APPENDIX B **Emissions Calculations**

APPENDIX B-1 Post-modification Emissions Calculations

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Units	Definitions
°C	degree Celsius
acfm	actual cubic feet per minute
bhp	brake horsepower
dcf	dry cubic feet
dscf	dry standard cubic feet
dscf	dry standard cubic feet
dscfm	dry standard cubic feet per minute
ft ²	square feet
g	gram
gal	gallon
gpm	gallon per minute
gr	grain
hp	horsepower
hp-hr	horsepower-hour
hr	hour
kW	kilowatt
lb	pound
mg	milligram
mg/kg	milligram per kilogram
mg/L	milligram per liter
min -	minute
mmBtu	million British thermal units
mph	miles per hour
Mtpy	million tons per year
ppm	part per million
tpy	ton per year
yr • • • • • • • • • • • • • • • • • • •	year
Acronyms AEI	Definitions Air Emissions Inventory
AO	Approval Order
BCM	Bingham Canyon Mine
BSFC	brake-specific fuel consumption
CDPHE	Colorado Department of Public Health and Environment
СМВ	Chemical Mass Balance
CO	carbon monoxide
EPA	U.S. Environmental Protection Agency
H ₂ SO ₄	sulfuric acid
HAP	hazardous air pollutant
HC	hydrocarbon
ID	identification
KUC	Kennecott Utah Copper LLC
LPG	liquefied petroleum gas
MSDS	material safety data sheet
MSL	mean sea level
NH_3	ammonia
NOI	Notice of Intent
NO_x	nitrogen oxides
PM	particulate matter
PM ₁₀	particulate matter less than 10 micrometers in aerodynamic diameter
PM _{2.5}	particulate matter less than 2.5 micrometers in aerodynamic diameter
PTE	potential to emit
SIP	·
	State Implementation Plan sulfur dioxide
SO ₂	
SO _x	sulfur oxides
SX/EW	solvent extraction/electrowinning
UDAQ	Utah Division of Air Quality
VMT	vehicle miles traveled
VOC	volatile organic compound

TABLE B1-1 Emissions Summary (260 MM case) KUC—Bingham Canyon Mine

	Point Sources	Other Fugitive Sources	Haulroad Fugitives (within pit influence boundary)	Haulroad Fugitives (outside pit influence boundary)	Mobile Sources	Post Project BCM PTEs
PM ₁₀ Emissions (tpy)	6.28	226	573	480	228	1,513
PM _{2.5} Emissions (tpy)	2.60	37	60	48	221	368
SO ₂ Emissions (tpy)	0.0002				6.56	6.56
NO _X Emissions (tpy)	1.17				5,829	5,830
CO Emissions (tpy)	10.6				1,672	1,682
VOC Emissions (tpy)	0.20	11.30			302	314
HAP Emissions (tpy)		1.37				1.37
PM ₁₀ +SO ₂ +NO _X Emissions (tpy)	7.44					7,350

NOTES:

- (1) Calculations assume 85,000,000 tons per year ore production.
- (2) Mobile Source emissions shown above are the maximum emissions between 2011 through 2028.
- (3) Haulroad emissions shown above are the maximum emissions between 2011 through 2028.
- (4) Calculations incorporate 75% control efficiency for the haulroads within the pit influence boundary and 85% outside the pit influence boundary. Calcs for C6/C7 transfer point baghouse and C7/C8 transfer point baghouse are based on 0.007 gr/dscf grain loading.
- (5) Haulroad emissions inside the pit influence boundary include a 0.20 escape factor in the calculations.

In-pit Crusher
KUC—Bingham Canyon Mine

S	ource Name	PM ₁₀ Emission Factor (gr/dscf)	Hours of Operation (hrs/yr)	Design Flow Rate (dcf/min)	PM ₁₀ Emissions with Primary Control (lbs/hr)	PM ₁₀ Emissions with Primary Control (tpy)			PM _{2.5} Pit Escape Factor (%)	Controlled PM ₁₀ Emissions from the pit (tpy)		
												Emissions controlled with a baghouse.
In	n Pit Crusher	0.016	8,760	12,898	1.77	7.75	2.28	20	21	1.55	0.48	Source Located in the pit.

NOTES:

Emissions based on AO limits.

Emissions for PM2.5 based on factors from AP-42, Table B.2.2, Category 3 - Mechanically Generated Aggregate and Unprocessed Ores.

PM₁₀ and PM_{2.5} Pit Escape Factor applied to the calculations and is based on University of Utah study (1996).

New In-pit Crusher

KUC—Bingham Canyon Mine

		Hours of		PM ₁₀ Emissions	PM ₁₀ Emissions	PM _{2.5} Emissions				Controlled PM _{2.5}	
	PM ₁₀ Emission	Operation	Design Flow	with Primary	with Primary	with Primary	PM ₁₀ Pit Escape	PM _{2.5} Pit Escape	Emissions from	Emissions from	
Source Name	Factor (gr/dscf)	(hrs/yr)	Rate (dcf/min)	Control (lbs/hr)	Control (tpy)	Control (tpy)	Factor (%)	Factor (%)	the pit (tpy)	the pit (tpy)	Control System and Comments
											Emissions controlled with a baghouse.
New In Pit Crusher	0.007	8,760	12,898	0.77	3.39	1.00	20	21	0.68	0.21	Source Located in the pit.

NOTES:

The new crusher is expected to be similar to the existing crusher.

Emissions for PM_{2.5} based on factors from AP-42, Table B.2.2, Category 3 - Mechanically Generated Aggregate and Unprocessed Ores.

PM₁₀ and PM_{2.5} Pit Escape Factor applied to the calculations and is based on University of Utah study (1996).

TABLE B1-4

C6/C7 Conveyor Transfer Point

KUC—Bingham Canyon Mine

	PM₁₀ Emission	Hours of Operation	Design Flow	Controlled PM ₁₀	Controlled PM ₁₀	Controlled PM _{2.5}	
Source Name	Factor (gr/dscf)	(hrs/yr)	Rate (dcf/min)	Emissions (lbs/hr)	Emissions (tpy)	Emissions (tpy)	Control System and Comments
C6/C7 Conveyor Transfer Point	0.007	8,760	5,120	0.31	1.35	0.40	Emissions controlled with a baghouse.

NOTES:

Emissions based on AO limits.

 ${\sf Emissions} \ for \ PM_{2.5} \ based \ on \ factors \ from \ AP-42, \ Table \ B.2.2, \ Category \ 3 \ - \ Mechanically \ Generated \ Aggregate \ and \ Unprocessed \ Ores.$

KUC is proposing a lower grain loading for the baghouse.

TABLE B1-5

C7/C8 Conveyor Transfer Point

KUC—Bingham Canyon Mine

Source Name	PM ₁₀ Emission Factor (gr/dscf)	Hours of Operation (hrs/yr)	Design Flow Rate (dcf/min)	Controlled PM ₁₀ Emissions (lbs/hr)	10	Controlled PM _{2.5} Emissions (tpy)	Control System and Comments
							Emissions controlled with a
C7/C8 Conveyor Transfer Point	0.007	8,760	3,168	0.19	0.83	0.24	baghouse.

NOTES:

Emissions based on AO limits.

Emissions for PM_{2.5} based on factors from AP-42, Table B.2.2, Category 3 - Mechanically Generated Aggregate and Unprocessed Ores.

KUC is proposing a lower grain loading for the baghouse.

Lime Bin

KUC—Bingham Canyon Mine

Source Name	PM ₁₀ Emission Factor (gr/dscf)	Hours of Operation (hrs/vr)	Design Flow Rate (dcf/min)	Controlled PM ₁₀ Emissions (lbs/hr)	Controlled PM ₁₀ Emissions (tpy)	Controlled PM _{2.5} Emissions (tpv)	Control System and Comments
Jource Name	ractor (gr/dscr)	(III S/yI)	Nate (dci/iiiii)	(IDS/III)	Lillissions (tpy)	Lillissions (tpy)	Emissions controlled with a
Lime Bin	0.016	8,760	616	0.08	0.37	0.13	baghouse.

NOTES:

Emissions based on AO limits.

Lime is an industrial nonmetalic mineral.

Emissions for PM2.5 based on factors from AP-42, Table B.2.2, Category 4 - Mechanically Generated Processed Ores and Nonmetallic Minerals.

Lime Bin

KUC—Bingham Canyon Mine

Source Name	PM ₁₀ Emission Factor (gr/dscf)	Hours of Operation (hrs/yr)	Design Flow Rate (dcf/min)	Controlled PM ₁₀ Emissions (lbs/hr)	Controlled PM ₁₀ Emissions (tpy)	Controlled PM _{2.5} Emissions (tpy)	Control System and Comments
							Emissions controlled with a
Lime Bin	0.016	8,760	616	0.08	0.37	0.13	baghouse.

NOTES:

Emissions based on AO limits.

Lime is an industrial nonmetalic mineral.

Emissions for PM_{2.5} based on factors from AP-42, Table B.2.2, Category 4 - Mechanically Generated Processed Ores and Nonmetallic Minerals.

TABLE B1-8

Sample Preparation

KUC—Bingham Canyon Mine

, ,		Hours of		PM ₁₀ Emissions	PM ₁₀ Emissions	PM _{2.5} Emissions			Controlled PM ₁₀	Controlled PM _{2.5}	
	PM ₁₀ Emission	Operation	Design Flow	with Primary	with Primary	with Primary	PM ₁₀ Pit Escape	PM _{2.5} Pit Escape	Emissions from	Emissions from	
Source Name	Factor (gr/dscf)	(hrs/yr)	Rate (dcf/min)	Control (lbs/hr)	Control (tpy)	Control (tpy)	Factor (%)	Factor (%)	the pit (tpy)	the pit (tpy)	Control System and Comments
											Emissions controlled with a
											baghouse. Source Located in the
Sample Preparation	0.016	2,920	4,269	0.59	0.85	0.25	20	21	0.17	0.05	pit.

NOTES:

Hours of operation will continue to be 8 hours per day. No change in hours of operation due to the proposed project.

Emissions for PM_{2.5} based on factors from AP-42, Table B.2.2, Category 3 - Mechanically Generated Aggregate and Unprocessed Ores.

Material handled during sample preparation is ore and waste rock material.

PM₁₀ and PM_{2.5} Pit Escape Factor applied to the calculations and is based on University of Utah study (1996).

Gasoline and Diesel Fueling

KUC—Bingham Canyon Mine

	Total VOC	
	Emissions	Total HAP
Source Name	(tpy)	Emissions (tpy)
Gasoline and Diesel Fueling	4.24	1.29

Gasoline Fueling

Source Name	Annual Throughput (1,000 gal/yr)	VOC Emissions (tpy)	Primary Control System and Comments
			Stage I Vapor
Gasoline Fueling	530	3.45	Recovery

NOTES:

VOC Emission Factor (lb/10³ gal)

13

1

Emission Factor obtained from AP-42, Table 5.2-7.

Station used to fuel light trucks and vehicles.

VOC Emission Factors (lb/10³ gal) from AP-42, Table 5.2.7

Balanced Submerged Filling

Underground Tank Breathing & Emptying

Vehicle refueling Displacement Losses

(uncontrolled) 11

Spillage 0.7

HAP Calculations

HAP	Concentration	Emissions (tpy)
Xylenes	6.5%	0.22
Toluene	10.0%	0.34
Naphthalene	0.2%	0.01
Benzene	3.0%	0.10
1,2,4-Trimethyl Benzene	7.0%	0.24
Ethyl Alcohol	10.0%	0.34
Cyclohexane	0.5%	0.02
Total HAP Emissions		1.28

NOTES:

(1) HAP Concentration data obtained from the MSDS for Gasoline.

Diesel Fueling

	Annual Throughput	VOC Emissions	Primary Control System and
Source Name	(1,000 gal/yr)	(tpy)	Comments
Diesel Fueling	55,000	0.80	Submerged Pipe

NOTES:

VOC Emission Factor (lb/10³ gal)

0.029

In the absence of an applicable AP-42 emission factor, the Colorado Department of Public Health and Environment guidance on emissions from service stations was used for estimating diesel dispensing emissions. Stations are used to fuel light trucks, vehicles and haul trucks.

HAP Calculations

HAP	Concentration	Emissions (tpy)
Toluene	0.5%	0.00399
Naphthalene	0.5%	0.00399
Total HAP Emissions		0.00798

NOTES:

(1) HAP Concentration data obtained from the MSDS for Diesel.

Truck Offloading Ore at In-pit Crusher KUC—Bingham Canyon Mine

Source Name	PM ₁₀ Aerodynamic Particle Size Multiplier (k)	PM _{2.5} Aerodynamic Particle Size Multiplier (k)	Moisture Content (%)			PM _{2.5} Emission Factor (lbs/ton)			Uncontrolled PM _{2.5} Emissions (tpy)	Primary Control		2.5		PM _{2.5} Pit Escape Factor (%)	Controlled PM ₁₀ Emissions from the pit (tpy)	Emissions from	
Truck Offloading Ore	0.35	0.053	4	7	0.00066	0.00010	85,000,000	27.9	4.2	90	2.79	0.42	20	21	0.56	0.09	Inherent material characteristics and physical enclosures. Source Located in the pit.
NOTES: Emission factors estimated using metho Wind speed and moisture content data	• • • • • • • • • • • • • • • • • • • •																

PM₁₀ and PM_{2.5} Pit Escape Factor applied to the calculations and is based on University of Utah study (1996).

Characteristics of the ore material, such as large diameter material, and inherent material moisture content of 4 percent, limit dust being generated during the transfer operations.

The control efficiency listed is based on previous determinations of BACT by UDAQ. This control efficiency has been applied in the 1994 SIP and 2005 SIP calculations and modeling.

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TABLE B1-11 In-pit Enclosed Transfer Points 1, 2, and 3 KUC—Bingham Canyon Mine

	Number of Transfer Points	Particle Size Multiplier (k)	PM _{2.5} Aerodynamic Particle Size Multiplier (k)	Moisture Content (%)		PM ₁₀ Emission Factor (lbs/ton)			Emissions per		Primary Control	primary controls per			PM _{2.5} Emissions with Primary Controls (tpy)	PM ₁₀ Pit Escape Factor (%)	PM _{2.5} Pit Escape Factor (%)	Controlled PM ₁₀ Emissions from the pit (tpy)	Controlled PM _{2.5} Emissions from the pit (tpy)	Control System and Comments
n-Pit Enclosed Transfer Point 1, 2, 3	3	0.35	0.053	4	7	0.00066	0.00010	85,000,000	27.9	4.2	90	2.79	0.42	8.38	1.27	20	21	1.68		Emissions controlled by enclosures. Source locate in the pit.
IOTES: Emission factors estimated using methodology	gy in AP-42, Section	on 13.2.4.																		in the pit.
Vind speed and moisture content data based	d on historical data	а.	sity of Utah study (1996).																	

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TABLE B1-12 New In-pit Enclosed Transfer Point 1, 2, and 3 KUC—Bingham Canyon Mine

Source Name	Number of Transfer Points	PM ₁₀ Aerodynamic Particle Size Multiplier (k)	PM _{2.5} Aerodynamic Particle Size Multiplier (k)	Moisture Content (%)	Wind Speed (mph)	PM ₁₀ Emission Factor (lbs/ton)	PM _{2.5} Emission Factor (lbs/ton)		Emissions per		Primary Control	primary controls per		PM ₁₀ Emissions with Primary Controls (tpy)			PM _{2.5} Pit Escape Factor (%)	Controlled PM ₁₀ Emissions from the pit (tpy)	Controlled PM _{2.5} Emissions from the pit (tpy)	Control System and Comments
New In-Pit Enclosed Transfer Point 1, 2, 3	3	0.35	0.053	4	7	0.00066	0.00010	85,000,000	27.9	4.2	90	2.79	0.42	8.38	1.27	20	21	1.68		Emissions controlled by enclosures. Source locate in the pit.
NOTES: Emission factors estimated using methodols Wind speed and moisture content data base PM ₁₀ and PM _{2.5} Pit Escape Factor applied to The control efficiency listed is based on pre-	ed on historical dat o the calculations	a. and is based on Univers			in the 1994 SIP ar	nd 2005 SIP calculati	ions and modeling.													

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In-pit Enclosed Transfer Point 4 and 5 (proposed new transfer point with the relocation of the existing in-pit crusher), KUC—Bingham Canyon Mine

												PM ₁₀	PM _{2.5}							
		PM ₁₀	PM _{2.5}						Uncontrolled	Uncontrolled		Emissions	Emissions	PM ₁₀	PM _{2.5}			Controlled	Controlled	
		Aerodynamic	Aerodynamic			PM ₁₀	PM _{2.5}	Annual	PM ₁₀	PM _{2.5}		with Primary	with Primary	Emissions	Emissions			PM ₁₀	PM _{2.5}	
		Particle	Particle		Wind	Emission	Emission	Process	Emissions	Emissions	Primary	Controls	Controls	with	with	PM ₁₀	PM _{2.5} Pit	Emissions	Emissions	Control
	Number of	Size	Size	Moisture	Speed	Factor	Factor	Rate	per Transfer	per Transfer	Control	per Transfer	per Transfer	Primary	Primary	Pit Escape	Escape	from the	from the	System and
Source Name	Transfer Points	Multiplier (k)	Multiplier (k)	Content (%)	(mph)	(lbs/ton)	(lbs/ton)	(tpy)	Point (tpy)	Point (tpy)	Efficiency (%)	Point (tpy)	Point (tpy)	Controls (tpy)	Controls (tpy)	Factor (%)	Factor (%)	Pit (tpy)	Pit (tpy)	Comments
																				Emissions controlled by
In-Pit Enclosed Transfer Point 4,5	2	0.35	0.053	4	7	0.00066	0.00010	85,000,000	27.9	4.2	90	2.79	0.42	5.59	0.85	20	21	1.12	0.18	enclosures. Source
																				located in the pit.

NOTES:

Emission factors estimated using methodology in AP-42, Section 13.2.4. Wind speed and moisture content data based on historical data.

PM₁₀ and PM_{2.5} Pit Escape Factor applied to the calculations and is based on University of Utah study (1996).

The control efficiency listed is based on previous determinations of BACT by UDAQ. This control efficiency has been applied in the 1994 SIP and 2005 SIP calculations and modeling.

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Conveyor-Stacker Transfer Point KUC—Bingham Canyon Mine

	PM ₁₀ Aerodynamic	PM _{2.5} Aerodynamic							Uncontrolled				
	Particle Size	Particle Size	Moisture	Wind Speed	PM ₁₀ Emission	PM _{2.5} Emission	Annual Process	Uncontrolled PM ₁₀	PM _{2.5} Emissions	Control	Controlled PM ₁₀	Controlled PM _{2.5}	Control System and
Source Name	Multiplier (k)	Multiplier (k)	Content (%)	(mph)	Factor (lbs/ton)	Factor (lbs/ton)	Rate (tpy)	Emissions (tpy)	(tpy)	Efficiency (%)	Emissions (tpy)	Emissions (tpy)	Comments
Conveyor-Stacker Transfer Point	0.35	0.053	4	7	0.00066	0.00010	85,000,000	27.9	4.2	90	2.79	0.42	Inherent material characteristics and physical enclosures.

NOTES:

Emission factors estimated using methodology in AP-42, Section 13.2.4. Wind speed and moisture content data based on historical data.

Characteristics of the ore material, such as large diameter material, and inherent material moisture content of 4 percent, limit dust being generated during the transfer operations.

The control efficiency listed is based on previous determinations of BACT by UDAQ. This control efficiency has been applied in the 1994 SIP and 2005 SIP calculations and modeling.

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Coarse Ore Stacker

KUC—Bingham Canyon Mine

	PM ₁₀ Aerodynamic	PM _{2.5} Aerodynamic							Uncontrolled				
	Particle Size	Particle Size Multiplier	Moisture	Wind Speed	PM ₁₀ Emission	PM _{2.5} Emission	Annual Process	Uncontrolled PM ₁₀	PM _{2.5} Emissions	Control	Controlled PM ₁₀	Controlled PM _{2.5}	
Source Name	Multiplier (k)	(k)	Content (%)	(mph)	Factor (lbs/ton)	Factor (lbs/ton)	Rate (tpy)	Emissions (tpy)	(tpy)	Efficiency (%)	Emissions (tpy)	Emissions (tpy)	Control System and Comments
Coarse Ore Stacker (Drop to Coarse Ore Storage Pile)	0.35	0.053	4	7	0.00066	0.00010	85,000,000	27.9	4.2	90	2.79	0.42	Inherent material characteristics and physical enclosures.

NOTES:

Emission factors estimated using methodology in AP-42, Section 13.2.4.

Wind speed and moisture content data based on historical data.

Characteristics of the ore material, such as large diameter material, and inherent material moisture content of 4 percent, limit dust being generated during the transfer operations.

The control efficiency listed is based on previous determinations of BACT by UDAQ. This control efficiency has been applied in the 1994 SIP and 2005 SIP calculations and modeling.

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Reclaim Tunnels

KUC—Bingham Canyon Mine

	PM ₁₀ Aerodynamic	PM _{2.5} Aerodynamic							Uncontrolled				
	Particle Size	Particle Size	Moisture	Wind Speed	PM ₁₀ Emission	PM _{2.5} Emission	Annual Process	Uncontrolled PM ₁₀	PM _{2.5} Emissions	Control	Controlled PM ₁₀	Controlled PM _{2.5}	
Source Name	Multiplier (k)	Multiplier (k)	Content (%)	(mph)	Factor (lbs/ton)	Factor (lbs/ton)	Rate (tpy)	Emissions (tpy)	(tpy)	Efficiency (%)	Emissions (tpy)	Emissions (tpy)	Control System and Comments
Reclaim Tunnels (Coarse Ore Reclaim Tunnel Vent)	0.35	0.053	4	7	0.00066	0.00010	85,000,000	27.9	4.2	90	2.79	0.42	Inherent material characteristics and physical enclosures.

NOTES:

Emission factors estimated using methodology in AP-42, Section 13.2.4.

Wind speed and moisture content data based on historical data.

Characteristics of the ore material, such as large diameter material, and inherent material moisture content of 4 percent, limit dust being generated during the transfer operations.

The control efficiency listed is based on previous determinations of BACT by UDAQ. This control efficiency has been applied in the 1994 SIP and 2005 SIP calculations and modeling.

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Disturbed Areas

KUC—Bingham Canyon Mine

			PM Emission	PM ₁₀ Emission	PM _{2.5} Emission		Uncontrolled		PM ₁₀ Emissions	PM _{2.5} Emissions			Controlled PM ₁₀	Controlled PM _{2.5}	
	Number of Days per	Number of Days of	Factor (tons/acre-	Factor (tons/acre-	Factor (tons/acre-	Total Disturbed	PM ₁₀ Emissions	Primary Control	with Primary	with Primary	PM ₁₀ Pit Escape	PM _{2.5} Pit Escape	Emissions from	Emissions from	
Source Name	Year	precipitation	yr)	yr)	yr)	Area (acres)	(tpy)	Efficiency (%)	Controls (tpy)	Controls (tpy)	Factor (%)	Factor (%)	the pit (tpy)	the pit (tpy)	Control System and Comments
Disturbed Areas (Unstabilized Areas) - areas Outside the Pit	365	106	0.38	0.18	0.03	256	32.7	0	32.7	7.0	100	100	32.67		Inherent material characteristics and water application from passing water trucks is used to further reduce emissions.
Disturbed Areas (Unstabilized Areas) - areas Inside the Pit	365	106	0.38	0.18	0.03	310	39.6	0	39.6	8.4	20	21	7.92	1.77	Inherent material characteristics and source located in the pit.

NOTES

PM Emission factor estimated using methodology in AP-42, Section 11.9-4 (Wind Erosion of Exposed Areas).

PM₁₀ and PM_{2.5} emission factor derived from ratio of transfer particle size multipliers in AP 42, Fifth Edition, Table 13.2.4 (EPA, 2006), (Wind Erosion of Pile Surfaces and Ground Areas around Piles).

Characteristics of the ore material, such as large diameter material, and inherent material moisture content of 4 percent, limit dust being generated.

PM₁₀ and PM_{2.5} Pit Escape Factor applied to the calculations and is based on University of Utah study (1996).

Days of precipitation data obtained from the East Butte Meterological Station. Number of days with at least 0.01 inches of precipitation per year.

Distribution of acres in and out of pit are based on expected mine operations provided by the KUC Mine group.

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Cold Solvent Degreasing Parts KUC—Bingham Canyon Mine

	Throughput	Specific	Density	Percent	Uncontrolled VOC Emissions	Control	Controlled VOC	Control System
Source Name	(gal/yr)	Gravity	(lbs/gal)	VOCs	(tpy)	Efficiency (%)	Emissions (tpy)	and Comments
Cold Solvent Degreasing Parts	500	0.81	6.76	100	1.69	0	1.69	Degreasers are enclosed.

NOTES:

Emissions estimated based on material balance.

Throughput based on one solvent change per year for 8 degreasers.

Haul Roads KUC—Bingham Canyon Mine														
Emissions for 2011			Max Hauled:	260,000,000	tons per year									
Activity & Road Description	Number of days of precipitation	PM Emission Factor (lbs/VMT)	PM ₁₀ Emission Factor (lbs/VMT)	PM _{2.5} Emission Factor (lbs/VMT)	Annual Material Hauled (tons)	Round Trip Haul Distance (miles)	Number of Round Trips	Vehicle Miles Traveled (VMT)	Uncontrolled PM ₁₀ Emissions (tpy)	Uncontrolled PM _{2.5} Emissions (tpy)	Control Efficiency (%)	Controlled PM ₁₀ Emissions (tpy)	Controlled PM _{2.5} Emissions (tpy)	Control System and Comments
Haul Roads Inside the Pit	106	12.66	3.11	0.31	214,000,000	3.9	891,667	3,477,500	5,411	541	75	1,353	135	Water Sprays and Road Base.
Haul Roads Outside the Pit	106	12.66	3.11	0.31	214,000,000	0.8	891,667	713,333	1,110	111	85	167	17	Chemical Suppressants and Water Sprays
,	•		•	!	•	!	•	4,190,833	•			1,519	152	!
Emissions for 2012	1	1	T	T	1	T	I	1	T	Π			T	I
Activity & Road Description	Number of days of precipitation	PM Emission Factor (Ibs/VMT)	PM ₁₀ Emission Factor (lbs/VMT)	PM _{2.5} Emission Factor (lbs/VMT)		Round Trip Haul Distance (miles)	Number of Round Trips	Vehicle Miles Traveled (VMT)	Uncontrolled PM ₁₀ Emissions (tpy)	Uncontrolled PM _{2.5} Emissions (tpy)	Control Efficiency (%)	Controlled PM ₁₀ Emissions (tpy)	Controlled PM _{2.5} Emissions (tpy)	Control System and Comments
Haul Roads Inside the Pit	106	12.66	3.11	0.31	235,000,000	4.4	979,167	4,308,333	6,704	670	75	1,676	168	Water Sprays and Road Base.
Haul Roads Outside the Pit	106	12.66	3.11	0.31	235,000,000	0.7	979,167	685,417	1,067	107	85	160	16	Chemical Suppressants and Water Sprays
								4,993,750				1,836	184	•
Emissions for 2013														
Activity & Road Description	Number of days of precipitation		PM ₁₀ Emission Factor (lbs/VMT)	PM _{2.5} Emission Factor (lbs/VMT)	Annual Material Hauled (tons)	Round Trip Haul Distance (miles)	Number of Round Trips	Vehicle Miles Traveled (VMT)	Uncontrolled PM ₁₀ Emissions (tpy)	Uncontrolled PM _{2.5} Emissions (tpy)	Control Efficiency (%)	Controlled PM ₁₀ Emissions (tpy)	Controlled PM _{2.5} Emissions (tpy)	Control System and Comments
Haul Roads Inside the Pit	106	12.66	3.11	0.31	255,000,000	5.5	1,062,500	5,843,750	9,094	909	75	2,273	227	Water Sprays and
Haul Roads Outside the Pit	106	12.66	3.11	0.31	255,000,000	2.1	1,062,500	2,231,250	3,472	347	85	521	52	Road Base. Chemical Suppressants and Water Sprays
		<u> </u>		<u> </u>		<u> </u>		8,075,000				2,794	279	1
Emissions for 2014		T	T	1	ı	1	1	1	ı	I				
Activity & Road Description	Number of days of precipitation	PM Emission Factor (Ibs/VMT)	PM ₁₀ Emission Factor (lbs/VMT)	PM _{2.5} Emission Factor (lbs/VMT)	Annual Material Hauled (tons)	Round Trip Haul Distance (miles)	Number of Round Trips	Vehicle Miles Traveled (VMT)	Uncontrolled PM ₁₀ Emissions (tpy)	Uncontrolled PM _{2.5} Emissions (tpy)	Control Efficiency (%)	Controlled PM ₁₀ Emissions (tpy)	Controlled PM _{2.5} Emissions (tpy)	Control System and Comments
Haul Roads Inside the Pit	106	12.66	3.11	0.31	259,000,000	6.2	1,079,167	6,690,833	10,412	1,041	75	2,603	260	Water Sprays and Road Base.
Haul Roads Outside the Pit	106	12.66	3.11	0.31	259,000,000	1.3	1,079,167	1,402,917	2,183	218	85	327	33	Chemical Suppressants and Water Sprays
		ļ	ļ	ļ	ļ	ļ	ļ	8,093,750	ļ	<u> </u>		2,930	293	!
Emissions for 2015	1	T	T	1		1		T		T				
Activity & Road Description	Number of days of precipitation	PM Emission Factor (Ibs/VMT)	PM ₁₀ Emission Factor (lbs/VMT)	PM _{2.5} Emission Factor (lbs/VMT)	Annual Material Hauled (tons)	Round Trip Haul Distance (miles)	Number of Round Trips	Vehicle Miles Traveled (VMT)	Uncontrolled PM ₁₀ Emissions (tpy)	Uncontrolled PM _{2.5} Emissions (tpy)	Control Efficiency (%)	Controlled PM ₁₀ Emissions (tpy)	Controlled PM _{2.5} Emissions (tpy)	Control System and Comments
Haul Roads Inside the Pit	106	12.66	3.11	0.31	259,000,000	5.8	1,079,167	6,259,167	9,740	974	75	2,435	244	Water Sprays and Road Base.
Haul Roads Outside the Pit	106	12.66	3.11	0.31	259,000,000	2.7	1,079,167	2,913,750	4,534	453	85	680	68	Chemical Suppressants and Water Sprays

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312

9,172,917

TABLE B1-19 Haul Roads KUC—Bingham Canyon Mine Emissions for 2016

Activity & Road Description	Number of days of precipitation		PM ₁₀ Emission Factor (lbs/VMT)			Round Trip Haul Distance (miles)	Number of	Vehicle Miles Traveled (VMT)	Uncontrolled PM ₁₀ Emissions (tpy)	Uncontrolled PM _{2.5} Emissions (tpy)		.0	Emissions (tpy)	and Comments
Haul Roads Inside the Pit	106	12.66	3.11	0.31	260,000,000	6.8	1,083,333	7,366,667	11,463	1,146	75	2,866	287	Water Sprays and Road Base.
Haul Roads Outside the Pit	106	12.66	3.11	0.31	260,000,000	1.9	1,083,333	2,058,333	3,203	320	85	480 3.346	48	Chemical Suppressants and Water Sprays

Emissions for 2017

Activity & Road Description	Number of days of precipitation	PM Emission Factor (lbs/VMT)	PM ₁₀ Emission Factor (lbs/VMT)			Round Trip Haul Distance (miles)		Vehicle Miles Traveled (VMT)		Uncontrolled PM _{2.5} Emissions (tpy)	•••••	.0	Controlled PM _{2.5} Emissions (tpy)	
Haul Roads Inside the Pit	106	12.66	3.11	0.31	242,000,000	6.2	1,008,333	6,251,667	9,728	973	75	2,432	243	Water Sprays and Road Base.
Haul Roads Outside the Pit	106	12.66	3.11	0.31	242,000,000	3.0	1,008,333	3,025,000	4,707	471	85	706	71	Chemical Suppressants and Water Sprays
	•							9,276,667				3,138	314	

Emissions for 2018

Activity & Road Description	Number of days of precipitation	PM Emission Factor (lbs/VMT)				Round Trip Haul Distance (miles)	Number of	Vehicle Miles Traveled (VMT)		Uncontrolled PM _{2.5} Emissions (tpy)			Controlled PM _{2.5} Emissions (tpy)	
Haul Roads Inside the Pit	106	12.66	3.11	0.31	217,000,000	3.4	904,167	3,074,167	4,784	478	75	1,196	120	Water Sprays and Road Base.
Haul Roads Outside the Pit	106	12.66	3.11	0.31	217,000,000	6.4	904,167	5,786,667	9,005	900	85	1,351	135	Chemical Suppressants and Water Sprays
						•		8,860,833	•			2,547	255	

Emissions for 2019

Activity & Road Description	Number of days of precipitation	PM Emission Factor (lbs/VMT)	PM ₁₀ Emission	PM _{2.5} Emission Factor (lbs/VMT)				Vehicle Miles Traveled (VMT)		Uncontrolled PM _{2.5} Emissions (tpy)			Controlled PM _{2.5} Emissions (tpy)	Control System and Comments
Haul Roads Inside the Pit	106	12.66	3.11	0.31	204,000,000	4.8	850,000	4,080,000	6,349	635	75	1,587	159	Water Sprays and Road Base.
Haul Roads Outside the Pit	106	12.66	3.11	0.31	204,000,000	5.3	850,000	4,505,000	7,010	701	85	1,052	105	Chemical Suppressants and Water Sprays
	•			•				8,585,000	•			2,639	264	•

Emissions for 2020

Activity & Road Description	Number of days of precipitation	PM Emission Factor (lbs/VMT)	PM ₁₀ Emission			Round Trip Haul Distance (miles)	Number of	Vehicle Miles Traveled (VMT)		Uncontrolled PM _{2.5} Emissions (tpy)		.0	Controlled PM _{2.5} Emissions (tpy)	
Haul Roads Inside the Pit	106	12.66	3.11	0.31	154,000,000	5.8	641,667	3,721,667	5,791	579	75	1,448	145	Water Sprays and Road Base.
Haul Roads Outside the Pit	106	12.66	3.11	0.31	154,000,000	3.5	641,667	2,245,833	3,495	349	85	524	52	Chemical Suppressants and Water Sprays
								5,967,500				1,972	197	

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TABLE B1-19 Haul Roads KUC—Bingham Canyon Mine Emissions for 2021

LIIIISSIOIIS IOI ZUZ I														
Activity & Road Description	Number of days of precipitation	PM Emission Factor (lbs/VMT)		PM _{2.5} Emission Factor (lbs/VMT)		Round Trip Haul Distance (miles)	Number of	Vehicle Miles Traveled (VMT)	Uncontrolled PM ₁₀ Emissions (tpy)	Uncontrolled PM _{2.5} Emissions (tpy)	Control Efficiency (%)		Controlled PM _{2.5} Emissions (tpy)	Control System and Comments
Haul Roads Inside the Pit	106	12.66	3.11	0.31	101,000,000	3.1	420,833	1,304,583	2,030	203	75	508	51	Water Sprays and Road Base.
Haul Roads Outside the Pit	106	12.66	3.11	0.31	101,000,000	7.2	420,833	3,030,000	4,715	472	85	707	71	Chemical Suppressants and Water Sprays
							•	4,334,583				1,215	121	

Emissions for 2022

Activity & Road Description	Number of days of precipitation	PM Emission Factor (lbs/VMT)				Round Trip Haul Distance (miles)		Vehicle Miles Traveled (VMT)		Uncontrolled PM _{2.5} Emissions (tpy)				
Haul Roads Inside the Pit	106	12.66	3.11	0.31	71,000,000	4.2	295,833	1,242,500	1,933	193	75	483	48	Water Sprays and Road Base.
Haul Roads Outside the Pit	106	12.66	3.11	0.31	71,000,000	7.7	295,833	2,277,917	3,545	354	85	532	53	Chemical Suppressants and Water Sprays
			•					3.520.417	•			1.015	102	

Emissions for 2023

Activity & Road Description	Number of days of precipitation	PM Emission Factor (lbs/VMT)				Round Trip Haul Distance (miles)		Vehicle Miles Traveled (VMT)		Uncontrolled PM _{2.5} Emissions (tpy)			Controlled PM _{2.5} Emissions (tpy)	
Haul Roads Inside the Pit	106	12.66	3.11	0.31	77,000,000	5.5	320,833	1,764,583	2,746	275	75	686	69	Water Sprays and Road Base.
Haul Roads Outside the Pit	106	12.66	3.11	0.31	77,000,000	10.3	320,833	3,304,583	5,142	514	85	771	77	Chemical Suppressants and Water Sprays
								5,069,167				1,458	146	

Emissions for 2024

L11113310113 101 2024	, , , , , , , , , , , , , , , , , , , ,		,			, , , , , , , , , , , , , , , , , , , ,			1	,		,		1
Activity & Road Description	Number of days of precipitation	PM Emission Factor (lbs/VMT)				Round Trip Haul Distance (miles)		Vehicle Miles Traveled (VMT)		Uncontrolled PM _{2.5} Emissions (tpy)			Controlled PM _{2.5} Emissions (tpy)	
Haul Roads Inside the Pit	106	12.66	3.11	0.31	90,000,000	6.9	375,000	2,587,500	4,026	403	75	1,007	101	Water Sprays and Road Base.
Haul Roads Outside the Pit	106	12.66	3.11	0.31	90,000,000	6.7	375,000	2,512,500	3,910	391	85	586	59	Chemical Suppressants and Water Sprays
								5,100,000	•			1,593	159	•

Emissions for 2025

Activity & Road Description	Number of days of precipitation	PM Emission Factor (lbs/VMT)				Round Trip Haul Distance (miles)		Vehicle Miles Traveled (VMT)	Uncontrolled PM ₁₀ Emissions (tpy)	Uncontrolled PM _{2.5} Emissions (tpy)	•••••	.0	Controlled PM _{2.5} Emissions (tpy)	
Haul Roads Inside the Pit	106	12.66	3.11	0.31	84,000,000	7.5	350,000	2,625,000	4,085	408	75	1,021	102	Water Sprays and Road Base.
Haul Roads Outside the Pit	106	12.66	3.11	0.31	84,000,000	8.1	350,000	2,835,000	4,412	441	85	662	66	Chemical Suppressants and Water Sprays
								5,460,000				1,683	168	

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Haul Roads

KUC—Bingham Canyon Mine
Emissions for 2026

Ellissions for 2020	Number of days	PM Emission Factor	PM ₁₀ Emission	PM _{2.5} Emission	Annual Material	Round Trip Haul	Number of	Vehicle Miles Traveled	Uncontrolled PM ₁₀ Emissions	Uncontrolled PM _{2.5} Emissions	Control	Controlled PM ₁₀	Controlled PM _{2.5}	Control System
Activity & Road Description	of precipitation		Factor (lbs/VMT)			Distance (miles)		(VMT)	(tpy)	(tpy)	Efficiency (%)		Emissions (tpy)	and Comments
Haul Roads Inside the Pit	106	12.66	3.11	0.31	80,000,000	4.7	333,333	1,566,667	2,438	244	75	609	61	Water Sprays and Road Base.
Haul Roads Outside the Pit	106	12.66	3.11	0.31	80,000,000	10.9	333,333	3,633,333	5,654	565	85	848	85	Chemical Suppressants and Water Sprays

5,200,000 1,458 146

Emissions for 2027

Activity & Road Description	Number of days of precipitation	PM Emission Factor (lbs/VMT)	PM ₁₀ Emission			Round Trip Haul Distance (miles)	Number of	Vehicle Miles Traveled (VMT)		Uncontrolled PM _{2.5} Emissions (tpy)			Controlled PM _{2.5} Emissions (tpy)	
Haul Roads Inside the Pit	106	12.66	3.11	0.31	84,000,000	4.2	350,000	1,470,000	2,288	229	75	572	57	Water Sprays and Road Base.
Haul Roads Outside the Pit	106	12.66	3.11	0.31	84,000,000		350,000	0	0	0	85	0	0	Chemical Suppressants and Water Sprays
								1,470,000				572	57	

Emissions for 2028

Activity & Road Description	Number of days of precipitation	PM Emission Factor (lbs/VMT)				Round Trip Haul Distance (miles)	Number of	Vehicle Miles Traveled (VMT)		Uncontrolled PM _{2.5} Emissions (tpy)			Controlled PM _{2.5} Emissions (tpy)	
Haul Roads Inside the Pit	106	12.66	3.11	0.31	85,000,000	4.2	354,167	1,487,500	2,315	231	75	579	58	Water Sprays and Road Base.
Haul Roads Outside the Pit	106	12.66	3.11	0.31	85,000,000		354,167	0	0	0	85	0	0	Chemical Suppressants and Water Sprays
						•		1,487,500	•			579	58	

2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 Fugitive PM₁₀ Emissions 3,115 1,519 1,836 2,794 2,930 3,346 3,138 2,547 2,639 1,972 1,215 1,015 1,458 1,593 1,683 1,458 572 579 335 PM_{2.5} Emissions 152 184 279 293 312 314 255 264 197 121 146 159 168 146 57 58 102

_	
Average Vehicle Weight - Full	
(tons)	413
Average Vehicle Weight - Empty	
(tons)	173
S = Silt Content (%)	4
Vehicle Capacity (tons)	240
W = Average Vehicle Weight	
(tons)	293

(tons)

Days of precipitation data obtained from the East Butte Meterological Station.
Haul Road Distances and Maximum Material Hauled based on data provided by KUC Mine Group.
240-Ton Truck capacity used in the calculation.

Average Vehicle Weight is used in the calculation.

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TABLE B1-19

Haul Roads

KUC—Bingham Canyon Mine

AP-42 emission calculations for <u>unpaved</u> roads. Chapter 13.2.2 (11/06)

$$E = k \times \left(\frac{s}{12}\right)^{a} \times \left(\frac{W}{3}\right)^{b} \times \left(\frac{365 - p}{365}\right)$$
$$E = k \times \left(\frac{s}{12}\right)^{a} \times \left(\frac{W}{3}\right)^{b} \times \left(\frac{365 - p}{365}\right)$$

Equation (1a):

$$E = k \times \left(\frac{s}{12}\right)^{a} \times \left(\frac{W}{3}\right)^{b} \times \left(\frac{365 - p}{365}\right)$$

		Unpaved	
	PM	PM ₁₀	PM _{2.5}
k =	4.9	1.5	0.150
a =	0.7	0.9	0.9
b =	0.45	0.45	0.45

- E: emission factor (lb/VMT) VMT = vehicle miles traveled
- k, a, b: dimensionless constants from Table 13.2.2-2
 - S: silt content (%) of road surface
 - W: mean vehicle weight (tons); = (wt.loaded + wt.unloaded / 2)
 - p: number of days with at least 0.01 inches of precipitation per year; not used for calculating hourly emissions (default = 90)

Low-grade Coarse Ore Storage Piles
KUC—Bingham Canyon Mine

Source Name	Size of Storage Pile (acres)	Mean Wind Speed (mph)			PM _{2.5} Emission Factor (lb/acre-hr)		Uncontrolled PM ₁₀ Emissions (tpy)		Control	PM ₁₀ Emissions with Primary Controls (tpy)	PM _{2.5} Emissions with Primary Controls (tpy)	PM ₁₀ Pit Escape Factor (%)	PM _{2.5} Pit Escape Factor (%)		Controlled PM _{2.5} Emissions from the pit (tpy)	Control System and Comments
Low-grade Coarse Ore Storage Piles	10	7	5.04	2.38	0.36	8,760	104.4	15.8	90	10.44	1.58	20	21	2.09	0.33	Inherent material characteristics and mechanical compaction to minimize emissions. Water application from passing water trucks is used to further reduce emissions. Source is located in the pit.

NOTES:

Emission factors estimated using methodology in AP-42, Table 11.9-1.

Based on ratio of transfer particle size multipliers in AP 42, Fifth Edition, Table 13.2.4 (EPA, 2006), assume PM₀ to be 47% of PM and PM_{2.5} to be 15% of PM₁₀.

PM_{1.0} and PM_{2.5} Pit Escape Factor applied to the calculations and is based on University of Utah study (1996).

Characteristics of the ore material, such as large diameter material, and inherent material moisture content of 4 percent, limit dust being generated during the transfer operations.

Wind speed and moisture content data based on historical data.

The control efficiency listed is based on previous determinations of BACT by UDAQ. This control efficiency has been applied in the 1994 SIP and 2005 SIP calculations and modeling.

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Front-end Loaders

KUC—Bingham Canyon Mine

Source Name	Moisture Content (%)	PM ₁₀ Emission Factor (lbs/ton)		Annual Process Rate (tpy)	Uncontrolled PM ₁₀ Emissions (tpy)		Primary Control Efficiency (%)	PM ₁₀ Emissions with Primary Controls (tpy)	PM _{2.5} Emissions with Primary Controls (tpy)	PM ₁₀ Pit Escape Factor (%)	PM _{2.5} Pit Escape Factor (%)	Controlled PM ₁₀ Emissions from the pit (tpy)	Controlled PM _{2.5} Emissions from the pit (tpy)	Control System and Comments
Front-end Loaders (Operation in Pit)	4	0.0256	0.0042	10,350,000	132.6	21.61	70	39.8	6.5	20	21	7.96	1.36	Water application from passing water trucks is used to further reduce emissions. Source located in the pit.
Front-end Loaders (Operation out of Pit)	4	0.0256	0.0042	1,150,000	14.7	2.40	70	4.4	0.7	100	100	4.42	0.72	Water application from passing water trucks is used to further reduce emissions.

NOTES:

Emission factors estimated using methodology outlined in AP-42, Table 11.9-1.

PM₁₀ and PM_{2.5} Pit Escape Factor applied to the calculations and is based on University of Utah study (1996).

Moisture content data based on historical data.

Front end loaders operate primarily in vehicular traveled areas. These areas are subject to road watering.

Front end loaders are not utilized for loading primary ore and waste haulage trucks.

70 percent Control Efficiency for water application in the areas where loaders are operated, per UDAQ policy. Process rates in and out of pit are based on expected mine operations provided by the KUC Mine group.

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Truck Loading

KUC—Bingham Canyon Mine

	PM ₁₀ Aerodynamic						Annual	Uncontrolled	Uncontrolled		PM ₁₀ Emissions				Controlled PM ₁₀		
Source Name	Particle Size Multiplier (k)	Particle Size Multiplier (k)	Moisture Content (%)			PM _{2.5} Emission Factor (lbs/ton)		PM ₁₀ Emissions (tpy)			,	with Primary Controls (tpy)	PM ₁₀ Pit Escape Factor (%)	PM _{2.5} Pit Escape Factor (%)	Emissions from the pit (tpy)	Emissions from the pit (tpy)	Control System and Comments
Truck Loading	0.35	0.053	4	7	0.00066	0.00010	260,000,000	85.4	12.9	90	8.5	1.3	20	21	1.71	0.27	Inherent material characteristics and minimal drop distance. Source is located in the pit.

NOTES:
Emission factors estimated using methodology in AP-42, Section 13.2.4.
Wind speed and moisture content data based on historical data.

White speed and infosture content data based on historica data.

PM₁₀ and PM_{2.5} Pit Escape Factor applied to the calculations and is based on University of Utah study (1996).

Characteristics of the ore/waste rock material, such as large diameter material, and inherent material moisture content of 4 percent, limit dust being generated during the transfer operations. The control efficiency listed is based on previous determinations of BACT by UDAQ. This control efficiency has been applied in the 1994 SIP and 2005 SIP calculations and modeling. Ore and waste rock is loaded into the haultrucks with shovels.

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Truck Offloading of Waste Rock

KUC—Bingham Canyon Mine

Source Name	PM ₁₀ Aerodynamic Particle Size Multiplier (k)	PM _{2.5} Aerodynamic Particle Size Multiplier (k)		Wind Speed (mph)	PM ₁₀ Emission Factor (lbs/ton)	2.0		Uncontrolled PM ₁₀ Emissions (tpy)	Uncontrolled PM _{2.5} Emissions (tpy)		.0	Controlled PM _{2.5} Emissions (tpy)	
Truck Offloading of Waste Rock	0.35	0.053	4	7	0.00066	0.00010	175,000,000	57.5	8.7	0	57.5	8.7	Inherent material characteristics and mechanical compaction to minimize emissions. Water application from passing water trucks is used to further reduce emissions.

NOTES:

Emission factors estimated using methodology in AP-42, Section 13.2.4.

Wind speed and moisture content data based on historical data.

Characteristics of the waste rock material, such as large diameter material, and inherent material moisture content of 4 percent, limit dust being generated during the transfer operations. Mechanical compaction is achieved with dozers operating in the waste rock disposal areas.

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Graders

KUC—Bingham Canyon Mine

Source Name	Mean Vehicle Speed (mph)	Number of Graders	Hours of Operation (hrs/yr)		Uncontrolled PM _{2.5} Emissions (tpy)		PM ₁₀ Emissions with Primary Controls (tpy)	PM _{2.5} Emissions with Primary Controls (tpy)		PM _{2.5} Pit Escape Factor (%)		Controlled PM _{2.5} Emissions from the pit (tpy)	Control System and Comments
Graders (Operation in Pit)	8	18	3,140	443	51	61	173	20	20	21	34.5	4.16	Water application from passing water trucks is used to further reduce emissions. Source is located in the pit.
Graders (Operation out of Pit)	8	18	785	111	13	61	43	5	100	100	43.2		Water application from passing water trucks is used to further reduce emissions.

NOTES:

Emissions calculated using methodology outlined in AP-42, Table 11.9-1.

61 percent Control Efficiency for water application in the areas where graders are operated (construction type activities), per Table 3-7 - WRAP Fugitive Dust Handbook.

PM₁₀ and PM_{2.5} Pit Escape Factor applied to the calculations and is based on University of Utah study (1996).

Graders primarily operate on the haulroads maintaining surfaces of the roads.

Operation hours in and out of pit and vehicle speed are based on expected mine operations provided by the KUC Mine group.

Hours per year: 8,760
Availability (%): 80
Effective Use of Utilization (%): 56
Hours of operation: 3,924

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Bulldozers (Track Dozers) KUC—Bingham Canyon Mine

Source Name	Silt Content (%)	Moisture Content (%)	Number of Track Dozers	Hours of Operation (hrs/yr)		PM _{2.5} Emission Factor (lbs/hr)		Uncontrolled PM _{2.5} Emissions (tpy)		with Primary	PM _{2.5} Emissions with Primary Controls (tpy)		PM _{2.5} Pit Escape Factor (%)	10	Controlled PM _{2.5} Emissions from the pit (tpy)	Control System and Comments
Track dozers (Operation in Pit)	4	4	26	2,137	0.86	0.52	24	14	61	9.33	5.65	20	21	1.9	1.19	Water application from passing water trucks is used to further reduce emissions. Source is located in the pit.
Track dozers (Operation out of Pit)	4	4	26	916	0.86	0.52	10	6	61	4.00	2.42	100	100	4.0	2.42	Water application from passing water trucks is used to further reduce emissions. Source is located in the pit.

Emission factors estimated using methodology outlined in AP-42, Table 11.9-1.
61 percent Control Efficiency for water application in the areas where dozers are operated (construction type activities), per Table 3-7 - WRAP Fugitive Dust Handbook.
PM₁₀ and PM_{2.5} Pit Escape Factor applied to the calculations and is based on University of Utah study (1996).

Wind speed and moisture content data based on historical data.

Dozers operate in the pit, on the haulroads and in waste rock disposal areas performing "cleanup" operations.

Operations in and out of pit are based on expected mine operations provided by the KUC Mine group.

EPA default silt content for Utah was applied.

Hours per year: Availability (%): Effective Use of Utilization (%): Hours of Operation: 8,760 85 41 3,053

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Wheeled Dozers

KUC—Bingham Canyon Mine

				Hours of				Uncontrolled	Primary	PM ₁₀ Emissions	PM _{2.5} Emissions			Controlled PM ₁₀	Controlled PM _{2.5}	
		Moisture	Number of	Operation	PM ₁₀ Emission	PM _{2.5} Emission	Uncontrolled PM ₁₀	PM _{2.5} Emissions	Control	with Primary	with Primary	PM ₁₀ Pit Escape	PM _{2.5} Pit Escape	Emissions from	Emissions from	Control System and
Source Name	Silt Content (%)	Content (%)	Wheeled Dozers	(hrs/yr)	Factor (lbs/hr)	Factor (lbs/hr)	Emissions (tpy)	(tpy)	Efficiency (%)	Controls (tpy)	Controls (tpy)	Factor (%)	Factor (%)	the pit (tpy)	the pit (tpy)	Comments
Rubber Tire Dozers	4	4	11	3,193	0.86	0.52	15.1	9.2	61	5.9	3.6	20	21	1.2	0.75	Water application from passing water trucks is used to further reduce emissions. Source is located in the pit.

NOTES:

Emission factors estimated using methodology outlined in AP-42, Table 11.9-1.
61 percent Control Efficiency for water application in the areas where dozers are operated (construction type activities), per Table 3-7 - WRAP Fugitive Dust Handbook.
PM₁₀ and PM_{2.5} Pit Escape Factor applied to the calculations and is based on University of Utah study (1996).

Wind speed and moisture content data based on historical data.

Dozers operate in the pit, on the haulroads and in waste rock disposal areas performing "cleanup" operations.

EPA default silt content for Utah was applied.

Hours per year: Availability (%): Effective Use of Utilization (%): Hours of Operation: 8,760 81 45 3,193

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Drilling with Water Injection KUC—Bingham Canyon Mine

	PM Emission			Number of	Uncontrolled	Uncontrolled	Primary	PM ₁₀ Emissions	PM _{2.5} Emissions			Controlled PM ₁₀	Controlled PM _{2.5}	
	Factor	PM ₁₀ Emission	PM _{2.5} Emission	Holes	PM ₁₀ Emissions	PM _{2.5} Emissions	Control	with Primary	with Primary	PM ₁₀ Pit Escape	PM _{2.5} Pit Escape	Emissions from	Emissions from	Control System and
Source Name	(lbs/hole)	Factor (lbs/hole)	Factor (lbs/hole)	(holes/yr)	(tpy)	(tpy)	Efficiency (%)	Controls (tpy)	Controls (tpy)	Factor (%)	Factor (%)	the pit (tpy)	the pit (tpy)	Comments
Drilling with Water Injection	1.3	0.615	0.093	90,000	27.7	4.2	90	2.77	0.42	20	21	0.6	0.09	Water injection at 90% efficiency. Source is located in the pit.

NOTES:

PM Emission factor obtained from AP-42, Table 11.9-4. Ratio of transfer particle size multipliers in AP 42, Fifth Edition, Table 13.2.4 (EPA, 2006), assume PM ₁₀ to be 47% of PM and PM_{2.5} to be 15% of PM₁₀.

PM₁₀ and PM_{2.5} Pit Escape Factor applied to the calculations and is based on University of Utah study (1996).

The control efficiency listed is based on previous determinations of BACT by UDAQ. This control efficiency has been applied in the 1994 SIP and 2005 SIP calculations and modeling. Number of holes drilled per year proved by the KUC mine group.

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TABLE B1-28 Blasting with Minimized Area KUC—Bingham Canyon Mine

		PM ₁₀ Emission			Uncontrolled	Uncontrolled	Primary	PM ₁₀ Emissions	PM _{2.5} Emissions			Controlled PM ₁₀	Controlled PM _{2.5}		NH ₃ Emission				
		Factor	PM _{2.5} Emission	Blasts per	PM ₁₀ Emissions	PM _{2.5} Emissions	Control	with Primary	with Primary	PM ₁₀ Pit Escape	PM _{2.5} Pit Escape	Emissions from	Emissions from	Control System	Factor	Uncontrolled NH ₃	Control	Controlled NH ₃	Control System
Source Name	Blasting Area (ft ²)	(lbs/blast)	Factor (lbs/blast)	Year	(tpy)	(tpy)	Efficiency (%)	Controls (tpy)	Controls (tpy)	Factor (%)	Factor (%)	the pit (tpy)	the pit (tpy)	and Comments	(lbs/blast)	Emissions (tpy)	Efficiency (%)	Emissions (toy)	and Comments
Blasting with Minimized Area	57,500	100.4	5.8	1,100	55.2	3.2	0	55.2	3.2	20	21	11.0	0.67	Source is located in the pit.	4.6	2.5	0	2.5	No controls.
NOTES: Emission factors for PM ₁₀ and PM _{2.5} obtained from AP-42, Table 11.9-1. Emission factor for Ammonia based on a historical Industrial Hygiene assessment completed onsite.																			
PM ₁₀ and PM _{2.5} Pit Escape Factor applied Blasting Area and Blasts per Year are prov			of Utah study (1996)).															

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Tertiary Crushing

KUC—Bingham Canyon Mine

							Controlled	Controlled	
							PM ₁₀	PM _{2.5}	
	Transient						Emissions	Emissions	
	Process Rate	Uncontrolled PM ₁₀	PM ₁₀ Emissions	PM _{2.5} Emissions	PM ₁₀ Pit Escape	PM _{2.5} Pit Escape	from the pit	from the pit	Control System
Source Name	(tpy)	Emissions (tpy)	(tpy)	(tpy)	Factor (%)	Factor (%)	(tpy)	(tpy)	and Comments
									Source is
Tertiary Crushing	3,150,000	3.78	0.85	0.16	20	21	0.17	0.03	located in the
									pit.

Emission Factors:

Emission Factor (lbs/ton)

0.0024

For tertiary crushing - uncontrolled (lbs of PM₁₀ per ton of material handled)

Emission Factor (lbs/ton)

0.00054

For tertiary crushing - controlled (lbs of PM₁₀ per ton of material handled)

Emission Factor (lbs/ton)

0.00010

For tertiary crushing - controlled (lbs of PM_{2.5} per ton of material handled)

NOTES:

Emission factors for PM_{10} and $PM_{2.5}$ obtained from AP-42, Table 11.19-2-2.

Transient Process Rate information obtained from the 2005 NOI submitted to UDAQ.

PM₁₀ and PM_{2.5} Pit Escape Factor applied to the calculations and is based on University of Utah study (1996).

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Screening

KUC—Bingham Canyon Mine

<u> </u>							Controlled	Controlled	
							PM ₁₀	$PM_{2.5}$	
			PM ₁₀				Emissions	Emissions	
	Transient Process	Uncontrolled PM ₁₀	Emissions	PM _{2.5}	PM ₁₀ Pit Escape	PM _{2.5} Pit Escape	from the pit	from the pit	Control System
Source Name	Rate (tpy)	Emissions (tpy)	(tpy)	Emissions (tpy)	Factor (%)	Factor (%)	(tpy)	(tpy)	and Comments
									Source is
Screening	3,150,000	13.70	1.17	0.08	20	21	0.23	0.02	located in the
									pit.

Emission Factors:

Emission Factor (lbs/ton)	0.0087	For screening - uncontrolled (lbs of PM ₁₀ per ton of material handled)
Emission Factor (lbs/ton)	0.00074	For screening - controlled (lbs of PM ₁₀ per ton of material handled)
Emission Factor (lbs/ton)	0.00005	For screening - controlled (lbs of PM _{2.5} per ton of material handled)

NOTES:

Emission factors for PM_{10} and $PM_{2.5}$ obtained from AP-42, Table 11.19-2-2.

Transient Process Rate information obtained from the 2005 NOI submitted to UDAQ.

PM₁₀ and PM_{2.5} Pit Escape Factor applied to the calculations and is based on University of Utah study (1996).

Transfer Points

KUC—Bingham Canyon Mine

							Controlled	Controlled	
							PM ₁₀	PM _{2.5}	
	Transient Process	Number of	PM ₄₀ Emissions	PM _{2.5} Emissions	PM ₁₀ Pit Escape	PM _{2.5} Pit Escape	Emissions from the pit	Emissions from the pit	Control System
Source Name	Rate (tpy)	Transfer Points	(tpy)	(tpy)	Factor (%)	Factor (%)	(tpy)	(tpy)	and Comments
_ , _ , _ , ,	0.450.000	4.0	0.70	0.00		0.4	0.4.4	0.04	Source is
Transfer Points	3,150,000	10	0.72	0.20	20	21	0.14	0.04	located in the pit.

Emission Factors:

Emission Factor (lbs/ton)

0.000046

For controlled transfer points (lbs of PM₁₀ per ton of material handled)

Emission Factor (lbs/ton)

0.000013

For controlled transfer points (lbs of PM_{2.5} per ton of material handled)

NOTES:

Emission factors for PM₁₀ and PM_{2.5} obtained from AP-42, Table 11.19-2-2 for controlled transfer points.

Transient Process Rate information obtained from the 2005 NOI submitted to UDAQ.

PM₁₀ and PM_{2.5} Pit Escape Factor applied to the calculations and is based on University of Utah study (1996).

SX/EW Copper Extraction

KUC—Bingham Canyon Mine

	VOC Emissions
Source Name	(tpy)
SX/EW Copper Extraction	5.37

Summary of Allowable VOC Emissions (tpy)

	Mixer/Settlers	Aqueous Flows	Tanks	Total
Proposed	2.92	2.38	0.07	5.37

Organic Solution Used

		Dil	Extractant				
	Constituent	Concentration	Constituent	Concentration	Spec. Gravity		
Proposed	SX-12 Diluent	96%	0.81 - 0.83	187–274°C	LIX 984N	4%	0.915

Specific gravity for of the diluent was obtained from the MSDS of the diluent.

Mixers/Settlers

	surface area	pan rate		density	time	Control		VOC
	(ft ²)	(ft/24-hr day)		(lb/gal)	(hrs)	(%)		(tpy)
Proposed Plant								
Extraction	550	0.00142	(a)	6.84	8,760	80%	(b)	1.46
Strip	550	0.00142	(a)	6.84	8,760	80%		1.46
Total	1100							2.92

 $VOC (tpy) = ((surface area(ft^2))*(evap rate(ft/day))*(7.48 gal/ft^3)*(density(lb/gal))*(operating hrs/yr))(1 - control eff)/((24 hrs)*(2000 lb/ton)))$

- (a) From Emission Inventory
- (b) Control eff of 80% for proposed plant, to be achieved by covers in place except during inspection, sampling, and adjustment.
- (c) Existing Pilot Plant mixer/settlers were not covered.

Volatilization from Aqueous Flows

	avg flow (gpm)	TPH Conc (mg/L)		operating (hrs)	throughput gal/yr		Est Evap		VOC (tpy)	
Proposed Plant (a)										
Raffinate	650.00	5.00	(b)	8,760	341,640,000	<	33%	(c)	2.38	
Electrolyte Circuit									0.00	(d)
Total	<u> </u>								2.38	

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TABLE B1-32 SX/EW Copper Extraction KUC—Bingham Canyon Mine

 $VOC (tpy) = (flow (gpm))^*(TPH Conc (mg/L))^*(3.79 L/gal)^*(60 min/hr)^*(operating hrs/yr))/((453597 mg/lb)^*(2000 lb/ton))$

- (a) The proposed plant will take Cu-bearing meteoric drainage from waste rock once through. Tailwater (raffinate) from the extraction settler in SX will go to the Large Bingham Reservoir, then to Copperton Concentrator as makeup water, and then to the tailings impoundment.
- (b) Because the solutions are mixed in agitation tanks for 3 minutes, organic concentration averaged 5 ppm
- in raffinate leaving the extractor settler in the pilot plant, although the solubility is less ("negligible" according to the MSDS).
- 5 ppm is the detection limit using centrifugal methods that are standard in the industry.
- (c) It is estimated that less than a third of the residual organic in the raffinate from the proposed plant will evaporate, some will biodegrade, & some will stay in the tailings impoundment. Note the high boiling range of the diluent.
- (d) No emission from the electrolyte circuit because it is contained in tanks and pipes.
- (e) The existing pilot plant took PLS from heap leaching, and recirculated the raffinate back to the heaps for further leaching.
- (f) A small percentage of the residual organic in the raffinate from the Pilot Plant evaporated when it was sprayed on the heaps, some biodegraded, but the large majority returned to the process in PLS. Note the high boiling range of the diluent.
- (g) Emission from volatilization in aqueous flows was apparently not included when the Pilot Plant was permitted, so current allowable for this source is 0.

Organic Surge Tanks and Organic Holding Tanks

	No. Tanks	Tank Volume	Total Volume	VOC Emission	
		(gal)	(gal)	(tpy)	
Pilot (calc)	2	3300	6,600	0.04	from Emission Inventory
Proposed	4	3000	12,000	0.07	Estimated by volume ratio

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Electrowinning

KUC—Bingham Canyon Mine

(From 2008 Mine AO Modification NOI)

	Exhaust Gas H ₂ SO ₄ Concentration	Volume F	low Rate			Operating	H₂SO₄ E	Emission
	(grains/dscf)	(acfm)	(dscfm)		Control	Hours	(tpy)	(lb/hr)
	0.004	8,000	6,377		Surfactant, covers, and	8,760	0.96	0.22
Proposed			52.1	T(act)	Mist Eliminator			
			10%	Ø				
			12.58	P(act)				,
			14.7	P(std)				
			70	T(std)				

Existing Pilot Plant

Acid Mist emissions were not included in the AO at the time of permitting.

0

Net change in permitted emissions

0.96

There were two Pilot Plant electrowinning cells, each the same size as one of the four in the proposed plant, but their acid mist emissions were controlled only by use of chemical mist suppression (surfactant). Therefore, acid mist emissions are estimated to have been greater than those of the proposed plant.

Net change in actual emissions: Unquantified, but < 0

H₂SO₄ Emission (tpy)

= (H₂SO₄ concentration(grains/dscf) x (volume flow(dscfm)) x 60 min/hr x annual operating time (hours)/(7000 grains/lb x 2000 lb/ton)

Notes:

TABLE B1-34 LPG Generators

KUC—Bingham Canyon Mine

		IV	lax Pov	ver Rating	Usage		Emission
Location	Model	(bhp)	(kW)	(mmBtu/hr)	(hr/yr)] [(tpy)
		105	78	0.27	500		
						$PM_{10} = PM_{2.5}$	0.0006
Production Control Building	Kohler 60RZG					SO ₂	0.00004
Froduction Control Ballating						NO _x	0.347
						CO	1.557
						Total HC	0.058
		75	56	0.19	500		
Communication 6190						$PM_{10} = PM_{2.5}$	0.0005
	Kohler 45RZG					SO ₂	0.00003
Communication 0190	Noniei 451020					NO _x	0.285
						CO	1.115
						Total HC	0.042
	Olympian G100	160	119	0.41	500	$PM_{10} = PM_{2.5}$	0.0010
						SO ₂	0.00003
Lark Gate						NO _x	0.214
						CO	6.476
						Total HC	0.058
		72	54	0.18	500		
						$PM_{10} = PM_{2.5}$	0.0004
Galena Gulch	Kohler 35RZG					SO ₂	0.00003
Galeria Guicii	Noniei 331(20					NO _x	0.266
						CO	1.246
						Total HC	0.040
						$PM_{10} = PM_{2.5}$	0.0025
						SO ₂	0.0001
Total						NO _x	1.1117
						CO	10.3935
						Total HC	0.1966

NOTES:

Emissions data obtained from previously submitted NOIs (2005-12-21 and 2008-05-12).

TABLE B1-35 Metal HAP Emissions (from dust) KUC—Bingham Canyon Mine

PM₁₀ Emissions (tpy)

230 [Includes PM₁₀ emissions from point and fugitive sources - excludes lime bins]

Metal HAP	Concentration (mg/kg)	HAP Emissions (tpy)
Sb	3	0.001
As	37	0.009
Be	1	0.000
Cd	1	0.000
Cr	15	0.003
Co	8	0.002
Pb	76	0.018
Mn	190	0.044
Ni	21	0.005
Se	15	0.003

Notes:

Metal HAP concentration based on ore and waste rock sampling at BCM

2011–2029 Haul Truck Emissions—260 Mtpy

KUC—Bingham Canyon Mine

Kee Bingham early on wine	
Emissions Summary (tpy)	Maximum Annual
HC	259
CO	1400
NO _x	5134
SO ₂	5.78
PM ₁₀	191
PM _{2.5}	186

PM_{2.5} calculated as 97% of PM₁₀ emissions, per NONROAD guidance

Estimated Number of Trucks in Operation

ier Information	Engine	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
AT 793C Fleet (2337 hp)	Tier 0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CAT 702D Float	Tier 1	29	29	29	29	29	23	29	23	12	0	0	0	0	0	0	0	0	0
CAT 793D Fleet	Tier 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(2415 hp)	Tier 4t	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Tier 4f	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Tier 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CAT 795F Fleet	Tier 2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(3440 hp)	Tier 4t	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Tier 4f	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Tier 1	25	30	30	26	29	27	22	27	20	0	0	0	0	0	0	0	0	0
KOM Fleet	Tier 2	11	41	47	47	47	47	47	47	47	44	12	9	19	30	28	4	7	5
(3500 hp)	Tier 4t	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Tier 4f	0	0	0	0	29	29	29	29	29	29	29	16	14	15	15	29	27	29
otal Truck s		67	100	106	102	134	126	127	126	108	73	41	25	33	45	43	33	34	34

It is assumed that all trucks will be repowered in kind every 3 years (~20,000 hours of operation).

Estimated Number of Operational Hours (in thousands)

Tier Information	Engine	2	011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
CAT 793C Fleet (2337 hp)	Tier 0		46	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CAT 702D Floor	Tier 1	2	203	203	203	203	203	161	203	161	84	0	0	0	0	0	0	0	0	0
CAT 793D Fleet (2415 hp)	Tier 2		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(2415 Hp)	Tier 4t		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Tier 4f		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Tier 1		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CAT 795F Fleet	Tier 2		12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(3440 hp)	Tier 4t		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Tier 4f		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Tier 1	1	179	215	215	186	207	193	157	193	143	0	0	0	0	0	0	0	0	0
KOM Fleet	Tier 2		81	301	336	336	336	336	336	336	336	315	86	64	136	215	200	29	50	36
(3500 hp)	Tier 4t		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Tier 4f		0	0	0	0	213	213	207	207	207	207	207	114	100	107	107	207	193	207
Total Hours		4	175	719	754	725	960	903	904	897	770	522	293	179	236	322	307	236	243	243

Emission Factors by Tier (g/hp-hr)	Tier 0	Tier 1	Tier 2	Tier 4t	Tier 4f
HC ,	0.75	0.31	0.18	0.29	0.13
CO	4.90	1.29	1.29	0.88	0.88
NOx	8.15	5.99	3.93	2.41	2.41
SO2	0.0049	0.0049	0.0049	0.0049	0.0049
PM10	0.64	0.26	0.15	0.02	0.02

All Age Factors assumed to be equal to 1.

Hydrocarbon emission factors for tier 4f represent the EPA proposed emission limits, and were not calculated using NONROAD guidance. All emission factors represent the lesser of EPA emission limits and factors calculated using EPA NONROAD methodology.

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2011–2029 Haul Truck Emissions—260 Mtpy

KUC—Bingham Canyon Mine

missions by Truck Type (tpy)		2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
	HC	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0.47 -000 5	CO	197	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CAT 793C Fleet	NO_x	328	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
(2337 hp)	SO ₂	0.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	PM ₁₀	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	HC	57	57	57	57	57	45	57	45	24	-	-	-	-	-	-	-	-	-
CAT 793D Fleet	CO	237	237	237	237	237	188	237	188	98	-	-	-	-	-	-	-	-	-
(2415 hp)	NO_x	1100	1100	1100	1100	1100	872	1100	872	455	-	-	-	-	-	-	-	-	-
	SO ₂	0.9	0.9	0.9	0.9	0.9	0.7	0.9	0.7	0.4	-	-	-	-	-	-	-	-	-
	PM ₁₀	48	48	48	48	48	38	48	38	20	-	-	-	-	-	-	-	-	-
	HC	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0.17 -0.55 -	CO	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CAT 795F Fleet	NO_x	61	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
(3440 hp)	SO ₂	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	PM ₁₀	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	HC	92.2	159.2	167.4	155.8	202.3	196.4	180.8	195.4	175.0	111.5	57.1	35.5	50.0	70.0	66.6	43.5	46.1	45.2
1/01/5	CO	438	871	930	881	1164	1139	1072	1133	1048	770	384	241	345	486	462	288	307	300
KOM Fleet	NO_x	1820	3238	3416	3192	4034	3922	3623	3904	3511	2278	1098	694	1017	1445	1371	803	869	840
(3500 hp)	SO ₂	1.68	3.33	3.56	3.37	4.87	4.78	4.51	4.74	4.42	3.36	1.88	1.15	1.52	2.07	1.98	1.51	1.56	1.56
	PM ₁₀	77.9	134.1	141.0	131.1	142.8	137.9	125.4	137.8	120.5	66.8	21.3	15.1	29.1	44.8	42.0	9.9	13.9	11.4
	HC	182	216	225	213	259	242	238	241	199	111	57	36	50	70	67	44	46	45
	CO	892	1108	1166	1118	1400	1327	1309	1320	1146	770	384	241	345	486	462	288	307	300
Total	NO_x	3309	4337	4516	4292	5134	4794	4723	4776	3966	2278	1098	694	1017	1445	1371	803	869	840
	SO ₂	2.9	4.2	4.5	4.3	5.8	5.5	5.4	5.5	4.8	3.4	1.9	1.1	1.5	2.1	2.0	1.5	1.6	1.6
	PM_{10}	154	182	189	179	191	176	174	176	141	67	21	15	29	45	42	10	14	11

Calculation Data

	NONROAD Equipment SCC
Haul Truck	2270002051

All tables and factors are from "Exhaust and Crankcase Emission Factors for Nonroad Engine Modeling--Compression-Ignition", EPA, 2004, unless otherwise noted.

Table A2 Zero-Hour, Steady-State Emission Factors for Nonroad CI Engines (>750 hp)

	BSFC	HC	CO	NO _x	PM ₁₀
T0	0.367	0.68	2.7	8.38	0.402
T1	0.367	0.2861	0.7642	6.1525	0.1934
T2	0.367	0.1669	0.7642	4.1	0.1316
T4t	0.367	0.2815	0.7642	2.392	0.069
T4f	0.0367	0.1314	0.7642	2.392	0.069

Table A3 Transient Adjustment Factors by Equipment Type for Nonroad CI Equipment

SCC	Cycle	TAF Assign.	HC	CO	NO _x	PM ₁₀	BSFC
2270002051	Crawler	Hi LF	1.05	1.53	0.95	1.23	1.01

TAFs are not applied to the emission factors for Tier 4 engines

Table A4 Deterioration Factors for Nonroad Diesel Engines (A)

Table A4 Deterioration Factors for Nonroad Diesei Engines (A)									
Pollutant	T0	T1	T2	T3+					
HC	0.047	0.036	0.034	0.027					
CO	0.185	0.101	0.101	0.151					
NO_x	0.024	0.024	0.009	0.008					
PM ₁₀	0.473	0.473	0.473	0.473					

Sulfur Content of Diesel Fuel

Sullui Colliciii di Diesei i dei			
sulfur conversion	7.0	grams PM su	lfate/gram Sulfur
soxcnv	0.02247	grams PM su	lfur/gram fuel consumed
default (soxbas)	3300	ppm	0.33 wt %
Diesel Sulfur Conc. (soxdsl)	15	mag	0.0015 wt %

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2011–2029 Haul Truck Emissions—260 Mtpy KUC—Bingham Canyon Mine

Engine Life at Full Load

7000 hrs

Engine life from Table 1 of "Median Life, Annual Activity, and Load Factor Values for Nonroad Engine Emissions Modeling", EPA, 2004.

Load Factor

0.3

Load factor estimated by KUC using BCM haul truck data.

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TABLE B1-37
2011–2029 Mobile Support Equipment Emissions—260 Mtpy
KUC—Bingham Canyon Mine

Emissions Summary (tpy)	Maximum Annual
HC	43
co	272
NO _x	695
SO ₂	0.78
PM ₁₀	36
PM _{2.5}	35

PM _{2.5}	35																			
Hydrocarbon Emissions (tpy)			2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
TRACK DOZERS - CAT D10																				
NOT TIER RATED (Existing)	580	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	· -
TIER 1 (Existing)	613	1	0.75	0.25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TIER 2 (Existing)	661	2	0.92	0.92	0.92	0.92	0.92	0.92	0.61	-	-	-	-	-	-	-	-	-	-	-
TIER 3 (Existing, New and Replacements)	646	3	3.93	4.84	5.75	5.75	5.75	5.75	5.75	5.75	5.45	4.54	3.03	2.42	1.51	1.21	0.30	0.30	0.30	0.30
TIER 4F (New and Replacements)	646	4F	-	-	-	-	-	-	-	-	-	-	-	-	0.67	1.11	1.78	1.78	1.78	1.78
TRACK DOZERS - CAT D11																				
NOT TIER RATED (Existing)	850	0	4.27	2.84	-	-	-	_	-	_	_	-	_	_	-	_	_	-	-	-
TIER 1 (Existing)	936	1	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	-	_	_	-	-	_	-	-	-
TIER 4A (New and Replacements)	936	4T	0.61	1.21	2.42	2.42	2.42	2.42	2.42	2.42	2.42	2.42	2.42	2.42	2.42	1.82	1.21	1.21	-	-
TIER 4F (New and Replacements)	936	4F	-	-	-	-		-	-		-	-	-	-	-	0.28	0.57	0.57	0.57	0.57
(L				I	ı			<u> </u>	l l								
GRADERS - CAT 16																				
TIER 1 (Existing)	289	1	0.62	0.31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TIER 2 (Existing)	299	2	0.96	0.96	0.96	0.64	0.64	-	-	-	-	-	-	-	-	-	-	-	-	-
TIER 3 (Existing)	297	3	0.94	0.94	0.94	0.94	0.94	0.94	0.19	-	-	-	-	-	-	-	-	-	-	-
TIER 4A (New and Replacements)	297	4T	0.13	0.38	0.51	0.64	0.64	0.64	0.64	0.64	0.64	0.51	0.26		-	-	-	-	-	-
TIER 4F (New and Replacements)	297	4F	-	-	-	-	0.13	0.38	0.90	1.02	1.02	1.02	1.28	1.41	1.41	1.41	1.41	1.41	1.41	1.41
GRADERS - CAT 24																			1	ĺ
NOT TIER RATED (Existing)	540	0	2.32	2.32	2.32	2.32	2.32	-	-		-	-	-		-	-	-	-	-	-
TIER 2 (Existing)	533	2	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	-	-	-	-	-	-	-	-
TIER 4F (Replacements)	533	4F	-	-	-	-	-	0.41	0.41	0.41	0.41	0.41	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62
RTDS - CAT 834																				
834B - NOT TIER RATED (Existing)	487	0	2.09	-	-	-	-	- 1	- 1	-	-	-	-	-	_	_	- 1	- 1	_	
834G - NOT TIER RATED (Existing)	487	0	1.05	-		-	-	-								_	-		_	_
TIER 3 (Existing)	525	3	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.54	0.54	-	-	-	-	_		_	-	_
TIER 4A (New and Replacements)	525	4T	0.02	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.41			_	-	-	_	-
TIER 4F (Replacements)	525	4F	- 0.20	-	-	-	-	-	-	0.20	0.20	0.20	0.41	0.82	0.82	0.82	0.82	0.82	0.82	0.82
RTDS - CAT 854	323	71		-						0.20	0.20	0.20	0.41	0.02	0.02	0.02	0.02	0.02	0.02	0.02
TIER 1 (Existing)	880	1	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	-	-	-	-	-	-	-	-	-	-
		1	•			Į.							<u> </u>			L L				
FEL - KOMATSU																				
WA500 - TIER 1 (Existing)	235	1	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	-	-	-	-	-	-	-	-	<u> </u>
WA600 - TIER 3 (Existing)	396	3	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.14	-	-	-	-	-	-	-
WA600 - TIER 4F (Replacements)	396	4F	-	-	-	-	-	-	-	-	-	-	0.10	0.21	0.21	0.21	0.21	0.21	0.21	0.21
WA700 - TIER 1 (Existing)	502	1	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	-	-	-	-	-	-	-
FEL - CAT 992																			1	ĺ
TIER 2 (Existing)	800	2	0.57	0.57	0.57	0.57	0.57	0.57	0.28	-	-	-	-	-	-	-	-	-	-	-
TIER 4A (New and Replacements)	801	4T	-	-	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45
TIER 4F (Replacements)	801	4F	-	-	-	-	-	-	0.21	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42
PRODUCTION FEL - KOM WA1200																				
TIER 1 (Existing)	1.782	1 1	1.47	1.47	1.47	1.47	1.47	- 1	-	-	-	-	-	-	_	-	-	-	-	-
TIER 4F (Replacements)	1,782	4F	- 1.47	-	-	-	-	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64
	,	1	'										<u> </u>			U U				-
TRACKHOES - CAT 330	201		0.10	0.40	0.40	0.40	0.46	1				-	1			1	-			
TIER 2 (Existing)	264	2	0.12	0.12	0.12	0.12	0.12	-	-	-	-	-	-	-	-	-	-	-	-	-
TIER 4F (Replacements)	268	4F	-	-	-	-	-	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
TRACKHOES - CAT 385							2.15													
TIER 3 (Existing)	523	3	0.26	0.26	0.26	0.13	0.13	0.13	-	-	-	-	-	-	-	-	-	-	-	-
TIER 4A (Replacements)	523	4T	-	-	-	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	-	-	-		-	-
TIER 4F (Replacements)	523	4F	-	-	-	-	-	-	0.10	0.10	0.10	0.10	0.10	0.10	0.20	0.20	0.20	0.20	0.20	0.20
TRACKHOES - KOMATSU																			·	
PC800 - TIER 1 (Existing)	323	1	0.20	0.20	0.20	0.20	0.10	0.10	0.10	0.10	0.10	-	-	-	-	-	-	-	-	-
PC800 - TIER 4F (Replacements)	323	4F	-	-	-	-	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	-	-
PC400 - TIER 1 (Existing)	246	1	0.12	0.12	0.12	0.12	0.12	0.12	-	-	-	-	-	-	-	-	-	-	-	-

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TABLE B1-37 2011–2029 Mobile Support Equipment Emissions—260 Mtpy KUC—Bingham Canyon Mine

WATER TRUCKS																				
CAT 789 (Existing)	1,900	0	2.27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CAT 793C - TIER 1 (Existing)	2,300	1	2.29	2.29	2.29	2.29	2.29	2.29	2.29	2.29	2.29	2.29	2.29	2.29	2.29	2.29	2.29	2.29	2.29	2.29
CAT 793D - TIER 2 (New and Replaceme	2,415	2	1.40	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80
					-				-	-							-			
HYDRAULIC SHOVELS																				
O&K RH 200, (NOT CERT)	2,100	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
O&K RH 200, (TIER 1)	2,520	1	7.32	7.25	7.17	7.14	7.10	7.06	7.03	6.99	6.95	3.66	3.66	3.59	3.59	3.55	3.55	3.51	3.51	3.48
CONSTRUCTION TRUCKS																				
KOM 785-7 TIER 1 (Existing)	1,200	1	3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01
DIESEL DRILLS - P&H	4.400	1 4 1	0.00	0.00	0.40	1		1			1				1					1
TIER 1 (Existing)	1,100	2	0.86	0.86	0.43	- 0.50	- 0.50	- 0.50	- 0.54	- 0.54	0.51	-	-	- 0.05	- 0.05	- 0.05	- 0.47	- 0.40	0.16	0.16
TIER 2 (during T4I) (Replacements) DIESEL DRILLS - ATLAS COPCO	1,100	2	-	-	0.26	0.52	0.52	0.52	0.51	0.51	0.51	0.51	0.50	0.25	0.25	0.25	0.17	0.16	0.16	0.16
TIER 2 (Existing)	750	2	0.90	0.90	0.90	0.89	0.89	0.89	0.66	0.44	0.33	-	-	_	-	-	-	-	-	_
TIER 2 (during T4I) (New)	750	2	0.90	0.46	0.46	0.09	0.45	0.45	0.45	0.45	0.37	0.26	0.12	-	-	-	-	-	-	
TIER 4F (Replacements)	750	4F	- 0.20	-	-	-	-	-	-	0.20	0.34	0.34	0.34	0.25	0.22	0.28	0.29	0.28	0.28	0.28
TOTAL			43.0	39.3	38.3	38.0	38.0	34.8	33.8	32.9	31.7	25.5	23.5	22.0	21.6	21.5	20.8	20.8	19.5	19.5
10.772		I I		00.0	00.0	00.0	00.0	0	55.5	02.0	•		20.0							
Carbon Monoxide Emissions (tpy)			2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
(17)		1	1	1			ıI.	I.			1	1	1	I.						
TRACK DOZERS - CAT D10	HP	Tier																		
NOT TIER RATED (Existing)	580	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TIER 1 (Existing)	613	1	10.51	3.50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TIER 2 (Existing)	661	2	11.34	11.34	11.34	11.34	11.34	11.34	7.56	-	-	-	-	-	-	-	-	-	-	-
TIER 3 (Existing, New and Replacements)	646	3	50.20	61.78	73.36	73.36	73.36	73.36	73.36	73.36	69.50	57.92	38.61	30.89	19.31	15.44	3.86	3.86	3.86	3.86
TIER 4F (New and Replacements)	646	4F	-	-	-	-	-	-	-	-	-	-	-	-	0.76	1.26	2.02	2.02	2.02	2.02
TRACK DOZERS - CAT D11																				
NOT TIER RATED (Existing)	850	0	27.93	18.62	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TIER 1 (Existing)	936	1	2.70	2.70	2.70	2.70	2.70	2.70	2.70	2.70	2.70	-	-	-	-	-	-	-	-	-
TIER 4A (New and Replacements)	936	4T	0.18	0.37	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.55	0.37	0.37	- 0.07	- 0.07
TIER 4F (New and Replacements)	936	4F	-	-	-	-	-	-	-	-	-	-	-	-	-	0.18	0.37	0.37	0.37	0.37
GRADERS - CAT 16																				
TIER 1 (Existing)	289	1 1	2.33	1.16	-		- 1	- 1	-	-	-	- 1	-	-	-	- 1	-	- 1	- 1	
TIER 2 (Existing)	299	2	3.61	3.61	3.61	2.41	2.41	-	-	-	-	-	-	_	-	-	-	-	-	-
TIER 3 (Existing)	297	3	6.25	6.25	6.25	6.25	6.25	6.25	1.25	-	-	-	-	-	_	-	-	-	-	_
TIER 4A (New and Replacements)	297	4T	0.08	0.25	0.33	0.41	0.41	0.41	0.41	0.41	0.41	0.33	0.16	-	-	-	-	-	-	-
TIER 4F (New and Replacements)	297	4F	-	-	-	-	0.08	0.25	0.57	0.66	0.66	0.66	0.82	0.90	0.90	0.90	0.90	0.90	0.90	0.90
GRADERS - CAT 24																				
NOT TIER RATED (Existing)	540	0	15.21	15.21	15.21	15.21	15.21	-	-	-	-	-	-	-	-	-	-	-	-	-
TIER 2 (Existing)	533	2	2.18	2.18	2.18	2.18	2.18	2.18	2.18	2.18	2.18	2.18	-	-	-	-	-	-	-	-
TIER 4F (Replacements)	533	4F	-	-	-	-	-	0.30	0.30	0.30	0.30	0.30	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44
RTDS - CAT 834						,								-						
834B - NOT TIER RATED (Existing)	487	0	13.72	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
834G - NOT TIER RATED (Existing)	487	0	6.86	- 0.70	- 0.70	- 0.70	- 0.70	- 0.70	-	- 4.40	- 4.40	-	-	-	-	-	-	-	-	-
TIER 3 (Existing)	525	3 4T	6.72	6.72	6.72	6.72	6.72	6.72	6.72	4.48	4.48	- 0.50	- 0.20	-	-	-	-	-	-	-
TIER 4A (New and Replacements) TIER 4F (Replacements)	525 525	4T 4F	0.15	0.58	0.58	0.58	0.58	0.58	0.58	0.58 0.15	0.58 0.15	0.58 0.15	0.29 0.29	0.58	0.58	0.58	0.58	0.58	0.58	0.58
RTDS - CAT 854	020	41	-	-	-	-	-	-	-	0.15	0.15	0.15	0.29	0.56	0.56	0.50	0.56	0.00	0.00	0.56
TIER 1 (Existing)	880	1	3.26	3.26	3.26	3.26	3.26	3.26	3.26	3.26	-	-	-	-	-	-	-	-	-	-
TIETY I (Existing)	550	<u> </u>	5.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	-	-	-	-	-	- 1	-	-	-	-
FEL - KOMATSU																				
WA500 - TIER 1 (Existing)	235	1	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	-	-	-	-	-	-	-	-	_
WA600 - TIER 3 (Existing)	396	3	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	1.15	-	-	-	-	-	-	-
WA600 - TIER 4F (Replacements)	502	4F	-	-	-	-	-	-	-	-	-	-	0.10	0.19	0.19	0.19	0.19	0.19	0.19	0.19
WA700 - TIER 1 (Existing)	396	1	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	-	-	-	-	-	-	-
FEL - CAT 992																				
TIER 2 (Existing)	800	2	4.03	4.03	4.03	4.03	4.03	4.03	2.02	-	-	-	-	-	-	-	-	-	-	-
TIER 4A (New and Replacements)	801	4T	-	-	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14
	001				_		-	-	0.14	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27
TIER 4F (Replacements)	801	4F	-	-																
TIER 4F (Replacements)		4F	-	-	ļ		•										*	•	•	
TIER 4F (Replacements) PRODUCTION FEL - KOM WA1200	801	4F		-													*			
TIER 4F (Replacements) PRODUCTION FEL - KOM WA1200 TIER 1 (Existing)	801 1,782	1	6.07	6.07	6.07	6.07	6.07	-	-	- [-	-	-	-	-	-	- [-	-	-
TIER 4F (Replacements) PRODUCTION FEL - KOM WA1200	801	· · · · · · · · · · · · · · · · · · ·		!	1	6.07	6.07	- 0.41	- 0.41	- 0.41	- 0.41	- 0.41	- 0.41	- 0.41						
TIER 4F (Replacements) PRODUCTION FEL - KOM WA1200 TIER 1 (Existing) TIER 4F (Replacements)	801 1,782	1	6.07	6.07	6.07															
TIER 4F (Replacements) PRODUCTION FEL - KOM WA1200 TIER 1 (Existing) TIER 4F (Replacements) TRACKHOES - CAT 330	1,782 1,782	1 4F	6.07	6.07	6.07	-	-	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41
TIER 4F (Replacements) PRODUCTION FEL - KOM WA1200 TIER 1 (Existing) TIER 4F (Replacements)	801 1,782	1	6.07	6.07	6.07															

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TABLE B1-37 2011–2029 Mobile Support Equipment Emissions—260 Mtpy KUC—Bingham Canyon Mine

NOO Birigham carryon mine																				
TRACKHOES - CAT 385						I														
TIER 3 (Existing)	523	3	2.18	2.18	2.18	1.09	1.09	1.09	-	-	-	-	-	-	-	-	-	-	-	-
TIER 4A (Replacements)	523	4T	-	-	-	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	-	-	-	_	_	_
TIER 4F (Replacements)	523	4F	-	-	- 1	-	-	-	0.07	0.07	0.07	0.07	0.07	0.07	0.14	0.14	0.14	0.14	0.14	0.14
TRACKHOES - KOMATSU	020								0.07	0.01	0.01	0.07	0.01	0.01	0	0	· · · ·	0	0	
PC800 - TIER 1 (Existing)	323	1	2.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	-	-	-	-	-	_	_	-	_
PC800 - TIER 4F (Replacements)	323	4F	-	-	2.00	-	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	-	-
PC400 - TIER 1 (Replacements)	246	1	0.44	0.44	0.44	0.44	0.04	0.04	-	-	-	-	-	-	-	-	-	-	-	-
FC400 - HER I (Existility)	240	ı	0.44	0.44	0.44	0.44	0.44	0.44	-	- 1	-		-	-	-	-	-		- 1	-
WATER TRUCKS																				
CAT 789 (Existing)	1,900	0	14.87	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CAT 793C - TIER 1 (Existing)	2,300	1	9.46	9.46	9.46	9.46	9.46	9.46	9.46	9.46	9.46	9.46	9.46	9.46	9.46	9.46	9.46	9.46	9.46	9.46
CAT 793D - TIER 2 (New and Replaceme	2,415	2	9.94	19.88	19.88	19.88	19.88	19.88	19.88	19.88	19.88	19.88	19.88	19.88	19.88	19.88	19.88	19.88	19.88	19.88
ON TOOL HERE (Non and Replaceme	2,0		0.01	.0.00	10.00	.0.00	10.00	10.00	10.00	.0.00	10.00	.0.00	10.00		.0.00	.0.00	10.00	.0.00	.0.00	10.00
HYDRAULIC SHOVELS																				
O&K RH 200, (NOT CERT)	2,100	0	-	-	- 1	- 1	-	-	-	- 1	-	-	_	-	-	-	-	-	-	-
O&K RH 200, (TIER 1)	2,520	1	30.28	29.98	29.67	29.52	29.37	29.22	29.07	28.92	28.77	15.14	15.14	14.84	14.84	14.69	14.69	14.53	14.53	14.38
Cartiff 200, (TERT)	2,020		00.20	20.00	20.07	20.02	20.07	20.22	20.07	20.02	20.77	10.14	10.14	14.04	14.04	14.00	14.00	14.00	14.00	14.00
CONSTRUCTION TRUCKS																				
KOM 785-7 TIER 1 (Existing)	1,200	1	12.44	12.44	12.44	12.44	12.44	12.44	12.44	12.44	12.44	12.44	12.44	12.44	12.44	12.44	12.44	12.44	12.44	12.44
NOW FOOT FIER F (Existing)	1,200	<u> </u>	12.77	12.11	12.11	12.77	12.11	12.17	12.77	12.11	12.77	12.77	12.77	12.11	12.77	12.11	12.77	12.77	12.11	12.11
DIESEL DRILLS - P&H																				
TIER 1 (Existing)	1,100	1	3.56	3.56	1.78	-	- 1	-	-	-	-	-	-	-	-	-	-	-	-	-
TIER 2 (during T4I) (Replacements)	1,100	2	-	-	1.85	3.69	3.69	3.69	3.62	3.62	3.62	3.62	3.56	1.78	1.78	1.78	1.19	1.16	1.16	1.16
DIESEL DRILLS - ATLAS COPCO	.,	- 	+		1.00	0.00	0.00	0.00	0.02	3.02	3.02	3.02	5.00		1.75	1	1.10	1.13	1.10	1.10
TIER 2 (Existing)	750	2	6.42	6.42	6.42	6.36	6.30	6.30	4.72	3.15	2.31	-	_	-	-	-	-	-	-	_
TIER 2 (during T4I) (New)	750	2	1.64	3.27	3.27	3.21	3.21	3.21	3.21	3.21	2.62	1.84	0.82	-	-	-	-	-	-	_
TIER 4F (Replacements)	750	4F	-	-	-	-	-	-	-	0.13	0.22	0.22	0.22	0.16	0.15	0.18	0.19	0.18	0.18	0.18
TOTAL	730	71	272	242	231	229	228	204	191	176	168	131	107	93.4	82.5	79.0	67.6	67.4	67.0	66.9
TOTAL		L	212	272	201	223	220	204	131	170	100	131	107	33.4	02.0	73.0	07.0	07.4	01.0	00.5
Oxides of Nitrogen Emissions (tpy)			2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
existed of this egon Emissions (49)		I.			20.0		20.0	20.0		20.0	20.0				2020					
TRACK DOZERS - CAT D10	HP	Tier																		
NOT TIER RATED (Existing)	580	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TIER 1 (Existing)	613	1	26.6	8.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TIER 2 (Existing)		2	19.9	19.9	19.9	19.9	19.9	19.9	40.0										-	-
LIEIX & LEAISHIUI	100								13.3	-	-	-	-	-	-	-	-	-		
. 0/	661 646								13.3 75.1											
TIER 2 (Existing) TIER 3 (Existing, New and Replacements) TIER 4F (New and Replacements)	646 646	3 4F	51.4	63.3	75.1	75.1	75.1	75.1	75.1	75.1 -	71.2	59.3	39.5	31.6	19.8 1.4	15.8	4.0	4.0	4.0	4.0 3.7
TIER 3 (Existing, New and Replacements)	646	3	51.4	63.3	75.1	75.1	75.1	75.1	75.1	75.1	71.2	59.3	39.5	31.6	19.8	15.8	4.0	4.0	4.0	4.0
TIER 3 (Existing, New and Replacements) TIER 4F (New and Replacements)	646	3	51.4	63.3	75.1	75.1	75.1	75.1	75.1	75.1	71.2	59.3	39.5	31.6	19.8	15.8	4.0	4.0	4.0	4.0
TIER 3 (Existing, New and Replacements) TIER 4F (New and Replacements) TRACK DOZERS - CAT D11	646 646	3 4F	51.4	63.3	75.1	75.1	75.1	75.1 - -	75.1	75.1	71.2	59.3	39.5	31.6	19.8	15.8 2.3	4.0 3.7	4.0 3.7	4.0 3.7	4.0
TIER 3 (Existing, New and Replacements) TIER 4F (New and Replacements) TRACK DOZERS - CAT D11 NOT TIER RATED (Existing)	646 646 850	3 4F 0	51.4	63.3	75.1	75.1	75.1	75.1	75.1 - - 12.5	75.1	71.2	59.3	39.5	31.6	19.8 1.4	15.8 2.3	4.0 3.7 - -	4.0 3.7	4.0 3.7	4.0 3.7
TIER 3 (Existing, New and Replacements) TIER 4F (New and Replacements) TRACK DOZERS - CAT D11 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 4A (New and Replacements)	646 646 850 936	3 4F 0 1	51.4 - 46.5 12.5	63.3 - 31.0 12.5	75.1 - - 12.5	75.1 - - 12.5	75.1 - - 12.5	75.1 - - 12.5	75.1	75.1 - - 12.5	71.2	59.3	39.5	31.6	19.8 1.4 - -	15.8 2.3 - -	4.0 3.7	4.0 3.7 - -	4.0 3.7 - -	4.0 3.7 - -
TIER 3 (Existing, New and Replacements) TIER 4F (New and Replacements) TRACK DOZERS - CAT D11 NOT TIER RATED (Existing) TIER 1 (Existing)	646 646 850 936 936	3 4F 0 1 4T	51.4 - 46.5 12.5 5.0	63.3 - 31.0 12.5 10.1	75.1 - - 12.5 20.2	75.1 - - 12.5 20.2	75.1 - - 12.5 20.2	75.1 - - 12.5 20.2	75.1 - - 12.5 20.2	75.1 - - 12.5 20.2	71.2 - - 12.5 20.2	59.3 - - - - 20.2	39.5 - - - - 20.2	31.6 - - - - 20.2	19.8 1.4 - - 20.2	15.8 2.3 - - 15.1	4.0 3.7 - - 10.1	4.0 3.7 - - 10.1	4.0 3.7 - -	4.0 3.7
TIER 3 (Existing, New and Replacements) TIER 4F (New and Replacements) TRACK DOZERS - CAT D11 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 4A (New and Replacements)	646 646 850 936 936	3 4F 0 1 4T	51.4 - 46.5 12.5 5.0	63.3 - 31.0 12.5 10.1	75.1 - - 12.5 20.2	75.1 - - 12.5 20.2	75.1 - - 12.5 20.2	75.1 - - 12.5 20.2	75.1 - - 12.5 20.2	75.1 - - 12.5 20.2	71.2 - - 12.5 20.2	59.3 - - - - 20.2	39.5 - - - - 20.2	31.6 - - - - 20.2	19.8 1.4 - - 20.2	15.8 2.3 - - 15.1	4.0 3.7 - - 10.1	4.0 3.7 - - 10.1	4.0 3.7 - -	4.0 3.7 - -
TIER 3 (Existing, New and Replacements) TIER 4F (New and Replacements) TRACK DOZERS - CAT D11 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 4A (New and Replacements) TIER 4F (New and Replacements)	646 646 850 936 936	3 4F 0 1 4T	51.4 - 46.5 12.5 5.0	63.3 - 31.0 12.5 10.1	75.1 - - 12.5 20.2	75.1 - - 12.5 20.2	75.1 - - 12.5 20.2	75.1 - - 12.5 20.2	75.1 - - 12.5 20.2	75.1 - - 12.5 20.2	71.2 - - 12.5 20.2	59.3 - - - - 20.2	39.5 - - - - 20.2	31.6 - - - - 20.2	19.8 1.4 - - 20.2	15.8 2.3 - - 15.1	4.0 3.7 - - 10.1	4.0 3.7 - - 10.1	4.0 3.7 - -	4.0 3.7 - -
TIER 3 (Existing, New and Replacements) TIER 4F (New and Replacements) TRACK DOZERS - CAT D11 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 4A (New and Replacements) TIER 4F (New and Replacements) GRADERS - CAT 16	646 646 850 936 936 936	3 4F 0 1 4T 4F	51.4 - 46.5 12.5 5.0	63.3 - 31.0 12.5 10.1 -	75.1 - - 12.5 20.2	75.1 - - 12.5 20.2	75.1 - - 12.5 20.2	75.1 - - 12.5 20.2	75.1 - - 12.5 20.2	75.1 - - 12.5 20.2	71.2 - - 12.5 20.2	59.3 - - - - 20.2	39.5 - - - - 20.2	31.6 - - - 20.2	19.8 1.4 - - 20.2	15.8 2.3 - - 15.1 5.0	4.0 3.7 - - 10.1 10.1	4.0 3.7 - - 10.1 10.1	4.0 3.7 - - - 10.1	4.0 3.7 - - - 10.1
TIER 3 (Existing, New and Replacements) TIER 4F (New and Replacements) TRACK DOZERS - CAT D11 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 4A (New and Replacements) TIER 4F (New and Replacements) GRADERS - CAT 16 TIER 1 (Existing)	646 646 850 936 936 936	3 4F 0 1 4T 4F	51.4 - 46.5 12.5 5.0 -	63.3 - 31.0 12.5 10.1 -	75.1 - - 12.5 20.2 -	75.1 - - 12.5 20.2 -	75.1 - - 12.5 20.2 -	75.1 - - 12.5 20.2 -	75.1 - - 12.5 20.2	75.1 - - 12.5 20.2 -	71.2 - - 12.5 20.2 -	59.3 - - - 20.2 -	39.5	31.6	19.8 1.4 - - 20.2 -	15.8 2.3 - - 15.1 5.0	4.0 3.7 - 10.1 10.1	4.0 3.7 - - 10.1 10.1	4.0 3.7 - - - 10.1	4.0 3.7 - - 10.1
TIER 3 (Existing, New and Replacements) TIER 4F (New and Replacements) TRACK DOZERS - CAT D11 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 4A (New and Replacements) TIER 4F (New and Replacements) GRADERS - CAT 16 TIER 1 (Existing) TIER 2 (Existing)	850 936 936 936 936	3 4F 0 1 4T 4F	51.4 - 46.5 12.5 5.0 - 10.0 11.0	63.3 - 31.0 12.5 10.1 - 5.0 11.0	75.1 - 12.5 20.2 -	75.1 - 12.5 20.2 - 7.3	75.1 - 12.5 20.2 - 7.3	75.1 - - 12.5 20.2 -	75.1 - 12.5 20.2 -	75.1 - - 12.5 20.2 -	71.2 - - 12.5 20.2 -	59.3 - - - 20.2 -	39.5	31.6	19.8 1.4 - - 20.2 -	15.8 2.3 - - 15.1 5.0	4.0 3.7 - 10.1 10.1	4.0 3.7 - - 10.1 10.1	4.0 3.7 - - 10.1	4.0 3.7 - - 10.1
TIER 3 (Existing, New and Replacements) TIER 4F (New and Replacements) TRACK DOZERS - CAT D11 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 4A (New and Replacements) TIER 4F (New and Replacements) GRADERS - CAT 16 TIER 1 (Existing) TIER 2 (Existing) TIER 2 (Existing) TIER 3 (Existing)	850 936 936 936 936 289 299	3 4F 0 1 4T 4F 1 2 3	51.4 - 46.5 12.5 5.0 - 10.0 11.0 11.4	63.3 - 31.0 12.5 10.1 - 5.0 11.0	75.1 - 12.5 20.2 - 11.0 11.4	75.1 - 12.5 20.2 - 7.3 11.4	75.1 - 12.5 20.2 - 7.3 11.4	75.1 - 12.5 20.2 - - 11.4	75.1 - 12.5 20.2 - - 2.3	75.1	71.2 - - 12.5 20.2 -	59.3 - - 20.2 - -	39.5 - - - 20.2 - -	31.6	19.8 1.4 - - 20.2 -	15.8 2.3 - - 15.1 5.0	4.0 3.7 - 10.1 10.1	4.0 3.7 - - 10.1 10.1	4.0 3.7 - - 10.1	4.0 3.7 - - - 10.1
TIER 3 (Existing, New and Replacements) TIER 4F (New and Replacements) TRACK DOZERS - CAT D11 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 4A (New and Replacements) TIER 4F (New and Replacements) GRADERS - CAT 16 TIER 1 (Existing) TIER 2 (Existing) TIER 3 (Existing) TIER 4A (New and Replacements) TIER 4F (New and Replacements) TIER 4F (New and Replacements) TIER 4F (New and Replacements) GRADERS - CAT 24	850 936 936 936 936 289 299 297 297	3 4F 0 1 4T 4F 1 2 3 4T	51.4 - 46.5 12.5 5.0 - 10.0 11.0 11.4 2.4	63.3 - 31.0 12.5 10.1 - 5.0 11.0 11.4 7.2	75.1 - 12.5 20.2 - 11.0 11.4 9.6	75.1 - 12.5 20.2 - 7.3 11.4 12.0	75.1 - 12.5 20.2 - 7.3 11.4 12.0	75.1 - - 12.5 20.2 - - - 11.4 12.0	75.1 - 12.5 20.2 - - 2.3 12.0	75.1 - - 12.5 20.2 - - - 12.0	71.2 - - 12.5 20.2 - - - 12.0	59.3 - - - 20.2 - - - - - - - - - - - - -	39.5 - - - 20.2 - - - - - - - - - - - - -	31.6	19.8 1.4 - - 20.2 -	15.8 2.3 - - 15.1 5.0	4.0 3.7 - 10.1 10.1	4.0 3.7 - - 10.1 10.1	4.0 3.7 - - - 10.1	4.0 3.7 - - 10.1
TIER 3 (Existing, New and Replacements) TIER 4F (New and Replacements) TRACK DOZERS - CAT D11 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 4A (New and Replacements) TIER 4F (New and Replacements) GRADERS - CAT 16 TIER 1 (Existing) TIER 2 (Existing) TIER 2 (Existing) TIER 3 (Existing) TIER 4A (New and Replacements) TIER 4A (New and Replacements) TIER 4A (New and Replacements)	850 936 936 936 936 289 299 297 297	3 4F 0 1 4T 4F 1 2 3 4T	51.4 - 46.5 12.5 5.0 - 10.0 11.0 11.4 2.4	63.3 - 31.0 12.5 10.1 - 5.0 11.0 11.4 7.2	75.1 - 12.5 20.2 - 11.0 11.4 9.6	75.1 - 12.5 20.2 - 7.3 11.4 12.0	75.1 - 12.5 20.2 - 7.3 11.4 12.0	75.1 - - 12.5 20.2 - - - 11.4 12.0	75.1 - 12.5 20.2 - - 2.3 12.0	75.1 - - 12.5 20.2 - - - 12.0	71.2 - - 12.5 20.2 - - - 12.0	59.3 - - - 20.2 - - - - - - - - - - - - -	39.5 - - - 20.2 - - - - - - - - - - - - -	31.6	19.8 1.4 - - 20.2 -	15.8 2.3 - - 15.1 5.0	4.0 3.7 - 10.1 10.1	4.0 3.7 - - 10.1 10.1	4.0 3.7 - - - 10.1	4.0 3.7 - - 10.1
TIER 3 (Existing, New and Replacements) TIER 4F (New and Replacements) TRACK DOZERS - CAT D11 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 4A (New and Replacements) TIER 4F (New and Replacements) GRADERS - CAT 16 TIER 1 (Existing) TIER 2 (Existing) TIER 3 (Existing) TIER 4A (New and Replacements) TIER 4F (New and Replacements) TIER 4F (New and Replacements) TIER 4F (New and Replacements) GRADERS - CAT 24	850 936 936 936 936 936 289 297 297 297	3 4F 0 1 4T 4F 1 2 3 4T 2 4F	51.4 - 46.5 12.5 5.0 - 10.0 11.0 11.4 2.4	63.3 31.0 12.5 10.1 - 5.0 11.0 11.4 7.2	75.1 - 12.5 20.2 - 11.0 11.4 9.6	75.1 - 12.5 20.2 - 7.3 11.4 12.0	75.1 - 12.5 20.2 - 7.3 11.4 12.0 0.3	75.1 - 12.5 20.2 - - 11.4 12.0 0.8	75.1 - 12.5 20.2 - - - 2.3 12.0 1.8	75.1 - 12.5 20.2 - - 12.0 2.1	71.2 - - 12.5 20.2 - - - 12.0 2.1	59.3 - - 20.2 - - - 9.6 2.1	39.5 - 20.2 - - 4.8 2.6	31.6 - - 20.2 - - - - - - 2.9	19.8 1.4 - - 20.2 - - - - - 2.9	15.8 2.3 - - 15.1 5.0	4.0 3.7 - 10.1 10.1 - - - - 2.9	4.0 3.7 - 10.1 10.1 - - - - 2.9	4.0 3.7 - - 10.1	4.0 3.7 - - 10.1
TIER 3 (Existing, New and Replacements) TIER 4F (New and Replacements) TRACK DOZERS - CAT D11 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 4A (New and Replacements) TIER 4F (New and Replacements) GRADERS - CAT 16 TIER 1 (Existing) TIER 2 (Existing) TIER 2 (Existing) TIER 3 (Existing) TIER 4A (New and Replacements) TIER 4F (New and Replacements) TIER 4F (New and Replacements) GRADERS - CAT 24 NOT TIER RATED (Existing)	850 936 936 936 936 936 289 299 297 297 297	3 4F 0 1 4T 4F 1 2 3 4T 4F 4F	51.4 - 46.5 12.5 5.0 - 10.0 11.0 11.4 2.4 - 25.3	63.3 - 31.0 12.5 10.1 - 5.0 11.0 11.4 7.2 - 25.3	75.1 - 12.5 20.2 - 11.0 11.4 9.6 - 25.3	75.1 - 12.5 20.2 - 7.3 11.4 12.0 -	75.1 - 12.5 20.2 - 7.3 11.4 12.0 0.3	75.1 - 12.5 20.2 - - 11.4 12.0 0.8	75.1 - 12.5 20.2 - - 2.3 12.0 1.8	75.1 - 12.5 20.2 - - - 12.0 2.1	71.2 - - 12.5 20.2 - - - - 12.0 2.1	59.3 - - 20.2 - - - 9.6 2.1	39.5 - 20.2 - - 4.8 2.6	31.6 - - 20.2 - - - - - - 2.9	19.8 1.4 - - 20.2 - - - - - 2.9	15.8 2.3 - - 15.1 5.0	4.0 3.7 - 10.1 10.1 - - - - 2.9	4.0 3.7 - 10.1 10.1 - - - - 2.9	4.0 3.7 - - - 10.1	4.0 3.7 - - 10.1
TIER 3 (Existing, New and Replacements) TIER 4F (New and Replacements) TRACK DOZERS - CAT D11 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 4A (New and Replacements) TIER 4F (New and Replacements) GRADERS - CAT 16 TIER 1 (Existing) TIER 2 (Existing) TIER 2 (Existing) TIER 3 (Existing) TIER 4A (New and Replacements) TIER 4F (New and Replacements)	850 936 936 936 936 289 299 297 297 297 540	3 4F 0 1 4T 4F 1 2 3 4T 4F 0 2	51.4 - 46.5 12.5 5.0 - 10.0 11.0 11.4 2.4 - 25.3	63.3 - 31.0 12.5 10.1 - 5.0 11.0 11.4 7.2 - 25.3	75.1 - 12.5 20.2 - 11.0 11.4 9.6 - 25.3	75.1 - 12.5 20.2 - 7.3 11.4 12.0 -	75.1 - 12.5 20.2 - 7.3 11.4 12.0 0.3 25.3 6.4	75.1 - 12.5 20.2 - 11.4 12.0 0.8 - 6.4	75.1 - 12.5 20.2 - - 2.3 12.0 1.8	75.1 - - 12.5 20.2 - - - 12.0 2.1	71.2 - - 12.5 20.2 - - 12.0 2.1	59.3 - - 20.2 - - 9.6 2.1	39.5 - - - 20.2 - - - 4.8 2.6	31.6 - - 20.2 - - - 2.9	19.8 1.4 - - 20.2 - - - 2.9	15.8 2.3 - - 15.1 5.0	4.0 3.7 - 10.1 10.1 - - - 2.9	4.0 3.7 - 10.1 10.1 - - - 2.9	4.0 3.7 - - - 10.1	4.0 3.7 - - - 10.1
TIER 3 (Existing, New and Replacements) TIER 4F (New and Replacements) TRACK DOZERS - CAT D11 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 4A (New and Replacements) TIER 4F (New and Replacements) GRADERS - CAT 16 TIER 1 (Existing) TIER 2 (Existing) TIER 3 (Existing) TIER 4A (New and Replacements) TIER 4F (New and Replacements) GRADERS - CAT 16 TIER 1 (Existing) TIER 2 (Existing) TIER 2 (Existing) TIER 4F (New and Replacements) GRADERS - CAT 24 NOT TIER RATED (Existing) TIER 2 (Existing) TIER 2 (Existing) TIER 4F (Replacements)	850 936 936 936 936 289 299 297 297 297 540	3 4F 0 1 4T 4F 1 2 3 4T 4F 0 2	51.4 - 46.5 12.5 5.0 - 10.0 11.0 11.4 2.4 - 25.3	63.3 - 31.0 12.5 10.1 - 5.0 11.0 11.4 7.2 - 25.3	75.1 - 12.5 20.2 - 11.0 11.4 9.6 - 25.3	75.1 - 12.5 20.2 - 7.3 11.4 12.0 -	75.1 - 12.5 20.2 - 7.3 11.4 12.0 0.3 25.3 6.4	75.1 - 12.5 20.2 - 11.4 12.0 0.8 - 6.4	75.1 - 12.5 20.2 - - 2.3 12.0 1.8	75.1 - - 12.5 20.2 - - - 12.0 2.1	71.2 - - 12.5 20.2 - - 12.0 2.1	59.3 - - 20.2 - - 9.6 2.1	39.5 - - - 20.2 - - - 4.8 2.6	31.6 - - 20.2 - - - 2.9	19.8 1.4 - - 20.2 - - - 2.9	15.8 2.3 - - 15.1 5.0	4.0 3.7 - 10.1 10.1 - - - 2.9	4.0 3.7 - 10.1 10.1 - - - 2.9	4.0 3.7 - - - 10.1	4.0 3.7 - - - 10.1
TIER 3 (Existing, New and Replacements) TIER 4F (New and Replacements) TRACK DOZERS - CAT D11 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 4A (New and Replacements) TIER 4F (New and Replacements) GRADERS - CAT 16 TIER 1 (Existing) TIER 2 (Existing) TIER 3 (Existing) TIER 4A (New and Replacements) TIER 4F (New and Replacements) GRADERS - CAT 16 TIER 4F (New and Replacements) TIER 4F (Replacements) TIER 2 (Existing) TIER 2 (Existing) TIER 4F (Replacements)	850 936 936 936 936 289 299 297 297 297 540	3 4F 0 1 4T 4F 1 2 3 4T 4F 0 2	51.4 - 46.5 12.5 5.0 - 10.0 11.0 11.4 2.4 - 25.3	63.3 - 31.0 12.5 10.1 - 5.0 11.0 11.4 7.2 - 25.3	75.1 - 12.5 20.2 - 11.0 11.4 9.6 - 25.3	75.1 - 12.5 20.2 - 7.3 11.4 12.0 -	75.1 - 12.5 20.2 - 7.3 11.4 12.0 0.3 25.3 6.4	75.1 - 12.5 20.2 - 11.4 12.0 0.8 - 6.4	75.1 - 12.5 20.2 - - 2.3 12.0 1.8	75.1 - - 12.5 20.2 - - - 12.0 2.1	71.2 - - 12.5 20.2 - - 12.0 2.1	59.3 - - 20.2 - - 9.6 2.1	39.5 - - - 20.2 - - - 4.8 2.6	31.6 - - 20.2 - - - 2.9	19.8 1.4 - - 20.2 - - - 2.9	15.8 2.3 - - 15.1 5.0	4.0 3.7 - 10.1 10.1 - - - 2.9	4.0 3.7 - 10.1 10.1 - - - 2.9	4.0 3.7 - - - 10.1	4.0 3.7 - - - 10.1
TIER 3 (Existing, New and Replacements) TIER 4F (New and Replacements) TRACK DOZERS - CAT D11 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 4A (New and Replacements) TIER 4F (New and Replacements) GRADERS - CAT 16 TIER 1 (Existing) TIER 2 (Existing) TIER 3 (Existing) TIER 4A (New and Replacements) TIER 4F (New and Replacements) GRADERS - CAT 16 TIER 1 (Existing) TIER 2 (Existing) TIER 2 (Existing) TIER 4F (New and Replacements) GRADERS - CAT 24 NOT TIER RATED (Existing) TIER 2 (Existing) TIER 2 (Existing) TIER 4F (Replacements)	850 936 936 936 936 937 289 299 297 297 297 540 533 533	3 4F 0 1 4T 4F 1 2 3 4T 4F 0 2 4F	51.4 - 46.5 12.5 5.0 - 10.0 11.0 11.4 2.4 - 25.3 6.4	5.0 11.0 11.4 7.2 25.3 6.4	75.1 - 12.5 20.2 - 11.0 11.4 9.6 - 25.3 6.4	75.1 - 12.5 20.2 - 7.3 11.4 12.0 - 25.3 6.4	75.1 - 12.5 20.2 - 7.3 11.4 12.0 0.3 25.3 6.4	75.1 - 12.5 20.2 - 11.4 12.0 0.8 - 6.4 0.9	75.1 - 12.5 20.2 - - 2.3 12.0 1.8 - 6.4 0.9	75.1 - 12.5 20.2 - - 12.0 2.1 - 6.4 0.9	71.2 - 12.5 20.2 - - 12.0 2.1 - 6.4 0.9	59.3 - 20.2 - - 9.6 2.1 - 6.4 0.9	39.5 - - 20.2 - - - 4.8 2.6	31.6 - - 20.2 - - - - 2.9	19.8 1.4 - - 20.2 - - - - 2.9 2.9	15.8 2.3 - - 15.1 5.0	4.0 3.7 - 10.1 10.1 - - - - 2.9 - 1.3	4.0 3.7 - 10.1 10.1 - - - - 2.9	4.0 3.7 - - - 10.1	4.0 3.7 - - - 10.1
TIER 3 (Existing, New and Replacements) TIER 4F (New and Replacements) TRACK DOZERS - CAT D11 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 4A (New and Replacements) TIER 4F (New and Replacements) GRADERS - CAT 16 TIER 1 (Existing) TIER 2 (Existing) TIER 2 (Existing) TIER 3 (Existing) TIER 4A (New and Replacements) TIER 4F (New and Replacements) TIER 4F (New and Replacements) TIER 4F (New and Replacements) TIER 4F (New and Replacements) TIER 4F (Replacements) TIER 4F (Replacements) TIER 2 (Existing) TIER 4F (Replacements) RTDS - CAT 834 834B - NOT TIER RATED (Existing)	850 936 936 936 936 937 289 299 297 297 297 540 533 533	3 4F 0 1 4T 4F 1 2 3 4T 4F 0 2 4F	51.4 - 46.5 12.5 5.0 - 10.0 11.0 11.4 2.4 - 25.3 6.4 - 22.8	5.0 11.0 11.4 7.2 25.3 6.4	75.1 - 12.5 20.2 - 11.0 11.4 9.6 - 25.3 6.4 -	75.1 - 12.5 20.2 - 7.3 11.4 12.0 - 25.3 6.4 -	75.1 - 12.5 20.2 - 7.3 11.4 12.0 0.3 25.3 6.4 -	75.1 - 12.5 20.2 - 11.4 12.0 0.8 - 6.4 0.9	75.1 - 12.5 20.2 - 2.3 12.0 1.8 - 6.4 0.9	75.1 - 12.5 20.2 - - 12.0 2.1 - 6.4 0.9	71.2 - - 12.5 20.2 - - - 12.0 2.1 - 6.4 0.9	59.3 - - 20.2 - - 9.6 2.1	39.5 - - 20.2 - - - 4.8 2.6	31.6 - - 20.2 - - - - 2.9 - 1.3	19.8 1.4 	15.8 2.3 - - 15.1 5.0	4.0 3.7 - 10.1 10.1 - - - 2.9 - 1.3	4.0 3.7 - - 10.1 10.1 - - - 2.9 - 1.3	4.0 3.7 - - - 10.1	4.0 3.7 - - 10.1
TIER 3 (Existing, New and Replacements) TIER 4F (New and Replacements) TRACK DOZERS - CAT D11 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 4A (New and Replacements) TIER 4F (New and Replacements) GRADERS - CAT 16 TIER 1 (Existing) TIER 2 (Existing) TIER 2 (Existing) TIER 3 (Existing) TIER 4F (New and Replacements) TIER 4F (Replacements) TIER 4F (Replacements) TIER 2 (Existing) TIER 2 (Existing) TIER 4F (Replacements) RTDS - CAT 834 834B - NOT TIER RATED (Existing) 834G - NOT TIER RATED (Existing)	850 936 936 936 936 937 289 299 297 297 297 540 533 533 533	3 4F 0 1 4T 4F 2 3 4T 4F 0 2 4F	51.4 - 46.5 12.5 5.0 - 10.0 11.0 11.4 2.4 - 25.3 6.4 -	63.3 - 31.0 12.5 10.1 - 5.0 11.0 11.4 7.2 - 25.3 6.4 -	75.1 - 12.5 20.2 - 11.0 11.4 9.6 - 25.3 6.4 -	75.1 - 12.5 20.2 - 7.3 11.4 12.0 - 25.3 6.4 -	75.1 - 12.5 20.2 - 7.3 11.4 12.0 0.3 25.3 6.4 -	75.1 - 12.5 20.2 - 11.4 12.0 0.8 - 6.4 0.9	75.1 - 12.5 20.2 - 2.3 12.0 1.8 - 6.4 0.9	75.1 - 12.5 20.2 - 12.0 2.1 - 6.4 0.9	71.2 - 12.5 20.2 - 12.0 2.1 - 6.4 0.9	59.3 - - 20.2 - - - 9.6 2.1 - 6.4 0.9	39.5 - - 20.2 - - - 4.8 2.6	31.6 	19.8 1.4 	15.8 2.3 - - 15.1 5.0	4.0 3.7 - 10.1 10.1 - - - 2.9 - 1.3	4.0 3.7 - 10.1 10.1 - - - 2.9 - 1.3	4.0 3.7 - - - 10.1	4.0 3.7 - - - 10.1
TIER 3 (Existing, New and Replacements) TIER 4F (New and Replacements) TRACK DOZERS - CAT D11 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 4A (New and Replacements) TIER 4F (New and Replacements) GRADERS - CAT 16 TIER 1 (Existing) TIER 2 (Existing) TIER 3 (Existing) TIER 3 (Existing) TIER 4A (New and Replacements) TIER 4F (Replacements) GRADERS - CAT 24 NOT TIER RATED (Existing) TIER 2 (Existing) TIER 2 (Existing) TIER 4F (Replacements) RTDS - CAT 834 834B - NOT TIER RATED (Existing) 834G - NOT TIER RATED (Existing) TIER 3 (Existing) TIER 3 (Existing)	850 936 936 936 936 937 289 299 297 297 297 297 540 533 533 533	3 4F 0 1 1 4T 4F 2 3 4T 4F 0 0 2 4F	51.4 - 46.5 12.5 5.0 - 10.0 11.0 11.4 2.4 - 25.3 6.4 - 22.8 11.4 10.8	63.3 - 31.0 12.5 10.1 - 5.0 11.0 11.4 7.2 - 25.3 6.4 - 10.8	75.1 - 12.5 20.2 - 11.0 11.4 9.6 - 25.3 6.4 - 10.8	75.1 - 12.5 20.2 - 7.3 11.4 12.0 - 25.3 6.4 - 10.8	75.1 - 12.5 20.2 - 7.3 11.4 12.0 0.3 25.3 6.4 - 10.8	75.1 - 12.5 20.2 - 11.4 12.0 0.8 - 6.4 0.9	75.1 - 12.5 20.2 - 2.3 12.0 1.8 - 6.4 0.9	75.1 - 12.5 20.2 - - 12.0 2.1 - 6.4 0.9	71.2 - 12.5 20.2 - - 12.0 2.1 - 6.4 0.9	59.3 - - 20.2 - - - 9.6 2.1 - 6.4 0.9	39.5 - - 20.2 - - - 4.8 2.6 - - 1.3	31.6 - - 20.2 - - - 2.9 - 1.3	19.8 1.4 20.2 2.9 - 1.3	15.8 2.3 - - 15.1 5.0	4.0 3.7 - 10.1 10.1 - - - 2.9 - 1.3	4.0 3.7 - 10.1 10.1 - - - 2.9 - 1.3	4.0 3.7 - - 10.1	4.0 3.7 - - - 10.1
TIER 3 (Existing, New and Replacements) TIER 4F (New and Replacements) TRACK DOZERS - CAT D11 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 4A (New and Replacements) TIER 4F (New and Replacements) GRADERS - CAT 16 TIER 1 (Existing) TIER 2 (Existing) TIER 2 (Existing) TIER 3 (Existing) TIER 4A (New and Replacements) TIER 4F (Replacements) GRADERS - CAT 24 NOT TIER RATED (Existing) TIER 2 (Existing) TIER 4F (Replacements) RTDS - CAT 834 834B - NOT TIER RATED (Existing) 834G - NOT TIER RATED (Existing) TIER 3 (Existing) TIER 3 (Existing) TIER 3 (Existing) TIER 4A (New and Replacements)	646 646 850 936 936 936 936 289 297 297 297 297 540 533 533 487 487 525 525	3 4F 0 1 4T 4F 1 2 3 3 4T 4F 0 0 2 4F	51.4 - 46.5 12.5 5.0 - 10.0 11.0 11.4 2.4 - 25.3 6.4 - 22.8 11.4 10.8 3.8	63.3 - 31.0 12.5 10.1 - 5.0 11.0 11.4 7.2 - 25.3 6.4 - 10.8 15.2	75.1 - 12.5 20.2 - 11.0 11.4 9.6 - 25.3 6.4 - 10.8 15.2	75.1 - 12.5 20.2 - 7.3 11.4 12.0 - 25.3 6.4 - 10.8 15.2	75.1 - 12.5 20.2 - 7.3 11.4 12.0 0.3 25.3 6.4 - 10.8 15.2	75.1 - 12.5 20.2 - 11.4 12.0 0.8 - 6.4 0.9	75.1 - 12.5 20.2 - 2.3 12.0 1.8 - 6.4 0.9	75.1 - 12.5 20.2 - - 12.0 2.1 - 6.4 0.9	71.2 - 12.5 20.2 - - 12.0 2.1 - 6.4 0.9	59.3 - - 20.2 - - - - 9.6 2.1 - 6.4 0.9	39.5 - - 20.2 - - - 4.8 2.6 - - 1.3	31.6 - - 20.2 - - - - - - - 2.9 - 1.3	19.8 1.4 - - 20.2 - - - - 2.9 - 1.3	15.8 2.3 - - 15.1 5.0	4.0 3.7 - 10.1 10.1 - - - 2.9 - 1.3	4.0 3.7 - 10.1 10.1 - - - 2.9 - 1.3	4.0 3.7 - - 10.1	4.0 3.7
TIER 3 (Existing, New and Replacements) TIER 4F (New and Replacements) TRACK DOZERS - CAT D11 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 4A (New and Replacements) TIER 4F (New and Replacements) GRADERS - CAT 16 TIER 1 (Existing) TIER 2 (Existing) TIER 3 (Existing) TIER 4F (New and Replacements) TIER 4F (New and Replacements) GRADERS - CAT 24 NOT TIER RATED (Existing) TIER 2 (Existing) TIER 4F (Replacements) RTDS - CAT 834 834B - NOT TIER RATED (Existing) TIER 3 (Existing) TIER 3 (Existing) TIER 4F (Replacements)	646 646 850 936 936 936 936 289 297 297 297 297 540 533 533 487 487 525 525	3 4F 0 1 4T 4F 1 2 3 3 4T 4F 0 0 2 4F	51.4 - 46.5 12.5 5.0 - 10.0 11.0 11.4 2.4 - 25.3 6.4 - 22.8 11.4 10.8 3.8	63.3 - 31.0 12.5 10.1 - 5.0 11.0 11.4 7.2 - 25.3 6.4 - 10.8 15.2	75.1 - 12.5 20.2 - 11.0 11.4 9.6 - 25.3 6.4 - 10.8 15.2	75.1 - 12.5 20.2 - 7.3 11.4 12.0 - 25.3 6.4 - 10.8 15.2	75.1 - 12.5 20.2 - 7.3 11.4 12.0 0.3 25.3 6.4 - 10.8 15.2	75.1 - 12.5 20.2 - 11.4 12.0 0.8 - 6.4 0.9	75.1 - 12.5 20.2 - 2.3 12.0 1.8 - 6.4 0.9	75.1 - 12.5 20.2 - - 12.0 2.1 - 6.4 0.9	71.2 - 12.5 20.2 - - 12.0 2.1 - 6.4 0.9	59.3 - - 20.2 - - - - 9.6 2.1 - 6.4 0.9	39.5 - - 20.2 - - - 4.8 2.6 - - 1.3	31.6 - - 20.2 - - - - - - - 2.9 - 1.3	19.8 1.4 - - 20.2 - - - - 2.9 - 1.3	15.8 2.3 - - 15.1 5.0	4.0 3.7 - 10.1 10.1 - - - 2.9 - 1.3	4.0 3.7 - 10.1 10.1 - - - 2.9 - 1.3	4.0 3.7 - - 10.1	4.0 3.7
TIER 3 (Existing, New and Replacements) TIER 4F (New and Replacements) TRACK DOZERS - CAT D11 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 4A (New and Replacements) TIER 4F (New and Replacements) GRADERS - CAT 16 TIER 1 (Existing) TIER 2 (Existing) TIER 2 (Existing) TIER 3 (Existing) TIER 4F (New and Replacements) TIER 4F (New and Replacements) GRADERS - CAT 24 NOT TIER RATED (Existing) TIER 2 (Existing) TIER 4F (Replacements) RTDS - CAT 834 834B - NOT TIER RATED (Existing) TIER 3 (Existing) TIER 3 (Existing) TIER 3 (Existing) TIER 4F (Replacements) RTDS - CAT 834 R34B - NOT TIER RATED (Existing) TIER 3 (Existing) TIER 4F (Replacements) TIER 4F (Replacements) TIER 4F (Replacements)	646 646 850 936 936 936 936 289 299 297 297 297 540 533 533 533	3 4F 0 1 4T 4F 1 2 3 4T 4F 0 2 4F 0 0 2 4F	51.4 - 46.5 12.5 5.0 - 10.0 11.0 11.4 2.4 - 25.3 6.4 - 11.4 10.8 3.8 10.0	5.0 11.0 11.4 7.2 25.3 6.4 - 10.8 15.2	75.1 - 12.5 20.2 - 11.0 11.4 9.6 - 25.3 6.4 - 10.8 15.2	75.1 - 12.5 20.2 - 7.3 11.4 12.0 - 25.3 6.4 - 10.8 15.2	75.1 - 12.5 20.2 - 7.3 11.4 12.0 0.3 25.3 6.4 - 10.8 15.2	75.1 - 12.5 20.2 - 11.4 12.0 0.8 - 6.4 0.9	75.1 - 12.5 20.2 - - 2.3 12.0 1.8 - 6.4 0.9	75.1 - 12.5 20.2 - - 12.0 2.1 - 6.4 0.9	71.2 - 12.5 20.2 - - 12.0 2.1 - 6.4 0.9	59.3 - - 20.2 - - 9.6 2.1 - 6.4 0.9	39.5 - - 20.2 - - 4.8 2.6 - - 1.3	31.6 	19.8 1.4 	15.8 2.3 - - 15.1 5.0 - - - 2.9 - 1.3	4.0 3.7 - 10.1 10.1 10.1 - - - 2.9 - 1.3	4.0 3.7 - 10.1 10.1 10.1 - - - 2.9 - 1.3	4.0 3.7 - - - 10.1	4.0 3.7
TIER 3 (Existing, New and Replacements) TIER 4F (New and Replacements) TRACK DOZERS - CAT D11 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 4A (New and Replacements) TIER 4F (New and Replacements) GRADERS - CAT 16 TIER 1 (Existing) TIER 2 (Existing) TIER 2 (Existing) TIER 3 (Existing) TIER 4F (New and Replacements) TIER 4F (New and Replacements) GRADERS - CAT 24 NOT TIER RATED (Existing) TIER 2 (Existing) TIER 4F (Replacements) RTDS - CAT 834 834B - NOT TIER RATED (Existing) TIER 3 (Existing) TIER 3 (Existing) TIER 3 (Existing) TIER 4F (Replacements) RTDS - CAT 834 R34B - NOT TIER RATED (Existing) TIER 3 (Existing) TIER 4F (Replacements) TIER 4F (Replacements) TIER 4F (Replacements)	646 646 850 936 936 936 938 289 299 297 297 297 540 533 533 533	3 4F 0 1 4T 4F 1 2 3 4T 4F 0 2 4F 0 0 2 4F	51.4 - 46.5 12.5 5.0 - 10.0 11.0 11.4 2.4 - 25.3 6.4 - 11.4 10.8 3.8 10.0	5.0 11.0 11.4 7.2 25.3 6.4 - 10.8 15.2	75.1 - 12.5 20.2 - 11.0 11.4 9.6 - 25.3 6.4 - 10.8 15.2	75.1 - 12.5 20.2 - 7.3 11.4 12.0 - 25.3 6.4 - 10.8 15.2	75.1 - 12.5 20.2 - 7.3 11.4 12.0 0.3 25.3 6.4 - 10.8 15.2	75.1 - 12.5 20.2 - 11.4 12.0 0.8 - 6.4 0.9	75.1 - 12.5 20.2 - - 2.3 12.0 1.8 - 6.4 0.9	75.1 - 12.5 20.2 - - 12.0 2.1 - 6.4 0.9	71.2 - 12.5 20.2 - - 12.0 2.1 - 6.4 0.9	59.3 - - 20.2 - - 9.6 2.1 - 6.4 0.9	39.5 - - 20.2 - - 4.8 2.6 - - 1.3	31.6 	19.8 1.4 	15.8 2.3 - - 15.1 5.0 - - - 2.9 - 1.3	4.0 3.7 - 10.1 10.1 10.1 - - - 2.9 - 1.3	4.0 3.7 - 10.1 10.1 10.1 - - - 2.9 - 1.3	4.0 3.7 - - - 10.1	4.0 3.7
TIER 3 (Existing, New and Replacements) TIER 4F (New and Replacements) TRACK DOZERS - CAT D11 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 4A (New and Replacements) TIER 4F (New and Replacements) GRADERS - CAT 16 TIER 1 (Existing) TIER 2 (Existing) TIER 3 (Existing) TIER 3 (Existing) TIER 4A (New and Replacements) TIER 4F (Rew and Replacements) TIER 4F (Replacements) RTDS - CAT 24 NOT TIER RATED (Existing) TIER 2 (Existing) TIER 4F (Replacements) RTDS - CAT 834 334B - NOT TIER RATED (Existing) 334G - NOT TIER RATED (Existing) TIER 3 (Existing) TIER 3 (Existing) TIER 4A (New and Replacements) TIER 4F (Replacements) TIER 4F (Replacements) RTDS - CAT 854 TIER 1 (Existing)	646 646 850 936 936 936 938 289 299 297 297 297 540 533 533 533	3 4F 0 1 4T 4F 1 2 3 4T 4F 0 2 4F 0 0 2 4F	51.4 - 46.5 12.5 5.0 - 10.0 11.0 11.4 2.4 - 25.3 6.4 - 11.4 10.8 3.8 10.0	5.0 11.0 11.4 7.2 25.3 6.4 - 10.8 15.2	75.1 - 12.5 20.2 - 11.0 11.4 9.6 - 25.3 6.4 - 10.8 15.2	75.1 - 12.5 20.2 - 7.3 11.4 12.0 - 25.3 6.4 - 10.8 15.2	75.1 - 12.5 20.2 - 7.3 11.4 12.0 0.3 25.3 6.4 - 10.8 15.2	75.1 - 12.5 20.2 - 11.4 12.0 0.8 - 6.4 0.9	75.1 - 12.5 20.2 - - 2.3 12.0 1.8 - 6.4 0.9	75.1 - 12.5 20.2 - - 12.0 2.1 - 6.4 0.9	71.2 - 12.5 20.2 - - 12.0 2.1 - 6.4 0.9	59.3 - - 20.2 - - 9.6 2.1 - 6.4 0.9	39.5 - - 20.2 - - 4.8 2.6 - - 1.3	31.6 	19.8 1.4 	15.8 2.3 - - 15.1 5.0 - - - 2.9 - 1.3	4.0 3.7 - 10.1 10.1 10.1 - - - 2.9 - 1.3	4.0 3.7 - 10.1 10.1 10.1 - - - 2.9 - 1.3	4.0 3.7 - - - 10.1	4.0 3.7
TIER 3 (Existing, New and Replacements) TIER 4F (New and Replacements) TRACK DOZERS - CAT D11 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 4A (New and Replacements) TIER 4F (New and Replacements) GRADERS - CAT 16 TIER 1 (Existing) TIER 2 (Existing) TIER 3 (Existing) TIER 4A (New and Replacements) TIER 4F (Rey and Replacements) TIER 4F (Rey and Replacements) TIER 4F (Rey and Replacements) TIER 4F (Replacements) TIER 2 (Existing) TIER 2 (Existing) TIER 4F (Replacements) RTDS - CAT 834 834B - NOT TIER RATED (Existing) TIER 3 (Existing) TIER 3 (Existing) TIER 3 (Existing) TIER 4F (Replacements)	646 646 850 936 936 936 936 289 297 297 297 297 540 533 533 487 487 525 525 525	3 4F 0 1 4T 4F 1 2 3 3 4T 4F 0 0 2 4F 0 0 3 3 4T 4F	51.4	63.3 31.0 12.5 10.1 - 5.0 11.0 11.4 7.2 - 25.3 6.4 - 10.8 15.2 - 15.2	75.1 - 12.5 20.2 - 11.0 11.4 9.6 - 25.3 6.4 - 10.8 15.2 - 15.2	75.1 - 12.5 20.2 - 7.3 11.4 12.0 - 25.3 6.4 - 10.8 15.2 - 15.2	75.1 - 12.5 20.2 - 7.3 11.4 12.0 0.3 25.3 6.4 - 10.8 15.2 - 15.2	75.1 - 12.5 20.2 - 11.4 12.0 0.8 - 6.4 0.9 - 10.8 15.2 - 15.2	75.1 - 12.5 20.2 2.3 12.0 1.8 - 6.4 0.9 - 10.8 15.2 - 15.2	75.1 - 12.5 20.2 - - 12.0 2.1 - 6.4 0.9	71.2 - 12.5 20.2 - - 12.0 2.1 - 6.4 0.9	59.3 - - 20.2 - - - 9.6 2.1 - 6.4 0.9	39.5 20.2 4.8 2.6 1.3	31.6 - - 20.2 - - - 2.9 - 1.3	19.8 1.4	15.8 2.3 - - 15.1 5.0	4.0 3.7 - 10.1 10.1 - - - 2.9 - 1.3	4.0 3.7 - 10.1 10.1 - - - 2.9 - 1.3	4.0 3.7 - - 10.1	4.0 3.7
TIER 3 (Existing, New and Replacements) TIER 4F (New and Replacements) TRACK DOZERS - CAT D11 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 4A (New and Replacements) TIER 4F (New and Replacements) GRADERS - CAT 16 TIER 1 (Existing) TIER 2 (Existing) TIER 3 (Existing) TIER 4F (New and Replacements) TIER 4F (New and Replacements) GRADERS - CAT 24 NOT TIER RATED (Existing) TIER 2 (Existing) TIER 4F (Replacements) RTDS - CAT 834 834B - NOT TIER RATED (Existing) TIER 3 (Existing) TIER 3 (Existing) TIER 4F (Replacements) RTDS - CAT 834 R34B - NOT TIER RATED (Existing) TIER 3 (Existing) TIER 4F (Replacements) TIER 4F (Replacements) FEDS - CAT 854 TIER 1 (Existing) FEL - KOMATSU WA500 - TIER 1 (Existing)	646 646 850 936 936 936 937 289 299 297 297 297 297 540 533 533 533 487 487 525 525 525 525	3 4F 0 1 4T 4F 1 2 3 4T 4F 0 2 4F 0 0 2 4F	51.4	5.0 11.0 11.4 7.2 25.3 6.4 - 10.8 15.2 2.5	75.1 - 12.5 20.2 - 11.0 11.4 9.6 - 25.3 6.4 - 10.8 15.2 - 15.2	75.1 - 12.5 20.2 - 7.3 11.4 12.0 - 25.3 6.4 - 10.8 15.2 - 15.2	75.1 - 12.5 20.2 - 7.3 11.4 12.0 0.3 25.3 6.4 - 10.8 15.2 - 15.2	75.1 - 12.5 20.2 - 11.4 12.0 0.8 - 6.4 0.9 - 10.8 15.2 - 15.2	75.1 - 12.5 20.2 2.3 12.0 1.8 - 6.4 0.9 - 10.8 15.2 - 15.2	75.1 12.5 20.2 12.0 2.1 - 6.4 0.9 7.2 15.2 0.4 15.2	71.2 - 12.5 20.2 - - 12.0 2.1 - 6.4 0.9	59.3 20.2 9.6 2.1 6.4 0.9 15.2 0.4	39.5 - - 20.2 - - - 4.8 2.6 - - 1.3	31.6 	19.8 1.4	15.8 2.3 - - 15.1 5.0	4.0 3.7 - 10.1 10.1 10.1 - - 2.9 - 1.3	4.0 3.7 	4.0 3.7 - - 10.1	4.0 3.7
TIER 3 (Existing, New and Replacements) TIER 4F (New and Replacements) TRACK DOZERS - CAT D11 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 4A (New and Replacements) TIER 4F (New and Replacements) GRADERS - CAT 16 TIER 1 (Existing) TIER 2 (Existing) TIER 2 (Existing) TIER 3 (Existing) TIER 4F (New and Replacements) TIER 4F (New and Replacements) GRADERS - CAT 24 NOT TIER RATED (Existing) TIER 2 (Existing) TIER 4F (Replacements) RTDS - CAT 834 834B - NOT TIER RATED (Existing) TIER 3 (Existing) TIER 3 (Existing) TIER 4F (Replacements) RTDS - CAT 834 834G - NOT TIER RATED (Existing) TIER 4F (Replacements) TIER 1 (Existing) TIER 4F (Replacements) TIER 1 (Existing) FEL - KOMATSU WA500 - TIER 1 (Existing) WA600 - TIER 1 (Existing)	646 646 850 936 936 936 936 289 299 297 297 297 540 533 533 533 487 487 487 525 525 525 525 525	3 4F 0 1 4T 4F 1 2 3 4T 4F 0 2 4F 0 0 2 4F	51.4	63.3 - 31.0 12.5 10.1 - 5.0 11.0 11.4 7.2 - 25.3 6.4 - 10.8 15.2 - 15.2 2.5 3.7	75.1 - 12.5 20.2 - 11.0 11.4 9.6 - 25.3 6.4 - 10.8 10.8 15.2 - 15.2	75.1 - 12.5 20.2 - 7.3 11.4 12.0 - 25.3 6.4 - 10.8 15.2 - 15.2 2.5 3.7	75.1 - 12.5 20.2 - 7.3 11.4 12.0 0.3 25.3 6.4 - 10.8 15.2 15.2	75.1 - 12.5 20.2 - 11.4 12.0 0.8 - 6.4 0.9 - 10.8 15.2 - 15.2 - 2.5 3.7	75.1 - 12.5 20.2 2.3 12.0 1.8 - 6.4 0.9 - 10.8 15.2 - 15.2 - 2.5 3.7	75.1 - 12.5 20.2 12.0 2.1 - 6.4 0.9 7.2 15.2 0.4 15.2 2.5 3.7	71.2 12.5 20.2 12.0 2.1 - 6.4 0.9 7.2 15.2 0.4	59.3 20.2 9.6 2.1 6.4 0.9 15.2 0.4 3.7	39.5 - 20.2 - - 4.8 2.6 - 1.3	31.6 	19.8 1.4	15.8 2.3 	4.0 3.7 	4.0 3.7 	4.0 3.7 - - - 10.1	4.0 3.7
TIER 3 (Existing, New and Replacements) TIER 4F (New and Replacements) TRACK DOZERS - CAT D11 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 4A (New and Replacements) TIER 4F (New and Replacements) GRADERS - CAT 16 TIER 1 (Existing) TIER 2 (Existing) TIER 3 (Existing) TIER 3 (Existing) TIER 4F (New and Replacements) TIER 4F (New and Replacements) TIER 4F (New and Replacements) TIER 4F (Rew and Replacements) TIER 4F (Replacements) RTDS - CAT 24 NOT TIER RATED (Existing) TIER 2 (Existing) TIER 4F (Replacements) RTDS - CAT 834 834B - NOT TIER RATED (Existing) TIER 3 (Existing) TIER 4F (Replacements) TIER 4F (Replacements) RTDS - CAT 854 TIER 1 (Existing) FEL - KOMATSU WA500 - TIER 1 (Existing) WA600 - TIER 1 (Existing) WA600 - TIER 4F (Replacements)	646 646 850 936 936 936 936 937 289 299 297 297 297 297 297 540 533 533 533 533 533 525 525 525 525 525	3 4F 0 1 4T 4F 1 2 3 4T 4F 0 2 4F 0 0 2 4F 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	51.4 - 46.5 12.5 5.0 - 10.0 11.0 11.4 2.4 - 25.3 6.4 - 10.8 3.8 - 15.2	63.3 - 31.0 12.5 10.1 - 5.0 11.0 11.4 7.2 - 25.3 6.4 - 10.8 15.2 - 15.2 - 2.5 3.7 -	75.1 12.5 20.2 - 11.0 11.4 9.6 - 25.3 6.4 - 10.8 15.2 - 15.2 - 2.5 3.7	75.1 - 12.5 20.2 - 7.3 11.4 12.0 - 25.3 6.4 - 10.8 15.2 - 15.2 - 2.5 3.7 -	75.1 12.5 20.2 - 7.3 11.4 12.0 0.3 25.3 6.4 10.8 15.2 - 15.2 - 2.5 3.7 -	75.1 - 12.5 20.2 - 11.4 12.0 0.8 - 6.4 0.9 - 10.8 15.2 - 15.2	75.1 12.5 20.2 2.3 12.0 1.8 - 6.4 0.9 - 10.8 15.2 - 15.2 - 2.5 3.7 -	75.1 12.5 20.2 12.0 2.1 6.4 0.9 7.2 15.2 0.4 - 15.2	71.2 12.5 20.2 12.0 2.1 - 6.4 0.9 7.2 15.2 0.4 2.5 3.7	59.3 20.2 9.6 2.1 6.4 0.9 15.2 0.4 3.7	39.5 20.2 4.8 2.6 1.3 1.9 0.3	31.6 	19.8 1.4	15.8 2.3	4.0 3.7 	4.0 3.7 	4.0 3.7 - - - 10.1	4.0 3.7
TIER 3 (Existing, New and Replacements) TIER 4F (New and Replacements) TRACK DOZERS - CAT D11 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 4A (New and Replacements) TIER 4F (New and Replacements) GRADERS - CAT 16 TIER 1 (Existing) TIER 2 (Existing) TIER 3 (Existing) TIER 3 (Existing) TIER 4F (New and Replacements) TIER 4F (Rew and Replacements) TIER 4F (Replacements) RTDS - CAT 24 NOT TIER RATED (Existing) TIER 2 (Existing) TIER 4F (Replacements) RTDS - CAT 834 834B - NOT TIER RATED (Existing) TIER 3 (Existing) TIER 4F (Replacements) TIER 1 (Existing) FEL - KOMATSU WA500 - TIER 1 (Existing) WA600 - TIER 1 (Existing) WA600 - TIER 1 (Existing)	646 646 850 936 936 936 936 937 289 299 297 297 297 297 297 540 533 533 533 533 533 525 525 525 525 525	3 4F 0 1 4T 4F 1 2 3 4T 4F 0 2 4F 0 0 2 4F 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	51.4 - 46.5 12.5 5.0 - 10.0 11.0 11.4 2.4 - 25.3 6.4 - 10.8 3.8 - 15.2	63.3 - 31.0 12.5 10.1 - 5.0 11.0 11.4 7.2 - 25.3 6.4 - 10.8 15.2 - 15.2 - 2.5 3.7 -	75.1 12.5 20.2 - 11.0 11.4 9.6 - 25.3 6.4 - 10.8 15.2 - 15.2 - 2.5 3.7	75.1 - 12.5 20.2 - 7.3 11.4 12.0 - 25.3 6.4 - 10.8 15.2 - 15.2 - 2.5 3.7 -	75.1 12.5 20.2 - 7.3 11.4 12.0 0.3 25.3 6.4 10.8 15.2 - 15.2 - 2.5 3.7 -	75.1 - 12.5 20.2 - 11.4 12.0 0.8 - 6.4 0.9 - 10.8 15.2 - 15.2	75.1 12.5 20.2 2.3 12.0 1.8 - 6.4 0.9 - 10.8 15.2 - 15.2 - 2.5 3.7 -	75.1 12.5 20.2 12.0 2.1 6.4 0.9 7.2 15.2 0.4 - 15.2	71.2 12.5 20.2 12.0 2.1 - 6.4 0.9 7.2 15.2 0.4 2.5 3.7	59.3 20.2 9.6 2.1 6.4 0.9 15.2 0.4 3.7	39.5 20.2 4.8 2.6 1.3 1.9 0.3	31.6 	19.8 1.4	15.8 2.3	4.0 3.7 	4.0 3.7 	4.0 3.7 - - - 10.1	4.0 3.7
TIER 3 (Existing, New and Replacements) TIER 4F (New and Replacements) TRACK DOZERS - CAT D11 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 4A (New and Replacements) TIER 4F (New and Replacements) GRADERS - CAT 16 TIER 1 (Existing) TIER 2 (Existing) TIER 3 (Existing) TIER 3 (Existing) TIER 4A (New and Replacements) TIER 4F (New and Replacements) GRADERS - CAT 24 NOT TIER RATED (Existing) TIER 2 (Existing) TIER 4F (Replacements) RTDS - CAT 834 834B - NOT TIER RATED (Existing) TIER 3 (Existing) TIER 14F (Replacements) FEL - KOMATSU WA500 - TIER 1 (Existing) WA600 - TIER 1 (Existing) FEL - CAT 992	646 646 850 936 936 936 936 937 289 299 297 297 297 297 540 533 533 533 533 533 533 533 533 533 53	3 4F 0 1 1 4T 4F 1 2 3 4T 4F 0 2 4F 0 0 2 4F 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	51.4	63.3 - 31.0 12.5 10.1 - 5.0 11.0 11.4 7.2 - 25.3 6.4 - 10.8 15.2 - 15.2 2.5 3.7 - 4.5	75.1 - 12.5 20.2 - 11.0 11.4 9.6 - 25.3 6.4 - 10.8 10.8 10.5 2.5 3.7 - 4.5	75.1 - 12.5 20.2 - 7.3 11.4 12.0 - 25.3 6.4 - 10.8 15.2 - 15.2 - 2.5 3.7 - 4.5	75.1 - 12.5 20.2 - 7.3 11.4 12.0 0.3 25.3 6.4 - 10.8 15.2 - 15.2 2.5 3.7 - 4.5	75.1 - 12.5 20.2 - 11.4 12.0 0.8 - 6.4 0.9 - 10.8 15.2 - 15.2 - 4.5	75.1 - 12.5 20.2 - 2.3 12.0 1.8 - 6.4 0.9 - 10.8 15.2 - 15.2 - 4.5	75.1 - 12.5 20.2 12.0 2.1 - 6.4 0.9 - 7.2 15.2 0.4 - 15.2 - 4.5	71.2 - 12.5 20.2 - - 12.0 2.1 - 6.4 0.9 - - 7.2 15.2 0.4 - - 4.5	59.3 20.2 9.6 2.1 6.4 0.9 15.2 0.4 4.5	39.5 20.2 4.8 2.6 1.3	31.6 - - 20.2 - - - 2.9 - 1.3	19.8 1.4	15.8 2.3 15.1 5.0 2.9 - 1.3	4.0 3.7 - 10.1 10.1 10.1 - - 2.9 - - 1.3	4.0 3.7 	4.0 3.7 - - - 10.1	4.0 3.7
TIER 3 (Existing, New and Replacements) TIER 4F (New and Replacements) TRACK DOZERS - CAT D11 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 4A (New and Replacements) TIER 4F (New and Replacements) GRADERS - CAT 16 TIER 1 (Existing) TIER 2 (Existing) TIER 3 (Existing) TIER 4F (New and Replacements) TIER 4F (New and Replacements) GRADERS - CAT 24 NOT TIER RATED (Existing) TIER 2 (Existing) TIER 4F (Replacements) RTDS - CAT 834 834B - NOT TIER RATED (Existing) TIER 3 (Existing) TIER 3 (Existing) TIER 4F (Replacements) RTDS - CAT 834 R34B - NOT TIER RATED (Existing) TIER 3 (Existing) TIER 1 (Existing) TIER 1 (Existing) TIER 4F (Replacements) FEL - KOMATSU WA500 - TIER 1 (Existing) WA600 - TIER 4F (Replacements) WA700 - TIER 4F (Replacements) FEL - CAT 992 TIER 2 (Existing) TIER 2 (Existing) FEL - CAT 992 TIER 2 (Existing)	646 646 850 936 936 936 936 937 289 299 297 297 297 297 540 533 533 533 533 525 525 525 525 525 525	3 4F 0 1 4T 4F 1 2 3 4T 4F 0 2 4F 0 0 2 4F 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	51.4	63.3 - 31.0 12.5 10.1 - 5.0 11.0 11.4 7.2 - 25.3 6.4 - 10.8 15.2 - 15.2 - 15.2 - 15.2	75.1 - 12.5 20.2 - 11.0 11.4 9.6 - 25.3 6.4 - 10.8 15.2 - 15.2 - 15.2	75.1 - 12.5 20.2 - 7.3 11.4 12.0 - 25.3 6.4 - 10.8 15.2 - 15.2 2.5 3.7 - 4.5	75.1 - 12.5 20.2 - 7.3 11.4 12.0 0.3 25.3 6.4 - 10.8 15.2 - 15.2 2.5 3.7 - 4.5	75.1 - 12.5 20.2 - 11.4 12.0 0.8 - 6.4 0.9 - 10.8 15.2 - 15.2 - 15.2 - 15.2	75.1 - 12.5 20.2 - 2.3 12.0 1.8 - 6.4 0.9 - 10.8 15.2 - 15.2 - 15.2 - 4.5 - 6.2	75.1 12.5 20.2 12.0 2.1 6.4 0.9 15.2 0.4 - 15.2 4.5	71.2 12.5 20.2 12.0 2.1 - 6.4 0.9	59.3 20.2 9.6 2.1 6.4 0.9 15.2 0.4 4.5	39.5 20.2 4.8 2.6 1.3 1.9 0.3 4.5	31.6 	19.8 1.4	15.8 2.3	4.0 3.7 - 10.1 10.1 10.1 - - 2.9 - 1.3	4.0 3.7 	4.0 3.7 - - 10.1 - - 2.9 - 1.3	4.0 3.7

IS080310013347SLCVApp_B-1_260MM_EmissionsWorkbook2010_Final_v13.xlsx\Support Equipment

PRODUCTION FEL - KOM WA1200																					
TIER 1 (Existing)	1,782	1		28.2	28.2	28.2	28.2	28.2	-	-	-	-		-		-		-		-	-
TIER 4F (Replacements)	1,782	4F		-	-	-	-	-	11.4	11.4	11.4	11.4	11.4	11.4	11.4	11.4	11.4	11.4	11.4	11.4	11.4
			-	-																	
TRACKHOES - CAT 330																					
TIER 2 (Existing)	264	2		1.4	1.4	1.4	1.4	1.4	-	-	-	-	-	-	-	-	-	-	-	-	-
TIER 4F (Replacements)	268	4F		-	-	-	-	-	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
TRACKHOES - CAT 385																					
TIER 3 (Existing)	523	3		3.5	3.5	3.5	1.8	1.8	1.8	-	-	-	-	-	-	-	-	-	-	-	-
TIER 4A (Replacements)	523	4T		-	-	-	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	-	-	-	-	-	-
TIER 4F (Replacements)	523	4F		-	-	-	-	-	-	0.2	0.2	0.2	0.2	0.2	0.2	0.4	0.4	0.4	0.4	0.4	0.4
TRACKHOES - KOMATSU																	-				
PC800 - TIER 1 (Existing)	323	1		5.3	5.3	5.3	5.3	2.7	2.7	2.7	2.7	2.7	-	-	_	-	-	-	-	_	_
PC800 - TIER 4F (Replacements)	323	4F		-	-	-	-	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	-	-
PC400 - TIER 1 (Existing)	246	1		1.9	1.9	1.9	1.9	1.9	1.9	-	-	-	-	-	-	-	-	-	-	-	-
1 0400 - HER I (Existing)	240			1.0	1.0	1.0	1.5	1.5	1.5												
WATER TRUCKS																					
CAT 789 (Existing)	1,900	0		24.8	- 1	-	-	- 1	- 1	- 1	-	-	-	-	-	-	-	-	- 1	-	
CAT 799 (Existing) CAT 793C - TIER 1 (Existing)	2,300	1		44.0	44.0	44.0	44.0	44.0	44.0	44.0	44.0	44.0	44.0	44.0	44.0	44.0	44.0	44.0	44.0	44.0	44.0
`	2,300	2		30.3	60.7	60.7	60.7	60.7	60.7	60.7	60.7	60.7	60.7	60.7	60.7	60.7	60.7		60.7	60.7	
CAT 793D - TIER 2 (New and Replaceme	2,415	2		30.3	60.7	60.7	60.7	60.7	60.7	60.7	60.7	60.7	60.7	60.7	60.7	60.7	60.7	60.7	60.7	60.7	60.7
HYDRAULIC SHOVELS																					
	2 100	1 0	1	-	1	- 1	ı	ı	Т	1	-	-	-	-	1	1	1	1	1	1	 1
O&K RH 200, (NOT CERT)	2,100	0			120.4		127.2	126.6	125.0	125.2					- 60.0	- 60.0	- 60 2	- 60 2	67.6	- 67.6	- 66.0
O&K RH 200, (TIER 1)	2,520	1		140.8	139.4	138.0	137.3	136.6	135.9	135.2	134.4	133.7	70.4	70.4	69.0	69.0	68.3	68.3	67.6	67.6	66.9
CONSTRUCTION TRUCKS																					
CONSTRUCTION TRUCKS	4.000		1	57.0	o T	c T			T	c T	-7.0		-7.c	57.0	-7 c T	57.0	c T	E7 0 T	o T	F7.0	====
KOM 785-7 TIER 1 (Existing)	1,200	1		57.9	57.9	57.9	57.9	57.9	57.9	57.9	57.9	57.9	57.9	57.9	57.9	57.9	57.9	57.9	57.9	57.9	57.9
DIEGEL DRILLO DOLL																					
DIESEL DRILLS - P&H									-	-	-						1				
TIER 1 (Existing)	1,100	1		16.5	16.5	8.3	-	-	-	-		-		-	-	-	-	-	-	-	-
TIER 2 (during T4I) (Replacements)	1,100	2		-	-	5.6	11.3	11.3	11.3	11.1	11.1	11.1	11.1	10.9	5.4	5.4	5.4	3.6	3.6	3.6	3.6
DIESEL DRILLS - ATLAS COPCO																					
TIER 2 (Existing)	750	2		19.6	19.6	19.6	19.4	19.2	19.2	14.4	9.6	7.1	-	-	-	-	-	-	-	-	-
TIER 2 (during T4I) (New)	750	2		5.0	10.0	10.0	9.8	9.8	9.8	9.8	9.8	8.0	5.6	2.5	-	-	-	-	-	-	-
TIER 4F (Replacements)	750	4F		-	-	-	-	-	-	-	3.6	6.1	6.1	6.0	4.5	4.0	5.0	5.3	4.9	4.9	4.9
TIER 4F (Replacements) TOTAL	750	4F		695	- 665	- 644	- 641	- 638	- 588	- 561	3.6 539	6.1 517	6.1 405	6.0 363	4.5 327	4.0 312	5.0 309	5.3 297	4.9 296	4.9 286	4.9 285
TOTAL	750	4F		695	665	644	641	638	588	561	539	517	405	363	327	312	309	297	296	286	285
` ' '	750	4F																			
TOTAL	750	4F		695	665	644	641	638	588	561	539	517	405	363	327	312	309	297	296	286	285
TOTAL Sulfur Dioxide Emissions (tpy)				695	665	644	641	638	588	561	539	517	405	363	327	312	309	297	296	286	285
TOTAL Sulfur Dioxide Emissions (tpy) TRACK DOZERS - CAT D10	НР	Tier		2011	2012	2013	2014	2015	2016	2017	539 2018	2019	2020	363 2021	2022	2023	309 2024	297	296	286	285
TOTAL Sulfur Dioxide Emissions (tpy) TRACK DOZERS - CAT D10 NOT TIER RATED (Existing)	HP 580	Tier 0		2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	297	296	286	285
TOTAL Sulfur Dioxide Emissions (tpy) TRACK DOZERS - CAT D10 NOT TIER RATED (Existing) TIER 1 (Existing)	HP 580 613	Tier 0 1		695 2011 - 0.0232	2012 - 0.0077	2013	2014 - - -	2015	2016	2017	2018	2019 - -	2020 - -	363 2021 - -	327 2022 - -	2023	309 2024 - -	297	296	286	285
TOTAL Sulfur Dioxide Emissions (tpy) TRACK DOZERS - CAT D10 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 2 (Existing)	HP 580 613 661	Tier 0 1 2		- 0.0232 0.0250	- 0.0077 0.0250	2013 - - - 0.0250	- - 0.0250	2015 - - 0.0250	2016 - - 0.0250	2017 0.0167	539 2018 - - -	517 2019 - - -	2020	363 2021	327 2022 - - -	312 2023	309 2024 - - -	297	296	2027	285
TOTAL Sulfur Dioxide Emissions (tpy) TRACK DOZERS - CAT D10 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 2 (Existing) TIER 3 (Existing), New and Replacements)	HP 580 613 661 646	Tier 0 1 2 3		- 0.0232 0.0250 0.1058	- 0.0077 0.0250 0.1302	2013 0.0250 0.1546	- - 0.0250 0.1546	- - - 0.0250 0.1546	2016 2016 - - 0.0250 0.1546	2017 0.0167 0.1546	2018 0.1546	2019 - - - - 0.1465	2020 - - 0.1220	363 2021 - - - - 0.0814	2022 0.0651	312 2023 - - - - 0.0407	2024 0.0325	297 2025 - - - - 0.0081	296 2026 - - - - 0.0081	286 2027 - - - 0.0081	285 2028 - - - - 0.0081
TOTAL Sulfur Dioxide Emissions (tpy) TRACK DOZERS - CAT D10 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 2 (Existing) TIER 3 (Existing, New and Replacements) TIER 4F (New and Replacements)	HP 580 613 661	Tier 0 1 2		- 0.0232 0.0250	- 0.0077 0.0250	2013 - - - 0.0250	- - 0.0250	2015 - - 0.0250	2016 - - 0.0250	2017 0.0167	539 2018 - - -	517 2019 - - -	2020	363 2021	327 2022 - - -	312 2023	309 2024 - - -	297	296	2027	285
TOTAL Sulfur Dioxide Emissions (tpy) TRACK DOZERS - CAT D10 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 2 (Existing) TIER 3 (Existing, New and Replacements) TIER 4F (New and Replacements) TRACK DOZERS - CAT D11	HP 580 613 661 646 646	Tier 0 1 2 3 4F		- 0.0232 0.0250 0.1058	- 0.0077 0.0250 0.1302	- 0.0250 0.1546	- - 0.0250 0.1546	- - 0.0250 0.1546	- - 0.0250 0.1546	- - 0.0167 0.1546	- - - 0.1546	517 2019 - - - - 0.1465 -	- - - - 0.1220	- - - 0.0814	2022 	312 2023 0.0407 0.0242	- - - 0.0325 0.0403	297 2025 - - - 0.0081 0.0645	296 2026 - - - - 0.0081 0.0645	286 2027 - - - 0.0081 0.0645	285 2028 - - - - 0.0081
TOTAL Sulfur Dioxide Emissions (tpy) TRACK DOZERS - CAT D10 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 2 (Existing) TIER 3 (Existing), New and Replacements) TIER 4F (New and Replacements) TRACK DOZERS - CAT D11 NOT TIER RATED (Existing)	HP 580 613 661 646 646 850	Tier 0 1 2 3 4F 0 0		- 0.0232 0.0250 0.1058 - 0.0280	- 0.0077 0.0250 0.1302 - 0.0187		- - 0.0250 0.1546	- 0.0250 0.1546	- 0.0250 0.1546	- 2017 - 2017 - 20167 - 20167 - 201546 20167		517 2019 - - - - 0.1465	- - - - 0.1220		2022 0.0651	312 2023 	- - - 0.0325 0.0403	297 2025 	296 2026 	286 2027 	285 2028 - - - - 0.0081
TOTAL Sulfur Dioxide Emissions (tpy) TRACK DOZERS - CAT D10 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 2 (Existing) TIER 3 (Existing, New and Replacements) TIER 4F (New and Replacements) TRACK DOZERS - CAT D11 NOT TIER RATED (Existing) TIER 1 (Existing)	HP 580 613 661 646 646 850 936	Tier 0 1 2 3 4F 0 1 1		- 0.0232 0.0250 0.1058 - 0.0280 0.0103	- 0.0077 0.0250 0.1302 - 0.0187 0.0103	- 0.0250 0.1546 - 0.0103	- 0.0250 0.1546 - 0.0103	- 0.0250 0.1546 - 0.0103	- 0.0250 0.1546 - 0.0103	- 0.0167 0.0103	- - - 0.1546 - 0.0103	- - - - 0.1465 - 0.0103	0.1220	0.0814	0.0651	312 2023 	- - - 0.0325 0.0403	297 2025 	296 2026	286 2027	285 2028
TOTAL Sulfur Dioxide Emissions (tpy) TRACK DOZERS - CAT D10 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 2 (Existing) TIER 3 (Existing), New and Replacements) TIER 4F (New and Replacements) TRACK DOZERS - CAT D11 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 1 (Existing) TIER 4A (New and Replacements)	HP 580 613 661 646 646 936	Tier 0 1 2 3 4F 0 1 4T		- 0.0232 0.0250 0.1058 - 0.0280 0.0103 0.0103	- 0.0077 0.0250 0.1302 - 0.0187 0.0103 0.0204	- 0.0250 0.1546 - 0.0103 0.0408	- - - 0.0250 0.1546 - - 0.0103 0.0408	- - 0.0250 0.1546 - - 0.0103 0.0408	- 0.0250 0.1546 - 0.0103 0.0408	- 0.0167 0.0103 0.0408	- - - 0.1546 - 0.0103 0.0408	- - - - 0.1465 - - 0.0103 0.0408	- - - 0.1220 - - 0.0408	0.0814 0.0408	0.0651 0.0408	312 2023 	- - - 0.0325 0.0403 - - 0.0306	297 2025 	296 2026 0.0081 0.0645 0.0204	286 2027	285 2028
TOTAL Sulfur Dioxide Emissions (tpy) TRACK DOZERS - CAT D10 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 2 (Existing) TIER 3 (Existing, New and Replacements) TIER 4F (New and Replacements) TRACK DOZERS - CAT D11 NOT TIER RATED (Existing) TIER 1 (Existing)	HP 580 613 661 646 646 850 936	Tier 0 1 2 3 4F 0 1 1		- 0.0232 0.0250 0.1058 - 0.0280 0.0103	- 0.0077 0.0250 0.1302 - 0.0187 0.0103	- 0.0250 0.1546 - 0.0103	- 0.0250 0.1546 - 0.0103	- 0.0250 0.1546 - 0.0103	- 0.0250 0.1546 - 0.0103	- 0.0167 0.0103	- - - 0.1546 - 0.0103	- - - - 0.1465 - 0.0103	0.1220	0.0814	0.0651	312 2023 	- - - 0.0325 0.0403	297 2025 	296 2026	286 2027	285 2028
TOTAL Sulfur Dioxide Emissions (tpy) TRACK DOZERS - CAT D10 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 2 (Existing) TIER 3 (Existing) TIER 4F (New and Replacements) TRACK DOZERS - CAT D11 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 1 (Existing) TIER 4F (New and Replacements) TIER 4F (New and Replacements)	HP 580 613 661 646 646 936	Tier 0 1 2 3 4F 0 1 4T		- 0.0232 0.0250 0.1058 - 0.0280 0.0103 0.0103	- 0.0077 0.0250 0.1302 - 0.0187 0.0103 0.0204	- 0.0250 0.1546 - 0.0103 0.0408	- - - 0.0250 0.1546 - - 0.0103 0.0408	- - 0.0250 0.1546 - - 0.0103 0.0408	- 0.0250 0.1546 - 0.0103 0.0408	- 0.0167 0.0103 0.0408	- - - 0.1546 - 0.0103 0.0408	- - - - 0.1465 - - 0.0103 0.0408	- - - 0.1220 - - 0.0408	0.0814 0.0408	0.0651 0.0408	312 2023 	- - - 0.0325 0.0403 - - 0.0306	297 2025 	296 2026 0.0081 0.0645 0.0204	286 2027	285 2028
TOTAL Sulfur Dioxide Emissions (tpy) TRACK DOZERS - CAT D10 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 2 (Existing) TIER 3 (Existing, New and Replacements) TIER 4F (New and Replacements) TRACK DOZERS - CAT D11 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 1 (Existing) TIER 4F (New and Replacements) TIER 4F (New and Replacements) TIER 4F (New and Replacements) GRADERS - CAT 16	HP 580 613 661 646 646 850 936 936	Tier 0 1 2 3 4F 0 1 4T		- 0.0232 0.0250 0.1058 - 0.0280 0.0103 0.0102	- 0.0077 0.0250 0.1302 - 0.0187 0.0103 0.0204	- 0.0250 0.1546 - 0.0103 0.0408	- - 0.0250 0.1546 - - 0.0103 0.0408	- 0.0250 0.1546 - 0.0103 0.0408	- - 0.0250 0.1546 - 0.0103 0.0408	- - 0.0167 0.1546 - - 0.0103 0.0408 -	- - 0.1546 - 0.0103 0.0408	- - - 0.1465 - - 0.0103 0.0408	- - - 0.1220 - - 0.0408		0.0651 - 0.0408	312 2023 	- - 0.0325 0.0403 - 0.0306 0.0102	297 2025 	296 2026	286 2027	285 2028
TOTAL Sulfur Dioxide Emissions (tpy) TRACK DOZERS - CAT D10 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 2 (Existing) TIER 3 (Existing, New and Replacements) TIER 4F (New and Replacements) TRACK DOZERS - CAT D11 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 4 (New and Replacements) TIER 4F (New and Replacements) GRADERS - CAT 16 TIER 1 (Existing)	HP 580 613 661 646 646 850 936 936 936	Tier 0 1 2 3 4F 0 1 4T 4F		- 0.0232 0.0250 0.1058 - 0.0280 0.0103 0.0102 - 0.0091	- 0.0077 0.0250 0.1302 - 0.0187 0.0103 0.0204 - 0.0045		- 0.0250 0.1546 - 0.0103 0.0408	- 0.0250 0.1546 - 0.0103 0.0408 	- 0.0250 0.1546 - 0.0103 0.0408	- 0.0167 0.0167 0.0103 0.0408	0.1546 - 0.0103 0.0408	- - - 0.1465 - 0.0103 0.0408 -	0.1220 0.0408	0.0814 0.0408	0.0651 - 0.0408	312 2023 	0.0325 0.0403 - 0.0306 0.0102	297 2025	296 2026	286 2027	285 2028
TOTAL Sulfur Dioxide Emissions (tpy) TRACK DOZERS - CAT D10 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 2 (Existing) TIER 3 (Existing, New and Replacements) TIER 4F (New and Replacements) TRACK DOZERS - CAT D11 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 4A (New and Replacements) TIER 4F (New and Replacements) TIER 1 (Existing) TIER 1 (Existing) TIER 1 (Existing) TIER 2 (Existing)	HP 580 613 661 646 646 936 936 936 936	Tier 0 1 2 3 4F 0 1 4T 4F		- 0.0232 0.0250 0.1058 - 0.0280 0.0103 0.0102 - 0.0091 0.0141	- 0.0077 0.0250 0.1302 - 0.0103 0.0103 0.0204 - 0.0045 0.0141	- 0.0250 0.1546 - 0.0103 0.0408 - 0.0141	- - 0.0250 0.1546 - - 0.0103 0.0408 - - - 0.0094	- - 0.0250 0.1546 - - 0.0103 0.0408 - - 0.0094	- 0.0250 0.1546 - 0.0103 0.0408 	- 0.0167 0.01646 - 0.0103 0.0408 	- - - 0.1546 - 0.0103 0.0408 -	- - - 0.1465 - - 0.0103 0.0408	- 0.1220 - 0.1220 - 0.0408 	- - - - 0.0814 - - 0.0408 -	327 2022 	312 2023 	0.0325 0.0403 - 0.0306 0.0102	297 2025	296 2026	286 2027	285 2028
TOTAL Sulfur Dioxide Emissions (tpy) TRACK DOZERS - CAT D10 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 2 (Existing) TIER 3 (Existing, New and Replacements) TIER 4F (New and Replacements) TRACK DOZERS - CAT D11 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 1 (Existing) TIER 4A (New and Replacements) TIER 4F (New and Replacements) TIER 4F (New and Replacements) TIER 1 (Existing) TIER 2 (Existing) TIER 1 (Existing) TIER 2 (Existing) TIER 3 (Existing)	HP 580 613 661 646 646 850 936 936 936 936	Tier 0 1 2 3 4F 0 1 4T 4F		- 0.0232 0.0250 0.1058 - 0.0280 0.0103 0.0103 0.0102 - 0.0091 0.0091 0.0141 0.0234	- 0.0077 0.0250 0.1302 - 0.0187 0.0103 0.0204 - 0.0045 0.0141 0.0234	- 0.0250 0.1546 - 0.0103 0.0408 - 0.0141 0.0234		- 0.0103 0.0408 - 0.0094 0.0234		- 0.0167 - 0.0167 - 0.1546 - 0.0103 - 0.0408 - 0.0047	- - - 0.1546 - - 0.0103 0.0408 - -	- - - 0.1465 - - 0.0103 0.0408 - -		0.0814 0.0408 	327 2022 	312 2023 	- 0.0325 0.0403 - 0.0306 0.0102	297 2025	296 2026	286 2027	285 2028
TOTAL Sulfur Dioxide Emissions (tpy) TRACK DOZERS - CAT D10 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 2 (Existing) TIER 3 (Existing) TIER 4F (New and Replacements) TRACK DOZERS - CAT D11 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 4A (New and Replacements) TIER 4F (New and Replacements) TIER 4F (New and Replacements) TIER 1 (Existing) TIER 4F (New and Replacements) GRADERS - CAT 16 TIER 1 (Existing) TIER 2 (Existing) TIER 2 (Existing) TIER 3 (Existing) TIER 4A (New and Replacements)	HP 580 613 661 646 646 850 936 936 936 936 937	Tier 0 1 2 3 4F 0 1 4T 4F 1 2 3 4F		- 0.0232 0.0250 0.1058 - 0.0280 0.0103 0.0102 - 0.0091 0.0091 0.0141 0.0234 0.0046	- 0.0077 0.0250 0.1302 - 0.0187 0.0103 0.0204 - 0.0045 0.0141 0.0234 0.0139	- 0.0250 0.1546 - 0.0103 0.0408 - 0.0141 0.0234 0.0185		- 0.0103 0.0408 - 0.0094 0.0232	- 0.0250 0.1546 - 0.0103 0.0408 - 0.0234 0.0234	0.0047 - 0.0047 - 0.0047 - 0.0047	0.0103 0.0408 				327 2022 	312 2023 	- - 0.0325 0.0403 - - 0.0306 0.0102	297 2025	296	286 2027	285 2028
TOTAL Sulfur Dioxide Emissions (tpy) TRACK DOZERS - CAT D10 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 2 (Existing), New and Replacements) TIER 4F (New and Replacements) TRACK DOZERS - CAT D11 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 4A (New and Replacements) TIER 4F (New and Replacements) TIER 4F (New and Replacements) TIER 4F (New and Replacements) GRADERS - CAT 16 TIER 1 (Existing) TIER 2 (Existing) TIER 2 (Existing) TIER 3 (Existing) TIER 4A (New and Replacements) TIER 4A (New and Replacements)	HP 580 613 661 646 646 850 936 936 936 936	Tier 0 1 2 3 4F 0 1 4T 4F		- 0.0232 0.0250 0.1058 - 0.0280 0.0103 0.0103 0.0102 - 0.0091 0.0091 0.0141 0.0234	- 0.0077 0.0250 0.1302 - 0.0187 0.0103 0.0204 - 0.0045 0.0141 0.0234	- 0.0250 0.1546 - 0.0103 0.0408 - 0.0141 0.0234		- 0.0103 0.0408 - 0.0094 0.0234		- 0.0167 - 0.0167 - 0.1546 - 0.0103 - 0.0408 - 0.0047	- - - 0.1546 - - 0.0103 0.0408 - -	- - - 0.1465 - - 0.0103 0.0408 - -		0.0814 0.0408 	327 2022 	312 2023 	- 0.0325 0.0403 - 0.0306 0.0102	297 2025	296 2026	286 2027	285 2028
TOTAL Sulfur Dioxide Emissions (tpy) TRACK DOZERS - CAT D10 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 2 (Existing) TIER 3 (Existing), New and Replacements) TIER 4F (New and Replacements) TRACK DOZERS - CAT D11 NOT TIER RATED (Existing) TIER 4A (New and Replacements) TIER 4F (Sisting) TIER 1 (Existing) TIER 2 (Existing) TIER 2 (Existing) TIER 3 (Existing) TIER 4A (New and Replacements) TIER 4F (New and Replacements) TIER 4F (New and Replacements) GRADERS - CAT 24	HP 580 613 661 646 646 850 936 936 936 936 289 299 297 297	Tier 0 1 2 3 4F 0 1 4T 4F 1 2 3 4F		- 0.0232 0.0250 0.1058 - 0.0280 0.0103 0.0102 - 0.0091 0.0141 0.0234 0.0046 - 0.0046	- 0.0077 0.0250 0.1302 - 0.0187 0.0103 0.0204 - 0.0045 0.0141 0.0234 0.0139	- 0.0103 0.0408 - 0.0141 0.0234 0.0185	- 0.0103 0.0408 - 0.0094 0.0232	- 0.0103 0.0408 - 0.0094 0.0232 0.0046	- 0.0103 0.0408 - 0.0234 0.0232 0.0139	- 0.0103 0.0408 - 0.0047 0.0232 0.0324	0.1546 - 0.0103 0.0408 - 0.0232 0.0370	0.1465 - 0.0103 0.0408 0.0232 0.0370			0.0408 - 0.0509	312 2023 	0.0325 0.0403 0.0306 0.0102	297 2025	296 2026	286 2027	285 2028
TOTAL Sulfur Dioxide Emissions (tpy) TRACK DOZERS - CAT D10 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 2 (Existing) TIER 3 (Existing), New and Replacements) TIER 4F (New and Replacements) TRACK DOZERS - CAT D11 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 4A (New and Replacements) TIER 4F (New and Replacements) TIER 4F (New and Replacements) TIER 4F (New and Replacements) TIER 1 (Existing) TIER 2 (Existing) TIER 3 (Existing) TIER 3 (Existing) TIER 4 (New and Replacements) TIER 4F (New and Replacements) GRADERS - CAT 24 NOT TIER RATED (Existing)	HP 580 613 661 646 646 850 936 936 936 936 289 299 297 297 297	Tier 0 1 2 3 4F 0 1 4T 4F 1 2 3 4F		0.0232 0.0250 0.1058 	- 0.0077 0.0250 0.1302 - 0.0103 0.0204 - 0.0045 0.0141 0.0234 0.0139 - 0.0153	- 0.0250 0.1546 - 0.0103 0.0408 - 0.0141 0.0234 0.0185 - 0.0153		- 0.0250 0.0250 0.1546 - 0.0103 0.0408 - 0.0094 0.0234 0.0232 0.0046	- 0.0250 0.0250 0.1546 - 0.0103 0.0408 - 0.0234 0.0232 0.0139	- 0.0167 0.0167 0.0168 - 0.0103 0.0408 - 0.0047 0.0232 0.0324	- 0.1546 - 0.0103 0.0408 - 0.0232 0.0370	- 0.1465 - 0.0103 0.0408 - 0.0232 0.0370	- 0.1220 - 0.1220 - 0.0408 - 0.0185 0.0370	0.0408 - 0.0093 0.0463	0.0408 - 0.0509 - 0	312 2023	0.0325 0.0403 0.0306 0.0102	297 2025	296 2026	286 2027	285 2028
TOTAL Sulfur Dioxide Emissions (tpy) TRACK DOZERS - CAT D10 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 2 (Existing) TIER 3 (Existing, New and Replacements) TRACK DOZERS - CAT D11 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 1 (Existing) TIER 44 (New and Replacements) TIER 45 (New and Replacements) TIER 15 (Existing) TIER 16 (New and Replacements) TIER 16 (New and Replacements) TIER 1 (Existing) TIER 2 (Existing) TIER 3 (Existing) TIER 44 (New and Replacements) TIER 45 (New and Replacements) TIER 46 (New and Replacements) TIER 47 (New and Replacements) TIER 48 (New and Replacements) TIER 49 (New and Replacements) TIER 49 (New and Replacements) TIER 49 (New and Replacements)	HP 580 613 661 646 646 850 936 936 936 937 289 297 297 297 540 533	Tier 0 1 2 3 4F 0 1 4T 4F 1 2 3 4T 4F 0 0 2		- 0.0232 0.0250 0.1058 - 0.0280 0.0103 0.0102 - 0.0091 0.0141 0.0234 0.0046 - 0.0153 0.0076	- 0.0077 0.0250 0.1302 - 0.0187 0.0187 0.0103 0.0204 - 0.0045 0.0141 0.0234 0.0139 - 0.0153 0.0076	- 0.0250 0.1546 - 0.0103 0.0408 - 0.0141 0.0234 0.0185 - 0.0153 0.0076			588 2016 0.0250 0.1546 0.0103 0.0408 0.0234 0.0232 0.0139 - 0.0076		- 0.0103 0.0408 - 0.0232 0.0370 - 0.0076			- 0.0814 - 0.0814 - 0.0408 - 0.0408 - 0.0093 0.0463	327 2022 	312 2023 	- 0.0325 0.0403 - 0.0306 0.0102	297 2025	296 2026	286 2027	285 2028
TOTAL Sulfur Dioxide Emissions (tpy) TRACK DOZERS - CAT D10 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 2 (Existing) TIER 3 (Existing), New and Replacements) TIER 4F (New and Replacements) TRACK DOZERS - CAT D11 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 4A (New and Replacements) TIER 4F (New and Replacements) TIER 4F (New and Replacements) TIER 4F (New and Replacements) TIER 1 (Existing) TIER 2 (Existing) TIER 3 (Existing) TIER 3 (Existing) TIER 4 (New and Replacements) TIER 4F (New and Replacements) GRADERS - CAT 24 NOT TIER RATED (Existing)	HP 580 613 661 646 646 850 936 936 936 936 289 299 297 297 297	Tier 0 1 2 3 4F 0 1 4T 4F 1 2 3 4F		0.0232 0.0250 0.1058 	- 0.0077 0.0250 0.1302 - 0.0103 0.0204 - 0.0045 0.0141 0.0234 0.0139 - 0.0153	- 0.0250 0.1546 - 0.0103 0.0408 - 0.0141 0.0234 0.0185 - 0.0153		- 0.0250 0.0250 0.1546 - 0.0103 0.0408 - 0.0094 0.0234 0.0232 0.0046	- 0.0250 0.0250 0.1546 - 0.0103 0.0408 - 0.0234 0.0232 0.0139	- 0.0167 0.0167 0.0168 - 0.0103 0.0408 - 0.0047 0.0232 0.0324	- 0.1546 - 0.0103 0.0408 - 0.0232 0.0370	- 0.1465 - 0.0103 0.0408 - 0.0232 0.0370	- 0.1220 - 0.1220 - 0.0408 - 0.0185 0.0370	0.0408 - 0.0093 0.0463	0.0408 - 0.0509 - 0.0509	312 2023	0.0325 0.0403 0.0306 0.0102	297 2025	296 2026	286 2027	285 2028
TOTAL Sulfur Dioxide Emissions (tpy) TRACK DOZERS - CAT D10 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 2 (Existing) TIER 3 (Existing, New and Replacements) TIER 4F (New and Replacements) TRACK DOZERS - CAT D11 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 4A (New and Replacements) TIER 4F (New and Replacements) GRADERS - CAT 16 TIER 1 (Existing) TIER 2 (Existing) TIER 2 (Existing) TIER 3 (Existing) TIER 3 (Existing) TIER 4A (New and Replacements) TIER 4F (New and Replacements) GRADERS - CAT 24 NOT TIER RATED (Existing) TIER 2 (Existing) TIER 2 (Existing) TIER 2 (Existing) TIER 4F (New and Replacements) GRADERS - CAT 24 NOT TIER RATED (Existing) TIER 2 (Existing) TIER 4F (Replacements)	HP 580 613 661 646 646 850 936 936 936 937 289 297 297 297 540 533	Tier 0 1 2 3 4F 0 1 4T 4F 1 2 3 4T 4F 0 0 2		- 0.0232 0.0250 0.1058 - 0.0280 0.0103 0.0102 - 0.0091 0.0141 0.0234 0.0046 - 0.0153 0.0076	- 0.0077 0.0250 0.1302 - 0.0187 0.0187 0.0103 0.0204 - 0.0045 0.0141 0.0234 0.0139 - 0.0153 0.0076	- 0.0250 0.1546 - 0.0103 0.0408 - 0.0141 0.0234 0.0185 - 0.0153 0.0076			588 2016 0.0250 0.1546 0.0103 0.0408 0.0234 0.0232 0.0139 - 0.0076		- 0.0103 0.0408 - 0.0232 0.0370 - 0.0076			- 0.0814 - 0.0814 - 0.0408 - 0.0408 - 0.0093 0.0463	327 2022 	312 2023 	- 0.0325 0.0403 - 0.0306 0.0102	297 2025	296 2026	286 2027	285 2028
TOTAL Sulfur Dioxide Emissions (tpy) TRACK DOZERS - CAT D10 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 2 (Existing) TIER 3 (Existing), New and Replacements) TIER 4F (New and Replacements) TRACK DOZERS - CAT D11 NOT TIER RATED (Existing) TIER 4 (New and Replacements) TIER 4F (Existing) TIER 1 (Existing) TIER 2 (Existing) TIER 3 (Existing) TIER 4A (New and Replacements) TIER 4F (Replacements) TIER 4F (Replacements) TIER 4F (Replacements)	HP 580 613 661 646 646 850 936 936 936 936 289 299 297 297 297 540 533 533	Tier 0 1 2 3 4F 0 1 4T 4F 1 2 3 4T 4F 0 2 4F		0.0230 0.0230 0.0250 0.1058 0.0103 0.0102 0.0141 0.0234 0.0046 0.0153 0.0076	- 0.0077 0.0250 0.1302 - 0.0187 0.0187 0.0103 0.0204 - 0.0045 0.0141 0.0234 0.0139 - 0.0153 0.0076	- 0.0250 0.1546 - 0.0103 0.0408 - 0.0141 0.0234 0.0185 - 0.0153 0.0076			588 2016 0.0250 0.1546 0.0103 0.0408 0.0234 0.0232 0.0139 - 0.0076		0.0103 0.0408 0.0232 0.0370 - 0.0076 0.0150			- 0.0814 - 0.0814 - 0.0408 - 0.0408 - 0.0093 0.0463	327 2022 	312 2023 	- 0.0325 0.0403 - 0.0306 0.0102	297 2025	296 2026	286 2027	285 2028
TOTAL Sulfur Dioxide Emissions (tpy) TRACK DOZERS - CAT D10 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 2 (Existing) TIER 3 (Existing, New and Replacements) TIER 4F (New and Replacements) TRACK DOZERS - CAT D11 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 4 (New and Replacements) TIER 4F (New and Replacements) TIER 4F (New and Replacements) GRADERS - CAT 16 TIER 1 (Existing) TIER 2 (Existing) TIER 3 (Existing) TIER 4 (New and Replacements) TIER 4 (New and Replacements) TIER 4 (New and Replacements) TIER 4F (New and Replacements) TIER 4F (Replacements) TIER 4F (Replacements) TIER 2 (Existing) TIER 2 (Existing) TIER 4F (Replacements)	HP 580 613 661 646 646 850 936 936 936 937 289 299 297 297 297 540 533 533	Tier 0 1 2 3 4F 0 1 4T 4F 1 2 3 4T 4F 0 2 4F		0.0232 0.0250 0.1058 - 0.0280 0.0103 0.0102 - 0.0091 0.0141 0.0234 0.0046 - 0.0153 0.0076 - 0.0138	0.0045 0.0141 0.0234 0.0139 0.0153 0.0076	- 0.0250 0.1546 - 0.0103 0.0408 - 0.0141 0.0234 0.0185 - 0.0153 0.0076	- 0.0250 0.1546 - 0.0103 0.0408 - 0.0094 0.0234 0.0232 - 0.0153 0.0076 	- 0.0250 0.0250 0.1546 - 0.0103 0.0408 - 0.0094 0.0234 0.0232 0.0046 0.0153 0.0076 - 0.0076	- 0.0250 0.1546 - 0.0103 0.0408 - 0.0234 0.0232 0.0139 - 0.0076 0.0150	- 0.0167 0.0167 0.1546 - 0.0103 0.0408 - 0.0047 0.0232 0.0324 - 0.0076 0.0150	539 2018	- 0.1465 - 0.0103 0.0408 - 0.0232 0.0370 - 0.0076 0.0150	- 0.0408 - 0.0185 0.0370 - 0.0076 0.0150	0.0408 - 0.0093 0.0463 - 0.0224	327 2022	312 2023	- 0.0325 0.0403 0.0306 0.0102	297 2025	296 2026	286 2027	285 2028
TOTAL Sulfur Dioxide Emissions (tpy) TRACK DOZERS - CAT D10 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 2 (Existing) TIER 3 (Existing) TIER 4F (New and Replacements) TIER 4F (New and Replacements) TIER 1 (Existing) TIER 1 (Existing) TIER 1 (Existing) TIER 4F (New and Replacements) TIER 1 (Existing) TIER 2 (Existing) TIER 3 (Existing) TIER 4F (New and Replacements) TIER 4F (New and Replacements) TIER 4F (New and Replacements) TIER 4F (Replacements) TIER 4F (Replacements) TIER 2 (Existing) TIER 2 (Existing) TIER 4F (Replacements) RTDS - CAT 834 834B - NOT TIER RATED (Existing) 834G - NOT TIER RATED (Existing)	HP 580 613 661 646 646 850 936 936 936 936 289 299 297 297 297 540 533 533	Tier 0 1 2 3 4F 0 1 4T 4F 1 2 3 4T 4F 0 2 4F 0 0 0 0		- 0.0232 0.0250 0.1058 - 0.0103 0.0103 0.0102 - 0.0141 0.0234 0.0046 - 0.0153 0.0076 - 0.0138	- 0.0077 0.0250 0.1302 - 0.0187 0.0103 0.0204 - 0.0045 0.0141 0.0234 0.0139 - 0.0153 0.0076 - 0.0076	- 0.0250 0.1546 - 0.0103 0.0408 - 0.0141 0.0234 0.0185 - 0.0153 0.0076		- 0.0153 0.0153 0.0153 0.0153 0.0076 	588 2016		- 0.0153 0.0408 - 0.0232 0.0370 - 0.0076 0.0150				327 2022	312 2023	309 2024	297 2025	296 2026	286 2027	285 2028
TOTAL Sulfur Dioxide Emissions (tpy) TRACK DOZERS - CAT D10 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 2 (Existing) TIER 2 (Existing) TIER 3 (Existing, New and Replacements) TIER 4F (New and Replacements) TRACK DOZERS - CAT D11 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 4 (New and Replacements) TIER 4F (New and Replacements) GRADERS - CAT 16 TIER 1 (Existing) TIER 2 (Existing) TIER 2 (Existing) TIER 3 (Existing) TIER 4A (New and Replacements) TIER 4F (New and Replacements) TIER 4F (New and Replacements) TIER 4F (Replacements) GRADERS - CAT 24 NOT TIER RATED (Existing) TIER 2 (Existing) TIER 4F (Replacements) RTDS - CAT 834 834B - NOT TIER RATED (Existing) TIER 3 (Existing) TIER 3 (Existing) TIER 3 (Existing) TIER 4SIGNATION TIER RATED (Existing) TIER 3 (Existing)	HP 580 613 661 646 646 850 936 936 936 936 937 297 297 297 297 540 533 533 533	Tier 0 1 2 3 4F 0 1 4T 4F 1 2 3 4T 4F 0 0 2 4F		- 0.0232 0.0232 0.0250 0.1058 0.0103 0.0102 - 0.0091 0.0141 0.0234 0.0046 - 0.0153 0.0076 - 0.0153	0.0045 0.0139 0.0153 0.0153 0.0153 0.0224	- 0.0234 0.0153 0.0153 0.0153 0.0076 - 0.00223		- 0.0094 0.0232 0.0153 0.0153 0.0076 - 0.0023	588 2016	0.0047 0.0150 0.0150 0.0150	539 2018	- 0.1465 - 0.0103 0.0408 - 0.0232 0.0370 - 0.0076 0.0150			327 2022	312 2023	- 0.0325 0.0403 0.0306 0.0102	297 2025	296 2026	286 2027	285 2028
TOTAL Sulfur Dioxide Emissions (tpy) TRACK DOZERS - CAT D10 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 2 (Existing) TIER 3 (Existing) TIER 4F (New and Replacements) TRACK DOZERS - CAT D11 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 4 (New and Replacements) TIER 4F (New and Replacements) TIER 1 (Existing) TIER 2 (Existing) TIER 2 (Existing) TIER 3 (Existing) TIER 4A (New and Replacements) TIER 4F (New and Replacements) TIER 4F (New and Replacements) TIER 4F (Replacements) TIER 4F (Replacements) TIER 2 (Existing) TIER 2 (Existing) TIER 2 (Existing) TIER 2 (Existing) TIER 4F (Replacements) RTDS - CAT 834 834B - NOT TIER RATED (Existing) 834G - NOT TIER RATED (Existing)	HP 580 613 661 646 646 850 936 936 936 936 289 299 297 297 297 540 533 533	Tier 0 1 2 3 4F 0 1 4T 4F 1 2 3 4T 4F 0 2 4F 0 0 0 0		- 0.0232 0.0250 0.1058 - 0.0103 0.0103 0.0102 - 0.0141 0.0234 0.0046 - 0.0153 0.0076 - 0.0138	- 0.0077 0.0250 0.1302 - 0.0187 0.0103 0.0204 - 0.0045 0.0141 0.0234 0.0139 - 0.0153 0.0076 - 0.0076	- 0.0250 0.1546 - 0.0103 0.0408 - 0.0141 0.0234 0.0185 - 0.0153 0.0076		- 0.0153 0.0153 0.0153 0.0153 0.0076 	588 2016		- 0.0153 0.0408 - 0.0232 0.0370 - 0.0076 0.0150			- 0.0408 - 0.00224	327 2022	312 2023	- 0.0325 0.0403 0.0325 0.0403 - 0.0306 0.0102	297 2025	296 2026	286 2027	285 2028
TOTAL Sulfur Dioxide Emissions (tpy) TRACK DOZERS - CAT D10 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 2 (Existing) TIER 2 (Existing) NOT TIER RATED (Existing) TIER 4F (New and Replacements) TRACK DOZERS - CAT D11 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 4 (New and Replacements) TIER 4F (New and Replacements) GRADERS - CAT 16 TIER 1 (Existing) TIER 2 (Existing) TIER 2 (Existing) TIER 3 (Existing) TIER 4A (New and Replacements) TIER 4F (Replacements) GRADERS - CAT 24 NOT TIER RATED (Existing) TIER 4F (Replacements) RTDS - CAT 834 834B - NOT TIER RATED (Existing) TIER 3 (Existing) TIER 3 (Existing) TIER 3 (Existing) TIER 4 (Replacements)	HP 580 613 661 646 646 850 936 936 936 936 937 297 297 297 297 297 487 487 525	Tier 0 1 2 3 4F 0 1 4T 4F 1 2 3 4T 4F 0 0 2 4F		- 0.0232 0.0232 0.0250 0.1058 0.0103 0.0102 - 0.0091 0.0141 0.0234 0.0046 - 0.0153 0.0076 - 0.0153	0.0045 0.0139 0.0153 0.0153 0.0153 0.0224	- 0.0234 0.0153 0.0153 0.0153 0.0076 - 0.00223		- 0.0094 0.0232 0.0153 0.0153 0.0076 - 0.0023	588 2016	0.0047 0.0150 0.0150 0.0150	539 2018	517 2019			327 2022	312 2023	0.0325 0.0403 - 0.0306 0.0102	297 2025	296 2026	286 2027	285 2028
TOTAL Sulfur Dioxide Emissions (tpy) TRACK DOZERS - CAT D10 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 2 (Existing) TIER 3 (Existing, New and Replacements) TRACK DOZERS - CAT D11 NOT TIER RATED (Existing) TIER 4F (New and Replacements) TIER 1 (Existing) TIER 4A (New and Replacements) TIER 4F (New and Replacements) GRADERS - CAT 16 TIER 1 (Existing) TIER 2 (Existing) TIER 2 (Existing) TIER 2 (Existing) TIER 2 (Existing) TIER 3 (Existing) TIER 4A (New and Replacements) GRADERS - CAT 24 NOT TIER RATED (Existing) TIER 2 (Existing) TIER 4F (Replacements) RTDS - CAT 834 834B - NOT TIER RATED (Existing) TIER 3 (Existing) TIER 4F (Replacements) RTDS - CAT 834 834G - NOT TIER RATED (Existing) TIER 3 (Existing) TIER 4A (New and Replacements)	HP 580 613 661 646 646 850 936 936 936 936 289 299 297 297 297 297 487 487 525 525	Tier 0 1 2 3 4F 0 1 4T 4F 0 2 3 4T 4F 0 0 2 4F		0.0232 0.0232 0.0250 0.1058 0.0103 0.0102 0.0102 0.01041 0.0234 0.0046 0.0153 0.0076 0.0153 0.0076 0.0091	- 0.0045 0.0141 0.0234 0.0139 0.0153 0.0076 - 0.00223 0.0223 0.0223	- 0.0250 0.1546 - 0.0103 0.0408 - 0.0141 0.0234 0.0185 - 0.0153 0.0076 - 0.0223 0.0223 0.0295		- 0.0094 0.0232 0.0153 0.0153 0.0076 - 0.0023	588 2016 0.0250 0.1546 - 0.0103 0.0408 0.0234 0.0232 0.0139 - 0.0076 0.0150 - 0.0223 0.0223 0.0295	0.0047 0.0150 0.0150 0.0150	- 0.1546 - 0.0149 - 0.0295				327 2022	312 2023	0.0306 0.0102 0.0509 0.00224	297 2025	296 2026	286 2027	285 2028
TOTAL Sulfur Dioxide Emissions (tpy) TRACK DOZERS - CAT D10 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 2 (Existing) TIER 3 (Existing) TIER 4F (New and Replacements) TRACK DOZERS - CAT D11 NOT TIER RATED (Existing) TIER 4F (New and Replacements) TIER 4F (New and Replacements) TIER 4F (New and Replacements) TIER 1 (Existing) TIER 4A (New and Replacements) TIER 4F (New and Replacements) GRADERS - CAT 16 TIER 1 (Existing) TIER 2 (Existing) TIER 3 (Existing) TIER 4 (New and Replacements) TIER 4F (New and Replacements) GRADERS - CAT 24 NOT TIER RATED (Existing) TIER 2 (Existing) TIER 4F (Replacements) RTDS - CAT 834 834B - NOT TIER RATED (Existing) TIER 3 (Existing) TIER 3 (Existing) TIER 4A (New and Replacements) TIER 4A (New and Replacements)	HP 580 613 661 646 646 850 936 936 936 936 289 299 297 297 297 297 487 487 525 525	Tier 0 1 2 3 4F 0 1 4T 4F 0 2 3 4T 4F 0 0 2 4F		0.0232 0.0232 0.0250 0.1058 0.0103 0.0102 0.0102 0.01041 0.0234 0.0046 0.0153 0.0076 0.0153 0.0076 0.0091	- 0.0045 0.0141 0.0234 0.0139 0.0153 0.0076 - 0.00223 0.0223 0.0223	- 0.0250 0.1546 - 0.0103 0.0408 - 0.0141 0.0234 0.0185 - 0.0153 0.0076 - 0.0223 0.0223 0.0295		- 0.0094 0.0232 0.0153 0.0153 0.0076 - 0.0023	588 2016 0.0250 0.1546 - 0.0103 0.0408 0.0234 0.0232 0.0139 - 0.0076 0.0150 - 0.0223 0.0223 0.0295	0.0047 0.0150 0.0150 0.0150	- 0.1546 - 0.0149 - 0.0295				327 2022	312 2023	0.0306 0.0102 0.0509 0.00224	297 2025	296 2026	286 2027	285 2028

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TABLE B1-37 2011–2029 Mobile Support Equipment Emissions—260 Mtpy KUC—Bingham Canyon Mine

FEL - KOMATSU																				
WA500 - TIER 1 (Existing)	235	1	0.0023	0.0023	0.0023	0.0023	0.0023	0.0023	0.0023	0.0023	0.0023	-	-	-	-	-	-	-	-	•
WA600 - TIER 3 (Existing)	396	3	0.0076	0.0076	0.0076	0.0076	0.0076	0.0076	0.0076	0.0076	0.0076	0.0076	0.0038	-	-	-	-	-	-	-
WA600 - TIER 4F (Replacements)	502	4F	-	-	-	-	-	-	-	-	-	-	0.0048	0.0096	0.0096	0.0096	0.0096	0.0096	0.0096	0.0096
WA700 - TIER 1 (Existing)	396	1	0.0038	0.0038	0.0038	0.0038	0.0038	0.0038	0.0038	0.0038	0.0038	0.0038	0.0038	-	-	-	-	-	-	-
FEL - CAT 992																				
TIER 2 (Existing)	800	2	0.0154	0.0154	0.0154	0.0154	0.0154	0.0154	0.0077	_	_	_	_	_	_	_	_	_	_	
TIER 4A (New and Replacements)	801	4T	- 0.0104	-	0.0076	0.0076	0.0076	0.0076	0.0076	0.0076	0.0076	0.0076	0.0076	0.0076	0.0076	0.0076	0.0076	0.0076	0.0076	0.0076
		<u> </u>																		
TIER 4F (Replacements)	801	4F	-	-	- 1	-	-	-	0.0076	0.0153	0.0153	0.0153	0.0153	0.0153	0.0153	0.0153	0.0153	0.0153	0.0153	0.0153
PRODUCTION FEL - KOM WA1200																				
TIER 1 (Existing)	1,782	1	0.0232	0.0232	0.0232	0.0232	0.0232	-	-	-	-	-	-	-	-	-	-	-	-	-
TIER 4F (Replacements)	1,782	4F	-	-	-	-	-	0.0230	0.0230	0.0230	0.0230	0.0230	0.0230	0.0230	0.0230	0.0230	0.0230	0.0230	0.0230	0.0230
									•			•		•						
TRACKHOES - CAT 330																				
TIER 2 (Existing)	264	2	0.0018	0.0018	0.0018	0.0018	0.0018	-	-	-	-	-	_	-	-	-	_	_	_	_
TIER 4F (Replacements)	268	4F	- 0.0010	-	-	-	-	0.0018	0.0018	0.0018	0.0018	0.0018	0.0018	0.0018	0.0018	0.0018	0.0018	0.0018	0.0018	0.0018
TRACKHOES - CAT 385	200	41	-	_	-	_	_	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010
-	=00																			
TIER 3 (Existing)	523	3	0.0072	0.0072	0.0072	0.0036	0.0036	0.0036	-	-	-	-	-	-	-	-	-	-	-	-
TIER 4A (Replacements)	523	4T	-	-	-	0.0072	0.0072	0.0072	0.0072	0.0072	0.0072	0.0072	0.0072	0.0072	-	-	-	-	-	
TIER 4F (Replacements)	523	4F	-	-	-	-	-	-	0.0036	0.0036	0.0036	0.0036	0.0036	0.0036	0.0072	0.0072	0.0072	0.0072	0.0072	0.007
TRACKHOES - KOMATSU																				
PC800 - TIER 1 (Existing)	323	1	0.0045	0.0045	0.0045	0.0045	0.0022	0.0022	0.0022	0.0022	0.0022	-	-	-	-	-	-	-	-	-
PC800 - TIER 4F (Replacements)	323	4F	-	-	-	-	0.0022	0.0022	0.0022	0.0022	0.0022	0.0022	0.0022	0.0022	0.0022	0.0022	0.0022	0.0022	-	-
PC400 - TIER 1 (Existing)	246	1	0.0017	0.0017	0.0017	0.0017	0.0017	0.0017	-	-	-	-	-	-	-	-	-	-	-	-
. 5 700 TIER I (Existing)	2-10	ı '	0.0017	5.0017	5.0017	0.0017	5.0017	0.0017	-	_	-	_	_	_		-	-	-	- 1	
WATER TRUCKS																				
WATER TRUCKS	4.000				1				1						1					
CAT 789 (Existing)	1,900	0	0.0149						-											-
CAT 793C - TIER 1 (Existing)	2,300	1	0.0362	0.0362	0.0362	0.0362	0.0362	0.0362	0.0362	0.0362	0.0362	0.0362	0.0362	0.0362	0.0362	0.0362	0.0362	0.0362	0.0362	0.0362
CAT 793D - TIER 2 (New and Replaceme	2,415	2	0.0380	0.0760	0.0760	0.0760	0.0760	0.0760	0.0760	0.0760	0.0760	0.0760	0.0760	0.0760	0.0760	0.0760	0.0760	0.0760	0.0760	0.0760
HYDRAULIC SHOVELS																				
O&K RH 200, (NOT CERT)	2,100	0	_	_	-	_	_	_	-	-	-	-	_	-	_	_	_	_	_	_
O&K RH 200, (TIER 1)	2,520	1	0.1158	0.1146	0.1134	0.1129	0.1123	0.1117	0.1111	0.1106	0.1100	0.0579	0.0579	0.0567	0.0567	0.0561	0.0561	0.0556	0.0556	0.0550
Odk Kii 200, (IILK I)	2,320	')	0.1130	0.1140	0.1134	0.1129	0.1123	0.1117	0.1111	0.1100	0.1100	0.0379	0.0373	0.0307	0.0307	0.0301	0.0301	0.0550	0.0550	0.0550
CONSTRUCTION TRUCKS																				
CONSTRUCTION TRUCKS			0.04=0		0.04=0		0.0470			0.04=0		0.04=0	0.04=0							
KOM 785-7 TIER 1 (Existing)	1,200	1	0.0476	0.0476	0.0476	0.0476	0.0476	0.0476	0.0476	0.0476	0.0476	0.0476	0.0476	0.0476	0.0476	0.0476	0.0476	0.0476	0.0476	0.0476
DIESEL DRILLS - P&H																				
TIER 1 (Existing)	1,100	1	0.0136	0.0136	0.0068	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TIER 2 (during T4I) (Replacements)	1,100	2	-	-	0.0071	0.0141	0.0141	0.0141	0.0139	0.0139	0.0139	0.0139	0.0136	0.0068	0.0068	0.0068	0.0045	0.0045	0.0045	0.0045
																			-	
	,																			
DIESEL DRILLS - ATLAS COPCO	•	2	0.0246	0.0246		0.0243	0.0241	0.0241	0.0181	0.0120	0.0089	_	_	_	_	_	_	_	_	
DIESEL DRILLS - ATLAS COPCO TIER 2 (Existing)	750	2	0.0246	0.0246	0.0246	0.0243	0.0241	0.0241	0.0181	0.0120	0.0089	- 0.0070	- 0.0024	-	-	-	-	-	-	-
DIESEL DRILLS - ATLAS COPCO TIER 2 (Existing) TIER 2 (during T4I) (New)	750 750	2	0.0246 0.0063	0.0246 0.0125		0.0243 0.0123	0.0241 0.0123	0.0241 0.0123	0.0181 0.0123	0.0123	0.0100	0.0070	0.0031	-	-	-	-	-	-	-
DIESEL DRILLS - ATLAS COPCO TIER 2 (Existing) TIER 2 (during T4I) (New) TIER 4F (Replacements)	750		0.0063	0.0125 -	0.0246 0.0125	0.0123	0.0123	0.0123	0.0123	0.0123 0.0072	0.0100 0.0124	0.0070 0.0124	0.0031 0.0122	0.0091	0.0081	- 0.0101	- 0.0106	0.0099	0.0099	0.0099
DIESEL DRILLS - ATLAS COPCO TIER 2 (Existing) TIER 2 (during T4I) (New)	750 750	2			0.0246					0.0123	0.0100	0.0070	0.0031		-	-	-	-	-	
DIESEL DRILLS - ATLAS COPCO TIER 2 (Existing) TIER 2 (during T4I) (New) TIER 4F (Replacements)	750 750	2	0.0063 - 0.70	0.0125 -	0.0246 0.0125 - 0.77	0.0123 - 0.78	0.0123	0.0123 - 0.78	0.0123 - 0.76	0.0123 0.0072 0.75	0.0100 0.0124 0.72	0.0070 0.0124 0.60	0.0031 0.0122	0.0091 0.51	0.0081 0.51	- 0.0101 0.52	- 0.0106 0.51	0.0099 0.51	0.0099	0.0099
DIESEL DRILLS - ATLAS COPCO TIER 2 (Existing) TIER 2 (during T4I) (New) TIER 4F (Replacements)	750 750	2	0.0063	0.0125 -	0.0246 0.0125	0.0123	0.0123	0.0123	0.0123	0.0123 0.0072	0.0100 0.0124	0.0070 0.0124	0.0031 0.0122	0.0091	0.0081	- 0.0101	- 0.0106	0.0099	0.0099	0.009
DIESEL DRILLS - ATLAS COPCO TIER 2 (Existing) TIER 2 (during T4I) (New) TIER 4F (Replacements) TOTAL	750 750	2	0.0063 - 0.70	0.0125 - 0.75	0.0246 0.0125 - 0.77	0.0123 - 0.78	0.0123 - 0.78	0.0123 - 0.78	0.0123 - 0.76	0.0123 0.0072 0.75	0.0100 0.0124 0.72	0.0070 0.0124 0.60	0.0031 0.0122 0.55	0.0091 0.51	0.0081 0.51	- 0.0101 0.52	- 0.0106 0.51	0.0099 0.51	0.0099 0.49	0.0099 0.4 9
DIESEL DRILLS - ATLAS COPCO TIER 2 (Existing) TIER 2 (during T4I) (New) TIER 4F (Replacements) TOTAL	750 750	2	0.0063 - 0.70	0.0125 - 0.75	0.0246 0.0125 - 0.77	0.0123 - 0.78	0.0123 - 0.78	0.0123 - 0.78	0.0123 - 0.76	0.0123 0.0072 0.75	0.0100 0.0124 0.72	0.0070 0.0124 0.60	0.0031 0.0122 0.55	0.0091 0.51	0.0081 0.51	- 0.0101 0.52	- 0.0106 0.51	0.0099 0.51	0.0099 0.49	0.0099 0.4 9
DIESEL DRILLS - ATLAS COPCO TIER 2 (Existing) TIER 2 (during T4I) (New) TIER 4F (Replacements) TOTAL Particulate Matter (PM ₁₀) Emissions (tpy)	750 750 750	2 4F	0.0063 - 0.70	0.0125 - 0.75	0.0246 0.0125 - 0.77	0.0123 - 0.78	0.0123 - 0.78	0.0123 - 0.78	0.0123 - 0.76	0.0123 0.0072 0.75	0.0100 0.0124 0.72	0.0070 0.0124 0.60	0.0031 0.0122 0.55	0.0091 0.51	0.0081 0.51	- 0.0101 0.52	- 0.0106 0.51	0.0099 0.51	0.0099 0.49	0.009
DIESEL DRILLS - ATLAS COPCO TIER 2 (Existing) TIER 2 (during T4I) (New) TIER 4F (Replacements) TOTAL Particulate Matter (PM ₁₀) Emissions (tpy) TRACK DOZERS - CAT D10	750 750 750 750	2 4F	0.0063 - 0.70	0.0125 - 0.75 2012	0.0246 0.0125 - 0.77	0.0123 - 0.78 2014	0.0123 - 0.78 2015	0.0123 - 0.78 2016	0.0123 - 0.76	0.0123 0.0072 0.75	0.0100 0.0124 0.72 2019	0.0070 0.0124 0.60	0.0031 0.0122 0.55	0.0091 0.51 2022	0.0081 0.51 2023	- 0.0101 0.52 2024	- 0.0106 0.51 2025	0.0099 0.51 2026	0.0099 0.49 2027	0.009
DIESEL DRILLS - ATLAS COPCO TIER 2 (Existing) TIER 2 (during T4I) (New) TIER 4F (Replacements) TOTAL Particulate Matter (PM ₁₀) Emissions (tpy) TRACK DOZERS - CAT D10 NOT TIER RATED (Existing)	750 750 750 750	2 4F	0.0063 - 0.70 2011	0.0125 - 0.75 2012	0.0246 0.0125 - 0.77 2013	0.0123 - 0.78 2014	0.0123 - 0.78 2015	0.0123 - 0.78 2016	0.0123 - 0.76 2017	0.0123 0.0072 0.75 2018	0.0100 0.0124 0.72	0.0070 0.0124 0.60 2020	0.0031 0.0122 0.55	0.0091 0.51 2022	0.0081 0.51 2023	- 0.0101 0.52 2024	- 0.0106 0.51 2025	0.0099 0.51	0.0099 0.49 2027	0.009 0.4 2028
DIESEL DRILLS - ATLAS COPCO TIER 2 (Existing) TIER 2 (during T4I) (New) TIER 4F (Replacements) TOTAL Particulate Matter (PM ₁₀) Emissions (tpy) TRACK DOZERS - CAT D10 NOT TIER RATED (Existing) TIER 1 (Existing)	750 750 750 750 HP 580 613	2 4F Tier 0 1	0.0063 - 0.70 2011	0.0125 - 0.75 2012 - 0.4889	0.0246 0.0125 - 0.77 2013	0.0123 - 0.78 2014	0.0123 - 0.78 2015	0.0123 - 0.78 2016	0.0123 - 0.76 2017	0.0123 0.0072 0.75 2018	0.0100 0.0124 0.72 2019	0.0070 0.0124 0.60	0.0031 0.0122 0.55	0.0091 0.51 2022	0.0081 0.51 2023	- 0.0101 0.52 2024	- 0.0106 0.51 2025	0.0099 0.51 2026	0.0099 0.49 2027	0.009
DIESEL DRILLS - ATLAS COPCO TIER 2 (Existing) TIER 2 (during T4I) (New) TIER 4F (Replacements) TOTAL Particulate Matter (PM ₁₀) Emissions (tpy) TRACK DOZERS - CAT D10 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 2 (Existing)	750 750 750 750 750	2 4F Tier 0 1 2	0.0063 - 0.70 2011 - 1.4668 0.7686	0.0125 - 0.75 2012 - - 0.4889 0.7686	0.0246 0.0125 - 0.77 2013	0.0123 - 0.78 2014 - - - 0.7686	0.0123 - 0.78 2015	0.0123 - 0.78 2016 - - - 0.7686	0.0123 - 0.76 2017	0.0123 0.0072 0.75 2018	0.0100 0.0124 0.72 2019	0.0070 0.0124 0.60 2020	0.0031 0.0122 0.55	0.0091 0.51 2022	- 0.0081 0.51 2023	- 0.0101 0.52 2024	- 0.0106 0.51 2025	- 0.0099 0.51 2026	- 0.0099 0.49 2027	0.0099 0.49 2028
DIESEL DRILLS - ATLAS COPCO TIER 2 (Existing) TIER 2 (during T4I) (New) TIER 4F (Replacements) TOTAL Particulate Matter (PM ₁₀) Emissions (tpy) TRACK DOZERS - CAT D10 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 2 (Existing) TIER 3 (Existing) TIER 3 (Existing) TIER 3 (Existing)	750 750 750 750 HP 580 613	2 4F Tier 0 1	0.0063 - 0.70 2011	0.0125 - 0.75 2012 - 0.4889	0.0246 0.0125 - 0.77 2013	0.0123 - 0.78 2014	0.0123 - 0.78 2015	0.0123 - 0.78 2016	0.0123 - 0.76 2017	0.0123 0.0072 0.75 2018	0.0100 0.0124 0.72 2019	0.0070 0.0124 0.60 2020	0.0031 0.0122 0.55	0.0091 0.51 2022	0.0081 0.51 2023	- 0.0101 0.52 2024	- 0.0106 0.51 2025	0.0099 0.51 2026	0.0099 0.49 2027	0.0099 0.49 2028
DIESEL DRILLS - ATLAS COPCO TIER 2 (Existing) TIER 2 (during T4I) (New) TIER 4F (Replacements) TOTAL Particulate Matter (PM ₁₀) Emissions (tpy) TRACK DOZERS - CAT D10 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 2 (Existing) TIER 2 (Existing) TIER 3 (Existing, New and Replacements) TIER 4F (New and Replacements)	750 750 750 750 750	2 4F Tier 0 1 2	0.0063 - 0.70 2011 - 1.4668 0.7686	0.0125 - 0.75 2012 - - 0.4889 0.7686	0.0246 0.0125 - 0.77 2013	0.0123 - 0.78 2014 - - - 0.7686	0.0123 - 0.78 2015	0.0123 - 0.78 2016 - - - 0.7686	0.0123 - 0.76 2017	0.0123 0.0072 0.75 2018	0.0100 0.0124 0.72 2019	0.0070 0.0124 0.60 2020	0.0031 0.0122 0.55	0.0091 0.51 2022	- 0.0081 0.51 2023	- 0.0101 0.52 2024	- 0.0106 0.51 2025	- 0.0099 0.51 2026	- 0.0099 0.49 2027	0.0099 0.49 2028
DIESEL DRILLS - ATLAS COPCO TIER 2 (Existing) TIER 2 (during T4I) (New) TIER 4F (Replacements) TOTAL Particulate Matter (PM ₁₀) Emissions (tpy) TRACK DOZERS - CAT D10 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 2 (Existing) TIER 3 (Existing), New and Replacements)	750 750 750 750 750 HP 580 661 661 646	2 4F Tier 0 1 1 2 3	0.0063 0.70 2011 - 1.4668 0.7686 3.2549	0.0125 - 0.75 2012 - - 0.4889 0.7686 4.0060	0.0246 0.0125 - 0.77 2013 - - - - - - 0.7686 4.7571	0.0123 - 0.78 2014 - - - 0.7686 4.7571	0.0123 - 0.78 2015 - - - 0.7686 4.7571	0.0123 - 0.78 2016 - - - 0.7686 4.7571	0.0123 - 0.76 2017 - - - 0.5124 4.7571	0.0123 0.0072 0.75 2018	0.0100 0.0124 0.72 2019	0.0070 0.0124 0.60 2020	0.0031 0.0122 0.55 2021	0.0091 0.51 2022 - - - - 2.0030	- 0.0081 0.51 2023	- 0.0101 0.52 2024	- 0.0106 0.51 2025	- 0.0099 0.51 2026	- 0.0099 0.49 2027	0.0099 0.49 2028 - - - 0.2504
DIESEL DRILLS - ATLAS COPCO TIER 2 (Existing) TIER 2 (during T4I) (New) TIER 4F (Replacements) TOTAL Particulate Matter (PM ₁₀) Emissions (tpy) TRACK DOZERS - CAT D10 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 2 (Existing) TIER 2 (Existing) TIER 3 (Existing, New and Replacements) TIER 4F (New and Replacements)	750 750 750 750 750 HP 580 661 661 646	2 4F Tier 0 1 1 2 3	0.0063 0.70 2011 - 1.4668 0.7686 3.2549	0.0125 - 0.75 2012 - - 0.4889 0.7686 4.0060	0.0246 0.0125 - 0.77 2013 - - - - - - 0.7686 4.7571	0.0123 - 0.78 2014 - - - 0.7686 4.7571	0.0123 - 0.78 2015 - - - 0.7686 4.7571	0.0123 - 0.78 2016 - - - 0.7686 4.7571	0.0123 - 0.76 2017 - - - 0.5124 4.7571	0.0123 0.0072 0.75 2018	0.0100 0.0124 0.72 2019	0.0070 0.0124 0.60 2020	0.0031 0.0122 0.55 2021	0.0091 0.51 2022 - - - - 2.0030	- 0.0081 0.51 2023	- 0.0101 0.52 2024	- 0.0106 0.51 2025	- 0.0099 0.51 2026	- 0.0099 0.49 2027	0.009: 0.4: 2028 - - - 0.250:
DIESEL DRILLS - ATLAS COPCO TIER 2 (Existing) TIER 2 (during T4I) (New) TIER 4F (Replacements) TOTAL Particulate Matter (PM ₁₀) Emissions (tpy) TRACK DOZERS - CAT D10 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 2 (Existing) TIER 3 (Existing, New and Replacements) TIER 4F (New and Replacements) TRACK DOZERS - CAT D11 NOT TIER RATED (Existing)	750 750 750 750 750 HP 580 613 661 646 646	2 4F Tier 0 1 2 3 4F	0.0063 - 0.70 2011 - 1.4668 0.7686 3.2549 - 3.6602	0.0125 - 0.75 2012 - 0.4889 0.7686 4.0060 - 2.4401	0.0246 0.0125 - 0.77 2013	0.0123 0.78 2014 - - - 0.7686 4.7571	0.0123 - 0.78 2015 0.7686 4.7571 	0.0123 - 0.78 2016 - - - 0.7686 4.7571 -	0.0123 - 0.76 2017 - - 0.5124 4.7571	0.0123 0.0072 0.75 2018	0.0100 0.0124 0.72 2019	0.0070 0.0124 0.60 2020	0.0031 0.0122 0.55 2021	0.0091 0.51 2022 - - - - 2.0030	- 0.0081 0.51 2023	- 0.0101 0.52 2024 - - - 1.0015 0.0826	- 0.0106 0.51 2025 - - - 0.2504 0.1322	- 0.0099 0.51 2026 - - - 0.2504 0.1322	- 0.0099 0.49 2027	0.009 0.4 2028 - - - 0.250
DIESEL DRILLS - ATLAS COPCO TIER 2 (Existing) TIER 2 (during T4I) (New) TIER 4F (Replacements) TOTAL Particulate Matter (PM ₁₀) Emissions (tpy) TRACK DOZERS - CAT D10 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 2 (Existing) TIER 3 (Existing, New and Replacements) TRACK DOZERS - CAT D11 NOT TIER RATED (Existing) TIER 4F (New and Replacements) TRACK DOZERS - CAT D11 NOT TIER RATED (Existing) TIER 1 (Existing)	750 750 750 750 750 750 750 750 750 643 643 646 646 646 646 936	2 4F Tier 0 1 1 2 3 4F	0.0063 0.70 2011 	0.0125 - 0.75 2012 - 0.4889 0.7686 4.0060 - 2.4401 0.5519	0.0246 0.0125 - 0.77 2013 - - - 0.7686 4.7571 - - 0.5519	0.0123 - 0.78 2014 - - - 0.7686 4.7571 - - 0.5519	0.0123 - 0.78 2015 0.7686 4.7571 0.5519	0.0123 - 0.78 2016 - - - 0.7686 4.7571 - - 0.5519	0.0123 - 0.76 2017 	0.0123 0.0072 0.75 2018	0.0100 0.0124 0.72 2019 	0.0070 0.0124 0.60 2020 	0.0031 0.0122 0.55 2021 	0.0091 0.51 2022 - - 2.0030 - -	- 0.0081 0.51 2023 - - - 1.2519 0.0496	- 0.0101 0.52 2024 - - - 1.0015 0.0826	- 0.0106 0.51 2025 - - - 0.2504 0.1322	- 0.0099 0.51 2026 - - - 0.2504 0.1322	- 0.0099 0.49 2027 0.2504 0.1322	0.009 0.4 2028 - - - 0.250 0.132
DIESEL DRILLS - ATLAS COPCO TIER 2 (Existing) TIER 2 (during T4I) (New) TIER 4F (Replacements) TOTAL Particulate Matter (PM ₁₀) Emissions (tpy) TRACK DOZERS - CAT D10 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 2 (Existing) TIER 3 (Existing, New and Replacements) TIER 4F (New and Replacements) TRACK DOZERS - CAT D11 NOT TIER RATED (Existing) TIER 4F (New AND TERM TERM TERM TERM TERM TERM TERM TERM	750 750 750 750 750 750 750 750 750 641 646 646 646 646 646 936 936	2 4F Tier 0 1 2 3 4F 0 1 4F	0.0063 0.70 2011 - 1.4668 0.7686 3.2549 - 3.6602 0.5519 0.0327	0.0125 - 0.75 2012 - 0.4889 0.7686 4.0060 - - 2.4401 0.5519 0.0654	0.0246 0.0125 - 0.77 2013 - - - - - 0.7686 4.7571 - - - - - - - - - - - - - - - - - - -	0.0123 - 0.78 2014 0.7686 4.7571 0.5519 0.1309	0.0123 0.78 2015 2015 	0.0123 - 0.78 2016 - - 0.7686 4.7571 - - 0.5519 0.1309	0.0123 - 0.76 2017 	0.0123 0.0072 0.75 2018 	0.0100 0.0124 0.72 2019 	0.0070 0.0124 0.60 2020 - - - 3.7556 - - 0.1309	0.0031 0.0122 0.55 2021 	0.0091 0.51 2022 - - 2.0030 - 0.1309	- 0.0081 0.51 2023 2023 - - - - 1.2519 0.0496 - - - -	- 0.0101 0.52 2024 - - 1.0015 0.0826	- 0.0106 0.51 2025 - - - 0.2504 0.1322 - - - -	- 0.0099 0.51 2026 - - - 0.2504 0.1322 - - - -	- 0.0099 0.49 2027 	0.0099 0.49 2028
DIESEL DRILLS - ATLAS COPCO TIER 2 (Existing) TIER 2 (during T4I) (New) TIER 4F (Replacements) TOTAL Particulate Matter (PM ₁₀) Emissions (tpy) TRACK DOZERS - CAT D10 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 2 (Existing) TIER 3 (Existing, New and Replacements) TIER 4F (New and Replacements) TRACK DOZERS - CAT D11 NOT TIER RATED (Existing) TIER 4F (New and Replacements) TRACK DOZERS - CAT D11 NOT TIER RATED (Existing) TIER 1 (Existing)	750 750 750 750 750 750 750 750 750 643 643 646 646 646 646 936	2 4F Tier 0 1 1 2 3 4F	0.0063 0.70 2011 	0.0125 - 0.75 2012 - 0.4889 0.7686 4.0060 - 2.4401 0.5519	0.0246 0.0125 - 0.77 2013 - - - 0.7686 4.7571 - - 0.5519	0.0123 - 0.78 2014 - - - 0.7686 4.7571 - - 0.5519	0.0123 - 0.78 2015 0.7686 4.7571 0.5519	0.0123 - 0.78 2016 - - - 0.7686 4.7571 - - 0.5519	0.0123 - 0.76 2017 	0.0123 0.0072 0.75 2018	0.0100 0.0124 0.72 2019 	0.0070 0.0124 0.60 2020 	0.0031 0.0122 0.55 2021 	0.0091 0.51 2022 - - 2.0030 - -	- 0.0081 0.51 2023 - - - 1.2519 0.0496	- 0.0101 0.52 2024 - - - 1.0015 0.0826	- 0.0106 0.51 2025 - - - 0.2504 0.1322	- 0.0099 0.51 2026 - - - 0.2504 0.1322	- 0.0099 0.49 2027 0.2504 0.1322	0.009 0.4 2028 - - 0.250 0.132
DIESEL DRILLS - ATLAS COPCO TIER 2 (Existing) TIER 2 (during T4I) (New) TIER 4F (Replacements) TOTAL Particulate Matter (PM ₁₀) Emissions (tpy) TRACK DOZERS - CAT D10 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 2 (Existing) TIER 3 (Existing), New and Replacements) TIER 4F (New and Replacements) TRACK DOZERS - CAT D11 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 4F (New and Replacements) TIER 4F (New and Replacements) TIER 1 (Existing) TIER 1 (Existing) TIER 4F (New and Replacements) TIER 4F (New and Replacements)	750 750 750 750 750 750 750 750 750 641 646 646 646 646 646 936 936	2 4F Tier 0 1 2 3 4F 0 1 4F	0.0063 0.70 2011 - 1.4668 0.7686 3.2549 - 3.6602 0.5519 0.0327	0.0125 - 0.75 2012 - 0.4889 0.7686 4.0060 - - 2.4401 0.5519 0.0654	0.0246 0.0125 - 0.77 2013 - - - - - 0.7686 4.7571 - - - - - - - - - - - - - - - - - - -	0.0123 - 0.78 2014 0.7686 4.7571 0.5519 0.1309	0.0123 0.78 2015 2015 	0.0123 - 0.78 2016 - - 0.7686 4.7571 - - 0.5519 0.1309	0.0123 - 0.76 2017 	0.0123 0.0072 0.75 2018 	0.0100 0.0124 0.72 2019 	0.0070 0.0124 0.60 2020 - - - 3.7556 - - 0.1309	0.0031 0.0122 0.55 2021 	0.0091 0.51 2022 - - 2.0030 - 0.1309	- 0.0081 0.51 2023 2023 - - - - 1.2519 0.0496 - - - -	- 0.0101 0.52 2024 - - 1.0015 0.0826	- 0.0106 0.51 2025 - - - 0.2504 0.1322 - - - -	- 0.0099 0.51 2026 - - - 0.2504 0.1322 - - - -	- 0.0099 0.49 2027 	0.0099 0.49 2028
DIESEL DRILLS - ATLAS COPCO TIER 2 (Existing) TIER 2 (during T4I) (New) TIER 4F (Replacements) TOTAL Particulate Matter (PM ₁₀) Emissions (tpy) TRACK DOZERS - CAT D10 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 2 (Existing) TIER 3 (Existing, New and Replacements) TIER 4F (New and Replacements) TRACK DOZERS - CAT D11 NOT TIER RATED (Existing) TIER 4F (New and Replacements) TIER 1 (Existing) TIER 1 (Existing) TIER 4 (New and Replacements) TIER 4F (New and Replacements) TIER 4F (New and Replacements) TIER 4F (New and Replacements)	750 750 750 750 750 750 HP 580 613 661 646 646 936 936 936	2 4F Tier 0 1 2 3 4F 0 1 4F	0.0063 0.70 2011 	0.0125 - 0.75 2012 - 0.4889 0.7686 4.0060 2.4401 0.5519 0.0654	0.0246 0.0125 - 0.77 2013 - - - - - 0.7686 4.7571 - - - - - - - - - - - - - - - - - - -	0.0123 - 0.78 2014 0.7686 4.7571 0.5519 0.1309	0.0123 0.78 2015 2015 	0.0123 - 0.78 2016 - - 0.7686 4.7571 - - 0.5519 0.1309	0.0123 - 0.76 2017 - - 0.5124 4.7571 - - 0.5519 0.1309	0.0123 0.0072 0.75 2018 	0.0100 0.0124 0.72 2019 	0.0070 0.0124 0.60 2020 - - - 3.7556 - - 0.1309	0.0031 0.0122 0.55 2021 	0.0091 0.51 2022 - - 2.0030 - 0.1309	- 0.0081 0.51 2023 2023 - - - - 1.2519 0.0496 - - - -	- 0.0101 0.52 2024 - - 1.0015 0.0826	- 0.0106 0.51 2025 - - - 0.2504 0.1322 - - - -	- 0.0099 0.51 2026 - - - 0.2504 0.1322 - - - -	- 0.0099 0.49 2027 	0.009 0.4 2028 - - 0.250 0.132
DIESEL DRILLS - ATLAS COPCO TIER 2 (Existing) TIER 2 (during T4I) (New) TIER 4F (Replacements) TOTAL Particulate Matter (PM ₁₀) Emissions (tpy) TRACK DOZERS - CAT D10 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 2 (Existing) TIER 3 (Existing), New and Replacements) TIER 4F (New and Replacements) TRACK DOZERS - CAT D11 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 4F (New and Replacements) TIER 4F (New and Replacements) TIER 1 (Existing) TIER 1 (Existing) TIER 4F (New and Replacements) TIER 4F (New and Replacements)	750 750 750 750 750 750 750 750 750 641 646 646 646 646 646 936 936	2 4F Tier 0 1 1 2 3 4F 0 1 4T 4T 4F	0.0063 0.70 2011 - 1.4668 0.7686 3.2549 - 3.6602 0.5519 0.0327	0.0125 - 0.75 2012 - 0.4889 0.7686 4.0060 - - 2.4401 0.5519 0.0654	0.0246 0.0125 - 0.77 2013 - - - 0.7686 4.7571 - - 0.5519 0.1309 -	0.0123 - 0.78 2014 0.7686 4.7571 0.5519 0.1309	0.0123 0.78 2015 2015 	0.0123 - 0.78 2016 - - 0.7686 4.7571 - - 0.5519 0.1309	0.0123 - 0.76 2017 - - 0.5124 4.7571 - - 0.5519 0.1309	0.0123 0.0072 0.75 2018 	0.0100 0.0124 0.72 2019 	0.0070 0.0124 0.60 2020 - - - 3.7556 - - 0.1309	0.0031 0.0122 0.55 2021 	0.0091 0.51 2022 - - 2.0030 - 0.1309	- 0.0081 0.51 2023 2023 - - - - 1.2519 0.0496 - - - -	- 0.0101 0.52 2024 - - 1.0015 0.0826	- 0.0106 0.51 2025 - - - 0.2504 0.1322 - - - -	- 0.0099 0.51 2026 - - - 0.2504 0.1322 - - - -	- 0.0099 0.49 2027 	0.009 0.4 2028 - - 0.250 0.132
DIESEL DRILLS - ATLAS COPCO TIER 2 (Existing) TIER 2 (during T4I) (New) TIER 4F (Replacements) TOTAL Particulate Matter (PM ₁₀) Emissions (tpy) TRACK DOZERS - CAT D10 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 2 (Existing) TIER 3 (Existing, New and Replacements) TIER 4F (New and Replacements) TRACK DOZERS - CAT D11 NOT TIER RATED (Existing) TIER 4F (New and Replacements) TIER 1 (Existing) TIER 1 (Existing) TIER 4 (New and Replacements) TIER 4F (New and Replacements) TIER 4F (New and Replacements) TIER 4F (New and Replacements)	750 750 750 750 750 750 HP 580 613 661 646 646 936 936 936	2 4F Tier 0 1 2 3 4F 0 1 4F	0.0063 0.70 2011 	0.0125 - 0.75 2012 - 0.4889 0.7686 4.0060 2.4401 0.5519 0.0654	0.0246 0.0125 - 0.77 2013 - 0.7686 4.7571 - 0.5519 0.1309 -	0.0123 - 0.78 2014 - - 0.7686 4.7571 - - 0.5519 0.1309 -	0.0123 - 0.78 2015 0.7686 4.7571 0.5519 0.1309 	0.0123 - 0.78 2016 0.7686 4.7571 0.5519 0.1309 	0.0123 - 0.76 2017 0.5124 4.7571 - 0.5519 0.1309	0.0123 0.0072 0.75 2018 4.7571 0.5519 0.1309	0.0100 0.0124 0.72 2019 	0.0070 0.0124 0.60 2020 	0.0031 0.0122 0.55 2021 2.5038 	0.0091 0.51 2022 - - 2.0030 - 2.0030 - 0.1309	- 0.0081 0.51 2023 - - 1.2519 0.0496 - - 0.1309 -	- 0.0101 0.52 2024 - - 1.0015 0.0826 - - 0.0982 0.0327	- 0.0106 0.51 2025 - - 0.2504 0.1322 - - 0.0654 0.0654	- 0.0099 0.51 2026 - - 0.2504 0.1322 - - 0.0654	- 0.0099 0.49 2027 0.2504 0.1322 0.0654	0.009 0.4 2028 - - 0.250 0.132
DIESEL DRILLS - ATLAS COPCO TIER 2 (Existing) TIER 2 (during T4I) (New) TIER 4F (Replacements) TOTAL Particulate Matter (PM ₁₀) Emissions (tpy) TRACK DOZERS - CAT D10 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 2 (Existing) TIER 3 (Existing, New and Replacements) TRACK DOZERS - CAT D11 NOT TIER RATED (Existing) TIER 4F (New and Replacements) TRACK DOZERS - CAT D11 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 1 (Existing) TIER 4A (New and Replacements) TIER 4F (New and Replacements) TIER 4F (New and Replacements) TIER 1F (Existing) TIER 1F (Existing) TIER 1 (Existing) TIER 1 (Existing) TIER 1 (Existing) TIER 1 (Existing)	750 750 750 750 750 750 750 750 750 750	2 4F Tier 0 1 1 2 3 4F 0 1 4T 4F 1 2	0.0063 - 0.70 2011 - 1.4668 0.7686 3.2549 - 3.6602 0.5519 0.0327 - 0.6834 0.4346	0.0125 - 0.75 2012 - 0.4889 0.7686 4.0060 - - 2.4401 0.5519 0.0654 - -	0.0246 0.0125 - 0.77 2013 - - - 0.7686 4.7571 - - 0.5519 0.1309 - -	0.0123 - 0.78 2014 	0.0123 0.78 2015 2015 	0.0123 - 0.78 2016 0.7686 4.7571 0.5519 0.1309 	0.0123 - 0.76 2017 - 0.5124 4.7571 - 0.5519 0.1309 	0.0123 0.0072 0.75 2018 	0.0100 0.0124 0.72 2019 	0.0070 0.0124 0.60 2020 	0.0031 0.0122 0.55 2021 	0.0091 0.51 2022 - - 2.0030 - 0.1309 -	- 0.0081 0.51 2023 	- 0.0101 0.52 2024 - - 1.0015 0.0826 - - - 0.0982 0.0327	- 0.0106 0.51 2025 - - - 0.2504 0.1322 - - - 0.0654 0.0654	- 0.0099 0.51 2026 - - - 0.2504 0.1322 - - - 0.0654 0.0654	- 0.0099 0.49 2027 0.2504 0.1322 0.0654	0.009 0.4 2028 - - 0.250 0.132
DIESEL DRILLS - ATLAS COPCO TIER 2 (Existing) TIER 2 (during T4I) (New) TIER 4F (Replacements) TOTAL Particulate Matter (PM ₁₀) Emissions (tpy) TRACK DOZERS - CAT D10 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 2 (Existing) TIER 3 (Existing), New and Replacements) TRACK DOZERS - CAT D11 NOT TIER RATED (Existing) TIER 4F (New and Replacements) TRACK DOZERS - CAT D11 NOT TIER RATED (Existing) TIER 4F (New and Replacements)	750 750 750 750 750 750 750 750 750 750	2 4F Tier 0 1 1 2 3 4F 0 1 1 4T 4F	0.0063 - 0.70 2011 - 1.4668 0.7686 3.2549 3.6602 0.5519 0.0327 	0.0125 - 0.75 2012 - 0.4889 0.7686 4.0060 - 2.4401 0.5519 0.0654 - 0.3417 0.4346 0.7194	0.0246 0.0125 0.77 2013 2013 - - 0.7686 4.7571 - 0.5519 0.1309 - - 0.4346 0.7194	0.0123 - 0.78 2014 0.7686 4.7571 0.5519 0.1309 0.2897 0.7194	0.0123 - 0.78 2015 0.7686 4.7571 0.5519 0.1309 0.2897 0.7194	0.0123 - 0.78 2016 0.7686 4.7571 0.5519 0.1309 0.7194	0.0123 - 0.76 2017 0.5124 4.7571 0.5519 0.1309 	0.0123 0.0072 0.75 2018 	0.0100 0.0124 0.72 2019 	0.0070 0.0124 0.60 2020 3.7556 0.1309 	0.0031 0.0122 0.55 2021 	0.0091 0.51 2022 	- 0.0081 0.51 2023 - 1.2519 0.0496 	- 0.0101 0.52 2024 - - 1.0015 0.0826 - - - 0.0982 0.0327	- 0.0106 0.51 2025 - - - - 0.2504 0.1322 - - - - - - - - - - - - - - - - - -	- 0.0099 0.51 2026 - - - - 0.2504 0.1322 - - - - - - - - - - - - - - - - - -	- 0.0099 0.49 2027 	0.009 0.4 2028 - - - 0.250 0.132 - - - - -
DIESEL DRILLS - ATLAS COPCO TIER 2 (Existing) TIER 2 (during T4I) (New) TIER 4F (Replacements) TOTAL Particulate Matter (PM ₁₀) Emissions (tpy) TRACK DOZERS - CAT D10 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 2 (Existing) TIER 3 (Existing, New and Replacements) TRACK DOZERS - CAT D11 NOT TIER RATED (Existing) TIER 3 (Existing) TIER 4F (New and Replacements) TRACK DOZERS - CAT D11 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 1 (Existing) TIER 4F (New and Replacements) TIER 4F (New and Replacements) GRADERS - CAT 16 TIER 1 (Existing) TIER 2 (Existing) TIER 2 (Existing) TIER 3 (Existing) TIER 3 (Existing) TIER 4A (New and Replacements)	750 750 750 750 750 750 750 860 613 661 646 646 850 936 936 936 936 936 939 289 299 297	2 4F Tier 0 1 2 3 4F 0 1 4T 4F 1 2 3 4F	0.0063 - 0.70 2011 - 1.4668 0.7686 3.2549 - 3.6602 0.5519 0.0327 0.6834 0.4346 0.7194 0.0095	0.0125 - 0.75 - 2012 - 0.4889 0.7686 4.0060 - 2.4401 0.5519 0.0654 0.3417 0.4346 0.7194 0.0285	0.0246 0.0125 - 0.77 2013 - 0.7686 4.7571 - 0.5519 0.1309 - - 0.4346 0.7194 0.0380	0.0123 0.78 2014 - - 0.7686 4.7571 - 0.5519 0.1309 - 0.2897 0.7194 0.0475	0.0123 - 0.78 2015 0.7686 4.7571 0.5519 0.1309 0.2897 0.7194 0.0475	0.0123 - 0.78 2016 0.7686 4.7571 0.5519 0.1309 	0.0123 - 0.76 2017 0.5124 4.7571 - 0.5519 0.1309 	0.0123 0.0072 0.75 2018 4.7571 0.5519 0.1309 	0.0100 0.0124 0.72 2019 	0.0070 0.0124 0.60 2020 3.7556 	0.0031 0.0122 0.55 2021 	0.0091 0.51 2022 - - 2.0030 - - 0.1309 - - - - - - -	- 0.0081 0.51 2023 	- 0.0101 0.52 2024 1.0015 0.0826 0.0982 0.0327	- 0.0106 0.51 2025 0.2504 0.1322 0.0654 0.0654	- 0.0099 0.51 2026 - - 0.2504 0.1322 - - 0.0654 0.0654	- 0.0099 0.49 2027 0.2504 0.1322 0.0654	0.009 0.4 2028 - 0.250 0.132 - 0.065
DIESEL DRILLS - ATLAS COPCO TIER 2 (Existing) TIER 2 (during T4I) (New) TIER 4F (Replacements) TOTAL Particulate Matter (PM ₁₀) Emissions (tpy) TRACK DOZERS - CAT D10 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 2 (Existing) TIER 3 (Existing, New and Replacements) TIER 4F (New and Replacements) TRACK DOZERS - CAT D11 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 1 (Existing) TIER 4F (New and Replacements) TIER 1 (Existing) TIER 2 (Existing) TIER 2 (Existing) TIER 3 (Existing) TIER 4A (New and Replacements) TIER 4F (New and Replacements) TIER 4F (New and Replacements)	750 750 750 750 750 750 750 750 750 750	2 4F Tier 0 1 1 2 3 4F 0 1 1 4T 4F	0.0063 - 0.70 2011 - 1.4668 0.7686 3.2549 3.6602 0.5519 0.0327 	0.0125 - 0.75 2012 - 0.4889 0.7686 4.0060 - 2.4401 0.5519 0.0654 - 0.3417 0.4346 0.7194	0.0246 0.0125 0.77 2013 2013 - - 0.7686 4.7571 - 0.5519 0.1309 - - 0.4346 0.7194	0.0123 - 0.78 2014 0.7686 4.7571 0.5519 0.1309 0.2897 0.7194	0.0123 - 0.78 2015 0.7686 4.7571 0.5519 0.1309 0.2897 0.7194	0.0123 - 0.78 2016 0.7686 4.7571 0.5519 0.1309 0.7194	0.0123 - 0.76 2017 0.5124 4.7571 0.5519 0.1309 	0.0123 0.0072 0.75 2018 	0.0100 0.0124 0.72 2019 	0.0070 0.0124 0.60 2020 3.7556 0.1309 	0.0031 0.0122 0.55 2021 	0.0091 0.51 2022 - - 2.0030 - 0.1309 - - -	- 0.0081 0.51 2023 	- 0.0101 0.52 2024 	- 0.0106 0.51 2025 	- 0.0099 0.51 2026 - - - - 0.2504 0.1322 - - - - 0.0654 0.0654	- 0.0099 0.49 2027 	0.009 0.4 2028 - 0.250 0.132 - 0.065
DIESEL DRILLS - ATLAS COPCO TIER 2 (Existing) TIER 2 (during T4I) (New) TIER 4F (Replacements) TOTAL Particulate Matter (PM ₁₀) Emissions (tpy) TRACK DOZERS - CAT D10 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 2 (Existing) TIER 3 (Existing), New and Replacements) TIER 4F (New and Replacements) TRACK DOZERS - CAT D11 NOT TIER RATED (Existing) TIER 4F (New and Replacements) TIER 1 (Existing) TIER 4F (New and Replacements) GRADERS - CAT 16 TIER 1 (Existing) TIER 2 (Existing) TIER 2 (Existing) TIER 3 (Existing) TIER 3 (Existing) TIER 4F (New and Replacements)	750 750 750 750 750 750 750 750 750 880 613 661 646 646 646 936 936 936 936 936 937 289 297 297	2 4F Tier 0 1 1 2 3 4F 0 1 4T 4F 1 2 3 4T 4F	0.0063 - 0.70 2011 - 1.4668 0.7686 3.2549 - 3.6602 0.5519 0.0327 - 0.6834 0.4346 0.7194 0.0095 -	0.0125 - 0.75 2012 - 0.4889 0.7686 4.0060 - 2.4401 0.5519 0.0654 - 0.3417 0.4346 0.7194 0.0285 -	0.0246 0.0125 - 0.77 2013 - - 0.7686 4.7571 - - 0.5519 0.1309 - - 0.4346 0.7194 0.0380	0.0123 0.78 2014 	0.0123 0.78 2015 	0.0123 0.78 2016 	0.0123 - 0.76 2017 0.5124 4.7571 0.5519 0.1309 	0.0123 0.0072 0.75 2018 	0.0100 0.0124 0.72 2019 	0.0070 0.0124 0.60 2020 	0.0031 0.0122 0.55 2021 	0.0091 0.51 2022 	- 0.0081 0.51 2023 	- 0.0101 0.52 2024 	- 0.0106 0.51 2025 	- 0.0099 0.51 2026 - - - 0.2504 0.1322 - - 0.0654 - - - - - - - - - - - - - - - - - - -	- 0.0099 0.49 2027	0.009: 0.4: 2028 - 0.250 0.132: - 0.065-
DIESEL DRILLS - ATLAS COPCO TIER 2 (Existing) TIER 2 (during T4I) (New) TIER 4F (Replacements) TOTAL Particulate Matter (PM ₁₀) Emissions (tpy) TRACK DOZERS - CAT D10 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 2 (Existing) TIER 2 (Existing) TIER 3 (Existing) TIER 4F (New and Replacements) TRACK DOZERS - CAT D11 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 4A (New and Replacements) TIER 4F (New and Replacements) TIER 4F (New and Replacements) TIER 4F (New and Replacements) TIER 1 (Existing) TIER 3 (Existing) TIER 3 (Existing) TIER 4 (New and Replacements) TIER 4F (New and Replacements) TIER 4F (New and Replacements) TIER 4F (New and Replacements)	750 750 750 750 750 750 750 750 750 750	2 4F Tier 0 1 1 2 3 4F 0 1 1 4T 4F 1 2 3 4T 4F	0.0063 - 0.70 2011 - 1.4668 0.7686 3.2549 - 3.6602 0.5519 0.0327 0.6834 0.4346 0.7194 0.0095 - 1.9931	0.0125 - 0.75 - 2012 - 0.4889 0.7686 4.0060 - 2.4401 0.5519 0.0654 - 0.3417 0.4346 0.7194 0.0285 - 1.9931	0.0246 0.0125 - 0.77 2013 - - - 0.7686 4.7571 - - 0.5519 0.1309 - - - - - - - - - - - - - - - - - - -	0.0123 - 0.78 2014 2014 	0.0123 0.78 2015 2015 	0.0123 - 0.78 2016 2016 	0.0123 - 0.76 2017 2017 - 0.5124 4.7571 - 0.5519 0.1309 	0.0123 0.0072 0.75 2018 	0.0100 0.0124 0.72 2019 	0.0070 0.0124 0.60 2020 	0.0031 0.0122 0.55 2021 	0.0091 0.51 2022 - - 2.0030 - - 0.1309 - - - - - - -	- 0.0081 0.51 2023 	- 0.0101 0.52 2024 1.0015 0.0826 0.0982 0.0327	- 0.0106 0.51 2025 0.2504 0.1322 0.0654 0.0654	- 0.0099 0.51 2026 - - 0.2504 0.1322 - - 0.0654 0.0654	- 0.0099 0.49 2027 0.2504 0.1322 0.0654	0.009 0.4 2028 - 0.250 0.132 - 0.065
DIESEL DRILLS - ATLAS COPCO TIER 2 (Existing) TIER 2 (during T4I) (New) TIER 4F (Replacements) TOTAL Particulate Matter (PM ₁₀) Emissions (tpy) TRACK DOZERS - CAT D10 NOT TIER RATED (Existing) TIER 1 (Existing) TIER 2 (Existing) TIER 3 (Existing, New and Replacements) TIER 4F (New and Replacements) TRACK DOZERS - CAT D11 NOT TIER RATED (Existing) TIER 4F (New and Replacements) TIER 1 (Existing) TIER 1 (Existing) TIER 1 (Existing) TIER 1 (Existing) TIER 4F (New and Replacements) TIER 4F (New and Replacements) TIER 1 (Existing) TIER 3 (Existing) TIER 2 (Existing) TIER 3 (Existing) TIER 4 (New and Replacements) TIER 4F (New and Replacements) GRADERS - CAT 24	750 750 750 750 750 750 750 750 750 880 613 661 646 646 646 936 936 936 936 936 937 289 297 297	2 4F Tier 0 1 1 2 3 4F 0 1 4T 4F 1 2 3 4T 4F	0.0063 - 0.70 2011 - 1.4668 0.7686 3.2549 - 3.6602 0.5519 0.0327 - 0.6834 0.4346 0.7194 0.0095 -	0.0125 - 0.75 2012 - 0.4889 0.7686 4.0060 - 2.4401 0.5519 0.0654 - 0.3417 0.4346 0.7194 0.0285 -	0.0246 0.0125 - 0.77 2013 - - 0.7686 4.7571 - - 0.5519 0.1309 - - 0.4346 0.7194 0.0380	0.0123 0.78 2014 	0.0123 0.78 2015 	0.0123 0.78 2016 	0.0123 - 0.76 2017 0.5124 4.7571 0.5519 0.1309 	0.0123 0.0072 0.75 2018 	0.0100 0.0124 0.72 2019 	0.0070 0.0124 0.60 2020 	0.0031 0.0122 0.55 2021 	0.0091 0.51 2022 	- 0.0081 0.51 2023 	- 0.0101 0.52 2024 	- 0.0106 0.51 2025 	- 0.0099 0.51 2026 - - - 0.2504 0.1322 - - 0.0654 - - - - - - - - - - - - - - - - - - -	- 0.0099 0.49 2027	0.0098 0.49 2028 - - - 0.2500 0.1322 - - - - - - - - - - - - -

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RTDS - CAT 834		, ,				1														
834B - NOT TIER RATED (Existing)	487	0	1.7975	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
834G - NOT TIER RATED (Existing)	487	0	0.8987	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TIER 3 (Existing)	525	3	0.6867	0.6867	0.6867	0.6867	0.6867	0.6867	0.6867	0.4578	0.4578	-	-	-	-	-	-	-	-	-
TIER 4A (New and Replacements)	525	4T	0.0151	0.0604	0.0604	0.0604	0.0604	0.0604	0.0604	0.0604	0.0604	0.0604	0.0302	-	-	-	-	-	-	-
TIER 4F (Replacements)	525	4F	-	-	-	-	-	-	-	0.0151	0.0151	0.0151	0.0302	0.0604	0.0604	0.0604	0.0604	0.0604	0.0604	0.0604
RTDS - CAT 854																				
TIER 1 (Existing)	880	1	0.6672	0.6672	0.6672	0.6672	0.6672	0.6672	0.6672	0.6672	-	-	-	-	-	-	-	-	-	-
FEL - KOMATSU																				
WA500 - TIER 1 (Existing)	235	1 1	0.1702	0.1702	0.1702	0.1702	0.1702	0.1702	0.1702	0.1702	0.1702	-	-	-	_	-	_	-	-	
WA600 - TIER 1 (Existing) WA600 - TIER 3 (Existing)	396	3	0.1702	0.1702	0.1702	0.1702	0.1702	0.1702	0.1702	0.1702	0.1702	0.2350	0.1175	-		_	-	-		
WA600 - TIER 4F (Replacements)	502	4F	0.2330	0.2330	0.2330	0.2330	0.2330	0.2330	0.2330	0.2330	-	0.2330	0.0098	0.0197	0.0197	0.0197	0.0197	0.0197	0.0197	0.0197
WA700 - TIER 1 (Replacements)	396	1	0.2147	0.2147	0.2147	0.2147	0.2147	0.2147	0.2147	0.2147	0.2147	0.2147	0.0030	0.0197	0.0137	0.0197	0.0197	0.0137	0.0197	-
FEL - CAT 992	550	'	0.2147	0.2147	0.2147	0.2147	0.2147	0.2147	0.2147	0.2147	0.2147	0.2147	0.2147							
TIER 2 (Existing)	800	2	0.4747	0.4747	0.4747	0.4747	0.4747	0.4747	0.2374	_	_	_	_	_		_	_	_	_	_
TIER 4A (New and Replacements)	801	4T	- 0.4141	- 0.4747	0.0245	0.0245	0.0245	0.0245	0.0245	0.0245	0.0245	0.0245	0.0245	0.0245	0.0245	0.0245	0.0245	0.0245	0.0245	0.0245
TIER 4F (Replacements)	801	4F	_	-	-	-	-	-	0.0245	0.0490	0.0490	0.0490	0.0490	0.0490	0.0490	0.0490	0.0490	0.0490	0.0490	0.0490
TIET II (Replacements)	001	-11	I	l					0.02-10	0.0400	0.0400	0.0400	0.0400	0.0400	0.0400	0.0400	0.0400	0.0400	0.0400	0.0400
PRODUCTION FEL - KOM WA1200																				
TIER 1 (Existing)	1,782	1	1.2423	1.2423	1.2423	1.2423	1.2423	-	-	-	-	-	-	-	-	-	-	-	-	-
TIER 4F (Replacements)	1,782	4F	-	-	-	-	-	0.0736	0.0736	0.0736	0.0736	0.0736	0.0736	0.0736	0.0736	0.0736	0.0736	0.0736	0.0736	0.0736
			•	ı l							1			1						
TRACKHOES - CAT 330																				
TIER 2 (Existing)	264	2	0.0563	0.0563	0.0563	0.0563	0.0563	-	-	-	-	-	-	-	-	-	-	-	-	-
TIER 4F (Replacements)	268	4F	-	-	-	-	-	0.0038	0.0038	0.0038	0.0038	0.0038	0.0038	0.0038	0.0038	0.0038	0.0038	0.0038	0.0038	0.0038
TRACKHOES - CAT 385																				
TIER 3 (Existing)	523	3	0.2230	0.2230	0.2230	0.1115	0.1115	0.1115	-	-	-	-	-	-	-	-	-	-	-	-
TIER 4A (Replacements)	523	4T	-	-	-	0.0147	0.0147	0.0147	0.0147	0.0147	0.0147	0.0147	0.0147	0.0147	-	-	-	-	-	-
TIER 4F (Replacements)	523	4F	-	-	-	-	-	-	0.0074	0.0074	0.0074	0.0074	0.0074	0.0074	0.0147	0.0147	0.0147	0.0147	0.0147	0.0147
TRACKHOES - KOMATSU																				
PC800 - TIER 1 (Existing)	323	1	0.2516	0.2516	0.2516	0.2516	0.1258	0.1258	0.1258	0.1258	0.1258	-	-	-	-	-	-	-	-	-
PC800 - TIER 4F (Replacements)	323	4F	-	-	-	-	0.0045	0.0045	0.0045	0.0045	0.0045	0.0045	0.0045	0.0045	0.0045	0.0045	0.0045	0.0045	-	-
PC400 - TIER 1 (Existing)	246	1	0.1280	0.1280	0.1280	0.1280	0.1280	0.1280	-	-	-	-	-	-	-	-	-	-	-	-
WATER TRUCKS																				
CAT 789 (Existing)	1,900	0	1.9480	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CAT 793C - TIER 1 (Existing)	2,300	1	1.9375	1.9375	1.9375	1.9375	1.9375	1.9375	1.9375	1.9375	1.9375	1.9375	1.9375	1.9375	1.9375	1.9375	1.9375	1.9375	1.9375	1.9375
CAT 793D - TIER 2 (New and Replaceme	2,415	2	1.1700	2.3400	2.3400	2.3400	2.3400	2.3400	2.3400	2.3400	2.3400	2.3400	2.3400	2.3400	2.3400	2.3400	2.3400	2.3400	2.3400	2.3400
HYDRAULIC SHOVELS	0.100	1 . 1	1	ı												ı	1			
O&K RH 200, (NOT CERT)	2,100	0	- 0.4007	- 0.4007	- 0.07.17	- 0.0407	- 0.0407	-	-	-	-	- 0.000	-	- 0.0074		-	-	- 0.0754	- 0.0754	-
O&K RH 200, (TIER 1)	2,520	1	6.1987	6.1367	6.0747	6.0437	6.0127	5.9817	5.9507	5.9197	5.8888	3.0993	3.0993	3.0374	3.0374	3.0064	3.0064	2.9754	2.9754	2.9444
CONCERNICATION TRUCKS																				
CONSTRUCTION TRUCKS KOM 785-7 TIER 1 (Existing)	1 200	1 4 1	0.5474	0.5474	2 5 4 7 4	0.5474	0.5474	2 5 4 7 4	2 5 4 7 4	0.5474	0.5474	2 5 4 7 4	0.5474	2 5 4 7 4	0.5474	0.5474	0.5474	2 5 4 7 4	0.5474	0.5474
KOW 765-7 TIER I (Existing)	1,200	!	2.5474	2.5474	2.5474	2.5474	2.5474	2.5474	2.5474	2.5474	2.5474	2.5474	2.5474	2.5474	2.5474	2.5474	2.5474	2.5474	2.5474	2.5474
DIESEL DRILLS - P&H																				
TIER 1 (Existing)	1,100	T 1 T	0.7282	0.7282	0.3641	-	-	-	- 1	- 1	- 1	- 1	-	-		l -	-	-	-	
TIER 2 (during T4I) (Replacements)	1,100	2	0.7262	0.7202	0.3041	0.4346	0.4346	0.4346	0.4267	0.4267	0.4267	0.4267	0.4188	0.2094	0.2094	0.2094	0.1396	0.1370	0.1370	0.1370
DIESEL DRILLS - ATLAS COPCO	1,100	-	1	_	0.2113	0.4340	0.4540	0.4340	0.4201	0.4201	U.7ZUI	0.7201	0.4100	0.2034	0.2034	0.2034	0.1390	0.1370	0.1370	0.1370
TIER 2 (Existing)	750	2	0.7558	0.7558	0.7558	0.7485	0.7412	0.7412	0.5559	0.3706	0.2725	_	_	_	_	_	_	_	-	
TIER 2 (during T4I) (New)	750	2	0.1926	0.7358	0.7350	0.7403	0.7412	0.7412	0.3779	0.3779	0.2723	0.2162	0.0963	-		-	-	-	-	
TIER 4F (Replacements)	750	4F	- 0.1320		-					0.0232	0.0397	0.0397	0.0390	0.0292	0.0260		0.0341	0.0318	0.0318	0.0318
TOTAL	100	 	36.3	31.3	28.7	28.3	28.1	24.6	23.2	21.9	20.8	15.6	13.9	12.6	11.9			10.9	10.8	10.8
		1 1		01.0	20.7	20.0	20.1	0	20.2	21.0	20.0	10.0	10.0	12.0	11.0		10.0	10.0	.0.0	10.0
Operation Hours			2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
operation rieure					20.0	20	20.0	20.0			20.0									
TRACK DOZERS - CAT D10	HP	Tier																		
	HP 580	Tier 0	-	- 1	-	-	-	-	-	-	-	-	-	-	-	-	- 1	-	-	
TRACK DOZERS - CAT D10 NOT TIER RATED (Existing) TIER 1 (Existing)			12,000	- 4,000	-	-	-	-	-	-		-	-		-	-	-	-	-	-
NOT TIER RATED (Existing) TIER 1 (Existing)	580	0	12,000	4,000	-								-							
NOT TIER RATED (Existing) TIER 1 (Existing) TIER 2 (Existing)	580 613	0 1				-	-	-	-	-	-	-	-	-	-	-	-	-	-	- - - 4,000
NOT TIER RATED (Existing) TIER 1 (Existing) TIER 2 (Existing) TIER 3 (Existing, New and Replacements)	580 613 661	0 1 2	12,000 12,000	4,000 12,000	12,000	12,000	12,000	- 12,000	- 8,000	-	-	-	-	-	-	-	-	-	-	-
NOT TIER RATED (Existing) TIER 1 (Existing) TIER 2 (Existing)	580 613 661 646	0 1 2 3	12,000 12,000 52,000	4,000 12,000	- 12,000 76,000	- 12,000 76,000	- 12,000 76,000	- 12,000 76,000	8,000 76,000	- - 76,000	- - 72,000	- - 60,000	-	- - 32,000	- 20,000	- - 16,000	- - 4,000	- - 4,000	- - 4,000	4,000
NOT TIER RATED (Existing) TIER 1 (Existing) TIER 2 (Existing) TIER 3 (Existing, New and Replacements) TIER 4F (New and Replacements) TRACK DOZERS - CAT D11	580 613 661 646	0 1 2 3	12,000 12,000 52,000	4,000 12,000	- 12,000 76,000	- 12,000 76,000	- 12,000 76,000	- 12,000 76,000	8,000 76,000	- - 76,000	- - 72,000	- - 60,000	-	- - 32,000	- 20,000	- - 16,000	- - 4,000	- - 4,000	- - 4,000	4,000
NOT TIER RATED (Existing) TIER 1 (Existing) TIER 2 (Existing) TIER 3 (Existing, New and Replacements) TIER 4F (New and Replacements)	580 613 661 646 646	0 1 2 3 4F	12,000 12,000 52,000 - 10,500	4,000 12,000 64,000	12,000 76,000	- 12,000 76,000	12,000 76,000	- 12,000 76,000 -	8,000 76,000	- - 76,000 -	72,000	- - 60,000 -	- - 40,000 -	- 32,000 -	20,000 12,000	- 16,000 20,000	- 4,000 32,000	- 4,000 32,000	- 4,000 32,000	4,000
NOT TIER RATED (Existing) TIER 1 (Existing) TIER 2 (Existing) TIER 3 (Existing, New and Replacements) TIER 4F (New and Replacements) TRACK DOZERS - CAT D11 NOT TIER RATED (Existing) TIER 1 (Existing)	580 613 661 646 646 850	0 1 2 3 4F	12,000 12,000 52,000	4,000 12,000 64,000 - 7,000	- 12,000 76,000 -	- 12,000 76,000 -	- 12,000 76,000 -	12,000 76,000	- 8,000 76,000 - -	- - 76,000 -	72,000	60,000	- 40,000 - -	- 32,000 - -	20,000 12,000	- 16,000 20,000	- 4,000 32,000	- 4,000 32,000	- 4,000 32,000	4,000 32,000
NOT TIER RATED (Existing) TIER 1 (Existing) TIER 2 (Existing) TIER 3 (Existing), New and Replacements) TIER 4F (New and Replacements) TRACK DOZERS - CAT D11 NOT TIER RATED (Existing)	580 613 661 646 646 850 936	0 1 2 3 4F	12,000 12,000 52,000 - 10,500 3,500	4,000 12,000 64,000 - 7,000 3,500	- 12,000 76,000 - - 3,500	- 12,000 76,000 - - 3,500	- 12,000 76,000 - - 3,500	- 12,000 76,000 - - 3,500	- 8,000 76,000 - - - 3,500	76,000 - 3,500	72,000 - 3,500	- - 60,000 - -	- 40,000 -	32,000	20,000 12,000	- 16,000 20,000	- 4,000 32,000	- 4,000 32,000	- 4,000 32,000	4,000 32,000

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TABLE B1-37
2011–2029 Mobile Support Equipment Emissions—260 Mtpy
KUC—Bingham Canyon Mine

GRADERS - CAT 16																				
TIER 1 (Existing)	289	1	10,000	5,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TIER 2 (Existing)	299	2	15,000	15,000	15,000	10,000	10,000	-	-	-	-	-	-	-	-	-	-	-	-	-
TIER 3 (Existing)	297	3	25,000	25,000	25,000	25,000	25,000	25,000	5,000	-	-	-	-	-	_	-	-	-	_	-
TIER 4A (New and Replacements)	297	4T	5,000	15,000	20,000	25,000	25,000	25,000	25,000	25,000	25,000	20,000	10,000	-	-	_	_	_	-	-
TIER 4F (New and Replacements)	297	4F		13,000	20,000	23,000	5,000	15,000	35,000	40,000	40,000	40,000	50,000	55,000	55,000	55,000	55,000	55,000	55,000	55,000
GRADERS - CAT 24	231	41	-		-		3,000	13,000	33,000	40,000	40,000	40,000	30,000	33,000	33,000	33,000	33,000	33,000	33,000	33,000
	540		0.000	0.000	0.000	0.000	0.000			-										
NOT TIER RATED (Existing)	540	0	9,000	9,000	9,000	9,000	9,000	-	-	-	-	-	-	-	-	-	-	-	-	-
TIER 2 (Existing)	533	2	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	-	-	-	-	-	-	-	-
TIER 4F (Replacements)	533	4F	-	-	-	-	-	9,000	9,000	9,000	9,000	9,000	13,500	13,500	13,500	13,500	13,500	13,500	13,500	13,500
RTDS - CAT 834																				
834B - NOT TIER RATED (Existing)	487	0	9,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
834G - NOT TIER RATED (Existing)	487	0	4,500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TIER 3 (Existing)	525	3	13,500	13,500	13,500	13,500	13,500	13,500	13,500	9,000	9,000	-	-	-	-	-	-	-	-	-
TIER 4A (New and Replacements)	525	4T	4,500	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	9,000	_	_	-	_	_	-	_
TIER 4F (Replacements)	525	4F	-,500	-	-	-	-	-	-	4,500	4,500	4,500	9,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000
(-	525	4F						-		4,500	4,500	4,500	9,000	16,000	16,000	16,000	16,000	16,000	16,000	16,000
RTDS - CAT 854		 	4.500	. =00	4 = 0.0	4 = 0.0	4 = 0.0	4 = 00	4 = 0.0	4 = 0.0										
TIER 1 (Existing)	880	1	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	-	-	-	-	-	-	-	-	-	-
FEL - KOMATSU																				
WA500 - TIER 1 (Existing)	235	1	3,700	3,700	3,700	3,700	3,700	3,700	3,700	3,700	3,700	-	-	-	-	-	-	-	-	-
WA600 - TIER 3 (Existing)	396	3	7,400	7,400	7,400	7,400	7,400	7,400	7,400	7,400	7,400	7,400	3,700	-	-	-	-	-	-	-
WA600 - TIER 4F (Replacements)	502	4F	-	-	-	-	-	-	-	-	-	-	3,700	7,400	7,400	7,400	7,400	7,400	7,400	7,400
WA700 - TIER 1 (Existing)	396	1	3,700	3,700	3,700	3,700	3,700	3,700	3,700	3,700	3,700	3,700	3,700		-	-	-	-		-
FEL - CAT 992		† · · · · · · · · · · · · · · · · · · ·		-,	-,:	-,	-,	-,	-,	0,100	-,	-,	-,							
TIER 2 (Existing)	800	2	7,400	7,400	7,400	7,400	7,400	7,400	3,700	-		_	_	_		_	-	_	_	_
TIER 4A (New and Replacements)	801	4T	7,400	7,400							3,700		2.700	3,700	3,700	2.700		3,700	2.700	3,700
()					3,700	3,700	3,700	3,700	3,700	3,700		3,700	3,700			3,700	3,700		3,700	
TIER 4F (Replacements)	801	4F	-	-	-	-	-	-	3,700	7,400	7,400	7,400	7,400	7,400	7,400	7,400	7,400	7,400	7,400	7,400
PRODUCTION FEL - KOM WA1200		, ,																		
TIER 1 (Existing)	1,782	1	5,000	5,000	5,000	5,000	5,000	-	-	-	-	-	-	-	-	-	-	-	-	-
TIER 4F (Replacements)	1,782	4F	-	-	-	-	-	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000
TRACKHOES - CAT 330																				
TIER 2 (Existing)	264	2	2,200	2,200	2,200	2,200	2,200	-	-	-	-	-	-	-	-	-	-	-	-	-
TIER 4F (Replacements)	268	4F	-	-	-	-	-	2,200	2,200	2,200	2,200	2,200	2,200	2,200	2,200	2,200	2,200	2,200	2,200	2,200
TRACKHOES - CAT 385								,	,	,	,	,	,	,	,	,	,	,	,	,
TIER 3 (Existing)	523	3	4.400	4,400	4,400	2,200	2,200	2,200	-	-		-	_	_	-	-	-	_	-	-
TIER 4A (Replacements)	523	4T		-	-	4,400	4,400	4,400	4,400	4,400	4,400	4,400	4,400	4,400	-	-	-	-	-	-
, ,		4F		-												4.400			4.400	4,400
TIER 4F (Replacements)	523	46	-	-	-	-	-	-	2,200	2,200	2,200	2,200	2,200	2,200	4,400	4,400	4,400	4,400	4,400	4,400
TRACKHOES - KOMATSU		 																		
PC800 - TIER 1 (Existing)	323	1	4,400	4,400	4,400	4,400	2,200	2,200	2,200	2,200	2,200	-	-	-	-	-	-	-	-	-
PC800 - TIER 4F (Replacements)	323	4F	-	-	-	-	2,200	2,200	2,200	2,200	2,200	2,200	2,200	2,200	2,200	2,200	2,200	2,200	-	-
PC400 - TIER 1 (Existing)	246	1	2,200	2,200	2,200	2,200	2,200	2,200	-	-	-	-	-	-	-	-	-	-	-	-
WATER TRUCKS																				
CAT 789 (Existing)	1,900	0	2,500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
CAT 793C - TIER 1 (Existing)	2,300	1	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000
CAT 793D - TIER 2 (New and Replaceme	2,415	2	5,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000
(, -	L	-,	-,	-,	-,	.,	-,	-,	.,	-,	.,	-,	.,	-,	-,	-,	-,	.,	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
HYDRAULIC SHOVELS																				
HYDRAULIC SHOVELS O&K RH 200 (NOT CERT)	2 100	T 0 T			_ 1			_ 1					_ 1				_ 1	_ 1		_
O&K RH 200, (NOT CERT)	2,100	0	- 14 600	-	-	-	- 14 162	- 14.090	-	-	- 12 970	- 7 200	- 7 200	- 7.154	- 7.154	- 7.091	- 7.091	- 7.009	- 7,009	-
	2,100 2,520	0 1	- 14,600	- 14,454	- 14,308	- 14,235	- 14,162	- 14,089	- 14,016	- 13,943	- 13,870	7,300	7,300	- 7,154	- 7,154	- 7,081		- 7,008	- 7,008	- 6,935
O&K RH 200, (NOT CERT) O&K RH 200, (TIER 1)	,	<u> </u>																		- 6,935
O&K RH 200, (NOT CERT) O&K RH 200, (TIER 1) CONSTRUCTION TRUCKS	2,520	1	14,600	14,454	14,308	14,235	14,162	14,089	14,016	13,943	13,870	7,300	7,300	7,154	7,154	7,081	7,081	7,008	7,008	
O&K RH 200, (NOT CERT) O&K RH 200, (TIER 1)	,	<u> </u>																		- 6,935 12,600
O&K RH 200, (NOT CERT) O&K RH 200, (TIER 1) CONSTRUCTION TRUCKS KOM 785-7 TIER 1 (Existing)	2,520	1	14,600	14,454	14,308	14,235	14,162	14,089	14,016	13,943	13,870	7,300	7,300	7,154	7,154	7,081	7,081	7,008	7,008	
O&K RH 200, (NOT CERT) O&K RH 200, (TIER 1) CONSTRUCTION TRUCKS	2,520	1	14,600	14,454	14,308	14,235	14,162	14,089	14,016	13,943	13,870	7,300	7,300	7,154	7,154	7,081	7,081	7,008	7,008	
O&K RH 200, (NOT CERT) O&K RH 200, (TIER 1) CONSTRUCTION TRUCKS KOM 785-7 TIER 1 (Existing)	2,520	1	14,600	14,454	14,308	14,235	14,162	14,089	14,016	13,943	13,870	7,300	7,300	7,154	7,154	7,081	7,081	7,008	7,008	
O&K RH 200, (NOT CERT) O&K RH 200, (TIER 1) CONSTRUCTION TRUCKS KOM 785-7 TIER 1 (Existing) DIESEL DRILLS - P&H	2,520 1,200 1,100	1 1	14,600	12,600	14,308	14,235	14,162	14,089	14,016	13,943	13,870	7,300	7,300	7,154	7,154	7,081	7,081	7,008	7,008	12,600
O&K RH 200, (NOT CERT) O&K RH 200, (TIER 1) CONSTRUCTION TRUCKS KOM 785-7 TIER 1 (Existing) DIESEL DRILLS - P&H TIER 1 (Existing) TIER 2 (during T4I) (Replacements)	2,520	1	14,600 12,600 5,300	12,600	12,600	12,600	14,162	14,089	14,016	13,943	13,870	7,300	7,300	7,154	7,154	7,081	7,081	7,008	7,008	
O&K RH 200, (NOT CERT) O&K RH 200, (TIER 1) CONSTRUCTION TRUCKS KOM 785-7 TIER 1 (Existing) DIESEL DRILLS - P&H TIER 1 (Existing) TIER 2 (during T4I) (Replacements) DIESEL DRILLS - ATLAS COPCO	2,520 1,200 1,100 1,100	1 1 2	14,600 12,600 5,300 -	12,600 5,300	14,308 12,600 2,650 2,750	14,235 12,600	14,162 12,600	14,089 12,600 - 5,500	14,016 12,600 - 5,400	13,943 12,600 - 5,400	13,870 12,600 - 5,400	7,300	7,300 12,600 - 5,300	7,154 12,600 - 2,650	7,154 12,600	7,081 12,600 - 2,650	7,081 12,600 - 1,767	7,008 12,600 - 1,733	7,008 12,600 - 1,733	12,600 - 1,733
O&K RH 200, (NOT CERT) O&K RH 200, (TIER 1) CONSTRUCTION TRUCKS KOM 785-7 TIER 1 (Existing) DIESEL DRILLS - P&H TIER 1 (Existing) TIER 2 (during T4I) (Replacements) DIESEL DRILLS - ATLAS COPCO TIER 2 (Existing)	2,520 1,200 1,100 1,100 750	1 1 2 2 2 2 2 2	14,600 12,600 5,300 - 10,400	14,454 12,600 5,300 - 10,400	14,308 12,600 2,650 2,750 10,400	14,235 12,600 - 5,500 10,300	14,162 12,600 - 5,500 10,200	14,089 12,600 - 5,500 10,200	14,016 12,600 - 5,400 7,650	13,943 12,600 - 5,400 5,100	13,870 12,600 - 5,400 3,750	7,300 12,600 - 5,400	7,300 12,600 - 5,300	7,154 12,600 - 2,650	7,154	7,081 12,600 - 2,650	7,081	7,008 12,600 - 1,733	7,008 12,600 - 1,733	12,600 - 1,733
O&K RH 200, (NOT CERT) O&K RH 200, (TIER 1) CONSTRUCTION TRUCKS KOM 785-7 TIER 1 (Existing) DIESEL DRILLS - P&H TIER 1 (Existing) TIER 2 (during T4I) (Replacements) DIESEL DRILLS - ATLAS COPCO	2,520 1,200 1,100 1,100	1 1 2	14,600 12,600 5,300 -	12,600 5,300	14,308 12,600 2,650 2,750	14,235 12,600	14,162 12,600	14,089 12,600 - 5,500	14,016 12,600 - 5,400	13,943 12,600 - 5,400	13,870 12,600 - 5,400	7,300	7,300 12,600 - 5,300	7,154 12,600 - 2,650	7,154 12,600	7,081 12,600 - 2,650	7,081 12,600 - 1,767	7,008 12,600 - 1,733	7,008 12,600 - 1,733	12,600 - 1,733

Material is loaded into haul trucks by shovels. KUC primarily operates electric shovels in addition to the hydraulic shovels included in the emissions calculations.

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TABLE B1-37
2011–2029 Mobile Support Equipment Emissions—260 Mtpy
KUC—Bingham Canyon Mine

mission Factors (g/hp-hr)	Pollutant	Tier 0	Tier 1	Tier 2	Tier 3	Tier 4t	Tier 4f
	HC	0.75	0.34	0.33	0.20	0.13	0.13
	CO	4.90	1.26	1.26	1.32	0.09	0.09
175-300-hp class	NO _x	8.15	5.43	3.83	2.39	2.52	0.28
	SO ₂	0.0049	0.0049	0.0049	0.0049	0.0049	0.0049
	PM ₁₀	0.64	0.37	0.15	0.15	0.01	0.01
	HC	0.75	0.22	0.18	0.18	0.13	0.13
	CO	4.90	2.20	1.42	1.48	0.10	0.10
300-600-hp class	NO _x	8.15	5.85	4.16	2.39	2.52	0.28
	SO ₂	0.0049	0.0049	0.0049	0.0049	0.0049	0.0049
	PM ₁₀	0.64	0.28	0.15	0.15	0.01	0.01
	HC	0.75	0.16	0.18	0.18	0.13	0.13
	CO	4.90	2.24	2.24	2.34	0.15	0.15
600-750-hp class	NO _x	8.15	5.66	3.93	2.39	2.52	0.28
	SO ₂	0.0049	0.0049	0.0049	0.0049	0.0049	0.0049
	PM ₁₀	0.64	0.31	0.15	0.15	0.01	0.01
	HC	0.75	0.31	0.18	NA	0.29	0.13
	CO	4.90	1.29	1.29	NA	0.09	0.09
>750-hp class	NO _x	8.15	5.99	3.93	NA	2.41	2.41
·	SO ₂	0.0049	0.0049	0.0049	NA	0.0049	0.0049
	PM ₁₀	0.64	0.26	0.15	NA	0.02	0.02
emission factors represent the less	er of EPA emission lim	its and factors cald	culated using	EPA NONROA	D methodolog	у.	

All Age Factors assumed to be equal to 1.

Calculation Data

	NONROAD Equipment SCC
Front-end Loaders	2270002060
Graders	2270002048
Truck Dozers	2270002069
Wheeled Dozers	2270002063

All tables and factors are from "Exhaust and Crankcase Emission Factors for Nonroad Engine Modeling--Compression-Ignition", EPA, 2004, unless otherwise noted.

Table A2 Zero-Hour, Steady-State Emission Factors for Nonroad CI Engines (>175 to 300 hp)

	BSFC	HC	СО	NO _x	PM ₁₀
T0	0.367	0.68	2.7	8.38	0.402
T1	0.367	0.3085	0.7475	5.5772	0.2521
T2	0.367	0.3085	0.7475	4	0.1316
T3	0.367	0.1836	0.7475	2.5	0.15
T4t	0.367	0.1314	0.075	2.5	0.0092
T4	0.367	0.1314	0.075	0.276	0.0092

Table A2 Zero-Hour, Steady-State Emission Factors for Nonroad CI Engines (>300 to 600 hp)

	BSFC	HC	co	NO _x	PM ₁₀
T0	0.367	0.68	2.7	8.38	0.402
T1	0.367	0.2025	1.306	6.0153	0.2008
T2	0.367	0.1669	0.8425	4.3351	0.1316
T3	0.367	0.1669	0.8425	2.5	0.15
T4t	0.367	0.1314	0.084	2.5	0.0092
T4	0.367	0.1314	0.084	0.276	0.0092

Table A2 Zero-Hour, Steady-State Emission Factors for Nonroad CI Engines (>600 to 750 hp)

	BSFC	HC	co	NO _x	PM ₁₀
T0	0.367	0.68	2.7	8.38	0.402
T1	0.367	0.1473	1.3272	5.8215	0.2201
T2	0.367	0.1669	1.3272	4.1	0.1316
T3	0.367	0.1699	1.3272	2.5	0.15
T4t	0.367	0.1314	0.133	2.5	0.0092
T4	0.367	0.1314	0.133	0.276	0.0092

Table A2 Zero-Hour, Stead					
	BSFC	HC	co	NO _x	PM ₁₀
T0	0.367	0.68	2.7	8.38	0.402
T1	0.367	0.2861	0.7642	6.1525	0.1934
T2	0.367	0.1669	0.7642	4.1	0.1316
T4t	0.367	0.2815	0.076	2.392	0.069
T4f	0.367	0.1314	0.076	2.392	0.0276

Table A3 Transient Adjustment Factors by Equipment Type for Nonroad CI Equipment

HC	co	NO _x	PM ₁₀	BSFC
1.05	1.53	0.95	1.23	1.01

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TABLE B1-37
2011–2029 Mobile Support Equipment Emissions—260 Mtpy
KUC—Bingham Canyon Mine

TAFs are not applied to the emission factors for Tier 4 engines

Table A4 Deterioration Factors for Nonroad Diesel Engines (A)

Table 71. Poterioration Factore 10. Home and Pieces Engineer (7.)										
T0	T1	T2	T3+							
0.047	0.036	0.034	0.027							
0.185	0.101	0.101	0.151							
0.024	0.024	0.009	0.008							
0.473	0.473	0.473	0.473							
	T0 0.047 0.185 0.024	TO T1 0.047 0.036 0.185 0.101 0.024 0.024	T0 T1 T2 0.047 0.036 0.034 0.185 0.101 0.101 0.024 0.024 0.009							

sulfur conversion	7.0	grams PM :	sulfate/gram Sulfur	
soxcnv	0.02247	grams PM sulfur/gram fuel consumed		
default (soxbas)	3300	ppm	0.33 wt %	
2010+ (soxdsl)	15	ppm	0.0015 wt %	

Load Factor

0.48 RTLoader Cycle Class
0.58 Crawler Cycle Class
0.43 7-cycle average
Load factors from Tables 9 and 10 of "Median Life, Annual Activity, and Load Factor Values for Nonroad Engine Emissions Modeling", EPA, 2004.

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TABLE B1-38 Emissions Summary KUC—Bingham Canyon Mine

KUC—BINGNAM	Garyon mine	PM ₁₀	PM _{2.5}	
Source ID	Source Description	Emissions (tny)	Emissions (tpy)	Location of Source within Pit Influence Boundary
BCM01	In Pit Crusher	(tpy)	0.48	
BCM201	New In Pit Crusher	0.68	0.40	
DOM/201	C6/C7 Conveyor Transfer	0.00	0.21	1.00
BCM02	Point	1.35	0.40	
DOMOL	C7/C8 Conveyor Transfer	1.00	0.10	
BCM03	Point	0.83	0.24	
BCM04	Lime Bin	0.37	0.13	
BCM05	Lime Bin	0.37	0.13	
BCM07	Sample Preparation	0.17	0.05	
SX/EW	Electrowinning (as H ₂ SO ₄)	0.96	0.96	
Total Point So		6.27	2.60	
BCM1.1	Truck Dump Ore	0.56	0.09	Yes
BCM204	Truck Dump Ore at Crusher	0.56	0.09	Yes
BCM205	Truck Dump Ore at Stockpile	0.56	0.09	Yes
	In-pit enclosed transfer point			
BCM1.2	1, 2,3	1.68	0.27	Yes
	New In-pit enclosed transfer			
BCM202	point 1, 2,3	1.68	0.27	Yes
	In-pit enclosed transfer point			
BCM203	4,5	1.12	0.18	Yes
	Conveyor Stacker Transfer			
BCM1.3	Point	2.79	0.42	
	Coarse Ore Stacker (drop to			
BCM1.4	coarse ore storage pile)	2.79	0.42	
	Reclaim Tunnels (Coarse ore			
BCM1.5	reclaim tunnel vent)	2.79	0.42	
BCM1.9	Disturbed Areas	40.6		Yes
BCM1.13	Coarse Ore Storage Pile	2.09	0.33	
BCM1.16	Front End Loaders	12.38	2.08	
BCM1.17	Truck Loading	1.71	0.27	Yes
BCM1.19	End Dump Trucks (truck dumping of waste)	E7 E	0.74	
BCM1.19	Graders	57.5 77.7	8.71	Yes
BCM1.21	Track Dozers			Yes
BCM1.21	Wheeled Dozers	5.9 1.2		Yes
BCM1.23	Drilling w/Water Injection	0.55	0.09	
BCM1.24	Blasting w/Water injection Blasting w/Minimized Area	11.0		Yes
BCM100	Tertiary Crushing	0.17	0.03	
BCM101	Screening	0.23	0.03	
BCM102	Transfer Points	0.14	0.02	
Total Fugitive		225.69	36.69	
. Jan . agin vo		220.00	33.03	
Total		231.00	38	
Total		231.00	38	

Truck Offloading Ore at In-pit Crusher (Additional drop point at the new crusher KUC—Bingham Canyon Mine

Source Name	PM ₁₀ Aerodynamic Particle Size Multiplier (k)	PM _{2.5} Aerodynamic Particle Size Multiplier (k)				PM _{2.5} Emission Factor (lbs/ton)		Uncontrolled PM ₁₀ Emissions (tpy)		Primary Control		PM _{2.5} Emissions with Primary Controls (tpy)		PM _{2.5} Pit Escape Factor (%)	Controlled PM ₁₀ Emissions from the pit (tpy)	Emissions from	
Truck Offloading Ore	0.35	0.053	4	7	0.00066	0.00010	85,000,000	27.9	4.2	90	2.79	0.42	20	21	0.56	0.09	Inherent material characteristics and physical enclosures. Source Located in the pit.

NOTES:
Emission factors estimated using methodology in AP-42, Section 13.2.4.
Wind speed and moisture content data based on historical data.

PM₁₀ and PM₂₅ Pit Escape Factor applied to the calculations and is based on University of Utah study (1996).

Characteristics of the ore material, such as large diameter material, and inherent material moisture content of 4 percent, limit dust being generated during the transfer operations.

The control efficiency listed is based on previous determinations of BACT by UDAQ. This control efficiency has been applied in the 1994 SIP and 2005 SIP calculations and modeling.

Truck Offloading Ore at Stockpile

KUC—Bingham Canyon Mine

	PM ₁₀ Aerodynamic Particle Size	PM _{2.5} Aerodynamic Particle Size	Moisture			2.0		Uncontrolled PM ₁₀				PM _{2.5} Emissions with Primary		PM _{2.5} Pit Escape			
Source Name	Multiplier (k)	Multiplier (k)	Content (%)	(mph)	Factor (lbs/ton)	Factor (lbs/ton)	Rate (tpy)	Emissions (tpy)	Emissions (tpy)	Efficiency (%)	Controls (tpy)	Controls (tpy)	Factor (%)	Factor (%)	the pit (tpy)	the pit (tpy)	Control System and Comments
Truck Offloading Ore	0.35	0.053	4	7	0.00066	0.00010	85,000,000	27.9	4.2	90	2.79	0.42	20	21	0.56	0.09	Inherent material characteristics and source located in the pit.
NOTES: Emission factors estimated using methodology in AP-42, Section 13.2.4. Wind speed and moisture content data based on historical data. Wind prediction of the ore material, such as large diameter material, and inherent material moisture content of 4 percent, limit dust being generated during the transfer operations. Characteristics of the ore material, such as large diameter material, and inherent material moisture content of 4 percent, limit dust being generated during the transfer operations. The control efficiency listed is based on previous determinations of BACT by UDAQ. This control efficiency has been applied in the 1994 SIP and 2005 SIP calculations and modeling.																	

New LPG Generator (Dinkeyville Hill) KUC—Bingham Canyon Mine

NO _X Emission Factor (g/HP-hr)	6.9 [Vendor Data]
CO Emission Factor (g/HP-hr)	27 [Vendor Data]
THC Emission Factor (g/HP-hr)	1 [Vendor Data]
SO ₂ Emission Factor (g/HP-hr)	0.0121 [EPA NONROAD Program]
PM ₁₀ Emission Factor (g/HP-hr)	0.0557 [EPA NONROAD Program]
PM _{2.5} Emission Factor (g/HP-hr)	0.0557 [EPA NONROAD Program]

	Generator
Engine Rating (HP)	71
Annual Hours of Operations (hrs/yr)	100
NO _X Emissions (lb/hr)	1.1
CO Emissions (lb/hr)	4.24
VOC Emissions (lb/hr)	0.16
SO ₂ Emissions (lb/hr)	0.002
PM ₁₀ Emissions (lb/hr)	0.01
PM _{2.5} Emissions (lb/hr)	0.01
NO _X Emissions (tpy)	0.0542
CO Emissions (tpy)	0.212
VOC Emissions (tpy)	0.01
SO ₂ Emissions (tpy)	0.0001
PM ₁₀ Emissions (tpy)	0.0004
PM _{2.5} Emissions (tpy)	0.0004

Notes:

- (1) Emissions of NO_X , CO, and VOC estimated using vendor provided data.
- (2) Emissions of SO_2 , PM_{10} , and $PM_{2.5}$ estimated using EPA's NONROAD Program