

**Decision
And
Findings of Compliance**

April 19, 2013

Usibelli Coal Mine, Incorporated

**Two Bull Ridge Mine
Major Revision: Coal Ash Disposal**

Surface Mining Permit Application

S-0603

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INTRODUCTION

This document is the Decision to approve the application for a major revision to the Two Bull Ridge surface coal mine permit (Permit No. S-0603) submitted by Usibelli Coal Mine, Inc., P.O. Box 1000, Healy, Alaska 99743. This document was prepared by the Alaska Department of Natural Resources (ADNR), Division of Mining, Land and Water (DMLW). A summary of the history of the review of the application, a description of the environment affected by the operation, a brief description of the mining and reclamation plan, and the written Findings of Compliance are included to help document the decision process.

Detailed information regarding the processing of permits and permit requirements can be found in the Alaska Surface Coal Mining Control and Reclamation Act (AS 27.21) and the Alaska Surface Coal Mining Regulations (11 AAC 90). References to these requirements appear throughout this document. Detailed information regarding the proposed mining and reclamation operation can be found in the permit application which is available for public review and copying at the Anchorage office of the Division of Mining, Land and Water (550 W 7th Ave Suite 920, Anchorage Alaska 99501), and at the Fairbanks office of the Division of Mining, Land and Water (3700 Airport Way, Fairbanks, Alaska 99709). Inquiries should be directed to Russell Kirkham of the Division of Mining, Land and Water at the above address, by phone at 907-269-8650, or by e-mail at ruusell.kirkham@alaska.gov

HISTORY OF REVIEW

Usibelli Coal Mine (UCM), Incorporated, submitted an application for a major revision to the Two Bull Ridge Mine (TBR) Permit (Permit No. S-0603) on December 21, 2012. The Division of Mining, Land and Water initiated the completeness review process for the permit. The Division distributed either the application or portions of it to agencies for comments on the application's completeness.

The application was determined to be sufficiently complete to begin technical adequacy on January 8, 2013. Starting on January 10, 2013 a public notice ran once a week for four consecutive weeks in the Fairbanks Daily News Miner. The comment period closed on March 4, 2013. The complete application was available at the Division's offices in Anchorage and Fairbanks.

No agency comments requiring stipulations were received. Two public comments were received. One comment was in support of the major revision. One comment was received that provided a list of suggestions to include in the permit language. That comment also expressed concerns regarding

monitoring, hydrology and transport. The Response to Comments concerning this major revision is located in: “Appendix A: Response to Public Comments”. No request for an informal conference was received from any of the people who commented on the major revision. Technical review of the project ended on April 3, 2013. Decision to approve the major revision application was finalized on April 16, 2013.

ENVIRONMENT AFFECTED

Introduction

UCM is proposing to relocate the approved coal ash disposal site located within the Poker Flats Permit area (Permit Numbers 01-83-796, 01-83-796-01 and S-0601-A) to the Two Bull Ridge Permit area (Permit Number S-0603). Coal ash will be disposed of in cells located within the active mine pit within the Two Bull Ridge Mine Area. Coal Ash disposal for the UCM Healy mines has been authorized by the State’s Department of Environmental Conservation Solid Waste Disposal permit #SWZA046-015.

The remainder of this section summarizes the background information presented in the original permit application, and is taken from the original Final Decision and Findings of Compliance for the Two Bull Ridge Mine.

Location

The Two Bull Ridge Mine area is in the northern foothills of the Alaska Range amid rugged terrain. The permit area includes about 2,522 acres and is north of Lignite Creek on the eastern side of the Nenana River. The area is north of the present Poker Flats Mine and is located approximately 100 miles south of Fairbanks, Alaska, and four miles northeast of Healy, Alaska. The mine is located in the following general area: Sections 26-28 and 32-35 Township 11 South, Range 7 West, , and Sections 3-5 Township 12 South, Range 7 West, Fairbanks Meridian. The area can be found on the Healy D-4 quad map.

Climate

The climatic conditions of the area are discussed in *Part ‘C’, Chapter VII* of the original application and measurements are primarily from three weather stations in the vicinity. The elevation of the permit area ranges between 1,200 feet and 2,600 feet above mean sea level. The area is typical of subarctic regions having short warm summers and long cold winters. Average summer temperatures vary from approximately 44⁰ to 69⁰ F while winter temperatures are in the - 6⁰ to 16⁰ F range.

Wind was stated to be predominantly from the southeast, secondarily from the northwest, and often gusting to over 40 mph during the winter months. The winds travel up and down the Nenana River valley the majority of the time. Records indicate that the average yearly rainfall equivalent is approximately 14.0 to 16.5 inches with the majority of this falling as rain in the months of June, July, and August.

The Alaska Department of Environmental Conservation determined that no air quality permit was required for the mine.

Cultural

Cultural and Historical information is discussed in *Part 'C', Chapter I* of the application. A portion of the Two Bull Ridge Mine area had been previously surveyed for archeological sites. It was concluded at that time that the area did not contain significant cultural properties and the surrounding areas had poor potential for site preservation. The portion not previously surveyed for archeological sites was surveyed in August 1996. No new cultural resources were discovered.

The State Historic Preservation Officer (ADNR, Division of Parks and Outdoor Recreation) has determined that known cultural and historic sites have been adequately identified or investigated for the Two Bull Ridge Mine permit area. The site was cleared on January 27, 1997.

Soils

Information pertaining to the soils of the Two Bull Ridge Mine is discussed in *Part 'C', Chapter X* of the application. General pre-mining soil resource information for the area was derived from a 1992 report prepared for Usibelli Coal Mine by the University of Alaska Fairbanks Agricultural and Forestry Experiment Station, Palmer, Alaska. Dr. Chien-Lu Ping, Associate Professor of Soil Science, prepared the report and performed the field investigation upon which the report was based. The report covered all of Usibelli's current lease holdings in the Hoseanna Creek Valley. Soil mapping and classification was performed using a combination of ground reconnaissance, air photo interpretation, and sampling of representative soil types in test pits and by hand borings. The purpose of the study was to characterize and classify the soils within the lease areas with respect to their chemical and physical properties, depth and extent, and in order to provide a baseline data set that will have utility for mine permitting throughout the lease areas. A total of 71 soil pits (pedons) were excavated throughout the lease areas in completing the Order 3 inventory.

Ground truthing of the 1992 survey was conducted in 1993 and 1994 for the Two Bull Ridge Mine area. During this time 105 soil pits were excavated and described. In 1996 an Order 1 survey was carried out to include the newly planned expanded mining area and to fine tune the 1993/1994 survey. An additional 64 soil pits were excavated and described to the family level of soils taxonomy.

The Two Bull Ridge Mine area has been mapped using 27 separate mapping units. The main soil map units include: Typic Cryofluvents 0-15% slopes, Typic Cryofluvents-Pergelic Cryaquepts 0-15% slopes, Typic Cryorthents-Typic Cryumbrepts complex 8-25% slopes, Typic Cryorthents-Typic Cryumbrepts complex 40-90% slopes, Vitric Gelicryands 0-5% slopes, Histic Cryaquepts 0-8% slopes, Histic Cryaquepts 8-35% slopes, Aquic Cryochrepts 0-8% slopes, Aquic Cryochrepts 8-30% slopes, Dystric Cryochrepts shallow 0-8% slopes, Dystric Cryochrepts moderate deep 0-8% slopes, Dystric Cryochrepts moderate deep 8-35% slopes, Dystric Cryochrepts deep 0-15% slopes, Dystric Cryochrepts-Typic Cryorthents complex 8-35% slopes, Dystric Cryochrepts-Typic Cryorthents complex 40-90% slopes, Typic Cryoboralfs 8-25% slopes, Typic Cryochrepts 8-20% slopes, Typic Cryochrepts 20-45% slopes, Aquic Cryumbrepts 0-20% slopes, Aquic Cryumbrepts 20-45% slopes, Histic Humicryods 8-25% slopes, Cryohemists 0-12% slopes, Pergelic Cryohemists 12-40% slopes, Pergelic Cryumbrepts 0-8% slopes, and Pergelic Cryaquepts 0-12% slopes.

Surface Water

Surface water hydrology is discussed in *Part 'C', Chapter V* of the application. Surface waters within the future disturbance area include Badlands Creek, Two Bull Creek, Frances Creek, and Louise Creek. Each of these tributary drainages has an individual surface area representing less than four percent of Hoseanna Creek, the main drainage, which forms most of the southern permit boundary. Surface water bodies in the mining area include not only creeks, but springs, seeps, and ponds.

Badlands Creek has a drainage area of approximately 0.61 square miles, while Two Bull Creek, Frances Creek, and Louise Creek have drainage areas of about 0.90, 1.70, and 1.56 square miles respectively. The applicant has separated springs from seeps by using measurable flow versus visible flow. Springs were designated when there was measurable flow and seeps when flow was too small to accurately measure. Both springs and seeps were identified along Louise, Frances, Badlands, and Two Bull creeks.

Hoseanna Creek, the primary watershed in the area, drains an area of approximately 49 square miles and has significant tributaries located upstream of the permit area. Hoseanna Creek flows year-around and exhibits peak flows due to snowmelt between late May and early June. Peak flows, from fall rains, occur during mid-August to mid-September. It has high levels of suspended solids and is slightly acidic to basic in character.

From 1986 through 1996 the ADNR Alaska Hydrologic Survey (AHS) measured discharge and collected surface and groundwater samples in the Hoseanna Creek basin. Some 2100 water-quality and sediment samples were collected. The studies have been detailed in nine Division of Geological and Geophysical Survey reports.

The applicant is the only surface water user in the general area.

Ground Water

Information pertaining to the hydrogeology of the Two Bull Ridge Mine is discussed in *Part 'C', Chapter IV* of the application. In general precipitation infiltrates near the southerly coal outcrop areas and works its way west and north in an unconfined state. As the coal seams continue to dip to the north, they become fully saturated and begin to saturate the overlying sandstone. Water-level data indicates water bearing units within the Suntrana Formation in the mining area include the number 2, 3, 4, 5, and 6 coal seams as well as slide materials, and the Two Bull, Francis, and Louise Creek alluvium. Throughout the Hoseanna creek basin, the primary aquifers tend to be the coal seams, with the underlying clays acting as aquacludes and the overlying sandstones as aquatards. Permeability is controlled by fractures within the coal. Faults also generally act as recharge boundaries supplying the coal seams, however, where faults intersect coal seams and then outcrop down gradient, they may act as a discharge area for the seams.

Ground water at the site can be characterized as mildly acidic with pH values ranging from 5.83 to 6.77. Temperatures range from 3.4⁰ to 15⁰ C. Total dissolved solids (TDS) concentrations indicate that ground water at the site varies from fresh to brackish. Individual coal seams have TDS concentrations ranging from 101 to 260 mg/L. Calcium and bicarbonate are the dominate cation and anion present in the ground water from the coal seams. Alluvial well sampling indicates a sodium-chloride type ground water. No nutrients were detected in the ground water, with the exception of ammonia and nitrate in well 96TM2C. In general, most dissolved trace metals, nonmetals, and metalloids included in the baseline sampling suite were either not detected or were near the detection limits.

The applicant is the only ground water user in the general area.

Vegetation

Information pertaining to the vegetation of the Two Bull Ridge Mine area is discussed in a report document titled *Premining Vegetation Inventory, Hoseanna Creek Basin, Usibelli Coal Mine*, and in *Part 'C', Chapter VIII* of the application. Pre-mining vegetation resource information for the area is derived from a report prepared for Usibelli Coal Mine by the University of Alaska Fairbanks Agricultural and Forestry Experiment Station, Palmer, Alaska. Dr. Dot Helm prepared the report and performed the field investigation upon which the report was based. The report covers all of Usibelli's current lease holdings in the Hoseanna Creek Valley. Vegetation mapping and classification was performed using a combination of ground reconnaissance, air photo interpretation, and sampling of existing vegetative types and communities.

Vegetation data were collected during the summers of 1989, 1990, and 1991. Sites within the permit area were inventoried to identify plant species, cover, and stem densities, as well as age, diameter at breast height, and height of trees. Diversity was calculated using relative species cover with

Simpson's reciprocal index. All vegetation communities were identified to at least the overstory species (Level IV of the Alaska Vegetation Classification) and in most cases were identified to understory species (Level V). Over 140 vascular plant species were identified along with 14 mosses and 18 lichens on the study area which covered some 26 sections.

A total of 16 vegetation communities were delineated on the new areas to be added. They included open white spruce-balsam poplar, open white spruce-paper birch, open paper birch, closed white spruce-paper birch, closed alder, closed paper birch, open black spruce, open white spruce-paper birch/open ericaceous shrub, woodland white spruce, open white spruce, open birch-ericaceous shrub, woodland dwarf black spruce, woodland dwarf white spruce, open white spruce/open ericaceous shrub, immature poplar, and open white spruce/alder. The total vascular vegetation cover ranges from around 92% to 99% while the Simpson's reciprocal diversity ranged from 2.5 to 5.6 on the new areas.

No threatened or endangered plant species were found on or near the permit area.

Fish and Wildlife

Fish and Wildlife information pertaining to the Two Bull Ridge Mine area is discussed in *Part 'C', Chapter IX* of the application. Limited studies have taken place in the general area. The area was inventoried for fish and wildlife resources as early as 1978. That survey included aquatic sampling of Hoseanna Creek. The relevant information noted extremely low numbers of small mammals, furbearers, large mammals, and low to moderate numbers of songbirds, waterfowl, and raptors.

No threatened or endangered animal species were identified by the US Fish and Wildlife Service as being present in or near the permit area.

Land Use

Land use information is discussed in *Part 'C', Chapter XI* of the application. Lands within the Two Bull Ridge Mine permit and adjacent areas consist of both surface and subsurface lands. The subsurface lands, include the mineral estate, which is owned by either the State of Alaska or the Alaska Mental Health Trust Authority. The land is undeveloped and primarily used as wildlife habitat. The permit area is within the Denali Borough and is covered in subunit D-4 of the Parks Highway/West Alaska Range subregion of the Tanana Basin Area Plan.

MINING AND RECLAMATION PLAN

Summary

The major change proposed by this revision would add ash disposal in cells located within the active mine pit.

The Two Bull Ridge Mine is expected to support ongoing mining operations at a maximum rate of 2.0 million short tons of coal per year for the next 20 years. This includes both clean coal and lower quality coal fed to the Healy Clean Coal Project. The permit area includes 2,522 acres of which 750 will be disturbed and reclaimed over the mine's 20-year life under this major revision (the original permit authorizes a total disturbance of 832 acres). During the first 5-year permit term, 321 acres are scheduled to be disturbed and 101 acres (48%) to be reclaimed (the original permit authorized a total of 403 acres to be disturbed and 192 acres reclaimed during the first 5-year term).

Geologically, the mining area is an extension of the same coal reserves being mined at Poker Flats. The coals are part of the Suntrana Formation which is middle Miocene in age. Structurally, the coal seams dip to the north at an average of 10 degrees and strike east-west.

Mining Techniques

The operation and reclamation plan is detailed in *Part 'D'* of the application. Blasting will be used for both loosening and casting overburden, and for fracturing the coal. Blasting will occur at any time between 6:00 AM and 9:00 PM or during daylight hours, whichever is greater. The mining is to be done by a combination of both conventional dragline sidecasting and shovel-truck operations. Backfilling and grading will occur contemporaneously with pit advance. Final grading before topsoil replacement will lag by no more than four spoil ridges or 600 feet, whichever is less. The area to be mined is broken into six pit layouts, two of which are not expected to be mined during the first permit term.

Approximate Original Contour and Excess Spoil

Reclaimed topography will blend with surrounding land and is appropriate for the post-mining land use of wildlife habitat. However, the reclaimed land will be at a lesser slope than much of the surrounding land, on an average of 4:1 to promote long-term slope stability, assist in topsoil replacement, decrease the potential for soil erosion, and enhance the efficiency of revegetation. The lower slope and swell of overburden materials creates spoil in excess of that required for establishing the post-mining topography.

In the original permit, the excess spoil materials were to be placed in two separate permanent out-of-pit spoil piles: 680,000 loose cubic yards (LCY) in a pile just to the south of the mine area, and 12.6 million LCY in a pile to the north of the mine area. Both piles were shown to have a factor of safety of 1.5 or greater, and were shown to be compatible with the natural surroundings and are suitable for the post-mining land use.

North Out of Pit Spoil

This dump is located north of the Two Bull Ridge mine area coal removal limits. The design criteria calls for 4:1 slopes and an 80 foot setback from the top of the northern endwall. With these criteria, the dump is capable of storing 8 million Bank Cubic Yards (BCY) of spoil. Prior to construction, the ground surface will be prepared by removing the vegetation and salvageable topsoil, exposing the sandstone and/or the subsurface gravel layer. Gravel may be excavated below the topsoil prior to spoil placement for use in haul road construction. Spoil placement will then begin with trucks end dumping and building the lowest lift. As the trucks stack their loads, the lift will be leveled with bulldozers and prepared for the next round of spoil. This will aid compaction and result in lifts of 10 to 20 feet in height. Each lift will be setback from the previous lift, allowing contemporaneous grading of the slope as the dump is being built. Each leveled lift will be slightly graded to drain surface water toward the north away from and around the replaced top soil.

The dump capacity encompasses a slightly smaller footprint and lower crest elevation than the original design, as less capacity is required. However, to maintain some flexibility in the construction of the Badlands spoil dump, UCM proposes a dump design with an estimated capacity of 10,000,000 LCY's. This is slightly more than the current 7,150,000 LCY excess spoil capacity deficit resulting from past permit changes, but is significantly less than the original 16,800,000 LCY's approved under the original permit.

Badlands Creek Valley Fill

This valley fill is located west of the Two Bull Ridge mine area coal removal limits. The design criteria calls for an engineered valley fill with a 3: 1 slope from an elevation of 1,450 feet up to 1,750 feet, and a 4:1 slope to a maximum of 1,900 feet. The fill has a capacity of 9.5 million bank cubic yards or about 12.7 million loose cubic yards of spoil, and has a footprint of about 50 acres.

The fill consists of two parts. First, the down-valley portion of the fill will be an engineered 'toe fill' consisting of 1.9 million BCY of drier and stronger material, while the up-valley portion of the fill will consist of moister and weaker materials.

The critical factors that were evaluated during the technical review were 1) site preparation, 2) underdrain design, 3) spoil placement, and 4) surface water control.

- 1) **Site Preparation.** Vegetation, organic matter, and topsoil will be removed within the entire footprint of the valley fill. All silts and clays will be excavated to in-place sandstone or gravel within the footprint of the toe fill. Preparation of the valley sidewalls within the footprint of the toe fill will consist of removing vegetation, organic matter, and topsoil. Also, the sidewalls will be "proofrolled," that is compacted with a loader or truck.

- 2) **Underdrain Design.** The proposed underdrain consists of three parts: **first**, the main underdrain that runs the length of the valley, and is constructed with 2 to 4 inch cobble wrapped in geocloth, ranging in cross-sectional area from 13 square feet (about 6 feet wide by 2 to 2.5 feet thick) to 9 square feet; **second**, finger drains consisting of cobble placed in 2 square foot channels wrapped in geocloth, extending from the main underdrain to each seep or spring flowing 1gpm or greater; **third**, a blanket drain of gravel placed to a thickness of 2 feet that covers the entire flat valley floor to the valley sidewalls, and also extends to any seeps or springs flowing less than 1 gallon per minute (gpm).
- 3) **Spoil Placement.** As stated earlier, the fill is to be constructed in two basic parts, the engineered toe fill constructed with dry sandstone spoil, and the northern up-valley fill constructed with weaker materials. Stability analyses were performed on the design, and showed a factor of safety greater than 1.5. The stability analyses assumed no compaction, but assumed a specific weight of 110 pcf in the toe fill. During construction, lift heights will be limited to four feet, and truck traffic will be routed to aid in compaction. Also, regular samples will be taken to ensure proper unit weight is being achieved, and moisture is below 10 percent.
- 4) **Surface Water Control.** The applicant has shown that surface waters encountered during construction of the fill will be properly diverted away from and around the fill area to prevent placed spoil in the toe fill from becoming saturated. After the fill has been completed, the post mining drainage plan includes two permanent channels. The main channel, which will run along the west side of the fill, will carry most of the surface drainage from Badlands Creek valley upstream of the toe of the fill. A second channel running along the east side of the fill, will divert any surface water draining from the valley slopes immediately to the east of the fill. The applicant has provided SedCad documentation that shows both channels have been properly designed to convey the 100-year event.

Top Soil Salvage and Replacement

An additional 200 acres of topsoil will be salvaged in the proposed disturbance area. All topsoil uncounted in the revision area will be salvaged. This was verified by Division staff by consulting the soils map in the original permit. For the purpose of topsoil volume estimates, the revision application assumes that no topsoil will be salvaged from the footprint of the west spoil pile. However, some salvageable topsoil may be present in the valley bottom, and on small benches in the valley. The standard criteria will be followed by the operator for determining if topsoil is salvageable or not. If salvageable topsoil is encountered, it will be salvaged in accordance with permit conditions.

The reclamation plan detailed in *Part 'D'* of the application calls for the removal of all topsoil and supplemental material meeting the removal criteria, in advance of disturbance. The criteria specify that soils will be salvaged unless they have pH of less than 4.0, have unsuitable texture or proportion

of rock fragments, or are on slopes greater than 33 percent. Small vegetation may be stripped along with the topsoil or hydra-axed. Large vegetation not taken for firewood will be either hydra-axed, chipped for inclusion with the soil material, disposed of with the overburden, or placed in slash piles as part of the final wildlife habitat reclamation plan. As a general rule, topsoil will be either temporarily stockpiled or directly hauled and replaced on final regraded areas within 200 feet of the active regrade area which is within 800 feet of the first active spoil ridge. Bulldozers will be used to spread the topsoil to a minimum depth of 12 inches, and all salvaged soils are to be replaced.

Post-Mining Land Use

The applicant intends to reclaim the area, primarily to a post-mining land use of wildlife habitat with a secondary land use of public recreation. These are consistent with the designated uses in the Tanana Basin Area Plan.

Post-Mining Drainage

The post-mining drainage plan consists of newly established or reconstructed drainage channels designed to convey at a minimum the peak runoff from a 100-year 6-hour storm for the main Two Bull Creek channel and for the 10-year 6 hour storm for other drainage channels. During the initial permit term, all culverts associated with the permanent road are designed to pass at a minimum the 100-year 6 hour storm event. The sediment ponds are proposed to be reclaimed in place and are not designed to contain water post-mining.

Revegetation

This major revision will not result in any changes in the revegetation objectives for this permit.

Revegetation objectives are twofold. First, to quickly establish a ground cover that will control erosion. Second, to allow the natural revegetation of species that will become wildlife habitat in the disturbed areas of Two Bull Ridge. The company will also plant 100 naturally occurring woody plant species per acre in varied shapes and locations to accelerate the natural regeneration process. However, the company does not guarantee that a particular species or community will be dominant on any individual acre of ground.

The bond release standards are the method in which the public is assured that the natural regeneration is occurring appropriately, and will re-establish a naturally occurring community within a reasonable period of time. The standards provide a method of quantifying the objectives outlined above.

The bond release standard for the first objective, erosion control, requires 65 percent cover of living and dead vegetation. The company will use a seed mix dominated by native and adapted grasses to provide the initial cover. The standard is a compromise of sorts: the higher the standard, the better erosion is controlled, but a denser grass cover will slow natural invasion by woody plant species which are important for wildlife habitat. The Division believes that 65 percent will control erosion but allow natural invasion to occur.

The bond release standards for the second objective, natural regeneration appropriate for wildlife habitat, includes a woody vegetation density standard and a woody vegetation diversity standard. The woody vegetation density standard requires 450 stems per acre on two-thirds of the area. The 450 stems per acre are adapted from the DNR Division of Forestry reforestation standards for Region II (interior Boreal Forest). It is applied to only two-thirds of the area to allow open areas to remain that will provide additional diversity within the wildlife habitat. To ensure appropriate species' diversity, the standard for woody species requires that no more than 80 percent of the stem count be of any one woody species, and that three woody species be present in any bond release area and represent at least 5 percent of the total stem count.

Annual Report

An annual report detailing the previous year's mining and reclamation efforts is to be provided on July 31 throughout the permit term.

GENERAL COMPLIANCE

Regulations at 11 AAC 90.125 require the Commissioner of the Department of Natural Resources to make certain findings before approving a permit for a surface coal mine. This section of the decision provides the discussions to explain and support those findings. Each of the required findings is also summarized at the end of this document.

Areas Unsuitable for Surface Coal Mining

The 2,522 acres in the permit area include no National Park System lands, National Wildlife Refuge System lands, National System of Trails lands, National Wilderness Preservation System lands, or Wild and Scenic Rivers System lands (including Study Rivers). No public parks or National Register of Historic Sites will be adversely affected. No mining will occur within 100 feet of the outside right-of-way line of any public road. No mining will occur within 300 feet of any occupied dwelling, public building, school, church, community or institutional building, or public park; or within 100 feet of a cemetery.

Applicant Compliance

Part 'B', Section 2.0 of the application states that the applicant has never had a Federal or State mining permit suspended or revoked. The applicant has not forfeited a mining bond or similar security deposited in lieu of a bond. The Office of Surface Mining's Applicant Violator System was checked on April 18, 2013 and indicated that there were no outstanding violation.

Surface Owners Consent

Part 'B', Section 3.0 of the application gives details on the surface and mineral ownership of the permit and adjacent area. The State of Alaska is the owner of the surface and mineral estate of part of the proposed permit and adjacent area. The application gives details on the two coal leases, ADL 20633 and ADL 21545, that the applicant has acquired. As the lessee, the applicant has the legal right to enter and mine on all State land within the proposed permit area.

The Mental Health Trust Authority is also an owner of the surface and mineral estate of part of the proposed permit and adjacent area. No access or mining activity for purposes associated with the Two Bull Ridge Mine application is to occur until authorization is received from the Trust Authority.

Existing Structures

No facilities exist in the permit area that will need upgrading. Electrical transmission lines in the Poker Flats Mine area were extended to the Two Bull Ridge Mine Area.

Alluvial Valley Floors

Due to the steep terrain, there are no alluvial valley floors included in the permit area. None of the area adjacent to the permit includes an alluvial valley floor. There is no farming in the area currently and none is anticipated.

Approvals Required Under 11 AAC 90.301 - 11 AAC 90.501

This section provides the Commissioner's determinations and findings necessary for certain practices under the performance standards of 11 AAC 90.301-11 AAC 90.501. It also describes important aspects of the application concerning those sections.

1. SIGNS AND MARKERS

Part D, Section 8.3 of the application discusses the design and placement of signs and markers. The Hoseanna Creek valley is being extensively mined. Access to the area is controlled by Usibelli Coal Mine, Inc. and the main entry roads have gated access. It would be difficult or impossible to access the area by road or foot without knowing that coal mining is occurring. Posting signs in addition to what is proposed and marking the entire permit boundary would serve no useful purpose. Therefore, under 11 AAC 90.301, the placement of signs and markers proposed in the application is acceptable.

2. SOILS

Various sections of the regulations address practices for the removal, storage, and replacement of topsoil. 11 AAC 90.311 allows approval of topsoil substitutes or supplements. The applicant proposes to use the existing topsoil and to supplement it with additional materials based on suitability criteria presented in *Part C, Chapter X* of the application. Overburden materials will only be allowed as a topsoil substitute in reclamation adjacent to the primary access road where the mapping units lack material that meets the salvage criteria. All topsoil on the disturbed area of the permit is to be salvaged and a minimum of 12 inches is to be replaced as described in *Part D, Section 10.0* of the application. This plan is acceptable.

3. STREAM BUFFER ZONES

Under 11 AAC 90.353, approval of activities within 100 feet of a perennial or intermittent stream requires a finding that “any temporary or permanent stream channel diversion will comply with 11 AAC 90.327; mining activities will not adversely affect the water quantity and quality of the stream under applicable state and federal water quality laws and regulations; and that any adverse effect on fish, wildlife, or other environmental resources of the stream will be minimized.”

During the original approval of the permit, the reconstruction of the main channel of Two Bull Creek was found to meet these requirements. The original permit authorized no other work within 100 feet of any other stream.

As part of a 2001 major revision, the applicant constructed a valley fill excess spoil pile in about 50 acres of the Badlands Creek Valley. The result of this fill placement was the permanent diversion of a 2,500 foot segment of Badlands Creek. A new creek channel was created that follows the western margin of the fill for this segment. The gradient of this segment is less in its first half than the original creek channel, and is steeper in the downstream second half. In addition, a smaller tributary was to be created by constructing a second channel that would follow the eastern margin of the fill; the purpose of this channel is to divert flow from the slopes immediately to the east of the fill, thus keeping the water off the face of the fill (as required by 11 AAC 90.391(n)).

As part of a 2011 revision, the applicant constructed a crossing of Frances Creek to reach the

Frances Creek Mine Area. The Revision moved the disturbance boundary for the third permit term 200 feet south within Frances Creek and a modification of the location crossing of Frances creek to minimize disturbance within the 100 foot stream buffer zone (SBZ).

a) Any temporary or permanent stream channel diversion will comply with 11 AAC 90.327.

The proposed diversion of Badlands Creek complies with local, state, and federal laws and regulations. The diversion, which is part of the post-mining drainage plan, has been designed and approved by a registered professional engineer. The diversion will remain stable and prevent additional contributions of suspended solids to stream flow or runoff outside the area. The channel has been designed by the engineer to be stable given the channels gradients, armoring, and projected flows. The channel has also been designed to safely pass the peak 100-year discharge, and is at least equal to the capacity of the stream channel upstream and downstream of the diversion. Also, during the life of the mine, all discharge from the channel will be treated by a series of two sediment ponds. The channels and ponds were designed using SedCad engineering software, and the SedCad documentation has been reviewed by Division hydrologists.

The applicant proposed to restore the riparian vegetation on the banks of the stream similar to pre-mining levels, and to restore the stream to its natural meandering ratio at environmentally acceptable gradients and velocities. The diverted segment of Badlands Creek is a relatively straight and steep segment of the creek, with no documented fish occurrences. Given the applicant's design of the channel to ensure stability, and the revegetation plan to restore native shrub and tree species, the Division finds that Badlands Creek will be restored to a longitudinal profile and cross section to restore aquatic productivity to pre-mining levels.

Thus, the Division finds that the Badlands Creek Diversion will comply with 11 AAC 90.327.

b) Mining activities will not adversely affect the water quantity and quality of the stream under applicable state and federal water quality laws and regulations.

During construction of the valley fill and the stream diversion of this segment of Badlands Creek, all flows from the creek will be treated in a series of two sediment ponds as described earlier. Any discharge from the ponds must meet the criteria set in the applicant's NPDES permit for the mining operation. Also, monitoring will be conducted by the applicant to ensure all discharges from the ponds are compliant with the Alaska Surface Coal Mining Control and Reclamation Act. Thus the Division finds that the diversion of Badlands Creek will not adversely affect the water quantity and quality of the stream under applicable state and federal water quality laws and regulations.

c) Any adverse effect on fish, wildlife, or other environmental resources of the stream will be minimized.

Badlands Creek has no documented fish occurrences, and no other significant wildlife habitat values. The reclamation plan proposes to restore the creek to a productive level equal to that of pre-mining levels by constructing a stable channel with an environmentally sound longitudinal profile, and by revegetation with native woody species. During the construction of the diversion and for the life of the mine, all water from the Badlands Creek valley will be treated and will meet EPA standards. The Division finds that the applicant's proposed stream diversion will minimize any adverse effect on fish, wildlife, and other environmental resources of the area.

4. STREAM DIVERSION

The proposed realignment of Hoseanna Creek complies with 11 AAC 90.327, and local, state, and federal laws and regulations. The US Army Corps of Engineers and the Alaska Department of Fish and Game have both approved the realignment, and issued the appropriate authorizations.

5. EXCESS SPOIL

The box cut spoil materials and those not required to re-establish the post-mining topography will be placed in two separate permanent out-of-pit spoil piles. The southern pile has a design capacity of approximately 850,000 loose cubic yards while the western pile has a design capacity of approximately 12.7 million loose cubic yards. Both are designed as engineered fills having a factor of safety of 1.5 or greater. The permanent relocation of this material will not detract from the establishment of the approximate original contour, will be compatible with the natural surroundings, and is suitable for the post-mining land use. The placement of this material will allow for the coal extraction area post mining slopes to be established at 3:1 and 4:1 thereby promoting long-term stability, assisting in topsoil replacement, lessening potential soil erosion, and enhancing the efficiency of the revegetation effort. All the applicable criteria of 11 AAC 90.391 will be met and the disposal plan is acceptable.

11 AAC 90.391(e) requires that spoil must be placed in horizontal lifts do not exceed four feet unless the commissioner approves an alternate design that demonstrates that the stability of the fill will be ensured and other requirements met. The applicant has provided an alternate design for the fill in the northern portion of the west out-of-pit spoil pile, and has shown stability analyses that demonstrate that the stability of the fill will be ensured. The Division has reviewed the alternate design and the stability analyses, and approves the alternate design.

6. TIMING OF BACKFILLING AND GRADING

11 AAC 90.441 requires that for area strip mining, rough backfilling and grading must be completed within 180 days following coal removal and may not be more than four spoil ridges behind the pit being worked unless additional time is allowed. As discussed in *Part 'D', Sections 2.7, 10.3, and 10.4* backfilling and grading, with limited exceptions, will follow pit excavation and coal removal.

Backfilling and grading operations will lag by no more than four spoil ridges or 600 feet, whichever is less. The backfilling and grading schedule has been made distance dependent and is required due to both the mining of three seams and the mining methods to be employed. It is an easily inspectable and enforceable standard and will promote timely reclamation.

PROBABLE HYDROLOGIC CONSEQUENCES

The probable hydrologic consequences are described in *Part D, Section 12.13* of the permit application, and are based on the present knowledge of the permit area and adjacent area which is detailed in the permit application and in other water information sources.

The ponds, as designed, should be adequate to meet state and federal water quality standards.

Resaturation of the backfilled overburden is expected to take several decades. Since there are no current, and unlikely to be any future, users within the area, the time for aquifer recharge is of no serious consequence.

Ground water recharge after mining will be at least equal to that which existed prior to mining.

No toxic or acid forming stratum have been identified thus both surface and ground water integrity should be maintained. No significant long-term adverse effects on the hydrologic regime should occur from the proposed mine development.

Coal Ash Disposal: Surface Water Quality

Approximately 30,000 cubic yards of Coal Combustion Bi-products (CCBs) are produced annually from Golden Valley Electric Association's (GVEA) Healy 1 power plant. The CCBs will be used as mine fill in the active mine area. An additional 45,000 cubic yards per year would be added when the Healy Clean Coal Plant (HCCP) begins operation. In addition, 50,000 cubic yards of CCBs are produced in Fairbanks at Aurora Energy (AE) power plant and may be backhauled to Healy if needed. Even with CCBs from all three power plants being used as mine fill in TBR, it would only comprise two percent of the total overburden and interburden material currently being used for mine fill. By utilizing small disposal sites located above the post mine groundwater level and covering the CCBs with overburden and interburden material as part of the reclamation process, it should have no effect on the final approved post mine topography and minimal hydrologic consequences.

Very minor shifts in surface water chemistry may occur as a result of placement of CCBs as mine fill. The CCBs will be placed above the post mine water table and be capped by overburden/interburden spoil to minimize exposure and potential for increasing the concentration

of constituents in surface waters. Table CIII-5 presents an analysis of total trace metal concentrations and the leaching potential of these metals of CCBs from both GVEA Healy 1 and AE power plants. The total trace metal concentrations are below Alaska Department of Environmental Conservation (ADEC's) maximum allowable concentrations (MAC) for all parameters except chromium, which is slightly above the MAC of 100 ppm. The ADEC allowable cleanup level in soil for chromium is 300 ppm and the results for CCB's are less than half of that level. ADEC requires that leaching potential be analyzed using Toxicity Characteristic Leaching Procedure (TCLP). All results are non-detect except for a small amount of barium. ADEC's MAC for TCLP of barium is 100 ppm and the results are less than 1 ppm. Based on the results shown in Table CIII-5 the trace metal total concentrations and leachable concentrations would have only minor changes to water chemistry even if the recommended engineering controls were not implemented to minimize exposures.

Coal Ash Disposal: Ground Water Quality

Similar to the case presented for surface water there should be only very minor shifts in groundwater as a result of placement of CCB's as mine fill. The CCB's will be placed above the post mine water table to minimize exposure to groundwater. The CCB's will be capped by low permeability overburden/interburden spoil to minimize infiltration of surface waters through the CCP's and potential for increasing the concentration of constituents in groundwaters. Table CIII-5 presents an analysis of total trace metal concentrations and the leaching potential of these metals of CCBs from both GVEA Healy 1 and AE power plants. The total trace metal concentrations are below ADEC's MAC for all parameters except chromium, which is slightly above the MAC of 100 ppm. The ADEC allowable cleanup level in soil for chromium is 300 ppm and the results for CCB's are less than half of that level. ADEC requires that leaching potential be analyzed using Toxicity Characteristic Leaching Procedure (TCLP). All results are non-detect except for a small amount of barium. ADEC's MAC for TCLP of barium is 100 ppm and the results are less than 1 ppm. Based on the results shown in Table CIII-5 the trace metal total concentrations and leachable concentrations would have only minor changes to water chemistry even if the recommended engineering controls were not implemented to minimize exposures.

CUMULATIVE HYDROLOGIC IMPACT ASSESSMENT

The Alaska Surface Coal Mining Control and Reclamation Act of 1982 requires that the Commissioner of the Department of Natural Resources assess the probable cumulative impact of all anticipated mining on the hydrologic balance outside the permit area before a mine permit is approved. Specifically, AS 27.21.180(c) requires that: "The commissioner may not approve an application for a permit or revision of a permit unless the application demonstrates and the commissioner finds, in writing and on the basis of information included in the application or information that is otherwise available to the commissioner and that the commissioner documents in the approval and makes available to the applicant, that an assessment of the probable cumulative

impact of all anticipated surface coal mining in the area on the hydrologic balance has been made by the commissioner, and that the proposed operation has been designed to prevent material damage to the hydrologic balance outside the permit area."

Cumulative Impact Area

The cumulative effects of mining will include existing Usibelli Coal Mine, Inc. operations at Poker Flats including Runaway Ridge and Major Revision "A", Gold Run Pass, Gold Run Pass Phase-5, and at Two Bull Ridge. For purposes of the surface water analysis, the cumulative impact area includes all surface waters upstream of Bridge Number 1, which is approximately 1,000 feet above the confluence of Hoseanna Creek with the Nenana River.

Surface and Ground Water Use in the Cumulative Impact Area

Surface water in the Cumulative Impact Area will be used for watering roads. Groundwater in this area will be used by the applicant for drinking water and for washing equipment. A 120 foot well, located next to the boiler building near the applicant's shop and office, is used for drinking water. An 80 foot well, located at the Tipple on the west bank of the Nenana River, is used for washing equipment. There are no known users of water within the Cumulative Impact Area other than the applicant.

Hydrologic Concerns

SURFACE WATER QUALITY

Coal sequences contain shale, claystone, and sandstone which are impregnated with salts and trace elements, which upon exposure are more readily available to the hydrologic system (Scully and others, 1981). The hydrologic concerns for surface water quality are changes in surface water dissolved solid content and specific ionic concentrations. Another concern is changes in total suspended sediment concentrations because of increased runoff and erosion potential associated with exposed topsoil, overburden, and interburden sedimentary rock.

SURFACE WATER QUANTITY

The hydrologic concerns for surface water quantity are the short and long term effects of additional mining within the Hoseanna Creek watershed on the quantity and timing of surface water flow, and hence availability, of surface water.

GROUND WATER QUALITY

The hydrologic concerns for ground water quality are an increase in the total dissolved solids and changes in the chemical composition of the ground water.

GROUND WATER QUANTITY

General ground water flow is to the north, away from Hoseanna Creek, and into an area with no known inhabitants. Based on flow direction there is no direct impact to surface waters within the Hoseanna Creek watershed. Hydrologic concerns for ground water quantity are analogous to that of surface water quantity concerns, dealing with timing and availability.

Cumulative Hydrologic Impacts

SURFACE WATER QUALITY

Presently, the permitted area is approximately 18 percent of the Hoseanna Creek drainage basin. This major revision would not add any acreage to the permitted area. The historic and recent water chemistry studies of Hoseanna Creek make it possible to examine long-term trends in the dissolved solid content, specific ion concentrations, and total suspended sediment concentrations in Hoseanna Creek over time.

During the review of the original permit submittal, cumulative impacts were assessed at Bridge # 1. It was apparent from these data that mining has not significantly increased the dissolved solid content of Hoseanna Creek under summer baseflow conditions. Some increase in dissolved solid content in Hoseanna Creek is expected with the addition of more permitted area in the basin from the original permit approval. However, this major revision would decrease the total disturbed acreage, so the total dissolved solid content can be expected to decrease slightly from levels expected under the original permit, but will remain well below Alaska Water Quality Standards. Water supply for drinking is neither a present or foreseeable use of Hoseanna Creek.

During the review of the original permit submittal, inorganic chemical constituents that have primary maximum contaminant levels for a public water supply were examined for trends using available data associated with a late summer-early fall discharge range of 18 to 23 cubic feet per second (cfs). No trend in dissolved barium, cadmium, arsenic, and chromium concentrations were observed using 1976 and 1989 data. No trend was observed in dissolved fluoride and nitrate concentrations using 1976, 1989, and 1992 data. Inorganic chemical constituents that have secondary maximum contaminant levels for a public water supply were also examined for trends under the same conditions as mentioned above. No trend was observed in color and dissolved chloride, iron, manganese, pH, sodium, or zinc concentrations. In addition, no trend was observed in the major ion concentrations of calcium, magnesium, potassium, and bicarbonate.

Sulfate is the only ionic concentration that shows an increasing trend at Bridge Number 1. Late

summer baseflow sulfate concentrations in 1976, 1989, 1992, and 1994 were 81, 82, 102, and 111 mg/L, respectively. This represents a 37 percent increase over an 18 year period. These concentrations do not exceed the Alaska water quality standard for drinking water of 200 mg/L. Some additional increase in sulfate is expected with the increase in the affected environment associated with the Two Bull Ridge Mine. However, this major revision would decrease the total disturbed acreage, so the sulfate content can be expected decrease slightly from levels expected under the original permit. The increase is not expected to be significant because the Two Bull Ridge permit area is underlain by Tertiary sedimentary rocks rather than schist. Sulfate concentrations are higher in surface waters of drainage basins underlain by schist (Parks, 1983).

Acid mine drainage is not a problem in the Hoseanna Creek drainage basin. A relatively high bicarbonate concentration, averaging 136 mg/L from 1987 to 1992 at Bridge Number 1 (Ray and Vohden, 1993), gives the stream a high buffering capacity, that is, the stream pH is not expected to be greatly altered by the addition of moderate quantities of acid or base. During the same five-year time period (1987-1992) Hoseanna Creek at Bridge Number 1 had an average pH of 7.3 (Ray and Vohden, 1993).

Because suspended sediments are the primary transport mechanism for trace metals, the total amount of trace metals added to surface waters should be a function of additional suspended sediment added (Parks, 1983). The mean suspended sediment concentration generally ranged from 50 to 350 mg/L during the summer months in 1993 to 1996 at Bridge Number 1. Over this four-year period no increasing trends in suspended sediment concentrations was observed at Bridge # 1. Total suspended sediment concentrations are not expected to increase significantly at Bridge Number 1 because runoff from the Two Bull Ridge permit area will be collected and treated in sediment ponds, and released under a NPDES permit.

SURFACE WATER QUANTITY

The combined flows draining into and contributing flow to Hoseanna Creek from the proposed Two Bull Ridge Mine is a relatively small proportion of the overall flow recorded and/or estimated to exist within Hoseanna Creek. At reported minimum measured flows (Usibelli Coal Mine, 1996) (all flows measured during ice-free period) the combined discharges of the drainages impacted by the Two Bull Ridge operation from Two Bull, Frances, Badlands, and Louise Creeks are 0.22 cfs. Minimum measured flow in Hoseanna Creek is 14.3 cfs at Bridge #3. The minimum measured flows from the combined four drainages of the Two Bull Ridge operation represent less than 1.6% of the flow in Hoseanna Creek.

At maximum measured discharges (Usibelli Coal Mine, 1996) the combined flows from the Two Bull Ridge affected streams is 28.4 cfs. Maximum measured discharge at Hoseanna Creek is 1200 cfs. Thus, at high flows the combined contribution of flow from the Two Bull Ridge affected streams to the flow within Hoseanna Creek is less than 2.4%. Continuing this analysis to the expected peak discharges (Usibelli Coal Mine, 1996); at the 2 year recurrence interval the Two Bull Ridge streams combine to just over 2.2% of predicted Hoseanna Creek discharge; at the 5 year

recurrence interval the Two Bull Ridge streams combine to just over 2.7% of predicted Hoseanna Creek discharge; at the 50 year recurrence interval the Two Bull Ridge Streams combine to just over 3.6% of predicted Hoseanna Creek discharge.

Maximum impact to surface water flow is expected to occur during active mining. Mining plans are such that not all of the Two Bull Ridge affected streams will be in operation at one time. Assuming that each drainage affected by mining contributes approximately one fourth to the combined flows referenced above, then even a 50% change in flow on one of the affected streams would at most have a combined impact of no more than one-half of one percent effect on Hoseanna Creek flow. The 50% change in flow figure used here is illustrative; it is unlikely that any sustained change of that magnitude will take place.

Given these values the expected impact on surface water quantity during mining should be minimal, to non-measurable. After cessation of mining, and reclamation of impacted areas, expected flows from Two Bull Ridge affected streams are expected to be non-measurable, and therefore the long term impact on Hoseanna Creek at Bridge #1 non-measurable.

GROUND WATER QUALITY

The coal seams are the primary water-bearing units in the Two Bull Ridge permit area. Ground water from wells completed in the 6 seam is of the calcium bicarbonate type, whereas ground water from wells completed in the 4 and 3 seams is of the calcium bicarbonate type or mixed cation (calcium > magnesium > sodium) bicarbonate type. Bicarbonate is the dominant anion in ground water from the coal seams. The predominance of bicarbonate ion indicates the ability of the ground water to buffer additions of acid or base. The ground water is acidic, ranging from pH 5.8 to pH 6.8. Total dissolved solid concentrations range from 101 to 260 mg/L. There are no anomalous concentrations of nutrients, trace elements, or metals in the ground water associated with the coal seams in the permit area, including the new area to be disturbed under this major revision.

The ground water from the Frances Creek alluvium is a sodium chloride type, which is dissimilar to the ground water from the coal-bearing sedimentary units, and to Frances Creek. Relatively high concentrations of total dissolved solids (8,850 mg/L), ammonia and nitrate nitrogen, and nickel were measured (Usibelli Coal Mine, 1996). The well may have tapped an upwelling of very deep ground water from a fault zone in the schist. This highly mineralized water is not expected to alter the surface or ground waters in the Hoseanna Creek drainage because the location is not in the physically disturbed area of the Two Bull Ridge permit area, nor in the area to be disturbed under this major revision.

An increase in the dissolved solid content and change in the specific ionic concentrations is expected in ground water that is in contact with mine spoils in the permit area. These changes to ground water quality outside the permit area are not expected to have a significant cumulative or long-term effect either on surface or ground water in the Hoseanna Creek drainage because of the relatively

small size of the disturbed area relative to the entire drainage basin.

This major revision would allow the disposal of Coal Combustion Products (CCPs) within the backfilled mine spoil. Based on current production of CCP, disposal of CCPs within the Two Bull Ridge mine area would not increase the amount of coal significantly change the amount of ground water that would be in contact with mine spoils. In fact, because the total disturbed acreage will decrease under this revision, the amount of ground water in contact with mine spoils may decrease.

The affected environment also includes an unnamed drainage to the north (T11S R7W, Sec 28, 29, 30) because the potentiometric surface map indicates a northwest ground water flow direction, and backfilled mine spoil is expected to approximate the premining potentiometric surface of the 3 seam aquifer.

Based on TCLP testing of the coal ash proposed for deposit in the backfilled mine area no leaching is expected. Even if leaching is higher than predicted, groundwater flow is directed away from Hoseanna Creek (Lignite Creek) towards the northwest. There are no current or expected users of groundwater in this direction.

Cumulative impacts to ground water quality are not expected to be significant because the affected area is small relative to the total size of the drainage, no historic or present mining has occurred, and there are no present or anticipated users of ground water within the unnamed drainage.

GROUND WATER QUANTITY

Ground water flow in the Two Bull Ridge area is to the north towards an area with no known inhabitants, and away from Hoseanna Creek. Potential impacts from mining are small due to the lack of any documented or recognized user of the ground water to the north of the Two Bull Ridge area. Generally, as found in other areas of the Hoseanna Creek basin, ground water tends to be confined within the separate layers of the coal seams. This accounts for variability in quality and quantity found in wells, depending on the depth of the screened interval.

Based on historic well sampling, wells in coal seam #2 have yielded up to 95 gallons of water per hour (Ray, Vohden, and Roe, 1991). Similarly, water from coal seam #3 has successfully been pumped at comparable rates. Although other wells monitored have produced water at a slower rate of 1-3 gallons per hour, the historic sampling data reveal that it has primarily been the method of water extraction itself that is the limiting factor, rather than the hydraulic yield of the well. Because mining in the Two Bull Ridge area will be bounded by seam #3 through seam #6, the high yields found in seam #3 will be encountered at the lowest point of mining. Based on Poker Flats Mine dewatering data, wells there have produced flows on the order of 120 to 600 gallons per hour. This type of pumping is more aggressive in terms of producing flow than pumping from wells for monitoring purposes, and indicates that there is sufficient water supply such that there is not a major concern due to loss of quantity.

Based on information from the baseline monitoring program (Usibelli Coal Mine, 1996), multiple piezometers and monitoring wells have been placed within the active seams in the Two Bull Ridge area and also such that there is monitoring beyond the extent of the mining limits. Recent well installation has proven that there is distinct isolation between the water bearing units of the #2 and #3 seams. This indicates that there is a separate water bearing unit below those that will be impacted by mining, which will be available for use as a water resource should the need arise in the future. As production proceeds, these wells will yield valuable information on water levels which can be used to assess the prevalence of ground water in the mine over time.

Material Damage Assessment

AS 27.21.180(C)(3) and 11 AAC 90.125(A)(1) require a cumulative hydrologic impact and resulting material damage assessment of all current and planned mining on the hydrologic balance within the Cumulative Impact Area.

No permanent material damage to surface water quality is expected because State water quality standards are not expected to be exceeded for the existing use within the Cumulative Impact Area. No long-term material damage to surface water quantity should occur due to mining and reclamation techniques, and small disturbance area within the Hoseanna Creek basin. No long-term material damage to ground water quality will occur that will preclude its use to existing water users within the Cumulative Impact Area. No long-term material damage to ground water quantity will occur based on the information to date that would preclude any existing water users from obtaining water in the future.

References Cited

Parks, Bruce, 1983, Trace metals in surface water and stream sediments of Healy and Hoseanna Creek basins, Alaska: U.S. Geological Survey Water-Resources Investigations Report 83-4173, 26 p.

Ray, Scott R., and Vohden, Jim, 1993, Streamflow, sediment load and water quality study of Hoseanna Creek basin near Healy, Alaska: 1992 progress report: Alaska Division of Geological and Geophysical Surveys Public-data file Report 93-78, 43 p.

Ray, Scott R., Vohden, Jim, Roe, J.T., 1991, Streamflow, sediment load, and water quality study of Hoseanna Creek basin near Healy, Alaska: 1990 progress report: Alaska Division of Geological and Geophysical Surveys, Public-data file Report 91-20, 65 p.

Scully, David R., Krumhardt, Andrea P., and Kernodle, Donald R., 1981, Hydrologic reconnaissance

of the Beluga, Peters Creek, and Healy coal areas, Alaska: U.S. Geological Survey Water-Resources Investigations Report 81-56, 79 p.

Usibelli Coal Mine, Inc., 1996, Two Bull Ridge Mine surface coal mining permit application. Four volumes submitted to Alaska Department of Natural Resources, Division of Mining and Water Management, December 1996.

POST-MINING LAND USE

Land use information is discussed in *Part 'C', Chapter XI* of the application. Land within the Two Bull Ridge Mine permit and adjacent areas consist of surface and subsurface, including the mineral estate, which is owned by the State of Alaska or the Mental Health Trust Authority. The land is undeveloped and primarily used as wildlife habitat. The permit area is within the Denali Borough and is within Subunit 4D-1 of the Parks Highway/West Alaska Range subregion of the Tanana Basin Area Plan. The area plan designates the area for minerals and wildlife habitat as primary use, and forestry and public recreation as secondary use. A post-mining land use of wildlife habitat with a secondary use of public recreation is consistent with the area plan.

Part 'D', Section 10.2 of the permit application discusses the post-mining land use and reclamation plans for the Two Bull Ridge Mine area. State lands will be reclaimed as wildlife habitat with a new permanent road left in place. The Division of Mining, Land and Water has reviewed the proposed uses and designs. The Mental Health Trust Land Unit has also reviewed and concurs with the proposed post-mining land uses and designs in the permit application for their lands, which also includes wildlife habitat and a permanent road. All uses and facilities that are proposed to remain following reclamation have been accepted by the respective landowners.

BONDING

Part D, Section 10.0 of the original permit application detailed the proposed reclamation bonding assumptions and calculation submitted by Usibelli Coal Mine, Inc. The approved permit application had a bond of \$5,842,902. This major revision does not propose to change the reclamation bond amount. A summary of UCM's new bond calculation is shown as follows:

	TOTAL
Direct Cost Items	
Earthmoving	\$4,079,049
Revegetation (seed bed preparation)	\$30,222

Subcontract Costs	
Aerial Seeding and Fertilizing	\$327,405
Facility Removal	\$57,864
Subtotal Subcontracts	\$385,269
SUBTOTAL DIRECT	\$4,494,540
Indirect Cost Items	
Mobilization & Demobilization @ 4.0%	\$134,836
Contingency Allowance @4.0%	\$179,782
Engineering Redesign Fee @4.0%	\$179,782
Contractor Profit & Overhead @15.0%	\$674,782
Reclamation Management Fee@4.0%	\$179,782
SUBTOTAL INDIRECT COSTS	\$1,348,362
GRAND TOTAL	\$5,842,902

After reviewing the proposed major revision to this permit, the Division concludes that this revision will increase the reclamation liability incurred during the permit term. The Division considered this and other changes to reclamation liability under the proposed revision in determining that the proposed bond amount is sufficient to conduct the required reclamation for disturbances during the 5 year term of the Two Bull Ridge Mine.

FINDINGS OF COMPLIANCE

Overview

Pursuant to 11 AAC 90.125 the Alaska Department of Natural Resources, Division of Mining and Water Management must make a number of written findings prior to the issuance of a Surface Mining Permit. These findings are based on the applicants' affirmative demonstration that information contained in the permit application, or otherwise available to ADNR and the public, demonstrates that the proposed mining operation will comply with the requirements of the Alaska Surface Coal Mining Program.

Those written findings which must be made by ADNR under AS 27.21.180(c) and 11 AAC 90.125(a), and the specific approvals required under 11 AAC 90.301-90.501 are addressed in the relevant sections of this document.

Findings

The basis for the findings are discussed in the appropriate sections and included in this document.

AS 27.21.180(c)(1): The application is accurate and complete and it complies with the requirements of AS 27.21 and 11 AAC 90. This finding is based on extensive analysis of the application and the requirements of the regulatory program

AS 27.21.180(c)(2): The applicant has demonstrated that reclamation as required by AS 27.21 and 11 AAC 90 can be accomplished under the reclamation plan contained in the application. This finding is based on extensive analysis of the reclamation plan presented and the requirements of the regulatory program.

AS 27.21.180(c)(3): An assessment of the probable cumulative impact of all anticipated surface coal mining in the area on the hydrologic balance has been made and the proposed operation has been designed to prevent material damage to the hydrologic balance outside the permit area.

AS 27.21.180(c)(4): The area proposed to be mined is not included within an area that is designated unsuitable for surface coal mining under AS 27.21.260 nor is it being considered for such a designation.

AS 27.21.180(c)(5): The proposed surface coal mining operation will not interrupt, discontinue, or preclude farming on an alluvial valley floor nor will it materially damage the quantity or quality of water in surface or underground water systems which supply an alluvial valley floor.

AS 27.21.180(c)(6): Ownership of the coal in the permit area has not been severed from the private surface estate.

11 AAC 90.125(a)(2) and AS 27.21.180(f): Neither the applicant nor the operator has controlled mining operations with a demonstrated pattern of willful violations of AS 27.21 of such nature and duration and with such resulting irreparable damage to the environment as to indicate an intent not to comply with AS 27.21.

11 AAC 90.125(a)(3): The applicant has assured that disturbances to the hydrologic balance will be minimized and that the water rights of present users will be protected.

11 AAC 90.125(a)(4): The applicant has obtained a negative determination of alluvial valley floors.

11 AAC 90.125(a)(5): The proposed post-mining land use of the permit area has been approved in accordance with 11 AAC 90.481.

11 AAC 90.125(a)(6): The operation will not affect the continued existence of known threatened or endangered species nor will it result in the destruction or adverse modification of their critical habitat as determined under the Endangered Species Act of 1973 (16 U.S.C. 1531, et. seq.)

11 AAC 90.125(a)(7): All specific approvals required when an existing structure is proposed to be used in the operation have been made.

11 AAC 90.125(a)(8): All specific approvals required under 11 AAC 90.301 through 11 AAC 90.501 have been made.

11 AAC 90.125(a)(9): The commissioner has determined the amount of bond necessary under 11 AAC 90.205.

11 AAC 90.125(a)(10): All specific approvals required when auger mining is proposed to be used in the operation have been made. (No augering is proposed.)

11 AAC 90.125(a)(11): The applicant has submitted proof that all reclamation fees required by 30 C.F.R. Part 870 have been paid.

Special Stipulations

In accordance with AS 27.21 and 11 AAC 90, approval of the revision is granted subject to the following special stipulations:

A. DISPOSAL AREA INSPECTIONS.

The permittee shall inspect the Badlands Creek Valley Fill spoil dump in accordance with 11 AAC 90.397. The inspections shall be conducted no less than quarterly, and also during the critical construction periods listed in 11 AAC 90.397 (c). At a minimum, color photographs will be provided showing the following:

1. The main underdrain during construction, clearly showing the cross-sectional extent and geocloth wrapping.
2. The blanket drain during construction, showing the typical blanket's thickness.
3. Each finger drain.
4. Base preparation of the valley bottom and sidewalls, including proof rolling, before each lift is started.
5. Each lift in the toe fill before the next lift is started, showing typical rutting from truck tires.
6. All mud cells in the north fill before they are covered up.

B. GEOMORPHIC APPROACH.

The permittee shall apply geomorphic principles to create channels and landforms that are appropriate to create a stable final grading and surface drainage for the post-mining topography to the extent technically feasible. Examples of available practices include scalloped complex slopes, sinuous drainage channels with concave longitudinal profiles, appropriate drainage density, and slopes with the bottom half concave in shape.

C. COAL COMBUSTION BI-PRODUCTS (REPORTING REQUIRMENTS)

As part of the annual report detailing the previous year's mining and reclamation efforts UCM must include maps detailing the location the CCB disposal sites active and/or reclaimed during the evaluation year. The annual report should include the volume and sources of CCBs deposited in the Two Bull Ridge Mine area.

D. RIGHT OF ENTRY

1. Mental Health Trust Land--Surface Estate. Until a surface lease or other agreement that provides the right of entry to the surface estate of Mental Health Trust land is executed and submitted to the Division, no activities associated with the North Out of Pit Spoils Dump may occur on land managed for the Trust Authority. This includes land within Section 27, T11S, R07W, Fairbanks Meridian,.
2. Mental Health Trust Land Subsurface Estate. Until a coal lease or other agreement that allows coal to be mined on Mental Health Trust Land is executed and submitted to the Division, no coal or associated overburden may be removed in Section 27, T11S, R07W, Fairbanks Meridian.

APPENDIX A: RESPONSES TO PUBLIC COMMENTS

Following are the Department of Natural Resources, Division of Mining Land and Water (DMLW) responses to the written comments received from the public during the comment period (July 21, 2010 to October 12, 2010) for a Major Revision of the Two Bull Ridge Mine Permit. The DMLW received a total of 1 comment letter containing suggestions for requirements to be included in any permit approval.

Comments and Responses to Comments

Comment (C): Coal combustion bi-products (CCBs) disposed of in the Two Bull Ridge Mine area should only come from the currently operating coal power plant in Healy.

Response (R): The commenter provides no basis as to why this restriction would be necessary. All coals currently used in the interior originate from coal in the Healy area. These coals have similar characteristics and leachability. Currently CCBs produced in the Fairbanks areas are used as a clean fill. Addition of the material would have minimal environmental impacts.

C: Location of CCB disposals areas should be made available to the public

R: As part of the approval of this major revision, DMLW will stipulate that the locations of the current and proposed CCB disposal areas are included as part of the annual report to DMLW. This requirement will include a calculation of the volume of CCB disposed during the previous evaluation year. Proposed CCB disposal sites will be reviewed by DMLW to ensure that they are placed above the predicted post mining water table, that they are not situated in areas of potential groundwater recharge (surface depressions, post mining drainage channels), and that they do not interfere with contemporaneous reclamation.

C: Recommend that DMLW require lined disposal cells be used to minimize the impacts of potential leaching of toxic material.

R: The proposed disposal plan requires that CCBs be placed above the predicted post mining water table. In addition, the hydraulic conductivity of the post mining spoil is predicted to be similar to the premining conditions. The low hydraulic conductivity ($<10^{-4}$ ft/day) of the spoil limits the flow of groundwater through replaced spoil material.

C: Surface and groundwater characterization of the CCB disposal areas should be available to the public.

R: All surface and groundwater hydrology data is available for the public to review. In addition, all

annual reports and any additional studies requested by DMLW for the CCB disposal areas are available for public review.

- C: Monitoring of ash composition for toxics and their composition should be required, periodically.
- R: As part of the permit application UCM provided DMLW with TCLP testing of the CCBs proposed for disposal in the Two Bull Ridge Mine area. DMLW may require additional leach testing and chemical analysis if other mining areas are opened in the Healy area or if CCBs from outside the interior are proposed for disposal in the mine area. DMLW will periodically sample and test CCBs being disposed of in the Two Bull Ridge Mine area. Until another test method is identified by the Resource Conservation and Recovery Act (RCRA) or another method is recommended by DEC, DMLW will require all future testing of CCBs to use TCLP analysis.
- C: Haul trucks returning CCBs to the Two Bull disposal area should be covered, in addition personnel transporting CCBs should use personal protective equipment.
- R: In DMLW's review of CCBs being hauled to the disposal site in the Poker Flats Mine area no issues concerning dust originating from these operations have been observed. CCBs from GVEA Healy 1 are in general wet and do not pose a dust issue. If dust issues are observed or the characteristics of the CCBs change due to the introduction of CCBs from GEVA Healy 2 or CCBs from Fairbanks, DNR will require that UCM introduce additional engineering controls. These controls can range from wetting coals to covering loads.

Personnel safety is regulated by MSHA. MSHA requires that the appropriate PPEs are made available for all personnel working in the mine.