

**PM<sub>10</sub> SIP/Maintenance Plan Evaluation Report:**  
**Kennecott Utah Copper – Bingham Canyon Mine & Copperton Concentrator**

**Salt Lake County Nonattainment Area**

**Utah Division of Air Quality**

**Major New Source Review Section**

**October 1, 2015**

# PM<sub>10</sub> SIP/MAINTENANCE PLAN EVALUATION REPORT

## Bingham Canyon Mine and Copperton Concentrator

### 1.0 Introduction

This evaluation report (report) provides Technical Support for Section IX, Part H.1 and Section IX, Part H.2 of the PM<sub>10</sub> Maintenance Plan (Maintenance Plan); to address the Salt Lake County PM<sub>10</sub> Nonattainment Area. This document specifically serves as an evaluation of Kennecott Utah Copper's Bingham Canyon Mine and Copperton Concentrator.

Note on document identification: The intention of the Utah Division of Air Quality is to develop a Maintenance Plan to address PM<sub>10</sub>. As part of this effort, SIP Subsections IX.H.1 Emission Limits and Operating Practices – General Requirements, IX.H.2 Source-Specific Particulate Emission Limitations in Salt Lake and Davis Counties and IX.H.3 Source-Specific Particulate Emission Limitations for Utah County will be repealed and replaced. Subsection IX.H.4 will be repealed and replaced with Interim Emission Limits and Operating Practices. This subsection provides interim limits, consistent with the limits codified in the PM<sub>2.5</sub> SIP, until future controls have been implemented within timeframes identified in Section IX Part H.2.

This evaluation report references the SIP version originally dated June 28, 1991 and made effective by EPA on August 8, 1994. This SIP version is often referred to as the “original SIP.” The Utah County portion of the SIP was further updated on June 5, 2002 and made effective by EPA on January 22, 2003. Additional SIP revisions were adopted by the Air Quality Board on July 6, 2005 and became state law on August 1, 2005. However, this version of the SIP was not adopted by EPA and therefore never became federal law. In order to distinguish between the various documents in this report, the following coding scheme will be used:

- Since Section IX.H of the 2005 State-only SIP will be repealed entirely, there is no need to refer to that document version within this report.
- When referencing the original SIP (the one issued in 1991/1992 and adopted by EPA in 1994), the qualifier <sup>(OS)</sup> will follow any citation from that document.
- When referencing any new SIP condition or requirement, the citation will be left blank.

Therefore, a particular sentence of this document might read as follows:

*SIP Subsection IX.H.1.c – Stack Testing supersedes 2.a.A<sup>(OS)</sup> from the original SIP.*

### 1.1 Facility Identification

*Name:* Kennecott Utah Copper Bingham Canyon Mine and Copperton Concentrator

*Address:* 8362 West 10200 South, Bingham Canyon, Utah, Salt Lake County

*Owner/Operator:* Kennecott Utah Copper, LLC

*UTM coordinates:* 407,000m Easting, 4,493,000 m Northing, Zone 12

### 1.2 Facility Process Summary

Kennecott Utah Copper operates the Bingham Canyon Mine and Copperton Concentrator in Salt Lake County, Utah. The Bingham Canyon Mine is an open pit copper mine. Ore is mined by drilling, blasting, crushing and hauling. The Copperton Concentrator receives ore material from

the Bingham Canyon Mine. At the Concentrator, ore is crushed and turned into slurry concentrate in the floatation process.

### 1.3 Facility Criteria Air Pollutant Emissions Sources

The following is a listing of installations at the Bingham Canyon Mine:

- In-pit crushers with baghouses
- Roadbase crushing units
- Conveyors and transfer points with baghouses
- Emergency generators
- Concrete batch plant controlled by baghouse
- Crushers and screens
- Haul trucks
- Support equipment

The following is a listing of installations at the Copperton Concentrator:

- Feed dryer oil heater
- Product dryer oil heater
- Molybdenite storage bins
- Molybdenite loading facility
- Ore sorting and sample preparation baghouses

This is not meant to be a complete listing of all equipment which may be involved or required during permitting activities at the Bingham Canyon Mine and Copperton Concentrator, rather it is a listing of all significant emission units.

### 1.4 Facility 2011 Baseline Actual Emissions and Current PTE

In 2011, the Bingham Canyon Mine and Copperton Concentrator baseline actual emissions were determined to be the following (in tons per year):

Table 1A: Actual Emissions Bingham Canyon Mine

Pollutant	Actual Emissions (Tons/Year)
PM <sub>10</sub>	808
SO <sub>2</sub>	3.0
NO <sub>x</sub>	3552

Table 1B: Actual Emissions Copperton Concentrator

Pollutant	Actual Emissions (Tons/Year)
PM <sub>10</sub>	1.94
SO <sub>2</sub>	0.004
NO <sub>x</sub>	0.67

Since 2011, the BCM has expanded operations and updated emissions calculation methodology. The Copperton Concentrator has also made modifications to the plant. The current PTE values, as established by the most recent AOs at the mine and concentrator (DAQE-AN105710036-14 and DAQE-AN105710035-13, respectively), are as follows:

Table 2A: Current Potential to Emit Bingham Canyon Mine

Pollutant	Potential to Emit (Tons/Year)
PM <sub>10</sub>	1,513
SO <sub>2</sub>	7
NO <sub>x</sub>	5,830

Table 2B: Current Potential to Emit Copperton Concentrator

Pollutant	Potential to Emit (Tons/Year)
PM <sub>10</sub>	25.3
SO <sub>2</sub>	0.10
NO <sub>x</sub>	10.66

## 2.0 Demonstration of Maintaining Attainment

These values have been used in the modeled attainment demonstration. The 2011 actual emissions were used as baseline for model validation. The Copperton Concentrator emissions were projected for future years using growth factors for the mining industry in Salt Lake County. Those emissions projected with growth are intended to represent future actual emissions for the Copperton Concentrator. The Bingham Canyon Mine differed from most of the listed sources in the establishment of projection year inventories. Rather than using a combination of “true-up” 2019 actual emissions plus projection year growth values, DAQ instead applied the facility’s emissions based on daily mine activity as the 2019 true-up value, and then assigned a growth factor of zero (0) to each of the projection years.

Although a specific application of new RACT is not a requirement of the maintenance plan, the limitations found within this maintenance plan are based on the most recent PM<sub>2.5</sub> Section of the SIP. This Section of the SIP required the application of RACT above and beyond the existing controls already required of most listed PM<sub>10</sub> SIP. The conditions, requirements and emission limitations contained within this maintenance plan are based on those in Sections IX.H.11, IX.H.12 and IX.H.13 – which comprise the PM<sub>2.5</sub> sections of the SIP, and include this additional RACT application. All requirements from the original PM<sub>10</sub> SIP that have not been superseded or replaced, and which are still necessary will also be retained. By necessary, meaning: needed in the demonstration of attainment of the 24-hour standard, or in demonstrating that no backsliding in the application of RACT has taken place. This is discussed in greater detail in Item 3 below.

## 3.0 Comparison of Requirements – Original SIP and New Maintenance Plan

The Bingham Canyon Mine and Copperton Concentrator are previously listed SIP sources. In the original PM<sub>10</sub> SIP document for Davis and Salt Lake Counties [IX.H.2 Emission Limitations and Operating Practices (Davis and Salt Lake Counties) – dated 28 June 1991 and Updated 4 November 1992]<sup>(OS)</sup>, the Bingham Canyon Mine was listed in Subsection IX.H.2.b.W<sup>(OS)</sup> and Copperton Concentrator was listed in Subsection IX.H.2.b.X<sup>(OS)</sup>. As listed sources there were several requirements and conditions that applied to the facility.

In addition, the Bingham Canyon Mine is a listed source in the PM<sub>2.5</sub> Section of the SIP (see SIP Section IX.H.12.1.i). The Copperton Concentrator is not a listed source in the PM<sub>2.5</sub> Section of the SIP. As was discussed above in Item 2.0, the limits in this maintenance plan are based on the limits in the PM<sub>2.5</sub> SIP; either in the general requirements of subsection IX.H.11 or the source specific requirements of IX.H.12. Therefore, a comparison between the original SIP

requirements, and those found in this new maintenance plan can be found below:

### 3.1 Original SIP General Requirements

#### IX.H.2.a General Requirements<sup>(OS)</sup>

The original SIP was a divided document, having two separate sets of General Requirements. The requirements found at IX.H.1.a<sup>(OS)</sup> applied to the listed sources found in Utah County, while those found at IX.H.2.a<sup>(OS)</sup> applied to the listed sources found in Salt Lake and Davis Counties. The Bingham Canyon Mine and Copperton Concentrator are located in Salt Lake County, only the general requirements of IX.H.2.a<sup>(OS)</sup> applied. However, except for the additional requirements found under IX.H.2.a.M<sup>(OS)</sup> for petroleum refineries and the specific fuel requirements of IX.H.2.a.N<sup>(OS)</sup>, the two subsections are essentially identical.

2.a.A. Stack Testing<sup>(OS)</sup> – this subsection covered the general methods and procedures for conducting stack testing, including the establishment of a pretest protocol, pretest conference, and the use of specific EPA test methods. This subsection has since been updated and superseded by SIP subsection IX.H.1.e which incorporates equivalent language.

2.a.B. Visible Emissions<sup>(OS)</sup> – covered the establishment of designated opacity limitations for specified process units and/or process equipment. This subsection has since been superseded by SIP subsection IX.H.1.f which incorporates equivalent language.

2.a.C. Visible Emissions (cont.)<sup>(OS)</sup> – covered the procedure by which visible emission observations would be conducted. This subsection has since been superseded by SIP subsection IX.H.1.f which incorporates equivalent language.

2.a.D. Annual Emission Limitations<sup>(OS)</sup> – established that annual emissions would be determined on a rolling 12-month basis, and that a new 12 month emission total would be calculated on the first day of each month using the previous 12 months data. This subsection is no longer needed as the annual PM<sub>10</sub> standard no longer exists.

2.a.E. Recordkeeping Requirements<sup>(OS)</sup> – established that records need to be kept for all periods that the plant is in operation, for a period of at least two years, and provided upon request. This subsection has since been superseded by SIP subsection IX.H.1.c which incorporates equivalent language.

2.a.F. Approval Orders<sup>(OS)</sup> – established that this subsection of the SIP superseded any previously issued AOs. No longer applicable, as this subsection of the SIP will be superseded, and no previously issued AOs are still in existence.

2.a.G. Proper Maintenance<sup>(OS)</sup> – established that all facilities need to be adequately and properly maintained. Not needed. This is inherent in the NSR permitting program.

2.a.H. Future Modifications<sup>(OS)</sup> – established that future modifications to the approved facilities were also subject to the NSR permitting requirements. Not needed. This is inherent in the NSR permitting program.

2.a.I. Unpaved Operational Areas<sup>(OS)</sup> – established rules for treating fugitive dust with water sprays or chemical dust suppression.

2.a.J. Actual Emissions<sup>(OS)</sup> – established that the actual emissions included for each listed source in subsection IX.H.2.b would not be used for compliance purposes. This subsection is no longer needed as a listing of individual source actual emissions are no longer included in the requirements of subsection IX.H of the SIP. This requirement is outdated and obsolete.

2.a.K. Test if Directed<sup>(OS)</sup> – established a definition of this term. No longer needed as this term is no longer used and the condition itself no longer applies. UDAQ has a minimum test frequency established under R307-165-2. This same rule also allows for (and requires) any additional testing to demonstrate compliance status as deemed necessary by the Director.

2.a.L. Definitions<sup>(OS)</sup> – established that the definitions contained in R307 apply to Section IX.H.2. This subsection has since been superseded by SIP subsection IX.H.1.b which incorporates equivalent language.

2.a.M. Petroleum Refineries<sup>(OS)</sup> – This is a fairly lengthy subsection pertaining only to the petroleum refineries. This subsection has its own sub-subsections that are either moved or no longer necessary.

2.a.N. Specific Fuel Requirements for Coal and/or Oil<sup>(OS)</sup> – established that specific rules for the sulfur content of these fuels also existed and applied. This subsection has since been superseded by the individual source requirements found in IX.H.2 and IX.H.3. This requirement is now, largely irrelevant as few sources have the ability or authority to burn coal, and the rules on the sulfur content of fuel oil have been updated with lower sulfur requirements – specifically the requirements on the sulfur content allowed in diesel fuel found under 40 CFR 80.510(c) for off-highway diesel and 40 CFR 80.520(a) for on-highway diesel. None of the listed sources located at the Bingham Canyon Mine or the Copperton Concentrator burn coal. Sources at the mine and concentrator meet the requirements of sulfur content allowed in diesel fuel.

## **3.2 Original SIP Source Specific Requirements**

### **Individual source requirements for the Bingham Canyon Mine:**

2.b.W.1.<sup>(OS)</sup> This subsection was a listing of the equipment at the mine and concentrator – this subsection has been superseded and is irrelevant. A simple listing of equipment does not constitute an emission limitation, does not impose any restriction on daily emissions, and rapidly becomes out of date as well as impossible to enforce.. The original listing found in this subsection does not match the current equipment installed and operating and would represent a significant step backwards in emission control and technology.

2.b.W.2.<sup>(OS)</sup> This subsection includes a 12-month limit on total material moved and specifies the approval process to exceed the limit. In accordance with this condition, two approval orders were issued– the first one in 1999 and the second one in 2011 – allowing an increase in the amount of material moved per 12-month period.

This limit is an annual limit. The PM<sub>10</sub> annual standard was revoked in 2006 and the primary and secondary standard for PM<sub>10</sub> is now a 24-hour standard. To protect the 24-hour standard, the limit on daily haul truck mileage was established in the PM<sub>10</sub> SIP. This is now in the current PM<sub>10</sub> SIP subsection IX.H.12.1.i.A. This condition enforces the daily vehicle miles limitation with monitoring and record keeping requirements for the miles travelled by ore and waste haul trucks. Daily records shall be kept for all periods when the mine is in operation and haul truck

miles shall be tracked with a Global Positioning System or equivalent.

2.b.W.3.,7-8.<sup>{OS}</sup> These subsections established visible emissions limits and test methods. Visible emissions limits and opacity observation requirements are more viable in the general requirements of the SIP. Visible emissions limits are consistent with federal standards set in 40 CFR Part 60 Subpart LL (Standards of Performance for Metallic Mineral Processing Plants). Section 60.382 sets the opacity for the processing plants at 7% for controlled emission points and 10% for all other points.

2.b.W.4.<sup>{OS}</sup> This subsection established emissions limitations for baghouse vents and conveyor transfer points. This subsection is outdated and some equipment has been removed and the others have since been updated to reflect current operations and BACT. Some of the limits have been changed since 1994 and the stack test results are less than the limits. The In-Pit Crusher limit was 1.77 lbs/hr and 0.016 grains/dscf. The lb/hr limit of 1.77 lb/hr has been retained but the 0.016 gr/dscf has been replaced with the NSPS Subpart L limit of 0.05 gram/dscm and the limits are listed in IX.H.2.g.i.C.

The two drop point baghouses are limited at 0.22 lbs/hr (0.016 grains/dscf) in the 1994 SIP. They have been modified and in 1999 AO DAQE-441-99 set the limits at 0.70 lb/hr for drop point C6/C7 located at the tunnel exit near Copperton at 0.70 lbs/hr, and 0.43 lbs/hr for the drop point at Copperton (C7/C8). The 1999 AO increased the material moved from 150,500,000 to 197,000,000 tons per year. These emission increases were offset with the emissions banked by KUC from the 1994 SIP emission limits. In 2011 KUC upgraded the C6/C7 AND C7/C8 baghouses and the limits were set at 0.31 lb/hr with 0.016 gr/dscf (C6/C7) and 0.19 lb/hr with 0.016 gr/dscf (C7/C8). The two baghouses were tested in 2013 at 0.03 lbs/hr (C6/C7), and 0.02 lbs/hr (C7/C8). If these two baghouses operated for 8760 hrs, the combined emission rate would only be 0.22 tpy. Based on these results and the fact that they both have been modified to a lower emission rate, this requirement is outdated and is no longer needed to demonstrate compliance with the PM<sub>10</sub> standard.

2.b.W.5.<sup>{OS}</sup> Stack Testing Requirements – established test method to be used to verify compliance and the frequency of testing. This subsection has since been superseded by SIP subsections IX.H.2.g.C.II and IX.H.1.a General Requirements - Stack Testing.

2.b.W.6.<sup>{OS}</sup> This subsection specifies a maximum waste dump lift height. Waste dump lift height is established to meet structural and geotechnical requirements. Height of the lift is not related to particulate emissions and currently KUC does not dump on the South Slope. The mine no longer constructs dumps in 1000 foot lifts due to geotechnical reasons. The current process for dump design and construction is based on geotechnical and operational parameters. Lift heights vary based on parameters such as dump geometry, dump capacity and foundational conditions below the dump. Currently they dump the waste material in the Bingham Canyon area and in lifts that are less than the previous 10000 ft dump. When they continue on the South Slope, it will be in lifts which will be less than the 1000 ft drop utilized in the past.

2.b.W.9.<sup>{OS}</sup> This subsection specifies fugitive dust control requirements for roads. This subsection is superseded by general condition in SIP subsection IX.H.1.h and source specific requirements in SIP subsection IX.H.2.g.i.D and IX.H.2.g.i.E.

2.b.W.10.<sup>{OS}</sup> This subsection includes operations limitations for mine operations. This subsection has been superseded by daily limitations in SIP subsection IX.H.2.g.i. Monitoring and record keeping requirements for a daily limitation of 30,000 miles travelled by ore and waste haul trucks

will be included in the new maintenance plan. Daily records shall be kept for all periods when the mine is in operation and haul truck miles shall be tracked with a Global Positioning System or equivalent. It is to KUC's benefit to use larger trucks. If they used smaller trucks then they would reach the 30,000 mile daily limit sooner without reaching their production levels needed. Currently their AO DAQE-AN105710036-14 requires KUC 240 tons for ore and waste haul trucks and 40 tons for underground usage. As KUC develops their underground mining they will not be able to use the larger trucks and will need to use the smaller trucks (40 tons) This requirement is outdated and their emissions are more limited by the mileage than by the truck size..

2.b.W.11.<sup>{OS}</sup> This subsection establishes a drilling method to reduce particulate emissions. The method is inherent in how the mine conducts drilling operations. The 2011 actual emissions from the wet drilling were 0.48 tpy PM<sub>10</sub>. Wet drilling is a requirement of the operations which makes this subsection outdated and no longer needed to demonstrate attainment and to prevent backsliding. Since the emissions from these sources are minimal, a source specific condition in the SIP is not warranted.

2.b.W.12.<sup>{OS}</sup> This subsection establishes particulate control for lime silos. The lime silos are equipped with bin vent control units which are BACT for this type of emission units. Minimal emissions are emitted from the lime silos (0.039 tpy PM<sub>10</sub> in 2011). The emissions are included in the appropriate SIP modeling. Since the emissions from these sources are minimal, a source specific condition in the SIP is not warranted. This subsection outdated and no longer needed to demonstrate attainment and to prevent backsliding.

2.b.W.13.<sup>{OS}</sup> This subsection establishes measures for spraying storage piles with water or chemical suppressants. This requirement provides control of material that has been evacuated. This requirement has been retained in IX.H.1.g.i.F.

2.b.W.14.<sup>{OS}</sup> This subsection limits sulfur content in diesel fuel. Federal rules on the sulfur content of fuel oil have been updated with lower sulfur requirements – specifically the requirements on the sulfur content allowed in diesel fuel found under 40 CFR 80.510(c) for off-highway diesel and 40 CFR 80.520(a) for on-highway diesel. Sulfur content in this subsection is outdated. Emissions from off-road equipment are now estimated by EPA's NONROAD program and this subsection is outdated and superseded by the requirement to use ultra-low sulfur fuel in their haul trucks in SIP subsection IX.H.2.g.i.C.

2.b.W.15.-16.<sup>{OS}</sup> These subsections reference New Source Performance Standards and testing methods. Compliance with federal NSPS requirements is required by sources and the testing methods specified are outdated. Federal standards and testing methods are not needed in the individual source sections of the SIP.

2.b.W.17.<sup>{OS}</sup> This subsection requires facilities to be properly maintained. Subsection 2.a.H. Future Modifications<sup>{OS}</sup> – established that future modifications to the approved facilities were also subject to the NSR permitting requirements. Not needed. This is inherent in the NSR permitting program, under UAC R307-401-3(1)(b), Applicability to NSR, and UAC R307-401-4, General Requirements.

2.b.W.18. & 2.b.X.14.<sup>{OS}</sup> Annual Emissions – established total annual emissions estimates for the entire Bingham Canyon Mine. Annual emissions estimates for the mine and concentrator are based on estimation methodologies as of 1991. Current PTE estimates (Section 1.4 of this document) are based on improved emissions methodologies including BACT. Conditions

limiting daily activity, included in SIP subsection IX.H.2.g.i, supersede the outdated annual emissions estimates. Therefore, the annual emission estimates have been eliminated.

**Individual source requirements for the Copperton Concentrator:**

2.b.X.1.<sup>{OS}</sup> This subsection was a listing of the equipment at the concentrator – this subsection has been superseded and is irrelevant. A simple listing of equipment does not constitute an emission limitation, does not impose any restriction on daily emissions, and rapidly becomes out of date as well as impossible to enforce. The original listing found in this subsection does not match the current equipment installed and operating and would represent a significant step backwards in emission control and technology.

2.b.X.2.&3.<sup>{OS}</sup> These subsections established visible emissions limits and test methods. Visible emissions limits and opacity observation requirements are more viable in the general requirements of the SIP. Visible emissions limits are consistent with federal standards and are superseded by SIP subsection IX.H.1.f and the UAC R307-309, Nonattainment and Maintenance Areas for PM<sub>10</sub> and PM<sub>2.5</sub>: Fugitive Emissions and Fugitive Dust.

2.b.X.4.<sup>{OS}</sup> These subsections reference New Source Performance Standards and testing methods. Compliance with federal NSPS requirements is required by sources and the testing methods specified are outdated. Federal standards and testing methods are not needed in the individual source sections of the SIP.

2.b.X.5.<sup>{OS}</sup> This subsection requires facilities to be properly maintained. Subsection 2.a.H. Future Modifications<sup>{OS}</sup> – established that future modifications to the approved facilities were also subject to the NSR permitting requirements. This is inherent in the NSR permitting program, under UAC R307-401-3(1)(b), Applicability to NSR, and UAC R307-401-4, General Requirements. Therefore, this requirement is not needed to enforce compliance with the limiting emissions from a source.

2.b.X.6.<sup>{OS}</sup> This subsection requires scrubber monitoring per federal standards. Federal standards and testing methods are not needed in the individual source section of the SIP.

2.b.X.7.<sup>{OS}</sup> This subsection established emissions limitations. This subsection is outdated and some equipment has been removed and the others have since been updated to reflect current operations and BACT. Emissions for the Copperton facility in 2011 were 1.94 tpy for PM<sub>10</sub> and 0.004 tpy for SO<sub>2</sub>. In 2005 KUC removed the Feed Molybdenite Dryers and the Molybdenite Heat Treater, and replaced a Product Molybdenite Dryer. Emissions from the Product Molybdenite dryers are 0.15 lb/hr or 0.66 tpy if operated 8,760 hours per year. The Molybdenite Storage Bins have an emission rate of 0.21 lbs/hr (0.92 tpy) and the loading facilities have an emission rate 0.07 lbs/hr (0.31 tpy). These emissions are insignificant and testing is not required to demonstrate attainment and to prevent backsliding.

2.b.X.8.<sup>{OS}</sup> Stack Testing Requirements – established test method to be used to verify compliance and the frequency of testing. The limits have been removed and this subsection is no longer required.

2.b.X.9.<sup>{OS}</sup> This subsection includes the requirement for natural gas and LPG use as a fuel source unless an Approval Order allows another fuel. Natural gas and LPG combustion sources exist at the Copperton Concentrator. If another fuel is proposed an Approval Order modification would be necessary and a BACT analysis would demonstrate that another fuel such as fuel oil would not

meet the BACT requirements. This subsection is outdated and is no longer needed.

2.b.X.11.&13<sup>(OS)</sup> The process listed in this subsection no longer exists at the Copperton Concentrator. This subsection is outdated and is no longer needed.

2.b.X.12.<sup>(OS)</sup> This subsection established 30-day limits on natural gas consumption for combustion sources. This subsection is outdated and some equipment has been removed and the others have since been updated to reflect current operations and BACT. The emissions in 2011 for the Copperton facility was 0.67 tpy for NO<sub>x</sub>. This emission rate is insignificant and a fuel limit is not required to demonstrate attainment and to prevent backsliding. This subsection is no longer needed in regulating daily activity.

2.b.W.18. & 2.b.X.14.<sup>(OS)</sup> Annual emissions estimates for the mine and concentrator are based on estimation methodologies as of 1991. Current PTE estimates (Section 1.4 of this document) are based on improved emissions methodologies including BACT. Conditions limiting daily activity, included in SIP subsection IX.H.12.1.i, supersede the outdated annual emissions estimates.

2.b.X.14.<sup>(OS)</sup> Annual Emissions – established total annual emission estimates for the entire Copperton Concentrator facility. The PM<sub>10</sub> annual standard has been eliminated and these estimates are annual estimates. Salt Lake County has not shown an exceedance in over ten years and the reduction in allowable emissions will demonstrate a prevention of backsliding. Therefore, the annual emission estimates have been eliminated.

#### **4.0 New Maintenance Plan – General Requirements**

The general requirements for all listed sources are found in SIP Subsection IX.H.1. These serve as a means of consolidating all commonly used and often repeated requirements into a central location for consistency and ease of reference.

IX.H.1.a. This paragraph states that the terms and conditions of Subsection IX.H.1 apply to all sources subsequently addressed in the following subsections IX.H.2 and IX.H.3. It also clarifies that should any inconsistency exist between the general requirements and the source specific requirements, then the source specific requirements take precedence.

IX.H.1.b States that the definitions found in State Rule 307-101-2, Definitions, apply to SIP Section IX.H. Since this is stated for the Section (IX.H), it applies equally to IX.H.1, IX.H.2 and IX.H.3.

IX.H.1.c This is a recordkeeping provision. Information used to determine compliance shall be recorded for all periods the source is in operation, maintained for a minimum period of five (5) years, and made available to the Director upon request. As the general recordkeeping requirement of Section IX.H, it will often be referred to and/or discussed as part of the compliance demonstration provisions for other general or source specific conditions.

IX.H.1.d Statement that emission limitations apply at all times that the source or emitting unit is in operation, unless otherwise specified in the source specific conditions listed in IX.H.2 or IX.H.3.

This is the definitive statement that emission limits apply at all times – including

periods of startup or shutdown. It may be that specific sources have separate defined limits that apply during alternate operating periods (such as during startup or shutdown), and these limits will be defined in the source specific conditions of either IX.H.2 or IX.H.3.

Conditions 1.a, 1.b and 1.d are declaratory statements, and have little in the way of compliance provisions. Rather, they define the framework of the other SIP conditions. As condition 1.c is the primary recordkeeping requirement, it shall be further discussed under item 4.2 below.

IX.H.1.e This is the main stack testing condition, and outlines the specific requirements for demonstrating compliance through stack testing. Several subsections detailing Sample Location, Volumetric Flow Rate, Calculation Methodologies and Stack Test Protocols are all included – as well as those which list the specific accepted test methods for each emitted pollutant species (PM<sub>10</sub>, NO<sub>x</sub>, or SO<sub>2</sub>). Finally, this subsection also discusses the need to test at an acceptable production rate, and that production is limited to a set ratio of the tested rate.

These stack testing requirements supersede those found in IX.H.1.a.A<sup>(OS)</sup> and IX.H.2.a.A<sup>(OS)</sup> of the original SIP.

IX.H.1.f This condition covers the use of CEMs and opacity monitoring. While it specifically details the rules governing the use of continuous monitors (both emission monitors and opacity monitors), it also covers visible opacity observations through the use of EPA reference method 9.

These requirements specifically supersede those found in IX.H.1.a.C<sup>(OS)</sup> and IX.H.2.a.C<sup>(OS)</sup> of the original SIP. The original SIP requirements of IX.H.1.a.B<sup>(OS)</sup> and IX.H.2.a.B<sup>(OS)</sup>, both of which addressed individual equipment opacity, will be superseded as necessary by the particular source specific limitations found in IX.H.2 or IX.H.3.

Both conditions 1.e and 1.f serve as the mechanism through which sources conduct monitoring for the verification of compliance with a particular emission limitation.

#### **4.1 Monitoring, Recordkeeping and Reporting**

As stated above, the general requirements IX.H.1.a through IX.H.1.f primarily serve as declaratory or clarifying conditions, and do not impose compliance provisions themselves. Rather, they outline the scope of the conditions which follow the source specific requirements of IX.H.2 and IX.H.3.

For example, most of the conditions in those subsections include some form of short-term emission limit. This limitation also includes a compliance demonstration methodology – stack test, CEM, visible opacity reading, etc. In order to ensure consistency in compliance demonstrations and avoid unnecessary repetition, all common monitoring language has been consolidated under IX.H.1.e and IX.H.1.f. Similarly, all common recordkeeping and reporting provisions have been consolidated under IX.H.1.c.

#### **4.2 Discussion of Attainment Demonstration**

As is discussed above in Items 4.0 and 4.1, these are general conditions and have few if any specific limitations and requirements. Their inclusion here serves three purposes. 1. They act as

a framework upon which the other requirements can build. 2. They demonstrate a prevention of backsliding. By establishing the same or functionally equivalent general requirements as were included in the original SIP, this demonstrates both that the original requirements have been considered, and either retained or updated/replaced as required. 3. When a general requirement has been removed, careful consideration was given as to its specific need, and whether its retention would in any way aid in the demonstration of attainment with the 24-hr standard. If no argument can be made in that regard, the requirement was simply removed.

## **5.0 New Maintenance Plan Specific Requirements**

The Bingham Canyon Mine and Copperton Concentrator specific conditions in Section IX.H.2.g address those limitations and requirements that apply to the mine and concentrator.

IX.H. 2.g.i.A Maximum total mileage per calendar day for ore and waste haul trucks shall not exceed 30,000 miles.

KUC shall keep records of daily total mileage for all periods when the mine is in operation. KUC shall track haul truck miles with a Global Positioning System or equivalent.

This condition establishes a limitation on daily activity. The daily mileage limitation effectively limits road dust emissions, tailpipe emissions from the haul trucks and overall activity of sources at the mine. Ore processing at the Copperton Concentrator, which results in minimal emissions, is also limited through the Bingham Canyon Mine activity limitations.

Emissions for the Bingham Canyon Mine are estimated using the most current calculation methodology. Daily emissions from the Bingham Canyon Mine can be regulated with the limitation on vehicle miles traveled by ore and waste haul trucks of 30,000 miles per day. Compliance to this limitation is demonstrated on a daily basis and is an appropriate metric for a 24-hour particulate standard.

Emissions resulting from the movement of ore and waste around the mine represent a significant portion of overall emissions at the Bingham Canyon Mine. The emissions related to material movement include fugitive dust generated from the truck travel on the haul roads and the tailpipe emissions from the haul trucks. Specifically, on an annual basis, greater than 99.9 percent of total mine emissions for NOX and SO2 come from the haul truck tailpipes. Also on an annual basis, material movement represents 85% or greater of overall particulate emissions at the Bingham Canyon Mine. Based on these emissions, the material movement of ore and waste by haul trucks represents a vast majority of overall emissions at the Bingham Canyon Mine and can effectively be used to represent mine operations.

It should be noted that the 30,000 miles per day limitation also limits overall Bingham Canyon Mine operations. Ancillary mining activities such as operation of the in-pit crusher, blasting, and drilling only occur to produce adequate amount of ore and waste rock that can be hauled via the trucks and sent to the concentrator via the conveyor system.

KUC uses conveyors as a primary means of crushed ore transport from the mine to the Copperton Concentrator. The use of conveyor as a primary means of transport reduces both fugitive dust and tailpipe emissions to the atmosphere. If KUC were to use haul trucks as a primary means to move crushed ore to the Copperton Concentrator, the daily mileage limit would be easily exceeded. Therefore, in order to comply with the daily mileage limit, KUC would have to use conveyors as

a primary means to transport ore to the Copperton Concentrator.

On a 24-hour basis, these emissions can be represented with a 30,000 miles per day limitation. Since they effectively represent mine operations, a single daily limitation is appropriate in the SIP for the Bingham Canyon Mine. These emissions have been included in the appropriate SIP model so emission caps are therefore not warranted.

The PTE emissions from the mine were used in the modeling that showed attainment with the PM<sub>10</sub> standard. The combined emissions from the mine are 24.79 tons per day (tpd) (19.86 tpd NO<sub>x</sub>, 4.62 tpd PM<sub>10</sub> and 0.32 tpd SO<sub>2</sub>). The PM<sub>10</sub> emissions from the haul roads are 2.65 tpd using a pit escape factor of 20% (7.04 without factor). The NO<sub>x</sub> emissions are 19.86 tpd from the mobile sources.

IX.H.2.1.i.B KUC shall use ultra-low sulfur diesel fuel in ore and waste haul trucks.

This condition establishes a requirement for the use of ultra-low sulfur diesel fuel in haul trucks.

IX.H.2.1.i.C This condition limits the Emissions from the In-pit Crusher baghouse. The lb/hr limits are from the 1994 SIP while the concentration limit is from 40 CFR Part 60 Subpart LL (Standards of Performance for Metallic Mineral Processing Plants).

IX.H.2.1.i.D This condition establishes requirements for reducing and controlling fugitive particulate emissions at the mine and concentrator. Ore conveyors shall be the primary means for transporting ore from the mine to the concentrator thereby displacing truck traffic. Water and chemical dust suppressants shall be used to minimize fugitive dust on haul roads and access roads.

KUC has implemented a comprehensive fugitive dust management program at the Bingham Canyon Mine to minimize fugitive emissions. These practices represent Best Available Control Technology (BACT) and in many cases result in controls beyond BACT. These practices are inherent to the operations at the mine and result from the most recent BACT analysis for emission sources at the mine. Implementation of aggressive dust control practices is also necessary at the Bingham Canyon Mine to meet the requirements of both the Approval Order and other limitations in the State Implementation Plans. This requirement originated in the 1994 PM<sub>10</sub> SIP.

IX.H.2.1.i.E KUC is subject to the fugitive dust rules that are in R307-1-4.5, Fugitive Emissions and Fugitive Dust. This rule was approved by EPA in 1994 and is applicable to the BCM under the 1994 PM<sub>10</sub> SIP. This rule sets a minimum for controlling fugitive dust at mines located in the nonattainment area along the Wasatch Front. The subsection R307-1.4.5.4, Mining Activities, outlines the minimum requirements that mines are to follow in minimizing the fugitive dust from the mining operations.

## **5.1 Monitoring, Recordkeeping and Reporting**

Monitoring, recordkeeping and reporting for all three conditions is addressed through a variety of methods, depending on the emission points. Haul truck miles shall be tracked with a global positioning system or equivalent and records of daily total mileage shall be kept for all periods when the mine is in operation. Fuel delivery records and records of road dust mitigation measures shall be kept in accordance with SIP subsection H.11.c.

## 5.2 Discussion of Attainment Demonstration

Generally, the calculation methodology for determination of emissions from the Bingham Canyon Mine and Copperton Concentrator is similar to the method used in during the 1991/1992 timeframe of the original SIP. However, two key differences exist:

1. Updated emissions estimation methodologies.

As mentioned in the source specific conditions section of this document, emissions estimation methodology has been updated for tailpipe emissions from off-road engines. Tailpipe emissions from haul trucks and support equipment at the mine are estimated using EPA's NONROAD program based on engine size and tier rating.

2. Condensable emissions, which were excluded from the original SIP, are included in the new maintenance plan

The original SIP was based on filterable PM<sub>10</sub> emissions only. The new maintenance plan modeled both filterable and condensable PM<sub>10</sub> emissions.

## 6.0 Implementation Schedule

The requirements imposed on the BCM are effective immediately, except for the requirement for higher tiered haul trucks. In accordance with the PM<sub>2.5</sub> RACT analysis, the haul truck engines will be replaced with higher tier engines on a replacement schedule. The general requirements, IX.H.1.a-f, can be applied immediately.

## 7.0 References

- Bingham Canyon Mine, PM<sub>2.5</sub> SIP Major Point Source RACT Documentation
- Copperton Concentrator, PM<sub>2.5</sub> SIP Major Point Source RACT Documentation
- UDSHW Contract No. 12601, Work Assignment No. 7, Utah PM<sub>2.5</sub> SIP RACT Support – TechLaw Inc.
- Bingham Canyon Mine Approval Order DAQE-AN105710036-14
- Copperton Concentrator Approval Order DAQE-AN105710035-13
- Bingham Canyon Mine In Pit Crusher 2012 stack test results
- Bingham Canyon Mine 2013 stack test results for the two conveyor crushers
- Utah Administrative Code R307-1-4.5.

**Evaluation Report**

**UTAH PM<sub>10</sub> SIP/MAINTENANCE PLAN**

**Salt Lake County Nonattainment Area**

**Supporting Information**