

Appendix III.K.13.F Part 3

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Golden Valley Electric Association (GVEA) North Pole Power Plant

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Hillcorp Alaska, LLC

March 10, 2022 Transmittal email regarding economic analysis of five Cook Inlet platforms
Economic Analysis, March 10, 2021, SO2 of five Cook Inlet platforms



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Your Touchstone Energy® Cooperative 

March 19, 2015

Nattinee Nipataruedi
State of Alaska Department of Environmental Conservation
Air Permits Program
410 Willoughby Ave, Suite 303
PO Box 11180
Juneau, AK 99811-1800

Email: Nattinee.nipataruedi@alaska.gov

Subject 2013 Emissions Inventory – GVEA North Pole and Zehnder Power Plants

Dear Ms. Nipataruedi:

Please find attached the 2014 Triennial Emission Inventory for Golden Valley Electric Association's (GVEA) Delta, Healy, North Pole and Zehnder Power Plants. If you have any questions, please contact me at (907) 451-5627.

Sincerely,

Kristen DuBois
Environmental Officer

cc: Don Caniparoli/CH2M Hill
Louise Brown/CH2M Hill

Enclosures

CERTIFICATION OF TRUTH, ACCURACY, AND COMPLETENESS

"Based on information and belief formed after reasonable inquiry, I certify that the statements and information in and attached to this document are true, accurate, and complete."

Signature

3/19/15
Date

Lynn N. Thompson
Printed Name

Vice President of Power Supply
Title

Stationary Source Detail	
ADEC ID	110
Name	North Pole Power Plant
Physical Location	1500 H & H Lane
	North Pole, AK 99705
	Lat 64.73444 Long -147.3453
	Description: 1150 H & H Lane North Pole AK
AFS ID	0209000011
Census Area	Fairbanks North Star Borough (090)
Line of Business (NAICS)	221112
	> Utilities
	> Utilities
	> Electric Power Generation, Transmission and Distribution
	> Fossil Fuel Electric Power Generation
Line of Business (SIC)	4911
	> Electric, gas, and sanitary services
	> Electric Services
Owner Name & Address	Golden Valley Electric Association
	PO Box 71249
	Fairbanks, AK 99707-1249

Emission Unit 01					
> Specifications					
ID	01	Design Capacity	672 MILLION BTU PER HOUR		
Description	GT#1 Gas Turbine				
Manufacturer	General Electric	Manufactured Year			
Model Number	Frame 7 Series 7001 Model BR	Serial Number	238057		
> Regulations					
Regulation/Description					
> Control Equipment					
Capture Efficiency (%)	0				
System Description					
Equipment Types					
> Pollutants Controlled					
Pollutant Description			Reduction Efficiency (%)		
> Processes					
Process	Primary Process				
SCC Code	20100109				
	> Internal Combustion Engines				
	> Electric Generation				
	> Distillate Oil (Diesel)				
	> Turbine Exhaust				
Material Processed	Heavy Aromatic Gas Oil (HAGO)/No. 2 Diesel				
Period Start	1/1/2014	Period End	12/31/2014		
Throughput					
Total		Summer %	Fall %	Winter %	Spring %
110038	gal	6	5	36	52
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
0.15	0.11	7	38.57		
Fuel Characteristics					
Heat Content	Elem. Sulfur Content	H2S Sulfur Content	Ash Content		
142	0.73		0.01		
Heating					
Heat Input		Heat Output		Heat Values Convention	
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide(CO)	-	-	-	Continuous Emission Monitoring System	0.22
Nitrogen Oxides(NOx)	-	-	-	Continuous Emission Monitoring System	6.57
PM10 Primary (Filt + Cond)(PM10-PR)	0.25	POUNDS	MILLION BTUS	Stack Test (no ctl eff used)	2.00
PM2.5 Primary (Filt + Cond)(PM25-PR)	0.25	POUNDS	MILLION BTUS	Stack Test (no ctl eff used)	2.00
Sulfur Dioxide(SO2)	-	-	-	Sulfur Content	5.64
Volatile Organic Compounds(VOC)	0.00041	POUNDS	MILLION BTUS	EPA Emission Factor (no ctl eff used)	0.00
Process	Secondary Process				
SCC Code	20100101				
	> Internal Combustion Engines				
	> Electric Generation				
	> Distillate Oil (Diesel)				
	> Turbine				
Material Processed	Jet A Fuel/No. 1				
Period Start	1/1/2014	Period End	12/31/2014		
Throughput					
Total		Summer %	Fall %	Winter %	Spring %
2866	gal	10	31	33	25
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
Startup Fuel	Startup Fuel	Startup Fuel	Startup Fuel		
Fuel Characteristics					
Heat Content	Elem. Sulfur Content	H2S Sulfur Content	Ash Content		
133	0.098		0		
Heating					
Heat Input		Heat Output		Heat Values Convention	
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide(CO)					Included in primary process
Nitrogen Oxides(NOx)					Included in primary process
PM10 Primary (Filt + Cond)(PM10-PR)					Included in primary process
Sulfur Dioxide(SO2)					Included in primary process
Volatile Organic Compounds(VOC)					Included in primary process
> Release Points					
ID	Description	Type	Apportion %		
01N	GT #1 North Stack	Vertical	50		
01S	GT #1 South Stack	Vertical	50		

Emission Unit 02					
> Specifications					
ID	02	Design Capacity	672 MILLION BTU PER HOUR		
Description	GT#2 Gas Turbine				
Manufacturer	General Electric	Manufactured Year			
Model Number	Frame 7, Series 7001, Model BR	Serial Number	248861		
> Regulations					
Regulation/Description					
> Control Equipment					
Capture Efficiency (%)	0				
System Description					
Equipment Types					
> Pollutants Controlled					
Pollutant Description					Reduction Efficiency (%)
> Processes					
Process	Primary Process				
SCC Code	20100109				
	> Internal Combustion Engines				
	> Electric Generation				
	> Distillate Oil (Diesel)				
	> Turbine Exhaust				
Material Processed	Heavy Aromatic Gas Oil (HAGO)/No. 2 Diesel				
Period Start	1/1/2014	Period End	12/31/2014		
Throughput					
Total		Summer %	Fall %	Winter %	Spring %
3714728	gal	54	35	8	4
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
1.64	2.26	27	823.45		
Fuel Characteristics					
Heat Content	Elem. Sulfur Content	H2S Sulfur Content	Ash Content		
142	0.73		0.01		
Heating					
Heat Input	Heat Output		Heat Values Convention		
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide(CO)	3.300e-003	POUNDS	MILLION BTUS	EPA Emission Factor (no ct eff used)	0.86
Nitrogen Oxides(NOX)	1.390e+000	POUNDS	MILLION BTUS	Stack Test (no ct eff used)	363.05
PM10 Primary (Filt + Cond)(PM10-PR)	2.500e-001	POUNDS	MILLION BTUS	Stack Test (no ct eff used)	65.30
PM2.5 Primary (Filt + Cond)(PM25-PR)	2.500e-001	POUNDS	MILLION BTUS	Stack Test (no ct eff used)	65.30
Sulfur Dioxide(SO2)	-	-	-	Sulfur Content	138.15
Volatile Organic Compounds(VOC)	4.100e-004	POUNDS	MILLION BTUS	EPA Emission Factor (no ct eff used)	0.11
Process					
Secondary Process					
SCC Code	20100101				
	> Internal Combustion Engines				
	> Electric Generation				
	> Distillate Oil (Diesel)				
	> Turbine				
Material Processed	Jet A Fuel/No. 1				
Period Start	1/1/2014	Period End	12/31/2014		
Throughput					
Total		Summer %	Fall %	Winter %	Spring %
19761	gal	47	14	31	9
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
Startup Fuel	Startup Fuel	Startup Fuel	Startup Fuel		
Fuel Characteristics					
Heat Content	Elem. Sulfur Content	H2S Sulfur Content	Ash Content		
133	0.098		0		
Heating					
Heat Input	Heat Output		Heat Values Convention		
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide(CO)					Included in primary process
Nitrogen Oxides(NOX)					Included in primary process
PM10 Primary (Filt + Cond)(PM10-PR)					Included in primary process
Sulfur Dioxide(SO2)					Included in primary process
Volatile Organic Compounds(VOC)					Included in primary process
> Release Points					
ID	Description	Type	Apportion %		
02N	GT #2 North Stack	Vertical	50		
02S	GT #2 South Stack	Vertical	50		

Emission Unit 03					
> Specifications					
ID	03	Design Capacity	50,000 gallons		
Description	Fuel storage tank				
Manufacturer		Manufactured Year			
Model Number		Serial Number			
> Regulations					
Regulation/Description					
> Control Equipment					
Capture Efficiency (%)	0				
System Description					
Equipment Type(s)					
> Pollutants Controlled					
Pollutant Description					Reduction Efficiency (%)
> Processes					
Process	Primary Process				
SCC Code	20100108				
	> Internal Combustion Engines				
	> Electric Generation				
	> Distillate Oil (Diesel)				
	> Turbine: Evaporative Losses (Fuel Storage and Delivery System)				
Material Processed	JET-A/No.1 Diesel				
Period Start	1/1/2014	Period End	12/31/2014		
Throughput					
Total		Summer %	Fall %	Winter %	Spring %
22627	gal	42	16	31	11
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
Continuous	Continuous	Continuous	Continuous		
Fuel Characteristics					
Heat Content	Elem. Sulfur Content	H2S Sulfur Content	Ash Content		
133	0.098		0		
Heating					
Heat Input	Heat Output		Heat Values Convention		
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide(CO)					n/a
Nitrogen Oxides(NOx)					n/a
PM10 Primary (Filt + Condl)(PM10-PR1)					n/a
Sulfur Dioxide(SO2)					n/a
Volatile Organic Compounds(VOC)					0
Process					
Process	Secondary Process				
SCC Code	NONE				
	>				
	>				
	>				
	>				
Material Processed	Diesel				
Period Start	1/1/2014	Period End	12/31/2014		
Throughput					
Total		Summer %	Fall %	Winter %	Spring %
(#)	(Unit Type)				
Operational Schedule					
Days/Week	Hours/Dav	Weeks/Period	Hours/Period		
Fuel Characteristics					
Heat Content	Elem. Sulfur Content	H2S Sulfur Content	Ash Content		
Heating					
Heat Input	Heat Output		Heat Values Convention		
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide(CO)					
Nitrogen Oxides(NOx)					
PM10 Primary (Filt + Condl)(PM10-PR1)					
Sulfur Dioxide(SO2)					
Volatile Organic Compounds(VOC)					
> Release Points					
ID	Description	Type	Apportion %		
03	Fuel Tank Fugitive	Goose Neck	100		

Emission Unit 04					
> Specifications					
ID	04	Design Capacity	50,000 gallons		
Description	Fuel storage tank				
Manufacturer		Manufactured Year			
Model Number		Serial Number			
> Regulations					
Regulation/Description					
> Control Equipment					
Capture Efficiency (%)	0				
System Description					
Equipment Type(s)					
> Pollutants Controlled					
Pollutant Description					Reduction Efficiency (%)
> Processes					
Process	Primary Process				
SCC Code	20100108				
	> Internal Combustion Engines				
	> Electric Generation				
	> Distillate Oil (Diesel)				
	> Turbine: Evaporative Losses (Fuel Storage and Delivery System)				
Material Processed	HAGO/No.2 Diesel				
Period Start	1/1/2014	Period End	12/31/2014		
Throughput					
Total		Summer %	Fall %	Winter %	Spring %
3824766	gal	53	34	8	5
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
Continuous	Continuous	Continuous	Continuous		
Fuel Characteristics					
Heat Content	Elem. Sulfur Content	H2S Sulfur Content	Ash Content		
142	0.73		0.01		
Heating					
Heat Input	Heat Output		Heat Values Convention		
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide(CO)					n/a
Nitrogen Oxides(NOx)					n/a
PM10 Primary (Filt + Condl)(PM10-PR1)					n/a
Sulfur Dioxide(SO2)					n/a
Volatile Organic Compounds(VOC)					0
Process					
Process	Secondary Process				
SCC Code	NONE				
	>				
	>				
	>				
	>				
Material Processed					
Period Start	1/1/2014	Period End	12/31/2014		
Throughput					
Total		Summer %	Fall %	Winter %	Spring %
(#)	(Unit Type)				
Operational Schedule					
Days/Week	Hours/Dav	Weeks/Period	Hours/Period		
Fuel Characteristics					
Heat Content	Elem. Sulfur Content	H2S Sulfur Content	Ash Content		
Heating					
Heat Input	Heat Output		Heat Values Convention		
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide(CO)					
Nitrogen Oxides(NOx)					
PM10 Primary (Filt + Condl)(PM10-PR1)					
Sulfur Dioxide(SO2)					
Volatile Organic Compounds(VOC)					
> Release Points					
ID	Description	Type	Apportion %		
04	Fuel Tank Fugitive	Goose Neck	100		

Emission Unit 05					
> Specifications					
ID	05	Design Capacity	455 MILLION BTU PER HOUR		
Description	GT#3 Gas Turbine				
Manufacturer	General Electric	Manufactured Year			
Model Number	LM6000PC	Serial Number	191-548		
> Regulations					
Regulation/Description					
> Control Equipment					
Capture Efficiency (%)	100				
System Description	weir rotojet water injection (NOx), CO catalyst				
Equipment Type(s)	Water injection, catalyst				
> Pollutants Controlled					
Pollutant Description					Reduction Efficiency (%)
Carbon Monoxide					
Nitrogen Oxides					
> Processes					
Process	Primary Process				
SCC Code	20100909				
	> Internal Combustion Engines				
	> Electric Generation				
	> Kerosene/Naphtha (Jet Fuel)				
	> Turbine: Exhaust				
Material Processed	Naphtha				
Period Start	1/1/2014	Period End	12/31/2014		
Throughput					
Total		Summer %	Fall %	Winter %	Spring %
18376628	gal	14	25	32	28
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
5.83	19.57	47	7144.65		
Fuel Characteristics					
Heat Content	Elem. Sulfur Content	H2S Sulfur Content	Ash Content		
120	0.004		0		
Heating					
Heat Input	Heat Output		Heat Values Convention		
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide(CO)	-	-	-	Continuous Emission Monitoring System	8.19
Nitrogen Oxides(NOx)	-	-	-	Continuous Emission Monitoring System	275.17
PM10 Primary (Filt + Cond)(PM10-PR)	1.200e-002	POUNDS	MILLION BTUS	EPA Emission Factor (not eff used)	13.25
PM2.5 Primary (Filt + Cond)(PM2.5-PR)	1.200e-002	POUNDS	MILLION BTUS	EPA Emission Factor (not eff used)	13.25
Sulfur Dioxide(SO2)	-	-	-	Sulfur Content	4.58
Volatile Organic Compounds(VOC)	4.100e-004	POUNDS	MILLION BTUS	EPA Emission Factor (not eff used)	0.45
Process					
Process	Secondary Process				
SCC Code	20100909				
	> Internal Combustion Engines				
	> Electric Generation				
	> Kerosene/Naphtha (Jet Fuel)				
	> Turbine: Exhaust				
Material Processed	Jet A Fuel/No. 1				
Period Start	1/1/2014	Period End	12/31/2014		
Throughput					
Total		Summer %	Fall %	Winter %	Spring %
18118	gal	78	17	3	3
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
Startup fuel	Startup fuel	Startup fuel	Startup fuel		
Fuel Characteristics					
Heat Content	Elem. Sulfur Content	H2S Sulfur Content	Ash Content		
133	0.098		0		
Heating					
Heat Input	Heat Output		Heat Values Convention		
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide(CO)					Included in primary process
Nitrogen Oxides(NOx)					Included in primary process
PM10 Primary (Filt + Cond)(PM10-PR)					Included in primary process
Sulfur Dioxide(SO2)					Included in primary process
Volatile Organic Compounds(VOC)					Included in primary process
> Release Points					
ID	Description	Type	Apportion %		
05	GT#3 Stack	Vertical	100		

Emission Unit 06					
> Specifications					
ID	06	Design Capacity	455 MILLION BTU PER HOUR		
Description	GT#4 Gas Turbine				
Manufacturer	General Electric	Manufactured Year	PERMITTED BUT NOT CONSTRUCTED		
Model Number	LM6000PC	Serial Number			
> Regulations					
Regulation/Description					
> Control Equipment					
Capture Efficiency (%)	0				
System Description					
Equipment Type(s)					
> Pollutants Controlled					
Pollutant Description					Reduction Efficiency (%)
> Processes					
Process	Primary Process				
SCC Code	20100909				
	> Internal Combustion Engines				
	> Electric Generation				
	> Kerosene/Naphtha (Jet Fuel)				
	> Turbine: Exhaust				
Material Processed					
Period Start	1/1/2014	Period End	12/31/2014		
Throughput					
Total		Summer %	Fall %	Winter %	Spring %
(#)	(Unit Type)				
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
Fuel Characteristics					
Heat Content	Elem. Sulfur Content	H2S Sulfur Content	Ash Content		
Heating					
Heat Input	Heat Output		Heat Values Convention		
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide(CO)					
Nitrogen Oxides(NOx)					
PM10 Primary (Filt + Condl)(PM10-PR1)					
Sulfur Dioxide(SO2)					
Volatile Organic Compounds(VOC)					
Process	Secondary Process				
SCC Code	>				
	>				
	>				
	>				
Material Processed					
Period Start	1/1/2014	Period End	12/31/2014		
Throughput					
Total		Summer %	Fall %	Winter %	Spring %
(#)	(Unit Type)				
Operational Schedule					
Days/Week	Hours/Dav	Weeks/Period	Hours/Period		
Fuel Characteristics					
Heat Content	Elem. Sulfur Content	H2S Sulfur Content	Ash Content		
Heating					
Heat Input	Heat Output		Heat Values Convention		
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide(CO)					
Nitrogen Oxides(NOx)					
PM10 Primary (Filt + Condl)(PM10-PR1)					
Sulfur Dioxide(SO2)					
Volatile Organic Compounds(VOC)					
> Release Points					
ID	Description	Type	Apportion %		

Emission Unit 07					
> Specifications					
ID	07	Design Capacity	400 KILOWATTS		
Description	Emergency Generator				
Manufacturer	Generac Gen Set	Manufactured Year			
Model Number	5231150100	Serial Number	2083094		
> Regulations					
Regulation/Description					
> Control Equipment					
Capture Efficiency (%)	0				
System Description					
Equipment Type(s)					
> Pollutants Controlled					
Pollutant Description		Reduction Efficiency (%)			
> Processes					
Process	Primary Process				
SCC Code	20100907				
	> Internal Combustion Engines				
	> Electric Generation				
	> Kerosene/Naphtha (Jet Fuel)				
	> Reciprocating: Exhaust				
Material Processed	Jet A/No. 1				
Period Start	1/1/2014	Period End	12/31/2014		
Throughput					
Total		Summer %	Fall %	Winter %	Spring %
154	gal	As needed	As needed	As needed	As needed
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
As needed	As needed	As needed	4.4		
Fuel Characteristics					
Heat Content	Elem. Sulfur Content	H2S Sulfur Content	Ash Content		
133	0.05		0		
Heating					
Heat Input		Heat Output		Heat Values Convention	
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide(CO)	1.100e+000	GRAMS	HORSEPOWER-HOUR	Manufacturer Specification	3.20E-03
Nitrogen Oxides(NOX)	6.900e+000	GRAMS	HORSEPOWER-HOUR	Manufacturer Specification	2.01E-02
PM10 Primary (Filt + Cond)(PM10-PRI)	3.500e-001	GRAMS	HORSEPOWER-HOUR	Manufacturer Specification	1.02E-03
PM2.5 Primary (Filt + Cond)(PM25-PRI)	3.500e-001	GRAMS	HORSEPOWER-HOUR	Manufacturer Specification	1.02E-03
Sulfur Dioxide(SO2)				Material Balance	5.22E-04
Volatile Organic Compounds(VOC)	1.400e-001	GRAMS	HORSEPOWER-HOUR	Manufacturer Specification	4.07E-04
Process					
Process	Secondary Process				
SCC Code	NONE				
	>				
	>				
	>				
	>				
Material Processed					
Period Start	1/1/2014	Period End	12/31/2014		
Throughput					
Total		Summer %	Fall %	Winter %	Spring %
(#)	(Unit Type)				
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
Fuel Characteristics					
Heat Content	Elem. Sulfur Content	H2S Sulfur Content	Ash Content		
Heating					
Heat Input		Heat Output		Heat Values Convention	
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide(CO)					
Nitrogen Oxides(NOX)					
PM10 Primary (Filt + Cond)(PM10-PRI)					
Sulfur Dioxide(SO2)					
Volatile Organic Compounds(VOC)					
> Release Points					
ID	Description	Type	Apportion %		
07	Emergency Generator Stack	Vertical	100		

Emission Unit 11					
> Specifications					
ID	11	Design Capacity	5 MILLION BTU PER HOUR		
Description	Building Heater				
Manufacturer	Bryan Steam	Manufactured Year			
Model Number	RV500-W-FDG w/ Gordon-Piatt R10.2-G-50	Serial Number	93433		
> Regulations					
Regulation/Description					
> Control Equipment					
Capture Efficiency (%)	0				
System Description					
Equipment Type(s)					
> Pollutants Controlled					
Pollutant Description		Reduction Efficiency (%)			
> Processes					
Process	Primary Process				
SCC Code	10500110				
	> External Combustion Boilers				
	> Space Heaters				
	> Industrial				
	> Liquefied Petroleum Gas (LPG)				
Material Processed	Propane				
Period Start	1/1/2014	Period End	12/31/2014		
Throughput					
Total		Summer %	Fall %	Winter %	Spring %
5859.5	gal	As needed	As needed	As needed	As needed
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
As needed	As needed	As needed	As needed		
Fuel Characteristics					
Heat Content	Elem. Sulfur Content	H2S Sulfur Content	Ash Content		
91.6	120 ppm		0		
Heating					
Heat Input		Heat Output		Heat Values Convention	
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide(CO)	3.600e-002	POUNDS	MILLION BTUS	Manufacturer Specification	9.66E-03
Nitrogen Oxides(NOX)	9.000e-002	POUNDS	MILLION BTUS	Manufacturer Specification	2.42E-02
PM10 Primary (Filt + Cond)(PM10-PRI)	4.000e-001	POUNDS	1000 GALLONS	Manufacturer Specification	1.07E-01
PM2.5 Primary (Filt + Cond)(PM25-PRI)	4.000e-001	POUNDS	1000 GALLONS	Manufacturer Specification	1.07E-01
Sulfur Dioxide(SO2)				Material Balance	2.04E-09
Volatile Organic Compounds(VOC)	1.60E-01	POUNDS	MILLION BTUS	Manufacturer Specification	4.29E-03
Process	Secondary Process				
SCC Code	None				
	>				
	>				
	>				
	>				
Material Processed					
Period Start	1/1/2014	Period End	12/31/2014		
Throughput					
Total		Summer %	Fall %	Winter %	Spring %
(#)	(Unit Type)				
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
Fuel Characteristics					
Heat Content	Elem. Sulfur Content	H2S Sulfur Content	Ash Content		
Heating					
Heat Input		Heat Output		Heat Values Convention	
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide(CO)					
Nitrogen Oxides(NOX)					
PM10 Primary (Filt + Cond)(PM10-PRI)					
Sulfur Dioxide(SO2)					
Volatile Organic Compounds(VOC)					
> Release Points					
ID	Description	Type	Apportion %		
11	Building Heater -common stack for EUIDs 11 and 12	Vertical	100		

Emission Unit 12					
> Specifications					
ID	12	Design Capacity	5 MILLION BTU PER HOUR		
Description	Building Heater				
Manufacturer	Bryan Steam	Manufactured Year			
Model Number	RV500-W-FDG w/ gordon-Piatt R10.2-G-50	Serial Number	93434		
> Regulations					
Regulation/Description					
> Control Equipment					
Capture Efficiency (%)	0				
System Description					
Equipment Type(s)					
> Pollutants Controlled					
Pollutant Description			Reduction Efficiency (%)		
> Processes					
Process	Primary Process				
SCC Code	10500110				
	> External Combustion Boilers				
	> Space Heaters				
	> Industrial				
	> Liquefied Petroleum Gas (LPG)				
Material Processed	Propane				
Period Start	1/1/2014	Period End	12/31/2014		
Throughput					
Total		Summer %	Fall %	Winter %	Spring %
5859.5	gal	As needed	As needed	As needed	As needed
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
As needed	As needed	As needed	As needed		
Fuel Characteristics					
Heat Content	Elem. Sulfur Content	H2S Sulfur Content	Ash Content		
91.6	120 ppm		0		
Heating					
Heat Input		Heat Output		Heat Values Convention	
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide(CO)	3.600e-002	POUNDS	MILLION BTUS	Manufacturer Specification	9.66E-03
Nitrogen Oxides(NOX)	9.000e-002	POUNDS	MILLION BTUS	Manufacturer Specification	2.42E-02
PM10 Primary (Filt + Cond)(PM10-PRI)	4.000e-001	POUNDS	1000 GALLONS	Manufacturer Specification	1.07E-01
PM2.5 Primary (Filt + Cond)(PM25-PRI)	4.000e-001	POUNDS	1000 GALLONS	Manufacturer Specification	1.07E-01
Sulfur Dioxide(SO2)				Material Balance	2.04E-09
Volatile Organic Compounds(VOC)	1.60E-02	POUNDS	MILLION BTUS	Manufacturer Specification	4.29E-03
Process	Secondary Process				
SCC Code	None				
	>				
	>				
	>				
	>				
Material Processed	Propane				
Period Start	1/1/2014	Period End	12/31/2014		
Throughput					
Total		Summer %	Fall %	Winter %	Spring %
(#)	(Unit Type)				
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
Fuel Characteristics					
Heat Content	Elem. Sulfur Content	H2S Sulfur Content	Ash Content		
Heating					
Heat Input		Heat Output		Heat Values Convention	
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide(CO)					
Nitrogen Oxides(NOX)					
PM10 Primary (Filt + Cond)(PM10-PRI)					
Sulfur Dioxide(SO2)					
Volatile Organic Compounds(VOC)					
> Release Points					
ID	Description	Type	Apportion %		
11	Building Heater -common stack for EUIDs 11 and 12	Vertical	100		

Release Point 01N					
> Specifications					
ID	01N		Type	Vertical	
Description	GT #1 North Stack				
> Stack Parameters					
Stack Height (ft)	Stack Diameter (ft)	Exit Gas Temp (F)	Exit Gas Velocity (fps)	Exit Gas Flow Rate (acfm)	
62	8.46	729	182	620700	
> Geographic Coordinate					
Latitude	64.73549	Longitude	-147.35021	Datum	NAD 1983
Base Elevation	150 meters	Accuracy	1		
Description					

Release Point 01S				
> Specifications				
ID	01S	Type	Vertical	
Description	GT #1 South Stack			
> Stack Parameters				
Stack Height (ft)	Stack Diameter (ft)	Exit Gas Temp (F)	Exit Gas Velocity (fps)	Exit Gas Flow Rate (acfm)
62	8.46	729	182	620700
> Geographic Coordinate				
Latitude	64.73525	Longitude	-147.35021	Datum
Base Elevation	150 meters	Accuracy	1	
Description				

Release Point 02N					
> Specifications					
ID	02N		Type	Vertical	
Description	GT #2 North Stack				
> Stack Parameters					
Stack Height (ft)	Stack Diameter (ft)	Exit Gas Temp (F)	Exit Gas Velocity (fps)	Exit Gas Flow Rate (acfm)	
62	8.46	729	182	620700	
> Geographic Coordinate					
Latitude	64.735044	Longitude	-147.351072	Datum	NAD 1983
Base Elevation	150 meters	Accuracy	1		
Description					

Release Point 02S					
> Specifications					
ID	02S	Type	Vertical		
Description	GT #2 South Stack				
> Stack Parameters					
Stack Height (ft)	Stack Diameter (ft)	Exit Gas Temp (F)	Exit Gas Velocity (fps)	Exit Gas Flow Rate (acfm)	
62	8.46	729	182	620700	
> Geographic Coordinate					
Latitude	64.73525	Longitude	-147.35127	Datum	NAD 1983
Base Elevation	150 meters	Accuracy	1		
Description					

Release Point 03					
> Specifications					
ID	03		Type	Goose Neck	
Description	Fuel Tank Fugitive				
> Stack Parameters					
Stack Height (ft)	Stack Diameter (ft)	Exit Gas Temp (F)	Exit Gas Velocity (fps)	Exit Gas Flow Rate (acfm)	
> Geographic Coordinate					
Latitude	64.735269	Longitude	-147.352509	Datum	NAD 1983
Base Elevation	150 meters	Accuracy	1		
Description					

Release Point 04					
> Specifications					
ID	04		Type	Goose Neck	
Description	Fuel Tank Fugitive				
> Stack Parameters					
Stack Height (ft)	Stack Diameter (ft)	Exit Gas Temp (F)	Exit Gas Velocity (fps)	Exit Gas Flow Rate (acfm)	
> Geographic Coordinate					
Latitude	64.735321	Longitude	-147.352513	Datum	NAD 1983
Base Elevation	150 meters	Accuracy	1		
Description					

Release Point 05				
> Specifications				
ID	05	Type	Vertical	
Description	GT#3 Stack			
> Stack Parameters				
Stack Height (ft)	Stack Diameter (ft)	Exit Gas Temp (F)	Exit Gas Velocity (fps)	Exit Gas Flow Rate (acfm)
110	8.77 x 11.11	270	73.8	347949
> Geographic Coordinate				
Latitude	64.73526	Longitude	-147.34985	Datum NAD 1983
Base Elevation	150 meters	Accuracy	1	
Description				

Release Point 07					
> Specifications					
ID	07		Type	Vertical	
Description	Emergency Generator Stack				
> Stack Parameters					
Stack Height (ft)	Stack Diameter (ft)	Exit Gas Temp (F)	Exit Gas Velocity (fps)	Exit Gas Flow Rate (acfm)	
27	1	1299	88.7	2878	
> Geographic Coordinate					
Latitude	64.7341	Longitude	-147.35072	Datum	NAD 1983
Base Elevation	150 meters	Accuracy	1		
Description					

Release Point 11				
> Specifications				
ID	11	Type	Vertical	
Description	Building Heaters			
> Stack Parameters				
Stack Height (ft)	Stack Diameter (ft)	Exit Gas Temp (F)	Exit Gas Velocity (fps)	Exit Gas Flow Rate (acfm)
63	0.98	450	121	5477
> Geographic Coordinate				
Latitude	64.73416	Longitude	-147.35072	Datum
Base Elevation	150 meters	Accuracy	1	
Description	common stack for EUIDs 11 and 12			

Adopted



July 5, 2022
RECEIVED
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ADEC AQ

March 30, 2016

Certified Mail
Return Receipt Requested
7014 3490 0002 1165 8863

State of Alaska Department of Environmental Conservation
Air Permits Program
ATTN: Nattinee Nipataruedi
410 Willoughby Ave., Suite 303
P.O. Box 111800
Juneau, Alaska 99811-1800

**Subject: Golden Valley Electric Association
North Pole Power Plant and Zehnder Facility
2015 Triennial Point Source Emission Inventory**

Dear Ms. Nipataruedi,

Golden Valley Electric Association (GVEA) submits the attached 2015 Triennial Point Source Emission Inventories for the North Pole Power Plant and the Zehnder Facility.

If you have any questions or would like any additional information please contact me by phone at 907-458-4557 or by email at nmknight@gvea.com. The certification from Lynn Thompson, Vice President of Power Supply follows.

Sincerely,

Naomi Morton Knight, P.E.
Environmental Health and Safety Officer

Certification

Based on information and belief formed after reasonable inquiry, I certify that the statements and information in and attached to this document are true, accurate and complete.

Sincerely,



Lynn N. Thompson
Vice President of Power Supply

cc: SLR International

Stationary Source Detail	
ADEC ID	110
Name	North Pole Power Plant
Physical Location	1500 H & H Lane
	North Pole, AK 99705
	Lat 64.73444 Long -147.3453
	Description: 1150 H & H Lane North Pole AK
AFS ID	0209000011
Census Area	Fairbanks North Star Borough (090)
Line of Business (NAICS)	221112
	> Utilities
	> Utilities
	> Electric Power Generation, Transmission and Distribution
	> Fossil Fuel Electric Power Generation
Line of Business (SIC)	4911
	> Electric, gas, and sanitary services
	> Electric Services
Owner Name & Address	Golden Valley Electric Association
	PO Box 71249
	Fairbanks, AK 99707-1249

Emission Unit 01					
> Specifications					
ID	01		Design Capacity	672 MILLION BTU PER HOUR	
Description	GT#1 Gas Turbine		Manufacturer	General Electric	
Manufacturer	General Electric		Manufactured Year	Installed 1976	
Model Number	Frame 7 Series 7001 Model BR		Serial Number	238057	
> Regulations					
Regulation/Description					
Not Applicable					
> Control Equipment					
Capture Efficiency (%)	0				
System Description	None				
Equipment Type(s)	None				
> Pollutants Controlled					
Pollutant Description			Reduction Efficiency (%)		
Not Applicable			Not Applicable		
> Processes					
Process	Primary Process				
SCC Code	20100109				
	<ul style="list-style-type: none"> > Internal Combustion Engines > Electric Generation > Distillate Oil (Diesel) > Turbine: Exhaust 				
Material Processed	Distillate Oil (No. 2)				
Period Start	1/1/2015		Period End	12/31/2015	
Throughput					
Total		Summer %	Fall %	Winter %	Spring %
293,810	gallons	1	78	0	21
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
0.1	0.4	0.8	134.6		
Fuel Characteristics					
Heat Content (MMBtu/keal)	Elem. Sulfur Content (wt. pct. S)	H2S Sulfur Content	Ash Content		
138.359	0.396	Not Available	Not Available		
Heating					
Heat Input (MMBtu)	40,651		Heat Output	Not Available	
			Heat Values Convention		
			HHV		
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide(CO)	3.300e-003	POUNDS	MILLION BTUS	AP-42 Table 3.1-1	0.07
Ammonia (NH3)	Not Available	Not Available	Not Available	Not Available	Not Available
Nitrogen Oxides(NOx)	8.800e-001	POUNDS	MILLION BTUS	AP-42 Table 3.1-1	17.89
PM10 Primary (Filt + Cond)(PM10-PRI)	1.20E-02	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	0.24
PM2.5 Primary (Filt + Cond)(PM25-PRI)	1.20E-02	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	0.24
Sulfur Dioxide(SO2)	5.62E-02	POUNDS	GALLON	Mass Balance	8.26
Lead and lead compounds	1.40E-05	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	0.00
Volatile Organic Compounds(VOC)	4.100e-004	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	0.01
Process					
Process	Secondary Process				
SCC Code	20100101				
	<ul style="list-style-type: none"> > Internal Combustion Engines > Electric Generation > Distillate Oil (Diesel) > Turbine: Exhaust 				
Material Processed	Distillate Oil (No. 1)				
Period Start	1/1/2015		Period End	12/31/2015	
Throughput					
Total		Summer %	Fall %	Winter %	Spring %
31,295	gallons	2	33	0	65
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
0.1	0.4	0.8	134.6		
Fuel Characteristics					
Heat Content (MMBtu/keal)	Elem. Sulfur Content (wt. pct. S)	H2S Sulfur Content	Ash Content		
133.872	0.098	Not Available	Not Available		
Heating					

Emission Unit 01					
Heat Input (MMBtu)		Heat Output		Heat Values Convention	
4,190		Not Available		HHV	
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide(CO)	3.300e-003	POUNDS	MILLION BTUS	AP-42 Table 3.1-1	0.01
Ammonia (NH3)	Not Available	Not Available	Not Available	Not Available	Not Available
Nitrogen Oxides(NOx)	8.800e-001	POUNDS	MILLION BTUS	AP-42 Table 3.1-1	1.84
PM10 Primary (Filt + Cond)(PM10-PRI)	1.20E-02	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	0.03
PM2.5 Primary (Filt + Cond)(PM25-PRI)	1.20E-02	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	0.03
Sulfur Dioxide(SO2)	1.33E-02	POUNDS	GALLON	Mass Balance	0.21
Lead and lead compounds	1.40E-05	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	0.00
Volatile Organic Compounds(VOC)	4.100e-004	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	0.00
> Release Points					
ID	Description	Type		Apportion %	
01N	GT #1 North Stack	Vertical		50	
01S	GT #1 South Stack	Vertical		50	
Release Point 01N					
> Specifications					
ID	01N	Type		Vertical	
Description	GT #1 North Stack				
> Stack Parameters					
Stack Height (ft)	Stack Diameter (ft)	Exit Gas Temp (F)	Exit Gas Velocity (fps)	Exit Gas Flow Rate (acfm)	
62	8.46	729	182	620700	
> Geographic Coordinate					
Latitude	64.73549	Longitude	-147.35021	Datum	NAD 1983
Base Elevation	150	Accuracy	1		
Description	None				
Release Point 01S					
> Specifications					
ID	01S	Type		Vertical	
Description	GT #1 South Stack				
> Stack Parameters					
Stack Height (ft)	Stack Diameter (ft)	Exit Gas Temp (F)	Exit Gas Velocity (fps)	Exit Gas Flow Rate (acfm)	
62	8.46	729	182	620700	
> Geographic Coordinate					
Latitude	64.73525	Longitude	-147.35021	Datum	NAD 1983
Base Elevation	150	Accuracy	1		
Description	None				

Emission Unit 02					
> Specifications					
ID	02	Design Capacity	672 MILLION BTU PER HOUR		
Description	GT#2 Gas Turbine				
Manufacturer	General Electric	Manufactured Year	Installed 1977		
Model Number	Frame 7, Series 7001, Model BR	Serial Number	248861		
> Regulations					
Regulation/Description					
> Control Equipment					
Capture Efficiency (%)	0				
System Description	None				
Equipment Type(s)	None				
> Pollutants Controlled					
Pollutant Description			Reduction Efficiency (%)		
Not Applicable			Not Applicable		
> Processes					
Process	Primary Process				
SCC Code	20100109				
	> Internal Combustion Engines				
	> Electric Generation				
	> Distillate Oil (Diesel)				
	> Turbine: Exhaust				
Material Processed	Distillate Oil (No. 2)				
Period Start	1/1/2015	Period End	12/31/2015		
Throughput					
Total		Summer %	Fall %	Winter %	Spring %
4,590,986	gallons	16	40	32	12
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
1.6	5.4	11.7	1,970.5		
Fuel Characteristics					
Heat Content (MMBtu/keal)	Elem. Sulfur Content (wt. pct. S)	H2S Sulfur Content	Ash Content		
138.359	0.396	Not Available	Not Available		
Heating					
Heat Input (MMBtu)		Heat Output	Heat Values Convention		
635,206		Not Available	HHV		
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide(CO)	3.300e-003	POUNDS	MILLION BTUS	AP-42 Table 3.1-1	1.05
Ammonia (NH3)	Not Available	Not Available	Not Available	Not Available	Not Available
Nitrogen Oxides(NOX)	8.800e-001	POUNDS	MILLION BTUS	AP-42 Table 3.1-1	279.49
PM10 Primary (Filt + Cond)(PM10-PRI)	1.20E-02	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	3.81
PM2.5 Primary (Filt + Cond)(PM2.5-PRI)	1.20E-02	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	3.81
Sulfur Dioxide(SO2)	5.62E-02	POUNDS	GALLON	Mass Balance	129.05
Lead and lead compounds	1.40E-05	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	0.00
Volatile Organic Compounds(VOC)	4.100e-004	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	0.13
Process					
Secondary Process					
SCC Code	20100101				
	> Internal Combustion Engines				
	> Electric Generation				
	> Distillate Oil (Diesel)				
	> Turbine: Exhaust				
Material Processed	Distillate Oil (No. 1)				
Period Start	1/1/2015	Period End	12/31/2015		
Throughput					
Total		Summer %	Fall %	Winter %	Spring %
403,665	gallons	7	33	51	9
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
1.6	5.4	11.7	1,970.5		
Fuel Characteristics					
Heat Content (MMBtu/keal)	Elem. Sulfur Content (wt. pct. S)	H2S Sulfur Content	Ash Content		
133.872	0.098	Not Available	Not Available		
Heating					

Emission Unit 02					
Heat Input (MMBtu)		Heat Output		Heat Values Convention	
54,039		Not Available		HHV	
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide(CO)	3.300e-003	POUNDS	MILLION BTUS	AP-42 Table 3.1-1	0.09
Ammonia (NH3)	Not Available	Not Available	Not Available	Not Available	Not Available
Nitrogen Oxide _x (NOX)	8.800e-001	POUNDS	MILLION BTUS	AP-42 Table 3.1-1	23.78
PM10 Primary (Filt + Cond)(PM10-PRI)	1.20E-02	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	0.32
PM2.5 Primary (Filt + Cond)(PM25-PRI)	1.20E-02	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	0.32
Sulfur Dioxide(SO2)	1.33E-02	POUNDS	GALLON	Mass Balance	2.69
Lead and lead compounds	1.40E-05	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	0.00
Volatile Organic Compounds(VOC)	4.100e-004	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	0.01
> Release Points					
ID	Description			Type	Apportion %
02N	GT #2 North Stack			Vertical	50
02S	GT #2 South Stack			Vertical	50
Release Point 02N					
> Specifications					
ID	02N			Type	Vertical
Description	GT #2 North Stack				
> Stack Parameters					
Stack Height (ft)	Stack Diameter (ft)	Exit Gas Temp (F)	Exit Gas Velocity (fps)	Exit Gas Flow Rate (acfm)	
62	8.46	729	182	620700	
> Geographic Coordinate					
Latitude	64.735044	Longitude	-147.351072	Datum	NAD 1983
Base Elevation	150	Accuracy	1		
Description	None				
Release Point 02S					
> Specifications					
ID	02S			Type	Vertical
Description	GT #2 South Stack				
> Stack Parameters					
Stack Height (ft)	Stack Diameter (ft)	Exit Gas Temp (F)	Exit Gas Velocity (fps)	Exit Gas Flow Rate (acfm)	
62	8.46	729	182	620700	
> Geographic Coordinate					
Latitude	64.73525	Longitude	-147.35127	Datum	NAD 1983
Base Elevation	150	Accuracy	1		
Description	None				

Emission Unit 03					
> Specifications					
ID	03	Design Capacity	50,000 gallons		
Description	Fuel Storage Tank				
Manufacturer	Unknown	Manufactured Year	Unknown		
Model Number	Unknown	Serial Number	Unknown		
> Regulations					
Regulation/Description					
Not Applicable					
> Control Equipment					
Capture Efficiency (%)	0				
System Description	None				
Equipment Type(s)	None				
> Pollutants Controlled					
Pollutant Description			Reduction Efficiency (%)		
Not Applicable			Not Applicable		
> Processes					
Process	Primary Process				
SCC Code	20100108				
	> Internal Combustion Engines				
	> Electric Generation				
	> Distillate Oil (Diesel)				
	> Turbine: Evaporative Losses (Fuel Storage and Delivery System)				
Material Processed	Diesel (No. 1)				
Period Start	1/1/2015	Period End	12/31/2015		
Throughput					
Total		Summer %	Fall %	Winter %	Spring %
	1,306,998 gallons	64	15	16	5
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
7	24	52	8760		
Fuel Characteristics					
Heat Content	Elem. Sulfur Content	H2S Sulfur Content	Ash Content		
Not Applicable	Not Applicable	Not Applicable	Not Applicable		
Heating					
Heat Input		Heat Output		Heat Values Convention	
Not Applicable		Not Applicable		Not Applicable	
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide(CO)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Ammonia (NH3)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Nitrogen Oxides(NOx)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM10 Primary (Filt + Cond)(PM10-PR1)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM2.5 Primary (Filt + Cond)(PM25-PR1)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Sulfur Dioxide(SO2)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Lead and lead compounds	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Volatile Organic Compounds(VOC)	Not Applicable	Not Applicable	Not Applicable	Tanks 4.09d	0.00
Process					
Process	Secondary Process				
SCC Code	Not Applicable				
	Not Applicable				
	Not Applicable				
	Not Applicable				
	Not Applicable				
Material Processed	Not Applicable				
Period Start	1/1/2015	Period End	12/31/2015		
Throughput					
Total		Summer %	Fall %	Winter %	Spring %
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
Not Applicable	Not Applicable	Not Applicable	Not Applicable		
Fuel Characteristics					
Heat Content	Elem. Sulfur Content	H2S Sulfur Content	Ash Content		
Not Applicable	Not Applicable	Not Applicable	Not Applicable		
Heating					
Heat Input		Heat Output		Heat Values Convention	
Not Applicable		Not Applicable		Not Applicable	

Emission Unit 03					
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide(CO)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Ammonia (NH3)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Nitrogen Oxides(NOX)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM10 Primary (Filt + Cond)(PM10-PRI)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM2.5 Primary (Filt + Cond)(PM25-PRI)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Sulfur Dioxide(SO2)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Lead and lead compounds	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Volatile Organic Compounds(VOC)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
> Release Points					
ID	Description	Type	Apportion %		
03	Fuel Storage Tank	Goose Neck	100		
Release Point 03					
> Specifications					
ID	Description	Type	Apportion %		
03	Fuel Storage Tank	Goose Neck	100		
> Stack Parameters					
Stack Height (ft)	Stack Diameter (ft)	Exit Gas Temp (F)	Exit Gas Velocity (fps)	Exit Gas Flow Rate (acfm)	
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
> Geographic Coordinate					
Latitude	Longitude	Datum	Accuracy		
Not Applicable	Not Applicable	Not Applicable	Not Applicable		
Base Elevation	Description				
150	None				

Emission Unit 04					
> Specifications					
ID	4	Design Capacity	50,000 gallons		
Description	Fuel Storage Tank				
Manufacturer	Unknown	Manufactured Year	Unknown		
Model Number	Unknown	Serial Number	Unknown		
> Regulations					
Regulation/Description					
Not Applicable					
> Control Equipment					
Capture Efficiency (%)	0				
System Description	None				
Equipment Type(s)	None				
> Pollutants Controlled					
Pollutant Description			Reduction Efficiency (%)		
Not Applicable			Not Applicable		
> Processes					
Process	Primary Process				
SCC Code	20100108				
	> Internal Combustion Engines > Electric Generation > Distillate Oil (Diesel) > Turbine: Evaporative Losses (Fuel Storage and Delivery System)				
Material Processed	Diesel (No. 2)				
Period Start	1/1/2015	Period End	12/31/2015		
Throughput					
Total		Summer %	Fall %	Winter %	Spring %
	4,884,924 gallons	15	42	31	12
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
7	24	52	8760		
Fuel Characteristics					
Heat Content	Elem. Sulfur Content	H2S Sulfur Content	Ash Content		
Not Applicable	Not Applicable	Not Applicable	Not Applicable		
Heating					
Heat Input		Heat Output		Heat Values Convention	
Not Applicable		Not Applicable		Not Applicable	
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide(CO)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Ammonia (NH3)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Nitrogen Oxides(NOx)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM10 Primary (Filt + Cond)(PM10-PR1)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM2.5 Primary (Filt + Cond)(PM25-PR1)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Sulfur Dioxide(SO2)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Lead and lead compounds	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Volatile Organic Compounds(VOC)	Not Applicable	Not Applicable	Not Applicable	Tanks 4.09d	0.00
Process					
Secondary Process					
SCC Code	Not Applicable				
	Not Applicable				
	Not Applicable				
	Not Applicable				
	Not Applicable				
Material Processed	Not Applicable				
Period Start	1/1/2015	Period End	12/31/2015		
Throughput					
Total		Summer %	Fall %	Winter %	Spring %
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
Not Applicable	Not Applicable	Not Applicable	Not Applicable		
Fuel Characteristics					
Heat Content	Elem. Sulfur Content	H2S Sulfur Content	Ash Content		
Not Applicable	Not Applicable	Not Applicable	Not Applicable		
Heating					
Heat Input		Heat Output		Heat Values Convention	
Not Applicable		Not Applicable		Not Applicable	

Emission Unit 04					
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide(CO)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Ammonia (NH3)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Nitrogen Oxides(NOx)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM10 Primary (Filt + Cond)(PM10-PR)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM2.5 Primary (Filt + Cond)(PM25-PR)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Sulfur Dioxide(SO2)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Lead and lead compounds	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Volatile Organic Compounds(VOC)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
> Release Points					
ID	Description	Type	Apportion %		
03	Fuel Storage Tank	Goose Neck	100		
Release Point 04					
> Specifications					
ID	04	Type	Goose Neck		
Description	Fuel Storage Tank				
> Stack Parameters					
Stack Height (ft)	Stack Diameter (ft)	Exit Gas Temp (F)	Exit Gas Velocity (fps)	Exit Gas Flow Rate (acfm)	
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	
> Geographic Coordinate					
Latitude	Not Applicable	Longitude	Not Applicable	Datum	Not Applicable
Base Elevation	150	Accuracy	Not Applicable		
Description	None				

Emission Unit 05					
> Specifications					
ID	05		Design Capacity	455 MILLION BTU PER HOUR	
Description	GT#3 Gas Turbine				
Manufacturer	General Electric		Manufactured Year	Purchased 2004	
Model Number	LM6000PC		Serial Number	191-548	
> Regulations					
Regulation/Description					
40 CFR 60 Subpart GG					
> Control Equipment					
Capture Efficiency (%)	77				
System Description	Weir Rotojet Water Injection (NO)				
Equipment Type(s)	Water Injection				
> Pollutants Controlled					
Pollutant Description			Reduction Efficiency (%)		
Carbon Monoxide			66		
Nitrogen Oxides			77		
> Processes					
Process	Primary Process				
SCC Code	20100909				
	> Internal Combustion Engines				
	> Electric Generation				
	> Kerosene/Naphtha (Jet Fuel)				
	> Turbine: Exhaust				
Material Processed	Naphtha				
Period Start	1/1/2015		Period End	12/31/2015	
Throughput					
Total		Summer %	Fall %	Winter %	Spring %
	19,255,411 gallons	23	21	26	30
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
6.0	20.5	44.5	7,469.0		
Fuel Characteristics					
Heat Content (MMBtu/kgal)	Elem. Sulfur Content (wt. pct. S)	H2S Sulfur Content	Ash Content		
117.78175	0.0026	Not Available	Not Available		
Heating					
Heat Input (MMBtu)	Heat Output		Heat Values Convention		
2,267,936	Not Available		HHV		
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide(CO)	0.076	POUNDS	MILLION BTUS	AP-42 Table 3.1-1	86.18
Ammonia (NH3)	Not Available	Not Available	Not Available	Not Available	Not Available
Nitrogen Oxides(NOx)	0.24	POUNDS	MILLION BTUS	AP-42 Table 3.1-1	272.15
PM10 Primary (Filt + Cond)(PM10-PR)	1.20E-02	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	13.61
PM2.5 Primary (Filt + Cond)(PM25-PR)	1.20E-02	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	13.61
Sulfur Dioxide(SO2)	3.14E-04	POUNDS	GALLON	Mass Balance	3.02
Lead and lead compounds	1.40E-05	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	0.02
Volatile Organic Compounds(VOC)	4.100e-004	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	0.46
Process					
Process	Secondary Process				
SCC Code	20100909				
	> Internal Combustion Engines				
	> Electric Generation				
	> Distillate Oil (Diesel)				
	> Turbine: Exhaust				
Material Processed	Distillate Oil (No. 1)				
Period Start	1/1/2015		Period End	12/31/2015	
Throughput					
Total		Summer %	Fall %	Winter %	Spring %
	872,038 gallons	93	6	0	1
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
6.0	20.5	44.5	7,469.0		
Fuel Characteristics					
Heat Content (MMBtu/kgal)	Elem. Sulfur Content (wt. pct. S)	H2S Sulfur Content	Ash Content		
139.591	0.098	Not Available	Not Available		

Emission Unit 05					
Heating					
Heat Input (MMBtu)		Heat Output		Heat Values Convention	
121,729		Not Available		HHV	
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide(CO)	0.076	POUNDS	MILLION BTUS	AP-42 Table 3.1-1	4.63
Ammonia (NH3)	Not Available	Not Available	Not Available	Not Available	Not Available
Nitrogen Oxides(NOx)	0.24	POUNDS	MILLION BTUS	AP-42 Table 3.1-1	14.61
PM10 Primary (Filt + Cond)(PM10-PR1)	1.20E-02	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	0.73
PM2.5 Primary (Filt + Cond)(PM25-PR1)	1.20E-02	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	0.73
Sulfur Dioxide(SO2)	1.34E-02	POUNDS	GALLON	Mass Balance	5.82
Lead and lead compounds	1.40E-05	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	0.00
Volatile Organic Compounds(VOC)	4.100e-004	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	0.02
> Release Points					
ID	Description	Type		Apportion %	
05	GT#3 Stack	Vertical		100	
Release Point 05					
> Specifications					
ID	05	Type		Vertical	
Description	GT#3 Stack				
> Stack Parameters					
Stack Height (ft)	Stack Diameter (ft)	Exit Gas Temp (F)	Exit Gas Velocity (fps)	Exit Gas Flow Rate (acfm)	
110	11.11	270	73.8	347,949	
> Geographic Coordinate					
Latitude	64.73526	Longitude	-147.34985	Datum	NAD 1983
Base Elevation	150	Accuracy	1		
Description	None				

Emission Unit 06					
> Specifications					
ID	06	Design Capacity	455 MILLION BTU PER HOUR		
Description	GT#4 Gas Turbine				
Manufacturer	General Electric	Manufactured Year	This unit has not been installed		
Model Number	LM6000PC	Serial Number	T8D		
> Regulations					
Regulation/Description					
Not Applicable					
> Control Equipment					
Capture Efficiency (%)	Not Applicable				
System Description	Not Applicable				
Equipment Type(s)	Not Applicable				
> Pollutants Controlled					
Pollutant Description			Reduction Efficiency (%)		
Not Applicable			Not Applicable		
> Processes					
Process	Primary Process				
SCC Code	Not Applicable				
	Not Applicable				
	Not Applicable				
	Not Applicable				
	Not Applicable				
Material Processed	Not Applicable				
Period Start	1/1/2015	Period End	12/31/2015		
Throughput					
Total	Summer %	Fall %	Winter %	Spring %	
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
Not Applicable	Not Applicable	Not Applicable	Not Applicable		
Fuel Characteristics					
Heat Content	Elem. Sulfur Content	H2S Sulfur Content	Ash Content		
Not Applicable	Not Applicable	Not Applicable	Not Applicable		
Heating					
Heat Input	Heat Output		Heat Values Convention		
Not Applicable	Not Applicable		Not Applicable		
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide(CO)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Ammonia (NH3)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Nitrogen Oxides(NOx)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM10 Primary (Filt + Condi)(PM10-PR1)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM2.5 Primary (Filt + Condi)(PM25-PR1)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Sulfur Dioxide(SO2)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Lead and lead compounds	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Volatile Organic Compounds(VOC)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Secondary Process					
Process	Secondary Process				
SCC Code	Not Applicable				
	Not Applicable				
	Not Applicable				
	Not Applicable				
	Not Applicable				
Material Processed	Not Applicable				
Period Start	1/1/2015	Period End	12/31/2015		
Throughput					
Total	Summer %	Fall %	Winter %	Spring %	
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
Not Applicable	Not Applicable	Not Applicable	Not Applicable		
Fuel Characteristics					
Heat Content	Elem. Sulfur Content	H2S Sulfur Content	Ash Content		
Not Applicable	Not Applicable	Not Applicable	Not Applicable		
Heating					
Heat Input	Heat Output		Heat Values Convention		
Not Applicable	Not Applicable		Not Applicable		

Emission Unit 06					
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide(CO)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Ammonia (NH3)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Nitrogen Oxides(NOx)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM10 Primary (Filt + Cond)(PM10-PR1)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM2.5 Primary (Filt + Cond)(PM25-PR1)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Sulfur Dioxide(SO2)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Lead and lead compounds	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Volatile Organic Compounds(VOC)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
> Release Points					
ID	Description			Type	Apportion %
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable

Emission Unit 07					
> Specifications					
ID	07	Design Capacity	565 hp		
Description	Emergency Generator Engine				
Manufacturer	Generac Gen Set	Manufactured Year	Installed 2005		
Model Number	5231150100	Serial Number	2083094		
> Regulations					
Regulation/Description					
40 CFR 63 Subpart ZZZZ					
> Control Equipment					
Capture Efficiency (%)	0				
System Description	None				
Equipment Type(s)	None				
> Pollutants Controlled					
Pollutant Description			Reduction Efficiency (%)		
Not Applicable			Not Applicable		
> Processes					
Process	Primary Process				
SCC Code	20100907				
	> Internal Combustion Engines > Electric Generation > Distillate Oil (Diesel) > Reciprocating: Exhaust				
Material Processed	Distillate Oil (No. 2)				
Period Start	1/1/2015	Period End	12/31/2015		
Throughput					
Total	Summer %	Fall %	Winter %	Spring %	
128 gallons	24	0	38	38	
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
0	0	0	4		
Fuel Characteristics					
Heat Content (MMBtu/kgal)	Elem. Sulfur Content (wt. pct. S)	H2S Sulfur Content	Ash Content		
138.359	0.396	Not Available	Not Available		
Heating					
Heat Input (MMBtu)	Heat Output	Heat Values Convention			
18	Not Available	HHV			
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide(CO)	6.68E-03	POUNDS	HORSEPOWER-HOUR	AP-42 Table 3.3-1	0.01
Ammonia (NH3)	N/A	N/A	N/A	N/A	N/A
Nitrogen Oxides(NOx)	0.031	POUNDS	HORSEPOWER-HOUR	AP-42 Table 3.3-1	0.04
PM10 Primary (Filt + Cond)(PM10-PRI)	2.20E-03	POUNDS	HORSEPOWER-HOUR	AP-42 Table 3.3-1	0.00
PM2.5 Primary (Filt + Cond)(PM2.5-PRI)	2.20E-03	POUNDS	HORSEPOWER-HOUR	AP-42 Table 3.3-1	0.00
Sulfur Dioxide(SO2)	5.62E-02	POUNDS	GALLON	Mass Balance	0.00
Lead and lead compounds	N/A	N/A	N/A	N/A	N/A
Volatile Organic Compounds(VOC)	2.51E-03	POUNDS	MILLION BTUS	AP-42 Table 3.3-1	0.00
Process					
Secondary Process					
SCC Code	Not Applicable				
	Not Applicable				
	Not Applicable				
	Not Applicable				
	Not Applicable				
Material Processed	Not Applicable				
Period Start	1/1/2015	Period End	12/31/2015		
Throughput					
Total	Summer %	Fall %	Winter %	Spring %	
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
Not Applicable	Not Applicable	Not Applicable	Not Applicable		
Fuel Characteristics					
Heat Content (MMBtu/kgal)	Elem. Sulfur Content (wt. pct. S)	H2S Sulfur Content	Ash Content		
Not Applicable	Not Applicable	Not Applicable	Not Applicable		
Heating					

Emission Unit 07					
Heat Input		Heat Output		Heat Values Convention	
Not Applicable		Not Applicable		Not Applicable	
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons Per Year
Carbon Monoxide(CO)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Ammonia (NH3)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Nitrogen Oxides(NOX)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM10 Primary (Filt + Cond)(PM10-PR1)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM2.5 Primary (Filt + Cond)(PM25-PR1)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Sulfur Dioxide(SO2)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Lead and lead compounds	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Volatile Organic Compounds(VOC)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
> Release Points					
ID	Description	Type		Apportion %	
07	Emergency Generator Stack	Vertical		100	
Release Point 07					
> Specifications					
ID	07	Type		Vertical	
Description	Emergency Generator Stack				
> Stack Parameters					
Stack Height (ft)	Stack Diameter (ft)	Exit Gas Temp (F)	Exit Gas Velocity (fps)	Exit Gas Flow Rate (acfm)	
27	0.83	1299	88.7	2878	
> Geographic Coordinate					
Latitude	64.7341	Longitude	-147.35072	Datum	NAD 1983
Base Elevation	150	Accuracy	1		
Description	None				

Emission Unit 11					
> Specifications					
ID	11	Design Capacity	5 MILLION BTU PER HOUR		
Description	Building Heater				
Manufacturer	Bryan Steam	Manufactured Year	Installed 2005		
Model Number	RV500	Serial Number	93433		
> Regulations					
Regulation/Description					
Not Applicable					
> Control Equipment					
Capture Efficiency (%)	0				
System Description	None				
Equipment Type(s)	None				
> Pollutants Controlled					
Pollutant Description			Reduction Efficiency (%)		
Not Applicable			Not Applicable		
> Processes					
Process	Primary Process				
SCC Code	10500110				
	<ul style="list-style-type: none"> > External Combustion Boilers > Space Heaters > Industrial > Liquefied Petroleum Gas (LPG) 				
Material Processed	Propane				
Period Start	1/1/2015	Period End	12/31/2015		
Throughput					
Total		Summer %	Fall %	Winter %	Spring %
11,848	gallons	9	18	62	11
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
4.1	14.1	30.7	5160		
Fuel Characteristics					
Heat Content (MMBtu/keal)	Elem. Sulfur Content (wt. pct. S)	H2S Sulfur Content (vol. pct. H2S)	Ash Content		
91.6	7.81E-06	0.5	Not Available		
Heating					
Heat Input (MMBtu)	1,085	Heat Output	Not Available		
				Heat Values Convention	
				HHV	
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide(CO)	7.5	POUNDS	1,000 GALLONS	AP-42 Table 1.5-1	0.04
Ammonia (NH3)	Not Available	Not Available	Not Available	Not Available	Not Available
Nitrogen Oxides(NOx)	13	POUNDS	1,000 GALLONS	AP-42 Table 1.5-1	0.08
PM10 Primary (Filt + Cond)(PM10-PR1)	0.7	POUNDS	1,000 GALLONS	AP-42 Table 1.5-1	0.00
PM2.5 Primary (Filt + Cond)(PM2.5-PR1)	0.7	POUNDS	1,000 GALLONS	AP-42 Table 1.5-1	0.00
Sulfur Dioxide(SO2)	1.09E-06	POUNDS	GALLON	Mass Balance	0.00
Lead and lead compounds	N/A	N/A	N/A	N/A	N/A
Volatile Organic Compounds(VOC)	1	POUNDS	1,000 GALLONS	AP-42 Table 1.5-1	0.01
Process					
Process	Secondary Process				
SCC Code	Not Applicable				
	Not Applicable				
	Not Applicable				
	Not Applicable				
	Not Applicable				
Material Processed	Not Applicable				
Period Start	1/1/2015	Period End	12/31/2015		
Throughput					
Total		Summer %	Fall %	Winter %	Spring %
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
Not Applicable	Not Applicable	Not Applicable	Not Applicable		
Fuel Characteristics					
Heat Content	Elem. Sulfur Content	H2S Sulfur Content	Ash Content		
Not Applicable	Not Applicable	Not Applicable	Not Applicable		
Heating					
Heat Input		Heat Output	Heat Values Convention		

Emission Unit 11					
Not Applicable		Not Applicable		Not Applicable	
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide(CO)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Ammonia (NH3)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Nitrogen Oxides(NOx)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM10 Primary (Filt + Cond)(PM10-PRI)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM2.5 Primary (Filt + Cond)(PM25-PRI)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Sulfur Dioxide(SO2)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Lead and lead compounds	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Volatile Organic Compounds(VOC)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
> Release Points					
ID	Description			Type	Apportion %
11	Building Heater			Vertical	100
Release Point 11					
> Specifications					
ID	11	Type		Vertical	
Description	Building Heater				
> Stack Parameters					
Stack Height (ft)	Stack Diameter (ft)	Exit Gas Temp (F)	Exit Gas Velocity (fps)	Exit Gas Flow Rate (acfm)	
63	0.98	450	121	5477	
> Geographic Coordinate					
Latitude	64.73416	Longitude	-147.35072	Datum	NAD 1983
Base Elevation	150	Accuracy	1		
Description	None				

Emission Unit 12					
> Specifications					
ID	12	Design Capacity	5 MILLION BTU PER HOUR		
Description	Building Heater				
Manufacturer	Bryan Steam	Manufactured Year	Installed 2005		
Model Number	RV500	Serial Number	93434		
> Regulations					
Regulation/Description					
Not Applicable					
> Control Equipment					
Capture Efficiency (%)	0				
System Description	None				
Equipment Type(s)	None				
> Pollutants Controlled					
Pollutant Description			Reduction Efficiency (%)		
Not Applicable			Not Applicable		
> Processes					
Process	Primary Process				
SCC Code	10500110				
	> External Combustion Boilers > Space Heaters > Industrial > Liquefied Petroleum Gas (LPG)				
Material Processed	Propane				
Period Start	1/1/2015	Period End	12/31/2015		
Throughput					
Total		Summer %	Fall %	Winter %	Spring %
11,848	gallons	9	18	62	11
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
4.1	14.1	30.7	5160		
Fuel Characteristics					
Heat Content (MMBtu/kgal)	Elem. Sulfur Content (wt. pct. S)	H2S Sulfur Content (vol. pct. H2S)	Ash Content		
91.6	7.81E-06	0.5	Not Available		
Heating					
Heat Input (MMBtu)	1,085	Heat Output	Not Available		
				Heat Values Convention	
				HHV	
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide(CO)	7.5	POUNDS	1,000 GALLONS	AP-42 Table 1.5-1	0.04
Ammonia (NH3)	Not Available	Not Available	Not Available	Not Available	Not Available
Nitrogen Oxides(NOX)	13	POUNDS	1,000 GALLONS	AP-42 Table 1.5-1	0.08
PM10 Primary (Filt + Cond)(PM10-PR1)	0.7	POUNDS	1,000 GALLONS	AP-42 Table 1.5-1	0.00
PM2.5 Primary (Filt + Cond)(PM25-PR1)	0.7	POUNDS	1,000 GALLONS	AP-42 Table 1.5-1	0.00
Sulfur Dioxide(SO2)	1.09E-06	POUNDS	GALLON	Mass Balance	0.00
Lead and lead compounds	N/A	N/A	N/A	N/A	N/A
Volatile Organic Compounds(VOC)	1	POUNDS	1,000 GALLONS	AP-42 Table 1.5-1	0.01
Process					
Process	Secondary Process				
SCC Code	Not Applicable				
	Not Applicable				
	Not Applicable				
	Not Applicable				
	Not Applicable				
Material Processed	Not Applicable				
Period Start	1/1/2015	Period End	12/31/2015		
Throughput					
Total		Summer %	Fall %	Winter %	Spring %
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
Not Applicable	Not Applicable	Not Applicable	Not Applicable		
Fuel Characteristics					
Heat Content	Elem. Sulfur Content	H2S Sulfur Content	Ash Content		
Not Applicable	Not Applicable	Not Applicable	Not Applicable		
Heating					

Emission Unit 12					
Heat Input		Heat Output		Heat Values Convention	
Not Applicable		Not Applicable		Not Applicable	
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide(CO)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Ammonia (NH3)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Nitrogen Oxides(NOx)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM10 Primary (Filt + Cond)(PM10-PR1)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM2.5 Primary (Filt + Cond)(PM25-PR1)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Sulfur Dioxide(SO2)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Lead and lead compounds	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Volatile Organic Compounds(VOC)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
> Release Points					
ID	Description			Type	Apportion %
11	Building Heater			Vertical	100
Release Point 12					
> Specifications					
ID	12	Type		Vertical	
Description	Building Heater				
> Stack Parameters					
Stack Height (ft)	Stack Diameter (ft)	Exit Gas Temp (F)	Exit Gas Velocity (fps)	Exit Gas Flow Rate (acfm)	
63	0.98	450	121	5477	
> Geographic Coordinate					
Latitude	64.33415	Longitude	-147.35011	Datum	NAD 1983
Base Elevation	150	Accuracy	1		
Description	None				

Golden Valley Electric Association
2016 Emission Inventories

North Pole Power Plant – AQ0110TVP03

Stationary Source Detail	
ADEC ID	110
Name	North Pole Power Plant
Physical Location	1500 H & H Lane
	North Pole, AK 99705
	Lat 64.73444 Long -147.3453
	Description: 1150 H & H Lane North Pole AK
AFS ID	0209000011
Census Area	Fairbanks North Star Borough (090)
Line of Business (NAICS)	221112
	> Utilities
	> Utilities
	> Electric Power Generation, Transmission and Distribution
	> Fossil Fuel Electric Power Generation
Line of Business (SIC)	4911
	> Electric, gas, and sanitary services
	> Electric Services
Owner Name & Address	Golden Valley Electric Association
	PO Box 71249
	Fairbanks, AK 99707-1249

Emission Unit 01					
> Specifications					
ID	01	Design Capacity	672 MILLION BTU PER HOUR		
Description	GT#1 Gas Turbine				
Manufacturer	General Electric	Manufactured Year	Installed 1976		
Model Number	Frame 7 Series 7001 Model BR	Serial Number	238057		
> Regulations					
Regulation/Description					
Not Applicable					
> Control Equipment					
Capture Efficiency (%)	0				
System Description	None				
Equipment Type(s)	None				
> Pollutants Controlled					
Pollutant Description				Reduction Efficiency (%)	
Not Applicable				Not Applicable	
> Processes					
Process	Primary Process				
SCC Code	20100109				
	> Internal Combustion Engines				
	> Electric Generation				
	> Distillate Oil (Diesel)				
	> Turbine: Exhaust				
Material Processed	Distillate Oil (No. 2)				
Period Start	1/1/2016	Period End	12/31/2016		
Throughput					
Total		Summer %	Fall %	Winter %	Spring %
1,279,961	gallons	3	57	16	24
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
0.5	1.6	3.4	568.7		
Fuel Characteristics					
Heat Content (MMBtu/kgal)	Elem. Sulfur Content (wt. pct. S)	H2S Sulfur Content	Ash Content		
137.575	0.379	Not Available	Not Available		
Heating					
Heat Input (MMBtu)		Heat Output		Heat Values Convention	
176,091		Not Available		HHV	
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide(CO)	3.3E-03	POUNDS	MILLION BTUS	AP-42 Table 3.1-1	0.29
Ammonia (NH3)	Not Available	Not Available	Not Available	Not Available	Not Available
Nitrogen Oxides(NOX)	8.8E-01	POUNDS	MILLION BTUS	AP-42 Table 3.1-1	77.48
PM10 Primary (Filt + Cond)(PM10-PRI)	1.2E-02	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	1.06
PM2.5 Primary (Filt + Cond)(PM25-PRI)	1.2E-02	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	1.06
Sulfur Dioxide(SO2)	5.5E-02	POUNDS	GALLON	Mass Balance	35.40
Volatile Organic Compounds(VOC)	4.1E-04	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	0.04
Lead and lead compounds	1.4E-05	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	0.00
PM Condensable (< 1 Micron)(PM-CON)	7.2E-03	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	0.63
Process					
Secondary Process					
SCC Code	20100101				
	> Internal Combustion Engines				
	> Electric Generation				
	> Distillate Oil (Diesel)				
	> Turbine: Exhaust				
Material Processed	Distillate Oil (No. 1)				
Period Start	1/1/2016	Period End	12/31/2016		
Throughput					
Total		Summer %	Fall %	Winter %	Spring %
373,269	gallons	1	37	53	9
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
0.5	1.6	3.4	568.7		

Emission Unit 01					
Fuel Characteristics					
Heat Content (MMBtu/kgal)	Elem. Sulfur Content (wt. pct. S)	H2S Sulfur Content	Ash Content		
133.994	0.097	Not Available	Not Available		
Heating					
Heat Input (MMBtu)		Heat Output		Heat Values Convention	
50,016		Not Available		HHV	
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide(CO)	3.3E-03	POUNDS	MILLION BTUS	AP-42 Table 3.1-1	0.08
Ammonia (NH3)	Not Available	Not Available	Not Available	Not Available	Not Available
Nitrogen Oxides(NOX)	8.8E-01	POUNDS	MILLION BTUS	AP-42 Table 3.1-1	22.01
PM10 Primary (Filt + Cond)(PM10-PR)	1.2E-02	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	0.30
PM2.5 Primary (Filt + Cond)(PM25-PR)	1.2E-02	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	0.30
Sulfur Dioxide(SO2)	1.3E-02	POUNDS	GALLON	Mass Balance	2.47
Volatile Organic Compounds(VOC)	4.1E-04	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	0.01
Lead and lead compounds	1.4E-05	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	0.00
PM Condensable (< 1 Micron)(PM-CON)	7.2E-03	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	0.18
> Release Points					
ID	Description	Type		Apportion %	
01N	GT #1 North Stack	Vertical		50	
01S	GT #1 South Stack	Vertical		50	
Release Point 01N					
> Specifications					
ID	01N	Type		Vertical	
Description	GT #1 North Stack				
> Stack Parameters					
Stack Height (ft)	Stack Diameter (ft)	Exit Gas Temp (F)	Exit Gas Velocity (fps)	Exit Gas Flow Rate (acfm)	
62	8.46	729	182	620700	
> Geographic Coordinate					
Latitude	64.73549	Longitude	-147.35021	Datum	NAD 1983
Base Elevation	150	Accuracy	1		
Description	None				
Data Source	Engineering Estimate				
Release Point 01S					
> Specifications					
ID	01S	Type		Vertical	
Description	GT #1 South Stack				
> Stack Parameters					
Stack Height (ft)	Stack Diameter (ft)	Exit Gas Temp (F)	Exit Gas Velocity (fps)	Exit Gas Flow Rate (acfm)	
62	8.46	729	182	620700	
> Geographic Coordinate					
Latitude	64.73525	Longitude	-147.35021	Datum	NAD 1983
Base Elevation	150	Accuracy	1		
Description	None				
Data Source	Engineering Estimate				

Emission Unit 02						
> Specifications						
ID	02		Design Capacity	672 MILLION BTU PER HOUR		
Description	GT#2 Gas Turbine					
Manufacturer	General Electric		Manufactured Year	Installed 1977		
Model Number	Frame 7, Series 7001, Model BR		Serial Number	248861		
> Regulations						
Regulation/Description						
> Control Equipment						
Capture Efficiency (%)	0					
System Description	None					
Equipment Type(s)	None					
> Pollutants Controlled						
Pollutant Description			Reduction Efficiency (%)			
Not Applicable			Not Applicable			
> Processes						
Process	Primary Process					
SCC Code	20100109					
	<ul style="list-style-type: none"> > Internal Combustion Engines > Electric Generation > Distillate Oil (Diesel) > Turbine: Exhaust 					
Material Processed	Distillate Oil (No. 2)					
Period Start	1/1/2016		Period End	12/31/2016		
Throughput						
Total		Summer %	Fall %	Winter %	Spring %	
6,655,802	gallons	12	40	39	9	
Operational Schedule						
Days/Week	Hours/Day	Weeks/Period	Hours/Period			
2.3	7.9	17.1	2,873.1			
Fuel Characteristics						
Heat Content (MMBtu/kgal)	Elem. Sulfur Content (wt. pct. S)	H2S Sulfur Content	Ash Content			
137.575	0.379	Not Available	Not Available			
Heating						
Heat Input (MMBtu)		Heat Output		Heat Values Convention		
915,674		Not Available		HHV		
Emissions						
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons	
Carbon Monoxide(CO)	3.3E-03	POUNDS	MILLION BTUS	AP-42 Table 3.1-1	1.51	
Ammonia (NH3)	Not Available	Not Available	Not Available	Not Available	Not Available	
Nitrogen Oxides(NOX)	8.8E-01	POUNDS	MILLION BTUS	AP-42 Table 3.1-1	402.90	
PM10 Primary (Filt + Cond)(PM10-PRI)	1.2E-02	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	5.49	
PM2.5 Primary (Filt + Cond)(PM25-PRI)	1.2E-02	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	5.49	
Sulfur Dioxide(SO2)	5.5E-02	POUNDS	GALLON	Mass Balance	184.07	
Volatile Organic Compounds(VOC)	4.1E-04	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	0.19	
Lead and lead compounds	1.4E-05	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	0.01	
PM Condensable (< 1 Micron)(PM-CON)	7.2E-03	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	3.30	
Process						
Process	Secondary Process					
SCC Code	20100101					
	<ul style="list-style-type: none"> > Internal Combustion Engines > Electric Generation > Distillate Oil (Diesel) > Turbine: Exhaust 					
Material Processed	Distillate Oil (No. 1)					
Period Start	1/1/2016		Period End	12/31/2016		
Throughput						
Total		Summer %	Fall %	Winter %	Spring %	
1,010,284	gallons	5	31	29	35	
Operational Schedule						
Days/Week	Hours/Day	Weeks/Period	Hours/Period			
2.3	7.9	17.1	2,873.1			

Emission Unit 02					
Fuel Characteristics					
Heat Content (MMBtu/kgal)	Elem. Sulfur Content (wt. pct. S)	H2S Sulfur Content	Ash Content		
133.9936667	0.097	Not Available	Not Available		
Heating					
Heat Input (MMBtu)		Heat Output		Heat Values Convention	
135,372		Not Available		HHV	
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide(CO)	3.3E-03	POUNDS	MILLION BTUS	AP-42 Table 3.1-1	0.22
Ammonia (NH3)	Not Available	Not Available	Not Available	Not Available	Not Available
Nitrogen Oxides(NOX)	8.8E-01	POUNDS	MILLION BTUS	AP-42 Table 3.1-1	59.56
PM10 Primary (Filt + Cond)(PM10-PR)	1.2E-02	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	0.81
PM2.5 Primary (Filt + Cond)(PM25-PR)	1.2E-02	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	0.81
Sulfur Dioxide(SO2)	1.3E-02	POUNDS	GALLON	Mass Balance	6.69
Volatile Organic Compounds(VOC)	4.1E-04	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	0.03
Lead and lead compounds	1.4E-05	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	0.00
PM Condensable (< 1 Micron)(PM-CON)	7.2E-03	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	0.49
> Release Points					
ID	Description	Type		Apportion %	
02N	GT #2 North Stack	Vertical		50	
02S	GT #2 South Stack	Vertical		50	
Release Point 02N					
> Specifications					
ID	02N	Type		Vertical	
Description	GT #2 North Stack				
> Stack Parameters					
Stack Height (ft)	Stack Diameter (ft)	Exit Gas Temp (F)	Exit Gas Velocity (fps)	Exit Gas Flow Rate (acfm)	
62	8.46	729	182	620700	
> Geographic Coordinate					
Latitude	64.735044	Longitude	-147.351072	Datum	NAD 1983
Base Elevation	150	Accuracy	1		
Description	None				
Data Source	Engineering Estimate				
Release Point 02S					
> Specifications					
ID	02S	Type		Vertical	
Description	GT #2 South Stack				
> Stack Parameters					
Stack Height (ft)	Stack Diameter (ft)	Exit Gas Temp (F)	Exit Gas Velocity (fps)	Exit Gas Flow Rate (acfm)	
62	8.46	729	182	620700	
> Geographic Coordinate					
Latitude	64.73525	Longitude	-147.35127	Datum	NAD 1983
Base Elevation	150	Accuracy	1		
Description	None				
Data Source	Engineering Estimate				

Emission Unit 03					
> Specifications					
ID	03	Design Capacity	50,000 gallons		
Description	Fuel Storage Tank				
Manufacturer	Unknown	Manufactured Year	Unknown		
Model Number	Unknown	Serial Number	Unknown		
> Regulations					
Regulation/Description					
Not Applicable - This emission unit is reported because it is included in Table A of AQ0110TVP03					
> Control Equipment					
Capture Efficiency (%)	0				
System Description	None				
Equipment Type(s)	None				
> Pollutants Controlled					
Pollutant Description			Reduction Efficiency (%)		
Not Applicable			Not Applicable		
> Processes					
Process	Primary Process				
SCC Code	20100108				
	> Internal Combustion Engines				
	> Electric Generation				
	> Distillate Oil (Diesel)				
	> Turbine: Evaporative Losses (Fuel Storage and Delivery System)				
Material Processed	Diesel (No. 1)				
Period Start	1/1/2016	Period End	12/31/2016		
Throughput					
Total	2,605,434 gallons	Summer %	22	Fall %	17
		Winter %	22	Spring %	39
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
7	24	52	8784		
Fuel Characteristics					
Heat Content	Elem. Sulfur Content	H2S Sulfur Content	Ash Content		
Not Applicable	Not Applicable	Not Applicable	Not Applicable		
Heating					
Heat Input	Heat Output		Heat Values Convention		
Not Applicable	Not Applicable		Not Applicable		
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide(CO)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Ammonia (NH3)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Nitrogen Oxides(NOX)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM10 Primary (Filt + Cond)(PM10-PRI)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM2.5 Primary (Filt + Cond)(PM25-PRI)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Sulfur Dioxide(SO2)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Volatile Organic Compounds(VOC)	Not Applicable	Not Applicable	Not Applicable	Tanks 4.09d	0.01
Lead and lead compounds	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM10 Primary (Filt + Cond)(PM10-PRI)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Process	Secondary Process				
SCC Code	Not Applicable				
	Not Applicable				
	Not Applicable				
	Not Applicable				
	Not Applicable				
Material Processed	Not Applicable				
Period Start	1/1/2016	Period End	12/31/2016		
Throughput					
Total		Summer %		Winter %	
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
Not Applicable	Not Applicable	Not Applicable	Not Applicable		
Fuel Characteristics					
Heat Content	Elem. Sulfur Content	H2S Sulfur Content	Ash Content		
Not Applicable	Not Applicable	Not Applicable	Not Applicable		

Emission Unit 03					
Heating					
Heat Input		Heat Output		Heat Values Convention	
Not Applicable		Not Applicable		Not Applicable	
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide(CO)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Ammonia (NH3)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Nitrogen Oxides(NOX)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM10 Primary (Filt + Cond)(PM10-PRI)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM2.5 Primary (Filt + Cond)(PM25-PRI)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Sulfur Dioxide(SO2)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Volatile Organic Compounds(VOC)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Lead and lead compounds	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM10 Primary (Filt + Cond)(PM10-PRI)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
> Release Points					
ID	Description			Type	Apportion %
03	Fuel Storage Tank			Goose Neck	100
Release Point 03					
> Specifications					
ID	03	Type		Goose Neck	
Description	Fuel Storage Tank				
> Stack Parameters					
Stack Height (ft)	Stack Diameter (ft)	Exit Gas Temp (F)	Exit Gas Velocity (fps)	Exit Gas Flow Rate (acfm)	
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
> Geographic Coordinate					
Latitude	Not Applicable	Longitude	Not Applicable	Datum	Not Applicable
Base Elevation	150	Accuracy	Not Applicable		
Description	None				
Data Source	Not Applicable				

Emission Unit 04					
> Specifications					
ID	4	Design Capacity	50,000 gallons		
Description	Fuel Storage Tank				
Manufacturer	Unknown	Manufactured Year	Unknown		
Model Number	Unknown	Serial Number	Unknown		
> Regulations					
Regulation/Description					
Not Applicable - This emission unit is reported because it is included in Table A of AQ0110TVP03					
> Control Equipment					
Capture Efficiency (%)	0				
System Description	None				
Equipment Type(s)	None				
> Pollutants Controlled					
Pollutant Description			Reduction Efficiency (%)		
Not Applicable			Not Applicable		
> Processes					
Process	Primary Process				
SCC Code	20100108				
	<ul style="list-style-type: none"> > Internal Combustion Engines > Electric Generation > Distillate Oil (Diesel) > Turbine: Evaporative Losses (Fuel Storage and Delivery System) 				
Material Processed	Diesel (No. 2)				
Period Start	1/1/2016	Period End	12/31/2016		
Throughput					
Total		Summer %	Fall %	Winter %	Spring %
	7,935,893 gallons	11	43	35	11
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
7	24	52	8784		
Fuel Characteristics					
Heat Content	Elem. Sulfur Content	H2S Sulfur Content	Ash Content		
Not Applicable	Not Applicable	Not Applicable	Not Applicable		
Heating					
Heat Input	Heat Output		Heat Values Convention		
Not Applicable	Not Applicable		Not Applicable		
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide(CO)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Ammonia (NH3)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Nitrogen Oxides(NOX)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM10 Primary (Filt + Cond)(PM10-PRI)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM2.5 Primary (Filt + Cond)(PM25-PRI)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Sulfur Dioxide(SO2)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Volatile Organic Compounds(VOC)	Not Applicable	Not Applicable	Not Applicable	Tanks 4.09d	0.01
Lead and lead compounds	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM10 Primary (Filt + Cond)(PM10-PRI)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Process					
Process	Secondary Process				
SCC Code	Not Applicable				
	Not Applicable				
	Not Applicable				
	Not Applicable				
	Not Applicable				
Material Processed	Not Applicable				
Period Start	1/1/2016	Period End	12/31/2016		
Throughput					
Total		Summer %	Fall %	Winter %	Spring %
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
Not Applicable	Not Applicable	Not Applicable	Not Applicable		
Fuel Characteristics					
Heat Content	Elem. Sulfur Content	H2S Sulfur Content	Ash Content		
Not Applicable	Not Applicable	Not Applicable	Not Applicable		

Emission Unit 04					
Heating					
Heat Input		Heat Output		Heat Values Convention	
Not Applicable		Not Applicable		Not Applicable	
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide(CO)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Ammonia (NH3)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Nitrogen Oxides(NOX)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM10 Primary (Filt + Cond)(PM10-PR1)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM2.5 Primary (Filt + Cond)(PM25-PR1)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Sulfur Dioxide(SO2)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Volatile Organic Compounds(VOC)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Lead and lead compounds	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM10 Primary (Filt + Cond)(PM10-PR1)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
> Release Points					
ID	Description			Type	Apportion %
03	Fuel Storage Tank			Goose Neck	100
Release Point 04					
> Specifications					
ID	04		Type	Goose Neck	
Description	Fuel Storage Tank				
> Stack Parameters					
Stack Height (ft)	Stack Diameter (ft)	Exit Gas Temp (F)	Exit Gas Velocity (fps)	Exit Gas Flow Rate (acfm)	
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
> Geographic Coordinate					
Latitude	Not Applicable	Longitude	Not Applicable	Datum	Not Applicable
Base Elevation	150	Accuracy	Not Applicable		
Description	None				
Data Source	Not Applicable				

Emission Unit 05					
> Specifications					
ID	05		Design Capacity	455 MILLION BTU PER HOUR	
Description	GT#3 Gas Turbine				
Manufacturer	General Electric		Manufactured Year	Purchased 2004	
Model Number	LM6000PC		Serial Number	191-548	
> Regulations					
Regulation/Description					
40 CFR 60 Subpart GG					
> Control Equipment					
Capture Efficiency (%)	73 per AP-42, Table 3.1-1				
System Description	Weir Rotojet Water Injection (NO)				
Equipment Type(s)	Water Injection				
> Pollutants Controlled					
Pollutant Description			Reduction Efficiency (%)		
Carbon Monoxide			66		
Nitrogen Oxides			77		
> Processes					
Process	Primary Process				
SCC Code	20100909				
	> Internal Combustion Engines				
	> Electric Generation				
	> Kerosene/Naphtha (Jet Fuel)				
	> Turbine: Exhaust				
Material Processed	Naphtha				
Period Start	1/1/2016		Period End	12/31/2016	
Throughput					
Total		Summer %	Fall %	Winter %	Spring %
	21,162,658 gallons	23	23	32	22
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
6.3	21.4	46.6	7,829.1		
Fuel Characteristics					
Heat Content (MMBtu/kgal)	Elem. Sulfur Content (wt. pct. S)	H2S Sulfur Content	Ash Content		
120.6255	0.0024	Not Available	Not Available		
Heating					
Heat Input (MMBtu)		Heat Output		Heat Values Convention	
2,552,756		Not Available		HHV	
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide(CO)	7.6E-02	POUNDS	MILLION BTUS	AP-42 Table 3.1-1	97.00
Ammonia (NH3)	Not Available	Not Available	Not Available	Not Available	Not Available
Nitrogen Oxides(NOX)	2.4E-01	POUNDS	MILLION BTUS	AP-42 Table 3.1-1	306.33
PM10 Primary (Filt + Cond)(PM10-PR)	1.2E-02	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	15.32
PM2.5 Primary (Filt + Cond)(PM25-PR)	1.2E-02	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	15.32
Sulfur Dioxide(SO2)	2.9E-04	POUNDS	GALLON	Mass Balance	3.11
Volatile Organic Compounds(VOC)	4.1E-04	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	0.52
Lead and lead compounds	1.4E-05	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	0.02
PM Condensable (< 1 Micron)(PM-CON)	7.2E-03	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	9.19
Process					
Secondary Process					
SCC Code	20100909				
	> Internal Combustion Engines				
	> Electric Generation				
	> Distillate Oil (Diesel)				
	> Turbine: Exhaust				
Material Processed	Distillate Oil (No. 1)				
Period Start	1/1/2016		Period End	12/31/2016	
Throughput					
Total		Summer %	Fall %	Winter %	Spring %
	1,221,881 gallons	44	0	6	50
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
6.3	21.4	46.6	7,829.1		

Emission Unit 05					
Fuel Characteristics					
Heat Content (MMBtu/kgal)	Elem. Sulfur Content (wt. pct. S)	H2S Sulfur Content	Ash Content		
133.994	0.097	Not Available	Not Available		
Heating					
Heat Input (MMBtu)		Heat Output		Heat Values Convention	
163,724		Not Available		HHV	
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide(CO)	7.6E-02	POUNDS	MILLION BTUS	AP-42 Table 3.1-1	6.22
Ammonia (NH3)	Not Available	Not Available	Not Available	Not Available	Not Available
Nitrogen Oxides(NOX)	2.4E-01	POUNDS	MILLION BTUS	AP-42 Table 3.1-1	19.65
PM10 Primary (Filt + Cond)(PM10-PRI)	1.2E-02	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	0.98
PM2.5 Primary (Filt + Cond)(PM25-PRI)	1.2E-02	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	0.98
Sulfur Dioxide(SO2)	1.3E-02	POUNDS	GALLON	Mass Balance	8.09
Volatile Organic Compounds(VOC)	4.1E-04	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	0.03
Lead and lead compounds	1.4E-05	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	0.00
PM Condensable (< 1 Micron)(PM-CON)	7.2E-03	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	0.59
> Release Points					
ID	Description	Type		Apportion %	
05	GT#3 Stack	Vertical		100	
Release Point 05					
> Specifications					
ID	05	Type		Vertical	
Description	GT#3 Stack				
> Stack Parameters					
Stack Height (ft)	Stack Diameter (ft)	Exit Gas Temp (F)	Exit Gas Velocity (fps)	Exit Gas Flow Rate (acfm)	
110	11.11	270	73.8	347,949	
> Geographic Coordinate					
Latitude	64.73526	Longitude	-147.34985	Datum	NAD 1983
Base Elevation	150	Accuracy	1		
Description	None				
Data Source	Engineering Estimate				

Emission Unit 06					
> Specifications					
ID	06		Design Capacity	455 MILLION BTU PER HOUR	
Description	GT#4 Gas Turbine				
Manufacturer	General Electric		Manufactured Year	This unit has not been installed	
Model Number	LM6000PC		Serial Number	TBD	
> Regulations					
Regulation/Description					
Not Applicable					
> Control Equipment					
Capture Efficiency (%)	Not Applicable				
System Description	Not Applicable				
Equipment Type(s)	Not Applicable				
> Pollutants Controlled					
Pollutant Description			Reduction Efficiency (%)		
Not Applicable			Not Applicable		
> Processes					
Process	Primary Process				
SCC Code	Not Applicable				
	Not Applicable				
	Not Applicable				
	Not Applicable				
	Not Applicable				
Material Processed	Not Applicable				
Period Start	1/1/2016		Period End	12/31/2016	
Throughput					
Total	Summer %		Fall %	Winter %	Spring %
Not Applicable	Not Applicable		Not Applicable	Not Applicable	Not Applicable
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
Not Applicable	Not Applicable	Not Applicable	Not Applicable		
Fuel Characteristics					
Heat Content	Elem. Sulfur Content	H2S Sulfur Content	Ash Content		
Not Applicable	Not Applicable	Not Applicable	Not Applicable		
Heating					
Heat Input		Heat Output		Heat Values Convention	
Not Applicable		Not Applicable		Not Applicable	
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide(CO)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Ammonia (NH3)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Nitrogen Oxides(NOX)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM10 Primary (Filt + Cond)(PM10-PR1)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM2.5 Primary (Filt + Cond)(PM25-PR1)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Sulfur Dioxide(SO2)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Volatile Organic Compounds(VOC)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Lead and lead compounds	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM Condensible (< 1 Micron)(PM-CON)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Process	Secondary Process				
SCC Code	Not Applicable				
	Not Applicable				
	Not Applicable				
	Not Applicable				
	Not Applicable				
Material Processed	Not Applicable				
Period Start	1/1/2016		Period End	12/31/2016	
Throughput					
Total	Summer %		Fall %	Winter %	Spring %
Not Applicable	Not Applicable		Not Applicable	Not Applicable	Not Applicable
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
Not Applicable	Not Applicable	Not Applicable	Not Applicable		

Emission Unit 06					
Fuel Characteristics					
Heat Content	Elem. Sulfur Content	H2S Sulfur Content	Ash Content		
Not Applicable	Not Applicable	Not Applicable	Not Applicable		
Heating					
Heat Input		Heat Output		Heat Values Convention	
Not Applicable		Not Applicable		Not Applicable	
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide(CO)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Ammonia (NH3)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Nitrogen Oxides(NOX)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM10 Primary (Filt + Cond)(PM10-PRI)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM2.5 Primary (Filt + Cond)(PM25-PRI)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Sulfur Dioxide(SO2)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Volatile Organic Compounds(VOC)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Lead and lead compounds	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM Condensable (< 1 Micron)(PM-CON)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
> Release Points					
ID	Description			Type	Apportion %
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable

Emission Unit 07					
> Specifications					
ID	07	Design Capacity	565 hp		
Description	Emergency Generator Engine				
Manufacturer	Generac Gen Set	Manufactured Year	Installed 2005		
Model Number	5231150100	Serial Number	2083094		
> Regulations					
Regulation/Description					
40 CFR 63 Subpart ZZZZ					
> Control Equipment					
Capture Efficiency (%)	0				
System Description	None				
Equipment Type(s)	None				
> Pollutants Controlled					
Pollutant Description			Reduction Efficiency (%)		
Not Applicable			Not Applicable		
> Processes					
Process	Primary Process				
SCC Code	20100907				
	> Internal Combustion Engines				
	> Electric Generation				
	> Distillate Oil (Diesel)				
	> Reciprocating: Exhaust				
Material Processed	Distillate Oil (No. 2)				
Period Start	1/1/2016	Period End	12/31/2016		
Throughput					
Total		Summer %	Fall %	Winter %	Spring %
129.5	gallons	22	19	37	22
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
0	0	0	4		
Fuel Characteristics					
Heat Content (MMBtu/kgal)	Elem. Sulfur Content (wt. pct. S)	H2S Sulfur Content	Ash Content		
137.575	0.379	Not Available	Not Available		
Heating					
Heat Input (MMBtu)		Heat Output		Heat Values Convention	
18		Not Available		HHV	
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide(CO)	6.68E-03	POUNDS	HORSEPOWER-HOUR	AP-42 Table 3.3-1	0.01
Ammonia (NH3)	Not Available	Not Available	Not Available	Not Available	Not Available
Nitrogen Oxides(NOX)	3.1E-02	POUNDS	HORSEPOWER-HOUR	AP-42 Table 3.3-1	0.03
PM10 Primary (Filt + Cond)(PM10-PRI)	2.2E-03	POUNDS	HORSEPOWER-HOUR	AP-42 Table 3.3-1	0.00
PM2.5 Primary (Filt + Cond)(PM25-PRI)	2.2E-03	POUNDS	HORSEPOWER-HOUR	AP-42 Table 3.3-1	0.00
Sulfur Dioxide(SO2)	5.4E-02	POUNDS	GALLON	Mass Balance	0.00
Volatile Organic Compounds(VOC)	2.5E-03	POUNDS	MILLION BTUS	AP-42 Table 3.3-1	0.00
Lead and lead compounds	Not Available	Not Available	Not Available	Not Available	Not Available
PM Condensable (< 1 Micron)(PM-CON)	Not Available	Not Available	Not Available	Not Available	Not Available
Process					
Secondary Process					
SCC Code	Not Applicable				
	Not Applicable				
	Not Applicable				
	Not Applicable				
	Not Applicable				
Material Processed	Not Applicable				
Period Start	1/1/2016	Period End	12/31/2016		
Throughput					
Total		Summer %	Fall %	Winter %	Spring %
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
Not Applicable	Not Applicable	Not Applicable	Not Applicable		

Emission Unit 07					
Fuel Characteristics					
Heat Content (MMBtu/kgal)	Elem. Sulfur Content (wt. pct. 5)	H2S Sulfur Content	Ash Content		
Not Applicable	Not Applicable	Not Applicable	Not Applicable		
Heating					
Heat Input		Heat Output		Heat Values Convention	
Not Applicable		Not Applicable		Not Applicable	
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons Per Year
Carbon Monoxide(CO)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Ammonia (NH3)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Nitrogen Oxides(NOX)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM10 Primary (Filt + Cond)(PM10-PRI)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM2.5 Primary (Filt + Cond)(PM25-PRI)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Sulfur Dioxide(SO2)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Volatile Organic Compounds(VOC)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Lead and lead compounds	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM Condensable (< 1 Micron)(PM-CON)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
> Release Points					
ID	Description	Type		Apportion %	
07	Emergency Generator Stack	Vertical		100	
Release Point 07					
> Specifications					
ID	07	Type		Vertical	
Description	Emergency Generator Stack				
> Stack Parameters					
Stack Height (ft)	Stack Diameter (ft)	Exit Gas Temp (F)	Exit Gas Velocity (fps)	Exit Gas Flow Rate (acfm)	
27	0.83	1299	88.7	2878	
> Geographic Coordinate					
Latitude	64.7341	Longitude	-147.35072	Datum	NAD 1983
Base Elevation	150	Accuracy	1		
Description	None				
Data Source	Engineering Estimate				

Emission Unit 11					
> Specifications					
ID	11	Design Capacity	5 MILLION BTU PER HOUR		
Description	Building Heater				
Manufacturer	Bryan Steam	Manufactured Year	Installed 2005		
Model Number	RV500	Serial Number	93433		
> Regulations					
Regulation/Description	Not Applicable				
> Control Equipment					
Capture Efficiency (%)	0				
System Description	None				
Equipment Type(s)	None				
> Pollutants Controlled					
Pollutant Description	Not Applicable			Reduction Efficiency (%)	
				Not Applicable	
> Processes					
Process	Primary Process				
SCC Code	10500110				
	> External Combustion Boilers				
	> Space Heaters				
	> Industrial				
	> Liquefied Petroleum Gas (LPG)				
Material Processed	Propane				
Period Start	1/1/2016		Period End	12/31/2016	
Throughput					
Total		Summer %	Fall %	Winter %	Spring %
4,886	gallons	42	58	0	0
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
0.1	0.2	0.5	89.5		
Fuel Characteristics					
Heat Content (MMBtu/kgal)	Elem. Sulfur Content (wt. pct. S)	H2S Sulfur Content (vol. pct. H2S)	Ash Content		
91.6	7.81E-06	0.5	Not Available		
Heating					
Heat Input (MMBtu)	Heat Output		Heat Values Convention		
	448	Not Available	HHV		
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide(CO)	7.5	POUNDS	1,000 GALLONS	AP-42 Table 1.5-1	0.02
Ammonia (NH3)	Not Available	Not Available	Not Available	Not Available	Not Available
Nitrogen Oxides(NOx)	13	POUNDS	1,000 GALLONS	AP-42 Table 1.5-1	0.03
PM10 Primary (Filt + Cond)(PM10-PRI)	0.7	POUNDS	1,000 GALLONS	AP-42 Table 1.5-1	0.00
PM2.5 Primary (Filt + Cond)(PM25-PRI)	0.7	POUNDS	1,000 GALLONS	AP-42 Table 1.5-1	0.00
Sulfur Dioxide(SO2)	7.5E-07	POUNDS	GALLON	Mass Balance	0.00
Volatile Organic Compounds(VOC)	1.0	POUNDS	1,000 GALLONS	AP-42 Table 1.5-1	0.00
Lead and lead compounds	Not Available	Not Available	Not Available	Not Available	Not Available
PM Condensable (< 1 Micron)(PM-CON)	0.5	POUNDS	1,000 GALLONS	AP-42 Table 1.5-1	0.00
Process					
Process	Secondary Process				
SCC Code	Not Applicable				
	Not Applicable				
	Not Applicable				
	Not Applicable				
	Not Applicable				
Material Processed	Not Applicable				
Period Start	1/1/2016		Period End	12/31/2016	
Throughput					
Total		Summer %	Fall %	Winter %	Spring %
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
Not Applicable	Not Applicable	Not Applicable	Not Applicable		

Emission Unit 11					
Fuel Characteristics					
Heat Content	Elem. Sulfur Content	H2S Sulfur Content	Ash Content		
Not Applicable	Not Applicable	Not Applicable	Not Applicable		
Heating					
Heat Input		Heat Output		Heat Values Convention	
Not Applicable		Not Applicable		Not Applicable	
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide(CO)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Ammonia (NH3)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Nitrogen Oxides(NOX)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM10 Primary (Filt + Cond)(PM10-PRI)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM2.5 Primary (Filt + Cond)(PM25-PRI)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Sulfur Dioxide(SO2)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Volatile Organic Compounds(VOC)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Lead and lead compounds	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM Condensable (< 1 Micron)(PM-CON)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
> Release Points					
ID	Description	Type		Apportion %	
11	Building Heater	Vertical		100	
Release Point 11					
> Specifications					
ID	11	Type		Vertical	
Description	Building Heater				
> Stack Parameters					
Stack Height (ft)	Stack Diameter (ft)	Exit Gas Temp (F)	Exit Gas Velocity (fps)	Exit Gas Flow Rate (acfm)	
63	0.98	450	121	5477	
> Geographic Coordinate					
Latitude	64.73416	Longitude	-147.35072	Datum	NAD 1983
Base Elevation	150	Accuracy	1		
Description	None				
Data Source	Engineering Estimate				

Emission Unit 12					
> Specifications					
ID	12	Design Capacity	5 MILLION BTU PER HOUR		
Description	Building Heater				
Manufacturer	Bryan Steam	Manufactured Year	Installed 2005		
Model Number	RV500	Serial Number	93434		
> Regulations					
Regulation/Description					
Not Applicable					
> Control Equipment					
Capture Efficiency (%)	0				
System Description	None				
Equipment Type(s)	None				
> Pollutants Controlled					
Pollutant Description			Reduction Efficiency (%)		
Not Applicable			Not Applicable		
> Processes					
Process	Primary Process				
SCC Code	10500110				
	> External Combustion Boilers				
	> Space Heaters				
	> Industrial				
	> Liquefied Petroleum Gas (LPG)				
Material Processed	Propane				
Period Start	1/1/2016	Period End	12/31/2016		
Throughput					
Total		Summer %	Fall %	Winter %	Spring %
4,886	gallons	42	58	0	0
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
0.1	0.2	0.5	89.5		
Fuel Characteristics					
Heat Content (MMBtu/kgal)	Elem. Sulfur Content (wt. pct. S)	H2S Sulfur Content (vol. pct. H2S)	Ash Content		
91.6	7.81E-06	0.5	Not Available		
Heating					
Heat Input (MMBtu)		Heat Output		Heat Values Convention	
448		Not Available		HHV	
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide(CO)	7.5	POUNDS	1,000 GALLONS	AP-42 Table 1.5-1	0.02
Ammonia (NH3)	Not Available	Not Available	Not Available	Not Available	Not Available
Nitrogen Oxides(NOx)	13	POUNDS	1,000 GALLONS	AP-42 Table 1.5-1	0.03
PM10 Primary (Filt + Cond)(PM10-PRI)	0.7	POUNDS	1,000 GALLONS	AP-42 Table 1.5-1	0.00
PM2.5 Primary (Filt + Cond)(PM25-PRI)	0.7	POUNDS	1,000 GALLONS	AP-42 Table 1.5-1	0.00
Sulfur Dioxide(SO2)	7.5E-07	POUNDS	GALLON	Mass Balance	0.00
Volatile Organic Compounds(VOC)	1.0	POUNDS	1,000 GALLONS	AP-42 Table 1.5-1	0.00
Lead and lead compounds	N/A	N/A	N/A	N/A	N/A
PM Condensable (< 1 Micron)(PM-CON)	0.5	POUNDS	1,000 GALLONS	AP-42 Table 1.5-1	0.00
Process					
Secondary Process					
SCC Code	Not Applicable				
	Not Applicable				
	Not Applicable				
	Not Applicable				
	Not Applicable				
Material Processed	Not Applicable				
Period Start	1/1/2016	Period End	12/31/2016		
Throughput					
Total		Summer %	Fall %	Winter %	Spring %
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
Not Applicable	Not Applicable	Not Applicable	Not Applicable		

Emission Unit 12					
Fuel Characteristics					
Heat Content	Elem. Sulfur Content	H2S Sulfur Content	Ash Content		
Not Applicable	Not Applicable	Not Applicable	Not Applicable		
Heating					
Heat Input		Heat Output		Heat Values Convention	
Not Applicable		Not Applicable		Not Applicable	
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide(CO)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Ammonia (NH3)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Nitrogen Oxides(NOX)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM10 Primary (Filt + Cond)(PM10-PR1)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM2.5 Primary (Filt + Cond)(PM25-PR1)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Sulfur Dioxide(SO2)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Volatile Organic Compounds(VOC)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Lead and lead compounds	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM Condensable (< 1 Micron)(PM-CON)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
> Release Points					
ID	Description	Type		Apportion %	
11	Building Heater	Vertical		100	
Release Point 12					
> Specifications					
ID	12	Type		Vertical	
Description	Building Heater				
> Stack Parameters					
Stack Height (ft)	Stack Diameter (ft)	Exit Gas Temp (F)	Exit Gas Velocity (fps)	Exit Gas Flow Rate (acfm)	
63	0.98	450	121	5477	
> Geographic Coordinate					
Latitude	64.33415	Longitude	-147.35011	Datum	NAD 1983
Base Elevation	150	Accuracy	1		
Description	None				
Data Source	Engineering Estimate				

EU ID	Fuel Type	Fuel Usage (Gallons) ¹												Total
		January	February	March	April	May	June	July	August	September	October	November	December	
1	No. 1 Diesel	559	33,630	30,024	1,671	677	1,891	1,487	-	34,629	86,105	17,099	165,497	373,269
	No. 2 Diesel	42,746	60,491	287,297	20,189	2,349	24,630	13,327	-	22,854	588,378	121,070	96,630	1,279,961
2	No. 1 Diesel	21,140	17,482	11,768	3,025	337,814	32,624	1,176	15,045	12,477	108,977	189,803	258,953	1,010,184
	No. 2 Diesel	189,953	794,366	67,478	73,829	443,989	80,001	105,247	633,905	284,363	1,488,458	876,068	1,618,145	6,655,802
5	No. 1 Diesel	-	654	953	126,990	488,024	149,997	371,347	10,328	1,683	917	727	70,261	1,221,881
	Naphtha	2,134,490	1,985,530	2,160,428	1,806,994	715,791	1,620,211	1,451,140	1,807,737	1,827,084	569,293	2,440,865	2,643,095	21,162,658
7	No. 2 Diesel	21	-	28	-	-	28	-	-	25	-	-	28	130
11	Propane	-	-	-	-	-	-	-	-	-	-	-	-	-
12		-	-	-	-	-	-	4,127	-	1,225	4,420	-	-	9,772

EU ID	Fuel Type	Fuel Usage by Season (%)			
		Summer	Fall	Winter	Spring
1	No. 1 Diesel	1	37	53	9
	No. 2 Diesel	3	57	16	24
2	No. 1 Diesel	5	31	29	35
	No. 2 Diesel	12	40	39	9
5	No. 1 Diesel	44	0	6	50
	Naphtha	23	23	32	22
7	No. 2 Diesel	22	19	38	22
11	Propane	-	-	-	-
12		42	58	-	-

Tank	Fuel Usage by Season (%)			
	Summer	Fall	Winter	Spring
No. 1 Diesel	22	17	22	38
No. 2 Diesel	11	43	35	11

EU ID	2016 Operating Hours ²
1	568.7
2	2,873.1
5	7,829.1
7	3.7
11	89.5
12	89.5

Fuel Type	Total Fuel Usage (Gallons)												Total
	January	February	March	April	May	June	July	August	September	October	November	December	
No. 1 Diesel	21,699	51,766	42,745	131,686	826,515	184,512	374,010	25,373	48,789	195,999	207,629	494,711	2,605,434
No. 2 Diesel	232,720	854,857	354,803	94,018	446,338	104,659	118,574	633,905	307,242	2,076,836	997,138	1,714,803	7,935,893
Naphtha	2,134,490	1,985,530	2,160,428	1,806,994	715,791	1,620,211	1,451,140	1,807,737	1,827,084	569,293	2,440,865	2,643,095	21,162,658
Propane	-	-	-	-	-	-	4,127	-	1,225	4,420	-	-	9,772

Fuel Type	Fuel HHV (Btu/gal) ³												Average
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
No. 1 Diesel	132,951	133,705	133,661	133,496	134,180	133,756	134,046	133,256	133,161	137,599	134,215	133,898	133,994
No. 2 Diesel	136,675	137,331	136,914	137,396	-	139,472	140,037	-	138,817	133,960	-	-	137,575
Naphtha	-	120,000	-	-	-	121,000	-	-	121,000	-	-	120,502	120,626

Fuel Type	Fuel Sulfur (max wt. pct. S) ⁴												Average
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
No. 1 Diesel	0.099	0.098	0.096	0.099	0.094	0.095	0.100	0.102	0.096	0.098	0.096	0.096	0.097
No. 2 Diesel	0.330	0.304	0.321	0.433	0.418	0.435	0.460	0.464	0.446	0.318	0.313	0.304	0.379
Naphtha	0.0022	0.0021	0.0020	0.0024	0.0035	0.0027	0.0022	0.0031	0.0022	0.0021	0.0023	0.0021	0.0024

Fuel Type	Fuel Density (lb/gal) ⁵
No. 1 Diesel	6.8
No. 2 Diesel	7.3
Naphtha	6.1
Propane ⁶	4.2

¹ From plant report
² Hours for EU IDs 1, 2, and 5 are from plant report, hours for EU ID 7 is from FOR, hours for EU IDs 10 and 11 are estimated based on fuel use
³ From fuel test records
⁴ Estimate from vendor propane factor notifications



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Alaska Department of Environmental Conservation
Air Permits Program
ATTN: Molly Birnbaum
410 Willoughby Avenue, Suite 303
PO Box 111800
Juneau, AK 99811-1800

**Subject: Golden Valley Electric Association – North Pole Power Plant
2017 Point Source Triennial Emission Inventory**

Dear Ms. Birnbaum,

Golden Valley Electric Association (GVEA) is submitting a 2017 Triennial Point Source Emission Inventory for the North Pole Power Plant.

The 2107 Triennial Point Source Emission Inventory letter from ADEC to GVEA dated January 31, 2018 mentions both an Excel template and guidance document available on the ADEC website at <http://dec.alaska.gov/Applications/Air/airtoolsweb/PointSourceEmissionInventory>.

The facility-specific template posted on the ADEC website requires reporting of:

- PM10 Primary (Filt + Cond)(PM10-PRI); and
- PM2.5 Primary (Filt + Cond)(PM25-PRI); and
- PM Condensable (< 1 Micron)(PM-CON).

The guidance document posted on the ADEC website requires reporting of:

- PM10 Primary (Filt + Cond)(PM10-PRI);
- PM2.5 Filterable (PM25-FIL); and
- PM Condensable (PM-CON).

March 28, 2018
ADEC – 2017 Point Source Emission Inventory
Page 2

Due to the discrepancies between the excel template and guidance document, GVEA has chosen to report the following PM-related pollutants in the 2017 Triennial Point Source Emission Inventory.

- PM10 Primary (Filt + Cond)(PM10-PRI);
- PM2.5 Primary (Filt + Cond)(PM25-PRI);
- PM2.5 Filterable (PM25-FIL); and
- PM Condensable (PM-CON).

If you have any questions or would like any additional information please contact me by phone at 907-458-4557 or by email at nmknight@gvea.com. The certification from Lynn Thompson, Vice President of Power Supply, follows.

Sincerely,



Naomi Morton Knight, P.E.
Environmental Officer

Enclosure

Certification

Based on information and belief formed after reasonable inquiry, I certify that the statements and information in and attached to this document are true, accurate and complete.



Lynn N. Thompson
Vice President of Power Supply

Stationary Source Detail	
Inventory Start Date	1/1/2017
Inventory End Date	12/31/2017
ADEC ID	110
AFS ID	0209000011
Census Area	Fairbanks North Star Borough (090)
Name	North Pole Power Plant
Physical Location	1500 H & H Lane
	North Pole, AK 99705
	Lat 64.73444 Long -147.3453
	Legal Description: Not Available
Owner Name, Address, and Contact Number	Naomi Morton Knight, P.E.
	Golden Valley Electric Association
	PO Box 71249
	Fairbanks, AK 99707-1249
	907-458-4557
Line of Business (NAICS)	221112
Line of Business (SIC)	4911
Facility Status	Operating
Facility Status Year	1976

Emission Unit 01					
Specifications					
ID	01		Design Capacity	672 MILLION BTU PER HOUR	
Description	GT#1 Gas Turbine		Emission Unit Status	Operating	
Manufacturer	General Electric		Manufactured Year	Installed 1976	
Model Number	Frame 7 Series 7001 Model BR		Serial Number	238057	
Regulations					
Regulation/Description					
Not Applicable					
> Control Equipment					
Capture Efficiency (%)	0				
System Description	None				
Equipment Type(s)	None				
Pollutants Controlled					
Pollutant Description			Reduction Efficiency (%)		
Not Applicable			Not Applicable		
Processes					
Process	Primary Process				
SCC Code	20100109				
	> Internal Combustion Engines				
	> Electric Generation				
	> Distillate Oil (Diesel)				
	> Turbine: Exhaust				
Material Processed	Distillate Oil (No. 2)				
Period Start	1/1/2017		Period End	12/31/2017	
Throughput					
Total		Summer %	Fall %	Winter %	Spring %
976,654	gallons	30	9	33	28
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
0.3	0.9	2.0	330		
Fuel Characteristics					
Heat Content (MMBtu/kgal)	Elem. Sulfur Content (wt. pct. S)	H2S Sulfur Content	Ash Content		
138.278	0.381	Not Available	Not Available		
Heating					
Heat Input (MMBtu)	Heat Output		Heat Values Convention		
135,049	Not Available		HHV		
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide (CO)	3.3E-03	POUNDS	MILLION BTUS	AP-42 Table 3.1-1	2.228E-01
Ammonia (NH ₃)	Not Available	Not Available	Not Available	Not Available	Not Available
Nitrogen Oxides (NO _x)	8.8E-01	POUNDS	MILLION BTUS	AP-42 Table 3.1-1	5.942E+01
PM10 Primary (Filt + Cond)(PM10-PRI)	1.2E-02	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	8.103E-01
PM2.5 Primary (Filt + Cond)(PM25-PRI)	1.2E-02	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	8.103E-01
PM2.5 Filterable (PM25-FIL)	4.3E-03	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	2.904E-01
PM Condensable (PM-CON)	7.2E-03	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	4.862E-01
Sulfur Dioxide (SO ₂)	5.6E-02	POUNDS	GALLON	Mass Balance	2.719E+01
Volatile Organic Compounds (VOC)	4.1E-04	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	2.769E-02
Lead and lead compounds	1.4E-05	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	9.453E-04
Process					
Process	Secondary Process				
SCC Code	20100109				
	> Internal Combustion Engines				
	> Electric Generation				
	> Distillate Oil (Diesel)				
	> Turbine: Exhaust				
Material Processed	Distillate Oil (No. 1)				
Period Start	1/1/2017		Period End	12/31/2017	
Throughput					
Total		Summer %	Fall %	Winter %	Spring %
695,867	gallons	3	3	65	29
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
0.2	0.6	1.4	235		

Emission Unit 01					
Fuel Characteristics					
Heat Content (MMBtu/kgal)	Elem. Sulfur Content (wt. pct. S)	H2S Sulfur Content	Ash Content		
133.643	0.095	Not Available	Not Available		
Heating					
Heat Input (MMBtu)		Heat Output		Heat Values Convention	
92,997		Not Available		HHV	
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide (CO)	3.3E-03	POUNDS	MILLION BTUS	AP-42 Table 3.1-1	1.534E-01
Ammonia (NH ₃)	Not Available	Not Available	Not Available	Not Available	Not Available
Nitrogen Oxides (NO _x)	8.8E-01	POUNDS	MILLION BTUS	AP-42 Table 3.1-1	4.092E+01
PM10 Primary (Filt + Cond)(PM10-PR)	1.2E-02	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	5.580E-01
PM2.5 Primary (Filt + Cond)(PM25-PR)	1.2E-02	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	5.580E-01
PM2.5 Filterable (PM25-FIL)	4.3E-03	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	1.999E-01
PM Condensable (PM-CON)	7.2E-03	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	3.348E-01
Sulfur Dioxide (SO ₂)	1.3E-02	POUNDS	GALLON	Mass Balance	4.491E+00
Volatile Organic Compounds (VOC)	4.1E-04	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	1.906E-02
Lead and lead compounds	1.4E-05	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	6.510E-04
Process	Tertiary Process				
SCC Code	20100109				
	> Internal Combustion Engines				
	> Electric Generation				
	> Distillate Oil (Diesel)				
	> Turbine: Exhaust				
Material Processed	Jet A				
Period Start	1/1/2017		Period End	12/31/2017	
Throughput					
Total	Summer %	Fall %	Winter %	Spring %	
8,757 gallons	0	0	100	0	
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
0.002	0.008	0.018	3.0		
Fuel Characteristics					
Heat Content (MMBtu/kgal)	Elem. Sulfur Content (wt. pct. S)	H2S Sulfur Content	Ash Content		
125.340	0.096	Not Available	Not Available		
Heating					
Heat Input (MMBtu)		Heat Output		Heat Values Convention	
1,098		Not Available		HHV	
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide (CO)	3.3E-03	POUNDS	MILLION BTUS	AP-42 Table 3.1-1	1.811E-03
Ammonia (NH ₃)	Not Available	Not Available	Not Available	Not Available	Not Available
Nitrogen Oxides (NO _x)	8.8E-01	POUNDS	MILLION BTUS	AP-42 Table 3.1-1	4.830E-01
PM10 Primary (Filt + Cond)(PM10-PR)	1.2E-02	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	6.586E-03
PM2.5 Primary (Filt + Cond)(PM25-PR)	1.2E-02	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	6.586E-03
PM2.5 Filterable (PM25-FIL)	4.3E-03	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	2.360E-03
PM Condensable (PM-CON)	7.2E-03	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	3.951E-03
Sulfur Dioxide (SO ₂)	1.3E-02	POUNDS	GALLON	Mass Balance	5.686E-02
Volatile Organic Compounds (VOC)	4.1E-04	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	2.250E-04
Lead and lead compounds	1.4E-05	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	7.683E-06
Release Points					
ID	Description	Type	Apportion %		
01N	GT #1 North Stack	Vertical	50		
01S	GT #1 South Stack	Vertical	50		

Emission Unit 01					
Release Point 01N					
Specifications					
ID	01N		Type	Vertical	
Description	GT #1 North Stack				
Stack Status	Active				
Stack Parameters					
Stack Height (ft)	Stack Diameter (ft)	Exit Gas Temp (F)	Exit Gas Velocity (fps)	Exit Gas Flow Rate (acfm)	
62	8.46	729	182	620,700	
Geographic Coordinate					
Latitude	64.73549	Longitude	-147.35021	Datum	NAD 1983
Base Elevation	150	Accuracy	1		
Location Description	North Pole, AK				
Data Source	Engineering Estimate				
Release Point 01S					
Specifications					
ID	01S		Type	Vertical	
Description	GT #1 South Stack				
Stack Status	Active				
Stack Parameters					
Stack Height (ft)	Stack Diameter (ft)	Exit Gas Temp (F)	Exit Gas Velocity (fps)	Exit Gas Flow Rate (acfm)	
62	8.46	729	182	620,700	
Geographic Coordinate					
Latitude	64.73525	Longitude	-147.35021	Datum	NAD 1983
Base Elevation	150	Accuracy	1		
Location Description	North Pole, AK				
Data Source	Engineering Estimate				

Emission Unit 02					
Specifications					
ID	02	Design Capacity	672 MILLION BTU PER HOUR		
Description	GT#2 Gas Turbine	Emission Unit Status	Operating		
Manufacturer	General Electric	Manufactured Year	Installed 1977		
Model Number	Frame 7, Series 7001, Model BR	Serial Number	248861		
Regulations					
Regulation/Description					
Not Applicable					
> Control Equipment					
Capture Efficiency (%)	0				
System Description	None				
Equipment Type(s)	None				
Pollutants Controlled					
Pollutant Description				Reduction Efficiency (%)	
Not Applicable				Not Applicable	
Processes					
Process	Primary Process				
SCC Code	20100109				
	> Internal Combustion Engines				
	> Electric Generation				
	> Distillate Oil (Diesel)				
	> Turbine: Exhaust				
Material Processed	Distillate Oil (No. 2)				
Period Start	1/1/2017		Period End	12/31/2017	
Throughput					
Total		Summer %	Fall %	Winter %	Spring %
	7,835,184 gallons	24	19	36	21
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
1.9	6.5	14.1	2,365.0		
Fuel Characteristics					
Heat Content (MMBtu/kgal)	Elem. Sulfur Content (wt. pct. S)	H2S Sulfur Content	Ash Content		
138.278	0.381	Not Available	Not Available		
Heating					
Heat Input (MMBtu)		Heat Output		Heat Values Convention	
1,083,431		Not Available		HHV	
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide (CO)	3.3E-03	POUNDS	MILLION BTUS	AP-42 Table 3.1-1	1.788E+00
Ammonia (NH ₃)	Not Available	Not Available	Not Available	Not Available	Not Available
Nitrogen Oxides (NO _x)	8.8E-01	POUNDS	MILLION BTUS	AP-42 Table 3.1-1	4.767E+02
PM10 Primary (Filt + Cond)(PM10-PR)	1.2E-02	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	6.501E+00
PM2.5 Primary (Filt + Cond)(PM25-PR)	1.2E-02	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	6.501E+00
PM2.5 Filterable (PM25-FIL)	4.3E-03	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	2.329E+00
PM Condensable (PM-CON)	7.2E-03	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	3.900E+00
Sulfur Dioxide (SO ₂)	5.6E-02	POUNDS	GALLON	Mass Balance	2.182E+02
Volatile Organic Compounds (VOC)	4.1E-04	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	2.221E-01
Lead and lead compounds	1.4E-05	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	7.584E-03
Process					
Process	Secondary Process				
SCC Code	20100109				
	> Internal Combustion Engines				
	> Electric Generation				
	> Distillate Oil (Diesel)				
	> Turbine: Exhaust				
Material Processed	Distillate Oil (No. 1)				
Period Start	1/1/2017		Period End	12/31/2017	
Throughput					
Total		Summer %	Fall %	Winter %	Spring %
	1,653,514 gallons	7	9	65	19
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
0.4	1.4	3.0	499.1		

Emission Unit 02						
Fuel Characteristics						
Heat Content (MMBtu/kgal)	Elem. Sulfur Content (wt. pct. S)	H2S Sulfur Content	Ash Content			
133.6425	0.095	Not Available	Not Available			
Heating						
Heat Input (MMBtu)		Heat Output		Heat Values Convention		
220,980		Not Available		HHV		
Emissions						
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons	
Carbon Monoxide (CO)	3.3E-03	POUNDS	MILLION BTUS	AP-42 Table 3.1-1	3.646E-01	
Ammonia (NH ₃)	Not Available	Not Available	Not Available	Not Available	Not Available	
Nitrogen Oxides (NO _x)	8.8E-01	POUNDS	MILLION BTUS	AP-42 Table 3.1-1	9.723E+01	
PM10 Primary (Filt + Cond)(PM10-PR)	1.2E-02	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	1.326E+00	
PM2.5 Primary (Filt + Cond)(PM25-PR)	1.2E-02	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	1.326E+00	
PM2.5 Filterable (PM25-FIL)	4.3E-03	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	4.751E-01	
PM Condensable (PM-CON)	7.2E-03	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	7.955E-01	
Sulfur Dioxide (SO ₂)	1.3E-02	POUNDS	GALLON	Mass Balance	1.067E+01	
Volatile Organic Compounds (VOC)	4.1E-04	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	4.530E-02	
Lead and lead compounds	1.4E-05	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	1.547E-03	
Process	Tertiary Process					
SCC Code	20100109					
	> Internal Combustion Engines					
	> Electric Generation					
	> Distillate Oil (Diesel)					
	> Turbine: Exhaust					
Material Processed	Jet A					
Period Start	1/1/2017		Period End	12/31/2017		
Throughput						
Total	29,818 gallons	Summer %	Fall %	Winter %	Spring %	
		0	0	100	0	
Operational Schedule						
Days/Week	Hours/Day	Weeks/Period	Hours/Period			
0.01	0.02	0.05	9.0			
Fuel Characteristics						
Heat Content (MMBtu/kgal)	Elem. Sulfur Content (wt. pct. S)	H2S Sulfur Content	Ash Content			
125.34	0.096	Not Available	Not Available			
Heating						
Heat Input (MMBtu)		Heat Output		Heat Values Convention		
3,737		Not Available		HHV		
Emissions						
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons	
Carbon Monoxide (CO)	3.3E-03	POUNDS	MILLION BTUS	AP-42 Table 3.1-1	6.167E-03	
Ammonia (NH ₃)	Not Available	Not Available	Not Available	Not Available	Not Available	
Nitrogen Oxides (NO _x)	8.8E-01	POUNDS	MILLION BTUS	AP-42 Table 3.1-1	1.644E+00	
PM10 Primary (Filt + Cond)(PM10-PR)	1.2E-02	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	2.242E-02	
PM2.5 Primary (Filt + Cond)(PM25-PR)	1.2E-02	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	2.242E-02	
PM2.5 Filterable (PM25-FIL)	4.3E-03	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	8.035E-03	
PM Condensable (PM-CON)	7.2E-03	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	1.345E-02	
Sulfur Dioxide (SO ₂)	1.3E-02	POUNDS	GALLON	Mass Balance	1.936E-01	
Volatile Organic Compounds (VOC)	4.1E-04	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	7.662E-04	
Lead and lead compounds	1.4E-05	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	2.616E-05	
Release Points						
ID	Description			Type	Apportion %	
02N	GT #2 North Stack			Vertical	50	
02S	GT #2 South Stack			Vertical	50	

Emission Unit 02					
Release Point 02N					
Specifications					
ID	02N		Type	Vertical	
Description	GT #2 North Stack				
Stack Parameters					
Stack Height (ft)	Stack Diameter (ft)	Exit Gas Temp (F)	Exit Gas Velocity (fps)	Exit Gas Flow Rate (acfm)	
62	8.46	729	182	620,700	
Geographic Coordinate					
Latitude	64.735044	Longitude	-147.351072	Datum	NAD 1983
Base Elevation	150	Accuracy	1		
Location Description	North Pole, AK				
Data Source	Engineering Estimate				
Release Point 02S					
Specifications					
ID	02S		Type	Vertical	
Description	GT #2 South Stack				
Stack Parameters					
Stack Height (ft)	Stack Diameter (ft)	Exit Gas Temp (F)	Exit Gas Velocity (fps)	Exit Gas Flow Rate (acfm)	
62	8.46	729	182	620,700	
Geographic Coordinate					
Latitude	64.73525	Longitude	-147.35127	Datum	NAD 1983
Base Elevation	150	Accuracy	1		
Location Description	North Pole, AK				
Data Source	Engineering Estimate				

Emission Unit 03					
Specifications					
ID	03	Design Capacity	50,000 gallons		
Description	Fuel Storage Tank	Emission Unit Status	Operating		
Manufacturer	Unknown	Manufactured Year	Unknown		
Model Number	Unknown	Serial Number	Unknown		
Regulations					
Regulation/Description					
Not Applicable - This emission unit is reported because it is included in Table A of AQ0110TVP03					
> Control Equipment					
Capture Efficiency (%)	0				
System Description	None				
Equipment Type(s)	None				
Pollutants Controlled					
Pollutant Description				Reduction Efficiency (%)	
Not Applicable				Not Applicable	
Processes					
Process	Primary Process				
SCC Code	20100108				
	> Internal Combustion Engines				
	> Electric Generation				
	> Distillate Oil (Diesel)				
	> Turbine: Evaporative Losses (Fuel Storage and Delivery System)				
Material Processed	Diesel (No. 1)				
Period Start	1/1/2017	Period End	12/31/2017		
Throughput					
Total		Summer %	Fall %	Winter %	Spring %
45,449 gallons		0	0	100	0
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
7	24	52	8,760		
Fuel Characteristics					
Heat Content	Elem. Sulfur Content	H2S Sulfur Content	Ash Content		
Not Applicable	Not Applicable	Not Applicable	Not Applicable		
Heating					
Heat Input		Heat Output		Heat Values Convention	
Not Applicable		Not Applicable		Not Applicable	
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide (CO)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Ammonia (NH ₃)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Nitrogen Oxides (NO _x)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM10 Primary (Flit + Cond)(PM10-PR)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM2.5 Primary (Flit + Cond)(PM25-PR)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM2.5 Filterable (PM25-FIL)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM Condensable (PM-CON)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Sulfur Dioxide (SO ₂)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Volatile Organic Compounds (VOC)	Not Applicable	Not Applicable	Not Applicable	Tanks 4.09d	1.194E-02
Lead and lead compounds	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Process					
Process	Secondary Process				
SCC Code	Not Applicable				
	Not Applicable				
	Not Applicable				
	Not Applicable				
Material Processed	Not Applicable				
Period Start	1/1/2017	Period End	12/31/2017		
Throughput					
Total		Summer %	Fall %	Winter %	Spring %
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
Not Applicable	Not Applicable	Not Applicable	Not Applicable		
Fuel Characteristics					

Emission Unit 03					
Heat Content	Elem. Sulfur Content	H2S Sulfur Content	Ash Content		
Not Applicable	Not Applicable	Not Applicable	Not Applicable		
Heating					
Heat Input		Heat Output		Heat Values Convention	
Not Applicable		Not Applicable		Not Applicable	
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide (CO)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Ammonia (NH ₃)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Nitrogen Oxides (NO _x)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM10 Primary (Flit + Cond)(PM10-PR)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM2.5 Primary (Flit + Cond)(PM25-PR)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM2.5 Filterable (PM25-FIL)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM Condensable (PM-CON)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Sulfur Dioxide (SO ₂)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Volatile Organic Compounds (VOC)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Lead and lead compounds	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Release Points					
ID	Description	Type		Apportion %	
03	Fuel Storage Tank	Goose Neck		100	
Release Point 03					
Specifications					
ID	03	Type		Goose Neck	
Description	Fuel Storage Tank				
Stack Parameters					
Stack Height (ft)	Stack Diameter (ft)	Exit Gas Temp (F)	Exit Gas Velocity (fps)	Exit Gas Flow Rate (acfm)	
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Geographic Coordinate					
Latitude	Not Applicable	Longitude	Not Applicable	Datum	Not Applicable
Base Elevation	150	Accuracy	Not Applicable		
Location Description	North Pole, AK				
Data Source	Not Applicable				

Emission Unit 04					
Specifications					
ID	4	Design Capacity	50,000 gallons		
Description	Fuel Storage Tank	Emission Unit Status	Operating		
Manufacturer	Unknown	Manufactured Year	Unknown		
Model Number	Unknown	Serial Number	Unknown		
Regulations					
Regulation/Description					
Not Applicable - This emission unit is reported because it is included in Table A of AQ0110TVP03					
> Control Equipment					
Capture Efficiency (%)	0				
System Description	None				
Equipment Type(s)	None				
Pollutants Controlled					
Pollutant Description				Reduction Efficiency (%)	
Not Applicable				Not Applicable	
Processes					
Process	Primary Process				
SCC Code	20100108				
	> Internal Combustion Engines				
	> Electric Generation				
	> Distillate Oil (Diesel)				
	> Turbine: Evaporative Losses (Fuel Storage and Delivery System)				
Material Processed	Diesel (No. 2)				
Period Start	1/1/2017	Period End	12/31/2017		
Throughput					
Total		Summer %	Fall %	Winter %	Spring %
	32,276,076 gallons	25	23	30	21
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
7	24	52	8,760		
Fuel Characteristics					
Heat Content	Elem. Sulfur Content	H2S Sulfur Content	Ash Content		
Not Applicable	Not Applicable	Not Applicable	Not Applicable		
Heating					
Heat Input		Heat Output		Heat Values Convention	
Not Applicable		Not Applicable		Not Applicable	
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide (CO)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Ammonia (NH ₃)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Nitrogen Oxides (NO _x)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM10 Primary (Flit + Cond)(PM10-PR)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM2.5 Primary (Flit + Cond)(PM25-PR)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM2.5 Filterable (PM25-FIL)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM Condensable (PM-CON)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Sulfur Dioxide (SO ₂)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Volatile Organic Compounds (VOC)	Not Applicable	Not Applicable	Not Applicable	Tanks 4.09d	1.619E-02
Lead and lead compounds	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Process					
Process	Secondary Process				
SCC Code	Not Applicable				
	Not Applicable				
	Not Applicable				
	Not Applicable				
	Not Applicable				
Material Processed	Not Applicable				
Period Start	1/1/2017	Period End	12/31/2017		
Throughput					
Total		Summer %	Fall %	Winter %	Spring %
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
Not Applicable	Not Applicable	Not Applicable	Not Applicable		
Fuel Characteristics					

Emission Unit 04					
Heat Content	Elem. Sulfur Content	H2S Sulfur Content	Ash Content		
Not Applicable	Not Applicable	Not Applicable	Not Applicable		
Heating					
Heat Input		Heat Output		Heat Values Convention	
Not Applicable		Not Applicable		Not Applicable	
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide (CO)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Ammonia (NH ₃)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Nitrogen Oxides (NO _x)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM10 Primary (Filt + Cond)(PM10-PR)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM2.5 Primary (Filt + Cond)(PM25-PR)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM2.5 Filterable (PM25-FIL)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM Condensable (PM-CON)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Sulfur Dioxide (SO ₂)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Volatile Organic Compounds (VOC)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Lead and lead compounds	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Release Points					
ID	Description	Type		Apportion %	
03	Fuel Storage Tank	Goose Neck		100	
Release Point 04					
Specifications					
ID	04	Type		Goose Neck	
Description	Fuel Storage Tank				
Stack Parameters					
Stack Height (ft)	Stack Diameter (ft)	Exit Gas Temp (F)	Exit Gas Velocity (fps)	Exit Gas Flow Rate (acfm)	
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	
Geographic Coordinate					
Latitude	Not Applicable	Longitude	Not Applicable	Datum	Not Applicable
Base Elevation	150	Accuracy	Not Applicable		
Location Description	North Pole, AK				
Data Source	Not Applicable				

Emission Unit 05					
Specifications					
ID	05	Design Capacity	455 MILLION BTU PER HOUR		
Description	GT#3 Gas Turbine	Emission Unit Status	Operating		
Manufacturer	General Electric	Manufactured Year	Purchased 2004		
Model Number	LM6000PC	Serial Number	191-548		
Regulations					
Regulation/Description					
40 CFR 60 Subpart GG					
> Control Equipment					
Capture Efficiency (%)	73 per AP-42, Table 3.1-1				
System Description	Weir Rotojet Water Injection (NO)				
Equipment Type(s)	Water Injection				
Pollutants Controlled					
Pollutant Description		Reduction Efficiency (%)			
Carbon Monoxide		66			
Nitrogen Oxides		77			
Processes					
Process	Primary Process				
SCC Code	20100901				
	> Internal Combustion Engines				
	> Electric Generation				
	> Kerosene/Naphtha (Jet Fuel)				
	> Turbine: Exhaust				
Material Processed	Naphtha				
Period Start	1/1/2017	Period End	12/31/2017		
Throughput					
Total		Summer %	Fall %	Winter %	Spring %
	23,464,075 gallons	25	25	28	21
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
6.0	20.5	44.5	7,478.7		
Fuel Characteristics					
Heat Content (MMBtu/kgal)	Elem. Sulfur Content (wt. pct. S)	H2S Sulfur Content	Ash Content		
109.09225	0.0013	Not Available	Not Available		
Heating					
Heat Input (MMBtu)		Heat Output		Heat Values Convention	
2,559,749		Not Available		HHV	
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide (CO)	7.6E-02	POUNDS	MILLION BTUS	AP-42 Table 3.1-1	9.727E+01
Ammonia (NH ₃)	Not Available	Not Available	Not Available	Not Available	Not Available
Nitrogen Oxides (NO _x)	2.4E-01	POUNDS	MILLION BTUS	AP-42 Table 3.1-1	3.072E+02
PM10 Primary (Filt + Cond)(PM10-PR)	1.2E-02	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	1.536E+01
PM2.5 Primary (Filt + Cond)(PM25-PR)	1.2E-02	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	1.536E+01
PM2.5 Filterable (PM25-FIL)	4.3E-03	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	5.503E+00
PM Condensable (PM-CON)	7.2E-03	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	9.215E+00
Sulfur Dioxide (SO ₂)	1.6E-04	POUNDS	GALLON	Mass Balance	1.844E+00
Volatile Organic Compounds (VOC)	4.1E-04	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	5.247E-01
Lead and lead compounds	1.4E-05	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	1.792E-02
Process					
Secondary Process					
SCC Code	20100109				
	> Internal Combustion Engines				
	> Electric Generation				
	> Distillate Oil (Diesel)				
	> Turbine: Exhaust				
Material Processed	Distillate Oil (No. 1)				
Period Start	1/1/2017	Period End	12/31/2017		
Throughput					
Total		Summer %	Fall %	Winter %	Spring %
	1,092,520 gallons	20	9	17	54

Emission Unit 05					
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
0.3	1.0	2.1	348.2		
Fuel Characteristics					
Heat Content (MMBtu/kgal)	Elem. Sulfur Content (wt. pct. S)	H2S Sulfur Content	Ash Content		
133.643	0.095	Not Available	Not Available		
Heating					
Heat Input (MMBtu)		Heat Output		Heat Values Convention	
146,007		Not Available		HHV	
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide (CO)	7.6E-02	POUNDS	MILLION BTUS	AP-42 Table 3.1-1	5.548E+00
Ammonia (NH ₃)	Not Available	Not Available	Not Available	Not Available	Not Available
Nitrogen Oxides (NO _x)	2.4E-01	POUNDS	MILLION BTUS	AP-42 Table 3.1-1	1.752E+01
PM10 Primary (Filt + Cond)(PM10-PR)	1.2E-02	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	8.760E-01
PM2.5 Primary (Filt + Cond)(PM25-PR)	1.2E-02	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	8.760E-01
PM2.5 Filterable (PM25-FIL)	4.3E-03	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	3.139E-01
PM Condensable (PM-CON)	7.2E-03	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	5.256E-01
Sulfur Dioxide (SO ₂)	1.3E-02	POUNDS	GALLON	Mass Balance	7.051E+00
Volatile Organic Compounds (VOC)	4.1E-04	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	2.993E-02
Lead and lead compounds	1.4E-05	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	1.022E-03
Process					
SCC Code	Tertiary Process				
	20100109				
	> Internal Combustion Engines				
	> Electric Generation				
	> Distillate Oil (Diesel)				
	> Turbine: Exhaust				
Material Processed	Jet A				
Period Start	1/1/2017		Period End	12/31/2017	
Throughput					
Total		Summer %	Fall %	Winter %	Spring %
6,874	gallons	0	0	100	0
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
0.002	0.006	0.013	2.2		
Fuel Characteristics					
Heat Content (MMBtu/kgal)	Elem. Sulfur Content (wt. pct. S)	H2S Sulfur Content	Ash Content		
125.340	0.096	Not Available	Not Available		
Heating					
Heat Input (MMBtu)		Heat Output		Heat Values Convention	
862		Not Available		HHV	
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide (CO)	7.6E-02	POUNDS	MILLION BTUS	AP-42 Table 3.1-1	3.274E-02
Ammonia (NH ₃)	Not Available	Not Available	Not Available	Not Available	Not Available
Nitrogen Oxides (NO _x)	2.4E-01	POUNDS	MILLION BTUS	AP-42 Table 3.1-1	1.034E-01
PM10 Primary (Filt + Cond)(PM10-PR)	1.2E-02	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	5.169E-03
PM2.5 Primary (Filt + Cond)(PM25-PR)	1.2E-02	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	5.169E-03
PM2.5 Filterable (PM25-FIL)	4.3E-03	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	1.852E-03
PM Condensable (PM-CON)	7.2E-03	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	3.102E-03
Sulfur Dioxide (SO ₂)	1.3E-02	POUNDS	GALLON	Mass Balance	4.463E-02
Volatile Organic Compounds (VOC)	4.1E-04	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	1.766E-04
Lead and lead compounds	1.4E-05	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	6.031E-06

Emission Unit 05				
Release Points				
ID	Description	Type	Apportion %	
05	GT#3 Stack	Vertical	100	
Release Point 05				
Specifications				
ID	05	Type	Vertical	
Description	GT#3 Stack			
Stack Parameters				
Stack Height (ft)	Stack Diameter (ft)	Exit Gas Temp (F)	Exit Gas Velocity (fps)	Exit Gas Flow Rate (acfm)
110	11.11	270	73.8	347,949
Geographic Coordinate				
Latitude	64.73526	Longitude	-147.34985	Datum NAD 1983
Base Elevation	150	Accuracy	1	
Location Description	North Pole, AK			
Data Source	Engineering Estimate			

Emission Unit 06					
Specifications					
ID	06	Design Capacity	455 MILLION BTU PER HOUR		
Description	GT#4 Gas Turbine	Emission Unit Status	Not Installed		
Manufacturer	General Electric	Manufactured Year	This unit has not been installed		
Model Number	LM6000PC	Serial Number	TBD		
Regulations					
Regulation/Description					
40 CFR 60 Subpart KKKK					
> Control Equipment					
Capture Efficiency (%)	Not Applicable				
System Description	Not Applicable				
Equipment Type(s)	Not Applicable				
Pollutants Controlled					
Pollutant Description				Reduction Efficiency (%)	
Not Applicable				Not Applicable	
Processes					
Process	Primary Process				
SCC Code	Not Applicable				
	Not Applicable				
	Not Applicable				
	Not Applicable				
Material Processed	Not Applicable				
Period Start	1/1/2017	Period End	12/31/2017		
Throughput					
Total		Summer %	Fail %	Winter %	Spring %
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
Not Applicable	Not Applicable	Not Applicable	Not Applicable		
Fuel Characteristics					
Heat Content	Elem. Sulfur Content	H2S Sulfur Content	Ash Content		
Not Applicable	Not Applicable	Not Applicable	Not Applicable		
Heating					
Heat Input		Heat Output		Heat Values Convention	
Not Applicable		Not Applicable		Not Applicable	
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide (CO)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Ammonia (NH ₃)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Nitrogen Oxides (NO _x)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM10 Primary (Filt + Cond)(PM10-PRI)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM2.5 Primary (Filt + Cond)(PM25-PRI)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM2.5 Filterable (PM25-FIL)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM Condensable (PM-CON)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Sulfur Dioxide (SO ₂)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Volatile Organic Compounds (VOC)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Lead and lead compounds	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Process					
Secondary Process					
SCC Code	Not Applicable				
	Not Applicable				
	Not Applicable				
	Not Applicable				
Material Processed	Not Applicable				
Period Start	1/1/2017	Period End	12/31/2017		
Throughput					
Total		Summer %	Fail %	Winter %	Spring %
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
Not Applicable	Not Applicable	Not Applicable	Not Applicable		
Fuel Characteristics					

Emission Unit 06					
Heat Content	Elem. Sulfur Content	H2S Sulfur Content	Ash Content		
Not Applicable	Not Applicable	Not Applicable	Not Applicable		
Heating					
Heat Input		Heat Output		Heat Values Convention	
Not Applicable		Not Applicable		Not Applicable	
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide (CO)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Ammonia (NH ₃)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Nitrogen Oxides (NO _x)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM10 Primary (Filt + Cond)(PM10-PR)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM2.5 Primary (Filt + Cond)(PM25-PR)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM2.5 Filterable (PM25-FIL)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM Condensable (PM-CON)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Sulfur Dioxide (SO ₂)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Volatile Organic Compounds (VOC)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Lead and lead compounds	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Release Points					
ID	Description			Type	Apportion %
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable

Emission Unit 07					
Specifications					
ID	07	Design Capacity	565 hp		
Description	Emergency Generator Engine	Emission Unit Status	Operating		
Manufacturer	Generac Gen Set	Manufactured Year	Installed 2005		
Model Number	5231150100	Serial Number	2083094		
Regulations					
Regulation/Description					
40 CFR 63 Subpart ZZZZ					
> Control Equipment					
Capture Efficiency (%)	0				
System Description	None				
Equipment Type(s)	None				
Pollutants Controlled					
Pollutant Description				Reduction Efficiency (%)	
Not Applicable				Not Applicable	
Processes					
Process	Primary Process				
SCC Code	20200107				
	> Internal Combustion Engines				
	> Electric Generation				
	> Distillate Oil (Diesel)				
	> Reciprocating: Exhaust				
Material Processed	Distillate Oil (No. 2)				
Period Start	1/1/2017	Period End	12/31/2017		
Throughput					
Total		Summer %	Fall %	Winter %	Spring %
163.2	gallons	12	25	6	57
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
0	0	0	5		
Fuel Characteristics					
Heat Content (MMBtu/kgal)	Elem. Sulfur Content (wt. pct. S)	H2S Sulfur Content	Ash Content		
138.278	0.0015	Not Available	Not Available		
Heating					
Heat Input (MMBtu)		Heat Output		Heat Values Convention	
23		Not Available		HHV	
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide (CO)	6.68E-03	POUNDS	HORSEPOWER-HOUR	AP-42 Table 3.3-1	9.624E-03
Ammonia (NH ₃)	Not Available	Not Available	Not Available	Not Available	Not Available
Nitrogen Oxides (NO _x)	3.1E-02	POUNDS	HORSEPOWER-HOUR	AP-42 Table 3.3-1	4.466E-02
PM10 Primary (Filt + Cond)(PM10-PRI)	2.2E-03	POUNDS	HORSEPOWER-HOUR	AP-42 Table 3.3-1	3.170E-03
PM2.5 Primary (Filt + Cond)(PM25-PRI)	2.2E-03	POUNDS	HORSEPOWER-HOUR	AP-42 Table 3.3-1	3.170E-03
PM2.5 Filterable (PM25-FIL)	42.5	POUNDS	THOUSAND GALLONS	WebFIRE	1.795E-07
PM Condensable (PM-CON)	Not Available	Not Available	Not Available	Not Available	Not Available
Sulfur Dioxide (SO ₂)	5.4E-02	POUNDS	GALLON	Mass Balance	4.390E-03
Volatile Organic Compounds (VOC)	2.5E-03	POUNDS	MILLION BTUS	AP-42 Table 3.3-1	3.622E-03
Lead and lead compounds	Not Available	Not Available	Not Available	Not Available	Not Available
Process					
Secondary Process					
SCC Code	Not Applicable				
	Not Applicable				
	Not Applicable				
	Not Applicable				
	Not Applicable				
Material Processed	Not Applicable				
Period Start	1/1/2017	Period End	12/31/2017		
Throughput					
Total		Summer %	Fall %	Winter %	Spring %
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
Not Applicable	Not Applicable	Not Applicable	Not Applicable		

Emission Unit 07					
Fuel Characteristics					
Heat Content (MMBtu/kgal)	Elem. Sulfur Content (wt. pct. S)	H2S Sulfur Content	Ash Content		
Not Applicable	Not Applicable	Not Applicable	Not Applicable		
Heating					
Heat Input		Heat Output		Heat Values Convention	
Not Applicable		Not Applicable		Not Applicable	
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons Per Year
Carbon Monoxide (CO)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Ammonia (NH ₃)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Nitrogen Oxides (NO _x)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM10 Primary (Filt + Cond)(PM10-PR)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM2.5 Primary (Filt + Cond)(PM25-PR)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM2.5 Filterable (PM25-FIL)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM Condensable (PM-CON)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Sulfur Dioxide (SO ₂)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Volatile Organic Compounds (VOC)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Lead and lead compounds	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Release Points					
ID	Description	Type		Apportion %	
07	Emergency Generator Stack	Vertical		100	
Release Point 07					
Specifications					
ID	07	Type		Vertical	
Description	Emergency Generator Stack				
Stack Parameters					
Stack Height (ft)	Stack Diameter (ft)	Exit Gas Temp (F)	Exit Gas Velocity (fps)	Exit Gas Flow Rate (acfm)	
27	0.83	1299	88.7	2878	
Geographic Coordinate					
Latitude	64.7341	Longitude	-147.35072	Datum	NAD 1983
Base Elevation	150	Accuracy	1		
Location Description	North Pole, AK				
Data Source	Engineering Estimate				

Emission Unit 11					
Specifications					
ID	11	Design Capacity	5 MILLION BTU PER HOUR		
Description	Building Heater	Emission Unit Status	Operating		
Manufacturer	Bryan Steam	Manufactured Year	Installed 2005		
Model Number	RV500	Serial Number	93433		
Regulations					
Regulation/Description					
Not Applicable					
> Control Equipment					
Capture Efficiency (%)	0				
System Description	None				
Equipment Type(s)	None				
Pollutants Controlled					
Pollutant Description				Reduction Efficiency (%)	
Not Applicable				Not Applicable	
Processes					
Process	Primary Process				
SCC Code	10301002				
	> External Combustion Boilers				
	> Space Heaters				
	> Commercial/Institutional				
	> Liquefied Petroleum Gas (LPG)				
Material Processed	Propane				
Period Start	1/1/2017		Period End	12/31/2017	
Throughput					
Total		Summer %	Fall %	Winter %	Spring %
2,060	gallons	0	100	0	0
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
0.1	0.2	0.5	89.5		
Fuel Characteristics					
Heat Content (MMBtu/kgal)	Elem. Sulfur Content (wt. pct. S)	H2S Sulfur Content (vol. pct. H2S)	Ash Content		
91.6	7.81E-06	0.5	Not Available		
Heating					
Heat Input (MMBtu)	Heat Output		Heat Values Convention		
	189 Not Available		HHV		
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide (CO)	7.5	POUNDS	THOUSAND GALLONS	AP-42 Table 1.5-1	7.723E-03
Ammonia (NH ₃)	Not Available	Not Available	Not Available	Not Available	Not Available
Nitrogen Oxides (NO _x)	13	POUNDS	THOUSAND GALLONS	AP-42 Table 1.5-1	1.339E-02
PM10 Primary (Filt + Cond)(PM10-PRI)	0.7	POUNDS	THOUSAND GALLONS	AP-42 Table 1.5-1	7.208E-04
PM2.5 Primary (Filt + Cond)(PM25-PRI)	0.7	POUNDS	THOUSAND GALLONS	AP-42 Table 1.5-1	7.208E-04
PM2.5 Filterable (PM25-FIL)	0.2	POUNDS	THOUSAND GALLONS	AP-42 Table 1.5-1	2.060E-04
PM Condensable (PM-CON)	0.5	POUNDS	THOUSAND GALLONS	AP-42 Table 1.5-1	5.149E-04
Sulfur Dioxide (SO ₂)	0.0E+00	POUNDS	GALLON	Mass Balance	0.000E+00
Volatile Organic Compounds (VOC)	1.0	POUNDS	THOUSAND GALLONS	AP-42 Table 1.5-1	1.030E-03
Lead and lead compounds	Not Available	Not Available	Not Available	Not Available	Not Available
Process					
Secondary Process					
SCC Code	Not Applicable				
	Not Applicable				
	Not Applicable				
	Not Applicable				
	Not Applicable				
Material Processed	Not Applicable				
Period Start	1/1/2017		Period End	12/31/2017	
Throughput					
Total		Summer %	Fall %	Winter %	Spring %
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
Not Applicable	Not Applicable	Not Applicable	Not Applicable		

Emission Unit 11					
Fuel Characteristics					
Heat Content	Elem. Sulfur Content	H2S Sulfur Content	Ash Content		
Not Applicable	Not Applicable	Not Applicable	Not Applicable		
Heating					
Heat Input		Heat Output		Heat Values Convention	
Not Applicable		Not Applicable		Not Applicable	
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide (CO)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Ammonia (NH ₃)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Nitrogen Oxides (NO _x)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM10 Primary (Filt + Cond)(PM10-PRI)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM2.5 Primary (Filt + Cond)(PM25-PRI)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM2.5 Filterable (PM25-FIL)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM Condensable (PM-CON)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Sulfur Dioxide (SO ₂)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Volatile Organic Compounds (VOC)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Lead and lead compounds	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Release Points					
ID	Description	Type		Apportion %	
11	Building Heater	Vertical		100	
Release Point 11					
Specifications					
ID	11	Type		Vertical	
Description	Building Heater				
Stack Parameters					
Stack Height (ft)	Stack Diameter (ft)	Exit Gas Temp (F)	Exit Gas Velocity (fps)	Exit Gas Flow Rate (acfm)	
63	0.98	450	121	5477	
Geographic Coordinate					
Latitude	64.73416	Longitude	-147.35072	Datum	NAD 1983
Base Elevation	150	Accuracy	1		
Location Description	North Pole, AK				
Data Source	Engineering Estimate				

Emission Unit 12					
Specifications					
ID	12	Design Capacity	5 MILLION BTU PER HOUR		
Description	Building Heater	Emission Unit Status	Operating		
Manufacturer	Bryan Steam	Manufactured Year	Installed 2005		
Model Number	RV500	Serial Number	93434		
Regulations					
Regulation/Description					
Not Applicable					
> Control Equipment					
Capture Efficiency (%)	0				
System Description	None				
Equipment Type(s)	None				
Pollutants Controlled					
Pollutant Description				Reduction Efficiency (%)	
Not Applicable				Not Applicable	
Processes					
Process	Primary Process				
SCC Code	10301002				
	> External Combustion Boilers				
	> Space Heaters				
	> Commercial/Institutional				
	> Liquefied Petroleum Gas (LPG)				
Material Processed	Propane				
Period Start	1/1/2017	Period End	12/31/2017		
Throughput					
Total		Summer %	Fall %	Winter %	Spring %
2,060	gallons	0	100	0	0
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
0.1	0.2	0.5	89.5		
Fuel Characteristics					
Heat Content (MMBtu/kgal)	Elem. Sulfur Content (wt. pct. S)	H2S Sulfur Content (vol. pct. H2S)	Ash Content		
91.6	7.81E-06	0.5	Not Available		
Heating					
Heat Input (MMBtu)		Heat Output		Heat Values Convention	
189		Not Available		HHV	
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide (CO)	7.5	POUNDS	THOUSAND GALLONS	AP-42 Table 1.5-1	7.723E-03
Ammonia (NH ₃)	Not Available	Not Available	Not Available	Not Available	Not Available
Nitrogen Oxides (NO _x)	13	POUNDS	THOUSAND GALLONS	AP-42 Table 1.5-1	1.339E-02
PM10 Primary (Filt + Cond)(PM10-PR)	0.7	POUNDS	THOUSAND GALLONS	AP-42 Table 1.5-1	7.208E-04
PM2.5 Primary (Filt + Cond)(PM25-PR)	0.7	POUNDS	THOUSAND GALLONS	AP-42 Table 1.5-1	7.208E-04
PM2.5 Filterable (PM25-FIL)	0.2	POUNDS	THOUSAND GALLONS	AP-42 Table 1.5-1	2.060E-04
PM Condensable (PM-CON)	0.5	POUNDS	THOUSAND GALLONS	AP-42 Table 1.5-1	5.149E-04
Sulfur Dioxide (SO ₂)	0.0E+00	POUNDS	GALLON	Mass Balance	0.000E+00
Volatile Organic Compounds (VOC)	1.0	POUNDS	THOUSAND GALLONS	AP-42 Table 1.5-1	1.030E-03
Lead and lead compounds	N/A	N/A	N/A	N/A	N/A
Process					
Secondary Process					
SCC Code	Not Applicable				
	Not Applicable				
	Not Applicable				
	Not Applicable				
	Not Applicable				
Material Processed	Not Applicable				
Period Start	1/1/2017	Period End	12/31/2017		
Throughput					
Total		Summer %	Fall %	Winter %	Spring %
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
Not Applicable	Not Applicable	Not Applicable	Not Applicable		

Emission Unit 12					
Fuel Characteristics					
Heat Content	Elem. Sulfur Content	H2S Sulfur Content	Ash Content		
Not Applicable	Not Applicable	Not Applicable	Not Applicable		
Heating					
Heat Input		Heat Output		Heat Values Convention	
Not Applicable		Not Applicable		Not Applicable	
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide (CO)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Ammonia (NH ₃)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Nitrogen Oxides (NO _x)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM10 Primary (Filt + Cond)(PM10-PRI)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM2.5 Primary (Filt + Cond)(PM25-PRI)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM2.5 Filterable (PM25-FIL)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM Condensable (PM-CON)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Sulfur Dioxide (SO ₂)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Volatile Organic Compounds (VOC)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Lead and lead compounds	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Release Points					
ID	Description	Type		Apportion %	
11	Building Heater	Vertical		100	
Release Point 12					
Specifications					
ID	12	Type		Vertical	
Description	Building Heater				
Stack Parameters					
Stack Height (ft)	Stack Diameter (ft)	Exit Gas Temp (F)	Exit Gas Velocity (fps)	Exit Gas Flow Rate (acfm)	
63	0.98	450	121	5477	
Geographic Coordinate					
Latitude	64.33415	Longitude	-147.35011	Datum	NAD 1983
Base Elevation	150	Accuracy	1		
Location Description	North Pole, AK				
Data Source	Engineering Estimate				

EU ID	Fuel Type	Fuel Usage (Gallons) ¹												Total				
		January	February	March	April	May	June	July	August	September	October	November	December					
1	Jet A	8,757	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8,757
	No. 1 Diesel	227,800	214,387	199,811	1,571	-	4,079	17,868	1,309	1,698	15,158	4,971	7,215	5,145	695,867	976,654	29,818	1,653,514
	No. 2 Diesel	59,850	259,961	233,028	41,247	-	10,731	233,143	44,426	336	81,718	7,069	-	-	-	-	-	-
2	Jet A	29,818	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	No. 1 Diesel	603,292	367,604	271,656	-	50,135	34,592	32,655	42,528	87,651	16,197	49,079	98,125	800,249	1,653,514	7,835,184	6,874	1,092,520
	No. 2 Diesel	1,401,981	637,016	1,318,146	-	299,856	572,233	903,373	425,300	204,848	644,079	628,102	-	-	-	-	-	-
5	Jet A	6,874	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	No. 1 Diesel	185,566	1,628	1,567	9,527	581,226	118,484	54,988	44,381	43,118	901	49,470	1,654	1,092,520	23,464,075	4,119	163	4,119
	Naphtha	2,426,865	1,928,353	1,741,528	2,020,513	1,184,847	1,957,786	1,838,328	2,074,474	2,014,925	1,771,180	2,190,685	2,313,991	-	-	-	-	-
7	No. 2 Diesel	-	10	13	-	80	-	-	-	-	-	19	6	22	-	-	-	-
	Propane	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

EU ID	2017 Operating Hours ²	
	EU ID	Hours
1	1	568.7
2	2	2,873.1
5	5	7,829.1
7	7	5.1
11	11	89.5
12	12	89.5

Tank	Fuel Usage by Season (%)			
	Summer	Fall	Winter	Spring
Jet A	0	0	100	0
No. 1 Diesel	10	8	50	32
No. 2 Diesel	25	23	30	21

EU ID	Fuel Type	Fuel Usage by Season (%)			
		Summer	Fall	Winter	Spring
1	Jet A	-	-	100	-
	No. 1 Diesel	3	3	65	29
	No. 2 Diesel	30	9	33	28
2	Jet A	-	-	100	-
	No. 1 Diesel	7	9	65	19
	No. 2 Diesel	24	19	36	21
5	Jet A	-	-	100	-
	No. 1 Diesel	20	9	17	54
	Naphtha	25	25	28	21
7	No. 1 Diesel	-	-	-	-
	No. 2 Diesel	12	25	6	57
	Propane	-	-	100	-

Fuel Type	Total Fuel Usage (Gallons)												Total					
	January	February	March	April	May	June	July	August	September	October	November	December						
Jet A	45,449	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	45,449
No. 1 Diesel	1,016,658	583,619	473,034	11,098	631,361	157,155	105,521	88,218	132,467	32,256	103,520	106,994	3,441,902	37,276,075	23,464,075	4,119	45,449	
No. 2 Diesel	3,888,697	2,825,340	3,292,715	2,061,760	1,484,783	2,540,750	2,975,444	2,544,219	2,220,115	2,496,999	2,825,869	3,119,385	2,190,685	2,313,991	23,464,075	4,119	45,449	
Naphtha	2,426,865	1,928,353	1,741,528	2,020,513	1,184,847	1,957,786	1,838,328	2,074,474	2,014,925	1,771,180	2,190,685	2,313,991	-	-	-	-	-	
Propane	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

Fuel Type	Fuel HHV (Btu/gal) ³												Average					
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec						
Jet A	125,340	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	125,340
No. 1 Diesel	133,960	132,340	132,948	132,530	133,460	134,315	134,840	134,090	132,768	135,673	-	-	-	-	-	-	-	133,543
No. 2 Diesel	137,295	-	135,968	135,909	137,952	139,594	140,097	140,505	138,812	136,867	-	-	-	-	-	-	-	136,278
Naphtha	114,617	-	-	-	109,161	-	-	-	110,062	-	-	-	-	-	-	-	-	109,092

Fuel Type	Fuel Sulfur (max wt. pct. S) ⁴												Average					
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec						
Jet A	0.096	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.096
No. 1 Diesel	0.095	0.094	0.092	0.097	0.096	0.095	0.098	0.093	0.097	0.095	0.093	0.094	0.094	0.094	0.094	0.094	0.094	0.095
No. 2 Diesel	0.308	0.316	0.316	0.449	0.441	0.485	0.452	0.448	0.480	0.301	0.289	0.292	0.292	0.292	0.292	0.292	0.292	0.381
Naphtha	0.0014	N/A	0.0011	0.0014	0.0010	0.0013	0.0012	0.0011	0.0015	0.0014	0.0016	0.0012	0.0012	0.0012	0.0012	0.0012	0.0012	0.0013

Fuel Type	Fuel Density (lb/gal) ¹
Jet A	6.8
No. 1 Diesel	6.8
No. 2 Diesel	7.3
Naphtha	6.1
Propane ⁴	4.2

¹ Assumed
² Hours for EU IDs 1, 2, and 5 are from plant report, hours for EU ID 7 are from FOR, hours for EU IDs 10 and 11 are estimated based on fuel use
³ From fuel test records
⁴ Estimate from vendor propane factor notifications

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Identification and Physical Characteristics

Identification
 User Identification: GVEA North Pole 2017 No. 1 Diesel
 City: Fairbanks
 State: Alaska
 Company: GVEA
 Type of Tank: Horizontal Tank
 Description: GVEA North Pole 50,000 gallon tank

Tank Dimensions
 Shell Length (ft): 60.00
 Diameter (ft): 12.00
 Volume (gallons): 50,000.00
 Turnovers: 69.75
 Net Throughput(gall/yr): 3,487,351.00
 Is Tank Heated (y/n): N
 Is Tank Underground (y/n): N

Paint Characteristics
 Shell Color/Shade: White/White
 Shell Condition: Good

Breather Vent Settings
 Vacuum Settings (psig): -0.03
 Pressure Settings (psig): 0.03

Meteorological Data used in Emissions Calculations: Fairbanks, Alaska (Avg Atmospheric Pressure = 14.41 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

GVEA North Pole 2017 No. 1 Diesel - Horizontal Tank
Fairbanks, Alaska

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F)			Liquid Bulk Temp (deg F)	Vapor Pressure (psia)		Vapor Mol. Weight	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
		Avg.	Min.	Max.		Min.	Max.					
Distillate fuel oil no. 2	All	27.96	23.54	32.39	26.89	0.0031	0.0031	130.0000	0.0100	0.0236	188.00	Option 1: VP40 = .0031
1,2,4-Trimethylbenzene						0.0051	0.0041	0.0062	0.0100	0.0236	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						0.4468	0.3865	0.5149	0.0000	0.0017	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene						0.0324	0.0270	0.0387	0.0001	0.0020	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						0.7777	0.6790	0.8882	0.0000	0.0004	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Styrene						0.0213	0.0178	0.0255	0.0003	0.0032	104.15	Option 2: A=7.14, B=1574.51, C=224.09
Toluene						0.1122	0.0953	0.1316	0.0003	0.0167	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						0.0028	0.0028	0.0028	0.9863	0.9164	189.65	Option 2: A=7.009, B=1462.266, C=215.11
Xylene (-m)						0.0267	0.0222	0.0319	0.0029	0.0361	106.17	

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

GVEA North Pole 2017 No. 1 Diesel - Horizontal Tank
Fairbanks, Alaska

Annual Emission Calculations	
Standing Losses (lb):	3.8982
Vapor Space Volume (cu ft):	4,322.1912
Vapor Density (lb/cu ft):	0.0001
Vapor Space Expansion Factor:	0.0321
Vented Vapor Saturation Factor:	0.9990
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	4,322.1912
Tank Diameter (ft):	12.0000
Effective Diameter (ft):	30.2853
Vapor Space Outage (ft):	6.0000
Tank Shell Length (ft):	60.0000
Vapor Density	
Vapor Density (lb/cu ft):	0.0001
Vapor Molecular Weight (lb/lb-mole):	130.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0031
Daily Avg. Liquid Surface Temp. (deg. R):	487.6347
Daily Average Ambient Temp. (deg. F):	26.8708
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	486.5608
Tank Paint Solar Absorbance (Shell):	0.1700
Daily Total Solar Insulation Factor (Btu/sqft day):	806.1566
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.0321
Daily Vapor Temperature Range (deg. R):	17.6913
Daily Vapor Pressure Range (psia):	0.0000
Breather Vent Press. Setting Range (psia):	0.0600
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0031
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	0.0031
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	0.0031
Daily Avg. Liquid Surface Temp. (deg R):	487.6347
Daily Min. Liquid Surface Temp. (deg R):	483.2119
Daily Max. Liquid Surface Temp. (deg R):	492.0575
Daily Ambient Temp. Range (deg. R):	19.2417
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	0.9990
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0031
Vapor Space Outage (ft):	6.0000
Working Losses (lb):	
Vapor Molecular Weight (lb/lb-mole):	19.9699
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	130.0000
Annual Net Throughput (gal/yr.):	0.0031
Annual Turnovers:	3,487,351.0000
Turnover Factor:	69.7470
	0.5968

Tank Diameter (ft):	12.0000
Working Loss Product Factor:	1.0000
Total Losses (lb):	23.9680

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: Annual

GVEA North Pole 2017 No. 1 Diesel - Horizontal Tank
Fairbanks, Alaska

Components	Losses(lbs)		Total Emissions
	Working Loss	Breathing Loss	
Hexane (-n)	0.01	0.00	0.01
Benzene	0.03	0.01	0.04
Toluene	0.33	0.07	0.40
Ethylbenzene	0.04	0.01	0.05
Xylene (-m)	0.72	0.14	0.86
1,2,4-Trimethylbenzene	0.47	0.09	0.56
Distillate fuel oil no. 2	19.97	3.90	23.87
Styrene	0.06	0.01	0.08
Unidentified Components	18.30	3.57	21.87

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Identification and Physical Characteristics

Identification
 User Identification: GVEA North Pole 2017 No. 2 Diesel
 City: Fairbanks
 State: Alaska
 Company: GVEA
 Type of Tank: Horizontal Tank
 Description: GVEA North Pole 50,000 gallon tank

Tank Dimensions
 Shell Length (ft): 60.00
 Diameter (ft): 12.00
 Volume (gallons): 50,000.00
 Turnovers: 176.24
 Net Throughput(gal/yr): 8,812,000.00
 Is Tank Heated (y/n): N
 Is Tank Underground (y/n): N

Paint Characteristics
 Shell Color/Shade: White/White
 Shell Condition: Good

Breather Vent Settings
 Vacuum Settings (psig): -0.03
 Pressure Settings (psig): 0.03

Meteorological Data used in Emissions Calculations: Fairbanks, Alaska (Avg Atmospheric Pressure = 14.41 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

GVEA North Pole 2017 No. 2 Diesel - Horizontal Tank
Fairbanks, Alaska

Mixture/Component	Month			Daily Liquid Surf. Temperature (deg F)			Liquid Bulk Temp (deg F)	Vapor Pressure (psia)			Vapor Mol. Weight	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
	Avg.	Min.	Max.	Avg.	Min.	Max.		Avg.	Min.	Max.					
Distillate fuel oil no. 2	27.96	23.54	32.39	26.89	0.0031	0.0031	0.0031	130.0000	0.0100	0.0236	188.00	Option 1: VP40 = .0031			
1,2,4-Trimethylbenzene					0.0051	0.0041	0.0062	120.1900	0.0100	0.0236	120.19	Option 2: A=7.04383, B=1573.267, C=206.56			
Benzene					0.4468	0.3865	0.5149	78.1100	0.0000	0.0017	78.11	Option 2: A=6.905, B=1211.033, C=220.79			
Ethylbenzene					0.0324	0.0270	0.0387	106.1700	0.0001	0.0020	106.17	Option 2: A=6.975, B=1424.255, C=213.21			
Hexane (-n)					0.7777	0.6790	0.8882	86.1700	0.0000	0.0004	86.17	Option 2: A=6.876, B=1171.17, C=224.41			
Styrene					0.0213	0.0178	0.0255	104.1500	0.0003	0.0032	104.15	Option 2: A=7.14, B=1574.51, C=224.09			
Toluene					0.1122	0.0953	0.1316	92.1300	0.0003	0.0167	92.13	Option 2: A=6.954, B=1344.8, C=219.48			
Unidentified Components					0.0028	0.0028	0.0028	132.8170	0.9863	0.9164	189.65	Option 2: A=7.009, B=1462.266, C=215.11			
Xylene (-m)					0.0267	0.0222	0.0319	106.1700	0.0029	0.0361	106.17				

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

GVEA North Pole 2017 No. 2 Diesel - Horizontal Tank
Fairbanks, Alaska

Annual Emission Calculations	
Standing Losses (lb):	3.8982
Vapor Space Volume (cu ft):	4,322.1912
Vapor Density (lb/cu ft):	0.0001
Vapor Space Expansion Factor:	0.0321
Vented Vapor Saturation Factor:	0.9990
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	4,322.1912
Tank Diameter (ft):	12.0000
Effective Diameter (ft):	30.2853
Vapor Space Outage (ft):	6.0000
Tank Shell Length (ft):	60.0000
Vapor Density	
Vapor Density (lb/cu ft):	0.0001
Vapor Molecular Weight (lb/lb-mole):	130.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0031
Daily Avg. Liquid Surface Temp. (deg. R):	487.6347
Daily Average Ambient Temp. (deg. F):	26.8708
Ideal Gas Constant R (psia.cuft / (lb-mol-deg R):	10.731
Liquid Bulk Temperature (deg. R):	486.5608
Tank Paint Solar Absorbance (Shell):	0.1700
Daily Total Solar Insulation Factor (Btu/sqft day):	806.1566
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.0321
Daily Vapor Temperature Range (deg. R):	17.6913
Daily Vapor Pressure Range (psia):	0.0000
Breather Vent Press. Setting Range (psia):	0.0600
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0031
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	0.0031
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	0.0031
Daily Avg. Liquid Surface Temp. (deg R):	487.6347
Daily Min. Liquid Surface Temp. (deg R):	483.2119
Daily Max. Liquid Surface Temp. (deg R):	492.0575
Daily Ambient Temp. Range (deg. R):	19.2417
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	0.9990
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0031
Vapor Space Outage (ft):	6.0000
Working Losses (lb):	
Vapor Molecular Weight (lb/lb-mole):	28.4851
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	130.0000
Annual Net Throughput (gal/yr.):	0.0031
Annual Turnovers:	8,812,000.0000
Turnover Factor:	176.2400
	0.3369

Tank Diameter (ft):	12.0000
Working Loss Product Factor:	1.0000
Total Losses (lb):	32.3832

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: Annual

GVEA North Pole 2017 No. 2 Diesel - Horizontal Tank
Fairbanks, Alaska

Components	Losses(lbs)			Total Emissions
	Working Loss	Breathing Loss		
Distillate fuel oil no. 2	28.49	3.90		32.38
Hexane (-n)	0.01	0.00		0.01
Benzene	0.05	0.01		0.05
Toluene	0.48	0.07		0.54
Ethylbenzene	0.06	0.01		0.06
Xylene (-m)	1.03	0.14		1.17
1,2,4-Trimethylbenzene	0.67	0.09		0.77
Styrene	0.09	0.01		0.10
Unidentified Components	26.10	3.57		29.67

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APR 02 2018

ADEC AQ

AQ 0110

RECEIVED

APR 02 2018

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GOLDEN VALLEY ELECTRIC ASSOCIATION, INC.

"Owned by those we serve"

758 Illinois Street
Fairbanks, AK 99701-2999

P.O. Box 71249
Fairbanks, AK 99707-1249

Molly Birnbaum
Alaska Dept of Environmental Conservation
Air Permits Program
PO Box 11180
Juneau, AK 99811-1800

Adopted

July 5, 2022



PO Box 71249, Fairbanks, AK 99707-1249 • (907) 452-1151 • www.gvea.com

Your Touchstone Energy® Cooperative 



April 30, 2018

Certified Mail
Return Receipt Requested
7016 0340 0000 0399 4998

Alaska Department of Environmental Conservation
Air Quality
ATTN: Emission Inventory Report
555 Cordova Street
Anchorage, AK 99501

**Subject: Golden Valley Electric Association – North Pole Power Plant
2018 Point Source Emission Inventory**

Dear Ms. Buck,

Golden Valley Electric Association (GVEA) is submitting a 2018 Annual Point Source Emission Inventory for the North Pole Power Plant (Permit No. AQ0110TVP03).

The 2108 Point Source Emission Inventory letter from Alaska Department of Environmental Conservation (ADEC) to GVEA dated March 15, 2019 mentions both an excel template and guidance document available on the ADEC website at <http://dec.alaska.gov/Applications/Air/airtoolsweb/PointSourceEmissionInventory>. The facility-specific template posted on the ADEC website requires reporting of:

- PM10 Primary (Filt + Cond)(PM10-PRI); and
- PM2.5 Primary (Filt + Cond)(PM25-PRI); and
- PM Condensable (< 1 Micron)(PM-CON).

The guidance document posted on the ADEC website requires reporting of:

- PM10 Primary (Filt + Cond)(PM10-PRI);
- PM2.5 Filterable (PM25-FIL); and
- PM Condensable (PM-CON).

Due to the discrepancies between the excel template and guidance document, GVEA has chosen to report the following PM-related pollutants in the 2018 Point Source Emission Inventory.

- PM10 Primary (Filt + Cond)(PM10-PRI);
- PM2.5 Primary (Filt + Cond)(PM25-PRI);
- PM2.5 Filterable (PM25-FIL); and

July 5, 2022

- PM Condensable (PM-CON).

If you have any questions or would like any additional information please contact me by phone at 907-458-4557 or by email at nmknight@gvea.com. The certification from Gary P. Betsill, Vice President of Operations, follows.

Sincerely,



Naomi Morton Knight, P.E.
Environmental Officer

Enclosure

Certification

Based on information and belief formed after reasonable inquiry, I certify that the statements and information in and attached to this document are true, accurate and complete.

Sincerely,



Gary P. Betsill
Vice President of Operations

Stationary Source Detail	
Inventory Start Date	1/1/2018
Inventory End Date	12/31/2018
ADEC ID	110
AFS ID	0209000011
Census Area	Fairbanks North Star Borough (090)
Name	North Pole Power Plant
Physical Location	1500 H & H Lane
	North Pole, AK 99705
	Lat 64.73444 Long -147.3453
	Legal Description: Not Available
Owner Name, Address, and Contact Number	Naomi Morton Knight, P.E.
	Golden Valley Electric Association
	PO Box 71249
	Fairbanks, AK 99707-1249 907-458-4557
Line of Business (NAICS)	221112
Line of Business (SIC)	4911
Facility Status	Operating
Facility Status Year	1976

Emission Unit 01					
Specifications					
ID	01	Design Capacity	672 MILLION BTU PER HOUR		
Description	GT#1 Gas Turbine	Emission Unit Status	Operating		
Manufacturer	General Electric	Manufactured Year	Installed 1976		
Model Number	Frame 7 Series 7001 Model BR	Serial Number	238057		
Regulations					
Regulation/Description					
Not Applicable					
> Control Equipment					
Capture Efficiency (%)	0				
System Description	None				
Equipment Type(s)	None				
Pollutants Controlled					
Pollutant Description				Reduction Efficiency (%)	
Not Applicable				Not Applicable	
Processes					
Process	Primary Process				
SCC Code	20100109				
	> Internal Combustion Engines				
	> Electric Generation				
	> Distillate Oil (Diesel)				
	> Turbine: Exhaust				
Material Processed	Distillate Oil (No. 2)				
Period Start	1/1/2018	Period End	12/31/2018		
Throughput					
Total		Summer %	Fall %	Winter %	Spring %
	702,220 gallons	5.4	5.4	66.3	22.9
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
0.2	0.7	1.5	253		
Fuel Characteristics					
Heat Content (MMBtu/kgal)	Elem. Sulfur Content (wt. pct. S)	H ₂ S Sulfur Content	Ash Content		
138.400	0.386	Not Available	Not Available		
Heating					
Heat Input (MMBtu/hr)		Heat Output	Heat Values Convention		
384		Not Available	HHV		
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide (CO)	3.0E-02	POUNDS	MILLION BTUS	2018 CEMS Average	1.458E+00
Ammonia (NH ₃)	Not Available	Not Available	Not Available	Not Available	Not Available
Nitrogen Oxides (NO _x)	6.94E-01	POUNDS	MILLION BTUS	2018 CEMS Average	3.372E+01
PM ₁₀ Primary (Filt + Cond)(PM ₁₀ -PRI)	1.2E-02	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	5.831E-01
PM _{2.5} Primary (Filt + Cond)(PM _{2.5} -PRI)	1.2E-02	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	5.831E-01
PM _{2.5} Filterable (PM _{2.5} -FIL)	4.3E-03	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	2.090E-01
PM Condensable (PM-CON)	7.2E-03	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	3.499E-01
Sulfur Dioxide (SO ₂)	5.6E-02	POUNDS	GALLON	Mass Balance	1.980E+01
Volatile Organic Compounds (VOC)	4.1E-04	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	1.992E-02
Lead and lead compounds	1.4E-05	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	6.803E-04

Emission Unit 01					
Process	Secondary Process				
SCC Code	20100109				
	> Internal Combustion Engines				
	> Electric Generation				
	> Distillate Oil (Diesel)				
	> Turbine: Exhaust				
Material Processed	Distillate Oil (No. 1)				
Period Start	1/1/2018	Period End	12/31/2018		
Throughput					
Total		Summer %	Fall %	Winter %	Spring %
142,518	gallons	13.9	8.1	72.9	5.1
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
0.0	0.1	0.3	51		
Fuel Characteristics					
Heat Content (MMBtu/kgal)	Elem. Sulfur Content (wt. pct. S)	H ₂ S Sulfur Content	Ash Content		
133.526	0.096	Not Available	Not Available		
Heating					
Heat Input (MMBtu/hr)	Heat Output		Heat Values Convention		
371	Not Available		HHV		
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide (CO)	3.0E-02	POUNDS	MILLION BTUS	2018 CEMS Average	2.854E-01
Ammonia (NH ₃)	Not Available	Not Available	Not Available	Not Available	Not Available
Nitrogen Oxides (NO _x)	6.94E-01	POUNDS	MILLION BTUS	2018 CEMS Average	6.603E+00
PM ₁₀ Primary (Filt + Cond)(PM ₁₀ -PRI)	1.2E-02	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	1.142E-01
PM _{2.5} Primary (Filt + Cond)(PM _{2.5} -PRI)	1.2E-02	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	1.142E-01
PM _{2.5} Filterable (PM _{2.5} -FIL)	4.3E-03	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	4.091E-02
PM Condensable (PM-CON)	7.2E-03	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	6.851E-02
Sulfur Dioxide (SO ₂)	1.3E-02	POUNDS	GALLON	Mass Balance	9.287E-01
Volatile Organic Compounds (VOC)	4.1E-04	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	3.901E-03
Lead and lead compounds	1.4E-05	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	1.332E-04

Emission Unit 01					
Process	Tertiary Process				
SCC Code	20100109				
	> Internal Combustion Engines				
	> Electric Generation				
	> Distillate Oil (Diesel)				
	> Turbine: Exhaust				
Material Processed	Jet A				
Period Start	1/1/2018	Period End	12/31/2018		
Throughput					
Total	gallons	Summer %	Fall %	Winter %	Spring %
0		0	0	0	0
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
0	0	0	0		
Fuel Characteristics					
Heat Content (MMBtu/kgal)	Elem. Sulfur Content (wt. pct. S)	H ₂ S Sulfur Content	Ash Content		
Not Available	-	Not Available	Not Available		
Heating					
Heat Input (MMBtu/hr)	Heat Output		Heat Values Convention		
Not Available	Not Available		HHV		
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide (CO)	3.0E-02	POUNDS	MILLION BTUS	2018 CEMS Average	0.000E+00
Ammonia (NH ₃)	Not Available	Not Available	Not Available	Not Available	Not Available
Nitrogen Oxides (NO _x)	6.94E-01	POUNDS	MILLION BTUS	2018 CEMS Average	0.000E+00
PM ₁₀ Primary (Filt + Cond)(PM ₁₀ -PRI)	1.2E-02	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	0.000E+00
PM _{2.5} Primary (Filt + Cond)(PM _{2.5} -PRI)	1.2E-02	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	0.000E+00
PM _{2.5} Filterable (PM _{2.5} -FIL)	4.3E-03	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	0.000E+00
PM Condensable (PM-CON)	7.2E-03	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	0.000E+00
Sulfur Dioxide (SO ₂)	#VALUE!	POUNDS	GALLON	Mass Balance	0.000E+00
Volatile Organic Compounds (VOC)	4.1E-04	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	0.000E+00
Lead and lead compounds	1.4E-05	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	0.000E+00

Emission Unit 01					
Release Points					
ID	Description	Type	Apportion %		
01N	GT #1 North Stack	Vertical	50		
01S	GT #1 South Stack	Vertical	50		
Release Point 01N					
Specifications					
ID	01N	Type	Vertical		
Description	GT #1 North Stack				
Stack Status	Active				
Stack Parameters					
Stack Height (ft)	Stack Diameter (ft)	Exit Gas Temp (F)	Exit Gas Velocity (fps)	Exit Gas Flow Rate (acfm)	
62	8.46	729	182	620,700	
Geographic Coordinate					
Latitude	64.73549	Longitude	-147.35021	Datum	NAD 1983
Base Elevation	150	Accuracy	1		
Location Description	North Pole, AK				
Data Source	Engineering Estimate				
Release Point 01S					
Specifications					
ID	01S	Type	Vertical		
Description	GT #1 South Stack				
Stack Status	Active				
Stack Parameters					
Stack Height (ft)	Stack Diameter (ft)	Exit Gas Temp (F)	Exit Gas Velocity (fps)	Exit Gas Flow Rate (acfm)	
62	8.46	729	182	620,700	
Geographic Coordinate					
Latitude	64.73525	Longitude	-147.35021	Datum	NAD 1983
Base Elevation	150	Accuracy	1		
Location Description	North Pole, AK				
Data Source	Engineering Estimate				

Emission Unit 02						
Specifications						
ID	02		Design Capacity	672 MILLION BTU PER HOUR		
Description	GT#2 Gas Turbine		Emission Unit Status	Operating		
Manufacturer	General Electric		Manufactured Year	Prior to October 4, 1977		
Model Number	Frame 7, Series 7001, Model BR		Serial Number	248861		
Regulations						
Regulation/Description						
Not Applicable						
> Control Equipment						
Capture Efficiency (%)	0					
System Description	None					
Equipment Type(s)	None					
Pollutants Controlled						
Pollutant Description				Reduction Efficiency (%)		
Not Applicable				Not Applicable		
Processes						
Process	Primary Process					
SCC Code	20100109					
	> Internal Combustion Engines					
	> Electric Generation					
	> Distillate Oil (Diesel)					
	> Turbine: Exhaust					
Material Processed	Distillate Oil (No. 2)					
Period Start	1/1/2018		Period End	12/31/2018		
Throughput						
Total	6,343,150 gallons		Summer %	46.8	Fall %	7.7
			Winter %	40.7	Spring %	4.8
Operational Schedule						
Days/Week	Hours/Day	Weeks/Period	Hours/Period			
2.0	6.8	14.8	2,482.3			
Fuel Characteristics						
Heat Content (MMBtu/kgal)	Elem. Sulfur Content (wt. pct. S)	H ₂ S Sulfur Content	Ash Content			
138.400	0.386	Not Available	Not Available			
Heating						
Heat Input (MMBtu/hr)		Heat Output		Heat Values Convention		
354		Not Available		HHV		
Emissions						
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons	
Carbon Monoxide (CO)	3.3E-03	POUNDS	MILLION BTUS	AP-42 Table 3.1-1	1.449E+00	
Ammonia (NH ₃)	Not Available	Not Available	Not Available	Not Available	Not Available	
Nitrogen Oxides (NO _x)	8.8E-01	POUNDS	MILLION BTUS	AP-42 Table 3.1-1	3.863E+02	
PM ₁₀ Primary (Filt + Cond)(PM ₁₀ -PRI)	1.2E-02	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	5.267E+00	
PM _{2.5} Primary (Filt + Cond)(PM _{2.5} -PRI)	1.2E-02	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	5.267E+00	
PM _{2.5} Filterable (PM _{2.5} -FIL)	4.3E-03	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	1.887E+00	
PM Condensable (PM-CON)	7.2E-03	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	3.160E+00	
Sulfur Dioxide (SO ₂)	5.6E-02	POUNDS	GALLON	Mass Balance	1.788E+02	
Volatile Organic Compounds (VOC)	4.1E-04	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	1.800E-01	
Lead and lead compounds	1.4E-05	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	6.145E-03	

Emission Unit 02					
Process	Secondary Process				
SCC Code	20100109				
	> Internal Combustion Engines				
	> Electric Generation				
	> Distillate Oil (Diesel)				
	> Turbine: Exhaust				
Material Processed	Distillate Oil (No. 1)				
Period Start	1/1/2018	Period End	12/31/2018		
Throughput					
Total		Summer %	Fall %	Winter %	Spring %
1,693,392	gallons	63.3	3.8	29.0	3.9
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
0.5	1.8	3.9	662.7		
Fuel Characteristics					
Heat Content (MMBtu/kgal)	Elem. Sulfur Content (wt. pct. S)	H ₂ S Sulfur Content	Ash Content		
133.526	0.096	Not Available	Not Available		
Heating					
Heat Input (MMBtu/hr)	Heat Output		Heat Values Convention		
341	Not Available		HHV		
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide (CO)	3.3E-03	POUNDS	MILLION BTUS	AP-42 Table 3.1-1	3.731E-01
Ammonia (NH ₃)	Not Available	Not Available	Not Available	Not Available	Not Available
Nitrogen Oxides (NO _x)	8.8E-01	POUNDS	MILLION BTUS	AP-42 Table 3.1-1	9.949E+01
PM ₁₀ Primary (Filt + Cond)(PM ₁₀ -PRI)	1.2E-02	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	1.357E+00
PM _{2.5} Primary (Filt + Cond)(PM _{2.5} -PRI)	1.2E-02	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	1.357E+00
PM _{2.5} Filterable (PM _{2.5} -FIL)	4.3E-03	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	4.861E-01
PM Condensable (PM-CON)	7.2E-03	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	8.140E-01
Sulfur Dioxide (SO ₂)	1.3E-02	POUNDS	GALLON	Mass Balance	1.104E+01
Volatile Organic Compounds (VOC)	4.1E-04	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	4.635E-02
Lead and lead compounds	1.4E-05	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	1.583E-03

Emission Unit 02					
Process	Tertiary Process				
SCC Code	20100109				
	> Internal Combustion Engines				
	> Electric Generation				
	> Distillate Oil (Diesel)				
	> Turbine: Exhaust				
Material Processed	Jet A				
Period Start	1/1/2018	Period End	12/31/2018		
Throughput					
Total	Summer %	Fall %	Winter %	Spring %	
- gallons	0	0	0	0	
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
0	0	0	0		
Fuel Characteristics					
Heat Content (MMBtu/kgal)	Elem. Sulfur Content (wt. pct. S)	H ₂ S Sulfur Content	Ash Content		
Not Available	-	Not Available	Not Available		
Heating					
Heat Input (MMBtu/hr)	Heat Output		Heat Values Convention		
Not Available	Not Available		HHV		
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide (CO)	3.3E-03	POUNDS	MILLION BTUS	AP-42 Table 3.1-1	0.000E+00
Ammonia (NH ₃)	Not Available	Not Available	Not Available	Not Available	Not Available
Nitrogen Oxides (NO _x)	8.8E-01	POUNDS	MILLION BTUS	AP-42 Table 3.1-1	0.000E+00
PM ₁₀ Primary (Filt + Cond)(PM ₁₀ -PRI)	1.2E-02	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	0.000E+00
PM _{2.5} Primary (Filt + Cond)(PM _{2.5} -PRI)	1.2E-02	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	0.000E+00
PM _{2.5} Filterable (PM _{2.5} -FIL)	4.3E-03	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	0.000E+00
PM Condensable (PM-CON)	7.2E-03	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	0.000E+00
Sulfur Dioxide (SO ₂)	#VALUE!	POUNDS	GALLON	Mass Balance	0.000E+00
Volatile Organic Compounds (VOC)	4.1E-04	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	0.000E+00
Lead and lead compounds	1.4E-05	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	0.000E+00

Emission Unit 02					
Release Points					
ID	Description	Type	Apportion %		
02N	GT #2 North Stack	Vertical	50		
02S	GT #2 South Stack	Vertical	50		
Release Point 02N					
Specifications					
ID	02N	Type	Vertical		
Description	GT #2 North Stack				
Stack Parameters					
Stack Height (ft)	Stack Diameter (ft)	Exit Gas Temp (F)	Exit Gas Velocity (fps)	Exit Gas Flow Rate (acfm)	
62	8.46	729	182	620,700	
Geographic Coordinate					
Latitude	64.735044	Longitude	-147.351072	Datum	NAD 1983
Base Elevation	150	Accuracy	1		
Location Description	North Pole, AK				
Data Source	Engineering Estimate				
Release Point 02S					
Specifications					
ID	02S	Type	Vertical		
Description	GT #2 South Stack				
Stack Parameters					
Stack Height (ft)	Stack Diameter (ft)	Exit Gas Temp (F)	Exit Gas Velocity (fps)	Exit Gas Flow Rate (acfm)	
62	8.46	729	182	620,700	
Geographic Coordinate					
Latitude	64.73525	Longitude	-147.35127	Datum	NAD 1983
Base Elevation	150	Accuracy	1		
Location Description	North Pole, AK				
Data Source	Engineering Estimate				

Emission Unit 03						
Specifications						
ID	03		Design Capacity	50,000 GALLONS		
Description	Fuel Storage Tank		Emission Unit Status	Operating		
Manufacturer	Unknown		Manufactured Year	Unknown		
Model Number	Unknown		Serial Number	Unknown		
Regulations						
Regulation/Description						
Not Applicable - This emission unit is reported because it is included in Table A of AQ0110TVP03						
> Control Equipment						
Capture Efficiency (%)	0					
System Description	None					
Equipment Type(s)	None					
Pollutants Controlled						
Pollutant Description				Reduction Efficiency (%)		
Not Applicable				Not Applicable		
Processes						
Process	Primary Process					
SCC Code	20100108					
	> Internal Combustion Engines					
	> Electric Generation					
	> Distillate Oil (Diesel)					
	> Turbine: Evaporative Losses (Fuel Storage and Delivery System)					
Material Processed	Diesel (No. 1)					
Period Start	1/1/2018		Period End	12/31/2018		
Throughput						
Total		Summer %	Fall %	Winter %	Spring %	
	2,657,504 gallons	44.7	2.9	22.7	29.7	
Operational Schedule						
Days/Week	Hours/Day	Weeks/Period	Hours/Period			
7	24	52	8,760			
Fuel Characteristics						
Heat Content	Elem. Sulfur Content	H ₂ S Sulfur Content	Ash Content			
Not Applicable	Not Applicable	Not Applicable	Not Applicable			
Heating						
Heat Input		Heat Output		Heat Values Convention		
Not Applicable		Not Applicable		Not Applicable		
Emissions						
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons	
Carbon Monoxide (CO)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	
Ammonia (NH ₃)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	
Nitrogen Oxides (NO _x)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	
PM ₁₀ Primary (Filt + Cond)(PM ₁₀ -PRI)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	
PM _{2.5} Primary (Filt + Cond)(PM _{2.5} -PRI)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	
PM _{2.5} Filterable (PM _{2.5} -FIL)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	
PM Condensable (PM-CON)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	
Sulfur Dioxide (SO ₂)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	
Volatile Organic Compounds (VOC)	Not Applicable	Not Applicable	Not Applicable	AP-42, Section 7.1, Please see Attachment 1 for Calculations	1.033E-02	
Lead and lead compounds	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	

Emission Unit 03					
Process	Secondary Process				
SCC Code	Not Applicable				
	Not Applicable				
	Not Applicable				
	Not Applicable				
	Not Applicable				
Material Processed	Not Applicable				
Period Start	1/1/2018	Period End	12/31/2018		
Throughput					
Total	Summer %	Fall %	Winter %	Spring %	
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
Not Applicable	Not Applicable	Not Applicable	Not Applicable		
Fuel Characteristics					
Heat Content	Elem. Sulfur Content	H ₂ S Sulfur Content	Ash Content		
Not Applicable	Not Applicable	Not Applicable	Not Applicable		
Heating					
Heat Input	Heat Output		Heat Values Convention		
Not Applicable	Not Applicable		Not Applicable		
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide (CO)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Ammonia (NH ₃)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Nitrogen Oxides (NO _x)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM ₁₀ Primary (Filt + Cond)(PM ₁₀ -PRI)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM _{2.5} Primary (Filt + Cond)(PM _{2.5} -PRI)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM _{2.5} Filterable (PM _{2.5} -FIL)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM Condensable (PM-CON)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Sulfur Dioxide (SO ₂)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Volatile Organic Compounds (VOC)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Lead and lead compounds	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Release Points					
ID	Description	Type	Apportion %		
03	Fuel Storage Tank	Goose Neck	100		
Release Point 03					
Specifications					
ID	03	Type	Goose Neck		
Description	Fuel Storage Tank				
Stack Parameters					
Stack Height (ft)	Stack Diameter (ft)	Exit Gas Temp (F)	Exit Gas Velocity (fps)	Exit Gas Flow Rate (acfm)	
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Geographic Coordinate					
Latitude	Not Applicable	Longitude	Not Applicable	Datum	Not Applicable
Base Elevation	150	Accuracy	Not Applicable		
Location Description	North Pole, AK				
Data Source	Not Applicable				

Emission Unit 04					
Specifications					
ID	4	Design Capacity	50,000 GALLONS		
Description	Fuel Storage Tank	Emission Unit Status	Operating		
Manufacturer	Unknown	Manufactured Year	Unknown		
Model Number	Unknown	Serial Number	Unknown		
Regulations					
Regulation/Description					
Not Applicable - This emission unit is reported because it is included in Table A of AQ0110TVP03					
> Control Equipment					
Capture Efficiency (%)	0				
System Description	None				
Equipment Type(s)	None				
Pollutants Controlled					
Pollutant Description		Reduction Efficiency (%)			
Not Applicable		Not Applicable			
Processes					
Process	Primary Process				
SCC Code	20100108				
	> Internal Combustion Engines				
	> Electric Generation				
	> Distillate Oil (Diesel)				
	> Turbine: Evaporative Losses (Fuel Storage and Delivery System)				
Material Processed	Diesel (No. 2)				
Period Start	1/1/2018	Period End	12/31/2018		
Throughput					
Total	7,045,370 gallons	Summer %	Fall %	Winter %	Spring %
		42.7	7.5	43.3	6.6
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
7	24	52	8,760		
Fuel Characteristics					
Heat Content	Elem. Sulfur Content	H ₂ S Sulfur Content	Ash Content		
Not Applicable	Not Applicable	Not Applicable	Not Applicable		
Heating					
Heat Input		Heat Output		Heat Values Convention	
Not Applicable		Not Applicable		Not Applicable	
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide (CO)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Ammonia (NH ₃)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Nitrogen Oxides (NO _x)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM ₁₀ Primary (Filt + Cond)(PM ₁₀ -PRI)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM _{2.5} Primary (Filt + Cond)(PM _{2.5} -PRI)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM _{2.5} Filterable (PM _{2.5} -FIL)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM Condensable (PM-CON)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Sulfur Dioxide (SO ₂)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Volatile Organic Compounds (VOC)	Not Applicable	Not Applicable	Not Applicable	AP-42, Section 7.1, Please see Attachment 1 for Calculations	1.384E-02
Lead and lead compounds	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable

Emission Unit 04					
Process	Secondary Process				
SCC Code	Not Applicable				
	Not Applicable				
	Not Applicable				
	Not Applicable				
	Not Applicable				
Material Processed	Not Applicable				
Period Start	1/1/2018	Period End	12/31/2018		
Throughput					
Total	Summer %	Fall %	Winter %	Spring %	
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
Not Applicable	Not Applicable	Not Applicable	Not Applicable		
Fuel Characteristics					
Heat Content	Elem. Sulfur Content	H ₂ S Sulfur Content	Ash Content		
Not Applicable	Not Applicable	Not Applicable	Not Applicable		
Heating					
Heat Input	Heat Output		Heat Values Convention		
Not Applicable	Not Applicable		Not Applicable		
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide (CO)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Ammonia (NH ₃)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Nitrogen Oxides (NO _x)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM ₁₀ Primary (Filt + Cond)(PM ₁₀ -PRI)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM _{2.5} Primary (Filt + Cond)(PM _{2.5} -PRI)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM _{2.5} Filterable (PM _{2.5} -FIL)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM Condensable (PM-CON)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Sulfur Dioxide (SO ₂)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Volatile Organic Compounds (VOC)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Lead and lead compounds	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Release Points					
ID	Description	Type	Apportion %		
03	Fuel Storage Tank	Goose Neck	100		
Release Point 04					
Specifications					
ID	04	Type	Goose Neck		
Description	Fuel Storage Tank				
Stack Parameters					
Stack Height (ft)	Stack Diameter (ft)	Exit Gas Temp (F)	Exit Gas Velocity (fps)	Exit Gas Flow Rate (acfm)	
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Geographic Coordinate					
Latitude	Not Applicable	Longitude	Not Applicable	Datum	Not Applicable
Base Elevation	150	Accuracy	Not Applicable		
Location Description	North Pole, AK				
Data Source	Not Applicable				

Emission Unit 05					
Specifications					
ID	05		Design Capacity	455 MILLION BTU PER HOUR	
Description	GT#3 Gas Turbine		Emission Unit Status	Operating	
Manufacturer	General Electric		Manufactured Year	Purchased 2004	
Model Number	LM6000PC		Serial Number	191-548	
Regulations					
Regulation/Description					
40 CFR 60 Subpart GG					
> Control Equipment					
Capture Efficiency (%)	73 per AP-42, Table 3.1-1				
System Description	Weir Rotojet Water Injection (NO) Emerachem LLC CO catalyst				
Equipment Type(s)	Water Injection				
Pollutants Controlled					
Pollutant Description			Reduction Efficiency (%)		
Carbon Monoxide			66		
Nitrogen Oxides			77		
Processes					
Process	Primary Process				
SCC Code	20100901				
	> Internal Combustion Engines				
	> Electric Generation				
	> Kerosene/Naphtha (Jet Fuel)				
	> Turbine: Exhaust				
Material Processed	Naphtha				
Period Start	1/1/2018		Period End	12/31/2018	
Throughput					
Total		Summer %	Fall %	Winter %	Spring %
	20,120,232 gallons	10.2	29.7	34.1	26.0
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
5.6	19.0	41.4	6,951.6		
Fuel Characteristics					
Heat Content (MMBtu/kgal)	Elem. Sulfur Content (wt. pct. S)	H ₂ S Sulfur Content	Ash Content		
107.3448	0.0020	Not Available	Not Available		
Heating					
Heat Input (MMBtu/hr)		Heat Output		Heat Values Convention	
311		Not Available		HHV	
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide (CO)	4.0E-03	POUNDS	MILLION BTUS	2018 CEMS Average	4.320E+00
Ammonia (NH ₃)	Not Available	Not Available	Not Available	Not Available	Not Available
Nitrogen Oxides (NO _x)	3.12E-01	POUNDS	MILLION BTUS	2018 CEMS Average	3.369E+02
PM ₁₀ Primary (Filt + Cond)(PM ₁₀ -PRI)	1.2E-02	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	1.296E+01
PM _{2.5} Primary (Filt + Cond)(PM _{2.5} -PRI)	1.2E-02	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	1.296E+01
PM _{2.5} Filterable (PM _{2.5} -FIL)	4.3E-03	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	4.644E+00
PM Condensable (PM-CON)	7.2E-03	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	7.775E+00
Sulfur Dioxide (SO ₂)	2.1E-04	POUNDS	GALLON	Mass Balance	2.300E-01
Volatile Organic Compounds (VOC)	4.1E-04	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	4.428E-01
Lead and lead compounds	1.4E-05	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	1.512E-02

Emission Unit 05					
Process	Secondary Process				
SCC Code	20100109				
	> Internal Combustion Engines				
	> Electric Generation				
	> Distillate Oil (Diesel)				
	> Turbine: Exhaust				
Material Processed	Distillate Oil (No. 1)				
Period Start	1/1/2018	Period End	12/31/2018		
Throughput					
Total		Summer %	Fall %	Winter %	Spring %
821,594	gallons	11.7	0.1	1.0	87.2
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
0.2	0.8	1.7	283.9		
Fuel Characteristics					
Heat Content (MMBtu/kgal)	Elem. Sulfur Content (wt. pct. S)	H ₂ S Sulfur Content	Ash Content		
133.526	0.096	Not Available	Not Available		
Heating					
Heat Input (MMBtu/hr)	Heat Output		Heat Values Convention		
386	Not Available		HHV		
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide (CO)	4.0E-03	POUNDS	MILLION BTUS	2018 CEMS Average	2.194E-01
Ammonia (NH ₃)	Not Available	Not Available	Not Available	Not Available	Not Available
Nitrogen Oxides (NO _x)	3.12E-01	POUNDS	MILLION BTUS	2018 CEMS Average	1.711E+01
PM ₁₀ Primary (Filt + Cond)(PM ₁₀ -PRI)	1.2E-02	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	6.582E-01
PM _{2.5} Primary (Filt + Cond)(PM _{2.5} -PRI)	1.2E-02	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	6.582E-01
PM _{2.5} Filterable (PM _{2.5} -FIL)	4.3E-03	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	2.359E-01
PM Condensable (PM-CON)	7.2E-03	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	3.949E-01
Sulfur Dioxide (SO ₂)	1.3E-02	POUNDS	GALLON	Mass Balance	5.354E+00
Volatile Organic Compounds (VOC)	4.1E-04	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	2.249E-02
Lead and lead compounds	1.4E-05	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	7.679E-04

Emission Unit 05					
Process	Tertiary Process				
SCC Code	20100109				
	> Internal Combustion Engines				
	> Electric Generation				
	> Distillate Oil (Diesel)				
	> Turbine: Exhaust				
Material Processed	Jet A				
Period Start	1/1/2018	Period End	12/31/2018		
Throughput					
Total	Summer %	Fall %	Winter %	Spring %	
- gallons	0	0	0	0	
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
0	0	0	0		
Fuel Characteristics					
Heat Content (MMBtu/kgal)	Elem. Sulfur Content (wt. pct. S)	H ₂ S Sulfur Content	Ash Content		
Not Available	-	Not Available	Not Available		
Heating					
Heat Input (MMBtu/hr)	Heat Output		Heat Values Convention		
Not Available	Not Available		HHV		
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide (CO)	4.0E-03	POUNDS	MILLION BTUS	2018 CEMS Average	0.000E+00
Ammonia (NH ₃)	Not Available	Not Available	Not Available	Not Available	Not Available
Nitrogen Oxides (NO _x)	3.12E-01	POUNDS	MILLION BTUS	2018 CEMS Average	0.000E+00
PM ₁₀ Primary (Filt + Cond)(PM ₁₀ -PRI)	1.2E-02	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	0.000E+00
PM _{2.5} Primary (Filt + Cond)(PM _{2.5} -PRI)	1.2E-02	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	0.000E+00
PM _{2.5} Filterable (PM _{2.5} -FIL)	4.3E-03	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	0.000E+00
PM Condensable (PM-CON)	7.2E-03	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	0.000E+00
Sulfur Dioxide (SO ₂)	#VALUE!	POUNDS	GALLON	Mass Balance	0.000E+00
Volatile Organic Compounds (VOC)	4.1E-04	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	0.000E+00
Lead and lead compounds	1.4E-05	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	0.000E+00

Emission Unit 05					
Release Points					
ID	Description	Type	Apportion %		
05	GT#3 Stack	Vertical	100		
Release Point 05					
Specifications					
ID	05		Type	Vertical	
Description	GT#3 Stack				
Stack Parameters					
Stack Height (ft)	Stack Diameter (ft)	Exit Gas Temp (F)	Exit Gas Velocity (fps)	Exit Gas Flow Rate (acfm)	
110	11.11	270	73.8	347,949	
Geographic Coordinate					
Latitude	64.73526	Longitude	-147.34985	Datum	NAD 1983
Base Elevation	150	Accuracy	1		
Location Description	North Pole, AK				
Data Source	Engineering Estimate				

Emission Unit 06					
Specifications					
ID	06	Design Capacity	455 MILLION BTU PER HOUR		
Description	GT#4 Gas Turbine	Emission Unit Status	Not Installed		
Manufacturer	General Electric	Manufactured Year	This unit has not been installed		
Model Number	LM6000PC	Serial Number	TBD		
Regulations					
Regulation/Description					
40 CFR 60 Subpart KKKK					
> Control Equipment					
Capture Efficiency (%)	Not Applicable				
System Description	Not Applicable				
Equipment Type(s)	Not Applicable				
Pollutants Controlled					
Pollutant Description				Reduction Efficiency (%)	
Not Applicable				Not Applicable	
Processes					
Process	Primary Process				
SCC Code	Not Applicable				
	Not Applicable				
	Not Applicable				
	Not Applicable				
	Not Applicable				
Material Processed	Not Applicable				
Period Start	1/1/2018	Period End	12/31/2018		
Throughput					
Total		Summer %	Fall %	Winter %	Spring %
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
Not Applicable	Not Applicable	Not Applicable	Not Applicable		
Fuel Characteristics					
Heat Content	Elem. Sulfur Content	H ₂ S Sulfur Content	Ash Content		
Not Applicable	Not Applicable	Not Applicable	Not Applicable		
Heating					
Heat Input		Heat Output		Heat Values Convention	
Not Applicable		Not Applicable		Not Applicable	
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide (CO)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Ammonia (NH ₃)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Nitrogen Oxides (NO _x)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM ₁₀ Primary (Filt + Cond)(PM ₁₀ -PRI)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM _{2.5} Primary (Filt + Cond)(PM _{2.5} -PRI)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM2.5 Filterable (PM _{2.5} -FIL)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM Condensable (PM-CON)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Sulfur Dioxide (SO ₂)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Volatile Organic Compounds (VOC)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Lead and lead compounds	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable

Emission Unit 06					
Process	Secondary Process				
SCC Code	Not Applicable				
	Not Applicable				
	Not Applicable				
	Not Applicable				
	Not Applicable				
Material Processed	Not Applicable				
Period Start	1/1/2018	Period End	12/31/2018		
Throughput					
Total	Summer %	Fall %	Winter %	Spring %	
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
Not Applicable	Not Applicable	Not Applicable	Not Applicable		
Fuel Characteristics					
Heat Content	Elem. Sulfur Content	H ₂ S Sulfur Content	Ash Content		
Not Applicable	Not Applicable	Not Applicable	Not Applicable		
Heating					
Heat Input	Heat Output		Heat Values Convention		
Not Applicable	Not Applicable		Not Applicable		
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide (CO)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Ammonia (NH ₃)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Nitrogen Oxides (NO _x)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM ₁₀ Primary (Filt + Cond)(PM ₁₀ -PRI)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM _{2.5} Primary (Filt + Cond)(PM _{2.5} -PRI)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM _{2.5} Filterable (PM _{2.5} -FIL)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM Condensable (PM-CON)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Sulfur Dioxide (SO ₂)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Volatile Organic Compounds (VOC)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Lead and lead compounds	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Release Points					
ID	Description	Type	Apportion %		
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable

Emission Unit 07					
Specifications					
ID	07		Design Capacity	565 HORSEPOWER	
Description	Emergency Generator Engine		Emission Unit Status	Operating	
Manufacturer	Generac Gen Set		Manufactured Year	Installed 2005	
Model Number	5231150100		Serial Number	2083094	
Regulations					
Regulation/Description					
40 CFR 63 Subpart ZZZZ					
> Control Equipment					
Capture Efficiency (%)	0				
System Description	None				
Equipment Type(s)	None				
Pollutants Controlled					
Pollutant Description			Reduction Efficiency (%)		
Not Applicable			Not Applicable		
Processes					
Process	Primary Process				
SCC Code	20200107				
	> Internal Combustion Engines				
	> Electric Generation				
	> Distillate Oil (Diesel)				
	> Reciprocating: Exhaust				
Material Processed	Distillate Oil (No. 2)				
Period Start	1/1/2018		Period End	12/31/2018	
Throughput					
Total	252.8 gallons		Summer %	Fall %	Winter %
			17.7	24.1	40.5
					17.7
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
0	0	0	8		
Fuel Characteristics					
Heat Content (MMBtu/kgal)	Elem. Sulfur Content (wt. pct. S)	H ₂ S Sulfur Content	Ash Content		
133.431	0.00014	Not Available	Not Available		
Heating					
Heat Input (MMBtu/hr)		Heat Output		Heat Values Convention	
4		Not Available		HHV	
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide (CO)	6.68E-03	POUNDS	HORSEPOWER-HOUR	AP-42 Table 3.3-1	1.491E-02
Ammonia (NH ₃)	Not Available	Not Available	Not Available	Not Available	Not Available
Nitrogen Oxides (NO _x)	3.1E-02	POUNDS	HORSEPOWER-HOUR	AP-42 Table 3.3-1	6.918E-02
PM ₁₀ Primary (Filt + Cond)(PM ₁₀ -PRI)	2.2E-03	POUNDS	HORSEPOWER-HOUR	AP-42 Table 3.3-1	4.910E-03
PM _{2.5} Primary (Filt + Cond)(PM _{2.5} -PRI)	2.2E-03	POUNDS	HORSEPOWER-HOUR	AP-42 Table 3.3-1	4.910E-03
PM _{2.5} Filterable (PM _{2.5} -FIL)	42.5	POUNDS	THOUSAND GALLONS	WebFIRE	5.372E-03
PM Condensable (PM-CON)	Not Available	Not Available	Not Available	Not Available	Not Available
Sulfur Dioxide (SO ₂)	2.0E-05	POUNDS	GALLON	Mass Balance	2.533E-06
Volatile Organic Compounds (VOC)	2.5E-03	POUNDS	MILLION BTUS	AP-42 Table 3.3-1	5.611E-03
Lead and lead compounds	Not Available	Not Available	Not Available	Not Available	Not Available

Emission Unit 07					
Process	Secondary Process				
SCC Code	Not Applicable				
	Not Applicable				
	Not Applicable				
	Not Applicable				
	Not Applicable				
Material Processed	Not Applicable				
Period Start	1/1/2018		Period End	12/31/2018	
Throughput					
Total		Summer %	Fall %	Winter %	Spring %
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
Not Applicable	Not Applicable	Not Applicable	Not Applicable		
Fuel Characteristics					
Heat Content (MMBtu/kgal)	Elem. Sulfur Content (wt. pct. S)	H ₂ S Sulfur Content	Ash Content		
Not Applicable	Not Applicable	Not Applicable	Not Applicable		
Heating					
Heat Input	Heat Output		Heat Values Convention		
Not Applicable	Not Applicable		Not Applicable		
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons Per Year
Carbon Monoxide (CO)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Ammonia (NH ₃)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Nitrogen Oxides (NO _x)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM ₁₀ Primary (Filt + Cond)(PM ₁₀ -PRI)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM _{2.5} Primary (Filt + Cond)(PM _{2.5} -PRI)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM _{2.5} Filterable (PM _{2.5} -FIL)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM Condensable (PM-CON)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Sulfur Dioxide (SO ₂)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Volatile Organic Compounds (VOC)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Lead and lead compounds	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Release Points					
ID	Description	Type	Apportion %		
07	Emergency Generator Stack	Vertical	100		
Release Point 07					
Specifications					
ID	07	Type	Vertical		
Description	Emergency Generator Stack				
Stack Parameters					
Stack Height (ft)	Stack Diameter (ft)	Exit Gas Temp (F)	Exit Gas Velocity (fps)	Exit Gas Flow Rate (acfm)	
27	0.83	1,299	88.7	2,878	
Geographic Coordinate					
Latitude	64.7341	Longitude	-147.35072	Datum	NAD 1983
Base Elevation	150	Accuracy	1		
Location Description	North Pole, AK				
Data Source	Engineering Estimate				

Emission Unit 11					
Specifications					
ID	11	Design Capacity	5 MILLION BTU PER HOUR		
Description	Building Heater	Emission Unit Status	Operating		
Manufacturer	Bryan Steam	Manufactured Year	Installed 2005		
Model Number	RV500	Serial Number	93433		
Regulations					
Regulation/Description					
Not Applicable					
> Control Equipment					
Capture Efficiency (%)	0				
System Description	None				
Equipment Type(s)	None				
Pollutants Controlled					
Pollutant Description				Reduction Efficiency (%)	
Not Applicable				Not Applicable	
Processes					
Process	Primary Process				
SCC Code	10301002				
	> External Combustion Boilers				
	> Space Heaters				
	> Commercial/Institutional				
	> Liquified Petroleum Gas (LPG)				
Material Processed	Propane				
Period Start	1/1/2018	Period End	12/31/2018		
Throughput					
Total		Summer %	Fall %	Winter %	Spring %
	5,864 gallons	69.2	30.8	0.0	0.0
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
0.1	0.3	0.6	107.4		
Fuel Characteristics					
Heat Content (MMBtu/kgal)	Elem. Sulfur Content (wt. pct. S)	H ₂ S Sulfur Content (vol. pct. H ₂ S)	Ash Content		
91.6	7.81E-06	0.5	Not Available		
Heating					
Heat Input (MMBtu/hr)		Heat Output		Heat Values Convention	
5		Not Available		HHV	
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide (CO)	7.5	POUNDS	THOUSAND GALLONS	AP-42 Table 1.5-1	2.199E-02
Ammonia (NH ₃)	Not Available	Not Available	Not Available	Not Available	Not Available
Nitrogen Oxides (NO _x)	13	POUNDS	THOUSAND GALLONS	AP-42 Table 1.5-1	3.812E-02
PM ₁₀ Primary (Filt + Cond)(PM ₁₀ -PRI)	0.7	POUNDS	THOUSAND GALLONS	AP-42 Table 1.5-1	2.052E-03
PM _{2.5} Primary (Filt + Cond)(PM _{2.5} -PRI)	0.7	POUNDS	THOUSAND GALLONS	AP-42 Table 1.5-1	2.052E-03
PM _{2.5} Filterable (PM _{2.5} -FIL)	0.2	POUNDS	THOUSAND GALLONS	AP-42 Table 1.5-1	5.864E-04
PM Condensable (PM-CON)	0.5	POUNDS	THOUSAND GALLONS	AP-42 Table 1.5-1	1.466E-03
Sulfur Dioxide (SO ₂)	6.6E-07	POUNDS	GALLON	Mass Balance	1.923E-06
Volatile Organic Compounds (VOC)	1.0	POUNDS	THOUSAND GALLONS	AP-42 Table 1.5-1	2.932E-03
Lead and lead compounds	Not Available	Not Available	Not Available	Not Available	Not Available

Emission Unit 11					
Process	Secondary Process				
SCC Code	Not Applicable				
	Not Applicable				
	Not Applicable				
	Not Applicable				
	Not Applicable				
Material Processed	Not Applicable				
Period Start	1/1/2018	Period End	12/31/2018		
Throughput					
Total	Summer %	Fall %	Winter %	Spring %	
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
Not Applicable	Not Applicable	Not Applicable	Not Applicable		
Fuel Characteristics					
Heat Content	Elem. Sulfur Content	H ₂ S Sulfur Content	Ash Content		
Not Applicable	Not Applicable	Not Applicable	Not Applicable		
Heating					
Heat Input	Heat Output		Heat Values Convention		
Not Applicable	Not Applicable		Not Applicable		
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide (CO)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Ammonia (NH ₃)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Nitrogen Oxides (NO _x)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM ₁₀ Primary (Filt + Cond)(PM ₁₀ -PRI)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM _{2.5} Primary (Filt + Cond)(PM _{2.5} -PRI)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM _{2.5} Filterable (PM _{2.5} -FIL)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM Condensable (PM-CON)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Sulfur Dioxide (SO ₂)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Volatile Organic Compounds (VOC)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Lead and lead compounds	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Release Points					
ID	Description	Type	Apportion %		
11	Building Heater	Vertical	100		
Release Point 11					
Specifications					
ID	11	Type	Vertical		
Description	Building Heater				
Stack Parameters					
Stack Height (ft)	Stack Diameter (ft)	Exit Gas Temp (F)	Exit Gas Velocity (fps)	Exit Gas Flow Rate (acfm)	
63	0.98	450	121	5,477	
Geographic Coordinate					
Latitude	64.73416	Longitude	-147.35072	Datum	NAD 1983
Base Elevation	150	Accuracy	1		
Location Description	North Pole, AK				
Data Source	Engineering Estimate				

Emission Unit 12					
Specifications					
ID	12	Design Capacity	5 MILLION BTU PER HOUR		
Description	Building Heater	Emission Unit Status	Operating		
Manufacturer	Bryan Steam	Manufactured Year	Installed 2005		
Model Number	RV500	Serial Number	93434		
Regulations					
Regulation/Description					
Not Applicable					
> Control Equipment					
Capture Efficiency (%)	0				
System Description	None				
Equipment Type(s)	None				
Pollutants Controlled					
Pollutant Description				Reduction Efficiency (%)	
Not Applicable				Not Applicable	
Processes					
Process	Primary Process				
SCC Code	10301002				
	> External Combustion Boilers				
	> Space Heaters				
	> Commercial/Institutional				
	> Liquefied Petroleum Gas (LPG)				
Material Processed	Propane				
Period Start	1/1/2018	Period End	12/31/2018		
Throughput					
Total	5,864 gallons	Summer %	69.2	Fall %	30.8
		Winter %	0.0		
		Spring %	0.0		
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
0.1	0.3	0.6	107.4		
Fuel Characteristics					
Heat Content (MMBtu/kgal)	Elem. Sulfur Content (wt. pct. S)	H ₂ S Sulfur Content (vol. pct. H ₂ S)	Ash Content		
91.6	7.81E-06	0.5	Not Available		
Heating					
Heat Input (MMBtu/hr)		Heat Output		Heat Values Convention	
5		Not Available		HHV	
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide (CO)	7.5	POUNDS	THOUSAND GALLONS	AP-42 Table 1.5-1	2.199E-02
Ammonia (NH ₃)	Not Available	Not Available	Not Available	Not Available	Not Available
Nitrogen Oxides (NO _x)	13	POUNDS	THOUSAND GALLONS	AP-42 Table 1.5-1	3.812E-02
PM ₁₀ Primary (Filt + Cond)(PM ₁₀ -PRI)	0.7	POUNDS	THOUSAND GALLONS	AP-42 Table 1.5-1	2.052E-03
PM _{2.5} Primary (Filt + Cond)(PM _{2.5} -PRI)	0.7	POUNDS	THOUSAND GALLONS	AP-42 Table 1.5-1	2.052E-03
PM _{2.5} Filterable (PM _{2.5} -FIL)	0.2	POUNDS	THOUSAND GALLONS	AP-42 Table 1.5-1	5.864E-04
PM Condensable (PM-CON)	0.5	POUNDS	THOUSAND GALLONS	AP-42 Table 1.5-1	1.466E-03
Sulfur Dioxide (SO ₂)	6.6E-07	POUNDS	GALLON	Mass Balance	1.923E-06
Volatile Organic Compounds (VOC)	1.0	POUNDS	THOUSAND GALLONS	AP-42 Table 1.5-1	2.932E-03
Lead and lead compounds	N/A	N/A	N/A	N/A	N/A

Emission Unit 12					
Process	Secondary Process				
SCC Code	Not Applicable				
	Not Applicable				
	Not Applicable				
	Not Applicable				
	Not Applicable				
Material Processed	Not Applicable				
Period Start	1/1/2018	Period End	12/31/2018		
Throughput					
Total	Summer %	Fall %	Winter %	Spring %	
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
Not Applicable	Not Applicable	Not Applicable	Not Applicable		
Fuel Characteristics					
Heat Content	Elem. Sulfur Content	H ₂ S Sulfur Content	Ash Content		
Not Applicable	Not Applicable	Not Applicable	Not Applicable		
Heating					
Heat Input	Heat Output		Heat Values Convention		
Not Applicable	Not Applicable		Not Applicable		
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide (CO)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Ammonia (NH ₃)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Nitrogen Oxides (NO _x)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM ₁₀ Primary (Filt + Cond)(PM ₁₀ -PRI)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM _{2.5} Primary (Filt + Cond)(PM _{2.5} -PRI)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM _{2.5} Filterable (PM _{2.5} -FIL)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM Condensable (PM-CON)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Sulfur Dioxide (SO ₂)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Volatile Organic Compounds (VOC)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Lead and lead compounds	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Release Points					
ID	Description	Type	Apportion %		
11	Building Heater	Vertical	100		
Release Point 12					
Specifications					
ID	12	Type	Vertical		
Description	Building Heater				
Stack Parameters					
Stack Height (ft)	Stack Diameter (ft)	Exit Gas Temp (F)	Exit Gas Velocity (fps)	Exit Gas Flow Rate (acfm)	
63	0.98	450	121	5,477	
Geographic Coordinate					
Latitude	64.73415	Longitude	-147.35011	Datum	NAD 1983
Base Elevation	150	Accuracy	1		
Location Description	North Pole, AK				
Data Source	Engineering Estimate				

**Attachment 1. Actual Volatile Organic Carbon (VOC) Emissions
Golden Valley Electric Association - North Pole Power Plant
Fuel Storage Tanks**

Fuel Storage Tank Detail:

EU ID 3			
Orientation:	Horizontal	Effective Diameter (De):	30.3 ft (AP-42, Section 7.1, Equation 1-13)
Capacity:	50,000 gallons	Effective Height (He):	9.4 ft (AP-42, Section 7.1, Equation 1-14)
Diameter:	12 ft	Maximum Liquid Height (Hlx):	8.4 ft
Length:	60 ft	Actual Diesel Throughput:	2,657,504 gal/yr
Location:	North Pole, AK	Paint Condition:	Good
Tank Color:	Tan		
EU ID 4			
Orientation:	Horizontal	Effective Diameter (De):	30.3 ft (AP-42, Section 7.1, Equation 1-13)
Capacity:	50,000 gallons	Effective Height (He):	9.4 ft (AP-42, Section 7.1, Equation 1-14)
Diameter:	12 ft	Maximum Liquid Height (Hlx):	8.4 ft
Length:	60 ft	Actual Diesel Throughput:	7,045,370 gal/yr
Location:	North Pole, AK	Paint Condition:	Good
Tank Color:	Tan		

Standing Loss

Standing Loss (Ls) = $365 \times Ke \times (\pi / 4 \times De^2) \times Hvo \times Ks \times Wv$ (AP-42, Section 7.1, Equation 1-4)

Ke = $0.0018 \times dTv = 0.0018 \times [0.72 \times (Tax - Tan) + 0.028 \times a \times x \cdot j]$ (AP-42, Section 7.1, Equation 1-5)

where:

Tax =	43.6 °F	(AP-42, Section 7.1, Table 7.1-7 for Homer AK)
Tan =	29.5 °F	(AP-42, Section 7.1, Table 7.1-7 for Homer AK)
Tax =	503.6 °R	
Tan =	489.5 °R	
a =	0.43 (dimensionless)	(AP-42, Section 7.1, Table 7.1-6)
j =	838 Btu/ft ² -d	(AP-42, Section 7.1, Table 7.1-7 for Homer AK)

Ke = 0.0364 (dimensionless)

Hvo = 0.5 x He (AP-42, Section 7.1, text below Equation 1-14)

Hvo (EU ID 3) = 4.7 ft

Hvo (EU ID 4) = 4.7 ft

Ks = $1 / (1 + 0.053 \times Pva \times Hvo)$ (AP-42, Section 7.1, Equation 1-20)

where:

Tla = $0.44 \times Taa + 0.56 \times Tb + 0.0079 \times a \times x \cdot i$ (AP-42, Section 7.1, Equation 1-26)

where:

Taa =	(Tax + Tan)/2	(AP-42, Section 7.1, Equation 1-27)
Taa =	496.55 °R	
Tb =	Taa + 6 x a - 1	(AP-42, Section 7.1, Equation 1-28)
Tb =	498.13 °R	

Tla = 500.28 °R

Pva (Diesel) = 0.0031 psi (AP-42, Section 7.1, Table 7.1-2)

Ks (EU ID 3) = 0.99923 (dimensionless)

Ks (EU ID 4) = 0.99923 (dimensionless)

Wv = $(Mv \times Pva) / (10.731 \times Tla)$ (AP-42, Section 7.1, Equation 1-21)

where:

Mv (Diesel) = 130 lb/lb-mole (AP-42, Section 7.1, Table 7.1-2)

Wv (Diesel) = 7.51E-05 lb/ft³

Ls (EU ID 3) = 3.38 lb/yr

Ls (EU ID 4) = 3.38 lb/yr

Working Loss

$$\text{Working Loss (Lw)} = 0.0010 / 5.614 \times 10.731 \times \text{Tla} \times \text{N} \times \text{Hlx} \times \text{pi} / 4 \times \text{De}2 \times \text{Kn} \times \text{Kp} \times \text{Wv}$$

(AP-42, Section 7.1, Equation 1-34)

Q (EU ID 3) = 63,274 bbl/yr
 Q (EU ID 4) = 167,747 bbl/yr

Kn = 1 (dimensionless)
 Kn = (180 + N) / 6 x N

(Throughput converted from gal/yr to bbl/yr)
 (Throughput converted from gal/yr to bbl/yr)
 for turnovers ≤36
 for turnovers >36

where:

$$N = 5.614 \times Q / \text{Vlx}$$

where:

$$\text{Vlx} = \text{pi} / 4 \times \text{De}^2 \times \text{Hlx}$$

Vlx (EU ID 3) = 6,048 ft³
 Vlx (EU ID 4) = 6,048 ft³

(AP-42, Section 7.1, Equation 1-30)

(AP-42, Section 7.1, Equation 1-31)

N (EU ID 3) = 58.7
 N (EU ID 4) = 155.7

Kn (EU ID 3) = 0.7 (dimensionless)
 Kn (EU ID 4) = 0.4 (dimensionless)

Kp = 1 (dimensionless)

(AP-42, Section 7.1, Notes under Equation 1-35)

Lw (EU ID 3) = 17.27 lb/yr
 Lw (EU ID 4) = 24.29 lb/yr

Total Loss

$$L_t = L_s + L_w$$

Lt (Diesel) = 20.66 lb/yr (EU ID 3)
 Lt (Diesel) = 27.68 lb/yr (EU ID 4)

(AP-42, Section 7.1, Equation 1-1)



April 24, 2020

Email Submittal
DEC.AQ.airreports@alaska.gov

Alaska Department of Environmental Conservation
Air Quality
ATTN: Emission Inventory Report
555 Cordova Street
Anchorage, AK 99501

**Subject: Golden Valley Electric Association – North Pole Power Plant
2019 Point Source Emission Inventory**

Golden Valley Electric Association (GVEA) is submitting a 2018 Annual Point Source Emission Inventory for the North Pole Power Plant (Permit No. AQ0110TVP03).

An excel template and guidance document are available on the ADEC website at <http://dec.alaska.gov/Applications/Air/airtoolsweb/PointSourceEmissionInventory>. The guidance document posted on the ADEC website requires reporting of:

- PM10 Primary (Filt + Cond)(PM10-PRI);
- PM2.5 Filterable (PM25-FIL); and
- PM Condensable (PM-CON).

The excel template posted ADEC website requires reporting of:

- PM10 Primary (Filt + Cond)(PM10-PRI).

Due to the discrepancies between the excel template and guidance document, GVEA has chosen to report the following PM-related pollutants in the 2019 Point Source Emission Inventory.

- PM10 Primary (Filt + Cond)(PM10-PRI);
- PM2.5 Primary (Filt + Cond)(PM25-PRI);
- PM2.5 Filterable (PM25-FIL); and
- PM Condensable (PM-CON).

If you have any questions or would like any additional information please contact me by phone at 907-458-4557 or by email at nmknight@gvea.com. The certification from Frank E. Perkins, President of Power Supply, follows.

Sincerely,

A handwritten signature in blue ink, appearing to read "Naomi Morton Knight", with a long horizontal flourish extending to the right.

Naomi Morton Knight, P.E.
Environmental Officer

Enclosures

Certification

Based on information and belief formed after reasonable inquiry, I certify that the statements and information in and attached to this document are true, accurate and complete.

Sincerely,

Frank E. Perkins
Vice President of Power Supply

Stationary Source Detail	
Inventory Start Date	1/1/2019
Inventory End Date	12/31/2019
ADEC ID	110
AFS ID	0209000011
Census Area	Fairbanks North Star Borough (090)
Name	North Pole Power Plant
Physical Location	1500 H & H Lane
	North Pole, AK 99705
	Lat 64.73444 Long -147.3453
	Legal Description: Not Available
Owner Name, Address, and Contact Number	Naomi Morton Knight, P.E.
	Golden Valley Electric Association
	PO Box 71249
	Fairbanks, AK 99707-1249
	907-458-4557
Line of Business (NAICS)	221112
Line of Business (SIC)	4911
Facility Status	Operating
Facility Status Year	1976

Emission Unit 01						
Specifications						
ID	01		Design Capacity	672 MILLION BTU PER HOUR		
Description	GT#1 Gas Turbine		Emission Unit Status	Operating		
Manufacturer	General Electric		Manufactured Year	Installed 1976		
Model Number	Frame 7 Series 7001 Model BR		Serial Number	238057		
Regulations						
Regulation/Description						
Not Applicable						
> Control Equipment						
Capture Efficiency (%)	0					
System Description	None					
Equipment Type(s)	None					
Pollutants Controlled						
Pollutant Description			Reduction Efficiency (%)			
Not Applicable			Not Applicable			
Processes						
Process	Primary Process					
SCC Code	20100109					
	> Internal Combustion Engines					
	> Electric Generation					
	> Distillate Oil (Diesel)					
	> Turbine: Exhaust					
Material Processed	Distillate Oil (No. 2)					
Period Start	1/1/2019		Period End	12/31/2019		
Throughput						
Total	702,220 gallons		Summer %	Fall %	Winter %	Spring %
			6.8	33.1	52.7	7.4
Operational Schedule						
Days/Week	Hours/Day	Weeks/Period	Hours/Period			
0.3	0.9	2.0	336			
Fuel Characteristics						
Heat Content (MMBtu/kgal)	Elem. Sulfur Content (wt. pct. S)	H ₂ S Sulfur Content	Ash Content			
138.321	0.332	Not Available	Not Available			
Heating						
Heat Input (MMBtu/hr)		Heat Output		Heat Values Convention		
289		Not Available		HHV		
Emissions						
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons	
Carbon Monoxide (CO)	4.4E-02	POUNDS	MILLION BTUS	2019 CEMS Average	2.137E+00	
Ammonia (NH ₃)	Not Available	Not Available	Not Available	Not Available	Not Available	
Nitrogen Oxides (NO _x)	6.26E-01	POUNDS	MILLION BTUS	2019 CEMS Average	3.040E+01	
PM ₁₀ Primary (Filt + Cond)(PM ₁₀ -PRI)	1.2E-02	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	5.828E-01	
PM _{2.5} Primary (Filt + Cond)(PM _{2.5} -PRI)	1.2E-02	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	5.828E-01	
PM _{2.5} Filterable (PM _{2.5} -FIL)	4.3E-03	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	2.088E-01	
PM Condensable (PM-CON)	7.2E-03	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	3.497E-01	
Sulfur Dioxide (SO ₂)	4.9E-02	POUNDS	GALLON	Mass Balance	1.704E+01	
Volatile Organic Compounds (VOC)	4.1E-04	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	1.991E-02	
Lead and lead compounds	1.4E-05	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	6.799E-04	

Emission Unit 01					
Process	Secondary Process				
SCC Code	20100109				
	> Internal Combustion Engines				
	> Electric Generation				
	> Distillate Oil (Diesel)				
	> Turbine: Exhaust				
Material Processed	Distillate Oil (No. 1 ULS)				
Period Start	1/1/2019		Period End	12/31/2019	
Throughput					
Total		Summer %	Fall %	Winter %	Spring %
149,332	gallons	23.6	47.5	26.0	2.9
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
0.0	0.2	0.3	56		
Fuel Characteristics					
Heat Content (MMBtu/kgal)	Elem. Sulfur Content (wt. pct. S)	H ₂ S Sulfur Content	Ash Content		
133.441	0.000413	Not Available	Not Available		
Heating					
Heat Input (MMBtu/hr)		Heat Output		Heat Values Convention	
353		Not Available		HHV	
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide (CO)	4.4E-02	POUNDS	MILLION BTUS	2019 CEMS Average	4.384E-01
Ammonia (NH ₃)	Not Available	Not Available	Not Available	Not Available	Not Available
Nitrogen Oxides (NO _x)	6.26E-01	POUNDS	MILLION BTUS	2019 CEMS Average	6.237E+00
PM ₁₀ Primary (Filt + Cond)(PM ₁₀ -PRI)	1.2E-02	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	1.196E-01
PM _{2.5} Primary (Filt + Cond)(PM _{2.5} -PRI)	1.2E-02	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	1.196E-01
PM _{2.5} Filterable (PM _{2.5} -FIL)	4.3E-03	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	4.284E-02
PM Condensable (PM-CON)	7.2E-03	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	7.174E-02
Sulfur Dioxide (SO ₂)	5.6E-05	POUNDS	GALLON	Mass Balance	4.197E-03
Volatile Organic Compounds (VOC)	4.1E-04	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	4.085E-03
Lead and lead compounds	1.4E-05	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	1.395E-04

Emission Unit 01					
Release Points					
ID	Description	Type	Apportion %		
01N	GT #1 North Stack	Vertical	50		
01S	GT #1 South Stack	Vertical	50		
Release Point 01N					
Specifications					
ID	01N	Type	Vertical		
Description	GT #1 North Stack				
Stack Status	Active				
Stack Parameters					
Stack Height (ft)	Stack Diameter (ft)	Exit Gas Temp (F)	Exit Gas Velocity (fps)	Exit Gas Flow Rate (acfm)	
62	8.46	729	182	620,700	
Geographic Coordinate					
Latitude	64.73549	Longitude	-147.35021	Datum	NAD 1983
Base Elevation	150	Accuracy	1		
Location Description	North Pole, AK				
Data Source	Engineering Estimate				
Release Point 01S					
Specifications					
ID	01S	Type	Vertical		
Description	GT #1 South Stack				
Stack Status	Active				
Stack Parameters					
Stack Height (ft)	Stack Diameter (ft)	Exit Gas Temp (F)	Exit Gas Velocity (fps)	Exit Gas Flow Rate (acfm)	
62	8.46	729	182	620,700	
Geographic Coordinate					
Latitude	64.73525	Longitude	-147.35021	Datum	NAD 1983
Base Elevation	150	Accuracy	1		
Location Description	North Pole, AK				
Data Source	Engineering Estimate				

Emission Unit 02						
Specifications						
ID	02		Design Capacity	672 MILLION BTU PER HOUR		
Description	GT#2 Gas Turbine		Emission Unit Status	Operating		
Manufacturer	General Electric		Manufactured Year	Prior to October 4, 1977		
Model Number	Frame 7, Series 7001, Model BR		Serial Number	248861		
Regulations						
Regulation/Description						
Not Applicable						
> Control Equipment						
Capture Efficiency (%)	0					
System Description	None					
Equipment Type(s)	None					
Pollutants Controlled						
Pollutant Description			Reduction Efficiency (%)			
Not Applicable			Not Applicable			
Processes						
Process	Primary Process					
SCC Code	20100109					
	> Internal Combustion Engines					
	> Electric Generation					
	> Distillate Oil (Diesel)					
	> Turbine: Exhaust					
Material Processed	Distillate Oil (No. 2)					
Period Start	1/1/2019		Period End	12/31/2019		
Throughput						
Total	10,342,183 gallons		Summer %	Fall %	Winter %	Spring %
			14.1	23.8	52.2	9.9
Operational Schedule						
Days/Week	Hours/Day	Weeks/Period	Hours/Period			
2.3	7.8	16.9	2,843.1			
Fuel Characteristics						
Heat Content (MMBtu/kgal)	Elem. Sulfur Content (wt. pct. S)	H ₂ S Sulfur Content	Ash Content			
138.321	0.332	Not Available	Not Available			
Heating						
Heat Input (MMBtu/hr)		Heat Output		Heat Values Convention		
503		Not Available		HHV		
Emissions						
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons	
Carbon Monoxide (CO)	3.3E-03	POUNDS	MILLION BTUS	AP-42 Table 3.1-1	2.360E+00	
Ammonia (NH ₃)	Not Available	Not Available	Not Available	Not Available	Not Available	
Nitrogen Oxides (NO _x)	8.8E-01	POUNDS	MILLION BTUS	AP-42 Table 3.1-1	6.294E+02	
PM ₁₀ Primary (Filt + Cond)(PM ₁₀ -PRI)	1.2E-02	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	8.583E+00	
PM _{2.5} Primary (Filt + Cond)(PM _{2.5} -PRI)	1.2E-02	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	8.583E+00	
PM _{2.5} Filterable (PM _{2.5} -FIL)	4.3E-03	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	3.076E+00	
PM Condensable (PM-CON)	7.2E-03	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	5.150E+00	
Sulfur Dioxide (SO ₂)	4.9E-02	POUNDS	GALLON	Mass Balance	2.510E+02	
Volatile Organic Compounds (VOC)	4.1E-04	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	2.933E-01	
Lead and lead compounds	1.4E-05	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	1.001E-02	

Emission Unit 02					
Process	Secondary Process				
SCC Code	20100109				
	> Internal Combustion Engines				
	> Electric Generation				
	> Distillate Oil (Diesel)				
	> Turbine: Exhaust				
Material Processed	Distillate Oil (No. 1 ULS)				
Period Start	1/1/2019		Period End	12/31/2019	
Throughput					
Total		Summer %	Fall %	Winter %	Spring %
	1,044,792 gallons	27.7	40.2	24.8	7.2
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
0.2	0.8	1.7	287.2		
Fuel Characteristics					
Heat Content (MMBtu/kgal)	Elem. Sulfur Content (wt. pct. S)	H ₂ S Sulfur Content	Ash Content		
133.4412857	0.00041	Not Available	Not Available		
Heating					
Heat Input (MMBtu/hr)		Heat Output		Heat Values Convention	
485		Not Available		HHV	
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide (CO)	3.3E-03	POUNDS	MILLION BTUS	AP-42 Table 3.1-1	2.300E-01
Ammonia (NH ₃)	Not Available	Not Available	Not Available	Not Available	Not Available
Nitrogen Oxides (NO _x)	8.8E-01	POUNDS	MILLION BTUS	AP-42 Table 3.1-1	6.134E+01
PM ₁₀ Primary (Filt + Cond)(PM ₁₀ -PRI)	1.2E-02	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	8.365E-01
PM _{2.5} Primary (Filt + Cond)(PM _{2.5} -PRI)	1.2E-02	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	8.365E-01
PM _{2.5} Filterable (PM _{2.5} -FIL)	4.3E-03	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	2.997E-01
PM Condensable (PM-CON)	7.2E-03	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	5.019E-01
Sulfur Dioxide (SO ₂)	5.6E-05	POUNDS	GALLON	Mass Balance	2.937E-02
Volatile Organic Compounds (VOC)	4.1E-04	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	2.858E-02
Lead and lead compounds	1.4E-05	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	9.759E-04

Emission Unit 02					
Release Points					
ID	Description	Type	Apportion %		
02N	GT #2 North Stack	Vertical	50		
02S	GT #2 South Stack	Vertical	50		
Release Point 02N					
Specifications					
ID	02N	Type	Vertical		
Description	GT #2 North Stack				
Stack Parameters					
Stack Height (ft)	Stack Diameter (ft)	Exit Gas Temp (F)	Exit Gas Velocity (fps)	Exit Gas Flow Rate (acfm)	
62	8.46	729	182	620,700	
Geographic Coordinate					
Latitude	64.735044	Longitude	-147.351072	Datum	NAD 1983
Base Elevation	150	Accuracy	1		
Location Description	North Pole, AK				
Data Source	Engineering Estimate				
Release Point 02S					
Specifications					
ID	02S	Type	Vertical		
Description	GT #2 South Stack				
Stack Parameters					
Stack Height (ft)	Stack Diameter (ft)	Exit Gas Temp (F)	Exit Gas Velocity (fps)	Exit Gas Flow Rate (acfm)	
62	8.46	729	182	620,700	
Geographic Coordinate					
Latitude	64.73525	Longitude	-147.35127	Datum	NAD 1983
Base Elevation	150	Accuracy	1		
Location Description	North Pole, AK				
Data Source	Engineering Estimate				

Emission Unit 03						
Specifications						
ID	03		Design Capacity	50,000 GALLONS		
Description	Fuel Storage Tank		Emission Unit Status	Operating		
Manufacturer	Unknown		Manufactured Year	Unknown		
Model Number	Unknown		Serial Number	Unknown		
Regulations						
Regulation/Description						
Not Applicable - This emission unit is reported because it is included in Table A of AQ0110TVP03						
> Control Equipment						
Capture Efficiency (%)	0					
System Description	None					
Equipment Type(s)	None					
Pollutants Controlled						
Pollutant Description			Reduction Efficiency (%)			
Not Applicable			Not Applicable			
Processes						
Process	Primary Process					
SCC Code	20100108					
	> Internal Combustion Engines					
	> Electric Generation					
	> Distillate Oil (Diesel)					
	> Turbine: Evaporative Losses (Fuel Storage and Delivery System)					
Material Processed	Diesel (No. 1 ULS)					
Period Start	1/1/2019		Period End	12/31/2019		
Throughput						
Total			Summer %	Fall %	Winter %	Spring %
	1,659,614	gallons	20.3	29.7	18.0	32.0
Operational Schedule						
Days/Week	Hours/Day	Weeks/Period	Hours/Period			
7	24	52	8,760			
Fuel Characteristics						
Heat Content	Elem. Sulfur Content	H ₂ S Sulfur Content	Ash Content			
Not Applicable	Not Applicable	Not Applicable	Not Applicable			
Heating						
Heat Input		Heat Output		Heat Values Convention		
Not Applicable		Not Applicable		Not Applicable		
Emissions						
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons	
Carbon Monoxide (CO)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	
Ammonia (NH ₃)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	
Nitrogen Oxides (NO _x)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	
PM ₁₀ Primary (Filt + Cond)(PM ₁₀ -PRI)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	
PM _{2.5} Primary (Filt + Cond)(PM _{2.5} -PRI)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	
PM _{2.5} Filterable (PM _{2.5} -FIL)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	
PM Condensable (PM-CON)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	
Sulfur Dioxide (SO ₂)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	
Volatile Organic Compounds (VOC)	Not Applicable	Not Applicable	Not Applicable	AP-42, Section 7.1, Please see Attachment 1 for Calculations	9.532E-03	
Lead and lead compounds	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	

Emission Unit 03					
Process	Secondary Process				
SCC Code	Not Applicable				
	Not Applicable				
	Not Applicable				
	Not Applicable				
	Not Applicable				
Material Processed	Not Applicable				
Period Start	1/1/2019	Period End	12/31/2019		
Throughput					
Total		Summer %	Fall %	Winter %	Spring %
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
Not Applicable	Not Applicable	Not Applicable	Not Applicable		
Fuel Characteristics					
Heat Content	Elem. Sulfur Content	H ₂ S Sulfur Content	Ash Content		
Not Applicable	Not Applicable	Not Applicable	Not Applicable		
Heating					
Heat Input	Heat Output		Heat Values Convention		
Not Applicable	Not Applicable		Not Applicable		
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide (CO)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Ammonia (NH ₃)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Nitrogen Oxides (NO _x)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM ₁₀ Primary (Filt + Cond)(PM ₁₀ -PRI)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM _{2.5} Primary (Filt + Cond)(PM _{2.5} -PRI)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM _{2.5} Filterable (PM _{2.5} -FIL)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM Condensable (PM-CON)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Sulfur Dioxide (SO ₂)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Volatile Organic Compounds (VOC)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Lead and lead compounds	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Release Points					
ID	Description	Type	Apportion %		
03	Fuel Storage Tank	Goose Neck	100		
Release Point 03					
Specifications					
ID	03	Type	Goose Neck		
Description	Fuel Storage Tank				
Stack Parameters					
Stack Height (ft)	Stack Diameter (ft)	Exit Gas Temp (F)	Exit Gas Velocity (fps)	Exit Gas Flow Rate (acfm)	
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Geographic Coordinate					
Latitude	Not Applicable	Longitude	Not Applicable	Datum	Not Applicable
Base Elevation	150	Accuracy	Not Applicable		
Location Description	North Pole, AK				
Data Source	Not Applicable				

Emission Unit 04						
Specifications						
ID	4		Design Capacity	50,000 GALLONS		
Description	Fuel Storage Tank		Emission Unit Status	Operating		
Manufacturer	Unknown		Manufactured Year	Unknown		
Model Number	Unknown		Serial Number	Unknown		
Regulations						
Regulation/Description						
Not Applicable - This emission unit is reported because it is included in Table A of AQ0110TVP03						
> Control Equipment						
Capture Efficiency (%)	0					
System Description	None					
Equipment Type(s)	None					
Pollutants Controlled						
Pollutant Description			Reduction Efficiency (%)			
Not Applicable			Not Applicable			
Processes						
Process	Primary Process					
SCC Code	20100108					
	> Internal Combustion Engines					
	> Electric Generation					
	> Distillate Oil (Diesel)					
	> Turbine: Evaporative Losses (Fuel Storage and Delivery System)					
Material Processed	Diesel (No. 2)					
Period Start	1/1/2019		Period End	12/31/2019		
Throughput						
Total	11,230,896 gallons		Summer %	Fall %	Winter %	Spring %
			13.5	24.5	52.2	9.7
Operational Schedule						
Days/Week	Hours/Day	Weeks/Period	Hours/Period			
7	24	52	8,760			
Fuel Characteristics						
Heat Content	Elem. Sulfur Content	H ₂ S Sulfur Content	Ash Content			
Not Applicable	Not Applicable	Not Applicable	Not Applicable			
Heating						
Heat Input		Heat Output		Heat Values Convention		
Not Applicable		Not Applicable		Not Applicable		
Emissions						
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons	
Carbon Monoxide (CO)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	
Ammonia (NH ₃)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	
Nitrogen Oxides (NO _x)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	
PM ₁₀ Primary (Filt + Cond)(PM ₁₀ -PRI)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	
PM _{2.5} Primary (Filt + Cond)(PM _{2.5} -PRI)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	
PM _{2.5} Filterable (PM _{2.5} -FIL)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	
PM Condensable (PM-CON)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	
Sulfur Dioxide (SO ₂)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	
Volatile Organic Compounds (VOC)	Not Applicable	Not Applicable	Not Applicable	AP-42, Section 7.1, Please see Attachment 1 for Calculations	1.718E-02	
Lead and lead compounds	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	

Emission Unit 04					
Process	Secondary Process				
SCC Code	Not Applicable				
	Not Applicable				
	Not Applicable				
	Not Applicable				
	Not Applicable				
Material Processed	Not Applicable				
Period Start	1/1/2019	Period End	12/31/2019		
Throughput					
Total		Summer %	Fall %	Winter %	Spring %
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
Not Applicable	Not Applicable	Not Applicable	Not Applicable		
Fuel Characteristics					
Heat Content	Elem. Sulfur Content	H ₂ S Sulfur Content	Ash Content		
Not Applicable	Not Applicable	Not Applicable	Not Applicable		
Heating					
Heat Input	Heat Output		Heat Values Convention		
Not Applicable	Not Applicable		Not Applicable		
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide (CO)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Ammonia (NH ₃)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Nitrogen Oxides (NO _x)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM ₁₀ Primary (Filt + Cond)(PM ₁₀ -PRI)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM _{2.5} Primary (Filt + Cond)(PM _{2.5} -PRI)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM _{2.5} Filterable (PM _{2.5} -FIL)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM Condensable (PM-CON)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Sulfur Dioxide (SO ₂)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Volatile Organic Compounds (VOC)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Lead and lead compounds	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Release Points					
ID	Description	Type	Apportion %		
03	Fuel Storage Tank	Goose Neck	100		
Release Point 04					
Specifications					
ID	04	Type	Goose Neck		
Description	Fuel Storage Tank				
Stack Parameters					
Stack Height (ft)	Stack Diameter (ft)	Exit Gas Temp (F)	Exit Gas Velocity (fps)	Exit Gas Flow Rate (acfm)	
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	
Geographic Coordinate					
Latitude	Not Applicable	Longitude	Not Applicable	Datum	Not Applicable
Base Elevation	150	Accuracy	Not Applicable		
Location Description	North Pole, AK				
Data Source	Not Applicable				

Emission Unit 05					
Specifications					
ID	05		Design Capacity	455 MILLION BTU PER HOUR	
Description	GT#3 Gas Turbine		Emission Unit Status	Operating	
Manufacturer	General Electric		Manufactured Year	Purchased 2004	
Model Number	LM6000PC		Serial Number	191-548	
Regulations					
Regulation/Description					
40 CFR 60 Subpart GG					
> Control Equipment					
Capture Efficiency (%)	73 per AP-42, Table 3.1-1				
System Description	Weir Rotojet Water Injection (NO) Emerachem LLC CO catalyst				
Equipment Type(s)	Water Injection				
Pollutants Controlled					
Pollutant Description			Reduction Efficiency (%)		
Carbon Monoxide			66		
Nitrogen Oxides			77		
Processes					
Process	Primary Process				
SCC Code	20100901				
	> Internal Combustion Engines				
	> Electric Generation				
	> Kerosene/Naphtha (Jet Fuel)				
	> Turbine: Exhaust				
Material Processed	Naphtha				
Period Start	1/1/2019		Period End	12/31/2019	
Throughput					
Total		Summer %	Fall %	Winter %	Spring %
	25,240,552 gallons	22.4	27.6	26.2	23.9
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
6.7	22.8	49.4	8,305.5		
Fuel Characteristics					
Heat Content (MMBtu/kgal)	Elem. Sulfur Content (wt. pct. S)	H ₂ S Sulfur Content	Ash Content		
108.141	0.0021	Not Available	Not Available		
Heating					
Heat Input (MMBtu/hr)		Heat Output		Heat Values Convention	
329		Not Available		HHV	
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide (CO)	6.0E-03	POUNDS	MILLION BTUS	2018 CEMS Average	8.189E+00
Ammonia (NH ₃)	Not Available	Not Available	Not Available	Not Available	Not Available
Nitrogen Oxides (NO _x)	2.84E-01	POUNDS	MILLION BTUS	2018 CEMS Average	3.876E+02
PM ₁₀ Primary (Filt + Cond)(PM ₁₀ -PRI)	1.2E-02	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	1.638E+01
PM _{2.5} Primary (Filt + Cond)(PM _{2.5} -PRI)	1.2E-02	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	1.638E+01
PM _{2.5} Filterable (PM _{2.5} -FIL)	4.3E-03	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	5.869E+00
PM Condensable (PM-CON)	7.2E-03	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	9.826E+00
Sulfur Dioxide (SO ₂)	2.2E-04	POUNDS	GALLON	Mass Balance	3.038E-01
Volatile Organic Compounds (VOC)	4.1E-04	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	5.596E-01
Lead and lead compounds	1.4E-05	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	1.911E-02

Emission Unit 05					
Process	Secondary Process				
SCC Code	20100109				
	> Internal Combustion Engines				
	> Electric Generation				
	> Distillate Oil (Diesel)				
	> Turbine: Exhaust				
Material Processed	Distillate Oil (No. 1 ULS)				
Period Start	1/1/2019		Period End	12/31/2019	
Throughput					
Total		Summer %	Fall %	Winter %	Spring %
	465,490 gallons	2.6	0.4	0.1	96.9
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
0.1	0.4	0.9	153.2		
Fuel Characteristics					
Heat Content (MMBtu/kgal)	Elem. Sulfur Content (wt. pct. S)	H ₂ S Sulfur Content	Ash Content		
133.441	0.00041	Not Available	Not Available		
Heating					
Heat Input (MMBtu/hr)		Heat Output		Heat Values Convention	
406		Not Available		HHV	
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide (CO)	6.0E-03	POUNDS	MILLION BTUS	2018 CEMS Average	1.863E-01
Ammonia (NH ₃)	Not Available	Not Available	Not Available	Not Available	Not Available
Nitrogen Oxides (NO _x)	2.84E-01	POUNDS	MILLION BTUS	2018 CEMS Average	8.820E+00
PM ₁₀ Primary (Filt + Cond)(PM ₁₀ -PRI)	1.2E-02	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	3.727E-01
PM _{2.5} Primary (Filt + Cond)(PM _{2.5} -PRI)	1.2E-02	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	3.727E-01
PM _{2.5} Filterable (PM _{2.5} -FIL)	4.3E-03	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	1.335E-01
PM Condensable (PM-CON)	7.2E-03	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	2.236E-01
Sulfur Dioxide (SO ₂)	5.6E-05	POUNDS	GALLON	Mass Balance	1.308E-02
Volatile Organic Compounds (VOC)	4.1E-04	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	1.273E-02
Lead and lead compounds	1.4E-05	POUNDS	MILLION BTUS	AP-42 Table 3.1-2a	4.348E-04

Emission Unit 05				
Release Points				
ID	Description	Type	Apportion %	
05	GT#3 Stack	Vertical	100	
Release Point 05				
Specifications				
ID	05	Type	Vertical	
Description	GT#3 Stack			
Stack Parameters				
Stack Height (ft)	Stack Diameter (ft)	Exit Gas Temp (F)	Exit Gas Velocity (fps)	Exit Gas Flow Rate (acfm)
110	11.11	270	73.8	347,949
Geographic Coordinate				
Latitude	64.73526	Longitude	-147.34985	Datum NAD 1983
Base Elevation	150	Accuracy	1	
Location Description	North Pole, AK			
Data Source	Engineering Estimate			

Emission Unit 06					
Specifications					
ID	06		Design Capacity	455 MILLION BTU PER HOUR	
Description	GT#4 Gas Turbine		Emission Unit Status	Not Installed	
Manufacturer	General Electric		Manufactured Year	This unit has not been installed	
Model Number	LM6000PC		Serial Number	TBD	
Regulations					
Regulation/Description					
40 CFR 60 Subpart KKKK					
> Control Equipment					
Capture Efficiency (%)	Not Applicable				
System Description	Not Applicable				
Equipment Type(s)	Not Applicable				
Pollutants Controlled					
Pollutant Description			Reduction Efficiency (%)		
Not Applicable			Not Applicable		
Processes					
Process	Primary Process				
SCC Code	Not Applicable				
	Not Applicable				
	Not Applicable				
	Not Applicable				
	Not Applicable				
Material Processed	Not Applicable				
Period Start	1/1/2019		Period End	12/31/2019	
Throughput					
Total	Summer %		Fall %		Spring %
Not Applicable	Not Applicable		Not Applicable		Not Applicable
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
Not Applicable	Not Applicable	Not Applicable	Not Applicable		
Fuel Characteristics					
Heat Content	Elem. Sulfur Content	H ₂ S Sulfur Content	Ash Content		
Not Applicable	Not Applicable	Not Applicable	Not Applicable		
Heating					
Heat Input		Heat Output		Heat Values Convention	
Not Applicable		Not Applicable		Not Applicable	
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide (CO)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Ammonia (NH ₃)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Nitrogen Oxides (NO _x)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM ₁₀ Primary (Filt + Cond)(PM ₁₀ -PRI)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM _{2.5} Primary (Filt + Cond)(PM _{2.5} -PRI)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM2.5 Filterable (PM _{2.5} -FIL)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM Condensable (PM-CON)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Sulfur Dioxide (SO ₂)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Volatile Organic Compounds (VOC)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Lead and lead compounds	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable

Emission Unit 06					
Process	Secondary Process				
SCC Code	Not Applicable				
	Not Applicable				
	Not Applicable				
	Not Applicable				
	Not Applicable				
Material Processed	Not Applicable				
Period Start	1/1/2019	Period End	12/31/2019		
Throughput					
Total		Summer %	Fall %	Winter %	Spring %
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
Not Applicable	Not Applicable	Not Applicable	Not Applicable		
Fuel Characteristics					
Heat Content	Elem. Sulfur Content	H ₂ S Sulfur Content	Ash Content		
Not Applicable	Not Applicable	Not Applicable	Not Applicable		
Heating					
Heat Input	Heat Output		Heat Values Convention		
Not Applicable	Not Applicable		Not Applicable		
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide (CO)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Ammonia (NH ₃)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Nitrogen Oxides (NO _x)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM ₁₀ Primary (Filt + Cond)(PM ₁₀ -PRI)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM _{2.5} Primary (Filt + Cond)(PM _{2.5} -PRI)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM2.5 Filterable (PM _{2.5} -FIL)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM Condensable (PM-CON)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Sulfur Dioxide (SO ₂)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Volatile Organic Compounds (VOC)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Lead and lead compounds	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Release Points					
ID	Description	Type	Apportion %		
Not Applicable	Not Applicable	Not Applicable	Not Applicable		

Emission Unit 07										
Specifications										
ID	07		Design Capacity	565 HORSEPOWER						
Description	Emergency Generator Engine		Emission Unit Status	Operating						
Manufacturer	Generac Gen Set		Manufactured Year	Installed 2005						
Model Number	5231150100		Serial Number	2083094						
Regulations										
Regulation/Description										
40 CFR 63 Subpart ZZZZ										
> Control Equipment										
Capture Efficiency (%)	0									
System Description	None									
Equipment Type(s)	None									
Pollutants Controlled										
Pollutant Description			Reduction Efficiency (%)							
Not Applicable			Not Applicable							
Processes										
Process	Primary Process									
SCC Code	20200107									
	> Internal Combustion Engines									
	> Electric Generation									
	> Distillate Oil (Diesel)									
	> Reciprocating: Exhaust									
Material Processed	Distillate Oil (No. 2)									
Period Start	1/1/2019		Period End	12/31/2019						
Throughput										
Total	160 gallons		Summer %	22.0	Fall %	8.0	Winter %	48.0	Spring %	22.0
Operational Schedule										
Days/Week	Hours/Day	Weeks/Period	Hours/Period							
0	0	0	5							
Fuel Characteristics										
Heat Content (MMBtu/kgal)	Elem. Sulfur Content (wt. pct. S)	H ₂ S Sulfur Content	Ash Content							
133.441	0.00041	Not Available	Not Available							
Heating										
Heat Input (MMBtu/hr)		Heat Output		Heat Values Convention						
4		Not Available		HHV						
Emissions										
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons					
Carbon Monoxide (CO)	6.68E-03	POUNDS	HORSEPOWER-HOUR	AP-42 Table 3.3-1	9.436E-03					
Ammonia (NH ₃)	Not Available	Not Available	Not Available	Not Available	Not Available					
Nitrogen Oxides (NO _x)	3.1E-02	POUNDS	HORSEPOWER-HOUR	AP-42 Table 3.3-1	4.379E-02					
PM ₁₀ Primary (Filt + Cond)(PM ₁₀ -PRI)	2.2E-03	POUNDS	HORSEPOWER-HOUR	AP-42 Table 3.3-1	3.108E-03					
PM _{2.5} Primary (Filt + Cond)(PM _{2.5} -PRI)	2.2E-03	POUNDS	HORSEPOWER-HOUR	AP-42 Table 3.3-1	3.108E-03					
PM _{2.5} Filterable (PM _{2.5} -FIL)	42.5	POUNDS	THOUSAND GALLONS	WebFIRE	3.400E-03					
PM Condensable (PM-CON)	Not Available	Not Available	Not Available	Not Available	Not Available					
Sulfur Dioxide (SO ₂)	6.0E-05	POUNDS	GALLON	Mass Balance	4.828E-06					
Volatile Organic Compounds (VOC)	2.5E-03	POUNDS	MILLION BTUS	AP-42 Table 3.3-1	3.551E-03					
Lead and lead compounds	Not Available	Not Available	Not Available	Not Available	Not Available					

Emission Unit 07					
Process	Secondary Process				
SCC Code	Not Applicable				
	Not Applicable				
	Not Applicable				
	Not Applicable				
	Not Applicable				
Material Processed	Not Applicable				
Period Start	1/1/2019		Period End	12/31/2019	
Throughput					
Total	Summer %		Fall %		Spring %
Not Applicable	Not Applicable		Not Applicable		Not Applicable
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
Not Applicable	Not Applicable	Not Applicable	Not Applicable		
Fuel Characteristics					
Heat Content (MMBtu/kgal)	Elem. Sulfur Content (wt. pct. S)	H ₂ S Sulfur Content	Ash Content		
Not Applicable	Not Applicable	Not Applicable	Not Applicable		
Heating					
Heat Input		Heat Output		Heat Values Convention	
Not Applicable		Not Applicable		Not Applicable	
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons Per Year
Carbon Monoxide (CO)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Ammonia (NH ₃)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Nitrogen Oxides (NO _x)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM ₁₀ Primary (Filt + Cond)(PM ₁₀ -PRI)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM _{2.5} Primary (Filt + Cond)(PM _{2.5} -PRI)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM _{2.5} Filterable (PM _{2.5} -FIL)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM Condensable (PM-CON)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Sulfur Dioxide (SO ₂)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Volatile Organic Compounds (VOC)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Lead and lead compounds	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Release Points					
ID	Description			Type	Apportion %
07	Emergency Generator Stack			Vertical	100
Release Point 07					
Specifications					
ID	07		Type	Vertical	
Description	Emergency Generator Stack				
Stack Parameters					
Stack Height (ft)	Stack Diameter (ft)	Exit Gas Temp (F)	Exit Gas Velocity (fps)	Exit Gas Flow Rate (acfm)	
27	0.83	1,299	88.7	2,878	
Geographic Coordinate					
Latitude	64.7341	Longitude	-147.35072	Datum	NAD 1983
Base Elevation	150	Accuracy	1		
Location Description	North Pole, AK				
Data Source	Engineering Estimate				

Emission Unit 11						
Specifications						
ID	11		Design Capacity	5 MILLION BTU PER HOUR		
Description	Building Heater		Emission Unit Status	Operating		
Manufacturer	Bryan Steam		Manufactured Year	Installed 2005		
Model Number	RV500		Serial Number	93433		
Regulations						
Regulation/Description						
Not Applicable						
> Control Equipment						
Capture Efficiency (%)	0					
System Description	None					
Equipment Type(s)	None					
Pollutants Controlled						
Pollutant Description			Reduction Efficiency (%)			
Not Applicable			Not Applicable			
Processes						
Process	Primary Process					
SCC Code	10301002					
	> External Combustion Boilers					
	> Space Heaters					
	> Commercial/Institutional					
	> Liquefied Petroleum Gas (LPG)					
Material Processed	Propane					
Period Start	1/1/2019		Period End	12/31/2019		
Throughput						
Total			Summer %	Fall %	Winter %	Spring %
	1,833 gallons		100.0	0.0	0.0	0.0
Operational Schedule						
Days/Week	Hours/Day	Weeks/Period	Hours/Period			
0.1	0.2	0.4	67.1			
Fuel Characteristics						
Heat Content (MMBtu/kgal)	Elem. Sulfur Content (wt. pct. S)	H ₂ S Sulfur Content (vol. pct. H ₂ S)	Ash Content			
91.6	7.81E-06	0.5	Not Available			
Heating						
Heat Input (MMBtu/hr)		Heat Output		Heat Values Convention		
3		Not Available		HHV		
Emissions						
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons	
Carbon Monoxide (CO)	7.5	POUNDS	THOUSAND GALLONS	AP-42 Table 1.5-1	6.872E-03	
Ammonia (NH ₃)	Not Available	Not Available	Not Available	Not Available	Not Available	
Nitrogen Oxides (NO _x)	13	POUNDS	THOUSAND GALLONS	AP-42 Table 1.5-1	1.191E-02	
PM ₁₀ Primary (Filt + Cond)(PM ₁₀ -PRI)	0.7	POUNDS	THOUSAND GALLONS	AP-42 Table 1.5-1	6.414E-04	
PM _{2.5} Primary (Filt + Cond)(PM _{2.5} -PRI)	0.7	POUNDS	THOUSAND GALLONS	AP-42 Table 1.5-1	6.414E-04	
PM _{2.5} Filterable (PM _{2.5} -FIL)	0.2	POUNDS	THOUSAND GALLONS	AP-42 Table 1.5-1	1.833E-04	
PM Condensable (PM-CON)	0.5	POUNDS	THOUSAND GALLONS	AP-42 Table 1.5-1	4.581E-04	
Sulfur Dioxide (SO ₂)	6.6E-07	POUNDS	GALLON	Mass Balance	6.009E-07	
Volatile Organic Compounds (VOC)	1.0	POUNDS	THOUSAND GALLONS	AP-42 Table 1.5-1	9.163E-04	
Lead and lead compounds	Not Available	Not Available	Not Available	Not Available	Not Available	

Emission Unit 11					
Process	Secondary Process				
SCC Code	Not Applicable				
	Not Applicable				
	Not Applicable				
	Not Applicable				
	Not Applicable				
Material Processed	Not Applicable				
Period Start	1/1/2019	Period End	12/31/2019		
Throughput					
Total		Summer %	Fall %	Winter %	Spring %
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
Not Applicable	Not Applicable	Not Applicable	Not Applicable		
Fuel Characteristics					
Heat Content	Elem. Sulfur Content	H ₂ S Sulfur Content	Ash Content		
Not Applicable	Not Applicable	Not Applicable	Not Applicable		
Heating					
Heat Input		Heat Output		Heat Values Convention	
Not Applicable		Not Applicable		Not Applicable	
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide (CO)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Ammonia (NH ₃)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Nitrogen Oxides (NO _x)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM ₁₀ Primary (Filt + Cond)(PM ₁₀ -PRI)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM _{2.5} Primary (Filt + Cond)(PM _{2.5} -PRI)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM _{2.5} Filterable (PM _{2.5} -FIL)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM Condensable (PM-CON)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Sulfur Dioxide (SO ₂)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Volatile Organic Compounds (VOC)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Lead and lead compounds	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Release Points					
ID	Description	Type		Apportion %	
11	Building Heater	Vertical		100	
Release Point 11					
Specifications					
ID	11	Type		Vertical	
Description	Building Heater				
Stack Parameters					
Stack Height (ft)	Stack Diameter (ft)	Exit Gas Temp (F)	Exit Gas Velocity (fps)	Exit Gas Flow Rate (acfm)	
63	0.98	450	121	5,477	
Geographic Coordinate					
Latitude	64.73416	Longitude	-147.35072	Datum	NAD 1983
Base Elevation	150	Accuracy	1		
Location Description	North Pole, AK				
Data Source	Engineering Estimate				

Emission Unit 12					
Specifications					
ID	12	Design Capacity	5 MILLION BTU PER HOUR		
Description	Building Heater	Emission Unit Status	Operating		
Manufacturer	Bryan Steam	Manufactured Year	Installed 2005		
Model Number	RV500	Serial Number	93434		
Regulations					
Regulation/Description					
Not Applicable					
> Control Equipment					
Capture Efficiency (%)	0				
System Description	None				
Equipment Type(s)	None				
Pollutants Controlled					
Pollutant Description			Reduction Efficiency (%)		
Not Applicable			Not Applicable		
Processes					
Process	Primary Process				
SCC Code	10301002				
	> External Combustion Boilers				
	> Space Heaters				
	> Commercial/Institutional				
	> Liquefied Petroleum Gas (LPG)				
Material Processed	Propane				
Period Start	1/1/2019	Period End	12/31/2019		
Throughput					
Total		Summer %	Fall %	Winter %	Spring %
	1,833 gallons	100.0	0.0	0.0	0.0
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
0.1	0.2	0.4	67.1		
Fuel Characteristics					
Heat Content (MMBtu/kgal)	Elem. Sulfur Content (wt. pct. S)	H ₂ S Sulfur Content (vol. pct. H ₂ S)	Ash Content		
91.6	7.81E-06	0.5	Not Available		
Heating					
Heat Input (MMBtu/hr)		Heat Output		Heat Values Convention	
3		Not Available		HHV	
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide (CO)	7.5	POUNDS	THOUSAND GALLONS	AP-42 Table 1.5-1	6.872E-03
Ammonia (NH ₃)	Not Available	Not Available	Not Available	Not Available	Not Available
Nitrogen Oxides (NO _x)	13	POUNDS	THOUSAND GALLONS	AP-42 Table 1.5-1	1.191E-02
PM ₁₀ Primary (Filt + Cond)(PM ₁₀ -PRI)	0.7	POUNDS	THOUSAND GALLONS	AP-42 Table 1.5-1	6.414E-04
PM _{2.5} Primary (Filt + Cond)(PM _{2.5} -PRI)	0.7	POUNDS	THOUSAND GALLONS	AP-42 Table 1.5-1	6.414E-04
PM _{2.5} Filterable (PM _{2.5} -FIL)	0.2	POUNDS	THOUSAND GALLONS	AP-42 Table 1.5-1	1.833E-04
PM Condensable (PM-CON)	0.5	POUNDS	THOUSAND GALLONS	AP-42 Table 1.5-1	4.581E-04
Sulfur Dioxide (SO ₂)	6.6E-07	POUNDS	GALLON	Mass Balance	6.009E-07
Volatile Organic Compounds (VOC)	1.0	POUNDS	THOUSAND GALLONS	AP-42 Table 1.5-1	9.163E-04
Lead and lead compounds	N/A	N/A	N/A	N/A	N/A

Emission Unit 12					
Process	Secondary Process				
SCC Code	Not Applicable				
	Not Applicable				
	Not Applicable				
	Not Applicable				
	Not Applicable				
Material Processed	Not Applicable				
Period Start	1/1/2019		Period End	12/31/2019	
Throughput					
Total	Summer %		Fall %		Spring %
Not Applicable	Not Applicable		Not Applicable		Not Applicable
Operational Schedule					
Days/Week	Hours/Day	Weeks/Period	Hours/Period		
Not Applicable	Not Applicable	Not Applicable	Not Applicable		
Fuel Characteristics					
Heat Content	Elem. Sulfur Content	H ₂ S Sulfur Content	Ash Content		
Not Applicable	Not Applicable	Not Applicable	Not Applicable		
Heating					
Heat Input		Heat Output		Heat Values Convention	
Not Applicable		Not Applicable		Not Applicable	
Emissions					
Pollutant	Emission Factor	EF Numerator	EF Denominator	EF Source	Tons
Carbon Monoxide (CO)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Ammonia (NH ₃)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Nitrogen Oxides (NO _x)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM ₁₀ Primary (Filt + Cond)(PM ₁₀ -PRI)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM _{2.5} Primary (Filt + Cond)(PM _{2.5} -PRI)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM _{2.5} Filterable (PM _{2.5} -FIL)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
PM Condensable (PM-CON)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Sulfur Dioxide (SO ₂)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Volatile Organic Compounds (VOC)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Lead and lead compounds	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Release Points					
ID	Description		Type	Apportion %	
11	Building Heater		Vertical	100	
Release Point 12					
Specifications					
ID	12		Type	Vertical	
Description	Building Heater				
Stack Parameters					
Stack Height (ft)	Stack Diameter (ft)	Exit Gas Temp (F)	Exit Gas Velocity (fps)	Exit Gas Flow Rate (acfm)	
63	0.98	450	121	5,477	
Geographic Coordinate					
Latitude	64.73415	Longitude	-147.35011	Datum	NAD 1983
Base Elevation	150	Accuracy	1		
Location Description	North Pole, AK				
Data Source	Engineering Estimate				

**Attachment 1. Actual Volatile Organic Carbon (VOC) Emissions
Golden Valley Electric Association - North Pole Power Plant
Fuel Storage Tanks**

Fuel Storage Tank Detail:

EU ID 3

Orientation:	Horizontal	Effective Diameter (De):	30.3 ft	(AP-42, Section 7.1, Equation 1-13)
Capacity:	50,000 gallons	Effective Height (He):	9.4 ft	(AP-42, Section 7.1, Equation 1-14)
Diameter:	12 ft	Maximum Liquid Height (Hlx):	8.4 ft	
Length:	60 ft	Actual Diesel Throughput:	1,659,614 gal/yr	
Location:	North Pole, AK	Paint Condition:	Good	
Tank Color:	Tan			

EU ID 4

Orientation:	Horizontal	Effective Diameter (De):	30.3 ft	(AP-42, Section 7.1, Equation 1-13)
Capacity:	50,000 gallons	Effective Height (He):	9.4 ft	(AP-42, Section 7.1, Equation 1-14)
Diameter:	12 ft	Maximum Liquid Height (Hlx):	8.4 ft	
Length:	60 ft	Actual Diesel Throughput:	11,230,896 gal/yr	
Location:	North Pole, AK	Paint Condition:	Good	
Tank Color:	Tan			

Standing Loss

Standing Loss (Ls) = $365 \times K_e \times (\pi / 4 \times D_e^2) \times H_{vo} \times K_s \times W_v$ (AP-42, Section 7.1, Equation 1-4)

$K_e = 0.0018 \times dTv = 0.0018 \times [0.72 \times (T_{ax} - T_{an}) + 0.028 \times a \times i]$ (AP-42, Section 7.1, Equation 1-5)

where:

Tax =	43.6 °F	(AP-42, Section 7.1, Table 7.1-7 for Homer AK)
Tan =	29.5 °F	(AP-42, Section 7.1, Table 7.1-7 for Homer AK)
Tax =	503.6 °R	
Tan =	489.5 °R	
a =	0.43 (dimensionless)	(AP-42, Section 7.1, Table 7.1-6)
i =	838 Btu/ft ² -d	(AP-42, Section 7.1, Table 7.1-7 for Homer AK)

Ke = 0.0364 (dimensionless)

Hvo = 0.5 x He (AP-42, Section 7.1, text below Equation 1-14)

Hvo (EU ID 3) = 4.7 ft
Hvo (EU ID 4) = 4.7 ft

$K_s = 1 / (1 + 0.053 \times P_{va} \times H_{vo})$ (AP-42, Section 7.1, Equation 1-20)

where:

$T_{1a} = 0.44 \times T_{aa} + 0.56 \times T_b + 0.0079 \times a \times i$ (AP-42, Section 7.1, Equation 1-26)

where:

Taa =	(Tax + Tan)/2	(AP-42, Section 7.1, Equation 1-27)
Taa =	496.55 °R	
Tb =	Taa + 6 x a - 1	(AP-42, Section 7.1, Equation 1-28)
Tb =	498.13 °R	

$T_{1a} = 500.28 °R$
Pva (Diesel) = 0.0031 psi (AP-42, Section 7.1, Table 7.1-2)

Ks (EU ID 3) = 0.99923 (dimensionless)
Ks (EU ID 4) = 0.99923 (dimensionless)

$W_v = (M_v \times P_{va}) / (10.731 \times T_{1a})$ (AP-42, Section 7.1, Equation 1-21)

where:

Mv (Diesel) = 130 lb/lb-mole (AP-42, Section 7.1, Table 7.1-2)

Wv (Diesel) = 7.51E-05 lb/ft³

Ls (EU ID 3) = 3.38 lb/yr
Ls (EU ID 4) = 3.38 lb/yr

Working Loss

Working Loss (Lw) = $0.0010 / 5.614 \times 10.731 \times Tla \times N \times Hlx \times \pi / 4 \times De2 \times Kn \times Kp \times Wv$

(AP-42, Section 7.1, Equation 1-34)

Q (EU ID 3) = 39,515 bbl/yr
 Q (EU ID 4) = 267,402 bbl/yr

(Throughput converted from gal/yr to bbl/yr)
 (Throughput converted from gal/yr to bbl/yr)

Kn = 1 (dimensionless)
 Kn = $(180 + N) / 6 \times N$

for turnovers ≤ 36
 for turnovers > 36

where:

$N = 5.614 \times Q / Vlx$

(AP-42, Section 7.1, Equation 1-30)

where:

$Vlx = \pi / 4 \times De^2 \times Hlx$

(AP-42, Section 7.1, Equation 1-31)

Vlx (EU ID 3) = 6,048 ft³

Vlx (EU ID 4) = 6,048 ft³

N (EU ID 3) = 36.7

N (EU ID 4) = 248.2

Kn (EU ID 3) = 1.0 (dimensionless)

Kn (EU ID 4) = 0.3 (dimensionless)

Kp = 1 (dimensionless)

(AP-42, Section 7.1, Notes under Equation 1-35)

Lw (EU ID 3) = 15.68 lb/yr

Lw (EU ID 4) = 30.99 lb/yr

Total Loss

$Lt = Ls + Lw$

(AP-42, Section 7.1, Equation 1-1)

Lt (Diesel) = 19.06 lb/yr

(EU ID 3)

Lt (Diesel) = 34.37 lb/yr

(EU ID 4)

EU ID	Fuel Type	Fuel Usage (Gallons) ¹												Total
		January	February	March	April	May	June	July	August	September	October	November	December	
1	Jet A	-	-	-	-	-	-	-	-	-	-	-	-	-
	No. 1 ULS	2,567	12,812	1,227	-	3,073	-	35,213	-	5,181	33,418	32,361	23,480	149,332
	No. 2 Diesel & blends	-	31,490	28,710	-	37,249	-	60,571	-	96,687	60,599	136,619	436,788	888,713
2	Jet A	-	-	-	-	-	-	-	-	-	-	-	-	-
	No. 1 ULS	89,600	93,177	30,504	14,366	30,668	130,062	34,950	124,629	203,969	152,122	64,387	76,358	1,044,792
	No. 2 Diesel & blends	460,887	4,044,779	187,173	186,367	654,637	625,545	265,479	565,633	957,475	1,086,157	414,504	893,547	10,342,183
5	Jet A	-	-	-	-	-	-	-	-	-	-	-	-	-
	No. 1 ULS	370	-	-	-	451,126	1,684	9,470	933	-	-	1,907	-	465,490
	Naptha	1,903,516	2,123,266	2,206,537	2,219,122	1,598,037	1,632,536	2,011,712	1,997,862	2,225,271	2,493,059	2,241,379	2,588,255	25,240,552
7	ULSD	-	58	-	-	35	-	35	-	-	-	13	19	160
	hours	1.8	0.0	0.0	1.1	0.0	1.1	0.0	0.0	0.0	0.0	0.4	0.6	-
11	Propane	-	-	-	-	-	-	-	3,665	-	-	-	-	-
12		-	-	-	-	-	-	-	-	-	-	-	-	3,665

EU ID	Fuel Type	Fuel Usage by Season (%)			
		Summer	Fall	Winter	Spring
1	Jet A	-	-	-	-
	No. 1 ULS	23.6	47.5	26.0	2.9
	No. 2 Diesel & blends	6.8	33.1	52.7	7.4
2	Jet A	-	-	-	-
	No. 1 ULS	27.7	40.2	24.8	7.2
	No. 2 Diesel & blends	14.1	23.8	52.2	9.9
5	Jet A	-	-	-	-
	No. 1 ULS	2.6	0.4	0.1	96.9
	Naptha	22.4	27.6	26.2	23.9
7	ULSD	22.0	8.0	48.0	22.0
11	Propane	100.0	-	-	-
12		-	-	-	-

Tank	Fuel Usage by Season (%)			
	Summer	Fall	Winter	Spring
Jet A	0	0	0	0
No. 1 Diesel	20.3	29.7	18.0	32.0
No. 2 Diesel	13.5	24.5	52.2	9.7
ULSD	22.0	8.0	48.0	22.0

EU ID	2019 Operating Hours ²
1	392.6
2	3,130.3
5	8,458.7
7	5.0
11	67.1
12	67.1

Fuel Type	Total Fuel Usage (Gallons)												Total	
	January	February	March	April	May	June	July	August	September	October	November	December		
Jet A	-	-	-	-	-	-	-	-	-	-	-	-	-	-
No. 1 ULS	92,537	105,989	31,731	14,366	484,867	131,746	79,633	125,562	209,150	185,540	98,655	99,838	1,659,614	
No. 2 Diesel & blends	460,887	4,076,269	215,883	186,367	691,886	625,545	326,050	565,633	1,054,162	1,146,756	551,123	1,330,335	11,230,896	
ULSD	58	-	-	35	-	35	-	-	-	-	13	19	160	
Naptha	1,903,516	2,123,266	2,206,537	2,219,122	1,598,037	1,632,536	2,011,712	1,997,862	2,225,271	2,493,059	2,241,379	2,588,255	25,240,552	
Propane	-	-	-	-	-	-	-	3,665	-	-	-	-	3,665	

Fuel Type	Fuel HHV (Btu/gal) ¹												Average
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Jet A	-	-	-	-	-	-	-	-	-	-	-	-	-
No. 1 ULS	133,475	-	-	133,629	-	-	133,076	132,971	133,764	-	133,852	133,322	133,441
No. 2 Diesel & blends	137,421	-	136,990	136,741	-	-	139,560	139,634	139,252	-	137,470	139,498	138,321
ULSD	133,475	-	-	133,629	-	-	133,076	132,971	133,764	-	133,852	133,322	133,441
Naptha	-	-	107,209	-	-	108,592	-	-	108,736	-	-	108,027	108,141

Fuel Type	Fuel Sulfur (max wt. pct. S) ³												Average
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Jet A	-	-	-	-	-	-	-	-	-	-	-	-	-
No. 1 ULS	0.00018	0.00014	0.00015	0.00009	0.00018	0.00017	0.00100	0.00125	0.00098	0.00026	0.00029	0.00027	0.00041
No. 2 Diesel & blends	0.301	0.302	0.302	0.242	0.244	0.484	0.453	0.455	0.308	0.311	0.295	0.292	0.332
ULSD	0.00018	0.00014	0.00015	0.00009	0.00018	0.00017	0.00100	0.00125	0.00098	0.00026	0.00029	0.00027	0.00041
Naptha	0.00140	0.00150	0.00170	0.00140	0.00280	0.00300	0.00130	0.00340	0.00170	0.00150	0.00200	0.00350	0.002

Fuel Type	Fuel Sulfur (vol pct. H ₂ S) ³												Average
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Propane	-	-	-	-	-	0.5	0.5	-	-	-	-	-	0.5

Fuel Type	Fuel Density (lb/gal) ⁴
Jet A	6.8
No. 1 Diesel	6.8
No. 2 Diesel	7.3
Naptha ⁴	5.3
Propane ⁵	4.2

¹ Assumed
² Hours for EU IDs 1, 2, and 5 are from plant report, hours for EU ID 7 are from the FOR, and hours for EU IDs 11, and 12 are estimated based on fuel use
³ From fuel test records
⁴ Provided by the supplier.
⁵ Estimate from vendor propane factor notifications

North Pole Power Plant
Permit No. AQ0110TVP04

Emissions Inventory

ID	Emissions (tpy)
2019	
1	17.0400
1	0.0042
2	251.0000
2	0.0294
5	0.3038
5	0.0131
7	0.0000
11	0.0000
12	0.0000
Total SO2 Emissions: 268.4	
2018	
1	19.8000
1	0.000
2	178.800
2	11.040
5	0.230
5	5.350
7	0.000
11	0.000
12	0.000
Total SO2 Emissions: 215.2	
2017	
1	27.19
1	4.49
2	218.20
2	10.67
5	1.84
5	7.05
7	0.00
11	0.00
12	0.00
Total SO2 Emissions: 269.5	
2016	
1	35.40
1	2.47
2	184.07
2	6.69
5	3.11
5	8.09
7	0.00
11	0.00
12	0.00
Total SO2 Emissions: 239.8	
2015	
1	8.26
1	0.21
2	129.05
2	2.69
5	3.02
5	5.82
7	0.00
11	0.00
12	0.00
Total SO2 Emissions: 149.1	
2014	
1	5.64
2	138.15
5	4.58
7	0.00
11	0.00
12	0.00
Total SO2 Emissions: 148.4	

Emission Estimates

Year	Emissions (tpy)
2019	253.1
2018	214.7
2017	269.5
2016	239.8
2015	149.1
2014	148.4

All prices per gallon

		W02 S24 W02 S26												W03						W04			Average for fuel type						
		Jan-19	Feb-19	Mar-19	Apr-19	May-19	May-19	Jun-19	Jul-19	Aug-19	Sep-19	Oct-19	Nov-19	Dec-19	Jan-20	Feb-20	Mar-20	Apr-20	May-20	Jun-20	Jul-20	Aug-20		Sep-20	Oct-20	Oct-20	Oct-20		
North Pole	Naphtha							\$1.654																				\$1.638	
	PG & Federal surcharges *					\$0.001		\$0.001																					\$0.001
	US Naphtha	\$1.503	\$1.534	\$1.533	\$1.492	\$1.395		\$1.453	\$1.349	\$1.293	\$1.870	\$1.100	\$1.403	\$1.621	\$1.608	\$1.201	\$1.070	\$0.896	\$0.928	\$1.210	\$1.310	\$1.200	\$1.230	\$1.227				\$1.338	
	PG & Federal surcharges *	\$0.001	\$0.001	\$0.001	\$0.001	\$0.001		\$0.001	\$0.001	\$0.001	\$0.001	\$0.001	\$0.001	\$0.001	\$0.001	\$0.001	\$0.001	\$0.001	\$0.001	\$0.001	\$0.001	\$0.001	\$0.001	\$0.001	\$0.001	\$0.001	\$0.001	\$0.001	
	US Naphtha	\$1.742	\$1.800	\$1.840	\$1.900	\$1.900		\$1.850	\$1.834	\$1.784	\$1.317	\$1.800	\$1.804	\$1.910	\$1.887	\$1.471	\$0.951	\$0.868	\$0.912	\$1.210	\$1.290	\$1.251	\$1.178	\$1.181				\$1.517	
	PG & Federal surcharges *	\$0.001	\$0.001	\$0.001	\$0.001	\$0.001		\$0.001	\$0.001	\$0.001	\$0.001	\$0.001	\$0.001	\$0.001	\$0.001	\$0.001	\$0.001	\$0.001	\$0.001	\$0.001	\$0.001	\$0.001	\$0.001	\$0.001	\$0.001	\$0.001	\$0.001	\$0.001	
	DF2-10					\$2.295		\$2.240	\$2.135	\$2.037	\$2.095									\$0.860	\$1.170	\$1.277	\$1.254	\$1.139	\$1.237	\$1.268			\$1.044
	PG & Federal surcharges *					\$0.001		\$0.001	\$0.001	\$0.001	\$0.001									\$0.001	\$0.001	\$0.001	\$0.001	\$0.001	\$0.001	\$0.001	\$0.001	\$0.001	\$0.001
	PG Ops Surcharges					\$0.05		\$0.05	\$0.05	\$0.05	\$0.05									\$0.06	\$0.06	\$0.06	\$0.06	\$0.06	\$0.06	\$0.06	\$0.06	\$0.06	\$0.06
	Big State Delivery					\$0.000		\$0.000	\$0.000	\$0.000	\$0.000									\$0.020	\$0.020	\$0.020	\$0.020	\$0.020	\$0.020	\$0.020	\$0.020	\$0.020	\$0.020
	PG State Fuel Surcharges					\$7.000		\$7.000	\$7.000	\$7.000	\$7.000									\$7.000	\$7.000	\$7.000	\$7.000	\$7.000	\$7.000	\$7.000	\$7.000	\$7.000	\$7.000
	DF2-15	\$1.898	\$2.081	\$2.157	\$2.238	\$2.295					\$2.095	\$2.108	\$2.144	\$2.150	\$2.131	\$1.815	\$1.345	\$0.794	\$0.860		\$1.277	\$1.254		\$1.237	\$1.268	\$1.339			\$1.712
	PG & Federal surcharges *	\$0.001	\$0.001	\$0.001	\$0.001	\$0.001					\$0.001	\$0.001	\$0.001	\$0.001	\$0.001	\$0.001	\$0.001	\$0.001	\$0.001	\$0.001	\$0.001	\$0.001	\$0.001	\$0.001	\$0.001	\$0.001	\$0.001	\$0.001	
	PG Ops Surcharges					\$0.05		\$0.05	\$0.05	\$0.05	\$0.05									\$0.06	\$0.06	\$0.06	\$0.06	\$0.06	\$0.06	\$0.06	\$0.06	\$0.06	\$0.06
	Big State Delivery	\$0.020	\$0.020	\$0.020	\$0.020	\$0.020					\$0.020	\$0.020	\$0.020	\$0.020	\$0.020	\$0.020	\$0.020	\$0.020	\$0.020	\$0.020	\$0.020	\$0.020	\$0.020	\$0.020	\$0.020	\$0.020	\$0.020	\$0.020	
	PG State Fuel Surcharges					\$7.000		\$7.000	\$7.000	\$7.000	\$7.000									\$7.000	\$7.000	\$7.000	\$7.000	\$7.000	\$7.000	\$7.000	\$7.000	\$7.000	\$7.000
	DF1-H6					\$2.295		\$2.240						\$2.150	\$2.131			\$0.794	\$0.860	\$1.170	\$1.277	\$1.254	\$1.139	\$1.237	\$1.268			\$1.533	
	PG & Federal surcharges *					\$0.001		\$0.001						\$0.001	\$0.001			\$0.001	\$0.001	\$0.001	\$0.001	\$0.001	\$0.001	\$0.001	\$0.001	\$0.001	\$0.001	\$0.001	
	PG Ops Surcharges					\$0.05		\$0.05						\$0.05	\$0.05			\$0.06	\$0.06	\$0.06	\$0.06	\$0.06	\$0.06	\$0.06	\$0.06	\$0.06	\$0.06	\$0.06	\$0.06
	Big State Delivery					\$0.000		\$0.000						\$0.000	\$0.000			\$0.020	\$0.020	\$0.020	\$0.020	\$0.020	\$0.020	\$0.020	\$0.020	\$0.020	\$0.020	\$0.020	
US Diesel Fuel Surcharges					\$8.000		\$8.000						\$8.000	\$8.000			\$8.000	\$8.000	\$8.000	\$8.000	\$8.000	\$8.000	\$8.000	\$8.000	\$8.000	\$8.000	\$8.000	\$8.000	
USLD	\$1.747	\$1.884	\$1.871	\$2.006	\$2.158	\$0.176	\$2.717	\$1.697	\$1.573	\$1.961	\$2.148	\$2.221	\$2.237	\$2.153	\$1.843	\$1.456	\$0.964	\$0.969	\$1.230	\$1.370	\$1.401	\$1.299	\$1.411				\$1.786		
PG & Federal surcharges *	\$0.001	\$0.001	\$0.001	\$0.001	\$0.001	\$0.001	\$0.001	\$0.001	\$0.001	\$0.001	\$0.001	\$0.001	\$0.001	\$0.001	\$0.001	\$0.001	\$0.001	\$0.001	\$0.001	\$0.001	\$0.001	\$0.001	\$0.001	\$0.001	\$0.001	\$0.001	\$0.001		
PG Ops Surcharges	\$0.153	\$0.151	\$0.151	\$0.151	\$0.151	\$0.000	\$0.151	\$0.151	\$0.151	\$0.151	\$0.151	\$0.170	\$0.170	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000		
PG State Fuel Surcharges	\$1.000	\$1.000	\$1.000	\$1.000	\$1.000	\$0.000	\$1.000	\$1.000	\$1.000	\$1.000	\$1.000	\$1.000	\$1.000	\$1.000	\$1.000	\$1.000	\$1.000	\$1.000	\$1.000	\$1.000	\$1.000	\$1.000	\$1.000	\$1.000	\$1.000	\$1.000	\$1.000		
PG State Fuel Surcharges	\$3.000	\$3.000	\$3.000	\$3.000	\$3.000	\$0.000	\$3.000	\$3.000	\$3.000	\$3.000	\$3.000	\$3.000	\$3.000	\$3.000	\$3.000	\$3.000	\$3.000	\$3.000	\$3.000	\$3.000	\$3.000	\$3.000	\$3.000	\$3.000	\$3.000	\$3.000	\$3.000		
US State Delivery	\$0.020	\$0.020	\$0.020	\$0.020	\$0.020	\$0.165	\$0.165	\$0.020	\$0.020	\$0.020	\$0.020	\$0.020	\$0.020	\$0.020	\$0.020	\$0.020	\$0.020	\$0.020	\$0.020	\$0.020	\$0.020	\$0.020	\$0.020	\$0.020	\$0.020	\$0.020	\$0.020		
US State Fuel Surcharges	\$3.000	\$3.000	\$3.000	\$3.000	\$3.000	\$0.000	\$3.000	\$3.000	\$3.000	\$3.000	\$3.000	\$3.000	\$3.000	\$3.000	\$3.000	\$3.000	\$3.000	\$3.000	\$3.000	\$3.000	\$3.000	\$3.000	\$3.000	\$3.000	\$3.000	\$3.000	\$3.000		
																												\$0.0016	

\$0.250 Difference between USLD and DF1-H6

Fuel Prices (\$/gallon) representative April 2016		NPP				ZNP	
		Naphtha	LSR Turbine **	DF#1, DF#2	ULSD	DF#1, DF#2	ULSD
A	PSI Base Price	\$1.127000	\$0.792619	\$1.492381	\$1.378810	\$1.492381	\$1.378810
B	PSI & Federal surcharges *	\$0.012405	\$0.012405	\$0.052405	\$0.012405	\$0.052405	\$0.012405
C	PSI Delivery Charge				\$0.155000		\$0.155000
D	PSI Fuel Surcharge C * 15%				\$0.023250		\$0.023250
E	PSI Truck Freight (C + D) * 15%				\$0.026738		\$0.026738
F	Big State Delivery			\$0.020000	\$0.020000	\$0.030000	\$0.030000
G	Big State fuel surcharge (F) * 15%			\$0.003000	\$0.003000	\$0.004500	\$0.004500
	Total	\$1.139405	\$0.805024	\$1.567786	\$1.619203	\$1.579286	\$1.630703

* Includes GVEA OPS surcharge, Federal Oil Spill Liability, Federal Excise Tax, and SOA Surcharge
 ** Estimated, will take delivery early 2017

Naphtha and LSR fuel direct pipe supply to North Pole GT3 (LM600, EUID 5).
 DF#1, DF#2, and ULSD trucked from PSI to North Pole and Zehnder.

Sulfur	Specification MAX ppm	Aug-15 ppm	Sep-15 ppm	Oct-15 ppm	Nov-15 ppm	Dec-15 ppm	Jan-16 ppm	Feb-16 ppm	Mar-16 ppm	Apr-16 ppm
Naphtha, Sulfur Specification	100	20.7	24.0	23.4	23.2	20.7	20.5	20.2	19.3	20.8
LSR Turbine, Sulfur Specification	30	12 predicted								
# 1 HSD	3000	950.0	970.0	940.0	940.0	960.0	980.0	950.0	940.0	950.0
# 2 HSD -15	4000	3220.0	3010.0	2840.0	3300.0	3130.0	3170.0	2940.0	2730.0	
# 2 HSD + 10	4000	4510.0	4720.0							4080.0
ULSD	15									0.8

North Pole Power Plant Fuel Usage from Emission Inventory Reporting

EU	Year	No.1 Fuel Usage (Gal)	Sulfur Content (wt. % S)	No. 1 E.F. (lb/MMBtu)	Fuel Heat Content (MMBtu/kgal)	No 2 Fuel Usage (Gal)	Sulfur Content (wt. % S)	Fuel Heat Content (MMBtu/kgal)	Total Fuel Used (Gal)	Total Fuel Used (MMBtu)	Weighted Sulfur Content	EI Emissions (tpy)
1	2016	373,269	0.097	0.10	133.994	1,279,961	0.379	137.575	1,653,230	226,106	0.32	37.87
1	1/2 of emissions								826,615		0.32	18.94
1	1/2 ULSD only								826,615		0.0015	0.09
1	Reduction											18.85
1	1/2 of emissions								826,615		0.32	18.94
1	1/2 0.1% S only								826,615		0.1	6.03
1	Reduction											12.90
												ULSD Reduction (
												0.1% Sulfur Redu
												99.5%
												68.1%
2	2019	1,044,792	0.00041	0.00042	133.441	10,342,183	0.332	138.321	11,386,975	1,569,959	0.30	250.68
2	1/2 of emissions								5,693,488		0.30	125.34
2	1/2 ULSD only								5,693,488		0.0015	0.62
2	Reduction											124.72
2	1/2 of emissions								5,693,488		0.30	125.34
2	1/2 0.1% S only								5,693,488		0.1	41.56
2	Reduction											83.78
												ULSD Reduction (
												0.1% Sulfur Redu
												99.5%
												66.8%
5	2016	1,221,881	0.097	133.994	21,162,658	0.0024	120.6255	22,384,539	2,716,481		0.008	10.75
5	ULSD							22,384,539			0.0015	2.45
5	Reduction											8.30
												ULSD Reduction (f
												77.2%

Assumptions	
Density	lb/gal
No. 1	6.8
No. 2	7.3
ULSD	7.3
Naptha	5.3
2 lb SO2/lb Sulfur	

Table 5-4. Annualized Costs for ULSD on the Diesel-fired Simple Cycle Gas Turbine (EU ID 1)

Project: <u>GVEA North Pole - PM_{2.5} BACT Analysis (EU ID 1 - GE Frame 7 CT)</u>		Shaded cells indicate user inputs			
		Prepared By:			
		Checked By:			
		Rev:			
Annualized Costs					
DIRECT ANNUAL COSTS					
	QTY	UNIT	TOTAL MATERIALS COST	TOTAL LABOR COST	TOTAL
(1) Operating & Maintenance Costs		%		\$ -	\$ -
(2) Repair & Replacement Costs		%		\$ -	\$ -
(3) Maintenance Materials		LOT	excluded in this estimate		
(4) Utilities					
(a) ULSD Costs:	826,615	GAL	0.250 \$ 206,296		\$ 206,296
Total Direct Annual Costs (TDAC)				TDAC = \$	206,296
INDIRECT ANNUAL COSTS					
(5) Overhead		%	excluded in this estimate	\$ -	\$ -
(6) Administrative Charges, Property Taxes, Insurance		% of capital		\$ -	\$ -
Capital Recovery Factor [see inputs below]	0.0688				
(7) Capital Recovery				CRF * TCI = \$	-
Total Indirect Annual Costs (TIAC) (refer to Table 5-10)				TIAC = \$	-
TOTAL ANNUALIZED COSTS (TAC)				TAC = (TDAC) + (TIAC) = \$	206,296
Cost Effectiveness Summary					
TOTAL TONS SO₂ AVOIDED PER YEAR					= 18.8
COST EFFECTIVENESS (\$ PER TON AVOIDED BASED ON 2016 Actuals)					(TAC)/(TPY) = \$ 10,945.88

Data Inputs for Capital Recovery Factor:	
Annual Interest Rate (EPA OAQPS Control Cost Manual)	3.25 %
Project Life (EPA OAQPS Control Cost Manual)	20 years

¹ Annual average run hours for EU 1 from 2009-2016 is 833 hours, and the peak in the last four years has been 587 hours. 833 hours equates to 4,305,969 gallons of fuel, a TDAC of \$1,148,832, and a TAC of \$3,068,356. The capital cost of bulk fuel storage would be less and the TIAC for actuals is shown in Table 5-10.

² Alaska Department of Environmental Conservation, Amendments to State Air Quality Control Plan Vol. III: Appendix III.D.5.7, page 52. In reference to fuel oil emissions, "Ambient sampling and modeling in FNSB indicates that reduction of six tons of SO_x emissions result in the same reduction in ambient PM_{2.5} concentration as the reduction of one ton of directly emitted PM_{2.5}".

Table 5-5. Annualized Costs for ULSD on the Diesel-fired Simple Cycle Gas Turbine (EU ID 2)

Project: <u>GVEA North Pole - PM_{2.5} BACT Analysis (EU ID 2 - GE Frame 7 CT)</u>		Shaded cells indicate user inputs			
		Prepared By:			
		Checked By:			
		Rev:			
Annualized Costs					
DIRECT ANNUAL COSTS					
	QTY	UNIT	TOTAL MATERIALS COST	TOTAL LABOR COST	TOTAL
(1) Operating & Maintenance Costs		%		\$ -	\$ -
(2) Repair & Replacement Costs		%		\$ -	\$ -
(3) Maintenance Materials		LOT	excluded in this estimate		
(4) Utilities					
(a) ULSD Costs:	5,693,488	GAL	0.249566716 \$ 1,420,905		\$ 1,420,905
Total Direct Annual Costs (TDAC)				TDAC = \$ 1,420,905	
INDIRECT ANNUAL COSTS					
(5) Overhead		%	excluded in this estimate	\$ -	\$ -
(6) Administrative Charges, Property Taxes, Insurance		% of capital		\$ -	\$ -
(7) Capital Recovery Factor [see inputs below]					
(7) Capital Recovery				CRF * TCI =	\$ -
Total Indirect Annual Costs (TIAC) (refer to Table 5-10)				TIAC =	
TOTAL ANNUALIZED COSTS (TAC)				TAC = (TDAC) + (TIAC) = \$ 1,420,905	
Cost Effectiveness Summary					
TOTAL TONS SO₂ AVOIDED PER YEAR					= 125
COST EFFECTIVENESS (\$ PER TON AVOIDED BASED ON 2019 Actuals)					(TAC)/(TPY) = \$ 11,393

Data Inputs for Capital Recovery Factor:	
Annual Interest Rate (EPA OAQPS Control Cost Manual)	3.25 %
Project Life (EPA OAQPS Control Cost Manual)	20 years

¹ Annual average run hours for EU 2 from 2009-2016 is 2472 hours, and the peak in the last four years has been 2873 hours. 2472 hours equates to 12,778,338 gallons of fuel, a TDAC of \$3,409,261, and a TAC of \$5,328,784. The capital cost of bulk fuel storage would be less and the TIAC for actuals is shown in Table 5-10.

² Alaska Department of Environmental Conservation, Amendments to State Air Quality Control Plan Vol. III: Appendix III.D.5.7, page 52. In reference to fuel oil emissions, "Ambient sampling and modeling in FNSB indicates that reduction of six tons of SO_x emissions result in the same reduction in ambient PM_{2.5} concentration as the reduction of one ton of directly emitted PM_{2.5}".

Table 5-6. Annualized Costs for ULSD on the Diesel-fired Combined Cycle Gas Turbines (EU IDs 5 and 6)

						Shaded cells indicate user inputs	
Project: GVEA North Pole - PM _{2.5} BACT Analysis (EU IDs 5 and 6 - GE LM6000PC CT)					Prepared By:		
					Checked By:		
					Rev:		
Annualized Costs							
DIRECT ANNUAL COSTS	QTY	UNIT	TOTAL MATERIALS COST	TOTAL LABOR COST	TOTAL		
(1) Operating & Maintenance Costs		%		\$ -	\$ -		
(2) Repair & Replacement Costs		%		\$ -	\$ -		
(3) Maintenance Materials		LOT	excluded in this estimate				
(4) Utilities							
(a) ULSD Costs:	21,162,658	GAL	0.588	\$ 12,436,888	\$ 12,436,888		
(b) ULSD Costs:	1,221,881	GAL	0.300	\$ 366,034	\$ 366,034		
Total Direct Annual Costs (TDAC)					TDAC = \$ 12,802,923		
INDIRECT ANNUAL COSTS							
(5) Overhead		%	excluded in this estimate	\$ -	\$ -		
(6) Administrative Charges, Property Taxes, Insurance		% of capital		\$ -	\$ -		
Capital Recovery Factor [see inputs below]	0.0688						
(7) Capital Recovery					CRF * TCI = \$ -		
Total Indirect Annual Costs (TIAC)					TIAC = \$ -		
TOTAL ANNUALIZED COSTS (TAC)					TAC = (TDAC) + (TIAC) = \$ 12,802,923		
Cost Effectiveness Summary							
TOTAL TONS SO₂ AVOIDED PER YEAR					= 8.3		
COST EFFECTIVENESS (\$ PER TON AVOIDED based on 2016 actuals)					(TAC)/(TPY) = \$ 1,542,463		

Data Inputs for Capital Recovery Factor:		
Annual Interest Rate (EPA OAQPS Control Cost Manual)	3.25	%
Project Life (EPA OAQPS Control Cost Manual)	20	years

Table 5-1. Summary of Available SO₂ Emission Control Technology

Emission Unit		Available Emission Control Technology
1, 2	Simple Cycle Gas Turbine	ULSD
		Low Sulfur Fuel
		Good Combustion Practices
5, 6	Combined Cycle Gas Turbine	ULSD
		LSR
		Limited Operation
		Good Combustion Practices
7	Emergency Generator Engine	ULSD
		Low Sulfur Fuel
		Limited Operation
		Good Combustion Practices
11, 12	Propane-Fired Boiler	Low Sulfur Fuel
		Good Combustion Practices

Table 5-2. Summary of Technically Feasible SO₂ Emission Control Technology

Emission Unit		Technically Feasible Control Technology
1, 2	Simple Cycle Gas Turbine	ULSD
		Low Sulfur Fuel
		Good Combustion Practices
5, 6	Combined Cycle Gas Turbine	ULSD
		Good Combustion Practices and LSR
7	Emergency Generator Engine	ULSD
		Low Sulfur Fuel
		Limited Operation
		Good Combustion Practices
11, 12	Propane-Fired Boiler	Low Sulfur Fuel
		Good Combustion Practices

Adopted



July 5, 2022
Scott Bell, Associate Vice Chancellor
(907) 474-6265
(907) 474-7284 fax
svbell2@alaska.edu
www.uaf.edu/fs

803 Alumni Drive, PO Box 757380, Fairbanks, Alaska 99775-7380

March 24, 2015

ATTN: Compliance Technician
Alaska Department of Environmental Conservation
Air Permits Program
610 University Avenue
Fairbanks, Alaska 99709

RE: Assessable Emission for University of Alaska Fairbanks Campus, Air Quality Operating Permit
Number AQ0316TVP02

Compliance Technician,

Assessable emissions are estimated to be 726 tons for FY2016. The estimate was based on actual operations that occurred during January 1 through December 31, 2014. This estimate includes emission units permitted under the above operating permit as well as additional emission units not covered under the permit, including those determined to be insignificant.

If you have any questions regarding this estimate, please contact Frances M Isgrigg, PE at 907-474-5487 or by e-mail at fisgrigg@alaska.edu.

Based on information and belief formed after reasonable inquiry, I certify that the statements and information in an attached to this document are true, accurate, and complete.

Sincerely,

A handwritten signature in black ink, appearing to read 'SBell', written over a light blue horizontal line.

Scott Bell, PE
Associate Vice Chancellor of Facilities Services

Attachment: Assessable Emissions Calculation Report

Cc: Charles Ward, Director of Utilities

University Alaska Fairbanks Assessable Emissions Estimate FY15

Assessable Emissions - Tons Per Year

Pollutant	NO _x	CO	PM ₁₀	SO ₂	VOC	HAPs	Total
Assessable PTE	637	252	17	858	11	13.6	1,788.6

from Table D, Statement of Basis for Operating Permit No. AQ0316TVP02

Emission Sources		Assessable Emissions Summary (TPY)					
		NO _x	CO	PM ₁₀	SO ₂	VOC	HAPs
Table 1	Coal-Fired Boilers	295.5	167.9	23.0	189.2	1.7	10.1
Table 2	Small External Combustion Units	1.1	0.3	0.2	3.5	0.02	
Table 3	Incinerator	0.01	0.01	0.02	0.01	0.001	
Table 4	CHPP Dual-Fired Boilers	10.4	4.8	1.1	16.9	0.2	
Table 5	CHPP Diesel Generator	0.0	0.0	0.00	0.0	0.00	
Table 6	Generator engines	0.3	0.2	0.0	0.00	0.0	
Table 7	Coal Handling Plant			0.3			
Table 8	Kilns	5.4E-03	3.1E-03	2.9E-04	8.3E-06	4.2E-04	
Table 9	Laboratory Hoods					2.42	1.14
	Totals	307.3	173.3	24.6	209.6	4.4	11.2

FY15 Assessable Emissions Estimate, in Tons	726.0
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Note: Actual HAP emissions for emission units in Tables 2 through 8 are not calculated for this estimate. The actual VOC emissions for these units are low enough that HAP emissions are expected to be insignificant.

University Alaska Fairbanks Assessable Emissions Estimate FY16
Emission Inventory and CY 2014 Operations Data

EU ID ⁶	Emission Unit	Emission Unit Type	Bldg No.	Installation Date	Make/Model	Fuel Type	Fuel Usage 2014	Maximum Capacity
1	Power Plant	Boiler - Coal Fired	FS802	1962	Erie City	Coal	33,022.9 tons	84.5 MMBtu/hr
2	Power Plant	Boiler - Coal Fired	FS802	1962	Erie City	Coal	34,136.9 tons	84.5 MMBtu/hr
3	Power Plant	Boiler - Dual Fired	FS802	1970	Zurn	Diesel	495,510.7 gal	180.9 MMBtu/hr
3	Power Plant	Boiler - Dual Fired	FS802	1970	Zurn	Natural Gas	0 MCF ⁶	180.9 MMBtu/hr
4	Power Plant	Boiler - Dual Fired	FS802	1987	Zurn	Diesel	45,842.8 gal	180.9 MMBtu/hr
4	Power Plant	Boiler - Dual Fired	FS802	1987	Zurn	Natural Gas	55,977 MCF	180.9 MMBtu/hr
6	Arctic Health Research Building	Engine - Emergency Generator	FS901	1968	Cummins/NH2501PG	Diesel	0 hrs ¹	125 kW
7	Arctic Health Research Building	Engine - Emergency Generator	FS901	1968	Cummins/NH2501P	Diesel	0 hrs ¹	125 kW
8	Power Plant	Engine - Backup/Peaking Generator (DEG)	FS817	1999	Fairbanks Morse Colt-Pielstick PC2.6	Diesel	0 gal	13,266 hp
9A	BiRD	Incinerator	FS919	2006	Therm-Tec/G-30P-1H	Waste	15,777 lbs	83 lb/hr
10	AFES Boiler	Boiler - Oil Fired	AF256	2000	Burnham/V9OGA	Diesel	23,157 gal ⁴	1.08 MMBtu/hr
11	AFES Boiler	Boiler - Oil Fired	AF256	2000	Burnham/V9OGA	Diesel		1.08 MMBtu/hr
12	Harper Boiler #1	Boiler - Oil Fired	FS420	1985	Weil McLain/BL776-S-W	Diesel	5,051 gal ²	0.64 MMBtu/hr
13	Harper Boiler #2	Boiler - Oil Fired	FS420	1985	Weil McLain/BL776-S-W	Diesel		0.64 MMBtu/hr
29	Harper Hot Water Heater	Hot Water Heater - Oil Fired	FS420	1985 (est)	Bock	Diesel		0.236 MMBtu/hr
34	Harper Trailer Toyo	Furnace - Oil Fired	FS421	2014	Toyotomi OM-180	Diesel		0.148 MMBtu/hr
14	Copper Lane Boiler	Boiler - Oil Fired	FS518	1985	Energy Kinetics System 2000	Diesel	1,165 gal ²	0.136 MMBtu/hr
15	Copper Lane Boiler	Boiler - Oil Fired	FS519	1985	Energy Kinetics System 2000	Diesel	702 gal ²	0.136 MMBtu/hr
16	Copper Lane (Honor's House) Boiler	Boiler - Oil Fired	FS520	2005	Weil McLain/P-WGO-5	Diesel	2,557 gal ²	0.233 MMBtu/hr
17	West Ridge Research Building Boiler #1	Boiler - Oil Fired	FS909	2003	Weil McLain/BL1688w-GPr10	Diesel	118.2 hrs	4.93 MMBtu/hr
18	West Ridge Research Building Boiler #2	Boiler - Oil Fired	FS909	2003	Weil McLain/BL1688w-GPr10	Diesel		4.93 MMBtu/hr
19	BiRD RM 100U3 Boiler #1	Boiler - Oil Fired	FS919	2004	Weil McLain/2094W	Diesel	181.3 hrs ³	6.13 MMBtu/hr
20	BiRD RM 100U3 Boiler #2	Boiler - Oil Fired	FS919	2004	Weil McLain/2094W	Diesel		6.13 MMBtu/hr
21	BiRD RM 100U3 Boiler #3	Boiler - Oil Fired	FS919	2004	Weil McLain/2094W	Diesel		6.13 MMBtu/hr
22	BiRD RM 100U3 Boiler #4	Boiler - Oil Fired	FS919	2005	Bryan/EB200-S-150-FDGO	Diesel	72,000.0 gal ^{2,3}	8.5 MMBtu/hr
23	Alaska Center for Energy and Power Generator Engine	Engine - Diesel Generator	FS814	2003	Detroit Diesel/6043-TK35	Diesel	0 gal	235 kW
24	Old University Park Emergency Generator Engine	Engine - Emergency Generator	FS423	2001	Cummins/4B3.9-G2	Diesel	2 hrs	51 kW
25	AFES Greenhouse Furnace	Furnace - Oil Fired	AF117	1991	Sunderman/L02OUF	Diesel	150 gal	0.209 MMBtu/hr
26	Copper Lane Furnace	Furnace - Oil Fired	FS517	2001	Matzger	Diesel	1,390 gal ²	0.08 MMBtu/hr
27	Alaska Center for Energy and Power Generator Engine	Engine - Diesel Fired	FS814	2013	Caterpillar C-15	Diesel	145 hrs	500 hp
28	AFES Grain Dryer	Grain Dryer - Oil Fired	AF108	1988	Unknown	Diesel	500 gal	2.43 MMBtu/hr
30	Duckering Classroom Engine	Engine - Diesel Fired	FS103	1987	Mitsubishi-Bosch	Diesel	0 hours	45 kW
31	Skarland Cabin Furnace	Furnace - Oil Fired	FS712	2001 (est)	Rheem/ROBC-084QPEB	Diesel	593 gal ²	0.140 MMBtu/hr
32	Alaska Earthquake Information Center Emergency Generator Engine	Engine - Emergency Generator	FS903	1998	Detroit Diesel	Diesel	13 hrs	120 hp

University Alaska Fairbanks Assessable Emissions Estimate FY16
Emission Inventory and CY 2014 Operations Data

EU ID ⁶	Emission Unit	Emission Unit Type	Bldg No.	Installation Date	Make/Model	Fuel Type	Fuel Usage 2014	Maximum Capacity
33	Arctic Health Research Emergency Generator Engine	Engine - Emergency Generator	FS901	2012	Cummins/QSB7-G3	Diesel	0 hrs	150 kW
N/A	Power Plant	Coal Handling/Crushing Facility	FS802	1964	American Pulverizer (crusher make)	Coal	67,159.8 tons	50 tons/hr
N/A	Fine Arts/Art Wing Rm 302	Kiln - Propane Fired	FS313	2009	Alpine Kilns and Equipment/SBF-40	Propane	833 gal	1.81 MMBtu/hr
N/A	Fine Arts/Art Wing Ceramic Rm 413	Kiln - Propane Fired	FS313	2009	Kilnmaster/constructed on-site	Propane		0.53 MMBtu/hr
N/A	Fine Arts/Art Wing Ceramic Rm 413	Kiln - Propane Fired	FS313	2009	Geil Kilns/DLB2	Propane		0.23 MMBtu/hr
N/A	Wooded Area west of the farm ⁵	Kiln(s) - Wood Fired	N/A	Various	Hand-built	Wood	4.5 cords	Unknown
						Vegetable Oil	130 gallons	Unknown
N/A	Facilities Services ⁵	Paint Booth Exhaust Fan	FS803	2001		Various Paints	Mainly water based paints are used. Minimal amounts of paint are stored on-site and paint booths are used infrequently.	12,500 cfm
N/A	Museum ⁵	Paint Booth Exhaust Fan	FS907	2006	Greenheck/TAB-42-030T3	Various Paints		5,480 cfm
N/A	Laboratory Fume Hoods (campus-wide)	Laboratory hoods	Multiple	Various	N/A	N/A	Per estimate in Table 9.	N/A
N/A	Duckering Classroom Turbine ⁵	Turbine - Propane Fired	FS103	1970(est)	Cussons Two Shaft Gas Turbine Unit	Propane	N/A	0.33 MMBtu/hr
N/A	Power Plant ⁵	Tank (Diesel) - Field Erected	FS817	1969	Fixed roof, 212,120 gallons	Diesel	N/A	212,120 gal
N/A	Graduation Flame ⁵	Ceremonial Flame	N/A	1975(est)	Custom-built	Propane	N/A	5.0E-03 MMBtu/hr
N/A	Power Plant ⁵	Ash Handling System	FS802	1962	N/A	N/A	N/A	8,760 hr/yr
N/A	SRC Pellet Stoves ⁵	Pellet Stove	N/A	2012	Avalon/AGP	Wood Pellets	N/A	5 lb/hr

Notes:

1. These emission units were removed from service on June 29, 2012 were replaced with EU ID 33.
2. Fuel burned was determined by review of fuel deliveries for calendar year 2014. The assumption was made that all fuel delivered was burned. Most deliveries for the year are in the same order of magnitude.
3. The hours provided are combined total hours for BiRD Boilers #1-3; The gallons of fuel provided are for all 4 of the boilers. Note 2 above applies to the gallons of fuel.
4. Fuel consumption for EU IDs 10 and 11 is a total for both boilers and is based on the fuel delivered during calendar year 2014.
5. Actual emissions are estimated to be insignificant for wood-fired kilns, paint booths, diesel storage tank, CHPP ash handling system, graduation flame, pellet stove, and small fuel-combusting unit (approx 3 hr/yr) in teaching laboratory.
6. EU ID 3 is permitted to fire natural gas but has not yet been modified to do so.

**Table 1 - UAF Coal Fired Boilers
CY 2014 Actual Emissions**

ID	Emission Unit Description	Coal Consumption, CY 2014	Actual Emissions (tpy)					
			NO _x	CO	PM ₁₀	SO ₂	VOC	HAPs
1	Power Plant Boiler - Coal Fired	33,022.9 ton/yr	145.3	82.6	11.3	93.0	0.8	5.0
2	Power Plant Boiler - Coal Fired	34,136.9 ton/yr	150.2	85.3	11.7	96.2	0.9	5.1
Total			295.5	167.9	23.0	189.2	1.7	10.1

Notes:

1. Weight conversion: 2,000 lb/ton
2. Sulfur content of coal: 0.161 weight percent weighted average based on 2013 UCM rail sample data
3. Emission factors:

<u>Pollutant</u>	<u>Emission Factor</u>	<u>Source</u>
NO _x	8.8 lb/ton	AP-42, Table 1.1-3, 9/98, Sub-bituminous spreader stoker
CO	5 lb/ton	AP-42, Table 1.1-3, 9/98, Sub-bituminous spreader stoker
PM ₁₀	0.68 lb/ton	AP-42, Tables 1.1-5 and 1.1-9, 9/98, Spreader stoker, with baghouse
SO ₂	35*S lb/ton	AP-42, Table 1.1-3, 9/98, Sub-bituminous spreader stoker, multiplied by weight percent sulfur in coal
VOC	0.05 lb/ton	AP-42, Table 1.1-19, 9/98, Spreader stoker (total NMOC)
HAPs	0.30 lb/ton	See note 4

4. HAPs emission factor is a sum of the following emission factors:

<u>Pollutant</u>	<u>Emission Factor</u>	<u>Source</u>
HCl	0.138 lb/ton	Source test from boilers of similar design at Clear Air Force Station
HF	0.139 lb/ton	Source test from boilers of similar design at Clear Air Force Station
Hg	8.46E-05 lb/ton	Source test from boilers of similar design at Clear Air Force Station
All other HAPs	0.0233 lb/ton	Total of emission factors from AP-42 Tables 1.1-13, 1.1-14, 1.1-18, 9/98

5. Example calculations:

$$\text{SO}_2 \text{ emission factor (lb/ton)} = 35 \times (\text{sulfur content of coal, weight percent})$$

$$\text{Actual emissions (ton/yr)} = (\text{coal use, ton/yr}) \times (\text{emission factor, lb/ton}) / (2,000 \text{ lb/ton})$$

$$\text{PM}_{10} \text{ emission factor (lb/ton)} = (\text{condensable PM emission factor, lb/MMBtu}) \times (\text{UCM heat content, 15.3 MMBtu/ton})$$

$$+ (\text{PM}_{10} \text{ particle emission factor, lb/ton})$$

Table 2 - UAF Small Oil-Fired External Combustion Units
CY 2014 Actual Emissions

ID	Emission Unit Description	Fuel Type	Maximum Capacity	Fuel Consumption, CY 2014	Actual Emissions (tpy)				
					NO _x	CO	PM ₁₀	SO ₂	VOC
10	AFES (the farm) Boiler - Oil Fired	Diesel	1.08 MMBtu/hr	23.2 1,000 gal/yr	0.23	0.06	0.04	0.72	3.9E-03
11	AFES (the farm) Boiler - Oil Fired	Diesel	1.08 MMBtu/hr						
12	Harper #1 Boiler - Oil Fired	Diesel	0.64 MMBtu/hr	5.05 1,000 gal/yr	0.05	0.01	0.01	0.16	8.6E-04
13	Harper #2 Boiler - Oil Fired	Diesel	0.64 MMBtu/hr						
29	Harper Hot Water Heater - Oil Fired	Diesel	0.236 MMBtu/hr						
34	Harper Trailer Toyo - Oil Fired	Diesel	MMBtu/hr						
14	Copper Lane Boiler - Oil Fired	Diesel	0.136 MMBtu/hr	1.17 1,000 gal/yr	0.01	0.00	0.00	0.04	2.0E-04
15	Copper Lane Boiler - Oil Fired	Diesel	0.136 MMBtu/hr	0.70 1,000 gal/yr	0.01	0.00	0.00	0.02	1.2E-04
16	Copper Lane (Honors House) Boiler - Oil Fired	Diesel	0.233 MMBtu/hr	2.56 1,000 gal/yr	0.03	0.01	0.00	0.08	4.3E-04
17	West Ridge Research Building #1 Boiler - Oil Fired	Diesel	4.93 MMBtu/hr	4.32 1,000 gal/yr	0.04	0.01	0.01	0.13	7.3E-04
18	West Ridge Research Building #2 Boiler - Oil Fired	Diesel	4.93 MMBtu/hr						
19	BiRD RM 100U3 #1 Boiler - Oil Fired	Diesel	6.13 MMBtu/hr	8.2 1,000 gal/yr	0.08	0.02	0.01	0.26	1.4E-03
20	BiRD RM 100U3 #2 Boiler - Oil Fired	Diesel	6.13 MMBtu/hr						
21	BiRD RM 100U3 #3 Boiler - Oil Fired	Diesel	6.13 MMBtu/hr						
22	BiRD RM 100U3 #4 Boiler - Oil Fired	Diesel	8.5 MMBtu/hr	63.8 1,000 gal/yr	0.64	0.16	0.11	1.99	1.1E-02
25	AFES (the farm) Greenhouse Furnace - Oil Fired	Diesel	0.209 MMBtu/hr	0.15 1,000 gal/yr	0.00	0.000	0.00	0.00	5.3E-05
26	Copper Lane Furnace - Oil Fired	Diesel	0.08 MMBtu/hr	1.39 1,000 gal/yr	0.01	0.003	0.00	0.04	5.0E-04
27	Skartland Cabin Furnace - Oil Fired	Diesel	0.140 MMBtu/hr	0.59 1,000 gal/yr	0.01	0.001	0.00	0.02	2.1E-04
28	AFES (the farm) Grain Dryer Grain Dryer - Oil Fired	Diesel	2.43 MMBtu/hr	0.50 1,000 gal/yr	0.01	0.001	0.00	0.02	8.5E-05
Total					1.1	0.3	0.2	3.5	1.9E-02

Notes:

- Maximum diesel sulfur content: 0.44 maximum weight percent, per records of fuel received at UAF during CY 2013
- Weight conversion: 2,000 lb/ton
- Emission factors:

Pollutant	Emission Factor	Source
NO _x	20 lb/1,000 gal	AP-42, Table 1.3-1, 5/10, Distillate oil fired
CO	5 lb/1,000 gal	AP-42, Table 1.3-1, 5/10, Distillate oil fired
PM ₁₀	3.3 lb/1,000 gal	AP-42, Tables 1.3-1 and 1.3-2, 5/10, Distillate oil fired - sum of filterable PM and total condensable PM
SO ₂	142*S lb/1,000 gal	AP-42, Table 1.3-1, 5/10, Distillate oil fired, multiplied by weight percent sulfur in fuel
VOC - boilers	0.34 lb/1,000 gal	AP-42, Table 1.3-3, 5/10, Distillate oil fired (total non-methane organic compounds) (also used for grain dryer EU)
VOC - furnaces	0.713 lb/1,000 gal	AP-42, Table 1.3-3, 5/10, Distillate oil fired (total non-methane organic compounds) (also used for hot water heater EU)

- Heat input ratings were not available for most external combustion units listed here. For ratings provided in terms of heat output or terms not specified, a conservative 75% efficiency has been applied to calculate the maximum heat input capacity shown in the table.

5. Example calculations:

Actual emissions, tons/yr = (Emission factor, lb/1,000 gal) x (Fuel consumption, 1,000 gal/yr) / (2,000 lb/ton)
 Actual emissions of SO₂, tons/yr = (Emission factor, lb/1,000 gal) x (Fuel sulfur content, wt %) x (Fuel consumption, 1,000 gal/yr) / (2,000 lb/ton)

- #2 Diesel Heating Value: 0.135 MMBtu/gal
- EU10 and EU 11 - Fuel consumption for EU IDs 10 and 11 is a total for both boilers and is based on the fuel delivered during calendar year 2014.
- EU17 through EU 21 - Fuel consumption calculated based on operating hours in CY 2014, assuming all operating hours at full load.
 Fuel consumption (1,000 gal/yr) = (Operation, hr/yr) x (Capacity, MMBtu/hr) / (0.135 MMBtu/gal) / (1,000)
- EU 22 - Fuel consumption calculated by subtracting calculated fuel use for EU19 through EU21 from the total recorded fuel consumption for EU19 through EU 22.

**Table 3 - UAF Incinerator
CY 2014 Actual Emissions**

ID	Emission Unit Description	Waste Combustion, CY 2014	Actual Emissions (tpy)				
			NO _x	CO	PM ₁₀	SO ₂	VOC
9A	BiRD Incinerator	7.9 ton/yr	1.40E-02	1.16E-02	0.02	8.56E-03	1.18E-03
Total			0.01	0.01	0.02	0.01	0.001

Notes:

1. Weight conversion:

2,000 lb/ton

2. Incineration emission factors:

Pathological waste incinerator emission factors are not available. Medical waste incineration emission factors are expected to be representative of emissions from a pathological waste incinerator.

<u>Pollutant</u>	<u>Emission Factor</u>	<u>Source</u>
NO _x	3.56 lb/ton	AP-42, Table 2.3-1, 7/93
CO	2.95 lb/ton	AP-42, Table 2.3-1, 7/93
PM ₁₀	4.7 lb/ton	AP-42, Table 2.3-2, 7/93 - Total PM
SO ₂	2.17 lb/ton	AP-42, Table 2.3-1, 7/93
VOC	2.99E-01 lb/ton	AP-42, Table 2.3-2, 7/93 - TOC

3. Example calculations:

$$\text{Actual emissions, tons/yr} = (\text{Emission factor, lb/ton}) \times (\text{Waste combusted, ton/yr}) / (2,000 \text{ lb/ton})$$

**Table 4 - UAF Dual-Fired Boilers
CY 2014 Actual Emissions**

ID	Emission Unit Description	Fuel Consumption, CY 2014	Actual Emissions (tpy)				
			NO _x	CO	PM ₁₀	SO ₂	VOC
3	Power Plant Boiler - Diesel Fired	495.5 kgal/yr	5.9	1.2	0.8	15.5	0.08
3	Power Plant Boiler - Gas Fired	0 MMscf	0	0	0	0	0
4	Power Plant Boiler - Diesel Fired	45.8 kgal/yr	0.6	1.2	0.1	1.4	0.01
4	Power Plant Boiler - Gas Fired	56.0 MMscf	3.9	2.4	0.2	0.02	0.2
Total			10.4	4.8	1.1	16.9	0.2

Notes:

1. Weight conversion: 2,000 lb/ton
2. Maximum diesel sulfur content: 0.44 maximum weight percent, per records of fuel received at UAF during CY 2014
3. Diesel emission factors:

<u>Pollutant</u>	<u>Emission Factor</u>	<u>Source</u>
NO _x	24 lb/kgal	AP-42 Table 1.3-1, 5/10
CO	5 lb/kgal	AP-42 Table 1.3-1, 5/10
PM ₁₀	3.3 lb/kgal	AP-42 Table 1.3-1, 5/10, sum of filterable and condensable
SO ₂	142 *S lb/kgal	AP-42 Table 1.3-1, 5/10
VOC	0.34 lb/kgal	AP-42 Table 1.3-3, 5/10, institutional boilers

4. Natural gas emission factors:

<u>Pollutant</u>	<u>Emission Factor</u>	<u>Source</u>
NO _x	140 lb/MMscf	AP-42 Table 1.4-1, 7/98, low NO _x burners
CO	84 lb/MMscf	AP-42 Table 1.4-1, 7/98
PM ₁₀	7.6 lb/MMscf	AP-42 Table 1.4-2, 7/98, Total PM
SO ₂	0.6 lb/MMscf	AP-42 Table 1.4-2, 7/98
VOC	5.5 lb/MMscf	AP-42 Table 1.4-2, 7/98

5. Example calculations:

$$\text{SO}_2 \text{ emission factor (lb/ton)} = 142 \times (\text{sulfur content of diesel, weight percent})$$

$$\text{Actual emissions (ton/yr)} = (\text{coal use, ton/yr}) \times (\text{emission factor, lb/ton}) / (2,000 \text{ lb/ton})$$

6. EU ID 3 has not been modified to combust natural gas.

**Table 5 - UAF CHPP Diesel Engine
CY 2014 Actual Emissions**

ID	Emission Unit Description	Maximum Capacity	Fuel Consumption, CY 2014	Actual Emissions (tpy)				
				NO _x	CO	PM ₁₀	SO ₂	VOC
8	Backup/Peaking Generator (DEG)	13,266 hp	0 gal/yr	0.00	0.00	0.00	0.00	0.00
Total				0.00	0.00	0.00	0.00	0.00

Notes:

1. Weight conversion: 2,000 lb/ton
2. Diesel Heating Value: 0.135 MMBtu/gal
3. Maximum diesel sulfur content: 0.44 maximum weight percent, per records of fuel received at UAF during CY 2014
4. Emission factors:

<u>Pollutant</u>	<u>Emission Factor</u>	<u>Source</u>
NO _x	0.057 lb/gal	AQ0316MSS02, Condition 12.3b, Equation 4 (controlled emission rate)
CO	0.85 lb/MMBtu	AP-42, Table 3.4-1, 10/96
PM ₁₀	0.10 lb/MMBtu	AP-42, Table 3.4-1, 10/96
SO ₂	1.01 *S lb/MMBtu	AP-42, Table 3.4-1, 10/96
VOC	0.09 lb/MMBtu	AP-42, Table 3.4-1, 10/96

5. Example calculations:

Actual emissions, tons/yr = (Emission factor, lb/MMBtu) x (Fuel consumption, gal/yr) x (Fuel heat value, MMBtu/gal) / (2,000 lb/ton)

Actual emissions of SO₂, tons/yr = (Emission factor, lb/MMBtu) x (Fuel sulfur content, wt %) x (Fuel consumption, gal/yr) x (Fuel heat value, MMBtu/gal) / (2,000 lb/ton)

Actual emissions of NO_x, tons/yr = (Emission factor, lb/gal) x (Fuel consumption, gal/yr) / (2,000 lb/ton)

6. EU ID 8 is permitted as a backup/peaking generator but is now an emergency generator

**Table 6 - UAF Internal Combustion Engines
CY 2014 Actual Emissions**

ID	Emission Unit Description	Maximum Capacity	Hours of Operation CY 2014	Actual Emissions (tpy)				
				NO _x	CO	PM ₁₀	SO ₂	VOC
23	Alaska Center for Energy and Power Generator Engine - Diesel Generator	332 hp	0 hrs	0.0	0.0	0.0	0.0	0.0
24	Old University Park Emergency Generator Engine - Emergency Generator	72 hp	2 hrs	2.3E-03	5.0E-04	1.7E-04	1.5E-04	1.9E-04
30	Duckering Classroom Engine - Diesel Fired	64 hp	0 hrs	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
31	Alaska Center for Energy and Power Generator Engine - Diesel Fired	500 hp	145 hrs	0.3	0.2	0.0	3.9E-04	0.0
32	Alaska Earthquake Information Center Emergency Generator Engine - Emergency Generator	120 hp	13 hrs	2.4E-02	5.2E-03	1.7E-03	1.6E-03	2.0E-03
33	Arctic Health Research Emergency Generator Engine - Emergency Generator	212 hp	0 hrs	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Total				0.3	0.2	0.0	0.00	0.0

Notes:

- 1. Weight conversion: 2,000 lb/ton
- 2. Emission factors:

<u>Pollutant</u>	<u>Emission Factor</u>	<u>Source</u>
NO _x	0.031 lb/hp-hr	AP-42, Table 3.3-1, 5/10, Diesel fuel
CO	6.68E-03 lb/hp-hr	AP-42, Table 3.3-1, 5/10, Diesel fuel
PM ₁₀	2.20E-03 lb/hp-hr	AP-42, Table 3.3-1, 5/10, Diesel fuel
SO ₂	2.05E-03 lb/hp-hr	AP-42, Table 3.3-1, 5/10, Diesel fuel
VOC	0.0025141 lb/hp-hr	AP-42, Table 3.3-1, 5/10, Diesel fuel - sum of exhaust and crankcase TOC emission factors

3. Emission factors for EU 31:

<u>Pollutant</u>	<u>Emission Factor</u>	<u>Source</u>
NO _x	3.52 lb/hr	Vendor
CO	3.14 lb/hr	Vendor
PM ₁₀	0.12 lb/hr	Vendor
SO ₂	1.09E-05 lb/hp-hr	Mass balance (ULSD required)
VOC	0.21 lb/hr	Vendor

4. Example calculations:

Actual emissions, tons/yr = (Emission factor, lb/hp-hr) x (Capacity, hp) x (Operation, hr/yr) / (2,000 lb/ton)

5. Horsepower ratings for EU IDs 23, 24, 30, and 33 assume a 95% shaft efficiency.

Capacity (hp) = (Capacity, kW) x (1.341 hp/kW) / 0.95

6. EU ID 23 did not operate during CY 2014.

7. Actual emissions for EU IDs 6 and 7 are not included in this assessable emissions estimate because they were permanently removed from service on June 29, 2012. EU ID 33 will replace these units.

**Table 7 - UAF Coal Preparation Plant
CY 2014 Actual Emissions, PM-10**

Emission Source		Emission Factor		Source	Material Handling (tpy)	Control Method	Control Efficiency (percent)	Annual PM ₁₀ Emission (tpy)
Identification	Type	Value	Units					
Railcar unloading through grate into crusher	Point	3.63E-04	lb/ton	AP-42, Section 13.2.4	67,159.8	Plant Building	0	0.012
Crusher	Point	0.006	lb/ton	3-05-010-10, FIRE	67,159.8	Plant Building	0	0.201
Crusher to conveyor 1	Point	3.63E-04	lb/ton	AP-42, Section 13.2.4	67,159.8	Plant Building	0	0.012
Conveyor 1 to bucket elevator	Point	3.63E-04	lb/ton	AP-42, Section 13.2.4	67,159.8	Plant Building	0	0.012
Bucket elevator to screw conveyor	Point	3.63E-04	lb/ton	AP-42, Section 13.2.4	67,159.8	Plant Building	0	0.012
Screw conveyor to coal bin 1 or	Point	3.63E-04	lb/ton	AP-42, Section 13.2.4	33,022.9	Plant Building	0	0.006
Screw conveyor to coal bin 2	Point	3.63E-04	lb/ton	AP-42, Section 13.2.4	34,136.9	Plant Building	0	0.006
Coal bin 1 to scale 1 or	Point	3.63E-04	lb/ton	AP-42, Section 13.2.4	33,022.9	Plant Building	0	0.006
Coal bin 2 to scale 2	Point	3.63E-04	lb/ton	AP-42, Section 13.2.4	34,136.9	Plant Building	0	0.006
Scale 1 to boiler 1 or	Point	3.63E-04	lb/ton	AP-42, Section 13.2.4	33,022.9	Plant Building	0	0.006
Scale 2 to boiler 2	Point	3.63E-04	lb/ton	AP-42, Section 13.2.4	34,136.9	Plant Building	0	0.006
Actual PM-10 Emissions from Coal Preparation Plant								0.29

Notes:

1. Coal transfer emission factor from AP-42, Section 13.2.4 based on empirical equation $E = k \times 0.0032 \times (U/5)^{1.3} / (M/2)^{1.4}$ lb/ton transferred where:

$k = 0.35$ for PM₁₀

$U =$ mean wind speed = 5.4 mph per <http://wf.ncdc.noaa.gov/oa/climate/online/ccd/avgwind.html>

$M =$ coal moisture content = 4.8 percent

2. FIRE = Factor Information Retrieval Data System.

3. Example Calculations:

Actual emissions (tpy) = (Emission factor, lb/ton) x (Material handled, ton/yr) / (2,000 lb/ton)

**Table 8 - UAF Kilns
CY 2014 Actual Emissions**

ID	Emission Unit Description	Fuel Consumption, CY 2014	Actual Emissions (tpy)				
			NO _x	CO	PM ₁₀	SO ₂	VOC
N/A	Fine Arts/Art Wing Rm 302 Kiln - Propane Fired	0.8 1,000 gal/yr	5.4E-03	3.1E-03	2.9E-04	8.3E-06	4.2E-04
N/A	Fine Arts/Art Wing Ceramic Rm 413 Kiln - Propane Fired						
N/A	Fine Arts/Art Wing Ceramic Rm 413 Kiln - Propane Fired						
Total			5.4E-03	3.1E-03	2.9E-04	8.3E-06	4.2E-04

Notes:

1. Weight conversion: 2,000 lb/ton
2. Propane sulfur content: 0.20 gr/100 ft³ gas vapor (assumption)
3. Propane Emission factors:

Emission factors for small pottery-firing kilns are not available. These calculations assume that combustion of propane in the kilns is similar to the combustion of propane in small propane-fired boilers.

<u>Pollutant</u>	<u>Emission Factor</u>	<u>Source</u>
NO _x	13 lb/1,000 gal	AP-42, Table 1.5-1, 07/08 (propane commercial boilers)
CO	7.5 lb/1,000 gal	AP-42, Table 1.5-1, 07/08 (propane commercial boilers)
PM ₁₀	0.7 lb/1,000 gal	AP-42, Table 1.5-1, 07/08 (propane commercial boilers)
SO ₂	0.1 *S lb/1,000 gal	AP-42, Table 1.5-1, 07/08 (propane commercial boilers), multiplied by gr/100 ft ³ gas vapor sulfur in fuel
VOC	1.0 lb/1,000 gal	AP-42, Table 1.5-1, 07/08 (propane commercial boilers), TOC

4. Example calculations:

$$\text{Actual emissions (ton/yr)} = (\text{Emission factor, lb/1,000 gal}) \times (\text{Fuel consumption, 1,000 gal/yr}) / (2,000 \text{ lb/ton})$$

Table 9 - UAF Laboratory Hoods
CY 2014 Actual Emission Estimate, VOC and HAPs

Chemical	CAS No.	Amount Stored On-site (liters)	Specific gravity of stored substance	Percent in solution	Amount Stored On-site (lbs)	VOC Emissions (ton/yr)	HAP Emissions (ton/yr)
2-Butanone	78-93-3	35	0.806	100	62.2	0.031	
Acetic acid	64-19-7	39	1.05	97	87.5	0.044	
Acetone	67-64-1	495	0.788	100	859.7	0.430	
Benzene	71-43-2	12	0.8765	100	23.2	0.012	0.012
Ethanol	64-17-5	502	0.79	100	874.1	0.437	
Formaldehyde	50-00-0	398	1.08	38	360.0	0.180	0.180
Methyl alcohol in formaldehyde solution	67-56-1			15	142.1	0.071	0.071
Hexane	110-54-3	77	0.659	94	105.1	0.053	0.053
Methanol	67-56-1	443	0.791	100	772.3	0.386	0.386
Methylene chloride	75-09-2	156	1.3266	100	456.1	0.228	0.228
Phenol	108-95-2	4	1.057	100	9.3	0.005	0.005
n-Propyl alcohol and 2-Propanol	71-23-8, 67-63-0	356	0.7945	100	623.4	0.312	
Stoddard solvent	8052-41-3	32	0.787	100	55.5	0.028	
Toluene	108-88-3	178	0.86	100	337.4	0.169	0.169
Xylene	1330-20-7	43	0.864	100	81.9	0.041	0.041
Total						2.42	1.14

Notes:

- The above chemicals were determined to be common chemicals that contained VOCs.
- Only chemical inventories of 4 liters or greater were included.
- This inventory is not up to date, but reflects information available at issuance of Title V Permit Renewal. Information will be updated every five years.
- This inventory does not reflect chemical usage, only those stored on-site.
- In order to conservatively estimate VOC emissions from laboratory hoods, the following assumptions are made:
 - The chemicals stored on-site are used within a year.
 - The chemicals are emitted in their current form and are 100% volatile.
 - The chemicals are not transformed into other chemicals. Other VOCs are not created during laboratory use.
- Specific gravity and percent of chemical in solution data obtained from chemical product material safety data sheets.

SG of Water = 1 kg/L
 Conversion: 2.204 lb/kg
 2,000 lb/ton

8. Example calculations:

Amount stored on-site (lbs) = (Liters stored) x (Specific gravity) x (2.204 lb/kg) x (percent in solution)
 Emission estimate (ton/yr) = (Pounds stored) / (2,000 lb/ton)

Adopted



July 5, 2022
Scott Bell, Associate Vice Chancellor

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803 Alumni Drive, PO Box 757380, Fairbanks, Alaska 99775-7380

March 30, 2016

ATTN: Compliance Technician
Alaska Department of Environmental Conservation
Air Permits Program
610 University Avenue
Fairbanks, Alaska 99709

RE: Assessable Emissions Report for University of Alaska Fairbanks Campus, Air Quality Operating Permit Number AQ0316TVP02

Compliance Technician,

Assessable emissions are estimated to be 709.9 tons for FY2017. The estimate was based on actual operations that occurred during January 1 through December 31, 2015. This estimate includes emission units permitted under the above operating permit as well as additional emission units not covered under the permit, including those determined to be insignificant.

If you have any questions regarding this estimate, please contact Russ Steiger, UAF Environmental Compliance Officer at 907-474-5812 or by e-mail at rhsteiger@alaska.edu.

Based on information and belief formed after reasonable inquiry, I certify that the statements and information in an attached to this document are true, accurate, and complete.

Sincerely,

A handwritten signature in blue ink, appearing to read 'S. Bell', is written over a vertical line that extends from the signature down to the name 'Scott Bell, PE'.

Scott Bell, PE
Associate Vice Chancellor of Facilities Services

Attachment: Assessable Emissions Calculation Report

Cc: Charles Ward, Director of Utilities

University Alaska Fairbanks Assessable Emissions Estimate FY17

Assessable Emissions - Tons Per Year

Pollutant	NO _x	CO	PM ₁₀	SO ₂	VOC	HAPs	Total
Assessable PTE	637	252	17	858	11	13.6	1,788.6

from Table D, Statement of Basis for Operating Permit No. AQ0316TVP02

Emission Sources		Assessable Emissions Summary (TPY)					
		NO _x	CO	PM ₁₀	SO ₂	VOC	HAPs
Table 1	Coal-Fired Boilers	289.8	164.7	22.5	172.9	1.6	9.9
Table 2	Small External Combustion Units	1.0	0.3	0.2	1.1	0.02	
Table 3	Incinerator	0.01	0.01	0.02	0.01	0.001	
Table 4	CHPP Dual-Fired Boilers	12.6	2.5	1.7	29.0	0.2	
Table 5	CHPP Diesel Generator	0.0	0.0	0.00	0.0	0.00	
Table 6	Generator engines	0.1	0.1	0.0	0.00	0.0	
Table 7	Coal Handling Plant			0.3			
Table 8	Kilns	2.9E-03	1.7E-03	1.5E-04	4.4E-06	2.2E-04	
Table 9	Laboratory Hoods					2.42	1.14
Totals		303.6	167.5	24.7	203.1	4.3	11.0

FY17 Assessable Emissions Estimate, in Tons	709.9
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Note: Actual HAP emissions for emission units in Tables 2 through 8 are not calculated for this estimate. The actual VOC emissions for these units are low enough that HAP emissions are expected to be insignificant.

University Alaska Fairbanks Assessable Emissions Estimate FY17
Emission Inventory and CY 2015 Operations Data

EU ID ⁶	Emission Unit	Emission Unit Type	Bldg No.	Installation Date	Make/Model	Fuel Type	Fuel Usage 2015	Maximum Capacity
1	Power Plant	Boiler - Coal Fired	FS802	1962	Erie City	Coal	32,811.0 tons	84.5 MMBtu/hr
2	Power Plant	Boiler - Coal Fired	FS802	1962	Erie City	Coal	33,055.0 tons	84.5 MMBtu/hr
3	Power Plant	Boiler - Dual Fired	FS802	1970	Zurn	Diesel	491,387.0 gal	180.9 MMBtu/hr
3	Power Plant	Boiler - Dual Fired	FS802	1970	Zurn	Natural Gas	0.00 MCF ⁶	180.9 MMBtu/hr
4	Power Plant	Boiler - Dual Fired	FS802	1987	Zurn	Diesel	556,978.0 gal	180.9 MMBtu/hr
4	Power Plant	Boiler - Dual Fired	FS802	1987	Zurn	Natural Gas	0.20 MCF	180.9 MMBtu/hr
6	Arctic Health Research Building	Engine - Emergency Generator	FS901	1968	Cummins/NH2501PG	Diesel	0 hrs ¹	125 kW
7	Arctic Health Research Building	Engine - Emergency Generator	FS901	1968	Cummins/NH2501P	Diesel	0 hrs ¹	125 kW
8	Power Plant	Engine - Backup/Peaking Generator (DEG)	FS817	1999	Fairbanks Morse Colt-Pielstick PC2.6	Diesel	0 gal	13,266 hp
9A	BIRD	Incinerator	FS919	2006	Therm-Tec/G-30P-1H	Waste	16,608 lbs	83 lb/hr
10	AFES Boiler	Boiler - Oil Fired	AF256	2000	Burnham/V90GA	Diesel	20,573 gal ⁴	1.08 MMBtu/hr
11	AFES Boiler	Boiler - Oil Fired	AF256	2000	Burnham/V90GA	Diesel	20,573 gal ⁴	1.08 MMBtu/hr
12	Harper Boiler #1	Boiler - Oil Fired	FS420	1985	Weil McLain/BL776-S-W	Diesel	8,577 gal ²	0.64 MMBtu/hr
13	Harper Boiler #2	Boiler - Oil Fired	FS420	1985	Weil McLain/BL776-S-W	Diesel	8,577 gal ²	0.64 MMBtu/hr
29	Harper Hot Water Heater	Hot Water Heater - Oil Fired	FS420	1985 (est)	Bock	Diesel	8,577 gal ²	0.236 MMBtu/hr
34	Harper Trailer Toyo	Furnace - Oil Fired	FS421	2014	Toyotomi OM-180	Diesel		0.148 MMBtu/hr
14	Copper Lane Boiler	Boiler - Oil Fired	FS518	1985	Energy Kinetics System 2000	Diesel	1,136 gal ²	0.136 MMBtu/hr
15	Copper Lane Boiler	Boiler - Oil Fired	FS519	1985	Energy Kinetics System 2000	Diesel	1,012 gal ²	0.136 MMBtu/hr
16	Copper Lane (Honor's House) Boiler	Boiler - Oil Fired	FS520	2005	Weil McLain/P-WGO-5	Diesel	2,076 gal ²	0.233 MMBtu/hr
17	West Ridge Research Building Boiler #1	Boiler - ULSD Fired	FS909	2003	Weil McLain/BL1688w-GPr10	ULSD ⁷	150.0 hrs	4.93 MMBtu/hr
18	West Ridge Research Building Boiler #2	Boiler - ULSD Fired	FS909	2003	Weil McLain/BL1688w-GPr10	ULSD	150.0 hrs	4.93 MMBtu/hr
19	BIRD RM 100U3 Boiler #1	Boiler - ULSD Fired	FS919	2004	Weil McLain/2094W	ULSD	62,272 gal ²⁻³	6.13 MMBtu/hr
20	BIRD RM 100U3 Boiler #2	Boiler - ULSD Fired	FS919	2004	Weil McLain/2094W	ULSD	62,272 gal ²⁻³	6.13 MMBtu/hr
21	BIRD RM 100U3 Boiler #3	Boiler - ULSD Fired	FS919	2004	Weil McLain/2094W	ULSD	62,272 gal ²⁻³	6.13 MMBtu/hr
22	BIRD RM 100U3 Boiler #4	Boiler - ULSD Fired	FS919	2005	Bryan/EB200-S-150-FDGO	ULSD	62,272 gal ²⁻³	8.5 MMBtu/hr
23	Alaska Center for Energy and Power Generator Engine	Engine - Diesel Generator	FS814	2003	Detroit Diesel/6043-TK35	Diesel	0 gal	235 kW
24	Old University Park Emergency Generator Engine	Engine - Emergency Generator	FS423	2001	Cummins/4B3.9-G2	Diesel	0.20 hrs	51 kW
25	AFES Greenhouse Furnace	Furnace - Oil Fired	AF117	1991	Sundeman/L02OUF	Diesel	150 gal	0.209 MMBtu/hr
26	Copper Lane Furnace	Furnace - Oil Fired	FS517	2001	Matzger	Diesel	1,022 gal ²	0.08 MMBtu/hr
27	Alaska Center for Energy and Power Generator Engine	Engine - Diesel Fired	FS814	2013	Caterpillar C-15	Diesel	57 hrs	500 hp
28	AFES Grain Dryer	Grain Dryer - Oil Fired	AF108	1988	Unknown	Diesel	500 gal	2.43 MMBtu/hr
30	Duckering Classroom Engine	Engine - Diesel Fired	FS103	1987	Mitsubishi-Bosch	Diesel	3 hours	45 kW
31	Skarland Cabin Furnace	Furnace - Oil Fired	FS712	2001 (est)	Rheem/ROBC-084QPEB	Diesel	778 gal ²	0.140 MMBtu/hr
32	Alaska Earthquake Information Center Emergency Generator Engine	Engine - Emergency Generator	FS903	1998	Detroit Diesel	Diesel	13 hrs	120 hp
33	Arctic Health Research Emergency Generator Engine	Engine - Emergency Generator	FS901	2012	Cummins/QSB7-G3	Diesel	0 hrs	150 kW
N/A	Power Plant	Coal Handling/Crushing Facility	FS802	1964	American Pulverizer (crusher make)	Coal	65,866.0 tons	50 tons/hr
N/A	Fine Arts/Art Wing Rm 302	Kiln - Propane Fired	FS313	2009	Alpine Kilns and Equipment/SBF-40	Propane	440 gal	1.81 MMBtu/hr
N/A	Fine Arts/Art Wing Ceramic Rm 413	Kiln - Propane Fired	FS313	2009	Kilnmaster/constructed on-site	Propane	440 gal	0.53 MMBtu/hr
N/A	Fine Arts/Art Wing Ceramic Rm 413	Kiln - Propane Fired	FS313	2009	Geil Kilns/DLB2	Propane	440 gal	0.23 MMBtu/hr
N/A		Kiln(s) - Wood Fired	N/A	Various	Hand-built	Wood	4 cords	Unknown
N/A						Vegetable Oil	80 gallons	Unknown
N/A	Facilities Services ⁵	Paint Booth Exhaust Fan	FS803	2001		Various Paints	Mainly water based paints are used. Minimal amounts of paint are stored on-site and paint booths are used infrequently.	12,500 cfm
N/A	Museum ⁵	Paint Booth Exhaust Fan	FS907	2006	Greenheck/TAB-42-030T3	Various Paints		5,480 cfm
N/A	Laboratory Fume Hoods (campus-wide)	Laboratory hoods	Multiple	Various	N/A	N/A	Per estimate in Table 9.	N/A
N/A	Duckering Classroom Turbine ⁵	Turbine - Propane Fired	FS103	1970(est)	Cussons Two Shaft Gas Turbine Unit	Propane	2	0.33 MMBtu/hr

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EU ID ⁶	Emission Unit	Emission Unit Type	Bldg No.	Installation Date	Make/Model	Fuel Type	Fuel Usage 2015	Maximum Capacity
N/A	Power Plant ⁵	Tank (Diesel) - Field Erected	FS817	1969	Fixed roof, 212,120 gallons	Diesel	N/A	212,120 gal
N/A	Graduation Flame ⁵	Ceremonial Flame	N/A	1975(est)	Custom-built	Propane	N/A	5.0E-03 MMBtu/hr
N/A	Power Plant ⁵	Ash Handling System	FS802	1962	N/A	N/A	N/A	8,760 hr/yr
N/A	SRC Pellet Stoves ⁵	Pellet Stove	N/A	2012	Avalon/AGP	Wood Pellets	N/A	5 lb/hr
TBD	BiRD Emergency Generator #2 (South)	Engine- Emergency Generator	FS919	2015	Cummins/QSB7-G5NR3	ULSD	3.6 hours 126 gallons	324 hp

Notes:

1. These emission units were removed from service on June 29, 2012 were replaced with EU ID 33.
2. Fuel burned was determined by review of fuel deliveries for calendar year 2015. The assumption was made that all fuel delivered was burned. Most deliveries for the year are in the same order of magnitude.
3. The gallons of fuel provided are for all 4 of the boilers. Note 2 above applies to the gallons of fuel.
4. Fuel consumption for EU IDs 10 and 11 is a total for both boilers and is based on the fuel delivered during calendar year 2015.
5. Actual emissions are estimated to be insignificant for wood-fired kilns, paint booths, diesel storage tank, CHPP ash handling system, graduation flame, pellet stove, and small fuel-combusting unit (approx 3 hr/yr) in teaching laboratory.
6. EU ID 3 is permitted to fire natural gas but has not yet been modified to do so.
7. ULSD = Ultra Low Sulfur Diesel

**Table 1 - UAF Coal Fired Boilers
CY 2015 Actual Emissions**

ID	Emission Unit Description	Coal Consumption, CY 2015	Actual Emissions (tpy)					
			NO _x	CO	PM ₁₀	SO ₂	VOC	HAPs
1	Power Plant Boiler - Coal Fired	32,811.0 ton/yr	144.4	82.0	11.2	86.1	0.8	4.9
2	Power Plant Boiler - Coal Fired	33,055.0 ton/yr	145.4	82.6	11.3	86.8	0.8	5.0
Total			289.8	164.7	22.5	172.9	1.6	9.9

Notes:

1. Weight conversion: 2,000 lb/ton
2. Sulfur content of coal: 0.150 weight percent weighted average based on 2015 UCM rail sample data
3. Emission factors:

<u>Pollutant</u>	<u>Emission Factor</u>	<u>Source</u>
NO _x	8.8 lb/ton	AP-42, Table 1.1-3, 9/98, Sub-bituminous spreader stoker
CO	5 lb/ton	AP-42, Table 1.1-3, 9/98, Sub-bituminous spreader stoker
PM ₁₀	0.68 lb/ton	AP-42, Tables 1.1-5 and 1.1-9, 9/98, Spreader stoker, with baghouse
SO ₂	35*S lb/ton	AP-42, Table 1.1-3, 9/98, Sub-bituminous spreader stoker, multiplied by weight percent sulfur in coal
VOC	0.05 lb/ton	AP-42, Table 1.1-19, 9/98, Spreader stoker (total NMOC)
HAPs	0.30 lb/ton	See note 4

4. HAPs emission factor is a sum of the following emission factors:

<u>Pollutant</u>	<u>Emission Factor</u>	<u>Source</u>
HCl	0.138 lb/ton	Source test from boilers of similar design at Clear Air Force Station
HF	0.139 lb/ton	Source test from boilers of similar design at Clear Air Force Station
Hg	8.46E-05 lb/ton	Source test from boilers of similar design at Clear Air Force Station
All other HAPs	0.0233 lb/ton	Total of emission factors from AP-42 Tables 1.1-13, 1.1-14, 1.1-18, 9/98

5. Example calculations:

$$\text{SO}_2 \text{ emission factor (lb/ton)} = 35 \times (\text{sulfur content of coal, weight percent})$$

$$\text{Actual emissions (ton/yr)} = (\text{coal use, ton/yr}) \times (\text{emission factor, lb/ton}) / (2,000 \text{ lb/ton})$$

$$\text{PM}_{10} \text{ emission factor (lb/ton)} = (\text{condensable PM emission factor, lb/MMBtu}) \times (\text{UCM heat content, 15.3 MMBtu/ton})$$

$$+ (\text{PM}_{10} \text{ particle emission factor, lb/ton})$$

**Table 2 - UAF Small Oil-Fired External Combustion Units
CY 2015 Actual Emissions**

ID	Emission Unit Description	Fuel Type	Maximum Capacity	Fuel Consumption, CY 2015		Actual Emissions (tpy)				
						NO _x	CO	PM ₁₀	SO ₂	VOC
10	AFES (the farm) Boiler - Oil Fired	Diesel	1.08 MMBtu/hr	20.6	1,000 gal/yr	0.21	0.05	0.03	0.64	3.5E-03
11	AFES (the farm) Boiler - Oil Fired	Diesel	1.08 MMBtu/hr							
12	Harper #1 Boiler - Oil Fired	Diesel	0.64 MMBtu/hr	8.58	1,000 gal/yr	0.09	0.02	0.01	0.27	1.5E-03
13	Harper #2 Boiler - Oil Fired	Diesel	0.64 MMBtu/hr							
29	Harper Hot Water Heater - Oil Fired	Diesel	0.236 MMBtu/hr							
34	Harper Trailer Toyo - Oil Fired	Diesel	MMBtu/hr							
14	Copper Lane Boiler - Oil Fired	Diesel	0.136 MMBtu/hr	1.14	1,000 gal/yr	0.01	0.00	0.00	0.04	1.9E-04
15	Copper Lane Boiler - Oil Fired	Diesel	0.136 MMBtu/hr	1.01	1,000 gal/yr	0.01	0.00	0.00	0.03	1.7E-04
16	Copper Lane (Honors House) Boiler - Oil Fired	Diesel	0.233 MMBtu/hr	2.08	1,000 gal/yr	0.02	0.01	0.00	0.06	3.5E-04
17	West Ridge Research Building #1 Boiler - Oil Fired	ULSD	4.93 MMBtu/hr	5.48	1,000 gal/yr	0.05	0.01	0.01	0.00	9.3E-04
18	West Ridge Research Building #2 Boiler - Oil Fired	ULSD	4.93 MMBtu/hr							
19	BIRD RM 100U3 #1 Boiler - Oil Fired	ULSD	6.13 MMBtu/hr	62.3	1,000 gal/yr	0.62	0.16	0.10	0.01	1.1E-02
20	BIRD RM 100U3 #2 Boiler - Oil Fired	ULSD	6.13 MMBtu/hr							
21	BIRD RM 100U3 #3 Boiler - Oil Fired	ULSD	6.13 MMBtu/hr							
22	BIRD RM 100U3 #4 Boiler - Oil Fired	ULSD	8.5 MMBtu/hr							
25	AFES (the farm) Greenhouse Furnace - Oil Fired	Diesel	0.209 MMBtu/hr	0.15	1,000 gal/yr	0.00	0.000	0.00	0.00	5.3E-05
26	Copper Lane Furnace - Oil Fired	Diesel	0.08 MMBtu/hr	1.02	1,000 gal/yr	0.01	0.003	0.00	0.03	3.6E-04
31	Skarland Cabin Furnace - Oil Fired	Diesel	0.140 MMBtu/hr	0.78	1,000 gal/yr	0.01	0.002	0.00	0.02	2.8E-04
28	AFES (the farm) Grain Dryer Grain Dryer - Oil Fired	Diesel	2.43 MMBtu/hr	0.50	1,000 gal/yr	0.01	0.001	0.00	0.02	8.5E-05
				103.6 Total		1.0	0.3	0.2	1.1	1.8E-02

Notes:

- Maximum diesel sulfur content: 0.44 maximum weight percent, per records of fuel received at UAF during CY 2015
- Maximum diesel sulfur content ULSD: 0.0015 maximum weight percent, per records of ULSD fuel received at UAF during CY 2015
- Weight conversion: 2,000 lb/ton
- Emission factors:

<u>Pollutant</u>	<u>Emission Factor</u>	<u>Source</u>
NO _x	20 lb/1,000 gal	AP-42, Table 1.3-1, 5/10, Distillate oil fired
CO	5 lb/1,000 gal	AP-42, Table 1.3-1, 5/10, Distillate oil fired
PM ₁₀	3.3 lb/1,000 gal	AP-42, Tables 1.3-1 and 1.3-2, 5/10, Distillate oil fired - sum of filterable PM and total condensable PM
SO ₂	142*S lb/1,000 gal	AP-42, Table 1.3-1, 5/10, Distillate oil fired, multiplied by weight percent sulfur in fuel
VOC - boilers	0.34 lb/1,000 gal	AP-42, Table 1.3-3, 5/10, Distillate oil fired (total non-methane organic compounds) (also used for grain dryer EU)
VOC - furnaces	0.713 lb/1,000 gal	AP-42, Table 1.3-3, 5/10, Distillate oil fired (total non-methane organic compounds) (also used for hot water heater EU)
- Heat input ratings were not available for most external combustion units listed here. For ratings provided in terms of heat output or terms not specified, a conservative 75% efficiency has been applied to calculate the maximum heat input capacity shown in the table.
- Example calculations:

Actual emissions, tons/yr = (Emission factor, lb/1,000 gal) x (Fuel consumption, 1,000 gal/yr) / (2,000 lb/ton)

Actual emissions of SO₂, tons/yr = (Emission factor, lb/1,000 gal) x (Fuel sulfur content, wt %) x (Fuel consumption, 1,000 gal/yr) / (2,000 lb/ton)
- #2 Diesel Heating Value: 0.135 MMBtu/gal
- EU10 and EU 11 - Fuel consumption for EU IDs 10 and 11 is a total for both boilers and is based on the fuel delivered during calendar year 2015.
- EU ID 17 and EU ID 18 Fuel consumption calculated based on estimated operating hours in CY 2015, assuming all operating hours at full load.

Fuel consumption (1,000 gal/yr) = (Operation, hr/yr) x (Capacity, MMBtu/hr) / (0.135 MMBtu/gal) / (1,000)

**Table 3 - UAF Incinerator
CY 2015 Actual Emissions**

ID	Emission Unit Description	Waste Combustion, CY 2015	Actual Emissions (tpy)				
			NO _x	CO	PM ₁₀	SO ₂	VOC
9A	BiRD Incinerator	8.3 ton/yr	1.48E-02	1.22E-02	0.02	9.01E-03	1.24E-03
Total			0.01	0.01	0.02	0.01	0.001

Notes:

1. Weight conversion:

2,000 lb/ton

2. Incineration emission factors:

Pathological waste incinerator emission factors are not available. Medical waste incineration emission factors are expected to be representative of emissions from a pathological waste incinerator.

<u>Pollutant</u>	<u>Emission Factor</u>	<u>Source</u>
NO _x	3.56 lb/ton	AP-42, Table 2.3-1, 7/93
CO	2.95 lb/ton	AP-42, Table 2.3-1, 7/93
PM ₁₀	4.7 lb/ton	AP-42, Table 2.3-2, 7/93 - Total PM
SO ₂	2.17 lb/ton	AP-42, Table 2.3-1, 7/93
VOC	2.99E-01 lb/ton	AP-42, Table 2.3-2, 7/93 - TOC

3. Example calculations:

$$\text{Actual emissions, tons/yr} = (\text{Emission factor, lb/ton}) \times (\text{Waste combusted, ton/yr}) / (2,000 \text{ lb/ton})$$

**Table 4 - UAF Dual-Fired Boilers
CY 2015 Actual Emissions**

ID	Emission Unit Description	Fuel Consumption, CY 2015	Actual Emissions (tpy)				
			NO _x	CO	PM ₁₀	SO ₂	VOC
3	Power Plant Boiler - Diesel Fired	491.4 kgal/yr	5.9	1.2	0.8	13.6	0.08
3	Power Plant Boiler - Gas Fired	0 MMscf	0	0	0	0	0
4	Power Plant Boiler - Diesel Fired	557.0 kgal/yr	6.7	1.2	0.9	15.4	0.09
4	Power Plant Boiler - Gas Fired	0.00020 MMscf	0.0	0.0	0.0	0.00	0.0
Total			12.6	2.5	1.7	29.0	0.2

Notes:

- Weight conversion: 2,000 lb/ton
- Maximum diesel sulfur content: 0.39 maximum weight percent, per records of fuel received at UAF during CY 2015
- Diesel emission factors:

<u>Pollutant</u>	<u>Emission Factor</u>	<u>Source</u>
NO _x	24 lb/kgal	AP-42 Table 1.3-1, 5/10
CO	5 lb/kgal	AP-42 Table 1.3-1, 5/10
PM ₁₀	3.3 lb/kgal	AP-42 Table 1.3-1, 5/10, sum of filterable and condensable
SO ₂	142 *S lb/kgal	AP-42 Table 1.3-1, 5/10
VOC	0.34 lb/kgal	AP-42 Table 1.3-3, 5/10, institutional boilers

4. Natural gas emission factors:

<u>Pollutant</u>	<u>Emission Factor</u>	<u>Source</u>
NO _x	140 lb/MMscf	AP-42 Table 1.4-1, 7/98, low NO _x burners
CO	84 lb/MMscf	AP-42 Table 1.4-1, 7/98
PM ₁₀	7.6 lb/MMscf	AP-42 Table 1.4-2, 7/98, Total PM
SO ₂	0.6 lb/MMscf	AP-42 Table 1.4-2, 7/98
VOC	5.5 lb/MMscf	AP-42 Table 1.4-2, 7/98

5. Example calculations:

$$\text{SO}_2 \text{ emission factor (lb/ton)} = 142 \times (\text{sulfur content of diesel, weight percent})$$

$$\text{Actual emissions (ton/yr)} = (\text{coal use, ton/yr}) \times (\text{emission factor, lb/ton}) / (2,000 \text{ lb/ton})$$

6. EU ID 3 has not been modified to combust natural gas.

**Table 5 - UAF CHPP Diesel Engine
CY 2015 Actual Emissions**

ID	Emission Unit Description	Maximum Capacity	Fuel Consumption, CY 2015	Actual Emissions (tpy)				
				NO _x	CO	PM ₁₀	SO ₂	VOC
8	Backup/Peaking Generator (DEG) Diesel fired	13,266 hp	0 gal/yr	0.00	0.00	0.00	0.00	0.00
Total				0.00	0.00	0.00	0.00	0.00

Notes:

1. Weight conversion: 2,000 lb/ton
2. Diesel Heating Value: 0.135 MMBtu/gal
3. Maximum diesel sulfur content: 0.39 maximum weight percent, per records of fuel received at UAF during CY 2015
4. Emission factors:

<u>Pollutant</u>	<u>Emission Factor</u>	<u>Source</u>
NO _x	0.057 lb/gal	AQ0316MSS02, Condition 12.3b, Equation 4 (controlled emission rate)
CO	0.85 lb/MMBtu	AP-42, Table 3.4-1, 10/96
PM ₁₀	0.10 lb/MMBtu	AP-42, Table 3.4-1, 10/96
SO ₂	1.01 *S lb/MMBtu	AP-42, Table 3.4-1, 10/96
VOC	0.09 lb/MMBtu	AP-42, Table 3.4-1, 10/96

5. Example calculations:

Actual emissions, tons/yr = (Emission factor, lb/MMBtu) x (Fuel consumption, gal/yr) x (Fuel heat value, MMBtu/gal) / (2,000 lb/ton)

Actual emissions of SO₂, tons/yr = (Emission factor, lb/MMBtu) x (Fuel sulfur content, wt %) x (Fuel consumption, gal/yr) x (Fuel heat value, MMBtu/gal) / (2,000 lb/ton)

Actual emissions of NO_x, tons/yr = (Emission factor, lb/gal) x (Fuel consumption, gal/yr) / (2,000 lb/ton)

6. EU ID 8 is permitted as a backup/peaking generator but is now an emergency generator

**Table 6 - UAF Internal Combustion Engines
CY 2015 Actual Emissions**

ID	Emission Unit Description	Maximum Capacity	Hours of Operation CY 2015	Actual Emissions (tpy)				
				NO _x	CO	PM ₁₀	SO ₂	VOC
23	Alaska Center for Energy and Power Generator Engine - Diesel Generator	332 hp	0 hrs	0.0	0.0	0.0	0.0	0.0
24	Old University Park Emergency Generator Engine - Emergency Generator	72 hp	0 hrs	2.2E-04	4.8E-05	1.6E-05	1.5E-05	1.8E-05
30	Duckering Classroom Engine - Diesel Fired	64 hp	3 hrs	3.0E-03	6.4E-04	2.1E-04	2.0E-04	2.4E-04
27	Alaska Center for Energy and Power Generator Engine - Diesel Fired	500 hp	57 hrs	0.1	0.1	0.0	1.5E-04	0.0
32	Alaska Earthquake Information Center Emergency Generator Engine - Emergency Generator	120 hp	13 hrs	2.4E-02	5.2E-03	1.7E-03	1.6E-03	2.0E-03
33	Arctic Health Research Emergency Generator Engine - Emergency Generator	212 hp	0 hrs	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
TBD	BiRD Emergency Generator Engine- ULSD Fired Emergency Generator # 2	324 hp	4 hrs	1.8E-02	3.9E-03	1.3E-03	1.3E-05	1.5E-03
Total				0.1	0.1	0.0	0.0	0.0

Notes:

- Weight conversion:
- Emission factors:

2,000 lb/ton

Pollutant	Emission Factor	Source
NO _x	0.031 lb/hp-hr	AP-42, Table 3.3-1, 5/10, Diesel fuel
CO	6.68E-03 lb/hp-hr	AP-42, Table 3.3-1, 5/10, Diesel fuel
PM ₁₀	2.20E-03 lb/hp-hr	AP-42, Table 3.3-1, 5/10, Diesel fuel
SO ₂	2.05E-03 lb/hp-hr	AP-42, Table 3.3-1, 5/10, Diesel fuel
VOC	0.0025141 lb/hp-hr	AP-42, Table 3.3-1, 5/10, Diesel fuel - sum of exhaust and crankcase TOC emission factors

See note 8 for BiRD Genset

- Emission factors for EU 27:

Pollutant	Emission Factor	Source
NO _x	3.52 lb/hr	Vendor
CO	3.14 lb/hr	Vendor
PM ₁₀	0.12 lb/hr	Vendor
SO ₂	1.09E-05 lb/hp-hr	Mass balance (ULSD required)
VOC	0.21 lb/hr	Vendor

- Example calculations:

Actual emissions, tons/yr = (Emission factor, lb/hp-hr) x (Capacity, hp) x (Operation, hr/yr) / (2,000 lb/ton)

- Horsepower ratings for EU IDs 23, 24, 30, and 33 assume a 95% shaft efficiency.

Capacity (hp) = (Capacity, kW) x (1.341 hp/kW) / 0.95

- EU ID 23 did not operate during CY 2014.

- Actual emissions for EU IDs 6 and 7 are not included in this assessable emissions estimate because they were permanently removed from service on June 29, 2012. EU ID 33 will replace these units.

**Table 7 - UAF Coal Preparation Plant
CY 2015 Actual Emissions, PM-10**

Emission Source		Emission Factor		Source	Material Handling (tpy)	Control Method	Control Efficiency (percent)	Annual PM ₁₀ Emission (tpy)
Identification	Type	Value	Units					
Railcar unloading through grate into crusher	Point	3.63E-04	lb/ton	AP-42, Section 13.2.4	65,866.0	Plant Building	0	0.012
Crusher	Point	0.006	lb/ton	3-05-010-10, FIRE	65,866.0	Plant Building	0	0.198
Crusher to conveyor 1	Point	3.63E-04	lb/ton	AP-42, Section 13.2.4	65,866.0	Plant Building	0	0.012
Conveyor 1 to bucket elevator	Point	3.63E-04	lb/ton	AP-42, Section 13.2.4	65,866.0	Plant Building	0	0.012
Bucket elevator to screw conveyor	Point	3.63E-04	lb/ton	AP-42, Section 13.2.4	65,866.0	Plant Building	0	0.012
Screw conveyor to coal bin 1 or	Point	3.63E-04	lb/ton	AP-42, Section 13.2.4	32,811.0	Plant Building	0	0.006
Screw conveyor to coal bin 2	Point	3.63E-04	lb/ton	AP-42, Section 13.2.4	33,055.0	Plant Building	0	0.006
Coal bin 1 to scale 1 or	Point	3.63E-04	lb/ton	AP-42, Section 13.2.4	32,811.0	Plant Building	0	0.006
Coal bin 2 to scale 2	Point	3.63E-04	lb/ton	AP-42, Section 13.2.4	33,055.0	Plant Building	0	0.006
Scale 1 to boiler 1 or	Point	3.63E-04	lb/ton	AP-42, Section 13.2.4	32,811.0	Plant Building	0	0.006
Scale 2 to boiler 2	Point	3.63E-04	lb/ton	AP-42, Section 13.2.4	33,055.0	Plant Building	0	0.006
Actual PM-10 Emissions from Coal Preparation Plant								0.28

Notes:

1. Coal transfer emission factor from AP-42, Section 13.2.4 based on empirical equation $E = k \times 0.0032 \times (U/5)^{1.3} / (M/2)^{1.4}$ lb/ton transferred where:

k = 0.35 for PM₁₀

U = mean wind speed = 5.4 mph

per <http://lwf.ncdc.noaa.gov/oa/climate/online/ccd/avgwind.html>

M = coal moisture content = 4.8 percent

2. FIRE = Factor Information Retrieval Data System.

3. Example Calculations:

$$\text{Actual emissions (tpy)} = (\text{Emission factor, lb/ton}) \times (\text{Material handled, ton/yr}) / (2,000 \text{ lb/ton})$$

**Table 8 - UAF Kilns
CY 2015 Actual Emissions**

ID	Emission Unit Description	Fuel Consumption, CY 2015	Actual Emissions (tpy)				
			NO _x	CO	PM ₁₀	SO ₂	VOC
N/A	Fine Arts/Art Wing Rm 302 Kiln - Propane Fired	0.4 1,000 gal/yr	2.9E-03	1.7E-03	1.5E-04	4.4E-06	2.2E-04
N/A	Fine Arts/Art Wing Ceramic Rm 413 Kiln - Propane Fired						
N/A	Fine Arts/Art Wing Ceramic Rm 413 Kiln - Propane Fired						
Total			2.9E-03	1.7E-03	1.5E-04	4.4E-06	2.2E-04

Notes:

1. Weight conversion: 2,000 lb/ton
2. Propane sulfur content: 0.20 gr/100 ft³ gas vapor (assumption)
3. Propane Emission factors:

Emission factors for small pottery-firing kilns are not available. These calculations assume that combustion of propane in the kilns is similar to the combustion of propane in small propane-fired boilers.

<u>Pollutant</u>	<u>Emission Factor</u>	<u>Source</u>
NO _x	13 lb/1,000 gal	AP-42, Table 1.5-1, 07/08 (propane commercial boilers)
CO	7.5 lb/1,000 gal	AP-42, Table 1.5-1, 07/08 (propane commercial boilers)
PM ₁₀	0.7 lb/1,000 gal	AP-42, Table 1.5-1, 07/08 (propane commercial boilers)
SO ₂	0.1 *S lb/1,000 gal	AP-42, Table 1.5-1, 07/08 (propane commercial boilers), multiplied by gr/100 ft ³ gas vapor sulfur in fuel
VOC	1.0 lb/1,000 gal	AP-42, Table 1.5-1, 07/08 (propane commercial boilers), TOC

4. Example calculations:

$$\text{Actual emissions (ton/yr)} = (\text{Emission factor, lb/1,000 gal}) \times (\text{Fuel consumption, 1,000 gal/yr}) / (2,000 \text{ lb/ton})$$

Table 9 - UAF Laboratory Hoods
CY 2015 Actual Emission Estimate, VOC and HAPs

Chemical	CAS No.	Amount Stored On-site (liters)	Specific gravity of stored substance	Percent in solution	Amount Stored On-site (lbs)	VOC Emissions (ton/yr)	HAP Emissions (ton/yr)
2-Butanone	78-93-3	35	0.806	100	62.2	0.031	
Acetic acid	64-19-7	39	1.05	97	87.5	0.044	
Acetone	67-64-1	495	0.788	100	859.7	0.430	
Benzene	71-43-2	12	0.8765	100	23.2	0.012	0.012
Ethanol	64-17-5	502	0.79	100	874.1	0.437	
Formaldehyde	50-00-0	398	1.08	38	360.0	0.180	0.180
Methyl alcohol in formaldehyde solution	67-56-1			15	142.1	0.071	0.071
Hexane	110-54-3	77	0.659	94	105.1	0.053	0.053
Methanol	67-56-1	443	0.791	100	772.3	0.386	0.386
Methylene chloride	75-09-2	156	1.3266	100	456.1	0.228	0.228
Phenol	108-95-2	4	1.057	100	9.3	0.005	0.005
n-Propyl alcohol and 2-Propanol	71-23-8, 67-63-0	356	0.7945	100	623.4	0.312	
Stoddard solvent	8052-41-3	32	0.787	100	55.5	0.028	
Toluene	108-88-3	178	0.86	100	337.4	0.169	0.169
Xylene	1330-20-7	43	0.864	100	81.9	0.041	0.041
Total						2.42	1.14

Notes:

1. The above chemicals were determined to be common chemicals that contained VOCs.
3. Only chemical inventories of 4 liters or greater were included.
4. This inventory is not up to date, but reflects information available at issuance of Title V Permit Renewal. Information will be updated every five years.
5. This inventory does not reflect chemical usage, only those stored on-site.
6. In order to conservatively estimate VOC emissions from laboratory hoods, the following assumptions are made:
 - The chemicals stored on-site are used within a year.
 - The chemicals are emitted in their current form and are 100% volatile.
 - The chemicals are not transformed into other chemicals. Other VOCs are not created during laboratory use.
7. Specific gravity and percent of chemical in solution data obtained from chemical product material safety data sheets.

SG of Water = 1 kg/L
 Conversion: 2.204 lb/kg
 2,000 lb/ton

8. Example calculations:

Amount stored on-site (lbs) = (Liters stored) x (Specific gravity) x (2.204 lb/kg) x (percent in solution)
 Emission estimate (ton/yr) = (Pounds stored) / (2,000 lb/ton)

Adopted



July 5, 2022
Scott Bell, Associate Vice Chancellor

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803 Alumni Drive, PO Box 757380, Fairbanks, Alaska 99775-7380

March 30, 2017

ATTN: Compliance Technician
Alaska Department of Environmental Conservation
Air Permits Program
610 University Avenue
Fairbanks, Alaska 99709

RE: Assessable Emissions Report for University of Alaska Fairbanks Campus, Air Quality Operating Permit Number AQ0316TVP02

Compliance Technician,

Assessable emissions are estimated to be 726.4 tons for FY2018. The estimate was based on actual operations that occurred January 1 through December 31, 2016. This estimate includes emission units permitted under the above operating permit as well as additional emission units not covered under the permit, including those determined to be insignificant.

If you have any questions regarding this estimate, please contact Russ Steiger, UAF Environmental Compliance Officer at 907-474-5812 or by e-mail at rhsteiger@alaska.edu.

Based on information and belief formed after reasonable inquiry, I certify that the statements and information in an attached to this document are true, accurate, and complete.

Sincerely,

A handwritten signature in blue ink, appearing to read "S Bell", is written over the word "Sincerely,".

Scott Bell, PE
Associate Vice Chancellor of Facilities Services

Attachment: Assessable Emissions Calculation Report

Cc: Charles Ward, Director of Utilities

University of Alaska Fairbanks Assessable Emissions Estimate FY18

Assessable Emissions - Tons Per Year

Pollutant	NO _x	CO	PM ₁₀	SO ₂	VOC	HAPs	Total
Assessable PTE	637	252	17	858	11	13.6	1,788.6

from Table D, Statement of Basis for Operating Permit No. AQ0316TVP02 Rev. 1

Emission Sources		Assessable Emissions Summary (TPY)					
		NO _x	CO	PM ₁₀	SO ₂	VOC	HAPs
Table 1	Coal-Fired Boilers	302.01	171.60	23.47	180.18	1.72	10.3
Table 2	Small External Combustion Units	0.97	0.24	0.16	1.02	0.02	
Table 3	Incinerator	0.02	0.02	0.03	0.01	0.00	
Table 4	CHPP Dual-Fired Boilers	9.17	3.85	1.07	20.49	0.19	
Table 5	CHPP Diesel Generator	0.00	0.00	0.00	0.00	0.00	
Table 6	Generator Engines	0.12	0.08	0.01	0.00	0.01	
Table 7	Coal Handling Plant			0.29			
Table 8	Kilns	9.4E-02	5.4E-02	5.1E-03	1.4E-04	7.2E-03	
Table 9	Laboratory Hoods					2.42	1.14
Totals		312.38	175.84	25.04	201.69	4.36	11.45

FY18 Assessable Emissions Estimate, in Tons	726.4
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Note: Actual HAP emissions for emission units in Tables 2 through 8 are not calculated for this estimate. The actual VOC emissions for these units are low enough that HAP emissions are expected to be insignificant.

University of Alaska Fairbanks Assessable Emissions Estimate FY18
Emission Inventory and CY 2016 Operations Data

EU ID ⁶	Emission Unit	Emission Unit Type	Bldg No.	Installation Date	Make/Model	Fuel Type	Fuel Usage 2016	Maximum Capacity
1	Power Plant	Boiler - Coal Fired	FS802	1962	Erie City	Coal	34,748.5 tons	84.5 MMBtu/hr
2	Power Plant	Boiler - Coal Fired	FS802	1962	Erie City	Coal	33,889.6 tons	84.5 MMBtu/hr
3	Power Plant	Boiler - Dual Fired	FS802	1970	Zurn	Diesel	500,628.2 gal	180.9 MMBtu/hr
4	Power Plant	Boiler - Dual Fired	FS802	1970	Zurn	Natural Gas	0.00 MCF ⁶	180.9 MMBtu/hr
4	Power Plant	Boiler - Dual Fired	FS802	1987	Zurn	Diesel	76,154.0 gal	180.9 MMBtu/hr
4	Power Plant	Boiler - Dual Fired	FS802	1987	Zurn	Natural Gas	32,116.00 MCF	180.9 MMBtu/hr
6	Arctic Health Research Building	Engine - Emergency Generator	FS901	1968	Cummins/NH2501PG	Diesel	0 hrs ¹	125 kW
7	Arctic Health Research Building	Engine - Emergency Generator	FS901	1968	Cummins/NH2501P	Diesel	0 hrs ¹	125 kW
8	Power Plant	Engine - Emergency Generator	FS917	1999	Fairbanks Morse Colt-Pielstick PC2.6	Diesel	70 gal	13,266 hp
9A	BIRD	Engine - Backup/Peaking Generator (DEG)	FS919	2006	Therm-Tec/G-30P-1H	Waste	22,863 lbs	83 lb/hr
10	AFES Boiler	Boiler - Oil Fired	AF256	2000	Burnham/V90GA	Diesel	14,262 gal ⁴	1.08 MMBtu/hr
11	AFES Boiler	Boiler - Oil Fired	AF256	2000	Burnham/V90GA	Diesel		1.08 MMBtu/hr
12	Harper Boiler #1	Boiler - Oil Fired	FS420	1985	Weil McLain/BL776-S-W	Diesel		0.64 MMBtu/hr
13	Harper Boiler #2	Boiler - Oil Fired	FS420	1985	Weil McLain/BL776-S-W	Diesel	7,033 gal ²	0.64 MMBtu/hr
29	Harper Hot Water Heater	Hot Water Heater - Oil Fired	FS420	1985 (est)	Bock	Diesel		0.236 MMBtu/hr
34	Harper Trailer Toyo	Furnace - Oil Fired	FS421	2014	Toyotomi OMI-180	Diesel		0.148 MMBtu/hr
14	Copper Lane Boiler	Boiler - Oil Fired	FS518	1985	Energy Kinetics System 2000	Diesel		0.136 MMBtu/hr
15	Copper Lane Boiler	Boiler - Oil Fired	FS519	1985	Energy Kinetics System 2000	Diesel	6,021	0.136 MMBtu/hr
16	Copper Lane (Honor's House) Boiler	Boiler - Oil Fired	FS520	2005	Weil McLain/P-WGO-5	Diesel		0.233 MMBtu/hr
17	West Ridge Research Building Boiler #1	Boiler - Oil Fired	FS909	2003	Weil McLain/BL1688w-GP10	ULSD ⁷	85.0 hrs	4.93 MMBtu/hr
18	West Ridge Research Building Boiler #2	Boiler - ULSD Fired	FS909	2003	Weil McLain/BL1688w-GP10	ULSD		4.93 MMBtu/hr
19	BIRD RM 100U3 Boiler #1	Boiler - ULSD Fired	FS919	2004	Weil McLain/2094W	ULSD		6.13 MMBtu/hr
20	BIRD RM 100U3 Boiler #2	Boiler - ULSD Fired	FS919	2004	Weil McLain/2094W	ULSD		6.13 MMBtu/hr
21	BIRD RM 100U3 Boiler #3	Boiler - ULSD Fired	FS919	2004	Weil McLain/2094W	ULSD	66,482 gal ^{2,3}	6.13 MMBtu/hr
22	BIRD RM 100U3 Boiler #4	Boiler - ULSD Fired	FS919	2005	Bryant/EB200-S-150-FDGO	ULSD		8.5 MMBtu/hr
23	Alaska Center for Energy and Power Generator Engine	Engine - Diesel Generator	FS814	2003	Detroit Diesel/6043-TK35	Diesel	0 gal	235 kW
24	Old University Park Emergency Generator	Engine - Emergency Generator	FS423	2001	Cummins/4B3.9-G2	Diesel	7.60 hrs	51 kW
25	AFES Greenhouse Furnace	Furnace - Oil Fired	AF117	1991	Sunderman/02OUF	Diesel	50 gal	0.209 MMBtu/hr
27	Generator Engine	Engine - Diesel Fired	FS814	2013	Caterpillar C-15	Diesel	45 hrs	500 hp
28	AFES Grain Dryer	Grain Dryer - Oil Fired	AF108	1988	Unknown	Diesel	300 gal	2.43 MMBtu/hr
30	Duckering Classroom Engine	Engine - Diesel Fired	FS103	1987	Mitsubishi-Bosch	Diesel	1 hours	45 kW
31	Starland Cabin Furnace	Furnace - Oil Fired	FS712	2001 (est)	Rheem/RBC-084QPEB	Diesel	741 gal ²	0.140 MMBtu/hr
32	Alaska Earthquake Information Center Emergency Generator Engine	Engine - Emergency Generator	FS903	1998	Detroit Diesel	Diesel	6 hrs	120 hp
33	Arctic Health Research Emergency Generator Engine	Engine - Emergency Generator	FS901	2013	Cummins/CSB7-G3	Diesel	1 hrs	150 kW
N/A	Power Plant	Coal Handling/Crushing Facility	FS802	1964	American Pulverizer (crusher make)	Coal	68,638.1 tons	50 tons/hr
N/A	Fine Arts/Art Wing Rms 302, 413	Klin - Propane Fired	FS313	2009	Alpine Kline and Equipment/SBF-40	Propane	14,440 gal	1.81 MMBtu/hr
N/A	Eternal Flame and Whitaker	Propane Fired	FS313	2009	Kilnmaster/constructed on-site	Propane		0.53 MMBtu/hr
N/A	Wood Center	Klin - Propane Fired	FS313	2009	Gell Kilns/DLB2	Propane		0.23 MMBtu/hr
N/A		Klin(s) - Wood Fired	N/A	Various	Hand-built	Wood	3 cords	Unknown
N/A	Facilities Services ⁵	Paint Booth Exhaust Fan	FS803	2001		Vegetable Oil	55 gallons	Unknown
N/A	Museum ⁵	Paint Booth Exhaust Fan	FS907	2006	Greenheck/TAB-42-030T3	Various Paints	Mainly water based paints are used. Minimal amounts of paint are stored on-site and paint booths are used infrequently.	12,500 cfm
N/A	Laboratory Fume Hoods (campus-wide)	Laboratory hoods	Multiple	Various	N/A	Various Paints		5,480 cfm
N/A	Duckering Classroom Turbine ⁵	Turbine - Propane Fired	FS103	1970(est)	Cussons Two Shaft Gas Turbine Unit	N/A	Per estimate in Table 9.	N/A
N/A	Power Plant ⁷	Tank (Diesel) - Field Erected	FS817	1969	Fixed roof, 212,120 gallons	Diesel	N/A	212,120 gal

University of Alaska Fairbanks Assessable Emissions Estimate FY18
Emission Inventory and CY 2016 Operations Data

EU ID ⁶	Emission Unit	Emission Unit Type	Blkg No.	Installation Date	Make/Model	Fuel Type	Fuel Usage 2016	Maximum Capacity
N/A	Graduation Flame ⁵	Ceremonial Flame	N/A	1975(est)	Custom-built	Propane	N/A	5.0E-03 MMBtu/hr
N/A	Power Plant ⁵	Ash Handling System	FS802	1962	N/A	N/A	N/A	8,760 hr/yr
N/A	SRC Pellet Stoves ⁵	Pellet Stove	N/A	2012	Avalon/AGP	Wood Pellets	N/A	5 lb/hr
TBD	BRD Emergency Generator #2 (South)	Engine- Emergency Generator	FS919	2015	Cummins/QSB7-G5NR3	ULSD	3.6 hours 103 gallons	324 hp
N/A	FS Physical Plant	Welding exhaust	Multiple	Various	Various	Various		
N/A	CTC Hutchison Diesel shop	Diesel engine exhaust	N/A	Various	Cummins and Caterpillar	Diesel		

- Notes:
1. These emission units were removed from service on June 29, 2012, were replaced with EU ID 33.
 2. Fuel burned was determined by review of fuel deliveries for calendar year 2016. The assumption was made that all fuel delivered was burned. Most deliveries for the year are in the same order of magnitude.
 3. The gallons of fuel provided are for all 4 of the boilers. Note 2 above applies to the gallons of fuel.
 4. Fuel consumption for EU IDs 10 and 11 is a total for both boilers and is based on the fuel delivered during calendar year 2016.
 5. Actual emissions are estimated to be insignificant for wood-fired kilns, paint booths, diesel storage tank, CHPP ash handling system, graduation flame, pellet stove, and small fuel-combusting unit (approx 3 hr/yr) in teaching laboratory.
 6. EU ID 3 is permitted to fire natural gas but has not yet been modified to do so.
 7. ULSD = Ultra Low Sulfur Diesel

Table 1 - UAF Coal Fired Boilers
CY 2016 Actual Emissions

ID	Emission Unit Description	Coal Consumption, CY 2016	Actual Emissions (tpy)					
			NO _x	CO	PM ₁₀	SO ₂	VOC	HAPs
1	Power Plant Boiler - Coal Fired	34,748.5 ton/yr	152.9	86.9	11.9	91.2		
2	Power Plant Boiler - Coal Fired	33,889.6 ton/yr	149.1	84.7	11.6	89.0		5.2
	Total		302.0	171.6	23.5	180.2	1.7	10.3

Notes:

1. Weight conversion: 2,000 lb/ton
2. Sulfur content of coal: 0.150 weight percent weighted average based on 2016 UCM rail sample data
3. Emission factors:

Pollutant	Emission Factor	Source
NO _x	8.8 lb/ton	AP-42, Table 1.1-3, 9/98, Sub-bituminous spreader stoker
CO	5 lb/ton	AP-42, Table 1.1-3, 9/98, Sub-bituminous spreader stoker
PM ₁₀	0.68 lb/ton	AP-42, Tables 1.1-5 and 1.1-9, 9/98, Spreader stoker, with baghouse
SO ₂	35*S lb/ton	AP-42, Table 1.1-3, 9/98, Sub-bituminous spreader stoker, multiplied by weight percent sulfur in coal
VOC	0.05 lb/ton	AP-42, Table 1.1-19, 9/98, Spreader stoker (total NMOC)
HAPs	0.30 lb/ton	See note 4

4. HAPs emission factor is a sum of the following emission factors:

Pollutant	Emission Factor	Source
HCl	0.138 lb/ton	Source test from boilers of similar design at Clear Air Force Station
HF	0.139 lb/ton	Source test from boilers of similar design at Clear Air Force Station
Hg	8.46E-05 lb/ton	Source test from boilers of similar design at Clear Air Force Station
All other HAPs	0.0233 lb/ton	Total of emission factors from AP-42 Tables 1.1-13, 1.1-14, 1.1-18, 9/98

5. Example calculations:

$$SO_2 \text{ emission factor (lb/ton)} = 35 \times (\text{sulfur content of coal, weight percent})$$

$$\text{Actual emissions (ton/yr)} = (\text{coal use, ton/yr}) \times (\text{emission factor, lb/ton}) / (2,000 \text{ lb/ton})$$

$$PM_{10} \text{ emission factor (lb/ton)} = (\text{condensable PM emission factor, lb/MMBtu}) \times (\text{UCM heat content, 15.3 MMBtu/ton}) + (PM_{10} \text{ particle emission factor, lb/ton})$$

Table 2 - UAF Small Oil-Fired External Combustion Units
CY 2016 Actual Emissions

ID	Emission Unit Description	Fuel Type	Maximum Capacity	Fuel Consumption, CY 2016		Actual Emissions (tpy)				
				NO _x	CO	PM ₁₀	SO ₂	VOC		
10	AFES (the farm) Boiler - Oil Fired	Diesel	1.08 MMBtu/hr	14.3	1,000 gal/yr	0.14	0.04	0.02	0.51	2.4E-03
11	AFES (the farm) Boiler - Oil Fired	Diesel	1.08 MMBtu/hr							
12	Harper #1 Boiler - Oil Fired	Diesel	0.64 MMBtu/hr							
13	Harper #2 Boiler - Oil Fired	Diesel	0.64 MMBtu/hr							
29	Harper Hot Water Heater - Oil Fired	Diesel	0.236 MMBtu/hr	7.03	1,000 gal/yr	0.07	0.02	0.01	0.25	1.2E-03
34	Harper Trailer Toyo - Oil Fired	Diesel	MMBtu/hr							
14	Copper Lane Boiler - Oil Fired	Diesel	0.136 MMBtu/hr		1,000 gal/yr	0.06	0.02	0.01	0.21	1.0E-03
15	Copper Lane Boiler - Oil Fired	Diesel	0.136 MMBtu/hr		1,000 gal/yr	0.00	0.00	0.00	0.00	0.0E+00
16	Copper Lane (Honors House) Boiler - Oil Fired	Diesel	0.233 MMBtu/hr		6.02	1,000 gal/yr	0.00	0.00	0.00	0.0E+00
17	West Ridge Research Building #1 Boiler - Oil Fired	ULSD	4.93 MMBtu/hr							
18	West Ridge Research Building #2 Boiler - Oil Fired	ULSD	4.93 MMBtu/hr							
19	BIRD RM 100U3 #1 Boiler - Oil Fired	ULSD	6.13 MMBtu/hr							
20	BIRD RM 100U3 #2 Boiler - Oil Fired	ULSD	6.13 MMBtu/hr							
21	BIRD RM 100U3 #3 Boiler - Oil Fired	ULSD	6.13 MMBtu/hr							
22	BIRD RM 100U3 #4 Boiler - Oil Fired	ULSD	8.5 MMBtu/hr							
25	AFES (the farm) Greenhouse Furnace - Oil Fired	Diesel	0.209 MMBtu/hr	65.5	1,000 gal/yr	0.65	0.16	0.11	0.01	1.1E-02
31	Skatland Cabin Furnace - Oil Fired	Diesel	0.140 MMBtu/hr	0.05	1,000 gal/yr	0.00	0.000	0.00	0.00	1.8E-05
28	AFES (the farm) Grain Dryer - Oil Fired	Diesel	2.43 MMBtu/hr	0.74	1,000 gal/yr	0.01	0.002	0.00	0.03	2.6E-04
				0.30	1,000 gal/yr	0.00	0.001	0.00	0.01	5.1E-05
				103.6 Total		1.0	0.2	0.2	1.0	1.7E-02

Notes:

- Maximum diesel sulfur content: 0.5 maximum weight percent, per records of fuel received at UAF during CY 2016
- Maximum diesel sulfur content ULSD: 0.0015 maximum weight percent, per records of ULSD fuel received at UAF during CY 2016
- Weight conversion: 2,000 lb/ton
- Emission factors:

Pollutant	Emission Factor	Source
NO _x	20 lb/1,000 gal	AP-42, Table 1.3-1, 5/10, Distillate oil fired
CO	5 lb/1,000 gal	AP-42, Table 1.3-1, 5/10, Distillate oil fired
PM ₁₀	3.3 lb/1,000 gal	AP-42, Tables 1.3-1 and 1.3-2, 5/10, Distillate oil fired
SO ₂	142'S lb/1,000 gal	AP-42, Table 1.3-1, 5/10, Distillate oil fired - sum of filterable PM and total condensable PM
VOC - boilers	0.34 lb/1,000 gal	AP-42, Table 1.3-3, 5/10, Distillate oil fired, multiplied by weight percent sulfur in fuel
VOC - furnaces	0.713 lb/1,000 gal	AP-42, Table 1.3-3, 5/10, Distillate oil fired (total non-methane organic compounds) (also used for grain dryer EU)
- Heat input ratings were not available for most external combustion units listed here. For ratings provided in terms of heat output or terms not specified, a conservative 75% efficiency has been applied to calculate the maximum heat input capacity shown in the table.
- Example calculations:

Actual emissions, tons/yr = (Emission factor, lb/1,000 gal) x (Fuel consumption, 1,000 gal/yr) / (2,000 lb/ton)

Actual emissions of SO₂, tons/yr = (Emission factor, lb/1,000 gal) x (Fuel sulfur content, wt %) x (Fuel consumption, 1,000 gal/yr) / (2,000 lb/ton)

#2 Diesel Heating Value: 0.135 MMBtu/gal
- EU10 and EU 11 - Fuel consumption for EU IDs 10 and 11 is a total for both boilers and is based on the fuel delivered during calendar year 2015.
- EU ID 17 and EU ID 18 Fuel consumption calculated based on estimated operating hours in CY 2015, assuming all operating hours at full load.
- Fuel consumption (1,000 gal/yr) = (Operation, hr/yr) x (Capacity, MMBtu/hr) / (0.135 MMBtu/gal) / (1,000)

**Table 3 - UAF Incinerator
CY 2016 Actual Emissions**

ID	Emission Unit Description	Waste Combustion, CY 2016	Actual Emissions (tpy)				
			NO _x	CO	PM ₁₀	SO ₂	VOC
9A	BIRD Incinerator	11.4 ton/yr	2.03E-02	1.69E-02	0.03	1.24E-02	1.71E-03
	Total		0.02	0.02	0.03	0.01	0.002

Notes:

- Weight conversion:
2,000 lb/ton
- Incineration emission factors:
Pathological waste incinerator emission factors are not available. Medical waste incineration emission factors are expected to be representative of emissions from a pathological waste incinerator.

<u>Pollutant</u>	<u>Emission Factor</u>	<u>Source</u>
NO _x	3.56 lb/ton	AP-42, Table 2.3-1, 7/93
CO	2.95 lb/ton	AP-42, Table 2.3-1, 7/93
PM ₁₀	4.7 lb/ton	AP-42, Table 2.3-2, 7/93 - Total PM
SO ₂	2.17 lb/ton	AP-42, Table 2.3-1, 7/93
VOC	2.99E-01 lb/ton	AP-42, Table 2.3-2, 7/93 - TOC

3. Example calculations:

$$\text{Actual emissions, tons/yr} = (\text{Emission factor, lb/ton}) \times (\text{Waste combusted, ton/yr}) / (2,000 \text{ lb/ton})$$

Table 4 - UAF Dual-Fired Boilers
CY 2016 Actual Emissions

ID	Emission Unit Description	Fuel Consumption, CY 2016	Actual Emissions (tpy)				
			NO _x	CO	PM ₁₀	SO ₂	VOC
3	Power Plant Boiler - Diesel Fired	500.6 kgal/yr	6.0	1.3	0.8	17.8	0.09
3	Power Plant Boiler - Gas Fired	0 MMscf	0	0	0	0	0
4	Power Plant Boiler - Diesel Fired	76.2 kgal/yr	0.9	1.3	0.1	2.7	0.01
4	Power Plant Boiler - Gas Fired	32.11600 MMscf	2.2	1.3	0.1	0.01	0.1
Total			9.2	3.9	1.1	20.5	0.2

Notes:

1. Weight conversion: 2,000 lb/ton
2. Maximum diesel sulfur content: 0.50 maximum weight percent, per records of fuel received at UAF during CY 2016
3. Diesel emission factors:

Pollutant	Emission Factor	Source
NO _x	24 lb/kgal	AP-42 Table 1.3-1, 5/10
CO	5 lb/kgal	AP-42 Table 1.3-1, 5/10
PM ₁₀	3.3 lb/kgal	AP-42 Table 1.3-1, 5/10, sum of filterable and condensable
SO ₂	142 *S lb/kgal	AP-42 Table 1.3-1, 5/10
VOC	0.34 lb/kgal	AP-42 Table 1.3-3, 5/10, institutional boilers

4. Natural gas emission factors:

Pollutant	Emission Factor	Source
NO _x	140 lb/MMscf	AP-42 Table 1.4-1, 7/98, low NO _x burners
CO	84 lb/MMscf	AP-42 Table 1.4-1, 7/98
PM ₁₀	7.6 lb/MMscf	AP-42 Table 1.4-2, 7/98, Total PM
SO ₂	0.6 lb/MMscf	AP-42 Table 1.4-2, 7/98
VOC	5.5 lb/MMscf	AP-42 Table 1.4-2, 7/98

5. Example calculations:

SO₂ emission factor (lb/ton) = 142 x (sulfur content of diesel, weight percent)
 Actual emissions (ton/yr) = (coal use, ton/yr) x (emission factor, lb/ton) / (2,000 lb/ton)

6. EU ID 3 has not been modified to combust natural gas.

**Table 5 - UAF CHPP Diesel Engine
CY 2016 Actual Emissions**

ID	Emission Unit Description	Maximum Capacity	Fuel Consumption, CY 2016	Actual Emissions (tpy)				
				NO _x	CO	PM ₁₀	SO ₂	VOC
8	Backup/Peaking Generator (DEG) Diesel fired	13,266 hp	70 gal/yr	0.00	0.00	0.00	0.00	0.00
			Total	0.00	0.00	0.00	0.00	0.00

Notes:

1. Weight conversion: 2,000 lb/ton
2. Diesel Heating Value: 0.135 MMBtu/gal
3. Maximum diesel sulfur content: 0.50 maximum weight percent, per records of fuel received at UAF during CY 2016
4. Emission factors:

Pollutant	Emission Factor	Source
NO _x	0.057 lb/gal	AQ0316MSS02, Condition 12.3b, Equation 4 (controlled emission rate)
CO	0.85 lb/MMBtu	AP-42, Table 3.4-1, 10/96
PM ₁₀	0.10 lb/MMBtu	AP-42, Table 3.4-1, 10/96
SO ₂	1.01 *S lb/MMBtu	AP-42, Table 3.4-1, 10/96
VOC	0.09 lb/MMBtu	AP-42, Table 3.4-1, 10/96

5. Example calculations:

Actual emissions, tons/yr = (Emission factor, lb/MMBtu) x (Fuel consumption, gal/yr) x (Fuel heat value, MMBtu/gal) / (2,000 lb/ton)
 Actual emissions of SO₂, tons/yr = (Emission factor, lb/MMBtu) x (Fuel sulfur content, wt %) x (Fuel consumption, gal/yr) x (Fuel heat value, MMBtu/gal) / (2,000 lb/ton)
 Actual emissions of NO_x, tons/yr = (Emission factor, lb/gal) x (Fuel consumption, gal/yr) / (2,000 lb/ton)

6. EU ID 8 is permitted as a backup/peaking generator but is now an emergency generator

Table 6 - UAF Internal Combustion Engines
CY 2016 Actual Emissions

ID	Emission Unit Description	Maximum Capacity	Hours of Operation CY 2016	Actual Emissions (tpy)				
				NO _x	CO	PM ₁₀	SO ₂	VOC
23	Alaska Center for Energy and Power Generator Engine - Diesel Generator	332 hp	0 hrs	0.0	0.0	0.0	0.0	0.0
24	Old University Park Emergency Generator Engine - Emergency Generator	72 hp	8 hrs	8.5E-03	1.8E-03	6.0E-04	5.6E-04	6.9E-04
30	Duckering Classroom Engine Engine - Diesel Fired	64 hp	1 hrs	9.8E-04	2.1E-04	7.0E-05	6.5E-05	8.0E-05
27	Alaska Center for Energy and Power Generator Engine - Diesel Fired	500 hp	45 hrs	0.1	0.1	0.0	1.2E-04	0.0
32	Alaska Earthquake Information Center Emergency Generator Engine - Emergency Generator	120 hp	6 hrs	1.1E-02	2.4E-03	7.9E-04	7.4E-04	9.1E-04
33	Arctic Health Research Emergency Generator Engine - Emergency Generator	212 hp	1 hrs	3.3E-03	7.1E-04	2.3E-04	2.2E-04	2.7E-04
TBD	BIRD Emergency Generator Engine- ULSD Fired Emergency Generator # 2	324 hp	4 hrs	1.8E-02	3.9E-03	1.3E-03	1.1E-05	1.5E-03
Total				0.1	0.1	0.0	0.0	0.0

Notes:

1. Weight conversion:
2. Emission factors:

2,000 lb/ton

Pollutant	Emission Factor	Source
NO _x	0.031 lb/hp-hr	AP-42, Table 3.3-1, 5/10, Diesel fuel
CO	6.68E-03 lb/hp-hr	AP-42, Table 3.3-1, 5/10, Diesel fuel
PM ₁₀	2.20E-03 lb/hp-hr	AP-42, Table 3.3-1, 5/10, Diesel fuel
SO ₂	2.05E-03 lb/hp-hr	AP-42, Table 3.3-1, 5/10, Diesel fuel
VOC	0.0025141 lb/hp-hr	AP-42, Table 3.3-1, 5/10, Diesel fuel - sum of exhaust and crankcase TOC emission factors

3. Emission factors for EU 27:

Pollutant	Emission Factor	Source
NO _x	3.52 lb/hr	Vendor
CO	3.14 lb/hr	Vendor
PM ₁₀	0.12 lb/hr	Vendor
SO ₂	1.09E-05 lb/hp-hr	Mass balance (ULSD required)
VOC	0.21 lb/hr	Vendor

4. Example calculations:

Actual emissions, tons/yr = (Emission factor, lb/hp-hr) x (Capacity, hp) x (Operation, hr/yr) / (2,000 lb/ton)

Horsepower ratings for EU IDs 23, 24, 30, and 33 assume a 95% shaft efficiency.

Capacity (hp) = (Capacity, kW) x (1.341 hp/kW) / 0.95

EU ID 23 did not operate during CY 2016.

7. Actual emissions for EU IDs 6 and 7 are not included in this assessable emissions estimate because they were permanently removed from service on June 29, 2012. EU ID 33 will replace these units.

Table 7 - UAF Coal Preparation Plant
CY 2016 Actual Emissions, PM-10

Emission Source Identification		Type	Emission Factor		Source	Material Handling (tpy)	Control Method	Control Efficiency (percent)	Annual PM ₁₀ Emission (tpy)
			Value	Units					
Railcar unloading through grate into crusher		Point	3.63E-04	lb/ton	AP-42, Section 13.2.4	68,638.1	Plant Building	0	0.012
Crusher		Point	0.006	lb/ton	3-05-010-10, FIRE	68,638.1	Plant Building	0	0.206
Crusher to conveyor 1		Point	3.63E-04	lb/ton	AP-42, Section 13.2.4	68,638.1	Plant Building	0	0.012
Conveyor 1 to bucket elevator		Point	3.63E-04	lb/ton	AP-42, Section 13.2.4	68,638.1	Plant Building	0	0.012
Bucket elevator to screw conveyor		Point	3.63E-04	lb/ton	AP-42, Section 13.2.4	68,638.1	Plant Building	0	0.012
Screw conveyor to coal bin 1 or		Point	3.63E-04	lb/ton	AP-42, Section 13.2.4	34,748.5	Plant Building	0	0.006
Screw conveyor to coal bin 2		Point	3.63E-04	lb/ton	AP-42, Section 13.2.4	33,889.6	Plant Building	0	0.006
Coal bin 1 to scale 1 or		Point	3.63E-04	lb/ton	AP-42, Section 13.2.4	34,748.5	Plant Building	0	0.006
Coal bin 2 to scale 2		Point	3.63E-04	lb/ton	AP-42, Section 13.2.4	33,889.6	Plant Building	0	0.006
Scale 1 to boiler 1 or		Point	3.63E-04	lb/ton	AP-42, Section 13.2.4	34,748.5	Plant Building	0	0.006
Scale 2 to boiler 2		Point	3.63E-04	lb/ton	AP-42, Section 13.2.4	33,889.6	Plant Building	0	0.006
Actual PM-10 Emissions from Coal Preparation Plant									0.29

Notes:

1. Coal transfer emission factor from AP-42, Section 13.2.4 based on empirical equation $E = k \times 0.0032 \times (U/5)^{1.3} / (M/2)^{1.4}$ lb/ton transferred where:
 $k = 0.35$ for PM₁₀

U = mean wind speed = 5.4 mph

M = coal moisture content = 4.8 percent

per <http://wf.ncdc.noaa.gov/oa/climate/online/ccd/avgwind.html>

2. FIRE = Factor Information Retrieval Data System.

3. Example Calculations:

$$\text{Actual emissions (tpy)} = (\text{Emission factor, lb/ton}) \times (\text{Material handled, ton/yr}) / (2,000 \text{ lb/ton})$$

Table 8 - UAF Propane Fired Sources
CY 2016 Actual Emissions

ID	Emission Unit Description	Fuel Consumption, CY 2016	Actual Emissions (tpy)				
			NO _x	CO	PM ₁₀	SO ₂	VOC
N/A	Fine Arts/Art Wing Rms 302, 413 Kiln - Propane Fired	14.4 1,000 gal/yr	9.4E-02	5.4E-02	5.1E-03	1.4E-04	7.2E-03
N/A	Eternal Flame and Whitaker Propane Fired						
N/A	Wood Center Kiln - Propane Fired						
Total			9.4E-02	5.4E-02	5.1E-03	1.4E-04	7.2E-03

Notes:

1. Weight conversion:
2. Propane sulfur content:
3. Propane Emission factors:

Emission factors for small pottery-firing kilns are not available. These calculations assume that combustion of propane in the kilns is similar to the combustion of propane in small propane-fired boilers.

Pollutant

Emission Factor Source

NO _x	13 lb/1,000 gal	AP-42, Table 1.5-1, 07/08 (propane commercial boilers)
CO	7.5 lb/1,000 gal	AP-42, Table 1.5-1, 07/08 (propane commercial boilers)
PM ₁₀	0.7 lb/1,000 gal	AP-42, Table 1.5-1, 07/08 (propane commercial boilers)
SO ₂	0.1 *S lb/1,000 gal	AP-42, Table 1.5-1, 07/08 (propane commercial boilers), multiplied by gr/100 ft ³ gas vapor sulfur in fuel
VOC	1.0 lb/1,000 gal	AP-42, Table 1.5-1, 07/08 (propane commercial boilers), TOC

4. Example calculations:

$$\text{Actual emissions (ton/yr)} = (\text{Emission factor, lb/1,000 gal}) \times (\text{Fuel consumption, 1,000 gal/yr}) / (2,000 \text{ lb/ton})$$

**Table 9 - UAF Laboratory Hoods
CY 2016 Actual Emission Estimate, VOC and HAPs**

Chemical	CAS No.	Amount Stored On-site (liters)	Specific gravity of stored substance	Percent in solution	Amount Stored On-site (lbs)	VOC Emissions (ton/yr)	HAP Emissions (ton/yr)
2-Butanone	78-93-3	35	0.806	100	62.2	0.031	
Acetic acid	64-19-7	39	1.05	97	87.5	0.044	
Acetone	67-64-1	495	0.788	100	859.7	0.430	
Benzene	71-43-2	12	0.8765	100	23.2	0.012	0.012
Ethanol	64-17-5	502	0.79	100	874.1	0.437	
Formaldehyde	50-00-0	398	1.08	38	360.0	0.180	0.180
Methyl alcohol in formaldehyde solution	67-56-1			15	142.1	0.071	0.071
Hexane	110-54-3	77	0.659	94	105.1	0.053	0.053
Methanol	67-56-1	443	0.791	100	772.3	0.386	0.386
Methylene chloride	75-09-2	156	1.3266	100	456.1	0.228	0.228
Phenol	108-95-2	4	1.057	100	9.3	0.005	0.005
n-Propyl alcohol and 2-Propanol	71-23-8, 67-63-0	356	0.7945	100	623.4	0.312	
Stoddard solvent	8052-41-3	32	0.787	100	55.5	0.028	
Toluene	108-88-3	178	0.86	100	337.4	0.169	0.169
Xylene	1330-20-7	43	0.864	100	81.9	0.041	0.041
Total					2.42	1.14	

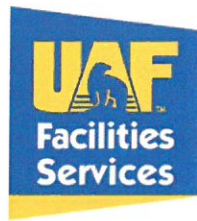
Notes:

- The above chemicals were determined to be common chemicals that contained VOCs.
- Only chemical inventories of 4 liters or greater were included.
- This inventory is not up to date, but reflects information available at issuance of Title V Permit Renewal.
- This inventory does not reflect chemical usage, only those stored on-site.
- In order to conservatively estimate VOC emissions from laboratory hoods, the following assumptions are made:
 - The chemicals stored on-site are used within a year.
 - The chemicals are emitted in their current form and are 100% volatile.
 - The chemicals are not transformed into other chemicals. Other VOCs are not created during laboratory use.
- Specific gravity and percent of chemical in solution data obtained from chemical product material safety data sheets.

SG of Water = 1 kg/L
 Conversion: 2,204 lb/kg
 2,000 lb/ton

Amount stored on-site (lbs) = (Liters stored) x (Specific gravity) x (2.204 lb/kg) x (percent in solution)
 Emission estimate (ton/yr) = (Pounds stored) / (2,000 lb/ton)
- Example calculations:

Adopted



July 5, 2022
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803 Alumni Drive, PO Box 757380, Fairbanks, Alaska 99775-7380

March 26, 2018

ATTN: Compliance Technician
Alaska Department of Environmental Conservation
Air Permits Program
610 University Avenue
Fairbanks, Alaska 99709

RE: Assessable Emissions Report for University of Alaska Fairbanks Campus, Air Quality Operating Permit Number AQ0316TVP02 Rev. 2

Compliance Technician,

Assessable emissions are estimated to be 696.5 tons for FY2019. The estimate was based on actual operations that occurred January 1 through December 31, 2017. This estimate includes emission units permitted under the above operating permit as well as additional emission units not covered under the permit, including those determined to be insignificant.

If you have any questions regarding this estimate, please contact Russ Steiger, UAF Environmental Compliance Officer at 907-474-5812 or by e-mail at rhsteiger@alaska.edu.

Based on information and belief formed after reasonable inquiry, I certify that the statements and information in an attached to this document are true, accurate, and complete.

Sincerely,

A handwritten signature in blue ink that reads "S Bell". The signature is written in a cursive style.

Scott Bell, PE
Associate Vice Chancellor of Facilities Services

Attachment: Assessable Emissions Calculation Report

Cc: Charles Ward, Director of Utilities

University of Alaska Fairbanks Assessable Emissions Estimate FY19

Assessable Emissions - Tons Per Year

Pollutant	NO _x	CO	PM ₁₀	SO ₂	VOC	HAPs	Total
Assessable PTE	637	252	17	858	11	13.6	1,788.6

from Table D, Statement of Basis for Operating Permit No. AQ0316TVP02 Rev. 2

Emission Sources		Assessable Emissions Summary (TPY)					
		NO _x	CO	PM ₁₀	SO ₂	VOC	HAPs
Table 1	Coal-Fired Boilers	303.03	172.18	23.55	126.55	1.72	10.3
Table 2	Small External Combustion Units	0.80	0.20	0.13	1.23	0.01	
Table 3	Incinerator	0.02	0.02	0.03	0.01	0.00	
Table 4	CHPP Dual-Fired Boilers	13.72	3.64	1.79	37.24	0.22	
Table 5	CHPP Diesel Generator	0.00	0.00	0.00	0.00	0.00	
Table 6	Generator Engines	0.21	0.13	0.01	0.00	0.01	
Table 7	Coal Handling Plant			0.29			
Table 8	Kilns	1.3E-01	7.3E-02	6.8E-03	1.9E-04	9.7E-03	
Table 9	Laboratory Hoods					2.42	1.14
Totals		317.91	176.24	25.82	165.03	4.41	11.49

FY19 Assessable Emissions Estimate, in Tons	696.5
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Note: Actual HAP emissions for emission units in Tables 2 through 8 are not calculated for this estimate. The actual VOC emissions for these units are low enough that HAP emissions are expected to be insignificant.

University of Alaska Fairbanks Assessable Emissions Estimate FY19
Emission Inventory and CY 2017 Operations Data

EU ID ⁵	Emission Unit	Emission Unit Type	Bldg No.	Installation Date	Make/Model	Fuel Type	Fuel Usage 2017	Maximum Capacity
1	Power Plant	Boiler - Coal Fired	FS802	1962	Erie City	Coal	33,342.0 tons	84.5 MMBtu/hr
2	Power Plant	Boiler - Coal Fired	FS802	1962	Erie City	Coal	35,528.0 tons	84.5 MMBtu/hr
3	Power Plant	Boiler - Dual Fired	FS802	1970	Zum	Diesel	591,364.0 gal	180.9 MMBtu/hr
3	Power Plant	Boiler - Dual Fired	FS802	1970	Zum	Natural Gas	0.00 MCF ⁶	180.9 MMBtu/hr
4	Power Plant	Boiler - Dual Fired	FS802	1987	Zum	Diesel	457,420.0 gal	180.9 MMBtu/hr
4	Power Plant	Boiler - Dual Fired	FS802	1987	Zum	Natural Gas	16,172.40 MCF	180.9 MMBtu/hr
6	Arctic Health Research Building	Engine - Emergency Generator	FS901	1968	Cummins/NH2501PG	Diesel	0 hrs ¹	125 kW
7	Arctic Health Research Building	Engine - Emergency Generator	FS901	1968	Cummins/NH2501P	Diesel	0 hrs ¹	125 kW
8	Power Plant	Engine - Backup/Peaking Generator (DEG)	FS817	1999	Fairbanks Morse Colt-Pielstick PC2.6	Diesel	0 gal	13,266 hp
9A	BiRD	Incinerator	FS919	2006	Therm-Tec/G-30P-1H	Waste	23,823 lbs	83 lb/hr
10	AFES Boiler	Boiler - Oil Fired	AF256	2000	Burnham/V90GA	Diesel	17,448 gal ⁴	1.08 MMBtu/hr
11	AFES Boiler	Boiler - Oil Fired	AF256	2000	Burnham/V90GA	Diesel		1.08 MMBtu/hr
12	Harper Boiler #1	Boiler - Oil Fired	FS420	1985	Weil McLain/BL776-S-W	Diesel		0.64 MMBtu/hr
13	Harper Boiler #2	Boiler - Oil Fired	FS420	1985	Weil McLain/BL776-S-W	Diesel	10,154 gal ²	0.64 MMBtu/hr
29	Harper Hot Water Heater	Hot Water Heater - Oil Fired	FS420	1985 (est)	Bock	Diesel		0.236 MMBtu/hr
34	Harper Trailer Toyo	Furnace - Oil Fired	FS421	2014	Toyotomi OM-180	Diesel		0.148 MMBtu/hr
14	Copper Lane Boiler	Boiler - Oil Fired	FS518	1985	Energy Kinetics System 2000	Diesel		0.136 MMBtu/hr
15	Copper Lane Boiler	Boiler - Oil Fired	FS519	1985	Energy Kinetics System 2000	Diesel	4,315 gal ²	0.136 MMBtu/hr
16	Copper Lane (Honor's House) Boiler	Boiler - Oil Fired	FS520	2005	Weil McLain/P-WGO-5	Diesel	gal ²	0.233 MMBtu/hr
17	West Ridge Research Building Boiler #1	Boiler - ULSD Fired	FS909	2003	Weil McLain/BL1688w-GPr10	ULSD ⁷	85.0 hrs	4.93 MMBtu/hr
18	West Ridge Research Building Boiler #2	Boiler - ULSD Fired	FS909	2003	Weil McLain/BL1688w-GPr10	ULSD		4.93 MMBtu/hr
19	BiRD RM 100U3 Boiler #1	Boiler - ULSD Fired	FS919	2004	Weil McLain/2094W	ULSD		6.13 MMBtu/hr
20	BiRD RM 100U3 Boiler #2	Boiler - ULSD Fired	FS919	2004	Weil McLain/2094W	ULSD	42,437 gal ^{2,3}	6.13 MMBtu/hr
21	BiRD RM 100U3 Boiler #3	Boiler - ULSD Fired	FS919	2004	Weil McLain/2094W	ULSD		6.13 MMBtu/hr
22	BiRD RM 100U3 Boiler #4	Boiler - ULSD Fired	FS919	2005	Bryan/EB200-S-150-FDGO	ULSD		8.5 MMBtu/hr
23	Alaska Center for Energy and Power Generator Engine	Engine - Diesel Generator	FS814	2003	Detroit Diesel/6043-TK35	Diesel	0 gal	235 kW
24	Old University Park Emergency Generator Engine	Engine - Emergency Generator	FS423	2001	Cummins/4B3.9-G2	Diesel	7.60 hrs	51 kW
25	AFES Greenhouse Furnace	Furnace - Oil Fired	AF117	1991	Sunderman/L02OUF	Diesel	50 gal	0.209 MMBtu/hr
27	Alaska Center for Energy and Power Generator Engine	Engine - Diesel Fired	FS814	2013	Caterpillar C-15	Diesel	74 hrs	500 hp
28	AFES Grain Dryer	Grain Dryer - Oil Fired	AF108	1988	Unknown	Diesel	300 gal	2.43 MMBtu/hr
30	Duckering Classroom Engine	Engine - Diesel Fired	FS103	1987	Mitsubishi-Bosch	Diesel	1 hrs	45 kW
31	Skariand Cabin Furnace	Furnace - Oil Fired	FS712	2001 (est)	Rheem/ROBC-084QPEB	Diesel	2,318 gal ²	0.140 MMBtu/hr
32	Alaska Earthquake Information Center Emergency Generator Engine	Engine - Emergency Generator	FS903	1998	Detroit Diesel	Diesel	6 hrs	120 hp
33	Arctic Health Research Emergency Generator Engine	Engine - Emergency Generator	FS901	2013	Cummins/QSB7-G3	Diesel	1 hrs	150 kW
N/A	Power Plant	Coal Handling/Crushing Facility	FS802	1964	American Pulverizer (crusher make)	Coal	68,870.0 tons	50 tons/hr
N/A	Fine Arts/Art Wing Rms 302, 413	Kiln - Propane Fired	FS313	2009	Alpine Kilns and Equipment/SBF-40	Propane		1.81 MMBtu/hr
N/A	Eternal Flame and Whitaker	Propane Fired	FS313	2009	Kilnmaster/constructed on-site	Propane	19,452 gal	0.53 MMBtu/hr
N/A	Wood Center	Kiln - Propane Fired	FS313	2009	Geil Kilns/DLB2	Propane		0.23 MMBtu/hr
N/A	AFES Farm kiln	Kiln(s) - Wood Fired	N/A	Various	Hand-built	Wood	3 cords	Unknown
N/A						Vegetable Oil	0 gallons	Unknown
N/A	Facilities Services ⁵	Paint Booth Exhaust Fan	FS803	2001		Various Paints	Mainly water based paints are used. Minimal amounts of paint are stored on-site and paint booths are used infrequently.	12,500 cfm
N/A	Museum ⁵	Paint Booth Exhaust Fan	FS907	2006	Greenheck/TAB-42-030T3	Various Paints		5,480 cfm
N/A	Laboratory Fume Hoods (campus-wide)	Laboratory hoods	Multiple	Various	N/A	N/A	Per estimate in Table 9.	N/A
N/A	Duckering Classroom Turbine ⁵	Turbine - Propane Fired	FS103	1970(est)	Cussons Two Shaft Gas Turbine Unit	Propane	0	0.33 MMBtu/hr
N/A	Power Plant ⁵	Tank (Diesel) - Field Erected	FS817	1969	Fixed roof, 212,120 gallons	Diesel	N/A	212,120 gal

University of Alaska Fairbanks Assessable Emissions Estimate FY19
Emission Inventory and CY 2017 Operations Data

EU ID ⁶	Emission Unit	Emission Unit Type	Bldg No.	Installation Date	Make/Model	Fuel Type	Fuel Usage 2017	Maximum Capacity
N/A	Graduation Flame ⁵	Ceremonial Flame	N/A	1975(est)	Custom-built	Propane	N/A	5.0E-03 MMBtu/hr
N/A	Power Plant ⁵	Ash Handling System	FS802	1962	N/A	N/A	N/A	8,760 hr/yr
N/A	SRC Pellet Stoves ⁵	Pellet Stove	N/A	2012	Avalon/AGP	Wood Pellets	N/A	5 lb/hr
TBD	BiRD Emergency Generator #2 (South)	Engine- Emergency Generator	FS919	2015	Cummins/QSB7-G5NR3	ULSD	12 hours	324 hp
							103 gallons	
N/A	FS Physical Plant	Welding exhaust	Multiple	Various	Various	Various		
N/A	CTC Hutchison Diesel shop	Diesel engine exhaust	N/A	Various	Cummins and Caterpillar	Diesel		

Notes:

1. These emission units were removed from service on June 29, 2012 were replaced with EU ID 33.
2. Fuel burned was determined by review of fuel deliveries for calendar year 2016. The assumption was made that all fuel delivered was burned. Most deliveries for the year are in the same order of magnitude.
3. The gallons of fuel provided are for all 4 of the boilers. Note 2 above applies to the gallons of fuel.
4. Fuel consumption for EU IDs 10 and 11 is a total for both boilers and is based on the fuel delivered during calendar year 2016.
5. Actual emissions are estimated to be insignificant for wood-fired kilns, paint booths, diesel storage tank, CHPP ash handling system, graduation flame, pellet stove, and small fuel-combusting unit (approx 3 hr/yr) in teaching laboratory.
6. EU ID 3 is permitted to fire natural gas but has not yet been modified to do so.
7. ULSD = Ultra Low Sulfur Diesel

**Table 1 - UAF Coal Fired Boilers
CY 2017 Actual Emissions**

ID	Emission Unit Description	Coal Consumption, CY 2017	Actual Emissions (tpy)					
			NO _x	CO	PM ₁₀	SO ₂	VOC	HAPs
1	Power Plant Boiler - Coal Fired	33,342.0 ton/yr	146.7	83.4	11.4	61.3	0.8	5.0
2	Power Plant Boiler - Coal Fired	35,528.0 ton/yr	156.3	88.8	12.2	65.3	0.9	5.3
Total			303.0	172.2	23.6	126.5	1.7	10.3

Notes:

- 1. Weight conversion: 2,000 lb/ton
- 2. Sulfur content of coal: 0.105 weight percent weighted average based on 2017 UCM rail sample data
- 3. Emission factors:

<u>Pollutant</u>	<u>Emission Factor</u>	<u>Source</u>
NO _x	8.8 lb/ton	AP-42, Table 1.1-3, 9/98, Sub-bituminous spreader stoker
CO	5 lb/ton	AP-42, Table 1.1-3, 9/98, Sub-bituminous spreader stoker
PM ₁₀	0.68 lb/ton	AP-42, Tables 1.1-5 and 1.1-9, 9/98, Spreader stoker, with baghouse
SO ₂	35*S lb/ton	AP-42, Table 1.1-3, 9/98, Sub-bituminous spreader stoker, multiplied by weight percent sulfur in coal
VOC	0.05 lb/ton	AP-42, Table 1.1-19, 9/98, Spreader stoker (total NMOC)
HAPs	0.30 lb/ton	See note 4

- 4. HAPs emission factor is a sum of the following emission factors:

<u>Pollutant</u>	<u>Emission Factor</u>	<u>Source</u>
HCl	0.138 lb/ton	Source test from boilers of similar design at Clear Air Force Station
HF	0.139 lb/ton	Source test from boilers of similar design at Clear Air Force Station
Hg	8.46E-05 lb/ton	Source test from boilers of similar design at Clear Air Force Station
All other HAPs	0.0233 lb/ton	Total of emission factors from AP-42 Tables 1.1-13, 1.1-14, 1.1-18, 9/98

- 5. Example calculations:

$$SO_2 \text{ emission factor (lb/ton)} = 35 \times (\text{sulfur content of coal, weight percent})$$

$$\text{Actual emissions (ton/yr)} = (\text{coal use, ton/yr}) \times (\text{emission factor, lb/ton}) / (2,000 \text{ lb/ton})$$

$$PM_{10} \text{ emission factor (lb/ton)} = (\text{condensable PM emission factor, lb/MMBtu}) \times (\text{UCM heat content, 15.3 MMBtu/ton})$$

$$+ (PM_{10} \text{ particle emission factor, lb/ton})$$

**Table 2 - UAF Small Oil-Fired External Combustion Units
CY 2017 Actual Emissions**

ID	Emission Unit Description	Fuel Type	Maximum Capacity	Fuel Consumption, CY 2017		Actual Emissions (tpy)				
						NO _x	CO	PM ₁₀	SO ₂	VOC
10	AFES (the farm) Boiler - Oil Fired	Diesel	1.08 MMBtu/hr	17.4	1,000 gal/yr	0.17	0.04	0.03	0.62	3.0E-03
11	AFES (the farm) Boiler - Oil Fired	Diesel	1.08 MMBtu/hr							
12	Harper #1 Boiler - Oil Fired	Diesel	0.64 MMBtu/hr	10.15	1,000 gal/yr	0.10	0.03	0.02	0.36	1.7E-03
13	Harper #2 Boiler - Oil Fired	Diesel	0.64 MMBtu/hr							
29	Harper Hot Water Heater - Oil Fired	Diesel	0.236 MMBtu/hr							
34	Harper Trailer Toyo - Oil Fired	Diesel	MMBtu/hr							
14	Copper Lane Boiler - Oil Fired	Diesel	0.136 MMBtu/hr	4.32	1,000 gal/yr	0.04	0.01	0.01	0.15	7.3E-04
15	Copper Lane Boiler - Oil Fired	Diesel	0.136 MMBtu/hr							
16	Copper Lane (Honors House) Boiler - Oil Fired	Diesel	0.233 MMBtu/hr	4.32	1,000 gal/yr	0.00	0.00	0.00	0.00	0.0E+00
17	West Ridge Research Building #1 Boiler - Oil Fired	ULSD	4.93 MMBtu/hr	3.10	1,000 gal/yr	0.03	0.01	0.01	0.00	5.3E-04
18	West Ridge Research Building #2 Boiler - Oil Fired	ULSD	4.93 MMBtu/hr							
19	BiRD RM 100U3 #1 Boiler - Oil Fired	ULSD	6.13 MMBtu/hr	42.4	1,000 gal/yr	0.42	0.11	0.07	0.00	7.2E-03
20	BiRD RM 100U3 #2 Boiler - Oil Fired	ULSD	6.13 MMBtu/hr							
21	BiRD RM 100U3 #3 Boiler - Oil Fired	ULSD	6.13 MMBtu/hr							
22	BiRD RM 100U3 #4 Boiler - Oil Fired	ULSD	8.5 MMBtu/hr							
25	AFES (the farm) Greenhouse Furnace - Oil Fired	Diesel	0.209 MMBtu/hr	0.05	1,000 gal/yr	0.00	0.000	0.00	0.00	1.8E-05
31	Skarland Cabin Furnace - Oil Fired	Diesel	0.140 MMBtu/hr	2.32	1,000 gal/yr	0.02	0.006	0.00	0.08	8.3E-04
28	AFES (the farm) Grain Dryer Grain Dryer - Oil Fired	Diesel	2.43 MMBtu/hr	0.30	1,000 gal/yr	0.00	0.001	0.00	0.01	5.1E-05
				103.6 Total		0.8	0.2	0.1	1.2	1.4E-02

Notes:

- Maximum diesel sulfur content: 0.5 maximum weight percent, per records of fuel received at UAF during CY 2017
- Maximum diesel sulfur content ULSD: 0.0015 maximum weight percent, per records of ULSD fuel received at UAF during CY 2017
- Weight conversion: 2,000 lb/ton
- Emission factors:

Pollutant	Emission Factor	Source
NO _x	20 lb/1,000 gal	AP-42, Table 1.3-1, 5/10, Distillate oil fired
CO	5 lb/1,000 gal	AP-42, Table 1.3-1, 5/10, Distillate oil fired
PM ₁₀	3.3 lb/1,000 gal	AP-42, Tables 1.3-1 and 1.3-2, 5/10, Distillate oil fired - sum of filterable PM and total condensable PM
SO ₂	142*S lb/1,000 gal	AP-42, Table 1.3-1, 5/10, Distillate oil fired, multiplied by weight percent sulfur in fuel
VOC - boilers	0.34 lb/1,000 gal	AP-42, Table 1.3-3, 5/10, Distillate oil fired (total non-methane organic compounds) (also used for grain dryer EU)
VOC - furnaces	0.713 lb/1,000 gal	AP-42, Table 1.3-3, 5/10, Distillate oil fired (total non-methane organic compounds) (also used for hot water heater EU)

- Heat input ratings were not available for most external combustion units listed here. For ratings provided in terms of heat output or terms not specified, a conservative 75% efficiency has been applied to calculate the maximum heat input capacity shown in the table.
- Example calculations:
 Actual emissions, tons/yr = (Emission factor, lb/1,000 gal) x (Fuel consumption, 1,000 gal/yr) / (2,000 lb/ton)
 Actual emissions of SO₂, tons/yr = (Emission factor, lb/1,000 gal) x (Fuel sulfur content, wt %) x (Fuel consumption, 1,000 gal/yr) / (2,000 lb/ton)
- #2 Diesel Heating Value: 0.135 MMBtu/gal
- EU10 and EU 11 - Fuel consumption for EU IDs 10 and 11 is a total for both boilers and is based on the fuel delivered during calendar year 2017.
- EU ID 17 and EU ID 18 Fuel consumption calculated based on estimated operating hours in CY 2017, assuming all operating hours at full load.
 Fuel consumption (1,000 gal/yr) = (Operation, hr/yr) x (Capacity, MMBtu/hr) / (0.135 MMBtu/gal) / (1,000)

**Table 3 - UAF Incinerator
CY 2017 Actual Emissions**

ID	Emission Unit Description	Waste Combustion, CY 2016	Actual Emissions (tpy)				
			NO _x	CO	PM ₁₀	SO ₂	VOC
9A	BiRD Incinerator	11.9 ton/yr	2.12E-02	1.76E-02	0.03	1.29E-02	1.78E-03
Total			0.02	0.02	0.03	0.01	0.002

Notes:

1. Weight conversion:

2,000 lb/ton

2. Incineration emission factors:

Pathological waste incinerator emission factors are not available. Medical waste incineration emission factors are expected to be representative of emissions from a pathological waste incinerator.

<u>Pollutant</u>	<u>Emission Factor</u>	<u>Source</u>
NO _x	3.56 lb/ton	AP-42, Table 2.3-1, 7/93
CO	2.95 lb/ton	AP-42, Table 2.3-1, 7/93
PM ₁₀	4.7 lb/ton	AP-42, Table 2.3-2, 7/93 - Total PM
SO ₂	2.17 lb/ton	AP-42, Table 2.3-1, 7/93
VOC	2.99E-01 lb/ton	AP-42, Table 2.3-2, 7/93 - TOC

3. Example calculations:

$$\text{Actual emissions, tons/yr} = (\text{Emission factor, lb/ton}) \times (\text{Waste combusted, ton/yr}) / (2,000 \text{ lb/ton})$$

**Table 4 - UAF Dual-Fired Boilers
CY 2017 Actual Emissions**

ID	Emission Unit Description	Fuel Consumption, CY 2017	Actual Emissions (tpy)				
			NO _x	CO	PM ₁₀	SO ₂	VOC
3	Power Plant Boiler - Diesel Fired	591.4 kgal/yr	7.1	1.5	1.0	21.0	0.10
3	Power Plant Boiler - Gas Fired	0 MMscf	0	0	0	0	0
4	Power Plant Boiler - Diesel Fired	457.4 kgal/yr	5.5	1.5	0.8	16.2	0.08
4	Power Plant Boiler - Gas Fired	16.17240 MMscf	1.1	0.7	0.1	0.00	0.0
Total			13.7	3.6	1.8	37.2	0.2

Notes:

1. Weight conversion: 2,000 lb/ton
2. Maximum diesel sulfur content: 0.50 maximum weight percent, per records of fuel received at UAF during CY 2017
3. Diesel emission factors:

<u>Pollutant</u>	<u>Emission Factor</u>	<u>Source</u>
NO _x	24 lb/kgal	AP-42 Table 1.3-1, 5/10
CO	5 lb/kgal	AP-42 Table 1.3-1, 5/10
PM ₁₀	3.3 lb/kgal	AP-42 Table 1.3-1, 5/10, sum of filterable and condensable
SO ₂	142 *S lb/kgal	AP-42 Table 1.3-1, 5/10
VOC	0.34 lb/kgal	AP-42 Table 1.3-3, 5/10, institutional boilers

4. Natural gas emission factors:

<u>Pollutant</u>	<u>Emission Factor</u>	<u>Source</u>
NO _x	140 lb/MMscf	AP-42 Table 1.4-1, 7/98, low NO _x burners
CO	84 lb/MMscf	AP-42 Table 1.4-1, 7/98
PM ₁₀	7.6 lb/MMscf	AP-42 Table 1.4-2, 7/98, Total PM
SO ₂	0.6 lb/MMscf	AP-42 Table 1.4-2, 7/98
VOC	5.5 lb/MMscf	AP-42 Table 1.4-2, 7/98

5. Example calculations:

$$\text{SO}_2 \text{ emission factor (lb/ton)} = 142 \times (\text{sulfur content of diesel, weight percent})$$

$$\text{Actual emissions (ton/yr)} = (\text{coal use, ton/yr}) \times (\text{emission factor, lb/ton}) / (2,000 \text{ lb/ton})$$

6. EU ID 3 has not been modified to combust natural gas.

**Table 5 - UAF CHPP Diesel Engine
CY 2017 Actual Emissions**

ID	Emission Unit Description	Maximum Capacity	Fuel Consumption, CY 2016	Actual Emissions (tpy)				
				NO _x	CO	PM ₁₀	SO ₂	VOC
8	Backup/Peaking Generator (DEG) Diesel fired	13,266 hp	0 gal/yr	0.00	0.00	0.00	0.00	0.00
Total				0.00	0.00	0.00	0.00	0.00

Notes:

1. Weight conversion: 2,000 lb/ton
2. Diesel Heating Value: 0.135 MMBtu/gal
3. Maximum diesel sulfur content: 0.50 maximum weight percent, per records of fuel received at UAF during CY 2017
4. Emission factors:

<u>Pollutant</u>	<u>Emission Factor</u>	<u>Source</u>
NO _x	0.057 lb/gal	AQ0316MSS02, Condition 12.3b, Equation 4 (controlled emission rate)
CO	0.85 lb/MMBtu	AP-42, Table 3.4-1, 10/96
PM ₁₀	0.10 lb/MMBtu	AP-42, Table 3.4-1, 10/96
SO ₂	1.01 *S lb/MMBtu	AP-42, Table 3.4-1, 10/96
VOC	0.09 lb/MMBtu	AP-42, Table 3.4-1, 10/96

5. Example calculations:

Actual emissions, tons/yr = (Emission factor, lb/MMBtu) x (Fuel consumption, gal/yr) x (Fuel heat value, MMBtu/gal) / (2,000 lb/ton)
 Actual emissions of SO₂, tons/yr = (Emission factor, lb/MMBtu) x (Fuel sulfur content, wt %) x (Fuel consumption, gal/yr) x (Fuel heat value, MMBtu/gal) / (2,000 lb/ton)
 Actual emissions of NO_x, tons/yr = (Emission factor, lb/gal) x (Fuel consumption, gal/yr) / (2,000 lb/ton)

6. EU ID 8 is permitted as a backup/peaking generator but is now an emergency generator

**Table 6 - UAF Internal Combustion Engines
CY 2017 Actual Emissions**

ID	Emission Unit Description	Maximum Capacity	Hours of Operation CY 2017	Actual Emissions (tpy)				
				NO _x	CO	PM ₁₀	SO ₂	VOC
23	Alaska Center for Energy and Power Generator Engine - Diesel Generator	332 hp	0 hrs	0.0	0.0	0.0	0.0	0.0
24	Old University Park Emergency Generator Engine - Emergency Generator	72 hp	8 hrs	8.5E-03	1.8E-03	6.0E-04	5.6E-04	6.9E-04
30	Duckering Classroom Engine - Diesel Fired	64 hp	1 hrs	9.8E-04	2.1E-04	7.0E-05	6.5E-05	8.0E-05
27	Alaska Center for Energy and Power Generator Engine - Diesel Fired	500 hp	74 hrs	0.1	0.1	0.0	2.0E-04	0.0
32	Alaska Earthquake Information Center Emergency Generator Engine - Emergency Generator	120 hp	6 hrs	1.1E-02	2.4E-03	7.9E-04	7.4E-04	9.1E-04
33	Arctic Health Research Emergency Generator Engine - Emergency Generator	212 hp	1 hrs	3.3E-03	7.1E-04	2.3E-04	2.2E-04	2.7E-04
TBD	BiRD Emergency Generator Engine- ULSD Fired Emergency Generator # 2	324 hp	12 hrs	6.0E-02	1.3E-02	4.3E-03	1.1E-05	4.9E-03
Total				0.2	0.1	0.0	0.0	0.0

Total Tons 0.38

Notes:

- 1. Weight conversion:
- 2. Emission factors:

2,000 lb/ton

<u>Pollutant</u>	<u>Emission Factor</u>	<u>Source</u>
NO _x	0.031 lb/hp-hr	AP-42, Table 3.3-1, 5/10, Diesel fuel
CO	6.68E-03 lb/hp-hr	AP-42, Table 3.3-1, 5/10, Diesel fuel
PM ₁₀	2.20E-03 lb/hp-hr	AP-42, Table 3.3-1, 5/10, Diesel fuel
SO ₂	2.05E-03 lb/hp-hr	AP-42, Table 3.3-1, 5/10, Diesel fuel
VOC	0.0025141 lb/hp-hr	AP-42, Table 3.3-1, 5/10, Diesel fuel - sum of exhaust and crankcase TOC emission factors

See note 8 for BiRD Genset

- 3. Emission factors for EU 27:

<u>Pollutant</u>	<u>Emission Factor</u>	<u>Source</u>
NO _x	3.52 lb/hr	Vendor
CO	3.14 lb/hr	Vendor
PM ₁₀	0.12 lb/hr	Vendor
SO ₂	1.09E-05 lb/hp-hr	Mass balance (ULSD required)
VOC	0.21 lb/hr	Vendor

- 4. Example calculations:

Actual emissions, tons/yr = (Emission factor, lb/hp-hr) x (Capacity, hp) x (Operation, hr/yr) / (2,000 lb/ton)

- 5. Horsepower ratings for EU IDs 23, 24, 30, and 33 assume a 95% shaft efficiency.

Capacity (hp) = (Capacity, kW) x (1.341 hp/kW) / 0.95

- 6. EU ID 23 did not operate during CY 2017.

- 7. Actual emissions for EU IDs 6 and 7 are not included in this assessable emissions estimate because they were permanently removed from service on June 29, 2012. EU ID 33 will replace these units.

**Table 7 - UAF Coal Preparation Plant
CY 2017 Actual Emissions, PM-10**

Emission Source		Emission Factor		Source	Material Handling (tpy)	Control Method	Control Efficiency (percent)	Annual PM ₁₀ Emission (tpy)
Identification	Type	Value	Units					
Railcar unloading through grate into crusher	Point	3.63E-04	lb/ton	AP-42, Section 13.2.4	68,870.0	Plant Building	0	0.013
Crusher	Point	0.006	lb/ton	3-05-010-10, FIRE	68,870.0	Plant Building	0	0.207
Crusher to conveyor 1	Point	3.63E-04	lb/ton	AP-42, Section 13.2.4	68,870.0	Plant Building	0	0.013
Conveyor 1 to bucket elevator	Point	3.63E-04	lb/ton	AP-42, Section 13.2.4	68,870.0	Plant Building	0	0.013
Bucket elevator to screw conveyor	Point	3.63E-04	lb/ton	AP-42, Section 13.2.4	68,870.0	Plant Building	0	0.013
Screw conveyor to coal bin 1 or	Point	3.63E-04	lb/ton	AP-42, Section 13.2.4	33,342.0	Plant Building	0	0.006
Screw conveyor to coal bin 2	Point	3.63E-04	lb/ton	AP-42, Section 13.2.4	35,528.0	Plant Building	0	0.006
Coal bin 1 to scale 1 or	Point	3.63E-04	lb/ton	AP-42, Section 13.2.4	33,342.0	Plant Building	0	0.006
Coal bin 2 to scale 2	Point	3.63E-04	lb/ton	AP-42, Section 13.2.4	35,528.0	Plant Building	0	0.006
Scale 1 to boiler 1 or	Point	3.63E-04	lb/ton	AP-42, Section 13.2.4	33,342.0	Plant Building	0	0.006
Scale 2 to boiler 2	Point	3.63E-04	lb/ton	AP-42, Section 13.2.4	35,528.0	Plant Building	0	0.006
Actual PM-10 Emissions from Coal Preparation Plant								0.29

Notes:

1. Coal transfer emission factor from AP-42, Section 13.2.4 based on empirical equation $E = k \times 0.0032 \times (U/5)^{1.3} / (M/2)^{1.4}$ lb/ton transferred where:

k = 0.35 for PM₁₀

U = mean wind speed = 5.4 mph per <http://wf.ncdc.noaa.gov/oa/climate/online/ccd/avgwind.html>

M = coal moisture content = 4.8 percent

2. FIRE = Factor Information Retrieval Data System.

3. Example Calculations:

$$\text{Actual emissions (tpy)} = (\text{Emission factor, lb/ton}) \times (\text{Material handled, ton/yr}) / (2,000 \text{ lb/ton})$$

**Table 8 - UAF Propane Fired Sources
CY 2017 Actual Emissions**

ID	Emission Unit Description	Fuel Consumption, CY 2017	Actual Emissions (tpy)				
			NO _x	CO	PM ₁₀	SO ₂	VOC
N/A	Fine Arts/Art Wing Rms 302, 413 Kiln - Propane Fired	19.5 1,000 gal/yr	1.3E-01	7.3E-02	6.8E-03	1.9E-04	9.7E-03
N/A	Eternal Flame and Whitaker Propane Fired						
N/A	Wood Center Kiln - Propane Fired						
Total			1.3E-01	7.3E-02	6.8E-03	1.9E-04	9.7E-03

Notes:

1. Weight conversion: 2,000 lb/ton
2. Propane sulfur content: 0.20 gr/100 ft³ gas vapor (assumption)
3. Propane Emission factors:

Emission factors for small pottery-firing kilns are not available. These calculations assume that combustion of propane in the kilns is similar to the combustion of propane in small propane-fired boilers.

<u>Pollutant</u>	<u>Emission Factor</u>	<u>Source</u>
NO _x	13 lb/1,000 gal	AP-42, Table 1.5-1, 07/08 (propane commercial boilers)
CO	7.5 lb/1,000 gal	AP-42, Table 1.5-1, 07/08 (propane commercial boilers)
PM ₁₀	0.7 lb/1,000 gal	AP-42, Table 1.5-1, 07/08 (propane commercial boilers)
SO ₂	0.1 *S lb/1,000 gal	AP-42, Table 1.5-1, 07/08 (propane commercial boilers), multiplied by gr/100 ft ³ gas vapor sulfur in fuel
VOC	1.0 lb/1,000 gal	AP-42, Table 1.5-1, 07/08 (propane commercial boilers), TOC

4. Example calculations:

$$\text{Actual emissions (ton/yr)} = (\text{Emission factor, lb/1,000 gal}) \times (\text{Fuel consumption, 1,000 gal/yr}) / (2,000 \text{ lb/ton})$$

**Table 9 - UAF Laboratory Hoods
CY 2017 Actual Emission Estimate, VOC and HAPs**

Chemical	CAS No.	Amount Stored On-site (liters)	Specific gravity of stored substance	Percent in solution	Amount Stored On-site (lbs)	VOC Emissions (ton/yr)	HAP Emissions (ton/yr)
2-Butanone	78-93-3	35	0.806	100	62.2	0.031	
Acetic acid	64-19-7	39	1.05	97	87.5	0.044	
Acetone	67-64-1	495	0.788	100	859.7	0.430	
Benzene	71-43-2	12	0.8765	100	23.2	0.012	0.012
Ethanol	64-17-5	502	0.79	100	874.1	0.437	
Formaldehyde	50-00-0	398	1.08	38	360.0	0.180	0.180
Methyl alcohol in formaldehyde solution	67-56-1			15	142.1	0.071	0.071
Hexane	110-54-3	77	0.659	94	105.1	0.053	0.053
Methanol	67-56-1	443	0.791	100	772.3	0.386	0.386
Methylene chloride	75-09-2	156	1.3266	100	456.1	0.228	0.228
Phenol	108-95-2	4	1.057	100	9.3	0.005	0.005
n-Propyl alcohol and 2-Propanol	71-23-8, 67-63-0	356	0.7945	100	623.4	0.312	
Stoddard solvent	8052-41-3	32	0.787	100	55.5	0.028	
Toluene	108-88-3	178	0.86	100	337.4	0.169	0.169
Xylene	1330-20-7	43	0.864	100	81.9	0.041	0.041
Total						2.42	1.14

Notes:

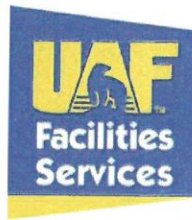
- The above chemicals were determined to be common chemicals that contained VOCs.
- Only chemical inventories of 4 liters or greater were included.
- This inventory is not up to date, but reflects information available at issuance of Title V Permit Renewal.
- This inventory does not reflect chemical usage, only those stored on-site.
- In order to conservatively estimate VOC emissions from laboratory hoods, the following assumptions are made:
 - The chemicals stored on-site are used within a year.
 - The chemicals are emitted in their current form and are 100% volatile.
 - The chemicals are not transformed into other chemicals. Other VOCs are not created during laboratory use.
- Specific gravity and percent of chemical in solution data obtained from chemical product material safety data sheets.

SG of Water = 1 kg/L
 Conversion: 2.204 lb/kg
 2,000 lb/ton

8. Example calculations:

Amount stored on-site (lbs) = (Liters stored) x (Specific gravity) x (2.204 lb/kg) x (percent in solution)
 Emission estimate (ton/yr) = (Pounds stored) / (2,000 lb/ton)

Adopted



July 5, 2022
Scott Bell, Associate Vice Chancellor
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CERTIFIED MAIL: 7018 1130 0002 0650 5342

March 28, 2019

ATTN: Compliance Technician
Alaska Department of Environmental Conservation
Air Permits Program
610 University Avenue
Fairbanks, Alaska 99709

RE: Assessable Emissions Report for University of Alaska Fairbanks Campus, Air Quality Operating Permit Number AQ0316TVP02 Rev. 1

Compliance Technician,

Attached is the Assessable Emissions Report for the UAF Fairbanks campus for FY 2020. The estimate was based on actual operations that occurred January 1 through December 31, 2018. This estimate includes emission units permitted under the above operating permit as well as additional emission units not covered under the permit, including those determined to be insignificant.

If you have any questions regarding this estimate, please contact Russ Steiger, UAF Environmental Compliance Officer at 907-474-5812 or by e-mail at rhsteiger@alaska.edu.

Based on information and belief formed after reasonable inquiry, I certify that the statements and information in an attached to this document are true, accurate, and complete.

Sincerely,

A handwritten signature in blue ink, appearing to read 'SBell', is written over a light blue horizontal line.

Scott Bell, PE
Associate Vice Chancellor of Facilities Services

Attachment: Assessable Emissions Calculation Report

University of Alaska Fairbanks Assessable Emissions Estimate FY2020

Assessable Emissions - Tons Per Year

Pollutant	NO _x	CO	PM ₁₀	SO ₂	VOC	HAPs	Total
Assessable PTE	637	252	17	858	11	13.6	1,788.6

from Table D, Statement of Basis for Operating Permit No. AQ0316TVP02 Rev. 1

Emission Sources		Assessable Emissions Summary (TPY)					
		NO _x	CO	PM ₁₀	SO ₂	VOC	HAPs
Table 1	Coal-Fired Boilers	295.28	167.77	22.95	129.18	1.68	10.1
Table 2	Small External Combustion Units	0.84	0.21	0.14	0.83	0.01	
Table 3	Incinerator	0.01	0.01	0.02	0.01	0.00	
Table 4	CHPP Dual-Fired Boilers	15.90	3.91	2.16	46.00	0.23	
Table 5	CHPP Diesel Generator	0.00	0.00	0.00	0.00	0.00	
Table 6	Generator Engines	0.11	0.03	0.01	0.00	0.01	
Table 7	Coal Handling Plant			0.29			
Table 8	Kilns	8.7E-02	5.0E-02	4.7E-03	1.3E-04	6.7E-03	
Table 9	Laboratory Hoods					2.42	1.14
Totals		312.22	171.99	25.56	176.03	4.37	11.22

FY19 Assessable Emissions Estimate, in Tons	697.0
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Note: Actual HAP emissions for emission units in Tables 2 through 8 are not calculated for this estimate. The actual VOC emissions for these units are low enough that HAP emissions are expected to be insignificant.

University of Alaska Fairbanks Assessable Emissions Estimate FY2020
Emission Inventory and CY 2018 Operations Data

EU ID ⁶	Emission Unit	Emission Unit Type	Bldg No.	Installation Date	Make/Model	Fuel Type	Fuel Usage 2018		Maximum Capacity
1	Power Plant	Boiler - Coal Fired	FS802	1962	Erie City	Coal	33,446.0	tons	84.5 MMBtu/hr
2	Power Plant	Boiler - Coal Fired	FS802	1962	Erie City	Coal	33,662.0	tons	84.5 MMBtu/hr
3	Power Plant	Boiler - Dual Fired	FS802	1970	Zurn	Diesel	740,805.0	gal	180.9 MMBtu/hr
3	Power Plant	Boiler - Dual Fired	FS802	1970	Zurn	Natural Gas	0.00	MCF ⁶	180.9 MMBtu/hr
4	Power Plant	Boiler - Dual Fired	FS802	1987	Zurn	Diesel	555,068.0	gal	180.9 MMBtu/hr
4	Power Plant	Boiler - Dual Fired	FS802	1987	Zurn	Natural Gas	4,957.00	MCF	180.9 MMBtu/hr
6	Arctic Health Research Building	Engine - Emergency Generator	FS901	1968	Cummins/NH2501PG	Diesel	0	hrs ¹	125 kW
7	Arctic Health Research Building	Engine - Emergency Generator	FS901	1968	Cummins/NH2501P	Diesel	0	hrs ¹	125 kW
8	Power Plant	Engine - Backup/Peaking Generator (DEG)	FS817	1999	Fairbanks Morse Colt-Pielstick PC2.6	Diesel	0	gal	13,266 hp
9A	BiRD	Incinerator	FS919	2006	Therm-Tec/G-30P-1H	Waste	16,541	lbs	83 lb/hr
10	AFES Boiler	Boiler - Oil Fired	AF256	2000	Burnham/V90GA	Diesel	12,371	gal ⁴	1.08 MMBtu/hr
11	AFES Boiler	Boiler - Oil Fired	AF256	2000	Burnham/V90GA	Diesel			1.08 MMBtu/hr
12	Harper Boiler #1	Boiler - Oil Fired	FS420	1985	Weil McLain/BL776-S-W	Diesel			0.64 MMBtu/hr
13	Harper Boiler #2	Boiler - Oil Fired	FS420	1985	Weil McLain/BL776-S-W	Diesel			0.64 MMBtu/hr
29	Harper Hot Water Heater	Hot Water Heater - Oil Fired	FS420	1985 (est)	Bock	Diesel	960	gal ²	0.236 MMBtu/hr
34	Harper Trailer Toyo	Furnace - Oil Fired	FS421	2014	Toyotomi OM-180	Diesel			0.148 MMBtu/hr
14	Copper Lane Boiler	Boiler - Oil Fired	FS518	1985	Energy Kinetics System 2000	Diesel			0.136 MMBtu/hr
15	Copper Lane Boiler	Boiler - Oil Fired	FS519	1985	Energy Kinetics System 2000	Diesel	9,166	gal ²	0.136 MMBtu/hr
16	Copper Lane (Honor's House) Boiler	Boiler - Oil Fired	FS520	2005	Weil McLain/P-WGO-5	Diesel			0.233 MMBtu/hr
17	West Ridge Research Building Boiler #1	Boiler - ULSD Fired	FS909	2003	Weil McLain/BL1688w-GPr10	ULSD ⁷	85.0	hrs	4.93 MMBtu/hr
18	West Ridge Research Building Boiler #2	Boiler - ULSD Fired	FS909	2003	Weil McLain/BL1688w-GPr10	ULSD			4.93 MMBtu/hr
19	BiRD RM 100U3 Boiler #1	Boiler - ULSD Fired	FS919	2004	Weil McLain/2094W	ULSD			6.13 MMBtu/hr
20	BiRD RM 100U3 Boiler #2	Boiler - ULSD Fired	FS919	2004	Weil McLain/2094W	ULSD	57,586	gal ^{2,3}	6.13 MMBtu/hr
21	BiRD RM 100U3 Boiler #3	Boiler - ULSD Fired	FS919	2004	Weil McLain/2094W	ULSD			6.13 MMBtu/hr
22	BiRD RM 100U3 Boiler #4	Boiler - ULSD Fired	FS919	2005	Bryan/EB200-S-150-FDGO	ULSD			8.5 MMBtu/hr
23	Alaska Center for Energy and Power Generator Engine	Engine - Diesel Generator	FS814	2003	Detroit Diesel/6043-TK35	Diesel	0	gal	235 kW
24	Old University Park Emergency Generator Engine	Engine - Emergency Generator	FS423	2001	Cummins/4B3.9-G2	Diesel	6.80	hrs	51 kW
25	AFES Greenhouse Furnace	Furnace - Oil Fired	AF117	1991	Sunderman/L020UF	Diesel	0	gal	0.209 MMBtu/hr
27	Alaska Center for Energy and Power Generator Engine	Engine - Diesel Fired	FS814	2013	Caterpillar C-15	Diesel	7	hrs	500 hp
28	AFES Grain Dryer	Grain Dryer - Oil Fired	AF108	1988	Unknown	Diesel	300	gal	2.43 MMBtu/hr
30	Duckering Classroom Engine	Engine - Diesel Fired	FS103	1987	Mitsubishi-Bosch	Diesel	1	hrs	45 kW
31	Skarland Cabin Furnace	Furnace - Oil Fired	FS712	2001 (est)	Rheem/ROBC-084QPEB	Diesel	495	gal ²	0.140 MMBtu/hr
32	Alaska Earthquake Information Center Emergency Generator Engine	Engine - Emergency Generator	FS903	1998	Detroit Diesel	Diesel	0	hrs	120 hp
33	Arctic Health Research Emergency Generator Engine	Engine - Emergency Generator	FS901	2013	Cummins/QSB7-G3	Diesel	2	hrs	150 kW
N/A	Power Plant	Coal Handling/Crushing Facility	FS802	1964	American Pulverizer (crusher make)	Coal	67,108.0	tons	50 tons/hr
N/A	Fine Arts/Art Wing Rms 302, 413	Kiln - Propane Fired	FS313	2009	Alpine Kilns and Equipment/SBF-40	Propane			1.81 MMBtu/hr
N/A	Eternal Flame and Whitaker	Propane Fired	FS313	2009	Kilnmaster/constructed on-site	Propane	13,436	gal	0.53 MMBtu/hr
N/A	Wood Center	Kiln - Propane Fired	FS313	2009	Geil Kilns/DLB2	Propane			0.23 MMBtu/hr
N/A	AFES Farm kiln	Kiln(s) - Wood Fired	N/A	Various	Hand-built	Wood	3	cords	Unknown
N/A	Facilities Services ⁵	Paint Booth Exhaust Fan	FS803	2001		Vegetable Oil	0	gallons	Unknown
N/A	Museum ⁵	Paint Booth Exhaust Fan	FS907	2006	Greenheck/TAB-42-030T3	Various Paints	Mainly water based paints are used. Minimal amounts of paint are stored on-site and paint booths are used infrequently.		12,500 cfm
N/A	Laboratory Fume Hoods (campus-wide)	Laboratory hoods	Multiple	Various	N/A	Various Paints	Per estimate in Table 9.		5,480 cfm
N/A	Duckering Classroom Turbine ⁵	Turbine - Propane Fired	FS103	1970(est)	Cussons Two Shaft Gas Turbine Unit	Propane	2	hours	N/A
N/A	Power Plant ⁶	Tank (Diesel) - Field Erected	FS817	1969	Fixed roof, 212,120 gallons	Diesel		N/A	0.33 MMBtu/hr
									212,120 gal

University of Alaska Fairbanks Assessable Emissions Estimate FY2020
Emission Inventory and CY 2018 Operations Data

EU ID ⁶	Emission Unit	Emission Unit Type	Bldg No.	Installation Date	Make/Model	Fuel Type	Fuel Usage 2018	Maximum Capacity
N/A	Graduation Flame ⁵	Ceremonial Flame	N/A	1975(est)	Custom-built	Propane	N/A	5.0E-03 MMBtu/hr
N/A	Power Plant ⁵	Ash Handling System	FS802	1962	N/A	N/A	N/A	8,760 hr/yr
N/A	SRC Pellet Stoves ⁵	Pellet Stove	N/A	2012	Avalon/AGP	Wood Pellets	N/A	5 lb/hr
TBD	BiRD Emergency Generator #2 (South)	Engine- Emergency Generator	FS919	2015	Cummins/QSB7-G5NR3	ULSD	16 hours 103 gallons	324 hp
N/A	FS Physical Plant	Welding exhaust	Multiple	Various	Various	Various		
N/A	CTC Hutchison Diesel shop	Diesel engine exhaust	N/A	Various	Cummins and Caterpillar	Diesel		

Notes:

1. These emission units were removed from service on June 29, 2012 were replaced with EU ID 33.
2. Fuel burned was determined by review of fuel deliveries for calendar year 2018. The assumption was made that all fuel delivered was burned. Most deliveries for the year are in the same order of magnitude.
3. The gallons of fuel provided are for all 4 of the boilers. Note 2 above applies to the gallons of fuel.
4. Fuel consumption for EU IDs 10 and 11 is a total for both boilers and is based on the fuel delivered during calendar year 2018.
5. Actual emissions are estimated to be insignificant for wood-fired kilns, paint booths, diesel storage tank, CHPP ash handling system, graduation flame, pellet stove, and small fuel-combusting unit (approx 3 hr/yr) in teaching laboratory.
6. EU ID 3 is permitted to fire natural gas but has not yet been modified to do so.
7. ULSD = Ultra Low Sulfur Diesel

**Table 1 - UAF Coal Fired Boilers
CY 2018 Actual Emissions**

ID	Emission Unit Description	Coal Consumption, CY 2018	Actual Emissions (tpy)					
			NO _x	CO	PM ₁₀	SO ₂	VOC	HAPs
1	Power Plant Boiler - Coal Fired	33,446.0 ton/yr	147.2	83.6	11.4	64.4	0.8	5.0
2	Power Plant Boiler - Coal Fired	33,662.0 ton/yr	148.1	84.2	11.5	64.8	0.8	5.1
Total			295.3	167.8	23.0	129.2	1.7	10.1

Notes:

1. Weight conversion: 2,000 lb/ton
2. Sulfur content of coal: 0.110 weight percent weighted average based on 2018 UCM rail sample data
3. Emission factors:

<u>Pollutant</u>	<u>Emission Factor</u>	<u>Source</u>
NO _x	8.8 lb/ton	AP-42, Table 1.1-3, 9/98, Sub-bituminous spreader stoker
CO	5 lb/ton	AP-42, Table 1.1-3, 9/98, Sub-bituminous spreader stoker
PM ₁₀	0.68 lb/ton	AP-42, Tables 1.1-5 and 1.1-9, 9/98, Spreader stoker, with baghouse
SO ₂	35*S lb/ton	AP-42, Table 1.1-3, 9/98, Sub-bituminous spreader stoker, multiplied by weight percent sulfur in coal
VOC	0.05 lb/ton	AP-42, Table 1.1-19, 9/98, Spreader stoker (total NMOC)
HAPs	0.30 lb/ton	See note 4

4. HAPs emission factor is a sum of the following emission factors:

<u>Pollutant</u>	<u>Emission Factor</u>	<u>Source</u>
HCl	0.138 lb/ton	Source test from boilers of similar design at Clear Air Force Station
HF	0.139 lb/ton	Source test from boilers of similar design at Clear Air Force Station
Hg	8.46E-05 lb/ton	Source test from boilers of similar design at Clear Air Force Station
All other HAPs	0.0233 lb/ton	Total of emission factors from AP-42 Tables 1.1-13, 1.1-14, 1.1-18, 9/98

5. Example calculations:

$$SO_2 \text{ emission factor (lb/ton)} = 35 \times (\text{sulfur content of coal, weight percent})$$

$$\text{Actual emissions (ton/yr)} = (\text{coal use, ton/yr}) \times (\text{emission factor, lb/ton}) / (2,000 \text{ lb/ton})$$

$$PM_{10} \text{ emission factor (lb/ton)} = (\text{condensable PM emission factor, lb/MMBtu}) \times (\text{UCM heat content, 15.3 MMBtu/ton})$$

$$+ (PM_{10} \text{ particle emission factor, lb/ton})$$

**Table 2 - UAF Small Oil-Fired External Combustion Units
CY 2018 Actual Emissions**

ID	Emission Unit Description	Fuel Type	Maximum Capacity	Fuel Consumption, CY 2018		Actual Emissions (tpy)				
						NO _x	CO	PM ₁₀	SO ₂	VOC
10	AFES (the farm) Boiler - Oil Fired	Diesel	1.08 MMBtu/hr	12.4	1,000 gal/yr	0.12	0.03	0.02	0.44	2.1E-03
11	AFES (the farm) Boiler - Oil Fired	Diesel	1.08 MMBtu/hr							
12	Harper #1 Boiler - Oil Fired	Diesel	0.64 MMBtu/hr	0.96	1,000 gal/yr	0.01	0.00	0.00	0.03	1.6E-04
13	Harper #2 Boiler - Oil Fired	Diesel	0.64 MMBtu/hr							
29	Harper Hot Water Heater - Oil Fired	Diesel	0.236 MMBtu/hr							
34	Harper Trailer Toyo - Oil Fired	Diesel	MMBtu/hr							
14	Copper Lane Boiler - Oil Fired	Diesel	0.136 MMBtu/hr	9.17	1,000 gal/yr	0.09	0.02	0.02	0.33	1.6E-03
15	Copper Lane Boiler - Oil Fired	Diesel	0.136 MMBtu/hr							
16	Copper Lane (Honors House) Boiler - Oil Fired	Diesel	0.233 MMBtu/hr	9.17	1,000 gal/yr	0.00	0.00	0.00	0.00	0.0E+00
17	West Ridge Research Building #1 Boiler - Oil Fired	ULSD	4.93 MMBtu/hr	3.10	1,000 gal/yr	0.03	0.01	0.01	0.00	5.3E-04
18	West Ridge Research Building #2 Boiler - Oil Fired	ULSD	4.93 MMBtu/hr							
19	BiRD RM 100U3 #1 Boiler - Oil Fired	ULSD	6.13 MMBtu/hr	57.6	1,000 gal/yr	0.58	0.14	0.10	0.01	9.8E-03
20	BiRD RM 100U3 #2 Boiler - Oil Fired	ULSD	6.13 MMBtu/hr							
21	BiRD RM 100U3 #3 Boiler - Oil Fired	ULSD	6.13 MMBtu/hr							
22	BiRD RM 100U3 #4 Boiler - Oil Fired	ULSD	8.5 MMBtu/hr							
25	AFES (the farm) Greenhouse Furnace - Oil Fired	Diesel	0.209 MMBtu/hr	0.00	1,000 gal/yr	0.00	0.000	0.00	0.00	0.0E+00
31	Skarland Cabin Furnace - Oil Fired	Diesel	0.140 MMBtu/hr	0.50	1,000 gal/yr	0.00	0.001	0.00	0.02	1.8E-04
28	AFES (the farm) Grain Dryer Grain Dryer - Oil Fired	Diesel	2.43 MMBtu/hr	0.30	1,000 gal/yr	0.00	0.001	0.00	0.01	5.1E-05
				103.6 Total		0.8	0.2	0.1	0.8	1.4E-02

Notes:

- Maximum diesel sulfur content: 0.5 maximum weight percent, per records of fuel received at UAF during CY 2018
- Maximum diesel sulfur content ULSD: 0.0015 maximum weight percent, per records of ULSD fuel received at UAF during CY 2017
- Weight conversion: 2,000 lb/ton
- Emission factors:

Pollutant	Emission Factor	Source
NO _x	20 lb/1,000 gal	AP-42, Table 1.3-1, 5/10, Distillate oil fired
CO	5 lb/1,000 gal	AP-42, Table 1.3-1, 5/10, Distillate oil fired
PM ₁₀	3.3 lb/1,000 gal	AP-42, Tables 1.3-1 and 1.3-2, 5/10, Distillate oil fired - sum of filterable PM and total condensable PM
SO ₂	142'S lb/1,000 gal	AP-42, Table 1.3-1, 5/10, Distillate oil fired, multiplied by weight percent sulfur in fuel
VOC - boilers	0.34 lb/1,000 gal	AP-42, Table 1.3-3, 5/10, Distillate oil fired (total non-methane organic compounds) (also used for grain dryer EU)
VOC - furnaces	0.713 lb/1,000 gal	AP-42, Table 1.3-3, 5/10, Distillate oil fired (total non-methane organic compounds) (also used for hot water heater EU)

- Heat input ratings were not available for most external combustion units listed here. For ratings provided in terms of heat output or terms not specified, a conservative 75% efficiency has been applied to calculate the maximum heat input capacity shown in the table.
- Example calculations:
 Actual emissions, tons/yr = (Emission factor, lb/1,000 gal) x (Fuel consumption, 1,000 gal/yr) / (2,000 lb/ton)
 Actual emissions of SO₂, tons/yr = (Emission factor, lb/1,000 gal) x (Fuel sulfur content, wt %) x (Fuel consumption, 1,000 gal/yr) / (2,000 lb/ton)
- #2 Diesel Heating Value: 0.135 MMBtu/gal
- EU10 and EU 11 - Fuel consumption for EU IDs 10 and 11 is a total for both boilers and is based on the fuel delivered during calendar year 2018.
- EU ID 17 and EU ID 18 Fuel consumption calculated based on estimated operating hours in CY 2018, assuming all operating hours at full load.
 Fuel consumption (1,000 gal/yr) = (Operation, hr/yr) x (Capacity, MMBtu/hr) / (0.135 MMBtu/gal) / (1,000)

**Table 3 - UAF Incinerator
CY 2018 Actual Emissions**

ID	Emission Unit Description	Waste Combustion, CY 2018	Actual Emissions (tpy)				
			NO _x	CO	PM ₁₀	SO ₂	VOC
9A	BiRD Incinerator	8.3 ton/yr	1.47E-02	1.22E-02	0.02	8.97E-03	1.24E-03
	Total		0.01	0.01	0.02	0.01	0.001

Notes:

1. Weight conversion:

2,000 lb/ton

2. Incineration emission factors:

Pathological waste incinerator emission factors are not available. Medical waste incineration emission factors are expected to be representative of emissions from a pathological waste incinerator.

<u>Pollutant</u>	<u>Emission Factor</u>	<u>Source</u>
NO _x	3.56 lb/ton	AP-42, Table 2.3-1, 7/93
CO	2.95 lb/ton	AP-42, Table 2.3-1, 7/93
PM ₁₀	4.7 lb/ton	AP-42, Table 2.3-2, 7/93 - Total PM
SO ₂	2.17 lb/ton	AP-42, Table 2.3-1, 7/93
VOC	2.99E-01 lb/ton	AP-42, Table 2.3-2, 7/93 - TOC

3. Example calculations:

$$\text{Actual emissions, tons/yr} = (\text{Emission factor, lb/ton}) \times (\text{Waste combusted, ton/yr}) / (2,000 \text{ lb/ton})$$

**Table 4 - UAF Dual-Fired Boilers
CY 2018 Actual Emissions**

ID	Emission Unit Description	Fuel Consumption, CY 2018	Actual Emissions (tpy)				
			NO _x	CO	PM ₁₀	SO ₂	VOC
3	Power Plant Boiler - Diesel Fired	740.8 kgal/yr	8.9	1.9	1.2	26.3	0.13
3	Power Plant Boiler - Gas Fired	0 MMscf	0	0	0	0	0
4	Power Plant Boiler - Diesel Fired	555.1 kgal/yr	6.7	1.9	0.9	19.7	0.09
4	Power Plant Boiler - Gas Fired	4.95700 MMscf	0.3	0.2	0.0	0.00	0.0
Total			15.9	3.9	2.2	46.0	0.2

Notes:

1. Weight conversion: 2,000 lb/ton
2. Maximum diesel sulfur content: 0.50 maximum weight percent, per records of fuel received at UAF during CY 2018
3. Diesel emission factors:

<u>Pollutant</u>	<u>Emission Factor</u>	<u>Source</u>
NO _x	24 lb/kgal	AP-42 Table 1.3-1, 5/10
CO	5 lb/kgal	AP-42 Table 1.3-1, 5/10
PM ₁₀	3.3 lb/kgal	AP-42 Table 1.3-1, 5/10, sum of filterable and condensable
SO ₂	142 *S lb/kgal	AP-42 Table 1.3-1, 5/10
VOC	0.34 lb/kgal	AP-42 Table 1.3-3, 5/10, institutional boilers

4. Natural gas emission factors:

<u>Pollutant</u>	<u>Emission Factor</u>	<u>Source</u>
NO _x	140 lb/MMscf	AP-42 Table 1.4-1, 7/98, low NO _x burners
CO	84 lb/MMscf	AP-42 Table 1.4-1, 7/98
PM ₁₀	7.6 lb/MMscf	AP-42 Table 1.4-2, 7/98, Total PM
SO ₂	0.6 lb/MMscf	AP-42 Table 1.4-2, 7/98
VOC	5.5 lb/MMscf	AP-42 Table 1.4-2, 7/98

5. Example calculations:

$$\text{SO}_2 \text{ emission factor (lb/ton)} = 142 \times (\text{sulfur content of diesel, weight percent})$$

$$\text{Actual emissions (ton/yr)} = (\text{coal use, ton/yr}) \times (\text{emission factor, lb/ton}) / (2,000 \text{ lb/ton})$$

6. EU ID 3 has not been modified to combust natural gas.

**Table 5 - UAF CHPP Diesel Engine
CY 2018 Actual Emissions**

ID	Emission Unit Description	Maximum Capacity	Fuel Consumption, CY 2018	Actual Emissions (tpy)				
				NO _x	CO	PM ₁₀	SO ₂	VOC
8	Backup/Peaking Generator (DEG) Diesel fired	13,266 hp	0 gal/yr	0.00	0.00	0.00	0.00	0.00
			Total	0.00	0.00	0.00	0.00	0.00

Notes:

1. Weight conversion: 2,000 lb/ton
2. Diesel Heating Value: 0.135 MMBtu/gal
3. Maximum diesel sulfur content: 0.50 maximum weight percent, per records of fuel received at UAF during CY 2018
4. Emission factors:

Pollutant	Emission Factor	Source
NO _x	0.057 lb/gal	AQ0316MSS02, Condition 12.3b, Equation 4 (controlled emission rate)
CO	0.85 lb/MMBtu	AP-42, Table 3.4-1, 10/96
PM ₁₀	0.10 lb/MMBtu	AP-42, Table 3.4-1, 10/96
SO ₂	1.01 *S lb/MMBtu	AP-42, Table 3.4-1, 10/96
VOC	0.09 lb/MMBtu	AP-42, Table 3.4-1, 10/96

5. Example calculations:

Actual emissions, tons/yr = (Emission factor, lb/MMBtu) x (Fuel consumption, gal/yr) x (Fuel heat value, MMBtu/gal) / (2,000 lb/ton)

Actual emissions of SO₂, tons/yr = (Emission factor, lb/MMBtu) x (Fuel sulfur content, wt %) x (Fuel consumption, gal/yr) x (Fuel heat value, MMBtu/gal) / (2,000 lb/ton)

Actual emissions of NO_x, tons/yr = (Emission factor, lb/gal) x (Fuel consumption, gal/yr) / (2,000 lb/ton)

6. EU ID 8 is permitted as a backup/peaking generator but is now an emergency generator.. EU ID 8 did not operate in CY 2018

**Table 6 - UAF Internal Combustion Engines
CY 2018 Actual Emissions**

ID	Emission Unit Description	Maximum Capacity		Hours of Operation CY 2018		Actual Emissions (tpy)				
						NO _x	CO	PM ₁₀	SO ₂	VOC
23	Alaska Center for Energy and Power Generator Engine - Diesel Generator	332	hp	0	hrs	0.0	0.0	0.0	0.0	0.0
24	Old University Park Emergency Generator Engine - Emergency Generator	72	hp	7	hrs	7.6E-03	1.6E-03	5.4E-04	5.0E-04	6.2E-04
30	Duckering Classroom Engine - Diesel Fired	64	hp	1	hrs	9.8E-04	2.1E-04	7.0E-05	6.5E-05	8.0E-05
27	Alaska Center for Energy and Power Generator Engine - Diesel Fired	500	hp	7	hrs	0.0	0.0	0.0	1.9E-05	0.0
32	Alaska Earthquake Information Center Emergency Generator Engine - Emergency Generator	120	hp	0	hrs	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
33	Arctic Health Research Emergency Generator Engine - Emergency Generator	212	hp	2	hrs	6.6E-03	1.4E-03	4.7E-04	4.3E-04	5.3E-04
TBD	BiRD Emergency Generator Engine- ULSD Fired Emergency Generator # 2	324	hp	16	hrs	8.0E-02	1.7E-02	5.7E-03	1.1E-05	6.5E-03
Total						0.1	0.0	0.0	0.0	0.0

Total Tons 0.16

Notes:

1. Weight conversion:
2. Emission factors:

2,000 lb/ton

Pollutant	Emission Factor	Source
NO _x	0.031 lb/hp-hr	AP-42, Table 3.3-1, 5/10, Diesel fuel
CO	6.68E-03 lb/hp-hr	AP-42, Table 3.3-1, 5/10, Diesel fuel
PM ₁₀	2.20E-03 lb/hp-hr	AP-42, Table 3.3-1, 5/10, Diesel fuel
SO ₂	2.05E-03 lb/hp-hr	AP-42, Table 3.3-1, 5/10, Diesel fuel
VOC	0.0025141 lb/hp-hr	AP-42, Table 3.3-1, 5/10, Diesel fuel - sum of exhaust and crankcase TOC emission factors

See note 8 for BiRD Genset

3. Emission factors for EU 27:

Pollutant	Emission Factor	Source
NO _x	3.52 lb/hr	Vendor
CO	3.14 lb/hr	Vendor
PM ₁₀	0.12 lb/hr	Vendor
SO ₂	1.09E-05 lb/hp-hr	Mass balance (ULSD required)
VOC	0.21 lb/hr	Vendor

4. Example calculations:

Actual emissions, tons/yr = (Emission factor, lb/hp-hr) x (Capacity, hp) x (Operation, hr/yr) / (2,000 lb/ton)

5. Horsepower ratings for EU IDs 23, 24, 30, and 33 assume a 95% shaft efficiency.

Capacity (hp) = (Capacity, kW) x (1.341 hp/kW) / 0.95

6. EU ID 23 did not operate during CY 2017.

7. Actual emissions for EU IDs 6 and 7 are not included in this assessable emissions estimate because they were permanently removed from service on June 29, 2012. EU ID 33 will replace these units.

**Table 7 - UAF Coal Preparation Plant
CY 2018 Actual Emissions, PM-10**

Emission Source		Emission Factor		Source	Material Handling (tpy)	Control Method	Control Efficiency (percent)	Annual PM ₁₀ Emission (tpy)
Identification	Type	Value	Units					
Railcar unloading through grate into crusher	Point	3.63E-04	lb/ton	AP-42, Section 13.2.4	67,108.0	Plant Building	0	0.012
Crusher	Point	0.006	lb/ton	3-05-010-10, FIRE	67,108.0	Plant Building	0	0.201
Crusher to conveyor 1	Point	3.63E-04	lb/ton	AP-42, Section 13.2.4	67,108.0	Plant Building	0	0.012
Conveyor 1 to bucket elevator	Point	3.63E-04	lb/ton	AP-42, Section 13.2.4	67,108.0	Plant Building	0	0.012
Bucket elevator to screw conveyor	Point	3.63E-04	lb/ton	AP-42, Section 13.2.4	67,108.0	Plant Building	0	0.012
Screw conveyor to coal bin 1 or	Point	3.63E-04	lb/ton	AP-42, Section 13.2.4	33,446.0	Plant Building	0	0.006
Screw conveyor to coal bin 2	Point	3.63E-04	lb/ton	AP-42, Section 13.2.4	33,662.0	Plant Building	0	0.006
Coal bin 1 to scale 1 or	Point	3.63E-04	lb/ton	AP-42, Section 13.2.4	33,662.0	Plant Building	0	0.006
Coal bin 2 to scale 2	Point	3.63E-04	lb/ton	AP-42, Section 13.2.4	33,662.0	Plant Building	0	0.006
Scale 1 to boiler 1 or	Point	3.63E-04	lb/ton	AP-42, Section 13.2.4	33,446.0	Plant Building	0	0.006
Scale 2 to boiler 2	Point	3.63E-04	lb/ton	AP-42, Section 13.2.4	33,662.0	Plant Building	0	0.006
Actual PM-10 Emissions from Coal Preparation Plant								0.29

Notes:

1. Coal transfer emission factor from AP-42, Section 13.2.4 based on empirical equation $E = k \times 0.0032 \times (U/5)^{1.3} / (M/2)^{1.4}$ lb/ton transferred where:

k = 0.35 for PM₁₀

U = mean wind speed = 5.4 mph

per <http://wf.ncdc.noaa.gov/oa/climate/online/ccd/avgwind.html>

M = coal moisture content = 4.8 percent

2. FIRE = Factor Information Retrieval Data System.

3. Example Calculations:

$$\text{Actual emissions (tpy)} = (\text{Emission factor, lb/ton}) \times (\text{Material handled, ton/yr}) / (2,000 \text{ lb/ton})$$

**Table 8 - UAF Propane Fired Sources
CY 2018 Actual Emissions**

ID	Emission Unit Description	Fuel Consumption, CY 2018	Actual Emissions (tpy)				
			NO _x	CO	PM ₁₀	SO ₂	VOC
N/A	Fine Arts/Art Wing Rms 302, 413 Kiln - Propane Fired	13.4 1,000 gal/yr	8.7E-02	5.0E-02	4.7E-03	1.3E-04	6.7E-03
N/A	Eternal Flame and Whitaker Propane Fired						
N/A	Wood Center Kiln - Propane Fired						
Total			8.7E-02	5.0E-02	4.7E-03	1.3E-04	6.7E-03

Notes:

1. Weight conversion: 2,000 lb/ton
2. Propane sulfur content: 0.20 gr/100 ft³ gas vapor (assumption)
3. Propane Emission factors:

Emission factors for small pottery-firing kilns are not available. These calculations assume that combustion of propane in the kilns is similar to the combustion of propane in small propane-fired boilers.

<u>Pollutant</u>	<u>Emission Factor</u>	<u>Source</u>
NO _x	13 lb/1,000 gal	AP-42, Table 1.5-1, 07/08 (propane commercial boilers)
CO	7.5 lb/1,000 gal	AP-42, Table 1.5-1, 07/08 (propane commercial boilers)
PM ₁₀	0.7 lb/1,000 gal	AP-42, Table 1.5-1, 07/08 (propane commercial boilers)
SO ₂	0.1 *S lb/1,000 gal	AP-42, Table 1.5-1, 07/08 (propane commercial boilers), multiplied by gr/100 ft ³ gas vapor sulfur in fuel
VOC	1.0 lb/1,000 gal	AP-42, Table 1.5-1, 07/08 (propane commercial boilers), TOC

4. Example calculations:

$$\text{Actual emissions (ton/yr)} = (\text{Emission factor, lb/1,000 gal}) \times (\text{Fuel consumption, 1,000 gal/yr}) / (2,000 \text{ lb/ton})$$

**Table 9 - UAF Laboratory Hoods
CY 2018 Actual Emission Estimate, VOC and HAPs**

Chemical	CAS No.	Amount Stored On-site (liters)	Specific gravity of stored substance	Percent in solution	Amount Stored On-site (lbs)	VOC Emissions (ton/yr)	HAP Emissions (ton/yr)
2-Butanone	78-93-3	35	0.806	100	62.2	0.031	
Acetic acid	64-19-7	39	1.05	97	87.5	0.044	
Acetone	67-64-1	495	0.788	100	859.7	0.430	
Benzene	71-43-2	12	0.8765	100	23.2	0.012	0.012
Ethanol	64-17-5	502	0.79	100	874.1	0.437	
Formaldehyde	50-00-0	398	1.08	38	360.0	0.180	0.180
Methyl alcohol in formaldehyde solution	67-56-1			15	142.1	0.071	0.071
Hexane	110-54-3	77	0.659	94	105.1	0.053	0.053
Methanol	67-56-1	443	0.791	100	772.3	0.386	0.386
Methylene chloride	75-09-2	156	1.3266	100	456.1	0.228	0.228
Phenol	108-95-2	4	1.057	100	9.3	0.005	0.005
n-Propyl alcohol and 2-Propanol	71-23-8, 67-63-0	356	0.7945	100	623.4	0.312	
Stoddard solvent	8052-41-3	32	0.787	100	55.5	0.028	
Toluene	108-88-3	178	0.86	100	337.4	0.169	0.169
Xylene	1330-20-7	43	0.864	100	81.9	0.041	0.041
Total						2.42	1.14

Notes:

1. The above chemicals were determined to be common chemicals that contained VOCs.
3. Only chemical inventories of 4 liters or greater were included.
4. This inventory is not up to date, but reflects information available at issuance of Title V Permit Renewal.
5. This inventory does not reflect chemical usage, only those stored on-site.
6. In order to conservatively estimate VOC emissions from laboratory hoods, the following assumptions are made:
 - The chemicals stored on-site are used within a year.
 - The chemicals are emitted in their current form and are 100% volatile.
 - The chemicals are not transformed into other chemicals. Other VOCs are not created during laboratory use.
7. Specific gravity and percent of chemical in solution data obtained from chemical product material safety data sheets.

SG of Water = 1 kg/L
 Conversion: 2.204 lb/kg
 2,000 lb/ton

8. Example calculations:

Amount stored on-site (lbs) = (Liters stored) x (Specific gravity) x (2.204 lb/kg) x (percent in solution)
 Emission estimate (ton/yr) = (Pounds stored) / (2,000 lb/ton)

University of Alaska Fairbanks Assessable Emissions Estimate FY2021

Assessable Emissions - Tons Per Year

Pollutant	NO _x	CO	PM ₁₀	SO ₂	VOC	HAPs	Total
Assessable PTE	637	252	17	858	11	13.6	1,788.6

from Table D, Statement of Basis for Operating Permit No. AQ0316TVP02 Rev. 1

Emission Sources		Assessable Emissions Summary (TPY-CY 2019)					
		NO _x	CO	PM ₁₀	SO ₂	VOC	HAPs
Table 1	Old Coal-Fired Boilers	227.91	129.49	17.71	126.90	1.29	7.8
Table 2	Small External Combustion Units	0.50	0.12	0.08	1.13	0.01	
Table 3	Incinerator	0.01	0.01	0.02	0.01	0.00	
Table 4	CHPP Dual-Fired Boilers	19.92	4.49	2.67	56.36	0.30	
Table 5	CHPP Diesel Generator	0.01	0.01	0.00	0.01	0.00	
Table 6	Generator Engines	0.12	0.04	0.01	0.00	0.01	
Table 7	Coal Handling Plant			0.22			
Table 8	Kilns - Propane fired	9.8E-02	5.7E-02	5.3E-03	1.5E-04	7.5E-03	
Table 9	Laboratory Hoods					2.42	1.14
Totals		248.56	134.23	20.72	184.41	4.05	8.92

FY21 Assessable Emissions Estimate, in Tons	587.9
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Note: Actual HAP emissions for emission units in Tables 2 through 8 are not calculated for this estimate. The actual VOC emissions for these units are low enough that HAP emissions are expected to be insignificant.

University of Alaska Fairbanks Assessable Emissions Estimate FY2021
Emission Inventory and CY 2019 Operations Data

EU ID ⁶	Emission Unit	Emission Unit Type	Bldg No.	Installation Date	Make/Model	Fuel Type	Fuel Usage 2019	Maximum Capacity
1	Power Plant	Boiler - Coal Fired	FS802	1962	Erie City	Coal	24,535.8 tons	84.5 MMBtu/hr
2	Power Plant	Boiler - Coal Fired	FS802	1962	Erie City	Coal	27,261.3 tons	84.5 MMBtu/hr
3	Power Plant	Boiler - Dual Fired	FS802	1970	Zum	Diesel	672,111.7 gal	180.9 MMBtu/hr
3	Power Plant	Boiler - Dual Fired	FS802	1970	Zum	Natural Gas	0.00 MCF ⁵	180.9 MMBtu/hr
4	Power Plant	Boiler - Dual Fired	FS802	1987	Zum	Diesel	914,861.9 gal	180.9 MMBtu/hr
4	Power Plant	Boiler - Dual Fired	FS802	1987	Zum	Natural Gas	0.00 MCF	180.9 MMBtu/hr
113	New CHPP	CFB Boiler- Coal Fired		2019	B&W	Coal	31,761.00 tons	295 MMBTU/hr
113	New CHPP	CFB Boiler- Coal Fired		2019	B&W	#2 Diesel	320.50 gal	295 MMBTU/hr
113	New CHPP	CFB Boiler- Coal Fired		2019	B&W	Natural Gas	12,424.00 MCF	295 MMBTU/hr
6	Arctic Health Research Building	Engine - Emergency Generator	FS901	1968	Cummins/NH2501PG	Diesel	0 hrs ¹	125 kW
7	Arctic Health Research Building	Engine - Emergency Generator	FS901	1968	Cummins/NH2501P	Diesel	0 hrs ¹	125 kW
8	Power Plant	Engine - Backup/Peaking Generator (DEG)	FS817	1999	Fairbanks Morse Colt-Pielstick PC2.6	Diesel	200 gal	13,266 hp
9A	BiRD	Incinerator	FS919	2006	Therm-Tec/G-30P-1H	Waste	15,388 lbs	83 lb/hr
10	AFES Boiler	Boiler - Oil Fired	AF256	2000	Burnham/V90GA	Diesel	18,069 gal ⁴	1.08 MMBtu/hr
11	AFES Boiler	Boiler - Oil Fired	AF256	2000	Burnham/V90GA	Diesel		1.08 MMBtu/hr
12	Harper Boiler #1	Boiler - Oil Fired	FS420	1985	Weil McLain/BL776-S-W	Diesel	9,369 gal ²	0.64 MMBtu/hr
13	Harper Boiler #2	Boiler - Oil Fired	FS420	1985	Weil McLain/BL776-S-W	Diesel		0.64 MMBtu/hr
29	Harper Hot Water Heater	Hot Water Heater - Oil Fired	FS420	1985 (est)	Bock	Diesel		0.236 MMBtu/hr
34	Harper Trailer Toyo	Furnace - Oil Fired	FS421	2014	Toyotomi OM-180	Diesel		0.148 MMBtu/hr
14	Copper Lane Boiler	Boiler - Oil Fired	FS518	1985	Energy Kinetics System 2000	Diesel	gal ²	0.136 MMBtu/hr
15	Copper Lane Boiler	Boiler - Oil Fired	FS519	1985	Energy Kinetics System 2000	Diesel	3,635 gal ²	0.136 MMBtu/hr
16	Copper Lane (Honor's House) Boiler	Boiler - Oil Fired	FS520	2005	Weil McLain/P-WGO-5	Diesel	gal ²	0.233 MMBtu/hr
17	West Ridge Research Building Boiler #1	Boiler - ULSD Fired	FS909	2003	Weil McLain/BL1688w-GPr10	ULSD ⁷	85.0 hrs	4.93 MMBtu/hr
18	West Ridge Research Building Boiler #2	Boiler - ULSD Fired	FS909	2003	Weil McLain/BL1688w-GPr10	ULSD		4.93 MMBtu/hr
19	BiRD RM 100U3 Boiler #1	Boiler - ULSD Fired	FS919	2004	Weil McLain/2094W	ULSD	15,046 gal ^{2,3}	6.13 MMBtu/hr
20	BiRD RM 100U3 Boiler #2	Boiler - ULSD Fired	FS919	2004	Weil McLain/2094W	ULSD		6.13 MMBtu/hr
21	BiRD RM 100U3 Boiler #3	Boiler - ULSD Fired	FS919	2004	Weil McLain/2094W	ULSD		6.13 MMBtu/hr
22	BiRD RM 100U3 Boiler #4	Boiler - ULSD Fired	FS919	2005	Bryan/EB200-S-150-FDGO	ULSD		8.5 MMBtu/hr
23	Alaska Center for Energy and Power Generator Engine	Engine - Diesel Generator	FS814	2003	Detroit Diesel/6043-TK35	Diesel	0 gal	235 kW
24	Old University Park Emergency Generator Engine	Engine - Emergency Generator	FS423	2001	Cummins/4B3.9-G2	Diesel	6.80 hrs	51 kW
25	AFES Greenhouse Furnace	Furnace - Oil Fired	AF117	1991	Sunderman/L02OUF	Diesel	0 gal	0.209 MMBtu/hr
27	Alaska Center for Energy and Power Generator Engine	Engine - Diesel Fired	FS814	2013	Caterpillar C-15	Diesel	15 hrs	500 hp
28	AFES Grain Dryer	Grain Dryer - Oil Fired	AF108	1988	Unknown	Diesel	0 gal	2.43 MMBtu/hr
30	Duckering Classroom Engine	Engine - Diesel Fired	FS103	1987	Mitsubishi-Bosch	Diesel	1 hrs	45 kW
31	Skarland Cabin Furnace	Furnace - Oil Fired	FS712	2001 (est)	Rheem/ROBC-084QPEB	Diesel	667 gal ²	0.140 MMBtu/hr
32	Alaska Earthquake Information Center Emergency Generator Engine	Engine - Emergency Generator	FS903	1998	Detroit Diesel	Diesel	0 hrs	120 hp
33	Arctic Health Research Emergency Generator Engine	Engine - Emergency Generator	FS901	2013	Cummins/QSB7-G3	Diesel	2 hrs	150 kW
N/A	Power Plant	Coal Handling/Crushing Facility	FS802	1964	American Pulverizer (crusher make)	Coal	51,797.1 tons	50 tons/hr
N/A	Fine Arts/Art Wing Rms 302, 413	Kiln - Propane Fired	FS313	2009	Alpine Kilns and Equipment/SBF-40	Propane	15,076 gal	1.81 MMBtu/hr
N/A	Eternal Flame and Whitaker	Propane Fired	FS313	2009	Kilnmaster/constructed on-site	Propane		0.53 MMBtu/hr
N/A	Wood Center	Kiln - Propane Fired	FS313	2009	Geil Kilns/DLB2	Propane		0.23 MMBtu/hr
N/A	AFES Farm kiln	Kiln(s) - Wood Fired	N/A	Various	Hand-built	Wood	2.5 cords	Unknown
N/A						Vegetable Oil	0 gallons	Unknown
N/A	Facilities Services ⁵	Paint Booth Exhaust Fan	FS803	2001		Various Paints	Mainly water based paints are used. Minimal amounts of paint are stored on-site and paint booths are used infrequently.	12,500 cfm
N/A	Museum ⁵	Paint Booth Exhaust Fan	FS907	2006	Greenheck/TAB-42-030T3	Various Paints		5,480 cfm

University of Alaska Fairbanks Assessable Emissions Estimate FY2021
Emission Inventory and CY 2019 Operations Data

EU ID ⁶	Emission Unit	Emission Unit Type	Bldg No.	Installation Date	Make/Model	Fuel Type	Fuel Usage 2019	Maximum Capacity
N/A	Laboratory Fume Hoods (campus-wide)	Laboratory hoods	Multiple	Various	N/A	N/A	Per estimate in Table 9.	N/A
N/A	Duckering Classroom Turbine ⁵	Turbine - Propane Fired	FS103	1970(est)	Cussons Two Shaft Gas Turbine Unit	Propane	2 hrs	0.33 MMBtu/hr
N/A	Power Plant ⁵	Tank (Diesel) - Field Erected	FS817	1969	Fixed roof, 212,120 gallons	Diesel	N/A	212,120 gal
N/A	Graduation Flame ⁵	Ceremonial Flame	N/A	1975(est)	Custom-built	Propane	N/A	5.0E-03 MMBtu/hr
N/A	Power Plant ⁵	Ash Handling System	FS802	1962	N/A	N/A	N/A	8,760 hr/yr
N/A	SRC Pellet Stoves ⁵	Pellet Stove	N/A	2012	Avalon/AGP	Wood Pellets	N/A	5 lb/hr
TBD	BiRD Emergency Generator #2 (South)	Engine- Emergency Generator	FS919	2015	Cummins/QSB7-G5NR3	ULSD	16 hours 103 gallons	324 hp
N/A	FS Physical Plant	Welding exhaust	Multiple	Various	Various	Various		
N/A	CTC Hutchison Diesel shop	Diesel engine exhaust	N/A	Various	Cummins and Caterpillar	Diesel		

Notes:

1. These emission units were removed from service on June 29, 2012 were replaced with EU ID 33.
2. Fuel burned was determined by review of fuel deliveries for calendar year 2019. The assumption was made that all fuel delivered was burned. Most deliveries for the year are in the same order of magnitude.
3. The gallons of fuel provided are for all 4 of the boilers. Note 2 above applies to the gallons of fuel.
4. Fuel consumption for EU IDs 10 and 11 is a total for both boilers and is based on the fuel delivered during calendar year 2019.
5. Actual emissions are estimated to be insignificant for wood-fired kilns, paint booths, diesel storage tank, CHPP ash handling system, graduation flame, pellet stove, and small fuel-combusting unit (approx 3 hr/yr) in teaching laboratory.
6. EU ID 3 is permitted to fire natural gas but has not yet been modified to do so.
7. ULSD = Ultra Low Sulfur Diesel

**Table 1 - UAF Coal Fired Boilers
CY 2019 Estimated Emissions**

ID	Emission Unit Description	Coal Consumption, CY 2019	Estimated Emissions (tpy)					
			NO _x	CO	PM ₁₀	SO ₂	VOC	HAPs
1	Power Plant Boiler - Coal Fired	24,535.8 ton/yr	108.0	61.3	8.4	60.1	0.6	3.7
2	Power Plant Boiler - Coal Fired	27,261.3 ton/yr	119.9	68.2	9.3	66.8	0.7	4.1
113	CFB Boiler- New CHPP- Coal Fired	31,761.0 ton/yr	139.7	79.4	10.9	77.8	0.8	0.0
Total			227.9	129.5	17.7	126.9	1.3	7.8

Notes:

- 1. Weight conversion: 2,000 lb/ton
- 2. Sulfur content of coal: 0.140 weight percent weighted average based on 2019 UCM rail sample data
- 3. Emission factors:

<u>Pollutant</u>	<u>Emission Factor</u>	<u>Source</u>
NO _x	8.8 lb/ton	AP-42, Table 1.1-3, 9/98, Sub-bituminous spreader stoker
CO	5 lb/ton	AP-42, Table 1.1-3, 9/98, Sub-bituminous spreader stoker
PM ₁₀	0.68 lb/ton	AP-42, Tables 1.1-5 and 1.1-9, 9/98, Spreader stoker, with baghouse
SO ₂	35*S lb/ton	AP-42, Table 1.1-3, 9/98, Sub-bituminous spreader stoker, multiplied by weight percent sulfur in coal
VOC	0.05 lb/ton	AP-42, Table 1.1-19, 9/98, Spreader stoker (total NMOC)
HAPs	0.30 lb/ton	See note 4

- 4. HAPs emission factor is a sum of the following emission factors:

<u>Pollutant</u>	<u>Emission Factor</u>	<u>Source</u>
HCl	0.138 lb/ton	Source test from boilers of similar design at Clear Air Force Station
HF	0.139 lb/ton	Source test from boilers of similar design at Clear Air Force Station
Hg	8.46E-05 lb/ton	Source test from boilers of similar design at Clear Air Force Station
All other HAPs	0.0233 lb/ton	Total of emission factors from AP-42 Tables 1.1-13, 1.1-14, 1.1-18, 9/98

- 5. Example calculations:

$$SO_2 \text{ emission factor (lb/ton)} = 35 \times (\text{sulfur content of coal, weight percent})$$

$$\text{Actual emissions (ton/yr)} = (\text{coal use, ton/yr}) \times (\text{emission factor, lb/ton}) / (2,000 \text{ lb/ton})$$

$$PM_{10} \text{ emission factor (lb/ton)} = (\text{condensable PM emission factor, lb/MMBtu}) \times (\text{UCM heat content, 15.3 MMBtu/ton})$$

$$+ (PM_{10} \text{ particle emission factor, lb/ton})$$

**Table 2 - UAF Small Oil-Fired External Combustion Units
CY 2019 Estimated Emissions**

ID	Emission Unit Description	Fuel Type	Maximum Capacity	Fuel Consumption, CY 2019		Estimated Emissions (tpy)				
						NO _x	CO	PM ₁₀	SO ₂	VOC
10	AFES (the farm) Boiler - Oil Fired	Diesel	1.08 MMBtu/hr	18.1	1,000 gal/yr	0.18	0.05	0.03	0.64	3.1E-03
11	AFES (the farm) Boiler - Oil Fired	Diesel	1.08 MMBtu/hr							
12	Harper #1 Boiler - Oil Fired	Diesel	0.64 MMBtu/hr	9.37	1,000 gal/yr	0.09	0.02	0.02	0.33	1.6E-03
13	Harper #2 Boiler - Oil Fired	Diesel	0.64 MMBtu/hr							
29	Harper Hot Water Heater - Oil Fired	Diesel	0.236 MMBtu/hr							
34	Harper Trailer Toyo - Oil Fired	Diesel	MMBtu/hr							
14	Copper Lane Boiler - Oil Fired	Diesel	0.136 MMBtu/hr							
15	Copper Lane Boiler - Oil Fired	Diesel	0.136 MMBtu/hr	3.64	1,000 gal/yr	0.04	0.01	0.01	0.13	6.2E-04
16	Copper Lane (Honors House) Boiler - Oil Fired	Diesel	0.233 MMBtu/hr							
17	West Ridge Research Building #1 Boiler - Oil Fired	ULSD	4.93 MMBtu/hr							
18	West Ridge Research Building #2 Boiler - Oil Fired	ULSD	4.93 MMBtu/hr	3.10	1,000 gal/yr	0.03	0.01	0.01	0.00	5.3E-04
19	BiRD RM 100U3 #1 Boiler - Oil Fired	ULSD	6.13 MMBtu/hr							
20	BiRD RM 100U3 #2 Boiler - Oil Fired	ULSD	6.13 MMBtu/hr							
21	BiRD RM 100U3 #3 Boiler - Oil Fired	ULSD	6.13 MMBtu/hr							
22	BiRD RM 100U3 #4 Boiler - Oil Fired	ULSD	8.5 MMBtu/hr	15.0	1,000 gal/yr	0.15	0.04	0.02	0.00	2.6E-03
25	AFES (the farm) Greenhouse Furnace - Oil Fired	Diesel	0.209 MMBtu/hr							
31	Skarland Cabin Furnace - Oil Fired	Diesel	0.140 MMBtu/hr	0.67	1,000 gal/yr	0.01	0.002	0.00	0.02	2.4E-04
28	AFES (the farm) Grain Dryer Grain Dryer - Oil Fired	Diesel	2.43 MMBtu/hr	0.00	1,000 gal/yr	0.00	0.000	0.00	0.00	0.0E+00
				103.6	Total	0.5	0.1	0.1	1.1	8.6E-03

Notes:

- Maximum diesel sulfur content: 0.5 maximum weight percent, per records of fuel received at UAF during CY 2019
- Maximum diesel sulfur content ULSD: 0.0015 maximum weight percent, per records of ULSD fuel received at UAF during CY 2019
- Weight conversion: 2,000 lb/ton
- Emission factors:

Pollutant	Emission Factor	Source
NO _x	20 lb/1,000 gal	AP-42, Table 1.3-1, 5/10, Distillate oil fired
CO	5 lb/1,000 gal	AP-42, Table 1.3-1, 5/10, Distillate oil fired
PM ₁₀	3.3 lb/1,000 gal	AP-42, Tables 1.3-1 and 1.3-2, 5/10, Distillate oil fired - sum of filterable PM and total condensable PM
SO ₂	142*S lb/1,000 gal	AP-42, Table 1.3-1, 5/10, Distillate oil fired, multiplied by weight percent sulfur in fuel
VOC - boilers	0.34 lb/1,000 gal	AP-42, Table 1.3-3, 5/10, Distillate oil fired (total non-methane organic compounds) (also used for grain dryer EU)
VOC - furnaces	0.713 lb/1,000 gal	AP-42, Table 1.3-3, 5/10, Distillate oil fired (total non-methane organic compounds) (also used for hot water heater EU)

4. Heat input ratings were not available for most external combustion units listed here. For ratings provided in terms of heat output or terms not specified, a conservative 75% efficiency has been applied to calculate the maximum heat input capacity shown in the table.

5. Example calculations:

Actual emissions, tons/yr = (Emission factor, lb/1,000 gal) x (Fuel consumption, 1,000 gal/yr) / (2,000 lb/ton)
 Actual emissions of SO₂, tons/yr = (Emission factor, lb/1,000 gal) x (Fuel sulfur content, wt %) x (Fuel consumption, 1,000 gal/yr) / (2,000 lb/ton)

- #2 Diesel Heating Value: 0.135 MMBtu/gal
- EU10 and EU 11 - Fuel consumption for EU IDs 10 and 11 is a total for both boilers and is based on the fuel delivered during calendar year 2018.
- EU ID 17 and EU ID 18 Fuel consumption calculated based on estimated operating hours in CY 2018, assuming all operating hours at full load.
 Fuel consumption (1,000 gal/yr) = (Operation, hr/yr) x (Capacity, MMBtu/hr) / (0.135 MMBtu/gal) / (1,000)

**Table 3 - UAF Incinerator
CY 2019 Estimated Emissions**

ID	Emission Unit Description	Waste Combustion, CY 2019	Estimated Emissions (tpy)				
			NO _x	CO	PM ₁₀	SO ₂	VOC
9A	BiRD Incinerator	7.7 ton/yr	1.37E-02	1.13E-02	0.02	8.35E-03	1.15E-03
Total			0.01	0.01	0.02	0.01	0.001

Notes:

1. Weight conversion:

2,000 lb/ton

2. Incineration emission factors:

Pathological waste incinerator emission factors are not available. Medical waste incineration emission factors are expected to be representative of emissions from a pathological waste incinerator.

<u>Pollutant</u>	<u>Emission Factor</u>	<u>Source</u>
NO _x	3.56 lb/ton	AP-42, Table 2.3-1, 7/93
CO	2.95 lb/ton	AP-42, Table 2.3-1, 7/93
PM ₁₀	4.7 lb/ton	AP-42, Table 2.3-2, 7/93 - Total PM
SO ₂	2.17 lb/ton	AP-42, Table 2.3-1, 7/93
VOC	2.99E-01 lb/ton	AP-42, Table 2.3-2, 7/93 - TOC

3. Example calculations:

$$\text{Actual emissions, tons/yr} = (\text{Emission factor, lb/ton}) \times (\text{Waste combusted, ton/yr}) / (2,000 \text{ lb/ton})$$

**Table 4 - UAF Dual-Fired Boilers
CY 2019 Estimated Emissions**

ID	Emission Unit Description	Fuel Consumption, CY 2018	Estimated Emissions (tpy)				
			NO _x	CO	PM ₁₀	SO ₂	VOC
3	Power Plant Boiler - Diesel Fired	672.1 kgal/yr	8.1	1.7	1.1	23.9	0.11
3	Power Plant Boiler - Gas Fired	0 MMscf	0.0	0.0	0.0	0.00	0.0
4	Power Plant Boiler - Diesel Fired	914.9 kgal/yr	11.0	2.3	1.5	32.5	0.16
4	Power Plant Boiler - Gas Fired	0.00000 MMscf	0.0	0.0	0.0	0.00	0.0
113	New CHPP- Natural Gas	12.42400 MMscf	0.9	0.5	0.0	0.00	0.0
113	New CHPP- Diesel	0.32050 kgal/yr	0.0	0.0	0.0	0.02	0.0
Total			19.9	4.5	2.7	56.4	0.3

Notes:

- Weight conversion: 2,000 lb/ton
- Maximum diesel sulfur content: 0.50 maximum weight percent, per records of fuel received at UAF during CY 2019
- Diesel emission factors:

<u>Pollutant</u>	<u>Emission Factor</u>	<u>Source</u>
NO _x	24 lb/kgal	AP-42 Table 1.3-1, 5/10
CO	5 lb/kgal	AP-42 Table 1.3-1, 5/10
PM ₁₀	3.3 lb/kgal	AP-42 Table 1.3-1, 5/10, sum of filterable and condensable
SO ₂	142 *S lb/kgal	AP-42 Table 1.3-1, 5/10
VOC	0.34 lb/kgal	AP-42 Table 1.3-3, 5/10, institutional boilers

4. Natural gas emission factors:

<u>Pollutant</u>	<u>Emission Factor</u>	<u>Source</u>
NO _x	140 lb/MMscf	AP-42 Table 1.4-1, 7/98, low NO _x burners
CO	84 lb/MMscf	AP-42 Table 1.4-1, 7/98
PM ₁₀	7.6 lb/MMscf	AP-42 Table 1.4-2, 7/98, Total PM
SO ₂	0.6 lb/MMscf	AP-42 Table 1.4-2, 7/98
VOC	5.5 lb/MMscf	AP-42 Table 1.4-2, 7/98

5. Example calculations:

$$\text{SO}_2 \text{ emission factor (lb/ton)} = 142 \times (\text{sulfur content of diesel, weight percent})$$

$$\text{Actual emissions (ton/yr)} = (\text{coal use, ton/yr}) \times (\text{emission factor, lb/ton}) / (2,000 \text{ lb/ton})$$

- EU ID 3 has not been modified to combust natural gas.

**Table 5 - UAF CHPP Diesel Engine
CY 2019 Estimated Emissions**

ID	Emission Unit Description	Maximum Capacity	Fuel Consumption, CY 2019	Estimated Emissions (tpy)				
				NO _x	CO	PM ₁₀	SO ₂	VOC
8	Backup/Peaking Generator (DEG) Diesel fired	13,266 hp	200 gal/yr	0.01	0.01	0.00	0.01	0.00
Total				0.01	0.01	0.00	0.01	0.00

Notes:

1. Weight conversion: 2,000 lb/ton
2. Diesel Heating Value: 0.135 MMBtu/gal
3. Maximum diesel sulfur content: 0.50 maximum weight percent, per records of fuel received at UAF during CY 2019
4. Emission factors:

Pollutant	Emission Factor	Source
NO _x	0.057 lb/gal	AQ0316MSS02, Condition 12.3b, Equation 4 (controlled emission rate)
CO	0.85 lb/MMBtu	AP-42, Table 3.4-1, 10/96
PM ₁₀	0.10 lb/MMBtu	AP-42, Table 3.4-1, 10/96
SO ₂	1.01 *S lb/MMBtu	AP-42, Table 3.4-1, 10/96
VOC	0.09 lb/MMBtu	AP-42, Table 3.4-1, 10/96

5. Example calculations:

Actual emissions, tons/yr = (Emission factor, lb/MMBtu) x (Fuel consumption, gal/yr) x (Fuel heat value, MMBtu/gal) / (2,000 lb/ton)

Actual emissions of SO₂, tons/yr = (Emission factor, lb/MMBtu) x (Fuel sulfur content, wt %) x (Fuel consumption, gal/yr) x (Fuel heat value, MMBtu/gal) / (2,000 lb/ton)

Actual emissions of NO_x, tons/yr = (Emission factor, lb/gal) x (Fuel consumption, gal/yr) / (2,000 lb/ton)

6. EU ID 8 is permitted as a backup/peaking generator but is now an emergency generator.. EU ID 8 did not operate in CY 2018

**Table 6 - UAF Internal Combustion Engines
CY 2019 Estimated Emissions**

ID	Emission Unit Description	Maximum Capacity		Hours of Operation CY 2018		Estimated Emissions (tpy)				
						NO _x	CO	PM ₁₀	SO ₂	VOC
23	Alaska Center for Energy and Power Generator Engine - Diesel Generator	332	hp	0	hrs	0.0	0.0	0.0	0.0	0.0
24	Old University Park Emergency Generator Engine - Emergency Generator	72	hp	7	hrs	7.6E-03	1.6E-03	5.4E-04	5.0E-04	6.2E-04
30	Duckering Classroom Engine - Diesel Fired	64	hp	1	hrs	9.8E-04	2.1E-04	7.0E-05	6.5E-05	8.0E-05
27	Alaska Center for Energy and Power Generator Engine - Diesel Fired	500	hp	15	hrs	0.0	0.0	0.0	4.1E-05	0.0
32	Alaska Earthquake Information Center Emergency Generator Engine - Emergency Generator	120	hp	0	hrs	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
33	Arctic Health Research Emergency Generator Engine - Emergency Generator	212	hp	2	hrs	6.6E-03	1.4E-03	4.7E-04	4.3E-04	5.3E-04
TBD	BiRD Emergency Generator Engine- ULSD Fired Emergency Generator # 2	324	hp	16	hrs	8.0E-02	1.7E-02	5.7E-03	1.1E-05	6.5E-03
Total						0.1	0.0	0.0	0.0	0.0

Total Tons 0.18

Notes:

- 1. Weight conversion: 2,000 lb/ton
- 2. Emission factors:

<u>Pollutant</u>	<u>Emission Factor</u>	<u>Source</u>
NO _x	0.031 lb/hp-hr	AP-42, Table 3.3-1, 5/10, Diesel fuel
CO	6.68E-03 lb/hp-hr	AP-42, Table 3.3-1, 5/10, Diesel fuel
PM ₁₀	2.20E-03 lb/hp-hr	AP-42, Table 3.3-1, 5/10, Diesel fuel
SO ₂	2.05E-03 lb/hp-hr	AP-42, Table 3.3-1, 5/10, Diesel fuel See note 8 for BiRD Genset
VOC	0.0025141 lb/hp-hr	AP-42, Table 3.3-1, 5/10, Diesel fuel - sum of exhaust and crankcase TOC emission factors

3. Emission factors for EU 27:

<u>Pollutant</u>	<u>Emission Factor</u>	<u>Source</u>
NO _x	3.52 lb/hr	Vendor
CO	3.14 lb/hr	Vendor
PM ₁₀	0.12 lb/hr	Vendor
SO ₂	1.09E-05 lb/hp-hr	Mass balance (ULSD required)
VOC	0.21 lb/hr	Vendor

4. Example calculations:

Actual emissions, tons/yr = (Emission factor, lb/hp-hr) x (Capacity, hp) x (Operation, hr/yr) / (2,000 lb/ton)

5. Horsepower ratings for EU IDs 23, 24, 30, and 33 assume a 95% shaft efficiency.

Capacity (hp) = (Capacity, kW) x (1.341 hp/kW) / 0.95

6. Actual emissions for EU IDs 6 and 7 are not included in this assessable emissions estimate because they were permanently removed from service on June 29, 2012. EU ID 33 will replace these units.

**Table 7 - UAF Coal Preparation Plant
CY 2019 Estimated Emissions, PM-10**

Emission Source		Emission Factor		Source	Material Handling (tpy)	Control Method	Control Efficiency (percent)	Annual PM ₁₀ Emission (tpy)
Identification	Type	Value	Units					
Railcar unloading through grate into crusher	Point	3.63E-04	lb/ton	AP-42, Section 13.2.4	51,797.1	Plant Building	0	0.009
Crusher	Point	0.006	lb/ton	3-05-010-10, FIRE	51,797.1	Plant Building	0	0.155
Crusher to conveyor 1	Point	3.63E-04	lb/ton	AP-42, Section 13.2.4	51,797.1	Plant Building	0	0.009
Conveyor 1 to bucket elevator	Point	3.63E-04	lb/ton	AP-42, Section 13.2.4	51,797.1	Plant Building	0	0.009
Bucket elevator to screw conveyor	Point	3.63E-04	lb/ton	AP-42, Section 13.2.4	51,797.1	Plant Building	0	0.009
Screw conveyor to coal bin 1 or	Point	3.63E-04	lb/ton	AP-42, Section 13.2.4	24,535.8	Plant Building	0	0.004
Screw conveyor to coal bin 2	Point	3.63E-04	lb/ton	AP-42, Section 13.2.4	27,261.3	Plant Building	0	0.005
Coal bin 1 to scale 1 or	Point	3.63E-04	lb/ton	AP-42, Section 13.2.4	24,535.8	Plant Building	0	0.004
Coal bin 2 to scale 2	Point	3.63E-04	lb/ton	AP-42, Section 13.2.4	27,261.3	Plant Building	0	0.005
Scale 1 to boiler 1 or	Point	3.63E-04	lb/ton	AP-42, Section 13.2.4	24,535.8	Plant Building	0	0.004
Scale 2 to boiler 2	Point	3.63E-04	lb/ton	AP-42, Section 13.2.4	27,261.3	Plant Building	0	0.005
EU 113 coal handling	Point	Calculate by ratio of 2019 coal use EU 113 to EU 1 and EU 2			31,761	New CHPP	0	0.132
Estimated PM-10 Emissions from Coal Preparation Plant								0.22

Notes:

1. Coal transfer emission factor from AP-42, Section 13.2.4 based on empirical equation $E = k \times 0.0032 \times (U/5)^{1.3} / (M/2)^{1.4}$ lb/ton transferred where:

k = 0.35 for PM₁₀

U = mean wind speed = 5.4 mph

per <http://lwf.ncdc.noaa.gov/oa/climate/online/ccd/avgwind.html>

M = coal moisture content = 4.8 percent

2. FIRE = Factor Information Retrieval Data System.

3. Example Calculations:

$$\text{Actual emissions (tpy)} = (\text{Emission factor, lb/ton}) \times (\text{Material handled, ton/yr}) / (2,000 \text{ lb/ton})$$

**Table 8 - UAF Propane Fired Sources
CY 2019 Estimated Emissions**

ID	Emission Unit Description	Fuel Consumption, CY 2019	Estimated Emissions (tpy)				
			NO _x	CO	PM ₁₀	SO ₂	VOC
N/A	Fine Arts/Art Wing Rms 302, 413 Kiln - Propane Fired	15.1 1,000 gal/yr	9.8E-02	5.7E-02	5.3E-03	1.5E-04	7.5E-03
N/A	Eternal Flame and Whitaker Propane Fired						
N/A	Wood Center Kiln - Propane Fired						
Total			9.8E-02	5.7E-02	5.3E-03	1.5E-04	7.5E-03

Notes:

1. Weight conversion: 2,000 lb/ton
2. Propane sulfur content: 0.20 gr/100 ft³ gas vapor (assumption)
3. Propane Emission factors:

Emission factors for small pottery-firing kilns are not available. These calculations assume that combustion of propane in the kilns is similar to the combustion of propane in small propane-fired boilers.

<u>Pollutant</u>	<u>Emission Factor</u>	<u>Source</u>
NO _x	13 lb/1,000 gal	AP-42, Table 1.5-1, 07/08 (propane commercial boilers)
CO	7.5 lb/1,000 gal	AP-42, Table 1.5-1, 07/08 (propane commercial boilers)
PM ₁₀	0.7 lb/1,000 gal	AP-42, Table 1.5-1, 07/08 (propane commercial boilers)
SO ₂	0.1 *S lb/1,000 gal	AP-42, Table 1.5-1, 07/08 (propane commercial boilers), multiplied by gr/100 ft ³ gas vapor sulfur in fuel
VOC	1.0 lb/1,000 gal	AP-42, Table 1.5-1, 07/08 (propane commercial boilers), TOC

4. Example calculations:

$$\text{Actual emissions (ton/yr)} = (\text{Emission factor, lb/1,000 gal}) \times (\text{Fuel consumption, 1,000 gal/yr}) / (2,000 \text{ lb/ton})$$

Table 9 - UAF Laboratory Hoods
CY 2019 Estimated Emissions, VOC and HAPs

Chemical	CAS No.	Amount Stored On-site (liters)	Specific gravity of stored substance	Percent in solution	Amount Stored On-site (lbs)	VOC Emissions (ton/yr)	HAP Emissions (ton/yr)
2-Butanone	78-93-3	35	0.806	100	62.2	0.031	
Acetic acid	64-19-7	39	1.05	97	87.5	0.044	
Acetone	67-64-1	495	0.788	100	859.7	0.430	
Benzene	71-43-2	12	0.8765	100	23.2	0.012	0.012
Ethanol	64-17-5	502	0.79	100	874.1	0.437	
Formaldehyde	50-00-0	398	1.08	38	360.0	0.180	0.180
Methyl alcohol in formaldehyde solution	67-56-1			15	142.1	0.071	0.071
Hexane	110-54-3	77	0.659	94	105.1	0.053	0.053
Methanol	67-56-1	443	0.791	100	772.3	0.386	0.386
Methylene chloride	75-09-2	156	1.3266	100	456.1	0.228	0.228
Phenol	108-95-2	4	1.057	100	9.3	0.005	0.005
n-Propyl alcohol and 2-Propanol	71-23-8, 67-63-0	356	0.7945	100	623.4	0.312	
Stoddard solvent	8052-41-3	32	0.787	100	55.5	0.028	
Toluene	108-88-3	178	0.86	100	337.4	0.169	0.169
Xylene	1330-20-7	43	0.864	100	81.9	0.041	0.041
Total						2.42	1.14

Notes:

1. The above chemicals were determined to be common chemicals that contained VOCs.
3. Only chemical inventories of 4 liters or greater were included.
4. This inventory is not up to date, but reflects information available at issuance of Title V Permit Renewal.
5. This inventory does not reflect chemical usage, only those stored on-site.
6. In order to conservatively estimate VOC emissions from laboratory hoods, the following assumptions are made:
 - The chemicals stored on-site are used within a year.
 - The chemicals are emitted in their current form and are 100% volatile.
 - The chemicals are not transformed into other chemicals. Other VOCs are not created during laboratory use.
7. Specific gravity and percent of chemical in solution data obtained from chemical product material safety data sheets.

SG of Water = 1 kg/L
 Conversion: 2.204 lb/kg
 2,000 lb/ton

8. Example calculations:

Amount stored on-site (lbs) = (Liters stored) x (Specific gravity) x (2.204 lb/kg) x (percent in solution)
 Emission estimate (ton/yr) = (Pounds stored) / (2,000 lb/ton)

Adopted



July 5, 2022
Jennifer Campbell, Acting Associate Vice
Chancellor

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VIA FEDERAL EXPRESS

March 12, 2021

Alaska Department of Environmental Conservation
Air Permits Program
610 University Avenue
Fairbanks, Alaska 99709

ATTN: Compliance Technician

RE: Assessable Emissions Report for University of Alaska Fairbanks Campus, Air Quality Operating Permit Number AQ0316TVP02 Rev. 1 and AQ0316MSS06 Rev 2

Compliance Technician,

Attached is the Assessable Emissions Report for FY 2022. The estimate was based on actual operations that occurred January 1 through December 31, 2020. This estimate includes emission units permitted under the above operating permit as well as additional emission units not covered under the permit, including those determined to be insignificant.

If you have any questions regarding this estimate, please contact Russ Steiger, UAF Environmental Compliance Officer at 907-474-5812 or by e-mail at rhsteiger@alaska.edu.

Based on information and belief formed after reasonable inquiry, I certify that the statements and information in an attached to this document are true, accurate, and complete.

Sincerely,

DocuSigned by:
A handwritten signature in cursive script that reads 'Jennifer Campbell'.
9154516DEE9D481...

Jennifer Campbell

Acting Associate Vice Chancellor for Facilities Services

Adopted

July 5, 2022

University of Alaska Fairbanks Assessable Emissions Estimate FY 2022 CY 2020

Assessable Emissions - Tons Per Year

Pollutant	NO _x	CO	PM ₁₀	SO ₂	VOC	HAPs	Total
Assessable PTE	637	252	17	858	11	13.6	1,788.6

from Table D, Statement of Basis for Operating Permit No. AQ0316TVP02 Rev. 1

Emission Sources		Assessable Emissions Summary (TPY-CY 2020)					
		NO _x	CO	PM ₁₀	SO ₂	VOC	HAPs
Table 1	New CHPP- EU 113	48.10	78.95	739.98	12.30	2.21	2.41
Table 2	Small External Combustion Units	0.65	0.16	0.11	0.34	0.01	
Table 3	Incinerator	0.01	0.01	0.02	0.01	0.00	
Table 4	CHPP Dual-Fired Boilers	8.39	1.80	1.14	8.17	0.12	
Table 5	CHPP Diesel Generator	0.00	0.00	0.00	0.00	0.00	
Table 6	Generator Engines	0.22	0.07	0.01	0.00	0.02	
Table 7	Coal Handling Plant			1.60			
Table 8	Kilns - Propane fired	0.04	0.02	0.00	0.00	0.00	
Table 9	Laboratory Hoods					2.42	1.14
Totals		57.43	81.02	742.87	20.82	4.79	3.55

FY22 Assessable Emissions Estimate, in Tons	902.1
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Note: Actual HAP emissions for emission units in Tables 2 through 8 are not calculated for this estimate. The actual VOC emissions for these units are low enough that HAP emissions are expected to be insignificant.

Adopted

July 5, 2022

University of Alaska Fairbanks Assessable Emissions Estimate FY2022
Emission Inventory and CY 2020 Operations Data

EU ID ⁶	Emission Unit	Emission Unit Type	Bldg No.	Installation Date	Make/Model	Fuel Type	Fuel Usage CY 2020	Maximum Capacity
3	Power Plant	Boiler - Dual Fired	FS802	1970	Zurn	Diesel	116,397.0 gal	180.9 MMBtu/hr
3	Power Plant	Boiler - Dual Fired	FS802	1970	Zurn	Natural Gas	0.00 MCF ⁶	180.9 MMBtu/hr
4	Power Plant	Boiler - Dual Fired	FS802	1987	Zurn	Diesel	572,189.0 gal	180.9 MMBtu/hr
4	Power Plant	Boiler - Dual Fired	FS802	1987	Zurn	Natural Gas	0.00 MCF	180.9 MMBtu/hr
113	New CHPP	CFB Boiler- Coal Fired	FS840	2019	B&W	Coal	88,491.00 tons	295 MMBTU/hr
113	New CHPP	CFB Boiler- Coal Fired	FS840	2019	B&W	#2 Diesel	0.00 gal	295 MMBTU/hr
113	New CHPP	CFB Boiler- Coal Fired	FS840	2019	B&W	Natural Gas	1,882.00 MCF	295 MMBTU/hr
8	Power Plant	Engine - Backup/Peaking Generator (DEG)	FS817	1999	Fairbanks Morse Colt-Pielstick PC2.6	Diesel	0 gal	13,266 hp
9A	BiRD	Incinerator	FS919	2006	Therm-Tec/G-30P-1H	Waste	16,320 lbs	83 lb/hr
10	AFES Boiler	Boiler - Oil Fired	AF256	2000	Burnham/V90GA	Diesel	0 gal ⁴	1.08 MMBtu/hr
11	AFES Boiler	Boiler - Oil Fired	AF256	2000	Burnham/V90GA	Diesel		1.08 MMBtu/hr
12	Harper Boiler #1	Boiler - Oil Fired	FS420	1985	Weil McLain/BL776-S-W	Diesel		0.64 MMBtu/hr
13	Harper Boiler #2	Boiler - Oil Fired	FS420	1985	Weil McLain/BL776-S-W	Diesel	8,672 gal ²	0.64 MMBtu/hr
29	Harper Hot Water Heater	Hot Water Heater - Oil Fired	FS420	1985 (est)	Bock	Diesel		0.236 MMBtu/hr
34	Harper Trailer Toyo	Furnace - Oil Fired	FS421	2014	Toyotomi OM-180	Diesel		0.148 MMBtu/hr
16	Copper Lane (Honor's House) Boiler	Boiler - Oil Fired	FS520	2005	Weil McLain/P-WGO-5	Diesel	2,459 gal ²	0.233 MMBtu/hr
17	West Ridge Research Building Boiler #1	Boiler - ULSD Fired	FS909	2003	Weil McLain/BL1688w-GPr10	ULSD ⁷	85.0 hrs	4.93 MMBtu/hr
18	West Ridge Research Building Boiler #2	Boiler - ULSD Fired	FS909	2003	Weil McLain/BL1688w-GPr10	ULSD		4.93 MMBtu/hr
19	BiRD RM 100U3 Boiler #1	Boiler - ULSD Fired	FS919	2004	Weil McLain/2094W	ULSD		6.13 MMBtu/hr
20	BiRD RM 100U3 Boiler #2	Boiler - ULSD Fired	FS919	2004	Weil McLain/2094W	ULSD	52,891 gal ^{2,3}	6.13 MMBtu/hr
21	BiRD RM 100U3 Boiler #3	Boiler - ULSD Fired	FS919	2004	Weil McLain/2094W	ULSD		6.13 MMBtu/hr
22	BiRD RM 100U3 Boiler #4	Boiler - ULSD Fired	FS919	2005	Bryan/EB200-S-150-FDGO	ULSD		8.5 MMBtu/hr
24	Old University Park Emergency Generator Engine	Engine - Emergency Generator	FS423	2001	Cummins/4B3.9-G2	Diesel	6.80 hrs	51 kW
25	AFES Greenhouse Furnace	Furnace - Oil Fired	AF117	1991	Sunderman/L02OUF	Diesel	0 gal	0.209 MMBtu/hr
27	Alaska Center for Energy and Power Generator Engine	Engine - Diesel Fired	FS814	2013	Caterpillar C-15	Diesel	15 hrs	500 hp
28	AFES Grain Dryer	Grain Dryer - Oil Fired	AF108	1988	Unknown	Diesel	0 gal	2.43 MMBtu/hr
30	Duckering Classroom Engine	Engine - Diesel Fired	FS103	1987	Mitsubishi-Bosch	Diesel	1 hrs	45 kW
31	Skarland Cabin Furnace	Furnace - Oil Fired	FS712	2001 (est)	Rheem/ROBC-084QPEB	Diesel	760 gal ²	0.140 MMBtu/hr
32	Alaska Earthquake Information Center Emergency Generator Engine	Engine - Emergency Generator	FS903	1998	Detroit Diesel	Diesel	0 hrs	120 hp
33	Arctic Health Research Emergency Generator Engine	Engine - Emergency Generator	FS901	2013	Cummins/QSB7-G3	Diesel	2 hrs	150 kW
N/A	Power Plant	Coal Handling/Crushing Facility	FS802	1964	American Pulverizer (crusher make)	Coal	88,491.0 tons	N/A
N/A	Fine Arts/Art Wing Rms 302, 413	Kiln - Propane Fired	FS313	2009	Alpine Kilns and Equipment/SBF-40	Propane		1.81 MMBtu/hr
N/A	Eternal Flame and Whitaker	Propane Fired	FS313	2009	Kilnmaster/constructed on-site	Propane	6,194 gal	0.53 MMBtu/hr
N/A	Wood Center	Kiln - Propane Fired	FS313	2009	Gell Kilns/DLB2	Propane		0.23 MMBtu/hr
N/A	AFES Farm kiln	Kiln(s) - Wood Fired	N/A	Various	Hand-built	Wood	2.5 cords	Unknown
N/A						Vegetable Oil	0 gallons	Unknown
N/A	Facilities Services ⁵	Paint Booth Exhaust Fan	FS803	2001		Various Paints	Mainly water based paints are used. Minimal amounts of paint are stored on-site and paint booths are used infrequently.	12,500 cfm
N/A	Museum ⁵	Paint Booth Exhaust Fan	FS907	2006	Greenheck/TAB-42-030T3	Various Paints		5,480 cfm
N/A	Laboratory Fume Hoods (campus-wide)	Laboratory hoods	Multiple	Various	N/A	N/A	Per estimate in Table 9.	N/A
N/A	Duckering Classroom Turbine ⁵	Turbine - Propane Fired	FS103	1970(est)	Cussons Two Shaft Gas Turbine Unit	Propane	2 hrs	0.33 MMBtu/hr
N/A	Power Plant ⁵	Tank (Diesel) - Field Erected	FS817	1969	Fixed roof, 212,120 gallons	Diesel	N/A	212,120 gal
N/A	Graduation Flame ⁵	Ceremonial Flame	N/A	1975(est)	Custom-built	Propane	N/A	5.0E-03 MMBtu/hr
N/A	SRC Pellet Stoves ⁵	Pellet Stove	N/A	2012	Avalon/AGP	Wood Pellets	N/A	5 lb/hr
TBD	BiRD Emergency Generator #2 (South)	Engine- Emergency Generator	FS919	2015	Cummins/QSB7-G5NR3	ULSD	36 hours	324 hp
N/A	FS Physical Plant	Welding exhaust	Multiple	Various	Various	Various	103 gallons	

Adopted

July 5, 2022

University of Alaska Fairbanks Assessable Emissions Estimate FY2022
Emission Inventory and CY 2020 Operations Data

EU ID ⁶	Emission Unit	Emission Unit Type	Bldg No.	Installation Date	Make/Model	Fuel Type	Fuel Usage CY 2020	Maximum Capacity
N/A	CTC Hutchison Diesel shop	Diesel engine exhaust	N/A	Various	Cummins and Caterpillar	Diesel		

Notes:

1. These emission units were removed from service on June 29, 2012 were replaced with EU ID 33.
2. Fuel burned was determined by review of fuel deliveries for calendar year 2020. The assumption was made that all fuel delivered was burned. Most deliveries for the year are in the same order of magnitude.
3. The gallons of fuel provided are for all 4 of the boilers. Note 2 above applies to the gallons of fuel.
4. Actual emissions are estimated to be insignificant for wood-fired kilns, paint booths, diesel storage tank, CHPP ash handling system, graduation flame, pellet stove, and small fuel-combusting unit (approx 3 hr/yr) in teaching laboratory.
5. EU ID 3 is permitted to fire natural gas but has not yet been modified to do so.
6. ULSD = Ultra Low Sulfur Diesel

Adopted

July 5, 2022

**Table 1 - UAF Coal Fired Boiler 5 (EU 113)
CY 2020 Estimated Emissions**

ID	Emission Unit Description	Coal Consumption, CY 2020	Estimated Emissions (tpy)					
			NO _x	CO	PM ₁₀	SO ₂	VOC	HAPs
113	CFB Boiler- New CHPP- Coal Fired	88,491.0 ton/yr	48.10	78.95	739.98	12.30	2.21	2.41

Notes:

1. Weight conversion: 2,000 lb/ton
2. Sulfur content of coal: 0.130 weight percent average based on CY 2020 UCM monthly rail sample data
3. Hours of Operation: 7,452.000 total hours of operation EU 113 in 2020, (steaming rate >25,000 lbs/hr, bed temperature >250F)
5. Heating value UCM coal: 14.87 MMBTU/ton of coal based on CY 2020 monthly averages from UCM analysis
6. Emission factors:

<u>Pollutant</u>	<u>Emission Factor</u>	<u>Source</u>
NO _x	N/A	CEMS data totalized for CY 2020
CO	0.12 lb/MMBTU	Source test data from December 2019
PM ₁₀	0.0993000 lb/hr	EU 113 Source test October 2020
SO ₂	N/A	CEMS data totalized for CY 2020
VOC	0.05 lb/ton	AP-42, Table 1.1-19, 9/98, Spreader stoker (total NMOC)
HAPs	N/A	See note 4

4. HAPs emission factor is a sum of the following emission factors:

<u>Pollutant</u>	<u>Emission Factor</u>	<u>Source</u>
HCl	1.29 tons CY 2020	EU 113 Source Test October 2020, modified by actual run hours
HF	0.08 tons CY 2020	EU 113 Source Test October 2020, modified by actual run hours
Hg	0.008800 tons CY 2020	Mercury in coal analysis March 2020
All other HAPs	1.03 tons CY 2020	using 0.0233 lb/ton - total of emission factors from AP-42 Tables 1.1-13, 1.1-14, 1.1-1
	2.41 tons CY 2020	

Table 2 - UAF Small Oil-Fired External Combustion Units
CY 2020 Estimated Emissions

ID	Emission Unit Description	Fuel Type	Maximum Capacity	Fuel Consumption, CY 2020		Estimated Emissions (tpy)				
						NO _x	CO	PM ₁₀	SO ₂	VOC
10	AFES (the farm) Boiler - Oil Fired	Diesel	1.08 MMBtu/hr	0.0	1,000 gal/yr	0.00	0.00	0.00	0.00	0.00
11	AFES (the farm) Boiler - Oil Fired	Diesel	1.08 MMBtu/hr							
12	Harper #1 Boiler - Oil Fired	Diesel	0.64 MMBtu/hr	8.67	1,000 gal/yr	0.09	0.02	0.01	0.31	0.00
13	Harper #2 Boiler - Oil Fired	Diesel	0.64 MMBtu/hr							
29	Harper Hot Water Heater - Oil Fired	Diesel	0.236 MMBtu/hr							
34	Harper Trailer Toyo - Oil Fired	Diesel	MMBtu/hr							
15	Copper Lane Boiler - Oil Fired	Diesel	0.136 MMBtu/hr							
16	Copper Lane (Honors House) Boiler - Oil Fired	Diesel	0.233 MMBtu/hr	1,000 gal/yr	0.00	0.00	0.00	0.00	0.00	0.00
17	West Ridge Research Building #1 Boiler - Oil Fired	ULSD	4.93 MMBtu/hr	3.10	1,000 gal/yr	0.03	0.01	0.01	0.00	0.00
18	West Ridge Research Building #2 Boiler - Oil Fired	ULSD	4.93 MMBtu/hr							
19	BiRD RM 100U3 #1 Boiler - Oil Fired	ULSD	6.13 MMBtu/hr	52.9	1,000 gal/yr	0.53	0.13	0.09	0.01	0.01
20	BiRD RM 100U3 #2 Boiler - Oil Fired	ULSD	6.13 MMBtu/hr							
21	BiRD RM 100U3 #3 Boiler - Oil Fired	ULSD	6.13 MMBtu/hr							
22	BiRD RM 100U3 #4 Boiler - Oil Fired	ULSD	8.5 MMBtu/hr							
25	AFES (the farm) Greenhouse Furnace - Oil Fired	Diesel	0.209 MMBtu/hr	0.00	1,000 gal/yr	0.00	0.00	0.00	0.00	0.00
31	Skarland Cabin Furnace - Oil Fired	Diesel	0.140 MMBtu/hr	0.76	1,000 gal/yr	0.01	0.00	0.00	0.03	0.00
28	AFES (the farm) Grain Dryer Grain Dryer - Oil Fired	Diesel	2.43 MMBtu/hr	0.00	1,000 gal/yr	0.00	0.00	0.00	0.00	0.00
103.6 Total						0.65	0.16	0.11	0.34	0.01

Notes:

- Maximum diesel sulfur content: 0.5 maximum weight percent, per records of fuel received at UAF during CY 2020
- Maximum diesel sulfur content ULSD: 0.0015 maximum weight percent, per records of ULSD fuel received at UAF during CY 2020
- Weight conversion: 2,000 lb/ton
- Emission factors:

Pollutant	Emission Factor	Source
NO _x	20 lb/1,000 gal	AP-42, Table 1.3-1, 5/10, Distillate oil fired
CO	5 lb/1,000 gal	AP-42, Table 1.3-1, 5/10, Distillate oil fired
PM ₁₀	3.3 lb/1,000 gal	AP-42, Tables 1.3-1 and 1.3-2, 5/10, Distillate oil fired - sum of filterable PM and total condensable PM
SO ₂	142*S lb/1,000 gal	AP-42, Table 1.3-1, 5/10, Distillate oil fired, multiplied by weight percent sulfur in fuel
VOC - boilers	0.34 lb/1,000 gal	AP-42, Table 1.3-3, 5/10, Distillate oil fired (total non-methane organic compounds) (also used for grain dryer EU)
VOC - furnaces	0.713 lb/1,000 gal	AP-42, Table 1.3-3, 5/10, Distillate oil fired (total non-methane organic compounds) (also used for hot water heater EU)

4. Heat input ratings were not available for most external combustion units listed here. For ratings provided in terms of heat output or terms not specified, a conservative 75% efficiency has been applied to calculate the maximum heat input capacity shown in the table.

5. Example calculations:

Actual emissions, tons/yr = (Emission factor, lb/1,000 gal) x (Fuel consumption, 1,000 gal/yr) / (2,000 lb/ton)
 Actual emissions of SO₂, tons/yr = (Emission factor, lb/1,000 gal) x (Fuel sulfur content, wt %) x (Fuel consumption, 1,000 gal/yr) / (2,000 lb/ton)

6. #2 Diesel Heating Value:

0.135 MMBtu/gal

7. EU10 and EU 11 - Fuel consumption for EU IDs 10 and 11 is a total for both boilers and is based on the fuel delivered during calendar year 2018.

8. EU ID 17 and EU ID 18 Fuel consumption calculated based on estimated operating hours in CY 2020, assuming all operating hours at full load.

Fuel consumption (1,000 gal/yr) = (Operation, hr/yr) x (Capacity, MMBtu/hr) / (0.135 MMBtu/gal) / (1,000)

Adopted

July 5, 2022

**Table 3 - UAF Incinerator
CY 2020 Estimated Emissions**

ID	Emission Unit Description	Waste Combustion, CY 2020	Estimated Emissions (tpy)				
			NO _x	CO	PM ₁₀	SO ₂	VOC
9A	BiRD Incinerator	8.2 ton/yr	0.01	0.01	0.02	0.01	0.00
Total			0.01	0.01	0.02	0.01	0.00

Notes:

1. Weight conversion:

2,000 lb/ton

2. Incineration emission factors:

Pathological waste incinerator emission factors are not available. Medical waste incineration emission factors are expected to be representative of emissions from a pathological waste incinerator.

<u>Pollutant</u>	<u>Emission Factor</u>	<u>Source</u>
NO _x	3.56 lb/ton	AP-42, Table 2.3-1, 7/93
CO	2.95 lb/ton	AP-42, Table 2.3-1, 7/93
PM ₁₀	4.7 lb/ton	AP-42, Table 2.3-2, 7/93 - Total PM
SO ₂	2.17 lb/ton	AP-42, Table 2.3-1, 7/93
VOC	2.99E-01 lb/ton	AP-42, Table 2.3-2, 7/93 - TOC

3. Example calculations:

Actual emissions, tons/yr = (Emission factor, lb/ton) x (Waste combusted, ton/yr) / (2,000 lb/ton)

Table 4 - UAF Dual-Fired Boilers
CY 2020 Estimated Emissions

ID	Emission Unit Description	Fuel Consumption, CY 2020	Estimated Emissions (tpy)				
			NO _x	CO	PM ₁₀	SO ₂	VOC
3	Power Plant Boiler - Diesel Fired	116.4 kgal/yr	1.40	0.29	0.19	1.38	0.02
4	Power Plant Boiler - Diesel Fired	572.2 kgal/yr	6.87	1.43	0.94	6.78	0.10
4	Power Plant Boiler - Gas Fired	0.00000 MMscf	0.00	0.00	0.00	0.00	0.00
113	New CHPP- Natural Gas	1.88200 MMscf	0.13	0.08	0.01	0.00	0.01
113	New CHPP- Diesel	0.00000 kgal/yr	0.00	0.00	0.00	0.00	0.00
Total			8.39	1.80	1.14	8.17	0.12

Notes:

- Weight conversion: 2,000 lb/ton
- Maximum diesel sulfur content: 0.17 maximum weight percent, per records of fuel received at UAF during CY 2020
- Diesel emission factors:

<u>Pollutant</u>	<u>Emission Factor</u>	<u>Source</u>
NO _x	24 lb/kgal	AP-42 Table 1.3-1, 5/10
CO	5 lb/kgal	AP-42 Table 1.3-1, 5/10
PM ₁₀	3.3 lb/kgal	AP-42 Table 1.3-1, 5/10, sum of filterable and condensable
SO ₂	142 *S lb/kgal	AP-42 Table 1.3-1, 5/10
VOC	0.34 lb/kgal	AP-42 Table 1.3-3, 5/10, institutional boilers

- Natural gas emission factors:

<u>Pollutant</u>	<u>Emission Factor</u>	<u>Source</u>
NO _x	140 lb/MMscf	AP-42 Table 1.4-1, 7/98, low NO _x burners
CO	84 lb/MMscf	AP-42 Table 1.4-1, 7/98
PM ₁₀	7.6 lb/MMscf	AP-42 Table 1.4-2, 7/98, Total PM
SO ₂	0.6 lb/MMscf	AP-42 Table 1.4-2, 7/98
VOC	5.5 lb/MMscf	AP-42 Table 1.4-2, 7/98

- Example calculations:

$$\text{SO}_2 \text{ emission factor (lb/ton)} = 142 \times (\text{sulfur content of diesel, weight percent})$$

$$\text{Actual emissions (ton/yr)} = (\text{coal use, ton/yr}) \times (\text{emission factor, lb/ton}) / (2,000 \text{ lb/ton})$$

- EU ID 3 has not been modified to combust natural gas.

Table 5 - UAF CHPP Diesel Engine
CY 2020 Estimated Emissions

ID	Emission Unit Description	Maximum Capacity	Fuel Consumption, CY 2020	Estimated Emissions (tpy)				
				NO _x	CO	PM ₁₀	SO ₂	VOC
8	Backup/Peaking Generator (DEG) Diesel fired	13,266 hp	0 gal/yr	0.00	0.00	0.00	0.00	0.00
Total				0.00	0.00	0.00	0.00	0.00

Notes:

1. Weight conversion: 2,000 lb/ton
2. Diesel Heating Value: 0.135 MMBtu/gal
3. Maximum diesel sulfur content: 0.50 maximum weight percent, per records of fuel received at UAF during CY 2020
4. Emission factors:

<u>Pollutant</u>	<u>Emission Factor</u>	<u>Source</u>
NO _x	0.057 lb/gal	AQ0316MSS02, Condition 12.3b, Equation 4 (controlled emission rate)
CO	0.85 lb/MMBtu	AP-42, Table 3.4-1, 10/96
PM ₁₀	0.10 lb/MMBtu	AP-42, Table 3.4-1, 10/96
SO ₂	1.01 *S lb/MMBtu	AP-42, Table 3.4-1, 10/96
VOC	0.09 lb/MMBtu	AP-42, Table 3.4-1, 10/96

5. Example calculations:

- Actual emissions, tons/yr = (Emission factor, lb/MMBtu) x (Fuel consumption, gal/yr) x (Fuel heat value, MMBtu/gal) / (2,000 lb/ton)
- Actual emissions of SO₂, tons/yr = (Emission factor, lb/MMBtu) x (Fuel sulfur content, wt %) x (Fuel consumption, gal/yr) x (Fuel heat value, MMBtu/gal) / (2,000 lb/ton)
- Actual emissions of NO_x, tons/yr = (Emission factor, lb/gal) x (Fuel consumption, gal/yr) / (2,000 lb/ton)

6. EU ID 8 is permitted as a backup/peaking generator but is now an emergency generator.. EU ID 8 did not operate in CY 2018

**Table 6 - UAF Internal Combustion Engines
CY 2020 Estimated Emissions**

ID	Emission Unit Description	Maximum Capacity		Hours of Operation CY 2020		Estimated Emissions (tpy)				
						NO _x	CO	PM ₁₀	SO ₂	VOC
24	Old University Park Emergency Generator Engine - Emergency Generator	72	hp	7	hrs	0.01	0.00	0.00	0.00	0.00
30	Duckering Classroom Engine - Diesel Fired	64	hp	1	hrs	0.00	0.00	0.00	0.00	0.00
27	Alaska Center for Energy and Power Generator Engine - Diesel Fired	500	hp	15	hrs	0.03	0.02	0.00	0.00	0.00
32	Alaska Earthquake Information Center Emergency Generator Engine - Emergency Generator	120	hp	0	hrs	0.00	0.00	0.00	0.00	0.00
33	Arctic Health Research Emergency Generator Engine - Emergency Generator	212	hp	2	hrs	0.01	0.00	0.00	0.00	0.00
TBD	BiRD Emergency Generator Engine- ULSD Fired Emergency Generator # 2	324	hp	36	hrs	0.18	0.04	0.01	0.00	0.01
Total						0.22	0.07	0.01	0.00	0.02

Total Tons 0.32

Notes:

1. Weight conversion:
2. Emission factors:

2,000 lb/ton

<u>Pollutant</u>	<u>Emission Factor</u>	<u>Source</u>
NO _x	0.031 lb/hp-hr	AP-42, Table 3.3-1, 5/10, Diesel fuel
CO	6.68E-03 lb/hp-hr	AP-42, Table 3.3-1, 5/10, Diesel fuel
PM ₁₀	2.20E-03 lb/hp-hr	AP-42, Table 3.3-1, 5/10, Diesel fuel
SO ₂	2.05E-03 lb/hp-hr	AP-42, Table 3.3-1, 5/10, Diesel fuel See note 8 for BiRD Genset
VOC	0.0025141 lb/hp-hr	AP-42, Table 3.3-1, 5/10, Diesel fuel - sum of exhaust and crankcase TOC emission factors

3. Emission factors for EU 27:

<u>Pollutant</u>	<u>Emission Factor</u>	<u>Source</u>
NO _x	3.52 lb/hr	Vendor
CO	3.14 lb/hr	Vendor
PM ₁₀	0.12 lb/hr	Vendor
SO ₂	1.09E-05 lb/hp-hr	Mass balance (ULSD required)
VOC	0.21 lb/hr	Vendor

4. Example calculations:

Actual emissions, tons/yr = (Emission factor, lb/hp-hr) x (Capacity, hp) x (Operation, hr/yr) / (2,000 lb/ton)

5. Horsepower ratings for EU IDs 23, 24, 30, and 33 assume a 95% shaft efficiency.

Capacity (hp) = (Capacity, kW) x (1.341 hp/kW) / 0.95

6. Actual emissions for EU IDs 6 and 7 are not included in this assessable emissions estimate because they were permanently removed from service on June 29, 2012. EU ID 33 will replace these units.

Adopted

July 5, 2022

**Table 7 - UAF Coal Preparation Plant
CY 2020 Estimated Emissions, PM-10**

Emission Source		Emission Factor		Source	Quantity Combusted 2020	Maximum Rating / Capacity	Annual PM ₁₀ Emission (tpy)
Identification	Type	Value	Units				
Railcar unloading through grate into crusher	Point	2.46E-04	lb/ton	AP-42, Section 13.2.4	88,491.0 tons coal	N/A	0.011
Crusher	Point	6.00E-03	lb/ton	3-05-010-10, FIRE	88,491.0 tons coal	N/A	0.265
Crusher to conveyor 1	Point	2.46E-04	lb/ton	AP-42, Section 13.2.4	88,491.0 tons coal	N/A	0.011
Conveyor 1 to bucket elevator	Point	2.46E-04	lb/ton	AP-42, Section 13.2.4	88,491.0 tons coal	N/A	0.011
Bucket elevator to screw conveyor	Point	2.46E-04	lb/ton	AP-42, Section 13.2.4	88,491.0 tons coal	N/A	0.011
Screw conveyor to coal bin 1 or	Point	2.46E-04	lb/ton	AP-42, Section 13.2.4	88,491.0 tons coal	N/A	0.011
Screw conveyor to coal bin 2	Point	2.46E-04	lb/ton	AP-42, Section 13.2.4	88,491.0 tons coal	N/A	0.011
Coal bin 1 to scale 1 or	Point	2.46E-04	lb/ton	AP-42, Section 13.2.4	88,491.0 tons coal	N/A	0.011
Coal bin 2 to scale 2	Point	2.46E-04	lb/ton	AP-42, Section 13.2.4	88,491.0 tons coal	N/A	0.011
Scale 1 to boiler 5	Point	2.46E-04	lb/ton	AP-42, Section 13.2.4	88,491.0 tons coal	N/A	0.011
Scale 2 to boiler 5	Point	2.46E-04	lb/ton	AP-42, Section 13.2.4	88,491.0 tons coal	N/A	0.011
Limestone Handling System (EU 105)	Point	3.00E-03	grains/dscf	Design Specification	8,784.0 hours	1,200 acfm	0.136
Sand Handling System (EU 107)	Point	3.00E-03	grains/dscf	Design Specification	8,784.0 hours	1,600 acfm	0.181
Ash Handling System (EU 109)	Point	3.00E-03	grains/dscf	Design Specification	8,784.0 hours	1,000 acfm	0.113
Ash Handling System Vacuum (EU 110)	Point	3.00E-03	grains/dscf	Design Specification	8,784.0 hours	2,000 acfm	0.226
Ash Loadout to Truck (EU 111)	Point	2.19E-05	lb/ton	AP-42, Section 13.2.4	6,194.4 tons ash	N/A	7.E-05
Dry Sorbent Handling Vent Filter Exhaust (EU 114)	Point	5.00E-02	grains/dscf	Design Specification	8,784.0 hours	5.0 acfm	0.009
Coal Silo No. 1 with bin vent (EU 128)	Point	3.00E-03	grains/dscf	Design Specification	8,784.0 hours	1,650 acfm	0.186
Coal Silo No. 2 with bin vent (EU 129)	Point	3.00E-03	grains/dscf	Design Specification	8,784.0 hours	1,650 acfm	0.186
Coal Silo No. 3 with bin vent (EU 130)	Point	3.00E-03	grains/dscf	Design Specification	8,784.0 hours	1,650 acfm	0.186
							1.60

Notes:

1. Coal/Ash transfer emission factor from AP-42, Section 13.2.4 based on empirical equation $E = k \times 0.0032 \times (U/5)^{1.3} / (M/2)^{1.4}$ lb/ton transferred where:

$$k = 0.35 \text{ for PM}_{10}$$

$$U = \text{mean wind speed} = 4 \text{ mph}$$

$$M = \text{coal moisture content} = 4.8 \text{ percent}$$

$$M = \text{ash moisture content} = 27 \text{ percent}$$

per National Climactic Data Center (<https://www.ncdc.noaa.gov/cdo-web/search>)

2. FIRE = Factor Information Retrieval Data System.

3. Ash loadout emissions based on maximum boiler (EU 113) total consumption capacity of 88,491.0 tons

Ash content of coal = 7.0 pct. per Usibelli Coal Mine website

Operations, ash tpy = (Σ coal capacity, hr/yr) x (0.07 ash content)

3. Example Calculations:

$$\text{Actual emissions (tpy)} = (\text{Emission factor, lb/ton}) \times (\text{Material handled, ton/yr}) / (2,000 \text{ lb/ton})$$

Adopted

July 5, 2022

Table 8 - UAF Propane Fired Sources
CY 2020 Estimated Emissions

ID	Emission Unit Description	Fuel Consumption, CY 2020	Estimated Emissions (tpy)				
			NO _x	CO	PM ₁₀	SO ₂	VOC
N/A	Fine Arts/Art Wing Rms 302, 413 Kiln - Propane Fired	6.2 1,000 gal/yr	0.04	0.02	0.00	0.00	0.00
N/A	Eternal Flame and Whitaker Propane Fired						
N/A	Wood Center Kiln - Propane Fired						
Total			0.04	0.02	0.00	0.00	0.00

Notes:

1. Weight conversion: 2,000 lb/ton
2. Propane sulfur content: 0.20 gr/100 ft³ gas vapor (assumption)
3. Propane Emission factors:

Emission factors for small pottery-firing kilns are not available. These calculations assume that combustion of propane in the kilns is similar to the combustion of propane in small propane-fired boilers.

<u>Pollutant</u>	<u>Emission Factor</u>	<u>Source</u>
NO _x	13 lb/1,000 gal	AP-42, Table 1.5-1, 07/08 (propane commercial boilers)
CO	7.5 lb/1,000 gal	AP-42, Table 1.5-1, 07/08 (propane commercial boilers)
PM ₁₀	0.7 lb/1,000 gal	AP-42, Table 1.5-1, 07/08 (propane commercial boilers)
SO ₂	0.1 *S lb/1,000 gal	AP-42, Table 1.5-1, 07/08 (propane commercial boilers), multiplied by gr/100 ft ³ gas vapor sulfur in fuel
VOC	1.0 lb/1,000 gal	AP-42, Table 1.5-1, 07/08 (propane commercial boilers), TOC

4. Example calculations:

Actual emissions (ton/yr) = (Emission factor, lb/1,000 gal) x (Fuel consumption, 1,000 gal/yr) / (2,000 lb/ton)

Adopted

July 5, 2022

Table 9 - UAF Laboratory Hoods
CY 2020 Estimated Emissions, VOC and HAPs

Chemical	CAS No.	Amount Stored On-site (liters)	Specific gravity of stored substance	Percent in solution	Amount Stored On-site (lbs)	VOC Emissions (ton/yr)	HAP Emissions (ton/yr)
2-Butanone	78-93-3	35	0.806	100	62.2	0.031	
Acetic acid	64-19-7	39	1.05	97	87.5	0.044	
Acetone	67-64-1	495	0.788	100	859.7	0.430	
Benzene	71-43-2	12	0.8765	100	23.2	0.012	0.012
Ethanol	64-17-5	502	0.79	100	874.1	0.437	
Formaldehyde	50-00-0	398	1.08	38	360.0	0.180	0.180
Methyl alcohol in formaldehyde solution	67-56-1			15	142.1	0.071	0.071
Hexane	110-54-3	77	0.659	94	105.1	0.053	0.053
Methanol	67-56-1	443	0.791	100	772.3	0.386	0.386
Methylene chloride	75-09-2	156	1.3266	100	456.1	0.228	0.228
Phenol	108-95-2	4	1.057	100	9.3	0.005	0.005
n-Propyl alcohol and 2-Propanol	71-23-8, 67-63-0	356	0.7945	100	623.4	0.312	
Stoddard solvent	8052-41-3	32	0.787	100	55.5	0.028	
Toluene	108-88-3	178	0.86	100	337.4	0.169	0.169
Xylene	1330-20-7	43	0.864	100	81.9	0.041	0.041
Total						2.42	1.14

Notes:

- The above chemicals were determined to be common chemicals that contained VOCs.
- Only chemical inventories of 4 liters or greater were included.
- This inventory is not up to date, but reflects information available at issuance of Title V Permit Renewal.
- This inventory does not reflect chemical usage, only those stored on-site.
- In order to conservatively estimate VOC emissions from laboratory hoods, the following assumptions are made:
 - The chemicals stored on-site are used within a year.
 - The chemicals are emitted in their current form and are 100% volatile.
 - The chemicals are not transformed into other chemicals. Other VOCs are not created during laboratory use.
- Specific gravity and percent of chemical in solution data obtained from chemical product material safety data sheets.

SG of Water = 1 kg/L
Conversion: 2.204 lb/kg
2,000 lb/ton

8. Example calculations:

Amount stored on-site (lbs) = (Liters stored) x (Specific gravity) x (2.204 lb/kg) x (percent in solution)
Emission estimate (ton/yr) = (Pounds stored) / (2,000 lb/ton)

**UAF SO2 Emissions
(Emission Fee Estimates)**

Year	SO2 (tpy) Facility wide	Coal Burning EUs
2020	20.82	113
2019	184.41	1, 2, 113
2018	176.03	1, 2
2017	165.03	1, 2
2016	201.69	1, 2
2015	203.1	1, 2
2014	209.6	1, 2



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Alaska Department of Environmental Conservation
 Air Permits Program
 ATTN: Assessable Emissions Estimate
 410 Willoughby Avenue Suite 303
 Juneau, Alaska 99811-1800

March 25, 2015

Subject: Assessable Emissions for the Sand Point Seafood Processing Facility
 Trident Seafoods Corporation
 Sand Point, Alaska

The Trident Sand Point Seafood Processing Facility (Trident Sand Point) currently operates under Title V Permit No. AQ0232TVP03. According to Condition 45 of the Title V Permit, the Alaska Department of Environmental Conservation (ADEC) will assess emission fees on the basis of actual emissions rather than potential emissions if Trident Sand Point submits estimates of anticipated 12-month actual emissions to ADEC by March 31, 2015. Summarized below are the anticipated actual emissions and assessable emission fees for Trident Sand Point during the 12-month period ending June 30, 2016:

	12-month Allowable emissions ¹	Anticipated Actual Emissions July 1, 2015 - June 30, 2016
NO_x emissions for Emission Units 1-6 (tons)	226.8	150.51
Pollutants:		
NO _x (ton)	235.4	154.69
SO ₂ (ton)	54.8	0.12 (not assessable)
CO (ton)	39.6	29.83
PM ₁₀ (ton)	7.7 (not assessable)	3.80 (not assessable)
VOC (ton)	11.8	7.97 (not assessable)
Total Assessable Emissions, rounded (ton)	342	185
Assessable Emissions Cost (cost/ton)	\$28.57	\$28.57
Assessable Emission Fee	\$9,770.94	\$5,271.97

¹ The allowable emissions are described in ADEC's Statement of Basis for Title V Permit No. AQ0232TVP03, dated October 20, 2014.



July 5, 2022

TRIDENT SEAFOODS CORPORATION

5303 Shilshole Ave. NW, Seattle, WA 98107-4000 USA • (206) 783-3818 • Fax 782-7195
Domestic Sales: (206) 783-3474 • Fax: (206) 782-7246
Canned Sales: (206) 781-7606 • (206) 781-7604
Export Sales: (206) 783-3718 • (206) 782-7195

The anticipated actual emissions are based upon the actual emissions emitted during the 2014 calendar year. A summary of the 2014 fuel use and the lb/gal emission factors is provided in Attachment 1 for your reference. Also included in Attachment 1 is a spreadsheet summarizing the emissions for 2014. Actual SO2, PM10, and VOC emissions are not assessable because they are estimated to be less than 10 tons during the 12-month period ending June 30, 2016.

If you have any questions concerning this projection of actual emissions and assessable emission fees for Trident Sand Point, please contact me at (206) 783-3818 or by email at sstokes@tridentseafoods.com.

Sincerely,

Handwritten signature of Shawn Stokes.

Shawn Stokes
Environmental Compliance Director

Attachment

cc: Maya Johnson, ADEC (via email)
Alan Pefley, ADEC (via email)
Michelle Blackmore, ADEC (via email)



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CERTIFICATION OF TRUTH, ACCURACY, AND COMPLETENESS

Based on information and belief formed after reasonable inquiry, I certify that the statements and information in and attached to this document are true, accurate, and complete.

March 25, 2015

Signature of Responsible Official

Date

Shawn Stokes

Environmental Compliance Director

Printed Name

Title

Attachment 1

Table 1. Fuel Consumption and Emission Factors for 2014

Emission Unit	2014 Fuel Consumption (gal)	Emission Factors (lb/gal)				
		NO _x ¹	SO ₂ ²	CO ³	PM ₁₀ ⁴	VOC ³
1	328,140	--	0.000112	0.0499	0.0050	0.0185
2	255,469	0.2140	0.000112	0.0551	0.0030	0.0024
3	62,875	0.2310	0.000112	0.0267	0.0110	0.0034
4	89,976	0.2310	0.000112	0.0267	0.0110	0.0034
5	399,284	--	0.000112	0.0499	0.0050	0.0185
6	68,561	--	0.000112	0.0499	0.0050	0.0185
8	114,324	0.0200	0.000112	0.0050	0.0033	0.0002
8 (with fish oil)	28,963	0.0200	0.0011	0.0050	0.0033	0.0002
9	0	0.0200	0.000112	0.0050	0.0033	0.0002
10	148,939	0.0200	0.000112	0.0050	0.0033	0.0002
10 (with fish oil)	31,556	0.0200	0.0011	0.0050	0.0033	0.0002
11	34,374	0.0200	0.000112	0.0050	0.0033	0.0002

¹ NO_x emission factors for Emission Units 1, 5, and 6 are based on average monthly load and actual fuel consumption. Please see Table 2 for the NO_x emission factors for Emission Units 1, 5, and 6. NO_x emission factors for Emission Units 2, 3, and 4 are based on source tests conducted at Trident Sand Point in July 2000. NO_x emission factors for Emission Units 8 through 11 are from AP-42.

² SO₂ emission factors are based on 0.00079 wt. % sulfur (average for fuel delivered in 2014) for diesel and 0.008 wt. % sulfur for fish oil.

³ CO and VOC emission factors for Emission Units 1 through 6 are based on vendor data. CO and VOC emission factors for Emission Units 8 through 11 are from AP-42.

⁴ PM₁₀ emission factors for Emission Units 1 through 6 are based on source tests conducted at the Trident Sand Point facility in July 2000. PM₁₀ emission factors for Emission Units 8 through 11 are from AP-42.

Table 2. Emission Factors for Emission Units 1, 5, and 6

Engines Equipped with Wet Manifold or at Low-NO_x Mode Engine Configuration Setting							
Uncontrolled NOX Emission Factor on varying % Load (lb/gal)							Design Fuel Consumption @100% Load (gal/hr)
≤ 50	51-75	75	76-84	85	86-99	100	
0.365	0.365	0.364	0.364	0.346	0.346	0.325	79.8
Engines Equipped with Dry Manifold or set to Fuel Economy (Low Brake Specific Fuel Consumption) Mode Engine Configuration Setting							
Uncontrolled NOX Emission Factor on varying % Load (lb/gal)							Design Fuel Consumption @100% Load (gal/hr)
≤ 50	51-75	75	76-84	85	86-99	100	
0.444	0.444	0.397	0.397	0.372	0.372	0.330	80.4

Table 3. Actual Emissions for 2014

Emission Unit	Actual Emissions for 2014 (ton)				
	NO_x	SO₂	CO	PM₁₀	VOC
1	59.78	0.02	8.19	0.82	3.04
2	27.34	0.01	7.04	0.38	0.31
3	7.26	0.00	0.84	0.35	0.11
4	10.39	0.01	1.20	0.49	0.15
5	33.61	0.02	9.96	1.00	3.69
6	12.13	0.00	1.71	0.17	0.63
8	1.43	0.01	0.29	0.19	0.01
8 (with fish oil)	0.29	0.02	0.07	0.05	0.00
9	0.00	0.00	0.00	0.00	0.00
10	1.81	0.01	0.37	0.25	0.01
10 (with fish oil)	0.32	0.02	0.08	0.05	0.00
11	0.35	0.00	0.09	0.06	0.00
Total (ton):	154.69	0.12	29.83	3.80	7.97

Attachment 1

Table 1. Fuel Consumption and Emission Factors for 2015

Emission Unit	2015 Fuel Consumption (gal)	Emission Factors (lb/gal)				
		NO _x ¹	SO ₂ ²	CO ³	PM ₁₀ ⁴	VOC ³
1	345,112	--	0.000121	0.0499	0.0050	0.0185
2	278,381	0.2140	0.000121	0.0551	0.0030	0.0024
3	76,853	0.2310	0.000121	0.0267	0.0110	0.0034
4	102,730	0.2310	0.000121	0.0267	0.0110	0.0034
5	443,285	--	0.000121	0.0499	0.0050	0.0185
6	75,695	--	0.000121	0.0499	0.0050	0.0185
8	92,961	0.0200	0.000121	0.0050	0.0033	0.0002
8 (with fish oil)	66,026	0.0200	0.0011	0.0050	0.0033	0.0002
9	0	0.0200	0.000121	0.0050	0.0033	0.0002
10	99,987	0.0200	0.000121	0.0050	0.0033	0.0002
10 (with fish oil)	67,820	0.0200	0.0011	0.0050	0.0033	0.0002
11	62,322	0.0200	0.000121	0.0050	0.0033	0.0002

¹ NO_x emission factors for Emission Units 1, 5, and 6 are based on average monthly load and actual fuel consumption. Please see Table 2 for the NO_x emission factors for Emission Units 1, 5, and 6. NO_x emission factors for Emission Units 2, 3, and 4 are based on source tests conducted at Trident Sand Point in July 2000. NO_x emission factors for Emission Units 8 through 11 are from AP-42.

² SO₂ emission factors are based on 0.00085 wt. % sulfur (average for fuel delivered in 2014) for diesel and 0.008 wt. % sulfur for fish oil.

³ CO and VOC emission factors for Emission Units 1 through 6 are based on vendor data. CO and VOC emission factors for Emission Units 8 through 11 are from AP-42.

⁴ PM₁₀ emission factors for Emission Units 1 through 6 are based on source tests conducted at the Trident Sand Point facility in July 2000. PM₁₀ emission factors for Emission Units 8 through 11 are from AP-42.

Table 2. Emission Factors for Emission Units 1, 5, and 6

Engines Equipped with Wet Manifold or at Low-NO_x Mode Engine Configuration Setting							
Uncontrolled NOX Emission Factor on varying % Load (lb/gal)							Design Fuel Consumption @100% Load (gal/hr)
≤ 50	51-75	75	76-84	85	86-99	100	
0.365	0.365	0.364	0.364	0.346	0.346	0.325	79.8
Engines Equipped with Dry Manifold or set to Fuel Economy (Low Brake Specific Fuel Consumption) Mode Engine Configuration Setting							
Uncontrolled NOX Emission Factor on varying % Load (lb/gal)							Design Fuel Consumption @100% Load (gal/hr)
≤ 50	51-75	75	76-84	85	86-99	100	
0.444	0.444	0.397	0.397	0.372	0.372	0.330	80.4

Table 3. Actual Emissions for 2015

Emission Unit	Actual Emissions for 2015 (ton)				
	NO _x	SO ₂	CO	PM ₁₀	VOC
1	62.90	0.02	8.61	0.86	3.19
2	29.79	0.02	7.67	0.42	0.33
3	8.88	0.00	1.03	0.42	0.13
4	11.87	0.01	1.37	0.57	0.17
5	74.46	0.03	11.06	1.11	4.10
6	11.61	0.00	1.89	0.19	0.70
8	1.59 ¹	0.01	0.23	0.15	0.01
8 (with fish oil)		0.04	0.17	0.11	0.01
9	0.00	0.00	0.00	0.00	0.00
10	1.68 ¹	0.01	0.25	0.16	0.01
10 (with fish oil)		0.04	0.17	0.11	0.01
11	0.62	0.00	0.16	0.10	0.01
Total (ton):	203.39	0.17	32.60	4.21	8.67

¹Total NO_x emissions from all fuels combusted

Attachment 1

Table 1. Fuel Consumption and Emission Factors for 2016

Emission Unit	2016 Fuel Consumption (gal)	Emission Factors (lb/gal)				
		NO _x ¹	SO ₂ ²	CO ³	PM ₁₀ ⁴	VOC ³
1	341,966	--	0.000114	0.0499	0.0050	0.0185
2	255,475	0.2140	0.000114	0.0551	0.0030	0.0024
3	103,607	0.2310	0.000114	0.0267	0.0110	0.0034
4	72,710	0.2310	0.000114	0.0267	0.0110	0.0034
5	390,810	--	0.000114	0.0499	0.0050	0.0185
6	148,482	--	0.000114	0.0499	0.0050	0.0185
8	141,741	0.0200	0.000114	0.0050	0.0033	0.0002
8 (with fish oil)	2,250	0.0200	0.0011	0.0050	0.0033	0.0002
9	0	0.0200	0.000114	0.0050	0.0033	0.0002
10	136,783	0.0200	0.000114	0.0050	0.0033	0.0002
10 (with fish oil)	27,836	0.0200	0.0011	0.0050	0.0033	0.0002
11	53,465	0.0200	0.000114	0.0050	0.0033	0.0002

¹ NO_x emission factors for Emission Units 1, 5, and 6 are based on average monthly load and actual fuel consumption. Please see Table 2 for the NO_x emission factors for Emission Units 1, 5, and 6. NO_x emission factors for Emission Units 2, 3, and 4 are based on source tests conducted at Trident Sand Point in July 2000. NO_x emission factors for Emission Units 8 through 11 are from AP-42.

² SO₂ emission factors are based on 0.00080 wt. % sulfur (average for fuel delivered in 2016) for diesel and 0.008 wt. % sulfur for fish oil.

³ CO and VOC emission factors for Emission Units 1 through 6 are based on vendor data. CO and VOC emission factors for Emission Units 8 through 11 are from AP-42.

⁴ PM₁₀ emission factors for Emission Units 1 through 6 are based on source tests conducted at the Trident Sand Point facility in July 2000. PM₁₀ emission factors for Emission Units 8 through 11 are from AP-42.

Table 2. Emission Factors for Emission Units 1, 5, and 6

Engines Equipped with Wet Manifold or at Low-NO_x Mode Engine Configuration Setting							
Uncontrolled NOX Emission Factor on varying % Load (lb/gal)							Design Fuel Consumption @100% Load (gal/hr)
≤ 50	51-75	75	76-84	85	86-99	100	
0.365	0.365	0.364	0.364	0.346	0.346	0.325	79.8
Engines Equipped with Dry Manifold or set to Fuel Economy (Low Brake Specific Fuel Consumption) Mode Engine Configuration Setting							
Uncontrolled NOX Emission Factor on varying % Load (lb/gal)							Design Fuel Consumption @100% Load (gal/hr)
≤ 50	51-75	75	76-84	85	86-99	100	
0.444	0.444	0.397	0.397	0.372	0.372	0.330	80.4

Table 3. Actual Emissions for 2016

Emission Unit	Actual Emissions for 2016 (ton)				
	NO_x	SO₂	CO	PM₁₀	VOC
1	62.37	0.02	8.53	0.85	3.16
2	27.34	0.01	7.04	0.38	0.31
3	11.97	0.01	1.38	0.57	0.18
4	8.40	0.00	0.97	0.40	0.12
5	24.83	0.02	9.75	0.98	3.61
6	29.03	0.01	3.70	0.37	1.37
8	1.44 ¹	0.01	0.35	0.23	0.01
8 (with fish oil)		0.00	0.01	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00
10	1.65 ¹	0.01	0.34	0.23	0.01
10 (with fish oil)		0.02	0.07	0.05	0.00
11	0.54	0.00	0.13	0.09	0.01
Total (ton):	167.55	0.11	32.28	4.15	8.79

¹Total NO_x emissions from all fuels combusted

Attachment 1

Table 1. Fuel Consumption and Emission Factors for 2017

Emission Unit	2017 Fuel Consumption (gal)	Emission Factors (lb/gal)				
		NO _x ¹	SO ₂ ²	CO ³	PM ₁₀ ⁴	VOC ³
1	231,118	--	0.000140	0.0499	0.005	0.0185
2	228,603	0.214	0.000140	0.0551	0.003	0.0024
3	23,270	0.231	0.000140	0.0267	0.011	0.0034
4	132,124	0.231	0.000140	0.0267	0.011	0.0034
5	407,533	--	0.000140	0.0499	0.005	0.0185
6	40,300	--	0.000140	0.0499	0.005	0.0185
8	82,705	0.02	0.000140	0.005	0.0033	0.0002
8 (with fish oil)	5,517	0.02	0.0011	0.005	0.0033	0.0002
9	0	0.02	0.000140	0.005	0.0033	0.0002
10	97,506	0.02	0.000140	0.005	0.0033	0.0002
10 (with fish oil)	0	0.02	0.0011	0.005	0.0033	0.0002
11	52,785	0.02	0.000140	0.005	0.0033	0.0002

¹ NO_x emission factors for Emission Units 1, 5, and 6 are based on average monthly load and actual fuel consumption. Please see Table 2 for the NO_x emission factors for Emission Units 1, 5, and 6. NO_x emission factors for Emission Units 2, 3, and 4 are based on source tests conducted at Trident Sand Point in July 2000. NO_x emission factors for Emission Units 8 through 11 are from AP-42.

² SO₂ emission factors are based on 0.00098 wt. % sulfur (average for fuel delivered in 2017) for diesel and 0.008 wt. % sulfur for fish oil.

³ CO and VOC emission factors for Emission Units 1 through 6 are based on vendor data. CO and VOC emission factors for Emission Units 8 through 11 are from AP-42.

⁴ PM₁₀ emission factors for Emission Units 1 through 6 are based on source tests conducted at the Trident Sand Point facility in July 2000. PM₁₀ emission factors for Emission Units 8 through 11 are from AP-42.

Table 2a - Uncontrolled NOx Emission Factors: Engines Equipped with Wet Manifold or at Low-NOx Mode Engine Configuration Setting

Emission Unit ID	Uncontrolled NOx Emission Factor on varying % Load (lb/gal)				Design Fuel Consumption @ 100% Load (gal/hr)
	<20	20-54	55-89	>90	
1	0.32	0.36	0.36	0.34	79.8
2					66.4
3 & 4					35.4
5					79.8
6	0.28	0.32	0.32	0.32	79.8

Table Note: Percent engine loads and load ranges are representative only, and may vary depending upon the number and relative spacing of engine loads actually source tested

Table 2b - Uncontrolled NOx Emission Factors: Engines Equipped with Dry Manifold or set to Fuel Economy (Low Brake Specific Fuel Consumption) Mode Engine Configuration Setting

Emission Unit ID	Uncontrolled NOx Emission Factor on varying % Load (lb/gal)				Design Fuel Consumption @ 100% Load (gal/hr)
	<20	20-54	55-89	>90	
1					80.4
2	0.24	0.24	0.25	0.25	83.6
3 & 4	0.33	0.33	0.29	0.27	47.9
5	0.87	0.87	0.63	0.48	80.4
6					80.4

Table Note: Percent engine loads and load ranges are representative only, and may vary depending upon the number and relative spacing of engine loads actually source tested.

Table 3. Actual Emissions for 2017

Emission Unit	Actual Emissions for 2017 (ton)				
	NO_x	SO₂	CO	PM₁₀	VOC
1	41.76	0.02	5.77	0.58	2.14
2	26.53	0.02	6.30	0.34	0.27
3	3.18	0.00	0.31	0.13	0.04
4	19.81	0.01	1.76	0.73	0.22
5	25.66	0.03	10.17	1.02	3.77
6	7.28	0.00	1.01	0.10	0.37
8	0.88	0.01	0.21	0.14	0.01
8 (with fish oil)		0.00	0.01	0.01	0.00
9	0.00	0.00	0.00	0.00	0.00
10	0.98	0.01	0.24	0.16	0.01
10 (with fish oil)		0.00	0.00	0.00	0.00
11	0.53	0.00	0.13	0.09	0.01
Total (ton):	126.61	0.09	25.91	3.29	6.84

¹Total NO_x emissions from all fuels combusted

Attachment 1

Table 1. Fuel Consumption and Emission Factors for 2018

Emission Unit	2018 Fuel Consumption (gal)	Emission Factors (lb/gal)				
		NO _x ¹	SO ₂ ²	CO ³	PM ₁₀ ⁴	VOC ³
1	148,327	--	0.000069	0.0499	0.005	0.0185
2	190,969	0.214	0.000069	0.0551	0.003	0.0024
3	63,592	0.231	0.000069	0.0267	0.011	0.0034
4	81,103	0.231	0.000069	0.0267	0.011	0.0034
5	297,149	--	0.000069	0.0499	0.005	0.0185
6	17,978	--	0.000069	0.0499	0.005	0.0185
8	78,908	0.02	0.000069	0.005	0.0033	0.0002
8 (with fish oil)	0	0.02	0.0011	0.005	0.0033	0.0002
9	0	0.02	0.000069	0.005	0.0033	0.0002
10	102,315	0.02	0.000069	0.005	0.0033	0.0002
10 (with fish oil)	0	0.02	0.0011	0.005	0.0033	0.0002
11	24,310	0.02	0.000069	0.005	0.0033	0.0002

¹ NO_x emission factors for Emission Units 1, 5, and 6 are based on average monthly load and actual fuel consumption. Please see Table 2 for the NO_x emission factors for Emission Units 1, 5, and 6. NO_x emission factors for Emission Units 2, 3, and 4 are based on source tests conducted at Trident Sand Point in July 2000. NO_x emission factors for Emission Units 8 through 11 are from AP-42.

² SO₂ emission factors are based on 0.00049 wt. % sulfur (average for fuel delivered in 2018) for diesel and 0.008 wt. % sulfur for fish oil.

³ CO and VOC emission factors for Emission Units 1 through 6 are based on vendor data. CO and VOC emission factors for Emission Units 8 through 11 are from AP-42.

⁴ PM₁₀ emission factors for Emission Units 1 through 6 are based on source tests conducted at the Trident Sand Point facility in July 2000. PM₁₀ emission factors for Emission Units 8 through 11 are from AP-42.

Table 2a - Uncontrolled NOx Emission Factors: Engines Equipped with Wet Manifold or at Low-NOx Mode Engine Configuration Setting

Emission Unit ID	Uncontrolled NOx Emission Factor on varying % Load (lb/gal)				Design Fuel Consumption @ 100% Load (gal/hr)
	<20	20-54	55-89	>90	
1	0.32	0.36	0.36	0.34	79.8
2					66.4
3 & 4					35.4
5					79.8
6	0.28	0.32	0.32	0.32	79.8

Table Note: Percent engine loads and load ranges are representative only, and may vary depending upon the number and relative spacing of engine loads actually source tested

Table 2b - Uncontrolled NOx Emission Factors: Engines Equipped with Dry Manifold or set to Fuel Economy (Low Brake Specific Fuel Consumption) Mode Engine Configuration Setting

Emission Unit ID	Uncontrolled NOx Emission Factor on varying % Load (lb/gal)				Design Fuel Consumption @ 100% Load (gal/hr)
	<20	20-54	55-89	>90	
1					80.4
2	0.24	0.24	0.25	0.25	83.6
3 & 4	0.33	0.33	0.29	0.27	47.9
5	0.87	0.87	0.63	0.48	80.4
6					80.4

Table Note: Percent engine loads and load ranges are representative only, and may vary depending upon the number and relative spacing of engine loads actually source tested.

Table 3. Actual Emissions for 2018

Emission Unit	Actual Emissions for 2018 (ton)				
	NO _x	SO ₂	CO	PM ₁₀	VOC
1	26.70	0.01	3.70	0.37	1.37
2	22.92	0.01	5.26	0.29	0.23
3	10.49	0.00	0.85	0.35	0.11
4	13.38	0.00	1.08	0.45	0.14
5	22.96	0.01	7.41	0.74	2.75
6	2.88	0.00	0.45	0.04	0.17
8	0.79	0.00	0.20	0.13	0.01
8 (with fish oil)		0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00
10	1.02	0.00	0.26	0.17	0.01
10 (with fish oil)		0.00	0.00	0.00	0.00
11	0.24	0.00	0.06	0.04	0.00
Total (ton):	101.38	0.03	19.27	2.58	4.78

¹Total NO_x emissions from all fuels combusted

Attachment 1

Table 1. Fuel Consumption and Emission Factors for 2019

Emission Unit	2019 Fuel Consumption (gal)	Emission Factors (lb/gal)				
		NO _x ¹	SO ₂ ²	CO ³	PM ₁₀ ⁴	VOC ³
1	246,232	--	0.000127	0.0499	0.005	0.0185
2	177,289	0.214	0.000127	0.0551	0.003	0.0024
3	65,060	0.231	0.000127	0.0267	0.011	0.0034
4	83,925	0.231	0.000127	0.0267	0.011	0.0034
5	237,771	--	0.000127	0.0499	0.005	0.0185
6	35,644	--	0.000127	0.0499	0.005	0.0185
8	100,496	0.02	0.000127	0.005	0.0033	0.0002
8 (with fish oil)	0	0.02	0.0011	0.005	0.0033	0.0002
9	0	0.02	0.000127	0.005	0.0033	0.0002
10	149,408	0.02	0.000127	0.005	0.0033	0.0002
10 (with fish oil)	0	0.02	0.0011	0.005	0.0033	0.0002
11	7,650	0.02	0.000127	0.005	0.0033	0.0002

¹ NO_x emission factors for Emission Units 1, 5, and 6 are based on average monthly load and actual fuel consumption. Please see Table 2 for the NO_x emission factors for Emission Units 1, 5, and 6. NO_x emission factors for Emission Units 2, 3, and 4 are based on source tests conducted at Trident Sand Point in July 2000. NO_x emission factors for Emission Units 8 through 11 are from AP-42.

² SO₂ emission factors are based on 0.0009 wt. % sulfur (average for fuel delivered in 2019) for diesel and 0.008 wt. % sulfur for fish oil.

³ CO and VOC emission factors for Emission Units 1 through 6 are based on vendor data. CO and VOC emission factors for Emission Units 8 through 11 are from AP-42.

⁴ PM₁₀ emission factors for Emission Units 1 through 6 are based on source tests conducted at the Trident Sand Point facility in July 2000. PM₁₀ emission factors for Emission Units 8 through 11 are from AP-42.

Table 2a - Uncontrolled NOx Emission Factors: Engines Equipped with Wet Manifold or at Low-NOx Mode Engine Configuration Setting

Emission Unit ID	Uncontrolled NOx Emission Factor on varying % Load (lb/gal)				Design Fuel Consumption @ 100% Load (gal/hr)
	<20	20-54	55-89	>90	
1	0.32	0.36	0.36	0.34	79.8
2					66.4
3 & 4					35.4
5					79.8
6	0.28	0.32	0.32	0.32	79.8

Table Note: Percent engine loads and load ranges are representative only, and may vary depending upon the number and relative spacing of engine loads actually source tested

Table 2b - Uncontrolled NOx Emission Factors: Engines Equipped with Dry Manifold or set to Fuel Economy (Low Brake Specific Fuel Consumption) Mode Engine Configuration Setting

Emission Unit ID	Uncontrolled NOx Emission Factor on varying % Load (lb/gal)				Design Fuel Consumption @ 100% Load (gal/hr)
	<20	20-54	55-89	>90	
1					80.4
2	0.24	0.24	0.25	0.25	83.6
3 & 4	0.33	0.33	0.29	0.27	47.9
5	0.87	0.87	0.63	0.48	80.4
6					80.4

Table Note: Percent engine loads and load ranges are representative only, and may vary depending upon the number and relative spacing of engine loads actually source tested.

Table 3. Actual Emissions for 2019

Emission Unit	Actual Emissions for 2019 (ton)				
	NO _x	SO ₂	CO	PM ₁₀	VOC
1	44.32	0.02	6.14	0.62	2.28
2	21.27	0.01	4.88	0.27	0.21
3	10.73	0.00	0.87	0.36	0.11
4	13.85	0.01	1.12	0.46	0.14
5	19.43	0.02	5.93	0.59	2.20
6	5.70	0.00	0.89	0.09	0.33
8	1.01	0.01	0.25	0.17	0.01
8 (with fish oil)	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00
10	1.50	0.01	0.37	0.25	0.01
10 (with fish oil)	0.00	0.00	0.00	0.00	0.00
11	0.08	0.00	0.02	0.01	0.00
Total (ton):	117.88	0.07	20.48	2.81	5.30

¹Total NO_x emissions from all fuels combusted

Facility	Denali	Trapper Creek	Simeonof	Tuxedni		Type of Analysis (4-Factor, Limited Review, Sector)	Staff Assigned	Notes	Status	Link
				KPB01	TUXE					
Healy Power Plant	x	x								
Chena Power Plant	x	x								
Fort Wainwright UGU	x	x								
Eielson Air Force Base	x	x								
GVEA North Pole Power Plant	x									
UAF Power Plant	x									
Platform A		X 2014		20% 14			Dave Jones			
Monopod Platform		X 2014		20% 14	X MID & 20% 14		James Renovatio			
Grayling Platform		X 2014		20% 14	X MID 14, 20% 14					
Dolly Varden Platform		X 14/17		20% 14	X MID 14/17, 20% 14/17					
King Salmon		X 2014		20% 14	X MID 14, 20% 14					
Steelhead		X 2017			X MID 17, 20% 17					
Trident Seafoods - Sand Point Facility			X		X MID 14	Limited	Dave Jones	Highest SO2 emissions in previous 5 year period: 0.17 tons in 2015	Mostly Finished	Sand Point Folder
Christy Lee/Drift River					X MID 14	Limited	Dave Jones	Permit Rescinded	Done	
Bernice Lake Combustion Plant				20% 14		Limited	Dave Jones	Email sent to Permittee to verify SO2 emissions		
Bluecrest - Cosmopolitan Project				20% 17				4 page EU Inventory Table		
NP Eielson Air Force Base	x	x								
NR - Ted Stevens Intl				20% WEP	20% WEP					
NP - Port of Anchorage		x								
NP Trapper Creek?		x								
NP - Port McKenzie		x								
NP Homer? Port?		x		20% WEP						
NP Aviation?		x		20% WEP						
NR Niniichik - ?				20% WEP						

From: [Greg Arthur](#)
To: [Plosay, James R \(DEC\)](#)
Cc: [Jones, Dave F \(DEC\)](#); [Renovatio, James J \(DEC\)](#); [Simpson, Aaron J \(DEC\)](#); [Vanessa Hughes](#); [Alaska Air Compliance](#); [Tom Damiana](#)
Subject: Cook Inlet Regional Haze Information - Economic Analysis
Date: Wednesday, March 10, 2021 3:51:25 PM
Attachments: [Cook Inlet Regional Haze Cost Information 03-10-2021.pdf](#)

Jim,

Please see the attached letter for a response to the Department's request regarding a high level economic analysis for SO2 emission controls on the five Cook Inlet platforms included in the Regional Haze review.

Let me know if you have any questions about the information provided.

Thanks

Greg

Greg Arthur, P.E.

Air Program Lead – Air Quality | Hilcorp Alaska, LLC
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March 10, 2021

Mr. Jim Plosay
Air Permit Program Manager
Alaska Department of Environmental Conservation
410 Willoughby Avenue, Ste 303
Juneau, AK 99801

Subject: Regional Haze Review – Information Request Response – Economic Analysis

Dear Mr. Plosay,

The Alaska Department of Environmental Conservation (Department) has requested Hilcorp Alaska, LLC's (Hilcorp) assistance with the second Regional Haze (RH) planning period for the Cook Inlet. Department staff provided questions to Hilcorp as part of the RH planning process with the intent of imposing the least regulatory burden possible. A response was provided to the first set of questions on February 17, 2021, and this letter responds to the final question. Specifically, the Department asked for an economic analysis of a pre- and/or post-combustion SO₂ emissions control system on one of the platforms (Monopod, Steelhead, Grayling, Dolly Varden, or King Salmon) that burns recovered fuel gas if there is space available. Hilcorp has not completed a technical feasibility study to determine if any of the platforms have space available for a control system and believes there is a high probability it will be technically infeasible to install pre-combustion controls. Regardless, we are providing a cost effectiveness analysis for installing a sweetening unit on the King Salmon platform because it combusts recovered fuel gas and has the highest projected actual emissions.

Hilcorp will not be exploring the economics of post-combustion controls because they will never be as cost effective as a sweetening unit. Similarly, the economics of a liquid scavenger sweetening unit is not explored because experience and a review of historic Best Available Control Technology (BACT) analyses shows liquid scavenging will not be as cost effective as solid scavenging. Therefore, this cost effectiveness analysis focuses on installing and operating a solid scavenger sweetening unit on the King Salmon platform knowing that no other type of pre- or post-combustion control will be as cost effective. It is worth reiterating that this analysis has been conducted assuming it is technologically feasible to install this control on the platform. Given the size and weight of the vessels required for a solid scavenger sweetening unit, and the lack of space and stringent weight and balance constraints of the platform, there is a high probability it would not be technically feasible to install a solid scavenger sweetening unit on the King Salmon platform.

After establishing a reasonably projected actual operation for the King Salmon platform and following high-level communications with a sweetening unit vendor, Hilcorp developed the basis of design presented in **Table 1**. The cost effectiveness resulting from the basis of design is detailed in **Table 2**. The analysis presented in **Table 2** shows that this system would not be cost effective from the perspective of a BACT analysis conducted for PSD review. If it is not cost effective from a BACT perspective, it will not be cost effective from a visibility benefit standpoint. Given the low anthropogenic impacts and improving haze conditions in Class I areas potentially impacted by platform emissions it is unlikely that 100 TPY or less of actual SO₂ emissions removed will result in noticeable visibility improvement making even inexpensive control technologies not cost effective.

While gas sweetening is clearly not cost effective, there are several areas where the analysis could be refined to include more robust annualized costs, making the potential emissions reductions even less cost effective. These include:

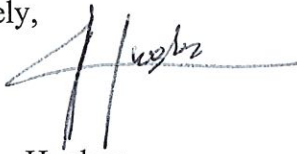
- Hilcorp did not include costs to treat and dispose of the sweetening vessel condensate waste stream. At this point, the quantity and properties of this stream are not known, but given the sensitive Cook Inlet ecosystem, it is unlikely the stream can be directly disposed of in the inlet even though it is largely water.
- Electricity costs were assumed to be twice the current onshore rate documented by the Regulatory Commission of Alaska for the Homer Electric Association, Inc. Since onshore power generation and distribution is much more cost effective than what can be achieved on a platform, electricity costs are expected to be underestimated.
- This level of cost estimating carries significant unknowns for a project conducted on an offshore platform. While this justifies the high retrofit costs and contingency assumed, they should likely be even higher. Platforms are space constrained and projects must fit within a stringent weight and balance envelope from construction through operation. Furthermore, platforms do not have extra bed space for construction crews. Therefore, construction crews must be flown to the platform each day. Until a detailed review of the design, installation, and operation of a sweetening unit can be conducted, these considerations carry large cost uncertainties which may not be covered by the moderate retrofit costs and contingency assumed.
- The current design assumes that one vessel is installed on the platform sweetening gas while the other vessel is onshore being recharged with media. When it is time to exchange the vessels, costs assume that the same ship transporting the recharged vessel to the platform ferries the spent vessel back to shore. The following costs associated with this process have not been included:
 - It is likely that multiple ships, as opposed to a single ship, will be required to facilitate the vessel exchange.
 - Labor associated with the vessel exchange offshore.
 - Vessel handling, cleaning, and recharging onshore.

- The analysis assumes 100% control and a conservative estimate of projected actual emissions. Any refinements to these parameters would reduce the level of potential emissions reductions relative to the costs.

Hilcorp hopes this analysis provides the Department with the level of review required to complete their RH planning as it relates to the platforms. Please contact Greg Arthur at (907) 777-8509 or via email at greg.arthur@hilcorp.com with any questions or concerns.

Based on information and belief formed after reasonable inquiry, I certify that the statements and information in and attached to this document are true, accurate, and complete.

Sincerely,

A handwritten signature in black ink, appearing to read 'V. Hughes', with a horizontal line extending to the right.

Vanessa Hughes
Asset Team Leader
Hilcorp Alaska, LLC

cc: Aaron Simpson, ADEC
Dave Jones, ADEC
James Renovatio, ADEC
AlaskaAirCompliance@hilcorp.com

Table 1 - Design Basis for the H₂S Fuel Gas Sweetening Unit – Solid Scavenger

Parameter	Value	Discussion
Projected Actuals Conditions		
Treated Gas Flowrate	4.2 MMscfd	1.15 times the maximum daily potential fuel gas consumption excluding flaring.
Projected Actual Emissions	100 TPY	Reference response dated February 17, 2021.
Input H ₂ S Concentration	830 ppmv	1.05 times the annual average fuel gas H ₂ S concentration required to achieve projected actual emissions.
Sweetening Unit Design		
Number of Vessels	2	Lead/Lag configuration. One vessel on the platform sweetening gas while the other is being recharged offshore.
Amount of Scavenging Media (1 vessel)	24,000 kg	High-level vendor communications.
Outlet H ₂ S Concentration	<<1 ppmv	
Predicted Scavenging Bed Life (1 vessel)	30 days	
Sweetening Unit Costs		
2 vessel system with supports.	\$679,000	Rough order of magnitude costs with initial bed charging based on vendor communications.
Media fill per vessel.	\$78,000	
Auxiliary equipment including pre and post gas conditioning and vessel condensate collection systems.	\$15,000	Professional judgement and does not account for the need to treat the vessel condensate before disposal.

Table 2 – Cost Effectiveness for the H₂S Fuel Gas Sweetening Unit – Solid Scavenger

Parameter	Value	Discussion
Capital Costs		
Purchased Equipment Cost (PEC)	\$855,700	<ul style="list-style-type: none"> • Purchased costs from Table 1. • Instrumentation, and taxes based on the EPA Air Pollution Control Cost Manual recommendations. • Freight based on the upper end of the range recommended in the EPA Air Pollution Control Cost Manual.
Direct Installation Costs (DC)	\$599,000	<ul style="list-style-type: none"> • 70% PEC based on historic BACT analyses conducted for Alaskan North Slope oil and gas projects for similar equipment.
Indirect Installation Costs (IC)	\$282,400	<ul style="list-style-type: none"> • 33% PEC based on the EPA Air Pollution Control Cost Manual recommendations.
Contingency/Retrofit/Inventory Capital	\$1,198,000	<ul style="list-style-type: none"> • Retrofit costs are 50% of DC+IC. Costs are elevated given the extreme challenges expected with adding equipment to an older offshore platform which is both spaced and weight constrained. • Contingency is 15% of DC+IC based on the upper end of the range recommended in the EPA Air Pollution Control Cost Manual.
Total Capital Investment =	\$2,935,000	
Annualized Costs		
Labor and Maintenance	\$188,800	Based on a combination of 4 hours per day operating labor plus the EPA Air Pollution Control Cost Manual recommendations for associated maintenance and supervisory labor and material costs.
Operating Materials and Disposal	\$1,722,000	<ul style="list-style-type: none"> • 210 kW and a utility rate twice the onshore rate. • \$15,000 round trip shipping sweetening vessels 12 times per year. During a trip, a fresh vessel is shipped to the platform, and a spent vessel is returned to shore. • New sweetening media costs from Table 1.
Indirect Annual Costs	\$466,200	Based on the EPA Air Pollution Control Cost Manual recommendations and a current 10-year treasury note interest rate of 2% + 3% for incremental risk.
Total Annualized Costs =	\$2,377,000	
Cost Effectiveness		
Tons per year of SO ₂ Removed	100	Controlling 100% of Projected Actual Emissions.
Cost Effectiveness (\$/ton) = \$24,000 per ton of SO ₂ removed.		