Statement of Basis

Permit to Construct No. P-2009.0124
Project ID 61373

Pacific Ethanol Magic Valley, LLC
Burley, Idaho

Facility ID 031-00032

Final

September 25,2014
Robert Baldwin
Permit Writer

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

1. ACRONYMS, UNITS, AND CHEMICAL NOMENCLATURE

AAC	acceptable ambient concentrations
AACC	acceptable ambient concentrations for carcinogens
acfm	actual cubic feet per minute
Btu	British thermal units
CAA	Clean Air Act
CFR	Code of Federal Regulations
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	CO_2 equivalent emissions
DEQ	Department of Environmental Quality
EL	screening emission levels
EPA	U.S. Environmental Protection Agency
GHG	greenhouse gases
gr	grains (1 lb = 7,000 grains)
HAP	hazardous air pollutants
hp	horsepower
ICE	internal combustion engines
IDAPA	a numbering designation for all administrative rules in Idaho promulgated in accordance with the Idaho Administrative Procedures Act
iwg	inches of water gauge
km	kilometers
lb/hr	pounds per hour
m	meters
MACT	Maximum Achievable Control Technology
mg/dscm	milligrams per dry standard cubic meter
MMscf	million standard cubic feet
NAAQS	National Ambient Air Quality Standard
NESHAP	National Emission Standards for Hazardous Air Pollutants
NO_2	nitrogen dioxide
NO_x	nitrogen oxides
NSPS	New Source Performance Standards
O&M	operation and maintenance
PAH	polyaromatic hydrocarbons
PM	particulate matter
$PM_{2.5}$	particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers
PM_{10}	particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers
POM	polycyclic organic matter
ppm	parts per million
ppmw	parts per million by weight
PSD	Prevention of Significant Deterioration
PTC	permit to construct
PTE	potential to emit
RICE	reciprocating internal combustion engines
Rules	*Rules for the Control of Air Pollution in Idaho*
scf	standard cubic feet
SCL	significant contribution limits
SIP	State Implementation Plan
SM	synthetic minor
SM80	synthetic minor facility with emissions greater than or equal to 80% of a major source threshold

SO_2	sulfur dioxide
SO_x	sulfur oxides
T/day	tons per calendar day
T/hr	tons per hour
T/yr	tons per consecutive 12 calendar month period
TAP	toxic air pollutants
T-RACT	Toxic Air Pollutant Reasonably Available Control Technology
U.S.C.	United States Code
VOC	volatile organic compounds

FACILITY INFORMATION

Description

Pacific Ethanol is a fuel-grade ethanol facility with a maximum permitted capacity of 73.57MMGal/yr of denatured ethanol, and 70 million gallons of undenatured ethanol. The facility is located near Burley. The facility processes approximately 23.6 million bushels of corn per year. The facility has the ability for an additional 315,000 T/yr corn to be received and shipped, , is now available to the facility. Corn load-out with a capacity of 20,000 bushels/hr also part of the operations at the facility. The facility consists of the following operations.

- Grain Handling and Milling Operation
- Fermentation and Distillation Operations
- Storage Tanks
- Ethanol Load-Out Operations
- Boilers
- Corn receiving and shipping
- Corn Load-out

Since the last permitting action Pacific Ethanol has the ability to supplement corn with sugar as a feed stock to the fermentation process. This supplementing can occur at approximately 600,000 lbs of sugar per day. No change in emissions resulted from this process.

Permitting History

The following information was derived from a review of the permit files available to DEQ. Permit status is noted as active and in effect (A) or superseded (S).

March 14, 2007	P-2009.0124, project 60885, to allow an increase in production of undenatured ethanol and add a flare(S).
November 10, 2009	P-2009.0124, add provisions of Consent Order No. E-2008.0020, including changing the catalytic oxidizer (RCO) to a regenerative thermal oxidizer (RTO) (S)
August 4, 2009	P-2009.0060 add ability to receive and ship whole and ground corn from the facility. (S)
March 28, 2008	P-2008.0025 install a RCO instead of a RTO. (S)
May 14, 2007	P-060450 issued for the initial construction of the ethanol production plant. (S)

Application Scope

This PTC is for a minor modification at an existing minor facility.

The applicant has proposed to increase the production of undenatured ethanol to 70 million gallons per year and the production of denatured to 73.57 million gallons per year. Application Chronology

May 13, 2014	DEQ received an application for this project.
May 14, 2014	DEQ received that application fee of $1,000.
May 27 through June 11, 2014	DEQ provided an opportunity to request a public comment period on the application and proposed permitting action.
June 13, 2014	DEQ determined that the application was complete.
July 8, 2014	DEQ received supplemental information from the applicant.

August 8, 2014	DEQ made available the draft permit and statement of basis for peer and regional office review.
August 13, 2014	DEQ made available the draft permit and statement of basis for applicant review.
September 9, 2014	DEQ received the permit processing fee.
August 22, 2014	DEQ issued the final permit and statement of basis.

TECHNICAL ANALYSIS

Emissions Units and Control Equipment

Table 1 EMISSIONS UNIT AND CONTROL EQUIPMENT INFORMATION

Emission Unit	Size or Capacity	Control Equipment
Truck Dump Pit - Corn	25,000 Bushels/hr	Corn Receiving Baghouse
Rail Dump Pit - Corn	50,000 Bushels/hr	
Corn Load-out	7,500 Bushels/hr	
3- Corn Conveyors	5,000 Bushels/hr	Corn Handling Baghouse
2- Corn Elevators	5,000 Bushels/hr	
Scalper	5,000 Bushels/hr	
2- Corn Bins	471,927 Bushels each	Corn Handling Baghouse or Corn Receiving Baghouse
Corn Surge Bin	5,414 Bushels	Corn Handling Baghouse
2- Hammermills	1,124 Bushels/hr each	Hammermill Baghouse
4- Fermenters	705,576 Gallons each	Fermentation Scrubber & RTO
Beerwell	910,944 Gallons	
Liquefaction Tank	165,438 Gallons	Vent Gas Scrubber & RTO
Slurry Tank	17,004 Gallons	
Beer Column	26,738 Gallons	
Stripper Column	6,500 Gallons	
Rectifier Column	26,173 Gallons	
Molecular Sieve	11,000 Gallons	
200-Proof Condenser	1,100 Gallons/hr (approximate)	
Whole Stillage Tank	178,459 Gallons	
Process Condensate Tank	178,459 Gallons	
Evaporator Vacuum Receiver	2,500 Gallons	
5-Centrifuges	13,200 Gallons/hr each	
Syrup Tank	122,251 Gallons	
Thin Stillage Tank	115,007 Gallons	
Yeast Propagation Tank	26,738 Gallons	
Ethanol Truck Load-out	38,000 Gallons/hr	Flare or RTO
Ethanol Rail Load-out	60,000 Gallons/hr	
3-Boilers	75.6 MMBtu/hr, Natural Gas	None
190-Proof Tank	185,068 Gallons	Internal Floating Roof
Denaturant Tank	63,452 Gallons	Internal Floating Roof
2- 200 Proof Tanks	185,068 Gallons each	
2- Denatured Ethanol Tanks	619,573 Gallons each	
Cooling Towers		None
Ammonia Tank	33,886 Gallons	None
Sulfuric Acid Tank	10,557 Gallons	None
Fire Pump Engine	Diesel Fuel 288BHP	None

Emissions Inventories

Ambient Air Quality Impact Analyses

No air modeling was required for this permitting action because this permitting action did not trigger any emission increases requiring modeling.

REGULATORY ANALYSIS

The following sections were copied from the permitting action regarding P-209-0124 project 60885.

Attainment Designation (40 CFR 81.313)

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

Facility Classification

"Synthetic Minor" classification for criteria pollutants is defined as the uncontrolled Potential to Emit for criteria pollutants are above the applicable major source thresholds and the Potential to Emit for criteria pollutants fall below the applicable major source thresholds. Therefore, the following table compares the uncontrolled Potential to Emit and the Potential to Emit for criteria pollutants to the Major Source thresholds to determine if the facility will be "Synthetic Minor."

Table 2 UNCONTROLLED PTE AND PTE FOR REGULATED AIR POLLUTANTS COMPARED TO THE MAJOR SOURCE THRESHOLDS

Pollutant	Uncontrolled PTE (T/yr)	PTE (T/yr)	Major Source Thresholds (T/yr)	AIRS/AFS Classification	Exceed Major Threshold
PM	> 100	7.98	100	SM	Yes
$PM_{10}/PM_{2.5}$	Unknown	7.98	100	C	No
SO_2	0.6	0.6	100	B	No
NO_x	53.6	53.6	100	B	No
CO	39.2	39.2	100	B	No
VOC	1,522	37.5	100	SM	No
CO_2e	122,591	99,500	100,000	SM80	No
HAP (single)	Unknown	8.8	10	C	C
HAP (Total)	Unknown	15	25	C	C

Permit to Construct (IDAPA 58.01.01.201)

IDAPA 58.01.01.201 .....Permit to Construct Required

The permittee has requested that a PTC be issued to the facility for the increase in ethanol production from 60 million gallons per year to 63 million gallons per year and add the option for the addition of a flare to control emissions from ethanol loadout operations. Also the facility requested TRACT emissions limits for formaldehyde and acetaldehyde. Therefore, a permit to construct is required to be issued in accordance with IDAPA 58.01.01.220. This permitting action was processed in accordance with the procedures of IDAPA 58.01.01.200-228.

Tier II Operating Permit (IDAPA 58.01.01.401)

IDAPA 58.01.01.401 ..... Tier II Operating Permit

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

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

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

Post project facility-wide emissions from this facility do not have a potential to emit greater than 100 tons per year for (PM_{10}, $PM_{2.5}$, SO2, NOx, CO, VOC) or 10 tons per year for any one HAP or 25 tons per year for all HAP combined as demonstrated previously in the Emissions Inventories Section of this analysis. Also greenhouse gas emissions are less 100,000 tons per year. Therefore, the facility is not a Tier I source in accordance with IDAPA 58.01.01.008.10 and the requirements of IDAPA 58.01.01.301 do not apply.

At that time of this permit modification Pacific Ethanol is requesting to limit the potential to emit greenhouse gases below the 100,000 ton per year major facility threshold and to remain a minor facility for all other regulated air pollutants. Therefore, the permitted facility will not be a major stationary source and a major modification PSD applicability analysis is not required[1].

PSD Classification (40 CFR 52.21)

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

The facility is classified as a non-existing major stationary source because the emissions of greenhouse gasses have the potential do not exceed 250 tons per year on a mass basis or 100,000 tons per year on a carbon dioxide equivalent basis. The facility is not a designated facility[2] as defined in 40 CFR 52.21(b)(1)(i)(a). All other new source review regulated air pollutants have the potential to be emitted less than the 250 ton per year major facility threshold.

Therefore, the permitted facility will not be a major stationary source and a major modification PSD applicability analysis is not required[3]

Demonstration of Preconstruction Compliance with Toxic Standards (IDAPA 58.01.01.210)

IDAPA 58.01.01.210.10.12, 13 & 14 T-RACT

In accordance with IDAPA 58.01.01.210.12 if the applicant proposes to use toxic reasonably available control technology (T-RACT) ambient impacts of carcinogens listed in IDAPA 58.01.01.586 may be emitted at a rate that causes ambient impacts to be up to 10 times the acceptable ambient concentration listed in Section 586.

In accordance with Section 210.14 the Department is to determine if T-RACT has been proposed as follows:

a. The applicant shall submit information to the Department identifying and documenting which control technologies or other requirements the applicant believes to be T-RACT.

b. The Department shall review the information submitted by the applicant and determine whether the applicant has proposed T-RACT.

c. The technological feasibility of a control technology or other requirements for a particular source

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1) US EPA, Region IV, July 31, 1981 – Policy Determinations Regarding PSD Questions (see Question #8 – "Since the source will not be major after the change, the action is not subject to PSD").
2) Ethanol production facilities are not designated sources -Federal Register / Vol. 72, No. 83 / Tuesday, May 1, 2007/ 24061
3) US EPA, Region IV, July 31, 1981 – Policy Determinations Regarding PSD Questions (see Question #8 – "Since the source will not be major after the change, the action is not subject to PSD").

shall be determined considering several factors including, but not limited to:

i. Process and operating procedures, raw materials and physical plant layout.

ii. The environmental impacts caused by the control technology that cannot be mitigated, including, but not limited to, water pollution and the production of solid wastes.

iii. The energy requirements of the control technology.

d. The economic feasibility of a control technology or other requirement, including the costs of necessary mitigation measures, for a particular source shall be determined considering several factors including, but not limited to:

i. Capital costs.

ii. Cost effectiveness, which is the annualized cost of the control technology divided by the amount of emission reduction.

iii. The difference in costs between the particular source and other similar sources, if any, that have implemented emissions reductions.

Pacific Ethanol reviewed reasonably available control technologies for controlling formaldehyde and acetaldehyde emissions from fermentation processes, distillation processes, natural gas combustion sources, and wetcake storage. Pacific Ethanol reviewed the technical and economic feasibility of using:

- flares,
- condensors
- carbon adsorption,
- wet scrubbers (with and without additives),
- catalytic oxidizers;
- and thermal oxidizers.

DEQ has reviewed and approved Pacific Ethanol's T-RACT proposal. The details of the proposal may be seen in the June 23, 2011 application. A summary of the proposal is provided below.

Fermentation & Distillation Processes

Pacific Ethanol rated aldehyde control efficiency from the most efficient control to the least effective control for fermentation processes and the distillation processes. If the applicant has proposed the most efficient control option T-RACT has been satisfied. If the most efficient option is not chosen it must be eliminated based on technical or economic reasons.

Table x. Aldehyde Control Options for the Fermentation Process

Technology	Aldehyde Control Efficiency (%)
Wet Scrubber, Chemical Additive & Oxidation	99.6
Wet Scrubber & Oxidation	99.0
Catalytic Oxidation	98
Thermal Oxidation	98
Flaring	98
Refrigeration Condenser	90
Wet Scrubber and Chemical Additive	90
Wet Scrubber	35

As can be seen in the table the wet scrubber, chemical additive and oxidation control technology option provided the greatest control for aldehydes from the fermentation and distillation processes. However, Pacific Ethanol proposed the second highest performing control technology as T-RACT. Pacific Ethanol described that to achieve the 0.6% increase from the second highest performing technology to the highest performing technology the chemical additive cost would be $14,247 per ton of aldehyde removal. This cost does not include, labor, electricity, or equipment costs. DEQ agrees that the additional cost of at least $14,247 per ton of aldehyde removal is not reasonable. DEQ accepts Pacific Ethanol's proposal for T-RACT, which is the second highest performing option (Wet Scrubber and Oxidation). RTO T-RACT emissions rate limits are 0.76 pounds per hour for formaldehyde and 2.01 pounds per hour for acetaldehyde. These emission limits cause ambient concentrations that acceptable in accordance with IDAPA 58.01.01.210.12 as determined through air pollution dispersion modeling.

Natural Gas Combustion Sources

Pacific Ethanol has proposed good combustion practices as T-RACT for aldehyde emissions from the natural gas combustion sources. DEQ accepts Pacific Ethanol's proposal for T-RACT. Aldehyde emissions from the natural gas combustion processes results from incomplete combustion. If good combustion practices are employed aldehyde emissions will be reduced.

Wetcake

Aldehyde emissions from wetcake occur from within a building. Controlling emissions from wetcake storage would entail installing a duct system to route the emissions to an existing control device or require the construction of a new control device. Pacific Ethanol estimated that would cost would be >$500,000 dollars per ton of aledehyde controlled. DEQ agrees that this is an unreasonable cost, and that no control on aldehyde emissions from wetcake storage satisfies T-RACT requirements.

Loadout Flare

Pacific Ethanol has requested the option to install a flare to control VOC emissions from ethanol loadout or to use the RTO to control emissions as currently permitted. Pacific Ethanol estimated formaldehyde emissions from the modification of the facility to add the flare, these emissions were determined to be 7.35E-5 lb/hr and they were included in the facility-wide model.

Pacific Ethanol has shown compliance with toxic standard through air pollutant dispersion modeling by either combusting the VOCs from loadout in either the flare or RTO. If loadout emissions are routed to the RTO instead of the flare, as they currently are, the proposed allowable emission rates from the RTO are the same whether the loadout emissions are routed to the RTO or not. The permit has been written to allow the option of combusting the VOCs from loadout at either the flare or the RTO.

NSPS & NESHAP Applicability (40 CFR 60, 40 CFR 61 & 40 CFR 63)

Copied from statement of Basis from project 60855.

Pacific Ethanol's proposed modifications do not involve any emissions units affected by NSPS or NESHAP. Pacific Ethanol has proposed to add a flare to control VOC emissions from truck and railcar loadout and to increase ethanol production capacity from 60 million gallons per year to 63 million gallons per year.

However, as part of this permit action DEQ reviewed all NSPSs and NESHAPs to determine if any of the existing permitted units are affected by a regulation that is not included in the permit.

40 CFR 63 Subpart JJJJJJ Industrial, Commercial, and Institutional Boilers – Area Sources

On March 21, 2011 EPA promulgated NESHAPs for boilers at area sources of HAP emissions. Area sources are source that are not major for HAP. Pacific Ethanol is an area source of HAP. However, Pacific Ethanol only combusts natural gas in the boilers and therefore is not affected by this NESHAP. In accordance with 40 CFR 63.11195 (e)(*Are any boilers not subject to this subpart?*) a gas-fired boiler as defined in this subpart.

Gas-fired boiler includes any boiler that burns gaseous fuels not combined with any solid fuels and burns liquid fuel only during periods of gas curtailment, gas supply interruption, startups, or periodic testing on liquid fuel. Periodic testing of liquid fuel shall not exceed a combined total of 48 hours during any calendar year

40 CFR 60 Subpart IIII Stationary Compression Ignition Internal Combustion Engines

§ 60.4200 Am I subject to this subpart?

The fire pump engine is an affected emissions unit in accordance with §60.4200(a)(2)(ii). The engine was constructed after July 11, 2005 and was manufactured as a certified National Fire Protection Association (NFPA) fire pump engine after July 1, 2006

§ 60.4201, § 60.4202 & § 60.4203 Are all Standards for Manufacturers and do not apply to Pacific Ethanol.

§ 60.4204 What emission standards must I meet for non-emergency engines if I am an owner or operator of a stationary CI internal combustion engine?

The fire pump engine is an emergency engine as defined by § 60.4219 because it is "used to pump water in the case of fire", therefore the provisions of this section do not apply.

§ 60.4205 What emission standards must I meet for emergency engines if I am an owner or operator of a stationary CI internal combustion engine?

In accordance with § 60.4205(c), "Owners and operators of fire pump engines with a displacement of less than 30 liters per cylinder must comply with the emission standards in table 4 to this subpart, for all pollutants." The applicable standards of table 4 are summarized in the following table.

Maximum engine power	Model year	NMHC + NO_x (g/HPhr)	CO (g/HPhr)	PM (g/HPhr)
75<HP<300	2008 and earlier	7.8	2.6	0.40

§ 60.4206 *How long must I meet the emission standards if I am an owner or operator* ?

The fire pump shall comply with § 60.4205 over the entire life of the engine.

§ 60.4207 What fuel requirements must I meet if I am an owner or operator of a stationary CI internal combustion engine subject to this subpart?

(a) Beginning October 1, 2007, owners and operators of stationary CI ICE subject to this subpart that use diesel fuel must use diesel fuel that meets the requirements of 40 CFR 80.510(a).

This provision is superseded by the following provision that became applicable October 1, 2010.

(b) Beginning October 1, 2010, owners and operators of stationary CI ICE subject to this subpart with a displacement of less than 30 liters per cylinder that use diesel fuel must purchase diesel fuel that meets the requirements of 40 CFR 80.510(b) for nonroad diesel fuel.

40 CFR 80.510(b):

"diesel fuel is subject to the following per-gallon standards":

(1) Sulfur content 15 ppm maximum.

(2) Cetane index or aromatic content, as follows:

(i) A minimum cetane index of 40; or
(ii) A maximum aromatic content of 35 volume percent.

(c) [Reserved]

(d) Beginning June 1, 2012owners and operators of stationary CI ICE subject to this subpart with a displacement of greater than or equal to 30 liters per cylinder are no longer subject to the requirements of paragraph (a) of this section, and must use fuel that meets a maximum per-gallon sulfur content of 1,000 parts per million (ppm). The fire pump engine has a displacement of less than 30 liters.

(e) Stationary CI ICE that have a national security exemption under §60.4200(d) are also exempt from the fuel requirements in this section. Pacific Ethanol has not pursued this exemption.

§ 60.4208 What is the deadline for importing or installing stationary CI ICE produced in previous model years?

Pacific Ethanol has not proposed to import or install a engine after any of the dates specified in this section.

§ 60.4209 What are the monitoring requirements if I am an owner or operator of a stationary CI internal combustion engine?

If you are an owner or operator, you must meet the monitoring requirements of this section. In addition, you must also meet the monitoring requirements specified in §60.4211.

(a) If you are an owner or operator of an emergency stationary CI internal combustion engine that does not meet the standards applicable to non-emergency engines, you must install a non-resettable hour meter prior to startup of the engine.

Pacific Ethanol has specified in the application that they are applicable to this monitoring provision.

(b) If you are an owner or operator of a stationary CI internal combustion engine equipped with a diesel particulate filter to comply with the emission standards in §60.4204, the diesel particulate filter must be installed with a backpressure monitor that notifies the owner or operator when the high backpressure limit of the engine is approached.

Pacific Ethanol's engine is not equipped with a particulate filter.

§ 60.4210 What are my compliance requirements if I am a stationary CI internal combustion engine manufacturer?

Pacific Ethanol is not a manufacturer and this provision does not apply.

§ 60.4211 What are my compliance requirements if I am an owner or operator of a stationary CI internal combustion engine?

If you are an owner or operator and must comply with the emission standards specified in this *subpart, you must do all of the following, except as permitted under paragraph (g) of this section:*

(1) Operate and maintain the stationary CI internal combustion engine and control device according to the manufacturer's emission-related written instructions;
(2) Change only those emission-related settings that are permitted by the manufacturer; and
(3) Meet the requirements of 40 CFR parts 89, 94 and/or 1068, as they apply to you.

The fire pump engine is applicable to emissions standards of this subpart and must comply with all of the above.

(b) *If you are an owner or operator of a pre-2007 model year stationary CI internal combustion engine and must comply with the emission standards specified in 60.4204(a) or 60.4205(a), or if you are an owner or operator of a CI fire pump engine that is manufactured prior to the model years in table 3 to*

this subpart and must comply with the emission standards specified in § 60.4205(c), you must demonstrate compliance according to one of the methods specified in paragraphs (b)(1) through (5) of this section.

Pacific Ethanol's fire water pump was manufactured prior to the dates specified in table 3 and has chosen to comply using (1) as listed below.

(1) Purchasing an engine certified according to 40 CFR part 89 or 40 CFR part 94, as applicable, for the same model year and maximum engine power. The engine must be installed and configured according to the manufacturer's specifications.

(c) *If you are an owner or operator of a 2007 model year and later stationary CI internal combustion engine and must comply with the emission standards specified in 60.4204(b) or 60.4205(b), or if you are an owner or operator of a CI fire pump engine that is manufactured during or after the model year that applies to your fire pump engine power rating in table 3 to this subpart and must comply with the emission standards specified in §60.4205(c), you must comply by purchasing an engine certified to the emission standards in §60.4204(b), or §60.4205(b) or (c), as applicable, for the same model year and maximum (or in the case of fire pumps, NFPA nameplate) engine power. The engine must be installed and configured according to the manufacturer's emission-related specifications, except as permitted in paragraph (g) of this section.*

Pacific Ethanol's fire pump engine is a 2007 model year but does not have to comply with standards specified in 60.4204(b) or 60.4205(b), nor was the pump engine manufactured during or after the model year that applies as listed in table 3. Therefore, this section does not apply to the engine.

(d) *If you are an owner or operator and must comply with the emission standards specified in §60.4204(c) or §60.4205(d), you must demonstrate compliance according to the requirements specified in paragraphs (d)(1) through (3) of this section.*

Pacific Ethanol's pump engine does not need to comply with emission standards specified in §60.4204(c) or §60.4205(d), therefore this section does not apply.

(e) *If you are an owner or operator of a modified or reconstructed stationary CI internal combustion engine and must comply with the emission standards specified in §60.4204(e) or §60.4205(f), you must demonstrate compliance according to one of the methods specified in paragraphs (e)(1) or (2) of this section.*

Pacific Ethanol is not proposing to modify or reconstruct an engine. Therefore, this section does not apply.

(f) *Emergency stationary ICE may be operated for the purpose of maintenance checks and readiness testing, provided that the tests are recommended by Federal, State or local government, the manufacturer, the vendor, or the insurance company associated with the engine. Maintenance checks and readiness testing of such units is limited to 100 hours per year. There is no time limit on the use of emergency stationary ICE in emergency situations. The owner or operator may petition the Administrator for approval of additional hours to be used for maintenance checks and readiness testing, but a petition is not required if the owner or operator maintains records indicating that Federal, State, or local standards require maintenance and testing of emergency ICE beyond 100 hours per year. Emergency stationary ICE may operate up to 50 hours per year in non-emergency situations, but those 50 hours are counted towards the 100 hours per year provided for maintenance and testing. The 50 hours per year for non-emergency situations cannot be used for peak shaving or to generate income for a facility to supply power to an electric grid or otherwise supply non-emergency power as part of a financial arrangement with another entity. For owners and operators of emergency engines, any operation other than emergency operation, maintenance and testing, and operation in non-emergency situations for 50 hours per year, as permitted in this section, is prohibited.*

This provision applies to Pacific Ethanol and is included in the permit.

(g) If you do not install, configure, operate, and maintain your engine and control device according to the manufacturer's emission-related written instructions, or you change emission-related settings in a way that is not permitted by the manufacturer, you must demonstrate compliance as follows:

Pacific ethanol has indicated that they plan install, configure, operate, and maintain your engine and control device according to the manufacturer's emission-related written instructions. This section would only apply if they did not follow the written instructions.

§ 60.4212 What test methods and other procedures must I use if I am an owner or operator of a stationary CI internal combustion engine with a displacement of less than 30 liters per cylinder?

Pacific Ethanol is going to comply with the emissions standards of § 60.4205(c) by purchasing an engine certified to the standards and installing and configuring according to the manufacturer's specifications. Therefore testing is not required.

§ 60.4214 What are my notification, reporting, and recordkeeping requirements if I am an owner or operator of a stationary CI internal combustion engine?

(a) Owners and operators of non-emergency stationary CI ICE that are greater than 2,237 KW (3,000 HP), or have a displacement of greater than or equal to 10 liters per cylinder, or are pre-2007 model year engines that are greater than 130 KW (175 HP) and not certified, must meet the requirements of paragraphs (a)(1) and (2) of this section.

The fire pump engine does not meet any of these criteria; therefore this section does not apply.

(b) If the stationary CI internal combustion engine is an emergency stationary internal combustion engine, the owner or operator is not required to submit an initial notification. Starting with the model years in table 5 to this subpart, if the emergency engine does not meet the standards applicable to nonemergency engines in the applicable model year, the owner or operator must keep records of the operation of the engine in emergency and non-emergency service that are recorded through the nonresettable hour meter. The owner must record the time of operation of the engine and the reason the engine was in operation during that time.

The fire pump engine is an emergency engine, Pacific Ethanol is not required to submit an initial notification. The pump engine is not of a model year listed in table 5 and records are not required to be kept on the operation of the engine.

40 CFR 63 Subpart ZZZZ Stationary Reciprocating Internal Combustion Engines

The fire pump engine is applicable to this subpart because it is internal combustion engine which uses reciprocating motion to convert heat energy into mechanical work and which is not mobile - 40 CFR 63.6585(a). However, in accordance with 40 CFR 63.6590(c) an affected source meet the requirements of this part by meeting the requirements of 40 CFR part 60 subpart IIII; no further requirements apply for such engines under this part. The requirements of 40 CFR part 60 subpart IIII are now included in the permit

Permit Conditions Review

This section describes the permit conditions for this initial permit or only those permit conditions that have been added, revised, modified or deleted as a result of this permitting action.

Existing Permit Condition 20

Ethanol Production Limits

The permittee shall not produce more than 63 million gallons of undenatured ethanol and 66 million gallons of denatured ethanol per any consecutive 12-month period.

Revised Permit Condition 3.5

Ethanol Production Limits

The permittee shall not produce more than 70 million gallons of undenatured ethanol and 73.57 million gallons of denatured ethanol per any consecutive 12-month period.

This permit condition was revised to allow the facility's increased production capacity. Pacific Ethanol has changed a process that allows a higher degree of undenatured ethanol extraction. This process and higher production did not require any addition throughput changes and reduced the emissions of formaldehyde and acetaldehyde.

All other permit conditions from permit P-2009.0124 project 60885 remained the same only a numbering change.

Prior Permit Condition 7 is now Permit Condition 2.3.

Prior Permit Condition 8 is now Permit Condition 2.4.

Prior Permit Condition 9 is now Permit Condition 2.5.

Prior Permit Condition 10 is now Permit Condition 2.6.

Prior Permit Condition 11 is now Permit Condition 2.7.

Prior Permit Condition 12 is now Permit Condition 2.8.

Prior Permit Condition 13 is now Permit Condition 2.9.

Prior Permit Condition 14 is now Permit Condition 2.10.

Prior Permit Condition 15 is now Permit Condition 2.11.

Prior Permit Condition 18 is now Permit Condition 3.3.

Prior Permit Condition 19 is now Permit Condition 3.4.

Prior Permit Condition 20 is now Permit Condition 3.5.

Prior Permit Condition 21 is now Permit Condition 3.6.

Prior Permit Condition 22 is now Permit Condition 3.7.

Prior Permit Condition 23 is now Permit Condition 3.8.

Prior Permit Condition 24 is now Permit Condition 3.9.

Prior Permit Condition 25 is now Permit Condition 3.10.

Prior Permit Condition 26 is now Permit Condition 3.11.

Prior Permit Condition 27 is now Permit Condition 3.12.

Prior Permit Condition 28 is now Permit Condition 3.13.

The new Permit Condition had the following paragraph removed, "Within 90 days of permit issuance, the permittee shall conduct performance test to demonstrate compliance with the pound per hour formaldehyde, acetaldehyde and VOC emission rate limits" because the source test has been performed and the paragraph is considered obsolete for this permitting action.

Prior Permit Condition 29 is now Permit Condition 3.14.

Prior Permit Condition 31 is now Permit Condition 4.2.

Prior Permit Condition 32 is now Permit Condition 4.3.

Prior Permit Condition 33 is now Permit Condition 4.4.

Prior Permit Condition 34 is now Permit Condition 4.5.

Prior Permit Condition 35 is now Permit Condition 5.1.

Prior Permit Condition 36 is now Permit Condition 5.2.

Prior Permit Condition 37 is now Permit Condition 5.3.

Prior Permit Condition 37.1 is now Permit Condition 5.3.1.

Prior Permit Condition 37.2 is now Permit Condition 5.3.2.

Prior Permit Condition 37.3 is now Permit Condition 5.3.3.

Prior Permit Condition 37.4 is now Permit Condition 5.3.4.

Prior Permit Condition 37.5 is now Permit Condition 5.3.5.

Prior Permit Condition 38 is now Permit Condition 5.4.

Prior Permit Condition 39 is now Permit Condition 5.5.

Prior Permit Condition 41 is now Permit Condition 6.2.

Prior Permit Condition 42 is now Permit Condition 6.3.

Prior Permit Condition 43 is now Permit Condition 6.4.

Prior Permit Condition 44 is now Permit Condition 6.5.

Prior Permit Condition 46 is now Permit Condition 7.2.

Prior Permit Condition 47 is now Permit Condition 7.3.

Prior Permit Condition 48 is now Permit Condition 7.4.

Prior Permit Condition 49 is now Permit Condition 7.5.

Prior Permit Condition 50 is now Permit Condition 7.6.

Prior Permit Condition 51 is now Permit Condition 7.7.

Prior Permit Condition 52 is now Permit Condition 7.8.

Prior Permit Condition 53 is now Permit Condition 7.9.

Prior Permit Condition 54 is now Permit Condition 7.10.

Prior Permit Condition 56 is now Permit Condition 8.2.

Prior Permit Condition 57 is now Permit Condition 8.3.

Prior Permit Condition 58 is now Permit Condition 8.4.

Prior Permit Condition 59 is now Permit Condition 8.5.

Prior Permit Condition 60 is now Permit Condition 9.1.

PUBLIC REVIEW

Public Comment Opportunity

An opportunity for public comment period on the application was provided in accordance with IDAPA 58.01.01.209.01.c or IDAPA 58.01.01.404.01.c. During this time, there were no comments on the application and there was not a request for a public comment period on DEQ's proposed action. Refer to the chronology for public comment opportunity dates.

APPENDIX A – EMISSIONS INVENTORIES

'Potential to Emit" Emission Calculations Summary:

Pacific Ethanol Magic Valley, Idaho

'0MM gallons/ year Ethanol — 660,674 tons/yr grain

'3.57MM gallons/year Denatured Ethanol — 0 tons/yr DDGS

741,969 tons/yr WDGS

Stack ID	Emission Source(s)	PM (tpy)	PM10 (tpy)	PM2.5 (tpy)	SO2 (tpy)	NOx (tpy)	CO (tpy)	VOC (tpy)	HAP (tpy)	CO_2e (tpy)
SV01	Corn Receiving Baghouse	3.75	3.75	3.75	--	--	--	--	--	--
SV02	Corn Handling Baghouse	1.88	1.88	1.88	--	--	--	--	--	--
SV06	Hammermilling Baghouse	1.69	1.69	1.69	--	--	--	--	--	--
SV09	Boiler #1	2.47	2.47	2.47	0.19	16.56	10.91	1.78	0.61	
SV10	Boiler #2	2.47	2.47	2.47	0.19	16.56	10.91	1.78	0.61	99,454.00
SV11	Boiler #3	2.47	2.47	2.47	0.19	16.56	10.91	1.78	0.61	
SV12	RTO[1]	0.20	0.20	0.20	0.02	1.31	2.25	26.00	12.49	
SV13	Truck Loadout Flare	0.00	0.00	0.00	0.00	1.95	10.41	1.46	--	
	Product Loadout[2]	--	--	--	--	--	--	4.76	1.52	--
TK01-06	Storage Tanks	--	--	--	--	--	--	2.63	0.27	--
FS01	Paved Roads	10.67	2.13	0.52	--	--	--	--	--	--
FS02	Grain Receiving Fugitives	6.44	1.43	1.43	--	--	--	--	--	--
FS03	Wetcake Storage/Loadout	--	--	--	--	--	--	3.22	0.14	--
FS04	Equipment Leaks	--	--	--	--	--	--	3.93	1.92	--
FS05	Cooling Tower	3.28	3.28	3.28	--	--	--	--	--	--
FS06	Grain Loadout	1.15	0.26	0.26	--	--	--	--	--	--
FWP	Fire Water Pump	0.03	0.03	0.03	0.03	0.13	0.10	0.040	--	6.00
COES	Corn Oil Extraction System	--	--	--	--	--	--	0.54	--	--
'otals, Plantwide		**36.50**	**22.07**	**20.46**	**0.63**	**53.06**	**45.49**	**47.94**	**18.17**	**99,500.00**

NOTES:

[1]RTO controls emissions from fermentation (including scrubber) and distillation.

[2]Facility ships denatured ethanol by both truck and rail; however, assumed all loaded out by truck to demonstrate worst-case emissions.

The facility has the ability to supplement corn with sugar as a feedstock to the fermentation process. Supplementing can occur at appoximately 600,000 lbs of sugar per day. No change in emissions result from this process.

The facility is installing Selective Milling Technology™ (SMT™) which does not result in any emission increase and is considered exempt from obtaining a construction permit.

Hazardous Air Pollutant Emissions Summary

See Workbook for details of emission calculations

Compound	Boilers	RTO	Product Loadout	Fugitive Comps.	Storage Tanks	Wetcake Storage/ Loadout	TOTAL
	(tpy)	(tpy)	(tpy)	(tpy)	(tpy)	(tpy)	(tpy)
Acrolein	--	0.13	0.0005	0.2756	0.0002	0.0051	**0.41**
Formaldehyde	0.07	3.33	0.0005	0.2672	0.0002	0.0618	**3.73**
Acetaldehyde	--	8.80	0.0010	0.57	0.0003	0.0309	**9.41**
Methanol	--	0.18	0.0010	0.30	0.0003	0.0386	**0.51**
Hexane	1.75	0.05	1.0085	0.3423	0.18	--	**3.33**
Toluene	3.31E-03	8.76E-05	--	--	--	--	**0.00**
Benzene	2.05E-03	5.41E-05	0.5043	0.1712	0.09	--	**0.77**
Nickel	2.05E-03	5.41E-05	--	--	--	--	**2.10E-03**
Chromium	1.36E-03	3.61E-05	--	--	--	--	**1.40E-03**
Dichlorobenzene	1.17E-03	3.09E-05	--	--	--	--	**1.20E-03**
Cadmium	1.07E-03	2.83E-05	--	--	--	--	**1.10E-03**
Naphthalene	5.94E-04	1.57E-05	--	--	--	--	**6.10E-04**
Manganese	3.70E-04	9.79E-06	--	--	--	--	**3.80E-04**
Mercury	2.53E-04	6.70E-06	--	--	--	--	**2.60E-04**
Arsenic	1.95E-04	5.15E-06	--	--	--	--	**2.00E-04**
Cobalt	8.18E-05	2.16E-06	--	--	--	--	**8.40E-05**
2-Methylnaphthalene	2.34E-05	6.18E-07	--	--	--	--	**2.40E-05**
Phenanthrene	1.66E-05	4.38E-07	--	--	--	--	**1.70E-05**
Pyrene	4.87E-06	1.29E-07	--	--	--	--	**5.00E-06**
Fluoranthene	2.92E-06	7.73E-08	--	--	--	--	**3.00E-06**
Fluorene	2.73E-06	7.21E-08	--	--	--	--	**2.80E-06**
Totals	*1.84*	*12.49*	*1.52*	*1.92*	*0.27*	0.136	
							18.17

Pacific Ethanol Magic Valley, LLC
Permit Modification Calculations

Wetcake Storage Emissions

Basis: Emission factors based on November 2, 2004 test data from a wetcake storage building at DENCO, LLC in Morris, MN.

Wetcake Production: 84.7 ton/hr
Total Wetcake: 741,969 tons/year

Pollutant	DENCO results[1] (lb/hr)	Emission Factor (lb/ton wetcake)	Scaled Emission Factor[2] (lb/ton wetcake)	Potential Emissions (lb/hr)	Potential Emission (tpy)
HAPs					
Acetaldehyde	0.001	5.56E-05	8.34E-05	7.06E-03	0.03
Acrolein	0.00017	9.17E-06	1.38E-05	1.17E-03	0.01
Formaldehyde	0.002	1.11E-04	1.67E-04	1.41E-02	0.06
Methanol	0.00125	6.94E-05	1.04E-04	8.82E-03	0.04
Non-HAPs					
Acetic Acid	0.08	4.44E-03	6.66E-03	5.64E-01	2.47
Ethanol	0.02	1.11E-03	1.67E-03	1.41E-01	0.62
VOC Total	0.10442	5.80E-03	8.69E-03	7.36E-01	**3.22**
HAPs of Interest Total					**0.14**

NOTES:

[1] For HAP results, used 1/2 the detection limit as results were non-detect.

[2] Factor is scaled based on tested facility production rate compared to facility production rate for conservatism.

Grain Handling Emissions:

Basis: Grain Handling/Storage is closed system

Emissions based on AP-42 Particulate Emission Factors for Grain Elevators

PM/PM10/PM2.5 Emissions:

ID	Emission Source	Baghouse Airflow (acfm)	Emission Factor (gr/scf)	Hours of Operation (hrs/yr)	Controlled PM Emissions (lbs/hr)	Controlled PM/ PM10/ PM2.5 Emissions (tons/yr)
SV01	Corn Receiving Baghouse	20,000	0.005	8,760	0.86	3.75
SV02	Corn Handling Baghouse	10,000	0.005	8,760	0.43	1.88
SV06	Hammermilling Baghouse	9,000	0.005	8,760	0.39	1.69
					Total:	7.32

Grain Handling Fugitive Emissions:

PM Emissions:

ID	Emission Source	Throughput (tons/hour)	Emission Factor (lb/ton)	Potential to Emit (lb/hr)	Potential PM Emissions (tons/yr)
FS02	Grain Receiving Fugitives	42	0.035	1.47	6.44
FS06	Grain Loadout	8	0.035	0.26	1.15
				Total:	7.59

PM10 Emissions:

ID	Emission Source	Throughput (tons/hour)	Emission Factor (lb/ton)	Potential to Emit (lb/hr)	Potential PM10 Emissions (tons/yr)
FS02	Fugitives Receiving	42	0.0078	0.33	1.43
FS06	Grain Loadout	8	0.0078	0.06	0.26
				Total:	1.69

PM-2.5 Emissions:

ID	Emission Source	Throughput (tons/hour)	Emission Factor (lb/ton)	Potential to Emit (lb/hr)	Potential PM-2.5 Emissions (tons/yr)
FS02	Fugitives Receiving	42	0.0078	0.33	1.43
FS06	Grain Loadout	8	0.0078	0.06	0.26
				Total:	1.69

Notes:

1. Fugitives are a result of uncaptured PM/PM10
2. Assumes ethanol plant will receive and store grain in their grain storage silos
3. Assumes storage bin vents are not included with the headhouse/internal handling emissions
4. Assumes addition control of fugitives by choked flow system (~95%)

Emissions from Boiler

Criteria emissions from combustion of natural gas at Boiler							
Basis:	SO2, VOC, PM, PM10, PM2.5 & HAP emission factors based on AP-42, Section 1.4. NOx and CO emission factors based on manufacturer factors. Unit assumed to operate maximum fuel input capacity Assumed operation time: 8,760 hours/year PTE based on 100% Natural Gas BTU content of natural gas: 1020 Btu/scf						
Unit	Fuel	Total MMBtu/hr	Pollutant	E Factors lb/MMBtu	E Factors Source	PTE lb/hr	PTE tpy
3 - 75.6 MMBtu/hr Boilers (SV09,SV10,SV11)	N Gas	226.8	NOx	0.05	manufacturer	11.34	49.67
			SO2	0.0006	AP-42	0.13	0.56
			CO	0.0329	manufacturer	7.47	32.73
			VOC	0.00539	AP-42	1.22	5.35
			PM/PM10/PM2.5	0.00745	AP-42	1.69	7.40
			Hexane	1.76E-03	AP-42	4.00E-01	1.75E+00
			Formaldehyde	7.35E-05	AP-42	1.67E-02	7.30E-02
			Toluene	3.33E-06	AP-42	7.56E-04	3.31E-03
			Benzene	2.06E-06	AP-42	4.67E-04	2.05E-03
			Nickel	2.06E-06	AP-42	4.67E-04	2.05E-03
			Chromium	1.37E-06	AP-42	3.11E-04	1.36E-03
			Dichlorobenzene	1.18E-06	AP-42	2.67E-04	1.17E-03
			Cadmium	1.08E-06	AP-42	2.45E-04	1.07E-03
			Naphthalene	5.98E-07	AP-42	1.36E-04	5.94E-04
			Manganese	3.73E-07	AP-42	8.45E-05	3.70E-04
			Mercury	2.55E-07	AP-42	5.78E-05	2.53E-04
			Arsenic	1.96E-07	AP-42	4.45E-05	1.95E-04
			Cobalt	8.24E-08	AP-42	1.87E-05	8.18E-05
			2-Methylnaphthalene	2.35E-08	AP-42	5.34E-06	2.34E-05
			Phenanthrene	1.67E-08	AP-42	3.78E-06	1.66E-05
			Pyrene	4.90E-09	AP-42	1.11E-06	4.87E-06
			Fluoranthene	2.94E-09	AP-42	6.67E-07	2.92E-06
			Fluorene	2.75E-09	AP-42	6.23E-07	2.73E-06
			Total HAPs				1.84E+00

GHG Emissions from Boiler

Total rate of boilers: 226.8 MMBtu/hr [Natural Gas Combustion]
Operating hours: 8,760 hrs/yr
Conversion Factor: 2.20462 lbs/kg

Boilers NG Combustion Emissions				
Pollutant	Emission Factor (kg/MMBtu)[1]	Emission Factor (lbs/MMBtu)[2]	Potential Hourly Emissions (lbs/hr)	Potential Annual Emissions (tons/yr)
GHGs				
CO_2	53.020	116.89	26,510.41	116,116
CH_4	0.0010	0.0022	0.500	2.19
N_2O	0.00010	0.00022	0.050	0.22
GHGs (mass basis)	53.021	116.891	26,510.954	116,118
CO_2e				116,296

NOTES:
[1]GHG Emissions are based on 40 CFR 98, Tables A-1, C-1 and C-2
[2]Conversions from Table A-2 to Subpart A of Part 98 - Units of Measure Conversion

Emissions from RTO

Criteria emissions from combustion of natural gas at RTO

Basis: SO2, PM, PM10, PM2.5 & most HAP emission factors based on AP-42, Section 1.4.
NOx and CO emission factors based on manufacturer factors.
VOC, acetaldehyde, acrolein, methanol & formaldehyde emission factors based on test data.
Unit assumed to operate maximum fuel input capacity
Assumed operation time: 8,760 hours/year
PTE based on 100% Natural Gas

BTU content of natural gas: 1020 Btu/scf

Unit	Fuel	Total MMBtu/hr	Pollutant	E Factors lb/MMBtu	E Factors Source	PTE lb/hr	PTE tpy
1 - 6.0 MMBtu/hr RTO (SV12)	N Gas	6	NOx	0.05	manufacturer	0.30	1.31
			SO2	0.0006	AP-42	0.00	0.02
			CO	0.08568	AP-42	0.51	2.25
			VOC		Test Data	5.94	26.00
			PM/PM10/PM2.5	0.00775	AP-42	0.05	0.20
			Acetaldehyde		Test Data	2.01	8.80
			Acrolein		Test Data	0.03	0.13
			Methanol		Test Data	0.04	0.18
			Hexane	1.76E-03	AP-42	1.06E-02	4.64E-02
			Formaldehyde		Test Data	7.60E-01	3.33
			Toluene	3.33E-06	AP-42	2.00E-05	8.76E-05
			Benzene	2.06E-06	AP-42	1.24E-05	5.41E-05
			Nickel	2.06E-06	AP-42	1.24E-05	5.41E-05
			Chromium	1.37E-06	AP-42	8.24E-06	3.61E-05
			Dichlorobenzene	1.18E-06	AP-42	7.06E-06	3.09E-05
			Cadmium	1.08E-06	AP-42	6.47E-06	2.83E-05
			Naphthalene	5.98E-07	AP-42	3.59E-06	1.57E-05
			Manganese	3.73E-07	AP-42	2.24E-06	9.79E-06
			Mercury	2.55E-07	AP-42	1.53E-06	6.70E-06
			Arsenic	1.96E-07	AP-42	1.18E-06	5.15E-06
			Cobalt	8.24E-08	AP-42	4.94E-07	2.16E-06
			2-Methylnaphthalene	2.35E-08	AP-42	1.41E-07	6.18E-07
			Phenanthrene	1.67E-08	AP-42	1.00E-07	4.38E-07
			Pyrene	4.90E-09	AP-42	2.94E-08	1.29E-07
			Fluoranthene	2.94E-09	AP-42	1.76E-08	7.73E-08
			Fluorene	2.75E-09	AP-42	1.65E-08	7.21E-08
			Total HAPs:				12.49

GHG Emissions from RTO

Total rate of boilers: 6 MMBtu/hr (Natural Gas Combustion)
Operating hours: 8,760 hrs/yr
Conversion Factor: 2.20462 lbs/kg

Boilers NG Combustion Emissions

Pollutant	Emission Factor (kg/MMBtu)[1]	Emission Factor (lbs/MMBtu)[2]	Potential Hourly Emissions (lbs/hr)	Potential Annual Emissions (tons/yr)
GHGs				
CO_2	53.020	116.89	701.33	3,071
CH_4	0.0010	0.0022	0.013	0.06
N_2O	0.00010	0.00022	0.001	0.01
GHGs (mass basis)	53.021	116.891	701.348	3,072
CO_2e				3,075

NOTES:
[1]GHG Emissions are based on 40 CFR 98, Tables A-1, C-1 and C-2
[2]Conversions from Table A-2 to Subpart A of Part 98 - Units of Measure Conversion

Emissions from Cooling Tower:

Basis: Mass balance based on circulation rates, TDS, Drift Loss
Water density 8.34 lb/gal
Based on manufacturer's guarantee of 0.005% drift loss
All PM is assumed to be PM10, therefore PM = PM10
Non VOC biocide proposed, therefore no VOCs calculated

ID	Emission Source	Circulation rate (gal/hr)	TDS content (avg ppm)	Drift Loss (percent)	Operating hours (hrs/yr)	PM10/ PM2.5 PTE (tons/yr)	PM PTE (tons/yr)	VOC PTE (tons/yr)
FS05	Cooling Tower	900,000	2,000	0.005	8760	3.28	3.28	0.00

Note: any increase in average TDS beyond 2000 ppm will result in increased PM/PM10 emissions.

Paved Roads (PS01):

Basis: 100% of grain, DDGS, ethanol, denaturant goes in/out by truck
Grain density = 56 lb/bushel
The below is considered a worst case emission estimate assuming no rail service
Equation based on AP-42 Section 13.2.1 Paved Roads
lbs/VMT Equation: $E=k\,(sL)^{0.91}\,(W)^{1.02}$

particle size multiplier	k_{PM}	0.011	dimensionless
	k_{PM10}	0.0022	dimensionless
	$k_{PM2.5}$	0.00054	dimensionless
road surface silt loading	sL	0.6	g/m2

Emission Unit	Truck Full (tons)	Truck Empty (tons)	Average Truck (tons)	PM Emission Factor (lb/VMT)	PM 10 Emission Factor (lb/VMT)	PM2.5 Emission Factor (lb/VMT)	Total VMT	PM Emissions (tons/yr)	PM10 Emissions (tons/yr)	PM2.5 Emissions (tons/yr)
In plant paved roads	40.00	15.00	29.00	0.21	0.04	0.01	99,511	10.67	2.13	0.52

VMT Calculations	Load Size	Amount/yr		% by truck	# of Trips	VMT (miles)	Full	Empty
Denaturant	7500 gal	3,571,429	gal	100%	476	714	357	357
Denatured Ethanol	7500 gal	71,428,571	gal	100%	9,524	14,286	7,143	7,143
Grain	25 tons	660,674	tons	100%	26,427	39,640	19,820	19,820
Wet DGS	25 tons	741,969	tons	100%	29,679	44,518	22,259	22,259
Corn Oil	7500 gal	1,760,000	gal	100%	235	352	176	176
						99,511	49,755	49,755
							50.0%	50.0%

Weighted Vehicle Average	((Empty %)*(15)) + ((Full %)*(40))
Empty Vehicle	15 Tons
Full Vehicle	40 tons
	29 tons

Fugitive Emissions from Equipment Leaks (FE01)

Component breakdown for applicability purposes only as includes components in <10% VOC service.

Fermentation

Equipment	#	Leak Rate (lb/hr/source)	Uncontrolled VOC lb/hr	LDAR Control percent	Controlled VOC lb/hr	Max % Alcohol in stream	Controlled VOC lb/hr	Controlled VOC tpy
Light Liquid Valves	90	0.00403	0.799	84%	0.128	13%	0.017	0.07
Light Liquid Pumps	8	0.0199	0.253	67%	0.082	13%	0.011	0.05
Gas Valves	0	0.00597	0.000	67%	0.000	13%	0.000	0.00
Compressor Seals	0	0.228	0.000	75%	0.000	13%	0.000	0.00
Pressure Relief Valves (gas)	5	0.104	1.145	87%	0.149	13%	0.019	0.08
Sampling Connections	0	0.015	0.000	87%	0.000	13%	0.000	0.00
Open-ended lines	5	0.0017	0.019	84%	0.000	13%	0.000	0.00
Flanges (connectors)	186	0.00183	0.669	84%	0.107	13%	0.014	0.06
Total Fugitive Components	272						Controlled	0.27

Distillation

Equipment	#	Leak Rate (lb/hr/source)	Uncontrolled VOC lb/hr	LDAR Control percent	Controlled VOC lb/hr	Max % Alcohol in stream	Controlled VOC lb/hr	Controlled VOC tpy
Light Liquid Valves	21	0.00403	0.185	84%	0.031	82%	0.026	0.11
Light Liquid Pumps	7	0.0199	0.307	69%	0.095	82%	0.078	0.34
Gas Valves	45	0.00597	0.592	87%	0.077	82%	0.063	0.28
Compressor Seals	0	0.228	0.000	75%	0.000	82%	0.000	0.00
Pressure Relief Valves (gas)	7	0.104	1.604	87%	0.208	82%	0.171	0.75
Sampling Connections	0	0.015	0.000	87%	0.000	82%	0.000	0.00
Open-ended lines	15	0.0017	0.056	84%	0.009	82%	0.007	0.03
Flanges (connectors)	190	0.00183	0.764	84%	0.123	82%	0.100	0.44
Total Fugitive Components	286						Controlled	1.06

Tank Farm

Equipment	#	Leak Rate (lb/hr/source)	Uncontrolled VOC lb/hr	LDAR Control percent	Controlled VOC lb/hr	Max % Alcohol in stream	Controlled VOC lb/hr	Controlled VOC tpy
Light Liquid Valves	70	0.00403	0.621	84%	0.099	100%	0.099	0.44
Light Liquid Pumps	3	0.0199	0.218	69%	0.068	100%	0.068	0.30
Gas Valves	0	0.00597	0.000	67%	0.000	100%	0.000	0.00
Compressor Seals	0	0.228	0.000	75%	0.000	100%	0.000	0.00
Pressure Relief Valves (gas)	5	0.104	1.145	87%	0.149	100%	0.149	0.65
Sampling Connections	0	0.015	0.000	87%	0.000	100%	0.000	0.00
Open-ended lines	4	0.0017	0.022	84%	0.004	100%	0.004	0.02
Flanges (connectors)	110	0.00183	0.443	84%	0.071	100%	0.071	0.31
Total Fugitive Components	196						Controlled	1.71

TOTAL COMPONENT COUNT

Equipment	#
Light Liquid Valves	182
Light Liquid Pumps	18
Gas Valves	45
Compressor Seals	0
Pressure Relief Valves (gas)	17
Sampling Connections	0
Open-ended lines	26
Flanges (connectors)	466
Total Fugitive Components	754

Pollutant	Mass Fraction of VOC - Ferm/Dist.	Mass Fraction of VOC - Tank Farm
Formaldehyde	0.0004 59	0.0001
Acetaldehyde	0.155	0.0002
Methanol	0.015	0.0002
Acrolein	0.0045	0.0001
Hexane	--	0.1
Benzene	--	0.1

TOTAL ESTIMATED EMISSIONS

VOC	3.99	tons/yr
Formaldehyde	0.267	tons/yr
Acetaldehyde	0.561	tons/yr
Methanol	0.286	tons/yr
Acrolein	0.276	tons/yr
Benzene	0.171	tons/yr
Hexane	0.842	tons/yr
Total HAPs	2.82	tons/yr

VOC emissions from Product Loading (Truck/Rail)

Truck Loading Losses Truck -- Flared (controlled):

Loading Operations	Basis:	Calculated from AP-42, Section 5.2.2 - Loading Losses		
		Equation:	12.46*S*P*M/T	
		where:	S	1 Saturation factor (submerged)
From Tanks 4.09			P	4.1037 Vapor pressure (psia)
			M	66 Molar Mass (lb/lb-mole)
From Tanks 4.09, average temp			T	506.04 Product Temp (deg R)
		AP-42 Factor:		6.67 lb/1000 gal
Losses calculated using this factor multiplied by loading rates:				
Gasoline vapor emission rate (denatured ethanol loadout):				71,428,571 gal/yr
VOC Loading losses				476,348 lb/yr,uncontrolled
Controlled by flare				4.76 tpy, @ 98% red.

Rail Loading Losses (controlled):

Denatured Ethanol

Loading Operations	Basis:	Calculated from AP-42, Section 5.2.2 - Loading Losses		
		Equation:	12.46*S*P*M/T	
		where:	S	0.6 Saturation factor
From Tanks 4.09			P	0.5284 Vapor pressure (psia)
			M	50.0449 Molar Mass (lb/lb-mole)
			T	506.04 Product Temp (deg R)
		AP-42 Factor:		0.39 lb/1000 gal
Losses calculated using this factor multiplied by loading rates:				
Gasoline vapor emission rate (denatured ethanol loadout):				71,428,571 gal/yr
VOC Loading losses				27,905 lb/yr
Uncontrolled VOCs				13.95 tpy
Vapor recovery with flaring (98% destruction)				0.28 tpy

NOTE: Used emissions associated with truck loadout as it demonstrates worst-case emissions.

Product Loadout Flare Combustion Emissions

PM/PM-10 is negligible based on smokeless design
Pilot operated 8760 hrs/yr

Throughput:	6.4	MMBtu/hr	
Heating Value	850	Btu/scf	
Operating time	8760	hr/yr	
Pilot	0.1	MMBtu/hr	
Pilot Operating Time	8760	hr/yr	

Emission Factors (waste gas only)	NOx	0.068	lb/MMBtu	(AP-42, Table 13.5-1)
	CO	0.37	lb/MMBtu	(AP-42, Table 13.5-1)
	VOC	0.052	lb/MMBtu	(AP-42, Table 13.5-1&2, less methane and ethane)
	PM/PM10	negligible	smokeless design	
	SO2	negligible	negligible sulfur presence	
	HAP	negligible	due to negligible presence	

Flaring Emissions (8760hr/yr) (truck and rail time)	NOx	3812	lb/yr	1.91	ton/yr
	CO	20744	lb/yr	10.37	ton/yr
	VOC	2915	lb/yr	1.46	ton/yr

Pilot Emissions (8760hr/yr)	NOx	0.1	lb/MMBtu	(AP-42, Table 1.4)	0.04 tpy
	CO	0.084	lb/MMBtu	(AP-42, Table 1.4)	0.04 tpy
	VOC	0.0055	lb/MMBtu	(AP-42, Table 1.4)	0.0024 tpy
	PM/PM10	0.0076	lb/MMBtu	(AP-42, Table 1.4)	0.0033 tpy
	SO2	0.0006	lb/MMBtu	(AP-42, Table 1.4)	0.0003 tpy
	HAP	negligible			negligible

Totals see above	NOx	**1.95**
	CO	**10.41**
	VOC	**1.46**
	PM/PM10	**0.0033**
	SO2	**0.0003**
	HAP	**negligible**

GHG Emissions from Loadout Flare

Pilot Design Rate: 0.1 MMBtu/hr (NG Combustion)
Operating hours: 8,760 hrs/yr
Conversion Factor: 2.20462 lbs/kg

Loadout Flare Pilot - NG Emissions				
Pollutant	Emission Factor (kg/MMBtu)[1]	Emission Factor (lbs/MMBtu)[2]	Potential Hourly Emissions (lbs/hr)	Potential Annual Emissions (tons/yr)
GHGs				
CO_2	53.020	116.889	11.69	51.20
CH_4	0.0010	0.0022	0.00022	0.0010
N_2O	0.00010	0.00022	0.00002	0.0001
GHGs (mass basis)	53.021	116.891	11.689	51.198
CO_2e				51.25

Flare Design Rate: 6.4 MMBtu/hr (Methane/VOC Combustion)
Operating hours: 8,760 hrs/yr
Conversion Factor 2.20462 lbs/kg

Loadout Flare - Methane/VOC Emissions				
Pollutant	Emission Factor (kg/MMBtu)[1]	Emission Factor (lbs/MMBtu)[2]	Potential Hourly Emissions (lbs/hr)	Potential Annual Emissions (tons/yr)
GHGs				
CO_2	52.070	114.795	734.69	3,217.92
CH_4	0.0032	0.0071	0.04515	0.1978
N_2O	0.00063	0.00139	0.00889	0.0389
GHGs (mass basis)	52.074	114.803	734.739	3,218.158
CO_2e				3,284.47

Loadout Flare Totals		
	CO_2	3,269
	CH_4	0.20
	N_2O	0.04
	GHGs (MB)	3,269.36
	CO_2e	3,285.72

NOTES:
[1]GHG Emissions are based on 40 CFR 98, Tables A-1, C-1 and C-2
[2]Conversions from Table A-2 to Subpart A of Part 98 - Units of Measure Conversion

TRUCK and RAIL LOADING HAP LOSSES:

RAIL Loading HAPs:

Rail Loading: 0.28 tpy

Rail Denatured Ethanol HAPs	Fraction (%/100)	VOC (tpy)	HAP (tpy)
Benzene	0.1	0.28	0.02790
Hexane	0.2	0.28	0.05581
Acrolein	0.0001	0.28	0.00003
Formaldehyde	0.0001	0.28	0.00003
Acetaldehyde	0.0002	0.28	0.00006
Methanol	0.0002	0.28	0.00006
All other HAPS insignificant			
		Total HAPs	0.084

Truck Loading HAPS:

Composition based on typical MSDS for unleaded gasoline (mid points used)
Most gasoline is similar in composition
Only listed HAPs are given below
Calculations assume that trucks carrying ethanol were carrying gasoline and these vapors are vented to flare during loading

Total estimated VOC from product loading 4.76 tpy

Compound	Percent in Product	HAP Emissions (lb/yr)	HAP Emissions (tpy)
Benzene	10.00%	952.70	0.48
Hexane	20.00%	1905.39	0.95
Acrolein	0.01%	0.95	0.0005
Formaldehyde	0.01%	0.95	0.0005
Acetaldehyde	0.02%	1.91	0.001
Methanol	0.02%	1.91	0.001
Total HAPs		2863.81 lb/yr	
		1.43 ton/yr	

Rail and Truck HAP loss totals: 1.52 tpy

Storage Tank VOCs and HAPs:

Basis: Tanks 4.09 software (VOC), see attached tank calculations.

% Ethanol in Final Product: 98.00%
% Denaturant in Final Product: 5.00%

...al exceeds 100%, however, represents worst-case for each constitue

ID	Stored Liquid	Capacity (gal)	VOC lbs/yr	VOC (tpy)	Acetaldehyde (tpy)	Methanol (tpy)	Acrolein (tpy)	Form - aldehyde (tpy)	Benzene (tpy)	Hexane (tpy)
TK01	190 proof	174,500	790.74	0.395	7.91E-05	7.91E-05	3.95E-05	3.95E-05		
TK03	200 proof	174,500	757.68	0.379	7.58E-05	7.58E-05	3.79E-05	3.79E-05		
TK04	200 proof	174,500	757.68	0.379	7.58E-05	7.58E-05	3.79E-05	3.79E-05		
TK05	den. ethanol	587,000	608.18	0.304	5.96E-05	5.96E-05	2.98E-05	2.98E-05	1.52E-03	3.04E-03
TK06	den. ethanol	587,000	608.18	0.304	5.96E-05	5.96E-05	2.98E-05	2.98E-05	1.52E-03	3.04E-03
TK02	denaturant	58,750	1,745.03	0.873					8.73E-02	1.75E-01
	Total VOCs			2.69						
	Total HAPs			0.27	3.50E-04	3.50E-04	1.75E-04	1.75E-04	9.03E-02	1.81E-01

HAP:	Mass Fractions (VOL specific) (% / 100)
Acetaldehyde	0.0002 etoh (190/200/denatured etoh)
Methanol	0.0002 etoh (190/200/denatured etoh)
Acrolein	0.0001 etoh (190/200/denatured etoh)
Formaldehyde	0.0001 etoh (190/200/denatured etoh)
Benzene	0.1 denaturant, natural gasoline
Hexane	0.2 denaturant, natural gasoline

HAP calculations (tpy) based on VOL (tpy) x HAP Mass Fraction

Corn Oil Extraction System

Storage VOCs and HAPs:
Basis: Tanks 4.09 software (VOC), see attached tank calculations.

Tank ID	Tank Description	Gallons	VOC	
			(lbs/yr)	(tpy)
TS-75701	Aqueous Soluble Phase Receiver Tank	263 gallons	77.07	0.039
TS-75801	Emulsion Concentrate Receiver Tank	382 gallons	77.63	0.039
TS-75501	Centrate Feed Tank	3,760 gallons	110.19	0.055
TS-77701	Bio Oil Storage Tank #1	9,000 gallons	152.22	0.076
TS-77702	Bio Oil Storage Tank #2	9,000 gallons	152.22	0.076
TP-6901	Emulsion Mix Flash Tank	1,000 gallons	90.54	0.045
TP-6930	Emulsion Settling Tank	450 gallons	85.8	0.043
TP-6931	Bio Oil Product Tank	400 gallons	79.56	0.040
Total VOCs			825.29	0.413

NOTES:
Due to actual tank/vessel size, some tank specs were modified in the TANKS program in order to calculate potential emissions.

VOC emissions from Product Loading (Truck/Rail)

Emissions are based on 100% of product shipped out by truck

Truck Loadout:

Loading Operations	Calculated from AP-42, Section 5.2.2 - Loading Losses		
	Equation:	12.46*S*P*M/T	
	where:	S	0.6 Saturation factor (submerged)
From Tanks 4.09		P	0.1112 Vapor pressure (psia)
		M	96.09 Molar Mass (lb/lb-mole)
From Tanks 4.09, average temp		T	569.67 Product Temp (deg R)
	AP-42 Factor:		0.14 lb/1000 gal
Losses calculated using this factor multiplied by loading rates:			
			1,760,000 gal/yr
			247 lb/yr,uncontrolled
			0.12 tons/yr,uncontrolled

Wetcake Store/Handling

Basis: PM/PM10 Emission Factor based on AP-42 Section 13.2.1 Paved Roads Equation
100% of Modified DGS is moved to hopper by front end loader
Front end loader average weight = 2 tons
1 Front end loader trip = 10 feet

Emission Unit	Front end loader (tons)	Front end loader empty (tons)	Average load (tons)	PM Emission Factor (lb/VMT)	PM10/ PM2.5 Emission Factor (lb/VMT)	Total VMT	PM Emissions (tons/yr)	PM10/PM2.5 Emissions (tons/yr)
pad and loading area fugitives	3.00	1.00	2.00	0.058	0.011	703	0.020	0.004

VMT Calculations	Load Size	Amount (tons) per year	# of Trips	VMT (miles)
Modified DGS	2	741,969	370,984	703

VOC Calcs	VOC/ton Mod. DGS	VOC emissions (tons/year)
	0.0083	3.08

Note: HAPs assumed insignificant.

HAP portion of VOCs:	Mass Fraction	VOC (tpy)	HAP (tpy)
Formaldehyde	0.000169	3.08	0.000520
Acetaldehyde	0.155	3.08	0.47727
Methanol	0.015	3.08	0.04619
Acrolein	0.0045	3.08	0.01386
		Total	0.53734

Firewater Pump - Emergency Equipment

Basis: Manufacturer's emission factors: 288 hp, diesel fired
Emission Factor for PM10 assumed to be all PM emissions

Unit Description	Unit Size (hp)	Operation hr/yr	Pollutant	E Factors lb/hp-hr	Emissions lb/yr	Emissions tpy
Fire Water Pump	288	100	NOx	0.0090	260.01	0.130
	288	100	SO2	0.0021	59.04	0.030
	288	100	CO	0.0067	192.38	0.096
	288	100	VOC*	0.003	80.01	0.040
	288	100	PM/PM10/PM2.5	0.0022	63.36	0.032
	288	100	CO2e	-	-	6.0

*Note: VOC factor considered conservative as it is for total organic carbon, which includes some non-VOC emissions (i.e.: Methane).
HAPs assumed to be negligible.

APPENDIX B – AMBIENT AIR QUALITY IMPACT ANALYSES

No Modeling was required for this permitting action.

APPENDIX C – FACILITY DRAFT COMMENTS

The following comments were received from the facility on September 9, 2014:

Facility Comment: The only comment was whether we would have to conduct a performance test of our RTO as stated in 3.13 within 90 days of permit issuance or if we are still on the five year schedule that started with the last issuance of the PTC on March 21, 2012. Our last performance test was done July 13, 2012.

I have no other comments.

DEQ Response: The source test referred to this permit condition was performed and this part of the performance test permit condition was removed.

APPENDIX D – PROCESSING FEE