3-1 section 3.1 in the introductory section identifies the presence or absence of wetlands, other waters of the United States, and Threatened and Endangered Species (TES) as subjects of concern in choosing a potential repository site. The EPA identifies the Coal Creek watershed as potential habitat for several state and federally listed species but little is known about their actual presence or absence. Page 3-9 in the results write up of Section 3 goes into greater detail about the likely “Occurrence in Study Area” of these listed species. A more thorough evaluation of impact to TES and other wildlife should be performed for those sites selected for further consideration as part of the process.

EPA RESPONSE: Additional wetland and TES surveys are being planned for spring 2007 to finalize the TES Assessment. These will be done prior to commencement of construction of the repository. Some planning has begun on this but most scheduling cannot be completed until the repository location is selected.

COMMENT: A wetland vegetation study was limited to repository sites on or adjacent to the Standard Mine property. We would expect the same investigations to be completed at any sites given final consideration prior to construction of a repository.

EPA RESPONSE: This is incorrect, the presence/absence of wetland vegetation was assessed during the study at each of the four most favorable repository sites (e.g. Areas 225, 245, USFS #2 and Level 2) as well as other areas evaluated as repository sites, please see Section 3.4 “Repository and Borrow Areas”, Appendix B, page 3-13 through 3-15. Additional wetland and TES surveys are being planned for spring 2007 to finalize the TES Assessment. These will be done prior to commencement of construction of the repository. Some planning has begun on this but most scheduling cannot be completed until the repository location is selected.

COMMENT: pg. 3-2: *Carex gynocrates* = *Carex dioica*; *Carex rostrata* = *Carex utriculata*
COMMENT: pg. 3-3: I couldn't find *Limnorchis aquilonis* at first but finally figured out it was *Limnorchis hyperborea* (Weber).

COMMENT: pg. 5-2: The latest version of Colorado Flora: Western Slope (Weber) is dated 2001.

EPA RESPONSE: EPA will incorporate these comments/changes into the Final Phase I EE/CA.

COMMENT: Add 1 sentence to the Wetlands and Other Water Features 4.1 section under the bullet "Minimize indirect and accidental impacts to wetlands and other water features by implementing the following measures:"

Power wash all heavy equipment prior to entering the project area to avoid introducing noxious weed seed or materials into wetlands or other areas of the project (or something to that affect).

You may want to put this sentence in a more general area than just the wetlands section because it pertains to the entire project area.

EPA RESPONSE: EPA will incorporate these changes into the Final Phase I EE/CA and/or the project work plan for 2007.

2. LEVEL 2 COMMENTS

COMMENT: My response to repository sites with the knowledge of being a land Owner/User is this:

Repository / borrow pit location L2

1. = is overlapping on my property
2. = is above my property
3. = is in a location of a healthy environment
4. = The other sites are in better location geographically, environmentally, and not on private property. This is my opinion from living around these areas since I purchased the land and explored these areas.

EPA RESPONSE: EPA has noted private land holdings in the Level 2 area.

COMMENT: I believe this site could be more challenging to design, build, and have high associated O & M factors/costs than what is shown as comparisons to the other sites and let alone exhibiting factors leading to a "fatally flawed" repository site.

EPA RESPONSE: A detailed cost analysis is not available at this time. A more detailed cost analysis will be part of the Phase II EE/CA evaluation; if the Level 2 area is selected for analysis in the Phase II EE/CA this information will be evaluated and presented.

COMMENT: I am concerned of the steepness of the location as described as "Not Favorable" for topography, unknown foundation conditions, possible groundwater issues, difficult surface water control issues, and having the COSTS rows indicating this site is expected to be within 15% of construction and O & M costs of the other sites. Is there additional information available to support these conclusions?

EPA RESPONSE: Additional detailed information on the items mentioned is not available at this time. A more detailed cost analysis will be part of the Phase II EE/CA evaluation; if the Level 2 area is selected for analysis in the Phase II EE/CA this

information will be evaluated and presented. EPA agrees the topography may not be desirable at this location; the occurrence of the other conditions mentioned is not fully known.

COMMENT: If this site is selected, how and when will the possible shallow groundwater and seepage/springs be determined? Will this information be needed for the repository design?

EPA RESPONSE: The results of test pit investigations done at each of the top four potential repository sites did not encounter shallow groundwater at the time of excavation, nor were thick organic soils or vegetation indicative of shallow groundwater observed at the locations judged potentially suitable for use as a mine waste repository. EPA does not expect to encounter shallow groundwater when construction begins in spring 2007. See detailed response to further ground water investigations on page 11.

COMMENT: Will blasting be required at this location to level out or bench a site to accommodate the waste material?

EPA RESPONSE: Preliminary repository evaluations for the Standard Mine Level 2 site indicate a repository could be constructed at this location without blasting or over excavation of the underlying bedrock.

COMMENT: What is the route of the 1.2 miles to the borrow source?

EPA RESPONSE: The referenced 1.2 mile haul route from the potential USFS Site 1 borrow area to the Standard Mine Level 2 area would follow existing roads north, past USFS Site 2, to the Standard Mine Level 1 area. From here, existing roads would be followed to the east, to the Standard Mine Level 2 area.

COMMENT: If this site is selected, the repository may/will be located on top of existing roads. What roads are needed to access the private land holdings? How will road fragments be handled in the removal action?

EPA RESPONSE: EPA would negotiate with the landowner and USFS to determine what road access is needed for both parties and where those should be placed.

COMMENT: How does the land status layout look for this site? The repository could be partially located on the Bonanza King claim. My records show Eastman is the land owner.

EPA RESPONSE: The Level 2 site is partially located on USFS land, partially located on the Polar Star claim (private property) and partially located on the Belmont claim (also private property).

COMMENT: I have concerns with Level 2 since it says it's adjacent to an existing water source. Doesn't Elk Creek run right by it?

COMMENT: So it would be further away but it just concerns me that there is an existing water source.

EPA RESPONSE: Elk Creek is approximately 1000ft west of the Level 2 area and is separated from Level 2 by a small ridge of rock which diverts drainage from the Level 2 area southward. EPA has noted the presence of surface water at the Level 2 area.

COMMENT: If driving distance is a factor in eliminating Area 245 why isn't it a factor for eliminating Level 2?

EPA RESPONSE: None of the potential repository areas have been eliminated from consideration based on the estimated waste haul distance, including Area 245.

COMMENT: The only problem I see with Level 2 is that there seems to be a small seep just below as seen on page 4 in appendix K.

EPA RESPONSE: EPA has noted the seeps in the Level 2 area.

3. AREA 99 COMMENTS

COMMENT: My first choice would be area 99 for its all already unstable shale rock. There is not a lot of growth or main drainage to Elk Creek and the repository would blend in with all the other rock.

COMMENT: It appears that Area 99 was solely excluded based upon presumed slope failure modes, which were not supported by geotechnical materials testing but rather upon field observations of soils exposed during test pit investigations. As such, even with a minimum score for Foundation Conditions and Considerations, Area 99 ranks highly when all other factors are considered in the ranking process. To completely eliminate Area 99 from the EE/CA process we request a more detailed justification.

EPA RESPONSE: EPA has chosen to eliminate Area 99 from the list of potential repository sites due to the existence of landslide features. During the test pit investigations at Area 99, information was found to suggest the site was part of and located on a relatively large Quaternary age landslide complex. The following photographs and discussion describe the methods and logic used to interpret the landslide features at Area 99.

Existing USGS geologic maps for the Standard Mine region indicate landslide features were mapped at Area 99 by Gaskill, et. al. in 1987 (see Figure 3-2 in the Phase I EE/CA). Specifically, two circular scarp symbols were shown at Area 99. During the initial reconnaissance of Area 99, a number of linear topographic features were observed in the general area of the mapped circular scarps. These linear topographic features were initially interpreted to be possible glacial features, such as roche moutonnée, eroded into the surface of the bedrock. Area 99 was therefore selected as a site to be further evaluated as a potential repository site.

Test pit investigations at Area 99 found features in the bedrock that suggested the linear topographic features were landslide structures, including evidence of a large tension crack. The following photos show materials found in the tension crack that support the interpretation that Area 99 is located on a large landslide deposit.

Test pits excavated along the linear topographic features (tension cracks) generally encountered loose materials to a depth of approximately 22 feet, the depth limit of the hydraulic excavator. Bedrock was not encountered in the test pits along the linear topographic features. As shown in the following photograph, the materials encountered in these test pits were loose, easy to excavate, and prone to sloughing.



Additional test pits not excavated along the linear topographic features encountered blocky bedrock at relatively shallow depths, with overlying glacial moraine. A typical photograph showing a test pit not along the linear features follows.



Information about Area 99, including previous geologic mapping, linear topographic features, and observation of materials encountered in the test pits, suggests the site is located on a large Quaternary age landslide. Additional details regarding Area 99 will be added to the text of the Phase I EE/CA.

4. LUCKY JACK IMPOUNDMENTS COMMENTS

COMMENT: I think I would argue that the other way. You're right in that the impoundments have been reclaimed and released from requirements by the State of Colorado but I think that there is a cover design there and that anything you do on the top would be a benefit. You wouldn't do anything different there than any of the other repositories. You would add additional thickness and minimize infiltration which would probably be beneficial to the existing facility as well as to the new repository.

COMMENT: We're not sure you'd want to depend on the existing cap/liner because if you're loading or compacting you may puncture the existing liner.

EPA RESPONSE: The existing cover and design would need to be further evaluated to consider the potential impacts of placing mine waste on the existing Lucky Jack tailing impoundment.

COMMENT: There could be a potential for differential settling with the tailings and not with the embankment and that there is the potential that if you load unconsolidated

materials that, with time, the tailings would fail but if you line beneath them and use cap coverage, it would probably stabilize it better.

EPA RESPONSE: A mine waste repository constructed atop the Lucky Jack Mine tailing impoundment could experience adverse differential settlement due to consolidation of the existing impounded tailing. Geotechnical investigations and laboratory testing would be necessary to evaluate the settlement potential of the repository to assess if the construction of a repository would be feasible.

COMMENT: I think the safeguard is with the cap or cover that's constructed on top. You want to minimize filtration through all the material and that's where I see the benefit to both.

EPA RESPONSE: The successful design of a mine waste repository atop the existing Luck Jack Mine tailing impoundment would need to consider settlement and stability of the existing tailing impoundment and cover, as well as a cover system to be constructed atop the mine waste repository.

COMMENT: So if Lucky Jack was to be considered it would need to include long term O&M and agreements with U.S. Energy.

EPA RESPONSE: Correct

COMMENT: The Forest Service has concerns with the long haul and the safety of driving up and down the road to haul the waste. We think the road is stabilized and we would have concerns with disturbing it which would mean convoying the trucks back and forth making the work a very lengthy project plus impact the road such as turnouts and widening of the road which could weaken the stabilization of the road.

EPA RESPONSE: This was a statement made by the USFS at the SMAG meeting; EPA concurs with this statement.

COMMENT: Several members of the SMTAG considered the dismissal of the Lucky Jack site as premature. In consideration of this Wendy Brown added the Lucky Jack tailings impoundments into her matrix and it subsequently scored higher than Area 245 and USFS 2. Additionally, when Frontier assessed the Lucky Jack repository against the same criteria as the other site repository location options it ranked second. The Lucky Jack Tailings Impoundments may be a technically and geographical sound selection alternative to the Standard Mine sites. The EPA does not consider this site favorable due to environmental and cost considerations due to the necessary road improvements and hauling distance, respectively. However, the site's lower elevation in the watershed, level of previous disturbance, and fairly controlled hydrologic regime are favorable conditions which may outweigh the aforementioned concerns regarding this site. As such, geotechnical, regulatory and political concerns should be considered and evaluated for inclusion or exclusion from the site selection process. The SMTAG recognizes the

significance of the EPA's concerns for this site but is requesting the site's dismissal be given a more thorough justification.

EPA RESPONSE: EPA disagrees that the Lucky Jack Impoundments were eliminated prematurely. EPA gave due consideration to this potential repository area and has eliminated it due to many factors, described as follows:

- a) A mine waste repository constructed atop the Lucky Jack Mine tailing impoundment could experience adverse differential settlement due to consolidation of the existing impounded tailing. Geotechnical investigations consisting of drilling several test holes, collecting relatively undisturbed tailing samples, and laboratory testing of the collected samples to evaluate the engineering and index properties would be necessary to evaluate the settlement potential of the repository to assess if the construction of a repository would be feasible. Little repository construction cost savings are expected for this site, as compared to others considered as part of the Phase I EE/CA. This site would still require site preparation, cover construction, and surface water controls; therefore, this does not eliminate cost or work needed for development of the site.
- b) After consultation with our partners, the United States Forest Service, it has been determined that the approximate 4 mile haul would require substantial improvements to the access road. The required road improvements could destabilize the road and create additional run-off and erosion issues as well as additional Health & Safety concerns for workers traversing this road many times per day. The cost and impacts of this road work have been deemed unacceptable by both agencies.
- c) It is expected the significant road improvements needed and the placement of waste at the Lucky Jack tailing impoundments would be highly visible from neighboring ridges and from Kebler Pass Road.
- d) After review of applicable regulations, the Lucky Jack tailing impoundments are considered an "off-site" facility, meaning the area must be a licensed, permitted RCRA Subtitle D facility prior to receiving any CERCLA wastes. To obtain the necessary permits and licensure, US Energy would have to undergo an extensive, costly and time-consuming process with the State to become a solid waste landfill. This process can take years to complete and would subject US Energy to additional RCRA environmental regulations.
- e) Likely the greatest limitation to the use of the Lucky Jack area is the potential liability to the Federal Government and taxpayers. Disposal of CERCLA wastes on private property, where the landowner is NOT considered a Potentially Responsible Party (PRP), puts EPA and the USFS at risk for assuming costs and liability. We are required to consider this factor in addition to factors that rate the technical performance of a clean-up method. It is based on all these factors EPA has chosen NOT to give the Lucky Jack tailing impoundments further consideration as a repository site.

COMMENT: The reference to the "Lucky Jack Mine" is incorrect. The area referred to as "Lucky Jack" is in fact the Keystone Mine...

EPA RESPONSE: EPA will ensure the proper nomenclature for this feature is included in the final version of the Phase I EE/CA.

5. USFS #1 COMMENTS

COMMENT: My second choice is FS1 that location is great for a repository. It's open, there is an old road already established, not a lot of growth for disturbance, and it just seems like a great spot.

COMMENT: Page 4-3, Item 4.2.5 USFS Site 1. Is there a potential to re-evaluate this site with the concept in mind to construct a repository below the ground surface where the depth of refusal is between the 7 and 22 feet. Additional excavation may be required to further expand a footprint where the entire volume could be re-located below ground surface between the 7 to 22 feet depth. This would eliminate the concern of a future landslide at this site impacting an above ground repository. This location would serve as an excellent borrow source for soil if a soil cap is considered as discussed above.

EPA RESPONSE: EPA considered several removal alternatives for waste rock and tailings at the Site as described in the November 9, 2006 Phase I EE/CA. The USFS Site #1 was excluded from further consideration because the USGS had mapped it as a landslide area and test pit investigations in this area showed soils "believed to be landslide or debris flow materials," as stated on page 4-3 of the 2006 Phase I EE/CA. EPA considered employing advanced scientific methods to assess whether the location was subject to an active landslide; however, the cost and time needed to perform these investigations was determined to be unwarranted as there were other feasible repository sites that would not require such extensive assessment methods. EPA does not consider the option of developing a repository below ground surface viable because the depth of the landslide shear plane in this area is unknown. The depth may be within the overburden making even a repository constructed at depth subject to movement during a landslide. In addition, this method of repository development is much more expensive than placing waste on or near the native ground surface. Additional costs arise from excavating the amount of soil equivalent to or more than the waste volume to be placed. Costs may also result from hauling and placement of the excavated soils.

6. USFS#2 COMMENTS

COMMENT: Foundation Conditions are listed as "Less Favorable". What design elements and construction work items are needed for this site to have a "Very Favorable" foundation condition?

EPA RESPONSE: The foundation conditions at the USFS #2 Site were judged to be "less favorable" than other potential repository sites; however, based on the results of the site reconnaissance and test pit investigations, the USFS #2 Site foundation soils would still be suitable for the construction of a mine waste repository. The results of the test pit investigations at the site indicated an approximately 12-inch thick layer of organic silt underlain by about 3 to 7 feet of silty to clayey gravel or sand with cobbles and boulders

above bedrock. The organic silt and other loose or soft foundation soils would be removed prior to repository construction.

COMMENT: If this site is selected, how and when will the possible shallow groundwater be determined? Will this information be needed for the repository design?

EPA RESPONSE: The results of test pit investigations at the potential repository sites did not encounter shallow groundwater at the time of excavation, nor were thick organic soils or vegetation indicative of shallow groundwater observed at the locations judged potentially suitable for use as a mine waste repository. Therefore, EPA does not believe shallow groundwater will be encountered at any of the top four repository locations. See detailed response to further ground water investigations on page 11.

7. AREA 225 COMMENTS

COMMENT: For Area 225, the observance of the vernal pond while problematic can be successfully addressed with engineered construction methodology for the control of snow melt and periodic storm water collection. Area 225 is topographically undesirable and restrictive with respect to construction related controls for the vernal pond. The SMTAG considers the ecological value of vernal pools to be significant. Therefore, it is difficult to further assess this site without more information on the size and location of the pool and how the repository would affect the pool. The SMTAG is requesting more detailed information regarding the pool and the concerns stated above.

EPA RESPONSE: The vernal pool is located in the northern portion of Area 225, in the vicinity of photograph locations 19 and 20 shown on Figure 3 of the Standard Mine Wetland, Other Features, and TES Assessment, included as Appendix B to the Phase I EE/CA.

Additional details regarding this vernal pool were not gathered as part of the initial reconnaissance; however, preliminary repository evaluations at Area 225 indicate that a suitably sized repository could be constructed in the southern portion of Area 225. Additional evaluations of the vernal pool would be necessary to evaluate the potential impacts of a repository in Area 225.

8. GENERAL COMMENTS

COMMENT: In general Phase 1 of the EE/CA appears to be more of a screening process than a true engineering evaluation and cost analysis. The overall EE/CA assessment assumes that each of the Areas evaluated account for the amount of mine waste to be placed. However, discussions within the EE/CA with respect to dilation of volumes of mine waste quantities was not fully evaluated with anticipated repository footprint and constructed depth and rise above topographic elevations. Each site selected for an engineering evaluation will need to take this into account.

EPA RESPONSE: EPA did not intend for the Phase I EE/CA to be the sole basis for selection and design of the repository, which is why the Phase II EE/CA is necessary for evaluation of site design considerations. The Phase II EE/CA will contain conceptual design elements, development cost estimates and projected long-term Operations & Maintenance (O&M) requirements for two potential locations. EPA did account for swelling of volumes; this information has been added to the text of the Phase I EE/CA.

COMMENT: A full evaluation of the presence of groundwater and/or surface water seeps and/or springs at each of the proposed repository locations may quickly eliminate sites from consideration based on engineering or cost concerns. The Standard Mine Phase I EE/CA does indicate the observance of these features when they were encountered during the site area inspection activities. Any further repository site evaluations should specifically address these features based upon Standard Mine regional site knowledge and operational mine history. As part of a complete engineering evaluation and cost analysis these specific “fatal flaws” scenarios need to be addressed.

EPA RESPONSE: To do full groundwater evaluations at each of the 10 proposed repository locations would be extremely costly and time consuming. In addition, the results of test pit investigations at the potential repository sites did not encounter shallow groundwater at the time of excavation, nor were thick organic soils or vegetation indicative of shallow groundwater observed at the locations judged potentially suitable for use as a mine waste repository. EPA does not believe shallow groundwater will be encountered at any of the top four repository locations.

EPA does not intend to do a full-scale groundwater study at the chosen repository location based on the following:

- a) To install groundwater monitoring wells at the remaining potential locations would be logistically difficult. Accessing these locations with an appropriately sized drill rig would be difficult, especially at Area 225 where no road exists. Maneuverability of drill rigs is limited and given the heavily wooded nature of several of the locations, the area accessible for drilling may be limited. Ground water wells would need to be drilled in specific locations within the repository footprints as well as upgradient and downgradient of the repository footprint to understand the ground water flow paths and depth to ground water if a full-scale ground water investigation was undertaken; this would mean disturbance to multiple areas, not only the repository location. Due to the fractured nature of the geology underlying the general area in question, it is highly unlikely that there exists a continuous aquifer beneath the area. Rather it is likely that the ground water is diverted and directed along fractures and fault zones creating a complex ground water network that would be costly and time consuming to investigate. In addition, the forested nature of these locations may not allow for such well placement, thereby making the attainability of useful data questionable.
- b) EPA does not expect to encounter shallow groundwater. The results of test pit investigations at the potential repository sites did not encounter shallow groundwater at the time of excavation, nor were thick organic soils or

vegetation indicative of shallow groundwater observed at the locations judged potentially suitable for use as a mine waste repository

- c) The Phase II EE/CA will give estimated infiltration or percolation rates for the repository design and these percolation rates are expected to be minimal. Because percolation rates through the repository are expected to be minimal, it is also expected that any leachate created at the repository will be minimal. It is acceptable to assume some of the leachate will be attenuated in the soils thus, a very small amount of leachate would be moving toward groundwater and/or through the drainage. This is expected to cause minimal environmental impacts, especially when compared to the current uncontrolled conditions and the rate of flow into the watershed happening at present.
- d) The Standard Mine site was listed on the NPL due to the potential for contamination of the drinking water supply for the Town of Crested Butte by heavy metals loading from the mine site to surface water. Presently groundwater is not used as a public drinking water source in the area in question, nor is this expected to happen in the vicinity; therefore the expected minimal impacts to groundwater are not likely to affect any users.

COMMENT: Discussions with respect to depth of test pits constructed in each of the EE/CA Areas would suggest that constructing a capped repository in SM Level 2 and USFS Site 2 may be problematic due to profile and depth to bedrock. The Standard Mine Level 2 location does not appear to meet site repository selection criteria.

EPA RESPONSE: EPA disagrees that this would be problematic. The test pits excavated at the Standard Mine Level 2 and USFS 2 sites indicate suitable foundation conditions for construction of a mine waste repository.

As indicated on the test pit summary logs presented as Figures 4-10 and 4-12 of the Phase I EE/CA, these sites have a thin layer of organic silt, underlain by a varying thickness of silty, clayey sand or gravel with cobbles and boulders. The depth to bedrock generally varied from 1.5 to 8 feet. Based on field observations and laboratory testing, the materials encountered in these test pits are not expected to be highly compressible and have adequate bearing capacity for the construction of a mine waste repository.

COMMENT: It is recommended that Area 99 and the Lucky Jack site be further considered in the process and that the Standard Mine Level 2 site be deferred.

EPA RESPONSE: EPA will not give these sites further consideration based on the factors mentioned in previous sections.

COMMENT: An acceptable dismissal of Area 99, Area 225, and the Lucky Jack site could be done without a full engineering evaluation. However, a true engineering evaluation for each of the four short-listed sites, plus Area 99 and the Luck Jack site may allow for a more educated assessment of the viability of each site.

EPA RESPONSE: EPA disagrees that the elimination of Area 99 and Lucky Jack Impoundments was done prematurely or is unacceptable. Based on factors mentioned in previous sections, these sites are not appropriate locations for long-term disposal of CERCLA wastes; therefore EPA feels any additional resources spent to conduct a “true engineering evaluation” for each of the four short-listed sites is considered a poor use of funds when some locations can be eliminated without expending such costs. EPA plans to develop conceptual design, cost estimates and evaluation for two sites (from the list of four) in the Phase II EE/CA document.

COMMENT: Should it be determined that Area 99, Area 225 and the Lucky Jack site are not acceptable for further evaluation as part of the selection process; Area 245, and USFS Site 2 should be fully evaluated.

COMMENT: Given this list, either Level 2 or FS2 would be o.k.

COMMENT: My third choice is FS2 and/or 245.

EPA RESPONSE: EPA appreciates input on which sites the commenter(s) view more suitable. The Phase II EE/CA will contain conceptual design elements, development cost estimates and projected long-term Operations & Maintenance (O&M) requirements for two potential locations.

COMMENT: Area 245 shows having younger growth forest area.

EPA RESPONSE: Note taken

COMMENT: The key question is visible from where?

EPA RESPONSE: EPA considered sites to be visible if it was expected the potential repository area could be seen from neighboring ridges or from Kebler Pass Road; however no official analyses/study of visibility was done.

COMMENT: If the tailings are going to make this matrix very unstable with the environment around it holding it together versus putting a slope where it's going to want to slump off it's something we want to consider.

EPA RESPONSE: EPA does not believe the tailings will destabilize the repository. Tailings will be de-watered and/or mixed with other waste material prior to placement in the repository and the repository will be designed such that both waste rock and tailings characteristics are considered.

COMMENT: Looking at all the criteria on Table 5.1 it seems like Area 245 and FS2 seems to be the top two choices.

EPA RESPONSE: Note taken

COMMENT: A downhill haul can be the same in terms of cost as an uphill haul so you really shouldn't look at this as a factor but instead look at the gradient.

EPA RESPONSE: We agree the gradient of haul roads can also be a factor in assessing haulage costs; however, the existing roads in the vicinity of the Standard Mine and the potential repository sites generally have steeper grades to the uphill repository sites (Standard Mine Level 2 and Area 245) than the downhill repository sites (Area 225 and USFS Site 2).

COMMENT: If you consider the amount of trees might have to be thinned, it seems like FS2 is pretty thin.

EPA RESPONSE: Note taken

COMMENT: Then you could cut down on red tape by keeping it on the Standard Metals property. This comment is referring to keeping it at Level 2.

EPA RESPONSE: EPA agrees that the administrative burden would be decreased if the repository were located in an area owned or managed by one entity.

COMMENT: From a human health prospective, the health consultation...prepared by the US Department of Health and Human Services, Agency for Toxic Substances and Disease Registry, issued November 17, 2006, concludes that “the site does not pose a health hazard to the community....”

EPA RESPONSE: The ATSDR Health Consultation misstates the findings of EPA’s 2005 Tailings Dam Inspection Report. The Health Consultation reported, page 7, that the 2005 Inspection Report “reported no critical condition affecting the safety or stability of the tailings impoundment.” This statement is erroneous and fails to consider other statements in the 2005 Inspection Report that define perceived and observed instability in the tailing dam. The complete citation from the 2005 Tailings Dam Inspection Report states “no critical conditions that require *immediate* attention...”; meaning the dam was not failing at the time of the inspection and was not an emergency. However the 2005 Inspection Report goes on to detail conditions at the dam that do pose a threat to its stability. As noted on page 2, last bullet of the Inspection Report, the long-term safety and stability of the tailings dam is questionable:

“The very moist soil observed in the overflow spillway erosion gulley is apparent evidence of an elevated phreatic surface within the dam. An elevated phreatic surface is typically indicative of poor drainage within the dam and can negatively impact the stability of the dam.”

The 2005 Inspection Report goes on to recommend additional intrusive testing and analyses needed to fully evaluate dam stability but based on conditions observed during the inspection, the potential for tailing dam instability is judged to be high. This determination is based on erosion observed in the outfall channel during the 2006 field season, which indicates large water flow rates have discharged through the impoundment, and is also based on the following factors:

- 1) inadequate spillway,
- 2) location in the Elk Creek drainage,
- 3) inadequate freeboard,
- 4) high phreatic surface,
- 5) unknown internal geometry,
- 6) nonexistent design/construction documentation,
- 7) no instrumentation (piezometers, movement monuments), and
- 8) no inspection records.

EPA determined that money (estimated at \$100,000) spent in a more detailed evaluation of dam stability would be better spent in the removal of the tailings impoundment. Additionally, EPA examined not only the likelihood of the dam failure but also the consequences. If the dam failed during a large storm event or in combination with high spring runoff conditions, tailings, waste rock, and contaminated water associated with the tailings could be distributed over a wide area downgradient of the site. Some material would likely be carried to and past the town of Crested Butte drinking water intake in Coal Creek. Other material would be deposited in and adjacent to Elk Creek and Coal Creek where it would contribute dissolved and undissolved metal load to these water courses over a long period. Cleanup costs involved in this scenario would be high and the ability to recover the material would be very limited.

These considerations were not part of the ATSDR's analysis of the tailings impoundment. This is explicitly stated in paragraph 2, page 7 of that consultation:

“ATSDR does not have the expertise to evaluate the structural stability of the dam...” and “due to the large number of assumptions inherent in this evaluation, the conclusions must be considered highly uncertain...but will at least give a basis for prioritizing necessary removal/remedial actions...”

EPA agrees with the Health Consultation's findings that the likelihood of events resulting in a public health hazard is minimal; however, not all aspects of the tailings dam were examined by ATSDR.

COMMENT: To the extent that the tailings impoundment has been de-watered then the risk of this water entering into the drinking water system and becoming a health hazard has been addressed.

EPA RESPONSE: During the 2006 field season, the tailings impoundment was de-watered by treating the surface water and discharging it back into Elk Creek. A PVC liner was then placed on the surface of the impoundment to prevent snowmelt from collecting on the surface and infiltrating into the impoundment. Afterward the impoundment was graded to allow snowmelt to flow from the impoundment and into Elk Creek. This was done in attempt to reduce the need to treat additional water (from snow melt, etc) next season and thereby reduce the preparation needed to move the tailings impoundment in 2007. Once the impoundment was de-watered, EPA's contractors

attempted to traverse the dam to complete installation of the aforementioned PVC liner. It was quickly learned that what was thought to be the bottom of the impoundment was merely a 3' (approximately) layer of crust/sediment "floating" above ground up tailings & other liquefied materials.

These actions were not intended to be long-term solutions and they may not measurably reduce the potential for failure of the dam due to the many unknowns for this structure (e.g. lack of design documentation, unknown internal geometry). It would not be a satisfactory long-term solution to leave this dam in its current condition and location. Nor can it be assumed all potential threats of structural failure have been addressed.

COMMENT: From an ecological perspective, there is no technical evidence that the waste rock piles and/or tailings in the impoundment, under ambient conditions, are a chronic impact to the water quality of Elk Creek or the aquatic resources in Coal Creek. Although there may be a short-lived impact during spring run-off when run-off flows come in contact with the waste rock this impact is likely mitigated by the volume of water in both Elk Creek and Coal Creeks during spring run-off period.

EPA RESPONSE: EPA believes there is substantial data to show the material at Standard Mine (the Site) is impacting Elk Creek. This is shown through the following factors:

- 1) There is heavy metal contamination present in the waste materials found at Standard Mine and concentration of the metals is above background levels. Uncovered and uncontrolled quantities of waste rock are present in the mill site area northeast of the tailings dam and in four other defined areas at Level 1. Samples collected from these areas during the October 2005 sampling event revealed lead concentrations of 2,500 milligrams per kilogram (mg/kg) to 19,000 mg/kg; copper concentrations of 190 mg/kg to 1,100 mg/kg; manganese concentrations of 2,000 mg/kg to 9,300 mg/kg and zinc concentrations of 660 mg/kg to 11,000 mg/kg. The lead concentrations are well above typical action levels for mining impacted sites.
- 2) The waste materials at the Site have leaching potential, which was not addressed by the removal actions taken during the summer of 2006 and so remain uncontrolled at the Site. Composite waste rock samples collected from Level 1 in October 2005 were submitted for laboratory analysis of leaching characteristics. The test performed was the Synthetic Precipitation Leaching Procedure (SPLP) (EPA Method 1312). The SPLP analysis was chosen instead of the Toxicity Characteristics Leaching Procedure (TCLP) test (EPA Method 1311) because TCLP is used to determine if a material is a Resource Conservation and Recovery Act (RCRA) hazardous waste. The waste material at the Site is exempt from the definition of a hazardous waste; therefore TCLP does not apply. Regardless, the SPLP test is believed to provide a more realistic representation of leaching properties for materials exposed to natural environmental conditions as opposed to conditions in a

landfill that the TCLP test was designed to simulate.

SPLP results revealed that cadmium, copper, lead, and zinc were present at measurable concentrations in leachate samples. Lead and zinc concentrations as high as 11 mg/L and 22 mg/L, respectively, were reported. Although the waste rock is not subject to RCRA hazardous waste regulations (RCRA Subtitle C), the SPLP result exceeds the lead TCLP threshold of 5 mg/L. There is no TCLP standard for zinc. The high SPLP results and toxicity to aquatic life indicate that zinc leaching from the waste rock into Elk Creek is a significant issue at the site.

- 3) Due to lack of controls, the contamination is migrating away from the Site, either by leaching or physical transport by wind or surface water run-off flows. These waste rock materials were seen in both sediment samples and water samples collected from Elk Creek.

Sediment samples have been collected from Elk Creek downstream of Level 1 (Elk 10 sample location). An increase in heavy metal concentrations through the Site was evident by comparing upstream sample results with downstream sample results, respectively, as shown in Table 1 below:

TABLE 1
Metal Concentrations of Sediment in Elk Creek at the Elk 08
and Elk 29 Sample Locations

Analyte	Elk 29	Elk 08
	Sample Results (ppm)	Sample Results (ppm)
Cadmium	3.8	25.8
Copper	13.8	253
Lead	838	632
Manganese	1,580	4,360
Zinc	512	2,630

Each metal, except for lead, shows a concentration increase below Level 1. This data does not attempt to separate Level 1 Adit contributions from contributions by waste rock and tailings.

Evidence of waste materials migrating into Elk Creek is found in water surface water sample results as well. Table 2 presents data for select metals in samples collected in 2006 from Elk Creek downstream of Level 1 (Elk 10 sample location) and upstream of Level 1 (Elk 29 sample location). Cadmium, copper, and zinc concentrations downstream of Level 1 exceed the applicable stream standards. Cadmium and zinc concentrations exceed stream standards by factors of 25 and 57 respectively.

TABLE 2
Dissolved Metal Concentrations in Elk Creek at the Elk 10 and Elk 29 Sample Locations

	2007 Segment 11 Acute / Chronic Stream Standard*	Elk 10			Elk 29		
		6/20/2006	7/19/2006	9/13/2006	6/20/2006	7/19/2006	9/13/2006
Analyte	(µg/L)	Sample Results (µg/L)			Sample Results (µg/L)		
Cadmium	1.7 / 0.42	17	29	43	0.75 J	1	1.1
Copper	13.4 / 9.0	44	28	47	1.1 J	2.8	1.4 J
Lead	65 / 2.5	66	33	44	4.6	2.3	1
Manganese	2,990 / 1650	810	1,500	2,300	1 U	2.1 J	1 U
Zinc	143 / 143	3,100	4,600	8,200	150	150	210

- * Using a hardness of 100 mg/L.
- U The material was analyzed for, but was not detected above the level of the associated value.
- J The associated numerical value is an estimated quantity because the Quality Control criteria were not met.

The Level 1 adit discharge contributes metal loading to Elk Creek in addition to the metal loading from waste rock and tailings. In an effort to separate the potential loading from the two sources, Dan Wall, Biologist with the US Dept. of Interior, Fish and Wildlife Service, has drafted a data interpretation examining the impact to Elk Creek. As stated on page 2, “converting the total metals load at Elk-10 to a concentration and assuming the metals are in the 100% dissolved phase suggests that the metals load from non-point sources into Elk Creek is sufficient to exceed water quality standards and potentially harm aquatic receptors.” This is shown in a table in that data interpretation and is included as Table 3 below:

Table 3 Calculated Concentrations at Elk-10 without Upstream Loads

Sampling Event	Analyte	Hardness	Calculated Concentration (ug/L)	AWQC (chronic)
June	Zn	50	266	67
June	Cd	50	2	0.16
September	Zn	98	1045	118
September	Cd	98	4	0.25

- 4) Migration of waste material from the Site into Elk Creek poses an impact to the ecology in the area. The Screening-Level Ecological Risk Assessment dated September 29, 2006, documents that there is an ecological impact from the site. Metals concentrations in sediment samples are important in the evaluation of the benthic invertebrate habitat. One of the conclusions from the report presented on Page 16 states that “For Elk Creek downstream of Standard Mine, there are multiple chemicals that have a high frequency of

Hazard Quotient (HQ) values above 1, often ranging into the 10-100 range. The highest chronic risks appear to be due to arsenic, cadmium, copper, lead, and zinc. For Coal Creek downstream of the confluence with Elk Creek, the pattern of HQ values is similar to Elk Creek, although the exceedance frequency and the range of HQ values tend to be somewhat lower.” Stream sediments have been sampled during spring and fall for two consecutive years at the site (including one sediment sampling effort in the summer of 2006). These sediments have been shown to contain significantly elevated concentrations of metals during the spring, summer, and fall months.

EPA is currently conducting a draft Ecological Risk Assessment (ERA), the completion of which is not planned until the summer/fall of 2007. In the meantime, the aforementioned data interpretation by Dan Wall, Biologist with the US Dept. of Interior, Fish and Wildlife Service (included as Attachment 2), was developed to investigate whether technical evidence exists to substantiate a threat to aquatic organisms in Elk Creek. Based on Mr. Wall’s professional judgment, the tailings/waste rock by themselves presents “unacceptable levels of risk to aquatic organisms in Elk Creek.” To fully remediate Elk Creek requires EPA to address the Level 1 Adit Discharge and the tailings/waste rock; remediation of one of these items will not remove the threat to aquatic organisms.

COMMENT: The information present in Section Four indicates that the four “more suitable” locations are Area 225, Area 243, Standard Mine level 2, and USFS Site 2. ...USFS Site 2 is perhaps the “preferred location” with respect to technical performance, construction, environmental considerations, and operation and maintenance costs. However, since there is no information on construction costs for any of the locations it is difficult to confirm that USFS Site 2 would be the “preferred” location without that critical aspect.

EPA RESPONSE: EPA agrees with CDPHE that from a logistics perspective, USFS Site 2 appears to be the most favorable site. As part of the Phase I EE/CA evaluation, a preliminary estimate of development costs was prepared for each potential repository site. The estimates indicate that the development costs for each of the four most favorable sites were within about 15 percent of each other. A detailed estimate of construction costs will be given in the Phase II EE/CA where the design options for two repository sites will be discussed. At this stage of the evaluation, EPA considered the selection of a repository site would not be based on cost alone. Other factors listed in Table 5-1 of the EE/CA would be considered as well as stakeholder opinions. All the evaluation criteria and stakeholder opinion will ultimately be factored into the actual repository site selection.

COMMENT: It was suggested EPA consider an in-place closure at the Standard Mine that included piping Elk Creek through the site.

EPA RESPONSE: EPA considered several removal alternatives for waste rock and tailings located at Level 1 as described in the November 9, 2006 Phase I EE/CA. EPA also consulted the July 9, 2002 EE/CA for Standard Mine prepared for the U.S. Forest Service (USFS), Rocky Mountain Region for removal alternatives. The findings of that report are referenced in specific citations in addition to EPA's findings throughout this section.

A repository location at Level 1 was considered to have negative factors such as the presence of numerous springs and wetlands in the northeast portion of Level 1. Also the width of the valley does not allow sufficient land surface to hold the estimated waste rock and tailings volume present at Level 1 above the 100-year floodplain and avoid contact with the wetlands and springs.

Capping waste rock and tailings in place was also considered. An evaluation of water discharge during a 100-year storm event revealed that a substantial portion of Level 1 would be submerged in stormwater. EPA determined that the potential impact from this storm discharge would likely result in the removal of cap materials placed on the waste rock and tailings and possible failure of the tailings dam. Further, the 2002 EE/CA supports elimination of this alternative as shown on page 43, last paragraph, "the bulk of the waste rock and mill tailings is within the flood plain of Elk Creek, and therefore, is susceptible to erosion. This technology would only be feasible with constant maintenance of the cover and therefore has been removed."

EPA then evaluated the next most cost-effective removal alternative, removal of waste rock and tailings to a constructed repository located as near, but not at, Level 1. This removal alternative is in accordance with suggestions made in the 2002 USFS EE/CA as noted on page 45, Table 5-2, which lists consolidation and disposal in an on-site cell as a feasible technology. EPA intends to select a site that meets the definition of "on-site" as defined by 40 C.F.R § 300.5. Two other alternatives considered feasible in the 2002 USFS EE/CA were run-on/run-off controls, which is something EPA plans to include in its design of the repository, and disposal at an off-site, permitted facility.