



**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

PMB 2020
JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182
denr.sd.gov

March 23, 2011

Ron Waterland
Environmental Manager
Wharf Resources (USA), Inc.
10928 Wharf Road
Lead, SD 57754

Re: Wharf Resources Large Scale Mine Permit Application

Dear Mr. Waterland:

Staff review has been completed of Wharf Resources' permit application for the Wharf Expansion Project submitted February 18, 2011. Based on this review, the department has determined the application is procedurally incomplete.

This letter is divided into three parts: Part I contains procedural completeness issues; Part II contains general regulatory comments; and Part III contains technical review comments. For the application to be considered procedurally complete pursuant to ARSD 74:29:02:01, Wharf must adequately address the items listed below under Part I.

Part I -- Procedural Completeness Issues

1. SDCL 45-6B-4, ARSD 74:29:02:02, ARSD 74:29:06:04(e), ARSD 74:29:07:24(1)(g), and ARSD 74:29:07:25(1)(f). Wharf must submit proof that it is in compliance with Lawrence County ordinances or proof that the application is in substantial compliance with the procedures for obtaining a Lawrence County Conditional Use Permit. A letter from the Lawrence County Planning and Zoning Office confirming this is sufficient to meet the requirement. The county is also required to approve the postmine land uses of Industrial Use and Home Sites before the Board of Minerals and Environment can approve those land uses. This can be addressed through the same letter noted above.
2. SDCL 45-6B-5(5) and SDCL 45-6B-91. The postclosure plan should address the treatment of tailings (spent ore) to ensure continued neutralization or immobilization of any parameters of concerns (including arsenic, nitrates, and sulfates) during the postclosure period. An updated postclosure bond calculation that includes any changes to the current

postclosure bond that may result from the proposed expansion project needs to be provided.

3. SDCL 45-6B-6. The application form should identify C.T. Corporation System as the resident agent rather than Bill Shand. Please include the correct resident agent name, address, and phone number on the application form. To correct these items, Wharf may want to submit a revised application form.
4. Certification of Applicant Form. Please submit a list of previous violations at the Wharf and Golden Reward mines that can be attached to the certification of applicant form.
5. SDCL 45-6B-6(2) and (3), SDCL 45-6B-10(2) and ARSD 74:29:02:03. There are a few minor errors or omissions on the Impacted Land Map in Exhibit 3 and in the land ownership tables in Appendix 1, as follows:
 - a. There are no claims shown on Exhibit 3 for the extreme western end of the expansion permit boundary. The map on the Lawrence County web page shows claims in this area that need to be identified in Exhibit 3; and
 - b. Mountain View Heights, Inc. is shown as a mineral owner in the ownership list at the end of the Table 1, Appendix 3, but not in the table. Also, White House Congress is shown as a mineral owner in table 1, but not in the list at the end of the table. Are Mountain View Heights, Inc. and White House Congress both mineral owners?
6. SDCL 45-6B-6(5) and ARSD 74:29:05. The application indicates that the applicant's right to dispose of tailings (spent ore) is addressed in Section 5.4 of the mine permit application. However, there is nothing on the legal right to dispose of spent ore in the Portland Ridgeline Pit. If Wharf is seeking to dispose of spent ore in areas other than the leach pads or the American Eagle Pit, the application will need to address those areas and the applicant's right to dispose of spent ore on those lands.

Note that under ARSD 74:29:01:01(104), the term "tailings impoundment" includes leach pads and dumps containing treated spent ore. The application mentions several times that about 10 million tons of the final spent ore from the leach pads will be off loaded into the Portland Ridgeline Pit to reduce the amount of exposed highwall during final reclamation. However, Section 4.2 of the Groundwater Report states none of the spent ore will be offloaded to expansion area pits. It also infers in Section 5.3.4 that the final heap leach pads may be reclaimed in place. Does Wharf plan to offload the final spent ore from the leach pads into the Portland Ridgeline Pit? Will Wharf need to obtain a ground water discharge permit to place spent ore in this pit? If so, how much spent ore will remain on the leach pads to be regraded and reclaimed in place? If spent ore will be placed in the Portland Ridgeline Pit, it needs to be addressed in Sections 3.3.4 and 3.4.3. Since Wharf will be placing spent ore in the American Eagle Pit and possibly the Portland Ridgeline Pit, the reclamation plan should address those sections in ARSD 74:29:05 (Reclamation of Millsites) that pertain to disposal of spent ore. ARSD 74:29:05:05 through 12 should be

addressed. As Wharf is already permitted to dispose of spent ore at its current operation, these regulations may be addressed in general terms. For instance Wharf may summarize data already submitted to the department to address ARSD 74:29:05:06.

Wharf mentions in the application it may construct another leach pad in the expansion area just to the north of the current process area. ARSD 74:20:05:01, 02, and 05 through 12 should be addressed for the potential new leach pad.

ARSD 74:29:05:05 requires plans and specifications and a stability analysis for spent ore depositories. For the purposes of completing the application, Wharf need only address conceptual plans and specifications at this point. Final plans and specifications and the stability analysis will be required prior to disposal of spent ore in areas not already permitted.

Also note for SDCL 45-6B-91(1) regarding the postclosure plan, the treatment of tailings to ensure continued water quality compliance in the postclosure period must be addressed (see item no. 2 above).

7. SDCL 45-6B-6(8)(d) and ARSD 74:29:02:04:(6). The blasting plan should also address minimizing undetonated and spilled blasting agent (ANFO), which will in turn minimize the concentration of nitrate in surface and ground waters.
8. SDCL 45-6B-7(2). The local conservation district should be consulted regarding the soil survey of the affected land.
9. SDCL 45-6B-7(5). In section 2.3, please include a statement summarizing any characteristics of the proposed affected land having historic, archaeologic, geologic, scientific, or recreational significance.
10. SDCL 45-6B-7(9) and ARSD 74:29:02:11. Please address the following sections of this regulation:
 - (1) Baseline surface water and ground water reports:
 - a. From previous baseline sampling at Golden Reward, it is known that radionuclides tend to be elevated. However, in Table 3-6 in Appendix 6, the radon concentration in the Nevada Gulch well appears to be excessively high. Please collect another radon sample from this well to verify the concentration;
 - b. Wharf needs to submit ten more months of data for well PW-2 to complete baseline data requirements; and

- c. In Appendix E of the Ground Water Baseline Report, we noted some sampling parameters are different than those specified in the baseline sampling plan for the following sites:

Nevada Gulch well - Sampled for total barium, copper, beryllium, and lead instead of dissolved on July 2010;
Foley Shaft - Sampled for total metals only in November 2009 rather than dissolved; and
Terry Peak well - Sampled for total metals rather than dissolved during November 2009 sampling event and sampled for total iron during July and August 2010 sampling events rather than dissolved.

We also noted some sampling parameters specified in the baseline sampling plan are missing for the following sites:

Nevada Gulch well - Sulfate and total mercury results missing for July, August, and September 2010;
Terry Peak well - Magnesium and nitrate results missing for July and August 2010; and
Railroad well - Mercury results missing for November 2009 sampling event and missing anion-cation balance for March 2010.

We did note that the sample results for these sites were reported as dissolved and not total metals and the missing parameters were included in the additional ground water data at the end of report. Please verify that the data at the end of the report is correct. If the samples were analyzed for total metals rather than dissolved, please provide an explanation for the deviation from the baseline sampling plan.

- d. In Section 3.4.2, page 40, the text defines 11 baseline surface sampling sites. However, baseline sampling did not address water quality associated with Long Valley. During the September 30, 2010 inspection at Wharf mine, the topic of baseline water quality in Long Valley was raised. At that time Wharf explained that the new expansion area depicted on the maps to the north of the heap leach pads was for a possible new heap leach pad. Wharf indicated there would be no disturbance to the north of the ridgeline that would impact the Long Valley drainage. Exhibit 2 indicates that the planned disturbance does cross into the Long Valley drainage. At the September 30, 2010 meeting DENR advised that surface water baseline sampling needs to be conducted in Long Valley if the expansion crosses the ridge into that drainage, but would not need to be done if the expansion stayed in the McKinley Gulch drainage. Please clarify the extent of the planned disturbance in this area. If the disturbance will cross the ridge, please submit a baseline sampling plan and schedule for this drainage.

- (2) In Exhibits 5, 6, and 7, there should be two more cross sections each for both the Green Mountain and Golden Reward Pits. It was noted on the Green Mountain Pit cross sections there are three trending north-south across the pit and only one east-west trending cross section across the southern edge of the pit. Please include two more east-west cross sections across the middle and north end of the pit. Likewise, with the Liberty and Harmony Pits there are three east-west trending cross sections, but only one north-south trending cross section across the eastern edge of the pit. Please include two more north-south cross sections across the center and western edge of the pits.

It was also noted in the report and Exhibit 4 (Wharf and Golden Reward Geologic Map) the porphyry deposits are separated into monzonite and phonolite porphyry deposits. Please modify the cross sections to indicate the location of the monzonite and phonolite porphyries.

- (3) Since the surface water inventory map in the Surface Water Baseline Report is too small to read, it needs to be revised. We suggest the map be constructed on a topographic base map similar to the size of the exhibits showing all streams, seeps, springs, lakes, ponds, wetlands, and dams for the entire mine site. There is also a reference to several unnamed minor springs from historic surveys located in the drainages of False Bottom Creek, Deadwood Creek, Nevada Gulch, Fantail Creek, and Stewart Gulch, which should be identified on the map.
- (4) Please add the permit expansion boundary to the well inventory map in the Ground Water Baseline Report.
- (7) It appears RESPEC used the parameter lists approved under the current mine permits for the ground and surface water baseline sampling at Golden Reward and Wharf. For the operational ground and surface water monitoring plan, Wharf should use one parameter list for all ground water sampling sites and one parameter list for all surface water sampling sites. Also, based on recent discussions with Wharf and a review of the additional surface water data tables provided with the report, it appears at least one of the parameter lists on this table is incorrect. Please verify that all the parameter lists are accurate.
- (10) Please submit a spill contingency plan. A copy of the current spill contingency plan for Mine Permits 356, 434, 435, and 464 may be submitted if the expansion will not require changes to the plan.
11. SDCL 45-6B-7(12), SDCL 45-6B-20, and ARSD 74:29:02:08: The methods used to calculate the bond numbers listed in table 6-5 in Section 6.10 of the application need to be described in detail. Please include material balances, haul distances, and equipment and operator costs used in the calculations and any assumptions used in the calculations.

The detailed calculations can be marked confidential if they comply with the confidentiality requirements in SDCL 45-6B-19.

Does Wharf plan to submit additional bond for the expansion operation in phases to correspond with each phase of the mining operation? Also, does Table 6-5 include calculations for areas affected under Permits 356, 434, 435, and 464?

12. SDCL 45-6B-8. Please identify any unreclaimed land disturbance on previously mined land in the expansion area which was incurred prior to July 1, 1971, if any.
13. SDCL 45-6B-10(4), and ARSD 74:29:02:12. The department has the following comments on the exhibits in Appendix 2 of the mine permit application:

Exhibit 2 - Please separate Exhibit 2 into two separate maps. The first map should just show the existing facilities such as the leach pads, process area, office, shop and crusher facilities, denitrification pads, Ross Valley Spent Ore Facility, the Reliance, Trojan, and Land Application Waste Rock Facilities, and the Juno, Portland, Deep Portland, American Eagle, and Trojan Pits. Exhibit 2 can remain the same and could be labeled as Current Facilities and Expansion Area. Finally, please show the boundary of the Terry Peak Ski area.

Exhibit 2 shows Portland Ridge disturbance outside the permit boundary and proposed disturbance limit. The Green Mountain disturbance is also shown outside the proposed disturbance limit. Please correct the map and any other maps so that all disturbances are within the proposed disturbance limits and permit boundary.

Exhibit 4 – The geologic map does not show the extent of the existing permit boundary or the proposed expansion area. This map also does not extend far enough to the west to show the entire expansion area or permit area. Please revise this map to so that it identifies all of the existing permitted area and proposed expansion areas.

Exhibit 10 - The map needs to be divided into at least four separate maps (e.g., one map for Portland, one for Green Mountain, one for Liberty, and one for Harmony.) Each map needs to be large enough so all labels are clearly visible. The ABA sample sites should be labeled with Sample ID numbers and ANP/AGP ratios. The ANP/AGP labels should also differentiate between discrete stratigraphic horizons or rock types (i.e. color coding). The ABA sample site maps should include ANP/AGP values from all sample sites listed in Tables 1 – 11 of Appendix 4 since it appears that many of the sample sites listed under the tables associated with “historic” sampling are not depicted on the map. Also, the potential special handling areas indicated on this map are extremely difficult to see. Please mark these areas more clearly.

Exhibit 15 – The map needs the applicant’s name, signature of preparer, and date prepared.

Exhibit 19 – The map needs the applicant’s name, signature of preparer, date prepared, legend, and scale.

Exhibit 21 - Please show the boundary of the Terry Peak Ski area.

14. SDCL 45-6B-12 and SDCL 45-6B-44, and ARASD 74:29:06:01. SDCL 45-6B-44 and ARSD 74:29:06:01 require that the reclamation plan be developed by Wharf, the department and the landowners. To date, the Bureau of Land Management (BLM) has not yet formally agreed to the four postmining land uses since in Appendix 16 there is a “Pre-submission Conference to Determine Post-Mining Land Use” letter that has not been signed by the BLM. Please submit a signed copy of the letter to show the BLM is in agreement with the four postmine land uses. In addition, even though Tom Marsing of the Black Hills Chairlift Company was at the December 15, 2010 meeting where we discussed the postmining land uses, a letter from Mr. Marsing documenting that the Black Hills Chairlift Company is in agreement with the four postmine land uses should be submitted.

Please submit an instrument of consultation with the BLM and the Black Hills Chairlift Company who are surface owners in the expansion area. Since the right-of-way for State Highway 473 is located in the proposed expansion area, Wharf also needs to obtain an instrument of consultation from the South Dakota Department of Transportation. This instrument of consultation must show that Wharf has permission to enter and commence operations. The instrument of consultation should also contain written confirmation of receipt of the operating and reclamation plans by each landowner.

In Section 2.2, page 15, please explain how Wharf has the legal right to mine the claims owned by the Golden Reward Mining Company, including the transfer of Mine Permit No.450 from Golden Reward to Wharf.

Proof of consultation with landowners adjacent to the proposed expansion permit boundary (John Dykes, Paul Akrop, Rose and Amber Determan, William and Katherine English, Randy and Juli Huber, and the Lead Volunteer Fire Department) must be submitted as required by SDCL 45-6B-44. This consultation was not identified in our review of Appendix 3. A signed statement from each adjacent landowner stating that they received a copy of the reclamation plan will suffice as proof of consultation.

15. SDCL 45-6B-32. In Section 1, page 1, please address the following comments related to the sections of this statute identified below:
- (4) Exhibit 2 - Several buildings shown along the Stewart Lodge Road are within 200 feet of the proposed permit boundary of the expansion area. Please describe how the stability of these buildings will be protected during mining.

- (5) Wharf should acknowledge it needs to obtain a conditional use permit from the county and the county needs to approve the postmining land uses of industrial and home sites.
 - (7) Wharf needs to discuss the wells in the process area that currently do not meet the ground water standards for nitrate.
 - (8) Please include a narrative of the department's special, exceptional, critical, or unique lands determination in this section.
16. SDCL 45-6B-37 and ARSD 74:29:07:03. Please address subsections (1) through (6) of ARSD 74:29:07:03 to explain why backfilling is not feasible in the portions of the Liberty and Portland Ridgeline pits that will not be backfilled. Although Wharf plans to partially backfill both pits, Wharf must demonstrate that it is economically or physically unfeasible to backfill the pit completely and leave remaining highwalls.
17. SDCL 45-6B-37 and ARSD 74:29:07:04. To address section 1 of ARSD 7429:07:04, please discuss the following for each postmine land use:
- a. How the reclaimed slopes will be visually and functionally compatible with the surrounding area;
 - b. How the reclaimed slopes will be suitable for the particular postmine land use;
 - c. How the reclaimed slopes will be stable;
 - d. If the reclaimed slopes will exceed the angle of repose; and
 - e. How the landforms created by grading, backfilling, and topographic reconstruction blend in with and complement the visual continuity of the surrounding area.

To address section 2 of ARSD 74:29:07:04, please explain if Wharf plans to create any erosion control features such as dozer basins during final grading to break up any long slopes to control long term erosion. Also, how does Wharf plan to protect areas outside the affected area from slides or other damage during grading activities?

18. SDCL 45-6B-38 and ARSD 74:29:07:05. Please provide details regarding the removal and disposal of petroleum and other contaminated soils and hazardous materials such as cyanide and other processing chemicals in the refuse disposal plan.
19. SDCL 45-6B-39, ARSD 74:29:02:10 and ARSD 74:29:07:06(1). In addition to the local conservation district, the seed mix must also be developed in consultation with the other

surface owners (BLM, Black Hills Chairlift Company, and DOT). Proof of this consultation must be submitted.

The seeding time table should also indicate the time of year seeding will be conducted.

20. SDCL 45-6B-40 and ARSD 74:29:07:07. It would be helpful if the discussion of topsoil replacement was confined to one clearly defined section in the reclamation plan. Certain aspects of topsoil replacement are discussed in both sections 6.2.1 and 6.3.

Do the topsoil salvage estimates in Section 5.3.3, page 82, also include any subsoil? Is it possible to salvage enough subsoil which could be amended to ensure a minimum 6 inch topsoil application depth for reclamation?

Please provide information on the fertilizer currently used for final reclamation. Will the current topsoil need to be analyzed to ensure the current fertilizer is adequate for the expansion area?

Will the current Portland Topsoil Stockpile need to be moved to make room for the Portland Ridgeline Pit? If so, where would the new location for the stockpile be?

21. SDCL 45-6B-41 and ARSD 74:29:07:08: SDCL 45-6B-41 requires that disturbance to the prevailing hydrologic balance be minimized in the affected and surrounding area during and after mining. In addition, SDCL 45-6B-7(6) requires that the application include a description of how Wharf's reclamation plan will be implemented to meet certain requirements, including how it will result in minimizing impacts to ground and surface water. The mine permit application includes a general discussion of sulfate in Nevada Gulch and nitrates in the process area. Sections 3.3.4 and 3.4.3 of the application also refer to a 2010 assessment of the current and potential future impacts of ore processing and spent ore and barren rock disposal on ground water and surface water quality prepared by ERM, Wharf's consultant. Wharf should either provide a detailed summary of this report or provide a copy of the report to address potential impacts to ground water and surface water, especially from nitrates, arsenic, sulfates, and other metals.

In addition, please list Wharf's current water rights permits, any potential future permits that may be required, and dredge and fill law requirements for disturbed portions of upper Fantail and Nevada Gulch.

Finally, in Sections 3.3 and 3.4, please address the potential of water pooling in the bottom of the mine pits, the expected water quality of the water, and how it will be handled. This may become an issue if the Precambrian Ellison Formation is left exposed in portions of the final pit floors and has the potential to generate acid.

22. SDCL 45-6B-42, ARSD 74:29:02:04(5) and ARSD 74:29:07:04(6). In accordance with ARSD 74:29:07:04(6), if highwall reduction or elimination is not proposed, the applicant

must provide justification describing why the reduction or elimination is impossible, impractical, or aesthetically undesirable.

The application indicates Wharf will take steps to protect highwalls during mining by installing fencing and posting warning signs. However, Wharf does not discuss how the Portland Ridgeline or Liberty Pit highwalls will be protected during and after final reclamation. Please address the protection of these highwalls during and after final reclamation.

Please submit copies of the previous highwall stability reports for the Trojan Pit and Golden Reward Mine as referenced in the mine permit application. In addition, a stability analysis needs to be conducted for the pit shown on Exhibit 21 just to the southwest of the Terry Cemetery since there were concerns during previous operations that mining could affect the stability of the cemetery. The stability analysis is also important since the cemetery has been placed on the preliminary list of special, exceptional, critical, or unique lands and is eligible for inclusion on the National Register of Historic Places.

23. SDCL-45-6B-46. Please address each section of this statute.
24. SDCL 45-6B-83.2. Please address this statute with regard to posting a reclamation surety and reclamation acreage credits. This statute was not specifically addressed in the mine permit application and is a procedural completeness item.
25. SDCL 45-6B-92. In addition to the subsections of Section 3.0 on threatened and endangered species, please provide additional information for the following critical resources and how impacts to the resources will be mitigated. It would be helpful if you could provide a separate subsection in Section 3.0 to address each of these critical resources and how the impacts to the resources will be mitigated:
 1. Wildlife – Species on the SDNHP list (including raptors) and critical deer winter range;
 2. Aquatic Resources – Cold water fish life propagation water;
 3. Vegetation – Wetland and riparian vegetation;
 4. Water – direct or indirect sources of drinking water;
 5. Visual Resources – Visual impacts to Barefoot Condominium and Lost Camp areas;
 6. Soils – Soils with high erosion and low revegetation potential;
 7. Cultural Resources – Summary of sites eligible for National Register of Historic Places;
 8. Air Quality – Impacts to Terry Peak, Barefoot Condominium, and Lost Camp areas; and
 9. Noise - Impacts to Terry Peak, Barefoot Condominium, and Lost Camp areas.

26. SDCL 45-6B-7(8)(a) and ARSD 74:29:02:04(2). In addition to the postmine land use map shown in Exhibit 23, please submit a separate postmine contour map. The shading used to depict the proposed land uses makes it difficult to see the contour lines. The highwalls that will remain and those areas where landshaping or talus slope construction will take place should be clearly defined. The new map should also show, at least at the conceptual level, any modifications proposed for the Empress (Red) Chairlift and any ski runs; and the potential locations of ski lifts, lodges, condominiums, and commercial facilities relating to the proposed outdoor recreational activities as well as home sites. In addition, potential tree and shrub planting areas should be shown.

Finally, since the new permit application impacts the American Eagle Pit and the process area, the new map should show the postmine contours for the entire mine site.

27. ARSD 74:29:01:17 and ARSD 74:29:02:09. Please submit a map showing the entire current permit boundary for the Wharf and Golden Reward Mines as well as the permit boundary for the expansion area.
28. ARSD 74:29:02:04(4). Exhibit 21 should clearly identify the locations in each pit where spent ore or waste rock will be placed as backfill, including the spent ore disposal site in the American Eagle Pit. There are wide red and black lines around the pit areas, but these are not identified in the legend. We assume that the red lines are waste rock disposal areas and black lines are spent ore disposal areas. If these red and black lines are the extent of pit backfill, please identify this in the map legend.

Is the spent ore re-handle repository shown just to the north of the exiting denitrification pads a new denitrification pad? If so, please address it in the mine permit application.

Finally, please use darker labels for the topsoil stockpiles and darker and larger labels for the sulfidic zones in the lined backfill area shown on the map.

29. ARSD 74:29:02:06. Wharf will need to consult the state archaeologist's office regarding historic and archaeological significance of the proposed mine areas. A letter from the state archaeologist's office would serve as proof of compliance. Section 3.9.1 on page 58, should mention the Terry Cemetery is eligible for inclusion on the National Register of Historic Places.
30. ARSD 74:29:06:02(4). Please address the following subsections of Section 4 of this regulation for each postmine land use:
- a. How the postmine land use is obtainable according to data on expected need and market;
 - b. How the land use is supported by comments from the public; and

- c. That Wharf has the financial capability to complete the requirements of the land use.
31. ARSD 74:29:07:01. Please provide more detail on how the reclamation plan rehabilitates land with respect to each postmine land use.
32. ARSD 74:29:07:02. Please address the following sections of this regulation:
- (4) Discuss how impacts to surface water and ground water will be mitigated if spent ore from the leach pads is disposed of in the Portland Ridgeline Pit.
 - (7) Discuss how the location of the waste rock and spent ore backfill areas will facilitate implementation of reclamation and minimize environmental impacts. Also discuss how the location of the topsoil stockpiles will facilitate reclamation.
33. ARSD 74:29:07:04(1)(b) and ARSD 74:29:07:20(2). Please identify which slopes will be less than 3(H):1(V) on a map.
34. ARSD 74:29:07:05 and ARSD 74:29:07:14(3) and (4). The acid base accounting (ABA) analysis in Section 3.1.3.1 addresses acid generation and material handling in the expansion area in general terms. Wharf submitted an ARD Management Plan to the department on December 4, 2001, which included a detailed assessment of the acid generating potential of rock from the Trojan Pit. Please provide an analysis for each proposed pit in the expansion area at the same level of detail as was done for the Trojan Pit in the December 2001 report. This analysis should also include a detailed plan that addresses handling potentially acid producing waste rock and spent ore to include, blending, base amendment, and encapsulation for each mine phase. The analysis should also include a detailed explanation of Wharf's rationale for selecting the location, number of, and geologic units for ABA samples and how that compares with industry standards (for example, there are general recommendations available that suggest how many samples should be taken for a given tonnage of rock).
35. ARSD 74:29:07:09(4). Please submit conceptual plans and cross-sections for the culverts to be used for diversion of surface runoff.
36. SDCL 45-6B-7(10), ARSD 74:29:07:08(5), ARSD 74:29:07:09 and ARSD 74:29:07:04(5). Exhibit 21 appears to show that a portion of the upper Fantail drainage at the Golden Reward Mine will be removed during mining in the Liberty and Harmony Pits. This drainage was reconstructed during the reclamation of the mine and needs to be shown on the applicable exhibits. As a result, this portion of the drainage will need to be diverted during mining and reconstructed during final reclamation as it was when these pits were previously mined. Therefore, please address each section of ARSD 74:29:07:10 regarding the temporary or permanent diversion of intermittent and perennial streams. Conceptual drawings of the stream diversion (including plan view and cross-section drawings of the diversion) and conceptual plans for reconstruction of the drainage during

final reclamation should also be submitted. The route of the reconstructed drainage needs to be shown in Exhibit 23. Finally, please address ARSD 74:29:07:04(5) describing how the original drainage will be preserved during final grading activities.

Exhibits 21 and 29 do not show Nevada Gulch Creek along the new haul road. Is the creek going to be covered by the new haul road? Will the creek need to be temporarily or permanently diverted and reconstructed during final reclamation? Please show the location of Nevada Gulch Creek on these and other applicable exhibits. If the stream needs to be diverted, please address each section of ARSD 74:29:07:10 and submit conceptual plans and drawings.

37. ARSD 74:29:07:12. If the new haul road will be constructed in the Nevada Gulch Creek riparian zone, please address the following sections of this regulation:

- (1) The feasibility of constructing the haul road in the Nevada Gulch riparian zone;
- (4) Whether the creek will be crossed at a right angle and if any fords will be constructed;
- (6) Details on culverts to be installed along the haul road, including cross sections, procedures to protect culverts from erosion, and a culvert maintenance plan;
- (9) Whether any other transport facilities or utilities will be located near any other riparian zones and how they will be constructed and maintained to control degradation of water quality and quantity; and
- (10) In Section 5.3.4 on page 84, the application indicates the portion of the haul road from the Terry Peak Kussy Express entrance to the Golden Reward Mine will be left in place for future use by the ski area. This rule subdivision allows for a road to remain unreclaimed if the surface landowner or governmental agency requests it and agrees to be responsible for future maintenance. If that is what Wharf desires, a letter from the Black Hills Chairlift Company stating it wants this portion of the haul road left for its use and agreeing to future maintenance needs to be submitted.

However, we question whether leaving the entire haul road is warranted if it is going to be used for general access purposes. Therefore, a plan to reduce the width of the haul road in this area as well as a plan to reclaim the remaining portion of the haul road which was not addressed in the reclamation plan should be provided. The location of the portion of the haul road that will remain should also be depicted on the postmine contour map.

Conceptual plans for the haul road bridge or tunnel crossing should be submitted.

38. ARSD 74:29:07:14(1) and (2). Exhibits 21 and 28 do not identify spent ore and waste rock disposal locations. Additionally, Section 5.2 only discusses pit highwall stability and should also address stability of spent ore and waste rock disposal areas.
39. ARSD 74:29:07:15. A detailed noxious weed control plan is required to be part of the reclamation plan which should address such things as herbicides used, spraying timetables, weed sprayer certification, and the current weed spraying contractor. Since Wharf indicated the current weed control plan will be used in the expansion area, a copy of that plan and proof that the plan has been approved by the Lawrence County Invasive Species Supervisor will suffice to meet this requirement. Even though you obtained approval of the plan from the Lawrence Conservation District, we want to make sure the Invasive Species Supervisor has had input into the plan.
40. ARSD 74:29:07:18. Please list the individuals involved in developing the reclamation plan and their past experience in developing reclamation plans.
41. ARSD 74:29:07:24. For the postmine land use of industrial use, please address the comments identified below for the following lettered subsections of section 1 of this regulation:
- (a) Supply data or other information showing that there is a current and future market for the industrial land use;
 - (c) Explain how traffic will be controlled in the industrial use areas;
 - (d) Address the source, suitability, and quantity of water available for industrial and potable uses; and
 - (e) Address the industry's legal right to inhabit the land.

It would be helpful to move the alternative land use timetable in Section 6.2.1 to Section 6.2.2.3 (Industrial Use).

42. ARSD 74:29:07:25. For the postmine land use of home sites, please address the comments identified below for the following lettered subsections of section 1 of this regulation:
- (a) Supply data or other information showing that there is a current and future market for home sites in this area;
 - (c) Explain how traffic will be controlled in the home site areas; and
 - (d) Address the source, suitability, and quantity of water available for domestic use.

It would be helpful to move the alternative land use timetable in Section 6.2.1 to Section 6.2.2.4 (Home Sites).

43. ARSD 74:29:08:01 and 02. Please provide more details on the annual interim and concurrent reclamation activities to be conducted for the Harmony and Liberty Pits at the Golden Reward Mine after the end of seasonal mining and before the beginning of ski season. Such things as pit backfilling plans for the end of each mining season, seeding timetables, and measures to secure the mining area during ski season should be addressed.
44. Table 1-1, pages 3 through 10. The following corrections need to be made to Table 1-1 which address procedural completeness items in the mine permit application:
- a. SDCL 45-6B-9 is a completeness item and needs to be included in the table;
 - b. SDCL-45-6B-46 is a completeness item and needs to be included in the table;
 - c. SDCL45-6B-16 and 17 are not completeness items and need to be removed from the table. These are statutes that need to be addressed after the application is considered filed;
 - d. SDCL 45-6B-54 (1 through 10) need to removed from the table. These statutes only apply to small scale mine permits;
 - e. The reference for ARSD 74:29:02:11(3), Surface Water Inventory Map, should be Figure 2-1 in Appendix 7 in addition to Figure 3-2 in Appendix 6;
 - f. The reference for ARSD 74:29:07:02(9) should be Section 6.2 instead of Section 6.7;
 - g. The reference for ARSD 74:29:07:04(3) should be Section 6.2.1 in addition to Table 6-4;
 - h. The reference for ARSD 74:29:07:04(7) does not address land shaping;
 - i. ARSD 74:29:07:10 and 11 are completeness items that need to be included in the table;
 - j. Section 1 of ARSD 74:29:07:14 needs to include Section 6.2.1 in the reference column. Also, Sections 3 and 4 of this regulation also need to reference Section 3.4.3;
 - k. ARSD 74:29:07:18 is a completeness item that needs to be included in the table; and
 - l. ARSD 74:29:07:27 is a completeness item that needs to be included in the table.

Part II -- General Regulatory Comments

Wharf should also be aware of the following general comments and questions concerning the permit application:

1. ARSD 74:29:01:07. Regarding the determination of procedural completeness, upon submission of a response to the completeness items listed above, the department will make a determination on the adequacy of the applicant's response. Within seven days of the submission of the response, the department will notify Wharf in writing of the determination. If the response is adequate, the application will be considered filed. If the response is determined to be inadequate, Wharf has the following options:

- a. Submit additional information necessary to complete the application;
 - b. Request in writing that the application be considered filed; or
 - c. Withdraw the application.
2. ARSD 74:29:01:04. For any additional information submitted in response to this letter, please remember that this supplemental information must also be filed with the Register of Deeds office and proof of filing is required to be submitted.
 3. ARSD 74:29:01:10. The department will begin drafting a summary document for the permit application. We will provide the summary document to you for review and comment at a later date.
 4. ARSD 74:29:03:16. Please develop a list of technical revision categories Wharf would like to have covered under this permit application as allowed by this rule. Technical revision categories will be specified in a permit condition attached to the permit.

Part III -- Technical Review Comments

The staff developed the following preliminary technical comments on the application. These comments are not completeness issues and are provided as our early thoughts on the technical adequacy of the submittal. Additional technical comments will be forthcoming pending the completion of our detailed technical review of the application and your responses to our completeness review.

1. Section 1.0, page 1. Item number one on this page indicates the required surety will be posted upon the issuance of the mine permit. Please note in accordance with SDCL 45-6B-20, the surety is required to be submitted before the issuance of the mine permit. If necessary, this issue can be resolved through a permit condition indicating the permit will not be issued until the surety is posted.
2. Section 1.0, page 2. This section states there will be 279 acres of mining areas, 17 acres for topsoil stockpiles, and 8 acres of roads. However, Section 2.0, page 15, states there will be 254 mine acres, 17 acres for topsoil stockpiles, and 8 acres for roads. Please revise the application to clarify the correct acreage.
3. Section 1.2, page 11. This section lists the permits that provide Wharf with the legal right to dispose of spent ore. GWD 2-90 was terminated in 1998 and was used for land application, not spent ore disposal. Please clarify the status of this permit.
4. Section 1.4, page 12. Regarding the expansion limitations of SDCL 45-6B-96, only surface mining disturbed acres count toward the 200 acre limit mentioned in this section. The Portland Ridgeline Pit, the Green Mountain Pit, the Bald Mountain Pit, and the Liberty and Harmony Pits at the Golden Reward Mine would be considered surface mining disturbed land. The haul road, other roads, and the topsoil stockpiles would not be

considered surface mining disturbed lands. Lands that will be redisturbed during the expansion project cannot be counted for reclamation credit. Therefore, please revise Section 1.4.

5. Table 1-3, page 14. The September 2007 American Eagle Permit Amendment which added 40 acres to the American Eagle Pit is not included. Please include this in the table.
6. Section 2.3, page 16. Please remove the last sentence in the second paragraph which states the department's scenic and unique determination is pending since the next paragraph discusses the department's determination. You should also discuss the Board of Mineral's determination on the cemetery made on March 17, 2011.
7. Section 3.1, page 18. The text states, "The sills are typically less than 20 feet thick". This description of intrusive geology is included in the Groundwater Characterization Study of the Wharf Expansion Project Area" as well. Exhibits 5, 6, and 7 indicate that a 20 foot thick sill is the exception rather than the norm. Please correct the application or explain this apparent inconsistency.
8. Section 3.1.3.1, page 21. The narrative states, "Test results indicate that portions of the Precambrian rock units may be amenable to acid generation, although no Precambrian rock is scheduled or planned to be mined." However, the cross sections presented in Exhibit 6 and 7 indicate Wharf plans to disturb a substantial amount of Precambrian material, especially in the saddle between Green Mountain and Bald Mountain. This inconsistency needs to be addressed.
9. Table 3-2, page 28. This table indicates all Precambrian samples are outside of pit limits. However, cross sections in Exhibits 6 and 7 show large areas of Precambrian being impacted by mining. Were Precambrian ABA samples done in these areas?
10. Section 3.1.3.1.3, pages 24 and 25. Why is the intermediate unit of the Deadwood Formation the only formation identified as having the potential for special handling units when a Tables 1 through 6 in Appendix 4 indicate other stratigraphic horizons may contain acid generating material?
11. Sections 3.1.3.1.4 and 3.1.3.1.5, page 25, Please describe the source of neutralization potential for the monzonite and phonolite porphyries.
12. Section 3.1.3.3, page 27. It is noted in this section there were elevated levels of arsenic found in one sample of the lower Deadwood contact. This section also indicates while the sample was consistent with whole rock data from the Trojan Project, it showed the lower contact unit was elevated in arsenic. How can this assessment be made accurately when according to Table 22 in Appendix 4, only two samples were tested in MWMT for the lower contact unit of the Deadwood Formation? Why were only two samples taken for this unit when according to Section 3.1 of the report (page 17) this is one of the primary ore bodies?

13. Section 3.3.2, page 35. Which three wells had cyanide levels above the detection limit? Please provide an explanation for the detection of cyanide in these wells.
14. Section 3.3.2.2, page 36. In the second paragraph, Wharf may want to acknowledge spills and leakage from leach pads, process ponds, piping, and ditches as a likely source of nitrate instead of a potential source.
15. Section 3.3.3, page 38. In the fourth paragraph of this section, it states, "This spring within the proposed disturbance area is a minor source of contributing water to Nevada Gulch, with the majority of flow in Nevada Gulch resulting from surface runoff." If this spring is not the only source of water for Nevada Gulch, why does the stream flow year round next to well SM01A just below the Terry Peak Blue Chair parking lot?
16. Section 3.4, page 40. In the second paragraph on this page, Wharf states no surface disturbances will overlie any streams. However, as mentioned earlier in this letter, upper Fantail Creek will be impacted by mining pits and Nevada Gulch Creek will be impacted by construction of the haul road. Please revise this statement so that impacts to Upper Fantail and Nevada Gulch Creeks are addressed.
17. Section 5.3.4, page 84. In the first paragraph, is the term "15-8 percent grade" the correct term?
18. Section 5.3.5, page 87. In the second paragraph, Wharf may want to also refer to Exhibit 21 which includes erosion control features during mining.
19. Section 5.3.6, page 87. Wharf may need to obtain a rubble permit from the Solid Waste Program before disposing of rubble. The impact of disposing of rubble on the stability of waste rock disposal facilities should be addressed.
20. Section 6.2.1, page 95. In the second paragraph, it states the seed mix listed in Section 6.5 is the same mix currently used at the Wharf Mine. Since 6.5.2 states the seed mix has been modified, this statement needs to be corrected.

It would also be helpful if the discussion of surface runoff diversions was combined with the surface runoff discussions in Sections 3.4.4 and 5.3.5 so there is one section that addresses all aspects of surface runoff.

21. Exhibit 21. Please explain how mine operations will avoid impacts to the lined backfill area in the West Liberty Pit. This lined area is adjacent to the current highwall which will be mined during the expansion project. If there are any planned modifications to the lined area, the postmine contour map should reflect them.
22. Appendix E, Ground Water Baseline Report. To allow us to confirm the accuracy of the data provided in this report, please submit the lab data sheets not previously submitted

through annual ground water monitoring reports for Wharf or Golden Reward which were used to develop the tables in Appendix E of the Ground Water Baseline Report.

23. Geochemical Testing Report, Tables 1 through 24. There is a column in several of these tables indicating a number that corresponds to a rock type. Please provide a reference table that defines what each rock type is for the indicated number present in the column.

Several samples are marked as being out of pit in Tables 1 through 6, but Exhibit 10 shows the samples located primarily in pit disturbance areas. For instance, Exhibit 10 identifies several samples located within the Bald Mountain Pit special handling area, but the tables indicate they are located outside of the pit limits. Please make any corrections to the sample locations and tables as necessary.

The discussion on ABA analysis relied heavily on the ANP:AGP ratio, but this ratio was not included in Tables 1 through 11. It would be helpful to modify the tables to include the ANP:AGP ratio.

The samples in Table 24 are supposed to correlate with locations on Exhibit 8. However, we noted Table 24 shows Sample_ID numbers while Exhibit 8 shows hole numbers. Please use either hole numbers or Sample_ID numbers in both the tables and Exhibit 8.

24. Ground Water Baseline Report. There are a couple of corrections that should be made within the text of this document:

- a. Section 1.0, page 1. In item number 1, please change SDCL 45-6B-7 (9) (a-o) to (9) (a-mm); and
- b. Section 2.4.1, page 14. This section contains a reference to well SS-09 in Nevada Gulch. The well should be referred to as SM-09.

25. Ground Water Baseline Report, Section 2.6.2, page 19. This section describes how Wharf field checked existing wells within close proximity of the Expansion Area to verify their presence/location. Wharf's baseline report states, "In several instances, wells listed in the SD DENR database as being located within or near the project area were misreported on the well completion form; wells listed in the SD DENR database that have an improper location or are abandoned are not represented on the map." Please submit a list of these "misreported" or abandoned wells. Please indicate the status of each well (abandoned vs. active), information about the location of each well, and any other information germane to each well (well logs, date of drilling, owner, driller).

26. Ground Water Baseline Report, Section 3.4 and 3.5. The statistical analysis included within the report does not adequately describe the ground water quality data collected during baseline sampling. Please present baseline data graphically to facilitate our review of seasonal trends and water chemistry changes possibly related to historic mining or recent large scale mining. At a minimum, the report should include graphs outlining key water quality parameters for each baseline well. Please provide a brief narrative

description of each water quality graph. These narratives should include your rationale for choosing key parameters, and an interpretation of any trends or issues associated with water quality at each respective sampling site.

In addition, Wharf does not discuss parameters that are elevated in some wells. For instance, in the Railroad monitoring well it is noted that the arsenic concentrations range from 0.198 mg/L to 0.238 mg/L which is well above the ground water standard. This well is located upgradient of the proposed expansion area. If the source of this water is intercepted during mining, there is a potential it could impact water quality in the Golden Reward area. Incidentally, if this were to occur how would this impact water resources at Golden Reward and how would it be mitigated?

There are also other parameters that exceed South Dakota ground water standards, such as antimony, beryllium, and copper. Each such occurrence should be analyzed and discussed in terms of impacts to ground water quality within the mining area and how Wharf will address these impacts if they are detected in the expansion area during mining.

27. Ground Water Baseline Report, Section 3.5, page 37. The report states the Horseshoe Well may not have been grouted properly which in turn may be causing excessively high pH levels within this well. If this well was not grouted properly how can the baseline values for this well be accepted as true baseline? What would the impact of the excessively high pHs have on general water quality?
28. Ground Water Baseline Report, Section 5.0, Page 41. Throughout the report, references were made to the other reports used to develop the discussion in this section. In most cases, only the final conclusions of these studies are included. This is acceptable for the more general studies referred to such as Downey, 1984 and Driscoll et al., 2002. However, the more specialized studies prepared specifically for Wharf and Golden Reward should either be provided in their entirety or a more detailed discussion of them should be included in the text of the report. This is necessary to allow for an adequate review of the methodology and reasoning behind the assessments and assumptions made during those studies.
29. Ground Water Baseline Report, Appendix C. This section is missing well completion reports for Nevada Gulch Well or MW-59. The last well completion report in this section is not labeled. Is this report for well MW-59 or the Nevada Gulch well? Please provide the well completion report for the missing well.
30. Ground Water Baseline Report, Appendix E. We have the following comments on the tables in Appendix E:

Table E-8: The results for July and August do not appear to correlate to the results for the previous 6 months on Table E-8. Please verify that all of these numbers are correct.

Table E-21: The results for the November 2005 sampling event do not seem to correlate to the results of the other sampling events shown on this table. Please verify that these numbers are correct.

Table E-23: What does the 'V' indicate for the November 2008 Field pH result?

Tables E-44, E-45, E-49, E-50, E-53, E-54, E-55, E-58, E-59, E-60, E-63, E-64, E-65, E-66, E-69, E-74, E-75, E-76, and Table E-77: These tables had values that contained a higher level of accuracy (contained more significant digits after the decimal) than those found on some correlating lab sheets from annual water quality reports. Please verify the data accuracy in these tables. If it is determined the data is accurate, please submit the correct lab sheets.

31. Ground Water Baseline Report, Appendix E. There is no well SM04A at either Wharf or Golden Reward. This section probably refers to well MM04A. Please verify that this is correct and make the necessary change. Also, is well PM-2 supposed to be well PW-2?
32. Surface Water Baseline Report, Table 2-1, page 7. Per ARSD 74:51:03:01, all streams listed in the table should include the beneficial use of 9 (fish wildlife propagation, recreation, and stock-watering waters) and 10 (irrigation waters). These uses apply to all streams in South Dakota.
33. Surface Water Baseline Report, Table 2-3, page 9. The title for this table should acknowledge that the surface water monitoring sites listed are for both the Golden Reward Mine and the Wharf Mine.
34. Surface Water Baseline Report, Section 2.4, page 18. The report states, 'Sampling will begin at one site on October 2010.' Please specify which sample site you are referring to.
35. Surface Water Baseline Report, Section 3.0. This section addresses concerns with erosion and sediment control from mining sites. Please expand on this to address other surface water quality concerns associated with runoff from mining activities and rock depositories such as the nitrate spikes at surface water quality monitoring sites BMT-1 and DWD-1 and selenium or nitrate concerns at compliance point 001 on Annie Creek below the Reliance Waste Rock Depository.
36. Vegetation Survey Report. There is no mention of riparian or wetland vegetation in the Vegetation Survey, especially along Nevada Gulch and Upper Fantail Creeks. Were any riparian or wetland species or communities noted during the field work?

Should you have any questions concerning this letter, please do not hesitate to contact me. Please be aware the department is continuing its review of the application, and any additional comments or questions developed will be forwarded to you.

Sincerely,

\s/

Eric Holm
Natural Resources Project Engineer
Minerals and Mining Program
Telephone: (605) 773-4201
E-mail: eric.holm@state.sd.us

cc: Stan Michals, GFP Rapid City
Amber Vogt, Lawrence County Planning and Zoning