United States Environmental Protection Agency
Region 10, Office of Air, Waste and Toxics
1200 Sixth Avenue, Suite 900
Seattle, Washington 98101

Permit Number: R10NT502600
Issued: 01-23-2015
AFS Plant I.D. Number: 530-77T-0048

Non - Title V Air Quality Operating Permit

This permit is issued in accordance with the provisions of 40 CFR § 49.139 and applicable rules and regulations to

Washington Beef LLC, Toppenish Plant

for operations in accordance with the conditions listed in this permit, at the following location:

Yakama Reservation
201 Elmwood Road
Toppenish, WA 98948

Person Responsible for Compliance: Burt Ross
Plant Director
Washington Beef LLC
201 Elmwood Road
Toppenish, WA 98948
Phone: 509-865-2121

OR

Sherry Byers-Eddy
Wastewater Treatment Plant Manager
Washington Beef LLC
201 Elmwood Road
Toppenish, WA 98948
Phone: 509-865-2121

A technical support document that describes the bases for conditions contained in this permit is also available.

Kate Kelly, Director Office of Air, Waste and Toxics U.S. Environmental Protection Agency, Region 10	January 23, 2015 Date

1. General Conditions

1.1. For purposes of this permit, the permitted source consists of the following equipment and/or activities. The information in this table is for descriptive purposes only.

Emission Unit ID	Description	Maximum Operation	Control Device
WB-01	Cleaver Brooks Processing Boiler #1	32.7 MMBtu/hr nat gas 233.5 gal/hr diesel	Low NO_x
WB-02	Cleaver Brooks Processing Boiler #2	32.7 MMBtu/hr nat gas/biogas 233.5 gal/hr diesel	Low NO_x
WB-03	Cleaver Brooks Fabrication Boiler #1	14.3 MMBtu/hr nat gas	Low NO_x
WB-04	Blood Dryer	9 MMBtu/hr nat gas 62 gal/hr diesel	Anco-Englin Rendering Scrubber (70,000 ft3/min)
WB-05	Rendering Room MAU (a heater)	7 MMBtu/hr nat gas	Anco-Englin Rendering Scrubber (70,000 ft3/min) and Pretreatment Spray Tower (10 gal/min)
WB-06	Rendering Operations & Tallow Tanks	Rendering: 36,000 lb/hr Tallow Tanks: 67,650 gal	Anco-Englin Rendering Scrubber (70,000 ft3/min) and Pretreatment Spray Tower (10 gal/min)
WB-07	Large Emergency Generator & Small Emergency Generator	Large: 423hp 19.2 gal/hr diesel Small: 80hp 3.4 gal/hr diesel	None
WB-08	Four Refrigeration System Cooling Towers (308,400 gal/hr)	Processing #1: 72,000 gal/hr Processing #2: 82,200 gal/hr Fabrication: 82,200 gal/hr VAP: 72,000 gal/hr	None
WB-09	Anaerobic Lagoon	500,000 ft^3/day biogas production	Lagoon is covered; biogas is captured, processed, stored and then combusted in WB-02 or flared in the Waste Biogas Flare
WB-10	Wastewater Treatment System	1,600,000 gal/day wastewater processing	None
WB-11	Room Heating Units	24 MMBtu/hr nat gas, combined	None – Emissions are released inside buildings and then vented

1.2. The permittee shall comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Clean Air Act.

1.3. Compliance with the terms of this permit does not relieve or exempt the permittee from compliance with other applicable Clean Air Act requirements or other applicable federal, tribal, state or local laws or regulations.

2. Emission Limits and Work Practice Requirements

2.1. At all times, including periods of startup, shutdown, maintenance and malfunction, the permittee shall, to the extent practicable, maintain and operate each emission unit, including any associated air pollution control equipment, in a manner consistent with good air pollution control practices for minimizing emissions and considering the manufacturer's recommended operating procedures. Determination of whether acceptable operating and maintenance procedures are being used will be based on information available to the EPA, which may include, but is not limited to, monitoring results, review of operating and maintenance procedures and inspection of the source.

2.2. Emissions of particulate matter with an aerodynamic diameter less than 10 microns (PM_{10}) from this source shall not exceed 99 tons/yr as determined on a rolling 12-month basis by calculating the emissions (tons/month) for each month and adding the emissions for the previous eleven months. Monthly PM_{10} emissions shall be calculated by multiplying the emission factors (lb/unit) in the Permit Appendix by the actual monthly operation/production (units/month) and dividing by 2,000 lb/ton.

2.3. Emissions of particulate matter with an aerodynamic diameter less than 2.5 microns ($PM_{2.5}$) from this source shall not exceed 99 tons/yr as determined on a rolling 12-month basis by calculating the emissions (tons/month) for each month and adding the emissions for the previous eleven months. Monthly $PM_{2.5}$ emissions shall be calculated by multiplying the PM_{10} emission factors (lb/unit) in the Permit Appendix by the actual monthly operation/production (units/month) and dividing by 2,000 lb/ton.

2.4. Emissions of sulfur dioxide (SO_2) from this source shall not exceed 99 tons/yr as determined on a rolling 12-month basis by calculating the emissions (tons/month) for each month and adding the emissions for the previous eleven months. Monthly SO_2 emissions shall be calculated by multiplying the emission factors (lb/unit) in the Permit Appendix by the actual monthly operation/production (units/month) and dividing by 2,000 lb/ton.

2.5. Emissions of hazardous air pollutants (HAP) from this source shall not exceed 24 tons/yr for the sum of all HAP, as determined on a rolling 12-month basis by calculating the emissions (tons/month) for each month and adding the emissions for the previous eleven months. Monthly HAP emissions shall be calculated by multiplying the emission factors (lb/unit) in the Permit Appendix by the actual monthly operation/production (units/month) and dividing by 2,000 lb/ton.

2.6. The Permittee shall not operate emission unit WB-07 (the Large & Small Emergency Generators) for more than 500 hr each during any rolling 12-month period.

3. Monitoring and Recordkeeping Requirements

3.1. Each month the permittee shall calculate and record source-wide monthly and rolling 12-month total emissions (tons) for all emission units and pollutant-emitting activities that emit PM_{10}, $PM_{2.5}$, SO_2 and/or HAP using the emission factors in the Permit Appendix.

3.2. Within four months after this permit is issued, the permittee shall install, calibrate, maintain and operate equipment or systems for tracking and recording the operation and production, such that source-wide emissions can be calculated on a monthly and rolling 12-month basis, including, but not limited to:

3.2.1. Monitoring continuously and recording monthly the combined total quantity of natural gas (standard cubic feet, scf) combusted in WB-01 (Processing Boiler #1), WB-02 (Processing Boiler #2), WB-03 (Fabrication Boiler), WB-04 (Blood Dryer), WB-05 (Rendering Room MAU) and WB-11 (Room Heating Units).

3.2.2. Monitoring continuously and recording monthly the quantity of biogas (scf) generated by WB-09, the quantity of biogas (scf) that is combusted in WB-02 (Processing Boiler #2) and the quantity of biogas (scf) that is flared in the Waste Biogas Flare.

3.2.3. Monitoring continuously and recording monthly the combined total quantity of diesel (gal, reported in units of 1,000gal or 10^3gal) combusted in WB-01 (Processing Boiler #1) and WB-02 (Processing Boiler #2).

3.2.4. Monitoring hourly and recording monthly the hours of operation using non-resettable, totalizing hour meters and/or the Computer Maintenance Management System (CMMS) for:

3.2.4.1. WB-04 while combusting diesel;

3.2.4.2. WB-06 while the rendering scrubber is operating (and the plant is operating);

3.2.4.3. WB-06 while the rendering scrubber is not operating (and the plant is operating);

3.2.4.4. WB-07 (each emergency generator).

3.2.5. When the rendering scrubber is operating, monitoring continuously and recording once per day the rendering scrubber combined pressure drop across the packing and mist eliminator (inches), water flow (gal/min) and pressure (psig) in the recirculation header, the blow down rate, and the water pH.

3.2.6. When the pretreatment spray tower is operating, monitoring continuously and recording once per day the pretreatment spray tower water flow (gal/min).

3.3. The permittee shall obtain and record the percent sulfur by weight from the vendor for each delivery of diesel fuel. If the vendor is unable to provide this information (or there is no vendor), then the permittee shall obtain a representative grab sample for each delivery and test the sample using ASTM methods D2880-03, D4294-03 and D6021-96(2001). The permittee shall use the highest percent sulfur value recorded over the previous twelve months to calculate the emission factors for WB-01, WB-02, WB-04 and WB-07 using the emission factor equations in the Permit Appendix.

3.4. The permittee shall maintain records for at least five years of emission calculations and raw data and parameters used in the calculations.

4. Reporting Requirements

4.1. Once each year, on or before February 15, the permittee shall, along with the annual registration required by 40 CFR § 49.138(e)(2), submit to Region 10 a report containing the twelve monthly rolling 12-month emissions calculations for the previous calendar year.

4.2. The report required under Permit Condition 4.1 shall contain a description of all emission estimating methods used, including emission factors and their sources, a summary of materials usage, assumptions made, and hourly operations data.

4.3. All submittals, notifications and reports to Region 10 shall be sent to:

Tribal Air Permits Coordinator, AWT-150
Office of Air, Waste and Toxics
U.S. EPA, Region 10
1200 Sixth Avenue, Suite 900
Seattle, WA 98101

Copies to: Environmental Management Program
Yakama Nation
P.O. Box 151
Toppenish, WA 98948

5. Acronyms, Abbreviations & Units

10^6btu	One Million Btu (or MMBtu)
10^3gal	One Thousand Gallons
AFS	Air Facility System (an EPA database)
As	Arsenic
ASTM	American Society for Testing and Materials
Be	Beryllium
btu	British Thermal Unit (or Btu)
Cd	Cadmium
CFR	Code of Federal Regulations
CH_4	Methane
CMMS	Computer Maintenance Management System
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CO_2e	Carbon Dioxide Equivalent
Cr	Chromium
CrVI	Chromium VI
DAF	Dissolved Air Flotation Unit
Diesel	Diesel Fuel, No. 2 Fuel Oil, Distillate Oil
dscf	Dry Standard Cubic Feet
EJ	Environmental Justice
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FARR	Federal Air Rules for Reservations
FIP	Federal Implementation Plan
FR	Federal Register
ft	Feet
ft^3	Cubic Feet
FWS	U.S. Fish & Wildlife Service
gal	Gallon
GHG	Greenhouse Gas
gr	Grains
GWP	Global Warming Potential
H2S	Hydrogen Sulfide
HAP	Hazardous Air Pollutant
HCOH	Formaldehyde
Hg	Mercury
hp	Horsepower
hr	Hour
kW	Kilowatt
L	Liter
lb	Pound
MAU	Make-Up Air Unit
min	Minute
ml	Milliliter
Mn	Manganese
mo	Month
N2O	Nitrous Oxide
nat gas	Natural Gas
NEPA	National Environmental Policy Act
NESHAP	National Emission Standards for HAP
NHPA	National Historic Preservation Act
Ni	Nickel
NMFS	National Marine Fisheries Services
NMTOC	Non Methane Total Organic Carbon
NOx	Nitrogen Oxide
NPDES	National Pollutant Discharge Elimination System
NSPS	New Source Performance Standards
O&M	Operation & Maintenance
PAH	Polynuclear Aromatic Hydrocarbons
Pb	Lead
PM	Particulate Matter
PM_{10}	PM with an aerodynamic diameter < 10 um
$PM_{2.5}$	PM with an aerodynamic diameter < 2.5 um
POM	Polycyclic Organic Matter
ppm	Parts per Million
ppmv	Parts per Million by Volume
PSD	Prevention of Significant Deterioration
PTE	Potential to Emit
Region 10	EPA, Region 10
RSC	Reduced Sulfur Compound
scf	Standard Cubic Feet
Se	Selenium
SO_2	Sulfur Dioxide
TSD	Technical Support Document
um	Micrometer
ug	Microgram
VOC	Volatile Organic Compound
yr	Year

Permit Appendix: Emission Factors for Washington Beef, Toppenish WA Plant

Source	Fuel or Operating Status	Pollutant	Emission Factor	
WB-01, -02	Diesel	PM_{10}	2.3	lb $PM_{10}/10^3$gal
WB-01, -02	Diesel	SO_2	142 x S[1]	lb $SO_2/10^3$gal
WB-01, -02	Diesel	Arsenic (As)	5.5E-04	lb As/10^3gal
WB-01, -02	Diesel	Beryllium (Be)	4.1E-04	lb Be/10^3gal
WB-01, -02	Diesel	Cadmium (Cd)	4.1E-04	lb Cd/10^3gal
WB-01, -02	Diesel	Chromium (Cr)	4.1E-04	lb Cr/10^3gal
WB-01, -02	Diesel	Chromium VI (CrVI)	2.1E-05	lb CrVI/10^3gal
WB-01, -02	Diesel	Formaldehyde (HCOH)	4.8E-02	lb HCOH/10^3gal
WB-01, -02	Diesel	Lead (Pb)	1.2E-03	lb Pb/10^3gal
WB-01, -02	Diesel	Manganese (Mn)	8.2E-04	lb Mn/10^3gal
WB-01, -02	Diesel	Mercury (Hg)	4.1E-04	lb Hg/10^3gal
WB-01, -02	Diesel	Nickel (Ni)	4.1E-04	lb Ni/10^3gal
WB-01, -02	Diesel	POM	3.3E-03	lb POM/10^3gal
WB-01, -02	Diesel	Selenium (Se)	2.1E-03	lb Se/10^3gal
WB-01, -02, -03, -11	Natural Gas	PM_{10}	7.6	lb $PM_{10}/10^6$scf
WB-01, -02, -03, -04, -05, -11	Natural Gas	SO_2	1.5	lb $SO_2/10^6$scf
WB-01, -02, -03, -04, -05, -11	Natural Gas	Arsenic (As)	2.0E-04	lb As/10^6scf
WB-01, -02, -03, -04, -05, -11	Natural Gas	Benzene	2.1E-03	lb Benzene/10^6scf
WB-01, -02, -03, -04, -05, -11	Natural Gas	Beryllium (Be)	1.2E-05	lb Be/10^6scf
WB-01, -02, -03, -04, -05, -11	Natural Gas	Cadmium (Cd)	1.1E-03	lb Cd/10^6scf
WB-01, -02, -03, -04, -05, -11	Natural Gas	Chromium (Cr)	1.4E-03	lb Cr/10^6scf
WB-01, -02, -03, -04, -05, -11	Natural Gas	Chromium VI (CrVI)	7.0E-05	lb CrVI/10^6scf
WB-01, -02, -03, -04, -05, -11	Natural Gas	Cobalt	8.4E-05	lb Cobalt/10^6scf
WB-01, -02, -03, -04, -05, -11	Natural Gas	Dichlorobenzene	1.2E-03	lb Dichlorobenzene/10^6scf
WB-01, -02, -03, -04, -05, -11	Natural Gas	Fluoranthene	3.0E-06	lb Fluoranthene/10^6scf
WB-01, -02, -03, -04, -05, -11	Natural Gas	Fluorene	2.8E-06	lb Fluorene/10^6scf
WB-01, -02, -03, -04, -05, -11	Natural Gas	Formaldehyde (HCOH)	7.5E-02	lb HCOH/10^6scf
WB-01, -02, -03, -04, -05, -11	Natural Gas	Hexane	1.8E+00	lb Hexane/10^6scf
WB-01, -02, -03, -04, -05, -11	Natural Gas	Lead (Pb)	5.0E-04	lb Pb/10^6scf
WB-01, -02, -03, -04, -05, -11	Natural Gas	Manganese (Mn)	3.8E-04	lb Mn/10^6scf
WB-01, -02, -03, -04, -05, -11	Natural Gas	Mercury (Hg)	2.6E-04	lb Hg/10^6scf
WB-01, -02, -03, -04, -05, -11	Natural Gas	Naphthalene	6.1E-04	lb Naphthalene/10^6scf
WB-01, -02, -03, -04, -05, -11	Natural Gas	Naphthalene, 2-Methyl	2.4E-05	lb Naphthalene, 2-Methyl/10^6scf
WB-01, -02, -03, -04, -05, -11	Natural Gas	Nickel (Ni)	2.1E-03	lb Ni/10^6scf
WB-01, -02, -03, -04, -05, -11	Natural Gas	Phenanthrene	1.7E-05	lb Phenanthrene/10^6scf
WB-01, -02, -03, -04, -05, -11	Natural Gas	POM	2.1E-03	lb POM/10^6scf
WB-01, -02, -03, -04, -05, -11	Natural Gas	Pyrene	5.0E-06	lb Pyrene/10^6scf
WB-01, -02, -03, -04, -05, -11	Natural Gas	Selenium (Se)	2.4E-05	lb Se/10^6scf
WB-01, -02, -03, -04, -05, -11	Natural Gas	Toluene	3.4E-03	lb Toluene/10^6scf

[1] S = % Sufur, i.e. If 0.5% Sulfur, S = 0.5

Permit Appendix: Emission Factors for Washington Beef, Toppenish WA Plant

Source	Fuel or Operating Status	Pollutant	Emission Factor	
WB-02	Biogas	PM_{10}	4.5	lb $PM_{10}/10^6$scf
WB-09	Biogas	PM_{10}	17	lb $PM_{10}/10^6$scf
WB-02, -09	Biogas	SO_2	84	lb $SO_2/10^6$scf
WB-02, -09	Biogas	Arsenic (As)	1.2E-04	lb As/10^6scf
WB-02, -09	Biogas	Benzene	1.2E-03	lb Benzene/10^6scf
WB-02, -09	Biogas	Beryllium (Be)	7.1E-06	lb Be/10^6scf
WB-02, -09	Biogas	Cadmium (Cd)	6.5E-04	lb Cd/10^6scf
WB-02, -09	Biogas	Chromium (Cr)	8.2E-04	lb Cr/10^6scf
WB-02, -09	Biogas	Chromium VI (CrVI)	4.1E-05	lb CrVI/10^6scf
WB-02, -09	Biogas	Cobalt	4.9E-05	lb Cobalt/10^6scf
WB-02, -09	Biogas	Dichlorobenzene	7.1E-04	lb Dichlorobenzene/10^6scf
WB-02, -09	Biogas	Fluoranthene	1.8E-06	lb Fluoranthene/10^6scf
WB-02, -09	Biogas	Fluorene	1.7E-06	lb Fluorene/10^6scf
WB-02, -09	Biogas	Formaldehyde (HCOH)	4.4E-02	lb HCOH/10^6scf
WB-02, -09	Biogas	Hexane	1.1E+00	lb Hexane/10^6scf
WB-02, -09	Biogas	Lead (Pb)	2.9E-04	lb Pb/10^6scf
WB-02, -09	Biogas	Manganese (Mn)	2.2E-04	lb Mn/10^6scf
WB-02, -09	Biogas	Mercury (Hg)	1.5E-04	lb Hg/10^6scf
WB-01, -09	Biogas	Naphthalene	3.6E-04	lb Naphthalene/10^6scf
WB-02, -09	Biogas	Naphthalene, 2-Methyl	1.4E-05	lb Naphthalene, 2-Methyl/10^6scf
WB-02, -09	Biogas	Nickel (Ni)	1.2E-03	lb Ni/10^6scf
WB-02, -09	Biogas	Phenanthrene	1.0E-05	lb Phenanthrene/10^6scf
WB-02, -09	Biogas	POM	1.2E-03	lb POM/10^6scf
WB-02, -09	Biogas	Pyrene	2.9E-06	lb Pyrene/10^6scf
WB-02, -09	Biogas	Selenium (Se)	1.4E-05	lb Se/10^6scf
WB-02, -09	Biogas	Toluene	2.0E-03	lb Toluene/10^6scf

WB-04	Diesel	PM_{10}	0.14	lb PM_{10}/hr
WB-04	Diesel	SO_2	8.8 x S[1]	lb SO_2/hr
WB-04	Diesel	Arsenic (As)	3.4E-05	lb As/hr
WB-04	Diesel	Beryllium (Be)	2.5E-05	lb Be/hr
WB-04	Diesel	Cadmium (Cd)	2.5E-05	lb Cd/hr
WB-04	Diesel	Chromium (Cr)	2.5E-05	lb Cr/hr
WB-04	Diesel	Chromium VI (CrVI)	1.3E-06	lb CrVI/hr
WB-04	Diesel	Formaldehyde (HCOH)	3.0E-03	lb HCOH/hr
WB-04	Diesel	Lead (Pb)	7.4E-05	lb Pb/hr
WB-04	Diesel	Manganese (Mn)	5.1E-05	lb Mn/hr
WB-04	Diesel	Mercury (Hg)	2.5E-05	lb Hg/hr
WB-04	Diesel	Nickel (Ni)	2.5E-05	lb Ni/hr
WB-04	Diesel	POM	2.0E-04	lb POM/hr
WB-04	Diesel	Selenium (Se)	1.3E-04	lb Se/hr

[1] S = % Sufur, i.e. If 0.5% Sulfur, S = 0.5

Permit Appendix: Emission Factors for Washington Beef, Toppenish WA Plant

Source	Fuel or Operating Status	Pollutant	Emission Factor	
WB-06	Scrubber Operating	PM_{10}	3.3	lb PM_{10}/hr
WB-06	Scrubber Not Operating	PM_{10}	23	lb PM_{10}/hr
WB-06	Scrubber Operating	Benzene	3.8E-02	lb Benzene/hr
WB-06	Scrubber Not Operating	Benzene	1.5E-01	lb Benzene/hr
WB-06	Scrubber Operating	Butadiene, 1,3-	2.6E-03	lb Butadiene, 1,3-/hr
WB-06	Scrubber Not Operating	Butadiene, 1,3-	1.0E-02	lb Butadiene, 1,3-/hr
WB-06	Scrubber Operating	Carbon Disulfide	4.0E-02	lb Carbon Disulfide/hr
WB-06	Scrubber Not Operating	Carbon Disulfide	1.6E-01	lb Carbon Disulfide/hr
WB-06	Scrubber Operating	Ethylbenzene	9.1E-02	lb Ethylbenzene/hr
WB-06	Scrubber Not Operating	Ethylbenzene	3.6E-01	lb Ethylbenzene/hr
WB-06	Scrubber Operating	Hexane	5.3E-03	lb Hexane/hr
WB-06	Scrubber Not Operating	Hexane	2.1E-02	lb Hexane/hr
WB-06	Scrubber Operating	Methanol	6.5E-02	lb Methanol/hr
WB-06	Scrubber Not Operating	Methanol	2.6E-01	lb Methanol/hr
WB-06	Scrubber Operating	Pentanone, 4-Methy-2-	2.6E-01	lb Pentanone, 4-Methy-2-/hr
WB-06	Scrubber Not Operating	Pentanone, 4-Methy-2-	1.0E+00	lb Pentanone, 4-Methy-2-/hr
WB-06	Scrubber Operating	Toluene	2.8E-01	lb Toluene/hr
WB-06	Scrubber Not Operating	Toluene	1.1E+00	lb Toluene/hr
WB-06	Scrubber Operating	$Xylenes_{total}$	4.8E-01	lb $Xylenes_{total}$/hr
WB-06	Scrubber Not Operating	$Xylenes_{total}$	1.9E+00	lb $Xylenes_{total}$/hr

WB-07 (Large Generator)	Diesel	PM_{10}	0.93	lb PM_{10}/hr
WB-07 (Small Generator)	Diesel	PM_{10}	0.18	lb PM_{10}/hr
WB-07 (Large Generator)	Diesel	SO_2	2.7 x S[1]	lb SO_2/hr
WB-07 (Small Generator)	Diesel	SO_2	0.48 x S[1]	lb SO_2/hr
WB-07 (Large Generator)	Diesel	Acetaldehyde	6.5E-03	lb Acetaldehyde/hr
WB-07 (Small Generator)	Diesel	Acetaldehyde	3.6E-04	lb Acetaldehyde/hr
WB-07 (Large Generator)	Diesel	Acrolein	7.9E-04	lb Acrolein/hr
WB-07 (Small Generator)	Diesel	Acrolein	4.3E-05	lb Acrolein/hr
WB-07 (Large Generator)	Diesel	Benzene	7.9E-03	lb Benzene/hr
WB-07 (Small Generator)	Diesel	Benzene	4.4E-04	lb Benzene/hr
WB-07 (Large Generator)	Diesel	Butadiene, 1,3- (54)	3.3E-04	lb Butadiene, 1,3-/hr
WB-07 (Small Generator)	Diesel	Butadiene, 1,3- (54)	1.8E-05	lb Butadiene, 1,3-/hr
WB-07 (Large Generator)	Diesel	Formaldehyde (HCOH)	1.0E-02	lb HCOH/hr
WB-07 (Small Generator)	Diesel	Formaldehyde (HCOH)	5.5E-04	lb HCOH/hr
WB-07 (Large Generator)	Diesel	POM	1.4E-03	lb POM/hr
WB-07 (Small Generator)	Diesel	POM	7.8E-05	lb POM/hr
WB-07 (Large Generator)	Diesel	Toluene	3.5E-03	lb Toluene/hr
WB-07 (Small Generator)	Diesel	Toluene	1.9E-04	lb Toluene/hr
WB-07 (Large Generator)	Diesel	$Xylenes_{total}$	2.4E-03	lb $Xylenes_{total}$/hr
WB-07 (Small Generator)	Diesel	$Xylenes_{total}$	1.3E-04	lb $Xylenes_{total}$/hr

[1] S = % Sufur, i.e. If 0.5% Sulfur, S = 0.5

Permit Appendix: Emission Factors for Washington Beef, Toppenish WA Plant

Source	Fuel or Operating Status	Pollutant	Emission Factor	
WB-08	Four Cooling Towers Operating	PM_{10}	4,272	lb PM_{10}/mo
WB-10	Wastewater Processed	Acetaldehyde	2.5E+02	lb Acetaldehyde/mo
WB-10	Wastewater Processed	Benzene	1.8E+01	lb Benzene/mo
WB-10	Wastewater Processed	Carbon Disulfide	1.1E+00	lb Carbon Disulfide/mo
WB-10	Wastewater Processed	Dichloromethane	9.5E+00	lb Dichloromethane/mo
WB-10	Wastewater Processed	Hexane	5.3E+00	lb Hexane/mo
WB-10	Wastewater Processed	Methanol	4.9E+00	lb Methanol/mo
WB-10	Wastewater Processed	Toluene	3.5E+01	lb Toluene/mo
WB-10	Wastewater Processed	$Xylenes_{total}$	1.7E+01	lb $Xylenes_{total}$/mo

United States Environmental Protection Agency
Region 10, Office of Air, Waste and Toxics
AWT-150
1200 Sixth Avenue, Suite 900
Seattle, Washington 98101-3140

Permit Number: R10NT502600
Issued: January 23, 2015
AFS Plant I.D. Number: 530-77T-0048

Technical Support Document
Non-Title V Air Quality Operating Permit

Permit Writer: Wallace Reid

Washington Beef LLC
Yakama Reservation
201 Elmwood Road
Toppenish, Washington 98948

Purpose of Owner-Requested Non-Title V Operating Permit and Technical Support Document

Title 40 Code of Federal Regulations Section 49.139 establishes a permitting program to provide for the establishment of federally-enforceable requirements for air pollution sources located within Indian reservations in Idaho, Oregon and Washington. The owner or operator of an air pollution source who wishes to obtain a federally-enforceable limitation on the source's actual emissions or potential to emit must submit an application to the Regional Administrator requesting such limitation.

The United States Environmental Protection Agency, Region 10, then develops the permit via a public process. The permit remains in effect until it is modified, revoked or terminated by Region 10 in writing.

This document, the technical support document, fulfills the requirement of 40 CFR § 49.139(c)(3) by describing the proposed limitation and its effect on the actual emissions and/or potential to emit of the air pollution source. Unlike the air quality operating permit, this document is not legally enforceable. The permittee is obligated to follow the terms of the permit. Any errors or omissions in the summaries provided here do not excuse the permittee from the requirements of the permit.

Table of Contents

1. Authority to Issue Non-Title V Permits

On April 8, 2005, Region 10 adopted regulations (70 FR 18074) codified at 40 CFR Parts 9 and 49, establishing Federal Implementation Plans under the Clean Air Act for Indian reservations in Idaho, Oregon and Washington. The FIPs, commonly referred to as the Federal Air Rules for Reservations, put in place basic air quality regulations to protect health and welfare on Indian reservations located in the Pacific Northwest. In the FARR, 40 CFR § 49.139 creates a permitting program for establishing federally enforceable requirements for air pollution sources on Indian reservations. This permit has been developed pursuant to 40 CFR § 49.139.

2. Plant Information

2.1 Location

The Washington Beef LLC (also known as the permittee) plant is located in Toppenish, Washington, within the exterior boundaries of the Yakama Reservation.

Tribal Contact: Elizabeth Sanchey, Program Manager
Environmental Management Program
Yakama Nation
P. O. Box 151
Toppenish, Washington 98948
Phone: 509-865-5121 x6038
Email: esanchey@yakama.com

2.2 Local Air Quality and Attainment Status

The Yakama Reservation is in attainment with the national ambient air quality standards or is unclassifiable. The subject plant is not located in a designated nonattainment area. With respect to prevention of significant deterioration impact evaluation, the majority of the reservation is classified as Class II lands.

2.3 General Description of Operations and Products

The Washington Beef, Toppenish plant is a beef slaughtering and rendering operation, producing a range of edible beef products and inedible beef byproducts, including, tallow, meat meal, a dried blood product and hides. The North American Industry Classification System, Standard Industrial Classification Code is 311614, Rendering and Meat Processing from Carcasses. This industry comprises establishments primarily engaged in rendering animal fat, bones and meat scraps; or preparing meat and meat by-products from carcasses.

The permittee has installed a rendering scrubber and pretreatment spray tower to control both odor and particulate emissions from their operations, and they have a wastewater treatment system with a permitted discharge to Wanity Slough. Upstream from the permitted discharge point, wastewater is collected throughout the plant, directed to a dissolved air flotation unit, then to an anaerobic lagoon, and is aerated prior to discharge. Anaerobic digestion of the wastewater occurs in the anaerobic lagoon, which is covered both to control odor and to capture biogas that is produced by the anaerobic decomposition of beef slaughtering and rendering wastewaters. The biogas is processed and stored in a dome for later combustion in WB-02, Processing Boiler #2; excess biogas is flared.

The rendering scrubber and pretreatment spray tower are installed on the roof of the building adjacent to where rendering operations are located. Emissions from the roof vents where rendering operations occur, except for those roof vents directly over the rendering cookers, are collected and directed to the pretreatment spray tower. After that, these rendering room emissions are routed to the rendering scrubber. Emissions from the roof vents directly over the rendering cookers are routed to the rendering scrubber without pretreatment, as are all the other emissions from the plant that run through the rendering scrubber, including blood dryer and blood dryer roof vent emissions, tallow tank emissions, and meat meal emissions.

Heat is needed for rendering operations, for keeping the slaughtering process clean and sanitary, for drying blood, and for space heating. The permittee generates this heat in three boilers (WB-01, WB-02 and WB-03), one blood dryer (WB-04), one make-up air unit heater (WB-05) located inside the rendering room, and several other heaters located throughout the plant (collectively WB-11). Fuels used to fire the boilers include natural gas, biogas and diesel. All of the heaters combust natural gas. The permittee has also expressed an interest in burning tallow at some point in the future, but this permit does not currently authorize this option. Four cooling towers provide cooling needed for slaughtering operations and for keeping edible beef products cold prior to shipment. Emergency power is provided to the plant by two diesel-fired emergency generators.

The above discussion is focused on describing operations that result in accountable, non-fugitive air pollutant emissions, which are the primary sources evaluated in this TSD, and for which there are emission limits included in the final non-Title V permit. However, in their application documents, the permittee also itemized a list of insignificant sources of air pollution and fugitive sources for which the permittee requested there be no emission limits included in the permit (see Administrative Record, Letter from Washington Beef to the EPA dated May 29, 2014, Table 15 “List of Insignificant Emission Units” and Table 16 “List of Fugitive Emissions Sources”). The EPA reviewed these lists and, except for one source listed in Table 16, had no data or information to refute the permittee’s claims. The exception was the Make-Up Air Units included in Table 16 that the EPA has since concluded are not fugitive because the emissions exhaust into various processing areas. The Make-Up Air Units are now included in the permit as WB-11. The EPA has separately informed Washington Beef that any future modifications to their plant, or the discovery of additional information that indicates any of these itemized fugitive or insignificant sources, or any other source, for which accountable air pollutant emissions are identified, would require that the permit be modified at that time to include such emissions.

There is another important detail about plant operations that is not specifically addressed in the final permit but is nonetheless important to both Washington Beef and future EPA enforcement personnel who will be inspecting the Washington Beef plant for compliance with the non-Title V air permit. The cover over the anaerobic lagoon is listed as a control device in the final permit and as such is subject to Permit Condition 2.1 relating to periods of startup, shutdown, maintenance and malfunction. Therefore, the EPA expects that the anaerobic lagoon cover will be in place and functional at most times, and that Washington Beef will seek to expeditiously return the anaerobic lagoon cover and collection system to operation after periods of down-time. On the other hand, the final permit does not mandate that the facility stop operating during periods when the anaerobic lagoon is not covered; however, emission released during such periods should be tracked and reported as part of any emission reports. The EPA expects Washington Beef to track operation of the anaerobic lagoon cover in sufficient detail, as for all other air pollution sources and control devices at the plant, to be able to calculate emissions.

Related to the tracking and reporting of emission from the lagoon, there are no emission factors in the permit to calculate greenhouse gas emissions due to venting of biogas because there are no greenhouse gas permit limitations included in the final permit. However, the EPA has decided it is appropriate to retain the greenhouse gas emission calculations in the Technical Support Document Appendix as a reference for both Washington Beef and the EPA when evaluating greenhouse gas emissions in the future.

The plant currently comprises the following equipment and activities with non-fugitive source emissions:

WB-01: Processing Boiler #1 is a Cleaver Brooks packaged boiler, model # CBLE200X-800-150ST, serial # 0L103915, dated 7/7/2011, with maximum fuel inputs of 32.7 10^6btu/hr natural gas, 233.5 gal/hr diesel.

WB-02: Processing Boiler #2 is a Cleaver Brooks packaged boiler, model # CBI-200-800-150, serial # 0L103326, dated 2003, with maximum fuel inputs of 32.7 10^6btu/hr natural gas and 233.5 gal/hr diesel, and can also combust biogas.

WB-03: The Fabrication Boiler is a Cleaver Brooks packaged boiler, model # CB I 700-350, serial # L-94177, dated 4/12/1995, with a maximum fuel input of 14.3 10^6btu/hr (natural gas only).

WB-04: The Blood Dryer is a Cyclonetic model unit, model # JB3C-50-EPD170-M.20-MA, serial # 82800A-011-07. It is used for blood drying operations and has maximum fuel inputs of 9 10^6btu/hr natural gas or 62 gal/hr diesel. Emissions from this unit and from the room where this unit is located are directed to the rendering scrubber without pretreatment; the rendering scrubber is an Anco-Eaglin Inc. 70,000 ft^3/min packed bed air scrubber (Operation & Maintenance Manual-Version1-Nov 2006), with a recirculating solution maintained at pH 4.5 by the addition of an odor neutralizer, an oxidizer and sulfuric acid. This tower is eight feet in diameter and ten feet high; water is sprayed into the tower countercurrent to airflow at a rate of 10 gal/min. Particulate matter removed from the air stream at this point is drained and routed to the wastewater treatment system (**WB-10**).

WB-05: The Make-Up Air Unit heater provides make-up air for rendering operations, with a maximum fuel input of 7 10^6btu/hr natural gas (natural gas only). Emissions from this unit are routed through either the rendering scrubber directly or first through the pretreatment spray tower and then on to the rendering scrubber.

WB-06: Rendering operations at the plant generate emissions that are emitted through roof vents in the rendering room, some of which are located directly over the rendering cookers. Emissions from the roof vents over the rendering cookers are routed directly to the rendering scrubber without pretreatment. All other rendering room emission are routed first through the pretreatment spray tower and then on to the rendering scrubber. The rendering operations include three barometric process cyclones, operated at less than atmospheric pressure and high temperature. These three identical units are located inside the rendering room. Each cyclone is approximately 7 feet tall and 4.5 feet across, and they are integral to the overall functioning of the rendering scrubber and the pretreatment spray tower. Emissions from WB-04, from tallow tank operations, from meat-meal operations (fugitive), and some emissions from WB-05 are routed to the rendering scrubber without pretreatment. The remaining emissions from WB-05 are routed first to the pretreatment spray tower and then on to the rendering scrubber.

WB-07: The Large Emergency Generator (423 hp, 19.2 gal/hr) and the Small Emergency Generator (80 hp, 3.4 gal/hr) are both 0.3 gal/kW-hr diesel-fired engines.

WB-08: The refrigeration cooling system at the plant includes four cooling towers with a combined recirculation rate of 308,000 gal/hr. The permittee also uses a biocide for the cooling towers to keep them functioning properly.

WB-09: Biogas is generated, combusted, and/or flared at the plant. Generation of biogas occurs in the anaerobic lagoon, which receives all process wastewater from rendering and meat processing, as well as all sanitary wastewater. Pursuant to NPDES Permit Number WA-005020-2, the maximum combined flow to the anaerobic lagoon is approximately 1,600,000 gal/day (67,000 gal/hr) and the volume of biogas generated from anaerobic digestion is approximately 500,000 ft^3/day. Combustion of biogas occurs in **WB-02** to offset the use of natural gas and diesel. Flaring of biogas occurs in the waste biogas flare (Varec Biogas 244E Waste Gas Burner), located near the anaerobic lagoon, and is done when biogas can't be combusted in **WB-02**.

WB-10: The wastewater treatment system at the plant processes approximately 1,600,000 gal/day (67,000 gal/hr). It includes the anaerobic lagoon, the cover over the lagoon for capturing biogas, two activated sludge basins, a surge basin, a dissolved air flotation unit, an NPDES discharge point to Wanity Slough, biogas collection and processing, a biogas storage dome, and a piping network for routing biogas to **WB-02**.

WB-11: Multiple gas-fired heaters associated with makeup air units are used at the plant for space heating. The combined capacity of these units is 24 10^6btu/hr natural gas. Emissions from these units are to interior work spaces throughout the plant and are eventually discharged outside through room vents.

3. Project Description

On October 2, 2006, Region 10 received an application from the permittee regarding their "Beef Cattle 'Complex' Slaughter House" plant in Toppenish, WA. In its application, the permittee requested "a limitation on the total number of gallons of fuel oil that may be combusted in all boilers", and "a requirement that cyclones and a packed bed scrubber be utilized…"

On August 5, 2011, Region 10 received a revised application from the permittee to account for modifications at their Toppenish plant: "…a fuel use change to incorporate biogas generated in an on-site anaerobic pond to fuel one of the existing boilers", "…a flare for that biogas to be used when the boiler is unavailable…", and "…ducting changes from the rendering room to the scrubber to lessen fugitive room emissions."

Region 10 has reviewed the permittee's submitted applications, toured the Toppenish plant on November 20, 2013, and prepared an emissions inventory (TSD Appendix) based on our understanding of the permittee's operations. A prior draft of Region 10's emission inventory was submitted to the permittee and to the Yakama Nation on March 14, 2014, for their review. Subsequent discussions with the permittee resulted in its submittal of a revised final application, which Region 10 received on June 2, 2014.

The permit and this TSD are based on the permittee's final application and on subsequent discussions with the permittee, in which it requested the following limitations and requirements:

1. A limitation on the emission of particulates (PM_{10}, $PM_{2.5}$), sulfur dioxide (SO_2) and hazardous air pollutants (HAP);

2. A requirement that the rendering scrubber be used when the plant is operating, including use of barometric process cyclones, a pretreatment spray tower, and a collection of ductwork that is used to route emissions from multiple sources to the pretreatment spray tower and/or rendering scrubber;

3. A requirement that the anaerobic lagoon be covered to capture biogas, and that biogas processing, storage, and distribution systems be used to combust or flare the biogas; and,

4. A requirement that all equipment and ducting be maintained and operated in accordance with manufacturers' specifications and instructions to the extent practicable.

4. Regulatory Analysis and Permit Content

4.1 Evaluation of Synthetic Minor Emission Limit Request

Region 10 has developed a detailed PTE emissions inventory (TSD Appendix) based on maximum production levels estimated by the permittee, and assuming these production levels would be sustained over 8,760 hr/yr. These emissions are summarized as follows:

Particulate matter (PM):	128	tons/yr
Particulate matter (PM_{10}), aerodynamic diameter less than 10 microns:	134	tons/yr
Particulate matter ($PM_{2.5}$), aerodynamic diameter less than 2.5 microns:	134	tons/yr
Sulfur dioxide (SO_2):	173	tons/yr
Greenhouse gases (GHG), CO_2-equivalent basis:	81,721	tons/yr
Carbon monoxide (CO):	64	tons/yr
Nitrogen oxides (NO_x):	69	tons/yr
Volatile organic compounds (VOC):	9.1	tons/yr
Lead (Pb):	0.0029	tons/yr
Hazardous air pollutants (HAP):	25	tons/yr
Largest single HAP – $Xylenes_{total}$:	8.4	tons/yr
Hydrogen Sulfide (H_2S) & Reduced Sulfur Compounds (RSC)	10	tons/yr

There are several fundamental assumptions reflected in these emission calculations. First, the particulate values are based on the assumption that the rendering scrubber is not operating. Region 10 used 2008 source test data (collected with the scrubber operating) and assumptions regarding scrubber efficiency to back-calculate particulate emissions without a scrubber. The scrubber source test data from the 2006 source test were not used because the permittee installed WB-04 (Blood Dryer) and made several upgrades to the rendering scrubber after the 2006 source test, so Region 10 concluded that the 2008 source test data are more representative of current operations. This uncontrolled emissions estimate was used because there is no requirement at this time that the scrubber be used; the permit will require use of the scrubber to meet the permit limits.

Second, for purposes of calculating $PM_{2.5}$ emissions for this permit, the permittee is willing to assume that all PM_{10} is $PM_{2.5}$, so no separate $PM_{2.5}$ emissions inventory is needed. Third, all of the diesel used at the plant, for purposes of the PTE calculation, is assumed to contain a maximum sulfur content of 0.5%, which leads to the value of 173 tons/yr SO_2; the permittee has indicated that low sulfur content diesel fuel will be used to assure compliance. Fourth, Region 10 has concluded that emissions from wastewater occur primarily from the dissolved air flotation unit into an enclosed structure at the plant, so they are considered to be non-fugitive emissions. The wastewater data used for this purpose was derived from the 2006 source test; no wastewater data was collected during the 2008 source test. Fifth, Region 10 has used the value 500 ppmv as the total sulfur content in the biogas based on a recent telephone conversation with the permittee. Sixth, Region 10 has not included GHG emissions in the permit because even if they did exceed 100 tons/yr, based on a recent court decision by the U.S. Supreme Court, they should not be included in a permit unless one of the criteria pollutant thresholds were also exceeded; in this case all criteria pollutants will be maintained below their relative thresholds based on compliance with the permit conditions. Seventh, the permittee has documented that WB-01, WB-02 and WB-

03 are low-NO_x boilers; this is reflected in the emissions inventory. Even without a low-NO_x credit, the permittee has a NO_x PTE below 100 tons/year, so there is no need for a limit in the permit.

The permittee is seeking to avoid the Title V program and is accepting practically enforceable emission limits below the 100-ton/yr threshold (25-ton/yr for total HAP). Consequently, emission limits are needed for PM_{10}, $PM_{2.5}$, SO_2 and HAP.

The emission limits requested by the permittee are presented in Permit Conditions 2.2 through 2.5. Operational requirements and limits are also included in permit conditions 2.1 and 2.6. The emission limits are accompanied by monitoring and recordkeeping requirements to ensure compliance (see Permit Conditions 3.1 through 3.4). The monitoring, recordkeeping and reporting for this permit will require the estimation of emissions from all of the non-fugitive activities at the plant at least once a month to confirm compliance with the rolling 12-month limits.

In general, the only emission limits necessary in the air permit are those for which the EPA has calculated a PTE equal to or greater than 100 tons per year, or 25 tons per year for total HAPs, or 10 tons per year for any individual HAP. This is why there is not an emission limitation in the permit for every pollutant for which the EPA calculated a PTE. The one pollutant for which this general rule does not apply is PM (not PM_{10} or $PM_{2.5}$, for which there are permit limitations). PM (particulate larger in size than 10um) does not have an imposed limitation in the permit even though the calculated PTE for PM is 128 tons per year. This is due to PM not being considered a regulated air pollutant for the purposes of Title V air permits. The logical explanation for this may be found in the EPA memorandum dated October 16, 1995, Definition of Regulated Pollutant for Particulate Matter for Purposes of Title V. This memorandum explains the EPA policy that PM_{10} (and now also $PM_{2.5}$) is considered to be the only regulated form of particulate matter.

However, as a practical matter, these technical and policy details associated with PM have little or no practical effect at the Washington Beef plant. This is because the vast majority, if not all of particulate matter emitted from the plant is less than 10um in diameter. For example, note that the calculated PTE for PM is 128 tons per year and the calculated PTE for PM_{10} is 134 tons per year. These numbers can't be directly compared because the measurement techniques for PM and PM_{10} are significantly different, but these values do suggest that the vast majority, if not all, of the particulate matter emitted from the Washington Beef plant is less than 10um in diameter, which does have a specific limitation in the permit.

4.2 Other Federal Regulations

Endangered Species Act Impacts: Region 10 is obligated to consider the impact that a federal project may have on listed species or critical habitats. Because the permit contains voluntarily requested emission limits, it is Region 10's conclusion that issuance of the permit will not affect a listed species or critical habitat. Therefore, no additional requirements will be added to the permit for ESA reasons. Region 10's "no-effect" determination concludes Region 10's obligations under Section 7 of the ESA. (See Endangered Species Consultation Handbook:

Procedures for Conducting Consultation and Conference Activities Under Section 7 of the Endangered Species Act, FWS and NMFS, March 1998, at Figure 1).

National Environmental Policy Act Review: Under Section 793(c) of the Energy Supply and Environmental Coordination Act of 1974, no action taken under the Clean Air Act shall be deemed a major federal action significantly affecting the quality of the human environment within the meaning of the National Environmental Policy Act of 1969. The permit in this case is an action taken under regulations implementing the Clean Air Act and is therefore exempt from the NEPA.

National Historic Preservation Act: No part of the plant is listed in the National Register, and this permit does not allow or require any construction activities. Consequently, no adverse effects are expected and further review under the NHPA is not necessary.

Environmental Justice (EJ): The plant is located in the town of Toppenish, WA, and within the Yakama Reservation. Links to maps that show environmental justice indicators for poverty and people of color are available at http://yosemite.epa.gov/R10/ocrej.nsf/environmental+justice/maps. In this action, however, the permit is only creating voluntary limits on emissions which will in turn lower emissions and lesson impacts. A disproportionately high environmental or public health impact to a low income or minority population is not expected to result from this project.

4.3 Permit Content

The permit includes the requested emission limits as well as monitoring, recordkeeping and reporting requirements necessary to assure compliance with the limits. Compliance with the limits allows the permittee to be treated as a minor source for Title V purposes.

In its May 29, 2014, letter to Region 10 requesting emission limits, the permittee included two Tables (#15 & #16) listing several sources they assert are insignificant or fugitive sources. Region 10 has reviewed this list of sources and included in the permit all non-fugitive activities with accountable emissions. If Region 10 becomes aware at any future time that additional sources exist, then the permit will need to be revised to address them.

Each section of the permit is discussed below. The permit is organized into four sections as follows:

Permit Section 1: General Conditions

This section of the permit contains conditions of a general nature that apply to the plant. Permit Condition 1.1 identifies the emission units at the plant. Condition 1.2 requires the permittee to comply with the conditions in the permit.

The permit establishes permittee-requested limits and related compliance assurance provisions to restrict the plant's PTE. It does not contain other Clean Air Act requirements to which the plant is or may be subject, such as the FARR; New Source Performance Standards, 40 CFR Part 60; or National Emissions Standards for Hazardous Air Pollutants, 40 CFR Part 61 and 63. It also does not contain any requirements that might apply in the future, such as the Tribal New Source Review, 40 CFR Part 49, or Prevention of Significant Deterioration, 40 CFR Part 52, permitting programs. As specified in Permit Condition 1.3, compliance with the terms of the permit in no way relieves or exempts the permittee from compliance with other applicable Clean Air Act requirements or of any other applicable federal, tribal, state, or local law or regulation.

Permit Section 2: Emission Limits and Work Practice Requirements

The permit contains emission limits (in tons per year) and work practice requirements that have been established as a result of the subject permit action. Permit Condition 2.1 requires the permittee to maintain and operate all emission units and associated control equipment in a manner that minimizes air pollutant emissions. Permit condition 2.6 sets hour per year limits for the two emergency generators to match the assumption in the PTE inventory reflecting the intention to only use the generators sparingly.

Permit conditions 2.2 through 2.5 contain annual limits for each pollutant with the potential to be emitted above a major source threshold. The emission limits were set at 99 tons/yr (24 tons/yr for total HAP). The permit specifies (and lists in the Permit Appendix) the emission factors that must be used when determining compliance with the annual emission limits. Note that for compliance purposes, consistent with the EPA policy (Performance Test Calculation Guidelines, June 6, 1990), 24.501 should be rounded to 25, while 24.500 should be rounded to 24.

Permit Section 3: Monitoring and Recordkeeping Requirements

Permit Condition 3.1 requires the permittee to calculate total monthly emissions every month. The rolling 12-month emissions must be determined by adding the emissions calculated for the most recent month with the emissions for the immediately preceding 11 months. Emissions are to be calculated for all the emission units identified in Permit Condition 1.1. The required emission factors are contained in the Permit Appendix. The permittee can refer to the emission estimating techniques set forth in the TSD Appendix when calculating monthly emissions and applying the required emission factors. For those sources with lb/mo emissions factors (WB-08 and WB-10), the permittee is willing to assume maximum operation for 8,760 hours per year to avoid tracking operations requirements.

Permit Condition 3.2 requires the permittee to track their operations in specific ways depending on the emission factors included in the Permit Appendix. All of the emission factors are in units of $lb/10^6scf$, $lb/10^3gal$, lb/hr or lb/mo. These units match the monitoring and recordkeeping requirements. For example, a factor with the units $lb/10^6scf$ will require the metering and tracking of the cubic-feet of either natural gas or biogas. A factor with the unit lb/hr will require monitoring and reporting the number of hours of operation. The lb/mo emission factors were set assuming maximum operations, making tracking actual operating rates unnecessary to ensure compliance. Thus, Permit Condition 3.2.1 only requires one metering location for natural gas usage because the emission units WB-01, WB-02, WB-03, WB-04, WB-05 and WB-11 all have identical emission factors when combusting natural gas (except for PM_{10}; WB-04 and WB-05 PM_{10} natural gas emissions are accounted for in WB-06 emissions).

Permit Condition 3.2.2 requires at least two metering locations for measuring the quantity of biogas produced in emission unit WB-09, the quantity of biogas combusted in WB-02, and the quantity of biogas flared in the Waste Biogas Flare. Permit Condition 3.2.3 requires at least one metering location for diesel usage in emission units WB-01 and WB-02, since they both have identical emission factors when combusting diesel fuel. Permit Condition 3.2.4 requires the installation of non-resettable, totalizing hour meters and/or operating practices to track the hours of operation of emission units WB-04, WB-06 and WB-07. Emission unit WB-06 has an additional requirement that its hours of operation be correlated with overall operation of the plant; for every hour the plant is operating, the permittee must be able to determine when WB-06 is operating and when it is not operating. Permit Conditions 3.2.5 and 3.2.6 requires the permittee to track various operating parameters that indicate whether the rendering scrubber and/or pretreatment spray tower are operating in accordance with manufacturer specifications.

Permit Condition 3.3 requires the permittee to obtain and record the sulfur content (percent sulfur by weight) for each diesel delivery, and then to use the highest recorded value over a rolling twelve-month period to calculate the monthly SO_2 emission factors for WB-01, WB-02, WB-04, WB-07 (Large Emergency Generator) and WB-07 (Small Emergency Generator). The emission factor equations in each instance are:

1. WB-01 (lb $SO_2/10^3$gal) EF = 142 x S [where S = % sulfur by weight; 0.5% sulfur, S = 0.5]
2. WB-02 (lb $SO_2/10^3$gal) EF = 142 x S [where S = % sulfur by weight; 0.5% sulfur, S = 0.5]
3. WB-04 (lb SO_2/hr) EF = 8.8 x S [where S = % sulfur by weight; 0.5% sulfur, S = 0.5]
4. WB-07 (Large, lb SO_2/hr) EF = 2.7 x S [where S = % sulfur by weight; 0.5% sulfur, S = 0.5]
5. WB-07 (Small, lb SO_2/hr) EF = 0.48 x S [where S = % sulfur by weight; 0.5% sulfur, S = 0.5]

These five emission factor equations are included in the Permit Appendix and must be used by the permittee to calculate these variable emission factors monthly, and then to calculate and report monthly emissions as required by Permit Condition 2.4.

Permit Condition 3.4 requires the permittee to maintain records adequate to enable the calculation of monthly emissions, including all supporting documentation, for a period of five years. Paper records may be scanned as electronic files, stored electronically, and reported to Region 10 in a widely available electronic format. However, paper records generated for monitoring plant operations and for demonstrating compliance with the Permit must be maintained with all other records for at least five years. Data loggers designed to overwrite pre-existing data in a continuously recording loop are not required by this permit condition to store historical data. However, continuously monitoring data loggers such as non-resettable totalizing hour meters and non-resettable totalizing natural gas or diesel meters, are required to maintain historical data, as designed. Lastly, data and information recorded and collected in the CMMS must also be maintained for at least five years and reported in a widely available electronic format whenever requested by Region 10.

Region 10 has also concluded that monitoring and recordkeeping for the H_2S content of biogas is unnecessary because we have included a sufficiently conservative H_2S concentration (500 ppmv) in the PTE calculation and emission factors to account for natural variability of the biogas. Similarly, Region 10 has concluded that monitoring and recordkeeping of the biocide used in the plant cooling towers is unnecessary because the HAP emissions are relatively insignificant.

Permit Section 4: Reporting Requirements

Permit Condition 4.1 requires the permittee to annually submit to Region 10 a record of the twelve monthly rolling 12-month emissions calculations for the previous calendar year. For ease in coordinating submittals, this report is required to be submitted concurrently with the annual FARR registration submittal due by February 15 of each year.

Permit Condition 4.2 requires that the annual report include details on how the emissions were calculated. Condition 4.3 requires copies of the report be sent to the Yakama Nation.

5. Permit Procedures

As required under 40 CFR § 49.139(c), all draft owner-requested operating permits must be publicly noticed and made available for public comment. For this permit action, the requirements of 40 CFR § 49.139(c)(5) are as follows.

Administrative Record: Make available for public inspection, in at least one location in the area affected by the air pollution source, a copy of the draft operating permit prepared by Region 10, the TSD for the draft permit, the application, and all supporting materials (see 40 CFR § 49.139(c)(5)(i)).

Publish Public Notice: Publish the draft permit notice via a prominent advertisement in a newspaper of general circulation in the area affected by the emissions source. The public notice must describe the availability of the draft permit to operate, the supporting materials and the opportunity to comment. Where possible, notices will also be made in the Tribal newspaper (see 40 CFR § 49.139(c)(5)(ii)).

Distribute Public Notice to Affected Parties: Provide copies of the public notice to the permittee, the Tribal governing body, and to the Tribal, State and local air pollution authorities having jurisdiction in areas outside of the Yakama Reservation potentially impacted by the air pollution source (see 40 CFR § 49.139(c)(5)(iii)).

30-Day Public Comment Period: Provide for a 30-day period for submittal of public comments, starting upon the date of publication of the notice. If requested, the Regional Administrator may hold a public hearing and/or extend the public comment period for up to an additional 30 days (see 40 CFR § 49.139(c)(5)(iv)).

Accept All Comments: Region 10 will accept all comments received on the draft permit during the 30-day public comment period (see 40 CFR § 49.139(c)(5)(iv)).

Prepare Final Permit and TSD: After the close of the public comment period, Region 10 will consider all comments received and prepare a final permit to operate and a final TSD. The final TSD will include a response to all comments received during the public comment period (see 40 CFR § 49.139(c)(6)).

Make the Permit Available: Region 10 will make the final permit and TSD available at all of the locations where the draft permit was made available (see 40 CFR § 49.139(c)(7)).

Send Final Documents to All Commenters: Send the final permit and TSD to all persons who provided comments on the draft permit to operate (see 40 CFR § 49.139(c)(7)).

5.1. Response to Public Comments

The public comment period for this permit ran from October 16 to November 20, 2014. The EPA received comments from Jan Whitefoot on November 12, 2104, and from Washington Beef on November 12, 2014. Washington Beef requested a meeting regarding their submitted comments. The EPA met with Washington Beef on November 14, 2014; after that meeting, Washington Beef submitted additional comments on November 20, 2014. Jan Whitefoot requested a public meeting, but no public meeting was held as explained in the response to Comment #17 below.

As required in 40 CFR § 49.139(c)(6), the EPA has considered the comments and has developed a response to each. The comments received are listed below along with a response to the comment that explains whether or not any change to the permit resulted and why any change was made.

As required in 40 CFR § 49.139(c)(7), the EPA will provide the final permit and TSD to the owner or operator of the air pollution source and each person who has submitted comments on the draft permit. The final permit and TSD are also being made available for 30 days at all of the locations where the draft permit was made available.

<u>Comments from Jan Whitefoot</u>:

1. The odor has literally driven people away from the City of Toppenish.

   EPA Response - Odor is not regulated under the Clean Air Act or its implementing regulations. Washington Beef voluntarily installed an air scrubber and covered an anaerobic lagoon. Both technological improvements have significantly reduced odors from the site, as experienced by the EPA personnel who have toured Washington Beef both before and after these improvements were made. With issuance of this permit, maintenance and operation of each emission unit and any associated air pollution control equipment, including the air scrubber and anaerobic lagoon cover, in a manner consistent with good air pollution control practices will be required – see Permit Condition 2.1. This new requirement should help minimize odors as well as other air pollutants that the permit specifically addresses.

2. We are concerned with cumulative health effects of breathing the hazardous gases and pathogens from the slaughterhouse.

   EPA Response - Under the Clean Air Act, the EPA regulates criteria air pollutants (ozone, particulate matter, carbon monoxide, nitrogen oxides, sulfur dioxide, and lead), hazardous air pollutants and certain other air pollutants. The EPA understands the concern regarding health effects caused by emissions from the facility. However, this permitting action is limited to simply creating enforceable limits voluntarily requested by the company.

   The permit creates limits for all regulated air pollutants that the facility could potentially emit at amounts higher than the Title V major source thresholds. Specifically, the permit will require that particulate matter (with aerodynamic diameters less than both 10 microns and 2.5 microns) and sulfur dioxide emissions not exceed 99 tons per year and that total hazardous air pollutant emissions not exceed 24 tons per year. As noted in our response to comment #1 above, the permit also requires the facility and existing air pollution control equipment be operated consistent with good air pollution control practices, which will help minimize emissions, and requires monitoring, recordkeeping and reporting to ensure the facility meets the new emission limits.

3. Does the EPA, AB Foods permit state AB foods will be cutting back on hours in order to stay under minor source emissions guidelines?

   EPA Response - The permit does not limit hours of operation, except for the emergency generators in Permit Condition 2.6. Emissions are generally determined by multiplying an emission factor (e.g. pounds per gallon or pounds per hour) by the amount of fuel consumed or hours of operation per year. The facility can voluntarily cut back on hours of operation to help meet their annual emission limits. The permit requires tracking of operations and calculation and reporting of emissions.

4. We realize AB Foods current permit states they emit 154 tons of particulate matter a year. This exceeds the amount EPA listed in the newspaper of 100 tons a year of sulfur dioxide and particulate matter.

   EPA Response – As the newspaper notice explained, the permit will limit particulate matter (with aerodynamic diameters less than 10 and 2.5 microns – PM_{10} and $PM_{2.5}$, respectively) and sulfur dioxide to less than 100-tons per year, the Title V major source threshold for those pollutants. The Technical Support Document presents the potential to emit for all of the regulated pollutants including particulate matter bigger than 10 microns (PM). PM is not considered a regulated pollutant for determining Title V applicability, so there is no need to limit PM in a permit the purpose of which is to avoid Title V applicability, such as this one. The Technical Support Document will be revised to explain this in more detail.

5. Please clarify, does the permit say 100 tons a year of sulfur dioxide and 100 tons a year of particulate, or 100 tons of year of both added together?

   EPA Response - The permit limits each of the pollutants to below 100-tons per year; the pollutants are not added together to determine compliance.

6. What type of permit was AB Foods operating under when it was violated for illegal ammonia release? Illegal water discharges? Minor source or major source? AB Foods was also fined for illegal ammonia releases into Wanity Slough. This also effects air quality and shows AB Foods needs to be closely monitored to protect the citizens working within the plant and living and visiting Toppenish. Has EPA done monitoring at the Toppenish site, to determine ammonia releases?

   EPA Response – This will be the first air pollution permit issued to the facility. Permits are not required for implementation of many federal regulations. We assume the comment is regarding two enforcement actions in 2008.

   Section 112(r) of the Clean Air Act, referred to as the Risk Management Program, does not require a permit, but instead requires development and implementation of a Risk Management Plan for certain chemicals that are used or stored onsite above a threshold amount specified in Section 112(r). For the Washington Beef plant the chemical requiring a Risk Management Plan is anhydrous ammonia, which is used in the plant's refrigeration systems. The enforcement action brought by the EPA against Washington Beef in 2008 under Section 112(r) did not relate to a release of anhydrous ammonia; the action was for failure to have a Risk Management Plan for anhydrous ammonia. For more information about this enforcement action, please contact Javier Morales at 206-553-1255 (morales.javier@epa.gov).

Also in 2008, the EPA brought an enforcement action under the Clean Water Act regarding untreated wastes being discharged directly into Spencer Lateral, which drains into Wanity Slough, that were subject to the terms of Washington Beef's National Pollutant Discharge Elimination System permit, WA-005020-2. The action did not involve or address any air releases. For more information about this case, please contact Steven Potokar at 206-553-6354 (potokar.steven@epa.gov).

Regarding actual releases of ammonia to the air, ammonia emissions from the rendering scrubber were measured in 2006 and 2008. These tests were provided to the EPA and are included in the Administrative Record for this permit. The 2006 test data indicated that ammonia emissions were below detection levels; however, due to changes to the rendering operations and emission controls since 2006, the EPA determined that the 2006 test data was no longer representative of current emissions. Using the highest of three measured rates and scaling from the measured scrubber air flow (61,907 cubic feet per minute) to the maximum scrubber air flow (70,000 cubic feet per minute) and the maximum number of hours per year (8,760 hours per year), the 2008 test data indicated that potential ammonia emissions are estimated to be less than 5 tons per year [(0.84 lbs/hr x 70,000 cfm / 61907 cfm x 8,760 hr/yr) / 2,000 lbs/ton = 4.2 tons/year]. As a regulated pollutant that is not classified as a hazardous air pollutant, ammonia's major source threshold is 100 tons per year. Worst case assumptions indicate that the facility emits less than 5% of the major source threshold for ammonia, so there was no need for Washington Beef to request an emission limit in this permit.

Although the 2006 scrubber test is no longer considered representative, during the 2006 test, Washington Beef also sampled the wastewater entering the dissolved air flotation unit for ammonia (results are documented in the 2006 test report). The samples were purged with nitrogen in a laboratory to simulate ammonia being released to the air, and the ammonia was measured. Based on the highest of three measured results and maximum wastewater flow rates, potential air emissions from the wastewater are estimated to be less than 1 ton per year [(0.17 ug/ml x 0.00834 (lb/10^3gal)/(ug/ml) x 67,000 gal/hr x 10^3gal/1,000 gal x 8,760 hr/yr) / 2,000 lbs/ton = 0.42 tons/yr]. Conservatively assuming all of the estimated ammonia is released in the dissolved air flotation unit (a non-fugitive emission unit) and adding these emissions to the rendering scrubber potential emissions, the total ammonia emissions are still less than 5% of the major source threshold.

While the EPA did not include ammonia in the emission inventory because the emissions were clearly far below the major source threshold, your question is a good one. The EPA should have documented the ammonia emissions in the technical support document, so applicability with regard to ammonia is clear.

7. Please provide a copy of AB Foods emergency evacuation plan.

   EPA Response – Under the permit action currently being considered, the EPA does not have authority to obtain an emergency evacuation plan from Washington Beef. We suggest contacting Washington Beef or the Yakama Nation to learn about any emergency evacuation plans that might exist.

   The Risk Management Plans required under the Clean Air Act, Section 112(r), are generally not publically available due to issues of plant security. However, the Risk Management Plan for Washington Beef, discussed in the response to comment #6 above, may be requested under the Freedom of Information Act or you may schedule a public reading room appointment to see the plan. For more information, please contact Javier Morales at 206-553-1255 (morales.javier@epa.gov).

8. AB foods Slaughterhouse cannot be trusted for a minor source of permit and should be a permitted under the more stringent Title 5 permit.

   EPA Response – Washington Beef has voluntarily requested that the EPA impose enforceable permit limitations on their facility to ensure they remain a minor source of air pollution. The permit will not only create emission limits that allow the facility to be treated as a minor source, but will create enforceable monitoring, recordkeeping and reporting requirements to confirm whether the facility is in compliance with the emission limits. Non-compliance will be enforceable by the EPA, the Yakama Nation or any member of the public. The facility will also be subject to inspections to ensure they are operating in compliance with their permit.

   The EPA does not have authority under the Clean Air Act to force a permittee to obtain a Title V permit when they voluntarily accept enforceable emission limits below the major source thresholds. If Washington Beef decides at some future time to expand their operations in a way that increases air pollutant emissions, they may be required to obtain a permit modification prior to expanding their operations. If such an expansion would cause Washington Beef to become a major source of air pollution, they will be required to submit a Title V permit application to the EPA before construction commences.

9. Also, in the potential permit it states AB Foods air quality numbers as stated as potentially released. This is not the same numbers as actual criteria pollutants, gases, particulates and pathogens actually released. Potential numbers are speculative. They are not proof AB foods would be under the 100 tons a year limit. This does not protect public health. AB Foods releases 8.4 tons a year of Xylene. Is it included with particulates when counted? What effect on human health?

   EPA Response - The EPA did calculate a theoretical potential to emit, as required by the Clean Air Act implementing regulations, rather than using actual emissions. The purpose for doing so is simply to identify a worst case scenario for the facility, assuming that all facility variables are at their maximum levels to project the greatest amount of air pollutant emissions. These potential to emit calculations are then used to determine the applicability of the various Clean Air Act regulatory programs to the specific facility circumstances. In

Washington Beef's case, their potential to emit values demonstrated that they have the potential to be a major source of air pollution for PM_{10}, $PM_{2.5}$, sulfur dioxide and total HAP. Washington Beef then had the choice to apply for a Title V permit as a major source or apply for a Non-Title V permit to create enforceable limits that are below the major source thresholds. Compliance with the proposed permit conditions will ensure that the Washington Beef facility emits actual levels of PM_{10}, $PM_{2.5}$ and sulfur dioxide below 100-tons per year each, and actual levels of total HAP below 25-tons per year.

Washington Beef's potential to emit for total xylenes is 8.4-tons per year. As explained above, this is a worst case scenario for the plant, assuming that all plant variables are at their maximum levels to produce the greatest amount of total xylenes emissions. Washington Beef's actual total xylenes emissions are likely to be significantly below this level under normal operating conditions, and will be reported to the EPA and to the Yakama Nation on an annual basis. Because the potential to emit for total xylenes is less than 10-tons per year, the Title V threshold for any single hazardous air pollutant, the proposed permit does not include any total xylenes limitations. Xylene emission do need to be tracked and added to the other plant hazardous air pollutant emissions to demonstrate compliance with the 24 ton per year limit in the permit. The health effects of total xylenes is described in the Public Health Statement – Xylene-CAS#: 1330-20-7, dated August 2007, issued by the U.S. Agency for Toxic Substances and Disease Registry (available free on the Internet).

10. EPA is bound by Washington State Air Quality Laws (SIPS) in which were just revised. EPA standards cannot be less than Washington State air quality laws.

    EPA Response – The Washington Beef facility is located within the boundaries of the Yakama Nation and is therefore not subject to Washington state air quality laws. The federal Clean Air Act is not required to be as stringent as the Washington State air quality laws.

11. Toppenish EPA air quality monitor has had some of the highest readings for polluted air quality in the Yakima Valley and in Washington State. Where is AB Foods air quality monitor located? Who is the contact person who supervises monitor? What is his/her training in air monitoring? What type of air monitor is used? Name of monitor? In 2013, EPA has stated Yakima Valley is close to non-attainment for air quality. Stakeholders need all facilities releasing ammonia, hydrogen sulfide, sulfur dioxide, pathogens and other hazardous chemicals and criteria pollutants to be closely monitored. We would like to see past data and current data on monitors from AB Foods for: hydrogen sulfide, ammonia, sulphate dioxide, pathogens and particulates. We request air monitoring data for the last 8 years on AB Foods.

    EPA Response – The permit does not require the installation of monitoring devices for plant emissions or ambient air quality. Instead, the permit requires Washington Beef to monitor operations and calculate actual emissions on a monthly and a rolling 12-month basis, using the emissions factors and formulae included in the permit. The EPA believes that the monitoring in the permit will ensure compliance. There are ambient air monitors in Toppenish and the Yakima Valley to determine overall compliance under the Clean Air Act with the National Ambient Air Quality Standards. For more information about air quality monitoring, please contact Keith Rose at 206-553-1949 (rose.keith@epa.gov).

12. We are worried about the public's health because AB Foods facility burns tallow which can potentially release airborne pathogens and prions.

    EPA Response – The proposed permit does not allow the burning of tallow in Washington Beef's boilers. If Washington Beef chooses to burn tallow at some time in the future, they will be required to first obtain a permit modification. If Washington Beef burns tallow without getting prior approval, it will be a permit violation.

13. AB Foods info state Biocides are used in the cooling towers to stop the growth of airborne pathogens. What exact chemicals are used in the Biocides? What is their effect on human health? Please provide us with AB Foods MSDS sheet on Biocides.

    EPA Response – The biocide used by Washington Beef in their cooling towers and reported in their application documents is chlorine, which was considered by the EPA in the calculation of hazardous air pollutant emissions from the facility. However, the actual emissions of chlorine are very small, orders of magnitude below the 10-ton per year threshold for any individual hazardous air pollutant. The permit allows Washington Beef to make a biocide change so long as it does not significantly alter their reported hazardous air pollutant emissions. As requested in your comment, the EPA has included a copy of the requested MSDS sheet in the record.

14. AB foods lists 64 tons of carbon dioxide and 6,411 tons (?) of carbon monoxide from the biogas flare. Is this tonnage included into the total tons of pollutants/particulates in the permit?

    EPA Response – Neither carbon dioxide (represented as greenhouse gases in the technical support document) nor carbon monoxide are limited by the permit. The potential to emit greenhouse gases (including carbon dioxide) from the Washington Beef plant is 81,721 tons per year. Because Washington Beef will be obtaining a non-Title V permit such that the facility will not be major for any other pollutants, the EPA is barred by a recent U.S. Supreme Court decision (June 23, 2014, Utility Air Regulatory Group v. EPA) from including any greenhouse gas limitations in the proposed permit, regardless of the potential to emit. The court decision allows a source to be treated as a minor source if greenhouse gases are the only pollutants that would qualify it a major source.

    The potential to emit carbon monoxide is 64 tons per year. Because, under a worst case operating scenario, the plant will not emit more than 100 tons per year of carbon monoxide, there is no permit limitation included in the permit. If Washington Beef elects to change their operations in any way that increases their carbon monoxide potential to emit above 100 tons per year, they must obtain a permit modification or a Title V permit prior to doing so.

15. We question where you obtained the numbers for your releases criteria pollutants of sulfur dioxide and particulates.

    EPA Response – For sulfur dioxide, the EPA generally used the most conservative (leading to higher emission estimates) published emission factor from the EPA guidance, AP-42, and we assumed that the sulfur content of any diesel fuel combusted in the boilers is the maximum allowed by regulation. These assumptions were used to calculate the potential to emit for sulfur dioxide. Washington Beef's actual sulfur dioxide emissions are likely to be significantly below this level under normal operating conditions, and will be reported an annual basis. The potential to emit calculations are presented in the Technical Support Document for the proposed permit; the emission factors used by Washington Beef to calculate actual sulfur dioxide emissions are included directly in the permit.

The 2008 source test for Washington Beef's air scrubber was used to calculate the potential to emit for particulate matter. This source test document is included in the Administrative Record, the potential to emit calculations are presented in the Technical Support Document for the proposed permit, and the emission factors used by Washington Beef to calculate actual fine particulate emissions are included directly in the permit

16. Since AB foods is located within the exterior boundaries of the Yakama Indian Reservation, FARR rules should be included. The permit we viewed did not list Federal Air Regulations for Reservation (FARR) requirements for air quality. Since these laws are federally enforceable, why are they not listed?

    EPA Response – Unlike Title V permits, which include all applicable requirements, Non-Title V permits are limited in scope to simply creating enforceable emission limits. Nonetheless, as stated in the proposed permit (Permit Condition 1.3), additional, applicable Clean Air Act requirements, such as the FARR rules mentioned in this comment, still apply to the plant and can be enforced separately.

17. There needs to be more information available to the public and a public meeting where all stakeholders are invited. There was one article in the Yakima Herald newspaper. Many people are unaware about this permit process and have not been notified of it. I talked to a senior citizen living directly across the street for AB foods. He had not been notified of the new permit. His family is interested in having AB Foods investigated for air quality and learning more in a public meeting. We are formally requesting a public meeting in Toppenish, WA, regarding the purposed air quality permit for AB Foods, Washington Beef Slaughterhouse.

    EPA Response – The EPA published the public notice for the proposed permit in two newspapers, the Yakima Herald and the Toppenish Review-Independent. We made available the permit, supporting technical documents, and the complete administrative record in three public libraries in Toppenish, Yakima and Seattle. We also delivered a Spanish version of the public notice to these three libraries, to the Yakama Nation, and to Washington Beef. Furthermore, throughout the entire process of drafting the proposed permit, we coordinated our efforts, including draft documents, with the Yakama Nation. When the public notice period ended on November 20, 2014, the EPA had received only one set of comments from a member of the public; another set of comments had been submitted by Washington Beef. Therefore, the EPA does not believe there is sufficient public interest to warrant the expense and time delay associated with holding a public hearing in this case. Furthermore, many of the issues raised in the public comments are outside the scope of the proposed permit action and could not be resolved in a public forum focused exclusively on the proposed permit.

The neighbor living directly across the street from the Washington Beef plant, or any other person, may contact the EPA at any time with concerns or observations. Such information is welcomed by the EPA and will be considered, as appropriate.

Comments from Washington Beef (date of receipt noted):

18. 11/12: Restoring the Facility-Wide Emission Limit for PM. EPA's working drafts of the Non-Title V Air Quality Operating Permit provided emission limitations for PM because it is a regulated air pollutant and because uncontrolled PM emissions are greater than 100 tons per year as set forth in permit application documents and in EPA's Technical Support Document at pages 7 and A-2. Accordingly, emission limits are needed for PM to assure that the facility is a minor source for Title V air permitting purposes. 11/20: Washington Beef commented on the removal of the PM emission limitation and requested reinstatement of the limitations. Washington Beef understands based on the November 14 meeting discussion and documents provided by EPA (specifically the EPA Headquarters October 16, 1995 Memorandum Definition of Regulated Pollutant for Particulate Matter for Purposes of Title V) that PM is not a regulated pollutant for Title V permitting and likewise is not considered regulated for Non-Title V permitting. Therefore, Washington Beef withdraws its November 12 comment and understands that PM will not be included in the Non-Title V Air Quality Operating Permit. Thank you for the clarification.

    EPA Response - This comment was formally withdrawn; however, for clarity, the EPA has also added language to the Technical Support Document (Section 4.1) explaining more clearly why there is no PM limit included in the permit.

19. 11/12: Establishing Facility-Wide Enforceable Emissions Limits. The question of whether a facility is a "major" source is a determination that is made on a facility-wide basis. When a facility requests emissions limits to avoid being a "major" source, those limits would also apply on a facility-wide basis. Washington Beefs Non-Title V Application was submitted for the entire Washington Beef processing plant ~ a source. EPA reviewed the application on this basis and the draft permit and Technical Support Document confirm that the processing facility is the source for which a permit was sought and for which the permit has been drafted. The draft permit is based on the careful discernment of air pollution units and activities within the processing facility and to be complete must include insignificant activities and fugitives in the source description. One way that this concern could be addressed is by adding the phrase "and includes insignificant emissions and fugitive emissions identified in the permit application documents" to the description of the permitted source in Section 1.1. This modification would also clarify that Washington Beef is authorized to operate all of the emission units, insignificant activities, and fugitive emissions disclosed and included in the permit application and permit preparation. 11/20: Washington Beef commented to request that the phrase “and includes insignificant emissions and fugitive emissions identified in the permit application documents” be added to the facility description in Draft Permit section 1.1. Thank you for clarifying that EPA’s permit practice is to permit a facility without specific reference in the permit to insignificant or fugitive emissions and without requirements regarding those emissions, even though the emissions are noted in the permit application documents. Washington Beef withdraws its November 12 comment regarding facility-wide enforceable emission limits. We also appreciate EPA’s understanding

of Washington Beef's concern that the permit administrative decision records, adequately document the existence of these insignificant and fugitive sources.

EPA Response - This comment was formally withdrawn; however, for clarity, the EPA has added language to the Technical Support Document that acknowledges Washington Beef's submittal of information about various insignificant and fugitive emissions from the Washington Beef Toppenish Plant and explains why such sources are or are not included in this permitting action. While fugitive emissions are not counted toward Title V applicability, insignificant emission units are not addressed in the non-Title V program. To the extent emissions from an emission unit can be calculated and could contribute towards Washington Beef exceeding an emission limit, the emission unit has been addressed in this permit action. There are in fact some emission units that emit minute levels of emissions that are not practical to track. If Washington Beef or the EPA become aware of emissions or emission units that have not been addressed but could contribute towards exceedances of the emission limits in the permit, the permit should be modified to address such emission or emission units.

20. 11/12: Permit, Page 2, Section 1.1. WB-01, WB-02, and WB-03 have low-NO_x burners, and this should be indicated as a control for each of these units. Documentation of this has previously been provided to EPA. Note also that emissions from the boilers should be calculated using either the boiler manufacturer provided emission factor or AP-42 natural gas combustion factor for small commercial and industrial boilers with low-NO_x burners. 11/20: Washington Beef has provided with these comments, additional information from Cleaver-Brook documenting that the boilers WB-01, WB-02, and WB-03 all have 30 ppm low-NO_x burners.

    EPA Response - The EPA acknowledges receipt of the letter from Cleaver Brooks to Washington Beef dated November 14, 2014, documenting that WB-01, WB-02 and WB-03 are low-NO_x boilers. Based on this information, the EPA has modified the boiler information in Section 1.1 and modified the NO_x calculations presented in the Technical Support Document Appendix. The EPA notes, however, that even without credit for low-NO_x boilers, the plant potential-to-emit for NO_x is significantly below 100 tons per year. Therefore, with or without low-NO_x boilers, there are no NO_x limits included in the final Washington Beef air permit.

21. 11/12: Permit, Page 2, Section 1.1. WB-04, the Blood Dryer, does not vent through the Pretreatment Spray Tower. 11/20: EPA confirmed its understanding that the Blood Dryer WB-04 does not vent through the Pretreatment Spray Tower.

    EPA Response – While the blood dryer controls were correctly described in the Technical Support Document, Section 2.3, the description in the permit, Section 1.1, had a typographical error. The final Washington Beef air permit has been modified to reflect that the Blood Dryer does not vent through the Pretreatment Spray Tower.

22. 11/12: Permit, Page 3, Section 2.2. We note that the 99 ton per year limit on PM that was included in Section 2.2 of the courtesy draft permit has been deleted. Since PM is a regulated air pollutant with uncontrolled Potential to Emit exceeding 100 tons/yr, an emissions limit for

PM is needed. 11/20: In accordance with the discussion above PM is not a regulated pollutant and thus emission limitations for PM will not be included in the permit.

EPA Response - This comment was formally withdrawn; however, for clarity, the EPA has also added language to the Technical Support Document (Section 4.1) explaining more clearly why there is no PM limit included in the permit.

23. 11/12: Permit, Page 4, Section 3.2.2. Please change dscf to scf. The flow measurement units installed are not moisture-compensating. Note that using scf instead of dscf will result in conservative (high) estimates of emissions. 11/20: EPA confirmed that it will change dscf to scf.

    EPA Response – This was a typographical error. The final Washington Beef air permit has been modified to reflect the use of “scf” units of measurement throughout.

24. 11/12: Permit, Page 4, Section 3.2.5. Add "when the scrubber is operating". During periods when the scrubber is shut down, monitoring is not needed. 11/20: EPA confirmed that it will add the language “when the scrubber is operating” as requested.

    EPA Response – The suggested language is typically used by the EPA for parameter monitoring requirements and was intended to be used in this permit. The final Washington Beef air permit has been modified as suggested.

25. 11/12: Permit, Page 4, Section 3.2.6. Add "when the pretreatment spray tower is operating". During periods when the pretreatment spray tower is shut down, monitoring is not needed. 11/20: EPA confirmed that it will add the language “when the pretreatment spray tower is operating” as requested.

    EPA Response – Again, the suggested language is typically used by the EPA for parameter monitoring requirements and was intended to be used in this permit. The final Washington Beef air permit has been modified as suggested.

26. 11/12: Permit Appendix, Page 4, Emission Factors. We believe the emission factor for WB-08, the Cooling Towers, is too large by a factor of 20. We note that the emission factor selected is based on AP-42, Table 13.4-1. The calculation method used by EPA assumes that the TDS content of the circulating is 20,000 parts per million – this is implicit when multiplying the 1.7 lbs drift/kgal circulating water by 0.020 to obtain lbs PM_{10}/kgal. This salinity level is more than 50% of the salinity of ocean water. As noted in our prior comments to EPA on cooling tower emissions, the maximum TDS in the circulating water at Washington Beef is 1000 parts per million. This is a practical limit associated with the design of ammonia condensers; at higher TDS levels the equipment is subject to scaling and corrosion. At a TDS level of 1000 parts per million, and assuming that all PM is emitted as PM_{10}, the maximum PM_{10} emissions from the tower would be 383 lb/month. 11/20: EPA indicated that potential PM_{10} emission from the cooling towers can also be estimated using the 0.019 lbs $PM_{10}/10^3$ gal circulating water emission factor that is in AP-42, Table 13.4-1. Washington Beef concurs with the use of this emission factor.

EPA Response – The emission factor for cooling towers in AP-42, Table 13.4-1, is considered representative and reasonable in this case. The final Washington Beef air permit has been modified to use the factor 0.019 lb/10^3 gal PM-10, obtained directly from AP-42, Table 13.4-1.

27. 11/12: Technical Support Document, Page 4, Section 2.3. The statement that “The permittee generates this heat in four boilers (WB-01, WB-02, WB-03 and WB-04)...” is incorrect. WB-04 is a dryer, not a boiler. 11/20: EPA confirmed that it will correct the Draft Permit to reflect that WB-04 is a dryer, not a boiler.

    EPA Response – While all of the plant descriptions in the permit and Technical support Document correctly identified the boilers and blood dryer, the statement in Section 2.3 of the Technical Support Document was incorrect. The final Washington Beef Technical Support Document has been modified to reflect this correction.

28. 11/12: Technical Support Document, Pages 7, A-2, A-7, Section 4.1. Calculations of GHG Potential to Emit include estimated emissions from unflared venting of biogas. Unflared venting of biogas is a process upset and should not be included in the calculations. 11/20: EPA confirmed that it will delete the requirement regarding estimated emissions from the unflared venting of biogas.

    EPA Response - There are no GHG limits included in the draft air permit or in the final air permit. Furthermore, the Technical Support Document has been modified to accurately reflect that unflared venting of biogas is not a normal operating practice at the Washington Beef plant. However, the EPA notes that biogas is produced at all times when there is wastewater in the anaerobic lagoon, and that biogas would need to be vented during periods when the anaerobic lagoon cover is not functional for any reason, perhaps during periods of maintenance, or at other times. There is no reason to remove the calculations from the Technical Support Document, so, for informational purposes, the calculation techniques will stay in the technical support document. See the response to Comment #31 for more discussion.

29. 11/12: Technical Support Document, Page 7, Section 4.1. The TSD states that “the permittee is willing to assume that all PM_{10} is $PM_{2.5}$, so no separate $PM_{2.5}$ emissions inventory is needed.” This assumption is true only for purposes of this permit. We request that the language be changed to read that “for purposes of calculating $PM_{2.5}$ emissions for this permit, the permittee is willing to assume that all PM_{10} is $PM_{2.5}$”. 11/20: EPA confirmed that it will include the requested language regarding calculation of $PM_{2.5}$ emissions.

    EPA Response – This is a reasonable and correct clarification. The final Washington Beef Technical Support Document has been modified as indicated.

30. 11/12: Technical Support Document, Page A-4. It's unclear why a PM for the flare would be calculated assuming a dirty flame. Methane burns very cleanly and generates virtually no soot. The value of 40 ug/l from AP-42 Table 13.5-1 provides a more reasonable emission factor. 11/20: Washington Beef withdraws its comments regarding PM calculations for the flame.

EPA Response - This comment was formally withdrawn. The final permit is unchanged from the draft.

31. 11/12: Technical Support Document, Pages A-12 and A-13. The monthly emission factors for carbon disulfide are different on these two pages. The reason for this difference is not clear. 11/20: EPA confirmed that the correct monthly emission factor for carbon disulfide is the HAP factor on page A-13 of the Draft Permit.

    EPA Response – This was a typographical error. The Technical Support Document has been modified to reflect that the correct emission factor for carbon disulfide is the HAP factor found on page A-13.

32. 11/20: Repair and maintenance of the anaerobic lagoon and the lagoon cover was also discussed during the meeting. There activities can require removal of the cover for extended times to accommodate activities such as removal of accumulated solids and greases and repair of the liner or cover itself. Because the lagoon cover is identified as a “control device” for the lagoon, Washington Beef wishes to confirm the discussion that during such repairs Washington Beef needs to keep records documenting that repairs are being completed with due diligence, that the records be made available during inspection by EPA, and that no formal notification to EPA of the commencement or completion of repairs is needed.

    EPA Response – The EPA has added language to the Technical Support Document to clarify that routine maintenance of the anaerobic lagoon cover is anticipated. The permit does not require shutdown of the plant when the anaerobic lagoon cover is not functional during periods of maintenance or during periods of unanticipated upset, but the permit does require that Washington Beef maintain the anaerobic lagoon cover during all other periods as an air pollution control device. Furthermore, Washington Beef should estimate, and report when required elsewhere, emissions released under such circumstances.

6. Acronyms, Abbreviations & Units

10^6btu	One Million Btu (or MMBtu)
10^3gal	One Thousand Gallons
AFS	Air Facility System (an EPA database)
As	Arsenic
ASTM	American Society for Testing and Materials
Be	Beryllium
btu	British Thermal Unit (or Btu)
Cd	Cadmium
CFR	Code of Federal Regulations
CH_4	Methane
CMMS	Computer Maintenance Management System
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CO_2e	Carbon Dioxide Equivalent
Cr	Chromium
CrVI	Chromium VI
DAF	Dissolved Air Flotation Unit
Diesel	Diesel Fuel, No. 2 Fuel Oil, Distillate Oil
dscf	Dry Standard Cubic Feet
EJ	Environmental Justice
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FARR	Federal Air Rules for Reservations
FIP	Federal Implementation Plan
FR	Federal Register
ft	Feet
ft^3	Cubic Feet
FWS	U.S. Fish & Wildlife Service
gal	Gallon
GHG	Greenhouse Gas
gr	Grains
GWP	Global Warming Potential
H2S	Hydrogen Sulfide
HAP	Hazardous Air Pollutant
HCOH	Formaldehyde
Hg	Mercury
hp	Horsepower
hr	Hour
kW	Kilowatt
L	Liter
lb	Pound
MAU	Make-Up Air Unit
min	Minute
ml	Milliliter
Mn	Manganese
mo	Month
N_2O	Nitrous Oxide
nat gas	Natural Gas
NEPA	National Environmental Policy Act
NESHAP	National Emission Standards for HAP
NHPA	National Historic Preservation Act
Ni	Nickel
NMFS	National Marine Fisheries Services
NMTOC	Non Methane Total Organic Carbon
NO_x	Nitrogen Oxide
NPDES	National Pollutant Discharge Elimination System
NSPS	New Source Performance Standards
O&M	Operation & Maintenance
PAH	Polynuclear Aromatic Hydrocarbons
Pb	Lead
PM	Particulate Matter
PM_{10}	PM with an aerodynamic diameter < 10 um
$PM_{2.5}$	PM with an aerodynamic diameter < 2.5 um
POM	Polycyclic Organic Matter
ppm	Parts per Million
ppmv	Parts per Million by Volume
PSD	Prevention of Significant Deterioration
PTE	Potential to Emit
Region 10	EPA, Region 10
RSC	Reduced Sulfur Compound
scf	Standard Cubic Feet
Se	Selenium
SO_2	Sulfur Dioxide
TSD	Technical Support Document
um	Micrometer
ug	Microgram
VOC	Volatile Organic Compound
yr	Year

Technical Support Document Appendix

Emissions Inventory

&

Potential to Emit Calculations

Technical Support Document

Non Title V Air Operating Permit

Initial Permit

Washington Beef LLC

Toppenish, Washington

AFS Plant Number 53-077-T0048

Sourcewide Emission Summary

Summary of Facility Potential Air Pollutant Emissions
Potential to Emit - all values in tons/yr

Sources[1]	WB-01[2] & WB-02[3]	WB-03[4]	WB-04[5]	WB-05[6]	WB-06[7]	WB-07[8]	WB-08[9]	WB-09[10]	WB-10[11]	WB-11[12]	Source-Wide PTE
Particulates (PM)[13]	4.1	0.12	0.53		95	0.28	26	1.56		0.20	128
Fine Particulates (PM_{10})[14]	4.7	0.47	0.61		100	0.28	26	1.56		0.78	134
Sulfur Dioxide (SO_2)[15]	145	0.092	19	0.045		0.41		7.6		0.15	173
Greenhouse Gases (GHG)[16]	45,849	7,328	6,088	3,590		145		6,411		12,309	81,721
Carbon Monoxide (CO)[17]	24	5.2	3.2	2.5		0.84		20		8.7	64
Nitrogen Oxides (NO_x)[17]	41	3.1	5.4	1.5		3.9		3.7		10	69
Volatile Organic Comp (VOC)[17]	1.5	0.34			5.1	0.32		0.30	0.93	0.57	9.1
Lead Compounds (Pb)[17]	0.0025	0.000031	0.00033	0.000015				0.000016			0.0029
Hygrogen Sulfide[17] (H_2S) & RSC					9.1				1.2		10
Predicted Highest Plantwide Single HAP[18]				$Xylenes_{total}$	8.4	Predicted Total HAP[19]					25

1 Fugitive sources are not considered when making a Non-Title V permit determination and not included in this PTE calculation; except for HAP emissions, for which fugitiv sources are considered.

2 **WB-01** Processing Boiler #1, 32.7 10^6btu/hr natural gas, 233.5 gal/hr diesel

3 **WB-02** Processing Boiler #2, 32.7 10^6btu/hr natural gas or biogas, 233.5 gal/hr diesel

4 **WB-03** Fabrication Boiler, 14.3 10^6btu/hr natural gas

5 **WB-04** Blood Dryer, 9 10^6btu/hr natural gas, 62 gal/hr diesel

6 **WB-05** Rendering Room Makeup Air Unit, 7 10^6btu/hr natural gas

7 **WB-06** Rendering Operations & Tallow Tank Operations, Rendering Scrubber 70,000 ft^3/min

8 **WB-07** Large Emergency Generator (423 hp) & Small Emergency Generator (80 hp)

9 **WB-08** Four Refrigeration System Cooling Towers, 308,000 gal/hr designed maximum flow rate

10 **WB-09** Biogas Flaring, 500,000 ft/day biogas generated

11 **WB-10** Wastewater Treatment System, 1,600,000 gal/day (67,000 gal/hr) wastewater processed

12 **WB-11** Room Heating Units, 24 10^6btu/hr natural gas, combined for all room heating units except WB-05

13 PM (>10um diameter) is not a regulated air pollutant for purposes of a Title V or Non-Title V permit as explained more fully in the text of the Techncial Support Document. In this case virtually all or most of the particulate matter calculated here is likely to be less than 10um.

14 The largest emissions of PM_{10} and $PM_{2.5}$ from WB-06 occurs when the plant is operating but the rendering scrubber is not operating. Operation of the rendering scrubber is required under this permit. The permit will limit PM_{10} and $PM_{2.5}$ emissions from the plant to less than 99 tons each per year.

15 The largest emissions of SO_2 from WB-01 and WB-02 occurs when the plant is combusting diesel containing a total sulfur content of 0.5%. In their application documents the Permittee indicated they will be using diesel with a sulfur content more on the order of 0.05%, which would result in an order of magnitude reduction in actual SO_2 emissions. The permit requires monitoring of the total gallons of diesel used and the sulfur content, and will limit SO_2 emissions from the plant to less than 99 tons/yr.

16 The largest emissions of GHG occurs from the combined emissions of WB-01 and WB-02 when the plant is combusting diesel. The combined WB-01 and WB-02 GHG emissions when combusting natural gas are only slightly less.

17 It is anticipated that actual CO, NO_x, VOC, Pb, H_2S and RSC emissions will each be significantly less than the calculated PTE under normal plant operating conditions.

18 It is anticipated that actual plantwide single HAP, $Xylenes_{total}$ emissions will be significantly less than 8.4 tons/yr under normal plant operating conditions. The predicted highest plantwide single HAP of 8.4 tons/yr is based on the rendering scrubber not working for an entire year. Operation of the rendering scrubber is required under this permit.

19 It is anticipated that actual total HAP emissions will be significantly less than 25 tons/yr under normal plant operating conditions. The predicted total HAP of 25 tons/yr is based on the rendering scrubber not working for an entire year. Operation of the rendering scrubber is required under this permit. The permit will limit total HAP emissions from the plant to less than 24 tons/yr.

Hazardous Air Pollutant Totals by Individual Constituent and Source

HAP by Source	WB-01 Natural Gas tons/yr	WB-02 Natural Gas tons/yr	WB-03 Natural Gas tons/yr	WB-01 Biogas tons/yr	WB-01 Diesel tons/yr	WB-02 Diesel tons/yr	WB-04 Natural Gas tons/yr	WB-04 Diesel tons/yr	WB-05 Natural Gas tons/yr	WB-06 Scrubber Operating tons/yr	WB-06 Scrubber Not Operating tons/yr	WB-07 Large Emerg Gen tons/yr	WB-07 Small Emerg Gen tons/yr	WB-08 Four Cooling Towers tons/yr	WB-09 Waste Biogas Flare tons/yr	WB-09 Biogas Venting Assume None	WB-10 Waste-water System tons/yr	WB-11 Room Heating Units tons/yr
	2.7E-01	3.0E-01	1.2E-01	6.1E-02	5.9E-02	5.9E-02	7.3E-02	1.6E-02	5.7E-02	5.5E+00	2.2E+01	8.2E-03	4.5E-04	0.0E+00	6.1E-02	0.0E+00	2.0E+00	1.9E-01
PTE	**2.7E-01**	**3.0E-01**	**1.2E-01**				**7.3E-02**		**5.7E-02**		**2.2E+01**	**8.2E-03**	**4.5E-04**		**6.1E-02**		**2.0E+00**	**1.9E-01**

HAP by Constituent

PTE 25.0

Acetaldehyde	1.5E+00	1.4717168	
Acrolein	2.1E-04	0.0002073	
Arsenic	1.1E-04	0.0001126	
Benzene	7.7E-01	0.7682712	
Beryllium	6.8E-06	0.0000068	
Butadiene, 1,3-	4.4E-02	0.0438876	
Cadmium	6.2E-04	0.0006193	
Carbon Disulfide	7.0E-01	0.6986400	
Chlorine	0.0E+00	0.0000000	**Assumed insignificant to allow greater flexibility choosing cooling tower biocide**
Chloroform	0.0E+00	0.0000000	**Not detected 2008 Source Test**
Chromium	7.9E-04	0.0007882	
Chromium VI	3.9E-05	0.0000394	
Cobalt	4.7E-05	0.0000473	
Dichlorobenzene	6.8E-04	0.0006756	
Dichloromethane	5.7E-02	0.0570000	
Ethylbenzene	1.6E+00	1.5943200	
Fluoranthene	1.7E-06	0.0000017	
Fluorene	1.6E-06	0.0000016	
Formaldehyde	4.5E-02	0.0448586	
Hexane	1.1E+00	1.1371750	
Lead	2.8E-04	0.0002815	
Manganese	2.1E-04	0.0002140	
Mercury	1.5E-04	0.0001464	
Methanol	1.2E+00	1.1638200	
Naphthalene	3.4E-04	0.0003434	
Naphthalene, 2-Methyl	1.4E-05	0.0000135	
Nickel	1.2E-03	0.0011825	
Pentanone, 4-Methy-2-	4.6E+00	4.5552000	
Phenanthrene (POM)	9.6E-06	0.0000096	
POM (Less Indv POM)	1.5E-03	0.0015456	
Pyrene (POM)	2.8E-06	0.0000028	
Selenium	1.4E-05	0.0000135	
Styrene	0.0E+00	0.0000000	**Not detected 2008 Source Test**
Toluene	5.0E+00	5.0308293	
Xylenes$_{total}$	**8.4E+00**	**8.4246383**	
	PTE	**25.0**	

The total predicted plantwide HAP PTE is 25 tons/yr. Xylenes are the predicted highest plantwide single HAP at 8.4 tons/yr

PM Calculations

Source	Emission Factor Reference		EF	Units	Converted Value & Units	Capacity	Units	Emission Rate (lb/hr)	hr/yr	tons/lb	tons/yr	PM PTE[20]
[21]WB-01 (Natural Gas)	AP-42 Table 1.4-2 (Filterable)	PM	1.9	lb PM/10^6scf	0.00186 lb PM/10^6btu	32.7	10^6btu/hr	0.061	8,760	0.00050	0.27	
[23]WB-01 (Diesel)	AP-42 Table 1.3-1 (Filterable)	PM	2.0	lb PM/10^3gal		233.5	gal/hr	0.47	8,760	0.00050	2.0	**2.0**
[21]WB-02 (Natural Gas)	AP-42 Table 1.4-2 (Filterable)	PM	1.9	lb PM/10^6scf	0.00186 lb PM/10^6btu	32.7	10^6btu/hr	0.061	8,760	0.00050	0.27	
[22]WB-02 (Biogas)	AP-42 Table 1.4-2 (Filterable), Adjusted for biogas	PM	1.1	lb PM/10^6scf		500,000	scf/day	0.023	8,760	0.00050	0.10	
[23]WB-02 (Diesel)	AP-42 Table 1.3-1 (Filterable)	PM	2.0	lb PM/10^3gal		233.5	gal/hr	0.47	8,760	0.00050	2.0	**2.0**
[21]WB-03 (Natural Gas)	AP-42 Table 1.4-2 (Filterable)	PM	1.9	lb PM/10^6scf	0.00186 lb PM/10^6btu	14.3	10^6btu/hr	0.027	8,760	0.00050	0.12	**0.12**
[23]WB-04 (Natural Gas)	No Emission Factor - PM accounted for in WB-06											
[25]WB-04 (Diesel)	AP-42 Table 1.3-1 (Filterable)	PM	0.12	lb PM/hr				0.12	8,760	0.00050	0.53	**0.53**
[23]WB-05 (Natural Gas)	No Emission Factor - PM accounted for in WB-06											
[26]WB-06 (Operating)	and Rendering Plant is Operating; 2008 Source Test	PM	1.3	lb PM/hr				1.3	8,760	0.00050	5.5	
[26]WB-06 (Not Operating)	and Rendering Plant is Operating; 2008 Source Test	PM	22	lb PM/hr				22	8,760	0.00050	95	**95**
[27]WB-07 (Large Generator)	AP-42 Table 3.3-1 (Diesel)	PM	0.93	lb PM/hr				0.93	500	0.00050	0.23	**0.23**
[28]WB-07 (Small Generator)	AP-42 Table 3.3-1 (Diesel)	PM	0.18	lb PM/hr				0.18	500	0.00050	0.045	**0.045**
[29]WB-08 (Four Cooling Towers)	AP-42 Table 13.4-1, Converted to hourly factor	PM	4,272	lb PM/mo				6	8,760	0.00050	26	**26**
[30]WB-09 (Waste Biogas Flare)	AP-42 Table 13.5-1 (Soot, heavily smoking flare)	PM	17	lb PM/10^6scf		500,000	scf/day	0.36	8,760	0.00050	1.56	**1.6**
[31]WB-09 (Biogas Venting)	No Biogas Venting - No reported PM in biogas											
[31]WB-10 (Wastewater System)	No Emission Factor - No reported PM from wastewater											
[21]WB-11 (Room Heating Units)	AP-42 Table 1.4-2 (Filterable)	PM	1.9	lb PM/10^6scf	0.00186 lb PM/10^6btu	24.0	10^6btu/hr	0.045	8,760	0.00050	0.20	**0.20**
												128

20 The PM PTE column is designed to capture the worst-case PTE scenario for each emission unit and fuel (or operating) configuration. These worst-cases are then summed below, in this case 128 tons PM/yr.

21 The converted value and units are derived as follows: 1.9 lb PM/10^6scf x 10^6scf/1,020 10^6btu (volume/heat-value conversion for natural gas) = 0.00186 lb PM/10^6btu. Converted to match capacity units for tons/yr calculation.

22 Adjustment for biogas is calculated as follows: 1.9 lb PM/10^6scf x [(600 10^6btu/10^6scf for biogas)/(1,020 10^6btu/10^6scf for natural gas)] = 1.12 lb PM/10^6scf. The tons/yr calculation is limited by the amount of biogas available for combustion.

23 The emission factor is directly from the referenced AP-42 table, for boilers less than 100 10^6btu/hr, and no conversion is necessary to match the capacity units for combusting diesel.

24 Blood dryer and rendering room MAU emissions are routed to the rendering scrubber, and during the 2008 source test the blood dryer was combusting natural gas (the rendering room MAU combusts only natural gas). Therefore, blood dryer and rendering room MAU natural gas emissions are accounted for in rendering scrubber emissions.

25 The emission factor is directly from the referenced AP-42 table, for boilers less than 100 10^6btu/hr, converted to an hourly factor: 2.0 lb PM/10^3gal x 62.0 gal/hr (capacity of WB-04) x 10^3gal/1,000 gal = 0.124 lb PM/hr

26 Region 10 has calculated uncontrolled non-fugitive PM PTE because without a permit there would be no enforceable requirement to either install or adequately maintain the rendering scrubber, pretreatment spray tower, and/or barometric process cyclones. A standard currently applicable to the rendering operations is 0.1 grains/scf from a process source stack, per 40 CFR § 49.125(d)(3). This standard applies because the source is located within the boundaries of the Yakama Reservation. When this standard is used the plant would be allowed to emit, in the absence of other regulatory restraints, 263 tons PM/yr. This demonstrates that in the absence of a permit, compliance with the particulate standard applicable to the rendering operations would allow the plant to exceed 99 tons PM/yr. The Region 10-calculated PM PTE for the entire plant is 128 tons PM/yr, most of which is generated when the rendering scrubber is not operating and the plant continues to operate. However, PM/yr PTE value is highly dependent on the efficiency of the rendering scrubber, which is unknown. For example, the calculated 95 tons PM/yr value assumes an efficiency of 94.2%. At 96% scrubber efficiency the reverse-calculated PM PTE (derived from the controlled PM PTE value) would be 138 tons PM/yr. At 93% scrubber efficiency the reverse-calculated PM PTE would be 79 tons PM/yr. Because the PM scrubber efficiency is unknown, and will remain unknown in the absence of additional source testing, Region 10 has assumed that PM PTE for the entire plant exceeds 100 tons PM/yr, even though a specific value can not be determined. For example, if the rendering scrubber is operating 90% of the time over the course of an entire year when the plant is also operating, the actual PM emissions would be 15.2 tons {[1.26 lb PM/hr x (8,760 hr/yr x 0.90)]/2,000 lb/ton + [21.8 lb PM/hr x (8,760 hr/yr x 0.10)]/2,000 lb/ton = 14.5 tons PM}. Furthermore, if the rendering scrubber is operating most of the time, the variability in PM emissions due to the scrubber PM efficiency being unknown is less important overall, which reinforces Region 10's conclusion that the permit must set a standard regarding scrubber operating performance of some kind. Region 10 derived the WB-06 (Operating) and WB-06 (Not Operating) PM emission factors by using the highest measured front-half PM results from the 2008 scrubber source test, 0.0021 gr/scf. There were three runs during the source test as follows, in units of gr/scf: 0.0021, 0.0015, 0.0009. Based on the 0.0021 gr/scf source test result, Region 10 calculated the WB-06 PM emission factors as follows: 1) 0.0021 gr/scf x 70,000 scf/min [rated capacity of scrubber] x lb/7,000 gr [conversion factor] x 60 min/hr [conversion factor] = 1.26 lb PM/hr; 2) 1.26 lb PM/hr x (100)/(100-94.2) = 21.8 lb PM/hr.

27 The emergency generator-specific emission factor is calculated as follows: 0.00220 lb PM, PM_{10}/hp-hr x 423 hp = 0.93 lb PM, PM_{10}/hr

28 The emergency generator-specific emission factor is calculated as follows: 0.00220 lb PM, PM_{10}/hp-hr x 80 hp = 0.18 lb PM, PM_{10}/hr

29 AP-42 Table 13.4-1, Converted to hourly factor, 0.019 1b/10^3gal x 308,000 gal/hr (maximum combined cooler design flowrate) x 10^3gal/1,000 gal x 8,760 hr/12 mo = 4,272 lb PM/mo for all four cooling towers

30 The converted value and units are derived as follows: 274 ug PM/L x L/0.0353147 ft^3 (L to ft^3 conversion) x 0.00000000220462 lb/ug (ug to lb conversion) x 1,000,000 scf/10^6scf = 17.1 lb PM/10^6scf.

31 There is no reported PM in the biogas and there are no reported PM emissions from the plant's wastewater.

PM_{10} Calculations

Source	Emission Factor Reference		EF	Units	Converted Value & Units		Capacity	Units	Emission Rate lb/hr	hr/yr	tons/lb	tons/yr	PM_{10} PTE[32]
[33]WB-01 (Natural Gas)	AP-42 Table 1.4-2 (Total)	PM_{10}	7.6	lb $PM_{10}/10^6$scf	0.00745	lb PM/10^6btu	32.7	10^6btu/hr	0.24	8,760	0.00050	1.1	
[35]WB-01 (Diesel)	AP-42 Table 1.3-1 (Filterable) & Table 1.3-2 (CPM-TOT)	PM_{10}	2.3	lb $PM_{10}/10^3$gal			233.5	gal/hr	0.54	8,760	0.00050	2.4	**2.4**
[33]WB-02 (Natural Gas)	AP-42 Table 1.4-2 (Total)	PM_{10}	7.6	lb $PM_{10}/10^6$scf	0.00745	lb PM/10^6btu	32.7	10^6btu/hr	0.24	8,760	0.00050	1.1	
[34]WB-02 (Biogas)	AP-42 Table 1.4-2 (Total), Adjusted for biogas	PM_{10}	4.5	lb $PM_{10}/10^6$scf			500,000	scf/day	0.094	8,760	0.00050	0.41	
[35]WB-02 (Diesel)	AP-42 Table 1.3-1 (Filterable) & Table 1.3-2 (CPM-TOT)	PM_{10}	2.3	lb $PM_{10}/10^3$gal			233.5	gal/hr	0.54	8,760	0.00050	2.4	**2.4**
[33]WB-03 (Natural Gas)	AP-42 Table 1.4-2 (Total)	PM_{10}	7.6	lb $PM_{10}/10^6$scf	0.00745	lb PM/10^6btu	14.3	10^6btu/hr	0.11	8,760	0.00050	0.47	**0.47**
[36]WB-04 (Natural Gas)	No Emission Factor - PM_{10} accounted for in WB-06												
[37]WB-04 (Diesel)	AP-42 Table 1.3-1 (Filterable) & Table 1.3-2 (CPM-TOT)	PM_{10}	0.14	lb PM_{10}/hr					0.14	8,760	0.00050	0.61	**0.61**
[36]WB-05 (Natural Gas)	No Emission Factor - PM_{10} accounted for in WB-06												
[38]WB-06 (Operating)	and Rendering Plant is Operating; 2008 Source Test	PM_{10}	3.3	lb PM_{10}/hr					3.3	8,760	0.00050	14	
[38]WB-06 (Not Operating)	and Rendering Plant is Operating; 2008 Source Test	PM_{10}	23	lb PM_{10}/hr					23	8,760	0.00050	100	**100**
[39]WB-07 (Large Generator)	AP-42 Table 3.3-1 (Diesel)	PM_{10}	0.93	lb PM_{10}/hr					0.93	500	0.00050	0.23	**0.23**
[39]WB-07 (Small Generator)	AP-42 Table 3.3-1 (Diesel)	PM_{10}	0.18	lb PM_{10}/hr					0.18	500	0.00050	0.045	**0.045**
[40]WB-08 (Four Cooling Towers)	AP-42 Table 13.4-1, Converted to hourly factor	PM_{10}	4,272	lb PM_{10}/mo					6	8,760	0.00050	26	**26**
[41]WB-09 (Waste Biogas Flare)	AP-42 Table 13.5-1 (Soot, heavily smoking flare)	PM_{10}	17	lb $PM_{10}/10^6$scf			500,000	scf/day	0.36	8,760	0.00050	1.56	**1.6**
[42]WB-09 (Biogas Venting)	No Biogas Venting - No reported PM_{10} in biogas												
[42]WB-10 (Wastewater System)	No Emission Factor - No reported PM_{10} from wastewater												
[33]WB-11 (Room Heating Units)	AP-42 Table 1.4-2 (Total)	PM_{10}	7.6	lb $PM_{10}/10^6$scf	0.00745	lb PM/10^6btu	24.0	10^6btu/hr	0.18	8,760	0.00050	0.78	**0.78**
													134

32 The PM_{10} PTE column is designed to capture the worst-case PTE scenario for each emission unit and fuel (or operating) configuration. These worst-case scenarios are then summed, in this case 134 tons PM_{10}/yr.

33 The converted value and units are derived as follows: 7.6 lb PM/10^6scf x 10^6scf/1,020 10^6btu (volume/heat-value conversion for natural gas) = 0.00745 lb PM/10^6btu. Converted to match capacity units for tons/yr calculation.

34 Adjustment for biogas is calculated as follows: 7.6 lb PM/10^6scf x [(600 10^6btu/10^6scf for biogas)/(1,020 10^6btu/10^6scf for natural gas)] = 4.47 lb PM/10^6scf. The tons/yr calculation is limited by the amount of biogas available for combustion.

35 Based on AP-42 Table 1.3-6 50% of PM is less than or equal to 10 um, thus the calculated PM_{10} emission factor is derived as follows: (2.0 x 0.50) lb $PM_{10}/10^3$gal (Filterable) + 1.3 lb $PM_{10}/10^3$gal (Condensible) = 2.3 lb $PM_{10}/10^3$gal

36 Blood dryer and rendering room MAU emissions are routed to the rendering scrubber, and during the 2008 source test the blood dryer was combusting natural gas (the rendering room MAU combusts only natural gas). Therefore, blood dryer and rendering room MAU natural gas emissions are accounted for in rendering scrubber emissions.

37 The conversion of the diesel PM_{10} emission factor to an hourly factor is calculated as follows: 2.3 lb $PM_{10}/10^3$gal x 62.0 gal/hr x 10^3gal/1,000 gal = 0.143 lb PM_{10}/hr

38 Region 10 has calculated uncontrolled non-fugitive PM_{10} PTE because without a permit there would be no enforceable requirement to either install or adequately maintain the rendering scrubber, pretreatment spray tower, and/or barometric process cyclones. A standard currently applicable to the rendering operations is 0.1 grains/scf PM from a process source stack, per 40 CFR § 49.125(d)(3). This standard applies because the source is located within the boundaries of the Yakama Reservation. When this standard is used the plant would be allowed to emit, in the absence of other regulatory restraints, 263 tons PM_{10}/yr. This demonstrates that in the absence of a permit, compliance with the PM standard applicable to the rendering operations would allow the plant to exceed 99 tons PM_{10}/yr. The Region 10-calculated PM_{10} PTE for the entire plant is 134 tons PM_{10}/yr, most of which is generated when the rendering scrubber is not operating and the plant continues to operate. However, the PM_{10}/yr PTE value is highly dependent on the efficiency of the rendering scrubber, which is unknown. For example, the calculated 100 tons PM_{10}/yr value assumes an efficiency of 85.5%. At 87% scrubber efficiency the reverse-calculated PM_{10} PTE (derived from the controlled PM_{10} PTE value) would be 111 tons PM_{10}/yr. At 84% scrubber efficiency the reverse-calculated PM_{10} PTE would be 90 tons PM_{10}/yr. Because the PM_{10} scrubber efficiency is unknown, and will remain unknown in the absence of additional source testing, Region 10 has assumed that PM_{10} PTE for the entire plant exceeds 100 tons PM_{10}/yr, even though a specific value can not be determined. Therefore, Region 10 has concluded that a PM_{10} emission limit of 99 tons PM_{10}/yr is necessary in the permit, and further concludes that the permit must require proper operation of the rendering scrubber, pretreatment spray tower and barometric process cyclones to ensure this PM_{10} limit is not exceeded. For example, if the rendering scrubber is operating 90% of the time over the course of an entire year when the plant is also operating, the actual PM_{10} emissions would be 23.0 tons {[3.30 lb PM_{10}/hr x (8,760 hr/yr x 0.90)]/2,000 lb/ton + [22.84 lb PM_{10}/hr x (8,760 hr/yr x 0.10)]/2,000 lb/ton = 23.0 tons PM_{10}}. Furthermore, if the rendering scrubber is operating most of the time, the variability in PM_{10} emissions due to the scrubber PM_{10} efficiency being unknown is less important overall, which reinforces Region 10's conclusion that the permit must set a standard regarding scrubber operating performance of some kind. Region 10 derived the WB-06 (Operating) and WB-06 (Not Operating) PM_{10} emission factors by using the highest measured back-half PM results from the 2008 scrubber source test, 0.0044 gr/scf. There were three runs during the source test as as follows, in units of gr/scf: 0.0041, 0.0018, 0.0044. Based on the 0.0044 gr/scf source test result, Region 10 calculated the WB-06 PM_{10} emission factors as follows: 1) 0.0044 + 0.0011 (50% of PM) gr/scf x 70,000 scf/min [rated capacity of scrubber] x lb/7,000 gr [conversion factor] x 60 min/hr [conversion factor] = 3.30 lb PM_{10}/hr; 2) 3.30 lb PM_{10}/hr x (100)/(100-85.5) = 22.8 lb PM_{10}/hr.

39 Assume the PM_{10} emission factor is the same as the PM emission factor for both the large generator and the small generator.

40 Assume the PM_{10} emission factor is the same as the PM emission factor for the four cooling towers.

41 Assume the PM_{10} emission factor is the same as the PM emission factor for the waste biogas flare.

42 There is no reported PM_{10} in the biogas and there are no reported PM_{10} emissions from the plant's wastewater.

SO_2 Calculations

Source	Emission Factor Reference		EF	Units	Converted Value & Units	Capacity	Units	Emission Rate lb/hr	hr/yr	tons/lb	tons/yr	SO_2 PTE[43]
[44]WB-01 (Natural Gas)	AP-42 Table 1.4-2 (Footnote d), Adjusted for 5,000 gr S/10^6scf	SO_2	1.5	lb $SO_2/10^6$scf	0.00147 lb $SO_2/10^6$btu	32.7	10^6btu/hr	0.048	8,760	0.00050	0.21	
[46,49]WB-01 (Diesel)	AP-42 Table 1.3-1 (142xS %, assume S=0.5%)	SO_2	71	lb $SO_2/10^3$gal		233.5	gal/hr	17	8,760	0.00050	73	**73**
[44]WB-02 (Natural Gas)	AP-42 Table 1.4-2 (Footnote d), Adjusted for 5,000 gr S/10^6scf	SO_2	1.5	lb $SO_2/10^6$scf	0.00147 lb $SO_2/10^6$btu	32.7	10^6btu/hr	0.048	8,760	0.00050	0.21	
[45]WB-02 (Biogas)	Reported (by Permittee) H_2S maximum value 500 ppmv	SO_2	84	lb $SO_2/10^6$scf		500,000	scf/day	1.7	8,760	0.00050	7.6	
[46,49]WB-02 (Diesel)	AP-42 Table 1.3-1 (142xS%, assume S=0.5%)	SO_2	71	lb $SO_2/10^3$gal		233.5	gal/hr	17	8,760	0.00050	73	**73**
[44]WB-03 (Natural Gas)	AP-42 Table 1.4-2 (Footnote d), Adjusted for 5,000 gr S/10^6scf	SO_2	1.5	lb $SO_2/10^6$scf	0.00147 lb $SO_2/10^6$btu	14.3	10^6btu/hr	0.021	8,760	0.00050	0.092	**0.092**
[47]WB-04 (Natural Gas)	AP-42 Table 1.4-2 (Footnote d), Adjusted for 5,000 gr S/10^6scf	SO_2	0.013	lb SO_2/hr				0.013	8,760	0.00050	0.057	
[48,49]WB-04 (Diesel)	AP-42 Table 1.3-1 (142xS%, assume S = 0.5%)	SO_2	4.4	lb SO_2/hr				4.4	8,760	0.00050	19	**19**
[50]WB-05 (Natural Gas)	AP-42 Table 1.4-2 (Footnote d), Adjusted for 5,000 gr S/10^6scf	SO_2	7.5	lb SO_2/mo				0.010	8,760	0.00050	0.045	**0.045**
[51]WB-06 (Operating)	No Emission Factor - 2008 Source Test											
[51]WB-06 (Not Operating)	No Emission Factor - 2008 Source Test											
[52]WB-07 (Large Generator)	100% conversion sulfur to SO_2 and S = 0.5%	SO_2	1.4	lb SO_2/hr				1.4	500	0.00050	0.35	**0.35**
[53]WB-07 (Small Generator)	100% conversion sulfur to SO_2 and S = 0.5%	SO_2	0.24	lb SO_2/hr				0.24	500	0.00050	0.060	**0.060**
[54]WB-08 (Four Cooling Towers)	No Emission Factor - No reported SO_2 from WB-08											
[45]WB-09 (Waste Biogas Flare)	Reported (by Permittee) H_2S maximum value 500 ppmv	SO_2	84	lb $SO_2/10^6$scf		500,000	scf/day	1.7	8,760	0.00050	7.6	**7.6**
[55]WB-09 (Biogas Venting)	No Biogas Venting - No reported SO_2 in Biogas											
[55]WB-10 (Wastewater System)	No EF - No reported SO_2 from Wastewater											
[44]WB-11 (Room Heating Units)	AP-42 Table 1.4-2 (Footnote d), Adjusted for 5,000 gr S/106scf	SO_2	1.5	lb $SO_2/10^6$scf	0.00147 lb $SO_2/10^6$btu	24	10^6btu/hr	0.035	8,760	0.00050	0.155	**0.15**
												173

43 The SO_2 PTE column is designed to capture the worst-case PTE scenario for each emission unit and fuel (or operating) configuration. These worst-case scenarios are then summed, in this case 173 tons SO_2/yr.

44 The adjustment for maximum sulfur content of pipeline natural ga is as follows: 0.6 lb $SO_2/10^6$scf x (5,000gr/10^6scf)/(2,000gr/10^6scf) = 1.5 lb $SO_2/10^6$scf. See 40 CFR §72.2 Definitions - "Pipeline natural gas".

45 (H2S ppmv) x (34.06 lb H_2S/385.1x10^6scf) x (1,000,000 scf/10^6scf) x (64.06 lb SO_2/34.06 lb H_2S) = [H_2S ppmv x 0.167] lb $SO_2/10^6$scf. 500 ppmv x 0.167 = 83.5 lb $SO_2/10^6$scf. The tons/yr calculation is limited by available biogas.

46 The emission factor is calculated as follows: 142 lb $SO_2/10^3$gal x 0.5% Sulfur = 71 lb $SO_2/10^3$gal, Boilers <100 10^6btu/hr, distillate oil fired.

47 The emission factor is based on the natural gas SO_2 factor, adjusted to 5,000 gr S/10^6scf maximum and converted to an hourly factor: 1.5 lb $SO_2/10^6$scf x 10^6scf/1,020 10^6btu x 9.0 10^6btu/hr = 0.0132 lb SO_2/hr

48 The emission factor is based on the diesel SO_2 factor, adjusted to S=0.5% and converted to an hourly factor: 71 lb $SO_2/10^3$gal x 62.0 gal/hr x 10^3gal/1,000 gal = 4.40 lb SO_2/hr

49 WB-01, WB-02 and WB-04 are the most significant source of SO_2 at the plant when combusting diesel. Region 10 has determined that the SO_2 PTE from these sources, and therefore from the entire plant, significantly exceeds 100 tons/yr. The Region 10-calculated SO_2 PTE for these three sources when combusting diesel is 165 tons/yr. Region 10 calculated this result by using the SO_2 emission factor from the EPA guidance AP-42, Section 1.3 – Fuel Oil Combustion, Table 1.3-1, for boilers less than 100 10^6btu/hr, distillate oil fired (142 lb/1,000 gallons), assuming a 0.5% sulfur concentration in the diesel, converting to appropriate units, multiplying this by the rated diesel capacities of WB-01 (233.5 gal/hr), WB-02 (233.5 gal/hr), and WB-04 (62 gal/hr), and then converting these results to tons/yr.

50 The emission factor is based on the natural gas SO_2 factor, adjusted to 5,000 gr S/10^6scf maximum and converted to a monthly factor: 1.5 lb $SO_2/10^6$scf x 10^6scf/1,020 10^6btu x 7.0 10^6 Btu/hr x 8,760 hr/12 mo = 7.52 lb SO_2/mo

51 No emissions of SO_2 from the rendering scrubber based on the 2008 source test

52 100% conversion sulfur to SO_2 and S = 0.5%, 19.2 gal/hr x 7.05 lb/gal x 0.005 x (64g/mole SO_2/32g/mole S) = 1.35 lb SO_2/hr

53 100% conversion sulfur to SO_2 and S = 0.5%, 3.4 gal/hr x 7.05 lb/gal x 0.005 x (64g/mole SO2/32g/mole S) = 0.240 lb SO_2/hr

54 The permittee has not reported SO_2 emissions from the cooling towers.

55 The permittee has not reported SO_2 in the biogas or SO_2 emissions from the plant's wastewater.

Greenhouse Gas (GHG) Calculations

Source	Emission Factor Reference		EF	Units	Converted Value & Units		Capacity	Units	Emission Rate (lb/hr)	hr/yr	tons/lb	tons/yr	CO_2e PTE[56]
[57]WB-01 (Natural Gas)	40 CFR 98 Tables C-1 (CO_2) and C-2 (CH_4, N_2O)	CO_2e	119,440	lb $CO_2e/10^6$scf	117	lb $CO_2e/10^6$btu	32.7	10^6btu/hr	3,824	8,760	0.00050	16,750	
[59,68]WB-01 (Diesel Fuel)	40 CFR 98 Tables C-1 (CO_2) and C-2 (CH_4, N_2O)	CO_2e	22,415	lb $CO_2e/10^3$gal			233.5	gal/hr	5,234	8,760	0.00050	22,924	**22,924**
[57]WB-02 (Natural Gas)	40 CFR 98 Tables C-1 (CO_2) and C-2 (CH_4, N_2O)	CO_2e	119,440	lb $CO_2e/10^6$scf	117	lb $CO_2e/10^6$btu	32.7	10^6btu/hr	3,824	8,760	0.00050	16,750	
[58]WB-02 (Biogas)	40 CFR 98 Tables C-1 (CO_2) and C-2 (CH_4, N_2O), adjusted biogas	CO_2e	70,259	lb $CO_2e/10^6$scf			500,000	scf/day	1,464	8,760	0.00050	6,411	
[59,68]WB-02 (Diesel Fuel)	40 CFR 98 Tables C-1 (CO_2) and C-2 (CH_4, N_2O)	CO_2e	22,415	lb $CO_2e/10^3$gal			233.5	gal/hr	5,234	8,760	0.00050	22,924	**22,924**
[57,68]WB-03 (Natural Gas)	40 CFR 98 Tables C-1 (CO_2) and C-2 (CH_4, N_2O)	CO_2e	119,440	lb $CO_2e/10^6$scf	117	lb $CO_2e/10^6$btu	14.3	10^6btu/hr	1,673	8,760	0.00050	7,328	**7,328**
[60]WB-04 (Natural Gas)	40 CFR 98 Tables C-1 (CO_2) and C-2 (CH_4, N_2O), converted to hr	CO_2e	1,054	lb CO_2e/hr					1,054	8,760	0.00050	4,617	
[61,68]WB-04 (Diesel Fuel)	40 CFR 98 Tables C-1 (CO_2) and C-2 (CH_4, N_2O), converted to hr	CO_2e	1,390	lb CO_2e/hr					1,390	8,760	0.00050	6,088	**6,088**
[62,68]WB-05 (Natural Gas)	40 CFR 98 Tables C-1 (CO_2) and C-2 (CH_4, N_2O), converted to mo	CO_2e	598,371	lb CO_2e/mo					820	8,760	0.00050	3,590	**3,590**
[63]WB-06 (Operating)	No Emission Factor - 2008 Source Test												
[63]WB-06 (Not Operating)	No Emission Factor - 2008 Source Test												
[64,68]WB-07 (Large Generator)	AP-42 Table 3.3-1, CO_2, Diesel	GHG	487	lb GHG/hr					487	500	0.00050	122	**122**
[65,68]WB-07 (Small Generator)	AP-42 Table 3.3-1, CO_2, Diesel	GHG	92	lb GHG/hr					92	500	0.00050	23	**23**
[66]WB-08 (Four Cooling Towers)	No Emission Factor - No reported GHG												
[58, 68]WB-09 (Waste Biogas Flare)	40 CFR 98 Tables C-1 (CO_2) and C-2 (CH_4, N_2O), adjusted biogas	CO_2e	70,259	lb $CO_2e/10^6$scf			500,000	scf/day	1,464	8,760	0.00050	6,411	**6,411**
[67]WB-09 (Biogas Venting)	No Biogas Venting; Biogas 40% CO_2 and 60% CH_4	CO_2e	667,478	lb $CO_2e/10^6$scf			500,000	scf/day	13,906	8,760	0.00050	60,907	
[66]WB-10 (Wastewater System)	No reported GHG from wastewater												
[57,68]WB-11 (Room Heating Units)	40 CFR 98 Tables C-1 (CO_2) and C-2 (CH_4, N_2O)	CO_2e	119,440	lb $CO_2e/10^6$scf	117	lb $CO_2e/10^6$btu	24.0	10^6btu/hr	2,810	8,760	0.00050	12,309	**12,309**
													81,721

56 The CO_2e PTE column is designed to capture the worst-case PTE scenario for each emission unit and fuel (or operating) configuration. These worst-case scenarios are then summed, in this case 81,721 tons CO_2e/yr.

57 See 40 CFR 98 Table A-1 for GWP: CO_2=1, N_2O=298, CH_4=25. [53.06 kg $CO_2/10^6$btu + (0.0001 x 298) kg $N_20/10^6$btu + (0.001 x 25) kg $CH_4/10^6$btu] x (2.20462 lb/kg) x (1,020 10^6btu/10^6scf) = 119,440 $CO_2e/10^6$scf.

58 The emission factor is the natural gas factor, adjusted for biogas. 119,440 lb $CO_2e/10^6$scf x [(600 10^6btu/10^6scf for biogas)/(1,020 10^6btu/10^6scf for natural gas)] = 70,259 lb $CO_2e/10^6$scf. The tons/yr calculation is limited by available biogas.

59 See 40 CFR 98 Table A-1 for GWP: CO_2=1, N_2O=298, CH_4=25. [73.96 kg $CO_2/10^6$btu + (0.0006 x 298) kg $N_20/10^6$btu + (0.003 x 25) kg $CH_4/10^6$btu] x (2.20462 lb/kg) x (137 10^6btu/10^3gal) = 22,415 lb $CO_2e/10^3$gal

60 The emission factor is the natural gas factor, converted to an hourly factor. 119,440 lb $CO_2e/10^6$scf x 9.0 10^6btu/hr x 10^6scf/1,020 10^6btu = 1,054 lb CO_2e/hr

61 The emission factor is the diesel factor, converted to an hourly factor. 22,415 lb $CO_2e/10^3$gal x 62.0 gal/hr x 10^3gal/1,000 gal = 1,390 lb CO_2e/hr

62 The emission factor is the natural gas factor, converted to a monthly factor. [119,440 lb $CO_2e/10^6$scf x 7.0 10^6btu/hr x 10^6scf/1,020 10^6btu x 8,760 hr/yr]/12 mo = 598,371 lb CO_2e/mo

63 No emissions of GHG from the rendering scrubber based on the 2008 source test

64 The emission factor is calculated as follows: 1.15 lb GHG/hp-hr x 423 hp = 486.5 lb GHG/hr

65 The emission factor is calculated as follows: 1.15 lb GHG/hp-hr x 80 hp = 92.0 lb GHG/hr

66 The permittee reported no GHG emissions from the four cooling towers or from the plant's wastewater, with the exception of biogas that is accounted for in WB-09 (Waste Biogas Flare).

67 The emission factor is calculated as follows: [(0.66 kg/m^3 CH_4 x 25 x 0.60) + (1.98 kg/m^3 CO_2 x 0.40)] x (2.20462 lb/kg) x (m^3/35.3147 ft^3) x (1,000,000 $ft^3/10^6$scf) = 667,478 lb/10^6scf. 0.66 kg/m^3 density CH_4. 1.98 kg/m^3 density CO_2.

68 This is the worst-case CO_2e scenario: 1) WB-01, WB-02 and WB-04 combust diesel, 2) WB-03, WB-05 and WB-11 combusts natural gas (because that's all it can burn), 3) the WB-07 emergency generators operate (combusting diesel) 500 hours/yr, and 4) all of the biogas is flared. The CO_2e PTE is 81,721 tons/yr, approximately 20% below the threshold of 100,000 tons/yr.

CO Calculations

Source	Emission Factor Reference		EF	Units	Converted Value & Units		Capacity	Units	Emission Rate (lb/hr)	hr/yr	tons/lb	tons/yr	CO PTE[69]
[70]WB-01 (Natural Gas)	AP-42 Table 1.4-1	CO	84	lb CO/10^6scf	0.082	lb CO/10^6btu	32.7	10^6btu/hr	2.7	8,760	0.00050	12	**12**
[72]WB-01 (Diesel Fuel)	AP-42 Table 1.3-1	CO	5.0	lb CO/10^3gal			233.5	gal/hr	1.2	8,760	0.00050	5.1	
[70]WB-02 (Natural Gas)	AP-42 Table 1.4-1	CO	84	lb CO/10^6scf	0.082	lb CO/10^6btu	32.7	10^6btu/hr	2.7	8,760	0.00050	12	**12**
[71]WB-02 (Biogas)	AP-42 Table 1.4-1, Adjusted for biogas	CO	49	lb CO/10^6scf			500,000	scf/day	1.0	8,760	0.00050	4.5	
[72]WB-02 (Diesel Fuel)	AP-42 Table 1.3-1	CO	5.0	lb CO/10^3gal			233.5	gal/hr	1.2	8,760	0.00050	5.1	
[70]WB-03 (Natural Gas)	AP-42 Table 1.4-1	CO	84	lb CO/10^6scf	0.082	lb CO/10^6btu	14.3	10^6btu/hr	1.2	8,760	0.00050	5.2	**5.2**
[73]WB-04 (Natural Gas)	AP-42 Table 1.4-1, Converted to hourly factor	CO	0.74	lb CO/hr					0.74	8,760	0.00050	3.2	**3.2**
[74]WB-04 (Diesel Fuel)	AP-42 Table 1.3-1, Converted to hourly factor	CO	0.31	lb CO/hr					0.31	8,760	0.00050	1.4	
[75]WB-05 (Natural Gas)	AP-42 Table 1.4-1, Converted to monthly factor	CO	421	lb CO/mo					0.58	8,760	0.00050	2.5	**2.5**
[76]WB-06 (Operating)	No Emission Factor - 2008 Source Test												
[76]WB-06 (Not Operating)	No Emission Factor - 2008 Source Test												
[77]WB-07 (Large Generator)	AP-42 Table 3.3-1, CO, Diesel	CO	2.8	lb CO/hr					2.8	500	0.00050	0.71	**0.71**
[78]WB-07 (Small Generator)	AP-42 Table 3.3-1, CO, Diesel	CO	0.53	lb CO/hr					0.53	500	0.00050	0.13	**0.13**
[79]WB-08 (Four Cooling Towers)	No Emission Factor - No reported CO from WB-08												
[80]WB-09 (Waste Biogas Flare)	AP-42 Table 13.5-1 (CO)	CO	222	lb CO/10^6scf			500,000	scf/day	4.6	8,760	0.00050	20	**20**
[79]WB-09 (Biogas Venting)	No Biogas Venting - No reported CO in biogas												
[79]WB-10 (Wastewater System)	No Emission Factor - No reported CO in wastewater												
[70]WB-11 (Room Heating Units)	AP-42 Table 1.4-1	CO	84	lb CO/10^6scf	0.082	lb CO/10^6btu	24.0	10^6btu/hr	2.0	8,760	0.00050	8.7	**8.7**
												[81]	**64**

69	The CO PTE column is designed to capture the worst-case PTE scenario for each emission unit and fuel (or operating) configuration. These worst-case scenarios are then summed, in this case 64 tons CO/yr.
70	Small Boilers < 100 10^6btu/hr, Low NOx
71	Small Boilers < 100 10^6btu/hr, Low NOx: 84 lb CO/10^6scf x [(600 10^6btu/10^6scf for biogas)/(1,020 10^6btu/10^6scf for natural gas)] = 49.4 lb CO/10^6scf. The tons/yr calculation is limited by available biogas.
72	Directly from AP-42 Table 1.3-1, <100 10^6btu/hr, Distillate oil
73	Directly from AP-42 Table 1.4-1, Small Boilers < 100 10^6btu/hr, Low NOx, Converted to hourly factor. 84 lb CO/10^6scf x 10^6scf/1,020 10^6btu x 9.0 10^6btu/hr = 0.741 lb CO/hr
74	Directly from AP-42 Table 1.3-1, <100 MM Btu/hr, Distillate oil, Converted to hourly factor, 5 lb CO/10^3gal x 62.0 gal/hr x 10^3gal/1,000 gal = 0.310 lb CO/hr
75	Small Boilers < 100 10^6btu/hr, Low NOx: [84 lb CO/10^6scf x 7.0 10^6btu/hr x 10^6scf/1,020 10^6btu x 8,760 hr/yr]/12 mo = 421 lb CO/mo
76	No emissions of CO from the rendering scrubber based on the 2008 source test
77	The emission factor is calculated as follows: 0.00668 lb CO/hp-hr x 423 hp = 2.83 lb CO/hr
78	The emission factor is calculated as follows: 0.00668 lb CO/hp-hr x 80 hp = 0.534 lb CO/hr
79	The permittee has reported no CO emissions from the four cooling towers, no CO in the biogas and no CO emissions from the plant's wastewater.
80	The emission factor is calculated as follows: 0.37 lb CO/10^6btu x 600 10^6btu/10^6scf = 222 lb CO/10^6scf
81	It is anticipated that CO emissions from the plant will be significantly less than 64 tons/yr under normal plant operating conditions.

NO_x Calculations

Source	Emission Factor Reference		EF	Units	Converted Value & Units		Capacity	Units	Emission Rate (lb/hr)	hr/yr	tons/lb	tons/yr	NO_x PTE[82]
[83]WB-01 (Natural Gas)	AP-42 Table 1.4-1	NO_x	50	lb NO_x/10^6scf	0.049	lb NO_x/10^6btu	32.7	10^6btu/hr	1.6	8,760	0.00050	7	
[85]WB-01 (Diesel Fuel)	AP-42 Table 1.3-1	NO_x	20	lb NO_x/10^3gal			233.5	gal/hr	4.7	8,760	0.00050	20	**20**
[83]WB-02 (Natural Gas)	AP-42 Table 1.4-1	NO_x	50	lb NO_x/10^6scf	0.049	lb NO_x/10^6btu	32.7	10^6btu/hr	1.6	8,760	0.00050	7	
[84]WB-02 (Biogas)	AP-42 Table 1.4-1	NO_x	29	lb NO_x/10^6scf			500,000	scf/day	0.6	8,760	0.00050	2.7	
[85]WB-02 (Diesel Fuel)	AP-42 Table 1.3-1	NO_x	20	lb NO_x/10^3gal			233.5	gal/hr	4.7	8,760	0.00050	20	**20**
[83]WB-03 (Natural Gas)	AP-42 Table 1.4-1	NO_x	50	lb NO_x/10^6scf	0.049	lb NO_x/10^6btu	14.3	10^6btu/hr	0.7	8,760	0.00050	3.1	**3.1**
[86]WB-04 (Natural Gas)	AP-42 Table 1.4-1, Converted to an hourly factor	NO_x	0.44	lb NO_x/hr					0.44	8,760	0.00050	1.9	
[87]WB-04 (Diesel Fuel)	AP-42 Table 1.3-1, Converted to an hourly factor	NO_x	1.2	lb NO_x/hr					1.2	8,760	0.00050	5.4	**5.4**
[88]WB-05 (Natural Gas)	AP-42 Table 1.4-1, Converted to a monthly factor	NO_x	250	lb NO_x/mo					0.34	8,760	0.00050	1.5	**1.5**
[89]WB-06 (Operating)	No Emission Factor - 2008 Source Test												
[89]WB-06 (Not Operating)	No Emission Factor - 2008 Source Test												
[90]WB-07 (Large Generator)	AP-42 Table 3.3-1	NO_x	13	lb NO_x/hr					13	500	0.00050	3.28	**3.3**
[91]WB-07 (Small Generator)	AP-42 Table 3.3-1	NO_x	2.5	lb NO_x/hr					2.5	500	0.00050	0.62	**0.62**
[92]WB-08 (Four Cooling Towers)	No Emission Factor - No reported NO_x from WB-08												
[93]WB-09 (Waste Biogas Flare)	AP-42 Table 13.5-1 (NO_x)	NO_x	41	lb NO_x/10^6scf			500,000	scf/day	0.85	8,760	0.00050	3.7	**3.7**
[92]WB-09 (Biogas Venting)	No Biogas Venting - No reported NO_x in Biogas												
[92]WB-10 (Wastewater System)	No Emission Factor - No reported NO_x in Wastewater												
[83]WB-11 (Room Heating Units)	AP-42 Table 1.4-1	NO_x	100	lb NO_x/10^6scf	0.098	lb NO_x/10^6btu	24.0	10^6btu/hr	2.4	8,760	0.00050	10	**10**
												[94]	**69**

82 The NO_x PTE column is designed to capture the worst-case PTE scenario for each emission unit and fuel (or operating) configuration. These worst-case scenarios are then summed, in this case 69 tons NO_x/yr.

83 Small Boilers < 50 10^6btu/hr, Low NOx, except for WB-11 use Uncontrolled

84 Small Boilers < 50 10^6btu/hr, Low NOx, Adjusted for biogas. 50 lb NO_x/10^6scf x [(600 10^6btu/10^6scf for biogas)/(1,020 10^6btu/10^6scf for natural gas)] = 29.4 lb NOx/10^6scf. The tons/yr calculation is limited by available biogas.

85 Boilers < 100 10^6btu/hr, Distillate oil fired

86 The emission factor is calculated as follows: 50 lb NO_x/10^6scf x 10^6scf/1,020 10^6btu x 9.0 10^6btu/hr = 0.441 lb/hr

87 The emission factor is calculated as follows: 20 lb NO_x/10^3gal x 10^3gal/1,000 gal x 62 gal/hr = 1.24 lb/hr

88 The emission factor is calculated as follows: [50 lb NO_x/10^6scf x 10^6scf/1,020 10^6btu x 7.0 10^6btu/hr x 8,760 hr/yr]/12mo/yr = 250 lb/mo

89 No emissions of NO_x from the rendering scrubber based on the 2008 source test

90 The emission factor is calculated as follows: 0.031 lb NO_x/hp-hr x 423 hp = 13.1 lb NO_x/hr

91 The emission factor is calculated as follows: 0.031 lb NO_x/hp-hr x 80 hp = 2.48 lb NO_x/hr

92 The permittee has reported no NO_x emissions from the four cooling towers, no NO_x in the biogas and no NO_x emissions from the plant's wastewater.

93 The emission factor is calculated as follows: 0.068 lb NO_x/10^6btu x 600 10^6btu/10^6scf = 40.8 lb CO/10^6scf

94 It is anticipated that NO_x emissions from the plant will be significantly less than 69 tons/yr under normal plant operating conditions.

VOC Calculations

Source	Emission Factor Reference		EF	Units	Converted Value & Units		Capacity	Units	Emission Rate (lb/hr)	hr/yr	tons/lb	tons/yr	VOC PTE[95]
WB-01 (Natural Gas)	AP-42 Table 1.4-2	VOC	5.5	lb VOC/10^6scf	0.0054	lb VOC/10^6btu	32.7	10^6btu/hr	0.18	8,760	0.00050	0.77	**0.77**
[97]WB-01 (Diesel Fuel)	AP-42 Table 1.3-3, NMTOC	VOC	0.34	lb VOC/10^3gal			233.5	gal/hr	0.079	8,760	0.00050	0.35	
WB-02 (Natural Gas)	AP-42 Table 1.4-2	VOC	5.5	lb VOC/10^6scf	0.0054	lb VOC/10^6btu	32.7	10^6btu/hr	0.18	8,760	0.00050	0.77	**0.77**
[96]WB-02 (Biogas)	AP-42 Table 1.4-2, Adjusted for biogas	VOC	3.2	lb VOC/10^6scf			500,000	scf/day	0.068	8,760	0.00050	0.30	
[97]WB-02 (Diesel Fuel)	AP-42 Table 1.3-3, NMTOC	VOC	0.34	lb VOC/10^3gal			233.5	gal/hr	0.079	8,760	0.00050	0.35	
WB-03 (Natural Gas)	AP-42 Table 1.4-2	VOC	5.5	lb VOC/10^6scf	0.0054	lb VOC/10^6btu	14.3	10^6btu/hr	0.077	8,760	0.00050	0.34	**0.34**
[98]WB-04 (Natural Gas)	No emission factor - VOC accounted for in WB-06												
[98]WB-04 (Diesel Fuel)	No emission factor - VOC accounted for in WB-06												
[98]WB-05 (Natural Gas)	No emission factor - VOC accounted for in WB-06												
[99]WB-06 (Operating)	and Rendering Plant is Operating; 2008 Source Test	VOC	0.058	lb VOC/hr					0.058	8,760	0.00050	0.25	
[100]WB-06 (Not Operating)	and Rendering Plant is Operating; 2008 Source Test	VOC	1.2	lb VOC/hr					1.2	8,760	0.00050	5.1	**5.1**
[101]WB-07 (Large Generator)	AP-42 Table 3.3-1, Diesel, Exhaust plus Crankcase	VOC	1.1	lb VOC/hr					1.1	500	0.00050	0.27	**0.27**
[102]WB-07 (Small Generator)	AP-42 Table 3.3-1, Diesel, Exhaust plus Crankcase	VOC	0.20	lb VOC/hr					0.20	500	0.00050	0.050	**0.050**
[103]WB-08 (Four Cooling Towers)	No Emission Factor - No reported VOC from WB-08												
[96]WB-09 (Waste Biogas Flare)	AP-42 Table 1.4-2, Adjusted for biogas	VOC	3.2	lb VOC/10^6scf			500,000	scf/day	0.068	8,760	0.00050	0.30	**0.30**
[103]WB-09 (Biogas Venting)	No Biogas Venting - No reported VOC in biogas												
[104]WB-10 (Wastewater System)	Based on 2006 source test	VOC	155	lb VOC/mo			67,000	gal/hr	0.21	8,760	0.00050	0.93	**0.93**
WB-11 (Room Heating Units)	AP-42 Table 1.4-2	VOC	5.5	lb VOC/10^6scf	0.0054	lb VOC/10^6btu	24.0	10^6btu/hr	0.13	8,760	0.00050	0.57	**0.57**
												[105]	**9.1**

95	The VOC PTE column is designed to capture the worst-case PTE scenario for each emission unit and fuel (or operating) configuration. These worst-case scenarios are then summed, in this case 9.1 tons VOC/yr.
96	The emission factor is calculated as follows: 5.5 lb VOC/10^6scf x [(600 10^6btu/10^6scf for biogas)/(1,020 10^6btu/10^6scf for natural gas)] = 3.24 lb VOC/10^6scf. The tons/yr calculation is limited by available biogas.
97	Commercial/institutional/residential combustors, Distillate oil fired: 0.34 NMTOC lb/10^3gal. Assume equivalent to 0.34 VOC lb/10^3gal.
98	Blood dryer and rendering room MAU emissions are routed to the rendering scrubber, and during the 2008 source test the blood dryer was combusting natural gas (the rendering room MAU combusts only natural gas). Also, VOC emissions when combusting diesel are less than when combusting natural gas. Therefore, blood dryer and rendering room MAU natural gas emissions are accounted for in rendering scrubber emissions.
99	VOC (THC propane), 0.058 lb VOC/hr (Highest value measured during 2008 source test)
100	VOC (THC propane), Assume rendering scrubber 95% efficient for VOC, 0.058 lb VOC/hr (Highest value measured during 2008 source test) x 100/5 = 1.16 lb VOC/hr
101	The emission factor is calculated as follows: (0.00247 + 0.0000441) lb VOC/hp-hr x 423 hp = 1.06 lb VOC/hr
102	The emission factor is calculated as follows: (0.00247 + 0.0000441) lb VOC/hp-hr x 80 hp = 0.201 lb VOC/hr
103	The permittee has reported no VOC emissions from the four cooling towers and no reported VOC in the biogas.
104	The emission factor is calculated as follows: 0.38 ug/ml VOC x (0.00834 lb/10^3gal)/(ug/ml) x 67,000 gal/hr x 10^3gal/1,000 gal x 8,760 hr/12 mo = 155 lb VOC/mo
105	It is anticipated that VOC emissions from the plant will be significantly less than 9.1 tons/yr under normal plant operating conditions.

Hazardous Air Pollutant Summary Calculations

Source	Emission Factor Reference		EF	Units	Converted Value & Units		Capacity	Units	Emission Rate (lb/hr)	hr/yr	tons/lb	tons/yr	[106]HAP PTE
[107]WB-01 (Natural Gas)	AP-42 Tables 1.4-2, 1.4-3 and 1.4-4, HAP factor summation	HAP	1.9	lb HAP/10^6scf	0.0019	lb HAP/10^6btu	32.7	10^6btu/hr	0.061	8,760	0.00050	0.27	**0.27**
[109]WB-01 (Diesel Fuel)	AP-42 Table 1.3.8 and Table 1.3-10, HAP factor summation	HAP	0.058	lb HAP/10^3gal			233.5	gal/hr	0.014	8,760	0.00050	0.059	
[107]WB-02 (Natural Gas)	AP-42 Tables 1.4-2, 1.4-3 and 1.4-4, HAP factor summation	HAP	1.9	lb HAP/10^6scf	0.0019	lb HAP/10^6btu	32.7	10^6btu/hr	0.061	8,760	0.00050	0.27	**0.27**
[108]WB-02 (Biogas)	AP-42 Tables 1.4-2, 1.4-3 and 1.4-4, Adjusted for biogas	HAP	1.1	lb HAP/10^6scf			500,000	scf/day	0.023	8,760	0.00050	0.101	
[109]WB-02 (Diesel Fuel)	AP-42 Table 1.3.8 and Table 1.3-10, HAP factor summation	HAP	0.058	lb HAP/10^3gal			233.5	gal/hr	0.014	8,760	0.00050	0.059	
[107]WB-03 (Natural Gas)	AP-42 Tables 1.4-2, 1.4-3 and 1.4-4, HAP factor summation	HAP	1.9	lb HAP/10^6scf	0.0019	lb HAP/10^6btu	14.3	10^6btu/hr	0.026	8,760	0.00050	0.12	**0.12**
[110]WB-04 (Natural Gas)	AP-42 Tables 1.4-2, 1.4-3 and 1.4-4, Converted to hourly factor	HAP	0.017	lb HAP/hr					0.017	8,760	0.00050	0.073	**0.073**
[111]WB-04 (Diesel Fuel)	AP-42 Table 1.3.8 and Table 1.3-10, Converted to hourly factor	HAP	0.0036	lb HAP/hr					0.0036	8,760	0.00050	0.016	
[112]WB-05 (Natural Gas)	AP-42 Tables 1.4-2, 1.4-3 and 1.4-4, Converted to monthly factor	HAP	9.5	lb HAP/mo					0.013	8,760	0.00050	0.057	**0.057**
[113]WB-06 (Operating)	and Rendering Plant is Operating; 2008 Source Test	HAP	1.2	lb HAP/hr					1.2	8,760	0.00050	5.5	
[114]WB-06 (Not Operating)	and Rendering Plant Operating; 2008 Source Test, 75% efficiency	HAP	5.0	lb HAP/hr					5.0	8,760	0.00050	22	**22**
[115]WB-07 (Large Generator)	Based on AP-42 Table 3.3-2, HAP factor summation	HAP	0.033	lb HAP/hr					0.033	500	0.00050	0.0082	**0.0082**
[116]WB-07 (Small Generator)	Based on AP-42 Table 3.3-2, HAP factor summation	HAP	0.0018	lb HAP/hr					0.0018	500	0.00050	0.00045	**0.00045**
[117]WB-08 (Four Cooling Towers)	Based on reported material balance	HAP	23	lb HAP/mo					0.032	8,760	0.00050	0.14	
[108]WB-09 (Waste Biogas Flare)	AP-42 Tables 1.4-2, 1.4-3 and 1.4-4, Adjusted for biogas	HAP	1.1	lb HAP/10^6scf			500,000	scf/day	0.023	8,760	0.00050	0.10	**0.10**
[118]WB-09 (Biogas Venting)	HAP emissions accounted for in WB-10; No Biogas Venting												
[119]WB-10 (Wastewater System)	WB-10 factor based on 2006 source test	HAP	335.80	lb HAP/mo					0.46000	8,760	0.00050	2.0148	**2.0**
[107]WB-11 (Room Heating Units)	AP-42 Tables 1.4-2, 1.4-3 and 1.4-4, HAP factor summation	HAP	1.9	lb HAP/10^6scf	0.0019	lb HAP/10^6btu	24.0	10^6btu/hr	0.044	8,760	0.00050	0.19	**0.19**
												[120]	**25.0**

106 The HAP PTE column is designed to capture the worst-case PTE scenario for each emission unit and fuel (or operating) configuration. These worst-case scenarios are then summed, in this case 25 tons HAP/yr.

107 Summation of all natural gas HAP factors specifc to the plant. See "HAPfact" worksheet that displays and sums all relevant natural gas HAP factors.

108 The emission factor is calculated as follows: 1.89 lb HAP/10^6scf x [(600 10^6btu/10^6scf for biogas)/(1,020 10^6btu/10^6scf for natural gas)] = 1.15 lb HAP/10^6scf. The tons/yr calculation is limited by available biogas.

109 Summation of all natural gas HAP factors specifc to the plant. See "HAPfact" worksheet that displays and sums all relevant diesel HAP factors.

110 The emission factor is the HAP natural gas factor converted to an hourly factor as follows: 1.89 lb HAP/10^6scf x 10^6scf/1,020 10^6btu x 9.0 10^6btu/hr = 0.0167 lb HAP/hr

111 The emission factor is the HAP diesel factor converted to an hourly factor as follows: 0.058 lb HAP/10^3gal x 103gal/1,000 gal x 62.0 gal/hr = 0.00360 lb HAP/hr

112 The emission factor is the HAP natural gas factor converted to a monthly factor as follows: [1.89 lb HAP/10^6scf x 10^6scf/1,020 10^6btu x 7.0 10^6btu/hr x 8,760 hr/yr]/12 mo/yr = 9.47 lb HAP/mo

113 Summation of all HAP detected during the 2008 source test. See "HAPfact" worksheet that displays and sums all relevant rendering scrubber HAP factors.

114 Region 10 has calculated uncontrolled non-fugitive HAP PTE because without a permit there would be no enforceable requirement to either install or adequately maintain the rendering scrubber, pretreatment spray tower, and/or barometric process cyclones. The Region 10-calculated HAP PTE for the entire plant is 25 tons HAP/yr, most of which (22 tons/yr, 88%) is generated when the rendering scrubber is not operating and the plant continues to operate. However, the 22 tons HAP/yr PTE value is highly dependent on the HAP efficiency of the rendering scrubber, which is unknown. For example, the calculated 25 tons HAP/yr value assumes an efficiency of 75%. At 95% scrubber efficiency the reverse-calculated HAP PTE (derived from the controlled HAP PTE value) would be approximately 118 tons HAP/yr. At 50% scrubber efficiency the reverse-calculated PM PTE would be approximately 14 tons HAP/yr. Because the HAP scrubber efficiency is unknown, and will remain unknown in the absence of additional source testing, Region 10 has assumed that HAP PTE for the entire plant exceeds 25 tons HAP/yr, even though a specific value can not be determined. Therefore, Region 10 has concluded that a HAP emission limit of 24 tons HAP/yr is necessary in the permit, and further concludes that the permit must require proper operation of the rendering scrubber, pretreatment spray tower and barometric process cyclones to ensure this HAP limit is not exceeded. For example, if the rendering scrubber is operating 90% of the time over the course of an entire year when the plant is also operating, the actual HAP emissions would be 11.0 tons {[1.32 lb HAP/hr x (8,760 hr/yr x 0.90)]/2,000 lb/ton + [13.2 lb HAP/hr x (8,760 hr/yr x 0.10)]/2,000 lb/ton = 11.0 tonsHAP}. Furthermore, if the rendering scrubber is operating most of the time, the variability in HAP emissions due to the scrubber HAP efficiency being unknown is less important overall, which reinforces Region 10's conclusion that the permit must set a standard regarding scrubber operating performance of some kind. See "HAPfact" worksheet that displays and sums all relevant rendering scrubber HAP factors.

115 See "HAPfact" worksheet that displays and sums all relevant large emergency generator HAP factors.

116 See "HAPfact" worksheet that displays and sums all relevant small emergency generator HAP factors.

117 The only cooling tower HAP reported by the Permittee is chlorine, 280 lb/yr x yr/12 mo = 23.3 lb/mo. This has been excluded from the PTE value as insignificant, primarily to allow the Permittee flexibility in changing biocide formulations as needed.

118 The HAP detected in wastewater are assumed to be emitted from the wastewater prior to entering the anaerobic lagoon; therefore, HAP is accounted for in WB-10 not in the biogas

119 Summation of all HAP detected during 2006 source test. See "HAPfact" worksheet that displays and sums all relevant wastewater HAP factors.

120 It is anticipated that total HAP emissions will be significantly less than 25 tons/yr under normal plant operating conditions. The predicted total HAP of 25 tons/yr is based on the rendering scrubber not operating for an entire year. This is not allowed under the permit becasue the permittee is required to operate the rendering scrubber at all times, to the extent practicable. The permit does require monitoring of hours when the rendering scrubber is operating, when it is not operating, and hours when the plant is operating, including calculation of actual HAP emissions to ensure the 24 tons/yr total HAP emission limit is not exceeded.

H_2S and RSC Calculations

Source	Emission Factor Reference		EF	Units	Converted Value & Units	Capacity	Units	Emission Rate (lb/hr)	hr/yr	tons/lb	tons/yr	H2S & RSC PTE
[120]WB-01 (Natural Gas)	No reported H_2S or RSC emissions from WB-01											
[120]WB-02 (Natural Gas)	No reported H_2S or RSC emissions from WB-02											
[120]WB-03 (Natural Gas)	No reported H_2S or RSC emissions from WB-03											
[120]WB-02 (Biogas)	No reported H_2S or RSC emissions from WB-01											
[120]WB-01 (Diesel Fuel)	No reported H_2S or RSC emissions from WB-01											
[120]WB-02 (Diesel Fuel)	No reported H_2S or RSC emissions from WB-02											
[120]WB-04 (Natural Gas)	No reported H_2S or RSC emissions from WB-04											
[120]WB-04 (Diesel Fuel)	No reported H_2S or RSC emissions from WB-04											
[120]WB-05 (Natural Gas)	No reported H_2S or RSC emissions from WB-05											
[121]WB-06 (Operating)	and Rendering Plant is Operating; 2008 Source Test	H_2S, RSC	1.04E-01	lb/hr		70,000	ft^3/min	0.10	8,760	0.00050	0.45	
[122]WB-06 (Not Operating)	and Rendering Plant Operating; 2008 Source Test, 95% efficiency	H_2S, RSC	2.08E+00	lb/hr		70,000	ft^3/min	2.1	8,760	0.00050	9.1	**9.1**
[120]WB-07 (Large Generator)	No reported H_2S or RSC emissions from WB-07											
[120]WB-07 (Small Generator)	No reported H_2S or RSC emissions from WB-07											
[120]WB-08 (Four Cooling Towers)	No reported H_2S or RSC emissions from WB-08											
[120]WB-09 (Waste Biogas Flare)	No reported H_2S or RSC emissions from WB-09											
WB-09 (Biogas Venting)	H_2S and RSC emissions accounted for in WB-10											
[123]WB-10 (Wastewater System)	WB-10 factors based on 2006 source test	H_2S, RSC	1.97E+02	lb/mo		67,000	gal/hr	0.270	8,760	0.00050	1.2	**1.2**
												10

WB-06 H_2S & RSC data from 2008 source test	Hydrogen Sulfide	H_2S, RSC	**0**	ppbv	**34**	**0**	ug/m^3	**0.00E+00**	lb/hr
	Carbon Disulfide	H_2S, RSC	**47**	ppbv	**76**	**146**	ug/m^3	**3.83E-02**	lb/hr
	Diethyl Disulfide	H_2S, RSC	**37**	ppbv	**122**	**185**	ug/m^3	**4.84E-02**	lb/hr
	Methyl Mercaptan	H_2S, RSC	**0**	ppbv	**48**	**0**	ug/m^3	**0.00E+00**	lb/hr
	sec-Butyl Mercaptan	H_2S, RSC	**14**	ppbv	**90**	**52**	ug/m^3	**1.35E-02**	lb/hr
	Unidentified S	H_2S, RSC	**10**	ppbv	**34**	**14**	ug/m^3	**3.64E-03**	lb/hr
								1.04E-01	

WB-10 H_2S & RSC data from 2006 source test	Hydrogen Sulfide	H_2S, RSC	**4.0E-01**	ug/ml				**1.6E+02**	lb/mo
	Carbon Disulfide	H_2S, RSC	**2.8E-03**	ug/ml				**1.1E+00**	lb/mo
	Methyl Mercaptan	H_2S, RSC	**8.5E-02**	ug/ml				**3.5E+01**	lb/mo
								1.97E+02	

120	The only reported H_2S and RSC emissions are from WB-06 and WB-10
121	Summation of all detected HAP from the rendering scrubber during the 2008 source test
122	Assume the rendering scrubber is 95% efficient removing H_2S and RSC, 1.04E-01 x 100/5 = 2.08E+00 lb/hr
123	Summation of all detected HAP from wastewater during the 2006 source test

Hazardous Air Pollutant Emission Factors

Hazardous Air Pollutants	WB-01 Natural Gas lb/10^{6}scf	WB-02 Natural Gas lb/10^{6}scf	WB-03 Natural Gas lb/10^{6}scf	WB-02 Biogas lb/10^{6}scf	WB-01 Diesel lb/10^{3}gal	WB-02 Diesel lb/10^{3}gal	WB-04 Natural Gas lb/hr	WB-04 Diesel lb/hr	WB-05 Natural Gas lb/mo	WB-06 Scrubber Operating lb/hr	Scrubber Not Operating lb/hr	Large Emerg Gen lb/hr	Small Emerg Gen lb/hr	WB-08 Cooling Towers lb/mo	Waste Biogas Flare lb/10^{6}scf	WB-09 Biogas Assume No Venting	WB-10 Waste-water lb/mo	WB-11 Room Heating Units lb/10^{6}scf
Acetaldehyde												6.51E-03	3.57E-04				2.45E+02	
Acrolein												7.86E-04	4.31E-05					
Arsenic	2.00E-04	2.00E-04	2.00E-04	1.18E-04	5.48E-04	5.48E-04	1.76E-06	3.41E-05	1.00E-03						1.18E-04			2.00E-04
Benzene	2.10E-03	2.10E-03	2.10E-03	1.24E-03			1.85E-05		1.05E-02	3.75E-02	1.50E-01	7.92E-03	4.35E-04		1.24E-03		1.80E+01	2.10E-03
Beryllium	1.20E-05	1.20E-05	1.20E-05	7.06E-06	4.11E-04	4.11E-04	1.06E-07	2.54E-05	6.01E-05						7.06E-06			1.20E-05
Butadiene, 1,3-										2.60E-03	1.00E-02	3.32E-04	1.82E-05					
Cadmium	1.10E-03	1.10E-03	1.10E-03	6.47E-04	4.11E-04	4.11E-04	9.71E-06	2.54E-05	5.51E-03						6.47E-04			1.10E-03
Carbon Disulfide										3.96E-02	1.58E-01						1.10E+00	
Chlorine														2.33E+01				
Chloroform										0.00E+00	0.00E+00							
Chromium	1.40E-03	1.40E-03	1.40E-03	8.24E-04	4.11E-04	4.11E-04	1.24E-05	2.54E-05	7.01E-03						8.24E-04			1.40E-03
Chromium VI	7.00E-05	7.00E-05	7.00E-05	4.12E-05	2.06E-05	2.06E-05	6.18E-07	1.30E-06	3.51E-04						4.12E-05			7.00E-05
Cobalt	8.40E-05	8.40E-05	8.40E-05	4.94E-05			7.41E-07		4.21E-04						4.94E-05			8.40E-05
Dichlorobenzene	1.20E-03	1.20E-03	1.20E-03	7.06E-04			1.06E-05		6.01E-03						7.06E-04			1.20E-03
Dichloromethane										0.00E+00	0.00E+00						9.50E+00	
Ethylbenzene										9.10E-02	3.64E-01							
Fluoranthene	3.00E-06	3.00E-06	3.00E-06	1.76E-06			2.65E-08		1.50E-05						1.76E-06			3.00E-06
Fluorene (POM)	2.80E-06	2.80E-06	2.80E-06	1.65E-06			2.47E-08		1.40E-05						1.65E-06			2.80E-06
Formaldehyde	7.50E-02	7.50E-02	7.50E-02	4.41E-02	4.80E-02	4.80E-02	6.62E-04	2.98E-03	3.76E-01			1.00E-02	5.50E-04		4.41E-02			7.50E-02
Hexane	1.80E+00	1.80E+00	1.80E+00	1.06E+00			1.59E-02		9.02E+00	5.34E-03	2.10E-02				1.06E+00		5.30E+00	1.80E+00
Lead	5.00E-04	5.00E-04	5.00E-04	2.94E-04	1.23E-03	1.23E-03	4.41E-06	7.44E-05	2.50E-03						2.94E-04			5.00E-04
Manganese	3.80E-04	3.80E-04	3.80E-04	2.24E-04	8.22E-04	8.22E-04	3.35E-06	5.08E-05	1.90E-03						2.24E-04			3.80E-04
Mercury	2.60E-04	2.60E-04	2.60E-04	1.53E-04	4.11E-04	4.11E-04	2.29E-06	2.54E-05	1.30E-03						1.53E-04			2.60E-04
Methanol										6.48E-02	2.59E-01						4.90E+00	
Naphthalene	6.10E-04	6.10E-04	6.10E-04	3.59E-04			5.38E-06		3.06E-03						3.59E-04			6.10E-04
Naphthalene, 2-Methyl	2.40E-05	2.40E-05	2.40E-05	1.41E-05			2.12E-07		1.20E-04						1.41E-05			2.40E-05
Nickel	2.10E-03	2.10E-03	2.10E-03	1.24E-03	4.11E-04	4.11E-04	1.85E-05	2.54E-05	1.05E-02						1.24E-03			2.10E-03
Pentanone, 4-Methy-2-										2.59E-01	1.04E+00							
Phenanthrene (POM)	1.70E-05	1.70E-05	1.70E-05	1.00E-05			1.50E-07		8.52E-05						1.00E-05			1.70E-05
POM (Less Indv POM)	2.08E-03	2.08E-03	2.08E-03	1.23E-03	3.30E-03	3.30E-03	1.83E-05	2.05E-04	1.04E-02			1.43E-03	7.83E-05		1.23E-03			2.08E-03
Pyrene (POM)	5.00E-06	5.00E-06	5.00E-06	2.94E-06			4.41E-08		2.50E-05						2.94E-06			5.00E-06
Selenium	2.40E-05	2.40E-05	2.40E-05	1.41E-05	2.06E-03	2.06E-03	2.12E-07	1.30E-04	1.20E-04						1.41E-05			2.40E-05
Styrene										0.00E+00	0.00E+00							
Toluene	3.40E-03	3.40E-03	3.40E-03	2.00E-03			3.00E-05		1.70E-02	2.75E-01	1.10E+00	3.47E-03	1.91E-04		2.00E-03		3.50E+01	3.40E-03
Xylenes$_{total}$										4.75E-01	1.90E+00	2.42E-03	1.33E-04				1.70E+01	
	1.89E+00	1.89E+00	1.89E+00	1.11E+00	5.80E-02	5.80E-02	1.67E-02	3.60E-03	9.47E+00	1.25E+00	5.00E+00	3.29E-02	1.81E-03	2.33E+01	1.11E+00	0.00E+00	3.36E+02	1.89E+00

Hazardous Air Pollutant Calculations by Individual Constituent and Source

Hazardous Air Pollutants	WB-01 Natural Gas tons/yr	WB-02 Natural Gas tons/yr	WB-03 Natural Gas tons/yr	WB-02 Biogas tons/yr	WB-01 Diesel tons/yr	WB-02 Diesel tons/yr	WB-04 Natural Gas tons/yr	WB-04 Diesel tons/yr	WB-05 Natural Gas tons/yr	WB-06 Scrubber Operating tons/yr	WB-06 Scrubber Not Operating tons/yr	WB-07 Large Emerg Gen tons/yr	WB-07 Small Emerg Gen tons/yr	WB-08 Cooling Towers tons/yr	WB-09 Waste Biogas Flare tons/yr	WB-09 Biogas Venting Assume None	WB-10 Waste-water tons/yr	WB-11 Room Heating Units tons/yr
Acetaldehyde												1.63E-03	8.93E-05				1.47E+00	
Acrolein												1.97E-04	1.08E-05					
Arsenic	2.80E-05	3.15E-05	1.23E-05	6.46E-06	5.61E-04	5.60E-04	7.73E-06	1.49E-04	6.01E-06						6.46E-06			2.06E-05
Benzene	2.94E-04	3.31E-04	1.29E-04	6.79E-05			8.12E-05		6.31E-05	1.64E-01	6.57E-01	1.98E-03	1.09E-04		6.79E-05		1.08E-01	2.17E-04
Beryllium	1.68E-06	1.89E-06	7.36E-07	3.87E-07	4.20E-04	4.20E-04	4.64E-07	1.11E-04	3.61E-07						3.87E-07			1.24E-06
Butadiene, 1,3-										1.14E-02	4.38E-02	8.30E-05	4.55E-06					
Cadmium	1.54E-04	1.73E-04	6.75E-05	3.54E-05	4.20E-04	4.20E-04	4.25E-05	1.11E-04	3.31E-05						3.54E-05			1.13E-04
Carbon Disulfide										1.73E-01	6.92E-01						6.60E-03	
Chlorine														0.00E+00				
Chloroform										0.00E+00	0.00E+00							
Chromium	1.96E-04	2.20E-04	8.59E-05	4.51E-05	4.20E-04	4.20E-04	5.41E-05	1.11E-04	4.21E-05						4.51E-05			1.44E-04
Chromium VI	9.81E-06	1.10E-05	4.29E-06	2.26E-06	2.11E-05	2.11E-05	2.71E-06	5.70E-06	2.10E-06						2.26E-06			7.22E-06
Cobalt	1.18E-05	1.32E-05	5.15E-06	2.70E-06			3.25E-06		2.52E-06						2.70E-06			8.66E-06
Dichlorobenzene	1.68E-04	1.89E-04	7.36E-05	3.87E-05			4.64E-05		3.61E-05						3.87E-05			1.24E-04
Dichloromethane										0.00E+00	0.00E+00						5.70E-02	
Ethylbenzene										3.99E-01	1.59E+00							
Fluoranthene	4.21E-07	4.72E-07	1.84E-07	9.64E-08			1.16E-07		9.02E-08						9.64E-08			3.09E-07
Fluorene (POM)	3.93E-07	4.41E-07	1.72E-07	9.03E-08			1.08E-07		8.42E-08						9.03E-08			2.89E-07
Formaldehyde	1.05E-02	1.18E-02	4.60E-03	2.41E-03	4.91E-02	4.91E-02	2.90E-03	1.30E-02	2.25E-03			2.50E-03	1.38E-04		2.41E-03			7.73E-03
Hexane	2.52E-01	2.83E-01	1.10E-01	5.80E-02			6.96E-02		5.41E-02	2.34E-02	9.20E-02				5.80E-02		3.18E-02	1.86E-01
Lead	7.01E-05	7.87E-05	3.07E-05	1.61E-05	1.26E-03	1.26E-03	1.93E-05	3.26E-04	1.50E-05						1.61E-05			5.16E-05
Manganese	5.33E-05	5.98E-05	2.33E-05	1.23E-05	8.41E-04	8.40E-04	1.47E-05	2.23E-04	1.14E-05						1.23E-05			3.92E-05
Mercury	3.65E-05	4.09E-05	1.60E-05	8.38E-06	4.20E-04	4.20E-04	1.00E-05	1.11E-04	7.82E-06						8.38E-06			2.68E-05
Methanol										2.84E-01	1.13E+00						2.94E-02	
Naphthalene	8.55E-05	9.60E-05	3.74E-05	1.97E-05			2.36E-05		1.83E-05						1.97E-05			6.29E-05
Naphthalene, 2-Methyl	3.36E-06	3.78E-06	1.47E-06	7.72E-07			9.28E-07		7.21E-07						7.72E-07			2.47E-06
Nickel	2.94E-04	3.31E-04	1.29E-04	6.79E-05	4.20E-04	4.20E-04	8.12E-05	1.11E-04	6.31E-05						6.79E-05			2.17E-04
Pentanone, 4-Methy-2-										1.13E+00	4.56E+00							
Phenanthrene (POM)	2.38E-06	2.68E-06	1.04E-06	5.48E-07			6.57E-07		5.11E-07						5.48E-07			1.75E-06
POM (Less Indv POM)	2.91E-04	3.27E-04	1.27E-04	6.71E-05	3.38E-03	3.37E-03	8.02E-05	8.96E-04	6.24E-05			3.58E-04	1.96E-05		6.71E-05			2.14E-04
Pyrene (POM)	7.01E-07	7.87E-07	3.07E-07	1.61E-07			1.93E-07		1.50E-07						1.61E-07			5.16E-07
Selenium	3.36E-06	3.78E-06	1.47E-06	7.72E-07	2.11E-03	2.11E-03	9.28E-07	5.70E-04	7.21E-07						7.72E-07			2.47E-06
Styrene										0.00E+00	0.00E+00							
Toluene	4.77E-04	5.35E-04	2.09E-04	1.10E-04			1.31E-04		1.02E-04	1.20E+00	4.82E+00	8.68E-04	4.78E-05		1.10E-04		2.10E-01	3.51E-04
$Xylenes_{total}$										2.08E+00	8.32E+00	6.05E-04	3.33E-05				1.02E-01	
	2.65E-01	2.98E-01	1.16E-01	6.10E-02	5.94E-02	5.93E-02	7.31E-02	1.58E-02	5.68E-02	5.47E+00	2.19E+01	8.22E-03	4.51E-04	0.00E+00	6.10E-02	0.00E+00	2.01E+00	1.95E-01
PTE	**2.65E-01**	**2.98E-01**	**1.16E-01**				**7.31E-02**		**5.68E-02**		**2.19E+01**	**8.22E-03**	**4.51E-04**		**6.10E-02**		**2.01E+00**	**1.95E-01**
																	2.50E+01	

Natural Gas Emission Factor Calculations

	Source	Emission Factor Reference	Pollutant	EF	Units	Derivation and/or calculation of emission factor
1	WB-01, -02, -03, -04, -05, -11	AP-42 Table 1.4-2	PM	1.90	lb PM/10^6scf	Directly from AP-42 Table 1.4-2, PM (Filterable)
2	WB-01, -02, -03, -04, -05, -11	AP-42 Table 1.4-2	PM_{10}	7.60	lb PM_{10}/10^6scf	Directly from AP-42 Table 1.4-2, PM (Total)
3	WB-01, -02, -03, -04, -05, -11	AP-42 Table 1.4-2 and Footnote d	SO_2	1.50	lb SO_2/10^6scf	(0.6 lb/10^6 scf) x (5,000grains/10^6 scf)/(2,000grains/10^6 scf) = 1.5 lb/10^6 scf (Assume maximum S in pipeline qulaity natural gas)
4	WB-04 (EF not in permit)	S max 5,000grains/10^6 scf	SO_2	0.0130	lb SO_2/hr	(0.6 lb/10^6scf)[(5,000grains/10^6scf)/(2,000grains/10^6scf)](10^6scf/1,020 10^6Btu)(9.0 10^6Btu/hr) = 0.0132 lb/hr
5	WB-05 (EF not in permit)	S max 5,000grains/10^6 scf, 8760	SO_2	7.52	lb SO_2/mo	(0.6 lb SO_2/10^6scf) x [(5,000gr/10^6scf)/(2,000gr/10^6scf)] x (10^6scf/1,020 10^6Btu) x (7.0 10^6 Btu/hr) x (8,760 hr/12 mo) = 7.52 lb SO_2/mo
6	WB-01, -02, -03, -04, -05, -11	40 CFR 98 Tbl C-1 (CO_2) and C-2 (CH_4, N_2O)	CO_2e	119,440	lb CO_2e/10^6scf	[53.06 kg CO_2/10^6btu + (0.0001 x 298) kg N_20/10^6btu + (0.001 x 25) kg CH_4/10^6btu] x (2.20462 lb/kg) x (1,020 10^6btu/10^6scf) = 119,440 CO_2e/10^6scf
7	WB-04 (EF not in permit)	40 CFR 98 Tbl C-1 (CO_2) and C-2 (CH_4, N_2O)	CO_2e	1,054	lb CO_2e/hr	(119,440 lb CO_2e/10^6scf) x (9.0 10^6btu/hr) x (10^6scf/1,020 10^6btu) = 1,054 lb CO_2e/hr [WB-04 Capacity 9.0 10^6btu/hr]
8	WB-05 (EF not in permit)	40 CFR 98 Tbl C-1 (CO_2) and C-2 (CH_4, N_2O)	CO_2e	598,371	lb CO_2e/mo	[119,440 lb CO_2e/10^6scf x 7.0 10^6btu/hr x 10^6scf/1,020 10^6btu x 8,760 hr/yr]/12 mo = 598,371 lb CO_2e/mo
9	WB-01, -02, -03, -04, -05, -11	AP-42 Table 1.4-1	CO	84.0	lb CO/10^6scf	Directly from AP-42 Table 1.4-1, Small Boilers < 100 10^6 Btu/hr, Low NOx
10	WB-04 (EF not in permit)	AP-42 Table 1.4-1, Converted to hourly factor	CO	0.741	lb CO/hr	84 lb CO/10^6scf x 9.0 10^6btu/hr x 10^6scf/1,020 10^6btu = 0.741 lb CO/10^6scf [WB-04 Capacity 9.0 10^6Btu/hr]
11	WB-05 (EF not in permit)	AP-42 Table 1.4-1, Converted to montly factor	CO	421	lb CO/mo	[84 lb CO/10^6scf x 7.0 10^6btu/hr x 10^6scf/1,020 10^6btu x 8,760 hr/yr]/12 mo = 421 lb CO/mo
12	WB-01, -02, -03, -04, -05, -11	AP-42 Table 1.4-1 (Low NOx, except WB-11)	NO_x	50	lb NO_x/10^6scf	Directly from AP-42 Table 1.4-3, <100 10^6btu/hr, Low NOx
13	WB-04 (EF not in permit)	AP-42 Table 1.4-1, Converted to an hourly factor	NO_x	0.441	lb NO_x/hr	50 lb NO_x/10^6scf x 10^6scf/1,020 10^6btu x 9.0 10^6btu/hr = 0.441 lb/hr
14	WB-05 (EF not in permit)	AP-42 Table 1.4-1, Converted to a monthly factor	NO_x	250	lb NO_x/mo	[50 lb NO_x/10^6scf x 10^6scf/1,020 10^6btu x 7.0 10^6btu/hr x 8,760 hr/yr]/12mo/yr = 250 lb/mo
15	WB-01, -02, -03, -04, -05, -11	AP-42 Table 1.4-2	VOC	5.50	lb VOC/10^6scf	Directly from AP-42 Table 1.4-2
16	WB-01, -02, -03, -04, -05, -11	AP-42 Table 1.4-2, 1.4-3 and 1.4-4	HAP	1.89E+00	lb HAP/10^6scf	Summation of all natural gas HAP factors from AP-42 Tables 1.4-2, 1.4-3 and 1.4-4
17	WB-04 (EF not in permit)	AP-42 Table 1.4-2, 1.4-3 and 1.4-4	HAP	1.67E-02	lb HAP/hr	Summation of all natural gas HAP factors from AP-42 Tables 1.4-2, 1.4-3 and 1.4-4
18	WB-05 (EF not in permit)	AP-42 Table 1.4-2, 1.4-3 and 1.4-4	HAP	9.47E+00	lb HAP/mo	Summation of all natural gas HAP factors from AP-42 Tables 1.4-2, 1.4-3 and 1.4-4
19	WB-01, -02, -03, -04, -05, -11	AP-42 Table 1.4-4, 7440-38-2	Arsenic (As)	2.00E-04	lb As/10^6scf	Directly from AP-42 Table 1.4-4
20	WB-04 (EF not in permit)	AP-42 Table 1.4-4, 7440-38-2	Arsenic (As)	1.76E-06	lb As/hr	Converted to hourly factor. 0.00020 lb/106scf x 106scf/1,020 106btu x 9.0 106btu/hr = 0.00000176 lb Arsenic/hr
21	WB-05 (EF not in permit)	AP-42 Table 1.4-4, 7440-38-2	Arsenic (As)	1.00E-03	lb As/mo	Converted to monthly factor
22	WB-01, -02, -03, -04, -05, -11	AP-42 Table 1.4-3, 71-43-2	Benzene	2.10E-03	lb Benzene/10^6scf	Directly from AP-42 Table 1.4-3
23	WB-04 (EF not in permit)	AP-42 Table 1.4-3, 71-43-2	Benzene	1.85E-05	lb Benzene/hr	Converted to hourly factor
24	WB-05 (EF not in permit)	AP-42 Table 1.4-3, 71-43-2	Benzene	1.05E-02	lb Benzene/mo	Converted to monthly factor
25	WB-01, -02, -03, -04, -05, -11	AP-42 Table 1.4-4, 7440-41-7	Beryllium (Be)	1.20E-05	lb Be/10^6scf	Directly from AP-42 Table 1.4-4
26	WB-04 (EF not in permit)	AP-42 Table 1.4-4, 7440-41-7	Beryllium (Be)	1.06E-07	lb Be/hr	Converted to hourly factor
27	WB-05 (EF not in permit)	AP-42 Table 1.4-4, 7440-41-7	Beryllium (Be)	6.01E-05	lb Be/mo	Converted to monthly factor
28	WB-01, -02, -03, -04, -05, -11	AP-42 Table 1.4-4, 7440-43-9	Cadmium (Cd)	1.10E-03	lb Cd/10^6scf	Directly from AP-42 Table 1.4-4
29	WB-04 (EF not in permit)	AP-42 Table 1.4-4, 7440-43-9	Cadmium (Cd)	9.71E-06	lb Cd/hr	Converted to hourly factor
30	WB-05 (EF not in permit)	AP-42 Table 1.4-4, 7440-43-9	Cadmium (Cd)	5.51E-03	lb Cd/mo	Converted to monthly factor
31	WB-01, -02, -03, -04, -05, -11	AP-42 Table 1.4-4, 7440-47-3	Chromium (Cr)	1.40E-03	lb Cr/10^6scf	Directly from AP-42 Table 1.4-4
32	WB-04 (EF not in permit)	AP-42 Table 1.4-4, 7440-47-3	Chromium (Cr)	1.24E-05	lb Cr/hr	Converted to hourly factor
33	WB-05 (EF not in permit)	AP-42 Table 1.4-4, 7440-47-3	Chromium (Cr)	7.01E-03	lb Cr/mo	Converted to monthly factor
34	WB-01, -02, -03, -04, -05, -11	AP-42 Table 1.4-4, Cr(VI) = 5% total Cr	Chromium VI (CrVI)	7.00E-05	lb CrVI/10^6scf	(0.0014 lb HAP/10 scf) x 0.05 = 0.000070 (7.0E-05), See CARB AB 2588 Guidance
35	WB-04 (EF not in permit)	AP-42 Table 1.4-4, Cr(VI) = 5% total Cr	Chromium VI (CrVI)	6.18E-07	lb CrVI/hr	(0.0014 lb HAP/10 scf) x 0.05 = 0.000070 (7.0E-05), See CARB AB 2588 Guidance
36	WB-05 (EF not in permit)	AP-42 Table 1.4-4, Cr(VI) = 5% total Cr	Chromium VI (CrVI)	3.51E-04	lb CrVI/mo	Converted to monthly factor
37	WB-01, -02, -03, -04, -05, -11	AP-42 Table 1.4-4, 7440-48-4	Cobalt	8.40E-05	lb Cobalt/10^6scf	Directly from AP-42 Table 1.4-4
38	WB-04 (EF not in permit)	AP-42 Table 1.4-4, 7440-48-4	Cobalt	7.41E-07	lb Cobalt/hr	Converted to hourly factor
39	WB-05 (EF not in permit)	AP-42 Table 1.4-4, 7440-48-4	Cobalt	4.21E-04	lb Cobalt/mo	Converted to monthly factor

Natural Gas Emission Factor Calculations (continued)

	Source	Emission Factor Reference	Pollutant	EF	Units	Derivation and/or calculation of emission factor
40	WB-01, -02, -03, -04, -05, -11	AP-42 Table 1.4-3, 25321-22-6	Dichlorobenzene	1.20E-03	lb Dichlorobenzene/10^6scf	Directly from AP-42 Table 1.4-3
41	WB-04 (EF not in permit)	AP-42 Table 1.4-3, 25321-22-6	Dichlorobenzene	1.06E-05	lb Dichlorobenzene/hr	Converted to hourly factor
42	WB-05 (EF not in permit)	AP-42 Table 1.4-3, 25321-22-6	Dichlorobenzene	6.01E-03	lb Dichlorobenzene/mo	Converted to monthly factor
43	WB-01, -02, -03, -04, -05, -11	AP-42 Table 1.4-3, 206-44-0	Fluoranthene	3.00E-06	lb Fluoranthene/10^6scf	Directly from AP-42 Table 1.4-3
44	WB-04 (EF not in permit)	AP-42 Table 1.4-3, 206-44-0	Fluoranthene	2.65E-08	lb Fluoranthene/hr	Converted to hourly factor
45	WB-05 (EF not in permit)	AP-42 Table 1.4-3, 206-44-0	Fluoranthene	1.50E-05	lb Fluoranthene/mo	Converted to monthly factor
46	WB-01, -02, -03, -04, -05, -11	AP-42 Table 1.4-3, 86-73-7	Fluorene	2.80E-06	lb Fluorene/10^6scf	Directly from AP-42 Table 1.4-3
47	WB-04 (EF not in permit)	AP-42 Table 1.4-3, 86-73-7	Fluorene	2.47E-08	lb Fluorene/hr	Converted to hourly factor
48	WB-05 (EF not in permit)	AP-42 Table 1.4-3, 86-73-7	Fluorene	1.40E-05	lb Fluorene/mo	Converted to monthly factor
49	WB-01, -02, -03, -04, -05, -11	AP-42 Table 1.4-3, 50-00-0	Formaldehyde (HCOH)	7.50E-02	lb HCOH/10^6scf	Directly from AP-42 Table 1.4-3
50	WB-04 (EF not in permit)	AP-42 Table 1.4-3, 50-00-0	Formaldehyde (HCOH)	6.62E-04	lb HCOH/hr	Converted to hourly factor
51	WB-05 (EF not in permit)	AP-42 Table 1.4-3, 50-00-0	Formaldehyde (HCOH)	3.76E-01	lb HCOH/mo	Converted to monthly factor
52	WB-01, -02, -03, -04, -05, -11	AP-42 Table 1.4-3, 110-54-3	Hexane	1.80E+00	lb Hexane/10^6scf	Directly from AP-42 Table 1.4-3
53	WB-04 (EF not in permit)	AP-42 Table 1.4-3, 110-54-3	Hexane	1.59E-02	lb Hexane/hr	Converted to hourly factor
54	WB-05 (EF not in permit)	AP-42 Table 1.4-3, 110-54-3	Hexane	9.02E+00	lb Hexane/mo	Converted to monthly factor
55	WB-01, -02, -03, -04, -05, -11	AP-42 Table 1.4-2	Lead (Pb)	5.00E-04	lb Pb/10^6scf	Directly from AP-42 Table 1.4-2
56	WB-04 (EF not in permit)	AP-42 Table 1.4-2	Lead (Pb)	4.41E-06	lb Pb/hr	Converted to hourly factor
57	WB-05 (EF not in permit)	AP-42 Table 1.4-2	Lead (Pb)	2.50E-03	lb Pb/mo	Converted to monthly factor
58	WB-01, -02, -03, -04, -05, -11	AP-42 Table 1.4-4, 7439-96-5	Manganese (Mn)	3.80E-04	lb Mn/10^6scf	Directly from AP-42 Table 1.4-4
59	WB-04 (EF not in permit)	AP-42 Table 1.4-4, 7439-96-5	Manganese (Mn)	3.35E-06	lb Mn/hr	Converted to hourly factor
60	WB-05 (EF not in permit)	AP-42 Table 1.4-4, 7439-96-5	Manganese (Mn)	1.90E-03	lb Mn/mo	Converted to monthly factor
61	WB-01, -02, -03, -04, -05, -11	AP-42 Table 1.4-4, 7439-97-6	Mercury (Hg)	2.60E-04	lb Hg/10^6scf	Directly from AP-42 Table 1.4-4
62	WB-04 (EF not in permit)	AP-42 Table 1.4-4, 7439-97-6	Mercury (Hg)	2.29E-06	lb Hg/hr	Converted to hourly factor
63	WB-05 (EF not in permit)	AP-42 Table 1.4-4, 7439-97-6	Mercury (Hg)	1.30E-03	lb Hg/mo	Converted to monthly factor
64	WB-01, -02, -03, -04, -05, -11	AP-42 Table 1.4-3, 91-20-3	Naphthalene	6.10E-04	lb Naphthalene/10^6scf	Directly from AP-42 Table 1.4-3
65	WB-04 (EF not in permit)	AP-42 Table 1.4-3, 91-20-3	Naphthalene	5.38E-06	lb Naphthalene/hr	Converted to hourly factor
66	WB-05 (EF not in permit)	AP-42 Table 1.4-3, 91-20-3	Naphthalene	3.06E-03	lb Naphthalene/mo	Converted to monthly factor
67	WB-01, -02, -03, -04, -05, -11	AP-42 Table 1.4-3, 91-57-6	Naphthalene, 2-Methyl	2.40E-05	lb Naphthalene, 2-Methyl/10^6scf	Directly from AP-42 Table 1.4-3
68	WB-04 (EF not in permit)	AP-42 Table 1.4-3, 91-57-6	Naphthalene, 2-Methyl	2.12E-07	lb Naphthalene, 2-Methyl/hr	Converted to hourly factor
69	WB-05 (EF not in permit)	AP-42 Table 1.4-3, 91-57-6	Naphthalene, 2-Methyl	1.20E-04	lb Naphthalene, 2-Methyl/mo	Converted to monthly factor
70	WB-01, -02, -03, -04, -05, -11	AP-42 Table 1.4-4, 7440-02-0	Nickel (Ni)	2.10E-03	lb Ni/10^6scf	Directly from AP-42 Table 1.4-4
71	WB-04 (EF not in permit)	AP-42 Table 1.4-4, 7440-02-0	Nickel (Ni)	1.85E-05	lb Ni/hr	Converted to hourly factor
72	WB-05 (EF not in permit)	AP-42 Table 1.4-4, 7440-02-0	Nickel (Ni)	1.05E-02	lb Ni/mo	Converted to monthly factor
73	WB-01, -02, -03, -04, -05, -11	AP-42 Table 1.4-3, 85-01-8	Phenanthrene	1.70E-05	lb Phenanthrene/10^6scf	Directly from AP-42 Table 1.4-3
74	WB-04 (EF not in permit)	AP-42 Table 1.4-3, 85-01-8	Phenanthrene	1.50E-07	lb Phenanthrene/hr	Converted to hourly factor
75	WB-05 (EF not in permit)	AP-42 Table 1.4-3, 85-01-8	Phenanthrene	8.52E-05	lb Phenanthrene/mo	Converted to monthly factor
76	WB-01, -02, -03, -04, -05, -11	AP-42 Table 1.4-3, Sum of POM	POM (PAH)	2.10E-03	lb POM/10^6scf	Summation of individual polycyclic organic matter (POM) components from Table 1.4-3
77	WB-04 (EF not in permit)	AP-42 Table 1.4-3, Sum of POM	POM (PAH)	1.85E-05	lb POM/hr	Converted to hourly factor
78	WB-05 (EF not in permit)	AP-42 Table 1.4-3, Sum of POM	POM (PAH)	1.05E-02	lb POM/mo	Converted to monthly factor

Natural Gas Emission Factor Calculations (continued)

	Source	Emission Factor Reference	Pollutant	EF	Units	Derivation and/or calculation of emission factor
79	WB-01, -02, -03, -04, -05, -11	AP-42 Table 1.4-3, 129-00-0	Pyrene	5.00E-06	lb Pyrene/10^6scf	Directly from AP-42 Table 1.4-3
80	WB-04 (EF not in permit)	AP-42 Table 1.4-3, 129-00-0	Pyrene	4.41E-08	lb Pyrene/hr	Converted to hourly factor
81	WB-05 (EF not in permit)	AP-42 Table 1.4-3, 129-00-0	Pyrene	2.50E-05	lb Pyrene/mo	Converted to monthly factor
82	WB-01, -02, -03, -04, -05, -11	AP-42 Table 1.4-4, 7782-49-2	Selenium (Se)	2.40E-05	lb Se/10^6scf	Directly from AP-42 Table 1.4-4
83	WB-04 (EF not in permit)	AP-42 Table 1.4-4, 7782-49-2	Selenium (Se)	2.12E-07	lb Se/hr	Converted to hourly factor
84	WB-05 (EF not in permit)	AP-42 Table 1.4-4, 7782-49-2	Selenium (Se)	1.20E-04	lb Se/mo	Converted to monthly factor
85	WB-01, -02, -03, -04, -05, -11	AP-42 Table 1.4-3, 108-88-3	Toluene	3.40E-03	lb Toluene/10^6scf	Directly from AP-42 Table 1.4-3
86	WB-04 (EF not in permit)	AP-42 Table 1.4-3, 108-88-3	Toluene	3.00E-05	lb Toluene/hr	Converted to hourly factor
87	WB-05 (EF not in permit)	AP-42 Table 1.4-3, 108-88-3	Toluene	1.70E-02	lb Toluene/mo	Converted to monthly factor

Biogas Emission Factor Calculations

	Source	Emission Factor Reference	Pollutants	EF	Units	Derivation of emission factor
1	WB-02	AP-42 Table 1.4-2, Filterable, Adjusted for biogas	PM	1.10	lb PM/10^{6}scf	1.9 lb PM/10^{6}scf x [(600 10^6 Btu/10^{6}scf for biogas)/(1,020 106Btu/10^{6}scf for natural gas)] = 1.12 lb PM/10^{6}scf
2	WB-09	AP-42 Table 13.5-1 (Soot, heavily smoking flare)	PM, PM_{10}	17.1	lb PM, PM_{10}/10^{6}scf	274 ug PM, PM_{10}/L x L/0.0353147 ft^3 x 0.00000000220462 lb/ug x 1,000,000 scf/10^{6}scf = 17.1 lb PM, PM_{10}/10^{6}scf
3	WB-02	AP-42 Table 1.4-2, Total, Adjusted for biogas	PM_{10}	4.50	lb PM_{10}/10^{6}scf	7.6 lb PM_{10}/10^{6}scf x [(600 10^6 Btu/10^{6}scf for biogas)/(1,020 106Btu/10^{6}scf for natural gas)] = 4.47 lb PM_{10}/10^{6}scf
4	WB-02, -09	Permittee reported H_2S maximum is 500 ppmv	SO_2	83.5	lb SO_2/10^{6}scf	(500 ppmv) x (34.06 lb H_2S/385.1x10^6 scf) x (1,000,000 scf/10^{6}scf) x (64.06 lb SO_2/34.06 lb H_2S) = 83.5 lb SO_2/10^{6}scf
5	WB-02, -09 (Flare)	40 CFR 98 Table C-1 (CO_2) and C-2 (CH_4, N_2O)	CO_2e	70,259	lb CO_2e/10^{6}scf	119,440 lb CO_2e/10^{6}scf x [(600 10^{6}btu/10^{6}scf for biogas)/(1,020 10^{6}btu/10^{6}scf for natural gas)] = 70,259 lb CO_2e/10^{6}scf
6	WB-09 (No Venting)	Assume biogas 40% CO_2 and 60% CH_4	CO_2e	667,478	lb GHG/10^{6}scf	[(0.66 kg/m^3 CH_4 x 25 x 0.60) + (1.98 kg/m^3 CO_2 x 0.40)] x (2.20462 lb/kg) x (m^3/35.3147 ft^3) x (1,000,000 ft^3/10^{6}scf) = 667,478 lb/10^{6}scf
7	WB-02	AP-42 Table 1.4-1, Adjusted for biogas	CO	49.40	lb CO/10^{6}scf	84 lb CO/10^{6}scf x [(600 10^6 Btu/10^{6}scf for biogas)/(1,020 10^{6}Btu/10^{6}scf for natural gas)] = 49.4 lb CO/10^{6}scf
8	WB-09	AP-42 Table 13.5-1	CO	222.00	lb CO/10^{6}scf	0.37 lb CO/10^{6}btu x 600 10^{6}btu/10^{6}scf = 222 lb CO/10^{6}scf
9	WB-02	AP-42 Table 1.4-1, Adjusted for biogas	NO_x	29.41	lb NO_x/10^{6}scf	50 lb NO_x/10^{6}scf x [(600 10^6 Btu/10^{6}scf for biogas)/(1,020 10^{6}Btu/10^{6}scf for natural gas)] = 29.41 lb NO_x/10^{6}scf
10	WB-09	AP-42 Table 13.5-1	NO_x	40.80	lb NO_x/10^{6}scf	0.068 lb NO_x/10^{6}btu x 600 10^{6}btu/10^{6}scf = 40.8 lb CO/10^{6}scf
11	WB-02, -09	AP-42 Table 1.4-2, Adjusted for biogas	VOC	3.24	lb VOC/10^{6}scf	5.5 lb VOC/10^{6}scf x [(600 10^6 Btu/10^{6}scf for biogas)/(1,020 10^{6}Btu/10^{6}scf for natural gas)] = 3.24 lb VOC/10^{6}scf
12	WB-02, -09	AP-42 Table 1.4-3, Adjusted for biogas	HAP	1.11E+00	lb HAP/10^{6}scf	1.89 lb HAP/10^{6}scf x [(600 10^6 Btu/10^{6}scf for biogas)/(1,020 10^{6}Btu/10^{6}scf for natural gas)] = 1.11 lb HAP/10^{6}scf
13	WB-02, -09	AP-42 Table 1.4-4, 7440-38-2, Adjusted for biogas	Arsenic (As)	1.18E-04	lb As/10^{6}scf	2.0E-04 lb/10^{6}scf x [(600 10^6 Btu/10^{6}scf for biogas)/(1,020 10^{6}Btu/10^{6}scf for natural gas)] = 1.18E-04 lb/10^{6}scf
14	WB-02, -09	AP-42 Table 1.4-3, 71-43-2, Adjusted for biogas	Benzene	1.24E-03	lb Benzene/10^{6}scf	2.1E-03 lb/10^{6}scf x [(600 10^6 Btu/10^{6}scf for biogas)/(1,020 10^{6}Btu/10^{6}scf for natural gas)] = 1.24E-03 lb/10^{6}scf
15	WB-02, -09	AP-42 Table 1.4-4, 7440-41-7, Adjusted for biogas	Beryllium (Be)	7.06E-06	lb Be/10^{6}scf	1.2E-05 lb/10^{6}scf x [(600 10^6 Btu/10^{6}scf for biogas)/(1,020 10^{6}Btu/10^{6}scf for natural gas)] = 7.06E-06 lb/10^{6}scf
16	WB-02, -09	AP-42 Table 1.4-4, 7440-43-9, Adjusted for biogas	Cadmium (Cd)	6.47E-04	lb Cd/10^{6}scf	1.1E-03 lb/10^{6}scf x [(600 10^6 Btu/10^{6}scf for biogas)/(1,020 10^{6}Btu/10^{6}scf for natural gas)] = 6.47E-04 lb/10^{6}scf
17	WB-02, -09	AP-42 Table 1.4-4, 7440-47-3, Adjusted for biogas	Chromium (Cr)	8.24E-04	lb Cr/10^{6}scf	1.4E-03 lb/10^{6}scf x [(600 10^6 Btu/10^{6}scf for biogas)/(1,020 10^{6}Btu/10^{6}scf for natural gas)] = 8.24E-04 lb/10^{6}scf
18	WB-02, -09	AP-42 Table 1.4-4, Cr(VI) = 5% total Cr, Adjusted for biogas	Chromium VI (CrVI)	4.12E-05	lb CrVI/10^{6}scf	7.0E-05 lb/10^{6}scf x [(600 10^6 Btu/10^{6}scf for biogas)/(1,020 10^{6}Btu/10^{6}scf for natural gas)] = 4.12E-05 lb/10^{6}scf
19	WB-02, -09	AP-42 Table 1.4-4, 7440-48-4, Adjusted for biogas	Cobalt	4.94E-05	lb Cobalt/10^{6}scf	8.4E-05 lb/10^{6}scf x [(600 10^6 Btu/10^{6}scf for biogas)/(1,020 10^{6}Btu/10^{6}scf for natural gas)] = 4.94E-05 lb/10^{6}scf
20	WB-02, -09	AP-42 Table 1.4-3, 25321-22-6, Adjusted for biogas	Dichlorobenzene	7.06E-04	lb Dichlorobenzene/10^{6}scf	1.2E-03 lb/10^{6}scf x [(600 10^6 Btu/10^{6}scf for biogas)/(1,020 10^{6}Btu/10^{6}scf for natural gas)] = 7.06E-04 lb/10^{6}scf
21	WB-02, -09	AP-42 Table 1.4-3, 206-44-0, Adjusted for biogas	Fluoranthene	1.76E-06	lb Fluoranthene/10^{6}scf	3.0E-06 lb/10^{6}scf x [(600 10^6 Btu/10^{6}scf for biogas)/(1,020 10^{6}Btu/10^{6}scf for natural gas)] = 1.76E-06 lb/10^{6}scf
22	WB-02, -09	AP-42 Table 1.4-3, 86-73-7, Adjusted for biogas	Fluorene	1.65E-06	lb Fluorene/10^{6}scf	2.8E-06 lb/10^{6}scf x [(600 10^6 Btu/10^{6}scf for biogas)/(1,020 10^{6}Btu/10^{6}scf for natural gas)] = 1.65E-06 lb/10^{6}scf
23	WB-02, -09	AP-42 Table 1.4-3, 50-00-0, Adjusted for biogas	Formaldehyde (HCOH)	4.41E-02	lb HCOH/10^{6}scf	7.5E-02 lb/10^{6}scf x [(600 10^6 Btu/10^{6}scf for biogas)/(1,020 10^{6}Btu/10^{6}scf for natural gas)] = 4.41E-02 lb/10^{6}scf
24	WB-02, -09	AP-42 Table 1.4-3, 110-54-3, Adjusted for biogas	Hexane	1.06E+00	lb Hexane/10^{6}scf	1.8E-00 lb/10^{6}scf x [(600 10^6 Btu/10^{6}scf for biogas)/(1,020 10^{6}Btu/10^{6}scf for natural gas)] = 1.06E-00 lb/10^{6}scf
25	WB-02, -09	AP-42 Table 1.4-2, Adjusted for biogas	Lead (Pb)	2.94E-04	lb Pb/10^{6}scf	5.0E-04 lb/10^{6}scf x [(600 10^6 Btu/10^{6}scf for biogas)/(1,020 10^{6}Btu/10^{6}scf for natural gas)] = 2.94E-04 lb/10^{6}scf
26	WB-02, -09	AP-42 Table 1.4-4, 7439-96-5, Adjusted for biogas	Manganese (Mn)	2.24E-04	lb Mn/10^{6}scf	3.8E-04 lb/10^{6}scf x [(600 10^6 Btu/10^{6}scf for biogas)/(1,020 10^{6}Btu/10^{6}scf for natural gas)] = 2.24E-04 lb/10^{6}scf
27	WB-02, -09	AP-42 Table 1.4-4, 7439-97-6, Adjusted for biogas	Mercury (Hg)	1.53E-04	lb Hg/10^{6}scf	2.6E-04 lb/10^{6}scf x [(600 10^6 Btu/10^{6}scf for biogas)/(1,020 10^{6}Btu/10^{6}scf for natural gas)] = 1.53E-04 lb/10^{6}scf
28	WB-02, -09	AP-42 Table 1.4-3, 91-20-3, Adjusted for biogas	Naphthalene	3.59E-04	lb Naphthalene/10^{6}scf	6.1E-04 lb/10^{6}scf x [(600 10^6 Btu/10^{6}scf for biogas)/(1,020 10^{6}Btu/10^{6}scf for natural gas)] = 3.59E-04 lb/10^{6}scf
29	WB-02, -09	AP-42 Table 1.4-3, 91-57-6, Adjusted for biogas	Naphthalene, 2-Methyl	1.41E-05	lb Naphthalene, 2-Methyl/10^{6}scf	2.4E-05 lb/10^{6}scf x [(600 10^6 Btu/10^{6}scf for biogas)/(1,020 10^{6}Btu/10^{6}scf for natural gas)] = 1.41E-05 lb/10^{6}scf
30	WB-02, -09	AP42 Tbl 1.4-4, 7440-02-0, Adjusted for biogas	Nickel (Ni)	1.24E-03	lb Ni/10^{6}scf	2.1E-03 lb/10^{6}scf x [(600 10^6 Btu/10^{6}scf for biogas)/(1,020 10^{6}Btu/10^{6}scf for natural gas)] = 1.24E-03 lb/10^{6}scf
31	WB-02, -09	AP42 Tbl 1.4-3, 85-01-8, Adjusted for biogas	Phenanthrene	1.00E-05	lb Phenanthrene/10^{6}scf	1.7E-05 lb/10^{6}scf x [(600 10^6 Btu/10^{6}scf for biogas)/(1,020 10^{6}Btu/10^{6}scf for natural gas)] = 1.00E-05 lb/10^{6}scf
32	WB-02, -09	AP-42 Table 1.4-3, Sum of POM, Adjusted for biogas	POM (PAH)	1.24E-03	lb POM/10^{6}scf	2.1E-03 lb/10^{6}scf x [(600 10^6 Btu/10^{6}scf for biogas)/(1,020 10^{6}Btu/10^{6}scf for natural gas)] = 1.24E-03 lb/10^{6}scf
33	WB-02, -09	AP-42 Table 1.4-3, 129-00-0, Adjusted for biogas	Pyrene	2.94E-06	lb Pyrene/10^{6}scf	5.0E-06 lb/10^{6}scf x [(600 10^6 Btu/10^{6}scf for biogas)/(1,020 10^{6}Btu/10^{6}scf for natural gas)] = 2.94E-06 lb/10^{6}scf
34	WB-02, -09	AP-42 Table 1.4-4, 7782-49-2, Adjusted for biogas	Selenium (Se)	1.41E-05	lb Se/10^{6}scf	2.4E-05 lb/10^{6}scf x [(600 10^6 Btu/10^{6}scf for biogas)/(1,020 10^{6}Btu/10^{6}scf for natural gas)] = 1.41E-05 lb/10^{6}scf
35	WB-02, -09	AP-42 Table 1.4-3, 108-88-3, Adjusted for biogas	Toluene	2.00E-03	lb Toluene/10^{6}scf	3.4E-03 lb/10^{6}scf x [(600 10^6 Btu/10^{6}scf for biogas)/(1,020 10^{6}Btu/10^{6}scf for natural gas)] = 2.00E-03 lb/10^{6}scf

Diesel Emission Factor Calculations

	Source	Emission Factor Reference	Pollutants	EF	Units	Derivation of emission factor
1	WB-01, -02	AP-42 Table 1.3-1, <100 10^6btu/hr, Filter PM	PM	2.00	lb PM/10^3gal	Directly from AP-42 Table 1.3-1, Boilers < 100 MM Btu/hr, Filterable PM, Emission Factor Rating A
2	WB-04	AP-42 Table 1.3-1, Converted to hourly factor	PM	0.120	lb PM/hr	2 lb PM/10^3gal x 62.0 gal/hr x 10^3gal/1,000 gal = 0.124 lb PM/hr
3	WB-07 (Large Generator)	AP-42 Table 3.3-1, Diesel	PM, PM_{10}	0.930	lb PM, PM_{10}/hr	0.00220 lb PM, PM_{10}/hp-hr x 423 hp = 0.931 lb PM, PM_{10}/hr
4	WB-07 (Small Generator)	AP-42 Table Tbl 3.3-1	PM, PM_{10}	0.180	lb PM, PM_{10}/hr	0.00220 lb PM, PM_{10}/hp-hr x 80 hp = 0.176 lb PM, PM_{10}/hr
5	WB-01, -02	AP-42 Table 1.3-2, CPM-TOT, 50% PM < 10um	PM_{10}	2.30	lb PM_{10}/10^3gal	Directly from AP-42 Table 1.3-2, No. 2 Oil Fired (assume diesel), CPM-TOT, Emission Factor Rating D plus 50% of PM (assumed < 10um)
6	WB-04	AP-42 Table 1.3-1, Converted to hourly factor	PM_{10}	0.140	lb PM_{10}/hr	2.3 lb PM_{10}/10^3gal x 62.0 gal/hr x 10^3gal/1,000 gal = 0.143 lb PM_{10}/hr
7	WB-01, -02	AP-42 Table 1.3-1 (142xS%, assumes S = 0.5%)	SO_2	71.0	lb SO_2/10^3gal	142 lb SO_2/10^3gal x 0.5% Sulfur = 71 lb SO2/103gal, Boilers,100 MM Btu/hr, Distillate oil fired (assume diesel), EF Rating A
8	WB-04	AP-42 Table 1.3-1 (142xS%, assumes S = 0.5%)	SO_2	4.40	lb SO_2/hr	71 lb SO_2/10^3gal x 62.0 gal/hr x 10^3gal/1,000 gal = 4.40 lb SO_2/hr
9	WB-07 (Large Generator)	100% conversion S to SO_2 and S = 0.5%	SO_2	1.40	lb SO_2/hr	19.2 gal/hr x 7.05 lb/gal x 0.005 x (64g/mole SO_2/32g/mole S) = 1.35 lb SO_2/hr
10	WB-07 (Small Generator)	100% conversion S to SO_2 and S = 0.5%	SO_2	0.240	lb SO_2/hr	3.4 gal/hr x 7.05 lb/gal x 0.005 x (64g/mole SO_2/32g/mole S) = 0.240 lb SO_2/hr
11	WB-01, -02	40 CFR 98 Tables A-1, C-1 and C-2	CO_2e	22,415	lb CO_2e/10^3gal	[73.96 kg/10^6 Btu CO_2 + (0.003 kg CH_4/10^6 Btu x 25) + (0.0006 kg N_20/10^6 Btu x 298)] x 137 10^6Btu/10^3gal x 2.20462 lb/kg = 22,415
12	WB-04	40 CFR 98 Tables A-1, C-1 and C-2	CO_2e	1,390	lb CO_2e/hr	22,415 lb GHG/10^3gal x 62.0 gal/hr x 10^3gal/1,000 gal = 1,390 lb GHG/hr
13	WB-07 (Large Generator)	AP-42 Table 3.3-1, CO_2, Diesel	CO_2e	487	lb CO_2e/hr	1.15 lb GHG/hp-hr x 423 hp = 486.5 lb GHG/hr
14	WB-07 (Small Generator)	AP-42 Table 3.3-1, CO_2, Diesel Fuel	CO_2e	92.0	lb CO_2e/hr	1.15 lb GHG/hp-hr x 80 hp = 92.0 lb GHG/hr
15	WB-01, -02	AP-42 Table 1.3-1, <100 10^6btu/hr, Distillate oil	CO	5.00	lb CO/10^3gal	Directly from AP-42 Table 1.3-1, Boilers < 100 10^6btu/hr
16	WB-04	AP-42 Table 1.3-1, <100 10^6btu/hr, Distillate oil	CO	0.310	lb CO/hr	5 lb CO/10^3gal x 62.0 gal/hr x 10^3gal/1,000 gal = 0.310 lb CO/hr
17	WB-07 (Large Generator)	AP-42 Table 3.3-1, CO, Diesel	CO	2.83	lb CO/hr	0.00668 lb CO/hp-hr x 423 hp = 2.83 lb CO/hr
18	WB-07 (Small Generator)	AP-42 Table 3.3-1, CO, Diesel	CO	0.534	lb CO/hr	0.00668 lb CO/hp-hr x 80 hp = 0.534 lb CO/hr
19	WB-01, -02	AP-42 Table 1.3-1	NO_x	20.0	lb NO_x/10^3gal	Directly from AP-42 Table 1.3-1, Boilers < 100 10^6btu/hr, Distillate oil fired
20	WB-04	AP-42 Table 1.3-1, <100 10^6btu/hr, Distillate oil	NO_x	1.24	lb NO_x/hr	20 lb NO_x/10^3gal x 62.0 gal/hr x 10^3gal/1,000 gal = 1.24 lb NO_x/hr
21	WB-07 (Large Generator)	AP-42 Table 3.3-1	NO_x	13.1	lb NO_x/hr	0.031 lb NO_x/hp-hr x 423 hp = 13.1 lb NOx/hr
22	WB-07 (Small Generator)	AP-42 Table 3.3-1	NO_x	2.48	lb NO_x/hr	0.031 lb NOx/hp-hr x 80 hp = 2.48 lb NOx/hr
23	WB-01, -02	AP-42 Table 1.3-3, NMTOC	VOC	0.340	lb VOC/10^3gal	Commercial/institutional/residential combustors, Distillate oil fired: 0.34 NMTOC lb/10^3gal. Assume equivalent to 0.34 VOC lb/10^3gal.
24	WB-07 (Large Generator)	AP-42 Table 3.3-1, Diesel, Exhaust + Crankcase	VOC	1.06	lb VOC/hr	(0.00247 + 0.0000441) lb VOC/hp-hr x 423 hp = 1.06 lb VOC/hr
25	WB-07 (Small Generator)	AP-42 Table 3.3-1, Diesel, Exhaust + Crankcase	VOC	0.201	lb VOC/hr	(0.00247 + 0.0000441) lb VOC/hp-hr x 80 hp = 0.201 lb VOC/hr
26	WB-01, -02	AP-42 Tables 1.3.8 and 1.3-10	HAP	5.80E-02	lb HAP/10^3gal	Summation of all diesel HAP factors from AP-42 Tables 1.3-8 and 1.3-10
27	WB-04	AP-42 Tables 1.3.8 and 1.3-10	HAP	3.60E-03	lb HAP/hr	Summation of all diesel HAP factors from AP-42 Tables 1.3-8 and 1.3-10
28	WB-07 (Large Generator)	AP-42 Table 3.3-2, Summation of HAP	HAP	3.29E-02	lb HAP/hr	Based on AP-42 Table 3.3-2, Summation of all HAP from table
29	WB-07 (Small Generator)	AP-42 Table 3.3-2, Summation of HAP	HAP	1.81E-03	lb HAP/hr	Based on AP-42 Table 3.3-2, Summation of all HAP from table
30	WB-07 (Large Generator)	AP-42 Table 3.3-2	Acetaldehyde	6.51E-03	lb Acetaldehyde/hr	0.000767 lb/10^6Btu x 137 10^6Btu/10^3gal x 10^3gal/1,000 gal x 62.0 gal/hr = 0.00651 lb/hr
31	WB-07 (Small Generator)	AP-42 Table 3.3-2	Acetaldehyde	3.57E-04	lb Acetaldehyde/hr	0.000767 lb Acetaldehyde/10^6Btu x 137 10^6Btu/10^3gal x 10^3gal/1,000 gal x 3.4 gal/hr = 0.000357 lb Acetaldehyde/hr
32	WB-07 (Large Generator)	AP-42 Table 3.3-2	Acrolein	7.86E-04	lb Acrolein/hr	0.0000925 lb/10^6Btu x 137 10^6Btu/10^3gal x 10^3gal/1,000 gal x 62.0 gal/hr = 0.000786 lb/hr
33	WB-07 (Small Generator)	AP-42 Table 3.3-2	Acrolein	4.31E-05	lb Acrolein/hr	0.0000925 lb Acrolein/10^6Btu x 137 10^6Btu/10^3gal x 10^3gal/1,000 gal x 3.4 gal/hr = 0.0000431 lb Acrolein/hr
34	WB-01, -02	AP-42 Table 1.3-10, Converted to lb/10^3gal	Arsenic (As)	5.48E-04	lb As/10^3gal	4.0 lb As/10^{12}Btu x 137,000 Btu/gal x 10^{12}Btu/1,000,000,000,000 Btu x 1,000 gal/10^3gal = 5.48E-04 lb As/10^3gal
35	WB-04	AP-42 Table 1.3-10, Converted to lb/10^3gal	Arsenic (As)	3.41E-05	lb As/hr	4.0 lb As/10^{12}Btu x 137,000 Btu/gal x 10^{12}Btu/1,000,000,000,000 Btu x 1,000 gal/10^3gal = 5.48E-04 lb As/10^3gal
36	WB-07 (Large Generator)	AP-42 Table 3.3-2	Benzene	7.92E-03	lb Benzene/hr	0.000933 lb/10^6Btu x 137 10^6Btu/10^3gal x 10^3gal/1,000 gal x 62.0 gal/hr = 0.00792 lb/hr
37	WB-07 (Small Generator)	AP-42 Table 3.3-2	Benzene	4.35E-04	lb Benzene/hr	0.000933 lb Benzene/10^6Btu x 137 10^6Btu/10^3gal x 10^3gal/1,000 gal x 3.4 gal/hr = 0.000435 lb Benzene/hr
38	WB-01, -02	AP-42 Table 1.3-10, Converted to lb/10^3gal	Beryllium (Be)	4.11E-04	lb Be/10^3gal	3.0 lb Be/10^{12}Btu x 137,000 Btu/gal x 10^{12}Btu/1,000,000,000,000 Btu x 1,000 gal/10^3gal = 4.11E-04 lb Be/10^3gal
39	WB-04	AP-42 Table 1.3-10, Converted to lb/10^3gal	Beryllium (Be)	2.54E-05	lb Be/hr	3.0 lb Be/10^{12}Btu x 137,000 Btu/gal x 10^{12}Btu/1,000,000,000,000 Btu x 1,000 gal/10^3gal = 4.11E-04 lb Be/10^3gal

Diesel Emission Factor Calculations - continued

	Source	Emission Factor Reference	Pollutants	EF	Units	Derivation of emission factor
40	WB-07 (Large Generator)	AP-42 Table 3.3-2	Butadiene, 1,3-	3.32E-04	lb Butadiene, 1,3-/hr	0.0000391 lb/10^6Btu x 137 10^6Btu/10^3gal x 10^3gal/1,000 gal x 62.0 gal/hr = 0.000332 lb/hr
41	WB-07 (Small Generator)	AP-42 Table 3.3-2	Butadiene, 1,3-	1.82E-05	lb Butadiene, 1,3-/hr	0.0000391 lb Butadiene, 1,3-/10^6Btu x 137 10^6Btu/10^3gal x 10^3gal/1,000 gal x 3.4 gal/hr = 0.0000182 lb Butadiene, 1,3-/hr
42	WB-01, -02	AP-42 Table 1.3-10, Converted to lb/10^3gal	Cadmium (Cd)	4.11E-04	lb Cd/10^3gal	3.0 lb Cd/10^{12}Btu x 137,000 Btu/gal x 1012Btu/1,000,000,000,000 Btu x 1,000 gal/103gal = 4.11E-04 lb Cd/10^3gal
43	WB-04	AP-42 Table 1.3-10, Converted to lb/10^3gal	Cadmium (Cd)	2.54E-05	lb Cd/hr	3.0 lb Cd/10^{12}Btu x 137,000 Btu/gal x 1012Btu/1,000,000,000,000 Btu x 1,000 gal/103gal = 4.11E-04 lb Cd/10^3gal
44	WB-01, -02	AP-42 Table 1.3-10, Converted to lb/10^3gal	Chromium (Cr)	4.11E-04	lb Cr/10^3gal	3.0 lb Cr/10^{12}Btu x 137,000 Btu/gal x 1012Btu/1,000,000,000,000 Btu x 1,000 gal/103gal = 4.11E-04 lb Cr/10^3gal
45	WB-04	AP-42 Table 1.3-10, Converted to lb/10^3gal	Chromium (Cr)	2.54E-05	lb Cr/hr	3.0 lb Cr/10^{12}Btu x 137,000 Btu/gal x 1012Btu/1,000,000,000,000 Btu x 1,000 gal/103gal = 4.11E-04 lb Cr/10^3gal
46	WB-01, -02	AP-42 Table 1.3-10, Converted to lb/10^3gal	Chromium VI (CrVI)	2.06E-05	lb CrVI/10^3gal	1.5 lb CrVI/10^{13}Btu x 137,000 Btu/gal x 10^{13}Btu/10,000,000,000,000 Btu x 1,000 gal/10^3gal = 2.06E-05 lb CrVI/10^3gal
47	WB-04	AP-42 Table 1.3-10, Converted to lb/10^3gal	Chromium VI (CrVI)	1.30E-06	lb CrVI/hr	1.5 lb CrVI/10^{13}Btu x 137,000 Btu/gal x 10^{13}Btu/10,000,000,000,000 Btu x 1,000 gal/10^3gal = 2.06E-05 lb CrVI/10^3gal
48	WB-01, -02	AP-42 Table 1.3-8 (HCOH), Average	Formaldehyde (HCOH)	4.80E-02	lb HCOH/10^3gal	(0.035 lb HCOH/10^3gal + 0.061 lb HCOH/10^3gal)/2 = 0.048 lb HCOH/10^3gal
49	WB-04	AP-42 Table 1.3-8 (HCOH), Average	Formaldehyde (HCOH)	2.98E-03	lb HCOH/hr	(0.035 lb HCOH/10^3gal + 0.061 lb HCOH/10^3gal)/2 = 0.048 lb HCOH/10^3gal
50	WB-07 (Large Generator)	AP-42 Table 3.3-2	Formaldehyde (HCOH)	1.00E-02	lb HCOH/hr	0.00118 lb/10^6Btu x 137 10^6Btu/10^3gal x 10^3gal/1,000 gal x 62.0 gal/hr = 0.010 lb/hr
51	WB-07 (Small Generator)	AP-42 Table 3.3-2	Formaldehyde	5.50E-04	lb HCOH/hr	0.00118 lb HCOH/10^6Btu x 137 10^6Btu/10^3gal x 10^3gal/1,000 gal x 3.4 gal/hr = 0.000550 lb HCOH/hr
52	WB-01, -02	AP-42 Table 1.3-10, Converted to lb/10^3gal	Lead (Pb)	1.23E-03	lb Pb/10^3gal	9.0 lb Pb/10^{12}Btu x 137,000 Btu/gal x 10^{12}Btu/1,000,000,000,000 Btu x 1,000 gal/10^3gal = 1.23E-03 lb Pb/10^3gal
53	WB-04	AP-42 Table 1.3-10, Converted to lb/10^3gal	Lead (Pb)	7.44E-05	lb Pb/hr	9.0 lb Pb/10^{12}Btu x 137,000 Btu/gal x 10^{12}Btu/1,000,000,000,000 Btu x 1,000 gal/10^3gal = 1.23E-03 lb Pb/10^3gal
54	WB-01, -02	AP-42 Table 1.3-10, Converted to lb/10^3gal	Manganese (Mn)	8.22E-04	lb Mn/10^3gal	6.0 lb Mn/10^{12}Btu x 137,000 Btu/gal x 10^{12}Btu/1,000,000,000,000 Btu x 1,000 gal/10^3gal = 8.22E-03 lb Mn/10^3gal
55	WB-04	AP-42 Table 1.3-10, Converted to lb/10^3gal	Manganese (Mn)	5.08E-05	lb Mn/hr	6.0 lb Mn/10^{12}Btu x 137,000 Btu/gal x 10^{12}Btu/1,000,000,000,000 Btu x 1,000 gal/10^3gal = 8.22E-03 lb Mn/10^3gal
56	WB-01, -02	AP-42 Table 1.3-10, Converted to lb/10^3gal	Mercury (Hg)	4.11E-04	lb Hg/10^3gal	3.0 lb Hg/10^{12}Btu x 137,000 Btu/gal x 10^{12}Btu/1,000,000,000,000 Btu x 1,000 gal/10^3gal = 4.11E-04 lb Hg/10^3gal
57	WB-04	AP-42 Table 1.3-10, Converted to lb/10^3gal	Mercury (Hg)	2.54E-05	lb Hg/hr	3.0 lb Hg/10^{12}Btu x 137,000 Btu/gal x 10^{12}Btu/1,000,000,000,000 Btu x 1,000 gal/10^3gal = 4.11E-04 lb Hg/10^3gal
58	WB-01, -02	AP-42 Table 1.3-10, Converted to lb/10^3gal	Nickel (Ni)	4.11E-04	lb Ni/10^3gal	3.0 lb Ni/10^{12}Btu x 137,000 Btu/gal x 10^{12}Btu/1,000,000,000,000 Btu x 1,000 gal/10^3gal = 4.11E-04 lb Ni/10^3gal
59	WB-04	AP-42 Table 1.3-10, Converted to lb/10^3gal	Nickel (Ni)	2.54E-05	lb Ni/hr	3.0 lb Ni/10^{12}Btu x 137,000 Btu/gal x 10^{12}Btu/1,000,000,000,000 Btu x 1,000 gal/10^3gal = 4.11E-04 lb Ni/10^3gal
60	WB-01, -02	AP-42 Table 1.3-8, POM	POM	3.30E-03	lb POM/10^3gal	Directly from AP-42 Table 1.3-8 (POM), Emission Factor Rating E
61	WB-04	AP-42 Table 1.3-8, POM	POM	2.05E-04	lb POM/hr	Directly from AP-42 Table 1.3-8 (POM), Emission Factor Rating E
62	WB-07 (Large Generator)	AP-42 Table 3.3-2, PAH	POM	1.43E-03	lb POM/hr	0.000168 lb/10^6Btu x 137 10^6Btu/10^3gal x 10^3gal/1,000 gal x 62.0 gal/hr = 0.00143 lb/hr
63	WB-07 (Small Generator)	AP-42 Table 3.3-2, PAH	POM	7.83E-05	lb POM/hr	0.000168 lb POM/10^6Btu x 137 10^6Btu/10^3gal x 10^3gal/1,000 gal x 3.4 gal/hr = 0.0000783 lb POM/hr
64	WB-01, -02	AP-42 Table 1.3-10, Converted to lb/10^3gal	Selenium (Se)	2.06E-03	lb Se/10^3gal	15.0 lb Se/10^{12}Btu x 137,000 Btu/gal x 10^{12}Btu/1,000,000,000,000 Btu x 1,000 gal/10^3gal = 2.06E-03 lb Se/10^3gal
65	WB-04	AP-42 Table 1.3-10, Converted to lb/10^3gal	Selenium (Se)	1.30E-04	lb Se/hr	15.0 lb Se/10^{12}Btu x 137,000 Btu/gal x 10^{12}Btu/1,000,000,000,000 Btu x 1,000 gal/10^3gal = 2.06E-03 lb Se/10^3gal
66	WB-07 (Large Generator)	AP-42 Table 3.3-2	Toluene	3.47E-03	lb Toluene/hr	0.000409 lb/10^6Btu x 137 10^6Btu/10^3gal x 10^3gal/1,000 gal x 62.0 gal/hr = 0.00347 lb/hr
67	WB-07 (Small Generator)	AP-42 Table 3.3-2	Toluene	1.91E-04	lb Toluene/hr	0.000409 lb Toluene/10^6Btu x 137 10^6Btu/10^3gal x 10^3gal/1,000 gal x 3.4 gal/hr = 0.000191 lb Toluene/hr
68	WB-07 (Large Generator)	AP-42 Table 3.3-2	$Xylenes_{total}$	2.42E-03	lb $Xylenes_{total}$/hr	0.000285 lb/10^6Btu x 137 10^6Btu/10^3gal x 10^3gal/1,000 gal x 62.0 gal/hr = 0.00242 lb/hr
69	WB-07 (Small Generator)	AP-42 Table 3.3-2	$Xylenes_{total}$	1.33E-04	lb $Xylenes_{total}$/hr	0.000285 lb $Xylenes_{total}$/10^6Btu x 137 10^6Btu/10^3gal x 10^3gal/1,000 gal x 3.4 gal/hr = 0.000133 lb $Xylenes_{total}$/hr

Operating Time EF Calculations

	Source	Emission Factor Reference	Pollutants	EF	Units	Derivation of emission factor
1	WB-06 (Operating)	and Rendering Plant Operating; 2008 Source Test	PM	1.26	lb PM/hr	0.0021 gr PM/ft^3 x lb/7,000 gr x 70,000 ft^3/min x 60 min/hr = 1.26 lb PM/hr
2	WB-06 (Not Operating)	and Rendering Plant Operating; 2008 Source Test	PM	21.8	lb PM/hr	0.0021 gr PM/ft^3 x lb/7,000 gr x 70,000 ft^3/min x 60 min/hr x 17.30 = 21.8 lb PM/hr, representing 94.2% scrubber efficiency
3	WB-08 (Four Cooling Towers)	AP-42 Table 13.4-1, PM_{10}	PM_{10}	4,272	lb PM_{10}/mo	0.019 1b PM_{10}/10^3gal x 308,000 gal/hr x 10^3gal/1,000 gal x 8,760 hr/12 mo = 4,272 lb PM_{10}/mo for all four cooling towers
4	WB-06 (Operating)	and Rendering Plant Operating; 2008 Source Test	PM_{10}	3.30	lb PM_{10}/hr	0.0044 + 0.0011 (50% of PM) gr PM_{10}/ft^3 x lb/7,000 gr x 70,000 ft^3/min x 60 min/hr = 3.30 lb PM_{10}/hr
5	WB-06 (Not Operating)	and Rendering Plant Operating; 2008 Source Test	PM_{10}	22.8	lb PM_{10}/hr	0.0044 + 0.0011 (50% of PM) gr PM_{10}/ft^3 x lb/7,000 gr x 70,000 ft^3/min x 60 min/hr x 6.92 = 22.84 lb PM_{10}/hr, representing 85.5% scrubber efficiency
6	WB-06 (Operating)	and Rendering Plant Operating; 2008 Source Test	VOC (THC propane)	0.058	lb VOC/hr	0.058 lb VOC/hr (Highest value measured during 2008 source test)
7	WB-06 (Not Operating)	and Rendering Plant Operating; 95% efficient	VOC (THC propane)	1.16	lb VOC/hr	0.058 lb VOC/hr (Highest value measured during 2008 source test) x 100/5 = 1.16 lb VOC/hr, assume 95% VOC efficient
8	WB-10 (Wastewater)	Based on 2006 source test	VOC (THC propane)	155	lb VOC/mo	0.38 ug/ml VOC x (0.00834 lb/10^3gal)/(ug/ml) x 67,000 gal/hr x 10^3gal/1,000 gal x 8,760/12 hr/mo = 155 lb VOC/mo
9	WB-06 (Operating)	and Rendering Plant Operating; 2008 Source Test	HAP	1.25E+00	lb HAP/hr	Summation of all HAP detected during 2008 source test
10	WB-06 (Not Operating)	and Rendering Plant Operating; 75% efficient	HAP	5.00E+00	lb HAP/hr	Summation of all HAP detected during 2008 source test
11	WB-08 (Four Cooling Towers)	Based on reported material balance	HAP	2.33E+01	lb HAP/mo	The only reported cooling tower HAP is chlorine
12	WB-10 (Wastewater)	Based on 2006 source test	HAP	3.36E+02	lb HAP/mo	(Summation of all HAP detected during 2006 source test)
13	WB-10 (Wastewater)	Based on 2006 source test	Acetaldehyde	2.45E+02	lb Acetaldehyde/mo	0.60 ug/ml Acetaldehyde x (0.00834 lb/10^3gal)/(ug/ml) x 67,000 gal/hr x 10^3gal/1,000 gal x 8760/12 = 245 lb Acetaldehyde/mo
14	WB-06 (Operating)	and Rendering Plant Operating; 2008 Source Test	Benzene (78)	3.75E-02	lb Benzene/hr	(44.9 ppbv Benzene x 78/24.46) ug/m3 x 0.0283 m3/ft3 x 2.2046E-09 lb/ug x 70,000 ft3/min x 60 min/hr = 0.0375 lb/Benzene/hr
15	WB-06 (Not Operating)	and Rendering Plant Operating; 75% efficient	Benzene (78)	1.50E-01	lb Benzene/hr	(44.9 ppbv Benzene x 78/24.46) ug/m3 x 0.0283 m3/ft3 x 2.2046E-09 lb/ug x 70,000 ft3/min x 60 min/hr x 100/25 = 0.150 lb/Benzene/hr
16	WB-10 (Wastewater)	Based on 2006 Source Test	Benzene (78)	1.80E+01	lb Benzene/mo	0.0440 ug/ml Benzene x (0.00834 lb/10^3gal)/(ug/ml) x 67,000 gal/hr x 10^3gal/1,000 gal x 8760/12 = 18 lb Benzene/mo
17	WB-06 (Operating)	and Rendering Plant Operating; 2008 Source Test	Butadiene, 1,3- (54)	2.60E-03	lb Butadiene, 1,3-/hr	(4.5 ppbv Butadiene, 1,3- x 54/24.46) ug/m3 x 0.0283 m3/ft3 x 2.2046E-09 lb/ug x 70,000 ft3/min x 60 min/hr = 0.00260 lb/ Butadiene, 1,3-/hr
18	WB-06 (Not Operating)	and Rendering Plant Operating; 75% efficient	Butadiene, 1,3- (54)	1.00E-02	lb Butadiene, 1,3-/hr	(4.5 ppbv Butadiene, 1,3- x 54/24.46) ug/m3 x 0.0283 m3/ft3 x 2.2046E-09 lb/ug x 70,000 ft3/min x 60 min/hr x 100/25 = 0.010 lb/ Butadiene, 1,3-/hr
19	WB-06 (Operating)	and Rendering Plant Operating; 2008 Source Test	Carbon Disulfide (76)	3.96E-02	lb Carbon Disulfide/hr	(13.5 ppbv Carbon Disulfide x 76/24.46) ug/m3 x 0.0283 m3/ft3 x 2.2046E-09 lb/ug x 70,000 ft3/min x 60 min/hr = 0.0396 lb/Carbon Disulfide/hr
20	WB-06 (Not Operating)	and Rendering Plant Operating; 75% efficient	Carbon Disulfide (76)	1.58E-01	lb Carbon Disulfide/hr	(13.5 ppbv Carbon Disulfide x 76/24.46) ug/m3 x 0.0283 m3/ft3 x 2.2046E-09 lb/ug x 70,000 ft3/min x 60 min/hr x 100/25 = 0.158 lb/Carbon Disulfide/hr
21	WB-10 (Wastewater)	Based on 2006 Source Test	Carbon Disulfide (76)	1.10E+00	lb Carbon Disulfide/mo	0.00280 ug/ml Carbon Disulfide x (0.00834 lb/10^3gal)/(ug/ml) x 67,000 gal/hr x 10^3gal/1,000 gal x 8760/12 = 1.1 lb Carbon Disulfide/mo
22	WB-08 (Four Cooling Towers)	Based on reported material balance	Chlorine	2.33E+01	lb Chlorine/mo	280 lb/yr x yr/12 mo = 23.3 lb/mo
23	WB-06 (Operating)	Not Detected 2008 Source Test	Chloroform (119)	0.00E+00	lb Chloroform/hr	0.00 ug/m3 Chloroform x 0.0283 m3/ft3 x 2.2046E-09 lb/ug x 70,000 ft3/min x 60 min/hr = 0.00 lb/Chloroform/hr
24	WB-06 (Not Operating)	Not Detected 2008 Source Test	Chloroform (119)	0.00E+00	lb Chloroform/hr	0.00 ug/m3 Chloroform x 0.0283 m3/ft3 x 2.2046E-09 lb/ug x 70,000 ft3/min x 60 min/hr x 100/25 = 0.00 lb/Chloroform/hr
25	WB-06 (Operating)	Not Detected 2008 Source Test	Dichloromethane (85)	0.00E+00	lb Dichloromethane/hr	0.00 ug/m3 Dichloromethane x 0.0283 m3/ft3 x 2.2046E-09 lb/ug x 70,000 ft3/min x 60 min/hr = 0.00 lb/Dichloromethane/hr
26	WB-06 (Not Operating)	Not Detected 2008 Source Test	Dichloromethane (85)	0.00E+00	lb Dichloromethane/hr	0.00 ug/m3 Dichloromethane x 0.0283 m3/ft3 x 2.2046E-09 lb/ug x 70,000 ft3/min x 60 min/hr x 100/25 = 0.00 lb/Dichloromethane/hr
27	WB-10 (Wastewater)	Based on 2006 Source Test	Dichloromethane (85)	9.50E+00	lb Dichloromethane/mo	0.0234 ug/ml Dichloromethane x (0.00834 lb/10^3gal)/(ug/ml) x 67,000 gal/hr x 10^3gal/1,000 gal x 8760/12 = 9.5 lb Dichloromethane/mo
28	WB-06 (Operating)	and Rendering Plant Operating; 2008 Source Test	Ethylbenzene (106)	9.10E-02	lb Ethylbenzene/hr	(80.1 ppbv Ethylbenzene x 106/24.46) ug/m3 x 0.0283 m3/ft3 x 2.2046E-09 lb/ug x 70,000 ft3/min x 60 min/hr = 0.0910 lb/Ethylbenzene/hr
29	WB-06 (Not Operating)	and Rendering Plant Operating; 75% efficient	Ethylbenzene (106)	3.64E-01	lb Ethylbenzene/hr	(80.1 ppbv Ethylbenzene x 106/24.46) ug/m3 x 0.0283 m3/ft3 x 2.2046E-09 lb/ug x 70,000 ft3/min x 60 min/hr x 100/25 = 0.364 lb/Ethylbenzene/hr
30	WB-06 (Operating)	and Rendering Plant Operating; 2008 Source Test	Hexane (86)	5.34E-03	lb Hexane/hr	(5.8 ppbv Hexane x 86/24.46) ug/m3 x 0.0283 m3/ft3 x 2.2046E-09 lb/ug x 70,000 ft3/min x 60 min/hr = 0.00534 lb/Hexane/hr
31	WB-06 (Not Operating)	and Rendering Plant Operating; 75% efficient	Hexane (86)	2.10E-02	lb Hexane/hr	(5.8 ppbv Hexane x 86/24.46) ug/m3 x 0.0283 m3/ft3 x 2.2046E-09 lb/ug x 70,000 ft3/min x 60 min/hr x 100/25 = 0.021 lb/Hexane/hr
32	WB-10 (Wastewater)	Based on 2006 Source Test	Hexane (86)	5.30E+00	lb Hexane/mo	0.0130 ug/ml Hexane x (0.00834 lb/10^3gal)/(ug/ml) x 67,000 gal/hr x 10^3gal/1,000 gal x 8760/12 = 5.3 lb Hexane/mo
33	WB-06 (Operating)	and Rendering Plant Operating; 2008 Source Test	Methanol (32)	6.48E-02	lb Methanol/hr	(189 ppbv Methanol x 32/24.46) ug/m3 x 0.0283 m3/ft3 x 2.2046E-09 lb/ug x 70,000 ft3/min x 60 min/hr = 0.0648 lb/Methanol/hr
34	WB-06 (Not Operating)	and Rendering Plant Operating; 75% efficient	Methanol (32)	2.59E-01	lb Methanol/hr	(189 ppbv Methanol x 32/24.46) ug/m3 x 0.0283 m3/ft3 x 2.2046E-09 lb/ug x 70,000 ft3/min x 60 min/hr x 100/25 = 0.259 lb/Methanol/hr
35	WB-10 (Wastewater)	Based on 2006 Source Test	Methanol (32)	4.90E+00	lb Methanol/mo	0.0121 ug/ml Methanol x (0.00834 lb/10^3gal)/(ug/ml) x 67,000 gal/hr x 10^3gal/1,000 gal x 8760/12 = 4.9 lb Methanol/mo
36	WB-06 (Operating)	and Rendering Plant Operating; 2008 Source Test	Pentanone, 4-Methy-2-	2.59E-01	lb Pentanone, 4-Methy-2-/hr	(242 ppbv Pentanone, 4-Methy-2- x 100/24.46) ug/m3 x 0.0283 m3/ft3 x 2.2046E-09 lb/ug x 70,000 ft3/min x 60 min/hr = 0.259 lb/Pentanone, 4-Methy-2-/hr
37	WB-06 (Not Operating)	and Rendering Plant Operating; 75% efficient	Pentanone, 4-Methy-2-	1.04E+00	lb Pentanone, 4-Methy-2-/hr	(242 ppbv Pentanone, 4-Methy-2- x 100/24.46) ug/m3 x 0.0283 m3/ft3 x 2.2046E-09 lb/ug x 70,000 ft3/min x 60 min/hr x 100/25 = 1.04 lb/Pentanone, 4-Methy-2-/hr
38	WB-06 (Operating)	Not Detected 2008 Source Test	Styrene (104)	0.00E+00	lb Styrene/hr	0.00 ug/m3 Styrene x 0.0283 m3/ft3 x 2.2046E-09 lb/ug x 70,000 ft3/min x 60 min/hr = 0.00 lb/Styrene/hr
39	WB-06 (Not Operating)	Not Detected 2008 Source Test	Styrene (104)	0.00E+00	lb Styrene/hr	0.00 ug/m3 Styrene x 0.0283 m3/ft3 x 2.2046E-09 lb/ug x 70,000 ft3/min x 60 min/hr x 100/25 = 0.00 lb/Styrene/hr

Operating Time EF Calculations (continued)

	Source	Emission Factor Reference	Pollutants	EF	Units	Derivation of emission factor
40	WB-06 (Operating)	and Rendering Plant Operating; 2008 Source Test	Toluene (92)	2.75E-01	lb Toluene/hr	(279ppbv Toluene x 92/24.46)ug/m3 x 0.0283 m3/ft3 x 2.2046E-09lb/ug x 70,000 ft3/min x 60 min/hr = 0.275lb/Toluene/hr
41	WB-06 (Not Operating)	and Rendering Plant Operating; 75% efficient	Toluene (92)	1.10E+00	lb Toluene/hr	(279ppbv Toluene x 92/24.46)ug/m3 x 0.0283m3/ft3 x 2.2046E-09lb/ug x 70,000ft3/min x 60min/hr x 4 = 1.10lb/Toluene/hr
42	WB-10 (Wastewater)	Based on 2006 Source Test	Toluene (92)	3.50E+01	lb Toluene/mo	0.0860 ug/ml Toluene x (0.00834 lb/10^3gal)/(ug/ml) x 67,000 gal/hr x 10^3gal/1,000 gal x 8760/12 = 35 lb Toluene/mo
43	WB-06 (Operating)	and Rendering Plant Operating; 2008 Source Test	$Xylenes_{total}$ (106)	4.75E-01	lb $Xylenes_{total}$/hr	(418ppbv $Xylenes_{total}$ x 106/24.46)ug/m3 x 0.0283m3/ft3 x 2.2046E-09lb/ug x 70,000ft3/min x 60min/hr = 0.475lb/$Xylenes_{total}$/hr
44	WB-06 (Not Operating)	and Rendering Plant Operating; 75% efficient	$Xylenes_{total}$ (106)	1.90E+00	lb $Xylenes_{total}$/hr	(418ppbv $Xylenes_{total}$ x 106/24.46)ug/m3 x 0.0283m3/ft3 x 2.2046E-09lb/ug x 70,000ft3/min x 60min/hr x 4 = 1.90 lb/Xylenes $_{total}$/hr
45	WB-10 (Wastewater)	Based on 2006 Source Test	$Xylenes_{total}$ (106)	1.70E+01	lb $Xylenes_{total}$/mo	0.0420ug/ml $Xylenes_{total}$ x (0.00834 lb/10^3gal)/(ug/ml) x 67,000gal/hr x 10^3gal/1,000gal x 8760/12 = 17lb $Xylenes_{total}$/mo