

**Decision**  
**And**  
**Findings of Compliance**

February 7, 2012

Usibelli Coal Mine, Incorporated

**Jumbo Dome Mine**

Surface Mining Permit Application

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## **Introduction**

This document is the Decision to approve the application for the Jumbo Dome surface coal mine permit (Permit No. S-0606) 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 and the Decision to approve with certain enumerated stipulations the applications submitted by Usibelli Coal Mine, Inc. for the Jumbo Dome Mine.

Detailed information regarding the processing of the permit and permit requirements can be found in the Alaska Surface Coal Mining Control and Reclamation Act (AS 27.21)(ASCMCRA) and the Alaska Surface Coal Mining Regulations (11 AAC Chapter 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 7<sup>th</sup> 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 Anchorage address listed above, by phone at 907.269.8650, or sent by electronic mail to: [russell.kirkham@alaska.gov](mailto:russell.kirkham@alaska.gov).

The applicant or any person who is, or may be adversely affected by this decision, may request a hearing to review the reasons for the decision. The applicant, or a person with an interest, which is or may be adversely affected by this decision, may within 30 days following public notice of the decision request in writing a hearing under AS 27.21.150 to review the reasons for this decision. The request for a hearing may be mailed or delivered to Daniel S. Sullivan, Commissioner, Department of Natural Resources, 550 West 7th Avenue, Suite 1400, Anchorage, AK 99501; or faxed to 907.269.8918; or sent by electronic mail to: [dnr.appeals@alaska.gov](mailto:dnr.appeals@alaska.gov).

## 1.0 History of Review

Usibelli Coal Mine, Incorporated (UCM), submitted an application for a surface coal mining permit for the Jumbo Dome Mine on January 21, 2010. This would be a new mine located on state coal leases ADL 673536, ADL 673538 and University of Alaska Lands located at Section 33, Township 10 South, Range 6 West of the Fairbanks Meridian. Upon receipt of the application, the Division of Mining, Land and Water initiated the completeness review process under 11 AAC 90.111. The Division distributed either the application or portions of the application to agencies for review and comments. These agencies included:

- Alaska Department of Natural Resources
  - Division of Parks
  - Division of Mining, Land and Water
- Alaska Department of Fish and Game
- Alaska Department of Environmental Conservation
- United States Army Corps of Engineers
- United States Fish and Wildlife Service
- United States Environmental Protection Agency

In response to internal agency review and comments from outside agencies, the applicant was notified that additional information was required to complete the application. This was an iterative process that resulted in multiple requests to UCM for additional information. Additional application materials were received and additional agency comments were generated between January 2010 and November 2011.

On November 11, 2011, the Division of Mining, Land and Water determined that the application contained sufficient information to address the requirements of 11 AAC Chapter 90 and found the application to be complete. At this time a public notice, which ran once a week for four consecutive weeks was published in Fairbanks Daily News Miner. Notice was also sent directly to the Division's list of affected persons and agencies and noticed on the Department of Natural Resources' Public Information website. The comment period opened on November 11, 2011 and closed on January 13, 2012. The complete application was made available for public review at the Division's offices in Anchorage and Fairbanks and online at <http://dnr.alaska.gov/mlw/mining/coal/jumbo-dome/index.cfm>.

Three agency comments requiring stipulations were received. Eleven public comments were received. Eight comments were in support of the proposed application. One comment was received that was opposed to coal mining in general. During the public review process, the Division did not receive a request for an informal conference under AS 27.21.140 from any of the individuals or agencies who submitted comments.

Analysis of the completed application material has been performed and the attached findings of compliance have been prepared by the Division of Mining, Land and Water. The decision to approve the application was finalized on January 31, 2012.

## **2.0 Environment Affected**

### **2.1 Introduction**

This section summarizes the background information presented in the permit application.

### **2.2 Location**

The Jumbo Dome Mine area is in the northern foothills of the Alaska Range amid rugged terrain. The permit area includes about 3,237 acres and is east of Marguerite Creek. The proposed Jumbo Dome Mine is located on State Land approximately 90 miles south of Fairbanks, Alaska, and 9 miles northeast of Healy, Alaska. The proposed mine is located in the following general area: Sections 27, 28, 33, and 34, Township 10 South, Range 6 West, and Sections 3-5, 8, and 9, Township 11 South, Range 6 West, Fairbanks Meridian. The area can be found on the Fairbanks A4 and Healy D4 quad maps.

### **2.3 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 1,800 feet and 2,100 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 50 degrees to 56 degrees F while winter temperatures are in the negative four degrees to two degrees F range. The average air temperature at the project area is below the freezing point of water approximately 7 months each year. Wind was stated to be predominantly from the southeast and secondarily from the northwest. During the winter months, high southeasterly winds frequently occur with gusts ranging from 40 to 55 mph. The winds appear to travel up and down the Nenana River valley the majority of the time. Records indicate that the average yearly rainfall equivalent is approximately 15.5 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 is required for the mine.

### **2.4 Cultural**

Cultural and Historical information is discussed in Part C, Chapter I of the application. The Jumbo Dome Mine area has had several systematic cultural resource surveys. Surveys were conducted in 2002 and 2005. The surveys concluded that the study areas did not contain any significant cultural properties and the potential for site preservation was minimal. The area had

previously been determined to be of low potential for discovering archeological sites.

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 Jumbo Dome Mine permit area and the site was cleared on January 31, 2012.

## 2.5 Soils

Information pertaining to the soils of the Jumbo Dome 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.

The soil resources for the Jumbo Dome lease area were surveyed between August 8 and September 1, 2007. The soil survey location is within the baseline study area boundary on both sides of Marguerite Creek, west of Jumbo Dome Mine. A study of the morphological properties of the soil provided for the groundtruthing of the soils through their relationships to vegetation communities and landforms along elevation transects on both sides of the creek. During the eight days of field work a total of 60 soil pits were excavated and described. Descriptions included, the soil's physical environment, landform, slope, land cover types and soil classification of each pit. Pits were located by GPS.

The Mapping Units used on the Jumbo Dome Mine Soil Survey Map are based on the groundtruthed excavation pits. The Jumbo Dome Mine area has been mapped using 27 separate mapping units. The main soil map units within the study area boundary include: River channels and sand/gravel bar; escarpments, rock outcrops; roads and disturbed area; *Typic Gelaquents-Gelaquepts-gelifluvents* complex\*, 0-3% slopes; *Typic Cryaquents\**, sandy, 0-3% slopes; *Typic Cryaquents\**, 3-8% slopes; *Typic Gelaquents\**, 8-25% slopes; *Gelorthent*, 15-35% slopes; *Typic Cyrothents*, 8-25% slopes; *Typic Cryorthents-Entic Haplocryods* complex, sandy, 25-45% slopes; *Cryorthents-Cryopsamments* complex, sandy, 45-90% slopes; *Ruptic Historthels\**, 0-8% slopes; *Historthels-Histoturbels* complex\*, 8-25% slopes; *Cryohemists\**, 0-3% slopes; *Cryosaprists\**, 0-15% slopes; *Typic Gelaquepts\**, 18-30% slopes; *Histic Cryaquepts-Typic Cryaquepts* complex\*, 0-8% slopes; *Typic Dystrogelepts*, 3-18% slopes; *Lithic Humicryepts-Dystrogelepts* complex, 25-45% slopes; *Aquic Humicryepts-Dystrogelepts* complex, 15-35% slopes; *Lithic Dystrocryepts*, 3-25% slopes; *Fluvaquentic Dystrocryepts*, 3-15% slopes; *Typic*

*Dystrocryepts*, sandy, 0-20% slopes; *Typic Dystrocryepts*, loamy, 20-45% slopes; *Entic Haplocryods*, 3-18% slopes. (\*Indicates Hydric Soil Map Units).

## **2.6 Surface Water**

Surface water hydrology is discussed in Part C, Chapter V of the application. The major surface water feature in the Jumbo Dome Mine area is the drainage basin of Marguerite Creek. Neighboring water bodies are Emma Creek to the west and Bonanza Creek to the east.

Marguerite Creek covers an area of approximately 15.2 square miles and is comprised of 18 major basins and 14 minor basins. Marguerite Creek is a low gradient stream with an average gradient of approximately 1.5 percent. Its tributaries are high gradient subarctic streams with the potential for high stream velocities and sediment transport.

In 2002 the United States Geological Survey (USGS) in cooperation with UCM, initiated a program to measure precipitation, stream flow and surface water quality within the Marguerite Creek Basin. A total of six surface water stations were established on Marguerite Creek and the tributaries of Emma Creek, Lower Emma Creek, Lower Marguerite Creek, Middle Marguerite Creek and Lower Bonanza Creek.

Surface water bodies in the mining area include not only the creeks but also springs, seeps, and seepage zones. As part of the baseline monitoring program UCM also performed a spring and seep survey in 2009.

Seasonal surface water flow variations begin with peak flows from rainfall and snowmelt during May and early June. Discharge decreases then stabilizes from mid-June to mid-July as the snowpack is diminished. Localized summer rain storms are known to result in the short-term discharge equal to peak flows from spring runoff.

Within the lease boundary the applicant is the only surface water user in the area. Downstream of the project area, there are two other surface water right applications besides Usibelli Coal Mine. A water application, LAS 25921, was filed by David W. Jacobs for placer mining operations on California Creek in Section 21, Township 9 South, Range 6 West, Fairbanks Meridian. A second water application, LAS 25506, was also filed by David W. Jacobs for placer mining operation on Eva Creek in Sections 7, 8, 13, 14, 18, 23, and 24, Township 10 South, Range 6 West, Fairbanks Meridian.

## **2.7 Groundwater**

Information pertaining to the hydrogeology of the Jumbo Dome Mine is discussed in Part C, Chapter IV and VI of the application. The proposed Jumbo Dome Mine is located within the drainage of Marguerite Creek. Marguerite Creek flows from east to west then south to north where it flows into California Creek. California Creek flows into the Totatlanika River which

flows into the Tanana River. Marguerite Creek flows year-round and exhibits peak flows from early May to mid-May and during late-July to early-August. 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 that the water bearing units within the Suntrana Formation within the mining area include the number 3, 4, 5, and 6 coal seams as well as surficial gravel deposits and alluvium. Throughout the Marguerite 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. Within Marguerite Creek, interactions with groundwater primarily occur where the coals crop out with the valley bottom. Groundwater flow within the project area is to the northwest and generally follows the dip of the coal beds. Recharge within the project area is primarily by infiltration of annual precipitation including snowmelt. As stated above, the overlying sandstones act as aquatards limiting recharge to coal outcrops. The limited extent of local outcrops in the mining area probably restricts the volume of local recharge to the seams.

Groundwater at the site can be characterized as neutral to mildly acidic with pH values ranging from 6.3 to 7.8. Temperatures range from 3.4 degrees to 8.2 degrees Celsius. Total dissolved solids (TDS) concentrations indicate that groundwater at the site varies from fresh to slightly brackish. TDS concentrations in groundwater from 3, 4, 5, and 6 seams vary from 156 to 481 mg/L. No nutrients were detected in the groundwater samples from the site, with the exception of ammonia and phosphate, which were approximately 0.1-0.8 and 0.02-0.27 mg/L, respectively. Sources for these two constituents are most likely from the decomposition of organic matter and weathering of the bedrock.

Most total and dissolved trace metals, nonmetals and metalloids included in the initial baseline and additional baseline sampling suite were not elevated above Alaska Water Quality Standards (WQS). Four metals were measured above WQS, three (Manganese, Iron and Copper) are naturally occurring within the groundwater system and one (Zinc) is likely based on a drilling product used. Due to this natural condition of the groundwater not meeting Water Quality Based Effluent Limits, UCM will route the pumped water away from all clean water diversion systems to either the land application site or the sediment pond. All pond and groundwater systems will be monitored and regulated by DNR in coordination with other permitting agencies.

Within the lease boundary the applicant is the only groundwater user in the general area. As stated in the surface water description, downstream of the project area, there are two other water right applications in the area besides Usibelli Coal Mine. A water application, LAS 25921, was filed by David W. Jacobs for placer mining operations on California Creek in Section 21, Township 9 South, Range 6 West, Fairbanks Meridian. A second water application, LAS 25506, was also filed by David W. Jacobs for placer mining operation on Eva Creek in Sections 7, 8, 13, 14, 18, 23, and 24, Township 10 South, Range 6 West, Fairbanks Meridian.

## 2.8 Vegetation

Information pertaining to the vegetation of the Jumbo Dome Mine area is discussed in Part C, Chapter VIII of the application.

According to the Land Resource Regions and Major Land Resource Areas of Alaska (Kautz and Taber, 2004), the lease area is within Major Land Resource Area (MLRA) 228, Interior Alaska Mountains. This area and region is characterized by brief summers and long cold winters. Average annual temperatures and precipitation vary greatly in the MLRA, but precipitation typically ranges from 15-20 inches in the lower elevations and the frost-free period varies from 50 to 80 days.

Pre-mining wetland and vegetation resource information for the area is derived from studies prepared for Usibelli Coal Mine by WHPacific, Inc. in 2007 and HDR Alaska, Inc. in 2010.

Vegetation mapping and classification was performed using a combination of ground reconnaissance, air photo interpretation, and sampling of existing vegetative types and communities. Air photo interpretation was compared to field-collected vegetation data and when it differed revised to match actual on-ground conditions. Data was incorporated into a GIS database.

The Jumbo Dome Mine baseline vegetation study area encompasses 4,798 acres. Approximately 2,926 acres are forested habitats, 1,755 acres are shrub habitat, 74 acres are herbaceous habitat and 40 acres are rock outcrops.

The Jumbo Dome Mine lease area encompasses approximately 3,238 acres. Approximately 1,101.2 acres are considered the “mining limits” or “impact area.” Within the impact area out of the 1,101.2 acres, 678.9 acres are forested; 302.5 acres shrub; 5.5 acres herbaceous; and 14.5 acres classified as un-vegetated.

Upland conditions support a mixture of white spruce forest, paper birch/quaking aspen forest, and dry forb herbaceous communities. Wetland conditions in the lease area support sedge-cottongrass wet meadows, bluejoint meadow, willow shrub and alder-willow shrub communities, black spruce woodlands and forest and ericaceous shrub tundra. Out of the total proposed impact area of 1,101.2 acres the total acreage of uplands is approximately 940.8 acres, or 85.4 percent of the area. The total acreage of wetlands and other waters is approximately 160.4 acres, or 14.6 percent of the area.

The vegetation in the proposed Jumbo Dome Mine area is represented outside the permit area in the region.

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

## **2.9 Fish and Wildlife**

Fish and Wildlife information pertaining to the Jumbo Dome Mine area is discussed in Part C, Chapter IX of the application. Fish and wildlife resources within the Hoseanna Creek basin were inventoried and assessed in separate studies in 1976 and 1984. The two studies were designed to evaluate the effects of development activities in the local area applicable to the proposed Jumbo Dome Mine project. The studies indicated that there are low numbers of small mammals, furbearers, large mammals, and low to moderate numbers of songbirds, waterfowl, and raptors.

Further studies of wetlands, vegetation, and fish and wildlife habitat were conducted in the Jumbo Dome Mine permit area by WHPacific in 2007. Common wildlife species present in the area were determined using species lists for Denali National Park, the DNR Preliminary Best Interest Finding for the Healy Basin, the ADFG Wildlife Notebook Series and on-site observations.

Wildlife evidence was documented thorough direct observations, vegetation browse indicators, tracks, scats, trails and similar wildlife signs. Fish sampling was conducted to determine the distribution and diversity of fish populations using beach seines, minnow traps, angling and electro-shocking.

Habitat types in the project area include terrestrial uplands and wetlands as well as riverine habitats.

Animal species listed by the US Fish & Wildlife Service under the Endangered Species Act were not identified as being present in or near the permit area. Development of the Jumbo Dome Mine is not expected to impact any listed species or their critical habitat in or outside of the project area. Surveys of the project area did not identify any bald or golden eagle nests within the proposed permit area. Typical nesting and foraging for bald eagles is limited or absent on site. Golden eagles have the potential to occur in the project area.

## **2.10 Land Use**

Land use information is discussed in Part C, Chapter XII of the application. The permit area is within the Denali Borough and is covered in subunit 4D1 of the Parks Highway/West Alaska Range subregion of the Tanana Basin Area Plan. Current land uses for the proposed permit area include coal mining, wildlife habitat, hunting and to a limited extent, timber harvesting. The proposed permit area for the Jumbo Dome Mine coal project is in a relatively undisturbed natural condition. The land is undeveloped and primarily used as wildlife habitat. Surface and subsurface ownership, including the mineral estate, is owned by either the State of Alaska or the University of Alaska. There are no dwellings within 1 mile of the permit boundary.

### **3.0 Mining and Reclamation Plan**

#### **3.1 Summary**

UCM has maintained active ongoing mining and reclamation operations in the Hoseanna Creek Valley since the early 1970's, beginning with the Gold Run Pass mining area and the Poker Flats and Runaway Ridge areas progressing to Two Bull Ridge for additional reserves to support ongoing operations and meet contractual obligations. The Jumbo Dome mining area is expected to support ongoing mining operations at a maximum rate of approximately 3.0 million tons of coal per year for the next 30 years. Over the life of the Jumbo Dome mining operations, approximately 83.3 million short tons of in-situ coal will be mined. The permit application requests that a new operation and reclamation plan be approved for a 3,237 acre area in the Marguerite Creek valley. During the first 5-year permit term, 476.8 acres are scheduled to be disturbed and 131 acres (27%) to be reclaimed.

Prior to ground disturbing activities appropriate storm water best management practices will be installed. Mining will commence with the boxcut of approximately 3.7 million total cubic yards in the southwestern most portion of the mining area as indicated on Plate D2-2, mine plan layout. Overburden and interburden removed from the boxcut will be stockpiled just south of the boxcut near the Jumbo Dome facilities. Coal mined in the boxcut will come primarily from the 3 seam and 4 seam, with a small amount of 5 seam mined where the outcrop is encountered. Removal of overburden and interburden material will be done mostly by truck/shovel, with the possibility of assistance from the dragline.

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.

#### **3.2 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 a.m. and 9:00 p.m. or during daylight hours, whichever is greater. The proper officials of local governments and public utilities will be verbally notified of unscheduled blasts prior to executing the blasts. 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 ongoing mine development and advancement. Backfilling and grading of mined areas will lag behind the backfilled crest of the active pit by no more than 600 feet.

It should be noted that the basic mining and reclamation methods described in the above will be utilized throughout the life of the Jumbo Dome mining operations; however, detailed pit layouts, backfill plans, and mining and reclamation sequencing have only been completed for the current term. Future mining blocks and disturbance areas have been identified and conceptual plans developed to determine the overall life-of-mine material balance and postmining configuration. Detailed planning, pit, and reclamation sequencing will be completed for future mining areas prior to the permit term during which these areas will be mined.

### **3.3 Approximate Original Contour and Excess Spoil**

The design post-mining topography is illustrated on Plate D10-1, approximate final reclamation contours and post-mining drainage control plan, and Plate D10-2, cross sections of pre-mining and post-mining topography.

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.

The post-mining configuration will include slight depressions to enhance reestablishment of wetlands. These depressions will be located at ponds JD-1 through JD-4 and within areas that are conducive to reestablishment of wetlands.

To provide a post-mining topography that promotes long-term stability of the backfill and allows for contemporaneous reclamation, there will be a permanent out-of-pit spoil pile. A stable disposal site was identified for permanent out-of-pit spoil disposal, which has more than adequate volume for the required spoil. The Jumbo Dome post-mining topography and permanent out-of-pit spoil pile have been designed to accommodate all of the overburden and interburden materials that will be removed from the entire mining area.

The two-dimensional model, Slide 6.0 modeling, was performed for the proposed 4:1 slope out-of-pit spoil pile. These results for the proposed 4:1 slope configuration meet the ASCMCRA requirements for long term stability of an out-of-pit spoils pile (minimum factor of safety of 1.5), and were shown to be compatible with the natural surroundings and is suitable for the post-mining land use.

Regraded mine disturbance areas, including spoil pile out-slopes, will be visually monitored semi-annually during the first 3 years following completion of reclamation and then at least annually for the remainder of the reclamation liability period. In the annual report, an Engineer's inspection report will be inserted.

### **3.4 Topsoil Salvage and Replacement**

The topsoil handling plan detailed in Part D of the application states that all topsoil that is operationally salvageable will be recovered for use as a revegetation medium during reclamation. Topsoil material recovered from mine disturbance areas, including roads, sedimentation ponds, diversion ditches, mining areas, and out-of-pit spoil piles, will be either stockpiled for future reclamation use or directly replaced on backfilled and regraded areas. Dozers will remove the topsoil material and push it into temporary piles from which mobile loading units will load it into haul trucks. The haul trucks will transport the topsoil material to temporary stockpiles or

replacement areas, where it will be spread by dozer. All of the salvaged topsoil material will be used during the various phases of reclamation work.

The native soils in the Jumbo Dome Mine area were identified and characterized in order to estimate the volume of salvageable topsoil for the life of the mine disturbance area. The “maximum recoverable volumes” assume a 75 percent estimate based on site conditions, operational limitations and previous mining experience. The 75 percent estimate accounts for potential loss of topsoil during transport and the potential for less than the anticipated amount of topsoil being salvaged at certain location. This estimated salvage rate is considered to provide a minimum topsoil thickness of 12 inches, which can be redistributed throughout the reclaimed areas to achieve approximate uniform stable thickness consistent with approved postmining land uses, in accordance with 11 AAC 90.315.

### **3.5 Post-Mining Land Use**

The proposed post-mining land use is detailed in Part D10.2 of the application. The applicant intends to reclaim the area to a post-mining land use of wildlife habitat with a secondary land use of public recreation. The proposed primary and secondary land use are consistent with the designated uses in the Tanana Basin Area Plan.

### **3.6 Post-Mining Drainage**

The post-mining drainage plan consists of newly established or reconstructed drainage channels designed to convey the peak runoff from a 10-year 24-hour precipitation event for all ephemerals streams reclaimed within the project area. The sediment ponds are proposed to be reclaimed in place and are not designed to contain water post-mining.

### **3.7 Revegetation**

Revegetation information pertaining to the Jumbo Dome Mine area is discussed in Part D of the application.

All mine disturbance areas will be revegetated by seeding with a mixture of native and adaptive introduced species and planting a variety of wood plant species.

Revegetation objectives are twofold; first, to quickly establish a ground cover that will control erosion, and second, to encourage the natural reinvasion of native vegetation that creates diverse plant communities, which will support post-mining land use of wildlife habitat.

Mine reclamation areas will be seeded between May 15 and August 15 to facilitate seed germination and provide an adequate growing season for initial establishment and erosion

control. The selected seed mixture consists of a variety of species dominated by native grasses. The seed mixture will contain no invasive species. The selected species included in the revegetation seed mixture reflect UCM's 25-year reclamation experience and the recommendations from the Alaska Plant Materials Center.

Reseeded areas will be fertilized at the time of seeding and in year 3 and year 5. Both seed and fertilizer will be applied either aerially by fixed-wing aircraft or by mechanical broadcasting using a low-ground-pressure all terrain vehicle.

A variety of native woody plant species including felt-leaf willow, alder and white spruce will be transplanted in reclamation areas. Transplanting will be scheduled for June through August.

UCM will submit an annual report to DNR with an updated summary of revegetation efforts. When a sampling unit becomes a candidate for bond release additional vegetation monitoring will be implemented.

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.

UCM is proposing bond release standards for objective 1, erosion control, of 70 percent ground cover to include live vegetation, dead vegetative mat, incidental woody debris, stones or gravel and litter in quantities that will resist erosion. The 70 percent standard is based on professional judgment as a value high enough to control erosion in the Jumbo Dome area. The higher the grass cover the lower the natural reinvasion of native species into newly seeded area. A lower standard would result in faster natural revegetation but would risk greater erosion.

1. The bond release standard for the second objective, natural reinvasion appropriate for wildlife habitat includes a woody vegetation standard and a diversity standard. The woody vegetation standard requires an average of 450 woody stems per acre on at least two-thirds of any area for which bond release is requested. The standard is adapted from the Division of Forestry Reforestation standard for Region II (Interior Boreal Forest).
2. The diversity standard requires that for each area requested for bond release at least three woody species be present. At least 20 percent of the density must be made up of at least two species.

### **3.9 Annual Report**

An annual report will be submitted each year. It will give a brief overview of the mining, reclamation, and permit maintenance that took place during the previous year.

## 4.0 Findings of Compliance

### 4.0 Overview

Pursuant to 11 AAC 90.125 the Alaska Department of Natural Resources, Division of Mining, Land and Water 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.

### 4.2 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 the presence 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 auger mining 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.

### **4.3 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.

#### **4.3.1 Areas Unsuitable for Surface Coal Mining**

Part B, Section 4.0, of the surface coal mining permit application states that the proposed mine area contains no areas that have been designated as unsuitable for mining under AS 27.21.260. In addition, there are no areas within the Marguerite Creek Watershed that have been designated as unsuitable for mining.

The 3,237 acres in the permit area include no National Park System lands, no National Wildlife Refuge System lands, no National System of Trails lands, no National Wilderness Preservation System lands, and no 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. There have been no petitions received by the Department to designate lands unsuitable for mining under AS 21.21.260. These conclusions are based on maps and information presented in the permit application.

#### **4.3.2 Applicant Compliance**

11 AAC 90 requires that an applicant for a surface coal mining permit include a list of all cited violations of this chapter and all cited violations of a law, rule, or regulation of the United States, or the State, pertaining to air or water environmental protection received by the applicant in connection with a surface coal mining operation during the previous three years. Part B, Section 2.0 of the application lists two violations under 11 AAC 90 and eleven violations of the Clean Water Act. The first two violations were issued on August 25, 2009. Both violations were abated in a timely fashion. The eleven violations of the Clean Water Act were issued in 2011 covering a period between 2007 and 2009. These violations were self reported to the EPA. In a consent agreement, UCM agreed to pay a fine and take corrective action.

A review of State and federal records shows 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 January 18, 2012 and responded favorably for permit issuance. All names associated with the mine application permit

and Usibelli Coal Mine, Incorporated's Board of Directors and Officers were negative for violations.

The Division has reviewed Usibelli's compliance history and finds that it does not demonstrate a pattern of willful violations of AS 27.21 or 11 AAC 90 of such nature and duration with such resulting irreparable damage to the environment to indicate an intent not to comply with the statute and regulations.

#### **4.3.3 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 University of Alaska owns the surface and mineral estate located at Section 33, Township 10 South, Range 6 West of the Fairbanks Meridian within the permit 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 coal leases were issued consistent with Alaska Statutes and Regulations governing the leasing of locatable minerals.

#### **4.3.4 Post Mining Land Use**

Land use information is discussed in Part C, Chapter XI of the application. Land within the Jumbo Dome Mine permit and adjacent areas consist of predominantly state land both surface and subsurface, including the mineral estate, and University of Alaska Land. 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 Jumbo Dome Mine area. State lands will be reclaimed to wildlife habitat with a new permanent road left in place. The Division of Mining, Land and Water has reviewed and concurs with the post-mining land uses and designs proposed in the permit application for the land 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.

#### **4.3.5 Existing Structures**

No facilities exist on the area that will need upgrading. The existing structures in the Jumbo

Mine Permit area are those associated with exploration activities both pre and post ASCMCRA. These include trails used to access drill sites and monitoring wells. All the monitoring wells and exploration trails were permitted under an exploration permit.

#### **4.3.6 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.

##### **Signs and Markers**

Part D, Section 8.3 of the application discusses the design and placement of signs and markers. UCM currently has identification signs posted on the Nenana River Road, Gold Run Pass South Access Road, Poker Flat South Access Road and the West Side Tipple Road. The existing signs will be modified to include Jumbo Dome Mine. 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.

Permit signs and markers will be posted wherever mining activities occur in close proximity to the permit boundary, to avoid confusion regarding the exact permit area limits. Stream buffer zones will be marked on Marguerite Creek. Signs will be constructed of durable material.

Therefore, under 11 AAC 90.301, the placement of signs and markers proposed in the application is acceptable.

##### **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 meets the requirements of the 11 AAC 90.

## **Stream Buffer Zones**

Under 11 AAC 90.353, “No land within 100 feet of a perennial or intermittent stream may be disturbed by a surface activity, unless the Commissioner specifically authorizes a mining activity closer to or through a stream upon finding that, 1) “any temporary or permanent stream channel diversion will comply with 11 AAC 90.327; 2) the mining activity will not adversely affect the water quantity or quality of the stream under applicable state and federal water quality laws and regulations; and 3) any adverse effect on fish, wildlife, or other environmental resources of the stream will be minimized.”

There is no direct disturbance to Marguerite Creek as part of this project and no activities within 100 feet of the creek. Construction of Clean Water Diversion CWD-1 and Clean Water Diversion CWD-2 meets the requirement for 11 AAC 90.327. These diversions are meant to convey any water from above mining to Marguerite Creek. Discussions with Fish and Game concluded that these conveyances will have minimal impact to fish and wildlife. Stream buffer zone waivers are granted for Clean Water Diversion CWD-1 and CWD-2.

No other streams meeting the definition of intermittent streams under 11 AAC 90.911(58) or perennial streams under 11 AAC 90.911(71) occur within the project area. UCM is requesting a stream buffer zone waiver for approximately five miles (24,542 linear feet) of ephemeral/intermittent streams within the disturbance boundary of the Jumbo Dome Mine area. These ephemeral/intermittent streams are drainages that were determined to be jurisdictional waters based on the Army Corps of Engineers 404 permit guidance documents. Many of these drainages do not meet the definition of “intermittent stream” in accordance with 11 AAC 90.911, but have been included for coverage in this waiver request. The drainages and their 100-foot buffer are shown in plate D9-1 in the application. Their inclusion as a buffer zone meets and exceeds the requirement under 11 AAC 90.353.

Installation of the bridge and culvert to cross Marguerite Creek were approved under the Jumbo Dome Road Corridor permit (S-0605). This design was reviewed and approved by the Department of Fish and Game. The design of this crossing meets the requirements set by the Alaska Department of Fish and Game as well as the requirements in 11 AAC 90.353. Stream buffer zones will be marked on Marguerite Creek (Application Section D8.3).

## **Stream Diversion**

Marguerite Creek is the one surface drainage that may be affected by mining operations in the Jumbo Dome Mine area. All of the tributaries of Marguerite Creek are ephemeral in their upper reaches. The tributaries become intermittent near their confluence with Marguerite Creek during spring discharge at and near the 3 and 4 Seam outcrops. There will be no net change in drainage basin area and no change to the grade of Marguerite creek.

A culvert (MCHR) was permitted for Marguerite Creek under the Jumbo Dome Road Corridor Permit to convey creek flow for both a 100-year storm event and for low flow passage of fish.

Additional culverts will be constructed for one of the tributary drainages to Marguerite Creek. The location of the tributary drainage is just north of the proposed out-of-pit spoils pile where it enters the proposed mining area.

Most of the tributary drainages to Marguerite Creek within the proposed mining area will be mined out during mining. The tributary drainages to Marguerite Creek will be reestablished within the proposed mining area during reclamation as shown in Approximate Final Reclamation Contours and Post Mining Drainage Control Plan. Preliminary designs for post mining drainages are included in Appendix D10-1.

### **Excess Spoil**

The permanent out-of-pit spoil pile will be located just outside the 3 Seam sub-crop to the south of the Jumbo Dome mine area. The design criteria specify a 4:1 slope with the maximum height of 150 feet. With these criteria, the out-of-pit spoil pile is capable of storing 5.1 M LCY of spoil.

Following the topsoil removal operations, mine development and excavation will be initiated to remove overburden and interburden materials and expose the minable coal seams. Essentially all overburden and interburden materials will be fragmented by drilling and blasting as described in Part D Section 4.0, blasting plan, and prior to excavation. Initial overburden and interburden removal may involve either dragline or truck/shovel operations.

Placement of spoil materials generated by truck/shovel operations will be dependent on the availability of backfill space. The initial boxcut material will be placed in the out-of-pit stockpile located south of the mining area; near the Jumbo Dome mine facilities (see Plate D2-1). Material from subsequent cuts will be placed in existing open cuts and completed pit areas to the extent that adequate backfill space is available at or near designed final elevation in order to minimize regrading.

The majority of the material to be placed in the permanent out-of-pit spoil pits will come from the boxcut since no backfill area will be available at the time of excavation. Construction of the permanent out-of-pit spoil pile will involve removal of any deleterious material from spoil pile foundation areas, establishment of required surface diversions, foundation preparation which includes soil removal and ripping, and controlled placement of spoil materials in a series of horizontal lifts. The initial spoil lift will be established from the downslope toe of the spoil pile, and successive lifts will be placed on top of and extend upslope from the initial lift. Spoil pile outslopes will be established and graded to an effective grade of 3:1 or less to promote effective drainage control and long-term stability. The permanent out-of-pit spoil piles have been designed based on the geotechnical stability analysis presented in Section D5.0 (pit excavation plan) Appendix D5-1. As spoil pile construction progresses upward and away from the lower spoil pile slopes, lower slope areas will be reclaimed.

11 AAC 90.391(e) requires that spoil piles must be placed in horizontal lifts that 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 south of Jumbo Dome area, 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.

### **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 necessary 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 600 feet. 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. The schedule presented is acceptable.

## **4.4 MINE ENGINEERING**

### **4.4.1 Mining Plan**

#### **Findings**

The coal reserves of Jumbo Dome Mine are bounded on the west by outcrops and Marguerite Creek, on the south by faulting and other geologic features, and by steep terrain and overburden thickness along the east. The reserves remain open to the west on the other side on Marguerite Creek, to the south, and to the northeast in the vicinity of Bonanza Creek. The currently delineated reserves are the basis for the coal removal limits and permit boundary depicted on Plate D2-1, general facility arrangement.

The Jumbo Dome coal reserves are similar to those in the Two Bull Ridge and Poker Flats mine areas, with minable reserves associated with the upper Suntrana formation. The target coal reserves total approximately 83.3 million in-situ short tons consisting of the following: 6 seam – 5.1 million short tons; 5 seam – 7.5 million short tons; 4 seam - 41.4 million short tons; and 3 seam - 29.3 million short tons. Mining will commence with a boxcut of approximately 3.7 million total cubic yards in the southwestern most portion of the mining area as indicated on Plate D2-2, mine plan layout. Overburden and interburden removed from the boxcut will be stockpiled just south of the boxcut near the Jumbo Dome facilities. Coal mined in the boxcut will come primarily from the 3 seam and 4 seam, with a small amount of 5 seam mined where the outcrop is encountered. Removal of overburden and interburden material will be done mostly by truck/ shovel, with the possibility of assistance from the dragline. The initial boxcut material will be placed in the out-of-pit stockpile located south of the mining area; near the Jumbo Dome mine facilities (see Plate D2-1). The majority of the material to be placed in the permanent out-

of-pit spoil piles will come from the boxcut since no backfill area will be available at the time of excavation.

Upon completion of the boxcut, mining will continue with pits oriented generally on the dip of the formation, which is east-southeast to west-northwest. The majority of coal mined during the first permit term will come from the 3, 4, and 5 seams, with 6 seam mined where the outcrop is encountered. Overburden and interburden removed during mining will be backfilled first in the boxcut and then into the preceding pits.

During the initial permit term, approximately 15 million short tons of in-situ coal will be mined at an anticipated maximum annual rate of approximately 3.0 million short tons per year.

The method of mining chosen for proposed mine will utilize a combination of truck/shovel and dragline mining techniques. It is anticipated that the following mining equipment will be used in compliance with 11AAC 90.071 (1) each application must contain a description of the operations to be conducted during the life of the mine including, at a minimum the major equipment to be used.

- Dozers in the caterpillar size range of D8, D10, and D11
- Bucyrus Erie 1300w dragline
- Two drills for overburden/interburden and coal blasting operations
- Explosive prill truck
- Front-end loaders
- Two hydraulic excavators
- Haul trucks in the 95 and 150 ton size range
- Backhoes

The proposed mining activities are designed to maximize utilization and conservation of the coal resources while minimizing potential adverse environmental impacts. Dragline and truck /shovel stripping operations remove the overburden and interburden materials to a level just above the top of each coal seam, and dozers are used for final material removal and cleaning of the top of the each coal seam. This standard operating practice minimizes the loss of minable coal due to over-stripping. Drilling depths for overburden and interburden blasting are controlled so that the coal seams are not intercepted to further minimize the potential for coal loss.

Once the surface of the coal seam(s) is cleaned, the seam(s) will be drilled and blasted as described in section D4.0, blasting plan, to fragment the coal for loading. Depending on operating condition and equipment availability, a front-end loader, shovel, or backhoe may be used to load the coal into haulage trucks for transport to the coal-handling facility. The relationship of coal removal operations in the overall mining sequence is graphically illustrated by Figure D2-1, typical cross section for mining and reclamation. Since the run-of-mine coal quality meets existing customer requirements, processing is limited to crushing and sizing prior to shipment to coal customers.

### Statement of Compliance

The application is in compliance with regulations governing mine planning and conservation of coal resources (applicable portions of 11 AAC 90.071, 90.077, 90.083, 90.361 and 90.471).

#### **4.4.2 Blasting Plan**

The mining and reclamation plans call for blasting of overburden, interburden and coal to facilitate excavation and transport. A description of the blasting plan can be found in Part D section 4.0. Overburden and coal will be drilled by a dedicated track mounted rotary drill capable of drilling 12 to 14 inch holes. The drill pattern for overburden shots and coal shots is show on Part D figure D4-1 and D4-2 respectively. The distances between drill holes may vary based on specific site geology and desired effect. Drill depth will be based on the thickness of overburden or interburden or the thickness of the coal seam. The blast patterns for overburden and coal described in the application are schematic, meaning they are basic designs that will require adjustments to site-specific conditions. Day to day operation will vary in pattern dimensions and layout. This will have no practical significance on any regulatory aspect, if the planned controls of air blast and ground vibrations are implemented as described in the application.

The primary explosive used will be ANFO or an ANFO/Emulsion blend (Heavy ANFO); the amount is dictated by hole depth, diameter, and the pattern size. The explosives will be initiated by cast boosters, non-electric shock tube and blasting cap or detonating cord, and electric or electronic blasting caps. Shots will be designed and delayed as necessary to maximize breakage, control fly rock, minimize air blast, and regulate ground vibration.

There are no structures within one-half mile of the proposed permit boundary that would require a pre-blast survey under 11 AAC 90.373.

Blasting is scheduled in the application to occur between 6:00 a.m. until 9:00 p.m. or during the daylight hours (whichever is greater). This schedule is the same as what is authorized at the surface coal mining operation closer to Healy. Operationally, blasting generally occurs during the lunch hour or before the evening shift change to minimize the number of personnel working near the blasting area.

All activities associated with the transportation, storage and use or destruction of explosives within the permit area, must be conducted under the supervision of a blaster certified under 11 AAC 90.779.

The applicant has provided a sample public notice of its proposed blasting schedule (Exhibit D4-1).

### Statement of Compliance

With the included stipulation, the application is in compliance with regulations governing blasting. The application submittal follows blasting regulations with adequate plans and methods

to be in compliance with these regulations: 11.AAC.90 075, 11.AAC.90 377.

The following regulations have been adequately addressed: 11 AAC 90 371 (b), 11 AAC 90 373 and 375 in total, 11 AAC 90 379 (a), (b) and ((e) to (h)), 11 AAC 90 383, 11 AAC 90 381. In addition to the requirements found in 11 AAC 90.379(e) blasting will be designed to not produce an instantaneous pressure change greater than 2.7 pounds per square inch (psi) in the swim bladder of resident fish when present. This requirement will be waived or a higher value set upon prior written approve from the Alaska Department of Fish and Game.

#### **4.4.3 Disposal of Excess Spoils**

##### Findings

To provide a post-mining topography that promotes long-term stability of the backfill and allows for contemporaneous reclamation. There will be a permanent out-of-pit spoil pile. A stable disposal site was identified for permanent out-of-pit spoil disposal, which has more than adequate volume for the required spoil (see Plate D2-1).

The Jumbo Dome post-mining topography and permanent out-of-pit spoil has been designed to accommodate all of the overburden and interburden materials that will be removed from the entire mining area.

##### Permanent out-of-pit Spoil Pile

The permanent out-of-pit spoil pile will be located just outside the 3 Seam sub-crop to the south of the Jumbo Dome mine area. The design criteria specify a 4:1 slope with the maximum height of 150 feet. Prior to construction, the ground surface will be prepared by removing the vegetation and salvageable topsoil, exposing sandstone and /or sands and gravels. Gravels may be excavated below the topsoil prior to spoil placement for use in haul road construction. If seeps are encountered a French drain will be installed under the pile to keep any water from coming in contact with the spoils pile. Spoil placement will then begin with a truck/shovel method. After placement, the spoil will be regraded, topsoil replaced, and revegetation initiated to complete dump construction.

The preliminary stability analyses for the post mining topography indicate that UCM will not need to remove the 3 Seam footwall clay layer during the mining.

Construction of the lower spoil pile lifts over a free-draining material will enhance the ability of the pile to efficiently transfer subsurface water flows along or below the existing ground surface and toward Marguerite Creek. This will minimize seepage into the spoil pile and maintain a phreatic surface below the pile itself. Borehole logs 09JD11 and 09JD12 (see Appendix D5-1) show that all of material types represent good foundation materials for the construction of the permanent out-of-pit spoil pile.

Active efforts to control several important aspects of the permanent out-of-pit spoil pile

construction process will be employed. These include placing as thin a lift as practicable, not allowing for the concentration of ice-rich or saturated spoil material within focused areas, and enhancing compaction of placed material using dozer spreading techniques and allowing for layer consolidation, especially of the weaker finer-grained spoil material. These simple construction methods have been successfully employed by UCM for the Two Bull Ridge valley-fill spoils dump. Similarly for Jumbo Dome, it will be important to maintain a low phreatic surface while maximizing efforts for material compaction during spoil placement, thereby ensuring a factor of safety of 1.5 can be maintained for the pile. 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 south of Jumbo Dome area, 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.

#### Reclamation and Drainage Control

Surface water from above the permanent out-of-pit spoil pile will be diverted around the pile by channel CWD-2, as depicted on Plate D9-1, Drainage and Sediment Control plan. The fill area will be as free as possible of standing water. Completed dump lifts will be graded east toward channel OOPS-1 and OOPS-2 for self-drainage purposes.

As construction of the fill progresses, each lift will be set back from the previous lift, allowing contemporaneous grading of the slope as the dump is being built. After grading and terrace construction, any topsoil salvaged from the active mine area will be hauled and spread on the outslope of the fill.

#### Stability

A stability analysis was performed for both the in-pit backfill spoils and the permanent out-of-pit spoil pile structure. They have been designed for a long-term static factor of safety in excess of the 1.3 and 1.5 regulatory design requirement respectively. The results of the stability analysis are attached in Appendix D5-1.

#### Dump Construction Inspection

Construction of the spoil dumps will be inspected by a professional engineer or a qualified person under the engineer's direction. Inspections will be conducted at least quarterly during the construction. The primary product of the inspections will be confirmation that the vegetation mat and organic soil layer have been adequately removed from the foundation area prior to spoil placement. In addition, the engineer will periodically note lift heights as they are being placed and the general nature of the placed material. The engineer will also note the progress and status of rough regrading, topsoil placement on the reclaimed slope, reseeding operations, and construction of post- mining drainage controls.

### Statement of Compliance

The application is in compliance with regulations governing disposal of excess spoil (applicable portions of 11 AAC 90.095, 90.311-317, 90.391 and 90.481)

#### **4.4.4 Coal Processing Waste**

##### Findings

There are no plans to dispose of any coal processing waste other than mine spoils within proposed Jumbo Dome area. Analysis of overburden and interburden materials indicates that these materials are not potentially acid-forming, toxic-forming, or alkalinity-producing; therefore, no special handling or disposal measures are necessary.

##### Statement of Compliance

The application is in compliance with 11 AAC 90.395 coal mine waste, general requirements. The requirements for this finding do not apply.

#### **4.4.5 Disposal of non-coal waste**

##### Findings

There are no plans to dispose of any solid wastes or any materials other than mine spoils within the proposed Jumbo Dome mine area.

##### Statement of Compliance

The application is in compliance with 11 AAC 90.395 coal mine waste, general requirements. The requirements for this finding do not apply.

#### **4.4.6 Mine Facilities**

##### Findings

Ancillary facilities that are located outside the Jumbo Dome permit area, will be required for the surface mining operations. These facilities include the Jumbo Dome road corridor and the tipple/coal transfer facility and have been permitted under the surface mining coal program. The road corridor and the tipple/coal transfer facility are addressed under surface mining permit S-0605 and 01-83-796, respectively.

#### **4.4.7 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. During the first 5-year permit term, the reclamation cost for early closure will occur at the end of year 5. Table D10-2 provides

a breakdown of the reclamation cost estimate at the end of year 5 and includes direct, indirect, and subcontractor costs for an incremental bond. One table (see Application Table D10-2a) is the bond cost for the pond construction phase only and (See application Table 10-2b) the other one is the bond cost reflecting all operations for the first 5 year term. This cost estimate includes funds for removing the facilities and regrading, topsoiling and revegetating the disturbed area. Detailed breakdowns of the two cost estimates of the Incremental Reclamation Bond are shown as follows:

**Summary of Jumbo Dome Reclamation Bond Costs  
For Phase I Pond Construction**

**Direct Cost Items**

|                                |            |
|--------------------------------|------------|
| Earthmoving/Drain Construction | \$ 923,287 |
| Revegetation (seed bed prep)   | \$ 9,450   |
| Aerial Seeding & Fertilizing   | \$ 102,375 |
| Facility Removal               | \$ 231,500 |

**Subtotal Direct Costs** **\$ 1,266,612**

**Indirect Cost Items**

|                                    |                   |
|------------------------------------|-------------------|
| Mobilization & Demobilization 4.0% | \$ 50,664         |
| Contingency Allowance 5.0%         | \$ 63,331         |
| Engineering Redesign Fee 4.0%      | \$ 50,664         |
| Contractor Profit & Overhead 15.0% | \$ 189,992        |
| Reclamation Management Fee 4.0%    | \$ 50,664         |
| <b>Subtotal Indirect Costs</b>     | <b>\$ 405,316</b> |

**Grand Totals** **\$ 1,671,930**

**A Summary of UCM's Reclamation Bond Calculation for Phase II Mining Operations**

**Direct Cost Items**

|                                |              |
|--------------------------------|--------------|
| Earthmoving/Drain Construction | \$ 2,942,679 |
| Revegetation (seed bed prep)   | \$ 28,608    |
| Aerial Seeding & Fertilizing   | \$ 309,920   |
| Facility Removal               | \$ 231,500   |

**Subtotal Direct Costs** **\$ 3,512,707**

**Indirect Cost Items**

|                                    |           |                  |
|------------------------------------|-----------|------------------|
| Mobilization & Demobilization 4.0% | \$        | 140,508          |
| Contingency Allowance 5.0%         | \$        | 175,635          |
| Engineering Redesign Fee 4.0%      | \$        | 140,508          |
| Contractor Profit & Overhead 15.0% | \$        | 526,906          |
| Reclamation Management Fee 4.0%    | \$        | 140,508          |
| <b>Subtotal Indirect Costs</b>     | <b>\$</b> | <b>1,124,066</b> |

**Grand Totals** \$ 4, 636,780

The grand totals above have been rounded to the nearest 10 dollars.

After reviewing the proposed bond to this permit, the Division has determined that the proposed bond amount is sufficient to conduct the required reclamation for disturbances during the 5 year term of the Jumbo Dome Mine. In accordance with AS 27.21.160 and 11 AAC 90.201 (a), before a permit, major revision, or renewal may be issued, the applicant shall file a surety, collateral, escrow account bond, or a combination of these bonds.

UCM's request for bond release has to meet the requirement of 11 AAC 90.211 Bond Release Procedure and Criteria. The proposal in subsection 10.9.4 bond release methodology is used to outline the boundary of a bond release area and field work. The bond release methodology is also the same as final bond release under 11 AAC 90.211 for portions of Gold Run Pass.

In addition to the bond release methodology spelled out in Part D Section 10.9.4 of the Application the bond release must meet the requirements of 11 AAC 90.211 and AS 27.21.170.

#### **4.4.8 Special Categories of Mining**

##### Mountain Top Removal. 11 AAC 90.141

The Jumbo Dome Mine does not conform to the definition of mountain top removal, in which the mining activity removes entire seams through the upper portion of a mountain. Requirements for this category do not apply.

##### Steep Slope Mining 11 AAC 90.143

A "steep slope" is defined as any slope more than 20 degrees. Slopes in the Jumbo Dome Mine area range from 1 to 34 degrees. However, the steeper slopes are found primarily in the east and northwest parts of the area and have already been mined. In the remainder of the mine area, gentler slopes will be mined. Requirements for this category do not apply.

##### Combined Surface and Underground Mining 11 AAC 90.147

The Jumbo Dome Mine is exclusively a surface mine. Requirements for combined surface and

underground mining do not apply.

#### Operations Near Alluvial Valley Floors 11 AAC 90.149

Local agricultural activities are precluded by permafrost and other adverse environmental conditions, and temperatures within the area prevent soils from being classed as prime farm lands.

Since the Jumbo Dome Mine area is not considered "arid or semi arid," and does not have agricultural potential, the area is not considered to be in or adjacent to an alluvial valley floor. Additional information concerning alluvial valley floors is not required.

#### In-Situ Processing 11 AAC 90.151

The Jumbo Dome Mine does not include any of the activities identified as in-situ processing; hence requirements under this section do not apply.

#### Experimental Practices Mining 11 AAC 90.153

The Jumbo Dome Mine has proposed no activities that would be considered experimental practices. The requirements under this section do not apply.

#### Facilities Outside Permit Area 11 AAC 90.155

The only support facility directly related to the Jumbo Dome mine which is, in part, located outside of the permit area is a UCM power line which connects the main Lignite Creek Mine area with the Jumbo Dome Mine shop. Requirements for this power line are discussed under Part D of the application. Other UCM facilities (Gold Run Pass Mine, Poker Flats Mine, Two Bull Ridge Mine, Hoseanna Creek Haul Road, Jumbo Dome Mine Road, Poker Flats East and West Tipple) are covered under separate permits.

#### Important Farmland 11 AAC 90.157

Land within the permit boundary has been primarily used as wildlife habitat, and is to be returned to this use following mining. In addition, the SCS Exploratory Soil Survey of Alaska has determined the area to be unsuitable for cropland and rangeland for cattle and sheep. Hence, the area is not considered to be important farmland, therefore requirements under this section do not apply.

#### Auger Mining 11 AAC 90.125(a)(10)

No auger mining is proposed. The requirements for this finding do not apply.

## **4.5 Fish and Wildlife**

Fish and wildlife resources within the Hoseanna Creek basin were inventoried and assessed in separate studies in 1976 and 1984. The two studies were designed to evaluate the effects of development activities in the local area applicable to the proposed Jumbo Dome Mine project. The studies indicated that there are low numbers of small mammals, furbearers, large mammals, and low to moderate numbers of songbirds, waterfowl, and raptors.

Further studies of wetlands, vegetation and fish and wildlife habitat were conducted in the Jumbo Dome Mine permit area by WHPacific in 2007.

Habitat types in the project area include terrestrial uplands and wetlands as well as riverine habitats.

During the comment period the Alaska Department of Fish and Game (ADFG) and the U.S. Fish and Wildlife Service (USFWS) submitted comments and recommendations.

### **4.5.1 Wildlife Resources**

Fish and Wildlife information pertaining to the Jumbo Dome Mine area is discussed in Part C, Chapter IX of the application. Bird and mammal species checklists are provided in Part C Table CIX-1 and Table CIX-2 of Chapter IX. The status of threatened and endangered fish and wildlife species is documented in Part C Chapter IX, Section 5.0.

Common wildlife species present in the area were determined using species lists for Denali National Park, the DNR Preliminary Best Interest Finding for the Healy Basin, the ADFG Wildlife Notebook Series and on-site observations.

Wildlife evidence was documented thorough direct observations, vegetation browse indicators, tracks, scats, trails and similar wildlife signs.

#### **Issues and potential impacts**

ADFG recommended that Section D-11, Fish and Wildlife Protection Plan, be updated and expanded to include a variety of wildlife management practices.

Per USFWS recommendations UCM submitted an Eagle Nest Survey Report prepared by an independent contractor. The survey found no bald or golden eagle nests within 0.5 miles of the proposed centerline of the Jumbo Dome Mine haul road. USFWS reiterated its recommendation that an eagle nest survey be conducted within 5 miles of the outer boundary of the mine footprint during the spring of 2012.

The USFWS also recommended that Section D-11 include consideration to protect nesting migratory birds during land clearing for mine development and operations. The Migratory Bird Act prohibits the willful killing or harassment of migratory birds. The spring and summer

breeding season is generally May 2 through July 15th. The USFWS recommends that initial clearing, excavation and fill activities for the project be completed before May 1. It was also recommended that to avoid excessive erosion areas greater than 5 acres not be cleared more than one month prior to initiating work.

Plants and animal species listed under the Endangered Species Act are not expected in the project area. Development of the Jumbo Dome Mine is not expected to impact any listed species or critical habitat in or outside of the project area. Surveys of the project area did not identify any bald or golden eagle nests. Typical nesting and foraging for bald eagles is limited or absent on site. Golden eagles have the potential to occur in the project area.

### Compliance with ASCMCRA and Performance Standards

The Fish and Wildlife Protection Plan is in Part D, Section 11.0 of the application. ASCMCRA requires that each application include a plan to minimize or prevent disturbance and adverse impact to fish and wildlife resources.

### Subsistence and personal use harvest of wildlife

Upland habitat in the area supports moose, bear, furbearers and songbirds. Moose are the most important species harvested for subsistence and sport hunting.

### Wildlife Protection Plan

The goal of the Fish and Wildlife protection plan is to introduce and encourage habitat diversity through a variety of management techniques. These techniques include sediment control, topographic controls, and irregularity of vegetation and interspersions of micro habitats. The reclamation plan includes the planting of trees and shrubs to encourage greater use by a more diverse group of species.

There are no threatened, endangered or other sensitive species known to occur in the proposed mine area.

With the following stipulations the application is in compliance with Sections 11 AAC 90.057, 11 AAC 90.081, 11 AAC 90.125(a)(6), 11 AAC 90.423, 11 AAC 90.457.

- 1 An eagle nest survey must be conducted within 5 miles of the outer boundary of the mine footprint during the spring of 2012.
- 2 To protect nesting migratory birds during land clearing for mine development and operations, the initial clearing, excavation and fill activities for the project will be completed before May 1.

### Findings

With the above stipulations, the application is in compliance with Sections 11 AAC 90.057, 11 AAC 90.081, 11 AAC 90.125(a)(6), 11 AAC 90.423, 11 AAC 90.457.

## **4.5.2 Fisheries Resources**

### Resource information

Fish and Wildlife information pertaining to the Jumbo Dome Mine area is discussed in Part C, Chapter IX of the application. The status of threatened and endangered fish and wildlife species is documented in Chapter IX, Section 5.0.

### Issues and potential impacts

The ADFG determined that the largest potential effects of the Jumbo Dome Mine project would be on year-round fish habitat and passage within Marguerite Creek through the maintenance of adequate surface and subsurface flows.

ADFG has the following concerns regarding possible effects on fish and fish habitat from the Jumbo Dome haul road and mine. Effects could include both fish passage and water quality and quantity:

- Surface flows toward the mine area from upslope portions of Jumbo Dome will capture clean water by a diversion system and route it to Marguerite Creek downstream of the haul road crossing. If this system is completely effective at bypassing surface flows around the mine the net effect on Marguerite Creek should be neutral, however the distribution of flows within the project reach will likely be altered.
- Under the mine design all precipitation and subsurface flows entering the mine is impounded with no planned surface discharge. The coals seams are primary routes for groundwater movement in the area. Marguerite Creek intersects 4 Seam and 3 Seam. Dewatering these seams through pit development will likely reduce water levels within Marguerite Creek, which will directly affect fish habitat and potentially affect fish passage.
- There is a lack of quantification of expected base flow reduction in Marguerite Creek.
- To assure substrate stability and maintain fish passage the hybrid culvert design on the Jumbo Dome Haul Road crossing of Marguerite Creek will require regular monitoring and maintenance.
- To maintain water quality and prevent turbid flows and eroded materials from reaching Marguerite Creek UCM will need to apply best management practices.
- The design of the clean surface water diversion system is unclear.

ADFG also had the following concerns:

- The reasons for permanently stockpiling the initial boxcut overburden and interburden area are unclear.
- A number of mine features are designated as temporary however they would be in place for more than one permit term. Any features that will be used for more than one permit term are encouraged to be designed and built as permanent.

- August 1 is a better deadline for the last day of seeding rather than August 15. An August 1st date provides better establishment of seedlings and better overwinter erosion resistance.
- ADFG recommended that Section D-11, Fish and Wildlife Protection Plan, be updated and expanded to include a variety of wildlife management practices.

#### Compliance with ASCMCRA and Performance Standards

The Fish and Wildlife Protection Plan is in Part D, Section 11.0 of the application. ASCMCRA requires that each application include a plan to minimize or prevent disturbance and adverse impact to fish and wildlife resources.

#### Fish and Aquatic Resources

Fish species identified as potentially residing in Marguerite and Emma Creeks include Arctic Grayling, Round Whitefish, Dolly Varden and Slimy Sculpin. Fish sampling efforts yielded an extensive distribution of Arctic Grayling and Slimy Sculpin. Only one White Fish and no Dolly Varden were found.

#### Subsistence and Personal Use of Harvest of Fish

There is a residential and spawning population of arctic grayling in Marguerite Creek. According to ADFG staff, in a personal communication, Arctic Grayling may spawn in the upper reaches of Marguerite Creek above the active mine area.

#### Reclamation plan

The reclamation plans for the Jumbo Dome Mine area are designed to prevent or minimize off-site hydrologic impacts and comply with the applicable provisions of Federal and State regulations. The reclamation plan includes measures for the protection of hydrologic balance and water quality. The plan reflects site-specific surface and groundwater conditions. Despite the application of control and mitigation measures certain hydrologic impacts may result from mining-related disturbance.

Marguerite Creek is the one surface drainage that will be affected by mining operations. All of the tributary creeks to Marguerite Creek are ephemeral in their upper reaches, becoming perennial near their confluence with Marguerite Creek. There will be no net change in drainage basin area and no change to the grade of the creek.

Most of the tributary drainages to Marguerite Creek will be mined out during mining but will be reestablished within the reclaimed mining area.

#### Fish Protection Plan

Fish protection strategies as required by Alaska statute will be met by designing the crossing of Marguerite Creek to meet all ADFG requirements.

For blasting the OSM setback requirements are more stringent than ADFG setback requirements and therefore will exceed ADFG requirements for blasting.

With the following stipulations the application is in compliance with Sections 11 AAC 90.057, 11 AAC 90.081, 11 AAC 90.125(a)(6), 11 AAC 90.423, 11 AAC 90.457.

1. To maximize infiltration of intercepted surface and subsurface flows into seams 3 and 4 so the seams can continue their role in groundwater feed to Marguerite Creek UCM will include new design measures. Measures could include burrito drains, half-pipe flumes, and infiltration galleries.

## Findings

The application is in compliance with Sections 11 AAC 90.057, 11 AAC 90.081, 11 AAC 90.125(a)(6), 11 AAC 90.423, 11 AAC 90.457.

## **4.6: Hydrology**

### **4.6.1 Geology and Hydrogeology**

Information concerning the geology and hydrogeology for the proposed mine site is presented in Part C Chapter CII Geology and Part C Chapter CIV Hydrogeology. The following is a brief description of the material presented by the applicant regarding the geology of the Jumbo Dome Project area.

The geology section contains the regional overview of the geology of the Jumbo Dome Area, and provides a description of the geologic setting and the regional stratigraphy. The stratigraphy and structure of the permit area is also addressed.

Part C Chapter III Overburden provides information on overburden and interburden rock types. This chapter describes the detailed geologic and geochemical studies of the overburden and interburden, from the surface of the permit area to the lowermost bed proposed for mining. This chapter also addresses the lithology, and acid and toxic forming potential of the overburden and interburden. It presents findings and conclusions on acid and toxic forming chemicals.

Details of the regional and site hydrogeology are found in the hydrogeology chapter of the baseline studies. This chapter provides information on the Regional Hydrogeology including details on site investigations, monitoring, and an analysis of the site hydrogeology. The primary water bearing units within the permit boundary and surrounding area are the coal seams. They typically have hydraulic conductivity ranging from 0.0006 ft/min to 0.0015 ft/min. This rate is most likely controlled by the amount of fracturing in the coal seams. The fine to coarse grained sandstones found in the overburden and interburden surrounding the coal seams have a lower hydraulic conductivity (0.00001 to 0.000001 ft/min) and acts as an aquitard. Below the coal seams there is a claystone/siltstone layer that also acts as an aquitard. The sandstone unit, while

being a water bearing unit, they are not the source of seeps and springs. Direction of flow within the water bearing unit is controlled by folds and faults in the area. Within the project area, groundwater flow is generally to the northwest with a portion of the flow entering the surface water system throughout crops of coal in Marguerite Creek. Recharge within the project area is primarily by infiltration of annual precipitation including snowmelt. Most of the recharge occurs along outcrops of coal east of the project area along the flanks of Jumbo Dome.

#### **4.6.2 Overburden and Interburden Chemistry**

The coal was formed in a fluvial environment, rather than a marine environment, which explains the low sulfur concentrations. The surrounding stratigraphy is also of continental origins. A majority of the coal and surrounding stratigraphy appear to have high Acid-Base Potentials (ABP), which is a quantification of the buffering capacity of the sediment. An ABP of greater than -5 is considered to have a low acid generating potential. Based on the information provided, it appears that the potential for the generation of acidic water during mining is low. The coal and surrounding stratigraphy also appears to have low metal concentrations.

A review of the analyses of the overburden and interburden materials within the proposed mine area indicates that this material is generally not potentially acid-forming, toxic-forming, or alkalinity producing. Only minor textural and chemical issues were noted. In all instances acidity or toxicity would be addressed through normal inter/overburden mixing in the mining process.

#### **4.6.3 Probable Hydrologic Consequences**

The probable hydrologic consequences are described in Part D, Section 12.13 “Hydrologic Consequences of the Operation” of the permit application. They are based on the present knowledge of the permit area and adjacent area and are detailed in the permit application and in other water information sources.

The Surface water system is described in Part C, Chapter V Surface Water Hydrology of the application and is summarized in Section 2.6 of this document. The major surface water feature in the Jumbo Dome Mine area is the drainage basin of Marguerite Creek.

Information pertaining to the groundwater system in and around the proposed Jumbo Dome Mine area is described in Part C, Chapter IV Hydrogeology and Chapter VI Surface and Groundwater Rights of the application and are summarized in Section 2.7. Within the proposed mining area there are a number of seeps and springs. These generally reflect local groundwater discharge and are associated with coal outcrops.

The proposed mining and reclamation operations will result in temporary localized surface and groundwater impacts. These impacts will generally be controlled, minimized, or mitigated by the operational and reclamation measures discussed in the application.

Section 12.12.1 describes the potential impacts to the surface water resources within the project area. These potential impacts include:

- Direct disturbance to the associated contributing (tributary) drainage areas of Marguerite Creek.
- Elimination of a number of existing seeps and springs through both direct disturbance and through loss or reduction of flow due to drawdowns associated with pit excavation and drainage.
- Reductions in baseflows to Marguerite Creek due to loss or reduction of spring and seep discharge, which may be offset by the clean groundwater diversion that will intercept flow from up-gradient 3 and 4 coal seams and route it through the pit to connect with the down-gradient coal seams.
- Changes in infiltration and runoff characteristics for mine disturbance areas.
- If a surface water discharge permit is obtained, there may be minor changes in surface water chemistry resulting from effluent limitations established under APDES permitting requirements.

Section 12.12.1 describes the potential impacts to the groundwater resources within the project area. These potential impacts include:

- Localized dewatering of aquifer units as a result of excavation and consequent pit drainage.
- Alteration of recharge, storage, and discharge characteristics and relationships.
- Localized changes in groundwater levels.
- Minor changes in groundwater chemistry.

The ponds, as designed, should be adequate to contain up to a 100 year six hour precipitation event.

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 of the backfill has minimal impact.

Groundwater 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 groundwater integrity should be maintained. No significant long-term adverse effects on the hydrologic regime would occur from the proposed mine development.

#### **4.6.4 Cumulative Hydrologic Impact Assessment**

The ASCMCRA 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."

#### **4.6.5 Cumulative Impact Area**

The only other coal mining operations in the area are Usibelli's operations in the Lignite Creek Watershed and include Poker Flats including Runaway Ridge and Revision 'A', Gold Run Pass, Gold Run Pass Phase-5, Two Bull Ridge and the Jumbo Dome Road Corridor. Within the Marguerite Creek Watershed there are no other active or proposed surface coal mining operations. The haul road associated with the Jumbo Dome Road Corridor crosses into the Marguerite Creek watershed from the Lignite Creek Watershed and is designed to cross Marguerite Creek above the Proposed Jumbo Dome mining operations. Downstream of the proposed surface mining operations there are two water right applications filed with the state located on Eva Creek and California Creek (see Part C Chapter CVI for more information).

For purposes of the surface water analysis, the cumulative impact area includes all surface waters on the east side of Marguerite Creek in the project area and the main stem of Marguerite Creek above the mining area downstream of the cumulative impact area extending to the junction of Marguerite Creek with California Creek. No impacts are expected on the west side of Marguerite Creek from the proposed mining operation and minimal impacts are associated with the construction of the Jumbo Dome Haul road.

#### **4.6.6 Surface and Groundwater Use in the Cumulative Impact Area**

As stated in the previous section there are no other active or proposed surface coal mining operations within the cumulative impact area other than the proposed Jumbo Dome Mine. Other users for surface water in the cumulative impact area are placer mining operations associated with LAS 25921. The primary use of surface and groundwater in the cumulative impact area is surface water which will be used for watering roads and irrigation of reclaimed areas. Water associated with the placer operations is primarily used for washing and screening as part of the gold recovery process. Groundwater within the project area will be pumped out of the coal seams and stored in the sediment ponds where it will also be used for watering roads and irrigation of reclaimed areas. There are no other known users of groundwater within the cumulative impact area other than the applicant.

#### **4.6.7 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. There is a potential to see increases in total dissolved solids ranging from 20 to 1,200 milligrams per liter (mg/L) in area surface waters due to exposure, weathering, and leaching of overburden and interburden materials in the backfilled areas. Another concern is possible temporary changes in total suspended sediment concentrations because of increased runoff and erosion potential associated with exposed and unvegetated topsoil, overburden, and interburden sedimentary rock.

##### Surface Water Quantity

The hydrologic concerns for surface water quantity are the short and long term effects of mining within the Marguerite Creek Watershed on the quantity and timing of surface water flow, and hence availability, of surface water. The project will directly affect some of the ephemeral streams on the east side of Marguerite Creek as the mine progresses through these drainages. Mining operations will progressively mine through existing seeps and springs associated with coal outcrops in the project area. Modeling also predicts minor changes in stream base flow for Marguerite Creek adjacent to the project area. Mining will also temporarily increase infiltration within the disturbance area.

##### Groundwater Quality

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

##### Groundwater Quantity

Hydrologic concerns for groundwater quantity are analogous to that of surface water quantity concerns, dealing with timing and availability. Dewatering and mining will result in localized changes in groundwater quantity and the depth to groundwater within the project area. As stated above, modeling predicts minor changes in stream base flow for Marguerite Creek adjacent to the project area. This base flow is sourced from coal seams cropping out in Marguerite Creek. Locally there may be areas of groundwater reversal as a result of dewatering.

#### **4.6.8 Cumulative Hydrologic Impacts**

The proposed Jumbo dome project area is approximately 11.1 percent of the Marguerite Creek drainage basin. During the first permit term approximately 4.8 percent of the Marguerite Creek drainage basin will be impacted will be impacted by mining. Of the 476.8 acres to be disturbed, 131 acres (1.3 percent) of the total watershed will have had been graded and topsoil replaced by the end of the permit term. At the end of each future permit term, the entire area of the previous

permit terms and approximately 30 percent of the current permit term will be graded and have topsoil replaced. The remainder of the area will consist of the grubbed areas, the active pit, haul roads active spoil areas and areas that have been rough graded.

### Surface Water Quality

Existing water quality data from the Marguerite Creek watershed indicate that surface waters are of high quality and generally meet State and Federal standards for water quality. Seven metals had at least one sample that had concentrations higher than the Alaska Water Quality Standards. Those metals are Aluminum, Cadmium, Copper, Iron, Lead, Manganese, and Zinc. Surface water quality from runoff should not be affected since runoff from the disturbed areas will be completely retained within the disturbance area and not discharged to the existing surface water.

The cumulative impact analysis of surface coal mining operation in Lignite Creek provides an essential analog for understanding potential impact and making a material damage assessment for the Jumbo Dome Project. The proposed mining at Jumbo Dome and the mining at Two Bull Ridge and Poker Flat mines all source coals from the same coal seams in the Suntrana formation. The chemical signature for the overburden, interburden and coals are similar at both locations. The historic and recent water chemistry studies of Lignite 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.

A review of the cumulative impacts associated with the Two Bull Ridge permit, which mines the same coal intervals as proposed for Jumbo Dome Mine found that mining has not significantly increased the dissolved solid content of Hoseanna Creek under summer baseflow conditions.

Additional review of the cumulative impacts associated with mining in the Lignite Creek watershed 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 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 # 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% 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 Jumbo Dome Mine. 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 # 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 # 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 # 1. Over this 4 year period no increasing trends in suspended sediment concentrations was observed at Bridge # 1.

Surface water quality should not be adversely affected since runoff from disturbed areas will be collected in the sedimentation ponds. A majority of this water will be used for dust control and irrigation.

If for some reason water was to bypass sediment ponds, the biggest impact would be a temporary increase in total suspended solids. Overall water chemistry would remain unchanged.

#### Surface Water Quantity

Typical recharge and stream flow in the region is generated from precipitation and snowmelt. Flows vary seasonally with peak flows occurring in the spring and early summer due to breakup and snowmelt and in the later summer early fall due to rain storms.

Over the 27 year mine life, mining operations will disturb approximately 24,542 feet of ephemeral streams. The reclamation plan calls for the approximately 22,000 feet of post mining channels to replace those lost during mining. During most of the mine life, all runoff from the disturbed areas will report to the sediment ponds and not discharge to Marguerite Creek. There are also numerous seeps and springs that will be affected during mining. These are shown in Part C Chapter V. It is expected that seeps removed during mining will not be restored. Nor in the short term are seeps expected to form in the reclaimed backfill. Based on experience at the Gold Run Pass Mine, where seeps have re-established in the back fill, minor seeps may form in the backfill in the long term (+15 years) in topographic lows. Contribution to flows within Marguerite Creek is estimated to be no greater than 15% of this volume. Clean water diversion will intercept a larger percentage of this volume and convey it to the upper reaches of Marguerite Creek above mining. The remainder of this water will be directed to one of the four sediment ponds. As stated in the project proposal, these ponds are designed to contain the total volume of a 100 year six hour precipitation event. This design greatly exceeds the 10 year 24 hour precipitation event as required in 11 AAC 90.331. The total volume for all ponds is approximately 917 acre-ft (~298,800,000 gallons). Based on a review of the inputs used to derive the runoff calculations and the areas that will be reporting to the ponds, these calculations are conservative and the actual additional volume that can be stored in the pit alone is larger than the 100 year six hour precipitation event. Runoff from larger events will therefor be diverted to the active mine pit.

To provide for additional capacity to deal with mine runoff the project proposes to use land application if dust abatement, irrigation, and evaporation are not enough to deal with storm water. Field studies were conducted during the summer of 2011 to determine the actual infiltration rate in the land application site located within the disturbance boundary. The results indicate that the proposed site may be used for land application. At the direction of the Division, Usibelli inserted provisions that set when the land application site will be developed. The provision states that if the pond system does not have 60 acre-ft of capacity by November 1 of any year the land application site will be developed and ready for use by April the following year. In addition, DNR will stipulate that Usibelli will apply for a land application permit from the Alaska Department of Environmental Conservation within 60 days of starting surface mining operations under 11 AAC 90.

Given these values the expected impact on surface water quantity during mining should be minimal. After cessation of mining and reclamation of impacted areas, expected reduction in flows from Jumbo Dome affected streams are anticipated to be non-measurable, and also the long term impact on Marguerite Creek will be non-measurable.

### Groundwater Quality

The coal seams are the primary water-bearing units in the Jumbo Dome permit area. Water quality of groundwater in the permit area is generally not elevated above, and for most constituents, meets state and federal water quality standards with exceedances in Iron, Manganese, and Copper. Elevated levels of zinc were also measured but are most likely a result of contamination during the drilling process and have been decreasing. Groundwater can be characterized as neutral to mildly acidic, with pH values ranging from 6.3 to 7.8 with water temperatures ranging from 3.4 degrees to 8.2 degrees C.

The main consequence of mining on groundwater will be an increase in the dissolved constituents due to increased surface area contact with spoil material with groundwater in the permit area. The increase in dissolved solids including some increases in iron, manganese, and other trace elements, which should not significantly increase these parameters in Marguerite Creek. These changes would constitute an even smaller change in the waters of California Creek.

Cumulative impacts to groundwater 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 groundwater within the unnamed drainage.

### Groundwater Quantity

Groundwater flow in the Jumbo Dome area is to the north towards an area with no known inhabitants. Potential impacts from mining are small due to the lack of any documented or recognized user of the groundwater. Generally, as found in other areas, and in the Hoseanna

Creek basin, groundwater 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 information from the baseline monitoring program (Usibelli Coal Mine, 2011), multiple piezometers and monitoring wells have been placed within the active seams in the Jumbo Dome area such that there is monitoring beyond the extent of the 27 year mining limits.

Mining within the Jumbo Dome area will result in groundwater drawdowns within the coal seam aquifers as stored water drains from the system. The lateral limit of this drawdown is not expected to exceed 2,000 feet. After mining, coal seam aquifers adjacent to the mined areas are expected to recharge to a level similar to the premining conditions.

After mining, the level of groundwater within the reclaimed backfill is expected to approximate a lower elevation equivalent of the premining potentiometric surface for the 3 Seam aquifer.

To minimize long term impacts to Marguerite Creek, Usibelli will install groundwater diversion within the backfilled spoil. The purpose of this diversion is to convey groundwater located in the coal seams from above mining to the coal seams below mining. In addition, the effects on the coal seam aquifer will be further mitigated by limited infiltration from the sediment ponds into the coal seams.

Regional groundwater flow regimes will not be affected by the mining operations, although some localized effects may be seen. Based on the information presented, no significant and long-term effects to the groundwater system are expected from the mining operations.

#### **4.6.9 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.

A cumulative hydrologic impact assessment of all anticipated mining on the hydrologic balance in the general area of the Jumbo Dome Mine has been made. Since there is no other active mining operation, the conclusions for the Probable Hydrologic Consequences are the same as those for the Cumulative Hydrologic Consequences. The division finds that no permanent material damage to surface water quality is expected because State water quality standards are not expected to be exceeded for the existing uses 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 Marguerite Creek watershed. No long-term material damage to groundwater quality will occur that will preclude its use by existing water users within the Cumulative Impact Area. No long-term material damage to groundwater quantity will occur based on the information to date that would preclude any existing water users from obtaining water in the future.

#### **4.6.10 Monitoring of Surface and Groundwater Quality and Quantity**

In Part D Section 12.9 and Part D Section 12.10, Usibelli has proposed a monitoring plan for surface and groundwater quality and quantity. For surface water quality and quantity, Usibelli plans to collect data using the same parameters used in developing the baseline data (Table D12-1 of the application). The plan is to collect samples at two locations; the first location is upstream of mining related activities; the second is below mining, above the confluence of Marguerite Creek with Emma Creek. The proposal is to monitor surface water locations on a tri-annual basis. To monitor the impacts to the groundwater system, Usibelli is proposing to monitor groundwater quality and quantity at two above mining locations and four below mining locations. Usibelli plans to use the same parameters used when developing the baseline data (Table D12-2 of the application). In addition, two monitoring wells will be placed in the backfilled spoils to measure resaturation of the spoils and water quality. The proposal calls for monitoring water levels on an annual basis and water quality on a tri-annual basis.

The division finds that the location for surface and groundwater monitoring is adequate to monitor potential impacts to the hydrologic balance. The division finds that the proposed monitoring frequency is not adequate to detect changes to the hydrologic balance in a timely fashion. The permit will stipulate changes to the monitoring frequency for surface and groundwater. Monitoring for surface water quality and quantity will be monitored on at least a bi-monthly interval (every other month). Monitoring locations for groundwater quality will be sampled annually along with the water level measurements.

#### **References**

- 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., 2010, Jumbo Dome Mine surface coal mining permit application. Two volumes submitted to Alaska Department of Natural Resources, Division of Mining, Land and Water, November 2011.

## **4.7 Soils, Overburden, And Vegetation**

### **4.7.1 Overburden Chemistry**

The overburden and interburden assessment information is found in Part C Chapter III of the permit application. The geologic description is found in Part C Chapter II of the permit application. As required by 11AAC 90.045 b(4), this chapter contains the chemical analyses of each stratum within the overburden and each stratum immediately below the lowest coal seam to be mined (Table CIII-4 and 3-6, pages CIII-9). Physical properties such as texture and saturation percentage were determined on each stratum as well. 11AAC 90.045 b(2) requires that the logs of drill holes show lithologic characteristics and thicknesses of each stratum and this is found in Part C Chapter II. Based on the logs of the drill holes and other existing data, the geological setting and lithologic units are described on pages CII-8. Analysis of the coal seam, required by 11AAC 90.045 b(5), is located in Appendix CIII-2. The objective of the overburden characterization project was to define the physical and chemical parameters of the overburden units so that successful reclamation plans could be developed. Emphasis was placed on the identification of acid-forming and toxic-forming strata. Findings for plant root zone suitability, vegetative forage quality and backfill water quality were conducted and are discussed on pages CIII-3. The overburden screening criteria are listed on Table CIII-5.

The geology of the permit area was described down to and including the stratum immediately below the lowest coal seam to be mined. Logical overburden units were defined and characterized based upon the anticipated mining operation plans. Each unit was screened based upon its geochemical characteristics. The purpose was to assess each unit for its acid and/or toxic forming materials and its suitability for reclamation.

Values for electrical conductivity, boron, and nitrates were well below levels suspected of producing adverse environmental impacts. No acid and or toxic forming material was identified within the overburden. The high neutralization capacity of the overburden/interburden materials will be more than sufficient to neutralize any acid producing material if encountered. Experience from other mines within this same geologic formation has shown that there is little to no potential for acid or toxic forming material. Sulfur analysis for the coal groups within the overburden revealed pyritic sulfur is present in relatively low percentages (~10%) compared to the organic sulfur fraction (~84%). Therefore acid production potential is extremely low for the carbonaceous materials within the Jumbo Dome project area.

#### Statement of Compliance

We find that the application is in compliance with the requirements of the sections entitled Geology and Overburden Chemistry without stipulation.

### **4.7.2 Soil Resources**

#### **Description of the Data**

Soil resource information is found in Part C, Chapter X of the application. Part C information was prepared by Dr. Chien-Lu Ping of Arctic Soils, LLC; Palmer, AK. Soil information is also found in Part D, Section 3.0 and Section 10.0.

As required by 11 AAC 90.059 the application contains (1) a map delineating different soils (Soil Survey Map, Exhibit CX-1), (2) soil identification (Table CX-1), (3) soil description (Table CX-1), (4) soil productivity (Section 3.4). Soil map units were established based on soils, vegetation and landforms and by ground truthing with pit excavations. Soil laboratory data is found in Table CX-2.

Topsoil suitability criteria as required by 11 AAC 90.311 and 11 AAC 90.317, is presented in Section 3.4, Criteria For Suitability and in Table CX-4.

A soil resources survey of the Jumbo Dome Mine coal lease was conducted in 2007. The survey was conducted to determine topsoil availability, assess soil resources for post-mining reclamation, determine hydric soils distribution and also for general planning purposes. Most mine soils south of the Jumbo Dome area have a cryic soil temperature regime. The Jumbo Dome soils are cooler because they are at a higher elevation and have thicker vegetation; the average mean annual soil temperature is estimated to be less than 0°F. The soil temperature regime therefore is subgelic.

The soil map units are based on 60 excavated soil pits. The map units are grouped together under Miscellaneous Land Types, Poorly Drained Bottomland Soils, Well Drained Upland Sandy Soils, Organic and Poorly Drained Mineral Soils and Well Drained Upland Loamy Soils,

#### Principal Issues Evaluated During the Technical Adequacy Review

##### Issue #1 Suitability Criteria for Topsoil - Gravel Content

Generally soil is suitable for topsoil when the A and B horizons are mixed with organic layers. Some of the Jumbo Dome mine area substratum, the C or 2C horizons, are derived from river outwash or floods which contains varying amount of rock fragments. The soils formed in colluviums from Jumbo Dome are high in rock fragments. When gravel exceeds 35% by volume the materials are not suitable for stockpiling and reclamation.

##### Issue #2 Topsoil Salvage Depth

The topsoil salvage depth is defined as the depth at which the soil material reaches a contrasting layer such as very gravelly layers or to bedrock or the coal seam. The maximum salvage depth and limitations of topsoil in the Jumbo Dome mine varies in the different soil mapping units but generally ranges from 10" to 40." Under 11 AAC 90.083 and 11 AAC 90.311 the applicant is required to submit a plan for topsoil removal, storage and redistribution. After vegetation removal topsoil will either be stockpiled for future reclamation use or directly replaced on backfilled and regraded areas. Temporary topsoil stockpiles, which are typically stockpiled for less than a year or two, will be reseeded in a timely manner to prevent erosion. To the maximum extent practicable topsoil that has been stored the longest will be used first.

### Issue #3 Wetlands

Approximately 160.4 acres of the 1,101.2 acres of the mining impact area are identified as wetlands or other waters. The remaining 940.8 acres of the impact area are identified as uplands. Wetland topsoil may be segregated from other topsoil piles in order to enhance revegetation of wetlands. Wetlands are subject to the jurisdiction of the U.S. Army Corps of Engineers (USACE) under the Clean Water Act. The USACE is reviewing an application to authorize the wetlands removal under Nationwide Permit-21, Surface Coal Mining Activities. All wetlands disturbed as part of this project will be compensated for under the Clean Water Act.

### Issue #4 Reclamation and Fertilizer

Following topsoil replacement all mine disturbance areas will be revegetated by seeding with a mixture of native and adaptive introduced species and by planting a variety of wood plant species native to the area. The two objectives of revegetation are to quickly establish a ground cover to control erosion and to encourage the natural reinvasion of native vegetation. Limiting factors to the reestablishment of native species are competition from grass and non native species and the use of too much fertilizer, which favors the growth of non native plant species. Reseeded areas will be fertilized at the time of seeding and in years 3 and 5. Fertilizer application will be at a rate of 450 pounds of 20-20-10 fertilizer per acre. Adjustments to the fertilizer schedule will be made based on annual monitoring to encourage the growth of native plant species.

The information provided in the Chapter X Soil Resources and Sections 3.0 and 10.0, Part D, is sufficient and adequate to discuss the suitability of the soil for revegetation

### Statement of Compliance

No issues regarding the soil resources as it relates to requirements of 11 AAC 90.059, 11 AAC 90.083, 11 AAC 90.311 – 90.317 were identified.

We find that the application is in compliance with the requirements of 11 AAC 90.059, 11 AAC 90.083, 11 AAC 90.311 – 90.317.

### **4.7.3 Vegetation**

Description of the vegetation of the site is found in Part C Chapter VIII. Pre-mining wetland and vegetation resource information for the area is derived from studies prepared for Usibelli Coal Mine by WHPacific, Inc. in 2007 and HDR Alaska, Inc. in 2010. Vegetation mapping and classification was performed using a combination of ground reconnaissance, air photo interpretation, and sampling of existing vegetative types and communities. Air photo interpretation was compared to field-collected vegetation data and when it differed revised to match actual on-ground conditions. Data was incorporated into a GIS database. The Jumbo Dome Mine baseline vegetation study area encompasses 4,798 acres. Approximately 2,926 acres are forested habitats, 1,755 acres are shrub habitat, 74 acres are herbaceous habitat and 40 acres

are rock outcrops. The study area includes the footprint for the entire life of the mine.

#### Statement of Compliance

The mapping of the vegetation of the proposed project area and the description of the identified vegetation types satisfies the requirement of 11 AAC 90.055 for these items.

#### **4.7.4 Revegetation plan**

The revegetation plan for Jumbo Dome Mine area (Part D, Section 10.8) is primarily intended to create diverse plant communities that are capable of supporting the post-mining land use of wildlife habitat. The secondary function is to establish ground cover to control erosion. Both grasses and shrubs will be planted as part of the revegetation plan. To establish ground cover, the proposed seed mix is dominated by native grasses. The application of fertilizer is planned after the initial seeding, and years three, and five after planting. The Division has been in discussions with the Plant Material Center and Dr. Dot Helm, to develop ways to maximize the rate at which native species re-establish themselves on disturbed areas. The biggest limiting factor for the re-establishment of native species is competition from grass and non-native species and the use of fertilizer which favors the growth of non-native plant species.

The company in its proposed revegetation plan acknowledged the need to reduce competition to establish adequate woody vegetation and encourage native plant communities within the reclaimed areas. The plan as presented, balances the need to establish ground cover and allow for natural plant communities to be reestablished.

#### Statement of Compliance

No issues regarding the revegetation plan as it relates to requirements of 11 AAC 90.083 were identified. We find that the application is in compliance with the requirements of 11 AAC 90.083.

#### **4.7.5 Determination of Revegetation Success**

Determination of revegetation success will be made, as stated in Part D Section 10.9.3, on the basis of performance standards - 1) percent ground cover, 2) woody plant stem density, and 3) diversity. These performance standards are being set through use of "technical standards" (i.e., levels of each parameter as advised by consultants knowledgeable about local conditions and have proven appropriate at other mining areas within the local area).

A ground cover standard of 70 percent ground cover has been proposed to minimize erosion while allowing natural vegetation to be established. Ground cover includes live vegetation, dead vegetative mat, incidental woody debris, stones or gravel and litter in quantities that will resist erosion. If appropriate and on a case by case basis, the Division of Mining, Land and Water may consider a lower ground cover standard for areas with low erosive potential. The 70 percent standard is based on professional judgment as a value high enough to control erosion in the

disturbed areas of the Jumbo Dome Mine and is still protective of the predominantly 4H:1V slopes found in the backfilled mine area.

A density standard for woody vegetation is an average of 450 woody stems per acre on at least two-thirds of an area proposed for bond release. To be counted, each stem must be at least eight inches tall, except for spruce and dwarf birch which may be four inches tall. In accordance with the 11 AAC 90, at the time of bond release, at least 80 percent of the trees and shrubs used to determine success must have been in place for at least six years. The reasoning for the standard applying to two-thirds of the area is to recognize the benefits of diversity. Up to one-third of the area may be open areas/grassland which, if disturbed throughout the area, will provide edge effect and provide more valuable habitat than a uniform vegetation community.

The diversity standard for woody vegetation states that at least three woody species must be present with at least 20 percent of the density being made up of at least two species. This standard is appropriate and is indicative of the diversity found in naturally disturbed areas in similar climatic and physical locations.

#### Statement of Compliance

Standards for cover, woody plant density, and diversity have been set forth in the application. We find that the application is in compliance with requirements of 11 AAC 90.457. The period of responsibility under the performance bond requirements of 11 AAC 90.203 is 10 years and begins after the last year of augmented seeding, fertilizing, irrigation or other work as outlined in 11 AAC 90.457(d).

#### **4.7.6 Finding of Reclaimability**

Based upon the reclamation plan, supporting evidence derived from local and regional re-vegetation research, in consultation with the Alaska Plant Material Center, and the regulations promulgated by the Alaska Division of Mining, Land and Water the following reclamation practices were found to be feasible and acceptable: There is ample evidence in the literature and local experience at other coal mine sites in the region that indicates the re-vegetation of the regraded and top soiled areas will occur.

As required by AS 27.21.180(c)(2) and based on information contained in the application, consultation with other State and federal agencies, we find that mining and reclamation plan as stipulated in this decision demonstrate that reclamation is feasible.

## **5.1 Summary**

The Alaska Department of Natural Resources, Division of Mining, Land and Water approves, with stipulations, the surface mining permit application submitted by Usibelli Coal Mine Inc. for the Jumbo Dome Mine.

This decision to approve the application is based on a finding that the applications are accurate and complete with the stipulations noted and that they comply with the requirements of the Alaska Surface Coal Mining Program (AS 27.21; 11 AAC Chapter 90). All written findings required under 11 AAC 90.125 and AS 27.21.180 have been made, and support permit issuance.

The permit will be issued upon submission by the applicant and acceptance by ADNR of a performance bond for the first increment of permit S-0606. The bond shall be on a form provided by ADNR, and will be conditioned upon the completion of the required reclamation, and compliance with all terms, stipulations, and conditions of the permit. Coverage under the bond shall include all areas disturbed in year one of permit S-0606. The permit, when issued, will be for a term of five years and the stipulations become a binding part of the permit.

## **5.2 Stipulations**

1. **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.
2. **BLASTING.** All blasting operations for the Jumbo Dome Project will be designed to not produce an instantaneous pressure change greater than 2.7 pounds per square inch (psi) in the swim bladder of resident fish. This requirement will be waived or a higher value set upon prior written approve from the Alaska Department of Fish and Game.
3. **APDES PERMIT.** Water may not be directly discharged from ponds JD-1, JD-2, JD-3 and JD-4 into Marguerite Creek unless an APDES permit is issued from the Alaska Department of Environmental Conservation.
4. **WATER QUALITY/QUANTITY MONITORING.** Monitoring for surface water quality and quantity is to be conducted on at least a bi-monthly (every other month) interval. Monitoring locations for groundwater quality will be sampled annually along with the water level measurements.
5. **CULTURAL/HISTORIC ARTIFACTS.** The Alaska Historic Preservation Act (AS41.35.200) prohibits the appropriation, excavation, removal, injury, or destruction of any State-owned historic, prehistoric (paleontological) or archaeological site without a

permit from the Commissioner. If cultural or paleontological resources are inadvertently discovered as a result of, or during, the activities authorized by this plan approval, all activities which would disturb such resources shall be stopped and measures taken to protect the site. The State Historic Preservation Officer (907-269-8722) shall be contacted immediately so that compliance with state laws may begin. If burials or human remains are found, in addition to the State Historical Preservation Officer, the State Troopers are to be notified immediately.

6. **LAND APPLICATION PERMIT.** Within 60 days of starting surface coal mining operations under the Jumbo Dome permit Usibelli will apply for a land application permit from the Alaska Department of Environmental Conservation. Usibelli will provide a copy of the approved land application permit to DNR within 30 days of being issued by Alaska Department of Environmental Conservation.
7. **DISPOSAL AREA INSPECTIONS.** The permittee shall inspect the out-of-pit Spoils 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:
  - a. Base preparation for the out-of-pit spoil.
  - b. Each lift in the toe fill before the next lift is started, showing typical rutting from truck tires.
  - c. UCM shall submit the annual report to DNR each January 31st for the permit term.
8. **WILDLIFE PROTECTION.** An eagle nest survey must be conducted for all areas within 5 miles of the permit boundary by May 31, 2012. To protect nesting migratory birds land initial clearing undisturbed land will not be conducted between May 1<sup>st</sup> and July 31<sup>st</sup> of any year.
9. **FISH PROTECTION.** To maximize infiltration of intercepted surface and subsurface flows into seams 3 and 4 so the seams can continue their role in groundwater feed to Marguerite Creek UCM will include new design measures. Measures could include burrito drains, half-pipe flumes, and infiltration galleries.

### 5.3 Signature of Authorization



2/7/2012

Brent Goodrum, Director  
Division of Mining, Land & Water

Date