Statement of Basis

Permit to Construct No. P-2020.0026
Project ID 62476

Darigold Boise Facility
Boise, Idaho

Facility ID 001-00198

Final

October 13, 2020

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Permit Writer

The purpose of this Statement of Basis is to satisfy the requirements of IDAPA 58.01.01.et seq, Rules for the Control of Air Pollution in Idaho, for issuing air permits.

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ACRONYMS, UNITS, AND CHEMICAL NOMENCLATURE

AAC	acceptable ambient concentrations
AACC	acceptable ambient concentrations for carcinogens
acfm	actual cubic feet per minute
ASTM	American Society for Testing and Materials
Btu	British thermal units
CAA	Clean Air Act
cfm	cubic feet per minute
CFR	Code of Federal Regulations
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	CO_2 equivalent emissions
DEQ	Department of Environmental Quality
EL	screening emission levels
EPA	U.S. Environmental Protection Agency
GACT	Generally Available Control Technology
gph	gallons per hour
gpm	gallons per minute
gr	grains (1 lb = 7,000 grains)
HAP	hazardous air pollutants
hr/yr	hours per consecutive 12 calendar month period
IDAPA	a numbering designation for all administrative rules in Idaho promulgated in accordance with the Idaho Administrative Procedures Act
km	kilometers
lb/hr	pounds per hour
lb/qtr	pound per quarter
m	meters
MACT	Maximum Achievable Control Technology
MMBtu	million British thermal units
MMscf	million standard cubic feet
NAAQS	National Ambient Air Quality Standard
NESHAP	National Emission Standards for Hazardous Air Pollutants
NO_2	nitrogen dioxide
NO_X	nitrogen oxides
NSPS	New Source Performance Standards
O&M	operation and maintenance
PC	permit condition
PM	particulate matter
$PM_{2.5}$	particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers
PM_{10}	particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers
ppm	parts per million
ppmw	parts per million by weight
PSD	Prevention of Significant Deterioration
psig	pounds per square inch gauge
PTC	permit to construct
PTC/T2	permit to construct and Tier II operating permit
PTE	potential to emit
PW	process weight rate
Rules	*Rules for the Control of Air Pollution in Idaho*
scf	standard cubic feet
SCL	significant contribution limits
SIP	State Implementation Plan

SM	synthetic minor
SM80	synthetic minor facility with emissions greater than or equal to 80% of a major source threshold
SO_2	sulfur dioxide
SO_x	sulfur oxides
ULNB	ultra-low NO_x burner
T/day	tons per calendar day
T/hr	tons per hour
T/yr	tons per consecutive 12 calendar month period
T2	Tier II operating permit
TAP	toxic air pollutants
U.S.C.	United States Code
VOC	volatile organic compounds
yd^3	cubic yards
$\mu g/m^3$	micrograms per cubic meter

FACILITY INFORMATION

Description

Darigold, Inc. (Darigold) operates a milk processing and bottling facility in Boise, Idaho. The facility was initially constructed in 1933 and additional equipment was added in 1995 and 2010. The facility was previously determined to be exempt from a permit to construct in 2010. The facility includes two natural gas boilers, two anaerobic digesters, a biogas flare, eighteen small air heaters, and three cooling towers. Darigold is proposing to modify the facility by adding an additional natural gas boiler, ten small air heaters, and a sanitary bottle filler. Additionally, the existing boilers will be retrofitted with 9 ppm ultra-low NO_x burners.

Permitting History

This is the initial PTC for an existing facility that was constructed in 1933 thus there is no permitting history.

Application Scope

This permit is the initial PTC for this facility.

The applicant has proposed to:

- Install and operate an additional natural gas boiler, ten small air heaters, and a sanitary bottle filler.
- Retrofit two existing boilers with 9 ppm ultra-low NO_x burners (ULNB).
- Include in the permit previously exempt equipment including two natural gas boilers, two anaerobic digesters, a biogas flare, eighteen small air heaters, and three cooling towers.

Application Chronology

July 2, 2020	DEQ received an application.
July 9, 2020	DEQ received an application fee.
July 20 – August 4, 2020	DEQ provided an opportunity to request a public comment period on the application and proposed permitting action.
August 6, 2020	DEQ determined that the application was complete.
September 18, 2020	DEQ made available the draft permit and statement of basis for peer and regional office review.
September 28, 2020	DEQ made available the draft permit and statement of basis for applicant review.
October 8, 2020	DEQ received the permit processing fee.
October 13, 2020	DEQ issued the final permit and statement of basis.

TECHNICAL ANALYSIS

Emissions Units and Control Equipment

Table 1 EMISSIONS UNIT AND CONTROL EQUIPMENT INFORMATION

Source ID No.	Sources	Control Equipment	Emission Point ID No.
BOI_KWN	Kewanee Boiler: Manufacturer: Kewanee Model: H3S350C Burner Model: NM400A25V Heat input rating: 14.3 MMBtu/hr Fuel: Natural gas Manufacture Date: 1989	Ultra-low NO_x burners (ULNB)	Exit height: 72 ft Exit diameter: 1.67 ft Exit flow rate: 6,365 acfm Exit temperature: 413.24 °F
BOI_CB	Cleaver Brooks Boiler: Manufacturer: Cleaver Brooks Model: CB-200-500 Burner Model: NM700A50V Heat input rating: 20.3 MMBtu/hr Fuel: Natural gas Manufacture Date: 1991	Ultra-low NO_x burners (ULNB)	Exit height: 72 ft Exit diameter: 2.0 ft Exit flow rate: 8,871 acfm Exit temperature: 391.82 °F
BOI_JSTN	Johnston Boiler: Manufacturer: Johnston Boiler Co. Model: PFTA 800-4 Burner Model: 30 ppm A-FGR Heat input rating: 32.1 MMBtu/hr Fuel: Natural gas Anticipated Manufacture Date: 2020	Ultra-low NO_x burners (ULNB)	Exit height: 62 ft Exit diameter: 2.34 ft Exit flow rate: 9,923 acfm Exit temperature: 380 °F
RMAU01	RMAU01: Manufacturer: Phoenix Air Systems Model: PH-08E95-H Heat input rating: 0.97 MMBtu/hr Fuel: Natural gas	None	
RMAU02	RMAU02: Manufacturer: Phoenix Air Systems Model: PH-32-95-MDFB Heat input rating: 3.60 MMBtu/hr Fuel: Natural gas	None	
RMAU03	RMAU03: Manufacturer: AAON Model: Unknown Heat input rating: 0.14 MMBtu/hr Fuel: Natural gas	None	
RMAU04	RMAU04: Manufacturer: Reznor Model: RDF1-40 Heat input rating: 0.50 MMBtu/hr Fuel: Natural gas	None	
RMAU05	RMAU05: Manufacturer: BDP Model:588ANW0 48120AAG Heat input rating: 0.12 MMBtu/hr Fuel: Natural gas	None	
RMAU06	RMAU06: Manufacturer: Aaon Model: RNA-011-C-0-8-DAAOA-DC1B0 Heat input rating: 0.24 MMBtu/hr Fuel: Natural gas	None	

Source ID No.	Sources	Control Equipment	Emission Point ID No.
RMAU07	RMAU07: Manufacturer: Carrier Model: 588ANW0 48120AAG Heat input rating: 0.12 MMBtu/hr Fuel: Natural gas	None	
RMAU08	RMAU08: Manufacturer: Carrier Model: Unknown Heat input rating: 0.06 MMBtu/hr Fuel: Natural gas	None	
RMAU09	RMAU09: Manufacturer: Bryant Model: Unknown Heat input rating: 0.09 MMBtu/hr Fuel: Natural gas	None	
RMAU10	RMAU10: Manufacturer: Unitech Model: Whisperair Heat input rating: 0.55 MMBtu/hr Fuel: Natural gas	None	
RMAU11	RMAU11: Manufacturer: Unitech Model: Whisperair Heat input rating: 0.55 MMBtu/hr Fuel: Natural gas	None	
RMAU12	RMAU12: Manufacturer: York Model: Unknown Heat input rating: 0.11 MMBtu/hr Fuel: Natural gas	None	
RMAU13	RMAU13: Manufacturer: Bryant Model: Unknown Heat input rating: 0.11 MMBtu/hr Fuel: Natural gas	None	
RMAU20	RMAU20: Manufacturer: AAON Model: Unknown Heat input rating: 0.9 MMBtu/hr Fuel: Natural gas	None	
RTU1	RTU1: Manufacturer: TRANE Model: OAGD144A4-C1A1A0BC-A1F00008bc1002BDA4A0 Heat input rating: 0.2 MMBtu/hr Fuel: Natural gas	None	
RTU1A	RTU1A: Manufacturer: TRANE Model: YHC047E4RZA Heat input rating: 0.12 MMBtu/hr Fuel: Natural gas	None	
RTU1B	RTU1B: Manufacturer: TRANE Model: YH0150F4RZB Heat input rating: 0.25 MMBtu/hr Fuel: Natural gas	None	

Source ID No.	Sources	Control Equipment	Emission Point ID No.
RTU1C	RTU1C: Manufacturer: TRANE Model: OANG050C3-DAB10BV00-N1AL00000-21A000030-A00A00A00-A00A00000-000000000 Heat input rating: 1.2 MMBtu/hr Fuel: Natural gas	None	
RTU2	RTU2: Manufacturer: TRANE Model: YCD600B4**6B4NF1*0*****H0*D0K0**000*0000X Heat input rating: 0.8 MMBtu/hr Fuel: Natural gas	None	
RTU3	RTU3: Manufacturer: TRANE Model: YHC060E4RHA-K0E1A00B0 Heat input rating: 0.13 MMBtu/hr Fuel: Natural gas	None	
CMAU1	CMAU1: Manufacturer: Modine Model: PDP200AE0130 Heat input rating: 0.2 MMBtu/hr Fuel: Natural gas	None	
CMAU2	CMAU2: Manufacturer: Modine Model: Unknown Heat input rating: 0.2 MMBtu/hr Fuel: Natural gas	None	
CMAU3	CMAU3: Manufacturer: Modine Hot Dawg Model: Unknown Heat input rating: 0.1 MMBtu/hr Fuel: Natural gas	None	
CMAU4	CMAU4: Manufacturer: Modine Hot Dawg Model: Unknown Heat input rating: 0.1 MMBtu/hr Fuel: Natural gas	None	
CMAU5	CMAU5: Manufacturer: Modine Hot Dawg Model: Unknown Heat input rating: 0.1 MMBtu/hr Fuel: Natural gas	None	
CMAU6	CMAU6: Manufacturer: Modine Hot Dawg Model: Unknown Heat input rating: 0.1 MMBtu/hr Fuel: Natural gas	None	
CMAU7	CMAU7: Manufacturer: Dayton Gas Trimmer Model: Unknown Heat input rating: 0.4 MMBtu/hr Fuel: Natural gas	None	
MAU1	MAU1: Manufacturer: Greenheck Model: DG-115-H20 Heat input rating: 0.66 MMBtu/hr Fuel: Natural gas	None	

Source ID No.	Sources	Control Equipment	Emission Point ID No.
CT1	Cooling Tower 1: Manufacturer: Baltimore Model: FXV-1218C-16Q-x Max Water Flow Rate: 1,300 gpm TDS Content: 937.5 mg/L Control Efficiency: 95%	Drift Eliminators	
CT2	Cooling Tower 2: Manufacturer: Baltimore Model: FXV-1218C-16Q-x Max Water Flow Rate: 1,300 gpm TDS Content: 937.5 mg/L Control Efficiency: 95%	Drift Eliminators	
CT3	Cooling Tower 3: Manufacturer: Evapco Model: AT 19-3K14 Max Water Flow Rate: 1,041 gpm TDS Content: 1,500 mg/L Control Efficiency: 95%	Drift Eliminators	
FLARE	Flare: Manufacturer: Unknown Model: Unknown Max Capacity: 245,749 scf/day Fuel: Biogas Control Efficiency: 97.7%	None	Exit height: 15.32 ft Exit diameter: 1.38 ft Exit flow rate: 20 m/s Exit temperature: 1,832 °F
FILLER	Bottle Filler: Manufacturer: Sidel Model: 681831	None	
DIGESTER1	Anaerobic Digester 1: Tank Capacity: 1,000,000 gal Biogas Produced: 245,749 scf/day combined	Flare	
DIGESTER2	Anaerobic Digester 2: Tank Capacity: 1,700,000 gal Biogas Produced: 245,749 scf/day combined	Flare	

Potential to Emit

IDAPA 58.01.01 defines Potential to Emit as the maximum capacity of a facility or stationary source to emit an air pollutant under its physical and operational design. Any physical or operational limitation on the capacity of the facility or source to emit an air pollutant, including air pollution control equipment and restrictions on hours of operation or on the type or amount of material combusted, stored or processed, shall be treated as part of its design if the limitation or the effect it would have on emissions is state or federally enforceable. Secondary emissions do not count in determining the potential to emit of a facility or stationary source.

Using this definition of Potential to Emit an emission inventory was developed for the three natural gas-fired boilers, twenty eight natural gas-fired heaters, three cooling towers, a flare, and a sanitary bottle filler at the facility (see Appendix A) associated with this proposed project. Emissions estimates of criteria pollutant, HAP, and TAPs were based on emission factors from AP-42, vendor reports, operation of 8,760 hours per year, and process information specific to the facility for this proposed project.

Uncontrolled Potential to Emit

Using the definition of Potential to Emit, uncontrolled Potential to Emit is then defined as the maximum capacity of a facility or stationary source to emit an air pollutant under its physical and operational design. Any physical or operational limitation on the capacity of the facility or source to emit an air pollutant, including air pollution control equipment and restrictions on hours of operation or on the type or amount of material combusted, stored or processed, shall **not** be treated as part of its design **since** the limitation or the effect it would have on emissions **is not** state or federally enforceable.

The uncontrolled Potential to Emit is used to determine if a facility is a "Synthetic Minor" source of emissions. Synthetic Minor sources are facilities that have an uncontrolled Potential to Emit for regulated air pollutants or HAP above the applicable Major Source threshold without permit limits.

The following table presents the uncontrolled Potential to Emit for regulated air pollutants as submitted by the Applicant and verified by DEQ staff. See Appendix A for a detailed presentation of the calculations and the assumptions used to determine emissions for each emissions unit. For this facility uncontrolled Potential to Emit is based upon a worst-case for operation of the facility of 8,760 hr/yr.

Table 2 UNCONTROLLED POTENTIAL TO EMIT FOR REGULATED AIR POLLUTANTS

Source	$PM_{10}/PM_{2.5}$	SO_2	NO_X	CO	VOC
	T/yr	T/yr	T/yr	T/yr	T/yr
Point Sources					
Anaerobic Digesters / Flare	0.17	5.94	0.70	3.16	1.43
Kewanee Boiler	0.07	0.04	0.76	2.55	0.21
Cleaver Brooks Boiler	0.10	0.05	1.07	3.61	0.29
Johnston Boiler	0.14	0.08	5.06	11.58	0.76
Heaters	0.39	0.03	5.08	4.26	0.28
Cooling Towers	0.06	---	---	---	---
Bottle Filling	---	---	---	---	---
Total, Point Sources	**0.93**	**6.14**	**12.67**	**25.16**	**2.97**

The following table presents the uncontrolled Potential to Emit for HAP pollutants as submitted by the Applicant and verified by DEQ staff. See Appendix A for a detailed presentation of the calculations and the assumptions used to determine emissions for each emissions unit. For this facility uncontrolled Potential to Emit is based upon a worst-case for operation of the facility of 8,760 hr/yr. Then, the worst-case maximum HAP Potential to Emit was determined for this facility.

Table 3 UNCONTROLLED POTENTIAL TO EMIT FOR HAZARDOUS AIR POLLUTANTS

Hazardous Air Pollutants	PTE (T/yr)
Chlorobenzene	7.83E-06
Chromium	4.72E-04
Cobalt	2.83E-05
Cresylic Acid	9.13E-05
Cumene	2.01E-05
Dibutyl phthalate	1.39E-05
o-Dichlorobenzene	4.04E-04
Ethyl benzene	5.23E-05
Hexane	6.07E-01
Hydrogen Sulfide	3.16E+00
Manganese	1.28E-04
Mercury	8.76E-05
Naphthalene	2.15E-04
Nitrobenzene	3.18E-06
Phenol	4.66E-05
Selenium	8.09E-06
Styrene	6.26E-06
Toluene	1.78E-03
Xylene	3.94E-04
Aniline	9.34E-05
Arsenic	6.74E-05
Benzene	7.29E-04
Bis (2-chloro-1-methyl-ethyl) ether	2.67E-05
Bis (2-ethylhexyl) phthalate	1.52E-05
Cadmium and compounds	3.71E-04
Carbon tetrachloride	1.53E-05
Formaldehyde	2.53E-02
Nickel	7.08E-04
1,1,2,2,Tetrachloro-ethane	5.36E-06

Tetrachloroethylene	1.27E-05
1,1,2 - trichloroethane	1.98E-04
7,12-Dimethylbenz(a)anthracene	5.39E-06
Acenapthene	6.07E-07
Acenapthylene	6.07E-07
Anthracene	8.09E-07
Benz(a)anthracene	6.07E-07
Benzo(b)fluoranthene	6.07E-07
Benzo(g,h,i)perylene	4.04E-07
Benzo(k)fluoranthene	6.07E-07
Chrysene	6.07E-07
Dibenzo(a,h)anthracene	4.04E-07
Fluoranthene	1.01E-06
Indeno(1,2,3-cd)pyrene	6.07E-07
Pyrene	1.69E-06
Total	**3.80**

Pre-Project Potential to Emit

Pre-project Potential to Emit is used to establish the change in emissions at a facility as a result of this project.

This is an existing facility. However, since this is the first time the facility is receiving a permit, pre-project emissions are set to zero for all criteria pollutants.

Post Project Potential to Emit

Post project Potential to Emit is used to establish the change in emissions at a facility and to determine the facility's classification as a result of this project. Post project Potential to Emit includes all permit limits resulting from this project.

The following table presents the post project Potential to Emit for criteria pollutants from all emissions units at the facility as determined by DEQ staff. See Appendix A for a detailed presentation of the calculations of these emissions for each emissions unit.

Table 4 POST PROJECT POTENTIAL TO EMIT FOR REGULATED AIR POLLUTANTS

Source	$PM_{10}/PM_{2.5}$		SO_2		NO_X		CO		VOC	
	lb/hr[(a)]	T/yr[(b)]	lb/hr[(a)]	T/yr[(b)]	lb/hr[(a)]	T/yr[(b)]	lb/hr[(a)]	T/yr[(b)]	lb/hr[(a)]	T/yr[(b)]
Anaerobic Digesters / Flare	0.10	0.17	4.59	5.94	0.40	0.70	1.79	3.16	0.81	1.43
Kewanee Boiler	0.02	0.07	0.01	0.04	0.17	0.76	0.58	2.55	0.05	0.21
Cleaver Brooks Boiler	0.02	0.10	0.01	0.05	0.25	1.07	0.83	3.61	0.07	0.29
Johnston Boiler	0.03	0.14	0.02	0.08	1.16	5.06	2.64	11.58	0.07	0.76
Heaters	0.09	0.39	0.01	0.03	1.16	5.08	0.97	4.26	0.06	0.28
Cooling Towers	0.01	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bottle Filling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Post Project Totals	**0.27**	**0.93**	**4.64**	**6.14**	**3.14**	**12.67**	**6.81**	**25.16**	**1.06**	**2.97**

a) Controlled average emission rate in pounds per hour is a daily average, based on the proposed daily operating schedule and daily limits.
b) Controlled average emission rate in tons per year is an annual average, based on the proposed annual operating schedule and annual limits.

Change in Potential to Emit

The change in facility-wide potential to emit is used to determine if a public comment period may be required and to determine the processing fee per IDAPA 58.01.01.225. The following table presents the facility-wide change in the potential to emit for criteria pollutants.

Table 5 CHANGES IN POTENTIAL TO EMIT FOR REGULATED AIR POLLUTANTS

Source	$PM_{10}/PM_{2.5}$		SO_2		NO_X		CO		VOC	
	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr
Pre-Project Potential to Emit	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Post Project Potential to Emit	0.27	0.93	4.64	6.14	3.14	12.67	6.81	25.16	1.06	2.97
Changes in Potential to Emit	**0.27**	**0.93**	**4.64**	**6.14**	**3.14**	**12.67**	**6.81**	**25.16**	**1.06**	**2.97**

Non-Carcinogenic TAP Emissions

A summary of the estimated PTE for emissions increase of non-carcinogenic toxic air pollutants (TAP) is provided in the following table.

Pre- and post-project, as well as the change in, non-carcinogenic TAP emissions are presented in the following table:

Table 6 PRE- AND POST PROJECT POTENTIAL TO EMIT FOR NON-CARCINOGENIC TOXIC AIR POLLUTANTS

Non-Carcinogenic Toxic Air Pollutants	Pre-Project 24-hour Average Emissions Rates for Units at the Facility (lb/hr)	Post Project 24-hour Average Emissions Rates for Units at the Facility (lb/hr)	Change in 24-hour Average Emissions Rates for Units at the Facility (lb/hr)	Non-Carcinogenic Screening Emission Level (lb/hr)	Exceeds Screening Level? (Y/N)
Barium	0.00E-03	3.63E-04	3.63E-04	3.30E-02	No
Chlorobenzene	0.00E-03	1.02E-07	1.02E-07	2.33E+01	No
2-Chlorophenol	0.00E-03	8.26E-08	8.26E-08	3.30E-02	No
Chromium metal	0.00E-03	1.16E-04	1.16E-04	3.30E-02	No
Cobalt	0.00E-03	6.94E-06	6.94E-06	3.30E-03	No
Copper -Fume	0.00E-03	7.02E-05	7.02E-05	1.30E-02	No
Cresols/Cresylic Acid	0.00E-03	1.19E-06	1.19E-06	1.47E+00	No
Cumene	0.00E-03	2.62E-07	2.62E-07	1.63E+01	No
Dibutyl phthalate	0.00E-03	1.80E-07	1.80E-07	3.33E-01	No
o-Dichlorobenzene	0.00E-03	9.91E-05	9.91E-05	2.00E+01	No
Diethyl phthalate	0.00E-03	3.47E-07	3.47E-07	3.33E-01	No
Ethyl benzene	0.00E-03	6.81E-07	6.81E-07	2.90E+01	No
Fluorine	0.00E-03	2.31E-07	2.31E-07	1.33E-01	No
Hexane (n-Hexane)	0.00E-03	1.49E-01	1.49E-01	1.20E+01	No
Hydrogen peroxide	0.00E-03	3.31E-01	3.31E-01	1.00E-01	Yes
Hydrogen sulfide	0.00E-03	5.62E-02	5.62E-02	9.33E-01	No
Manganese	0.00E-03	3.14E-05	3.14E-05	3.33E-01	No
Mercury	0.00E-03	2.15E-05	2.15E-05	7.00E-03	No
Molybdenum	0.00E-03	9.09E-05	9.09E-05	3.33E-01	No
Naphthalene	0.00E-03	5.05E-05	5.05E-05	3.33E+00	No
Nitrobenzene	0.00E-03	4.14E-08	4.14E-08	3.33E-01	No
Pentane	0.00E-03	2.15E-01	2.15E-01	1.18E+02	No
Phenol	0.00E-03	6.06E-07	6.06E-07	1.27E+00	No
Pyridine	0.00E-03	7.21E-08	7.21E-08	1.00E+00	No
Selenium	0.00E-03	1.98E-06	1.98E-06	1.30E-02	No
Styrene monomer	0.00E-03	8.15E-08	8.15E-08	6.67E+00	No
Toluene	0.00E-03	2.89E-04	2.89E-04	2.50E+01	No
Xylene	0.00E-03	5.12E-06	5.12E-06	2.90E+01	No
Zinc metal	0.00E-03	2.40E-03	2.40E-03	6.67E-01	No

Some of the changes in emissions rates for non-carcinogenic TAP were exceeded as a result of this project. Therefore, modeling is required for hydrogen peroxide because the 24-hour average non-carcinogenic screening ELs identified in IDAPA 58.01.01.585 were exceeded.

Carcinogenic TAP Emissions

A summary of the estimated PTE for emissions increase of carcinogenic toxic air pollutants (TAP) is provided in the following table.

Table 7 PRE- AND POST PROJECT POTENTIAL TO EMIT FOR CARCINOGENIC TOXIC AIR POLLUTANTS

Carcinogenic Toxic Air Pollutants	Pre-Project Annual Average Emissions Rates for Units at the Facility (lb/hr)	Post Project Annual Average Emissions Rates for Units at the Facility (lb/hr)	Change in Annual Average Emissions Rates for Units at the Facility (lb/hr)	Carcinogenic Screening Emission Level (lb/hr)	Exceeds Screening Level? (Y/N)
Aniline	0.00E-03	4.90E-07	4.90E-07	9.00E-04	No
Arsenic compounds	0.00E-03	2.77E-06	2.77E-06	1.50E-06	Yes
Benzene	0.00E-03	2.92E-05	2.92E-05	8.00E-04	No
Benzo(a)pyrene	0.00E-03	1.66E-08	1.66E-08	2.00E-06	No
Bis (2-chloro-1-methyl-ethyl) ether	0.00E-03	1.40E-07	1.40E-07	3.30E-04	No
Bis (2-ethylhexyl) phthalate	0.00E-03	8.00E-08	8.00E-08	2.80E-02	No
Cadmium	0.00E-03	1.53E-05	1.53E-05	3.70E-06	Yes
Carbon tetrachloride	0.00E-03	8.05E-08	8.05E-08	4.40E-04	No
Formaldehyde	0.00E-03	1.04E-03	1.04E-03	5.10E-04	Yes
3-methylcholanthrene	0.00E-03	2.50E-08	2.50E-08	2.50E-06	No
Nickel	0.00E-03	2.91E-05	2.91E-05	2.70E-05	No
1,1,2,2,Tetrachloro-ethane	0.00E-03	2.82E-08	2.82E-08	1.10E-05	No
Tetrachloroethylene	0.00E-03	6.67E-08	6.67E-08	1.30E-02	No
1,1,2 - trichloroethane	0.00E-03	1.04E-06	1.04E-06	4.20E-04	No

Some of the PTEs for carcinogenic TAP were exceeded as a result of this project. Therefore, modeling is required for arsenic, cadmium, and formaldehyde because the annual average carcinogenic screening ELs identified in IDAPA 58.01.01.586 were exceeded.

Post Project HAP Emissions

The following table presents the post project potential to emit for HAP pollutants from all emissions units at the facility as submitted by the Applicant and verified by DEQ staff. See Appendix A for a detailed presentation of the calculations of these emissions for each emissions unit.

Table 8 HAZARDOUS AIR POLLUTANTS EMISSIONS POTENTIAL TO EMIT SUMMARY

Hazardous Air Pollutants	PTE (T/yr)
Chlorobenzene	1.80E-07
Chromium	4.86E-04
Cobalt	2.92E-05
Cresylic Acid	2.10E-06
Cumene	4.62E-07
Dibutyl phthalate	3.19E-07
o-Dichlorobenzene	4.16E-04
Ethyl benzene	1.20E-06
Hexane	6.25E-01
Hydrogen Sulfide	7.26E-02
Manganese	1.32E-04
Mercury	9.02E-05
Naphthalene	2.12E-04
Nitrobenzene	7.31E-08
Phenol	1.07E-06
Selenium	8.33E-06
Styrene	1.44E-07
Toluene	1.19E-03
Xylene	9.05E-06
Aniline	2.15E-06
Arsenic	6.94E-05
Benzene	7.29E-04
Bis (2-chloro-1-methyl-ethyl) ether	6.13E-07
Bis (2-ethylhexyl) phthalate	3.50E-07
Cadmium and compounds	3.82E-04
Carbon tetrachloride	3.52E-07
Formaldehyde	2.60E-02
Nickel	7.29E-04
1,1,2,2,Tetrachloro-ethane	1.23E-07
Tetrachloroethylene	2.92E-07
1,1,2 - trichloroethane	4.56E-06
7,12-Dimethylbenz(a)anthracene	5.55E-06
Acenapthene	6.25E-07
Acenapthylene	6.25E-07
Anthracene	8.33E-07
Benz(a)anthracene	6.25E-07
Benzo(b)fluoranthene	6.25E-07
Benzo(g,h,i)perylene	4.16E-07
Benzo(k)fluoranthene	6.25E-07
Chrysene	6.25E-07
Dibenzo(a,h)anthracene	4.16E-07
Fluoranthene	5.43E-02
Indeno(1,2,3-cd)pyrene	6.25E-07
Pyrene	1.74E-06
Totals	**0.78**

Ambient Air Quality Impact Analyses

As presented in the Modeling Memo in Appendix B, the estimated emission rates of PM_{10}, $PM_{2.5}$, SO_2, NO_2, and TAP from this project exceeded applicable screening emission levels (EL) and published DEQ modeling thresholds established in IDAPA 58.01.01.585-586 and in the State of Idaho Air Quality Modeling Guideline[1]. Refer to the Emissions Inventories section for additional information concerning the emission inventories.

[1] Criteria pollutant thresholds in Table 2, State of Idaho Guideline for Performing Air Quality Impact Analyses, Doc ID AQ-011, September 2013.

The applicant has demonstrated pre-construction compliance to DEQ's satisfaction that emissions from this facility will not cause or significantly contribute to a violation of any ambient air quality standard. The applicant has also demonstrated pre-construction compliance to DEQ's satisfaction that the emissions increase due to this permitting action will not exceed any acceptable ambient concentration (AAC) or acceptable ambient concentration for carcinogens (AACC) for toxic air pollutants (TAP). A summary of the Ambient Air Impact Analysis for TAP is provided in Appendix A.

An ambient air quality impact analyses document has been crafted by DEQ based on a review of the modeling analysis submitted in the application. That document is part of the final permit package for this permitting action (see Appendix B).

REGULATORY ANALYSIS

Attainment Designation (40 CFR 81.313)

The facility is located in Ada County, which is designated as attainment or unclassifiable for $PM_{2.5}$, PM_{10}, SO_2, NO_2, CO, and Ozone. Refer to 40 CFR 81.313 for additional information.

Facility Classification

The AIRS/AFS facility classification codes are as follows:

For HAPs (Hazardous Air Pollutants) Only:

A = Use when any one HAP has permitted emissions > 10 T/yr or if the aggregate of all HAPS (Total HAPs) has permitted emissions > 25 T/yr.

SM80 = Use if a synthetic minor (uncontrolled HAPs emissions are > 10 T/yr or if the aggregate of all uncontrolled HAPs (Total HAPs) emissions are > 25 T/yr and permitted emissions fall below applicable major source thresholds) and the permit sets limits > 8 T/yr of a single HAP or ≥ 20 T/yr of Total HAPs.

SM = Use if a synthetic minor (uncontrolled HAPs emissions are > 10 T/yr or if the aggregate of all uncontrolled HAPs (Total HAPs) emissions are > 25 T/yr and permitted emissions fall below applicable major source thresholds) and the permit sets limits < 8 T/yr of a single HAP and/or < 20 T/yr of Total HAPs.

B = Use when the potential to emit (i.e. uncontrolled emissions and permitted emissions) are below the 10 and 25 T/yr HAP major source thresholds.

UNK = Class is unknown.

For All Other Pollutants:

A = Use when permitted emissions of a pollutant are > 100 T/yr.

SM80 = Use if a synthetic minor for the applicable pollutant (uncontrolled emissions are > 100 T/yr and permitted emissions fall below 100 T/yr) and permitted emissions of the pollutant are ≥ 80 T/yr.

SM = Use if a synthetic minor for the applicable pollutant (uncontrolled emissions are > 100 T/yr and permitted emissions fall below 100 T/yr) and permitted emissions of the pollutant are < 80 T/yr.

B = Use when the potential to emit (i.e. uncontrolled emissions and permitted emissions) are below the 100 T/yr major source threshold.

UNK = Class is unknown.

Table 9 REGULATED AIR POLLUTANT FACILITY CLASSIFICATION

Pollutant	Uncontrolled PTE (T/yr)	Permitted PTE (T/yr)	Major Source Thresholds (T/yr)	AIRS/AFS Classification
PM	0.93	0.93	**100**	B
PM_{10}	0.93	0.93	**100**	B
$PM_{2.5}$	0.93	0.93	**100**	B
SO_2	6.14	6.14	**100**	B
NO_X	12.67	12.67	**100**	B
CO	25.16	25.16	**100**	B
VOC	2.97	2.97	**100**	B
HAP (single)	3.16	0.63	**10**	B
Total HAPs	3.80	0.78	**25**	B

Permit to Construct (IDAPA 58.01.01.201)

IDAPA 58.01.01.201..... Permit to Construct Required

The permittee has requested that a PTC be issued to the facility for the modified emissions source. Therefore, a permit to construct is required to be issued in accordance with IDAPA 58.01.01.220. This permitting action was processed in accordance with the procedures of IDAPA 58.01.01.200-228.

Tier II Operating Permit (IDAPA 58.01.01.401)

IDAPA 58.01.01.401..... Tier II Operating Permit

The application was submitted for a permit to construct (refer to the Permit to Construct section), and an optional Tier II operating permit has not been requested. Therefore, the procedures of IDAPA 58.01.01.400–410 were not applicable to this permitting action.

Visible Emissions (IDAPA 58.01.01.625)

IDAPA 58.01.01.625..... Visible Emissions

The sources of PM emissions at this facility are subject to the State of Idaho visible emissions standard of 20% opacity. This requirement is assured by Permit Conditions 2.6 and 3.4.

Standards for New Sources (IDAPA 58.01.01.676)

IDAPA 58.01.01.676..... Standards for New Sources

The fuel burning equipment located at this facility, with a maximum rated input of ten (10) million BTU per hour or more, are subject to a particulate matter limitation of 0.015 gr/dscf of effluent gas corrected to 3% oxygen by volume when combusting gaseous fuels. Fuel-Burning Equipment is defined as any furnace, boiler, apparatus, stack and all appurtenances thereto, used in the process of burning fuel for the primary purpose of producing heat or power by indirect heat transfer. This requirement is assured by Permit Condition 3.3.

Title V Classification (IDAPA 58.01.01.300, 40 CFR Part 70)

IDAPA 58.01.01.301..... Requirement to Obtain Tier I Operating Permit

Post project facility-wide emissions from this facility do not have a potential to emit greater than 100 tons per year for PM_{10}, $PM_{2.5}$, SO_2, NO_X, CO, VOC, and HAP or 10 tons per year for any one HAP or 25 tons per year for all HAP combined as demonstrated previously in the Emissions Inventories Section of this analysis. Therefore, the facility is not a Tier I source in accordance with IDAPA 58.01.01.006 and the requirements of IDAPA 58.01.01.301 do not apply.

PSD Classification (40 CFR 52.21)

40 CFR 52.21 ..... Prevention of Significant Deterioration of Air Quality

The facility is not a major stationary source as defined in 40 CFR 52.21(b)(1), nor is it undergoing any physical change at a stationary source not otherwise qualifying under paragraph 40 CFR 52.21(b)(1) as a major stationary source, that would constitute a major stationary source by itself as defined in 40 CFR 52. Therefore in accordance with 40 CFR 52.21(a)(2), PSD requirements are not applicable to this permitting action. The facility is not a designated facility as defined in 40 CFR 52.21(b)(1)(i)(a), and does not have facility-wide emissions of any criteria pollutant that exceed 250 T/yr.

NSPS Applicability (40 CFR 60)

The facility is subject to the requirements of 40 CFR 60 Subpart Dc – Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units. DEQ is delegated this Subpart.

40 CFR 60, Subpart Dc ..... Standards of Performance for Small Industrial–Commercial–Institutional Steam Generating Units

All three boilers at this facility only combust natural gas as fuel as required by Permit Condition 3.5. Therefore, the only Sections of this subpart that are applicable to the three boilers at this facility are the Applicability and Delegation of Authority specified in § CFR 60.40c(a), the Recordkeeping requirements of § CFR 60.48c(g) and (i), and the Reporting requirements of § CFR 60.48c(a), (a)(1), and (a)(3).

§ 60.40c ..... Applicability and Delegation of Authority

Section (a) specifies that except as provided in paragraph (d), (e), (f), and (g) of this section, the affected facility to which this subpart applies is each steam generating unit for which construction, modification, or reconstruction is commenced after June 9, 1989 and that has a maximum design heat input capacity of 29 megawatts (MW) (100 million British thermal units per hour (MMBtu/hr)) or less, but greater than or equal to 2.9 MW (10 MMBtu/hr).

(b) In delegating implementation and enforcement authority to a State under section 111(c) of the Clean Air Act, §60.48c(a)(4) shall be retained by the Administrator and not transferred to a State.

(c) Steam generating units that meet the applicability requirements in paragraph (a) of this section are not subject to the sulfur dioxide (SO_2) or particulate matter (PM) emission limits, performance testing requirements, or monitoring requirements under this subpart (§§60.42c, 60.43c, 60.44c, 60.45c, 60.46c, or 60.47c) during periods of combustion research, as defined in §60.41c.

The Cleaver-Brooks boiler, the Kewanee boiler, and the Johnston boiler natural gas-fired boilers are rated at between 10 MMBtu/hr and 100 MMBtu/hr and were constructed after June 9, 1989. Therefore, these three natural gas fired boilers are subject to some of the requirements of this subpart.

§ 60.41c ..... Definitions

The definitions of this section apply to the three natural gas fired boilers at this facility.

§ 60.48c ..... Reporting and recordkeeping requirements

Section (a) requires that the owner or operator of each affected facility shall submit notification of the date of construction or reconstruction and actual startup, as provided by §60.7 of this part. This notification shall include:

(1) The design heat input capacity of the affected facility and identification of fuels to be combusted in the affected facility.

(3) The annual capacity factor at which the owner or operator anticipates operating the affected facility based on all fuels fired and based on each individual fuel fired.

Section (g) requires the facility to record and maintain records of the amount of each fuel combusted during each operating day except as provided under paragraphs (g)(2) and (g)(3).

(2) As an alternative to meeting the requirements of paragraph (g)(1) of this section, the owner or operator of an affected facility that combusts only natural gas, wood, fuels using fuel certification in §60.48c(f) to demonstrate compliance with the SO_2 standard, fuels not subject to an emissions standard (excluding opacity), or a mixture of these fuels may elect to record and maintain records of the amount of each fuel combusted during each calendar month.

(3) As an alternative to meeting the requirements of paragraph (g)(1) of this section, the owner or operator of an affected facility or multiple affected facilities located on a contiguous property unit where the only fuels combusted in any steam generating unit (including steam generating units not subject to this subpart) at that property are natural gas, wood, distillate oil meeting the most current requirements in §60.42C to use fuel certification to demonstrate compliance with the SO_2 standard, and/or fuels, excluding coal and residual oil, not subject to an emissions standard (excluding opacity) may elect to record and maintain records of the total amount of each steam generating unit fuel delivered to that property during each calendar month.

Section (i) requires that all records under this section shall be maintained by the owner or operator of the facility for a period of two years following the date of such record.

NESHAP Applicability (40 CFR 61)

The facility is not subject to any NESHAP requirements in 40 CFR 61.

MACT/GACT Applicability (40 CFR 63)

The facility has proposed to operate as a minor source of hazardous air pollutant (HAP) emissions, and may be subject to the requirements of 40 CFR 63, Subpart JJJJJJ–National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers Area Sources.

40 CFR 63, Subpart JJJJJJ ..... National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers Area Sources

§ 63.11195 ..... Are any boilers not subject to this subpart?

In accordance with §63.11195(e), Subpart JJJJJJ specifically lists that gas-fired boilers are not subject to the Subpart or any requirements of the Subpart.

Permit Conditions Review

This section describes the permit conditions for this initial permit.

Permit Condition 1.1

This permit condition describes the scope of the project. This is the initial permit for an existing milk processing and bottling facility.

Table 1.1

This table describes the emission units regulated by the permit.

Permit Conditions 2.1 and 2.2

These permit conditions describe the two anaerobic digesters and the flare regulated in Section 2 of the permit.

Permit Condition 2.3

This permit condition establishes the flare emission limits as demonstrated in the emission inventory as submitted the Applicant. Emissions and the modeling analysis showed compliance with all ambient air quality standards at these limits.

Permit Condition 2.4

This permit condition establishes a hydrogen sulfide concentration limit in the biogas. Emissions at the facility were based on this concentration as submitted by the Applicant.

Permit Condition 2.5

This permit condition establishes a biogas flare particulate matter emission limit in accordance with IDAPA 58.01.01.785.

Permit Condition 2.6

This permit condition establishes an opacity limit from the flare as required by IDAPA 58.01.01.625.

Permit Condition 2.7

This permit condition establishes that all biogas generated from the anaerobic digesters shall be combusted in the flare. Emission estimates are based on this requirement.

Permit Condition 2.8

This permit condition establishes the amount of biogas that may be combusted in the flare based on the emissions for the facility. Emissions and the modeling analysis showed compliance with all ambient air quality standards at this limit.

Permit Condition 2.9

This permit condition establishes operating requirements for the flare.

Permit Condition 2.10

This permit condition is for the control of odors in accordance with IDAPA 58.01.01.776.01.

Permit Condition 2.11

This permit condition establishes the monitoring requirements to show compliance with the biogas combustion limit.

Permit Condition 2.12

This permit condition establishes the monitoring requirements to show compliance with the flare ignition system operating requirements.

Permit Condition 2.13

This permit condition establishes the monitoring requirements to show compliance with the hydrogen sulfide concentration limit.

Permit Condition 2.14

This permit condition establishes requirements to demonstrate compliance with the Odors permit condition.

Permit Condition 2.15

This permit condition establishes the requirement for an O&M manual for equipment at the facility.

Permit Conditions 3.1 and 3.2

These permit conditions describe the boilers and heaters regulated in Section 3 of the permit.

Permit Condition 3.3

This permit condition establishes the PM limit for fuel burning equipment in accordance with IDAPA 58.01.01.676.

Permit Condition 3.4

This permit condition establishes an opacity limit from the boilers and heaters as required by IDAPA 58.01.01.625.

Permit Condition 3.5

This permit condition establishes that the boilers may only combust natural gas. Emission estimates are based on this requirement.

Permit Condition 3.6

This permit condition establishes the facility must maintain records of the amount of natural gas combusted each operating day for all three boilers in accordance with 40 CFR 60.48c(g).

Permit Condition 3.7

This permit condition establishes the length of time the facility must keep all records in accordance with 40 CFR 60.48c(i).

Permit Condition 3.8

This permit condition establishes the notification requirements for the burner retrofit of the Kewanee and Cleaver and Brooks boilers.

Permit Condition 3.9

This permit condition establishes the notification requirements for the boilers in accordance with 40 CFR 60.48c(a).

Permit Condition 3.10

This permit condition provides the address for the notification requirements.

Permit Condition 3.11

This permit condition incorporates federal requirements by reference so that should there be any conflict between the requirements of the permit condition and the requirements of the document, the requirements of the document shall govern, including any amendments to that regulation.

Permit Conditions 4.1 and 4.2

These permit conditions describe the cooling towers regulated in Section 4 of the permit.

Permit Condition 4.3

This permit condition establishes that the cooling towers be equipped with drift eliminators to minimize PM emissions. Emission estimates are based on this requirement.

Permit Condition 4.4

This permit condition establishes that the drift eliminators shall be operated at all times that the cooling towers are operated. Emission estimates are based on this requirement.

Permit Condition 5.1

The duty to comply general compliance provision requires that the permittee comply with all of the permit terms and conditions pursuant to Idaho Code §39-101.

Permit Condition 5.2

The maintenance and operation general compliance provision requires that the permittee maintain and operate all treatment and control facilities at the facility in accordance with IDAPA 58.01.01.211.

Permit Condition 5.3

The obligation to comply general compliance provision specifies that no permit condition is intended to relieve or exempt the permittee from compliance with applicable state and federal requirements, in accordance with IDAPA 58.01.01.212.01.

Permit Condition 5.4

The inspection and entry provision requires that the permittee allow DEQ inspection and entry pursuant to Idaho Code §39-108.

Permit Condition 5.5

The permit expiration construction and operation provision specifies that the permit expires if construction has not begun within two years of permit issuance or if construction has been suspended for a year in accordance with IDAPA 58.01.01.211.02.

Permit Condition 5.6

The notification of construction and operation provision requires that the permittee notify DEQ of the dates of construction and operation, in accordance with IDAPA 58.01.01.211.01 and 211.03.

Permit Condition 5.7

The performance testing notification of intent provision requires that the permittee notify DEQ at least 15 days prior to any performance test to provide DEQ the option to have an observer present, in accordance with IDAPA 58.01.01.157.03.

Permit Condition 5.8

The performance test protocol provision requires that any performance testing be conducted in accordance with the procedures of IDAPA 58.01.01.157, and encourages the permittee to submit a protocol to DEQ for approval prior to testing.

Permit Condition 5.9

The performance test report provision requires that the permittee report any performance test results to DEQ within 60 days of completion, in accordance with IDAPA 58.01.01.157.04-05.

Permit Condition 5.10

The monitoring and recordkeeping provision requires that the permittee maintain sufficient records to ensure compliance with permit conditions, in accordance with IDAPA 58.01.01.211.

Permit Condition 5.11

The excess emissions provision requires that the permittee follow the procedures required for excess emissions events, in accordance with IDAPA 58.01.01.130-136.

Permit Condition 5.12

The certification provision requires that a responsible official certify all documents submitted to DEQ, in accordance with IDAPA 58.01.01.123.

Permit Condition 5.13

The false statement provision requires that no person make false statements, representations, or certifications, in accordance with IDAPA 58.01.01.125.

Permit Condition 5.14

The tampering provision requires that no person render inaccurate any required monitoring device or method, in accordance with IDAPA 58.01.01.126.

Permit Condition 5.15

The transferability provision specifies that this permit to construct is transferable, in accordance with the procedures of IDAPA 58.01.01.209.06.

Permit Condition 5.16

The severability provision specifies that permit conditions are severable, in accordance with IDAPA 58.01.01.211.

PUBLIC REVIEW

Public Comment Opportunity

An opportunity for public comment period on the application was provided in accordance with IDAPA 58.01.01.209.01.c or IDAPA 58.01.01.404.01.c. During this time, there was not a request for a public comment period on DEQ's proposed action. Refer to the chronology for public comment opportunity dates.

APPENDIX A – EMISSIONS INVENTORIES

Table C-1. Darigold Boise Facility Wide Potential Emissions

		1 Million Gallon Anaerobic Digester				1.7 Million Gallon Anaerobic Digester				Kewanee Boiler		Cleaver Brooks Boiler		Johnston Boiler		Heaters		Cooling Towers		Bottle Filling		Site-Wide		Site-Wide	
		Uncontrolled Emissions		Controlled Emissions		Uncontrolled Emissions		Controlled Emissions		Uncontrolled Emissions		Uncontrolled Emissions		Uncontrolled Emissions		Uncontrolled Emissions		Uncontrolled Emissions		Uncontrolled Emissions		Total Uncontrolled Emissions		Total Controlled Emissions	
		(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)
Regulated Pollutants	PM10	-	-	0.04	0.06	-	-	0.06	0.11	0.02	0.07	0.02	0.10	0.03	0.14	0.09	0.39	0.01	0.06	-	-	0.17	0.76	0.27	0.93
	PM2.5	-	-	0.04	0.06	-	-	0.06	0.11	0.02	0.07	0.02	0.10	0.03	0.14	0.09	0.39	<0.01	<0.01	-	-	0.16	0.70	0.26	0.87
	SO_2	-	-	1.70	2.20	-	-	2.89	3.74	<0.01	0.04	0.01	0.05	0.02	0.08	<0.01	0.03	-	-	-	-	0.05	0.20	4.64	6.14
	NOx	-	-	0.15	0.26	-	-	0.25	0.44	0.17	0.76	0.25	1.07	1.16	5.06	1.16	5.08	-	-	-	-	2.73	11.97	3.13	12.66
	CO	-	-	0.66	1.17	-	-	1.13	1.99	0.58	2.55	0.83	3.61	2.64	11.58	0.97	4.26	-	-	-	-	5.02	22.01	6.81	25.16
	VOC	<0.01	<0.01	0.30	0.53	<0.01	<0.01	0.51	0.90	0.05	0.21	0.07	0.29	0.17	0.76	0.06	0.28	-	-	-	-	0.35	1.54	1.16	2.96
	H2S	9.04E-01	1.17E+00	2.08E-02	2.69E-02	1.54E+00	1.99E+00	3.54E-02	4.57E-02	-	-	-	-	-	-	-	-	-	-	-	-	2.44	3.16	0.06	0.07
	Lead	-	-	<0.01	<0.01	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	-	-	<0.01	<0.01	<0.01	<0.01
	Total HAPs	9.05E-01	1.17E+00	2.92E-02	5.40E-02	1.54E+00	1.99E+00	4.97E-02	9.18E-02	2.65E-02	1.16E-01	3.75E-02	1.64E-01	5.94E-02	2.60E-01	2.19E-02	9.58E-02	-	-	-	-	2.59	3.79	0.22	0.78
	Uncontrolled - Largest Single HAP: Hexane (n-Hexane)	-	-	3.77E-03	6.66E-03	-	-	6.41E-03	1.13E-02	2.52E-02	1.11E-01	3.58E-02	1.57E-01	5.66E-02	2.48E-01	2.09E-02	9.14E-02	-	-	-	-	0.14	0.61	0.15	0.62
	Controlled - Largest Single HAP: Hexane (n-Hexane)	-	-	3.77E-03	6.66E-03	-	-	6.41E-03	1.13E-02	2.52E-02	1.11E-01	3.58E-02	1.57E-01	5.66E-02	2.48E-01	2.09E-02	9.14E-02	-	-	-	-	0.14	0.61	0.15	0.62
GHG	CO2	-	-	256274	452750	-	-	4217400	6742	1682	7368	2386	10449	3776	16541	1391	6091	-	-	-	-	9235	40449	4482909	499942
	CH4	88	155	4.9	8.7	1448	2.3	80.8	0.13	0.03	0.14	0.05	0.20	0.07	0.32	0.03	0.12	-	-	-	-	1536	159	85.9	9.6
	N2O	-	-	4.7	8.3	-	-	77.3	0.12	0.03	0.14	0.04	0.19	0.02	0.09	0.03	0.11	-	-	-	-	0.12	0.5	82.1	9.0
	CO2e	2200	3887	257797	455441	36207	58	4242462	6782	1692	7412	2400	10511	3784	16575	1399	6128	-	-	-	-	47683	44571	4509534	502849
Section 585 TAP																									
	Barium, soluble compounds, as Ba	-	-	9.21E-06	1.63E-05	-	-	1.57E-05	2.77E-05	6.17E-05	2.70E-04	8.75E-05	3.83E-04	1.38E-04	6.07E-04	5.10E-05	2.23E-04	-	-	-	-	3.39E-04	1.48E-03	3.63E-04	1.53E-03
	Chlorobenzene	1.64E-06	2.90E-06	3.77E-08	6.67E-08	2.79E-06	4.93E-06	6.42E-08	1.13E-07	-	-	-	-	-	-	-	-	-	-	-	-	4.43E-06	7.83E-06	1.02E-07	1.80E-07
	2-Chlorophenol (and all isomers) (ID)	1.33E-06	2.35E-06	3.06E-08	5.40E-08	2.26E-06	3.99E-06	5.20E-08	9.19E-08	-	-	-	-	-	-	-	-	-	-	-	-	3.59E-06	6.34E-06	8.26E-08	1.46E-07
	Chromium metal - Including:	-	-	2.93E-06	5.18E-06	-	-	4.98E-06	8.80E-06	1.96E-05	8.60E-05	2.78E-05	1.22E-04	4.41E-05	1.93E-04	1.62E-05	7.11E-05	-	-	-	-	1.08E-04	4.72E-04	1.16E-04	4.86E-04
	Cobalt metal, dust, and fume	-	-	1.76E-07	3.11E-07	-	-	2.99E-07	5.28E-07	1.18E-06	5.16E-06	1.67E-06	7.31E-06	2.64E-06	1.16E-05	9.74E-07	4.26E-06	-	-	-	-	6.46E-06	2.83E-05	6.94E-06	2.92E-05
	Copper -Fume	-	-	1.78E-06	3.14E-06	-	-	3.03E-06	5.34E-06	1.19E-05	5.22E-05	1.69E-05	7.40E-05	2.68E-05	1.17E-04	9.85E-06	4.31E-05	-	-	-	-	6.54E-05	2.87E-04	7.02E-05	2.95E-04
	Cresols/Cresylic Acid (isomers and mixtures)	1.91E-05	3.38E-05	4.40E-07	7.78E-07	3.25E-05	5.75E-05	7.48E-07	1.32E-06	-	-	-	-	-	-	-	-	-	-	-	-	5.17E-05	9.13E-05	1.19E-06	2.10E-06
	Cumene	4.21E-06	7.45E-06	9.69E-08	1.71E-07	7.17E-06	1.27E-05	1.65E-07	2.91E-07	-	-	-	-	-	-	-	-	-	-	-	-	1.14E-05	2.01E-05	2.62E-07	4.62E-07
	Dibutyl phthalate	2.91E-06	5.13E-06	6.68E-08	1.18E-07	4.94E-06	8.73E-06	1.14E-07	2.01E-07	-	-	-	-	-	-	-	-	-	-	-	-	7.85E-06	1.39E-05	1.80E-07	3.19E-07
	o-Dichlorobenzene	-	-	2.51E-06	4.44E-06	-	-	4.27E-06	7.55E-06	1.68E-05	7.37E-05	2.39E-05	1.04E-04	3.78E-05	1.65E-04	1.39E-05	6.09E-05	-	-	-	-	9.24E-05	4.04E-04	9.91E-05	4.16E-04
	Diethyl phthalate	5.59E-06	9.87E-06	1.29E-07	2.27E-07	9.50E-06	1.68E-05	2.18E-07	3.86E-07	-	-	-	-	-	-	-	-	-	-	-	-	1.51E-05	2.67E-05	3.47E-07	6.13E-07
	Ethyl benzene	1.10E-05	1.94E-05	2.52E-07	4.46E-07	1.86E-05	3.29E-05	4.29E-07	7.58E-07	-	-	-	-	-	-	-	-	-	-	-	-	2.96E-05	5.23E-05	6.81E-07	1.20E-06
	Fluorine	-	-	5.86E-09	1.04E-08	-	-	9.97E-09	1.76E-08	3.93E-08	1.72E-07	5.57E-08	2.44E-07	8.81E-08	3.86E-07	3.25E-08	1.42E-07	-	-	-	-	2.15E-07	9.44E-07	2.31E-07	9.72E-07
	Hexane (n-Hexane)	-	-	3.77E-03	6.66E-03	-	-	6.41E-03	1.13E-02	2.52E-02	1.11E-01	3.58E-02	1.57E-01	5.66E-02	2.48E-01	2.09E-02	9.14E-02	-	-	-	-	1.39E-01	6.07E-01	1.49E-01	6.25E-01
	Hydrogen peroxide	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.31E-01	1.45E+00	3.31E-01	1.45E+00	3.31E-01	1.45E+00
	Hydrogen sulfide	9.04E-01	1.17E+00	2.08E-02	2.69E-02	1.54E+00	1.99E+00	3.54E-02	4.57E-02	-	-	-	-	-	-	-	-	-	-	-	-	2.44E+00	3.16E+00	5.62E-02	7.26E-02
	Manganese as Mn Dust & compounds	-	-	7.96E-07	1.41E-06	-	-	1.35E-06	2.39E-06	5.33E-06	2.33E-05	7.55E-06	3.31E-05	1.20E-05	5.24E-05	4.40E-06	1.93E-05	-	-	-	-	2.92E-05	1.28E-04	3.14E-05	1.32E-04
	Mercury (Aryl & inorganic compounds as Hg)	-	-	5.44E-07	9.62E-07	-	-	9.25E-07	1.63E-06	3.64E-06	1.60E-05	5.17E-06	2.26E-05	8.18E-06	3.58E-05	3.01E-06	1.32E-05	-	-	-	-	2.00E-05	8.76E-05	2.15E-05	9.02E-05
	Molybdenum as Mo -Soluble compounds	-	-	2.30E-06	4.07E-06	-	-	3.92E-06	6.92E-06	1.54E-05	6.75E-05	2.19E-05	9.58E-05	3.46E-05	1.52E-04	1.27E-05	5.58E-05	-	-	-	-	8.47E-05	3.71E-04	9.09E-05	3.82E-04
	Naphthalene	2.05E-06	3.61E-06	1.32E-06	2.34E-06	3.48E-06	6.14E-06	2.25E-06	3.98E-06	8.55E-06	3.75E-05	1.21E-05	5.31E-05	1.92E-05	8.41E-05	7.07E-06	3.10E-05	-	-	-	-	5.25E-05	2.15E-04	5.05E-05	2.12E-04
	Nitrobenzene	6.67E-07	1.18E-06	1.53E-08	2.71E-08	1.13E-06	2.00E-06	2.61E-08	4.61E-08	-	-	-	-	-	-	-	-	-	-	-	-	1.80E-06	3.18E-06	4.14E-08	7.31E-08
	Pentane	-	-	5.44E-03	9.62E-03	-	-	9.25E-03	1.63E-02	3.64E-02	1.60E-01	5.17E-02	2.26E-01	8.18E-02	3.58E-01	3.01E-02	1.32E-01	-	-	-	-	2.00E-01	8.76E-01	2.15E-01	9.02E-01
	Phenol	9.76E-06	1.72E-05	2.25E-07	3.97E-07	1.66E-05	2.93E-05	3.82E-07	6.74E-07	-	-	-	-	-	-	-	-	-	-	-	-	2.64E-05	4.66E-05	6.06E-07	1.07E-06
	Pyridine	1.16E-06	2.05E-06	2.67E-08	4.72E-08	1.97E-06	3.49E-06	4.54E-08	8.02E-08	-	-	-	-	-	-	-	-	-	-	-	-	3.13E-06	5.54E-06	7.21E-08	1.27E-07
	Selenium	-	-	5.02E-08	8.88E-08	-	-	8.54E-08	1.51E-07	3.36E-07	1.47E-06	4.77E-07	2.09E-06	7.55E-07	3.31E-06	2.78E-07	1.22E-06	-	-	-	-	1.85E-06	8.09E-06	1.98E-06	8.33E-06
	Styrene monomer (ID)	1.31E-06	2.32E-06	3.02E-08	5.34E-08	2.23E-06	3.94E-06	5.13E-08	9.07E-08	-	-	-	-	-	-	-	-	-	-	-	-	3.55E-06	6.26E-06	8.15E-08	1.44E-07
	Toluene (toluol)	1.34E-04	2.36E-04	1.02E-05	1.80E-05	2.27E-04	4.01E-04	1.73E-05	3.06E-05	4.77E-05	2.09E-04	6.76E-05	2.96E-04	1.07E-04	4.69E-04	3.94E-05	1.73E-04	-	-	-	-	6.23E-04	1.78E-03	2.89E-04	1.19E-03
	Xylene (o-, m-, p-isomers)	8.25E-05	1.46E-04	1.90E-06	3.35E-06	1.40E-04	2.48E-04	3.23E-06	5.70E-06	-	-	-	-	-	-	-	-	-	-	-	-	2.23E-04	3.94E-04	5.12E-06	9.05E-06
	Zinc metal (ID)	-	-	6.07E-05	1.07E-04	-	-	1.03E-04	1.82E-04	4.07E-04	1.78E-03	5.77E-04	2.53E-03	9.13E-04	4.00E-03	3.36E-04	1.47E-03	-	-	-	-	2.23E-03	9.78E-03	2.40E-03	1.01E-02
Section 586 TAP	Aniline	7.90E-06	3.46E-05	1.82E-07	7.95E-07	1.34E-05	5.88E-05	3.09E-07	1.35E-06	-	-	-	-	-	-	-	-	-	-	-	-	2.13E-05	9.34E-05	4.90E-07	2.15E-06
	Arsenic compounds	-	-	1.69E-07	7.40E-07	-	-	2.87E-07	1.26E-06	2.80E-06	1.23E-05	3.98E-06	1.74E-05	6.29E-06	2.76E-05	2.32E-06	1.02E-05	-	-	-	-	1.54E-05	6.74E-05	1.58E-05	6.94E-05
	Benzene	1.82E-06	7.95E-06	1.82E-06	7.95E-06	3.09E-06	1.35E-05	3.09E-06	1.35E-05	2.94E-05	1.29E-04	4.17E-05	1.83E-04	6.61E-05	2.89E-04	2.43E-05	1.07E-04	-	-	-	-	1.67E-04	7.29E-04	1.67E-04	7.29E-04
	Benzo(a)pyrene	-	-	1.01E-09	4.44E-09	-	-	1.72E-09	7.55E-09	1.68E-08	7.37E-08	2.39E-08	1.04E-07	3.78E-08	1.65E-07	1.39E-08	6.09E-08	-	-	-	-	9.24E-08	4.04E-07	9.51E-08	4.16E-07
	Bis (2-chloro-1-methyl- ethyl) ether	2.25E-06	9.87E-06	5.18E-08	2.27E-07	3.83E-06	1.68E-05	8.81E-08	3.86E-07	-	-	-	-	-	-	-	-	-	-	-	-	6.09E-06	2.67E-05	1.40E-07	6.13E-07
	Bis (2-ethylhexyl) phthalate	1.29E-06	5.64E-06	2.96E-08	1.30E-07	2.19E-06	9.59E-06	5.04E-08	2.21E-07	-	-	-	-	-	-	-	-	-	-	-	-	3.48E-06	1.52E-05	8.00E-08	3.50E-07
	Cadmium and compounds	-	-	9.29E-07	4.07E-06	-	-	1.58E-06	6.92E-06	1.54E-05	6.75E-05	2.19E-05	9.58E-05	3.46E-05	1.52E-04	1.27E-05	5.58E-05	-	-	-	-	8.47E-05	3.71E-04	8.72E-05	3.82E-04
	Carbon tetrachloride	1.30E-06	5.67E-06	2.98E-08	1.31E-07	2.20E-06	9.65E-06	5.07E-08	2.22E-07	-	-	-	-	-	-	-	-	-	-	-	-	3.50E-06	1.53E-05	8.05E-08	3.52E-07
	Formaldehyde	-	-	6.33E-05	2.77E-04	-	-	1.08E-04	4.72E-04	1.05E-03	4.60E-03	1.49E-03	6.53E-03	2.36E-03	1.03E-02	8.69E-04	3.81E-03	-	-	-	-	5.77E-03	2.53E-02	5.94E-03	2.60E-02
	3-methylcholanthrene	-	-	1.52E-09	6.66E-09	-	-	2.58E-09	1.13E-08	2.52E-08	1.11E-07	3.58E-08	1.57E-07	5.66E-08	2.48E-07	2.09E-08	9.14E-08	-	-	-	-	1.39E-07	6.07E-07	1.43E-07	6.25E-07
	Nickel	-	-	1.77E-06	7.77E-06	-	-	3.01E-06	1.32E-05	2.94E-05	1.29E-04	4.17E-05	1.83E-04	6.61E-05	2.89E-04	2.43E-05	1.07E-04	-	-	-	-	1.62E-04	7.08E-04	1.66E-04	7.29E-04
	1,1,2,2,Tetrachloro-ethane	4.53E-07	1.99E-06	1.04E-08	4.57E-08	7.71E-07	3.38E-06	1.77E-08	7.77E-08	-	-	-	-	-	-	-	-	-	-	-	-	1.22E-06	5.36E-06	2.82E-08	1.23E-07
	Tetrachloroethylene	1.07E-06	4.70E-06	2.47E-08	1.08E-07	1.83E-06	7.99E-06	4.20E-08	1.84E-07	-	-	-	-	-	-	-	-	-	-	-	-	2.90E-06	1.27E-05	6.67E-08	2.92E-07
	1,1,2 - trichloroethane	1.68E-05	7.34E-05	3.85E-07	1.69E-06	2.85E-05	1.25E-04	6.55E-07	2.87E-06	-	-	-	-	-	-	-	-	-	-	-	-	4.52E-05	1.98E-04	1.04E-06	4.56E-06
Other HAP	7,12-Dimethylbenz(a)anthracene	-	-	1.35E-08	5.92E-08	-	-	2.30E-08	1.01E-07	2.24E-07	9.82E-07	3.18E-07	1.39E-06	5.04E-07	2.21E-06	1.85E-07	8.12E-07	-	-	-	-	1.23E-06	5.39E-06	1.27E-06	5.55E-06
	Acenapthene	-	-	1.52E-09	6.66E-09	-	-	2.58E-09	1.13E-08	2.52E-08	1.11E-07	3.58E-08	1.57E-07	5.66E-08	2.48E-07	2.09E-08	9.14E-08	-	-	-	-	1.39E-07	6.07E-07	1.43E-07	6.25E-07
	Acenapthylene	-	-	1.52E-09	6.66E-09	-	-	2.58E-09	1.13E-08	2.52E-08	1.11E-07	3.58E-08	1.57E-07	5.66E-08	2.48E-07	2.09E-08	9.14E-08	-	-	-	-	1.39E-07	6.07E-07	1.43E-07	6.25E-07
	Anthracene	-	-	2.03E-09	8.88E-09	-	-	3.45E-09	1.51E-08	3.36E-08	1.47E-07	4.77E-08	2.09E-07	7.55E-08	3.31E-07	2.78E-08	1.22E-07	-	-	-	-	1.85E-07	8.09E-07	1.90E-07	8.33E-07
	Benz(a)anthracene	-	-	1.52E-09	6.66E-09	-	-	2.58E-09	1.13E-08	2.52E-08	1.11E-07	3.58E-08	1.57E-07	5.66E-08	2.48E-07	2.09E-08	9.14E-08	-	-	-	-	1.39E-07	6.07E-07	1.43E-07	6.25E-07
	Benzo(b)fluoranthene	-	-	1.52E-09	6.66E-09	-	-	2.58E-09	1.13E-08	2.52E-08	1.11E-07	3.58E-08	1.57E-07	5.66E-08	2.48E-07	2.09E-08	9.14E-08	-	-	-	-	1.39E-07	6.07E-07	1.43E-07	6.25E-07
	Benzo(g,h,i)perylene	-	-	1.01E-09	4.44E-09	-	-	1.72E-09	7.55E-09	1.68E-08	7.37E-08	2.39E-08	1.04E-07	3.78E-08	1.65E-07	1.39E-08	6.09E-08	-	-	-	-	9.24E-08	4.04E-07	9.51E-08	4.16E-07
	Benzo(k)fluoranthene	-	-	1.52E-09	6.66E-09	-	-	2.58E-09	1.13E-08	2.52E-08	1.11E-07	3.58E-08	1.57E-07	5.66E-08	2.48E-07	2.09E-08	9.14E-08	-	-	-	-	1.39E-07	6.07E-07	1.43E-07	6.25E-07
	Chrysene	-	-	1.52E-09	6.66E-09	-	-	2.58E-09	1.13E-08	2.52E-08	1.11E-07	3.58E-08	1.57E-07	5.66E-08	2.48E-07	2.09E-08	9.14E-08	-	-	-	-	1.39E-07	6.07E-07	1.43E-07	6.25E-07
	Dibenzo(a,h)anthracene	-	-	1.01E-09	4.44E-09	-	-	1.72E-09	7.55E-09	1.68E-08	7.37E-08	2.39E-08	1.04E-07	3.78E-08	1.65E-07	1.39E-08	6.09E-08	-	-	-	-	9.24E-08	4.04E-07	9.51E-08	4.16E-07
	Fluoranthene	-	-	4.59E-03	2.01E-02	-	-	7.80E-03	3.42E-02	4.21E-08	1.84E-07	5.96E-08	2.61E-07	9.44E-08	4.14E-07	3.48E-08	1.52E-07	-	-	-	-	2.31E-07	1.01E-06	1.24E-02	5.43E-02
	Indeno(1,2,3-cd)pyrene	-	-	1.52E-09	6.66E-09	-	-	2.58E-09	1.13E-08	2.52E-08	1.11E-07	3.58E-08	1.57E-07	5.66E-08	2.48E-07	2.09E-08	9.14E-08	-	-	-	-	1.39E-07	6.07E-07	1.43E-07	6.25E-07
	Pyrene	-	-	4.22E-09	1.85E-08	-	-	7.18E-09	3.14E-08	7.01E-08	3.07E-07	9.94E-08	4.35E-07	1.57E-07	6.89E-07	5.79E-08	2.54E-07	-	-	-	-	3.85E-07	1.69E-06	3.96E-07	1.74E-06

Table C-2. Site Wide Emissions and Modeling Applicability

		Site-Wide Total Uncontrolled Emissions		Site-Wide Total Controlled Emissions		Significant Emission Rate[1]	PTC Category I Exemption[2]		Idaho Air Dispersion Modeling Requirements[3]								Federal Title V Permit Applicability[4]	
									Level I Threshold				Level II Threshold					
		(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(tons/yr)	Threshold (ton/yr)	Exempt?	(lb/hr)	Status	(ton/yr)	Status	(lb/hr)	Status	(ton/yr)	Status	Threshold (ton/yr)	Status
Regulated Pollutants	PM10	0.17	0.76	0.27	0.93	15	1.5	YES	0.22	ABOVE	*NA*		2.6	BELOW	*NA*		100	BELOW
	PM2.5	0.16	0.70	0.26	0.87	10	1	YES	0.054	ABOVE	0.35	ABOVE	0.63	BELOW	4.1	BELOW	100	BELOW
	SO2	0.05	0.20	4.64	6.14	40	4	NO	0.21	ABOVE	1.2	ABOVE	2.5	ABOVE	14	BELOW	100	BELOW
	NOx	2.73	11.97	3.13	12.66	40	4	NO	0.20	ABOVE	1.2	ABOVE	2.4	ABOVE	14	BELOW	100	BELOW
	CO	5.02	22.01	6.81	25.16	100	10	NO	15	BELOW	*NA*		175	BELOW	*NA*		100	BELOW
	VOC	0.35	1.54	1.16	2.96	40	4	YES	*NA*								100	BELOW
	H2S	2.44	3.16	0.06	0.07	10	1	YES	*NA*								10	BELOW
	Lead	0.00	0.00	0.00	0.00	0.6	0.06	YES	0.02	BELOW	*NA*		0.02	BELOW	*NA*		10	BELOW
	Total HAPs	2.59	3.79	0.22	0.78	*NA*											25	BELOW
	Uncontrolled - Largest Single HAP: Hexane (n-Hexane)	0.14	0.61	0.15	0.62	*NA*											10	BELOW
	Controlled - Largest Single HAP: Hexane (n-Hexane)	0.14	0.61	0.15	0.62	*NA*											10	BELOW
GHG	CO2	9,235	40,449	4,482,909	499,942													
	CH4	1536	159	86	10													
	N2O	0.12	0.53	82	9													
	CO2e	47,683	44,571	4,509,534	502,849													

		Applicable[5] Site-Wide Total Uncontrolled Emissions		Applicable[5] Site-Wide Total Controlled Emissions		TAPs Emission Limit[6]	TAPs Exempt Based on Emission Rate?			TAPs Pre-Construction Compliant Based on Emission Rate?		
		(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	BRC[7]	Level I (a)[8]	Level II[9]	Uncontrolled[10]	Controlled[11]	Status[12]
Section 585 TAP	Barium, soluble compounds, as Ba	5.10E-05	2.23E-04	7.59E-05	2.67E-04	3.30E-02	YES	YES	YES	YES	YES	Compliant
	Chlorobenzene	4.43E-06	7.83E-06	1.02E-07	1.80E-07	2.33E+01	YES	YES	YES	YES	YES	Compliant
	2-Chlorophenol (and all isomers) (ID)	3.59E-06	6.34E-06	8.26E-08	1.46E-07	3.30E-02	YES	YES	YES	YES	YES	Compliant
	Chromium metal - Including:	1.62E-05	7.11E-05	2.41E-05	8.50E-05	3.30E-02	YES	YES	YES	YES	YES	Compliant
	Cobalt metal, dust, and fume	9.74E-07	4.26E-06	1.45E-06	5.10E-06	3.30E-03	YES	YES	YES	YES	YES	Compliant
	Copper -Fume	9.85E-06	4.31E-05	1.47E-05	5.16E-05	1.30E-02	YES	YES	YES	YES	YES	Compliant
	Cresols/Cresylic Acid (isomers and mixtures)	5.17E-05	9.13E-05	1.19E-06	2.10E-06	1.47E+00	YES	YES	YES	YES	YES	Compliant
	Cumene	1.14E-05	2.01E-05	2.62E-07	4.62E-07	1.63E+01	YES	YES	YES	YES	YES	Compliant
	Dibutyl phthalate	7.85E-06	1.39E-05	1.80E-07	3.19E-07	3.33E-01	YES	YES	YES	YES	YES	Compliant
	o-Dichlorobenzene	1.39E-05	6.09E-05	2.07E-05	7.29E-05	2.00E+01	YES	YES	YES	YES	YES	Compliant
	Diethyl phthalate	1.51E-05	2.67E-05	3.47E-07	6.13E-07	3.33E-01	YES	YES	YES	YES	YES	Compliant
	Ethyl benzene	2.96E-05	5.23E-05	6.81E-07	1.20E-06	2.90E+01	YES	YES	YES	YES	YES	Compliant
	Fluorine	3.25E-08	1.42E-07	4.83E-08	1.70E-07	1.33E-01	YES	YES	YES	YES	YES	Compliant
	Hexane (n-Hexane)	2.09E-02	9.14E-02	3.10E-02	1.09E-01	1.20E+01	YES	YES	YES	YES	YES	Compliant
	Hydrogen peroxide	3.31E-01	1.45E+00	3.31E-01	1.45E+00	1.00E-01	NO	NO	NO	NO	NO	Modeling Required
	Hydrogen sulfide	2.44E+00	3.16E+00	5.62E-02	7.26E-02	9.33E-01	NO	NO	YES	NO	YES	Compliant
	Manganese as Mn Dust & compounds	4.40E-06	1.93E-05	6.55E-06	2.31E-05	3.33E-01	YES	YES	YES	YES	YES	Compliant
	Mercury (Aryl & inorganic compounds as Hg)	3.01E-06	1.32E-05	4.48E-06	1.58E-05	7.00E-03	YES	YES	YES	YES	YES	Compliant
	Molybdenum as Mo -Soluble compounds	1.27E-05	5.58E-05	1.90E-05	6.68E-05	3.33E-01	YES	YES	YES	YES	YES	Compliant
	Naphthalene	1.26E-05	4.07E-05	1.06E-05	3.73E-05	3.33E+00	YES	YES	YES	YES	YES	Compliant
	Nitrobenzene	1.80E-06	3.18E-06	4.14E-08	7.31E-08	3.33E-01	YES	YES	YES	YES	YES	Compliant
	Pentane	3.01E-02	1.32E-01	4.48E-02	1.58E-01	1.18E+02	YES	YES	YES	YES	YES	Compliant
	Phenol	2.64E-05	4.66E-05	6.06E-07	1.07E-06	1.27E+00	YES	YES	YES	YES	YES	Compliant
	Pyridine	3.13E-06	5.54E-06	7.21E-08	1.27E-07	1.00E+00	YES	YES	YES	YES	YES	Compliant
	Selenium	2.78E-07	1.22E-06	4.14E-07	1.46E-06	1.30E-02	YES	YES	YES	YES	YES	Compliant
	Styrene monomer (ID)	3.55E-06	6.26E-06	8.15E-08	1.44E-07	6.67E+00	YES	YES	YES	YES	YES	Compliant
	Toluene (toluol)	4.00E-04	8.10E-04	6.69E-05	2.21E-04	2.50E+01	YES	YES	YES	YES	YES	Compliant
	Xylene (o-, m-, p-isomers)	2.23E-04	3.94E-04	5.12E-06	9.05E-06	2.90E+01	YES	YES	YES	YES	YES	Compliant
	Zinc metal (ID)	3.36E-04	1.47E-03	5.00E-04	1.76E-03	6.67E-01	YES	YES	YES	YES	YES	Compliant
Section 586 TAP	Aniline	2.13E-05	9.34E-05	4.90E-07	2.15E-06	9.00E-04	YES	YES	YES	YES	YES	Compliant
	Arsenic compounds	2.32E-06	1.02E-05	2.77E-06	1.21E-05	1.50E-06	NO	NO	NO	NO	NO	Modeling Required
	Benzene	2.92E-05	1.28E-04	2.92E-05	1.28E-04	8.00E-04	YES	YES	YES	YES	YES	Compliant
	Benzo(a)pyrene	1.39E-08	6.09E-08	1.66E-08	7.29E-08	2.00E-06	YES	YES	YES	YES	YES	Compliant
	Bis (2-chloro-1-methyl- ethyl) ether	6.09E-06	2.67E-05	1.40E-07	6.13E-07	3.30E-04	YES	YES	YES	YES	YES	Compliant
	Bis (2-ethylhexyl) phthalate	3.48E-06	1.52E-05	8.00E-08	3.50E-07	2.80E-02	YES	YES	YES	YES	YES	Compliant
	Cadmium and compounds	1.27E-05	5.58E-05	1.53E-05	6.68E-05	3.70E-06	NO	NO	NO	NO	NO	Modeling Required
	Carbon tetrachloride	3.50E-06	1.53E-05	8.05E-08	3.52E-07	4.40E-04	YES	YES	YES	YES	YES	Compliant
	Formaldehyde	8.69E-04	3.81E-03	1.04E-03	4.56E-03	5.10E-04	NO	NO	NO	NO	NO	Modeling Required
	3-methylcholanthrene	2.09E-08	9.14E-08	2.50E-08	1.09E-07	2.50E-06	YES	YES	YES	YES	YES	Compliant
	Nickel	2.43E-05	1.07E-04	2.91E-05	1.28E-04	2.70E-05	NO	YES	NO	YES	NO	Compliant
	1,1,2,2,Tetrachloro-ethane	1.22E-06	5.36E-06	2.82E-08	1.23E-07	1.10E-05	NO	YES	YES	YES	YES	Compliant
	Tetrachloroethylene	2.90E-06	1.27E-05	6.67E-08	2.92E-07	1.30E-02	YES	YES	YES	YES	YES	Compliant
	1,1,2 - trichloroethane	4.52E-05	1.98E-04	1.04E-06	4.56E-06	4.20E-04	NO	YES	YES	YES	YES	Compliant

Notes

1. Definded in IDAPA 58.01.01 §006.108
2. Per IDAPA 58.01.01 §221.01 a category I exemption is allowed only if facility wide controlled emissions are less than 10% of the signifficant emission rate.
3. State of Idaho Guideline for Performing Air Qualifty Impact Analysis (Doc. I D AQ-011 September 2013) Table 2. Modeling is required if pollutant emissions are above the Level II threshold, and is potentially required if above the Level I threshold. Lead threshold of 14 lb/month is scaled to an hourly basis using 12 months per year and 8760 hours per year.
4. 40 CFR 70.2 Definition of Major Source
5. Per IDAPA 58.01.01 §210.20 emissions from boilers are not included in determination of TAPs compliance because they are subject to NSPS Subpart Dc.
6. Emission Limits (ELs) Listed in IDAPA 58.01.01 §585 and §586
7. Per IDAPA 58.01.01 §223.01 TAPs emissions qualify for Below Regulatory Concern (BRC) PTC exemption if applicable uncontrolled emissions are less than 10% of the EL.
8. Per IDAPA 58.01.01 §223.02(a) TAPs emissions qualify for Level I (a) PTC exemption if applicable uncontrolled emissions are less than the EL.
9. Per IDAPA 58.01.01 §223.03 TAPs emissions qualify for a Level II PTC exemption if applicable controlled emissions are less than 10% of the EL.
10. Per IDAPA 58.01.01 §210.05 TAPs achieve preconstruction compliance if the applicable uncontrolled emissions are less than the EL.
11. Per IDAPA 58.01.01 §210.07 achieve preconstruction compliance if the applicable controlled emissions are less than the EL.
12. If TAPs emission rates are not below preconstruction compliance thresholds then compliance must be determined based on ambient concentration impact analysis as stated in IDAPA 58.01.01 §210.06 or 08.

Table C-3. Darigold WWTP Biogas Calculation Input Assumptions

Digester 1 Tank Capacity	1,000,000	gallons	
Digester 2 Tank Capacity	1,700,000	gallons	
Total Digester Storage Capacity	2,700,000	gallons	
Peak Biogas Flow from Both Digesters Combined	245,749	SCF/day	(based on maximum measured flow rate)
Average Biogas Flow from Both Digesters Combined	99,122	SCF/day	(based on mean measured historical flow with 12.5% inflation factor)
Annual Biogas Production	36.18	MMSCF/year	(based on average daily gas generation)
Average Methane Content of Biogas	55.7%	by mass	(from analysis of biogas)
Gross Heat Value Methane	1,011	BTU/SCF	(reference value)
Gross Heat Value Natural Gas	1,020	BTU/SCF	(reference value)
Biogas Heat Value	563	BTU/SCF	(Average Methane Content x Gross Heat Value Methane)
Biogas / Natural Gas Heat Value Ratio	0.55		
Facility Annual Operating Hours	8760	hours/year	

Flare Model Parameters

Flare actual diameter	0.20	meters	
Flare peak heat release rate	403631	calories/sec	(Peak biogas SCF/day)*(1 day/24 hours)*(biogas BTU/SCF)*(252 calories/BTU)*(1 hour/3600 seconds)
Sensible heat release rate[1]	181634	calories/sec	(0.45)*(Peak heat release rate)
Flare modeled diameter[1]	0.42	meters	(9.88×10^{-4}*(Sensible heat release rate^0.5))
Exit velocity[1]	20	meters/sec	
Temperature[1]	1273	Kelvin	
Actual height	4.67	meters	
Vertical height of flame[2]	2.18	meters	(4.56×10^{-3})*(Peak heat release rate^0.478)
Effective release height[2]	6.85	meters	(Actual height)+(Vertical height of flame)

1. SCREEN3 Model User's Guide Section 3.3 (EPA-454/B-95-004)
2. EPA Screening Procedures for Estimating the Air Quality Impact of Stationary Sources Revised, Equation 4.4 (EPA 454/R-92-019)

Table C-4. Darigold WWTP Biogas H2S and SO2 Emission Factor Calcuation

Assumptions for gas stream

2,700	ppm H2S concentration (maximum)	**Date**	**H2S Conc.**		
1,975	ppm H2S concentration (average)	2/17/2011	2100	ppm	
385	scf gas/lb-mole	2/21/2011	1500	ppm	Lowest production rate
34	Molecular weight of H2S	2/23/2011	2700	ppm	Highest Production Rate
64	Molecular weight of SO2	8/10/2011	1600	ppm	

Maximum EF Calculation:

$$\frac{2{,}700 \text{ part H2S}}{1.00\text{E+06 part biogas}} \times \frac{1 \text{ lb-mole}}{385 \text{ scf}} \times \frac{34 \text{ lb}}{1 \text{ lb-mole}} = \frac{2.38\text{E-04 lb H2S}}{\text{scf of biogas}}$$

$$\frac{2.38\text{E-04 lb H2S}}{1 \text{ scf of biogas}} \times \frac{64 \text{ lb/lb-mole SO2}}{34 \text{ lb/lb-mole H2S}} = \frac{\mathbf{4.49E\text{-}04} \text{ lb SO2}}{\text{scf of biogas}}$$

Average EF Calculation:

$$\frac{1{,}975 \text{ part H2S}}{1.00\text{E+06 part biogas}} \times \frac{1 \text{ lb-mole}}{385 \text{ scf}} \times \frac{34 \text{ lb}}{1 \text{ lb-mole}} = \frac{1.74\text{E-04 lb H2S}}{\text{scf of biogas}}$$

$$\frac{1.74\text{E-04 lb H2S}}{1 \text{ scf of biogas}} \times \frac{64 \text{ lb/lb-mole SO2}}{34 \text{ lb/lb-mole H2S}} = \frac{\mathbf{3.28E\text{-}04} \text{ lb SO2}}{\text{scf of biogas}}$$

Table C-5. Darigold Biogas WWTP HAP/TAP Emission Factors Calculation

Compound	CAS	585 TAP Reference	586 TAP Reference	Molecular weight	Partially Clean Biogas Avg Conc (ppbv)[1]	Partially Clean Biogas Max Conc (ppbv)[1]	Raw Biogas Avg Conc (ppbv)[1]	Raw Biogas Max Conc (ppbv)[1]	Selected Biogas Concentration (ppbv)[2]	Biogas Compound Mass Flow Rate (lb/scf biogas)[3]	AP-42 (NG Boiler) (lb/MMscf NG)	AP-42 (NG Boiler) (lb/scf biogas)[4]
1,1,2- Trichloroethane	79-00-5	-	76	133.40	2.42E+01	4.96E+01	3.16E+01		3.16E+01	1.10E-08		
1,1,2,2-Tetracholoroethane	79-34-5	-	74	167.85	6.80E-01	6.80E-01			6.80E-01	2.96E-10		
1,2,4-Trimethylbenzene	95-63-6	-	-	120.19	3.08E+00		1.20E+01		1.20E+01	3.75E-09		
1,3,5-Trimethylbenzene	108-67-8	-	-	120.19	1.61E+00		4.72E+00		4.72E+00	1.47E-09		
1,3-Butadiene	106-99-0	-	14	54.09								
1-Methylnaphthalene	90-12-0	-	-	142.20			3.08E+00		3.08E+00	1.14E-09		
2,2,4-Trimethylpentane	540-84-1	495	-	114.23								
2-Chlorophenol	95-57-8	94	-	128.56	1.05E+00		8.50E-01	1.17	1.05E+00	3.51E-10		
2-Methylnaphthalene	91-57-6	-	-	142.20			2.20E+00		2.20E+00	8.13E-10	2.40E-05	1.33E-11
3,4-Methylphenol (o,p-cresol)	1319-77-3	113	-	108.14	7.45E+00		1.80E+01	82.07	1.80E+01	5.05E-09		
3-Methylcholanthrene	56-49-5	-	54	268.35							1.80E-06	9.94E-13
Acrolein	107-02-8	7	-	56.06								
Aniline	62-53-3	-	5	93.13	1.29E+01	2.56E+01	2.13E+01		2.13E+01	5.16E-09		
Arsenic	7440-38-2	-	8	74.92							2.00E-04	1.10E-10
Barium	7440-39-3	27	-	137.33							4.40E-03	2.43E-09
Benzene	71-43-2	-	10	78.11	5.85E+00	1.27E+01	4.20E+00		5.85E+00	1.19E-09	2.10E-03	1.16E-09
Benzo(a)pyrene	50-32-8	-	12	252.31							1.20E-06	6.63E-13
Benzyl Alcohol	100-51-6	-	-	108.14	4.63E+01		5.08E+00		4.63E+01	1.30E-08		
Beryllium	7440-41-7	-	13	9.01							1.20E-05	6.63E-12
Biphenyl	92-52-4	30	-	154.21								
Bis (2-chloro-1-methyl- ethyl)	108-60-1	-	17	171.06	3.15E+00	3.15E+00	3.35E+00		3.35E+00	1.47E-09		
bis(2-Ethylhexyl)phthalate	117-81-7	-	18	390.56	8.30E-01	3.80E+00	3.90E-01		8.30E-01	8.42E-10		
Cadmium	7440-43-9	-	19	112.41							1.10E-03	6.07E-10
Carbon Tetrachloride	56-23-5	-	20	153.82	1.35E+00	2.12E+00	1.30E+00		2.12E+00	8.47E-10		
Chlorobenzene	108-90-7	90	-	112.56	1.48E+00				1.48E+00	4.33E-10		
Chromium	7440-47-3	100	-	52.01							1.40E-03	7.73E-10
Cobalt	7440-48-4	107	-	58.93							8.40E-05	4.64E-11
Copper	7440-50-8	108	-	63.55							8.50E-04	4.69E-10
Cyclopentane	287-92-3	126	-	70.13								
Dichlorobenzene	95-50-1	140	-	112.56							1.20E-03	6.63E-10
Diethylphthalate	84-66-2	159	-	222.24	2.30E-01		2.10E-01		2.30E-01	1.47E-09		
Di-n-butyl phthalate	84-74-2	138	-	278.34	7.40E-01		7.50E-01	1.06	1.06E+00	7.66E-10		
Ethylbenzene	100-41-4	199	-	106.17	9.75E+00		1.05E+01	33.81	1.05E+01	2.89E-09		
Fluoranthene	206-44-0	-	-	202.26			4.30E-01		4.30E-01	2.26E-10		
Fluorene	7782-41-4	223	-	38.00							2.80E-06	1.55E-12
Formaldehyde	50-00-0	-	42	30.03							7.50E-02	4.14E-08
Hexane	110-54-3	240	-	86.18							1.80E+00	9.94E-07
Isopropylbenzene (cumene)	98-82-8	116	-	120.19	1.11E+00		3.56E+00		3.56E+00	1.11E-09		
Manganese	7439-96-5	278	-	54.94							3.80E-04	2.10E-10
Mercury	7439-97-6	281	-	200.59							2.60E-04	1.44E-10
Methanol	67-56-1	286	-	32.04								
Methylcyclohexane	583-60-8	307	-	112.17								
Methylene Chloride	75-09-2	-	31	84.93								
Molybdenum	7439-98-7	331	-	95.94							1.10E-03	6.07E-10
Naphthalene	91-20-3	336	-	128.17	9.00E-01		1.62E+00		1.62E+00	5.39E-10	6.10E-04	3.37E-10
n-Butylbenzene	104-51-8	-	-	134.22	1.36E+00		3.55E+00		3.55E+00	1.24E-09		
Nickel	7440-02-0	-	59	58.71							2.10E-03	1.16E-09
Nitrobenzene	98-95-3	341	-	123.06			5.50E-01	0.57	5.50E-01	1.76E-10		
N-nitroso-di-n-propylamine	621-64-7	-	-	130.19	6.40E-01		6.80E-01		6.80E-01	2.30E-10		
Nonane	111-84-2	352	-	128.20								
n-propylbenzene	103-65-1	-	-	120.19	1.42E+00		5.74E+00		5.74E+00	1.79E-09		
Octane	111-65-9	354	-	114.23								
Pentane	109-66-0	367	-	72.15							2.60E+00	1.44E-06
Phenanthrene	85-01-8	-	-	178.23			1.09E+00		1.09E+00	5.05E-10	1.70E-05	9.39E-12
Phenol	108-95-2	371	-	94.11	1.05E+01		9.68E+00	28.14	1.05E+01	2.57E-09		
p-Isopropyltoluene	99-87-6	-	-	134.22	2.01E+01		3.26E+00		2.01E+01	7.02E-09		
Pyridine	110-86-1	411	-	79.10			1.49E+00	1.49	1.49E+00	3.06E-10		
sec-Butylbenzene	135-98-8	-	-	134.22	9.60E-01		3.83E+00		3.83E+00	1.34E-09		
Selenium	7782-49-2	421	-	78.96							2.40E-05	1.33E-11
Styrene	100-42-5	447	-	104.15	1.28E+00		4.50E-01	0.45	1.28E+00	3.46E-10		
tert-Butylbenzene	98-06-6	-	-	134.22	1.02E+00		3.26E+00		3.26E+00	1.14E-09		
Tetrachloroethylene	127-18-4	-	75	167.85	1.61E+00	1.61E+00	1.26E+00		1.61E+00	7.02E-10		
Toluene	108-88-3	480	-	92.14	2.23E+01		4.33E+01	147.26	1.47E+02	3.52E-08	3.40E-03	1.88E-09
Trimethylbenzene	25551-13-7	494	-	120.19								
Vanadium	1314-62-1	505	-	50.94							2.30E-03	1.27E-09
Vinyl Chloride	75-04-3	-	-	62.50								
Xylenes (o,m,p isomers)	1330-20-7	510	-	106.17	5.22E+00		1.77E+01	78.89	7.89E+01	2.18E-08		
Zinc	7440-66-6	514	-	65.38							2.90E-02	1.60E-08
7,12-Dimethylbenz(a)anthracene	57-97-6	-	-								1.60E-05	8.83E-12
Acenapthene	83-32-9	-	-								1.80E-06	9.94E-13
Acenapthylene	203-96-8	-	-								1.80E-06	9.94E-13
Anthracene	120-12-7	-	-								2.40E-06	1.33E-12
Benz(a)anthracene	56-55-3	-	-								1.80E-06	9.94E-13
Benzo(b)fluoranthene	205-99-2	-	-								1.80E-06	9.94E-13
Benzo(g,h,i)perylene	191-24-2	-	-								1.20E-06	6.63E-13
Benzo(k)fluoranthene	207-08-9	-	-								1.80E-06	9.94E-13
Chrysene	218-01-9	-	-								1.80E-06	9.94E-13
Dibenzo(a,h)anthracene	53-70-3	-	-								1.20E-06	6.63E-13
Fluoranthene	206-44-0	-	-								3.00E-06	1.66E-12
Indeno(1,2,3-cd)pyrene	193-39-5	-	-								1.80E-06	9.94E-13
Pyrene	129-00-0	-	-								5.00E-06	2.76E-12
Total VOC										1.28E-07		

Notes:

1. Source: GTI Pipeline Quality Biomethane: North American Guidance Document for Introduction of Dairy Waste Derived Biomethane Into Existing Natural Gas Networks, Task 2 Report Tables 17 and 23.
Link: https://www.gti.energy/wp-content/uploads/2018/09/Pipeline_Quality_Biomethane_FINAL_TASK_2_REPORT.pdf
2. Selected biogas concentration based on highest of either partially clean or raw biogas maximum concentrations for IDAPA 585 TAPs and the highest of either partially clean or raw biogas average concentrations for IDAPA 586 TAPs.
3. Biogas compound mass flow rate = (Selected biogas concentration (ppbv) / 1x10^9) x (1 lb-mole / 385 scf) x (molar mass (lb / lb-mol))

$$\frac{x \text{ parts}}{1.00E+09 \text{ parts}} \times \frac{1 \text{ lb-mole}}{385 \text{ scf}} = \frac{Z \text{ lb Compound}}{\text{cf - biogas}}$$

4. AP-42 emission factors for natural gas are converted to biogas emission factors using a ratio of the heat content for each fuel, in order to account for increased biogas usage to produce the same amount of heat that natural gas would produce.

Table C-6. Darigold Emission Unit Calculations - Roof and Ceiling Mounted Heaters (Page 1 of 3)

Equipment ID		Total Heater Emissions		RMAU01		RMAU02		RMAU03		RMAU04		RMAU05		RMAU06		RMAU07		RMAU08		RMAU09		RMAU10	
Fuel				Natural Gas		Natural Gas		Natural Gas		Natural Gas		Natural Gas		Natural Gas		Natural Gas		Natural Gas		Natural Gas		Natural Gas	
Heat Input (MMBTU/hr)				0.97		3.60		0.14		0.50		0.12		0.24		0.12		0.06		0.09		0.55	
Criteria Pollutants				*Criteria Pollutants Emissions*																			
	Emissions Factors[1] (lb/MMBTU) Natural Gas	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)
PM_{10}	7.45E-03	0.09	0.39	0.007	3.2E-02	0.027	1.2E-01	0.001	4.7E-03	0.004	1.6E-02	0.001	3.9E-03	0.002	8.0E-03	0.001	3.9E-03	0.000	2.0E-03	0.001	2.9E-03	0.004	1.8E-02
$PM_{2.5}$	7.45E-03	0.09	0.39	0.007	3.2E-02	0.027	1.2E-01	0.001	4.7E-03	0.004	1.6E-02	0.001	3.9E-03	0.002	8.0E-03	0.001	3.9E-03	0.000	2.0E-03	0.001	2.9E-03	0.004	1.8E-02
SO_2	5.88E-04	0.01	0.03	0.0006	2.5E-03	0.0021	9.3E-03	0.0001	3.7E-04	0.0003	1.3E-03	0.0001	3.1E-04	0.0001	6.3E-04	0.0001	3.1E-04	0.0000	1.5E-04	0.0001	2.3E-04	0.0003	1.4E-03
NO_x	9.80E-02	1.16	5.08	0.10	4.2E-01	0.35	1.5E+00	0.01	6.2E-02	0.05	2.1E-01	0.01	5.2E-02	0.02	1.0E-01	0.01	5.2E-02	0.01	2.6E-02	0.01	3.9E-02	0.05	2.4E-01
CO	8.24E-02	0.97	4.26	0.08	3.5E-01	0.30	1.3E+00	0.01	5.2E-02	0.04	1.8E-01	0.01	4.3E-02	0.02	8.8E-02	0.01	4.3E-02	0.00	2.2E-02	0.01	3.2E-02	0.05	2.0E-01
VOC	5.39E-03	0.06	0.28	0.01	2.3E-02	0.02	8.5E-02	0.00	3.4E-03	0.00	1.2E-02	0.00	2.8E-03	0.00	5.8E-03	0.00	2.8E-03	0.00	1.4E-03	0.00	2.1E-03	0.00	1.3E-02
H_2S	-	-	-																				
Lead	4.90E-07	5.79E-06	2.54E-05	4.76E-07	2.1E-06	1.76E-06	7.7E-06	7.06E-08	3.1E-07	2.45E-07	1.1E-06	5.88E-08	2.6E-07	1.2E-07	5.2E-07	5.88E-08	2.6E-07	2.94E-08	1.3E-07	4.41E-08	1.9E-07	2.7E-07	1.2E-06
Greenhouse Gasses				*Greenhouse Gas Emissions*																			
	Emissions Factors[1] (lb/MMBTU) Natural Gas	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)
CO_2	1.18E+02	1391	6091	114	5.0E+02	423.1059	1.9E+03	16.9412	7.4E+01	58.8235	2.6E+02	14.1176	6.2E+01	28.6824	1.3E+02	14.1176	6.2E+01	7.0588	3.1E+01	10.5882	4.6E+01	64.7059	2.8E+02
CH_4	2.25E-03	0.03	0.12	0.0022	9.6E-03	0.0081	3.6E-02	0.0003	1.4E-03	0.0011	4.9E-03	0.0003	1.2E-03	0.0005	2.4E-03	0.0003	1.2E-03	0.0001	5.9E-04	0.0002	8.9E-04	0.0012	5.4E-03
N_2O	2.16E-03	0.03	0.11	0.0021	9.2E-03	0.0078	3.4E-02	0.0003	1.4E-03	0.0011	4.7E-03	0.0003	1.1E-03	0.0005	2.3E-03	0.0003	1.1E-03	0.0001	5.7E-04	0.0002	8.5E-04	0.0012	5.2E-03
CO_2e[4]	-	1399	6128	115.0325	5.0E+02	425.6202	1.9E+03	17.0418	7.5E+01	59.1731	2.6E+02	14.2015	6.2E+01	28.8528	1.3E+02	14.2015	6.2E+01	7.1008	3.1E+01	10.6512	4.7E+01	65.0904	2.9E+02
TAPs				*Toxic Air Pollutants Emissions*																			
	Emissions Factors[2] (lb/MMscf)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)
2-Methylnaphthalene	2.4E-05	2.8E-07	1.2E-06	2.3E-08	1.0E-07	8.5E-08	3.7E-07	3.4E-09	1.5E-08	1.2E-08	5.2E-08	2.8E-09	1.2E-08	5.7E-09	2.5E-08	2.8E-09	1.2E-08	1.4E-09	6.2E-09	2.1E-09	9.3E-09	1.3E-08	5.7E-08
3-Methylcholanthrene	1.8E-06	2.1E-08	9.1E-08	1.7E-09	7.5E-09	6.3E-09	2.8E-08	2.5E-10	1.1E-09	8.8E-10	3.9E-09	2.1E-10	9.3E-10	4.3E-10	1.9E-09	2.1E-10	9.3E-10	1.1E-10	4.6E-10	1.6E-10	7.0E-10	9.7E-10	4.3E-09
Arsenic	2.0E-04	2.3E-06	1.0E-05	1.9E-07	8.3E-07	7.1E-07	3.1E-06	2.8E-08	1.2E-07	9.8E-08	4.3E-07	2.4E-08	1.0E-07	4.8E-08	2.1E-07	2.4E-08	1.0E-07	1.2E-08	5.2E-08	1.8E-08	7.7E-08	1.1E-07	4.7E-07
Barium	4.4E-03	5.1E-05	2.2E-04	4.2E-06	1.8E-05	1.6E-05	6.8E-05	6.2E-07	2.7E-06	2.2E-06	9.4E-06	5.2E-07	2.3E-06	1.1E-06	4.6E-06	5.2E-07	2.3E-06	2.6E-07	1.1E-06	3.9E-07	1.7E-06	2.4E-06	1.0E-05
Benzene	2.1E-03	2.4E-05	1.1E-04	2.0E-06	8.8E-06	7.4E-06	3.2E-05	3.0E-07	1.3E-06	1.0E-06	4.5E-06	2.5E-07	1.1E-06	5.0E-07	2.2E-06	2.5E-07	1.1E-06	1.2E-07	5.4E-07	1.9E-07	8.1E-07	1.1E-06	5.0E-06
Benzo(a)pyrene	1.2E-06	1.4E-08	6.1E-08	1.1E-09	5.0E-09	4.2E-09	1.9E-08	1.7E-10	7.4E-10	5.9E-10	2.6E-09	1.4E-10	6.2E-10	2.9E-10	1.3E-09	1.4E-10	6.2E-10	7.1E-11	3.1E-10	1.1E-10	4.6E-10	6.5E-10	2.8E-09
Beryllium	1.2E-05	1.4E-07	6.1E-07	1.1E-08	5.0E-08	4.2E-08	1.9E-07	1.7E-09	7.4E-09	5.9E-09	2.6E-08	1.4E-09	6.2E-09	2.9E-09	1.3E-08	1.4E-09	6.2E-09	7.1E-10	3.1E-09	1.1E-09	4.6E-09	6.5E-09	2.8E-08
Cadmium	1.1E-03	1.3E-05	5.6E-05	1.0E-06	4.6E-06	3.9E-06	1.7E-05	1.6E-07	6.8E-07	5.4E-07	2.4E-06	1.3E-07	5.7E-07	2.6E-07	1.2E-06	1.3E-07	5.7E-07	6.5E-08	2.8E-07	9.7E-08	4.3E-07	5.9E-07	2.6E-06
Chromium	1.4E-03	1.6E-05	7.1E-05	1.3E-06	5.8E-06	4.9E-06	2.2E-05	2.0E-07	8.7E-07	6.9E-07	3.0E-06	1.6E-07	7.2E-07	3.3E-07	1.5E-06	1.6E-07	7.2E-07	8.2E-08	3.6E-07	1.2E-07	5.4E-07	7.5E-07	3.3E-06
Cobalt	8.4E-05	9.7E-07	4.3E-06	8.0E-08	3.5E-07	3.0E-07	1.3E-06	1.2E-08	5.2E-08	4.1E-08	1.8E-07	9.9E-09	4.3E-08	2.0E-08	8.8E-08	9.9E-09	4.3E-08	4.9E-09	2.2E-08	7.4E-09	3.2E-08	4.5E-08	2.0E-07
Copper	8.5E-04	9.9E-06	4.3E-05	8.1E-07	3.5E-06	3.0E-06	1.3E-05	1.2E-07	5.3E-07	4.2E-07	1.8E-06	1.0E-07	4.4E-07	2.0E-07	8.9E-07	1.0E-07	4.4E-07	5.0E-08	2.2E-07	7.5E-08	3.3E-07	4.6E-07	2.0E-06
Dichlorobenzene	1.2E-03	1.4E-05	6.1E-05	1.1E-06	5.0E-06	4.2E-06	1.9E-05	1.7E-07	7.4E-07	5.9E-07	2.6E-06	1.4E-07	6.2E-07	2.9E-07	1.3E-06	1.4E-07	6.2E-07	7.1E-08	3.1E-07	1.1E-07	4.6E-07	6.5E-07	2.8E-06
Fluorene	2.8E-06	3.2E-08	1.4E-07	2.7E-09	1.2E-08	9.9E-09	4.3E-08	4.0E-10	1.7E-09	1.4E-09	6.0E-09	3.3E-10	1.4E-09	6.7E-10	2.9E-09	3.3E-10	1.4E-09	1.6E-10	7.2E-10	2.5E-10	1.1E-09	1.5E-09	6.6E-09
Formaldehyde	7.5E-02	8.7E-04	3.8E-03	7.1E-05	3.1E-04	2.6E-04	1.2E-03	1.1E-05	4.6E-05	3.7E-05	1.6E-04	8.8E-06	3.9E-05	1.8E-05	7.9E-05	8.8E-06	3.9E-05	4.4E-06	1.9E-05	6.6E-06	2.9E-05	4.0E-05	1.8E-04
Hexane	1.8E+00	2.1E-02	9.1E-02	1.7E-03	7.5E-03	6.3E-03	2.8E-02	2.5E-04	1.1E-03	8.8E-04	3.9E-03	2.1E-04	9.3E-04	4.3E-04	1.9E-03	2.1E-04	9.3E-04	1.1E-04	4.6E-04	1.6E-04	7.0E-04	9.7E-04	4.3E-03
Manganese	3.8E-04	4.4E-06	1.9E-05	3.6E-07	1.6E-06	1.3E-06	5.9E-06	5.4E-08	2.3E-07	1.9E-07	8.2E-07	4.5E-08	2.0E-07	9.1E-08	4.0E-07	4.5E-08	2.0E-07	2.2E-08	9.8E-08	3.4E-08	1.5E-07	2.0E-07	9.0E-07
Mercury	2.6E-04	3.0E-06	1.3E-05	2.5E-07	1.1E-06	9.2E-07	4.0E-06	3.7E-08	1.6E-07	1.3E-07	5.6E-07	3.1E-08	1.3E-07	6.2E-08	2.7E-07	3.1E-08	1.3E-07	1.5E-08	6.7E-08	2.3E-08	1.0E-07	1.4E-07	6.1E-07
Molybdenum	1.1E-03	1.3E-05	5.6E-05	1.0E-06	4.6E-06	3.9E-06	1.7E-05	1.6E-07	6.8E-07	5.4E-07	2.4E-06	1.3E-07	5.7E-07	2.6E-07	1.2E-06	1.3E-07	5.7E-07	6.5E-08	2.8E-07	9.7E-08	4.3E-07	5.9E-07	2.6E-06
Naphthalene	6.1E-04	7.1E-06	3.1E-05	5.8E-07	2.5E-06	2.2E-06	9.4E-06	8.6E-08	3.8E-07	3.0E-07	1.3E-06	7.2E-08	3.1E-07	1.5E-07	6.4E-07	7.2E-08	3.1E-07	3.6E-08	1.6E-07	5.4E-08	2.4E-07	3.3E-07	1.4E-06
Nickel	2.1E-03	2.4E-05	1.1E-04	2.0E-06	8.8E-06	7.4E-06	3.2E-05	3.0E-07	1.3E-06	1.0E-06	4.5E-06	2.5E-07	1.1E-06	5.0E-07	2.2E-06	2.5E-07	1.1E-06	1.2E-07	5.4E-07	1.9E-07	8.1E-07	1.1E-06	5.0E-06
Pentane	2.6E+00	3.0E-02	1.3E-01	2.5E-03	1.1E-02	9.2E-03	4.0E-02	3.7E-04	1.6E-03	1.3E-03	5.6E-03	3.1E-04	1.3E-03	6.2E-04	2.7E-03	3.1E-04	1.3E-03	1.5E-04	6.7E-04	2.3E-04	1.0E-03	1.4E-03	6.1E-03
Phenanthrene	1.7E-05	2.0E-07	8.6E-07	1.6E-08	7.1E-08	6.0E-08	2.6E-07	2.4E-09	1.1E-08	8.3E-09	3.7E-08	2.0E-09	8.8E-09	4.1E-09	1.8E-08	2.0E-09	8.8E-09	1.0E-09	4.4E-09	1.5E-09	6.6E-09	9.2E-09	4.0E-08
Selenium	2.4E-05	2.8E-07	1.2E-06	2.3E-08	1.0E-07	8.5E-08	3.7E-07	3.4E-09	1.5E-08	1.2E-08	5.2E-08	2.8E-09	1.2E-08	5.7E-09	2.5E-08	2.8E-09	1.2E-08	1.4E-09	6.2E-09	2.1E-09	9.3E-09	1.3E-08	5.7E-08
Toluene	3.4E-03	3.9E-05	1.7E-04	3.2E-06	1.4E-05	1.2E-05	5.3E-05	4.8E-07	2.1E-06	1.7E-06	7.3E-06	4.0E-07	1.8E-06	8.1E-07	3.6E-06	4.0E-07	1.8E-06	2.0E-07	8.8E-07	3.0E-07	1.3E-06	1.8E-06	8.0E-06
Vanadium	2.3E-03	2.7E-05	1.2E-04	2.2E-06	9.6E-06	8.1E-06	3.6E-05	3.2E-07	1.4E-06	1.1E-06	4.9E-06	2.7E-07	1.2E-06	5.5E-07	2.4E-06	2.7E-07	1.2E-06	1.4E-07	5.9E-07	2.0E-07	8.9E-07	1.2E-06	5.4E-06
Zinc	2.9E-02	3.4E-04	1.5E-03	2.8E-05	1.2E-04	1.0E-04	4.5E-04	4.1E-06	1.8E-05	1.4E-05	6.2E-05	3.4E-06	1.5E-05	6.9E-06	3.0E-05	3.4E-06	1.5E-05	1.7E-06	7.5E-06	2.6E-06	1.1E-05	1.6E-05	6.8E-05
Other HAPs				*Other Hazardous Air Pollutants Emissions*																			
	Emissions Factors[2] (lb/MMscf)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)
7,12-Dimethylbenz(a)anthracene	1.6E-05	1.9E-07	8.1E-07	1.5E-08	6.7E-08	5.6E-08	2.5E-07	2.2E-09	9.9E-09	7.8E-09	3.4E-08	1.9E-09	8.2E-09	3.8E-09	1.7E-08	1.9E-09	8.2E-09	9.4E-10	4.1E-09	1.4E-09	6.2E-09	8.6E-09	3.8E-08
Acenaphthene	1.8E-06	2.1E-08	9.1E-08	1.7E-09	7.5E-09	6.3E-09	2.8E-08	2.5E-10	1.1E-09	8.8E-10	3.9E-09	2.1E-10	9.3E-10	4.3E-10	1.9E-09	2.1E-10	9.3E-10	1.1E-10	4.6E-10	1.6E-10	7.0E-10	9.7E-10	4.3E-09
Acenaphthylene	1.8E-06	2.1E-08	9.1E-08	1.7E-09	7.5E-09	6.3E-09	2.8E-08	2.5E-10	1.1E-09	8.8E-10	3.9E-09	2.1E-10	9.3E-10	4.3E-10	1.9E-09	2.1E-10	9.3E-10	1.1E-10	4.6E-10	1.6E-10	7.0E-10	9.7E-10	4.3E-09
Anthracene	2.4E-06	2.8E-08	1.2E-07	2.3E-09	1.0E-08	8.5E-09	3.7E-08	3.4E-10	1.5E-09	1.2E-09	5.2E-09	2.8E-10	1.2E-09	5.7E-10	2.5E-09	2.8E-10	1.2E-09	1.4E-10	6.2E-10	2.1E-10	9.3E-10	1.3E-09	5.7E-09
Benz(a)anthracene	1.8E-06	2.1E-08	9.1E-08	1.7E-09	7.5E-09	6.3E-09	2.8E-08	2.5E-10	1.1E-09	8.8E-10	3.9E-09	2.1E-10	9.3E-10	4.3E-10	1.9E-09	2.1E-10	9.3E-10	1.1E-10	4.6E-10	1.6E-10	7.0E-10	9.7E-10	4.3E-09
Benzo(b)fluoranthene	1.8E-06	2.1E-08	9.1E-08	1.7E-09	7.5E-09	6.3E-09	2.8E-08	2.5E-10	1.1E-09	8.8E-10	3.9E-09	2.1E-10	9.3E-10	4.3E-10	1.9E-09	2.1E-10	9.3E-10	1.1E-10	4.6E-10	1.6E-10	7.0E-10	9.7E-10	4.3E-09
Benzo(g,h,i)perylene	1.2E-06	1.4E-08	6.1E-08	1.1E-09	5.0E-09	4.2E-09	1.9E-08	1.7E-10	7.4E-10	5.9E-10	2.6E-09	1.4E-10	6.2E-10	2.9E-10	1.3E-09	1.4E-10	6.2E-10	7.1E-11	3.1E-10	1.1E-10	4.6E-10	6.5E-10	2.8E-09
Benzo(k)fluoranthene	1.8E-06	2.1E-08	9.1E-08	1.7E-09	7.5E-09	6.3E-09	2.8E-08	2.5E-10	1.1E-09	8.8E-10	3.9E-09	2.1E-10	9.3E-10	4.3E-10	1.9E-09	2.1E-10	9.3E-10	1.1E-10	4.6E-10	1.6E-10	7.0E-10	9.7E-10	4.3E-09
Chrysene	1.8E-06	2.1E-08	9.1E-08	1.7E-09	7.5E-09	6.3E-09	2.8E-08	2.5E-10	1.1E-09	8.8E-10	3.9E-09	2.1E-10	9.3E-10	4.3E-10	1.9E-09	2.1E-10	9.3E-10	1.1E-10	4.6E-10	1.6E-10	7.0E-10	9.7E-10	4.3E-09
Dibenzo(a,h)anthracene	1.2E-06	1.4E-08	6.1E-08	1.1E-09	5.0E-09	4.2E-09	1.9E-08	1.7E-10	7.4E-10	5.9E-10	2.6E-09	1.4E-10	6.2E-10	2.9E-10	1.3E-09	1.4E-10	6.2E-10	7.1E-11	3.1E-10	1.1E-10	4.6E-10	6.5E-10	2.8E-09
Fluoranthene	3.0E-06	3.5E-08	1.5E-07	2.9E-09	1.3E-08	1.1E-08	4.6E-08	4.2E-10	1.9E-09	1.5E-09	6.4E-09	3.5E-10	1.5E-09	7.2E-10	3.1E-09	3.5E-10	1.5E-09	1.8E-10	7.7E-10	2.6E-10	1.2E-09	1.6E-09	7.1E-09
Indeno(1,2,3-cd)pyrene	1.8E-06	2.1E-08	9.1E-08	1.7E-09	7.5E-09	6.3E-09	2.8E-08	2.5E-10	1.1E-09	8.8E-10	3.9E-09	2.1E-10	9.3E-10	4.3E-10	1.9E-09	2.1E-10	9.3E-10	1.1E-10	4.6E-10	1.6E-10	7.0E-10	9.7E-10	4.3E-09
Pyrene	5.0E-06	5.8E-08	2.5E-07	4.8E-09	2.1E-08	1.8E-08	7.7E-08	7.1E-10	3.1E-09	2.5E-09	1.1E-08	5.9E-10	2.6E-09	1.2E-09	5.2E-09	5.9E-10	2.6E-09	2.9E-10	1.3E-09	4.4E-10	1.9E-09	2.7E-09	1.2E-08

Reference Values		
Heat content of natural gas	1,020	BTU/scf

Notes

1 Emissions factors for natural gas obtained from AP-42 Chapter 1.4. Factors were multiplied by the heat content to convert to lb/MMBtu basis.

2 Emissions factors obtained from AP-42 Chapter 1.4 and calculate emissions from natural gas combustion for all heaters

3 Heat content of natural gas obtained from AP-42 Table 1.5-1

Table C-6. Darigold Emission Unit Calculations - Roof and Ceiling Mounted Heaters (Page 2 of 3)

Equipment ID		Total Heater Emissions		RMAU11		RMAU12		RMAU13		RMAU20		RTU1		RTU1A		RTU1B		RTU1C		RTU2		RTU3	
Fuel				Natural Gas		Natural Gas		Natural Gas		Natural Gas		Natural Gas		Natural Gas		Natural Gas		Natural Gas		Natural Gas		Natural Gas	
Heat Input (MMBTU/hr)				0.55		0.11		0.11		0.09		0.20		0.12		0.25		1.20		0.80		0.13	
Criteria Pollutants				*Criteria Pollutants Emissions*																			
	Emissions Factors[1] (lb/MMBTU) Natural Gas	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)
PM_{10}	7.45E-03	0.09	0.39	0.004	1.8E-02	0.001	3.7E-03	0.001	3.7E-03	0.001	2.9E-03	0.001	6.5E-03	0.001	3.9E-03	0.002	8.2E-03	0.009	3.9E-02	0.006	2.6E-02	0.001	4.2E-03
$PM_{2.5}$	7.45E-03	0.09	0.39	0.004	1.8E-02	0.001	3.7E-03	0.001	3.7E-03	0.001	2.9E-03	0.001	6.5E-03	0.001	3.9E-03	0.002	8.2E-03	0.009	3.9E-02	0.006	2.6E-02	0.001	4.2E-03
SO_2	5.88E-04	0.01	0.03	0.0003	1.4E-03	0.0001	2.9E-04	0.0001	2.9E-04	0.0001	2.3E-04	0.0001	5.2E-04	0.0001	3.1E-04	0.0001	6.4E-04	0.0007	3.1E-03	0.0005	2.1E-03	0.0001	3.3E-04
NO_x	9.80E-02	1.16	5.08	0.05	2.4E-01	0.01	4.8E-02	0.01	4.8E-02	0.01	3.9E-02	0.02	8.6E-02	0.01	5.2E-02	0.02	1.1E-01	0.12	5.2E-01	0.08	3.4E-01	0.01	5.6E-02
CO	8.24E-02	0.97	4.26	0.05	2.0E-01	0.01	4.1E-02	0.01	4.1E-02	0.01	3.2E-02	0.02	7.2E-02	0.01	4.3E-02	0.02	9.0E-02	0.10	4.3E-01	0.07	2.9E-01	0.01	4.7E-02
VOC	5.39E-03	0.06	0.28	0.00	1.3E-02	0.00	2.7E-03	0.00	2.7E-03	0.00	2.1E-03	0.00	4.7E-03	0.00	2.8E-03	0.00	5.9E-03	0.01	2.8E-02	0.00	1.9E-02	0.00	3.1E-03
H_2S	-	-	-																				
Lead	4.90E-07	5.8E-06	2.5E-05	2.7E-07	1.2E-06	5.51E-08	2.4E-07	5.51E-08	2.4E-07	4.41E-08	1.9E-07	9.8E-08	4.3E-07	5.88E-08	2.6E-07	1.23E-07	5.4E-07	5.88E-07	2.6E-06	3.92E-07	1.7E-06	6.37E-08	2.8E-07
Greenhouse Gasses				*Greenhouse Gas Emissions*																			
	Emissions Factors[1] (lb/MMBTU) Natural Gas	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)
CO_2	1.18E+02	1391	6091	65	2.8E+02	13.2353	5.8E+01	13.2353	5.8E+01	10.5882	4.6E+01	23.5294	1.0E+02	14.1176	6.2E+01	29.4118	1.3E+02	141.1765	6.2E+02	94.1176	4.1E+02	15.2941	6.7E+01
NH_4	2.25E-03	0.03	0.12	0.0012	5.4E-03	0.0003	1.1E-03	0.0003	1.1E-03	0.0002	8.9E-04	0.0005	2.0E-03	0.0003	1.2E-03	0.0006	2.5E-03	0.0027	1.2E-02	0.0018	7.9E-03	0.0003	1.3E-03
N_2O	2.16E-03	0.03	0.11	0.0012	5.2E-03	0.0002	1.1E-03	0.0002	1.1E-03	0.0002	8.5E-04	0.0004	1.9E-03	0.0003	1.1E-03	0.0005	2.4E-03	0.0026	1.1E-02	0.0017	7.6E-03	0.0003	1.2E-03
CO_2e[4]	-	1398.99	6127.59	65.0904	2.9E+02	13.3139	5.8E+01	13.3139	5.8E+01	10.6512	4.7E+01	23.6692	1.0E+02	14.2015	6.2E+01	29.5865	1.3E+02	142.0154	6.2E+02	94.6769	4.1E+02	15.3850	6.7E+01
TAPs				*Toxic Air Pollutants Emissions*																			
	Emissions Factors[2] (lb/MMscf)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)
2-Methylnaphthalene	2.4E-05	2.8E-07	1.2E-06	1.3E-08	5.7E-08	2.6E-09	1.2E-08	2.6E-09	1.2E-08	2.1E-09	9.3E-09	4.7E-09	2.1E-08	2.8E-09	1.2E-08	5.9E-09	2.6E-08	2.8E-08	1.2E-07	1.9E-08	8.2E-08	3.1E-09	1.3E-08
3-Methylcholanthrene	1.8E-06	2.1E-08	9.1E-08	9.7E-10	4.3E-09	2.0E-10	8.7E-10	2.0E-10	8.7E-10	1.6E-10	7.0E-10	3.5E-10	1.5E-09	2.1E-10	9.3E-10	4.4E-10	1.9E-09	2.1E-09	9.3E-09	1.4E-09	6.2E-09	2.3E-10	1.0E-09
Arsenic	2.0E-04	2.3E-06	1.0E-05	1.1E-07	4.7E-07	2.2E-08	9.7E-08	2.2E-08	9.7E-08	1.8E-08	7.7E-08	3.9E-08	1.7E-07	2.4E-08	1.0E-07	4.9E-08	2.1E-07	2.4E-07	1.0E-06	1.6E-07	6.9E-07	2.5E-08	1.1E-07
Barium	4.4E-03	5.1E-05	2.2E-04	2.4E-06	1.0E-05	4.9E-07	2.1E-06	4.9E-07	2.1E-06	3.9E-07	1.7E-06	8.6E-07	3.8E-06	5.2E-07	2.3E-06	1.1E-06	4.7E-06	5.2E-06	2.3E-05	3.5E-06	1.5E-05	5.6E-07	2.5E-06
Benzene	2.1E-03	2.4E-05	1.1E-04	1.1E-06	5.0E-06	2.3E-07	1.0E-06	2.3E-07	1.0E-06	1.9E-07	8.1E-07	4.1E-07	1.8E-06	2.5E-07	1.1E-06	5.1E-07	2.3E-06	2.5E-06	1.1E-05	1.6E-06	7.2E-06	2.7E-07	1.2E-06
Benzo(a)pyrene	1.2E-06	1.4E-08	6.1E-08	6.5E-10	2.8E-09	1.3E-10	5.8E-10	1.3E-10	5.8E-10	1.1E-10	4.6E-10	2.4E-10	1.0E-09	1.4E-10	6.2E-10	2.9E-10	1.3E-09	1.4E-09	6.2E-09	9.4E-10	4.1E-09	1.5E-10	6.7E-10
Beryllium	1.2E-05	1.4E-07	6.1E-07	6.5E-09	2.8E-08	1.3E-09	5.8E-09	1.3E-09	5.8E-09	1.1E-09	4.6E-09	2.4E-09	1.0E-08	1.4E-09	6.2E-09	2.9E-09	1.3E-08	1.4E-08	6.2E-08	9.4E-09	4.1E-08	1.5E-09	6.7E-09
Cadmium	1.1E-03	1.3E-05	5.6E-05	5.9E-07	2.6E-06	1.2E-07	5.3E-07	1.2E-07	5.3E-07	9.7E-08	4.3E-07	2.2E-07	9.4E-07	1.3E-07	5.7E-07	2.7E-07	1.2E-06	1.3E-06	5.7E-06	8.6E-07	3.8E-06	1.4E-07	6.1E-07
Chromium	1.4E-03	1.6E-05	7.1E-05	7.5E-07	3.3E-06	1.5E-07	6.8E-07	1.5E-07	6.8E-07	1.2E-07	5.4E-07	2.7E-07	1.2E-06	1.6E-07	7.2E-07	3.4E-07	1.5E-06	1.6E-06	7.2E-06	1.1E-06	4.8E-06	1.8E-07	7.8E-07
Cobalt	8.4E-05	9.7E-07	4.3E-06	4.5E-08	2.0E-07	9.3E-09	4.1E-08	9.3E-09	4.1E-08	7.4E-09	3.2E-08	1.6E-08	7.2E-08	9.9E-09	4.3E-08	2.1E-08	9.0E-08	9.9E-08	4.3E-07	6.6E-08	2.9E-07	1.1E-08	4.7E-08
Copper	8.5E-04	9.9E-06	4.3E-05	4.6E-07	2.0E-06	9.4E-08	4.1E-07	9.4E-08	4.1E-07	7.5E-08	3.3E-07	1.7E-07	7.3E-07	1.0E-07	4.4E-07	2.1E-07	9.1E-07	1.0E-06	4.4E-06	6.7E-07	2.9E-06	1.1E-07	4.7E-07
Dichlorobenzene	1.2E-03	1.4E-05	6.1E-05	6.5E-07	2.8E-06	1.3E-07	5.8E-07	1.3E-07	5.8E-07	1.1E-07	4.6E-07	2.4E-07	1.0E-06	1.4E-07	6.2E-07	2.9E-07	1.3E-06	1.4E-06	6.2E-06	9.4E-07	4.1E-06	1.5E-07	6.7E-07
Fluorene	2.8E-06	3.2E-08	1.4E-07	1.5E-09	6.6E-09	3.1E-10	1.4E-09	3.1E-10	1.4E-09	2.5E-10	1.1E-09	5.5E-10	2.4E-09	3.3E-10	1.4E-09	6.9E-10	3.0E-09	3.3E-09	1.4E-08	2.2E-09	9.6E-09	3.6E-10	1.6E-09
Formaldehyde	7.5E-02	8.7E-04	3.8E-03	4.0E-05	1.8E-04	8.3E-06	3.6E-05	8.3E-06	3.6E-05	6.6E-06	2.9E-05	1.5E-05	6.4E-05	8.8E-06	3.9E-05	1.8E-05	8.1E-05	8.8E-05	3.9E-04	5.9E-05	2.6E-04	9.6E-06	4.2E-05
Hexane	1.8E+00	2.1E-02	9.1E-02	9.7E-04	4.3E-03	2.0E-04	8.7E-04	2.0E-04	8.7E-04	1.6E-04	7.0E-04	3.5E-04	1.5E-03	2.1E-04	9.3E-04	4.4E-04	1.9E-03	2.1E-03	9.3E-03	1.4E-03	6.2E-03	2.3E-04	1.0E-03
Manganese	3.8E-04	4.4E-06	1.9E-05	2.0E-07	9.0E-07	4.2E-08	1.8E-07	4.2E-08	1.8E-07	3.4E-08	1.5E-07	7.5E-08	3.3E-07	4.5E-08	2.0E-07	9.3E-08	4.1E-07	4.5E-07	2.0E-06	3.0E-07	1.3E-06	4.8E-08	2.1E-07
Mercury	2.6E-04	3.0E-06	1.3E-05	1.4E-07	6.1E-07	2.9E-08	1.3E-07	2.9E-08	1.3E-07	2.3E-08	1.0E-07	5.1E-08	2.2E-07	3.1E-08	1.3E-07	6.4E-08	2.8E-07	3.1E-07	1.3E-06	2.0E-07	8.9E-07	3.3E-08	1.5E-07
Molybdenum	1.1E-03	1.3E-05	5.6E-05	5.9E-07	2.6E-06	1.2E-07	5.3E-07	1.2E-07	5.3E-07	9.7E-08	4.3E-07	2.2E-07	9.4E-07	1.3E-07	5.7E-07	2.7E-07	1.2E-06	1.3E-06	5.7E-06	8.6E-07	3.8E-06	1.4E-07	6.1E-07
Naphthalene	6.1E-04	7.1E-06	3.1E-05	3.3E-07	1.4E-06	6.7E-08	2.9E-07	6.7E-08	2.9E-07	5.4E-08	2.4E-07	1.2E-07	5.2E-07	7.2E-08	3.1E-07	1.5E-07	6.5E-07	7.2E-07	3.1E-06	4.8E-07	2.1E-06	7.8E-08	3.4E-07
Nickel	2.1E-03	2.4E-05	1.1E-04	1.1E-06	5.0E-06	2.3E-07	1.0E-06	2.3E-07	1.0E-06	1.9E-07	8.1E-07	4.1E-07	1.8E-06	2.5E-07	1.1E-06	5.1E-07	2.3E-06	2.5E-06	1.1E-05	1.6E-06	7.2E-06	2.7E-07	1.2E-06
Pentane	2.6E+00	3.0E-02	1.3E-01	1.4E-03	6.1E-03	2.9E-04	1.3E-03	2.9E-04	1.3E-03	2.3E-04	1.0E-03	5.1E-04	2.2E-03	3.1E-04	1.3E-03	6.4E-04	2.8E-03	3.1E-03	1.3E-02	2.0E-03	8.9E-03	3.3E-04	1.5E-03
Phenanthrene	1.7E-05	2.0E-07	8.6E-07	9.2E-09	4.0E-08	1.9E-09	8.2E-09	1.9E-09	8.2E-09	1.5E-09	6.6E-09	3.3E-09	1.5E-08	2.0E-09	8.8E-09	4.2E-09	1.8E-08	2.0E-08	8.8E-08	1.3E-08	5.8E-08	2.2E-09	9.5E-09
Selenium	2.4E-05	2.8E-07	1.2E-06	1.3E-08	5.7E-08	2.6E-09	1.2E-08	2.6E-09	1.2E-08	2.1E-09	9.3E-09	4.7E-09	2.1E-08	2.8E-09	1.2E-08	5.9E-09	2.6E-08	2.8E-08	1.2E-07	1.9E-08	8.2E-08	3.1E-09	1.3E-08
Toluene	3.4E-03	3.9E-05	1.7E-04	1.8E-06	8.0E-06	3.8E-07	1.6E-06	3.8E-07	1.6E-06	3.0E-07	1.3E-06	6.7E-07	2.9E-06	4.0E-07	1.8E-06	8.3E-07	3.7E-06	4.0E-06	1.8E-05	2.7E-06	1.2E-05	4.3E-07	1.9E-06
Vanadium	2.3E-03	2.7E-05	1.2E-04	1.2E-06	5.4E-06	2.5E-07	1.1E-06	2.5E-07	1.1E-06	2.0E-07	8.9E-07	4.5E-07	2.0E-06	2.7E-07	1.2E-06	5.6E-07	2.5E-06	2.7E-06	1.2E-05	1.8E-06	7.9E-06	2.9E-07	1.3E-06
Zinc	2.9E-02	3.4E-04	1.5E-03	1.6E-05	6.8E-05	3.2E-06	1.4E-05	3.2E-06	1.4E-05	2.6E-06	1.1E-05	5.7E-06	2.5E-05	3.4E-06	1.5E-05	7.1E-06	3.1E-05	3.4E-05	1.5E-04	2.3E-05	1.0E-04	3.7E-06	1.6E-05
Other HAPs				*Other Hazardous Air Pollutants Emissions*																			
	Emissions Factors[2] (lb/MMscf)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)
7,12-Dimethylbenz(a)anthracene	1.6E-05	1.9E-07	8.1E-07	8.6E-09	3.8E-08	1.8E-09	7.7E-09	1.8E-09	7.7E-09	1.4E-09	6.2E-09	3.1E-09	1.4E-08	1.9E-09	8.2E-09	3.9E-09	1.7E-08	1.9E-08	8.2E-08	1.3E-08	5.5E-08	2.0E-09	8.9E-09
Acenaphthene	1.8E-06	2.1E-08	9.1E-08	9.7E-10	4.3E-09	2.0E-10	8.7E-10	2.0E-10	8.7E-10	1.6E-10	7.0E-10	3.5E-10	1.5E-09	2.1E-10	9.3E-10	4.4E-10	1.9E-09	2.1E-09	9.3E-09	1.4E-09	6.2E-09	2.3E-10	1.0E-09
Acenaphthylene	1.8E-06	2.1E-08	9.1E-08	9.7E-10	4.3E-09	2.0E-10	8.7E-10	2.0E-10	8.7E-10	1.6E-10	7.0E-10	3.5E-10	1.5E-09	2.1E-10	9.3E-10	4.4E-10	1.9E-09	2.1E-09	9.3E-09	1.4E-09	6.2E-09	2.3E-10	1.0E-09
Anthracene	2.4E-06	2.8E-08	1.2E-07	1.3E-09	5.7E-09	2.6E-10	1.2E-09	2.6E-10	1.2E-09	2.1E-10	9.3E-10	4.7E-10	2.1E-09	2.8E-10	1.2E-09	5.9E-10	2.6E-09	2.8E-09	1.2E-08	1.9E-09	8.2E-09	3.1E-10	1.3E-09
Benz(a)anthracene	1.8E-06	2.1E-08	9.1E-08	9.7E-10	4.3E-09	2.0E-10	8.7E-10	2.0E-10	8.7E-10	1.6E-10	7.0E-10	3.5E-10	1.5E-09	2.1E-10	9.3E-10	4.4E-10	1.9E-09	2.1E-09	9.3E-09	1.4E-09	6.2E-09	2.3E-10	1.0E-09
Benzo(b)fluoranthene	1.8E-06	2.1E-08	9.1E-08	9.7E-10	4.3E-09	2.0E-10	8.7E-10	2.0E-10	8.7E-10	1.6E-10	7.0E-10	3.5E-10	1.5E-09	2.1E-10	9.3E-10	4.4E-10	1.9E-09	2.1E-09	9.3E-09	1.4E-09	6.2E-09	2.3E-10	1.0E-09
Benzo(g,h,i)perylene	1.2E-06	1.4E-08	6.1E-08	6.5E-10	2.8E-09	1.3E-10	5.8E-10	1.3E-10	5.8E-10	1.1E-10	4.6E-10	2.4E-10	1.0E-09	1.4E-10	6.2E-10	2.9E-10	1.3E-09	1.4E-09	6.2E-09	9.4E-10	4.1E-09	1.5E-10	6.7E-10
Benzo(k)fluoranthene	1.8E-06	2.1E-08	9.1E-08	9.7E-10	4.3E-09	2.0E-10	8.7E-10	2.0E-10	8.7E-10	1.6E-10	7.0E-10	3.5E-10	1.5E-09	2.1E-10	9.3E-10	4.4E-10	1.9E-09	2.1E-09	9.3E-09	1.4E-09	6.2E-09	2.3E-10	1.0E-09
Chrysene	1.8E-06	2.1E-08	9.1E-08	9.7E-10	4.3E-09	2.0E-10	8.7E-10	2.0E-10	8.7E-10	1.6E-10	7.0E-10	3.5E-10	1.5E-09	2.1E-10	9.3E-10	4.4E-10	1.9E-09	2.1E-09	9.3E-09	1.4E-09	6.2E-09	2.3E-10	1.0E-09
Dibenzo(a,h)anthracene	1.2E-06	1.4E-08	6.1E-08	6.5E-10	2.8E-09	1.3E-10	5.8E-10	1.3E-10	5.8E-10	1.1E-10	4.6E-10	2.4E-10	1.0E-09	1.4E-10	6.2E-10	2.9E-10	1.3E-09	1.4E-09	6.2E-09	9.4E-10	4.1E-09	1.5E-10	6.7E-10
Fluoranthene	3.0E-06	3.5E-08	1.5E-07	1.6E-09	7.1E-09	3.3E-10	1.4E-09	3.3E-10	1.4E-09	2.6E-10	1.2E-09	5.9E-10	2.6E-09	3.5E-10	1.5E-09	7.4E-10	3.2E-09	3.5E-09	1.5E-08	2.4E-09	1.0E-08	3.8E-10	1.7E-09
Indeno(1,2,3-cd)pyrene	1.8E-06	2.1E-08	9.1E-08	9.7E-10	4.3E-09	2.0E-10	8.7E-10	2.0E-10	8.7E-10	1.6E-10	7.0E-10	3.5E-10	1.5E-09	2.1E-10	9.3E-10	4.4E-10	1.9E-09	2.1E-09	9.3E-09	1.4E-09	6.2E-09	2.3E-10	1.0E-09
Pyrene	5.0E-06	5.8E-08	2.5E-07	2.7E-09	1.2E-08	5.5E-10	2.4E-09	5.5E-10	2.4E-09	4.4E-10	1.9E-09	9.8E-10	4.3E-09	5.9E-10	2.6E-09	1.2E-09	5.4E-09	5.9E-09	2.6E-08	3.9E-09	1.7E-08	6.4E-10	2.8E-09

Reference Values		
Heat content of natural gas	1,020	BTU/scf

Notes

1 Emissions factors for natural gas obtained from AP-42 Chapter 1.4. Factors were multiplied by the heat content to convert to lb/MMBtu basis.

2 Emissions factors obtained from AP-42 Chapter 1.4 and calculate emissions from natural gas combustion for all heaters

3 Heat content of natural gas obtained from AP-42 Table 1.5-1

Table C-6. Darigold Emission Unit Calculations - Roof and Ceiling Mounted Heaters (Page 3 of 3)

Equipment ID		Total Heater Emissions		CMAU1		CMAU2		CMAU3		CMAU4		CMAU5		CMAU6		CMAU7		MAU1	
Fuel				Natural Gas		Natural Gas		Natural Gas		Natural Gas		Natural Gas		Natural Gas		Natural Gas		Natural Gas	
Heat Input (MMBTU/hr)				0.20		0.20		0.10		0.10		0.10		0.10		0.40		0.66	
Criteria Pollutants				*Criteria Pollutants Emissions*															
	Emissions Factors[1] (lb/MMBTU) Natural Gas	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)
PM_{10}	7.45E-03	0.09	0.39	0.0015	6.5E-03	0.001	6.5E-03	0.001	3.3E-03	0.001	3.3E-03	0.001	3.3E-03	0.001	3.3E-03	0.003	1.3E-02	0.005	2.2E-02
$PM_{2.5}$	7.45E-03	0.09	0.39	0.001	6.5E-03	0.001	6.5E-03	0.001	3.3E-03	0.001	3.3E-03	0.001	3.3E-03	0.001	3.3E-03	0.003	1.3E-02	0.005	2.2E-02
SO_2	5.88E-04	0.01	0.03	0.0001	5.2E-04	0.0001	5.2E-04	0.0001	2.6E-04	0.0001	2.6E-04	0.0001	2.6E-04	0.0001	2.6E-04	0.0002	1.0E-03	0.0004	1.7E-03
NO_x	9.80E-02	1.16	5.08	0.02	8.6E-02	0.02	8.6E-02	0.01	4.3E-02	0.01	4.3E-02	0.01	4.3E-02	0.01	4.3E-02	0.04	1.7E-01	0.06	2.8E-01
CO	8.24E-02	0.97	4.26	0.02	7.2E-02	0.02	7.2E-02	0.01	3.6E-02	0.01	3.6E-02	0.01	3.6E-02	0.01	3.6E-02	0.03	1.4E-01	0.05	2.4E-01
VOC	5.39E-03	0.06	0.28	0.00	4.7E-03	0.00	4.7E-03	0.00	2.4E-03	0.00	2.4E-03	0.00	2.4E-03	0.00	2.4E-03	0.00	9.4E-03	0.01	1.6E-02
H_2S	-	-	-																
Lead	4.90E-07	5.8E-06	2.5E-05	9.8E-08	4.3E-07	9.8E-08	4.3E-07	4.9E-08	2.1E-07	4.9E-08	2.1E-07	4.9E-08	2.1E-07	4.9E-08	2.1E-07	1.96E-07	8.6E-07	3.24E-07	1.4E-06
Greenhouse Gasses				*Greenhouse Gas Emissions*															
	Emissions Factors[1] (lb/MMBTU) Natural Gas	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)
CO_2	1.18E+02	1391	6091	24	1.0E+02	23.5294	1.0E+02	11.7647	5.2E+01	11.7647	5.2E+01	11.7647	5.2E+01	11.7647	5.2E+01	47.0588	2.1E+02	77.6471	3.4E+02
NH_4	2.25E-03	0.03	0.12	0.0005	2.0E-03	0.0005	2.0E-03	0.0002	9.9E-04	0.0002	9.9E-04	0.0002	9.9E-04	0.0002	9.9E-04	0.0009	4.0E-03	0.0015	6.5E-03
N_2O	2.16E-03	0.03	0.11	0.0004	1.9E-03	0.0004	1.9E-03	0.0002	9.4E-04	0.0002	9.4E-04	0.0002	9.4E-04	0.0002	9.4E-04	0.0009	3.8E-03	0.0014	6.2E-03
CO_2e[4]	-	1398.99	6127.59	23.6692	1.0E+02	23.6692	1.0E+02	11.8346	5.2E+01	11.8346	5.2E+01	11.8346	5.2E+01	11.8346	5.2E+01	47.3385	2.1E+02	78.1085	3.4E+02
TAPs				*Toxic Air Pollutants Emissions*															
	Emissions Factors[2] (lb/MMscf)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)
2-Methylnaphthalene	2.4E-05	2.8E-07	1.2E-06	4.7E-09	2.1E-08	4.7E-09	2.1E-08	2.4E-09	1.0E-08	2.4E-09	1.0E-08	2.4E-09	1.0E-08	2.4E-09	1.0E-08	9.4E-09	4.1E-08	1.6E-08	6.8E-08
3-Methylcholanthrene	1.8E-06	2.1E-08	9.1E-08	3.5E-10	1.5E-09	3.5E-10	1.5E-09	1.8E-10	7.7E-10	1.8E-10	7.7E-10	1.8E-10	7.7E-10	1.8E-10	7.7E-10	7.1E-10	3.1E-09	1.2E-09	5.1E-09
Arsenic	2.0E-04	2.3E-06	1.0E-05	3.9E-08	1.7E-07	3.9E-08	1.7E-07	2.0E-08	8.6E-08	2.0E-08	8.6E-08	2.0E-08	8.6E-08	2.0E-08	8.6E-08	7.8E-08	3.4E-07	1.3E-07	5.7E-07
Barium	4.4E-03	5.1E-05	2.2E-04	8.6E-07	3.8E-06	8.6E-07	3.8E-06	4.3E-07	1.9E-06	4.3E-07	1.9E-06	4.3E-07	1.9E-06	4.3E-07	1.9E-06	1.7E-06	7.6E-06	2.8E-06	1.2E-05
Benzene	2.1E-03	2.4E-05	1.1E-04	4.1E-07	1.8E-06	4.1E-07	1.8E-06	2.1E-07	9.0E-07	2.1E-07	9.0E-07	2.1E-07	9.0E-07	2.1E-07	9.0E-07	8.2E-07	3.6E-06	1.4E-06	6.0E-06
Benzo(a)pyrene	1.2E-06	1.4E-08	6.1E-08	2.4E-10	1.0E-09	2.4E-10	1.0E-09	1.2E-10	5.2E-10	1.2E-10	5.2E-10	1.2E-10	5.2E-10	1.2E-10	5.2E-10	4.7E-10	2.1E-09	7.8E-10	3.4E-09
Beryllium	1.2E-05	1.4E-07	6.1E-07	2.4E-09	1.0E-08	2.4E-09	1.0E-08	1.2E-09	5.2E-09	1.2E-09	5.2E-09	1.2E-09	5.2E-09	1.2E-09	5.2E-09	4.7E-09	2.1E-08	7.8E-09	3.4E-08
Cadmium	1.1E-03	1.3E-05	5.6E-05	2.2E-07	9.4E-07	2.2E-07	9.4E-07	1.1E-07	4.7E-07	1.1E-07	4.7E-07	1.1E-07	4.7E-07	1.1E-07	4.7E-07	4.3E-07	1.9E-06	7.1E-07	3.1E-06
Chromium	1.4E-03	1.6E-05	7.1E-05	2.7E-07	1.2E-06	2.7E-07	1.2E-06	1.4E-07	6.0E-07	1.4E-07	6.0E-07	1.4E-07	6.0E-07	1.4E-07	6.0E-07	5.5E-07	2.4E-06	9.1E-07	4.0E-06
Cobalt	8.4E-05	9.7E-07	4.3E-06	1.6E-08	7.2E-08	1.6E-08	7.2E-08	8.2E-09	3.6E-08	8.2E-09	3.6E-08	8.2E-09	3.6E-08	8.2E-09	3.6E-08	3.3E-08	1.4E-07	5.4E-08	2.4E-07
Copper	8.5E-04	9.9E-06	4.3E-05	1.7E-07	7.3E-07	1.7E-07	7.3E-07	8.3E-08	3.7E-07	8.3E-08	3.7E-07	8.3E-08	3.7E-07	8.3E-08	3.7E-07	3.3E-07	1.5E-06	5.5E-07	2.4E-06
Dichlorobenzene	1.2E-03	1.4E-05	6.1E-05	2.4E-07	1.0E-06	2.4E-07	1.0E-06	1.2E-07	5.2E-07	1.2E-07	5.2E-07	1.2E-07	5.2E-07	1.2E-07	5.2E-07	4.7E-07	2.1E-06	7.8E-07	3.4E-06
Fluorene	2.8E-06	3.2E-08	1.4E-07	5.5E-10	2.4E-09	5.5E-10	2.4E-09	2.7E-10	1.2E-09	2.7E-10	1.2E-09	2.7E-10	1.2E-09	2.7E-10	1.2E-09	1.1E-09	4.8E-09	1.8E-09	7.9E-09
Formaldehyde	7.5E-02	8.7E-04	3.8E-03	1.5E-05	6.4E-05	1.5E-05	6.4E-05	7.4E-06	3.2E-05	7.4E-06	3.2E-05	7.4E-06	3.2E-05	7.4E-06	3.2E-05	2.9E-05	1.3E-04	4.9E-05	2.1E-04
Hexane	1.8E+00	2.1E-02	9.1E-02	3.5E-04	1.5E-03	3.5E-04	1.5E-03	1.8E-04	7.7E-04	1.8E-04	7.7E-04	1.8E-04	7.7E-04	1.8E-04	7.7E-04	7.1E-04	3.1E-03	1.2E-03	5.1E-03
Manganese	3.8E-04	4.4E-06	1.9E-05	7.5E-08	3.3E-07	7.5E-08	3.3E-07	3.7E-08	1.6E-07	3.7E-08	1.6E-07	3.7E-08	1.6E-07	3.7E-08	1.6E-07	1.5E-07	6.5E-07	2.5E-07	1.1E-06
Mercury	2.6E-04	3.0E-06	1.3E-05	5.1E-08	2.2E-07	5.1E-08	2.2E-07	2.5E-08	1.1E-07	2.5E-08	1.1E-07	2.5E-08	1.1E-07	2.5E-08	1.1E-07	1.0E-07	4.5E-07	1.7E-07	7.4E-07
Molybdenum	1.1E-03	1.3E-05	5.6E-05	2.2E-07	9.4E-07	2.2E-07	9.4E-07	1.1E-07	4.7E-07	1.1E-07	4.7E-07	1.1E-07	4.7E-07	1.1E-07	4.7E-07	4.3E-07	1.9E-06	7.1E-07	3.1E-06
Naphthalene	6.1E-04	7.1E-06	3.1E-05	1.2E-07	5.2E-07	1.2E-07	5.2E-07	6.0E-08	2.6E-07	6.0E-08	2.6E-07	6.0E-08	2.6E-07	6.0E-08	2.6E-07	2.4E-07	1.0E-06	3.9E-07	1.7E-06
Nickel	2.1E-03	2.4E-05	1.1E-04	4.1E-07	1.8E-06	4.1E-07	1.8E-06	2.1E-07	9.0E-07	2.1E-07	9.0E-07	2.1E-07	9.0E-07	2.1E-07	9.0E-07	8.2E-07	3.6E-06	1.4E-06	6.0E-06
Pentane	2.6E+00	3.0E-02	1.3E-01	5.1E-04	2.2E-03	5.1E-04	2.2E-03	2.5E-04	1.1E-03	2.5E-04	1.1E-03	2.5E-04	1.1E-03	2.5E-04	1.1E-03	1.0E-03	4.5E-03	1.7E-03	7.4E-03
Phenanthrene	1.7E-05	2.0E-07	8.6E-07	3.3E-09	1.5E-08	3.3E-09	1.5E-08	1.7E-09	7.3E-09	1.7E-09	7.3E-09	1.7E-09	7.3E-09	1.7E-09	7.3E-09	6.7E-09	2.9E-08	1.1E-08	4.8E-08
Selenium	2.4E-05	2.8E-07	1.2E-06	4.7E-09	2.1E-08	4.7E-09	2.1E-08	2.4E-09	1.0E-08	2.4E-09	1.0E-08	2.4E-09	1.0E-08	2.4E-09	1.0E-08	9.4E-09	4.1E-08	1.6E-08	6.8E-08
Toluene	3.4E-03	3.9E-05	1.7E-04	6.7E-07	2.9E-06	6.7E-07	2.9E-06	3.3E-07	1.5E-06	3.3E-07	1.5E-06	3.3E-07	1.5E-06	3.3E-07	1.5E-06	1.3E-06	5.8E-06	2.2E-06	9.6E-06
Vanadium	2.3E-03	2.7E-05	1.2E-04	4.5E-07	2.0E-06	4.5E-07	2.0E-06	2.3E-07	9.9E-07	2.3E-07	9.9E-07	2.3E-07	9.9E-07	2.3E-07	9.9E-07	9.0E-07	4.0E-06	1.5E-06	6.5E-06
Zinc	2.9E-02	3.4E-04	1.5E-03	5.7E-06	2.5E-05	5.7E-06	2.5E-05	2.8E-06	1.2E-05	2.8E-06	1.2E-05	2.8E-06	1.2E-05	2.8E-06	1.2E-05	1.1E-05	5.0E-05	1.9E-05	8.2E-05
Other HAPs				*Other Hazardous Air Pollutants Emissions*															
	Emissions Factors[2] (lb/MMscf)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)
7,12-Dimethylbenz(a)anthracene	1.6E-05	1.9E-07	8.1E-07	3.1E-09	1.4E-08	3.1E-09	1.4E-08	1.6E-09	6.9E-09	1.6E-09	6.9E-09	1.6E-09	6.9E-09	1.6E-09	6.9E-09	6.3E-09	2.7E-08	1.0E-08	4.5E-08
Acenaphthene	1.8E-06	2.1E-08	9.1E-08	3.5E-10	1.5E-09	3.5E-10	1.5E-09	1.8E-10	7.7E-10	1.8E-10	7.7E-10	1.8E-10	7.7E-10	1.8E-10	7.7E-10	7.1E-10	3.1E-09	1.2E-09	5.1E-09
Acenaphthylene	1.8E-06	2.1E-08	9.1E-08	3.5E-10	1.5E-09	3.5E-10	1.5E-09	1.8E-10	7.7E-10	1.8E-10	7.7E-10	1.8E-10	7.7E-10	1.8E-10	7.7E-10	7.1E-10	3.1E-09	1.2E-09	5.1E-09
Anthracene	2.4E-06	2.8E-08	1.2E-07	4.7E-10	2.1E-09	4.7E-10	2.1E-09	2.4E-10	1.0E-09	2.4E-10	1.0E-09	2.4E-10	1.0E-09	2.4E-10	1.0E-09	9.4E-10	4.1E-09	1.6E-09	6.8E-09
Benz(a)anthracene	1.8E-06	2.1E-08	9.1E-08	3.5E-10	1.5E-09	3.5E-10	1.5E-09	1.8E-10	7.7E-10	1.8E-10	7.7E-10	1.8E-10	7.7E-10	1.8E-10	7.7E-10	7.1E-10	3.1E-09	1.2E-09	5.1E-09
Benzo(b)fluoranthene	1.8E-06	2.1E-08	9.1E-08	3.5E-10	1.5E-09	3.5E-10	1.5E-09	1.8E-10	7.7E-10	1.8E-10	7.7E-10	1.8E-10	7.7E-10	1.8E-10	7.7E-10	7.1E-10	3.1E-09	1.2E-09	5.1E-09
Benzo(g,h,i)perylene	1.2E-06	1.4E-08	6.1E-08	2.4E-10	1.0E-09	2.4E-10	1.0E-09	1.2E-10	5.2E-10	1.2E-10	5.2E-10	1.2E-10	5.2E-10	1.2E-10	5.2E-10	4.7E-10	2.1E-09	7.8E-10	3.4E-09
Benzo(k)fluoranthene	1.8E-06	2.1E-08	9.1E-08	3.5E-10	1.5E-09	3.5E-10	1.5E-09	1.8E-10	7.7E-10	1.8E-10	7.7E-10	1.8E-10	7.7E-10	1.8E-10	7.7E-10	7.1E-10	3.1E-09	1.2E-09	5.1E-09
Chrysene	1.8E-06	2.1E-08	9.1E-08	3.5E-10	1.5E-09	3.5E-10	1.5E-09	1.8E-10	7.7E-10	1.8E-10	7.7E-10	1.8E-10	7.7E-10	1.8E-10	7.7E-10	7.1E-10	3.1E-09	1.2E-09	5.1E-09
Dibenzo(a,h)anthracene	1.2E-06	1.4E-08	6.1E-08	2.4E-10	1.0E-09	2.4E-10	1.0E-09	1.2E-10	5.2E-10	1.2E-10	5.2E-10	1.2E-10	5.2E-10	1.2E-10	5.2E-10	4.7E-10	2.1E-09	7.8E-10	3.4E-09
Fluoranthene	3.0E-06	3.5E-08	1.5E-07	5.9E-10	2.6E-09	5.9E-10	2.6E-09	2.9E-10	1.3E-09	2.9E-10	1.3E-09	2.9E-10	1.3E-09	2.9E-10	1.3E-09	1.2E-09	5.2E-09	1.9E-09	8.5E-09
Indeno(1,2,3-cd)pyrene	1.8E-06	2.1E-08	9.1E-08	3.5E-10	1.5E-09	3.5E-10	1.5E-09	1.8E-10	7.7E-10	1.8E-10	7.7E-10	1.8E-10	7.7E-10	1.8E-10	7.7E-10	7.1E-10	3.1E-09	1.2E-09	5.1E-09
Pyrene	5.0E-06	5.8E-08	2.5E-07	9.8E-10	4.3E-09	9.8E-10	4.3E-09	4.9E-10	2.1E-09	4.9E-10	2.1E-09	4.9E-10	2.1E-09	4.9E-10	2.1E-09	2.0E-09	8.6E-09	3.2E-09	1.4E-08

Reference Values		
Heat content of natural gas	1,020	BTU/scf

Notes

1 Emissions factors for natural gas obtained from AP-42 Chapter 1.4. Factors were multiplied by the heat content to convert to lb/MMBtu basis.

2 Emissions factors obtained from AP-42 Chapter 1.4 and calculate emissions from natural gas combustion for all heaters

3 Heat content of natural gas obtained from AP-42 Table 1.5-1

Table C-7. Darigold WWTP Biogas Emission Unit Calculations - Digester 1 and Flare Criteria Pollutants and GHG

	Pollutant	Raw Biogas[a] EF (lb/SCF)	Control Efficiency[b]	Uncombusted Biogas[c] EF (lb/scf)	Combustion Products[d] EF (lb/scf)	Uncontrolled Emissions		Controlled Emissions	
						(lb/hr)[e]	(tons/yr)[f]	(lb/hr)[g]	(tons/yr)[h]
Regulated Pollutants	PM10				9.47E-06			0.04	0.06
	PM2.5				9.47E-06			0.04	0.06
	SO_2 (hourly maximum)				4.49E-04			1.70	
	SO_2 (annual average)				3.28E-04				2.20
	NOx				3.83E-05			0.15	0.26
	CO				1.75E-04			0.66	1.17
	VOC	1.28E-07	97.7%	2.95E-09	7.88E-05	4.86E-04	8.58E-04	0.30	0.53
	H_2S (hourly maximum)	2.38E-04	97.7%	5.48E-06		0.90		0.02	
	H_2S (annual average)	1.74E-04	97.7%	4.01E-06			1.17		0.03
	Lead				5.0E-10			1.90E-06	3.35E-06
GHGs	CO_2				6.76E+01			256274	452750
	CH_4	2.32E-02			1.30E-03	88.01	155.48	4.91	8.68
	N_2O				1.24E-03			4.70	8.30
	CO_2e[d]					2200	3887	257797	455441

Notes:

a. EF Raw biogas VOC concentrations from *GTI Pipeline Quality: North American Guidance Document for Introduction of Dairy Waste Derived Biomethane into Existing Natural Gas Networks.* Conservatively assumed that all non-methane components of the biogas are VOC. H2S and CH4 concentration is site specific data from sampling in 2011. CH4 concentration = (55.7% methane in biogas)*(16.04 lb/mol methane)/(385 SCF/mol methane)

b. Control Efficiency (AP42 Table 2.4-3 (2008 draft) = **97.7%** **(Flare)**
Methane has no listed control efficiency because combustion products emissions factor accounts for any unburned methane.

c. EF Un-Combused Biogas = Raw Biogas x (1-Control Factor)

d. Emission Factor Source: AP-42 Table 13.5-1 and WebFIRE. See details in table below.

e. Uncontrolled Emissions (lb/hr) = EF Raw Biogas x Peak Hourly Biogas

f. Uncontrolled Emissions (tons/yr) = EF Raw Biogas x Average Hourly Biogas x 24 hr/day x 365 day/yr / 2000 lb/ton

g. Controlled Emissions (lb/hr) = (EF Uncombusted Biogas + EF Combust Products) x Peak Hourly Biogas

h. Controlled Emissions (tons/yr) = (EF Uncombusted Biogas + EF Combust Products) x Average Hourly Biogas x 24 hr/day x 365 day/yr / 2000 lb/ton

i. IDAPA 58.01.01.06.106

Assumptions

Peak Daily Biogas from Digester:	91,018	SCF/day	(Digester 1 Tank Capacity / Total Digester Capacity x Peak Biogas from Both Digesters Combined)
Peak Hourly Biogas from Digester:	3,792	SCF/hr	(Peak Daily Biogas from Digester / 24 hr/day)
Average Daily Biogas from Digester	36,712	SCF/day	(Digester 1 Tank Capacity / Total Digester Capacity x Average Biogas from Both Digesters Combined)
Average Hourly Biogas from Digester:	1,530	SCF/hr	(Average Daily Biogas from Digester / 24 hr/day)
Annual Gas Production from Digester:	13.40	MMSCF/year	(Average Daily Biogas from Digester x 365 day/yr / $1x10^6$ SCF/MMCF)

Air Dispersion Model Parameters

Stack height (m)	4.67[a]
Stack inside Diameter (m)	0.20
Stack exit velocity (m/s)	10.01
Stack gas temperature (°K)	1273[a]

[a] Stack height for flare is effective release hight calculated by SCREEN3. The stack gas temperature is the default value listed in the SCREEN3 Model User's Guide.

Pollutant	Emission Factor Calculation Details									
PM10	17	lb/MMscf CH4	x	0.557	CH4/biogas	=	9.47	lb/MMCF biogas	SCC: 50300601 WebFIRE
PM2.5	17	lb/MMscf CH4	x	0.557	CH4/biogas	=	9.47	lb/MMCF biogas	SCC: 50300601 WebFIRE
SO2	Refer to Stoichiometric conversion of H2S to SO2 in following worksheet								
NOx	6.8E-02	lb/MMBtu	x	5.6E-04	MMBtu/cf	=	3.8E-05	lb/cf	AP-42 Table 13.5-1
CO	0.31	lb/MMBtu	x	5.6E-04	MMBtu/cf	=	1.7E-04	lb/cf	AP-42 Table 13.5-1
VOC	0.14	lb/MMBtu	x	5.6E-04	MMBtu/cf	=	7.9E-05	lb/cf	AP-42 Table 13.5-1
CO_2	120000	lb/MMBtu	x	5.6E-04	MMBtu/cf	=	6.8E+01	lb/cf	AP-42 Table 1.4-2
CH_4	2.3	lb/MMBtu	x	5.6E-04	MMBtu/cf	=	1.3E-03	lb/cf	AP-42 Table 1.4-2
N_2O	2.2	lb/MMBtu	x	5.6E-04	MMBtu/cf	=	1.2E-03	lb/cf	AP-42 Table 1.4-2

Table C-8. Darigold WWTP Biogas Emission Unit Calculations - Digester 1 and Flare TAPs

Peak Hourly Biogas:	3,792 cf/hr
Average Hourly Biogas	1,530 cf/hr

			Uncontrolled (Digester Emissions)			Controlled (Flare Emissions)				
	CAS #	Pollutant	EF Raw Biogas[a] (lb/scf)	Uncontrolled Emissions[b,c] (lb/hr)	Uncontrolled Emissions[b,c] (ton/yr)	Control Efficiency[e]	EF Uncombusted Biogas[f] (lb/scf)	EF Combustion Products[g] (lb/scf)	Controlled Emissions[h,i] (lb/hr)	Controlled Emissions[h,i] (ton/yr)
Section 585 TAP	7440-39-3	Barium, soluble compounds, as Ba						2.43E-09	9.21E-06	1.63E-05
	108-90-7	Chlorobenzene	4.33E-10	1.64E-06	2.90E-06	97.7%	9.95E-12		3.77E-08	6.67E-08
	95-57-8	2-Chlorophenol (and all isomers) (ID)	3.51E-10	1.33E-06	2.35E-06	97.7%	8.06E-12		3.06E-08	5.40E-08
	7440-47-3	Chromium metal - Including:						7.73E-10	2.93E-06	5.18E-06
	7440-48-4	Cobalt metal, dust, and fume						4.64E-11	1.76E-07	3.11E-07
	7440-50-8	Copper -Fume						4.69E-10	1.78E-06	3.14E-06
	1319-77-3	Cresols/Cresylic Acid (isomers and mixtures)	5.05E-09	1.91E-05	3.38E-05	97.7%	1.16E-10		4.40E-07	7.78E-07
	98-82-8	Cumene	1.11E-09	4.21E-06	7.45E-06	97.7%	2.56E-11		9.69E-08	1.71E-07
	84-74-2	Dibutyl phthalate	7.66E-10	2.91E-06	5.13E-06	97.7%	1.76E-11		6.68E-08	1.18E-07
	95-50-1	o-Dichlorobenzene						6.63E-10	2.51E-06	4.44E-06
	84-66-2	Diethyl phthalate	1.47E-09	5.59E-06	9.87E-06	97.7%	3.39E-11		1.29E-07	2.27E-07
	100-41-4	Ethyl benzene	2.89E-09	1.10E-05	1.94E-05	97.7%	6.65E-11		2.52E-07	4.46E-07
	7782-41-4	Fluorine						1.55E-12	5.86E-09	1.04E-08
	110-54-3	Hexane (n-Hexane)						9.94E-07	3.77E-03	6.66E-03
	6-4-7783	Hydrogen sulfide	2.38E-04	9.04E-01	1.17E+00	97.7%	5.48E-06		2.08E-02	2.69E-02
	7439-96-5	Manganese as Mn Dust & compounds						2.10E-10	7.96E-07	1.41E-06
	7439-97-6	Mercury (Aryl & inorganic compounds as Hg)						1.44E-10	5.44E-07	9.62E-07
	7439-98-7	Molybdenum as Mo -Soluble compounds						6.07E-10	2.30E-06	4.07E-06
	91-20-3	Naphthalene	5.39E-10	2.05E-06	3.61E-06	97.7%	1.24E-11	3.37E-10	1.32E-06	2.34E-06
	98-95-3	Nitrobenzene	1.76E-10	6.67E-07	1.18E-06	97.7%	4.04E-12		1.53E-08	2.71E-08
	109-66-0	Pentane						1.44E-06	5.44E-03	9.62E-03
	108-95-2	Phenol	2.57E-09	9.76E-06	1.72E-05	97.7%	5.92E-11		2.25E-07	3.97E-07
	110-86-1	Pyridine	3.06E-10	1.16E-06	2.05E-06	97.7%	7.04E-12		2.67E-08	4.72E-08
	7782-49-2	Selenium						1.33E-11	5.02E-08	8.88E-08
	100-42-5	Styrene monomer (ID)	3.46E-10	1.31E-06	2.32E-06	97.7%	7.96E-12		3.02E-08	5.34E-08
	108-88-3	Toluene (toluol)	3.52E-08	1.34E-04	2.36E-04	97.7%	8.11E-10	1.88E-09	1.02E-05	1.80E-05
	1330-20-7	Xylene (o-, m-, p-isomers)	2.18E-08	8.25E-05	1.46E-04	97.7%	5.00E-10		1.90E-06	3.35E-06
	7440-66-6	Zinc metal (ID)						1.60E-08	6.07E-05	1.07E-04
Section 586 TAP	62-53-3	Aniline	5.16E-09	7.90E-06	3.46E-05	97.7%	1.19E-10		1.82E-07	7.95E-07
	7440-38-2	Arsenic compounds						1.10E-10	1.69E-07	7.40E-07
	71-43-2	Benzene	1.19E-09	1.82E-06	7.95E-06	97.7%	2.73E-11	1.16E-09	1.82E-06	7.95E-06
	50-32-8	Benzo(a)pyrene						6.63E-13	1.01E-09	4.44E-09
	108-60-1	Bis (2-chloro-1-methyl- ethyl) ether	1.47E-09	2.25E-06	9.87E-06	97.7%	3.39E-11		5.18E-08	2.27E-07
	117-81-7	Bis (2-ethylhexyl) phthalate	8.42E-10	1.29E-06	5.64E-06	97.7%	1.94E-11		2.96E-08	1.30E-07
	7440-43-9	Cadmium and compounds						6.07E-10	9.29E-07	4.07E-06
	56-23-5	Carbon tetrachloride	8.47E-10	1.30E-06	5.67E-06	97.7%	1.95E-11		2.98E-08	1.31E-07
	50-00-0	Formaldehyde						4.14E-08	6.33E-05	2.77E-04
	56-49-5	3-methylcholanthrene						9.94E-13	1.52E-09	6.66E-09
	7440-02-0	Nickel						1.16E-09	1.77E-06	7.77E-06
	79-34-5	1,1,2,2,Tetrachloro-ethane	2.96E-10	4.53E-07	1.99E-06	97.7%	6.82E-12		1.04E-08	4.57E-08
	127-18-4	Tetrachloroethylene	7.02E-10	1.07E-06	4.70E-06	97.7%	1.61E-11		2.47E-08	1.08E-07
	79-00-5	1,1,2 - trichloroethane	1.10E-08	1.68E-05	7.34E-05	97.7%	2.52E-10		3.85E-07	1.69E-06
Other HAP	57-97-6	7,12-Dimethylbenz(a)anthracene						8.83E-12	1.35E-08	5.92E-08
	83-32-9	Acenapthene						9.94E-13	1.52E-09	6.66E-09
	203-96-8	Acenapthylene						9.94E-13	1.52E-09	6.66E-09
	120-12-7	Anthracene						1.33E-12	2.03E-09	8.88E-09
	56-55-3	Benz(a)anthracene						9.94E-13	1.52E-09	6.66E-09
	205-99-2	Benzo(b)fluoranthene						9.94E-13	1.52E-09	6.66E-09
	191-24-2	Benzo(g,h,i)perylene						6.63E-13	1.01E-09	4.44E-09
	207-08-9	Benzo(k)fluoranthene						9.94E-13	1.52E-09	6.66E-09
	218-01-9	Chrysene						9.94E-13	1.52E-09	6.66E-09
	53-70-3	Dibenzo(a,h)anthracene						6.63E-13	1.01E-09	4.44E-09
	206-44-0	Fluoranthene						3.00E-06	4.59E-03	2.01E-02
	193-39-5	Indeno(1,2,3-cd)pyrene						9.94E-13	1.52E-09	6.66E-09
	129-00-0	Pyrene						2.76E-12	4.22E-09	1.85E-08

Notes:

a EF Raw biogas concentrations, with exception of H2S, from Gas Technology Institute (2009) *Task 3 Final Report: Guidance Document for Introduction of Dairy Waste Biomethane* . The H2S emission factor is worst-case uncontrolled biogas concentration measured in samples from the site.

b Uncontrolled Emissions (585 TAP) Hourly Emissions = Peak Hourly Biogas x EF Raw Biogas; Annual Emissions = Average Hourly Biogas x EF Raw Biogas

c Uncontrolled Emissions (586 TAP) = Average Hourly Biogas x EF Raw Biogas

d IDAPA 58.01.01.585 and .586

e Control Efficiency (AP-42 Table 2.4-3 (2008 draft) = **97.7% (Flare)**

f EF Un-Combused Biogas = Raw Biogas x (1-Control Factor)

g EF Combustion Products from AP-42, Chapter 1.4.

h Controlled Emissions (585) hourly emissions = (EF Uncombusted Biogas + EF Combust Products) x Peak Hourly Biogas; Annual emissions use Average Hourly Biogas

i Controlled Emissions (586) = (EF Uncombusted Biogas + EF Combust Products) x Average Hourly Biogas

Table C-9. Darigold WWTP Biogas Emission Unit Calculations - Digester 2 and Flare Criteria Pollutants and GHG

	Pollutant	Raw Biogas[a] EF (lb/SCF)	Control Efficiency[b]	Uncombusted Biogas[c] EF (lb/scf)	Combustion Products[d] EF (lb/scf)	Uncontrolled Emissions (lb/hr)[e]	Uncontrolled Emissions (tons/yr)[f]	Controlled Emissions (lb/hr)[g]	Controlled Emissions (tons/yr)[h]
Regulated Pollutants	PM10				9.47E-06			0.06	0.11
	PM2.5				9.47E-06			0.06	0.11
	SO_2 (hourly maximum)				4.49E-04			2.89	
	SO_2 (annual average)				3.28E-04				3.74
	NOx				3.83E-05			0.25	0.44
	CO				1.75E-04			1.13	1.99
	VOC	1.28E-07	97.7%	2.95E-09	7.88E-05	8.26E-04	1.46E-03	0.51	0.90
	H_2S (hourly maximum)	2.38E-04	97.7%	5.48E-06		1.54		0.04	
	H_2S (annual average)	1.74E-04	97.7%	4.01E-06			1.99		0.05
	Lead				5.0E-10			3.22E-06	5.69E-06
GHGs	CO_2				6.76E+01			4217400	6742
	CH_4	2.32E-02			1.30E-03	1448.29	2.32	80.83	0.13
	N_2O				1.24E-03			77.32	0.12
	CO_2e[d]					36207	58	4242462	6782

Notes:

a. EF Raw biogas VOC concentrations from *GTI Pipeline Quality: North American Guidance Document for Introduction of Dairy Waste Derived Biomethane into Existing Natural Gas Networks.* Conservatively assumed that all non-methane components of the biogas are VOC. H2S and CH4 concentration is site specific data from sampling in 2011. CH4 concentration = (55.7% methane in biogas)*(16.04 lb/mol methane)/(385 SCF/mol methane)

b. Control Efficiency (AP42 Table 2.4-3 (2008 draft) = **97.7%** **(Flare)**
Methane has no listed control efficiency because combustion products emissions factor accounts for any unburned methane.

c. EF Un-Combused Biogas = Raw Biogas x (1-Control Factor)

d. Emission Factor Source: AP-42 Table 13.5-1 and WebFIRE.

e. Uncontrolled Emissions (lb/hr) = EF Raw Biogas x Peak Hourly Biogas

f. Uncontrolled Emissions (tons/yr) = EF Raw Biogas x Average Hourly Biogas x 24 hr/day x 365 day/yr / 2000 lb/ton

g. Controlled Emissions (lb/hr) = (EF Uncombusted Biogas + EF Combust Products) x Peak Hourly Biogas

h. Controlled Emissions (tons/yr) = (EF Uncombusted Biogas + EF Combust Products) x Average Hourly Biogas x 24 hr/day x 365 day/yr / 2000

i. IDAPA 58.01.01.06.106

Assumptions

Peak Daily Biogas from Digester:	154,731 SCF/day	(Digester 2 Tank Capacity / Total Digester Capacity x Peak Biogas from Both Digesters Combined)
Peak Hourly Biogas from Digester:	6,447 SCF/hr	(Peak Daily Biogas from Digester / 24 hr/day)
Average Daily Biogas from Digester	62,410 SCF/day	(Digester 2 Tank Capacity / Total Digester Capacity x Average Biogas from Both Digesters Combined)
Average Hourly Biogas from Digester:	2,600 SCF/hr	(Average Daily Biogas from Digester / 24 hr/day)
Annual Gas Production from Digester:	22.78 MMSCF/year	(Average Daily Biogas from Digester x 365 day/yr / $1x10^6$ SCF/MMCF)

Air Dispersion Model Parameters	Controlled	Uncontrolled [b]
Stack height (m)	4.67[a]	10.67
Stack inside Diameter (m)	0.20	0.15
Stack exit velocity (m/s)	17.02	2.78
Stack gas temperature (°K)	1273[a]	ambient

[a] Stack height for flare is effective release hight calculated by SCREEN3. The stack gas temperature is the default value listed in the SCREEN3 Model User's Guide.

[b] Uncontrolled scenario represents emissions of biogas through the emergency vent of Digester 2.

Pollutant	Emission Factor Calculation Details									
PM10	17	lb/MM CH4	x	0.557	CH4/biogas	=	9.47	lb/MMCF biogas	SCC: 50300601 WebFIRE
PM2.5	17	lb/MM CH4	x	0.557	CH4/biogas	=	9.47	lb/MMCF biogas	SCC: 50300601 WebFIRE
SO2	Refer to Stoichiometric conversion of H2S to SO2 in following worksheet								
NOx	6.8E-02	lb/MMBtu	x	5.6E-04	MMBtu/cf	=	3.8E-05	lb/cf	AP-42 Table 13.5-1
CO	0.31	lb/MMBtu	x	5.6E-04	MMBtu/cf	=	1.7E-04	lb/cf	AP-42 Table 13.5-1
VOC	0.14	lb/MMBtu	x	5.6E-04	MMBtu/cf	=	7.9E-05	lb/cf	AP-42 Table 13.5-1
CO_2	120000	lb/MMBtu	x	5.6E-04	MMBtu/cf	=	6.8E+01	lb/cf	AP-42 Table 1.4-2
CH_4	2.3	lb/MMBtu	x	5.6E-04	MMBtu/cf	=	1.3E-03	lb/cf	AP-42 Table 1.4-2
N_2O	2.2	lb/MMBtu	x	5.6E-04	MMBtu/cf	=	1.2E-03	lb/cf	AP-42 Table 1.4-2

Table C-10. Darigold WWTP Biogas Emission Unit Calculations - Digester 2 and Flare TAPs

Peak Hourly Biogas:	6,447 cf/hr
Average Hourly Biogas	2,600 cf/hr

			Uncontrolled (Digester Emissions)			Controlled (Flare Emissions)				
	CAS #	**Pollutant**	**EF Raw Biogas[a] (lb/scf)**	**Uncontrolled Emissions[b,c] (lb/hr)**	**Uncontrolled Emissions[b,c] (ton/yr)**	**Control Efficiency[e]**	**EF Uncombusted Biogas[f] (lb/scf)**	**EF Combustion Products[g] (lb/scf)**	**Controlled Emissions[h,i] (lb/hr)**	**Controlled Emissions[h,i] (ton/yr)**
Section 585 TAP	7440-39-3	Barium, soluble compounds, as Ba						2.43E-09	1.57E-05	2.77E-05
	108-90-7	Chlorobenzene	4.33E-10	2.79E-06	4.93E-06	97.7%	9.95E-12		6.42E-08	1.13E-07
	95-57-8	2-Chlorophenol (and all isomers) (ID)	3.51E-10	2.26E-06	3.99E-06	97.7%	8.06E-12		5.20E-08	9.19E-08
	7440-47-3	Chromium metal - Including:						7.73E-10	4.98E-06	8.80E-06
	7440-48-4	Cobalt metal, dust, and fume						4.64E-11	2.99E-07	5.28E-07
	7440-50-8	Copper -Fume						4.69E-10	3.03E-06	5.34E-06
	1319-77-3	Cresols/Cresylic Acid (isomers and mixtures)	5.05E-09	3.25E-05	5.75E-05	97.7%	1.16E-10		7.48E-07	1.32E-06
	98-82-8	Cumene	1.11E-09	7.17E-06	1.27E-05	97.7%	2.56E-11		1.65E-07	2.91E-07
	84-74-2	Dibutyl phthalate	7.66E-10	4.94E-06	8.73E-06	97.7%	1.76E-11		1.14E-07	2.01E-07
	95-50-1	o-Dichlorobenzene						6.63E-10	4.27E-06	7.55E-06
	84-66-2	Diethyl phthalate	1.47E-09	9.50E-06	1.68E-05	97.7%	3.39E-11		2.18E-07	3.86E-07
	100-41-4	Ethyl benzene	2.89E-09	1.86E-05	3.29E-05	97.7%	6.65E-11		4.29E-07	7.58E-07
	7782-41-4	Fluorine						1.55E-12	9.97E-09	1.76E-08
	110-54-3	Hexane (n-Hexane)						9.94E-07	6.41E-03	1.13E-02
	6-4-7783	Hydrogen sulfide	2.38E-04	1.54E+00	1.99E+00	97.7%	5.48E-06		3.54E-02	4.57E-02
	7439-96-5	Manganese as Mn Dust & compounds						2.10E-10	1.35E-06	2.39E-06
	7439-97-6	Mercury (Aryl & inorganic compounds as Hg)						1.44E-10	9.25E-07	1.63E-06
	7439-98-7	Molybdenum as Mo -Soluble compounds						6.07E-10	3.92E-06	6.92E-06
	91-20-3	Naphthalene	5.39E-10	3.48E-06	6.14E-06	97.7%	1.24E-11	3.37E-10	2.25E-06	3.98E-06
	98-95-3	Nitrobenzene	1.76E-10	1.13E-06	2.00E-06	97.7%	4.04E-12		2.61E-08	4.61E-08
	109-66-0	Pentane						1.44E-06	9.25E-03	1.63E-02
	108-95-2	Phenol	2.57E-09	1.66E-05	2.93E-05	97.7%	5.92E-11		3.82E-07	6.74E-07
	110-86-1	Pyridine	3.06E-10	1.97E-06	3.49E-06	97.7%	7.04E-12		4.54E-08	8.02E-08
	7782-49-2	Selenium						1.33E-11	8.54E-08	1.51E-07
	100-42-5	Styrene monomer (ID)	3.46E-10	2.23E-06	3.94E-06	97.7%	7.96E-12		5.13E-08	9.07E-08
	108-88-3	Toluene (toluol)	3.52E-08	2.27E-04	4.01E-04	97.7%	8.11E-10	1.88E-09	1.73E-05	3.06E-05
	1330-20-7	Xylene (o-, m-, p-isomers)	2.18E-08	1.40E-04	2.48E-04	97.7%	5.00E-10		3.23E-06	5.70E-06
	7440-66-6	Zinc metal (ID)						1.60E-08	1.03E-04	1.82E-04
Section 586 TAP	62-53-3	Aniline	5.16E-09	1.34E-05	5.88E-05	97.7%	1.19E-10		3.09E-07	1.35E-06
	7440-38-2	Arsenic compounds						1.10E-10	2.87E-07	1.26E-06
	71-43-2	Benzene	1.19E-09	3.09E-06	1.35E-05	97.7%	2.73E-11	1.16E-09	3.09E-06	1.35E-05
	50-32-8	Benzo(a)pyrene						6.63E-13	1.72E-09	7.55E-09
	108-60-1	Bis (2-chloro-1-methyl- ethyl) ether	1.47E-09	3.83E-06	1.68E-05	97.7%	3.39E-11		8.81E-08	3.86E-07
	117-81-7	Bis (2-ethylhexyl) phthalate	8.42E-10	2.19E-06	9.59E-06	97.7%	1.94E-11		5.04E-08	2.21E-07
	7440-43-9	Cadmium and compounds						6.07E-10	1.58E-06	6.92E-06
	56-23-5	Carbon tetrachloride	8.47E-10	2.20E-06	9.65E-06	97.7%	1.95E-11		5.07E-08	2.22E-07
	50-00-0	Formaldehyde						4.14E-08	1.08E-04	4.72E-04
	56-49-5	3-methylcholanthrene						9.94E-13	2.58E-09	1.13E-08
	7440-02-0	Nickel						1.16E-09	3.01E-06	1.32E-05
	79-34-5	1,1,2,2,Tetrachloro-ethane	2.96E-10	7.71E-07	3.38E-06	97.7%	6.82E-12		1.77E-08	7.77E-08
	127-18-4	Tetrachloroethylene	7.02E-10	1.83E-06	7.99E-06	97.7%	1.61E-11		4.20E-08	1.84E-07
	79-00-5	1,1,2 - trichloroethane	1.10E-08	2.85E-05	1.25E-04	97.7%	2.52E-10		6.55E-07	2.87E-06
Other HAP	57-97-6	7,12-Dimethylbenz(a)anthracene						8.83E-12	2.30E-08	1.01E-07
	83-32-9	Acenapthene						9.94E-13	2.58E-09	1.13E-08
	203-96-8	Acenapthylene						9.94E-13	2.58E-09	1.13E-08
	120-12-7	Anthracene						1.33E-12	3.45E-09	1.51E-08
	56-55-3	Benz(a)anthracene						9.94E-13	2.58E-09	1.13E-08
	205-99-2	Benzo(b)fluoranthene						9.94E-13	2.58E-09	1.13E-08
	191-24-2	Benzo(g,h,i)perylene						6.63E-13	1.72E-09	7.55E-09
	207-08-9	Benzo(k)fluoranthene						9.94E-13	2.58E-09	1.13E-08
	218-01-9	Chrysene						9.94E-13	2.58E-09	1.13E-08
	53-70-3	Dibenzo(a,h)anthracene						6.63E-13	1.72E-09	7.55E-09
	206-44-0	Fluoranthene						3.00E-06	7.80E-03	3.42E-02
	193-39-5	Indeno(1,2,3-cd)pyrene						9.94E-13	2.58E-09	1.13E-08
	129-00-0	Pyrene						2.76E-12	7.18E-09	3.14E-08

Notes:

a EF Raw biogas concentrations, with exception of H2S, from Gas Technology Institute (2009) *Task 3 Final Report: Guidance Document for Introduction of Dairy Waste Biomethane* . The H2S emission factor is worst-case uncontrolled biogas concentration measured in samples from the site.

b Uncontrolled Emissions (585 TAP) Hourly Emissions = Peak Hourly Biogas x EF Raw Biogas; Annual Emissions = Average Hourly Biogas x EF Raw Biogas

c Uncontrolled Emissions (586 TAP) = Average Hourly Biogas x EF Raw Biogas

d IDAPA 58.01.01.585 and .586

e Control Efficiency (AP-42 Table 2.4-3 (2008 draft) = **97.7% (Flare)**

f EF Un-Combused Biogas = Raw Biogas x (1-Control Factor)

g EF Combustion Products from AP-42, Chapter 1.4.

h Controlled Emissions (585) hourly emissions = (EF Uncombusted Biogas + EF Combust Products) x Peak Hourly Biogas; Annual emissions use Average Hourly Biogas

i Controlled Emissions (586) = (EF Uncombusted Biogas + EF Combust Products) x Average Hourly Biogas

Table C-11. Darigold Emission Unit Calculations - Boiler B1 Kewanee

Combustion Source Characteristics

Boiler Manufacturer	Kewanee
Input Heat Capacity (BTU/hr)	14,298,527
Fuel	Natural Gas
Heating Value (BTU/scf)	1,020
Max Hourly Fuel Consumption (scf/hr)	14,018
Annual Fuel Consumption (scf/yr)	122,799,114

Criteria Pollutants and Greenhouse Gasses

Pollutant	Pollutant Source	Emission Factor[a]	Emission Factor Unit	Emission Factor Data Source	Potential Emissions [b] (lb/hr)	Potential Emissions [c] (TPY)	Potential Emissions (g/s)
PM_{10}	NG Combustion	1.12	lb/10^6 scf	(1)	0.02	0.1	0.002
$PM_{2.5}$	NG Combustion	1.12	lb/10^6 scf	(1)	0.02	0.1	0.002
SO_2	NG Combustion	0.6	lb/10^6 scf	(2)	0.01	0.0	0.001
NO_x	NG Combustion	12.34	lb/10^6 scf	(1)	0.17	0.8	0.022
CO	NG Combustion	41.51	lb/10^6 scf	(1)	0.58	2.5	0.073
VOC	NG Combustion	3.37	lb/10^6 scf	(1)	0.05	0.2	0.006
Lead	NG Combustion	0.0005	lb/10^6 scf	(2)	7.01E-06	0.0	8.83E-07
CO_2	NG Combustion	120000	lb/10^6 scf	(2)	1.68E+03	7367.9	2.12E+02
CH_4	NG Combustion	2.3	lb/10^6 scf	(2)	3.22E-02	0.1	4.06E-03
N_2O	NG Combustion	2.2	lb/10^6 scf	(2)	3.08E-02	0.1	3.89E-03
CO_2e[d]	NG Combustion	-	lb/10^6 scf		1.69E+03	7.41E+03	2.13E+02

Notes:

(a) Emission factor sources: (1) PM10, NOx, CO and VOC from vendor reports for new burners. PM2.5 emissions assumed equal to PM10 emisssions. (2) All other pollutants from AP-42 Chapter 1.4, "Natural Gas Combustion".

(b) Potential Emissions (lb/hr) = Emission Factor x Max Hourly Fuel Consumption / 10^6 scf

(c) Potential Emissions (T/yr) = Emission Factor x Annual Fuel Consumption / 10^6 scf / 2000 lb/Ton

(d) CO2e based on Global Warming Potentials of Greenhouse Gasses located in Table A-1 to Subpart A of 40 CFR 98

Table C-12. Darigold Emission Unit Calculations - Boiler B1 Kewanee

Combustion Source Characteristics

Boiler Manufacturer	Kewanee	Heating Value (BTU/scf)	1,020
Input Heat Capacity (BTU/hr)	14,298,527	Max Hourly Fuel Consumption (scf/hr)	14,018
Fuel	Natural Gas	Annual Fuel Consumption (scf/yr)	122,799,114

Toxic Air Pollutants					
Pollutant	CAS #	Emission Factor[a]	Emission Factor Unit	Potential Emissions[b] (lb/hr)	Potential Emissions (g/s)
2-Methylnaphthalene	91-57-6	2.40E-05	lb/10^6 scf	3.36E-07	4.24E-08
3-Methylcholanthrene	56-49-5	1.80E-06	lb/10^6 scf	2.52E-08	3.18E-09
Arsenic	7440-38-2	2.00E-04	lb/10^6 scf	2.80E-06	3.53E-07
Barium	7440-39-3	4.40E-03	lb/10^6 scf	6.17E-05	7.77E-06
Benzene	71-43-2	2.10E-03	lb/10^6 scf	2.94E-05	3.71E-06
Benzo(a)pyrene	50-32-8	1.20E-06	lb/10^6 scf	1.68E-08	2.12E-09
Beryllium	7440-41-7	1.20E-05	lb/10^6 scf	1.68E-07	2.12E-08
Cadmium	7440-43-9	1.10E-03	lb/10^6 scf	1.54E-05	1.94E-06
Chromium	7440-47-3	1.40E-03	lb/10^6 scf	1.96E-05	2.47E-06
Cobalt	7440-48-4	8.40E-05	lb/10^6 scf	1.18E-06	1.48E-07
Copper	7440-50-8	8.50E-04	lb/10^6 scf	1.19E-05	1.50E-06
Dichlorobenzene	95-50-1	1.20E-03	lb/10^6 scf	1.68E-05	2.12E-06
Fluorene	7782-41-4	2.80E-06	lb/10^6 scf	3.93E-08	4.95E-09
Formaldehyde	50-00-0	7.50E-02	lb/10^6 scf	1.05E-03	1.32E-04
Hexane	110-54-3	1.80E+00	lb/10^6 scf	2.52E-02	3.18E-03
Manganese	7439-96-5	3.80E-04	lb/10^6 scf	5.33E-06	6.71E-07
Mercury	7439-97-6	2.60E-04	lb/10^6 scf	3.64E-06	4.59E-07
Molybdenum	7439-98-7	1.10E-03	lb/10^6 scf	1.54E-05	1.94E-06
Naphthalene	91-20-3	6.10E-04	lb/10^6 scf	8.55E-06	1.08E-06
Nickel	7440-02-0	2.10E-03	lb/10^6 scf	2.94E-05	3.71E-06
Pentane	109-66-0	2.60E+00	lb/10^6 scf	3.64E-02	4.59E-03
Phenanthrene	85-01-8	1.70E-05	lb/10^6 scf	2.38E-07	3.00E-08
Selenium	7782-49-2	2.40E-05	lb/10^6 scf	3.36E-07	4.24E-08
Toluene	108-88-3	3.40E-03	lb/10^6 scf	4.77E-05	6.01E-06
Vanadium	1314-62-1	2.30E-03	lb/10^6 scf	3.22E-05	4.06E-06
Zinc	7440-66-6	2.90E-02	lb/10^6 scf	4.07E-04	5.12E-05

Other Hazardous Air Pollutants					
Pollutant	CAS #	Emission Factor[a]	Emission Factor Unit	Potential Emissions[b] (lb/hr)	Potential Emissions (g/s)
7,12-Dimethylbenz(a)anthracene	57-97-6	1.60E-05	lb/10^6 scf	2.24E-07	2.83E-08
Acenapthene	83-32-9	1.80E-06	lb/10^6 scf	2.52E-08	3.18E-09
Acenapthylene	203-96-8	1.80E-06	lb/10^6 scf	2.52E-08	3.18E-09
Anthracene	120-12-7	2.40E-06	lb/10^6 scf	3.36E-08	4.24E-09
Benz(a)anthracene	56-55-3	1.80E-06	lb/10^6 scf	2.52E-08	3.18E-09
Benzo(b)fluoranthene	205-99-2	1.80E-06	lb/10^6 scf	2.52E-08	3.18E-09
Benzo(g,h,i)perylene	191-24-2	1.20E-06	lb/10^6 scf	1.68E-08	2.12E-09
Benzo(k)fluoranthene	207-08-9	1.80E-06	lb/10^6 scf	2.52E-08	3.18E-09
Chrysene	218-01-9	1.80E-06	lb/10^6 scf	2.52E-08	3.18E-09
Dibenzo(a,h)anthracene	53-70-3	1.20E-06	lb/10^6 scf	1.68E-08	2.12E-09
Fluoranthene	206-44-0	3.00E-06	lb/10^6 scf	4.21E-08	5.30E-09
Indeno(1,2,3-cd)pyrene	193-39-5	1.80E-06	lb/10^6 scf	2.52E-08	3.18E-09
Pyrene	129-00-0	5.00E-06	lb/10^6 scf	7.01E-08	8.83E-09

Notes:

(a) Emission Factors from AP-42 Chapter 1.4, "Natural Gas Combustion".

(b) Potential Emissions (lb/hr) = Emission Factor x Max Hourly Fuel Consumption / 10^6 scf

(c) IDAPA 58.01.01.585 and 586

Table C-13. Darigold Emission Unit Calculations - Boiler B2 Cleaver Brooks

Combustion Source Characteristics

Boiler Manufactur	Cleaver Brooks
Input Heat Capacity (BTU/hr)	20,278,047
Fuel	Natural Gas
Heating Value (BTU/scf)	1,020
Max Hourly Fuel Consumption (scf/hr)	19,880
Annual Fuel Consumption (scf/yr)	174,152,639

Criteria Pollutants and Greenhouse Gasses

Pollutant	Pollutant Source	Emission Factor[a]	Emission Factor Unit	Emission Factor Data Source	Potential Emissions [b] (lb/hr)	Potential Emissions [c] (TPY)	Potential Emissions (g/s)
PM_{10}	NG Combustion	1.12	lb/10^6 scf	(1)	0.02	0.1	0.003
$PM_{2.5}$	NG Combustion	1.12	lb/10^6 scf	(1)	0.02	0.1	0.003
SO_2	NG Combustion	0.6	lb/10^6 scf	(2)	0.01	0.1	0.002
NO_x	NG Combustion	12.34	lb/10^6 scf	(1)	0.25	1.1	0.031
CO	NG Combustion	41.51	lb/10^6 scf	(1)	0.83	3.6	0.104
VOC	NG Combustion	3.37	lb/10^6 scf	(1)	0.07	0.3	0.008
Lead	NG Combustion	0.0005	lb/10^6 scf	(2)	9.94E-06	0.0	1.25E-06
CO_2	NG Combustion	120000	lb/10^6 scf	(2)	2.39E+03	10449.2	3.01E+02
CH_4	NG Combustion	2.3	lb/10^6 scf	(2)	4.57E-02	0.2	5.76E-03
N_2O	NG Combustion	2.2	lb/10^6 scf	(2)	4.37E-02	0.2	5.51E-03
CO_2e[d]	NG Combustion	-	lb/10^6 scf		2.40E+03	1.05E+04	3.02E+02

Notes:

(a) Emission factor sources: (1) PM10, NOx, CO and VOC from vendor reports for new burners. PM2.5 emissions assumed equal to PM10 emisssions. (2) All other pollutants from AP-42 Chapter 1.4, "Natural Gas Combustion".

(b) Potential Emissions (lb/hr) = Emission Factor x Max Hourly Fuel Consumption / 10^6 scf

(c) Potential Emissions (T/yr) = Emission Factor x Annual Fuel Consumption / 10^6 scf / 2000 lb/Ton

(d) CO2e based on Global Warming Potentials of Greenhouse Gasses located in Table A-1 to Subpart A of 40 CFR 98

Table C-14. Darigold Emission Unit Calculations - Boiler B2 Kewanee

Combustion Source Characteristics

Boiler Manufacturer	Kewanee	Heating Value (BTU/scf)	1,020
Input Heat Capacity (BTU/hr)	20,278,047	Max Hourly Fuel Consumption (scf/hr)	19,880
Fuel	Natural Gas	Annual Fuel Consumption (scf/yr)	174,152,639

Toxic Air Pollutants					
Pollutant	**CAS #**	**Emission Factor[a]**	**Emission Factor Unit**	**Potential Emissions[b] (lb/hr)**	**Potential Emissions (g/s)**
2-Methylnaphthalene	91-57-6	2.40E-05	lb/10^6 scf	4.77E-07	6.01E-08
3-Methylcholanthrene	56-49-5	1.80E-06	lb/10^6 scf	3.58E-08	4.51E-09
Arsenic	7440-38-2	2.00E-04	lb/10^6 scf	3.98E-06	5.01E-07
Barium	7440-39-3	4.40E-03	lb/10^6 scf	8.75E-05	1.10E-05
Benzene	71-43-2	2.10E-03	lb/10^6 scf	4.17E-05	5.26E-06
Benzo(a)pyrene	50-32-8	1.20E-06	lb/10^6 scf	2.39E-08	3.01E-09
Beryllium	7440-41-7	1.20E-05	lb/10^6 scf	2.39E-07	3.01E-08
Cadmium	7440-43-9	1.10E-03	lb/10^6 scf	2.19E-05	2.76E-06
Chromium	7440-47-3	1.40E-03	lb/10^6 scf	2.78E-05	3.51E-06
Cobalt	7440-48-4	8.40E-05	lb/10^6 scf	1.67E-06	2.10E-07
Copper	7440-50-8	8.50E-04	lb/10^6 scf	1.69E-05	2.13E-06
Dichlorobenzene	95-50-1	1.20E-03	lb/10^6 scf	2.39E-05	3.01E-06
Fluorene	7782-41-4	2.80E-06	lb/10^6 scf	5.57E-08	7.01E-09
Formaldehyde	50-00-0	7.50E-02	lb/10^6 scf	1.49E-03	1.88E-04
Hexane	110-54-3	1.80E+00	lb/10^6 scf	3.58E-02	4.51E-03
Manganese	7439-96-5	3.80E-04	lb/10^6 scf	7.55E-06	9.52E-07
Mercury	7439-97-6	2.60E-04	lb/10^6 scf	5.17E-06	6.51E-07
Molybdenum	7439-98-7	1.10E-03	lb/10^6 scf	2.19E-05	2.76E-06
Naphthalene	91-20-3	6.10E-04	lb/10^6 scf	1.21E-05	1.53E-06
Nickel	7440-02-0	2.10E-03	lb/10^6 scf	4.17E-05	5.26E-06
Pentane	109-66-0	2.60E+00	lb/10^6 scf	5.17E-02	6.51E-03
Phenanthrene	85-01-8	1.70E-05	lb/10^6 scf	3.38E-07	4.26E-08
Selenium	7782-49-2	2.40E-05	lb/10^6 scf	4.77E-07	6.01E-08
Toluene	108-88-3	3.40E-03	lb/10^6 scf	6.76E-05	8.52E-06
Vanadium	1314-62-1	2.30E-03	lb/10^6 scf	4.57E-05	5.76E-06
Zinc	7440-66-6	2.90E-02	lb/10^6 scf	5.77E-04	7.26E-05

Other Hazardous Air Pollutants					
Pollutant	**CAS #**	**Emission Factor[a]**	**Emission Factor Unit**	**Potential Emissions[b] (lb/hr)**	**Potential Emissions (g/s)**
7,12-Dimethylbenz(a)anthracene	57-97-6	1.60E-05	lb/10^6 scf	3.18E-07	4.01E-08
Acenapthene	83-32-9	1.80E-06	lb/10^6 scf	3.58E-08	4.51E-09
Acenapthylene	203-96-8	1.80E-06	lb/10^6 scf	3.58E-08	4.51E-09
Anthracene	120-12-7	2.40E-06	lb/10^6 scf	4.77E-08	6.01E-09
Benz(a)anthracene	56-55-3	1.80E-06	lb/10^6 scf	3.58E-08	4.51E-09
Benzo(b)fluoranthene	205-99-2	1.80E-06	lb/10^6 scf	3.58E-08	4.51E-09
Benzo(g,h,i)perylene	191-24-2	1.20E-06	lb/10^6 scf	2.39E-08	3.01E-09
Benzo(k)fluoranthene	207-08-9	1.80E-06	lb/10^6 scf	3.58E-08	4.51E-09
Chrysene	218-01-9	1.80E-06	lb/10^6 scf	3.58E-08	4.51E-09
Dibenzo(a,h)anthracene	53-70-3	1.20E-06	lb/10^6 scf	2.39E-08	3.01E-09
Fluoranthene	206-44-0	3.00E-06	lb/10^6 scf	5.96E-08	7.51E-09
Indeno(1,2,3-cd)pyrene	193-39-5	1.80E-06	lb/10^6 scf	3.58E-08	4.51E-09
Pyrene	129-00-0	5.00E-06	lb/10^6 scf	9.94E-08	1.25E-08

Notes:

(a) Emission Factors from AP-42 Chapter 1.4, "Natural Gas Combustion".

(b) Potential Emissions (lb/hr) = Emission Factor x Max Hourly Fuel Consumption / 10^6 scf

(c) IDAPA 58.01.01.585 and 586

Table C-15. Darigold Emission Unit Calculations - Boiler B3 Johnston

Combustion Source Characteristics

Boiler Manufactur	Johnston
Input Heat Capacity (BTU/hr)	32,100,000
Fuel	Natural Gas
Heating Value (BTU/scf)	1,020
Max Hourly Fuel Consumption (scf/hr)	31,471
Annual Fuel Consumption (scf/yr)	275,682,353

Criteria Pollutants and Greenhouse Gasses

Pollutant	Pollutant Source	Emission Factor[a]	Emission Factor Unit	Potential Emissions[b] (lb/hr)	Potential Emissions[c] (TPY)	Potential Emissions (g/s)
PM_{10}	NG Combustion	1.04	lb/10^6 scf	0.03	0.1	0.004
$PM_{2.5}$	NG Combustion	0.86	lb/10^6 scf	0.03	0.1	0.004
SO_2	NG Combustion	0.6	lb/10^6 scf	0.02	0.1	0.002
NO_x	NG Combustion	36.7	lb/10^6 scf	1.16	5.1	0.146
CO	NG Combustion	84	lb/10^6 scf	2.64	11.6	0.333
VOC	NG Combustion	5.5	lb/10^6 scf	0.17	0.8	0.022
Lead	NG Combustion	0.0005	lb/10^6 scf	1.57E-05	0.0	1.98E-06
CO_2	NG Combustion	120000	lb/10^6 scf	3.78E+03	16540.9	4.76E+02
CH_4	NG Combustion	2.3	lb/10^6 scf	7.24E-02	0.3	9.12E-03
N_2O	NG Combustion	0.64	lb/10^6 scf	2.01E-02	0.1	2.54E-03
CO_2e[d]	NG Combustion	-	lb/10^6 scf	3.78E+03	1.66E+04	4.77E+02

Notes:

(a) NOx emission factor from Manufacturer specifications. PM10 and PM2.5 Emission factors from EPA "NG_process_gas_LPG_PM_factors" spreadsheet and doubled as a safety factor. All other emisison factors from AP-42 Chapter 1.4, "Natural Gas Combustion", unless otherwise noted. PM2.5 emissions assumed equal to PM10 emisssions.

(b) Potential Emissions (lb/hr) = Emission Factor x Max Hourly Fuel Consumption / 10^6 scf

(c) Potential Emissions (T/yr) = Emission Factor x Annual Fuel Consumption / 10^6 scf / 2000 lb/Ton

(d) CO2e based on Global Warming Potentials of Greenhouse Gasses located in Table A-1 to Subpart A of 40 CFR 98

Table C-16. Darigold Emission Unit Calculations - Boiler B3 Johnston

Combustion Source Characteristics

Boiler Manufacturer	Johnston	Heating Value (BTU/scf)	1,020
Input Heat Capacity (BTU/hr)	32,100,000	Max Hourly Fuel Consumption (scf/hr)	31,471
Fuel	Natural Gas	Annual Fuel Consumption (scf/yr)	275,682,353

Toxic Air Pollutants					
Pollutant	CAS #	Emission Factor[a]	Emission Factor Unit	Potential Emissions[b] (lb/hr)	Potential Emissions (g/s)
2-Methylnaphthalene	91-57-6	2.40E-05	lb/10^6 scf	7.55E-07	9.52E-08
3-Methylcholanthrene	56-49-5	1.80E-06	lb/10^6 scf	5.66E-08	7.14E-09
Arsenic	7440-38-2	2.00E-04	lb/10^6 scf	6.29E-06	7.93E-07
Barium	7440-39-3	4.40E-03	lb/10^6 scf	1.38E-04	1.74E-05
Benzene	71-43-2	2.10E-03	lb/10^6 scf	6.61E-05	8.33E-06
Benzo(a)pyrene	50-32-8	1.20E-06	lb/10^6 scf	3.78E-08	4.76E-09
Beryllium	7440-41-7	1.20E-05	lb/10^6 scf	3.78E-07	4.76E-08
Cadmium	7440-43-9	1.10E-03	lb/10^6 scf	3.46E-05	4.36E-06
Chromium	7440-47-3	1.40E-03	lb/10^6 scf	4.41E-05	5.55E-06
Cobalt	7440-48-4	8.40E-05	lb/10^6 scf	2.64E-06	3.33E-07
Copper	7440-50-8	8.50E-04	lb/10^6 scf	2.68E-05	3.37E-06
Dichlorobenzene	95-50-1	1.20E-03	lb/10^6 scf	3.78E-05	4.76E-06
Fluorene	7782-41-4	2.80E-06	lb/10^6 scf	8.81E-08	1.11E-08
Formaldehyde	50-00-0	7.50E-02	lb/10^6 scf	2.36E-03	2.97E-04
Hexane	110-54-3	1.80E+00	lb/10^6 scf	5.66E-02	7.14E-03
Manganese	7439-96-5	3.80E-04	lb/10^6 scf	1.20E-05	1.51E-06
Mercury	7439-97-6	2.60E-04	lb/10^6 scf	8.18E-06	1.03E-06
Molybdenum	7439-98-7	1.10E-03	lb/10^6 scf	3.46E-05	4.36E-06
Naphthalene	91-20-3	6.10E-04	lb/10^6 scf	1.92E-05	2.42E-06
Nickel	7440-02-0	2.10E-03	lb/10^6 scf	6.61E-05	8.33E-06
Pentane	109-66-0	2.60E+00	lb/10^6 scf	8.18E-02	1.03E-02
Phenanthrene	85-01-8	1.70E-05	lb/10^6 scf	5.35E-07	6.74E-08
Selenium	7782-49-2	2.40E-05	lb/10^6 scf	7.55E-07	9.52E-08
Toluene	108-88-3	3.40E-03	lb/10^6 scf	1.07E-04	1.35E-05
Vanadium	1314-62-1	2.30E-03	lb/10^6 scf	7.24E-05	9.12E-06
Zinc	7440-66-6	2.90E-02	lb/10^6 scf	9.13E-04	1.15E-04

Other Hazardous Air Pollutants					
Pollutant	CAS #	Emission Factor[a]	Emission Factor Unit	Potential Emissions[b] (lb/hr)	Potential Emissions (g/s)
7,12-Dimethylbenz(a)anthracene	57-97-6	1.60E-05	lb/10^6 scf	5.04E-07	6.34E-08
Acenapthene	83-32-9	1.80E-06	lb/10^6 scf	5.66E-08	7.14E-09
Acenapthylene	203-96-8	1.80E-06	lb/10^6 scf	5.66E-08	7.14E-09
Anthracene	120-12-7	2.40E-06	lb/10^6 scf	7.55E-08	9.52E-09
Benz(a)anthracene	56-55-3	1.80E-06	lb/10^6 scf	5.66E-08	7.14E-09
Benzo(b)fluoranthene	205-99-2	1.80E-06	lb/10^6 scf	5.66E-08	7.14E-09
Benzo(g,h,i)perylene	191-24-2	1.20E-06	lb/10^6 scf	3.78E-08	4.76E-09
Benzo(k)fluoranthene	207-08-9	1.80E-06	lb/10^6 scf	5.66E-08	7.14E-09
Chrysene	218-01-9	1.80E-06	lb/10^6 scf	5.66E-08	7.14E-09
Dibenzo(a,h)anthracene	53-70-3	1.20E-06	lb/10^6 scf	3.78E-08	4.76E-09
Fluoranthene	206-44-0	3.00E-06	lb/10^6 scf	9.44E-08	1.19E-08
Indeno(1,2,3-cd)pyrene	193-39-5	1.80E-06	lb/10^6 scf	5.66E-08	7.14E-09
Pyrene	129-00-0	5.00E-06	lb/10^6 scf	1.57E-07	1.98E-08

Notes:

(a) Emission Factors from AP-42 Chapter 1.4, "Natural Gas Combustion".

(b) Potential Emissions (lb/hr) = Emission Factor x Max Hourly Fuel Consumption / 10^6 scf

(c) IDAPA 58.01.01.585 and 586

Table C-17. Emissions from Cooling Towers

Equipment ID	Equipment Name	Draft[1]	Flow Pattern[1]	Water Flow[1]	TDS[1]	PM_{10} Emission Rate[2]		$PM_{2.5}$ Emission Rate[2]	
				(GPM)	(mg/L)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)
CT1	Baltimore AirCoil	Induced	Crossflow	1300	937.5	0.00	0.02	1.4E-05	6.0E-05
CT2	Baltimore AirCoil	Induced	Crossflow	1300	937.5	0.00	0.02	1.4E-05	6.0E-05
CT3	Evapco	Induced	Counterflow	1041	1500	0.01	0.02	1.8E-05	7.7E-05
					Total:	**0.01**	**0.06**	**4.5E-05**	**2.0E-04**

Drift Parameters[3]

Uncontrolled drift loss[4]	0.02%
Drift loss with drift eliminators	0.0010%
Drift eliminators control efficiency	95%
Fraction of flow producing PM10 drift:	70%
Fraction of flow producing PM2.5 drift:	0.226%

Notes:

1. Cooling tower draft, flow patern, and water flow rate from facility process knowledge. TDS obtained from actual process data and added 25% to be conservative.
2. Emission Rate (lb/hr) = Flow Rate (GPM) x 60 min/hr x 3.785 L/gal x TDS (mg/L) x 1 g/1000 mg x 1 lb/453.592 g x Drift Loss x Flow of Fraction Producing Specific Particle Size. Annual emissions are scaled by operating time (8760 hr/yr)
3. From "Calculating Realistic PM10 Emissions from Cooling Towers"; Reisman & Frisbie (2002). https://www.researchgate.net/publication/227727158_Calculating_realistic_PM10_emissions_from_cooling_towers
   A PM2.5 percentage of 0.0226% and a PM10 percentage of 70% were used to calculate the respective emission rates. A drift loss of 0.0006% is given in the reference, and rounded up to 0.0010% to be conservative; all onsite cooling towers are equipped with drift eliminators but manufacturer specifications do not list a guaranteed drift loss.
4. AP-42 Section 13.4, Table 13.4-1

Table C-18. Emissions from Milk Bottle Filling Operations[1]

Machine[2]	Item[2]	Flow Rate[2]	H2O2 Concentration[2,3]		H2O2 Emission Rate	
		(m^3/hr)	(ppm)	(mg/m^3)	(lb/hr)	(ton/yr)
Filler	CO-800	200	180	250	0.11	0.48
Filler	CO-801	200	180	250	0.11	0.48
Filler	CO-802	200	180	250	0.11	0.48
				Total:	**0.33**	**1.45**

Notes:

1. Milk bottles are sanitized with Hydrogen Peroxide (H2O2 - CAS# 7722-84-1) and Paracetic Acid (PAA - CAS# 79-21-0) prior to filling. Air emissions for PAA are not quantified because PAA is not a Federal HAP or IDAPA 58.01.01 Section 585 or 586 TAP.
2. Exhaust point ID and Flow rate, and H2O2 design concentration in filler exhaust obtained from communications with filler manufactuerer.
3. To convert from ppm to mg/m^3, ppm is multiplied by the molar mass of H202 (34.02) and then divided by the molar volume of an ideal gas at STP (24.45 L/mol).

APPENDIX B – AMBIENT AIR QUALITY IMPACT ANALYSES

M E M O R A N D U M

DATE: September 18, 2020

TO: Kelli Wetzel, Permit Writer, Air Program

FROM: Pao Baylon, Modeling Review Analyst, Air Program

PROJECT: P-2020.0026 PROJ 62476, Initial Permit for an Existing Previously Exempt Milk Processing and Bottling Facility Located in Boise, Idaho.

SUBJECT: Demonstration of Compliance with IDAPA 58.01.01.203.02 (NAAQS) and 203.03 (TAPs) as it relates to air quality impact analyses.

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Acronyms, Units, and Chemical Nomenclature

AAC	Acceptable Ambient Concentration of a Non-carcinogenic TAP
AACC	Acceptable Ambient Concentration of a Carcinogenic TAP
AERMAP	The terrain data preprocessor for AERMOD
AERMET	The meteorological data preprocessor for AERMOD
AERMOD	American Meteorological Society/Environmental Protection Agency Regulatory Model
AERSCREEN	An EPA-recommended screening model based on AERMOD
Appendix W	40 CFR 51, Appendix W – Guideline on Air Quality Models
ASOS	Automated Surface Observing System
BPIP	Building Profile Input Program
BRC	Below Regulatory Concern
Btu	British thermal units
cfm	Cubic feet per minute
CFR	Code of Federal Regulations
CMAQ	Community Multi-Scale Air Quality Modeling System
CO	Carbon Monoxide
D	Effective stack diameter of flare
Darigold	Darigold, Inc. (permittee)
DEQ	Idaho Department of Environmental Quality
DV	Design Values
EL	Emissions Screening Level of a TAP
EPA	United States Environmental Protection Agency
GEP	Good Engineering Practice
H_a	Actual height of flare
H_e	Effective stack height of flare
hr	Hours
Idaho Air Rules	Rules for the Control of Air Pollution in Idaho, located in the Idaho Administrative Procedures Act 58.01.01
ISCST3	Industrial Source Complex Short Term 3 dispersion model
K	Kelvin
km	Kilometers
lb/hr	Pounds per hour
m	Meters
m/sec	Meters per second
MMBtu/hr	Million British thermal units per hour
NAAQS	National Ambient Air Quality Standards
NED	National Elevation Dataset
NO	Nitrogen Oxide
NO_2	Nitrogen Dioxide
NOx	Oxides of Nitrogen
NW AIRQUEST	Northwest International Air Quality Environmental Science and Technology Consortium
O_3	Ozone
Pb	Lead

PM_{10}	Particulate matter with an aerodynamic particle diameter less than or equal to a nominal 10 micrometers
$PM_{2.5}$	Particulate matter with an aerodynamic particle diameter less than or equal to a nominal 2.5 micrometers
ppb	Parts per billion
PPH	Pounds per hour
ppm	Parts per million
PRIME	Plume Rise Model Enhancement
PSD	Prevention of Significant Deterioration
psig	Pounds per square inch, gauge
PTC	Permit to Construct
PTE	Potential to Emit
q	Gross heat released from flare
q_n	Net heat released from flare
scf	Standard cubic feet
SIL	Significant Impact Level
SO_2	Sulfur Dioxide
TAP	Toxic Air Pollutant
tpy	Tons per year
Trinity	Trinity Consultants (permittee's permitting and modeling consultant)
USGS	United States Geological Survey
UTM	Universal Transverse Mercator
VOC	Volatile Organic Compounds
º	Degrees Latitude or Longitude
ºF	Degrees Fahrenheit
$\mu g/m^3$	Micrograms per cubic meter of air

1.0 Summary

Darigold, Inc. (Darigold) submitted a Permit to Construct (PTC) application for its existing previously exempt milk processing and bottling facility located in Boise, Idaho. Existing facility sources include two natural gas boilers, two anaerobic digesters, a biogas flare, eighteen small air heaters, and three cooling towers. The current project involves adding a natural gas boiler, ten small air heaters, and a sanitary bottle filler. Additionally, the existing boilers will be retrofitted with low-NOx burners. The new equipment raises the total facility emissions above exempted levels. Therefore, the entire facility emissions were considered new project emissions. Project-specific air quality analyses involving atmospheric dispersion modeling of estimated emissions associated with the facility were submitted to DEQ to demonstrate that applicable emissions do not result in violation of a National Ambient Air Quality Standard (NAAQS) or Toxic Air Pollutant (TAP) increment as required by the Idaho Administrative Procedures Act 58.01.01.203.02 and 203.03 (Idaho Air Rules Section 203.02 and 203.03). This memorandum provides a summary of the applicability assessment for analyses and air impact analyses used to demonstrate compliance with applicable NAAQS and TAP increments, as required by Idaho Air Rules Section 203.02 and 203.03.

Trinity Consultants (Trinity), on behalf of Darigold, prepared the PTC application and performed ambient air impact analyses for this project. DEQ review of submitted data and DEQ analyses summarized by this memorandum addressed only the rules, policies, methods, and data pertaining to the air impact analyses used to demonstrate that estimated emissions associated with operation of the facility will not cause or significantly contribute to a violation of any applicable air quality standard. This review did not address/evaluate compliance with other rules or analyses not pertaining to the air impact analyses. Evaluation of emission estimates was the responsibility of the DEQ permit writer and is addressed in the main body of the DEQ Statement of Basis, and emission calculation methods were not evaluated in this modeling review memorandum.

Table 1 presents key assumptions and results to be considered in the development of the permit. Idaho Air Rules require air impact analyses be conducted in accordance with methods outlined in 40 CFR 51, Appendix W *Guideline on Air Quality Models* (Appendix W). Appendix W requires that air quality impacts be assessed using atmospheric dispersion models with emissions and operations representative of design capacity or as limited by a federally enforceable permit condition.

The submitted information and analyses: 1) utilized appropriate methods and models; 2) was conducted using reasonably accurate or conservative model parameters and input data (review of emission estimates was addressed by the DEQ permit writer); 3) adhered to established DEQ guidelines for new source review dispersion modeling; 4) showed either a) that estimated potential/allowable emissions are at a level defined as below regulatory concern (BRC) and do not require a NAAQS compliance demonstration; b) that predicted pollutant concentrations from emissions associated with the project as modeled were below Significant Impact Levels (SILs) or other applicable regulatory thresholds; or c) that predicted pollutant concentrations from emissions associated with the project, when appropriately combined with co-contributing sources and background concentrations, were below applicable NAAQS at ambient air locations where and when the project has a significant impact; 5) showed that TAP emission increases associated with the project will not result in increased ambient air impacts exceeding allowable TAP increments. This conclusion assumes that conditions in Table 1 are representative of facility design capacity or operations as limited by a federally enforceable permit condition. The DEQ permit writer should use Table 1 and other information presented in this memorandum to generate appropriate permit provisions/restrictions to assure emissions do not exceed applicable regulatory thresholds requiring further analyses and to assure the requirements of Appendix W are met regarding emissions representative of design capacity or permit allowable rates.

Table 1. KEY ASSUMPTIONS USED IN MODELING ANALYSES.	
Criteria/Assumption/Result	**Explanation/Consideration**
General Emission Rates. Emission rates used in the air impact analyses must represent maximum potential emissions as given by design capacity, inherently limited by the nature of the process or configuration of the facility, or as limited by the issued permit for the specific pollutant and averaging period.	Compliance has not been demonstrated for emission rates greater than those used in the air impact analyses.
Air Impact Analyses for Criteria Pollutant Emissions. Short-term and long-term project emission increase of $PM_{2.5}$[a], PM_{10}[b], SO_2[c], and NO_2[d] are greater than DEQ Level I modeling thresholds. Therefore, 24-hour and annual $PM_{2.5}$, 24-hour PM_{10}, 1-hour and 3-hour SO_2, and 1-hour and annual NO_2 were subject to NAAQS Compliance Demonstration requirements. The pre-project potential to emit (PTE) was considered to be zero for all pollutants since the facility does not currently operate under a PTC. The entire facility emissions were considered new project emissions.	Project-specific air impact analyses demonstrating compliance with NAAQS, as required by Idaho Air Rules Section 203.02, are required for pollutant increases above BRC thresholds, or for pollutants having an emissions increase that is greater than Level I modeling applicability thresholds (where the BRC exclusion cannot be used).
Air Impact Analyses for TAP Emissions. Allowable emissions of hydrogen peroxide, arsenic compounds, cadmium compounds, and formaldehyde exceed screening emission levels (ELs). Analyses demonstrating compliance with hydrogen peroxide, arsenic compounds, cadmium compounds, and formaldehyde TAP increments were performed.	A TAP increment compliance demonstration would be required for any TAPs with emissions above ELs.
Significant Impact Level Analysis Not Conducted. A Significant Impact Level (SIL) analysis was not conducted for the Darigold Boise facility.	A SIL analysis, which is performed to evaluate whether the proposed project could have a significant impact to ambient air, requires modeling project emissions only. Because the facility is previously exempt and the new equipment raises the total facility emissions above exempted levels, the entire facility emissions were considered new project emissions. Therefore, a SIL analysis was considered redundant and not performed for the project.
Background Concentrations. Background concentrations for all modeled pollutants, except for 1-hour NO_2, were obtained from the Northwest International Air Quality Environmental Science and Technology Consortium (NW AIRQUEST) for the closest grid point to the Darigold Boise facility. Hourly NO_2 background data was sourced from the Meridian, Idaho EPA monitor for the years 2014-2018, concurrent with the meteorological data. A Monte Carlo method was performed by DEQ to verify compliance with the 1-hour NO_2 NAAQS.	Pollutant background concentrations determined using the NW AIRQUEST online tool use regional scale modeling of pollutants in Washington, Oregon, and Idaho, with model results adjusted according to available monitoring data.
NOx Chemistry. Ambient Ratio Method 2 (ARM2), a Tier 2 NO_2 screening method, was used to estimate the 1-hour and annual NO_2 impacts. A minimum and maximum NO_2/NOx ratio of 0.5 and 0.9, respectively, were specified in the model.	The atmospheric chemistry of NO, NO_2, and O_3 complicates accurate prediction of NO_2 impacts resulting from NOx emissions. The ARM2 method is a Tier 2 analysis method which assumes an ambient equilibrium between NO and NO_2, in which the conversion of NO to NO_2 is predicted using hourly ambient NOx monitoring data. ARM2 has been adopted by the EPA as a default regulatory Tier 2 option.

a. Particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers.
b. Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers.
c. Sulfur dioxide.
d. Nitrogen dioxide.

Summary of Submittals and Actions

July 2, 2020 Application received by DEQ.

July 10, 2020 Regulatory start date.

August 6, 2020 Application determined complete by DEQ.

2.0 Background Information

This section provides background information applicable to the project and the site proposed for the facility. It also provides a brief description of the applicable air impact analyses requirements for the project.

2.1 Project Description

The Darigold Boise facility is a milk processing and bottling facility that operates 24 hours per day, 365 days per year. Process steam and hot water are supplied by boilers, all of which are fired on natural gas. The two existing boilers are rated at 14.3 million British thermal units per hour (MMBtu/hr) (Kewanee boiler) and 20.3 MMBtu/hr (Cleaver Brooks boiler). Two existing anaerobic digesters process wastewater and produce biogas. The digesters have volumes of 1.0 million and 1.7 million gallons each and the biogas is controlled by combustion in the flare. The existing facility also includes eighteen small natural gas-fired building air heaters ranging from 0.06 to 3.60 MMBtu/hr. Three cooling towers are also a part of the existing facility.

Two separate operating scenarios are possible for the facility. The "controlled" operating scenario represents emissions of biogas being combusted in the flare. The "uncontrolled" operating scenario represents raw biogas emissions from the digesters, which could occur during a flare malfunction. All other facility sources operate identically in both operating scenarios. Emissions were quantified for both operating scenarios.

Modifications at the facility include the following:

- Installation of a new natural gas-fired boiler (Johnston boiler) rated at 32.1 MMBtu/hr and equipped with 30 parts per million (ppm) low NOx burners;
- Retrofit of existing natural gas-fired boilers to use 9 ppm ultra-low NOx burners;
- Installation of ten new natural gas-fired small building air heaters rated between 0.50 to 3.60 MMBtu/hr; and
- Installation of a sanitary milk bottle filler that uses hydrogen peroxide for sanitation and exhausts outside the facility.

The new filler and some of the new heaters will be located in an expanded portion of the existing building, which will be built on the east side of the existing building.

The PTC addresses all air pollutant-emitting activities associated with the facility.

2.2 Facility Location and Area Classification

The Darigold Boise facility is located at 618 N. Allumbaugh St. in Ada County (Northing: 4,828,894 meters; Easting: 559,288 meters; UTM Zone 11). Ada County is designated as an attainment area for sulfur dioxide (SO_2), nitrogen dioxide (NO_2), carbon monoxide (CO), lead (Pb), ozone (O_3), particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers (PM_{10}), and particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers ($PM_{2.5}$).

The area is not classified as non-attainment for any criteria pollutants. Land use in the area is a mix of light-moderate industrial, commercial, residential, metropolitan natural, and undeveloped. Terrain surrounding the immediate project site is relatively flat, with hilly terrain beginning 6 kilometers (km) to the north and east.

2.3 Air Impact Analyses Required for All Permits to Construct

Idaho Air Rules Sections 203.02 and 203.03:

> *No permit to construct shall be granted for a new or modified stationary source unless the applicant shows to the satisfaction of the Department all of the following:*
>
> ***02. NAAQS**. The stationary source or modification would not cause or significantly contribute to a violation of any ambient air quality standard.*
>
> ***03. Toxic Air Pollutants.** Using the methods provided in Section 210, the emissions of toxic air pollutants from the stationary source or modification would not injure or unreasonably affect human or animal life or vegetation as required by Section 161. Compliance with all applicable toxic air pollutant carcinogenic increments and toxic air pollutant non-carcinogenic increments will also demonstrate preconstruction compliance with Section 161 with regards to the pollutants listed in Sections 585 and 586.*

Atmospheric dispersion modeling, using computerized simulations, is used to demonstrate compliance with both NAAQS and TAPs. Idaho Air Rules Section 202.02 states:

> ***02. Estimates of Ambient Concentrations**. All estimates of ambient concentrations shall be based on the applicable air quality models, data bases, and other requirements specified in 40 CFR 51 Appendix W (Guideline on Air Quality Models).*

2.4 Significant Impact Level and Cumulative NAAQS Impact Analyses

If specific criteria pollutant emission increases associated with the proposed permitting project cannot qualify for a BRC exemption as per Idaho Air Rules Section 221, then the permit cannot be issued unless the application demonstrates that applicable emission increases will not cause or significantly contribute to a violation of NAAQS, as required by Idaho Air Rules Section 203.02.

The first phase of a NAAQS compliance demonstration is to evaluate whether the proposed facility/project could have a significant impact to ambient air. Section 3.1.1 of this memorandum describes the applicability evaluation of Idaho Air Rules Section 203.02. The Significant Impact Level (SIL) analysis for a new facility or proposed modification to a facility involves modeling estimated criteria air pollutant emissions from the facility or modification to determine the potential impacts to ambient air. Air impact analyses are required by Idaho Air Rules to be conducted in accordance with methods outlined in Appendix W. Appendix W requires that facilities be modeled using emissions and operations representative of design capacity or as limited by a federally enforceable permit condition.

A facility or modification is considered to have a significant impact on air quality if maximum modeled impacts to ambient air exceed the established SIL listed in Idaho Air Rules Section 006 (referred to as a "significant contribution" in Idaho Air Rules) or as incorporated by reference as per Idaho Air Rules Section 107.03.b. Table 2 lists the applicable SILs.

Table 2. APPLICABLE REGULATORY LIMITS.				
Pollutant	**Averaging Period**	**Significant Impact Levels[a] ($\mu g/m^3$)[b]**	**Regulatory Limit[c] ($\mu g/m^3$)**	**Modeled Design Value Used[d]**
PM_{10}[e]	24-hour	5.0	150[f]	Maximum 6th highest[g]
$PM_{2.5}$[h]	24-hour	1.2	35[i]	Mean of maximum 8th highest[j]
	Annual	0.2	12[k]	Mean of maximum 1st highest[l]
Carbon Monoxide (CO)	1-hour	2,000	40,000[m]	Maximum 2nd highest[n]
	8-hour	500	10,000[m]	Maximum 2nd highest[n]
Sulfur Dioxide (SO_2)	1-hour	3 ppb[o] (7.8 $\mu g/m^3$)	75 ppb[p] (196 $\mu g/m^3$)	Mean of maximum 4th highest[q]
	3-hour	25	1,300[m]	Maximum 2nd highest[n]
Nitrogen Dioxide (NO_2)	1-hour	4 ppb (7.5 $\mu g/m^3$)	100 ppb[s] (188 $\mu g/m^3$)	Mean of maximum 8th highest[t]
	Annual	1.0	100[r]	Maximum 1st highest[n]
Lead (Pb)	3-month[u]	NA	0.15[r]	Maximum 1st highest[n]
	Quarterly	NA	1.5[r]	Maximum 1st highest[n]
Ozone (O_3)	8-hour	40 TPY VOC[v]	70 ppb[w]	Not typically modeled

a. Idaho Air Rules Section 006 (definition for significant contribution) or as incorporated by reference as per Idaho Air Rules Section 107.03.b.
b. Micrograms per cubic meter.
c. Incorporated into Idaho Air Rules by reference, as per Idaho Air Rules Section 107.
d. The maximum 1st highest modeled value is always used for the significant impact analysis unless indicated otherwise. Modeled design values are calculated for each ambient air receptor.
e. Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers.
f. Not to be exceeded more than once per year on average over 3 years.
g. Concentration at any modeled receptor when using five years of meteorological data.
h. Particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers.
i. 3-year mean of the upper 98th percentile of the annual distribution of 24-hour concentrations.
j. 5-year mean of the 8th highest modeled 24-hour concentrations at the modeled receptor for each year of meteorological data modeled. For the SIL analysis, the 5-year mean of the 1st highest modeled 24-hour impacts at the modeled receptor for each year.
k. 3-year mean of annual concentration.
l. 5-year mean of annual averages at the modeled receptor.
m. Not to be exceeded more than once per year.
n. Concentration at any modeled receptor.
o. Interim SIL established by EPA policy memorandum.
p. 3-year mean of the upper 99th percentile of the annual distribution of maximum daily 1-hour concentrations.
q. 5-year mean of the 4th highest daily 1-hour maximum modeled concentrations for each year of meteorological data modeled. For the significant impact analysis, the 5-year mean of 1st highest modeled 1-hour impacts for each year is used.
r. Not to be exceeded in any calendar year.
s. 3-year mean of the upper 98th percentile of the annual distribution of maximum daily 1-hour concentrations.
t. 5-year mean of the 8th highest daily 1-hour maximum modeled concentrations for each year of meteorological data modeled. For the significant impact analysis, the 5-year mean of maximum modeled 1-hour impacts for each year is used.
u. 3-month rolling average.
v. An annual emissions rate of 40 ton/year of VOCs is considered significant for O_3.
w. Annual 4th highest daily maximum 8-hour concentration averaged over three years.

If modeled maximum pollutant impacts to ambient air from the emission sources associated with a new facility or modification exceed the SILs, then a cumulative NAAQS impact analysis is necessary to demonstrate compliance with NAAQS and Idaho Air Rules Section 203.02.

A cumulative NAAQS impact analysis for attainment area pollutants involves assessing ambient impacts (typically the design values consistent with the form of the standard) from potential/allowable emissions resulting from the project and emissions from any nearby co-contributing sources (including existing emissions from the facility that are unrelated to the project), and then adding a DEQ-approved background concentration value to the modeled result that is appropriate for the criteria pollutant/averaging-period at the facility location and the area of significant impact. The resulting

pollutant concentrations in ambient air are then compared to the NAAQS listed in Table 2. Table 2 also specifies the modeled design value that must be used for comparison to the NAAQS. NAAQS compliance is evaluated on a receptor-by-receptor basis for the modeling domain.

If the cumulative NAAQS impact analysis indicates an exceedance of NAAQS, a culpability analysis can determine if this exceedance is due to emissions from the proposed project. The permit may not be issued if the proposed project has a significant contribution (exceeding the SIL) to the modeled violation. If project-specific impacts are below the SIL, then the project does not have a significant contribution to the specific violations.

Compliance with Idaho Air Rules Section 203.02 is generally demonstrated if: a) applicable specific criteria pollutant emission increases are at a level defined as BRC, using the criteria established by DEQ regulatory interpretation[1]; or b) all modeled impacts of the SIL analysis are below the applicable SIL or other level determined to be inconsequential to NAAQS compliance; or c) modeled design values of the cumulative NAAQS impact analysis (modeling all emissions from the facility and co-contributing sources, and adding a background concentration) are less than applicable NAAQS at receptors where impacts from the proposed facility/modification exceeded the SIL or other identified level of consequence; or d) if the cumulative NAAQS analysis showed NAAQS violations, the impact of proposed facility/modification to any modeled violation was inconsequential (typically assumed to be less than the established SIL) for that specific receptor and for the specific modeled time when the violation occurred.

2.5 Toxic Air Pollutant Analyses

Emissions of toxic substances are generally addressed by Idaho Air Rules Section 161:

> *Any contaminant which is by its nature toxic to human or animal life or vegetation shall not be emitted in such quantities or concentrations as to alone, or in combination with other contaminants, injure or unreasonably affect human or animal life or vegetation.*

Permitting requirements for toxic air pollutants (TAPs) from new or modified sources are specifically addressed by Idaho Air Rules Section 203.03 and require the applicant to demonstrate to the satisfaction of DEQ the following:

> *Using the methods provided in Section 210, the emissions of toxic air pollutants from the stationary source or modification would not injure or unreasonably affect human or animal life or vegetation as required by Section 161. Compliance with all applicable toxic air pollutant carcinogenic increments and toxic air pollutant non-carcinogenic increments will also demonstrate preconstruction compliance with Section 161 with regards to the pollutants listed in Sections 585 and 586.*

Per Section 210, if the total project-wide emission increase of any TAP associated with a new source or modification exceeds screening emission levels (ELs) of Idaho Air Rules Section 585 or 586, then the ambient impact of the emission increase must be estimated. If ambient impacts are less than applicable Acceptable Ambient Concentrations (AACs) for non-carcinogens of Idaho Air Rules Section 585 and Acceptable Ambient Concentrations for Carcinogens (AACCs) of Idaho Air Rules Section 586, then compliance with TAP requirements has been demonstrated.

Idaho Air Rules Section 210.20 states that if TAP emissions from a specific source are regulated by the Department or EPA under 40 CFR 60, 61, or 63, then a TAP impact analysis under Section 210 is not

required for that TAP. The DEQ permit writer evaluates the applicability of specific TAPs to the Section 210.20 exclusion.

3.0 Analytical Methods and Data

This section describes the methods and data used in the analyses to demonstrate compliance with applicable air quality impact requirements. The DEQ Statement of Basis provides a discussion of the methods and data used to estimate criteria and TAP emission rates.

3.1 Emission Source Data

Emissions of criteria pollutants and TAPs resulting from operation of the Darigold Boise facility were estimated by Trinity for various applicable averaging periods. The calculation of potential emissions is the responsibility of the DEQ permit writer, and the representativeness and accuracy of emission estimates is not addressed in this modeling memorandum. DEQ air impact analysts are responsible for assuring that potential emission rates provided in the emission inventory are properly used in the model. The rates listed must represent the maximum allowable rate as averaged over the specified period.

Emission rates used in the impact modeling applicability analyses and any modeling analyses, as listed in this memorandum, should be reviewed by the DEQ permit writer and compared with those in the final emission inventory. All modeled criteria air pollutant and TAP emission rates must be equal to or greater than the facility's potential emissions calculated in the PTC emission inventory or proposed permit allowable emission rates.

3.1.1 Modeling Applicability and Modeled Criteria Pollutant Emission Rates

If project-specific emission increases for criteria pollutants would qualify for a BRC permit exemption as per Idaho Air Rules Section 221 if it were not for potential emissions of one or more pollutants exceeding the BRC threshold of 10 percent of emissions defined by Idaho Air Rules as significant, then a NAAQS compliance demonstration may not be required for those pollutants with emissions below BRC levels. DEQ's regulatory interpretation policy of exemption provisions of Idaho Air Rules is that: "A DEQ NAAQS compliance assertion will not be made by the DEQ modeling group for specific criteria pollutants having a project emissions increase below BRC levels, provided the proposed project would have qualified for a Category I Exemption for BRC emissions quantities except for the emissions of another criteria pollutant.[1]" The interpretation policy also states that the exemption criteria of uncontrolled potential to emit (PTE) not to exceed 100 ton/year (Idaho Air Rules Section 220.01.a.i) is not applicable when evaluating whether a NAAQS impact analyses is required. A permit will be issued limiting PTE below 100 ton/year, thereby negating the need to maintain calculated uncontrolled PTE under 100 ton/year. The BRC exemption cannot be used to exempt a project from a pollutant-specific NAAQS compliance demonstration in most cases where a PTC is required for the action regardless of emission quantities, such as the modification of an existing emission or throughput limit.

A NAAQS compliance demonstration must be performed for pollutant increases that would not qualify for the BRC exemption from the requirement to demonstrate compliance with NAAQS.

Site-specific air impact modeling analyses may not be necessary for some pollutants, even where such emissions do not qualify for the BRC exemption. DEQ has developed modeling applicability thresholds, below which a site-specific modeling analysis is not required. DEQ generic air impact modeling analyses that were used to develop the modeling thresholds provide a conservative SIL analysis for projects with

emissions below identified threshold levels. Project-specific modeling applicability thresholds are provided in the *Idaho Air Modeling Guideline*[2]. These thresholds were based on assuring an ambient impact of less than the established SIL for specific pollutants and averaging periods.

If total project-specific emission rate increases of a pollutant are below Level I Modeling Applicability Thresholds, then project-specific air impact analyses are not necessary for permitting. Use of Level II Modeling Applicability Thresholds is conditional, requiring DEQ approval. DEQ approval is based on dispersion-affecting characteristics of the emission sources such as stack height, stack gas exit velocity, stack gas temperature, distance from sources to ambient air, presence of elevated terrain, and potential exposure to sensitive public receptors.

Table 3 provides a comparison between project-specific emission increases and modeling applicability thresholds. The pre-project PTE was considered to be zero for all pollutants since the facility does not currently operate under a PTC. The facility-wide, post-project PTE is therefore equal to the change in PTE. Table 3 shows the maximum emissions among the uncontrolled and controlled operating scenarios.

Table 3. SITE-SPECIFIC CRITERIA POLLUTANT MODELING APPLICABILITY.

Pollutant	Averaging Period	Emission Increase	Level I Modeling Thresholds	Level II Modeling Thresholds[a]	Site-Specific Modeling Required?
PM_{10}[b]	24-hour	0.27 lb/hr[c]	0.22	2.6	Yes[d]
$PM_{2.5}$[e]	24-hour	0.27 lb/hr	0.054	0.63	Yes[d]
	Annual	0.87 tpy[f]	0.35	4.1	Yes[d]
Carbon Monoxide (CO)	1-hour, 8-hour	6.81 lb/hr	15	175	No
Sulfur Dioxide (SO_2)	1-hour, 3-hour	4.64 lb/hr	0.21	2.5	Yes
Nitrogen Oxides (NOx)	1-hour	3.13 lb/hr	0.20	2.4	Yes
	Annual	12.66 tpy	1.2	14	Yes

a. Level II modeling thresholds were neither evaluated nor approved for use with this project.
b. Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers.
c. Pounds per hour.
d. Facility-wide PTE values for PM_{10} (0.93 tpy) and $PM_{2.5}$ (0.87 tpy) are less than 10 percent of significant emission rate (1.50 tpy for PM_{10} and 1.0 tpy for $PM_{2.5}$) and therefore qualify for a BRC exemption as per Idaho Air Rules Section 221. However, PM_{10} and $PM_{2.5}$ modeling was performed by the applicant, providing additional verification that NAAQS will be met, even though a NAAQS compliance demonstration was not required for permit issuance.
e. Particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers.
f. Tons per year.

Facility-wide PTE values for PM_{10} (0.93 tpy) and $PM_{2.5}$ (0.87 tpy) are less than 10 percent of significant emission rate (1.50 tpy for PM_{10} and 1.0 tpy for $PM_{2.5}$) and therefore qualify for a BRC exemption as per Idaho Air Rules Section 221. However, PM_{10} and $PM_{2.5}$ modeling was performed by the applicant, providing additional verification that NAAQS will be met, even though a NAAQS compliance demonstration was not required for permit issuance. As indicated in Table 3, air impact modeling was performed for 24-hour PM_{10}, 24-hour and annual $PM_{2.5}$, 1-hour and 3-hour SO_2, and 1-hour and annual NO_2 based on the Level I modeling thresholds. Level II modeling thresholds were neither evaluated nor approved for use with this project.

A SIL analysis was not performed for the project. Table 4 lists criteria pollutant emission rates used in the cumulative NAAQS impact analyses. Description for each source ID is listed later in Tables 7 (point sources) and 8 (volume sources).

Table 4. MODELED EMISSION RATES FOR CUMULATIVE NAAQS IMPACT ANALYSIS.							
Type of Source	**Source ID**	**24-hr PM_{10}[a] (lb/hr)[b]**	**24-hr $PM_{2.5}$[c] (lb/hr)**	**Annual $PM_{2.5}$ (tpy)[d]**	**1-hour, 3-hour SO_2[e] (lb/hr)**	**1-hour NO_2[f] (lb/hr)**	**Annual NO_2 (tpy)**
Point Sources	BOI_CB	2.23E-02	2.23E-02	9.77E-02	1.19E-02	2.45E-01	1.07E+00
	BOI_JSTN	3.27E-02	3.27E-02	1.43E-01	1.89E-02	1.16E+00	5.06E+00
	BOI_KWN	1.57E-02	1.57E-02	6.89E-02	8.41E-03	1.73E-01	7.58E-01
	RMAU03	1.07E-03	1.07E-03	4.70E-03	8.47E-05	1.41E-02	6.18E-02
	CT1A	1.42E-03	4.60E-06	2.01E-05	0	0	0
	CT1B	1.42E-03	4.60E-06	2.01E-05	0	0	0
	CT1C	1.42E-03	4.60E-06	2.01E-05	0	0	0
	CT2A	1.42E-03	4.60E-06	2.01E-05	0	0	0
	CT2B	1.42E-03	4.60E-06	2.01E-05	0	0	0
	CT2C	1.42E-03	4.60E-06	2.01E-05	0	0	0
	CT3	5.47E-03	1.77E-05	7.74E-05	0	0	0
	FLARE	9.70E-02	9.70E-02	1.71E-01	4.60E+00	3.92E-01	6.93E-01
	RMAU07	8.94E-04	8.94E-04	3.92E-03	7.06E-05	1.18E-02	5.15E-02
	RMAU08	4.47E-04	4.47E-04	1.96E-03	3.53E-05	5.88E-03	2.58E-02
	RMAU13	8.38E-04	8.38E-04	3.67E-03	6.62E-05	1.10E-02	4.83E-02
	CMAU1	1.49E-03	1.49E-03	6.53E-03	1.18E-04	1.96E-02	8.59E-02
	CMAU2	1.49E-03	1.49E-03	6.53E-03	1.18E-04	1.96E-02	8.59E-02
	CMAU3	7.45E-04	7.45E-04	3.26E-03	5.88E-05	9.80E-03	4.29E-02
	CMAU4	7.45E-04	7.45E-04	3.26E-03	5.88E-05	9.80E-03	4.29E-02
	CMAU5	7.45E-04	7.45E-04	3.26E-03	5.88E-05	9.80E-03	4.29E-02
	CMAU6	7.45E-04	7.45E-04	3.26E-03	5.88E-05	9.80E-03	4.29E-02
	CMAU7	2.98E-03	2.98E-03	1.31E-02	2.35E-04	3.92E-02	1.72E-01
	FILLER	0	0	0	0	0	0
	RMAU05	8.94E-04	8.94E-04	3.92E-03	7.06E-05	1.18E-02	5.15E-02
	RMAU06	1.82E-03	1.82E-03	7.96E-03	1.43E-04	2.39E-02	1.05E-01
	RMAU09	6.71E-04	6.71E-04	2.94E-03	5.29E-05	8.82E-03	3.86E-02
	RMAU10	4.10E-03	4.10E-03	1.79E-02	3.24E-04	5.39E-02	2.36E-01
	RMAU11	4.10E-03	4.10E-03	1.79E-02	3.24E-04	5.39E-02	2.36E-01
	RMAU12	8.38E-04	8.38E-04	3.67E-03	6.62E-05	1.10E-02	4.83E-02
	RMAU20	6.71E-04	6.71E-04	2.94E-03	5.29E-05	8.82E-03	3.86E-02
Volume Sources	MAU1	8.94E-03	8.94E-03	3.92E-02	7.06E-04	1.18E-01	5.15E-01
	RMAU01	7.24E-03	7.24E-03	3.17E-02	5.72E-04	9.53E-02	4.17E-01
	RMAU02	2.68E-02	2.68E-02	1.17E-01	2.12E-03	3.53E-01	1.54E+00
	RMAU04	3.72E-03	3.72E-03	1.63E-02	2.94E-04	4.90E-02	2.15E-01
	RTU1	1.49E-03	1.49E-03	6.53E-03	1.18E-04	1.96E-02	8.59E-02
	RTU1A	8.94E-04	8.94E-04	3.92E-03	7.06E-05	1.18E-02	5.15E-02
	RTU1B	1.86E-03	1.86E-03	8.16E-03	1.47E-04	2.45E-02	1.07E-01
	RTU1C	8.94E-03	8.94E-03	3.92E-02	7.06E-04	1.18E-01	5.15E-01
	RTU2	5.96E-03	5.96E-03	2.61E-02	4.71E-04	7.84E-02	3.44E-01
	RTU3	9.69E-04	9.69E-04	4.24E-03	7.65E-05	1.28E-02	5.58E-02

a. Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers.
b. Pounds per hour.
c. Particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers.
d. Tons per year.
e. Sulfur dioxide.
f. Nitrogen dioxide.

Ozone (O_3) differs from other criteria pollutants in that it is not typically emitted directly into the atmosphere. O_3 is formed in the atmosphere through reactions of VOCs, NOx, and sunlight. Atmospheric dispersion models used in stationary source air permitting analyses cannot be used to estimate O_3 impacts resulting from VOC and NOx emissions from an industrial facility. O_3 concentrations resulting from area-wide emissions are predicted by using more complex airshed models such as the Community Multi-

Scale Air Quality (CMAQ) modeling system. Use of the CMAQ model is very resource-intensive and DEQ asserts that performing a CMAQ analysis for a particular permit application is not typically a reasonable or necessary requirement for air quality permitting.

Addressing secondary formation of O_3 within the context of permitting a new stationary source has been somewhat addressed in EPA regulation and policy. As stated in a letter from Gina McCarthy of EPA to Robert Ukeiley, acting on behalf of the Sierra Club (letter from Gina McCarthy, Assistant Administrator, United States Environmental Protection Agency, to Robert Ukeiley, January 4, 2012):

> *. . . footnote 1 to sections 51.166(I)(5)(I) of the EPA's regulations says the following: "No de minimis air quality level is provided for ozone. However, any net emission increase of 100 tons per year or more of volatile organic compounds or nitrogen oxides subject to PSD would be required to perform an ambient impact analysis, including the gathering of air quality data."*
>
> *The EPA believes it unlikely a source emitting below these levels would contribute to such a violation of the 8-hour ozone NAAQS, but consultation with an EPA Regional Office should still be conducted in accordance with section 5.2.1.c. of Appendix W when reviewing an application for sources with emissions of these ozone precursors below 100 TPY."*

DEQ determined it was not appropriate or necessary to require a quantitative source-specific O_3 impact analysis because allowable emission estimates of VOCs and NOx are below the 100 tons/year threshold.

3.1.2 TAPs Modeling Applicability

Facility-wide emissions of hydrogen peroxide, arsenic compounds, cadmium compounds, and formaldehyde exceed the applicable emission screening levels (ELs) of Idaho Air Rules Section 585 and 586 for both controlled and uncontrolled scenarios. Air impact modeling analyses were then required to demonstrate that maximum impacts of hydrogen peroxide, arsenic compounds, cadmium compounds, and formaldehyde are below applicable ambient increment standards expressed in Idaho Air Rules Section 585 and 586 as AACs and AACCs.

Hydrogen peroxide is a non-carcinogenic TAP that is regulated on a short-term averaging basis. Therefore, the appropriate emission rates for impact analyses are maximum daily emissions, expressed as an average pound/hour value over a 24-hour period. Arsenic compounds, cadmium compounds, and formaldehyde are carcinogenic TAPs that are regulated on a long-term averaging basis. Therefore, the appropriate emission rates for impact analyses are maximum annual emissions, expressed as an average pound/hour value over an 8,760-hour period.

Table 5 provides a summary of TAP emission increases for the four TAPs that had an increase exceeding the ELs of Idaho Air Rules Section 585 or 586 for both controlled and uncontrolled scenarios.

Table 5. TAP EMISSION INCREASES THAT TRIGGER MODELING.

Toxic Air Pollutant	Emissions (lb/hr)[a]	Screening Emissions Level (lb/hr)
Hydrogen peroxide[b]	3.31E-01	1.00E-01
Arsenic compounds[c]	2.77E-06	1.50E-06
Cadmium compounds[c]	1.53E-05	3.70E-06
Formaldehyde[c]	1.04E-03	5.10E-04

a. Pounds per hour.

b. Non-carcinogenic TAP. ELs are daily maximum emissions expressed as pounds/hour. The emission rate is the daily emissions divided by 24 hours/day.

c. Carcinogenic TAP. ELs are annual maximum emissions expressed as pounds/hour. The emission rate is the annual emissions divided by 8,760 hours/year.

Table 6 lists the emission rates used in the TAPs impact analyses. Description for each source ID is listed later in Tables 7 (point sources) and 8 (volume sources).

Table 6. MODELED EMISSION RATES FOR TAPS IMPACT ANALYSES.

Type of Source	Source ID	Hydrogen peroxide[a] (lb/hr)[b]	Arsenic compounds[c] (lb/hr)	Cadmium compounds[c] (lb/hr)	Formaldehyde[c] (lb/hr)
Point Sources	BOI_CB	0	0	0	0
	BOI_JSTN	0	0	0	0
	BOI_KWN	0	0	0	0
	RMAU03	0	2.82E-08	1.55E-07	1.06E-05
	CT1A	0	0	0	0
	CT1B	0	0	0	0
	CT1C	0	0	0	0
	CT2A	0	0	0	0
	CT2B	0	0	0	0
	CT2C	0	0	0	0
	CT3	0	0	0	0
	FLARE	0	4.56E-07	2.51E-06	1.71E-04
	RMAU07	0	2.35E-08	1.29E-07	8.82E-06
	RMAU08	0	1.18E-08	6.47E-08	4.41E-06
	RMAU13	0	2.21E-08	1.21E-07	8.27E-06
	CMAU1	0	3.92E-08	2.16E-07	1.47E-05
	CMAU2	0	3.92E-08	2.16E-07	1.47E-05
	CMAU3	0	1.96E-08	1.08E-07	7.35E-06
	CMAU4	0	1.96E-08	1.08E-07	7.35E-06
	CMAU5	0	1.96E-08	1.08E-07	7.35E-06
	CMAU6	0	1.96E-08	1.08E-07	7.35E-06
	CMAU7	0	7.84E-08	4.31E-07	2.94E-05
	FILLER	3.31E-01	0	0	0
	RMAU05	0	2.35E-08	1.29E-07	8.82E-06
	RMAU06	0	4.78E-08	2.63E-07	1.79E-05
	RMAU09	0	1.77E-08	9.71E-08	6.62E-06
	RMAU10	0	1.08E-07	5.93E-07	4.04E-05
	RMAU11	0	1.08E-07	5.93E-07	4.04E-05
	RMAU12	0	2.21E-08	1.21E-07	8.27E-06
	RMAU20	0	1.77E-08	9.71E-08	6.62E-06
Volume Sources	MAU1	0	2.35E-07	1.29E-06	8.82E-05
	RMAU01	0	1.91E-07	1.05E-06	7.15E-05
	RMAU02	0	7.05E-07	3.88E-06	2.64E-04
	RMAU04	0	9.80E-08	5.39E-07	3.68E-05
	RTU1	0	3.92E-08	2.16E-07	1.47E-05
	RTU1A	0	2.35E-08	1.29E-07	8.82E-06
	RTU1B	0	4.90E-08	2.70E-07	1.84E-05
	RTU1C	0	2.35E-07	1.29E-06	8.82E-05
	RTU2	0	1.57E-07	8.63E-07	5.88E-05
	RTU3	0	2.55E-08	1.40E-07	9.56E-06

a. Non-carcinogenic TAP. The emission rate is the daily emissions divided by 24 hours/day.
b. Pounds per hour.
c. Carcinogenic TAP. The emission rate is the annual emissions divided by 8,760 hours/year.

3.1.3 Emission Release Parameters

Table 7 lists the emission release parameters, including stack height, exhaust temperature, exhaust

velocity, and stack diameter for Darigold's point sources in metric units (English units are in parentheses). Emission point release parameters were based on information provided in the application. Justification for emission release parameters is summarized in the next section.

Table 7. POINT SOURCE EMISSION RELEASE PARAMETERS IN METRIC UNITS (ENGLISH UNITS IN PARENTHESES).

Release Point	Description	UTM[a] Coordinates		Stack Height in m (ft)[c]	Stack Exhaust Temp. in K (ºF)[d]	Stack Exhaust Velocity in m/sec (fps)[e]	Stack Diameter in m (ft)	Orient. Of Release[f]
		Easting-X in m[b]	Northing-Y in m					
BOI_CB	Cleaver Brooks boiler	559,241.00	4,828,924.00	22.0 (72.0)	473 (392)	6.8 (22.4)	0.61 (2.00)	D
BOI_JSTN	Johnston boiler	559,308.00	4,828,844.00	18.9 (62.0)	466 (380)	12.0 (39.2)	0.71 (2.33)	D
BOI_KWN	Kewanee boiler	559,252.00	4,828,920.00	22.0 (72.0)	485 (413)	5.4 (17.6)	0.51 (1.67)	D
RMAU03	Air heater	559,252.00	4,828,926.00	8.2 (27.0)	311 (100)	2.7 (8.7)	0.11 (0.36)	H
CT1A	Cooling tower	559,239.00	4,828,852.00	12.5 (41.0)	303 (85)	26.1 (85.5)	1.71 (5.61)	D
CT1B	Cooling tower	559,239.00	4,828,850.00	12.5 (41.0)	303 (85)	26.1 (85.5)	1.71 (5.61)	D
CT1C	Cooling tower	559,239.00	4,828,848.00	12.5 (41.0)	303 (85)	26.1 (85.5)	1.71 (5.61)	D
CT2A	Cooling tower	559,248.00	4,828,852.00	12.5 (41.0)	303 (85)	26.1 (85.5)	1.71 (5.61)	D
CT2B	Cooling tower	559,248.00	4,828,850.00	12.5 (41.0)	303 (85)	26.1 (85.5)	1.71 (5.61)	D
CT2C	Cooling tower	559,248.00	4,828,848.00	12.5 (41.0)	303 (85)	26.1 (85.5)	1.71 (5.61)	D
CT3	Cooling tower	559,288.00	4,828,915.00	13.4 (44.0)	303 (85)	9.9 (32.5)[g]	2.13 (6.99)	D
FLARE	Flare	559,037.00	4,828,821.00	6.8 (22.5)	1273 (1832)	20.0 (65.6)	0.42 (1.38)	D
RMAU07	Air heater	559,323.00	4,828,867.00	9.5 (31.0)	311 (100)	5.4 (17.8)	0.07 (0.23)	D
RMAU08	Air heater	559,271.00	4,828,904.00	8.5 (28.0)	311 (100)	2.7 (8.9)	0.07 (0.23)	D
RMAU13	Air heater	559,240.00	4,828,888.00	7.9 (26.0)	311 (100)	2.7 (8.9)	0.07 (0.23)	D
CMAU1	Air heater	559,258.00	4,828,882.00	8.5 (28.0)	339 (150)	6.2 (20.2)	0.15 (0.49)	R
CMAU2	Air heater	559,265.00	4,828,865.00	10.1 (33.0)	339 (150)	6.2 (20.2)	0.15 (0.49)	R
CMAU3	Air heater	559,331.00	4,828,921.00	8.8 (29.0)	383 (230)	4.4 (14.3)	0.08 (0.26)	R
CMAU4	Air heater	559,352.00	4,828,922.00	8.8 (29.0)	383 (230)	4.4 (14.3)	0.08 (0.26)	R
CMAU5	Air heater	559,352.00	4,828,907.00	8.8 (29.0)	383 (230)	4.4 (14.3)	0.08 (0.26)	R
CMAU6	Air heater	559,330.00	4,828,907.00	8.8 (29.0)	383 (230)	4.4 (14.3)	0.08 (0.26)	R
CMAU7	Air heater	559,306.00	4,828,910.00	11.0 (36.0)	339 (150)	12.3 (40.4)	0.15 (0.49)	R
FILLER	Milk bottle filler	559,335.00	4,828,914.00	8.5 (28.0)	297 (75)	0.6 (2.0)	0.13 (0.43)	R
RMAU05	Air heater	559,249.00	4,828,906.00	8.5	311	5.1	0.08	H

				(28.0)	(100)	(16.6)	(0.26)	
RMAU06	Air heater	559,264.00	4,828,903.00	9.1 (30.0)	311 (100)	8.5 (28.0)	0.11 (0.36)	H
RMAU09	Air heater	559,240.00	4,828,898.00	7.9 (26.0)	311 (100)	3.6 (11.6)	0.11 (0.36)	H
RMAU10	Air heater	559,322.00	4,828,899.00	8.8 (29.0)	319 (115)	2.7 (8.7)	0.15 (0.49)	H
RMAU11	Air heater	559,307.00	4,828,896.00	8.8 (29.0)	319 (115)	2.7 (8.7)	0.15 (0.49)	H
RMAU12	Air heater	559,242.00	4,828,904.00	7.9 (26.0)	311 (100)	2.7 (8.7)	0.09 (0.30)	H
RMAU20	Air heater	559,323.00	4,828,883.00	8.2 (27.0)	311 (100)	2.7 (8.7)	0.11 (0.36)	H

a. Universal Transverse Mercator.
b. m: meters.
c. ft: feet.
d. K: Kelvin; ºF: degrees Fahrenheit.
e. m/sec: meters per second; fps: feet per second.
f. Orientation of release: D (default, vertical, uninterrupted release); H (horizontal release); R (rain-capped release).
g. CT3 was originally modeled by Trinity with an exit velocity of 26.0 m/sec. John Goetze, Associate Consultant from Trinity, confirmed on August 4, 2020 via e-mail that the correct exit velocity for CT3 is 9.9 m/sec (32.5 fps). DEQ adjusted the exit velocity in the final modeling runs.

Table 8 lists the emission release parameters for Darigold's volume sources in metric units (English units are in parentheses). Emission release parameters were based on information provided in the application. Justification for volume source parameters is summarized in the next section.

Table 8. VOLUME SOURCE EMISSION RELEASE PARAMETERS IN METRIC UNITS (ENGLISH UNITS IN PARENTHESES).

Release Point	Description	UTM[a] Coordinates		Release Height in m (ft)[c]	Init. Horiz. Dim. in m (ft)	Init. Vert. Dim. in m (ft)
		Easting-X in m[b]	Northing-Y in m			
MAU1	Air heater	559,309.00	4,828,883.00	8.67	0.47	3.69
RMAU01	Air heater	559,318.00	4,828,858.00	8.92	1.86	3.69
RMAU02	Air heater	559,324.00	4,828,927.00	9.84	1.86	4.11
RMAU04	Air heater	559,257.00	4,828,926.00	8.67	0.47	3.69
RTU1	Air heater	559,331.00	4,828,926.00	8.67	0.47	3.69
RTU1A	Air heater	559,334.00	4,828,926.00	8.67	0.47	3.69
RTU1B	Air heater	559,338.00	4,828,931.00	8.67	0.47	3.69
RTU1C	Air heater	559,357.00	4,828,914.00	8.67	0.47	3.69
RTU2	Air heater	559,364.00	4,828,914.00	8.67	0.47	3.69
RTU3	Air heater	559,246.00	4,828,914.00	8.67	0.47	3.69

a. Universal Transverse Mercator.
b. m: meters.
c. ft: feet.

3.1.4 Emission Release Parameter Justification

<u>Cleaver Brooks Boiler</u>

Model ID: BOI_CB

The Cleaver Brooks boiler is an existing boiler that was modeled as an unrestricted point source. It was modeled to run at full capacity continuously since it is not restricted by any alternate operating scenarios or permit conditions. Stack height (22.0 meters) and diameter (0.61 meters) were based on facility

physical design characteristics. The exhaust temperature (473 Kelvin) and exhaust flow rate (24,760 pounds per hour [PPH]) were sourced from the ultra-low NOx burner vendor specifications, with the burner operating at 100% capacity. Flow rate in units of PPH was converted to exit velocity using the stack diameter and the density of air at the exhaust temperature (https://www.engineeringtoolbox.com/air-density-specific-weightd_600.html). The calculated exhaust velocity is 14.4 m/sec, but BOI_CB was conservatively modeled with an exit velocity of 6.8 m/sec.

Exhaust parameters for the Cleaver Brooks boiler were adequately documented and justified.

Kewanee Boiler

Model ID: BOI_KWN

The Kewanee boiler is an existing boiler that was also modeled as an unrestricted point source. It was modeled to run at full capacity continuously since it is not restricted by any alternate operating scenarios or permit conditions. Stack height (22.0 meters) and diameter (0.51 meters) were based on facility physical design characteristics. The exhaust temperature (485 Kelvin) and exhaust flow rate (17,330 PPH) were sourced from the ultra-low NOx burner vendor specifications, with the burner operating at 100% capacity. Flow rate in units of PPH was converted to exit velocity using the stack diameter and the density of air at the exhaust temperature. The calculated exhaust velocity is 14.4 m/sec, but BOI_KWN was conservatively modeled with an exit velocity of 5.4 m/sec.

Exhaust parameters for the Kewanee boiler were adequately documented and justified.

Johnston Boiler

Model ID: BOI_JSTN

The Johnston boiler is a new boiler that was modeled as an unrestricted point source. It was modeled to run at full capacity continuously since it is not restricted by any alternate operating scenarios or permit conditions. Stack height (18.9 meters) and diameter (0.71 meters) were based on facility physical design characteristics. Modeled exit temperature was based on manufacturer specifications. Operating pressure is 125 pounds per square inch (psig); however, exhaust temperature was provided in the manual only for operating pressures of 100 psig and 150 psig. Modeled exit temperature was calculated as the average for 100 psig and 150 psig and rounded down to 380°F (466 Kelvin) for conservatism. Flow rate (2,355 cubic feet per minute [cfm]) was also based on vendor specifications. The calculated exhaust velocity for BOI_JSTN is 12.0 m/sec.

Exhaust parameters for the Johnston boiler were adequately documented and justified.

Cooling Towers

Model IDs: CT1A, CT1B, CT1C, CT2A, CT2B, CT2C, CT3

Cooling towers were modeled as unrestricted point sources continuously operating at full capacity. The exhaust temperature used for each cooling tower was 85°F (303 Kelvin) based on onsite process knowledge and historical operation. The height and diameter were based on the facility physical characteristics. The flow rate of each cooling tower was based on manufacturer specifications. For cooling towers CT1A, CT1B, CT1C, CT2A, CT2B, and CT2C, the listed flow rate is 127,370 cubic feet per minute (cfm); given an exit diameter of 1.71 meters, the calculated exit velocity is 26.1 m/sec. For

cooling tower CT3, the listed flow rate is 75,000 cfm; given an exit diameter of 2.13 meters, the calculated exit velocity is 9.9 m/sec. CT3 was originally modeled by Trinity with an exit velocity of 26.0 m/sec. DEQ adjusted this value in the final modeling simulation.

Exhaust parameters for the cooling towers were adequately documented and justified.

Flare

Model ID: FLARE

The biogas flare was modeled with vertical, uninterrupted release. The modeled stack parameters for the flare were based on EPA's AERSCREEN manual to assess the enhanced buoyancy occurring with open flare sources (AERSCREEN Model User's Guide [EPA-454/B-16-004, December 2016]). The AERSCREEN method sets the exit gas velocity and temperature constant at 20 m/sec and 1,273 Kelvin, respectively. The stack diameter (*D*) is then calculated based on the heat released from the combustion of gases in the flare using the following equation:

$$D = 9.88 \times 10^{-4} (q_n)^{0.5}$$

where

D: effective stack diameter in meters; and
q_n: net heat released in calories/second.

The net heat released (q_n) is calculated from the gross heat released using the following equation:

$$q_n = 0.45q$$

where

q: gross heat released in calories/second.

Gross heat released (*q*) was calculated using the following equation:

$$q = \left(\frac{peak\ biogas\ SCF}{day}\right) \times \left(\frac{1\ day}{24\ hours}\right) \times \left(\frac{biogas\ BTU}{SCF}\right) \times \left(\frac{252\ calories}{BTU}\right) \times \left(\frac{1\ hour}{3{,}600\ seconds}\right)$$

$$q = \left(\frac{245{,}749\ SCF}{day}\right) \times \left(\frac{1\ day}{24\ hours}\right) \times \left(\frac{563\ BTU}{SCF}\right) \times \left(\frac{252\ calories}{BTU}\right) \times \left(\frac{1\ hour}{3{,}600\ seconds}\right)$$

$$q = 403{,}631\ calories/second$$

where

SCF: standard cubic feet; and
BTU: British thermal units.

Using a *q* value of 403,631 calories/second, a net heat release (q_n) of 181,634 calories/second was calculated, giving a final effective diameter (*D*) of 0.42 meters.

An effective stack height was also calculated by the AERSCREEN method using the following equation:

$$H_e = H_a + [(4.56 \times 10^{-3})(q^{0.478})]$$

where

H_e: effective stack height in meters;
H_a: actual height of flare at tip in meters.

The actual flare height (H_a) is 4.7 meters, giving an effective height (H_e) of 6.8 meters.

Flare release parameters were appropriately justified.

<u>Sanitary Milk Bottle Filler</u>

Model ID: FILLER

The filler is a new emission source. Filler exhaust was modeled as a rain-capped point source operating continuously at full capacity. The filler vendor provided an exhaust outlet temperature of 75°F (297 Kelvin) based on process knowledge and historical operation of similar fillers at other facilities. The flow rate of the filler was provided in vendor drawings. Exit velocity was conservatively set to 0.6 m/sec. Exit diameter was set to 0.13 meters and stack height was modeled as 8.5 meters.

Exhaust parameters for the filler were reasonably justified.

<u>Heaters with Visible Stacks</u>

Model IDs: RMAU03, RMAU05, RMAU06, RMAU07, RMAU08, RMAU09, RMAU10, RMAU11, RMAU12, RMAU20, RMAU13, CMAU1, CMAU2, CMAU3, CMAU4, CMAU5, CMAU6, CMAU7

Heaters with visible stacks were modeled as unrestricted, rain-capped, or horizontal point sources. The fuel burning capacity of each heater is known; however, manufacturer specifications for all new and existing heaters are not available. For heaters with visible stacks, facility personnel verified the diameter and exit configuration (unrestricted, rain-capped, horizontal) and, where possible, temperature and velocity. For heaters with rectangular stacks, an equivalent circular diameter was determined that gives an equal stack cross-sectional area. Some heaters have an unknown exhaust velocity; the lowest known exit velocity of other heaters with the same stack exit configuration is used in this case. Some heaters have an unknown exhaust temperature; the lowest known temperature of other heaters is used in this case.

Exhaust parameters for heaters with visible stacks were adequately justified.

<u>Heaters with No Visible Stacks</u>

Model IDs: MAU1, RMAU01, RMAU02, RMAU04, RTU1, RTU1A, RTU1B, RTU1C, RTU2, RTU3

Heaters with no visible stacks were modeled as volume sources, with parameters determined according to *State of Idaho Guideline for Performing Air Quality Impact Analyses*.[2] Calculations for volume source release height and initial plume dimensions are summarized in Table 9.

Table 9. CALCULATION OF VOLUME SOURCE PARAMETERS FOR HEATERS WITH NO VISIBLE STACKS.							
Source ID	**Building Height (ft)[a]**	**Building Height (m)[b]**	**Maximum Horizontal Side Length (m)**	**Vertical Side Length (m)**	**Release Height[c] (m)**	**Init. Horiz. Dim.[d] (m)**	**Init. Vert. Dim.[e] (m)**
MAU1	26	7.92	2	1.5	8.67	0.47	3.69
RMAU01	26	7.92	8	2	8.92	1.86	3.69
RMAU02	29	8.84	8	2	9.84	1.86	4.11
RMAU04	26	7.92	2	1.5	8.67	0.47	3.69
RTU1	26	7.92	2	1.5	8.67	0.47	3.69
RTU1A	26	7.92	2	1.5	8.67	0.47	3.69
RTU1B	26	7.92	2	1.5	8.67	0.47	3.69
RTU1C	26	7.92	2	1.5	8.67	0.47	3.69
RTU2	26	7.92	2	1.5	8.67	0.47	3.69
RTU3	26	7.92	2	1.5	8.67	0.47	3.69

a. Feet.
b. Meters.
c. Release height is the center of the source, calculated as the building height plus half of the vertical side length.
d. Initial horizontal dimension is the maximum horizontal side length divided by 4.3.
e. Initial vertical dimension is the building height divided by 2.15, since the sources are roof-mounted heaters.

Exhaust parameters for heaters with no visible stacks were adequately justified.

3.2 Background Concentrations

The background concentrations for all modeled pollutants, other than 1-hour NO_2, were obtained from the Northwest International Air Quality Environmental Science and Technology Consortium (NW AIRQUEST; https://arcg.is/1jXmHH) online tool for the closest grid point to the Boise facility. These background air pollutant levels are based on regional-scale air pollution modeling of pollutants in Washington, Oregon, and Idaho, with modeling results adjusted according to available monitoring data. The background concentrations used in the modeling analysis are shown in Table 10 below.

Table 10. BACKGROUND CONCENTRATION DATA.			
Pollutant	**Averaging Period**	**Background Concentration ($\mu g/m^3$)**	**Source**
PM_{10}[a]	24-hour	81.2	NW AIRQUEST, 2014-2017
$PM_{2.5}$[b]	24-hour	25.9[c]	NW AIRQUEST, 2014-2017
	Annual	7.9	NW AIRQUEST, 2014-2017
Sulfur Dioxide (SO_2)	1-hour	13.2	NW AIRQUEST, 2014-2017
	3-hour	14.5	NW AIRQUEST, 2014-2017
Nitrogen Oxides (NOx)	1-hour	Temporally varying	Meridian, Idaho EPA Monitor (AQS Site ID: 16-001-0023)
	Annual	27.2	NW AIRQUEST, 2014-2017

a. Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers.
b. Particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers.
c. The submitted modeling analysis used seasonally varying 24-hour $PM_{2.5}$ data from the Meridian, Idaho EPA Monitor (AQS Site ID: 16-001-0023). However, the modeling analysis presented in this memorandum reflects results from using a single-background value obtained from NW AIRQUEST which safely demonstrates compliance with the 24-

hour $PM_{2.5}$ NAAQS. This result was confirmed by John Goetze, Associate Consultant from Trinity, via e-mail on August 4, 2020. Seasonal $PM_{2.5}$ backgrounds were therefore not reviewed by DEQ.

Hourly NO_2 background data were sourced from the Meridian, Idaho EPA monitor for the years 2014-2018, concurrent with the meteorological data. Any missing hourly values were filled with the maximum NO_2 concentration from the same hour and calendar day of all other years in the dataset. This includes filling data for the entire year of 2018, of which monitor data is unavailable. The average of the annual 98th percentile 1-hour NO_2 concentration for years 2014-2017 is 45.13 ppb for the Meridian, Idaho EPA monitor. This is nearly equal to the NW AIRQUEST value for the closest grid point to the Boise facility, which is 45.48 ppb.

DEQ performed a verification analysis for 1-hour NO_2 using the Monte Carlo method. DEQ's results are described in Section 4.1.3 of this memorandum.

3.3 Impact Modeling Methodology

This section describes the modeling methods used by the applicant to demonstrate preconstruction compliance with applicable air quality standards.

3.3.1 General Overview of Impact Analyses

Trinity performed the project-specific air pollutant emission inventory and air impact analyses that were submitted with the application. The submitted information/analyses, in combination with results from DEQ's air impact analyses, demonstrate compliance with applicable air quality standards to DEQ's satisfaction, provided the facility is operated as described in the submitted application and in this memorandum.

Table 11 provides a brief description of parameters used in the modeling analyses.

Table 11. MODELING PARAMETERS.

Parameter	Description/Values	Documentation/Addition Description
General Facility Location	Ada County, Idaho	The area is an attainment or unclassified area for all criteria pollutants.
Model	AERMOD	AERMOD with the PRIME downwash algorithm, version 19191.
Meteorological Data	KBOI surface station; KBOI upper air station	The meteorological model input files for this project were developed by DEQ. The data were processed using the latest version of AERMET (version 19191) and the "ADJ_U*" option. See Section 3.3.5 of this memorandum for additional details of the meteorological data.
Terrain	Considered	1/3 arc second National Elevation Dataset (NED) was acquired from the USGS for the surrounding area. AERMAP version 18081 was used to process terrain elevation data for all buildings and receptors. See Section 3.3.6 for more details.
Building Downwash	Considered	Plume downwash was considered for the structures associated with the facility. BPIP-PRIME was used to evaluate building dimensions for consideration of downwash effects in AERMOD. See Section 3.3.7 for more details.
NOx Chemistry	ARM2	The ARM2 method is a Tier 2 analysis method which assumes an ambient equilibrium between NO and NO_2, in which the conversion of NO to NO_2 is predicted using hourly ambient NOx monitoring data. ARM2 has been adopted by the EPA as a default regulatory Tier 2 option. See Section 3.3.8 for more details.
Receptor Grid	**SIL Analysis** A SIL analysis was not conducted for the project.	
	Cumulative NAAQS Impact Analysis	

	The selection of receptors for use in the cumulative NAAQS impact analysis is as follows (see Section 3.3.11 for more details):	
	Grid 1	10-meter spacing along the ambient air boundary; a supplemental tighter receptor grid which includes 10-meter spacing in the area of greatest impact (the area extending 120 meters from the center of the northeast portion of the facility) for 24-hour $PM_{2.5}$ and 1-hour NO_2 was also used.
	Grid 2	25-meter spacing out to 1,000 meters from the property center.
	Grid 3	50-meter spacing out to 1,500 meters from the property center.
	Grid 4	150-meter spacing out to 2,500 meters from the property center.
	Grid 5	500-meter spacing out to 5,000 meters from the property center.
	TAPs Analysis The same receptor grid was used for the TAPs analysis as for the cumulative NAAQS impact analysis.	

3.3.2 Modeling Protocol

A modeling protocol was submitted by Todd Hughes, Senior Environmental Compliance Manager at Darigold, to DEQ via e-mail on June 24, 2020. However, a PTC application from Darigold that included a modeling analysis was received by DEQ on July 2, 2020, with a regulatory start date of July 10, 2020, before DEQ could provide its comments on the modeling protocol. Therefore, the modeling protocol that was submitted by Darigold was neither reviewed nor approved by DEQ's modeling team.

3.3.3 Modeling Methodology

Project-specific modeling and other required impact analyses were generally conducted using data and methods described in the *Idaho Air Quality Modeling Guideline*.[2]

3.3.4 Model Selection

Idaho Air Rules Section 202.02 requires that estimates of ambient concentrations be based on air quality models specified in Appendix W. The refined, steady-state, multiple-source, Gaussian dispersion model AERMOD was promulgated as the replacement model for ISCST3 in December 2005. AERMOD retains the single straight-line trajectory of ISCST3, but it includes more advanced algorithms to assess turbulent mixing processes in the planetary boundary layer for both convective and stable stratified layers.

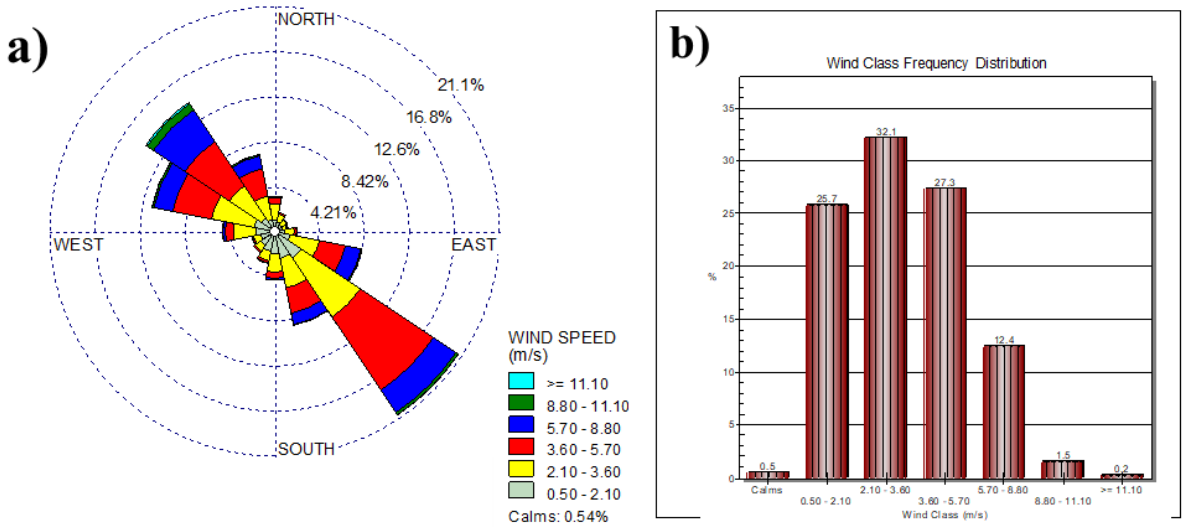
AERMOD version 19191 was used by Trinity for the modeling analyses to evaluate impacts of the facility. This version was the current version at the time the application was received by DEQ.

3.3.5 Meteorological Data

DEQ processed a meteorological dataset from Boise, Idaho (KBOI; station ID 726810-24131) covering the years 2014-2018. The upper air soundings required by AERMET were obtained from the Boise airport station (site ID 24131). Surface characteristics were determined by DEQ staff using AERSURFACE version 13016. DEQ modeling staff evaluated annual moisture conditions for the AERSURFACE runs based on thirty years of Boise airport precipitation data. Conditions were determined to be "wet" for 2014 and 2017, and "average" for 2015, 2016, and 2018. Average moisture content is defined as within a 30 percentile of the 30-year mean of 11.3 inches.

Figure 1 shows a wind rose and wind speed histogram at Boise Airport. On average, winds are dominated by southeasterlies with magnitudes of between 2.10 and 3.60 m/sec. Calms were relatively low at 0.54%, and less than one percent of the data were missing from the five-year record.

Figure 1. (a) WIND ROSE AND (b) WIND SPEED HISTOGRAM AT BOISE AIRPORT IN IDAHO (2014-2018).

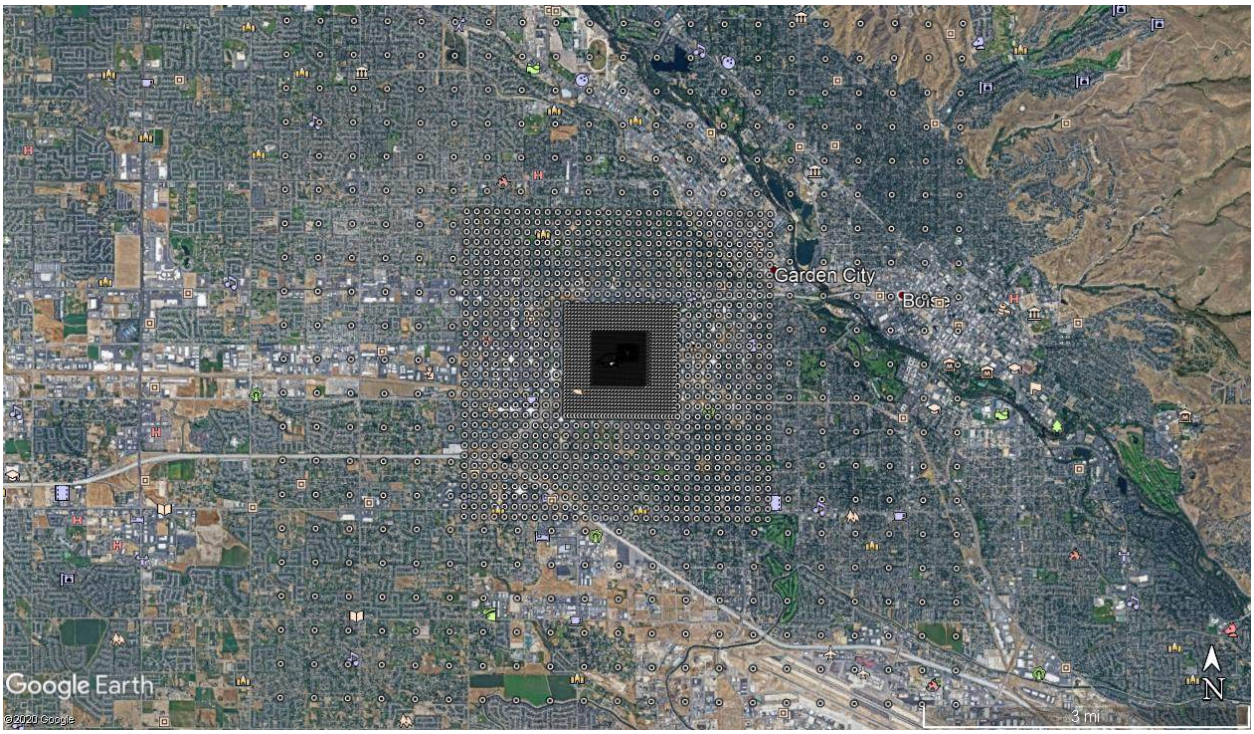


AERMINUTE version 15271 was used to process Automated Surface Observing Systems (ASOS) wind data for use in AERMET. AERMET version 19191 was used to process surface and upper air data and to generate a model-ready meteorological data input file. The "adjust u star" (ADJ_U*) option was applied in AERMET to enhance model performance during low wind speeds under stable conditions. The modeling analyses used the met data set processed with the U* option.

3.3.6 Effects of Terrain on Modeled Impacts

Submitted ambient air impact analyses used terrain data extracted from United States Geological Survey (USGS) National Elevation Dataset (NED) 1/3 arc second TIFF files. The terrain preprocessor AERMAP version 18081 was used by Trinity to extract the elevations from the NED files (for the quadrangle between 43° and 44° latitude north and 116° and 117° longitude west) and assign them to receptors in the modeling domain in a format usable by AERMOD. AERMAP also determined the hill-height scale for each receptor. The hill-height scale is an elevation value based on the surrounding terrain which has the greatest effect on that individual receptor. AERMOD uses those heights to evaluate whether the emission plume has sufficient energy to travel up and over the terrain or if the plume will travel around the terrain. Figure 2 depicts the full receptor grid used in the analyses, overlaid on a terrain image from Google Earth.

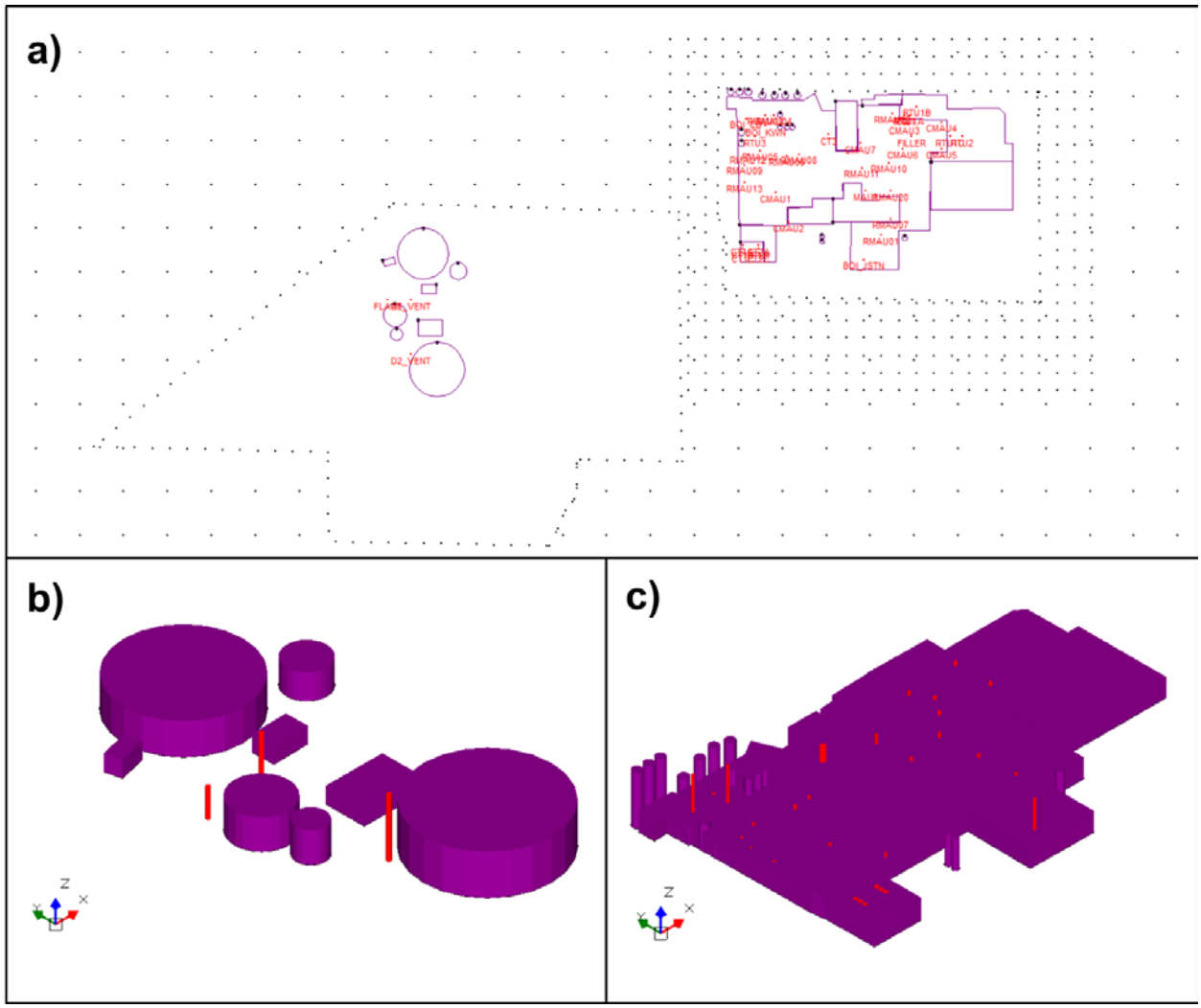
Figure 2. THE FULL RECEPTOR GRID CENTERED AT THE DARIGOLD FACILITY IN BOISE, IDAHO.



3.3.7 Facility Layout and Downwash

Figure 3a shows the facility's model setup. Figures 3b and 3c illustrate three-dimensional views of the western and eastern portions of the facility as viewed from the southwest.

Figure 3. (a) DARIGOLD FACILITY'S MODEL SETUP SHOWING STRUCTURES AND EMISSION SOURCES, AND THREE-DIMENSIONAL VIEWS OF THE (b) WESTERN AND (c) EASTERN PORTIONS OF THE FACILITY AS VIEWED FROM THE SOUTHWEST.



DEQ verified proper identification of the site location, equipment locations, and the ambient air boundary by comparing a graphical representation of the modeling input file to plot plans submitted in the application. Aerial photographs on Google Earth (available at https://www.google.com/earth) were also used to assure that horizontal coordinates were accurate as described in the application.

Potential downwash effects on emission plumes were accounted for in the model by using building dimensions and locations (locations of building corners, base elevation, and building heights). Dimensions and orientation of proposed buildings were used as input to the Building Profile Input Program for the Plume Rise Model Enhancements downwash algorithm (BPIP-PRIME version 04274) to calculate direction-specific dimensions and Good Engineering Practice (GEP) stack height information for input to AERMOD.

3.3.8 NOx Chemistry

The atmospheric chemistry of NO, NO_2, and O_3 complicates accurate prediction of NO_2 impacts resulting from NOx emissions. The conversion of NO to NO_2 can be conservatively addressed through the use of several methods as outlined in a *2014 EPA NO_2 Modeling Clarification Memorandum*.[3] The guidance outlines a three-tiered approach:

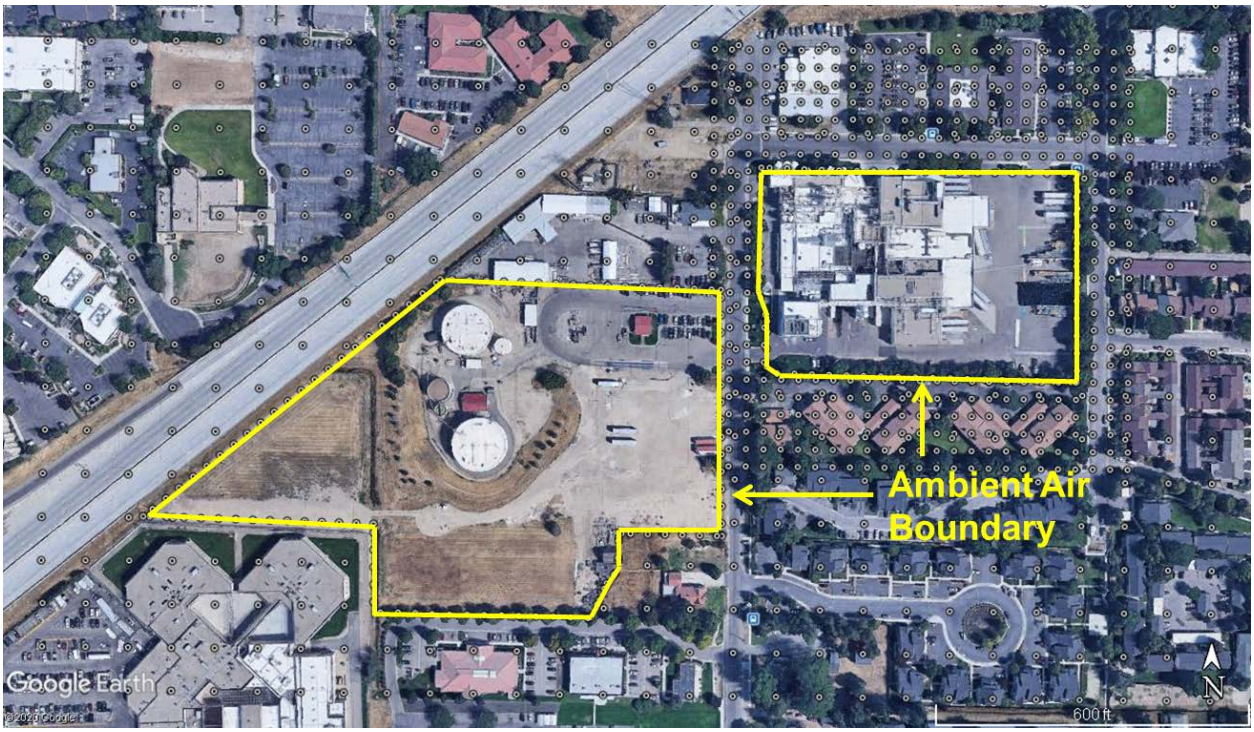
- Tier 1 – assume full conversion of NO to NO_2 where total NOx emissions are modeled and modeled impacts are assumed to be 100 percent NO_2.
- Tier 2 – use an ambient ratio to adjust impacts from the Tier 1 analysis.
- Tier 3 – use a detailed screening method to account for $NO/NO_2/O_3$ chemistry such as the Ozone Limiting Method (OLM) or the Plume Volume Molar Ratio Method (PVMRM).

Trinity used the ARM2 method, a Tier 2 analysis method which assumes an ambient equilibrium between NO and NO_2, in which the conversion of NO to NO_2 is predicted using hourly ambient NOx monitoring data. ARM2 has been adopted by the EPA as a default regulatory Tier 2 option. A minimum and maximum NO_2/NOx ratio of 0.5 and 0.9, respectively, were specified in the model.

3.3.9 Ambient Air Boundary

Ambient air is defined in Section 006 of the Idaho Air Rules as "that portion of the atmosphere, external to buildings, to which the general public has access." The property boundaries of the Darigold Boise facility are not fenced throughout; however, constant employee activity throughout the property precludes public access. Facility employees are trained to report any public encroachment onto unauthorized areas and no trespassing rules are enforced. There is, however, a landscaped grassy area surrounding a majority of the northeast parcel of the property that the public is authorized to access for short periods of time. This landscaped area is included as ambient air because it is adjacent to a public sidewalk in a residential area, and the public is authorized to access it. The ambient boundary is illustrated in Figure 4. DEQ determined that the facility is adequately able to preclude public access to areas excluded from the air impact assessment.

Figure 4. DARIGOLD FACILITY'S AMBIENT AIR BOUNDARY.



3.3.10 Nearby Co-Contributing Sources

If impacts of neighboring emission sources on receptors showing a significant impact from the sources subject to the permitting action are not adequately accounted for by the background concentration used, then emissions from those sources must be modeled. No nearby co-contributing sources were identified by the applicant. DEQ concurs that there are no nearby sources not accounted for by the fairly high background concentrations that must be included as co-contributing sources to Darigold's cumulative NAAQS impact analysis.

3.3.11 Receptor Network

Table 11 describes the receptor network used in the submitted modeling analyses. Receptor density was set to a spacing of 10 meters along the ambient air boundary, 25 meters for the first 1,000 meters from the approximate center of the property, then 50-meter spacing out to 1,500 meters away from the property center, 150-meter spacing out to 2,500 meters from the property center, and 500-meter spacing out to 5,000 meters from the center of the property. The full grid, along with the fenceline receptors, includes a total of 3,151 receptors and is illustrated in Figure 2.

A supplemental tighter receptor grid was included in the area of high-concentration impacts for 1-hour NO_2 and 24-hour $PM_{2.5}$ modeling. This tighter grid includes 10-meter receptor spacing that was placed in the area of greatest impact, which is the area extending 120 meters from the center of the northeast portion of the facility. The tighter grid is illustrated in Figure 4. The full grid network for 1-hour NO_2 and 24-hour $PM_{2.5}$ modeling includes a total of 3,547 receptors. DEQ determined that the receptor grid used in the submitted modeling analyses was adequate to resolve maximum modeled impacts.

The receptor grid used in the submitted modeling analyses met the minimum recommendations specified in the *Idaho Air Quality Modeling Guideline*[2], and DEQ determined that the receptor network was effective in reasonably assuring compliance with applicable air quality standards at all ambient air locations.

3.3.12 Good Engineering Practice Stack Height

An allowable good engineering practice (GEP) stack height may be established using the following equation in accordance with Idaho Air Rules Section 512.03.b:

H = S + 1.5L, where:

H = good engineering practice stack height measured from the ground-level elevation at the base of the stack.

S = height of the nearby structure(s) measured from the ground-level elevation at the base of the stack.

L = lesser dimension, height or projected width, of the nearby structure.

Sources from the Darigold facility are below GEP stack height. Therefore, consideration of downwash caused by nearby buildings was required.

4.0 NAAQS and TAPs Impact Modeling Results

4.1 Results for NAAQS Analyses

4.1.1 Significant Impact Level Analysis

A SIL analysis was not conducted for the project.

4.1.2 Cumulative NAAQS Impact Analysis

Table 12 provides results for the cumulative NAAQS impact analysis. For each modeled pollutant, the total impact was calculated by adding the design value (DV) of the impact to the ambient background value. The sum was then compared to the NAAQS. Note that for 1-hour NO_2, a background concentration file was used in the modeling simulation. Ambient impacts for the facility, when combined with approved ambient backgrounds, were below the NAAQS at all receptors for all modeled criteria pollutants.

Table 12. RESULTS FOR CUMULATIVE NAAQS IMPACT ANALYSIS.

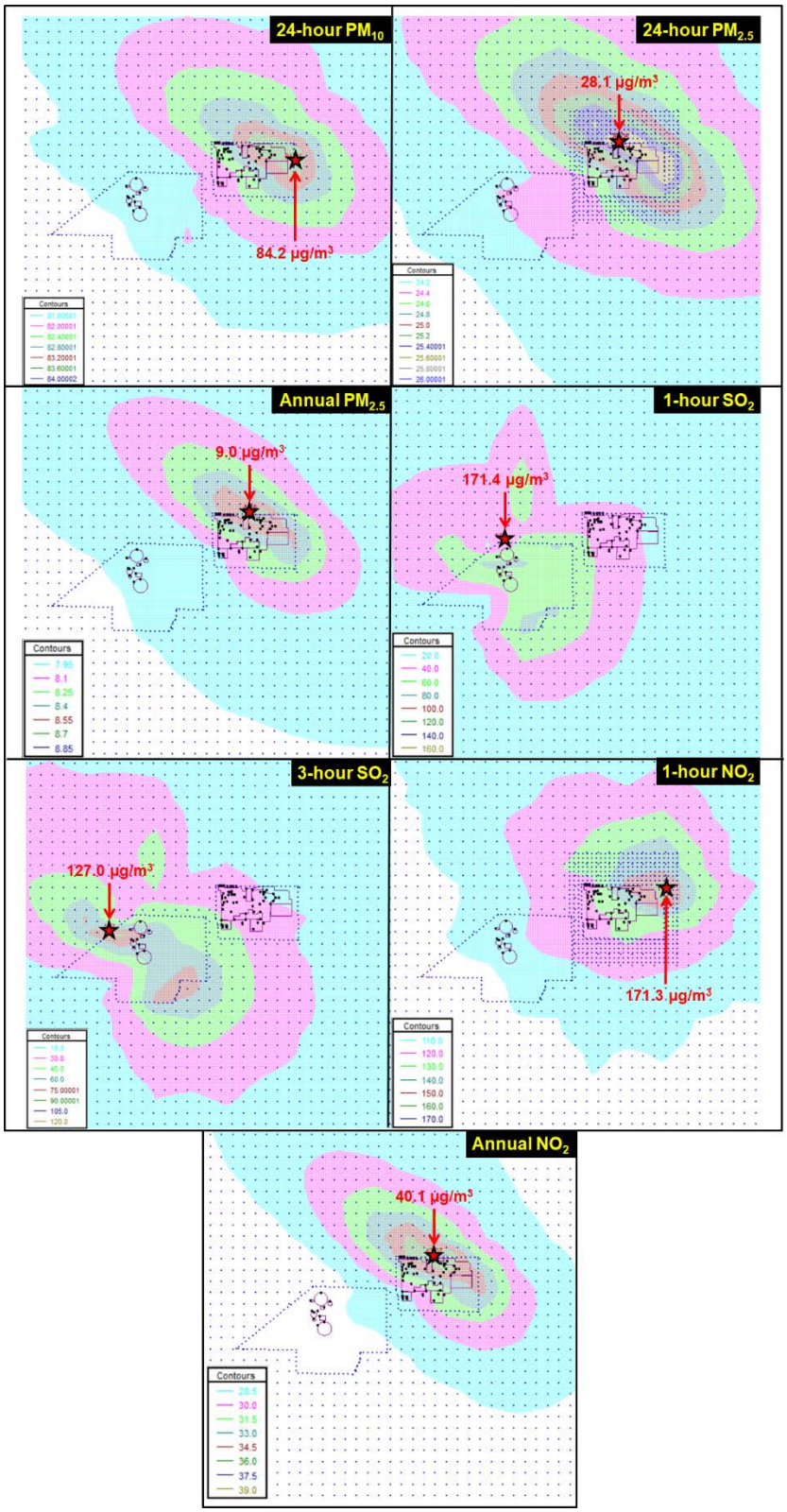
Pollutant	Averaging Period	Modeled Design Value Concentration ($\mu g/m^3$)[a]	Background Concentration ($\mu g/m^3$)	Total Ambient Impact ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)	Percent of NAAQS
PM_{10}[b]	24-hour	3.0	81.2	84.2	150	56.1%
$PM_{2.5}$[c]	24-hour	2.2	25.9	28.1	35	80.3%
	Annual	1.1	7.9	9.0	12	75.0%
Sulfur dioxide (SO_2)	1-hour	158.2	13.2	171.4	196	87.4%
	3-hour	112.5	14.5	127.0	1,300	9.8%

Table 12. RESULTS FOR CUMULATIVE NAAQS IMPACT ANALYSIS.						
Nitrogen oxides (NOx)	1-hour	118.0	Temporally varying	171.3	188	91.1%
	Annual	12.9	27.2	40.1	100	40.1%

a. Micrograms per cubic meter.
b. Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers.
c. Particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers.

Figure 6 illustrates the total impacts (modeled design values + background) for all modeled criteria pollutants. Locations of maximum impacts are indicated by the red star. Figure 6 shows that all receptors are below NAAQS. High concentrations occur at or near the facility fenceline, which is adequately resolved by the receptor network. Note the supplemental receptor network used for modeling 24-hour $PM_{2.5}$ and 1-hour NO_2.

Figure 6. TOTAL IMPACT (MODELED DESIGN VALUES + BACKGROUND) IN µg/m^3 FOR CUMULATIVE NAAQS IMPACT ANALYSIS.



4.1.3 DEQ's Monte Carlo Verification Analysis for Short-Term NO_2

As mentioned in Section 3.2 of this memorandum, hourly NO_2 background data were sourced from the Meridian, Idaho EPA monitor for the years 2014-2018, concurrent with the meteorological data. Any missing hourly values were filled with the maximum NO_2 concentration from the same hour and calendar day of all other years in the dataset. This includes filling data for the entire year of 2018, of which monitor data are unavailable. To verify this result, DEQ performed a verification analysis for 1-hour NO_2 using the Monte Carlo method described in the article "*A Monte Carlo Method for Summing Modeled and Background Pollutant Concentrations.*"[4] The Monte Carlo method randomly selects and combines background concentrations and modeled values from the same month for each day of the year to create a representative year of AERMOD + background values, from which the 98th percentile design value at each receptor is obtained. The whole process is repeated 1,000 times. The median of the 1,000 98th percentile values is selected as the most likely design value at each modeled receptor.

The Monte Carlo method is executed with an R script, which is available freely. The R script does not work for hourly data, hence for modeling 1-hour NO_2, DEQ used the MAXDAILY output files from AERMOD (as recommended in the R script). For NO_2 backgrounds, DEQ used both daily average and daily maximum NO_2 concentrations, where simulations using the latter are expected to be more conservative than the former. To ensure accuracy and reproducibility, DEQ performed a total of three Monte Carlo simulations for each background dataset. Results are summarized in Table 13 below.

Table 13. RESULTS FOR DEQ'S MONTE CARLO VERIFICATION ANALYSIS FOR SHORT-TERM NO_2.

Background Data Used in the Simulation	Run 1 ($\mu g/m^3$)[a]	Run 2 ($\mu g/m^3$)	Run 3 ($\mu g/m^3$)	Average ($\mu g/m^3$)	1-hour NO_2 NAAQS ($\mu g/m^3$)	Percent of NAAQS
Daily average	152.76	152.67	152.50	152.64	188	81.1%
Daily maximum	187.35	187.45	187.53	187.44	188	99.7%

[a.] Micrograms per cubic meter.

Table 13 shows that the Darigold Boise facility demonstrates compliance with 1-hour NO_2 NAAQS when either daily average or daily maximum background NO_2 concentrations are used in the Monte Carlo simulation. The Monte Carlo simulation that uses daily maximum NO_2 backgrounds yields higher impacts (99.7% of 1-hour NO_2 NAAQS) than the submitted analysis (91.1% of 1-hour NO_2 NAAQS) because it sums MAXDAILY modeled concentrations from AERMOD with *daily maximum* background concentrations, whereas the submitted analysis uses temporally varying *hourly* backgrounds. Furthermore, maximum modeled impacts typically occur during nighttime when atmospheric conditions are more stable and background NO_2 is low, hence the lower total (modeled + background) impacts from the temporally varying backgrounds approach. The fact that the Monte Carlo method still demonstrates compliance with the 1-hour NO_2 NAAQS provides additional verification that NAAQS will be met.

4.2 Results for TAPs Impact Analyses

Dispersion modeling was required to demonstrate compliance with TAP increments specified by Idaho Air Rules Section 585 and 586 for those TAPs with facility-wide emissions exceeding screening emission levels (ELs). Table 14 lists the maximum modeled impacts for the four TAPs that required modeling. All modeled impacts are below applicable AACs and AACCs.

Table 14. TAPS AIR IMPACT ANALYSIS RESULTS.			
TAP	**Maximum Modeled Impact (µg/m^3)[a]**	**AAC or AACC (µg/m^3)**	**Percent of AAC/AACC**
Hydrogen peroxide[b]	53.8	75	71.7%
Arsenic compounds[c]	3.0E-05	2.30E-04	13.0%
Cadmium compounds[c]	1.5E-04	5.60E-04	26.8%
Formaldehyde[c]	1.1E-02	7.70E-02	14.3%

a. Micrograms per cubic meter.
b. Non-carcinogenic TAP. Modeled impact and AAC represent a 24-hour averaged concentration.
c. Carcinogenic TAP. Modeled impact and AACC represent annual or period-average concentration.

5.0 Conclusions

The information submitted with the PTC application, combined with DEQ's air impact analyses, demonstrated to DEQ's satisfaction that emissions from the Darigold facility in Boise, Idaho will not cause or significantly contribute to a violation of any applicable ambient air quality standard or TAP increment.

References

1. *Policy on NAAQS Compliance Demonstration Requirements*. Idaho Department of Environmental Quality Policy Memorandum. July 11, 2014.

2. *State of Idaho Guideline for Performing Air Quality Impact Analyses*. Idaho Department of Environmental Quality. September 2013. State of Idaho DEQ Air Doc. ID AQ-011. Available at http://www.deq.idaho.gov/media/1029/modeling-guideline.pdf.

3. *Clarification on the Use of AERMOD Dispersion Modeling for Demonstrating Compliance with the NO_2 National Ambient Air Quality Standard*. Office of Air Quality Planning and Standards. Air Quality Modeling Group. Research Triangle Park, NC. Guidance memorandum from R. Chris Owen and Roger Brode to Regional Dispersion Modeling Contacts. September 30, 2014.

4. Dhammapala, R., Bowman, C., and Schulte, J. *A Monte Carlo Method for Summing Modeled and Background Pollutant Concentrations*, Journal of the Air & Waste Management Association, 67:8, 836-846, DOI: 10.1080/10962247.2017.1294546. 2017.

APPENDIX C – FACILITY DRAFT COMMENTS

The following comments were received from the facility on October 2, 2020:

Facility Comment: Regarding permit conditions 2.11, 2.13, and 3.6, Darigold would like to request that a compliance schedule be added to the permit to allow for the purchase and installation of said equipment. Darigold would like to request nine months to complete this work.

DEQ Response: Once the permit is issued, the facility has two years to construct the sources regulated in the permit as well as corresponding equipment. A compliance schedule should not be necessary since the biogas flow meter and natural gas flow meter should be installed as the regulated emission sources are installed and/or constructed. The sampling equipment for monitoring the H_2S concentration in the biogas can also be purchased as the emission sources are constructed.

Facility Comment: Regarding permit conditions 2.6 and 3.4, the permit requires that opacity be determined in accordance with IDAPA 58.01.01.625, which references the Environmental Protection Agency's (EPA's) Method 9 as described in 40 CFR Part 60. Darigold would like further clarification on when a Method 9 observation would be required. In other air quality permits issued by the IDEQ to Darigold, a requirement to perform a periodic see/no see visible emissions check is required. If visible emissions are noted during the see/no see visible emissions checks, then a Method 9 observation is required. Darigold would like to request a similar requirement be added to P-2020.0026.

DEQ Response: In Tier I operating permits DEQ includes language that the facility conduct a facility-wide inspection of potential sources of visible emissions which includes a see/no see evaluation. For a minor source such as Darigold Boise, DEQ adds the opacity limit to the permit for certain emission sources that are regulated in the permit. The requirement is determined by the procedures contained in IDAPA 58.01.01.625.

APPENDIX D – PROCESSING FEE

PTC Processing Fee Calculation Worksheet

Instructions:
Fill in the following information and answer the following questions with a Y or N. Enter the emissions increases and decreases for each pollutant in the table.

Company:	**Darigold Boise Facility**
Address:	**618 Allumbaugh Street**
City:	**Boise**
State:	**ID**
Zip Code:	**83704**
Facility Contact:	**Scott Algate**
Title:	**Sr. Environmental Compliance Manager**
AIRS No.:	**001-00198**

N	Does this facility qualify for a general permit (i.e. concrete batch plant, hot-mix asphalt plant)? Y/N
Y	Did this permit require engineering analysis? Y/N
N	Is this a PSD permit Y/N (IDAPA 58.01.01.205.04)

Emissions Inventory			
Pollutant	Annual Emissions Increase (T/yr)	Annual Emissions Reduction (T/yr)	Annual Emissions Change (T/yr)
NO_X	12.7	0	12.7
SO_2	6.1	0	6.1
CO	25.2	0	25.2
PM10	0.9	0	0.9
VOC	3.0	0	3.0
Total:	47.9	0	**47.9**
Fee Due	**$ 5,000.00**		

Comments: