STATE OF NEBRASKA

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CONSTRUCTION PERMIT AMENDMENT

PERMIT NUMBER: CP06-0021

ORIGINAL PERMIT TO CONSTRUCT AN AIR CONTAMINANT SOURCE ISSUED ON NOVEMBER 17, 2005, TO:

Siouxland Ethanol, LLC
PO Box 147
Jackson, Nebraska 68743-0147

FOR THE SPECIFIC CONSTRUCTION OF:

Dry Mill Process Ethanol Manufacturing Facility

LOCATED AT:

1501 Knox Boulevard
Jackson, Dakota County, Nebraska 68743

IS HEREBY AMENDED AS FOLLOWS:

- Increase allowable emissions from emission points S20, S30, and S70;
- Allow the biogas from the adjacent L.P. Gill Landfill to be burned as fuel in the thermal oxidizer (TO); and
- Require the heights of several emission stacks be increased.

Pursuant to Chapter 14 of the Nebraska Air Quality Regulations, the public has been notified by prominent advertisement of this proposed construction permit amendment and the thirty (30) day period allowed for comments has elapsed. This construction permit amendment approves the proposed changes to the existing ethanol manufacturing facility permit.

This permit may contain abbreviations and symbols of units of measure, which are defined in 40 CFR Part 60.3. Other abbreviations may include, but are not limited to, the following: Code of Federal Regulations (CFR), Compilation of Air Pollutant Emission Factors, Volume I, Stationary Point and Area Sources (AP-42), Carbon Monoxide (CO), Hazardous Air Pollutant (HAP), Hazardous Air Pollutants (HAPs), Hydrogen Sulfide (H_2S), Million British thermal units per hour (MMBtu/hr), New Source Performance Standards (NSPS), Nitrogen Oxides (NO_x), Particulate Matter (PM), Particulate Matter less than or equal to 10 micrometers (PM_{10}), Prevention of Significant Deterioration (PSD), Sulfur Dioxide (SO_2), Volatile Organic Compounds (VOC).

This construction permit amendment supersedes Conditions XIII.(B)(3), XIII.(D)(2), XIII.(D)(5), XIII.(D)(6)(f), XIII.(E)(3), XIII.(O)(1), and Equations 2d.1 and 2d.2 of Attachment A of the original construction permit issued on November 17, 2005.

This permit is issued with the following conditions under the authority of Title 129 - Nebraska Air Quality Regulations as amended December 13, 2006:

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Condition XIII.(B)(3) now reads:

(3) PM emissions from the grain receiving baghouse (S20) and the hammermill baghouse (S30) shall not exceed the following emission limits (3-hour or test method average). {Title 129, Chapters 4 and 19}

(a) S20: 1.67 pounds per hour

(b) S30: 1.20 pounds per hour

Condition XIII.(D)(2) now reads:

(2) Only natural gas and methane from the biomethanator shall be burned as fuel in the dryers. Only natural gas or landfill biogas shall be burned as fuel in the thermal oxidizer;

Condition XIII.(D)(5) now reads:

(5) In order to demonstrate compliance with Conditions XIII.(A) and (D)(4) and to verify the assumptions used in the permit application, the source shall conduct two performance tests for CO, SO_2, VOC, HAPs, and PM (both filterable and condensable) on the TO/HRSG system stack (S10) while burning 1) natural gas and 2) landfill biogas. The performance tests shall be conducted in accordance with Condition XIII.(N) and shall include speciation and quantification of the HAP composition of the emissions. If sufficient landfill biogas is not available to conduct a test using 100% biogas, then the remainder will be natural gas and the test will specify the percentage of biogas that was used. VOC emissions shall be expressed as weight of VOC. {Title 129, Chapter 34}

Condition XIII.(D)(6)(f) now reads:

(f) The source shall record and maintain records of the amount of natural gas and landfill gas combusted during each day unless EPA Region VII approves an alternative record-keeping frequency. {40 CFR 60.49b(d)}

Condition XIII.(E)(3) now reads:

(3) The emissions from the DDGS cooler cyclone/baghouse system (S70) shall not exceed the following emission limits (3-hour or test method average). {Title 129, Chapters 4 and 19}

(a) 1.20 pounds per hour PM

(b) 1.20 pounds per hour PM_{10}

Condition XIII.(O)(1) now reads:

(1) Stack heights shall not be less than the following heights above ground level:

Emission Point	Minimum Stack Height (ft)
S10 (TO/HRSG system stack)	125
S20 (grain receiving baghouse)	135
S30 (hammermill baghouse)	135
S40 (CO_2 scrubber)	45
S50 (truck loadout flare)	36
S60 (biomethanator flare)	34
S70 (DDGS cooler cyclone/baghouse system)	135
S90 (DDGS loading baghouse)	40
Cooling tower (each cell)	28

Attachment A, Equations 2d.1 and 2d.2 now read:

(2d.1) $E_{TF} = (\{(NEF_{TF}) \times (NQ_{TF}) \times (HN)\} + \{(LFGEF_{TF}) \times (LFGQ_{TF}) \times (HLFG)\}) / (2000 \text{ lbs/ton})$

Where:
E_{TF} = Fuel combustion emissions from thermal oxidizer (tons/month)
NEF_{TF} = Natural gas combustion emission factor (lb/MMBtu)
NQ_{TF} = Natural gas usage rate in the thermal oxidizer (MMscf/month)
HN = Heat content of natural gas (MMBtu/MMscf)
$LFGEF_{TF}$ = Landfill biogas combustion emission factor (lb/MMBtu)
$LFGQ_{TF}$ = Landfill biogas usage rate in the thermal oxidizer (MMscf/month)
HLFG = Heat content of landfill biogas (MMBtu/MMscf)

(2d.2) $E_{TF} = (\{(NEF_{TF}) \times (NQ_{TF})\} + \{(LFGEF_{TF}) \times (LFGQ_{TF})\}) / (2000 \text{ lbs/ton})$

Where:
E_{TF} = Fuel combustion emissions from thermal oxidizer (tons/month)
NEF_{TF} = Natural gas combustion emission factor (lb/MMscf)
NQ_{TF} = Natural gas usage rate in the thermal oxidizer (MMscf/month)
$LFGEF_{TF}$ = Landfill biogas combustion emission factor (lb/MMBtu)
LFGQTF = Landfill biogas usage rate in the thermal oxidizer (MMscf/month)

The amendments to Condition XIII. of the original construction permit issued on November 17, 2005, addressed herein do not trigger any additional requirements under Nebraska Title 129. No other terms or conditions of the original construction permit are being revised or otherwise amended by this document.

All other provisions of the original issued permit are still in effect, and in concert with this amendment, constitute the effective construction permit. This amended construction permit form shall be attached to the original construction permit and maintained with it henceforth.

The undersigned issues this document on behalf of the Director in accordance with Title 129 – Nebraska Air Quality Regulations.

4/13/07
Date

Shelley Kaderly
Air Quality Division Administrator

FACT SHEET

Siouxland Ethanol, LLC
1501 Knox Boulevard
Jackson, Dakota County, Nebraska 68743

April 13, 2007

DESCRIPTION OF THE FACILITY OR ACTIVITY:

Siouxland Ethanol is currently under construction. It received a construction permit on November 17, 2005. The proposed modifications to that construction permit are to allow the emission rate of Emission Points S20 (baghouse), S30 (baghouse), and S70 (baghouse) to increase, to allow biogas from the adjacent L.P. Gill Landfill to be combusted as fuel in the Thermal Oxidizer (TO) (emission point S10), and to require the stack heights of Emission Points S20, S30, S60 (flare), and S70 to be raised. In addition, but not requiring any modification of permit conditions, the legal location of the source as cited in the permit be corrected from R76W to R7E.

The fact sheet also has corrections to the potential to emit emissions for several emission units. These corrections include a decrease in fugitive emissions from equipment associated with baghouses S20, S30, and S90 due to greater capture efficiency. These corrections will cause any changes to the permit, but will affect the facility-wide potential to emit summary.

ABBREVIATIONS USED IN THIS FACT SHEET

acfm	Actual cubic feet per minute
AP-42	Compilation of Air Pollutant Emission Factors, Volume I, Stationary Point and Area Sources
CAS #	Chemical Abstracts Service Registry Number
CP	Construction permit
DDGS	Dried distillers grain with solubles
gr/dscf	Grains per dry standard cubic feet
HAP	Hazardous air pollutant
lbs/hr	Pounds per hour
min/hr	Minutes per hour
MMBtu	Million British Thermal Units
MMscf	Million standard cubic feet
NO_x	Nitrogen oxides
PM	Particulate matter
PM_{10}	Particulate matter smaller than or equal to 10 microns
PTE	Potential to Emit
SO_2	Sulfur dioxide
TO	Thermal oxidizer
TO/HRSG	Thermal oxidizer/heat recovery steam generator
Tons/yr	Tons per year

TYPE AND QUANTITY OF AIR CONTAMINANT EMISSIONS ANTICIPATED:

The revised emission limits for Emissions Points S20, S30, and S70 will result in an increase of PM and PM_{10} emissions. The addition of landfill gas as an approved fuel for the TO will result in a small increase in potential SO_2 and individual HAP emissions. Additionally, the corrections to the fugitive

emissions from the baghouses will result in a decrease in PM and PM_{10} emissions. The proposed design changes to the stack heights and diameter will not affect the quantity or chemical constituents of the emissions. The changes in potential emissions are summarized in Table 6.

Baghouses and Associated Fugitive Emissions (S20, S30, S70 and S90)

The Grain Receiving Baghouse (S20) has an emission increase due to an increase in the grain loading from 0.00057 gr/dscf to 0.005 gr/dscf. The Milling Baghouse (S30) has an emission increase due to an increase in the grain loading from 0.0028 gr/dscf to 0.005 gr/dscf and an increase in the airflow from 17,550 acfm to 28,000 acfm. The DDGS Cooling System Baghouse (S70) has an emission increase due to an increase in the grain loading from 0.00015 gr/dscf to 0.005 gr/dscf for PM and grain loading from 0.00025 gr/dscf to 0.005 gr/dscf for PM_{10}. No change to the DDGS Storage and Loadout Baghouse (S90).

S20 Grain Receiving Baghouse proposed PTE (emissions for PM and PM_{10}):
(0.005 gr/dscf)(1 lb/7,000 grains)(39,000 acf/min)(60 min/hr) = 1.67 lbs/hr
(1.67 lbs/hr)(8,760 hrs/yr)/(2,000 lbs/ton)= 7.32 tons/yr

S30 Milling Baghouse proposed PTE (emissions for PM and PM_{10}):
(0.005 gr/dscf)(1 lb/7,000 grains)(28,000 acf/min)(60 min/hr) = 1.20 lbs/hr
(1.20 lbs/hr)(8,760 hrs/yr)/(2,000 lbs/ton) = 5.26 tpy.

S70 DDGS Cooling System Baghouse proposed PTE (emissions for PM and PM_{10}):
(0.005 gr/dscf)(1 lb/7,000 grains)(28,000 acf/min)(60 min/hr) = 1.20 lbs/hr
(1.20 lbs/hr)(8,760 hrs/yr)/(2,000 lbs/ton) = 5.26 tpy

The fugitive (uncollected process) emissions from the baghouse operations are emissions that are not captured in the airflow routed to each of the baghouses. The baghouses and the operations' enclosures have a capture efficiency of 95%. In the 2005 construction permit, the capture efficiencies' were assumed to be 80 or 90% (conservative values). The emissions are estimated based on AP-42 factors from Grain Elevators and Processes, Section 9.9.1 (May 2003), Table 9.9.1-1 for grain receiving and handling/storage (AP-42 activity: hopper trucks and headhouse), and Table 9.9.1-2 for grain scalping and DDGS storage/loadout (AP-42 activity: cleaning house and feed shipping).

Table 1 contains the fugitive emissions for operations associated with Baghouses S20, S30, and S90. (There are no fugitive emissions from Baghouse S70.)

Annual rate
= (throughput tons/yr)(emission factor lbs/ton)(1-(capture efficiency %/100))/ (2,000 lbs/ton)
= tons/yr

Hourly rate = (annual rate tons/yr)(2,000 lbs/ton)/(8,760 hrs/yr) = lbs/hr

Table 1: Fugitive Emissions Summary for Operations Associated with Baghouses S20, S30, and S90						
Process	Throughput (tons/yr)	Pollutant	Emission Factor (lbs/ton)	Capture Efficiency (%)	Fugitive Emissions	
					(lbs/hr)	(tons/yr)
Grain Receiving	550,000	PM	0.035	95	0.110	0.481
		PM_{10}	0.0078	95	0.024	0.107
Grain Handling & Storage	550,000	PM	0.061	95	0.191	0.839
		PM_{10}	0.034	95	0.107	0.468
Grain Scalping	550,000	PM	0.012	95	0.038	0.165
		PM_{10}	0.006	95	0.019	0.083
DDGS Storage & Loadout	178,440	PM	0.0033	95	0.003	0.015
		PM_{10}	0.0008	95	0.0008	0.004

Tables 2 & 3 summarize the PM and PM10 emission changes from the baghouses and associated fugitive emissions. Emission sources that are not modified from the 2005 construction permit are not listed in these tables.

Table 2: PM Emission Summary From Baghouses and Associated Fugitive Emissions						
Emission Unit	2005 Permitted PTE		Proposed PTE		Change in PTE	
	(lbs/hr)	(tons/yr)	(lbs/hr)	(tons/yr)	(lbs/hr)	(tons/yr)
Grain Receiving Baghouse	0.19	0.83	1.67	7.32	1.48	6.49
Milling Baghouse	0.42	1.84	1.20	5.26	0.78	3.42
DDGS Cooling System Baghouse	0.37	1.61	1.20	5.26	0.83	3.65
Grain Receiving – Fugitives	0.440	1.927	0.110	0.481	-0.330	-1.446
Grain Handling/Storage - Fugitives	0.383	1.678	0.191	0.839	-0.192	-0.839
Grain Scalping - Fugitives	0.151	0.661	0.038	0.165	-0.113	-0.496
DDGS Storage/Loadout - Fugitives	0.350	1.533	0.003	0.015	-0.347	-1.518
Total PM Emission Change					2.108	9.261

Table 3: PM_{10} Emission Summary From Baghouses and Associated Fugitive Emissions						
Emission Unit	2005 Permitted PTE		Proposed PTE		Change in PTE	
	(lbs/hr)	(tons/yr)	(lbs/hr)	(tons/yr)	(lbs/hr)	(tons/yr)
Grain Receiving Baghouse	0.19	0.83	1.67	7.32	1.48	6.49
Milling Baghouse	0.42	1.84	1.20	5.26	0.78	3.42
DDGS Cooling System Baghouse	0.06	0.27	1.20	5.26	1.14	4.99
Grain Receiving – Fugitives	0.098	0.429	0.024	0.107	-0.074	-0.322
Grain Handling/Storage - Fugitives	0.213	0.933	0.107	0.468	-0.106	-0.465
Grain Scalping - Fugitives	0.075	0.329	0.019	0.083	-0.056	-0.246
DDGS Storage/Loadout - Fugitives	0.118	0.517	0.001	0.004	-0.117	-0.513
Total PM_{10} Emission Change					3.047	13.354

TO/HRSG System Stack (S10)

Landfill biogas is being added as an additional fuel for the thermal oxidizer. The CO, VOC, PM, and PM_{10} emissions from the fuel combustion are included in the Process Vent Emissions (includes drying, and pre-fermentation/distillation equipment). The facility has chosen to maintain the permitted emission limits for CO, VOC, PM, and PM10 from the 2005 Construction Permit, because the Process Vent Emissions calculations in the 2005 Construction Permit were conservative and any differences between the combustion of natural gas and landfill gas for these pollutants will be accounted for in the Process Vent Emissions. The Process Vent Emissions are unchanged for this modification. The emissions from fuel combustion in the DDGS dryers are unchanged for this modification.

Table 4 includes the emission calculations for the combustion of landfill gas. The emission factor for SO_2 was determined based on testing data from November/December 2005 on the L.P. Gill Landfill, which determined the concentrations of all of the sulfur containing compounds in the landfill biogas. The concentrations of sulfur containing compounds was converted to concentration of Total Reduce Sulfur, then converted to SO_2. The calculations and values for each step of the SO_2 emission factor determination was submitted as part of the May 2006 construction permit application. The NO_x emission factor is from AP-42, Section 2.4-5 (11/1998), Table 2.4-5 using value for boiler/steam turbine. The HAPs emission factors were determined based on testing data from November/December 2005 on the L.P. Gill Landfill, which determined the concentration of each individual HAP in the landfill biogas. The individual HAP concentrations were converted into units of lbs/MMscf; the May 2006 construction permit application includes the conversion calculations. (Some of the individual HAP names in Table 4 are different than the names in the construction permit application. These are individual HAP names as they are listed in Title 129 (synonyms of chemical names in the application). The CAS # is listed in the table to assist in correlating the synonyms.)

Heat content of landfill biogas: 505 MMBtu/MMscf
Hourly PTE = (150 MMBtu/hr)(1 MMscf/505 MMBtu)(Emission Factor in lbs/MMscf) =lbs/hr
Annual PTE = (Hourly PTE lbs/hr)(8,760 hrs/yr)/(2,000 lbs/ton) = tons/yr

Table 4: Thermal Oxidizer - Landfill Biogas Combustion Emissions				
Pollutant	CAS #	Emission Factor (lbs/MMscf)	Potential Hourly Emissions (lbs/hour)	Potential Annual Emissions (tons/yr)
SO_2		2.04	0.61	2.65
NO_x		33	9.80	42.93
Individual HAPs				
Acetonitrile	75058	0.0119	0.0035	0.0155
Acrolein	107028	0.0137	0.0041	0.0178
Benzene	71432	0.0336	0.0100	0.0437
1,3-Butadiene	106990	0.044	0.0131	0.0572
Carbon Disulfide	75150	0.0203	0.0060	0.0264
Carbonyl Sulfide	463581	0.0024	0.0007	0.0031
Ethyl Chloride	75003	0.0435	0.0129	0.0566
Ethylene Dichloride	107062	0.0129	0.0038	0.0168
Ethylidene Dichloride	75343	0.0351	0.0104	0.0457
n-Hexane	110543	0.3183	0.0945	0.4141
Methyl Chloroform	71556	0.0078	0.0023	0.0101
Methyl Ethyl Ketone	78933	0.2913	0.0865	0.3790
Methyl tert-Butyl Ether	1634044	0.0162	0.0048	0.0211
Methylene Chloride	75092	0.2701	0.0802	0.3514
Toluene	108883	0.0201	0.0060	0.0261
Trichloroethylene	79016	0.0148	0.0044	0.0193
Vinyl Chloride	75014	0.123	0.0365	0.1600
Vinylidene Chloride	75354	0.253	0.0751	0.3292
Total HAPs			0.4550	1.9931

Table 5 compares the natural gas and landfill biogas emissions due to fuel combustion in the thermal oxidizer. The natural gas emissions are from the 2005 construction permit's fact sheet. The landfill biogas emissions are from Table 4. The Worst-Case Fuel column identifies whether natural gas (NG) or landfill biogas (LFG) has the worst-case emission rate for each pollutant. The Change in Emissions column identifies the increase in potential emissions from each pollutant (occurs when LFG is worst-case fuel).

Table 5: Summary in Change in Emissions for Fuel Combustion in Thermal Oxidizer							
Pollutant	Natural Gas		Landfill Gas		Worst-Case Fuel	Change in Emissions from 2005 permit	
	Hourly Emissions	Annual Emissions	Hourly Emissions	Annual Emissions			
	(lbs/hr)	(tons/yr)	(lbs/hr)	(tons/yr)		(lbs/hr)	(tons/yr)
SO_2	0.09	0.394	0.606	2.654	LFG	0.516	2.260
NO_x	12.75	55.845	9.802	42.933	NG	0.000	0.000
Individual HAPs							
Acetonitrile	0	0	0.0035	0.0155	LFG	0.0035	0.0155
Acrolein	0	0	0.0041	0.0178	LFG	0.0041	0.0178
Benzene	0.000315	0.00138	0.0100	0.0437	LFG	0.0097	0.0423
1,3-Butadiene	0	0	0.0131	0.0572	LFG	0.0131	0.0572
Carbon Disulfide	0	0	0.0060	0.0264	LFG	0.0060	0.0264
Carbonyl Sulfide	0	0	0.0007	0.0031	LFG	0.0007	0.0031
Dichlorobenzene	0.00018	0.000788	0	0	NG	0.0000	0.0000
Ethyl Chloride	0	0	0.0129	0.0566	LFG	0.0129	0.0566
Ethylene Dichloride	0	0	0.0038	0.0168	LFG	0.0038	0.0168
Ethylidene Dichloride	0	0	0.0104	0.0457	LFG	0.0104	0.0457
n-Hexane	0.27	1.1826	0.0945	0.4141	NG	0.0000	0.0000
Lead	0.000075	0.000329	0	0	NG	0.0000	0.0000
Methyl Chloroform	0	0	0.0023	0.0101	LFG	0.0023	0.0101
Methyl Ethyl Ketone	0	0	0.0865	0.3790	LFG	0.0865	0.3790
Methyl tert-Butyl Ether	0	0	0.0048	0.0211	LFG	0.0048	0.0211
Methylene Chloride	0	0	0.0802	0.3514	LFG	0.0802	0.3514
Naphthalene	9.15E-05	0.000401	0	0	NG	0.0000	0.0000
Polycyclic Organic Matter	1.32E-05	5.79E-05	0	0	NG	0.0000	0.0000
Toluene	0.00051	0.002234	0.0060	0.0261	LFG	0.0055	0.0239
Trichloroethylene	0	0	0.0044	0.0193	LFG	0.0044	0.0193
Vinyl Chloride	0	0	0.0365	0.1600	LFG	0.0365	0.1600
Vinylidene Chloride	0	0	0.0751	0.3292	LFG	0.0751	0.3292
Arsenic Compounds	0.00003	0.000131	0	0	NG	0.0000	0.0000
Beryllium Compounds	1.8E-06	7.88E-06	0	0	NG	0.0000	0.0000
Cadmium Compounds	0.000165	0.000723	0	0	NG	0.0000	0.0000
Chromium Compounds	0.00021	0.00092	0	0	NG	0.0000	0.0000
Cobalt Compounds	1.26E-05	5.52E-05	0	0	NG	0.0000	0.0000
Manganese Compounds	0.000057	0.00025	0	0	NG	0.0000	0.0000
Mercury Compounds	0.000039	0.000171	0	0	NG	0.0000	0.0000
Nickel Compounds	0.000315	0.00138	0	0	NG	0.0000	0.0000
Selenium Compounds	3.6E-06	1.58E-05	0	0	NG	0.0000	0.0000
Total HAPs	0.2715	1.1893	0.4550	1.9931	LFG	0.1835	0.8038

Table 6 is the facility-wide summary of the changes of the potential emissions and identifies the proposed new potential to emit.

Table 6: Facility-Wide Emission Summary			
Regulated Pollutant	2005 Permitted PTE (tons/year)	Total Changes in Emissions (tons/year)	Proposed PTE (tons/year)
PM	86.80	9.26	96.06
PM_{10}	40.68	13.35	54.03
SO_2	40.90	2.26	43.16
NO_x	94.23	0	94.23
CO	94.89	0	94.89
VOCs	<100	0	<100
Individual HAPs	<10 each	Individual HAPs increased by 0.002 to 0.191 tons/yr per pollutant, and including 12 new individual HAPs (see Table 5)	<10 each
Total HAPs	<25	0[1]	<25

[1] Even though more individual HAPs may be emitted, the worst-case Total HAPs emission rate is when the thermal oxidizer is combusting natural gas.

APPLICABLE REQUIREMENTS AND VARIANCES OR ALTERNATIVES TO REQUIRED STANDARDS:

Title 129, Chapter 4 – Ambient Air Quality Standards:

1. Air Quality Impact Analysis

The air quality impact analysis for the proposed Siouxland Ethanol facility consists of a refined modeling analysis to demonstrate that the proposed facility will not cause or contribute to any violations of applicable Ambient Air Quality Standards (AAQS) for those pollutants with concentrations above the respective Significant Impact Levels (SILs) in Table 1.0-1 of the Department's *Atmospheric Dispersion Modeling Guidance for Permits* (09/05). The analysis includes all appropriate regional emission sources (other nearby facilities). A refined analysis was completed for annual, 3-hour, and 24-hour SO_2, annual NO_2, and 24-hour & annual PM_{10} because these were the pollutants and averaging periods for which the maximum concentrations from the Siouxland Ethanol facility were predicted to exceed SILs.

The specifics of the air quality impact analysis can be found in the facility's permitting file at the DEQ.

2. Refined Modeling Analysis for NAAQS Compliance

The purpose of the refined modeling analysis is to demonstrate that the proposed project will not cause or contribute to violations of applicable AAQS for SO_2 (3-hour, 24-hour, & Annual), PM_{10} (24-hour, & Annual), and NO_2 (Annual). The Nebraska and National AAQS are identical. The AAQS are shown below:

Table 7: Nebraska and National Ambient Air Quality Standards For SO_2, PM_{10}, and NO_2			
Pollutant	Averaging Period	Ambient Air Quality Standards ($\mu g/m^3$)	
		National	Nebraska
SO_2	3-hour [a]	1300	1300
	24-hour [a]	365	365
	Annual	80	80
PM_{10}	24-hour [b]	150	150
	Annual	50	50
NO_2	Annual	100	100

[a] Concentration is allowed to be exceeded once per year at a single receptor.

[b] Concentration is allowed to be exceeded five times in a five-year period at a single receptor.

This ambient air quality impact analysis takes into account the combined impacts of emissions from the proposed Siouxland Ethanol facility, contributions from nearby major and minor sources, and background concentrations due to distant major and minor sources and natural sources. Based on the potential emissions from the proposed facility and other sources' allowable emissions, this analysis demonstrates that the facility is expected to be in compliance with the AAQS for SO_2, PM_{10}, and NO_2.

a. SO_2 Results

The SO_2 results for AAQS compliance are shown in the table below for 3-hour, 24-hour and annual concentrations, including contributions from existing sources of SO_2 emissions in the project area. As shown in the table, the 3-hr, 24-hour and annual concentrations are predicted to be below the ambient standards.

Table 8: Maximum Predicted Ambient SO_2 Concentrations							
Averaging Period	Year	UTM Coordinates (m)		Background ($\mu g/m^3$)	Modeled ($\mu g/m^3$)	Total ($\mu g/m^3$)	AAQS ($\mu g/m^3$)
		X	Y				
3-hour	1987	694,750	4,698,000	120	264.71	384.71	1,300
	1988	697,750	4,698,750		253.89	373.89	
	1989	696,250	4,698,750		295.57	415.57	
	1990	697,750	4,698,750		298.84	418.84	
	2004	695,000	4,702,750		249.68	369.68	
24-hour	1987	697,750	4,698,750	48	62.92	110.92	365
	1988	697,750	4,698,750		64.39	112.39	
	1989	696,000	4,698,750		79.36	127.36	
	1990	695,500	4,698,750		71.81	119.81	
	2004	697,750	4,698,750		62.41	110.41	
Annual	1987	697,750	4,698,750	12	10.45	22.45	80
	1988	697,750	4,698,750		11.19	23.19	
	1989	697,750	4,698,750		13.24	25.24	
	1990	697,750	4,698,750		10.64	22.64	
	2004	697,750	4,698,750		10.64	22.64	

b. PM_{10} Results

The PM10 results for AAQS compliance are shown in the table below for 24-hour and annual concentrations, including contributions from existing sources of PM_{10} emissions in the project area. Siouxland Ethanol modeling does not include haul roads. As shown in the table, the 24-hour and annual concentrations are predicted to be below the ambient standards.

Table 9: Maximum Predicted Ambient PM_{10} Concentrations

Averaging Period	Year	UTM Coordinates (m) X	UTM Coordinates (m) Y	Background ($\mu g/m^3$)	Modeled ($\mu g/m^3$)	Total ($\mu g/m^3$)	AAQS ($\mu g/m^3$)
24-hour	00-04	697,796	4,702,887	60	85.36	145.36	150
Annual	2000	697,740	4,702,966	25	8.46	33.46	50
	2001	697,796	4,702,887		9.42	34.42	
	2002	697,740	4,702,966		9.77	34.77	
	2003	697,796	4,702,887		11.36	36.36	
	2004	697,740	4,702,966		8.07	33.07	

c. NO_2 Results

The NO_2 results for AAQS compliance are shown in the table below for annual concentrations, including contributions from existing sources of NO_2 emissions in the project area. As shown in the table, the annual concentrations are predicted to be below the ambient standards.

Table 10: Maximum Predicted Ambient NO_2 Concentrations

Averaging Period	Year	UTM Coordinates (m) X	UTM Coordinates (m) Y	Background ($\mu g/m^3$)	Modeled ($\mu g/m^3$)	Total ($\mu g/m^3$)	AAQS ($\mu g/m^3$)
Annual	1987	697,365	4,702,998	15	12.98	27.98	100
	1988	697,365	4,702,998		12.86	27.86	
	1989	697,365	4,702,998		15.02	30.02	
	1990	697,365	4,702,998		12.35	27.35	
	1991	697,365	4,702,998		13.61	28.61	

3. Air Quality Impact Summary

The analyses of the proposed Siouxland Ethanol facility demonstrate that the facility will comply with all applicable short-term (3-hour, & 24-hour) and annual SO_2, PM_{10}, and NO_2 Ambient Air Quality Standards.

To ensure that assumptions used in the modeling remain valid, the facility will have to conduct best management practices for maintenance of the haul roads, if best management practices are not properly maintained, then the facility may need to remodel to show compliance with the NAAQS.

Title 129, Chapter 17 – Construction Permit Requirements: The facility submitted application to allow landfill gas to be combusted in the TO and to revise other requirements in the original permit. Facility-wide emissions after issuance of this permit required the submission of a $1,500 application fee.

Title 129, Chapter 18 – New Source Performance Standards (NSPS), and 40 CFR Part 60:
The proposed modifications to the facility do not change the applicability of the NSPS subparts from the November 17, 2005, construction permit. See the fact sheet associated with the 2005 construction permit for the NSPS subpart discussions.

Title 129, Chapter 19 – Prevention of Significant Deterioration (PSD)

This modification does not trigger the PSD thresholds. Since this is a new plant (plant still under construction), the initial PSD threshold is used to determine if this plant triggers PSD requirements. Since this is a Synthetic Organic Compound Manufacturing Industry (SOCMI) Plant, the initial PSD threshold is 100 tons per year each for PM, PM_{10}, SO_x, NO_x, VOC, and CO (including fugitive emissions). Since the controlled emissions do not exceed 100 tons/yr, this plant is not subject to PSD and is a PSD minor source.

Title 129, Chapter 20, Section 001 - Process Weight Rate

Each of the permitted emission rate limitations ensures the process weight rate limitations will not be exceeded. The following formulas were used to determine compliance: for process weight rates up to 60,000 lbs/hr, $E= 4.10\ p^{0.67}$, and for process weight rates in excess of 60,000 lbs/hr, $E= 55.0\ p^{0.11}-40$, where E = rate of emissions in lbs/hr and p = process weight rate in tons/hr. The Process Weight Rate evaluations are unchanged from the 2005 construction permit for the fermentation scrubber (S40), TO/HRSG system (S10), DDGS loadout baghouse (S90), and cooling tower (S80) – see the fact sheet associated with the 2005 construction permit for the evaluations of these emission units.

For the grain receiving baghouses (S20):

P = 125,570 lbs/hr corn = 62.79 tons/hr corn processed

$E = 55.0(62.79)^{0.11}-40 = 46.72$ lbs/hr PM emission rate allowed per Title 129, Chapter 20

S20 = 1.67 lbs/hr PM emission rate limitation in permit

For the grain milling baghouses (S30):

P = 125,570 lbs/hr corn = 62.79 tons/hr corn processed

$E = 55.0(62.79)^{0.11}-40 = 46.72$ lbs/hr PM emission rate allowed per Title 129, Chapter 20

S30 = 1.20 lbs/hr PM emission rate limitation in permit

For DDGS cooler (S70):

P = 20.37 tons/hr DDGS cooled = 40,740 lbs/hr DDGS cooled

$E = 4.10\ (20.37)^{0.67} = 30.89$ lbs/hr PM emission rate allowed per Title 129, Chapter 20

S70 = 1.20 lbs/hr PM emission rate limitation in permit

Title 129, Chapter 20, Section 002 - Particulate Emissions from Combustion Sources:

The evaluations of particulate emissions from combustion sources are unchanged from the fact sheet associated with the 2005 construction permit.

Title 129, Chapter 20, Section 004 – Opacity:

The discussion about opacity is unchanged from the fact sheet associated with the 2005 construction permit.

Title 129, Chapter 24 – Sulfur Compound Emissions:

The regulation limits sulfur compound emissions from fossil fuel burning to less than 2.5 lbs/MMBtu. The evaluations of sulfur compound (SO_x) emissions from combustion sources are unchanged from the fact sheet associated with the 2005 construction permit. The facility added landfill biogas as a fuel to the thermal oxidizer. Landfill Biogas is not a fossil fuel; therefore it isn't subject to this chapter of Title 129.

Title 129, Chapter 27 - Best Available Control Technology/ Maximum Achievable Control Technology:

The evaluations of Best Available Control Technology (BACT) and Maximum Achievable Control Technology for HAPs are unchanged from the fact sheet associated with the 2005 construction permit.

Title 129, Chapter 28 - National Emission Standards for Hazardous Air Pollutants (NESHAP, 40 CFR 63)

The evaluations of NESHAPs (40 CFR 63) are unchanged from the fact sheet associated with the 2005 construction permit.

Permit conditions specific to the proposed permit are discussed as follows:

Condition XIII.(B)(3) was modified to increase the maximum PM emissions from baghouse S20 from 0.19 lbs/hr to 1.67 lbs/hr and from baghouse S30 from 0.42 lbs/hr to 1.20 lbs/hr. This increase in emissions was as requested by the facility.

Condition XIII.(D)(2) allows combustion of landfill biogas as well as natural gas as fuel in the thermal oxidizer as requested by the facility.

Condition XIII.(D)(5) requires stack tests on the TO/HRSG system stack (S10) while burning 1) natural gas and 2) landfill biogas.

Condition XIII.(D)(6)(f) requires the source to record the amount of natural gas and landfill biogas combusted during each day.

Condition XIII.(E)(3) was modified to increase the maximum emissions from baghouse S70 from 0.37 lbs/hr to 1.20 lbs/hr for PM and from 0.06 lbs/hr to 1.20 lbs/hr for PM_{10}. This increase in emissions was requested by the facility.

Condition XIII.(O)(1) was modified to increase the stack height for baghouses S20 and S30 from 40 ft to 135 ft (each), biomethanator flare (S60) from 11 ft to 34 ft, and baghouse S70 from 45 ft to 135 ft. This increases in stack heights were requested by the facility based on NAAQS modeling.

Permit Attachment A, Equations 2d.1 and 2d.2 now include the combustion emission factor, usage rate in the thermal oxidizer, and heat content of landfill biogas.

STATUTORY OR REGULATORY PROVISIONS ON WHICH PERMIT REQUIREMENTS ARE BASED:

Applicable regulations: Title 129 - Nebraska Air Quality Regulations as amended December 13, 2006.

PROCEDURES FOR FINAL DETERMINATION WITH RESPECT TO THE PROPOSED CONSTRUCTION PERMIT:

The public notice, as required under NAQR Chapter 14, shall be published on March 8, 2007, in the South Sioux City Star newspaper. Persons or groups shall have 30 days from that issuance of public notice (April 6, 2007) to provide the NDEQ with any written comments concerning the proposed permit action and/or to request a public hearing, in accordance with NAQR Chapter 14. If a public hearing is granted by the Director, there will be a notice of that meeting published at least 30 days prior to the hearing. Persons having comments or requesting a public hearing may contact:

W. Clark Smith-Permitting Section Supervisor
Air Quality Division
Nebraska Department of Environmental Quality
PO Box 98922
Lincoln, Nebraska 68509-8922

If no public hearing is requested, the permit may be granted at the close of the 30-day comment period. If a public hearing is requested, the Director of the NDEQ may choose to extend the date on which the permit is to be granted until after that public hearing has been held. During the 30-day comment period, persons requiring further information should contact:

Stephenie Moyer-Program Specialist
Air Quality Division-Permitting Section
Nebraska Department of Environmental Quality
PO Box 98922
Lincoln, Nebraska 68509-8922

Telephone inquiries may be made at:

(402) 471-2189

TDD users please call 711 and ask the relay operator to call us at (402) 471-2186.