ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION
Air Permits Program

TECHNICAL ANALYSIS REPORT
for
Air Quality Control Minor Permit No. AQ0978MSS01

Alaska Gold Company
Rock Creek Mine

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Date: Preliminary – October 19, 2006

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Abbreviations/Acronyms

AAC	Alaska Administrative Code
ADEC	Alaska Department of Environmental Conservation
AQC	Air Quality Control
AS	Alaska Statutes
ASTM	American Society of Testing and Materials
COMs	Continuouse Emission Monitoring System
C.F.R.	Code of Federal Regulations
EPA	U.S. Environmental Protection Agency
MR&R	Monitoring, Recordkeeping, and Reporting
N/A	Not Applicable
NESHAPS	National Emission Standards for Hazardous Air Pollutants
NSPS	New Source Performance Standards
ORL	Owner Requested Limit
PS	Performance Standard
PSD	Prevention of Significant Deterioration
PTE	Potential to Emit
TAR	Technical Analysis Report
TBD	To Be Determined

Units and Measures

bhp	brake horsepower
gr./dscf	grains per dry standard cubic feet (1 pound = 7,000 grains)
dscf	dry standard cubic foot
gph	gallons per hour
kW	kiloWatts (electric)
lbs	pounds
mmBtu	million British Thermal Units
ppm	parts per million
ppmv	parts per million by volume
ppmw	parts per million by weight
tph	tons per hour
tpy	tons per year
wt%	weight percent

Pollutants

CO	Carbon Monoxide
HAPS	Hazardous Air Pollutants
NO_X	Oxides of Nitrogen
NO_2	Nitrogen Dioxide
NO	Nitric Oxide
PM	Particulate Matter
PM-10	Particulate Matter with an aerodynamic diameter less than 10 microns
S	Sulfur
SO_2	Sulfur Dioxide
VOC	Volatile Organic Compound

1. Introduction

This Technical Analysis Report (TAR) provides the Alaska Department of Environmental Conservation's (Department's) basis for issuing Air Quality Control (AQC) Minor Permit No. AQ0978MSS01 to the Alaska Gold Company (AGC) for a project at the Rock Creek Mine (RCM). The AGC's minor permit application is dated August 3, 2006. AGC is planning to construct an open pit mine and rock crusher at the RCM.

2. Background

2.1. Current Permits

There are currently no other Air Quality Control permits issued to AGC for the RCM.

2.2. Project Description

The RCM will be an open pit mine that operates 24 hours per day, 365 days per year. The RCM mill will process approximate 7,700 tons of gold ore per day. The RCM mill includes a crushing and grinding circuit, a gravity circuit, a floatation circuit, and a cyanide carbon leach circuit. The primary air pollutant emissions from the mill will be particulate matter from the crushing and grinding circuit. Particulate matter emissions from the primary jaw crusher and secondary and tertiary cone crushers will be controlled by baghouses.

Combustion emissions will result from oil-fired heaters and boilers used to heat water and provide comfort and process heat to RCM facilities. Combustion emissions will also result from two 320 kilowatt (kW) emergency generators. The generators will be in emergency service because the RCM will purchase power from the Nome Joint Utility System. The generators will only be operated when power is lost from the Nome Joint Utility System or for reliability checks and maintenance.

AGC indicated in their application fugitive particulate matter emissions are expected from three areas of the RCM. These areas are material drop points on the crushing circuit, the fine, crushed ore stockpile, and the RCM haul roads. AGC indicated fugitive particulate matter emissions from crushing circuit drop points will be reduced by minimizing drop distances and enclosing the material drop points. AGC also indicated fugitive particulate matter emissions from the RCM haul roads will be minimized by watering the mine haul roads with dust control agents such as magnesium chloride or calcium chloride. The department amended the dust control plan so that all of these control measures are included. The permit requires compliance with the dust control plan.

AGC also indicated in their application that fugitive dust emissions from the RCM pit, organic soil stockpiles, waste rock and overburden piles, and tailings ponds will be minimal because:

- Fugitive dust emissions from the RCM pit will be minimized because most of the pit will be below the water table. Though Rock Creek will use surface water diversion ditches and ground water pumping to dewater the pit, dewatering is not completely effective and the pit will be damp.
- The organic soil stockpiles will be seeded and vegetated to prevent erosion.

- Waste rock and overburden material is normally gravel size and larger. Because the overburden may also contain fines, the permit requires daily inspections.
- Tailings from the mill will be pumped as a slurry onto the tailings ponds. As a result, the surface of the tailings pond will either be wet or frozen. The tailings dams will be armored with very coarse materials to protect the tailings dams and to prevent erosion from wind and water.

Because AGC indicated fugitive dust emissions from the RCM pit, organic soil stockpiles, waste rock and overburden piles, and tailings piles will be minimal to non-existent, fugitive dust emissions from these facilities were not included as emission units by AGC in this permit application for the Rock Creek Mine.

The Departments' findings regarding the application are listed in Section 3

2.3. Project Emissions Summary

In their application, the AGC provided emission calculations for the RCM. The AGC used the following assumptions in their emission calculations.

(1) Units 1 through 85 unlimited operations. Units 86 and 87 500 hours per year.

(2) Units 1, 16 through 18, 31 through 35 and 42 are fugitive dust sources that count toward permit applicability and as assessable emissions. Fugitive PM-10 emissions based on Equation 1 in AP42 Chapter 13.2.4.

(3) Fugitive dust sources from unpaved roads based on AP42, Chapter 13.2.2. Fugitive dust souces from Fine Ore Storage Pile based on AP42 Chapter 13.2.5. [These are fugitive dust sources that count toward permit applicability and as assessable emissions]

(4) Units 2 through 15, 19 through 30 and 36 through 41 PM-10 emissions controlled by baghouses. PM-10 emissions based on vendor provided emission factors for the baghouses.

(5) NO_X and PM-10 emissions for Units 43 through 85 based on AP-42 Table 1.3-1.

(6) NO_X and PM-10 emissions for Units 86 and 87 based on vendor emission factors at 1800 rpm and 100 percent load.

(7) SO_2 emissions for Units 43 through 87 based on mass balance calculations, assuming 7.05 lb fuel per gallon fuel with 0.50 wt%S.

Potential emissions from these units and pollutant emitting activities authorized by this minor permit are shown in Table 1.

Table 1 –Emission Estimates [a]

Unit No.	Description	Potential Emissions in tpy				
		NO_X	CO	PM-10	VOC	SO_2
1, 16 thru 18, 31 thru 35, and 42	Crushing and Grinding Circuit	N/A	N/A	5.74	N/A	N/A
2 thru 15, 19 thru 30, and 36 thru 41	Crushing and Grinding Circuit	N/A	N/A	12.00	N/A	N/A
43 through 85	Domestic Heaters and Boilers (Diesel)	9.20	N/A	0.92	N/A	32.11
86 through 87	Emergency Generators (Diesel)	2.88	N/A	0.02	N/A	0.90
Haul Roads		N/A	N/A	12.00	N/A	N/A
Fine Ore Storage Pile		N/A	N/A	2.77	N/A	N/A
Total Potential Emissions		**12.1**	**N/A**	**33.5**	**N/A**	**33.0**
Minor Permit Applicability Threshold		40	N/A	15	N/A	40
Minor Permit Required Under 18 AAC 502(c)(1)?		**No**	**No**	**Yes**	**No**	**No**

Table Notes
[a]N/A means not applicable.

3. Department Findings

Based on a review of the application, the Department finds that:

(1) The AGC has requested authorization to construct a rock crusher at the RCM.

(2) The project is classified as needing a permit under 18 AAC 502(b)(3) to construct, operate, or relocate a rock crusher with a rated capacity of at least five tons per hour of untreated material. A permit is also required under 18 AAC 502(c)(1) (See Table 1).

(3) As described in 18 AAC 50.540(c)(2), an application for a minor permit classified under 18 AAC 50.502 must include a demonstration showing that the proposed construction of the stationary source will not interfere with the attainment or maintenance of the ambient air quality standards. The AGC submitted a modeling analysis with their permit application for the RCM.

(4) Emission Units 1 through 87 are subject to state emissions standards in 18 AAC 50.055(a)(1) for visible emissions, 18 AAC 50.055(b)(1) for PM emissions, and 18 AAC 50.055(c) for SO_2 emissions, for industrial processes and fuel burning equipment.

(5) AGC proposed burning used oil in Unit 64.

(6) Total assessable emissions for the RCM is 79 tpy.

(7) The RCM is in the Northwest Coastal District. The Alaska Coastal Management Program completed a full review for the RCM.

(8) The AGC's application and subsequent submittals for a minor permit contain the elements listed in 18 AAC 50.540.

4. Permit Requirements

As described in 18 AAC 50.544(a), this minor permit identifies the stationary source, the project, the permittee, and contact information, and includes requirements to pay fees.

4.1. Emission Unit-Specific Requirements

4.1.1. State Emission Standards for Visible Emissions

The diesel fuel-fired generators, boilers and heaters are fuel-burning equipment (Units 43 through 87) subject to 18 AAC 50.055(a) for visible emissions. The crushing and grinding circuit (Units 1 through 42) are industrial processes also subject to the state standard for visible emissions.

AGC did not provide compliance demonstrations for the visible emission standard for the fuel burning equipment. Properly operated and maintained diesel heaters and boilers are capable of complying with the visible emission standards of 18 AAC 50.055(a) (1). The Department is not requiring any compliance demonstration for the heaters and boilers.

Because diesel-fired engines have the potential to exceed the visible emission standard, the Department is requiring AGC to verify compliance by conducting visible emission surveillance shortly after startup

AGC did not provide any compliance demonstrations for the crushing and grinding circuit. The Department is requiring on going visible emission surveillance for the conveyor transfer points which are not exhausted through the baghouses (Units 16 through 18, 31 through 35 and 42) to ensure compliance with the state standard.

AGC also did not provide any compliance demonstrations for the baghouses. The Department is requiring on going monitoring of the baghouse pressure differential to ensure compliance with the state standard.

4.1.2. State Emission Standards for Particulate Matter

The diesel fuel-fired generators, boilers and heaters are fuel-burning equipment (Units 43 through 87) subject to 18 AAC 50.055(b) for PM emissions. The crushing and grinding circuit (Units 1 through 42) are industrial processes also subject to the state standard for PM.

AGC included a compliance demonstration in the application for the diesel fired equipment using vendor data or AP-42. Because of these compliance demonstrations the permit does not include requirements for an initial source test for these units.

AGC did not provide a compliance demonstrations for the crushing and grinding circuit not exhausted through the baghouses. (Units 1, 16 through 18, 31 through 35 and 42). Because it would not be feasible to conduct a Reference Method 5 PM source test at the exhaust location of these units the permit does not contain an initial compliance demonstration for PM emissions for these units.

Exhaust from Units 2 through 15, 19 through 30 and 36 through 41 are exhausted through the baghouses. AGC did provide vendor emission guarantees for the baghouses of 0.01 grains per actual cubic foot per minute (gr/acfm). Because these vendor guarantees are based on assumptions which may not occur during operation the permit contains an initial compliance demonstration for PM emissions for the baghouses.

AGC proposed burning used oil in Unit 64. The Department has required an ash content analysis of used oil in previously issued minor permits. The permittee is then required to blend the used oil with distillate oil at a ratio based on the ash content to ensure the PM standard is met. Because of the small size of Unit 64 the Department has assumed an ash content of 1.0% so that . AGC does not have to analyze the ash content of their used oil. This assumption is based on ash content analyses of used oil at other stationary sources. The Department has calculated the blending ratio of distillate oil to used oil for this emission unit (See Appendix A)

If AGC wishes to measure the ash content of the used oil and have their blending ratio based on the measured ash content they may comment during the public comment period.

4.1.3. State Emission Standards for Sulfur Dioxide

The diesel fuel-fired generators, boilers and heaters are fuel-burning equipment (Units 43 through 87) subject to 18 AAC 50.055(c) for SO_2 emissions. The crushing and grinding circuit (Units 1 through 42) are industrial processes also subject to the state standard for SO_2 .

Although the industrial processes are subject to the sulfur standard, they will not have sulfur emissions so no permit requirements are necessary.

The Department has previously calculated that emission units burning distillate fuel with less than 0.75 percent sulfur by weight will comply with the state SO_2 emission standard of 500 ppm. Since the American Society of Testing and Materials (ASTM) limits fuel sulfur to less than 0.5 percent (by weight) for diesel fuel, the Department is not including any initial compliance requirements in the minor permit for the diesel-fired emission units. The permittee may show compliance with the state sulfur standard for distillate fuel burning equipment by keeping records of fuel grade and amount.

4.1.4. Ambient Air Quality Protection Requirements

AGC provided the required ambient PM-10 air quality analysis with their application. The Department's review memorandum, which includes the Department's findings, conclusions, and discussion of the permit conditions needed to protect the AAAQS, is provided in Appendix B.

The Department made revisions to the Fugitive Dust Control Plan submitted by AGC to be consistent with control practice descriptions in the application, and to ensure compliance with ambient air quality protection requirements.

The minor permit contains no conditions to prevent fugitive dust on the public road accessing the Rock Creek Mine.

4.1.5. Maintenance Requirements

As described in 18 AAC 50.544(b)(2), the permit must include maintenance of equipment according to the manufacturer's or operator's maintenance procedures, keep records, and keep a copy of the maintenance procedures.

4.2. Recordkeeping, Reporting, and Certification Requirements

All air quality control permits must contain procedures for recordkeeping, reporting, and certification.

Information request and certification requirements are specifically required under 18 AAC 50.200 and 18 AAC 50.205, respectively.

4.3. Terms to Make Permit Enforceable

The minor permit contains these requirements to ensure that the permittee will construct and operate the stationary source or modification in accordance with 18 AAC 50, as described in 18 AAC 50.544(i).

5. Permit Administration

The AGC may operate the RCM in accordance with Minor Permit No. AQ0978MSS01 upon issuance.

Appendix A
PARTICULATE MATTER STANDARDS WHEN USING RECLAIMED OIL

The Department used an AP-42 emission factor and the following equation from 40 CFR 60, Appendix A, Performance Test 19, to determine the grain loading from the space heaters:

$$\mathbf{E = CF(20.9/(20.9-O_2))}$$

where

E = Emission Factor, lb/10^3 gal
F = F factor specific to fuel type
O_2 = % oxygen in exhaust gas typical to equipment unit
C = Pollutant Concentration

Unit: Used oil fired space heater (Unit No. 64)

From AP-42, Table 1.11-1, PM emission factor = 66A lb/10^3 gal
Where, A is the ash content of the used oil assumed to be 1.0% .

From 40 CFR 60, Appendix A, Table 19-1, F=9,190 dscf/MMBtu

Converting emission factor assuming 150,000 Btu/gal.
PM emission factor = (66 lbx1.0/10^3 gal)/0.15 MMBtu/gal) = 0.44 lb/MMBtu

Solving for C, converting to grains for standard cubic foot (gr/scf) and assuming 3% excess oxygen,

$C = E(20.9-O_2)/F(20.9)$

C = 0.44 lb/MMBtu (20.9-3)/ 9,190 scf/MMBtu(20.9) = 4.0 x 10^{-5} lb/scf

C = 4.0 x 10^{-5} lb/scf x 7000 gr/lb = 0.28 gr/scf

Or, 0.28 gr/scf is 5.6 times the 0.05 gr/scf standard.

DF-8 fuel oil will have grain loading of 0.01 gr/scf when using AP-42 Table 1.3-1 PM emission factor of 2 lb/10^3 gal and heating value of 126,815 MMBtu/gal. In order to meet grain loading requirements of 0.05 gr/scf, the used oil will need to be blended with distillate oil at a ratio of 1:X and solve for X as follows:

$$\frac{0.28 + 0.01X}{1 + X} = 0.05$$

$$X\,(0.05-0.01) = 0.28 - 0.05$$

$$X = 5.8$$

Therefore the used oil will have to be blended with distillate oil in the ratio of 1: 2.3

Appendix B
MODELING MEMORANDUM

MEMORANDUM

State of Alaska
Department of Environmental Conservation
Division of Air Quality

TO: File
DATE: October 13, 2006

THRU:
FILE NO:

PHONE: 465-5100
FAX: 465-5129

FROM: Alan Schuler, P.E.
Environmental Engineer
Air Permits Program

SUBJECT: Review of Rock Creek
Ambient PM-10 Assessment

As required under 18 AAC 50.542(d)(1)(C), this memorandum summarizes the Department's findings regarding the ambient analysis submitted by Alaska Gold Company (AGC) for the Rock Creek Mine. AGC submitted this analysis in support of their July 2006 minor permit application. The application is *not* subject to review under the State's Prevention of Significant Deterioration (PSD) program. As described in this memorandum, AGC's analysis adequately shows that operating their emission units within the requested constraints will not cause or contribute to a violation of the Alaska Ambient Air Quality Standards (AAAQS) provided in 18 AAC 50.010.

BACKGROUND

The Rock Creek Mine is a new stationary source located 6 miles north of Nome. The area is unclassified in regards to compliance with the ambient air quality standards.

AGC will purchase the power needed to operate this open pit mine from the Nome Joint Utility System (NJUS). On-site power generation will be limited to two 320 kilowatt (kW) emergency generators. The other combustion units will consist of numerous heaters and boilers used for process/space heat. The largest heater/boiler is rated at 3 million Btu/hr (MMBtu/hr). The remaining heaters/boilers are rated at less than 1 MMBtu/hr.

The largest source of fugitive emissions will mostly be due to the material drop points on the crushing circuit; the fine, crushed ore stockpile; and the mine haul roads. AGC intends to minimize these emissions by minimizing the drop distances and enclosing the material drop points and watering the main haul roads with dust control agents. AGC stated the fugitive dust emissions from the Rock Creek pit, organic soil stockpiles, waste rock and overburden piles, and tailings ponds will be minimal.

The mining activities require a minor air quality control permit under 18 AAC 50.502(b)(3) since they include a rock crusher with a rate capacity of at least five tons per hour. The project emissions do *not* trigger the minor permit requirements under 18 AAC 50.502(c)(1).

AGC did not submit a modeling protocol for Department approval. However, their consultant (Hoefler Consulting Group) did discuss several key aspects of their analysis with the Department prior to conducting the analysis. AGC also submitted several revisions to their ambient analysis to address Department comments. The Department received the latest revision on October 3, 2006.

APPROACH

AGC used computer analysis (modeling) to predict the ambient air quality impacts. Hoefler Consulting Group conducted the modeling analysis on behalf of AGC.

Model Selection

There are a number of air dispersion models available to applicants and regulators. The U.S. Environmental Protection Agency (EPA) lists these models in their *Guideline on Air Quality Models* (Guideline). AGC used EPA's *Industrial Source Complex Short-Term 3* (ISCST3) model for the ambient analysis.[1] ISCST3 is an appropriate model for this analysis. AGC used the current version (02035).

Meteorological Data

ISCST3 requires hourly meteorological data to estimate plume dispersion. AGC used one year (2004) of site-specific surface data and concurrent upper air data collected by the National Weather Service (NWS) at the Nome airport.

The Department used a term contractor to review the quality assurance procedures used by AGC for collecting the surface data. The contractor noted several instances where the data does *not* meet EPA's quality assurance requirements. These instances are documented in the contractor's *Meteorological Findings Report*.

Some of the data concerns regard parameters that were not used in this modeling analysis. AGC subsequently provided additional information that adequately addresses another concern (sigma theta data).[2] The remaining concerns (i.e., accuracy of the ambient temperature under freezing conditions and lack of adequate quality assurance measures during the first week of January) are not substantive enough to affect the modeling results.

The Department notes that while AGC may use their meteorological data set for this minor permit application, ***future applications subject to PSD review will need to use meteorological data that fully meets EPA's quality assurance requirements – regardless of whether an***

[1] AGC used EPA's AERMOD Modeling System in their initial application. However, they later switched to ISCST3 as a quick workaround to Department concerns with the AERMOD meteorological data. ISCST3 is a Guideline method, so this switch is allowed under both EPA and state rules. The Department's concerns regarded the solar radiation and delta-temperature (SRDT) data, which does not meet the quality assurance requirements. The switch to ISCST3 allowed AGC to use sigma-theta data, which marginally meets the quality assurance requirements.

[2] E-mail from Al Trbovich (Hoefler) to Bill Walker; "Re: Rock Creek Incompleteness;" September 27, 2006.

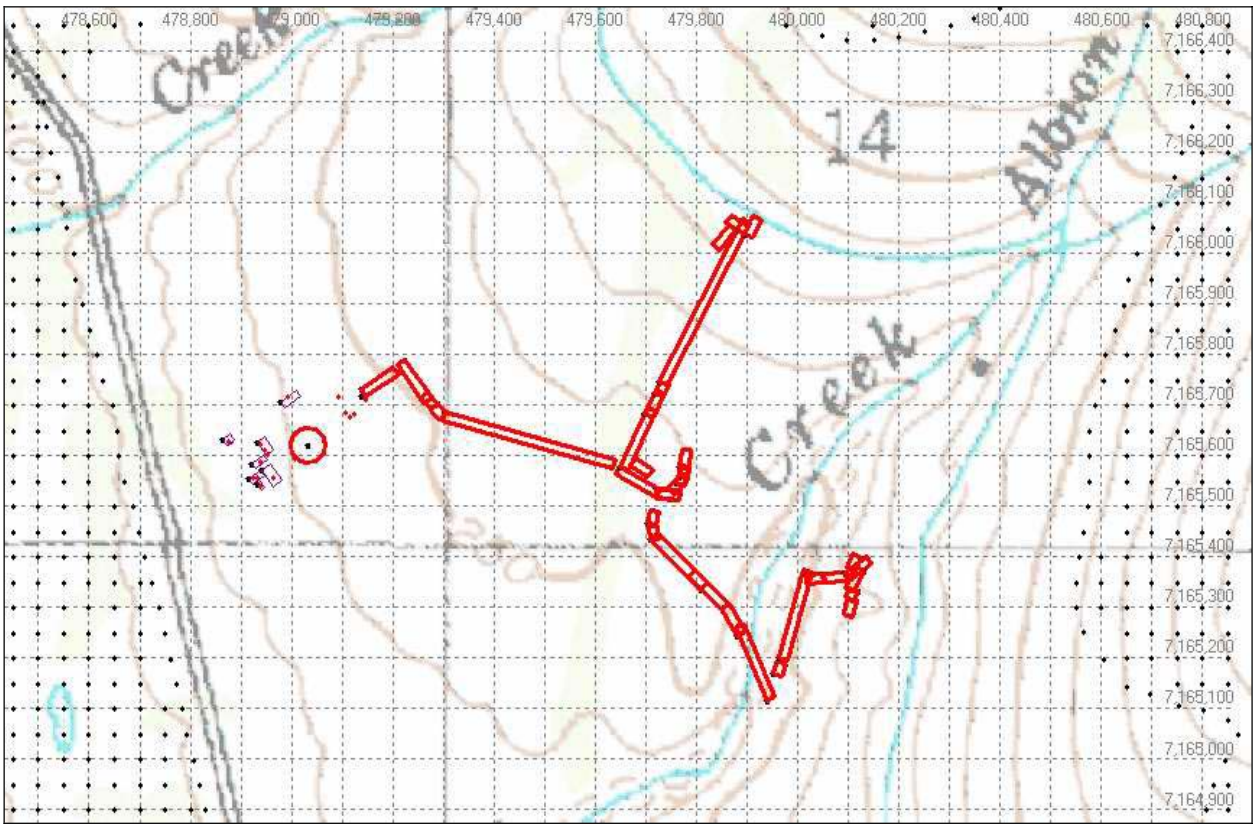
argument can be made regarding the model's sensitivity to the given parameter. The Department further notes that as presented, this meteorological data may not be used in AERMOD.

EPA allows applicants to compare the high second-high (h2h) modeled concentration to the short-term air quality standards if at least one year of temporally representative site-specific, or five years of representative off-site data, are used. When these criteria are not met, then applicants must use the high first-high (h1h) concentration. In all cases, applicants must compare the h1h modeled concentration to the annual average standards. The Department allowed AGC to compare the h2h modeled concentration to the short-term standards since they used one year of site-specific data.

Emission Unit Inventory

AGC included the proposed emission units and fugitive activities in the ambient analysis. The locations of the emission units are shown in Figure 4 of their modeling report (Appendix J). AGC did not show the location of the modeled fugitive activities. Therefore, the Department is showing the locations of all emission activities in Figure 1 of this memorandum.

Figure 1: Emission Activity Locations



Emission Rates and Source Characterization
The assumed emission rates and source characterization have significant roles in an ambient demonstration. Therefore, the Department checks these parameters very carefully.

AGC summarized the emission rates, stack parameters and other parameters used to characterize the emission activities in Tables 2 and 3 of their modeling report. The values are acceptable and consistent with the other portions of their permit application. The following parameters or assumptions nevertheless warrant special comment.

Operating Assumptions
AGC stated the two emergency generators will only operate up to 500 hours per year (hr/yr). However, they modeled them as if they are operating continuously (i.e., 8760 hr/yr). They likewise assumed all other activities occur continuously throughout the year. Therefore, the Department does not need to impose any operating restrictions for ambient air purposes.

Haul Road Dimensions
ISCST3 is providing a warning message regarding the length to width ratio for many of the road sections. The warning message also states that the sections should be subdivided into segments with length to width ratios less than 10.

The length to width ratio concern pertains to situations where the receptors are adjacent (close) to the area source. Since the nearest receptors are a couple of hundred meters from the area sources, AGC may ignore this warning message.

Fugitive Dust Control Plan
AGC assumed the fugitive dust from haul road traffic is reduced by 85-percent through the use of watering practices and hygroscopic binding agents (as described in their fugitive dust control plan). This is a major reduction in emissions. It's also well above the typical value of 50-percent used by most other applicants. Therefore, the Department is requiring AGC to comply with their fugitive dust control plan to protect the AAAQS.

Horizontal/Capped Stacks
The presence of non-vertical stacks or stacks with rain caps requires special handling in an ISCST3 analysis. For capped and horizontal stacks, EPA recommends that the plumes be characterized with an artificially small exit velocity (0.001 m/s) and an artificially large diameter (as needed to maintain the actual exhaust flow rate).[3]

AGC assumed that most of the point sources have capped/horizontal stacks. Therefore, AGC used EPA's recommended approach to characterize these exhaust stacks.

[3] EPA Memorandum from Joseph Tikvart to Ken Eng, *Proposal for Calculating Plume Rise for Stacks with Horizontal Releases or Rain Caps for Cookson Pigment, Newark, New Jersey*, July 9, 1993.

Ambient Air Boundary
For purposes of air quality modeling, "ambient air" means outside air to which the public has access. Ambient air typically excludes that portion of the atmosphere within a stationary source's boundary.

AGC will preclude public access within the general mining area. The exact boundaries are shown in Figure 1 of their Public Access Control Plan (Revision 1 – August 2006). The boundary encompasses property (surface rights) owned by either AGC or the Sitnasuak Native Corporation (SNC). SNC is allowing AGC to preclude public access within their portion of the land under the May 2006 Surface Use Agreement.

AGC will follow the procedures described in their Public Access Control Plan to post the ambient boundaries and preclude public access. The Department is incorporating these provisions as permit conditions.

Receptor Grid
AGC used the following receptor grid density:

- 50-meter spacing along the ambient air boundary,
- 50-meter resolution from the boundary outward to 300 meters,
- 100-meter resolution from the 50-meter grid outward to 1 km in each direction, and
- 1,000-meter resolution from the 100-meter grid outward to 5 km in each direction.

The grid is adequate for determining the maximum impacts and significant impact area.

AGC used 1-degree Digital Elevation Model (DEM) terrain data to generate the receptor elevations. The Department reviewed the resulting receptor elevations using the proprietary contour program, Surfer® 8. The elevation contours are consistent with a topographic map of this area.

Downwash
Downwash refers to conditions where nearby structures influence plume dispersion. Downwash can occur when a stack height is less than a height derived by a procedure called "Good Engineering Practice," as defined in 18 AAC 50.990(42). The modeling of downwash-related impacts requires the inclusion of dimensions from nearby buildings.

EPA has established specific algorithms for determining which buildings must be included in the analysis and for determining the profile dimensions that would influence the plume from a given stack. EPA has incorporated these algorithms into the "Building Profile Input Program" (BPIP) computer program. AGC used the current version of BPIP to determine the building profiles needed by ISCST3.

Off-Site Impacts
In a cumulative impact analysis, the applicant must include impacts from large sources located within 50 km of the applicant's SIA. These impacts from "off-site" sources are typically assessed through modeling. However, the off-site impacts in an AAAQS analysis can also be

accounted for with ambient monitoring data, if representative data is available. AGC used site-specific ambient monitoring data to account for the off-site impacts at the Rock Creek Mine.

Background Concentrations

The background concentration represents impacts from sources not included in the modeling analysis. Typical examples include natural, area-wide, and long-range transport sources. The background concentration must be evaluated on a case-by-case basis for each ambient analysis. Once the background concentration is determined, it is added to the modeled concentration to estimate the total ambient concentration.

AGC collected ambient PM-10 data at the proposed mine site in case the project (which was still being designed at that point) triggered PSD review. AGC collected data between April 1, 2004 and March 31, 2005 using battery/solar operated, "low volume" monitors.[4] AGC used the maximum reported PM-10 concentrations (75 $\mu g/m^3$ and 5 $\mu g/m^3$) to represent the 24-hour and annual average background concentrations.

The Department used a term contractor to review the quality assurance procedures used by AGC for collecting the PM-10 data. The contractor found that the data does *not* meet all of EPA's quality assurance requirements. These instances are documented in the contractor's *PM_{10} Findings Report*. The largest concern is AGC's invalidation of data that AGC said, "was not collected in a manner consistent with EPA's validity criteria." AGC further said, "an invalid sample was typically caused by a mechanical problem, the inability to maintain the required sample flow, or a failed flow calibration."

The Department has experienced conditions were a PM-10 low volume monitor has shut off due to unacceptable changes in flow rate during a sample run. This can happen when heavy particulate loading restricts air flow through the sample filter. When it does, such data are not to be invalidated – only flagged and reported with the complete raw sample data. Applicants should also report any relevant meteorological data that may support a request to exclude the flagged data from the final data set. The proper procedure for determining the 24-hour concentration during these events is to divide the collected sample mass by the total time the monitor actually ran – even if it was only a few hours. It is the Department's job to determine whether the data should be ultimately invalidated and/or excluded from the final data set. Because AGC did not follow proper procedure, it is unknown whether they correctly reported the maximum 24-hour concentration.

In spite of these very real data monitoring concerns, the Department is nevertheless allowing AGC to use the PM-10 data to represent the *background* concentrations. The Department has made this determination for the following reasons:

1. AGC used the *highest* reported value for the background concentrations, even though the Guideline allows applicants to use the *average* (mean) concentration measured during the modeled meteorological conditions of concern;

[4] AGC was unable to use the more typical "high volume" monitors due to the lack of sufficient electrical power.

2. AGC *voluntarily* provided the PM-10 data even though ambient monitoring is *not* required under the minor permit program; and
3. AGC's 24-hour PM-10 value (75 $\mu g/m^3$) is higher than the 50 $\mu g/m^3$ value that they could have used under the allowance in 18 AAC 50.542(c)(2)(A).

AGC had the option to withdraw their PM-10 data since there are no regulatory requirements for providing/using it. However, AGC instead took the more conservative approach of using their highest reported 24-hour value. AGC has shown that even when using this value (which is higher than the Department's alternative value), the total 24-hour concentration (modeled plus background) is still only two-thirds of the AAAQS (see Results and Discussion). Therefore, AGC has adequately demonstrated compliance with the AAAQS, even though there are questions regarding their PM-10 data.

The Department nevertheless encourages AGC to address the data concerns noted in the contractor's finding report. ***The Department further notes, that if the Rock Creek project ever becomes subject to PSD review for which preconstruction monitoring is needed, then AGC will need to collect data that fully meets EPA's quality assurance requirements.***

RESULTS AND DISCUSSION

The maximum PM-10 AAAQS impacts are shown in Table 1. The background concentrations, total impacts, and ambient standards are also shown. The total impacts are well below the AAAQS. Therefore, AGC has demonstrated compliance with the AAAQS.

Table 1: Maximum AAAQS Impacts

Air Pollutant	Avg. Period	Maximum Modeled Conc ($\mu g/m^3$)	Bkgd Conc ($\mu g/m^3$)	TOTAL IMPACT ($\mu g/m^3$)	Ambient Standard ($\mu g/m^3$)
PM-10	24-hr	18.7	75	**94**	150
	Annual	1.7	5	**7**	50

It is important to note that since ambient concentrations vary with distance from each emission unit, the maximum value represents the highest value that may occur within the area. The concentrations at other locations within the area are less than the values reported above.

CONCLUSION

The Department reviewed AGC's modeling analysis for the Rock Creek Mine and concluded the following:

1. The PM-10 emissions associated with operating the proposed emission units will not cause or contribute to a violation of the AAAQS listed in 18 AAC 50.010.
2. AGC's modeling analysis fully complies with the showing requirements of 18 AAC 50.540(c)(2).

3. AGC conducted their modeling analysis in a manner consistent with EPA's *Guideline on Air Quality Models*.

The Department developed conditions in the minor permit to ensure AGC complies with the AAAQS. These conditions are summarized below.

1. Establish and maintain the ambient boundaries described in the Public Access Control Plan (Revision 1 – August 2006) using the procedures therein; and
2. Limit fugitive dust as described in the Rock Creek Mine – Fugitive Dust Control Plan (July 2006) using the procedures therein.

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