DE/AFS/SF

MSE **Millennium Science & Engineering, Inc.**

1605 N. 13th Street
Boise, Idaho 83702
Phone: 208.345.8292
Fax: 208.344.8007

RECEIVED
2 8 2007
DEPARTMENT OF ENVIRONMENTAL QUALITY
STATE AQ PROGRAM

February 26, 2007

Mr. William Rogers
Air Quality and Permits Manager
Idaho Department of Environmental Quality
1410 N. Hilton
Boise, Idaho 83706

RE: Pre-Permit Construction Approval and Permit to Construct Application, Renova Energy Ethanol Plant, Heyburn, Idaho

Dear Mr. Rogers:

Please find enclosed one copy of the Pre-Permit Construction Approval and Permit to Construct Application for the Renova Energy Ethanol Plant in Heyburn, Idaho. Electronic copies of application forms, report (without attachments), and modeling input and output files are included on a compact disc (see Appendix 4). A check to pay the Permit to Construction application fees is also enclosed.

Thank you for your assistance with this project. If you have any questions please call me at (208) 345-8292.

Regards,

Troy D. Riecke, P.E.
Environmental Engineer

Cc: Mr. James Glancey – Renova Energy, Inc
Mr. Sot Chimonas – Chimonas Enterprises

DE/AFS/SF

Pre-Permit Construction Approval and Permit to Construct Application

Renova Energy Ethanol Plant
Heyburn, Idaho

RECEIVED
FEB 28 2007
DEPARTMENT OF ENVIRONMENTAL QUALITY
STATE A Q PROGRAM

February 23, 2007

Prepared for:

Renova Energy, Inc.
913 South Latah
Boise, Idaho 83705

renova energy

Prepared by:

Millennium Science & Engineering, Inc.
1605 North 13th Street
Boise, Idaho 83702
(208)345-8292

MSE Millennium Science & Engineering, Inc.

Environmental Science & Engineering Solutions for the 21st Century

TABLE OF CONTENTS

Section 1	Process Description	1
Section 2	Process Flow Diagram	5
Section 3	Applicable Requirements	7
Section 4	Emission Estimates	18
Section 5	Facility Classification	23
Section 6	Plot Plan	25
Section 7	Ambient Impact Assessment	27

Appendices

Appendix 1	Emission Calculations and Vendor Supplied Equipment Information
Appendix 2	Copy of Public Meeting Notice
Appendix 3	Modeling Protocol and DEQ Response
Appendix 4	Model Output and Electronic Copy of Model Input/Output
Appendix 5	Permit to Construct Application

Section 1 – Process Description

Section 1. Process Description

Renova Energy, Inc. (Renova) proposes to construct an ethanol manufacturing plant in Heyburn, Idaho. The proposed location is east of Highway 30 with 9th Street forming the southern boundary and J Street intersecting the site. UTM coordinates for the facility are 273479E, 4714438N in Zone 12 (NAD83/WGS84). A Permit to Construct Application (PTC) for the facility is enclosed as Appendix 5

The facility will receive corn grain where it will be stored and cleaned. The corn will be fermented onsite to generate ethanol. The fermented solids that remain after ethanol generation will be transferred to anaerobic digesters, where biogas will be produced from digestion of the corn solids. This biogas will be combusted in an onsite boiler and two electric generators. In the event of emergency or planned maintenance, biogas will be combusted for a short time in an emergency flare. Further details regarding the proposed activities at the Heyburn facility are presented below.

Grain Handling

Grain is received at the plant in trucks and unloaded into dump pits. The dump pits are fitted with conveyors that feed the grain to an elevator, which transfers it to two grain storage silos. Grain is fed from the grain storage silos to the grain cleaner by a conveyor and a grain transfer elevator. The cleaner removes unusable debris from the grain. The discharge from the grain cleaner goes to the milling operation. Baghouses at the receiving bins (C-1) and grain silo (C-2) capture particulate released from grain handling processes.

Grain is fed from the grain cleaner to the process through a surge bin to ensure continuous operation of the downstream milling and mashing processes. The grain moves past a magnetic separator and into the hammer mill that grinds the grain into a grain meal. The hammer mill is fitted with a baghouse for dust control (C-3).

Ethanol Production

The meal is transferred by conveyor to a mixer called the mash mingler. Inside the mash mingler, the meal is continuously mixed with water and recycled process solutions to form meal slurry. The meal slurry is then discharged by gravity from the mash mingler to the mash mix tank.

The mash mix tank provides surge capacity in the cooking system, allows for pre-liquefaction of the starch, and enables viscosity control of the mash. Also, caustic or anhydrous ammonia may be added to the mash mix tank for pH control, if required. Mash from the mash mix tank is pumped to the jet cooker, where steam is injected into the mash. The mash is cooled by flashing into the liquefaction tank.

Liquefying enzyme is added to the mash in the liquefaction tank to begin the hydrolysis of the previously gelatinized starch.

The mash from the liquefaction tank is pumped through a set of heat exchangers known as "mash coolers." Cooling tower water provides for primary cooling to reduce the mash temperature. Drift of water containing dissolved solids at the cooling towers (FS-19 and FS-20) produces a small amount of fugitive particulate matter that is released to the air.

The cooled mash flows to one of four fermenters. In the fermenters, enzymes and yeast convert complex carbohydrates in the cooked mash into an ethanol-rich intermediate called "beer" plus carbon dioxide. Fermenter pumps circulate the contents of the fermenters through coolers to remove heat generated by fermentation. The carbon dioxide produced during fermentation is vented through the ethanol absorber to recover ethanol. When fermentation is complete, the fermenter pumps transfer the beer to the beerwell.

Cleaning and sanitizing the fermenters, fermenter coolers, mash coolers, and related process piping is accomplished by an automated clean-in-place (CIP) system using hot caustic solution. The beerwell serves as a surge tank connecting the fermentation system with distillation. The contents of the beerwell are kept mixed by the beerwell circulation pump.

The beer, which consists of approximately 10 percent by weight (wt%) ethanol, is pumped by the distillation beer feed pump through the beer preheaters to the beer stripper. The beer stripper uses heat to separate the ethanol/water mixture from the residual grain solids solution. The residual grain solids solution, known as stillage, is sent to the whole stillage tank. The processing of this stillage will be discussed in the Centrifugation section.

The dilute ethanol from the beer stripper is further concentrated to about 92 wt% ethanol in the stripper/rectifier. Uncondensed vapors from the distillation process are vented to the ethanol absorber for recovery of residual ethanol.

Concentrated ethanol vapor from the stripper/rectifier is superheated by steam as it flows into the molecular sieve units for a process known as dehydration. The dehydration process is used to increase the ethanol concentration from approximately 92 wt% to 99.5 wt%. From the molecular sieve units, the anhydrous ethanol product flows through a condenser and into the product shift tanks.

Stillage is pumped from the whole stillage tank to the stillage centrifuges. The stillage centrifuges split the stillage feed into two streams called cake and centrate. The cake consists of approximately 30 wt% to 35 wt% solids (mostly suspended solids) and 65 wt% to 70 wt% water. The centrifuges are positioned to discharge the cake into a conveyor that transfers it directly to storage. Within a few days, the wet distillers grains (WDG) is shipped off site by truck.

The centrate, also known as thin stillage, contains approximately 8 wt% to 10 wt% total solids. The majority of these solids are dissolved solids. The thin stillage is pumped to the anaerobic digester tanks (ES-8 and ES-9) where it is utilized for biogas generation.

The ethanol product is transferred from the product coolers into one of two product shift tanks (FS-3 and FS-4). When a shift tank becomes full, it is checked for quality before transferring to final storage (FS-8 and FS-16). A denaturant (FS-6 and FS-7) is added to the final product. In the event the product is "off-spec," it is directed to an off-spec product tank (FS-5). Off-spec product is gradually pumped back to the process for recovery of ethanol.

Biogas Production

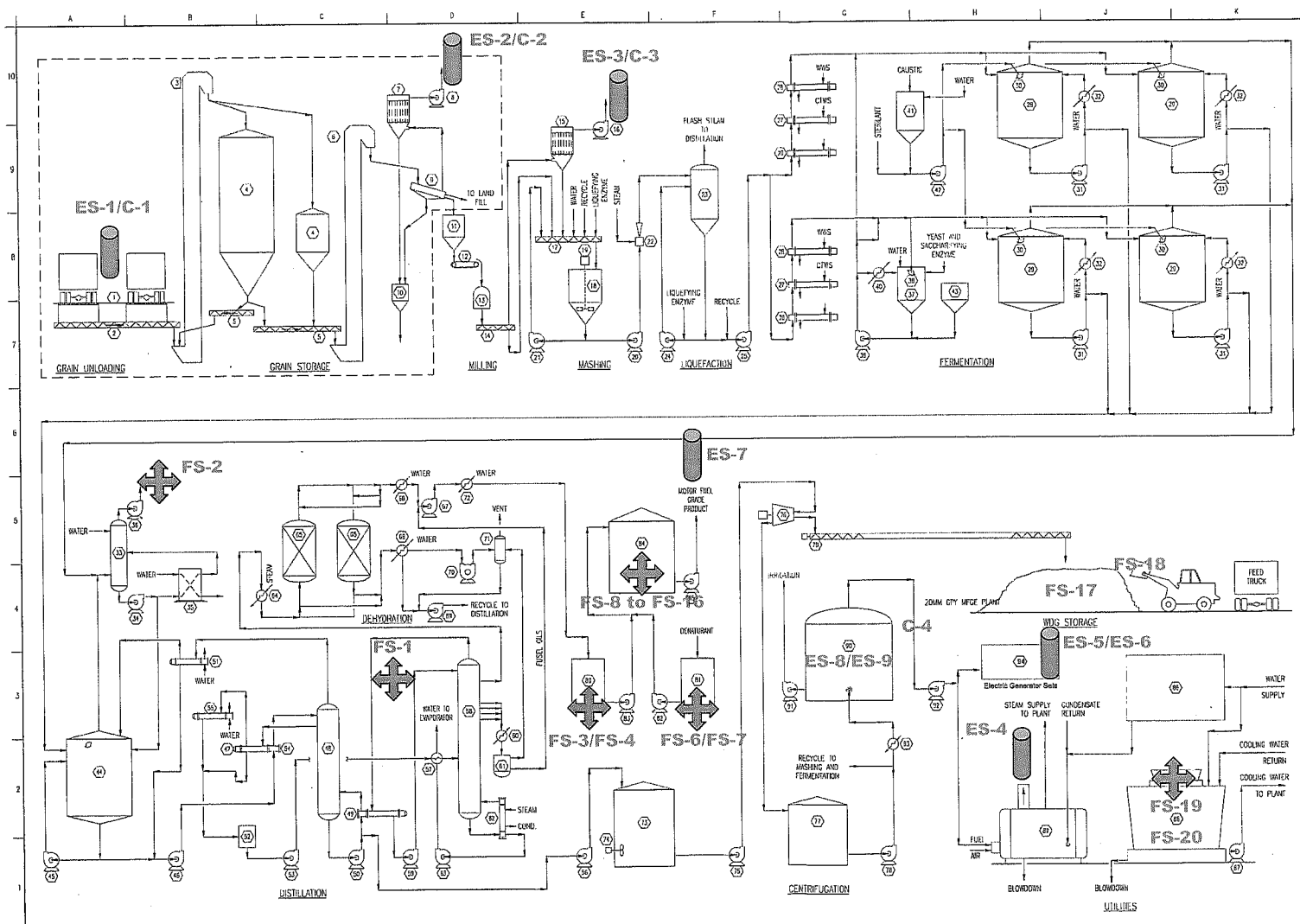
Thin stillage is combined with reverse osmosis concentrated whey lactose from the nearby cheese factory as well as other cheese factory sources. The anaerobic reactor will be constructed as above ground pre-stressed concrete tanks.

The Anaerobic Digester system will consist of an influent mixing tank for receiving and mixing the two feedstock streams. A pump system will transfer the streams to one Anaerobic Digester vessel of the Biological Vertical Film (BVF) Type. The plant will have one 9 million gallon and one 3.4 million gallon tanks to process the feedstocks. The reactor is fitted with a floating insulated geomembrane cover system, submersible mixers, a biogas blower system to pump the biogas to an "iron sponge" H_2S Scrubber (C-4) and subsequently to the Ethanol Plant Boiler (ES-4) as well a dual set of engine-generators (ES-5 and ES-6) and an emergency flare to combust any and all of the biogas during emergencies and in the infrequent event that the boiler or engines are being maintained. Recirculation pumps will return biological solids back to the reactor or transfer the centrifuged and dewatered waste sludge cake to trucks for off-site transport. A control building will house the centrifuge, the engines, lab and the electrical equipment.

The thin stillage will be stored at the Ethanol Plant and be pumped to the digester after passing a heat exchanger to cool it to desired process temperature depending on seasonal weather and digester heat demands. The BVF type digester will operate satisfactorily between 90–100 ^{o}F. The reactor will remove the bulk of the biologically degradable organic load in the feedstock streams.

Under design conditions, it is projected that the system will generate approximately 3,000,000 ft^3 of biogas per day (3.715 MMscf/day maximum) containing up to 65% (60% average) methane and 35% (40% average) CO_2 or an equivalent 1,950 MMBtu/day (2,274 MMBtu/day maximum).

Section 2 – Process Flow Diagram



EQUIPMENT LIST

1	Grain Dump Pit
2	Grain Receiving Conveyors
3	Grain Receiving Elevator
4	Grain Storage
5	Grain Transfer Conveyors
6	Grain Transfer Elevator
7	Grain Receiving & Storage Bag House
8	Grain Receiving & Storage Bag House Blower
9	Grain Cleaner
10	Grain Cleanings Bin
11	Surge Bin
12	Weigh Feeder
13	Hammer Mill
14	Hammer Mill Conveyor
15	Milling Bag House
16	Milling Bag House Blower
17	Mingler
18	Mash Mix Tank
19	Mash Mix Tank Agitator
20	Cooker Feed Pump
21	Mash Mix Tank Recirculation Pump
22	Jet Cooker
23	Liquefaction Tank
24	Liquefaction Tank Recirculation Pump
25	Mash Cooler Pump
26	Process Condensate Preheaters
27	Mash Coolers
28	Final Mash Coolers
29	Fermenters
30	Fermenter Cleaners
31	Fermenter Pumps
32	Fermenter Coolers
33	Ethanol Absorber
34	Ethanol Absorber Circulation Pump
35	Ethanol Absorber Cooler
36	Ethanol Absorber Blower
37	Yeast Slurry Tank
38	Yeast Slurry Tank Cleaner
39	Yeast Slurry Pump
40	Yeast Slurry Cooler
41	CIP Caustic Tank
42	CIP Pump
43	Clean Caustic Tank
44	Beerwell
45	Beerwell Circulation Pump
46	Distillation Beer Feed Pump
47	Beer Preheater #1
48	Beer Stripper
49	Beer Stripper Reboiler
50	Beer Stripper Reboiler Pump
51	Vent Condenser
52	Beer Stripper Product Drum
53	Beer Stripper Product Pump
54	Beer Preheater #2
55	Final Condenser
56	Beer Stripper Stillage Pump
57	Stripper/Rectifier Feed Preheater
58	Stripper/Rectifier
59	Stripper/Rectifier Reflux Pump
60	Fusel Oil Cooler
61	Fusel Oil Decanter
62	Stripper/Rectifier Reboiler
63	Stripper/Rectifier Bottoms Pump
64	Mol Sieve Superheater
65	Mol Sieve Units
66	Mol Sieve Condenser
67	Ethanol Product Pump
68	Mol Sieve Regenerant Condenser
69	Mol Sieve Regenerant Pump
70	Mol Sieve Vacuum Pump
71	Mol Sieve Vacuum Pump Drum
72	Ethanol Product Cooler
73	Whole Stillage Tank
74	Whole Stillage Tank Agitator
75	Centrifuge Feed Pump
76	Stillage Centrifuge
77	Centrifuge Surge Tank
78	Backset Pump
79	Wet Cake Conveyor
80	Product Shift Tanks
81	Denaturant Tank
82	Denaturant Pump
83	Product Transfer Pump
84	Product Storage Tank
85	Product Loadout Pump
86	Cooling Tower
87	Cooling Tower Water Supply Pump
88	Boiler Treatment System
89	Boiler
90	Anaerobic Digester
91	Digester Water Pump
92	Digester Gas Blower
93	Digester Heater
94	Electric Generator Set

Legend

Emission Source Stack

Fugitive Emission Source

ES-# = Point Emission Source ID

C-# = Control Device ID

FS-# = Fugitive Emission Source ID

The process design and other information contained on this drawing is the property of KATZEN INTERNATIONAL, INC., Cincinnati, Ohio and may not be reproduced in any manner, changed, altered, or modified in any mechanical process or application, without prior written approval by an authorized representative of KATZEN INTERNATIONAL, INC.
KATZEN INTERNATIONAL, INC. is authorized to practice engineering in the state of Ohio. THE AI seal represents that be reviewed by a person or persons licensed to practice engineering in the applicable jurisdiction, unless stipulated otherwise.

PRINT ISSUED 3/2/07

PRELIMINARY NOT FOR CONSTRUCTION

#	DESCRIPTION	BY	DATE	APPD.

REVISIONS

KATZEN INTERNATIONAL, INC.
TECHNOLOGY • ENGINEERING CINCINNATI, OHIO, U.S.A.

RENOVA ENERGY, INC.
HOLDRIN, IDAHO
20MM GPY MFGE PLANT
PROCESS FLOW DIAGRAM
PROCESS OVERVIEW

ORIGIN	DRAWN	CHECKED	DATE	SCALE	CLIENT No.	DWG No.	REV
HJA	RLM	HJA	2/20/07	NONE	1075-03	SK-001	A

Note: Emission source details added by Millennium Science & Engineering, Inc. to a drawing provided by KATZEN INTERNATIONAL, INC.

Section 3 – Applicable Requirements

3.0 Applicable Requirements

Regulations applicable to the proposed facility are discussed in this section.

3.1 Federal Requirements

The following includes the rules and regulations reviewed in preparation of this PTC application.

3.1.1 40 CFR § 52 - Prevention of Significant Deterioration (PSD)

The facility is not a PSD major facility and does not belong to any designated source category, therefore PSD review is not applicable.

3.1.2 40 CFR § 60 - New Source Performance Standards (NSPS)

<u>40 CFR § 60-Subpart Dc – Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units</u>

Affected Units:
1.) Superior Boiler (ES-4)

60.40c – Applicability
The Superior Boiler is subject to requirements of Subpart Dc because the boiler is a steam generating unit with heat input capacity greater than 10 million BTU/hr and will be constructed or modified after June 9, 1989.

Note: The EPA's latest proposed revision to this rule entirely exempts this class of boiler that burns natural gas (and inferred biogas) from the standards for SO_2 and particulate matter (see Federal Register, Volume 72, No. 27, February 9, 2007). Prior to commencing operation of the boiler at the site, the rules will be revisited to determine what, if any, NSPS rules apply to the source.

§ 60.43c – Standard for particulate matter (60.43c(e)(1))
The NSPS standard for particulate matter is 0.030 lb PM/MMBtu. The estimated particulate emission rate for the boiler, utilizing AP-42 emission factors for natural gas combustion is: 0.00745 lb PM/MMBtu (see attached emission estimate sheet for the boiler). Therefore, it appears that the proposed combustion of biogas in the boilers will meet the NSPS standard for particulate matter.

§ 60.45c(c) – Compliance and performance test methods and procedures for particulate matter.

Since the boiler only combusts gaseous fuels that have potential SO_2 emission rates less than 0.54 lb/MMBtu (potential emissions when combusting biogas is 0.19 lb SO_2/MMBtu and when combusting natural gas is 0.00059 lb SO_2/MMBtu) compliance can be demonstrated by maintaining fuel certification for the sulfur content of the fuel burned (per 60.45c(c)).

§ 60.48c Reporting and recordkeeping requirements.
The following information is required to be submitted *(directly quoted from the applicable part of the standard)*:

(a) The owner or operator of each affected facility shall submit, as provided by §60.7 of this part. This notification shall include:
The design heat input capacity of the affected facility and identification of fuels to be combusted in the affected facility.

If applicable, a copy of any Federally enforceable requirement that limits the annual capacity factor for any fuel or mixture of fuels under §60.42c, or §60.43c.

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

Because potential SO_2 emissions will be less than 0.32 lb SO_2/MMBtu the operator is only required to record and maintain records of the fuels combusted during each calendar month (instead of the daily record keeping requirements that would apply if emissions were greater than 0.32 lb SO_2/MMBtu).

Records required under this section are to be maintained by the operator for two years.

The reporting period for the reports required under this subpart is each six-month period. All reports shall be submitted to the Administrator and shall be postmarked by the 30th day following the end of the reporting period.

<u>Subpart Kb—Standards of Performance for Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced After July 23, 1984</u>

Affected Units:
1.) Shift Tanks (FS-3 and FS-4)
2.) Off-Spec Product Tank (FS-5)
3.) Denaturant Tanks (FS-6 and FS-7)
4.) Product Storage Tanks (FS-8 through FS-16)

NSPS Subpart Kb will not apply to any tanks at the site due to size and vapor pressure characteristics (see Table 3-1 for a summary of storage tank details and NSPS applicability).

Table 3-1
Summary of NSPS Subpart Kb Applicability Analysis

Tank ID	Product	Vapor Pressure		Tank Volume		Volume Check		Vapor Pressure Check		Exempt ?
		(psi)	(kpa)	(gallons)	(m^3)	< 75 m^3	<151m^3	<3.5kpa	<15kpa	
801a	Shift Tank - Ethanol	0.40	2.7	45,000	170.5	no	no	yes	yes	exempt
801b	Shift Tank - Ethanol	0.40	2.7	45,000	170.5	no	no	yes	yes	exempt
803	Off-Spec Ethanol	0.40	2.7	45,000	170.5	no	no	yes	yes	exempt
808a	Denaturant	5.29	36.5	19,000	72.0	yes	yes	no	no	exempt
808b	Denaturant	5.29	36.5	19,000	72.0	yes	yes	no	no	exempt
810a	Final Product	0.52	3.6	39,800	150.8	no	yes	no	yes	exempt
810b	Final Product	0.52	3.6	39,800	150.8	no	yes	no	yes	exempt
810c	Final Product	0.52	3.6	39,800	150.8	no	yes	no	yes	exempt
810d	Final Product	0.52	3.6	39,800	150.8	no	yes	no	yes	exempt
810e	Final Product	0.52	3.6	39,800	150.8	no	yes	no	yes	exempt
810f	Final Product	0.52	3.6	39,800	150.8	no	yes	no	yes	exempt
810g	Final Product	0.52	3.6	39,800	150.8	no	yes	no	yes	exempt
810h	Final Product	0.52	3.6	39,800	150.8	no	yes	no	yes	exempt
810i	Final Product	0.52	3.6	39,800	150.8	no	yes	no	yes	exempt

3.1.3 40 CFR § 61 - National Emission Standards for Hazardous Air Pollutants (NESHAPs) & Maximum Achievable Control Technology (MACT)

There are no applicable NESHAPs or MACT for this facility.

3.2 State Requirements

Applicable state requirements include the following. All citations refer to specific sections of IDAPA 58.01.01, Rules for the Control of Air Pollution in Idaho.

123. CERTIFICATION OF DOCUMENTS.

All documents, including but not limited to, application forms for permits to construct, application forms for operating permits, progress reports, records, monitoring data, supporting information, testing reports or compliance certifications submitted to the Department shall contain a certification by a responsible official.

128. CONFIDENTIAL INFORMATION

Not applicable as no confidential information is being submitted.

201 - PERMIT TO CONSTRUCT REQUIRED

Affected Units:
1.) Grain Receiving #1 (ES-1) and associated baghouse (C-1)
2.) Grain Receiving # 2 (ES-2) and associated baghouse (C-2)
3.) Grain Milling and Cleaning (ES-3) and associated baghouse (C-3)
4.) Superior Boiler (ES-4)
5.) Electric Generator Engine #1 (ES-5)
6.) Electric Generator Engine #2 (ES-6)
7.) Loading Rack (ES-7)
8.) Anaerobic Digester Tank #1 (ES-8)
9.) Anaerobic Digester Tank #2 (ES-9)

The proposed facility is a new synthetic minor source, a PTC is required.

203. PERMIT REQUIREMENTS FOR NEW AND MODIFIED STATIONARY SOURCES

Affected Units:
1.) Grain Receiving #1 (ES-1) and associated baghouse (C-1)
2.) Grain Receiving # 2 (ES-2) and associated baghouse (C-2)
3.) Grain Milling and Cleaning (ES-3) and associated baghouse (C-3)
4.) Superior Boiler (ES-4)
5.) Electric Generator Engine #1 (ES-5)
6.) Electric Generator Engine #2 (ES-6)
7.) Loading Rack (ES-7)
8.) Anaerobic Digester Tank #1 (ES-8)
9.) Anaerobic Digester Tank #2 (ES-9)

Permit requirements were proposed for the facility to protect the National Ambient Air Quality Standards (NAAQS), to comply with the toxic air pollutant (TAP) standards, to comply with the grain loading standard for fuel burning equipment, and the reasonable control of fugitives.

210. DEMONSTRATION OF PRECONSTRUCTION COMPLIANCE WITH TOXIC STANDARDS

210.01. Identification of Toxic Air Pollutants.

Affected Units:
1.) Shift Tanks (FS-3 and FS-4)
2.) Off-Spec Product Tank (FS-5)
3.) Denaturant Tanks (FS-6 and FS-7)
4.) Product Storage Tanks (FS-8 through FS-16)
5.) Superior Boiler (ES-4)

6.) Electric Generator Engine #1 (ES-5)
7.) Electric Generator Engine #2 (ES-6)
8.) Loading Rack (ES-7)
9.) Anaerobic Digester Tank #1 (ES-8)
10.) Anaerobic Digester Tank #2 (ES-9)

All TAP emitted by these emission units shall be identified. These compounds are listed in Section 4.

210.02. Quantification of Emission Rates

Affected Units:
1.) Shift Tanks (FS-3 and FS-4)
2.) Off-Spec Product Tank (FS-5)
3.) Denaturant Tanks (FS-6 and FS-7)
4.) Product Storage Tanks (FS-8 through FS-16)
5.) Superior Boiler (ES-4)
6.) Electric Generator Engine #1 (ES-5)
7.) Electric Generator Engine #2 (ES-6)
8.) Loading Rack (ES-7)
9.) Anaerobic Digester Tank #1 (ES-8)
10.) Anaerobic Digester Tank #2 (ES-9)

Emission rates of all TAP shall be estimated. Toxic emissions were estimated using emission factors engineering estimates. This analysis is presented in Section 4.

210.03. Quantification of Ambient Concentrations

Affected Units:
1.) Superior Boiler (ES-4)
2.) Electric Generator Engine #1 (ES-5)
3.) Electric Generator Engine #2 (ES-6)

Ambient concentrations at appropriate receptor sites were estimated as described in Section 7.

210.04. Preconstruction Compliance Demonstration

Affected emission units:
1.) Superior Boiler (ES-4)
2.) Electric Generator Engine #1 (ES-5)
3.) Electric Generator Engine #2 (ES-6)

Preconstruction compliance for each identified TAP is demonstrated by the modeling described in Section 7. Where appropriate, the limitations on potential to emit (PTE) described in Section 4 were included in this analysis.

213 - PRE-PERMIT CONSTRUCTION

213.01. Pre-Permit Construction Eligibility

Affected emission units:
1.) Grain Receiving #1 (ES-1) and associated baghouse (C-1)
2.) Grain Receiving # 2 (ES-2) and associated baghouse (C-2)
3.) Grain Milling and Cleaning (ES-3) and associated baghouse (C-3)
4.) Superior Boiler (ES-4)
5.) Electric Generator Engine #1 (ES-5)
6.) Electric Generator Engine #2 (ES-6)
7.) Loading Rack (ES-7)
8.) Anaerobic Digester Tank #1 (ES-8)
9.) Anaerobic Digester Tank #2 (ES-9)

213.01(a): The owner or operator shall apply for a permit to construct.

This application is submitted to satisfy this requirement.

213.01(b): The owner or operator shall consult with Department representatives prior to submitting a pre-permit construction approval application.

This requirement was satisfied by meeting with Mr. William Rogers on November 1, 2006.

213.01(c): *The owner or operator shall submit a pre-permit construction approval application which must contain, but not be limited to: a letter requesting the ability to construct before obtaining the required permit to construct, a copy of the notice referenced in Subsection 213.02; proof of eligibility; process description(s); equipment list(s); proposed emission limits and modeled ambient concentrations for all regulated air pollutants, such that they demonstrate compliance with all applicable air quality rules and regulations. The models shall be conducted in accordance with Subsection 202.02 and with written Department approved protocol and submitted with sufficient detail so that modeling can be duplicated by the Department.*

These required elements are included in this application package.

213.01(d): *Owners or operators seeking limitations on a source's potential to emit such that permitted emissions will be either below major source levels or below a significant increase must describe in detail in the pre-permit construction application the proposed restrictions and certify in accordance with Section 123 that they will*

comply with the restrictions, including any applicable monitoring and reporting requirements. The required description of PTE limitations is included in Section 4.

The required certification is included in the cover letter accompanying this application.

213.02. Permit To Construct Procedures For Pre-Permit Construction
Within ten (10) days after the submittal of the pre-permit construction approval application, the owner or operator shall hold an informational meeting in at least one (1) location in the region in which the stationary source or facility is to be located. The informational meeting shall be made known by notice published at least ten (10) days before the meeting in a newspaper of general circulation in the county(ies) in which the stationary source or facility is to be located. A copy of such notice shall be included in the application.

The required public meeting will be held on March 5, 2007. A copy of the required notice is included in Appendix 2.

214. DEMONSTATION OF PRECONSTRUCTION COMPLIANCE FOR NEW AND RECONSTRUCTED MAJOR SOURCES OF HAZARDOUS AIR POLLUTANTS

The proposed emission sources are not considered Major Facilities so this section does not apply.

223. EXEMPTION CRITERIA AND REPORTING REQUIREMENTS FOR TOXIC AIR POLLUTANT EMISSIONS.

Not applicable as no exemptions are being claimed.

577. AMBIENT AIR QUALITY STANDARDS FOR SPECIFIC AIR POLLUTANTS.

Compliance with all applicable ambient air quality standards is discussed in Section 7.

578. DESIGNATION OF ATTAINMENT, UNCLASSIFIABLE, AND NONATTAINMENT AREAS.

Not applicable to applicant - designation of attainment, unclassifiable, and nonattainment areas is the responsibility of DEQ. Current attainment status of the facility location is discussed in Section 5.

585. TOXIC AIR POLLUTANTS NON-CARCINOGENIC INCREMENTS.

Compliance with AACs is addressed in Sections 4 and 7.

586. TOXIC AIR POLLUTANTS CARCINOGENIC INCREMENTS.

Compliance with AACCs is addressed in Sections 4 and 7.

590. NEW SOURCE PERFORMANCE STANDARDS.

Affected Units:
1.) Shift Tanks (FS-3 and FS-4)
2.) Off-Spec Product Tank (FS-5)
3.) Denaturant Tanks (FS-6 and FS-7)
4.) Product Storage Tanks (FS-8 through FS-16)
5.) Superior Boiler (ES-4)

Compliance with NSPS is discussed in Section 3.1.

591. NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS.

Compliance with NESHAPs is discussed in Section 3.1.

625. VISIBLE EMISSIONS.

Affected Units:
1.) Grain Receiving #1 (ES-1) and associated baghouse (C-1)
2.) Grain Receiving # 2 (ES-2) and associated baghouse (C-2)
3.) Grain Milling and Cleaning (ES-3) and associated baghouse (C-3)
4.) Superior Boiler (ES-4)
5.) Electric Generator Engine #1 (ES-5)
6.) Electric Generator Engine #2 (ES-6)
7.) Loading Rack (ES-7)
8.) Anaerobic Digester Tank #1 (ES-8)
9.) Anaerobic Digester Tank #2 (ES-9)

A person shall not discharge any air pollutant into the atmosphere from any point of emission for a period or periods aggregating more than three (3) minutes in any sixty (60) minute period which is greater than twenty percent (20%) opacity as determined by this section.

This requirement is applicable to all emission units listed above.

650. RULES FOR CONTROL OF FUGITIVE DUST.
All reasonable precautions shall be taken to prevent particulate matter from becoming airborne. In determining what is reasonable, consideration will be given to factors such as the proximity of dust emitting operations to human habitations and/or activities and atmospheric conditions which might affect the movement of particulate

matter. Some of the reasonable precautions may include, but are not limited to, the following:
01. Use Of Water Or Chemicals. Use, where practical, of water or chemicals for control of dust in the demolition of existing buildings or structures, construction operations, the grading of roads, or the clearing of land.
02. Application Of Dust Suppressants. Application, where practical, of asphalt, oil, water or suitable chemicals to, or covering of dirt roads, material stockpiles, and other surfaces which can create dust.
03. Use Of Control Equipment. Installation and use, where practical, of hoods, fans and fabric filters or equivalent systems to enclose and vent the handling of dusty materials.
04. Covering Of Trucks. Covering, when practical, open bodied trucks transporting materials likely to give rise to airborne dusts.
05. Paving. Paving of roadways and their maintenance in a clean condition, where practical. Note: all truck traffic areas will be paved.

675. FUEL BURNING EQUIPMENT -- PARTICULATE MATTER.
And
676. STANDARDS FOR NEW SOURCES.
And
677. STANDARDS FOR MINOR AND EXISTING SOURCES.

Affected units:
1.) Superior Boiler (ES-4)

Compliance with particulate matter emission limits is discussed in Section 4 and/or Appendix 1. Note: These sections are not applicable to the electric generator sets (ES-5 and ES-6) because, although they use gas as a fuel, it does not satisfy the definition of Fuel Burning Equipment contained in Section 006.40 (i.e., Any furnace, boiler, apparatus, stack and all appurtenances thereto, used in the process of burning fuel for the primary purpose of producing heat or power by indirect heat transfer).

700. PARTICULATE MATTER -- PROCESS WEIGHT LIMITATIONS.
And
710. PARTICULATE MATTER -- PROCESS EQUIPMENT EMISSION LIMITATIONS ON OR AFTER JULY 1, 2000.

Affected units:
1.) Grain Receiving #1 (ES-1) and associated baghouse (C-1)
2.) Grain Receiving # 2 (ES-2) and associated baghouse (C-2)
3.) Grain Milling and Cleaning (ES-3) and associated baghouse (C-3)

The maximum grain loading to each of these processes is 54,330 lb/hr. Based on the equation included in this section, the maximum allowable emission rate from each

source is 16.8 lb/hr. Section 4 and Appendix 1 demonstrates compliance with this rule.

775. RULES FOR CONTROL OF ODORS.
And
776. GENERAL RULES.

No emission of odorous gases, liquids or solids into the atmosphere in such quantities as to cause air pollution will be allowed.

Section 4 – Emission Estimates

4.0 Potential to Emit/Emission Estimates/Limitation on Potential to Emit

4.1 Emission Estimates

Emission estimates are summarized in Table 4-1. Specific discussion regarding potential to emit for each source is presented in the following sections.

4.1.1 Grain Receiving/Handling

Particulate emissions from receiving, cleaning, and milling corn are generated at emission sources ES-1, ES-2, and ES-3. A baghouse to limit particulate emissions is installed at each emission source (C-1, C-2, and C-3, respectively). Particulate matter emission rates were estimated based on 99.99% control efficiency associated with the baghouses. Emissions from the grain receiving and handling operations were estimated based on owner experience with similar installations at other facilities. Appendix 1 summarizes emission estimate calculations for the grain handling units.

4.1.2 Boiler and Electric Generator Engines

Emissions from the Superior Boiler (ES-4) and two CAT electric generator engines (ES-5 and ES-6) were estimated using vendor supplied emission factors along with AP-42 emission factors when vendor supplied factors were not available. The equipment will primarily combust biogas generated at onsite anaerobic digesters. Natural gas will be combusted in this equipment when necessary for maintenance or emergency conditions. Emission calculations are included in Appendix 1.

4.1.3 Loading Rack

Ethanol (VOC) emissions from the loading rack (ES-7) were estimated using AP-42 emission factors. Vapors from truck loading are collected from the tanker truck vapor recovery systems and emitted to the atmosphere. Appendix 1 summarizes emission estimate calculations performed for the loading rack.

4.1.4 Anaerobic Digester

Biogas is generated onsite in two anaerobic digesters. This biogas is captured, passed through "Iron Sponges" (C-4) to reduce the H_2S content, and then diverted to an onsite boiler (ES-4) and two electric generator engines (ES-5 and ES-6) or under emergency conditions will be diverted to an onsite emergency biogas flare. Emission estimates for combustion of biogas in the boiler and generator engines is discussed in Section 4.1.2 above. Emissions from the flare were not evaluated since it will only be used over a short period of time and will not exceed emissions that would be generated from combustion of the gas in the boiler or generator engines. The maximum daily anaerobic digester biogas generation rate of 3.715×10^6 standard cubic feet (scf/day) was determined by ADI Systems, Inc.

4.1.5 Fugitive Emissions

There are twenty fugitive emission sources at the site, the following is a brief discussion of emission estimates for each source:

LDAR Alcohol Plant
Fugitive VOC emissions (FS-1) from the ethanol manufacturing process were estimated for this source. Fugitive VOC losses from pumps, fittings, and valves were considered. Based on planned monitoring and maintenance activities the initial fugitive emission estimates were reduced by 80%. Appendix 1 summarizes these emission estimate calculations.

Ethanol Absorption Column
Fugitive VOC emissions from the ethanol absorption column (FS-2) were estimated by the process engineering firm based on mass balance around the column.

Storage Tanks
VOC emissions from storage tanks were estimated using EPA's TANKS version 4.0.9d software. There are 13 fixed roof horizontal tanks that will be buried below the ground surface to store ethanol products and a denaturant. There are two Shift Tanks (FS-3 and FS-4) which are used to store ethanol during process operations, ethanol in these tanks is not denatured. There is one Off-Spec Product Tank (FS-5) that stores ethanol that does not meet required specifications. This product is also not denatured and is stored and then returned to the process as appropriate. There are two tanks (FS-6 and FS-7) that store natural gasoline used to denature the ethanol product. Natural gasoline is composed primarily of straight-chain hydrocarbons (such as methane, propane, butane, and ethane) and does not contain cyclic hydrocarbons (such as benzene). There are nine finished product storage tanks (FS-8 to FS-16). These tanks store denatured ethanol prior to loading out to tanker trucks. TANKS software output is included in Appendix 1.

Wetcake Storage and Loadout
Emissions of VOC from wetcake storage (FS-17) and loadout (FS-18) were estimated for the site. Wetcake storage emissions were estimated based on stored volume and wetcake ethanol content. Emission estimates for wetcake storage can be found in Appendix 1. It was conservatively assumed that wetcake loadout VOC emissions would equal wetcake storage emissions.

Cooling Towers
Particulate matter emissions from the cooling towers (FS-19 and FS-20) were estimated based on vendor supplied drift rates and an assumption regarding the dissolved solids content present in the drift loss. Appendix 1 summarizes the cooling tower fugitive particulate emissions estimates.

Table 4-1
Summary of Emission Rates
Renova Energy Ethanol Plant
Heyburn, Idaho

Source	ID	Criteria Air Pollutant Emission Rates										TAPs	
		PM/PM10		SOx		NOx		CO		VOC		H_2S	
		(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)
Grain Receiving #1	ES-1	to baghouse											
Grain Receiving #1 baghouse	C-1	3.24	0.74										
Grain Receiving #2	ES-2	to baghouse											
Grain Receiving #2 baghouse	C-2	0.79	0.18										
Grain Milling and Cleaning	ES-3	to baghouse											
Grain Milling/Cleaning baghouse	C-3	0.21	0.05										
Boiler	ES-4	2.24	0.55	57.1	14.00	3.17	7.16	6.39	1.58	2.7	0.66	0.610	0.149
Electric Generator Engine #1	ES-5	0.00	0.00	10.94	2.69	10.09	2.48	45.42	11.15	6.78	1.67	0.120	0.029
Electric Generator Engine #2	ES-6	0.00	0.00	10.94	2.69	10.09	2.48	45.42	11.15	6.84	1.67	0.120	0.029
Loading Rack	ES-7	Only VOCs emitted								7.72	1.76		
Anaerobic Digester Tank 1	ES-8	Emissions are through boiler or generator, flared for emergency/maintenance situations											
Anaerobic Digester Tank 2	ES-9	Emissions are through boiler or generator, flared for emergency/maintenance situations											
LDAR Alcohol Plant	FS-1	Only VOCs emitted								3.6	0.82		
Ethanol Absorption Column	FS-2	Only VOCs emitted								31.4	7.17		
Shift Tanks (TK-801a/b)	FS-3/FS-4	Only VOCs emitted								0.44	0.10		
Off-Spec Product Tank (TK-803)	FS-5	Only VOCs emitted								0.22	0.05		
Denaturant Tanks (TK-808a/b)	FS-6/FS-7	Only VOCs emitted								4.7	1.08		
Product Storage Tanks (TK-810a to TK-810i)	FS-8 to FS-16	Only VOCs emitted								4.6	1.05		
Wetcake Storage	FS-17	Only VOCs emitted								0.8	0.18		
Wetcake Loadout	FS-18	Only VOCs emitted								0.8	0.18		
Cooling Tower #1	FS-19	0.1	0.02										
Cooling Tower #2	FS-20	0.4	0.09										
	Total:	6.48		78.98		23.35		97.23		70.63		0.85	

Key: "ES-#" = Point Emission Source, "C-#" = Control Device, "FS-#" = Fugitive Source

4.2 Limitations on Potential to Emit

Operational limitations and controls are proposed to maintain compliance with regulations. The following sections discuss the proposed limitations and controls for each source.

4.2.1 Grain Receiving/Handling

Controls (baghouses: C-1, C-2, and C-3) are required to prevent exceedance of the NAAQS for particulate matter (PM_{10}) and to maintain the facility as a synthetic minor source. The proposed baghouses will provide 99.99% particulate capture efficiency.

4.2.2 Boiler and Electric Generator Engines

Limitations on the quantity of biogas that can be combusted in the boiler (ES-4) and electric generator engines (ES-5 and ES-6) are proposed to prevent triggering the major classification for CO emissions. The following annual biogas consumption limits are proposed:

- Superior Boiler (ES-4): 980.3 MMscf/year
- CAT Electric Generator Motors (ES-5 and ES-6): 375.6 MMscf/year (total)
- Total biogas consumption: 1,356 MMscf/year

Natural gas combustion is proposed for emergency operation of the facility. No limit on natural gas combustion is proposed.

4.2.3 Anaerobic Digester

Biogas from the anaerobic digester is combusted in boilers (ES-4) and two electric generators (ES-5 and ES-6). The H_2S content of the biogas is reduced at an "iron sponge" scrubber (C-4) before it is combusted. Combustion of the biogas is required to prevent exceedance of the acceptable ambient concentration (AAC) for H_2S and to maintain a synthetic minor source designation for the facility. A maximum annual biogas generation rate of 1,356 MMscf/yr is proposed for the facility.

4.2.4 Fugitive Emissions

No emission limits are established for the fugitive sources beyond implementing operation and maintenance plans to minimize fugitive emission production.

Section 5 – Facility Classification

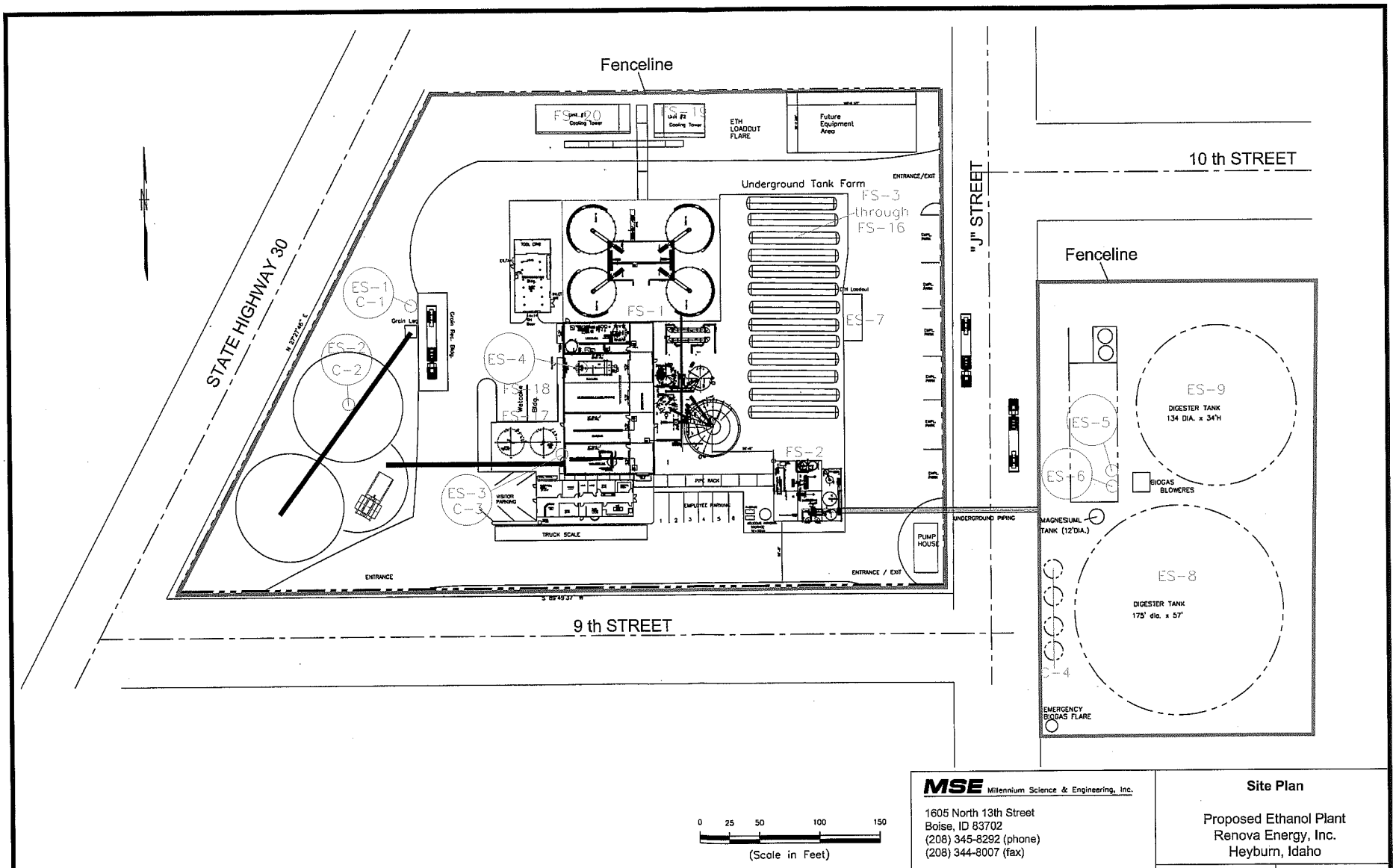
5.0 Facility Classification

The Renova Energy Ethanol Plant is to be located in Heyburn, Idaho, Minidoka County. This area is considered attainment or unclassified for all criteria pollutants.

The facility is not a designated facility as defined in IDAPA 58.01.01.006.26. The facility is not a major facility as defined IDAPA 58.01.01.008.10. The proposed modification is not a major modification defined in IDAPA 58.01.01.006.55. The primary SIC Code for the facility is 2869 and the NAICS code is 325193.

There are no Class I areas within 10 km of the facility. PSD is not applicable as discussed in Section 3. Emission inventories are presented in Section 4.

Section 6 - Plot Plan



MSE Millennium Science & Engineering, Inc.

1605 North 13th Street
Boise, ID 83702
(208) 345-8292 (phone)
(208) 344-8007 (fax)

Site Plan

Proposed Ethanol Plant
Renova Energy, Inc.
Heyburn, Idaho

02-19-07 | Figure 1

Section 7 – Ambient Impact Assessment

7.0 Ambient Impact Assessment

Air dispersion modeling was performed to demonstrate compliance with NAAQS for criteria pollutants and Idaho Department of Environmental Quality (IDEQ) screening levels for TAPs in support of this Pre-Permit Construction and PTC Application for the Renova facility. Modeling was performed according to the Modeling Protocol submitted to the IDEQ on November 8, 2006 (see Appendix 3 for a copy of the modeling protocol and the IDEQ approval letter).

7.1 Model Description / Justification

Air dispersion modeling was performed using the short term dispersion model Industrial Source Complex with Plume Rise Model Enhancement (ISC-PRIME) (version 04269). ISC-PRIME was an alternative EPA refined model listed in Appendix W of 40 CFR Ch. I, Part 51 – Guideline on Air Quality Models. On December 9, 2005 AERMOD replaced ISCST3 as the EPA preferred air dispersion model for refined modeling of industrial point sources. A one-year transition period was established that allowed for continued use of ISCST3 through November 9, 2006. The modeling protocol, submitted to the IDEQ for this project on November 8, 2006, proposed the use of ISC-PRIME. This modeling protocol was approved on November 29, 2006. Building downwash was accounted for in the ISC-PRIME model. Building and tank dimensions were entered into the Building Parameter Input Program for PRIME (BPIP-PRIME) (version 04274) to calculate appropriate building profiles to import into ISC-PRIME. Model output files are included in Appendix 4 and input/output files are included as electronic files on an enclosed compact disc.

7.2 Emission and Source Data

Six point sources were modeled. The six point sources included discharges from three baghouses, one boiler, and two electricity generator engines. Fugitive emission sources were not included in the modeling analysis. Four criteria pollutants (PM-10, NOx, SOx, and CO) were modeled from these sources. The only toxic air pollutant (TAP) that was considered for the site was hydrogen sulfide (H_2S). Emissions of H_2S will occur from equipment that combusts biogas at the facility (ES-4, ES-5, and ES-6). Ethyl alcohol is also a TAP that is emitted at the facility but the total VOC emission rate of 16.1 lb/hr (ethyl alcohol is a portion of this) is less than the emission screening limit (EL) for ethyl alcohol of 125 lb/hr. No other TAPs were identified for this facility. Table 7-1 summarizes the emission source characteristics used in the ambient impact analysis.

Although annual fuel consumption for the combustion sources was limited to prevent triggering the major source classification for CO emissions, air dispersion modeling was performed using the maximum potential to emit (no limits on fuel combustion).

Table 7-1
Emission Source Characteristics

Emission Source	Stack ID	Stack Height (m)	Stack Diam. (m)	Exhaust Temp. (K)	Stack Gas Vel. (m/s)	Emission Rates (g/s)				
						PM_{10}	NOx	SOx	CO	H_2S
Grain Receiving#1	C-1	12.2	0.61	Ambient	32.35	0.094	--	--	--	--
Grain Receiving#2	C-2	39.6	0.81	Ambient	3.05	0.023	--	--	--	--
Grain Mill/Cleaning	C-3	10.7	0.30	Ambient	0.001(1)	0.006	--	--	--	--
Boiler	ES-4	24.4	1.27	491.48	9.45	0.069	0.902	1.765	0.199	1.88E-2
Generator#1	ES-5	9.15	0.406	533.15	19.18	0.0	0.31	0.338	1.41	3.60E-3
Generator#2	ES-6	9.15	0.406	533.15	19.18	0.0	0.31	0.338	1.41	3.60E-3

Notes:
(1) Stack gas velocity set to 0.001 m/s for modeling purposes due to the stacks horizontal discharge orientation.

7.3 Receptor Network

A receptor network was established so that ambient concentrations could be evaluated. The first step in this process was to determine the location of the ambient air boundary and the second step was to assign receptor locations within the ambient air zone.

7.3.1 Ambient Air Boundary

The ambient air boundary was established as the facility's fenceline. There are two fencelines, one is around the main ethanol plant, the second fenceline is around the digester and biogas facilities that are east of J Street. (see Plot Plan – Section 6, for location of the fenceline).

7.3.2 Receptors

Receptors were established to determine maximum ambient air concentrations. A receptor grid with approximately 100 meter spacing was established across the entire evaluated area. Receptors along the ambient air boundary were spaced between 15 and 50 meters apart. Additional receptors were added as needed to determine the maximum model predicted ambient air concentration. No receptors were established within the facility's controlled property boundary (ambient air boundary).

7.4 Elevation Data

The facility was modeled assuming flat terrain. The maximum change in elevation observed across the site is 4 feet. There does not appear to be an increase in elevation within 1000 meters of the property that exceeds 10 feet. All model predicted maximum air concentrations occur at or within 100 meters of the ambient air boundary. There are no terrain elevations that exceed the emission source elevations

and terrain elevations are relatively flat in the areas of predicted maximum ambient air concentrations, so the terrain was modeled as flat with simple terrain.

7.5 Meteorological Data

Surface meteorological data was obtained from IDEQ for the Heyburn area for year 2000. This data is considered more representative of site meteorological data than the five year worst-case dataset available for Pocatello and Boise. Upper air meteorological data was from the EPA SCRAM website for Boise, measured over the same time period as the surface data.

7.6 Land Use Classification

The facility is industrial while the surrounding land is a mix of open space/agricultural and industrial land uses. The Air dispersion modeling was performed using a "rural" classification.

7.7 Background Concentrations

Table 7-2 summarizes the criteria pollutant background concentrations. Criteria pollutant background concentrations for small town/suburban areas were provided by Kevin Schilling of the IDEQ.

7.8 Evaluation of Compliance With Standards

To determine compliance with NAAQS, the applicable background concentrations were added to the maximum predicted ambient concentrations determined from air dispersion modeling to result in total ambient concentrations. These total ambient air concentrations were compared to the NAAQS. Table 7-2 summarizes the air dispersion modeling results and compares the total predicted ambient air concentration to the applicable NAAQS. See Appendix 4 for graphical output from air dispersion modeling. Based on this evaluation, no NAAQS are predicted to be exceeded by emissions from the sources, if operated and configured as proposed in this application.

Table 7-2
Results of Ambient Impact Assessment for Criteria Pollutants
(All Concentrations in Units of $\mu g/m^3$)

Pollutant	Averaging Period	Air Dispersion Model Output	Compliance Demonstration		
			Background	Total	NAAQS
PM10	24 hr, 2nd high	30.1	81	111.1	150
	Annual	9.3	27	36.3	50
NOx	Annual	20.4	32	52.4	100
CO	1hr, 2nd high	804	10,200	11,004	40,000
	8hr, 2nd high	661	3,400	4,061	10,000
SOx	3hr, 2nd high	176	42	218	1300
	24hr, 2nd high	93.5	26	119.5	365
	Annual	24.3	8	32.3	80

7.9 Evaluation of Ambient Impact Assessment for TAPs

Hydrogen sulfide is the only TAP predicted to be emitted from the facility at a rate greater than the screening Emission Limit (EL). Table 7-3 summarizes the results of air dispersion modeling performed to evaluate the ambient impact for H_2S. Maximum predicted ambient air concentrations were compared to AAC in Table 7-3. The AAC for H_2S was not exceeded by the maximum predicted ambient air concentration; therefore, the predicted ambient impact from TAP emissions is acceptable.

Table 7-3
Results of Ambient Impact Assessment for Toxic Air Pollutants
(All Concentrations in Units of $\mu g/m^3$)

Pollutant	Averaging Period	Air Dispersion Modeling Output	Idaho AAC
H_2S	24 hr, 1st high	1.24	700