2.0 Description of Emission Sources

The BCM is located in Salt Lake County, Utah, near the town of Copperton. The BCM is currently operating under AO DAQE-AN0105710023-08, issued by UDAQ. With this NOI, KUC proposes to increase the total material-moved limitation to 260,000,000 tpy of ore and waste rock combined on an annual basis to maintain the current levels of metal production. Emissions from the existing mobile and stationary equipment have been recalculated to maintain consistent methodology using the most current emission factors.

Emission sources at the BCM are located either inside or outside the pit influence boundary. When particles, such as fugitive dust, are emitted within the pit influence boundary, only a certain portion of what is originally emitted is modeled to reach the top of the pit and enter the general atmosphere (the so-called escape fraction). *Airflow Patterns and Pit-Retention of Fugitive Dust for the Bingham Canyon Mine* predicts the escape fraction for different conditions at the BCM (Bhaskar and Tandon, 1996). A summary of the study is provided in Appendix D-1, with a copy of the entire study in Appendix D-2.

2.1 Point Sources

This subsection describes the stationary sources of emissions at the BCM.

2.1.1 In-pit Ore Crushers and Transfer Points

The existing in-pit ore crusher is equipped with a baghouse to control emissions. All exhaust air from the crusher is routed through the baghouse before being vented to the atmosphere. The baghouse is designed to handle 12,898 dry standard cubic feet per minute (dscfm) and is permitted to operate 8,760 hours per year (UDAQ, 2008). This source will not change under the proposed modification.

Under the proposed modification, KUC is proposing to add a new in-pit ore crusher within the next 3 to 4 years, also equipped with a baghouse to control emissions. All exhaust air from the new crusher will be routed through the baghouse before being vented to the atmosphere. The baghouse will have a proposed grain loading of 0.007 grains per dry standard cubic foot (gr/dscf) and will be designed to handle 12,898 dscfm airflow. The crusher will be permitted to operate 8,760 hours per year. Both the existing and new in-pit ore crushers are located within the pit influence boundary.

The BCM has two ore conveyor transfer drop points near Copperton that are equipped with baghouses—Point C6/C7 and Point C7/C8. All exhaust air from each transfer drop point is routed through the respective baghouse before being vented to the atmosphere. The C6/C7 drop point baghouse is designed to handle 5,120 dscfm, and the C7/C8 drop point baghouse is designed to handle 3,168 dscfm (UDAQ, 2008). Both baghouses are permitted to operate 8,760 hours per year. KUC is proposing to upgrade both baghouses. The upgrades will include replacing the bags and modifying hopper discharge design to provide a higher PM_{10} capture rate. This will result in reducing grain loading from 0.016 gr/dscf to 0.007 gr/dscf.

2.1.2 Lime Silos at Copperton Concentrator

Each of the two lime silos at the Copperton Concentrator is equipped with fabric bin vent control units. All exhaust air from the lime silos is routed through the control units before being vented to the atmosphere. Both bins are designed to handle 616 dscfm and are permitted to operate 8,760 hours per year (UDAQ, 2008). The PTE of these sources will not change under the proposed modification. These lime silos are associated with the Copperton Concentrator operations, and lime is used for pH adjustment.

2.1.3 Sample Preparation Building

The sample preparation building is equipped with a baghouse. All exhaust air from the sample preparation building is routed through the baghouse before being vented to the atmosphere. The baghouse is designed to handle 4,269 dscfm and is permitted to operate 2,920 hours per year (UDAQ, 2008). This source will not change under the proposed modification. The sample preparation building is located within the pit influence boundary.

2.1.4 Emergency Generators

The BCM has four existing emergency generators fueled with liquefied petroleum gas (LPG) (UDAQ, 2008). The power ratings and location of each emergency generator are listed in Table 2-1. As currently permitted, the use of each of the emergency generators is limited to 500 hours per year for routine maintenance and testing. KUC is also proposing to add a new 71 BHP LPG generator which shall be limited to 100 hours per year for routine maintenance and testing.

TABLE 2-1
Description of Emergency Generators

Location	Power Rating (brake horsepower)
Lark Gate	160
Production Control Building	105
Mine Office	75
Galena Gulch	72
Dinkeyville Hill	71

2.2 Sources of Fugitive Dust Emissions

This subsection describes the sources of fugitive dust emissions at the BCM. All sources of fugitive dust emissions are located on KUC property.

2.2.1 Drilling and Blasting

With the proposed modification, the BCM will drill approximately 90,000 holes each year. The drilling is performed with water injection to help control PM_{10} emissions with an estimated efficiency of 90 percent. The BCM will conduct approximately 1,100 blasts each year with a total area of 57,500 square feet per average blast. Both drilling and blasting operations occur within the pit influence boundary.

2.2.2 Material Movement

The ore and waste rock at the BCM are transferred from the mining areas to other areas of the mine through a series of transfers using haultrucks and conveyor belts. Ore is transferred from the in-pit crushers on conveyors while waste rock is hauled with trucks from the shovel face. From the mining areas, haultrucks are loaded with either ore or waste rock. Because of characteristics of the waste rock/ore material (such as large-diameter material, contained moisture, and minimal drop distance from the shovels to the haultrucks), fugitive dust emissions are minimal. It should be noted that the AO limitation on material moved (ore and waste) is applied to dry tons mined at the shovel face. Ore stockpiled, topsoil movement, road base, and reclamation material should not be counted toward this limit.

Ore Transfers

Ore is hauled and dumped into the in-pit ore crusher(s). The design of the crusher(s) will allow each crusher to process an average of 85,000,000 tpy of ore with the proposed modification. Fugitive dust generated by this activity is controlled with a baghouse. Because of inherent characteristics of the ore, moisture of the material, and physical enclosures, fugitive dust emissions are minimal.

Once the ore is crushed by the in-pit crushers, it is transported from the crusher to the C6 conveyor tunnel. The existing in-pit conveyor system has three enclosed transfer points. Fugitive dust from the transfer points is controlled with an estimated efficiency of 90 percent due to the enclosures.

The proposed modification will include adding a new in-pit conveyor system, interfacing with the new in-pit crusher, and finally transferring to the C6 conveyor tunnel that will include three enclosed transfer points. Consistent with the existing conveyor system, fugitive dust from the new transfer points will be controlled with an estimated efficiency of 90 percent due to the enclosures.

In-pit crushers and associated conveyors are moved approximately once per decade to accommodate changing mine topography. Emissions from the existing crusher are estimated to include two additional transfer points anticipated during the next move.

The previously mentioned transfer points are located within the BCM pit influence boundary.

Ore is conveyed through the C6 conveyor tunnel and transferred to the enclosed conveyor C7 and then C8 through the baghouse-equipped transfer points previously discussed. From the conveyor belt C8, the ore is dropped to the C9 belt and shuttle conveyor (stacker) at the Copperton Concentrator. The inherent characteristics of the material and physical enclosures result in minimal fugitive dust emissions.

The shuttle conveyor (stacker) drops the ore onto the coarse ore storage piles in the A-frame at the Copperton Concentrator. The inherent characteristics of the material and physical enclosures result in minimal fugitive dust emissions.

Finally, the ore is carried from the coarse ore piles to the semiautogenous grinding mills on a conveyor belt in the Reclaim Tunnels. The Reclaim Tunnel conveyors will process an average of 85,000,000 tpy of ore with the proposed modification. The inherent characteristics of the material and physical enclosures result in minimal fugitive dust emissions.

Waste Rock Transfers

Haultrucks place the waste rock onto designated waste rock disposal areas. With the proposed modification, haultrucks will continue to haul and place waste rock in the disposal areas. The waste rock transfers currently occur outside the pit influence boundary.

2.2.3 Low-grade Ore Stockpile

The BCM has low-grade run-of-mine ore stockpiles within the pit operations. With the proposed modification, haultrucks will continue to haul and place ore on the low-grade ore stockpiles. Emissions from the low-grade ore stockpiles are minimized by inherent material characteristics and incidental compaction from mobile equipment. Water application from passing water trucks is used to further reduce emissions. Low-grade ore can be reclaimed by loaders and hauled by trucks to the in-pit crusher as needed.

2.2.4 Disturbed Areas

Areas of land are exposed when mining is performed. While achieving a production rate of 260,000,000 tons of ore and waste rock movement it is estimated, according to proposed mine plan, that approximately 565 total acres of land is disturbed per year.

2.2.5 Haulroads

Unpaved haulroads are used by haultrucks to carry the waste rock and ore from the mining areas to waste rock disposal areas, to and from the low-grade ore stockpile, or to the in-pit crushers. On the haulroads, KUC will apply water frequently or commercial dust suppressants as needed to control fugitive dust emissions. Additionally, application of Application of road base material on haulroads enhances effectiveness of the fugitive dust control measures. Details of this activity will be regulated through the FDCP, which is updated and submitted annually to UDAQ. Each of the dust control measures varies seasonably based on ambient conditions.

2.2.6 Road-base Crushing and Screening Plant

The BCM employs the use of a road-base crushing and screening plant that operates at the 6,190 elevation on the north rim of the pit near the Bingham Truck Shop. The purpose of the plant is to crush non-sulfide-bearing waste rock material for use as road base on the unpaved haulroads. Fugitive emissions from the crushing, screening, and transfer points (10) operation are effectively controlled with water sprays and/or belt enclosures. The crushing and screening unit has a capacity of 700 tons per hour and is currently permitted to operate no more than 4,500 hours per year, resulting in an annual material throughput of 3,150,000 tons (UDAQ, 2008). This source will not be modified as part of this modification. The crushing and screening plant is located within the BCM pit influence boundary.

2.3 Volatile Organic Compound Sources

2.3.1 Maintenance Degreasing

Maintenance degreasing involves the use of a cold solvent to degrease and clean equipment parts. The annual use of solvent from all the degreasers combined is approximately 500 gallons. When not in use, the lids on the degreasers are kept closed at all times to minimize emissions. The solvent is recycled frequently, and no significant loss in volume is observed, implying minimal losses as emissions. For purposes of estimating emissions, a conservative estimate of one solvent change-out lost per year is assumed.

2.3.2 Gasoline and Diesel Fueling Stations

The gasoline and diesel fueling stations are used to fuel the BCM's light-duty trucks, vehicles, and haultrucks. For the proposed modification, the peak year annual throughput at the fueling stations will be approximately 530,000 gallons of gasoline and 55,000,000 gallons of diesel fuel. Volatile organic compounds are emitted as a result of balanced submerged filling, underground tank breathing and emptying, spillage, and uncontrolled displacement losses during vehicle refueling. The gasoline fueling stations are equipped with Stage I Vapor Recovery Systems to minimize volatile organic compound (VOC) emissions.

2.3.3 Solvent Extraction/Electrowinning Plant

The solvent extraction/electrowinning (SX/EW) plant was permitted in 2008. When construction is complete and operation commences, the process will consist of mixers and settlers for the extraction and stripping of copper; organic surge and holding tanks; and raffinate and electrolyte circuits causing agitation of organic solutions. The mixers and settlers will have a combined total surface area of 1,100 square feet and be permitted to operate for 8,760 hours per year. They will be covered at all times except during inspection, sampling, and adjustment to control VOC emissions with an efficiency of 80 percent. A total of four process tanks with a combined total volume of 12,000 gallons will operate. The tanks are also covered at all times to control VOC emissions. The circuits will have a combined average flow rate of 650 gallons per minute (gpm) and be permitted to operate 8,760 hours per year.

The SX/EW plant will also have an electrowinning acid mist eliminator to control process streams from the electrowinning cells. Exhaust air from the electrowinning cells will be routed through the mist eliminator before being vented to the atmosphere. The mist eliminator is designed to handle 8,000 acfm and operate 8,760 hours per year (UDAQ, 2008).

2.4 Mobile Sources

The mine diesel operated support equipment includes front-end loaders (FELs), graders, track dozers, rubber-tire dozers, water trucks, diesel shovels, diesel drills, track excavators, and small haultrucks. The graders primarily operate on the haulroads maintaining surfaces of the roads. The dozers operate in the pit, on the haulroads performing "cleanup" operations, and in dumping operations at the waste rock disposal areas. The smaller FELs operate haulroad construction and cleanup projects. The large FELs are production loaders, which load ore and waste rock into haul trucks from the mining area. Some of this equipment may also be used for snow removal in winter. Tailpipe emissions from the support equipment will meet the required EPA standards for NONROAD equipment.

The haultrucks transfer ore to the in-pit crusher and low-grade ore stockpiles and waste rock to the waste disposal areas 365 days per year.

Tailpipe emissions from the haultrucks will meet the required EPA standards for NONROAD equipment.