Barrick Goldstrike Mines Inc.
P.O. Box 29, Elko Nevada 89803
Carlin Nevada, (Interstate 80, / Exit 280)

Class 1 (Title V) Air Quality Operating Permit Renewal
Air Case 02AP0136
Permit AP1041-0739.01

Nevada Division of Environmental Protection
NDEP

BY

State of Nevada
Department Of Conservation and Natural Resources
Division of Environmental Protection
Bureau of Air Pollution Control

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Staff Engineer

February 4, 2005

CLASS I RENEWAL
Barrick Goldstrike Mines Inc.

1.0 INTRODUCTION

Barrick Goldstrike Mines Inc. (Barrick) submitted a Class I (Title V) application for renewal on November 16, 2001 to their existing Title V Air Quality Operating Permit. The

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Nevada Division of Environmental Protection – Bureau of Air Pollution Control (BAPC) declared Barrick's permit renewal application administratively complete on January 15, 2002. Barrick agreed to provide, and did provide additional supplemental information including an ambient air quality analysis, supplemental CAM information, HAPs inventory, and facility and process narratives to the BAPC. Three pending minor revisions, outstanding at the time of this renewal application, were completed and incorporated into Barrick's renewal request. These included:

1. Shotcrete Facilities Backfill Facilities Aggregate Dryer
2. Rodeo Shaft Throughput Increase
3. Diesel Generators.

On January 29, 2004, Barrick submitted a minor revision application to the BAPC, requesting an increase in carbon throughput rate for the Carbon Reactivation Kiln 2 (Drum) and an increase in the heat input rate for the Carbon Reactivation Kiln 2 (Burner). Barrick was issued the minor revision on April 9, 2004.

The BAPC case log number for this Title V Renewal application is 02AP0136. The facility consists of an open pit mine, two underground mines, and process facilities. Support facilities located on site but not owned by Barrick include the Air Liquide oxygen plant permitted under operating permit AP2813-0133.02.

Table 1, Facility Wide Potential-To-Emit

Summary of the Potential to Emit (Tons Per Year)

Facility-Wide Renewal	H_2S	PM	PM_{10}	NO_x	SO_2	CO	VOC
	81.0	415.0	379.0	393.0	251.0	361.0	264.0

Emissions from the Barrick Goldstrike facility exceed the 250-ton per year Prevention of Significant Deterioration (PSD) threshold for PM, PM_{10}, NOx, SO_2 and CO. Barrick Goldstrike Mine has been designated as both a Title V and major PSD source for the above-mentioned pollutants. All modifications require full PSD review at the de-minimis emission increase rates. To date Barrick has not been issued a PSD permit.

Barrick's Goldstrike mine is located in the Lynn Mining District northeast Nevada, 27 miles north of Carlin, at the southern end of Elko County and the northern end of Eureka County.

The facility operations are located approximately at the intersection of the Carlin Trend (northwest-southeast strike) and the Shoshone Belt (southwest-northeast strike). The principal operation is metal mining and the processing of gold ores.

Several surface and underground mining operations are found throughout the Lynn Mining District. In addition to the Barrick operation, other significant operations located within the district are the Newmont (North Operations Area and Gold Quarry) and Rayrock (Dee Gold Mine). The Barrick facility is surrounded by the Newmont operations and through a series of agreements and memorandums of understanding, both companies are jointly developing several gold bearing ore bodies and sharing technical process information. The Barrick operation consists of the Betze/Post open-pit mine, and the Meikle and Rodeo underground mines. Other activities and facilities include: gold recovery, refining, support facilities, and exploration.

Gold is recovered and refined using two methods:

1. Milling, Roasting, and Carbon-in-Leach (CIL) process

Milling and Roasting: Mill grade carbonaceous ore is crushed and ground in one of two dry-grind mill circuits at the roaster facility. Gold is recovered from the ground carbonaceous ore via roasting, neutralization, the CIL process, carbon acid washing, carbon stripping, electrowinning, and refining.

2. Milling, Autoclave, and CIL process.

Milling-Autoclave: Mill grade sulfide ore is crushed and ground in one of two mill circuits at the wet mill facility. Gold is recovered from the ground sulfide ore via acidulation, autoclave oxidation, neutralization, the CIL process, carbon acid washing, carbon stripping, electrowinning, and refining.

2.0 DESCRIPTION OF PROCESS

2.1 Mining Activities

<u>Open Pit Mining</u>

Barrick is currently operating one open-pit mine, the Betze/Post Mine, and two underground mines, the Meikle and Rodeo. Fugitive dust emissions from haul roads in both the above ground and the underground mining operations are controlled by watering and by the application of chemical dust suppressants. When practical, fugitive dust emissions from disturbed surface area are controlled by watering or revegetation. Other emissions from the mining operations include emissions from dewatering ponds and hot water dams.

In the open pit mine; gold ores and waste materials are drilled and blasted using ammonium nitrate and fuel oil, ANFO, explosives. Shot ore and waste is loaded into haul trucks and removed from the open pit. The ores are hauled to leach pads for leaching, or to the mill for additional processing. Uneconomic materials are relocated to outside storage areas. Pollutants emitted during the open pit mining process are considered as fugitive dust because they cannot reasonably pass through a stack, vent or other control device.

Underground Mining

For the underground operations, gold bearing ore and mine rock is drilled, blasted, hoisted to the surface using the production shaft, and loaded into haul trucks. The non-ore rock is hauled to the mine rock storage area for future backfilling operations. Ore is hauled either to the leach pads for leaching or to the mill for processing. The Meikle and Rodeo production and development shafts are sources for PM_{10} emissions and require permitting. Pneumatic sprays or enclosures control emissions. Haul truck travel and dumping are sources of fugitive dust emissions, including HAP metal emissions.

Meikle and Rodeo Backfill Operations

The backfill plants produce materials used to fill the voids in the underground mines after the ore is removed. Backfill is a mixture of cement, fly ash, admix, and various sized aggregate which is produced by the surface crushing and screening plants. Conveyors and vibrating feeders, a dump hopper, and two surge bins are used to relocate the crushed aggregate in and out of stockpiles. These equipment pieces are process sources of PM_{10} emissions and require permitting. Pneumatic sprays or building enclosures are used to control the emissions from these process sources.

A front-end loader is used to carry aggregate from the stockpiles to the mixing plant aggregate feed hoppers. The aggregate is then conveyed to the underground mixing plant. The hoppers and conveyors are process sources of PM10 emissions that require permitting. Pneumatic sprays are used to control the emissions from these process sources.

The remainder of the above ground equipment includes fly ash silos and associated screw conveyors. Emissions from cement and fly ash loading to silos are controlled by baghouses and emissions from cement or fly ash discharging are controlled by enclosures.

2.2 AA Process Facility

<u>Ore Crushing and Wet Grinding</u>

Mill grade sulfide ore is crushed and ground in one of two wet mill circuits: Mill No. 1 and Mill No. 2. In these circuits, jaw or gyratory crushers are used for primary crushing, SAG and ball mills for wet grinding, and recycle cone crushers for tertiary crushing (oversize material from the wet grinding processes). After crushing and grinding, the ore slurry is pumped to the autoclave oxidation process. Other equipment associated with these circuits includes hoppers, conveyors, apron feeders, lime silos, screens, and cyclones.

The SAG mills, ball mills, screens, cyclones, are not a source of regulated air pollutant emissions because the material in these processes is a slurry or pulp and these are wet processes.

Particulate emissions generated by the primary crushing and screening process, including all transfers up to the coarse ore belt conveyor, are contained in building enclosures and are vented to baghouses. The recycle crushers are controlled by a building enclosure and pneumatic sprays. The apron feeder transfer points are underground. Emissions from lime silo loading are controlled by a vent filter and emissions from lime discharging are controlled by enclosures.

<u>Autoclave Oxidation and Steam Generation</u>

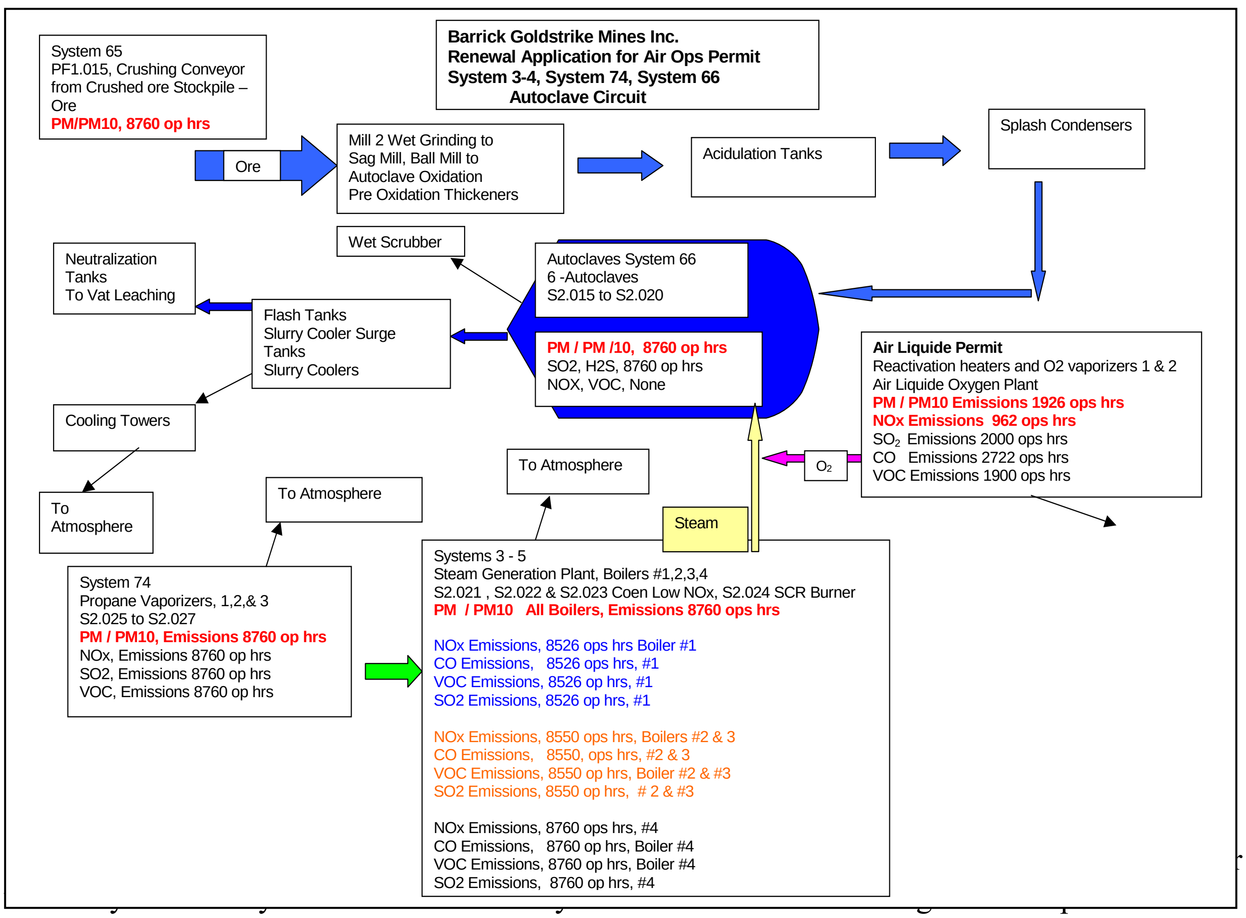
In the autoclave oxidation process, sulfide ore slurry is oxidized so that it can be leached with a NaCN solution. Sulfide ore slurry from the wet grinding mills is first thickened in thickener tanks. The slurry is then acidulated with sulfuric acid in acidulation tanks. The thickener tanks are not reasonably expected to be a source of regulated air pollutants. The acidulation tanks are potential minor sources of hydrogen sulfide (H_2S) and sulfuric acid (H_2SO_4) emissions. Permitting is not required for these tanks as they are not subject to an applicable requirement.

Sulfide ore slurry from the acidulation tanks is pre-heated and then oxidized in the autoclaves with pressure, steam, and oxygen. The autoclaves are vented to wet scrubbers and they require permitting. Pollutants emitted from the autoclaves include PM_{10} (with trace amounts of HAP metals), SO_2, H_2S, H_2SO_4, arsenic (As), and mercury (Hg). Steam is supplied to the autoclaves by the propane-fired boilers.

The autoclave boilers are sources of propane combustion products and require permitting. Boiler #4 is the largest and is equipped with a selective catalytic reduction system (SCR) to remove NOx emissions from the exhausts stream before it is emitted into the atmosphere. The SCR system is a potential source of ammonia due to ammonia slip. Boilers Nos. 2 and 3 are equipped with Coen Low-NOx burners to reduce NOx emissions.

The Air Liquide America Corporation (Air Liquide) oxygen plant, located at the Barrick site, provides oxygen to the autoclaves. By agreement, Air Liquide is permitted under its own Class I permit, AP2813-0133.02. Process sources at this plant include: one (1) propane-fired reactivation heater and one (1) propane-fired liquid oxygen vaporizer. These process sources emit propane combustion products.

Drawing 1. Crushing, Milling, Acidulation, Autoclave Oxidation, and Steam Generation



emissions, PM and PM_{10}. Four cooling towers supply the cooling water for this process. These existing cooling towers were addressed in Barrick's 1996 Class I-A Operating Permit Application. At that time, NDEP determined that specific permit conditions were not warranted due to the trivial amount of particulate emissions from these towers.

Cooled slurry then enters the neutralization tanks where slaked lime is added. The neutralized slurry (oxidized ore) is then leached in the carbon-in-leach (CIL) circuit. The lime silos used to provide lime for neutralization are process sources of PM_{10} and require permitting. Emissions from lime silo loading are controlled by a vent filter and emissions from lime silo discharging are controlled by enclosures.

Carbon-In-Leach Circuit (CIL)

As the ore slurry passes through the CIL circuit, sodium cyanide in a dilute and buffered solution is added and is utilized to dissolve the gold in the ore slurry. The gold enriched solution is transferred to a series of CIL tanks where a suspension of activated carbon granules adsorbs the gold-cyanide complexes out of solution. Screens separate the carbon from the slurry, and the loaded carbon is sent to the carbon stripping process. The spent ore slurry is processed through a thermal cyanide destruct process and then passed on to the tailings pond. Water is decanted from the tailings pond and sent to the reclaim water tanks for use as make-up water in the wet grinding circuit.

Carbon Stripping and Electrowinning

Loaded carbon must be "stripped " to recover the gold values. First, the carbon is washed with nitric acid (HNO_3) in acid wash vessels, and then it is passed to stripping vessels where a hot alkaline (pH>13) sodium cyanide (NaCN) solution is used to remove the gold. Excess steam generated by the autoclave boilers and/or preheaters is used to heat the strip solution. The pregnant strip solution is sent to holding tanks for eventual transfer to the electrowinning circuit.

The electrowining (EW) cells transfer the gold from the pregnant solution onto cathodes by electrolysis. The barren solution leaves the EW cells and returns to the barren solution tanks to be reused. The cathode material is sent to the retorting and melting process.

The carbon strip vessels, electrowining cells, and barren and pregnant solution tanks have a throughput of less than 400 gallons per minute, and are designated "insignificant" by NDEP-BAPC. The acid wash tanks are not expected to be a source of regulated air pollutants. The propane-fired heaters used to heat the strip solution are less than 4.0 MMBtu per hour heat input and are exempt from permitting requirements, pursuant to NAC 445B.288.2(e)(1).

<u>Retorting Operations</u>

Mercury is removed from the cathode material by retorting the cathodes before they are refined in the melting furnaces. The mercury retorts are heated electrically to temperatures that vaporize the mercury. The mercury vapors are collected, cooled, and mercury collected. The retort off-gasses are passed through a carbon filter before being released into the atmosphere to remove residual mercury. The retorts are process sources of mercury and other HAP metals; however, these emissions are less than de-minimis levels and are exempt from permitting requirements. The mercury retorts are also used to remove mercury from other materials at the Barrick facility as well.

<u>Melting operations</u>

The retorted cathodes are transferred to the electric melting furnaces and fluxes are added to facilitate the separation of impurities during the making of the gold doré. Furnace emissions are processed through a bag house before release. The furnaces are permitted because they emit PM_{10}, mercury, and trace amounts of other HAP emissions.

Other activities associated with retorting and melting include the storage of retort materials and building clean up. These activities emit air pollutants well below the de-minimis levels and are not subject to permitting requirements.

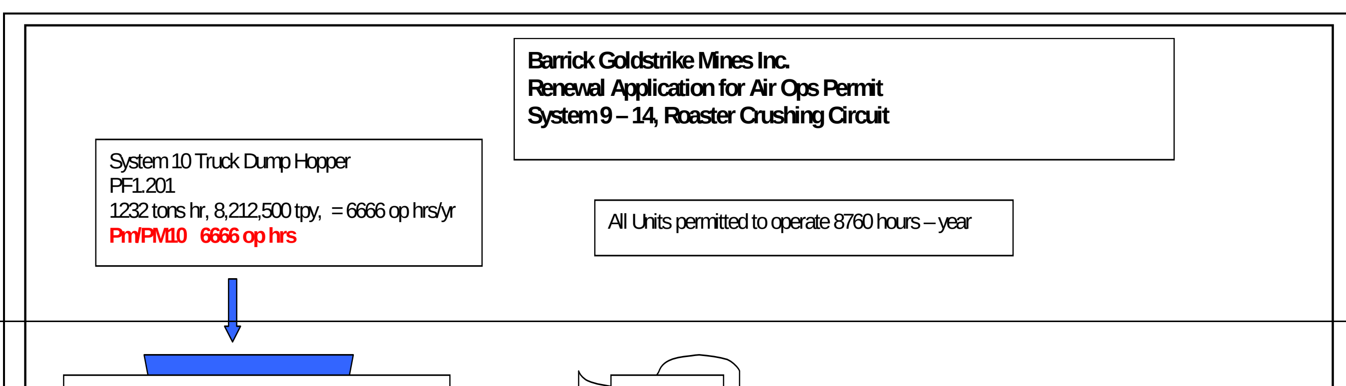
2.3 Roasting Facility

<u>Roaster Ore Crushing</u>

In the crushing circuit, ore undergoes primary crushing, screening, and secondary crushing. Crushed ore is conveyed to the coarse ore stockpile via the coarse ore belt conveyor. The crushers, screens, and conveyors are process sources of particulate emissions (dust) requiring permitting. Because the dust generated contains trace amounts of HAP metals, these process sources are also sources of trace emissions.

Particulate emissions generated by the crushing and screening process (including all transfers up to the coarse ore belt conveyor) are contained in building enclosures and vented to baghouses. The coarse ore belt conveyor discharge point is equipped with pneumatic sprays to control the fugitive particulate emissions generated by the material transfer to the stockpile.

Drawing 2. Roaster Crushing Circuit



Roaster Ore Dry Grinding

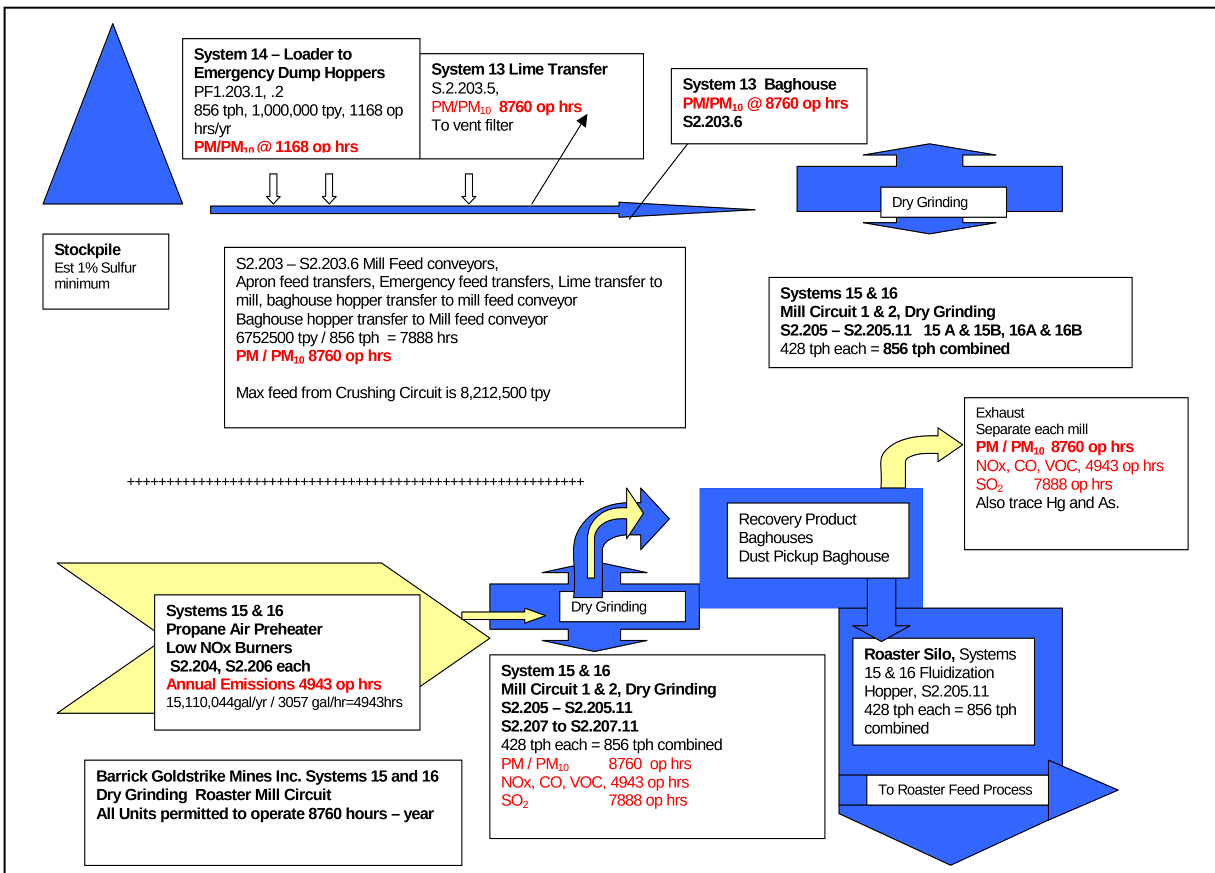
In the mill circuit, underground apron feeders transfer ore to mill feed conveyors that lead to the two (2) dry grinding processes; Mill Nos. 1 and 2. When the apron feeders are out of service, ore can be fed to the mill conveyors via the emergency hoppers.

In the dry grinding processes, ore is dried with hot air (provided by a propane or natural gas-fired air pre-heater for each mill) and ground in the grinding mills. Ground ore is then transferred to roaster silos. The apron feeders, emergency hoppers, mill conveyors, grinding mills, and the roaster silos are process sources of particulate emissions (dust) requiring permitting. Because the dust generated contains trace amounts of HAP metals, these process sources are also sources of trace HAP metal emissions. In addition, heating of the ore may release SO_2 and trace amounts of mercury and arsenic as a vapor. The mill air pre-heaters are process sources of propane/natural gas combustion products (i.e., PM_{10}, NOx, SO_2, CO, and

VOC's).

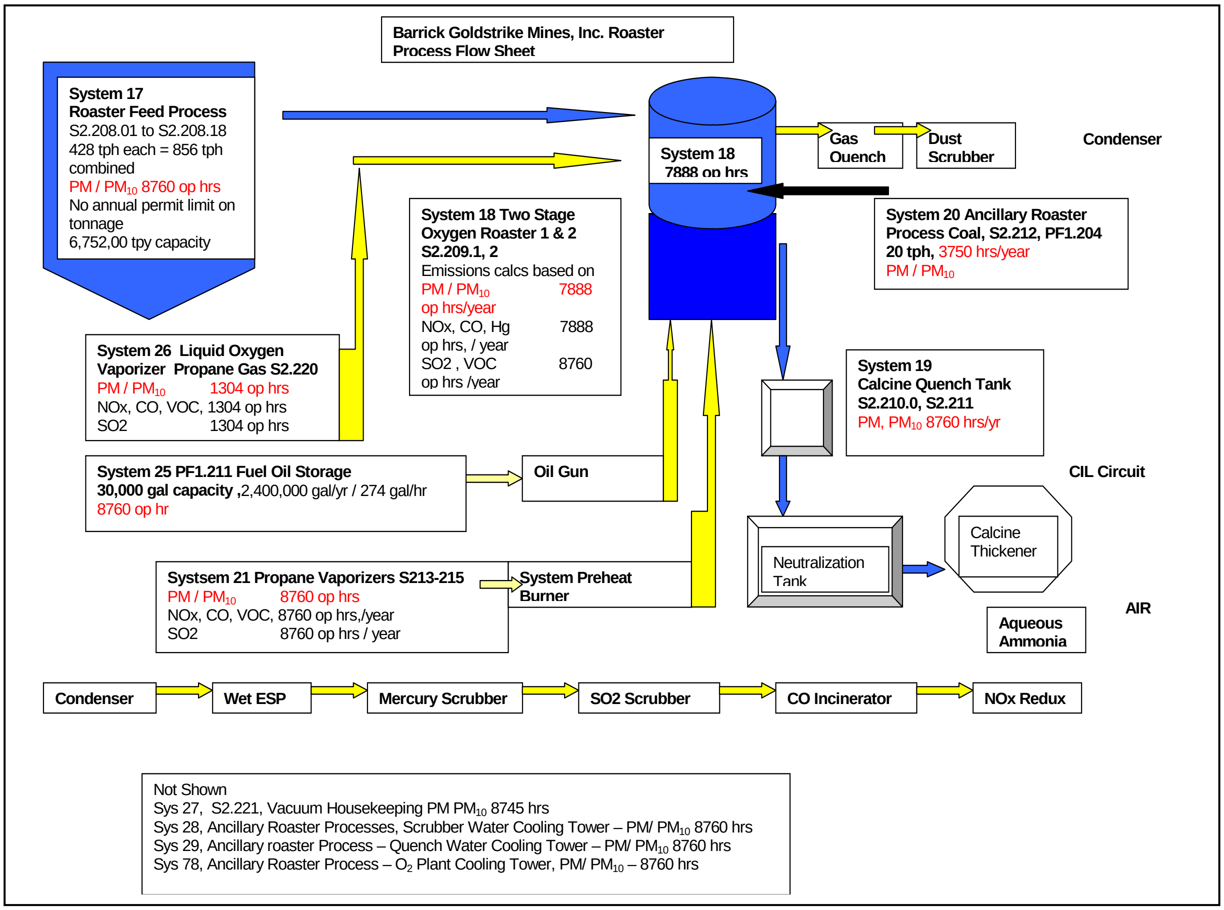
Particulate emissions generated by the ore transfer to and from the apron feeders and the lime transfer to the mill belts are enclosed and vented to a baghouse. Fugitive particulate emissions from loading the emergency hoppers are not controlled. Sources of particulate emissions from the grinding mills are contained in building enclosures and vented to product recovery baghouses. Note that the exhaust gases from the air pre-heaters are vented into the grinding mills and ultimately to the product recovery baghouses. All other points of particulate emissions (e.g., mill conveyors, silos, and other ore transfers) are contained in building enclosures and vented to dust pick-up point baghouses. The product recovery baghouses and dust pick-up point baghouses for each mill are vented to the exhaust stack for that mill. The air pre-heaters are equipped with low-NOx burners to minimize NOx emissions.

Drawing 3. Roaster Dry Grinding Process



oxidation. Each of the roasters is equipped with oil or propane/natural gas fired pre-heat burners, which are exhausted into the roasters, for startup purposes. The exhaust from each roaster is vented through the cyclones to the roaster air emissions control circuit (see below). Particulate emissions from the roaster feed system are captured by dust pick-up point baghouses.

Drawing 4, Roaster Process



Each roaster is also equipped with an emergency exhaust stack. These stacks are used in the event of a malfunction of the exhaust system and to prevent over pressurization of the roasters. If an over pressure malfunction occurs, the feed to the roaster is shut-off and the roaster is shut down.

After roasting, the oxidized ores are quenched in quench tanks, neutralized by adding lime, and thickened before passing on to the CIL leaching circuit. Emissions from the quench tanks are vented to a wet dust scrubber. Lime is slaked at the roaster facility in the roaster lime slaking process. The ore slurry is thickened by gravity separation in the thickener and pumped to the CIL process.

The roaster air emissions control circuit is made up of venturi wet scrubbers, a wet electrostatic precipitator (ESP), a mercury scrubber, and SO_2 scrubber, a CO oxidizer, and a

NOx selective catalytic reduction system (SCR). The CO and NOx control systems will be operated after initial start up, however, if pre control testing shows that the proposed emission limits can be met without the CO and/or NOx controls, Barrick may opt to request removal of one or both of these controls.

The mercury scrubbing system removes mercury from the gas stream in the form of calomel (Hg_2Cl_2). Mercury is then separated from the calomel by electrowinning, producing liquid, elemental, mercury that is shipped off site, and chlorine (Cl_2), which is returned and reused in the process. This process has the potential to produce trace fugitive emissions of Cl_2. To minimize any fugitive emissions, potential exhaust points are ducted back to the mercury scrubber.

Roaster Carbon in Leach

In the Roaster Facility CIL process, as in the AA Facility CIL process, gold is dissolved from the oxidized ore into a cyanide solution and collected onto activated carbon in a series of CIL tanks. The cyanide solution is stored in cyanide storage tanks. Ore slurry, activated carbon, and a dilute buffered solution of NaCN are introduced into the CIL tanks where the mixture is agitated and aspirated with air. Within the CIL tanks, screens separate the carbon from the slurry. The loaded carbon is sent to the existing AA Facility carbon stripping process. The spent ore slurry exiting the CIL tanks is sent to a cyanide destruction process and into the existing tailings pond.

The CIL tanks and screens are potential sources of fugitive hydrogen cyanide (HCN) emissions; however, permitting is not required for these sources. The cyanide storage tanks are a potential source of HCN. Permitting is not required for these tanks pursuant to NAC 445B.288.2(d). The cyanide destruction process results in trace amounts of fugitive ammonia (NH_3) emissions because of the chemical breakdown of cyanide. Permitting is not required for this process.

2.4 Meikle and Rodeo Backfill Plants

The Meikle and Rodeo backfill plants produce material used to backfill the Meikle and Rodeo underground mines after the ore is removed. Backfill is a mixture of cement, fly ash, admix, and various sized aggregate.

Various sizes of aggregate for the Meikle and Rodeo Mines are produced by the surface

Backfill Crushing and Screening Plant. This is accomplished with primary and secondary crushers, a reject screen and a twin screen. Conveyors and feeders are used to move the crushed aggregate to stockpiles. A load-out bin is also used in this process. The equipment is considered a source of PM_{10} emissions that requires permitting. The emissions contain trace amounts of HAP metals inherent to the aggregate. Pneumatic sprays are/or enclosures are used to control the emissions from these process sources.

Crushed aggregate from the crushing and screening process is fed to the Meikle mixing plant or Rodeo Backfill Feed Plant. A front-end loader is used to carry the aggregate from the stockpiles to the Meikle or Rodeo aggregate feed hopper, where it is transferred underground. The hoppers at Meikle and Rodeo and the conveyor at Meikle are process sources of PM_{10} emissions (which contain trace amounts of HAP metals inherent to the aggregate) and require permitting. Pneumatic sprays and/or enclosures are used to control the emissions from these process sources.

The remainder of the above ground equipment includes cement and fly ash silos at each location, associated screw conveyors, and a mixer at Rodeo. The cement and fly ash is transferred underground and mixed with the crushed aggregate for backfill. The cement and fly ash silos, mixer, and associated screw conveyors are process sources of PM_{10} emissions that require permitting. Emissions from cement or fly ash silo loading are controlled by vent filters and emissions from cement or fly ash discharging are controlled by enclosures.

2.5 Shotcrete Plant and Loadout Stations

The shotcrete plant produces shotcrete for the Meikle and Rodeo underground mines. The plant includes aggregate and sand feeders, aggregate dryer, cement, fly ash and product load-out silos, and a blending screen. Feeder belts and augers are used to move the sand, aggregate, fly ash, cement and shotcrete product through the plant. The feeders, silos, blending screen, and associated conveyors and belts are process sources of PM_{10} emissions that require permitting. The dryer is a process source of combustion product emissions from low sulfur diesel fuel firing. Emissions from the dryer, loadout silo loading, and the blending screen are controlled by a baghouse. Emissions from the cement and fly ash silos loading are controlled by vent filters and emissions from the cement and fly ash discharging are controlled by enclosures.

Shotcrete loadout stations are located at the Meikle and Rodeo Mines. Shotcrete is transported from the shotcrete plant to the loadout stations by truck. The loadout stations consist of a screw conveyor and slick-line to carry the shotcrete underground. The truck and screw conveyor discharges are process sources of PM_{10} emissions and require permitting. Emissions are controlled by enclosures.

2.6 Meikle Concrete Batch Plant

A concrete batch plant located at the Meikle Mine is used to produce concrete for various construction projects at the site. The batch plant consists of an aggregate feed hopper, fine and course aggregate storage bins, cement/fly ash silo, weigh hoppers, and associated conveyors. Pneumatic transfer is used to load the cement/fly ash silo. The feed hopper, storage bins, silo, weigh hoppers, and conveyors are process sources of PM_{10} emissions that require permitting. Emissions from the loading and discharge of the feed hopper and conveyors are controlled by enclosures. Emissions from the cement/fly ash silo loading are controlled by a vent filter and emissions from the cement and fly ash discharge and weigh hoppers are controlled by enclosures.

2.7 Backup Crushing System

This system is used as a backup aggregate crusher for the surface crushing and screening plant or as a backup ore crusher at the Roaster facility. The crusher includes an aggregate/ore feeder, crusher, a series of conveyors, and a hopper. The feeder, crusher, and associated conveyors are process sources of PM_{10} emissions that require permitting. Emissions are controlled with pneumatic sprays.

2.8 Laboratories

Two separate laboratories are utilized for preparing and analyzing mine rock samples: the analytical laboratory, and the metallurgical laboratory. Each laboratory includes a sample preparation area and a fire assay area. The sample preparation area consists of various types of laboratory crushers, pulverizers, and a sample reject conveyor, all of which are sources of PM_{10} emissions, which are ducted to a baghouse and require permitting.

The fire assay areas consist of assay furnaces, drag conveyors, waste crushers, flux dispensers, furnace tables, and tumblers, all of which are process sources of PM_{10} and lead emissions and require permitting. Particulate emissions are controlled by a baghouse. Barrick also operates Gilson screens that have a throughput of less than 50 pounds per hour and are therefore exempt from permitting pursuant to NAC 445B.288.2(c).

2.9 Support Activities

Support activities include the Air Liquide oxygen plant (permitted separately), propane storage tanks, volatile organic liquid (VOL) storage tanks, volatile inorganic liquid (VIL) storage and mixing tanks, internal combustion (IC) engines, including but not limited to generators, fire pumps, sump pumps, and air compressors, building heaters, air refrigeration plant and water treatment systems. Some of this equipment requires permitting while some is exempt.

Certain storage tanks are subject to the Accidental Release provisions under 112(r) of the

Act. These tanks require permitting in general terms only, and are as follows:

3-pressurized propane storage tanks (90,000 gallons)
2-pressurized propane storage tanks (30,000 gallons)
2-nitric acid (HNO_3) storage tanks (5,600 and 6,000 gallons)
1-pressurized NH_4OH tank (5000 gallons)

Propane storage tanks not subject to 112(r) are exempt from permitting requirements because they are sealed and pressurized and therefore not a source of air emissions. Storage tanks of VOL's such as antifreeze (glycol), waste oil, jet fuel, diesel oil, lubricating oils and greases, gasoline, and other miscellaneous petroleum products of less than 10,567 gallons in size are insignificant sources per NAC 445B.288.2(d).

Fuel storage tanks incorporated into the facility wide permit

S2.080	Fuel Oil Storage tank	250,000	Gallons
S2.081	Fuel Oil Storage tank	150,000	Gallons
S2.082	Gasoline Storage tank	12,000	Gallons
S2.083	Fuel Oil Storage tank	34,200	Gallons

Miscellaneous storage tanks for the storage and mixing of anti-scalents, sulfuric acid (H_2SO_4) and nitric acid (HNO_3) are not sources of regulated air pollutants. The refrigeration plant (which contains less than the 112(r) de-minimis level of ammonia (NH_3)) is not expected to be a source of regulated air pollutants since the NH_3 is within a sealed compartment.

Storage and mixing tanks of anti-scalents, sulfuric acid (H_2SO_4), and nitric acid (HNO_3) are not reasonably expected to be a source of regulated air pollutants. The Meikle Mine refrigeration plant is not reasonably expected to be a source of regulated air pollutants since the NH_3 is within a sealed compartment.

2.10 Fuel Burning Equipment

Fuel-burning equipment (such as propane vaporizers, building heaters, and other miscellaneous heaters) with a heat input less than 4 MM Btu's per hour are insignificant per NAC 445B.288.2.(e)(1). The internal combustion, IC, engines of less than 250 horsepower (HP), such as generators, fire pumps, and trash pumps, and the IC engines of greater than 250 HP but operated less than 100 hours per year such as generators are insignificant per NAC 445B.288.2.(e)(1)(2).

2.11 Water Treatment Systems

Barrick operates potable water treatment systems and rotating biological contactor sewer systems. The potable water treatment systems are not reasonably expected to be a source of regulated air pollutants. The rotating biological contactor sewer systems are potential minor sources of fugitive VOC emissions. Permitting is not required for this fugitive source.

Barrick also operates the Boulder Valley Water Treatment Plant. The plant treats pit and underground mine waters prior to their discharge into the Humboldt River. Permitting is required for the silos because they are process fugitive sources.

2.12 Exploration

The company maintains above ground and below ground exploration drilling programs. These drilling activities do create fugitive dust emissions, but they only require permitting in general terms

2.13 Backup and Emergency Generators

Barrick has permitted ten (originally twelve) backup electrical generators to co-generate electricity as necessary during peak-demand periods. The generators are process sources of combustion product emissions from low sulfur diesel fuel firing. The generators require permitting to be operated in this manner. Additionally, Barrick maintains several emergency generators that qualify as insignificant activities pursuant to NAC 445B.288.2.(h).

2.14 Insignificant and Trivial Activities

These are activities listed on the NDEP's insignificant activities list which includes the activities defined under NAC 445B.288 and activities determined by the director to be insignificant based on emissions pursuant to NAC 445B.288. Insignificant activities are not specifically identified in a Title V permit, but a description of these activities is maintained for the record. Trivial activities are also identified and listed for the record. Barrick has submitted a facility wide insignificant activity list, with quantification of emissions, as part of the renewal application of their Title V Air Quality Operating Permit.

2.15 Condensable Particulate Matter

The first initial Title V Air Quality Operating Permit issued for the Goldstrike facility by the BAPC, omitted compliance testing requirements, (i.e. Method 202) for condensable particulate matter for fuel burning equipment located at the Goldstrike facility. Upon renewal of the Title V operating permit for Barrick Goldstrike, the BAPC has included the Method 202 test method for compliance demonstration with permitted particulate matter emission limits for all applicable combustion emission units. Any increases in the particulate matter emission rates (as a result of the Method 202 tests for condensable matter), over and above current permitted emission rates for particulate matter, will **not** subject Barrick to a revision and/or comparison to the PSD Significant emission thresholds for PM and PM_{10} for this Title V Renewal OP .

This is a correction of an error. Previously, the BAPC inadvertently looked at both PM and PM_{10} emissions without considering condensable particulates. A correction to the permitted PM and PM_{10} emission rates is necessary and accordingly, the BAPC will adjust the PM and PM_{10} emission rates to include the condensable fraction of particulate matter upon receiving the results from the Method 202 tests conducted at the Barrick Goldstrike facility.

The following emission units in the Title V Renewal OP have been revised to include increased PM and PM_{10} emission limits based on the results from the Method 202 performance tests, and the emission rates for the ambient air quality impact analysis for PM_{10} (both 24-hour and annual averaging periods) has been corrected accordingly to include these increases:
System 04 – Autoclave Circuit Boilers 2 & 3,
System 19 – Roaster Circuit Quench Tanks,
System 61 – Carbon Kiln #2 Burner,
System 66 – Autoclaves.

Table 2.15-1 identifies Systems and Revised PM & PM_{10} Emission Rates based on CPM tests
Table 2.15-1 (Comparison between Existing and Revised PM, PM_{10} Emissions)

System	Emission Unit Description	Existing PM, PM_{10} Emission Rates (lb/hr)	Existing PM, PM_{10} Emission Rates (tons/yr)	Revised PM, PM_{10} Emission Rates (lb/hr)	Revised PM, PM_{10} Emission Rates (tons/yr)
04	**Autoclave Circuit Boilers 2 & 3**	**0.57 each Boiler**	**4.87, total for 2 Boilers**	**1.10 each Boiler**	**9.40, total for 2 Boilers**
19	**Roaster Circuit**	**1.37 each**	**N/A**	**1.84 each**	**N/A**

	Quench Tanks (1 & 2)	**Tank**		**Tank**	
61	**Carbon Regeneration Kiln #2 (Burner)**	**0.34**	**N/A**	**0.60**	**N/A**
66	**Autoclave Circuit**				
	Autoclave 1	**0.65**	**2.85**	**2.28**	**9.99**
	Autoclaves 2 & 3	**4.48 total**	**19.62 total**	**7.00 total**	**30.66 total**
	Autoclave 4	**2.24**	**9.81**	**3.50**	**15.33**
	Autoclaves 5 & 6	**4.48 total**	**19.62 total**	**7.00 total**	**30.66 total**

3.0 APPLICABLE REQUIREMENTS

Applicable requirements are those regulatory requirements that apply to a stationary source or to emissions units contained within the stationary source. In Nevada's program, the regulations governing the emissions of air pollutants from which the applicable requirements originate, are derived from four categories of regulations. These four categories consist of the requirements contained in the Nevada Revised Statutes (NRS), the Nevada Administrative Code (NAC), the Applicable State Implementation Plan (ASIP), and the Code of Federal Regulations (CFR, contained in various Parts within Title 40).

3.1 Generally Applicable Requirements

Of the four categories of regulations governing emissions of air pollutants, there are many generally applicable requirements that apply to stationary sources and emission units located at a stationary source. A comprehensive summary of applicable permit requirements is contained in Sections I. through V. of the operating permit.

3.2 Specific Applicable Requirements

<u>Nevada Revised Statutes</u>

The Nevada Revised Statutes (NRS) is the statutory authority for the adoption and implementation of administrative regulations. The statutes relating to the control of air pollution are contained in NRS 445B.100 through 445B.640. The NRS specifies that the State Environmental Commission is the governing body given the power to adopt administrative regulations. Because the NRS is the enabling statutory authority, very few specific requirements are contained in the statutes. Rather, the NRS provides, generally, broad authority for the adoption and implementation of air pollution control regulations.

<u>Nevada Administrative Code</u>

The Nevada Administrative Code, (NAC), is a collection of administrative regulations that contain specific requirements relating to the control of air pollution. The State Environmental Commission adopts these regulations. The NAC requires that, where state regulations are more stringent in comparison to Federal regulations, the State regulations are applicable. The NAC sets forth, by rule, maximum emission standards for visible emissions (opacity), PM_{10} and sulfur emitting processes. Other requirements are established for incinerators, storage tanks, odors and maximum concentrations of regulated air pollutants in the ambient air. Other NAC regulations specify the requirements for applying for and method of processing applications for operating permits.

All of the equipment considered in this application must meet, at a minimum, the applicable standards and requirements set forth in the NAC. Note that the provisions in this section are "state only" regulations and are not federally enforceable. Specifically, the emission standards contained in NAC 445B.2203 for particulate matter, 445B.22047 for sulfur emissions, 445B.22017 for opacity, and 445B.22097 for the ambient air quality standards must not be exceeded.

<u>"Organic solvent and other volatile compounds" NAC 445B.22093.3 and 4.</u>

Paragraphs 3 and 4 of this regulation state that any tank for the storage of any other petroleum or volatile organic compound which is constructed or extensively remodeled on or after November 7, 1975, must be equipped with a submerged fill pipe or the equivalent, as approved by the director, for the control of emissions. All facilities for dock loading of products consisting of petroleum or other volatile organic compounds having a vapor pressure of 1.5 lb/square inch absolute (1,055 kg/square meter) or greater at loading pressure must have facilities for submerged filling by a submerged fill pipe or an acceptable equivalent, for the control of emissions. Barrick's non-exempt VOL storage tanks are equipped with submerged fill pipes in compliance with this regulation.

Nevada Applicable Sip (SIP)

Nevada's most recent ASIP, which was approved by U.S. EPA, is based on State regulations codified in 1982. In general, the regulations contained in the ASIP closely parallel the current NAC regulations. However, because the ASIP is based on older air quality regulations (at this time), compliance with all of the current NAC regulatory requirements does not necessarily ensure compliance with the ASIP requirements. All of the equipment considered in this application must meet, at a minimum, the standards set forth in the ASIP. Specifically, the emission standards contained in ASIP 445.731 for particulate matter, ASIP Article 8.2 for sulfur emissions, SIP 445.721 for opacity, and 12.1 for the ambient air quality standards must not be exceeded.

Code of Federal Regulations (CFR)

The Code of Federal Regulations (CFR) are regulations adopted by the U.S. EPA and published in the Federal Register pursuant to the authority granted by Congress in the Clean Air Act. The following sections list the federal requirements under 40 C.F.R. (Section 6.1.1), Nevada requirements specified in NAC 445B.001 to .3497 and the Nevada permit requirement listed in the existing air quality operating permits that limit air emissions form Barrick's non-exempt process sources.

New Source Performance Standards (NSPS)

The U.S. EPA has promulgated maximum emission standards and monitoring/recordkeeping methods for selected source categories. These standards are contained in Title 40 of the CFR, Part 60, and are known as the New Source Performance Standards (NSPS).

40 C.F.R. §60 Subpart K, Ka, and Kb

The New Source Performance Standards (NSPS) applies to VOL storage tanks constructed after July 23, 1984 with a design capacity of 40 m^3 (10,567 gallons) or greater, per §60.110b(b) & (c), storage tanks with (i) a design capacity less than $75m^3$ (39,890 gallons) and without regard to vapor pressure, (ii) a capacity greater than or equal to 151 m^3 (39,890 gallons) storing a liquid with a maximum true vapor pressure less than 3.5 kPa, or (iii) a capacity greater than or equal to 75 m^3 (19,813 gallons) but less than 151 m^3 (39,890 gallons) storing a liquid with a maximum true vapor pressure less than 15 kPa, are exempt from all NSPS requirements except those specified in paragraphs (a) and (b) of §60.116b. These paragraphs require that the facility maintain records of the tank dimensions and capacity for the life of the tank.

NSPS Subparts K, and Ka "Standards of Performance for Storage Vessels for Petroleum Liquids for Which Construction, Reconstruction, or Modification Commenced After June 11, 1973, and Prior to May 19, 1978: and "Standards of Performance for Storage Vessels for Petroleum Liquids for Which Construction, Reconstruction, or Modification Commenced After May 18, 1978, and Prior to July 23, 1984, " 40 C.F.R. §60.110- 113 and §60.110a- 115a, respectively, are inapplicable to Barrick's VOL storage tanks because each tank was installed after July 24, 1984. In addition, except for the two 250,000 gallon diesel tanks and one 12,000 gallon gasoline tank, all other VOL storage tanks at Barrick are not subject to NSPS Subpart Kb "Standards of Performance for Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for which Construction, Reconstruction, or Modification Commenced after July 23, 1984," 40 CFR §60.110b- 117b, because the capacity of each tank is less than the 10,567 gallons (40 cubic meters).

Barrick operates three diesel fuel storage tanks (250,000, 150,000 and 34,200 gallons respectively) and one gasoline storage tank (12,000 gallons) all of which fall within the general exemption. The maximum true vapor pressure of diesel fuel is well below 3.5 kPa and the gasoline tank has a storage capacity of less than $75m^3$. Barrick must only comply with the record keeping requirements specified in §60.116b(a) and (b). Barrick maintains these files at the facility.

<u>40 C.F.R. 60Subpart LL, §60.380-.386, "Standards of Performance for Metallic Mineral Processing Plants"</u>

NSPS Subpart LL applies to "affected facilities" at a metallic mineral processing plant. This standard requires that "process fugitive emissions" from the affected facility do not exhibit opacity exceeding 10 percent (§60.382(b)). Process fugitive emissions are defined as particulate matter emissions that are not collected by a capture system. Subpart LL also contains standards for "stack emissions" from affected facilities. However, Barrick has no "LL" units that have a stack.

<u>40 C.F.R 60 Subparts Db and Dc: Standards of Performance, Inapplicable to Boilers No. 1, 2, 3, and 4.</u>

NSPS subparts Db and Dc: "Standards of Performance for Industrial-Commercial-Institutional Steam Generating Units" and "Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units", 40 C.F.R. §60.40b-49b and §60.40c-48c, establish standards for steam generating units with heat inputs in the range of 10 to 250 MMBtu per hour. Boilers 1,2,3 and 4 are classified as process heaters (i.e., devices that are primarily used to heat a material to initiate or promote a chemical reaction in which the material participates as a reactant or catalyst) and therefore are not subject to these subparts.

40 C.F.R. Parts 61 and 63 National Emission Standards for Hazardous Air Pollutants (NESHAP)

Parts 61 and 63 establish the National Emission Standards for Hazardous Air Pollutants (NESHAPS). There are no sources at the facility for which a standard has been established under these parts. The federal NESHAP provisions are contained in 40 CFR Parts 61 and 63.

40 C.F.R. Parts 72 to 78 Acid Rain Exemption

The Barrick facility is exempt from the acid rain provisions under 40 C.F.R. Parts 72 to 78 because there are no units listed in Tables 1, 2, or 3 of §73.10 at the facility, and there are no utility units at the facility that serve a generator that produces electricity for sale.

40 CFR Part 52.21. Prevention of Significant Deterioration Regulations (PSD)

The U.S. EPA delegated implementation of the federal PSD regulations to the State of Nevada; and NBAPC implements the federal PSD regulations through a delegation agreement with EPA. These regulations contained at 40 CFR Part 52.21 specify federally required permitting procedures for each "major stationary source". The PSD regulations define a "stationary source" as "any building, structure, facility, or installation which emits or may emit any air pollutant subject to regulation under the Act."

A "building structure facility or installation" is defined as "all of the pollutant emitting activities which belong to the same industrial grouping, are located on one or more contiguous or adjacent properties, and are under the control of the same person (or persons under common control) except the activities of any vessel. Pollutant-emitting activities shall be considered as part of the same industrial grouping if they belong to the same "Major Group" (i.e., which have the same first two digit code) as described in the Standard Industrial Classification Manual, 1972, as amended by the 1977 Supplement."

"Major" is defined as the potential to emit of a stationary source, which equals or exceeds a specified threshold (in tons per year) of any air pollutant regulated under the Clean Air Act (40 CFR 52.21(b)(1)). The first threshold is for a stationary source that emits or has the potential to emit 100 tons per year or more and is defined as one of 28 specific categories of sources (see 40 CFR 52.21(b)(1)(i)(a). The other applicability threshold is for any other stationary source that emits or has the potential to emit 250 tons per year (see 40 CFR 52.21(b)(1)(i)(b)). As mentioned above, the SIC code for this facility is 1041 (Gold Ores). None of the 28 specific categories is representative of this facility. Major source status is classified at the 250 tons per year emission threshold for any pollutant regulated under the Act.

Prevention of Significant Deterioration Determination

As discussed above, 40 CFR Part 52.21 specifies that Prevention of Significant Deterioration (PSD) review is required for any new major stationary source or any major modification. A major source is defined as any pollutant emitting activities, which belong to the same two digit Source Industry Classification (SIC), and:

1. Emit 100 tons/yr or more of a regulated air contaminate as one of the listed categories of sources listed in 40 CFR 52.21; or
2. Emits 250 tons/yr or more of a regulated air contaminant and belong to any other category sources.

Although this facility is not classified as one of the listed categories of sources, the total potential to emit of a regulated pollutant exceeds 250 tons/yr. The facility is a major PSD source. Any relaxation of the limits specified in the final operating permit or modifications that increase the emissions above the applicable significant emission threshold will require a full PSD/NSR review of the source as though construction had not yet commenced.

Compliance Assurance Monitoring (CAM)

The U.S. EPA has promulgated requirements for sources to provide detailed monitoring plans that will ensure compliance with all applicable requirements.

These monitoring requirements are contained in 40 CFR Part 64. Section 64.2 specifies that these monitoring requirements apply to a "pollutant specific emission unit at a major source" if all of the following are satisfied:

- The unit is subject to an emission limitation or standard;
- The unit uses a control device to achieve compliance with any such emission limitation or standard; and
- The unit has potential pre-control device (uncontrolled) emissions equal to or greater than 100 percent of the amount, in tons per year, required for a source to be classified as a major source.

The key factors that would require the submission of a CAM plan are: 1) the facility must be defined as a “major source”; and 2) the units must be subject to an emission limitation or standard (acid rain limitations and standards are not included). Because Barrick Goldstrike is subject to the NSPS, and has several emission units that have potential pre-control emissions equal to or greater than 100% of the amount, in tons per year required for a source to be classified as a major source, a CAM plan is required. Barrick has submitted as Supplement to their Title V-Class I Air Quality Operating Permit Renewal Cam Plans for the following emission units:

Table 3. List of Emission Units with CAM Plans

Emission Unit Description Cam Plan		Pollutant and Emission Limits (Controlled)	Control Technology	Monitoring Requirements
System 05 - Autoclave Circuit S2.024	Propane fired 238.16 MMBtu Boiler No 4 FW Model AG5175C	NOx 3.19 lb/hr 13.98 tpy	SCR to control NOx	1. Daily catalysts temp reading 2. Daily ammonia flow rate reading 3. Annual Catalyst activity test
System 09 – Roaster Crushing Circuit	Primary Crushing Process S2.201	PM 2.59 lb/hr PM_{10} 2.59 lb/hr Opacity 7 % & 20%	Baghouse	1. Weekly visible emission assessment, if yes, Method 9 within 24 hrs.
System 11 – Roaster	Secondary Crushing/Screenin	PM 1.29 lb/hr PM_{10} 1.29 lb/hr	Baghouse	1. Daily pressure drop reading

Crushing Circuit	g S2.202	Opacity 7% & 20%		2. Weekly visible emission assessment
System 13 – Roaster Mill Circuit	Apron Feed System & conveyors S2.203	PM 1.29 lb/hr PM_{10} 1.29 lb/hr Opacity 7 % & 20%	Baghouse	Weekly visible emission assessment, if yes, Method 9 within 24 hrs.
System 15A & 15B -Roaster Mill Circuit	Air pre-htr. & dry grinding process, conveyors, air slide systems, bkt. elev. classifiers S2.204 and S2.205	PM 12.6 lb/hr PM_{10} 12.6 lb/hr Opacity 7 % & 20%	2-Product recovery baghouses & Pick-up point baghouse	1. Daily pressure drop reading 2. Weekly visible emission assessment
Emission Unit Description CAM Plan		Pollutant and Emission Limits (Controlled)	Control Technology	Monitoring Requirements
System 16A & 16B - Roaster Mill Circuit	Air Pre-heater and Mill 2 Dry Grinding Process S2.206 and S2.207	PM 12.6 lb/hr PM_{10} 12.6 lb/hr Opacity 7 % & 20%	2-Product Recovery baghouses & Pick-up point baghouse	1. Daily pressure drop reading 2. Weekly visible emission assessment
System 17 – Roaster Circuit	Roasters 1 and 2 Feed Process S2.208	PM 1.01 lb/hr PM_{10} 1.01 lb/hr Opacity 7 % & 20%	Baghouses	1. Daily pressure drop reading 2. Weekly visible emission assessment
System 18 – Roaster Circuit	Ore Roaster 1 & 2 Process S2.209 S2.209.1, S2.209.2	PM 6.0 lb/hr PM_{10} 6.0 lb/hr Opacity 20%	Wet ESP to control particulate emissions	Cont. monitoring of ESP transformer P&S voltage and current. Wkly visible emission assessment
System 18 –	Ore Roaster 1 & 2	Hg: 0.2 lb/hr	Calomel	Daily HG-chloride

Roaster Circuit	Mercury Scrubber Process S2.209 S2.209.1, S2.209.2		process wet scrubber	solution inlet line pressure & reading of gas stream temp.
System 18 – Roaster Circuit	Ore Roaster 1 & 2 Thermal oxidizer S2.209 S2.209.1, S2.209.2	VOC 30 lb/hr	Thermal oxidizer to control VOC	Continuous CO monitoring
System 18 – Roaster Circuit	Ore Roaster 1 & 2 2xVenturi Scrubbers S2.209 S2.209.1, S2.209.2	PM & PM_{10} 6.0 lb/hr 20 % opacity	Venturi scrubbers	Continuous venturi pressure drop, continuous water flow reading, weekly visible emission assessment
System 19 – Roaster Circuit	Roaster 1 Quench Tank Process S2.210	PM & PM_{10} 1.37 lb/hr 20 % opacity	Venturi scrubber	Daily venturi pressure drop and daily water flow reading, Weekly visible emission assessment
Emission Unit Description CAM Plan		Pollutant and Emission Limits (Controlled)	Control Technology	Monitoring Requirements
System 19 – Roaster Circuit	Roaster 2 Quench Tank Process S2.211	PM & PM_{10} 1.37 lb/hr 20 % opacity	Venturi scrubber	Daily venturi pressure drop and daily water flow reading, Weekly visible emission assessment
System 27 – Ancillary Roaster Process	Vacuum Housekeeping System S2.221	PM & PM_{10} 0.51 lb/hr 20 % opacity	Baghouse	Daily pressure drops Weekly visible emission assessment
System 96 – Shotcrete Plant & Aggregate Dryer	Aggregate Dryer with screen, bucket elevator and silo loading	PM & PM_{10} 7.0 lb/hr	Baghouse	Daily pressure drop

New Applicable Requirements

In accordance with NAC 445.B.3405.1 (h), Barrick must comply in a timely manner with any new applicable requirement that becomes effective during the term of the operating permit.

4.0 EMISSIONS INVENTORY
4.1 Emissions

Table 4. Summary of the Facility-Wide Potential to Emit, (Tons Per Year)

Facility-Wide Renewal	H_2S	PM	PM_{10}	NO_x	SO_2	CO	VOC
	81.0	415.0	379.0	393.0	251.0	361.0	264.0

4.2 Potential to Emit
<u>Maximum Throughput</u>

The maximum hourly and annul throughput rates used for this review are those provided by Barrick in their renewal and earlier applications. Barrick reports that their permit has used maximum hourly and annual throughput rates that are based on the design capacity of the equipment or are based on an upper estimate of production requirements in terms of tons of throughput and/or gallons of fuel fired averaged over the 24 hours (or in some cases a lesser hourly operating time) in each day. During the review, NDEP met with Barrick to review specific issues and to review how the various operating hour estimates were derived. Barrick provided information supporting their estimates for the annual emission limits and inventory. Following-up with compliance, individual exceedance reports have been filed from time to time, but no systematic exceedance trends and issues were noted.

Control Efficiencies

The control systems and corresponding estimated control efficiencies used to estimate emissions from each process source were provided by Barrick in their permit application. When no control efficiency is specified, the controls are taken into account by the emission factors.

The types of control equipment employed by Barrick include:

- Pneumatic sprays
- Pneumatic sprays combined with an extended building enclosure
- Conveyor transfer point covers
- Lime, cement, or fly ash silo baghouses for loading, enclosed screw conveyors for silo discharging, and covers at the screw conveyor discharge point
- Autoclave venturi wet scrubbers
- Mercury retorts, condensers and carbon adsorbers
- Boiler selective catalytic reduction (SCR) system
- Baghouse for laboratory equipment and melting furnaces

Pneumatic sprays are estimated by the manufacturer and NDEP to control particulate emissions by 95%. Sprays are applied on primary ore crushers, in conjunction with extended building enclosures; recycle cone crusher, and various conveyors, feeders, bins, and hoppers. The extended building enclosures used on the primary ore crushers extend approximately ten (10) feet up around the dump pockets and have an assigned control efficiency of 90%. The combined control efficiency of the pneumatic sprays and extended building enclosures is estimated to be 99.5%. The control efficiency applied to the recycle cone crushers and backfill plant conveyor, bin, and hopper drop points includes consideration for controls.

Building enclosures and conveyor covers reduce the effect of dust particle suspension due to wind and inhibit the diffusion of dust particles from the emission point to ambient air. Building enclosures or covers are used on the backfill plant crushers and screens, and on various conveyor, feeder, bucket, chute, hopper, skip and bin drop points. Emission estimates for these process sources account for this control.

The control systems used on the lime, cement, and fly ash silos consist of baghouses placed at the top of the silos to control particulate emissions from pneumatic loading, an enclosed screw conveyor at the silo discharge point, and (in most cases) a cover around the screw conveyor discharge point. The control efficiency of the baghouse was estimated by the manufacturer and, because of the discharge enclosures, the control efficiency at these emission points is estimated at 99%.

A control efficiency estimate is not required for the autoclave venturi wet scrubbers, the mercury retort condensers and carbon adsorbers, and the east and west furnace baghouse. Emissions from the autoclaves, retorts, and furnaces are determined from emission factors that account for these controls. The SCR system on boiler No 4 is used to control NOx emissions.

Four separate baghouses are used to control particulate and/or lead emissions from the analytical sample preparation and fire assay laboratories, and the metallurgical sample preparation and fire assay laboratories. The control efficiencies of the two baghouses used to control particulate emissions from the sample preparation laboratories are estimated by the manufacturer. The control efficiencies of the two baghouses used to control particulate and lead emissions from the fire assay laboratories are estimated at 98% by the manufacturer.

Emission Factors

The emission factors used in this permit are those utilized in previous permit revisions. Previous NDEP-BAPC reports document the following concerning the source and applicability of these emission factors.

The combustion product emission factors from AP-42, Table 1.5-1, Liquefied Petroleum Gas Combustion, were used to calculate emissions from all propane-fired units with the exception of Boilers No. 2,3, and 4. For boilers No.2 through 4, the emission factors came from the following three sources: AP-42 Table 1.5-1, manufacturer's data, and the permitted emission limits divided by the permitted throughput rates. Note that the boiler emission limits (specifically NOx and CO) have been verified by stack tests.

Lime, cement, and fly ash silo particulate emissions were calculated using the pneumatic loading (for silo loading) and weigh hopper loading (for silo discharging) emission factors from AP-42 Table 11.12-1, Concrete Batching. Because these emission factors are for uncontrolled loading, the appropriate control efficiency was used to calculate emissions from the controlled loading and discharging of Barrick's silos.

The particulate emission factors found in AP-42 Table 11.19-2, Crushed Stone Processing, were used to calculate emissions form the backfill plant primary crusher, the crusher bin (loading) secondary crusher, screen, and aggregate transfers (or drops) associated with the backfill plant conveyors, bins, and hoppers. In all cases, emissions were calculated using controlled emission factors to account for the associated enclosures or pneumatic sprays. Emissions from the recycle cone crushers (used to crush recycle ore from the SAG mill) were also calculated using the controlled emission factors from this chapter based on NDEP's determination of appropriate emission factors for this source type.

The particulate emission factors found in AP-42 Table 11.24-2, Metallic Mineral Processing, were used to calculate emissions from Barrick's primary ore crushers.

The particulate emission factor equation provided in AP-42 Section. 13.2.4, Miscellaneous Sources Aggregate Handling and Storage Piles, was used to calculate emissions from ore/mine rock transfers (or drops) associated with conveyors, apron feeders, bins, hoppers, buckets, and chutes. This emission factor equation calls for wind speed and material moisture content. A 7.5 mph wind speed (the annual average wind speed measured at Barrick's meteorology station) was used for non-enclosed transfers and a 1.3 mph wind speed (the lowest value listed in Ap-42 for use in the equation) was used for underground or enclosed transfers. Use of the lower wind speed (1.3 mph results in a controlled emission factor (i.e. an emission factor that takes into account the control efficiency of the enclosure). The ore moisture percentages used in the equation are based on ore sample analyses. Ore found in the Betz/Post pit averages approximately 3 % moisture.

Ore found in the Meikle Mine and Rodeo shaft averages well above 3.5 % moisture. The two wind speeds and two moisture values result in four distinct emission factors.

Emissions of VOCs from the VOL storage tanks were calculated previously using the U.S.EPA Tanks Program (version 3.0). This program provided annual VOC emissions for a given maximum annual VOL throughput for each tank. An emission factor for each tank was then determined by dividing the calculated annual emission rates by the annual maximum throughputs. The Tanks 3.0 output can be found in Barrick's facility-wide permit application.

The particulate and SO_2 emission factors for the autoclave and the particulate emission factors for the carbon reactivation kilns are based on the permitted emission limits (and thus the emission factors) have been verified by stack tests.

4.3 Potential Emissions Inventory

A separate estimate of the potential emission inventory was completed for this review and it is provided as an attachment to this document.

4.4 Determination of Major Source Status for HAPs

An historical reference indicates a major source review for HAPs was completed in

December 1999, and updated Febrary 2000, Engineering Review by NDEP-BAPC. According to the reference, the quantification was performed using the NDEP approved methodology, *Recommended Methodology for Quantification of Fugitive Dust Metals Emissions from Mining Activities for Title V Applicability*. The reference reports that the fugitive dust metal emissions add up to less than 10 tons per year per HAP, and 25 tons per year of any combination of HAP's. As an update to this earlier work, Barrick has provided a current HAP Emissions Inventory Table - Potential HAP Emissions by Emission Type and Pollutant, confirming that the Barrick Facility is not a major source of HAPs.

5.0 Compliance Plan and Compliance Statement

Barrick's compliance plan addresses the applicable requirements and provides a compliance certification statement. The compliance monitoring, record keeping, reporting, and testing plan began with issuance of the Class I Operating Permit.

5.1 Compliance Monitoring and Test Methods

<u>Compliance Plan for Applicable Federal Standards</u>

In accordance with 40 C.F.R. Subpart Kb, Barrick will maintain records of the dimensions and capacity of each affected storage tank for the life of the tanks.

40 C.F.R. 60 Subpart LL limits the opacity from the process sources affected by this standard to 10 percent. Initial compliance with this limit was determined by performing EPA Method 9 opacity tests on affected sources within 90 days after issuance of the operating permit. Subsequent compliance demonstration is determined from ongoing monitoring, record keeping, and reporting. When monitoring of controls, visual inspections, and production rates indicate noncompliance with the 10% opacity standard, Barrick will initiate a review of the affected facilities, will make whatever corrections are warranted, and will perform follow-up EPA Method 9 opacity tests.

<u>Compliance Plan for Applicable Nevada Standards</u>

The sulfur emission limits established by Nevada regulations are less stringent than the permitted emission limits (potential emissions) estimated for each applicable process source in this application. Compliance with the proposed emission limits will ensure compliance with the Nevada emission standards.

<u>Compliance Plan for Permit Conditions</u>

Permit conditions impose limits on emissions, including opacity, and limits on operating procedures. The emission limits are a function of the operating parameters, i.e. throughput, fuel use limits, control requirements, and operating schedules. A demonstration of compliance with these underlying operating parameters will verify compliance with the emission limits. For certain process standards, the parametric monitoring will be supplemented with periodic stack testing.

Parametric Monitoring

In accordance with NAC 445B.3405.1(c), the monitoring frequency must be consistent with the emission limit-averaging period. For example, parametric monitoring for compliance demonstration with hourly emission rate calculations (applied over the operating hours in each day) will, in most cases, be performed daily.

- Parametric monitoring and recording activities for each process source consist of one or more of the following:
- Recording of daily throughput,
- Recording of daily fuel consumption
- Recording the amount of fuel, lime, or fly ash purchased each month
- Inspection of the control system
- Monitoring of control system parameters
- Recording of the operating schedule, and/or

Throughput and Fuel Consumption

Daily throughput of the mill, autoclave and roaster process sources is determined from weight scales, flow/density meters, or by logging the bucket loads into the crushers. Daily throughput of the Meikle production shaft and Rodeo shaft process sources is determined from weight scales or by logging the number of skips or buckets unloaded. Daily throughput of the backfill plant crushing and screening process sources is determined by weight scales or by logging the bucket loads into the primary crusher. Daily throughput of the furnaces and kilns is determined from weight scales. Daily throughput of the laboratory process sources is determined by logging the number samples processed and assayed.

The amount of lime, cement, and fly ash loaded into the silos is determined from delivery truck weights (purchasing receipts). Discharge from the silos is determined monthly from purchasing receipts and measurements of the level of lime, cement, and fly ash in the silo at the beginning and end of the month. Fuel purchased for the diesel and gasoline tanks is determined monthly based on fuel delivery records. Daily fuel consumption of the boilers, kilns, and mine air heaters is measured by propane flow meters. The daily fuel consumption of the propane vaporizers is estimated from the hours of operation multiplied by the maximum hourly fuel input rate. All information regarding throughputs and fuel consumption is logged onto data sheets. This information will be maintained at the facility for at least five years.

Control System Inspection or Monitoring

The different control systems employed by Barrick include pneumatic sprays, building enclosures, conveyor transfer points covers, silo baghouses (loading) and enclosures (discharging), autoclave venturi wet scrubbers, mercury retort condensers, and carbon adsorbers, a selective catalytic reduction (SCR) system on boiler No. 4, and laboratory and furnace baghouses. These controls are either inspected daily and/or monitored for performance.

The pneumatic sprays are inspected each day to ensure proper operation (i.e., the sprays are on and there is normal water flow and dispersion). Each pneumatic spray bar is fitted with backup spray nozzles, and normal water flow and dispersion are determined when at least two out of three nozzles are functioning on bars with three nozzles, three out of four nozzles are functioning on spray bars with four nozzles, and at least 80% of the nozzles are functioning on spray bars with five or more nozzles. Records of each inspection must be maintained for five years.

Building enclosures will be inspected periodically to ensure the integrity of the enclosures is maintained. Conveyor transfer point covers will be inspected daily to ensure that they are intact (i.e., surround the transfer point on all sides). Records of the inspection results must be maintained for five years.

The baghouse on each silo will be inspected once for each day loading occurs. The inspection will consist of visually observing the baghouse vent (from the ground) at some time during the loading process. The baghouse is determined to be operating when no visible emissions are observed. Enclosed transfer between the silo and screw conveyor and the cover around the screw conveyor discharge point will be inspected daily to ensure that the enclosure and cover are intact. Records of the results of each inspection will be maintained for five years.

The autoclave and roaster wet scrubbers are tracked by continuously monitoring the scrubber water flow rate. These wet scrubbers are deemed to be operating properly when the water flow rate is maintained above, or equal to 100 gallons per minute (averaged over a one-hour period) and the minimum water flow rate does not drop below 20 gallons per minute for more than 10 consecutive minutes in each hour. Water flow rate data is measured by flow meters and logged by a computer. Recorded data is reviewed daily to determine whether the instantaneous flow rate has been maintained above, or equal to 100 gallons per minute. If there are no instances when the flow drops below 100 gallons per minute, compliance is verified and noted on the daily log sheet. If the instantaneous flow rate drops below 100 gallons per minute, the data will be reviewed to determine compliance with the flow rate limits. If in compliance, this is noted on the log sheet. If non-compliance is determined, this is also noted on the log sheet. Records will be maintained for five (5) years.

The mercury retort condensers are monitored by continuously monitoring the condenser water temperature. The condensers are deemed to be operating properly when the condenser water temperature is maintained below 100ºF. To ensure there are no leaks in the retort, the vacuum gauge pressure is continuously monitored. Acceptable vacuum pressure readings (gauge) are at least 5 inches of water within the first 10 minutes of the batch process and maintaining this pressure or higher for the remainder of the batch. The rotors are designed to automatically shut down before the pressure or temperature falls outside of these limits. The retorts are also equipped with carbon adsorbers as a backup control. The carbon in the adsorbers is replaced at least once a year to ensure proper working order of this backup control system. Records will be kept of the carbon adsorber replacement dates, and the minimum pressure and maximum temperature readings for each batch for five years.

The Boiler No 4 SCR system is monitored during boiler operation (which excludes the boiler and catalyst start-up period) by monitoring the exit NOx concentration with a NOx meter. A reading of 9 ppm (averaged over a 24-hour period) or less indicates that the SCR system is functioning properly. The NOx concentration for each day will be maintained for five years.

The pressure drop across the four laboratory baghouses and the baghouse for the east and west furnaces will be inspected daily. If the pressure reading is out-of-range (as defined by the manufacturer), the problem will be corrected. Records of the results of each inspection will be maintained for five years.

Operating Schedule

Except for the mercury retorts, the source emissions for each process are based on throughput and in some cases, controls. Hours of operation do not play a role in determining emissions or demonstrating compliance for these process sources, and therefore do not need to be recorded. For the retorts, emissions are solely a function of controls and hours of operation. Barrick must record the hours of operation of each retort daily and maintain these records at the facility for at least five years.

Stack Testing

Barrick also supplements the parametric monitoring with specific stack testing for the autoclave, roaster, boilers, and carbon kiln. These are more specifically described in the attached operating permit under Specific Operating Conditions.

Reporting

In accordance with NAC445B.3405.1 (e), Barrick submits reports of all required monitoring to NDEP every six months, within eight (8) weeks after the end of the reporting periods. The reporting periods end June 30 and December 31. The semi-annual compliance monitoring reports must include the following information:

- The total throughput and/or fuel consumption for each process source for the last six months and lasts 12 months
- The days where required control inspections or monitoring showed that the control system for a process source was not functioning properly, and
- Hours the mercury retorts operated in the last six months and the last 12 months.

Any deviations from the requirements of the operating permit will be reported promptly pursuant to NAC445B.3405.1 (e). Promptly, constitute reporting deviations on the six-month report, except for excess emissions. In accordance with NAC 445B.232, Barrick will report any incidents of excess emissions by phone or fax to NDEP within one working day, and provide the information required under paragraph 5 of this regulation within 15 days.

5.2 Compliance History

Notice of Action: Order of Compliance No. 2002-1A for Barrick's Roaster Facility, Amendment No. 2 Operating Permit No AP1041-0739. Amended schedule of compliance to schedule established in Compliance Order No 2002-1, (**issued July 5, 2001)** for the Roaster Facility, dated November 19, 2001. Address delays in the start-up date of the new CO incinerator caused by transportation and manufacturing problems resulting in more than 14 days of lost time. NDEP amended Compliance Order No 2002-1 to change the operational date of the CO incinerator to November 29, 2001 and to allow the Roaster to operate until November 30, 2001 in the event the shakedown and tie-in schedules are not met, subject to conditions.

Notice of Action: Order of Compliance No. 2002-1 For Barrick's Roaster Facility, Operating Permit No. AP1041-0739 **Dated July 5, 2001.** NDEP notes that a violation of the permitted emission limits for CO and NOx has occurred from the roaster's gas handling facility, which includes the CO incinerator and the Selective Catalytic Reduction (SCR) NOx reduction unit, during the first year of the Roaster's operation. NDEP issued an enforceable compliance schedule for Barrick to follow until the existing CO incinerator is replaced with a new CO incinerator capable of handling the wide range of Roaster off gas concentrations possible across all operating conditions. The Order allowed for the continued operation of the Roaster facility in excess of the permitted CO emission limits during the compliance scheduled period and the revision of the permitted emission limits.

6.0 AMBIENT AIR QUALITY IMPACT

The purpose of the air quality analysis was to provide the first facility wide emissions model, to assess the ambient air impacts of criteria pollutant emissions for the facility, and to demonstrate that the emissions from the stationary source will not cause or contribute to a violation of any applicable federal or state ambient air quality standards. Although Barrick Goldstrike Mines, Inc. did not provide a modeling analysis as part of their original application, NDEP did request and Barrick did provide a facility wide modeling analysis for this renewal.

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Table 5. Modeled Pollutant Emission Rates are:

POLLUTANT	EMISSION RATE	
	Pounds per hour	Tons per year
Carbon Monoxide	264.2	N/A
Sulfur Dioxide	82.9	251.0
Nitrogen Oxide	N/A	393.0
Particulate Matter (PM_{10})	146.96 (CPM included)	379.0

Ambient air impacts from the facility-wide sources were assessed at receptors with a 25-meter spacing along the modeling boundary and at a grid of offsite receptors extending 12 kilometers from the center of the Barrick facility with a 100-meter spacing. A total of 12,087 receptors were used in the modeling analysis.

Table 6. Modeling Results and Compliance with Ambient Standards

Pollutant	Averaging Period	Maximum Impact (μg/m^3) (CPM included)	Background Concentration (μg/m^3) *	Total Impact (μg/m^3)	NAAQS Standards (μg/m^3)
NOx	Annual	9.8	19	28.8	100
PM_{10}	24-Hour Annual	111.64 11.7	36.1 36.1	147.7 47.8	150 50
CO	1-Hour 8-Hour	1,989 557	- -	1,989 557	40,000 10,000
SO_2	3-Hour 24-Hour Annual	96.8 20.0 3.3	3 3 3	99.8 23.0 6.3	1300 365 80

* Concentrations measured on site by Barrick's on-site monitoring station; Calendar year 2000 – 2001, and are much more conservative than true background concentrations since the monitoring station is measuring cumulative impacts from both Barrick and other nearby sources.

7.0 PROPOSED OPERATING PERMIT

CLASS I RENEWAL
Barrick Goldstrike Mines Inc.

The Barrick Goldstrike Mines, Inc. Title V permit renewal (See Attachment 2, AP1041-0739.01) lists the emission units, throughputs, combustion rates, and control technologies as requested in the submitted Title V Renewal application. The emissions units are incorporated into the permit chronologically and do not necessarily follow any particular process scheme.

8.0 CLASSIFICATION OF AIR BASIN

The Barrick facility is located within upper Hydrographic Basin 61. This area has been designated as unclassifiable/attainment for criteria air pollutants.

9.0 COMPLIANCE STATEMENT

The Barrick facility as described in this application is currently operating under two compliance orders issued in 2001. Otherwise, Barrick complies with all applicable requirements identified earlier. The compliance certification statement, signed by the responsible official of the facility, was included in the application. By signing the certification, Barrick is agreeing to comply with applicable requirements with which it is in compliance and to meet in a timely manner any new applicable requirements that become effective during the operating permit term. Compliance demonstration will be based on the test methods and monitoring plans described in section 5.

In accordance with NAC 445B.3405.1(j), Barrick will submit a compliance certification statement annually. This statement will be submitted within eight weeks after December 31 with the semiannual compliance monitoring report.

10.0 CONCLUSIONS / RECOMMENDATIONS

Based on the above review and supporting data and analyses, Barrick Goldstrike Mines

Inc.'s request to renew their Title V Air Quality Operating Permit for the Barrick Gold Strike Mine will not violate any applicable requirements. As a result, I recommend that the conditions specified in the proposed renewed operating permit be issued.

Rod A. Moore Date
Staff Engineer, Permitting Branch

Matthew DeBurle Date
Supervisor, Permitting Branch

Attachment (1) Emissions Calculation Sheets
Attachment (2) Draft Operating Permit

CLASS I RENEWAL
Barrick Goldstrike Mines Inc.

ATTACHMENT 1
Emissions Calculation Sheets

CLASS I RENEWAL
Barrick Goldstrike Mines Inc.

ATTACHMENT 2
Draft Operating Permit

CLASS I RENEWAL
Barrick Goldstrike Mines Inc.