

Nebraska Air Quality Construction Permit Application

APPLICATION COVER SHEET AND CHECKLIST



Nebraska
DEQ

Department Of Environmental Quality
Air Quality Division – Construction Permit Unit
P.O. Box 98922, Lincoln, NE 68509-8922
877-834-0474 or 402-471-2189
<http://deq.ne.gov/>

Facility Name: State of Nebraska Ethanol

Date: 1/1/2007

Facility ID# (if known): _____

IMPORTANT: PLEASE READ THE GENERAL INSTRUCTIONS AT THE END OF THIS COVER SHEET

All applications must also include this completed cover sheet and completeness checklist. Please indicate below which application forms/sections are being included with this Construction Permit Application packet.

- FORM 1.0 – Application General Information
 - SECTION 1.1 – General Information (REQUIRED, unless only SECTION 1.4 is submitted)
 - SECTION 1.2 – Prevention of Significant Deterioration Information
 - SECTION 1.3 – BACT/MACT Applicability Determination
 - SECTION 1.4 – MACT Initial Notification
- FORM 2.0 – Emissions Summary
 - SECTION 2.1 – Emission Point Summary
 - SECTION 2.2 – Pollutant Emissions Summary (lb/hr)
 - SECTION 2.3 – Criteria Pollutant Emissions Summary (tons/yr)
 - SECTION 2.4 – Hazardous Air Pollutant Emissions Summary (tons/yr)
- FORM 3.0 – Air Dispersion Modeling Information
 - SECTION 3.1.x – Point/Area/Volume Source Information, Potential Emissions
 - SECTION 3.2.x – Point/Area/Volume Source Information, Actual Emissions
- FORM 4.0 – External Combustion Units
- FORM 5.0 – Internal Combustion Units
- FORM 6.0 – Incineration Units
- FORM 7.0 – Material Handling
 - SECTION 7.1 – Material Handling Emission Point Information
 - SECTION 7.2.x – Grain Handling Facility Information
- FORM 8.0 – Coating Operations
- FORM 9.0 – Storage Tanks
- FORM 10.0 – Cooling Towers
- FORM 11.0 – Fugitive Emission Sources
 - SECTION 11.1 – Haul Roads
 - SECTION 11.2 – Equipment Leaks
 - SECTION 11.3 – Storage Pile Information
- FORM 12.0 – Control Equipment Emissions
 - SECTION 12.1 – Combustion Flare
 - SECTION 12.2.x – Thermal Oxidizer Information
 - SECTION 12.3 – Control Equipment Information (no combustion)
- FORM 13.0 – Ethanol Production Facility

Nebraska Air Quality Construction Permit Application

APPLICATION COVER SHEET AND CHECKLIST.

Application Completeness Checklist (must be completed for all applications):

- The application does not include any confidential information and no application materials are marked confidential. (Pay particular attention to drawings, figures, diagrams, and specification sheets from manufacturers, as these are the most often overlooked materials that have “confidential” stamped on them.)
- The application does include confidential information and the appropriate request for confidentiality in accordance with Title 115 – Rules of Practice and Procedure is provided. Refer to the NDEQ Guidance Document titled “Air Quality Confidentiality Claims” available on our website for more information.
- The application is typed or filled out using a black or blue pen.
- The original application is signed and dated by the responsible official. (Section 1.1)
- The relevant sections have been duly marked on the front page of this form and filled out completely to the best of my ability (If you are unsure as to which sections pertain to your facility, please contact the NDEQ).
- Instructions for each section have been read thoroughly (If you are unsure as to what information is needed, please contact the NDEQ).
- Emissions calculations – calculations of potential emissions (controlled and uncontrolled) of all regulated air pollutants have been provided, with all supporting documentation included and units clearly defined. Include emission factors and source (i.e. AP-42, FIRE, etc).
- Application Fee of the proper amount is enclosed. (Section 1.1)
- Air pollution control equipment for each emission point is identified and described. (Section 2.1)
- Emission point/stack data is identified and described.
- Plant Diagram shows heights and locations of all buildings, property boundaries and location of all stacks and emission points.
- Detailed Project Summary clearly outlines the intent and processes at the facility. (Section 1.1)
- Ambient Air Quality Analysis is provided, including the modeling data and results, where required (see Modeling Guidance or contact NDEQ). If an analysis is not provided, include an explanation for why it wasn't.
- Application is for a Prevention of Significant Deterioration (PSD) permit.
- One (1) original and two (2) copies (3 copies for PSD applications) of the complete application have been sent to the proper address. If an electronic version of the application is submitted, only one original and one copy are required regardless of application type.
- Additional information not identified on application forms is included and clearly identified.

I have completed this application cover sheet and completeness checklist and can attest that the accompanying construction permit application materials are complete to the best of my ability. In completing this form, I understand the following: That if any of the required information is not included in this application submittal, the application will be placed in a suspended file until the Department receives the necessary materials and information; That my completion of this Cover Sheet and Checklist does not assure this is a complete application and the Department may request additional information to complete the permit; That by checking the box indicating this application does not include confidential information, the application will be placed in the public files and be subject to public review; and, That the application review will not commence until all required information is received and the application is determined to be complete.

Jane Doe /
Name / Signature of Application Preparer

1/1/2007
Date

Nebraska Air Quality Construction Permit Application

APPLICATION COVER SHEET AND CHECKLIST.

GENERAL INSTRUCTIONS

The following are general instructions for the completion and submittal of an Air Quality Construction Permit Application. These instructions will not cover the individual Sections in this packet. Instructions for each Section are included at the end of that Section. We are continually updating our application forms so please check the NDEQ website frequently for the latest application forms.

TIMELINESS

This application and additional information must be submitted to the Department of Environmental Quality (NDEQ) in sufficient time to allow for its processing prior to the anticipated date of commencement of construction, modification or reconstruction. Your application must be reviewed and a permit must be granted before actual construction can commence. Please use the following timelines as guidance for permit processing: 210 days for PSD-major permits; 150 days for PSD-minor and State Toxic BACT permits; and, 120 days for all others. If an expedited timeframe is desired, please contact the NDEQ to set up a Preapplication Meeting – please see FastTrack Permitting on our website.

COMPLETENESS

All application packets must include this cover sheet and Section 1.1 - General Information. The other forms and sections that must be included in the application depend on the type of project that is being proposed (i.e. initial construction permit for a new source, modification of an existing source, historical construction, etc.) and complexity. On each form or section, the Department requests various types and amounts of information. This information is being requested to expedite the permitting process and to minimize the number of times the permit writer must contact the facility. Because of this, the information should be provided as completely and thoroughly as possible. Any missing or incomplete information will result in a delay in the processing of this application. If you have any questions regarding the forms that should be included with your application submittal, please contact the Air Quality Construction Permitting Hotline (see number below).

SUPPLEMENTAL INFORMATION

The Application Completeness Checklist includes a final bullet where the user can indicate whether, or not, they have included supplemental information. In addition, other forms ask for any additional information pertinent to emission control such as flow rates, efficiency of control equipment, type of control equipment, performance standards, output loading, manufacturers guarantees, etc. Please include all additional information that will assist the permit writer in the assessment of the proposal.

SUBMITTAL

One original and two copies of the completed Air Quality Construction Permit Application must be submitted. For PSD projects, one original and three copies are required. The Department prefers that the application be double-sided and not be spiral bound, since the bindings will be removed for filing. For ease of review, the Department requests that the application also be submitted in electronic format (*.pdf). If an electronic version of the application is submitted, only one original and one paper copy are required regardless of application type. All submittals must be mailed to:

Postal Mail: Department of Environmental Quality
Air Quality Permitting Section
P.O. Box 98922
Lincoln, NE 68509-8922

Express Mail: Department of Environmental Quality
Air Quality Permitting Section
1200 N Street, Suite 400
Lincoln, NE 68508

QUESTIONS

If you have any questions concerning any portion of the Construction Permit Application packet, please feel free to contact the Air Quality Construction Permit Hotline at (877) 834-0474, Air Quality Permitting Section at (402) 471-2189 or the Environmental Assistance Division at their toll free number (877) CLEAN03 (253-2603).



Table with 4 rows: NDEQ USE ONLY, Amount Paid, Check #, Receipt #, Application #.

Nebraska Air Quality Construction Permit Application

Form 1.0: Application General Information

Section 1.1: Air Quality Construction Permit General Information

IMPORTANT: READ THE INSTRUCTIONS ACCOMPANYING THIS SECTION
Do NOT use pencil to fill out this application. Please type responses or use black ink.

Administrative Information

Form fields for Administrative Information: 1) Facility Name: State of Nebraska Ethanol, 2) NDEQ Facility ID#, 3) Facility SIC Code(s): 2869, 4) Facility Description: 10.5 MMGal/year Denatured Ethanol Production Plant, 5) Facility Physical Address: 1200 N Street, 6) Facility City: Lincoln, 7) State: Nebraska, 8) Zip: 68509, 9) County: Lancaster, SW 1/4, NE 1/4, Section: 35, Township: 10, Range: 6, 10) Is the source located within 50 Miles of an adjacent State: No, 11) Company Name: State of Nebraska Ethanol, 12) Company Mailing Address: P.O. Box 98922, 13) Company City: Lincoln, 14) State: Nebraska, 15) Zip: 68509-8922, 16) Is The Business Incorporated? No, 17) State of Incorporation:

Contact Information

Form fields for Contact Information: 18) Facility Contact Person: John Smith, 19) Facility Contact Person's Title or Responsibility: Environmental Manager, 20) Phone Number: (402) 123-4567, 21) Alt. Phone Number: N/A, 22) Fax Number: (402) 234-5678, 23) Email Address: johnsmith@sne.us, 24) Who is the Primary Contact for Application-related Questions?: Other (fill in 25-30 below), 25) Primary Contact Name: Jane Doe, 26) Primary Contact Company: Jane Doe and Associates, 27) Phone Number: (402) 890-2345, 28) Alt. Phone Number: N/A, 29) Fax Number: N/A, 30) Email Address: janedoe@janedoe.com, 31) Hard-copy drafts and the final permit documents should be sent to: Facility Contact, 32) Document Recipient's Name:, 33) Document Recipient's Title or Responsibility:, 34) Document Recipient's Mailing Address:, 35) Document Recipient's City:, 36) State:, 37) Zip:

Construction Permit Fee Information

Form fields for Construction Permit Fee Information: 38) Construction Permit Application Fee Enclosed (see instructions): \$1,500, Make check payable to: Nebraska Department of Environmental Quality, Memo: Air Quality CP Application Fee



Air Quality Construction Permit Application Form 1.0: Application General Information

FACILITY NAME: <u>State of Nebraska Ethanol</u>	DATE: <u>1/1/2007</u>
NDEQ Facility ID#: _____	

Section 1.1: Air Quality Construction Permit General Information

Project Information		
39) This Application is For: (Check One)	a.	<input checked="" type="checkbox"/> Initial Construction Permit for a New Facility
	b.	<input type="checkbox"/> Modification of an Existing Facility
	c.	<input type="checkbox"/> Significant Revision of an Existing Construction Permit(s) issued: _____
	d.	<input type="checkbox"/> Historical Construction/Modification
40) Projected Date to Begin Actual Construction: October 1, 2007		
41) Projected Date of Startup: January 1, 2009		
42) Estimated Cost of Project: \$50,000,000.00		
Historical Permitting Information		<input checked="" type="checkbox"/> N/A
43) What year was the facility originally constructed?		
44) Enter the date the most recent Air Quality Construction Permit was issued (mm/dd/yyyy):		
45) Provide a brief summary of each modification below (Attach additional sheets if needed):		
Date of Modification	Date Permitted	Summary of Modification
Source Information		
46) Is the existing source classified as a Major Prevention of Significant Deterioration (PSD) Source? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A		
47) Is this project subject to PSD Review? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If Yes, complete Section 1.2.		
48) Is the Source subject to State toxic BACT Requirements? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If Yes or unknown, complete Section 1.3.		
49) Is the Source subject to NESHAP or MACT Requirements? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If Yes or unknown, complete Section 1.3.		
50) Is this Air Quality Construction Permit Application also fulfilling the notification requirements for an applicable NESHAP/MACT standard? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If Yes, complete Section 1.4.		
51) Responsible Official Certification Statement		
I certify under penalty of law that, based on information and belief formed after reasonable inquiry, the statements and information contained in this Air Quality Construction Permit application are true, accurate, and complete. I also certify that all copies, including the electronic copy, of this application are identical in content to the original.		
Signature (See Instructions for Signatory Requirements)		Date (mm/dd/yyyy): 1/15/2007
Typed or Printed Name: Adam Smith		Title: President



Air Quality Construction Permit Application

Form 1.0: Application General Information

FACILITY NAME: <u>State of Nebraska Ethanol</u>	DATE: <u>1/1/2007</u>
NDEQ Facility ID#: _____	

Section 1.1: Air Quality Construction Permit General Information

52) Project Description

For New Facilities: On a separate sheet(s) of paper, provide a detailed narrative of the proposed construction at the facility. This should include all emission units, processes, and pollution control equipment being constructed. The descriptions must be complete and particular attention must be given in explaining all stages in the process that may result in a discharge of any air pollutant. All obtainable data must be supplied concerning the nature, volume, particle size, weights, chemical composition and concentrations of all types of air pollutants that are expected to be emitted by the source. All emission point, emission unit, and control equipment identification numbers should be present in this description appropriately.

For Existing Facilities: On a separate sheet(s) of paper, provide a detailed narrative of the production, operations, processes, and emission units that currently exist at the facility. This should include all emission units, processes, and pollution control equipment that are currently in operation. The descriptions must be complete and particular attention must be given in explaining all stages in the process where there is a discharge of any air pollutant. All obtainable data must be supplied concerning the nature, volume, particle size, weights, chemical composition and concentrations of all types of air pollutants that are emitted by the source. In addition to existing information, narrative of the proposed construction/modification occurring at the source must also be discussed with emphasis on the additions/changes occurring. The same information presented for the existing sources should also be provided for the new construction/modification. Ensure that the narrative is clear as to what is new, existing, and/or being modified. All emission point, emission unit, and control equipment identification numbers should be present in this description appropriately.

53) Facility Layout Diagram

On a separate sheet(s) of paper, provide a detailed diagram or site drawing that includes all new and existing buildings, stacks, and emission points identified in this application. Make sure all elements of the drawing are properly identified, drawn to scale, and are consistent with other sections of this application. The plant diagram should indicate the height and location of all buildings/structures and property boundaries. Fences or other public access restrictions should be identified and described. Clearly indicate which elements currently exist and which will be built/installed/modified. (See [Sample Plant Layout Diagram](#) for an example)

54) Process Flow Diagram

On a separate sheet(s) of paper, provide a flow chart that includes all processes, process equipment, stacks, air pollution control equipment, and fuel burning equipment identified in this application. When finished, this diagram should show how products and materials (including fuel) flow through each process. Make sure all units are identified and properly cross-referenced to match other Sections of the application (including existing units). Provide an inclusive date from which the diagram is valid. Clearly indicate which elements exist and which are new. (See [Sample Process Flow Diagram](#) for an example of this document)

55) Air Dispersion Modeling Information

Modeling Guidance for determining whether air dispersion modeling may be required can be found on the NDEQ website, or contact the Department for assistance.

Has an air dispersion modeling protocol been established for this source and reviewed by NDEQ? Yes No

Air dispersion modeling and modeling checklist submitted with application? Yes No

Note: If air dispersion modeling is required but not included with this application, please provide complete modeling submittal and modeling checklist within 30 days to avoid delays in processing this permit application. A delay in submitting the modeling can result in the application being placed on hold and the Department cannot guarantee work will resume immediately upon receipt of modeling. One original and two copies of the modeling submittal are required.

52) Sample Project Description

State of Nebraska Ethanol (SNE) is an anhydrous ethanol manufacturing plant (SIC 2869) that will use a corn dry-milling process to produce 10,000,000 gallons per year of anhydrous ethanol. The facility has been designed to produce approximately 10,500,000 gallons/year of denatured ethanol. Solids resulting from the dry-milling process will be converted to animal feed. Approximately 31,381 tons/year of dried distiller grain with solubles (DDGS), or up to 80,952 tons/year of wet distiller grain with solubles (WDGS) will be by-products at SNE. The difference between the two by-products is moisture content; DDGS contains approximately 10% moisture while WDGS contains approximately 65% moisture.

The facility consists of the following major production steps/areas:

- Grain receiving, handling, storing, and milling
- Fermentation and distillation
- Ethanol and denaturant storage and loadout
- DDGS drying, cooling, storage, and loadout
- WDGS storage and loadout
- Steam generation
- Emergency equipment

The proposed ethanol plant will generate emissions of several air pollutants, including particulate matter (PM), particulate matter with an aerodynamic diameter less than or equal to 10 micrometers (PM₁₀), nitrogen oxides (NO_x), sulfur oxides (SO_x), carbon monoxide (CO), volatile organic compounds (VOC), and hazardous air pollutants (HAP), specifically Acetaldehyde and Hexane. The primary emission sources at the facility will be from the following equipment/processes:

Equipment/Process	Expected Pollutants
Grain Receiving, Handling, Storing, and Milling	PM and PM ₁₀
Fermentation and Distillation	VOC and HAP
Ethanol and Denaturant Loadout	VOC and HAP
DDGS Drying, Cooling, Storage and Loadout	PM, PM ₁₀ , NO _x , SO ₂ , CO, VOC, and HAP
WDGS Storage and Loadout	VOC and HAP
Steam Generation	PM, PM ₁₀ , NO _x , SO ₂ , CO, VOC, and HAP
Emergency equipment	PM, PM ₁₀ , NO _x , SO ₂ , CO, VOC, and HAP
Fugitive Emissions	PM, PM ₁₀ , VOC, and HAP

Various pieces of control equipment have been designed into the facility in order to reduce potential emissions. The control equipment at this facility include baghouses on grain receiving, milling, and DDGS storage and loadout; scrubbers on fermentation operations; a thermal oxidizer that controls emissions from the DDGS dryer and cooler and distillation equipment; a flare on the ethanol truck loadout, and all plant haul roads will be paved in order to control fugitive haul road emissions.

Grain Receiving, Handling, Storing, and Milling

The grain handling operations consist of the unloading of grain by trucks or railcars, two 200,000-bushel capacity storage silos, two grain elevators, and associated conveyors. The annual grain-unloading rate estimated based on the maximum anhydrous ethanol production rate of 10 MMgal/yr is 103,704 tons per year (tpy). Grain is received at the plant in 25-ton hopper bottom trucks or railcars at two dump pits (one for trucks and one for railcars) that are located inside enclosed buildings. The dump pits are fitted with conveyor belts, which feed the elevator leg and grain-to-grain storage silos. Based on the design of the

grain conveying equipment, only one storage silo can be filled at any one time. The dump pits, and associated grain transfer points, are controlled by several baghouses. Table A indicates the baghouses associated with grain receiving, handling, and storing and the equipment each baghouse controls.

Table A: Grain Receiving, Handling, and Storing Baggouses

Control Equipment Identification	Units Controlled by Control Equipment
CE001 – Baghouse #1	Rail Dump Pit (EU-001)
	Truck Dump Pit (EU-002)
	Conveyor #1 (EU-003)
	Elevator #1 (EU-004)
CE002 – Baghouse #2	Conveyor #2 (EU-005)
	Corn Storage Silo #1 (EU-006)
	Corn Storage Silo #2 (EU-007)
	Conveyor #3 (EU-008)
	Elevator #2 (EU-009)

The grain milling operations consist of one 25,000-bushel surge bin, one scalper, one hammermill, and associated conveyors. A grain transfer conveyor feeds grain from the grain storage silos, which moves it from the adjacent elevator to a scalper. Prior to hammermilling, the corn will be routed to the scalpers from the surge bins. The scalper removes sticks, cobs, and other unusable debris from the grain. The discharge conveyor from the scalper transfers the scalped grain into the hammermills. The hammermills grind the scalped grain to the required particle size. The ground grain is then transferred to the slurry tank, which marks the beginning of the fermentation process. The grain milling and associated transfer points are controlled by a baghouse. Table B indicates the baghouse associated with grain milling and the equipment each baghouse controls. The solids collected in all of the baghouses (CE001–CE003) are returned to the process downstream of the hammermills.

Table B: Grain Milling Baghouse

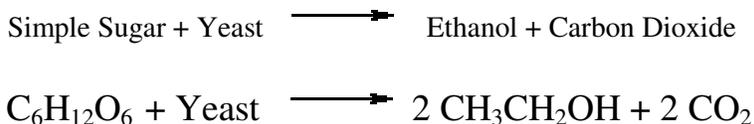
Control Equipment Identification	Units Controlled by Control Equipment
CE003 – Baghouse #3	Surge Bin (EU-010)
	Scalper (EU-011)
	Hammermill (EU-012)

Fermentation and Distillation

The fermentation and distillation operations consist of a slurry tank, a liquefaction tank, one yeast tank, one fermenter, one beerwell, a one-column distillation unit, one molecular sieve, one whole stillage tank, one centrifuge, one thin stillage tank, one condenser, and one evaporator.

Prior to fermentation, a conveyor transfers milled grain from the hammermills to a mash mingler under flow-ratio control. The mash mingler mixes the grain with process water and hot water from the hot well. The meal slurry is then discharged to the slurry tank. The slurry will be cooked, liquefacted with enzymes, and the resultant mash cooled. The mash leaves the cooker and is cooled by flashing in a liquefaction tank. Liquefying enzyme is then added to the mash in the liquefaction tank in order to begin the hydrolysis of the previously gelatinized starch. After liquefaction, previously hydrated and actively growing yeast is added. The mash is then cooled.

The cooled mash will be mixed with yeast and more enzymes in the fermenter. Saccharifying enzymes, nutrients, and industrial antibiotics are added to the fermenter during filling. The fermenter contents are recirculated by fermenter pumps through the fermenter coolers to remove heat generated by fermentation. The chemical process and chemical equation occurring during fermentation is shown below:



The carbon dioxide (CO₂) generated during fermentation is vented to the CO₂ scrubber for recovery of ethanol vapors and control VOC and HAP emissions. After approximately 48 hours of fermentation the resultant liquid (beer) will contain approximately 10% ethanol by weight. When fermentation is completed, the beer is transferred to the beerwell via the fermenter pumps.

The CO₂ scrubber (identified as CE004) controls the emissions from the yeast tank, fermenter, and beer well. The CO₂ scrubber allows for ethanol vapors to be collected in order for a higher product yield, however the unit also provides VOC and HAP emission control.

The beerwell serves as a surge tank connecting the fermentation system with distillation. The beer will then be separated into ethanol and grain solids. The remaining grain solids, known as stillage, are sent to the whole stillage tank to be further processed for use as cattle feed. Stillage, from the whole stillage tank, is pumped to the stillage centrifuges. The stillage centrifuge splits the feed into two flows: the wet cake and the centrate. The wet cake (WDGS) consists of approximately 65% water. The centrifuge is positioned to discharge the cake onto a conveyor that transfers the wet cake to the DDGS drying area. The centrate, called thin stillage, consists of approximately 92.0% water. Centrate is pumped from the centrate stillage tank to the evaporators. The multiple-effect evaporator system removes water from the thin stillage on a continuous, steady-state basis. Concentrated dissolved solids syrup (CDS), a byproduct from the evaporation system, is added to one of the solid byproducts.

The beer will be distilled in a distillation column; the resultant product is 95% ethanol and 5% water (190-proof) and the byproduct is whole stillage consisting of solids and water. Hydrous ethanol vapor from distillation is drawn and superheated in the molecular sieve using steam. Using a molecular sieve, the remaining water will be removed from the product resulting in 100% ethanol (200-proof). The anhydrous ethanol product flows through the molecular sieve cooler to the product shift tanks, which is where final processing of the ethanol occurs. The non-condensables that exist throughout the distillation process are vented to the thermal oxidizer (CE-005) to control the VOC and HAP emissions.

Ethanol and Denaturant Loadout

Prior to shipping the 200-proof ethanol out of the facility, the ethanol will be combined with 5% natural gasoline. The gasoline is added to the final product in order to make the ethanol unfit for human consumption. The final product will be sold as near 200-proof denatured ethanol. Liquid product loading consists of submerged loading of denatured fuel ethanol into tanker trucks. The emissions from the truck loadout will be collected by a vapor recovery system, and then routed to an ethanol loadout flare.

DDGS Drying, Cooling, Storage and Loadout

The wet cake that results from the ethanol production can be dried in order to be used as cattle feed in feedlots. The drying process occurs by conveying the wet mixture into an indirect heating, natural gas fired rotary dryer where the cake solids concentration increases from 35% to 90%. The dryer will have a

heat input rating of 92.0 MMBtu/hr. The dryer will be able to dry 100% of the wet cake that will be produced at the facility. A cooler is also used to lower the temperature of the DDGS directly after the drying occurs. The drying process emits PM, PM₁₀, CO, VOC, and HAPs. In order to control these emissions, a thermal oxidizer (TO) (CE-005) will control the PM, PM₁₀, VOC, and CO emissions.

The DDGS will be loaded into trucks or railcars. Actual loading will occur inside a building in order to control and capture PM and PM₁₀ emissions. A baghouse will be used to control the dust at the transfer points of the material handling. Table C shows the baghouse associated with DDGS storage, transfer, and loadout and the associated equipment it will control.

Table C: DDGS Storage, Transfer, and Loadout Baghouses

Control Equipment Identification	Units Controlled by Control Equipment
CE-006 – Fabric Filter: DDGS Handling Baghouse #4	DDGS Storage (EU-032)
	Elevator #3 (EU-033)
	Conveyor #4 (EU-034)
	DDGS Loadout (EU-035)

WDGS Storage and Loadout

An alternative to drying the wet cake produced by the ethanol production process is to leave it as wet cake and deliver it to cattle feedlots in the area. The wet cake may be stored in an open storage area due to its 65% moisture content. Because the wet cake will be transferred offsite quickly (e.g., in 1 or 2 days), the cake will not dry completely under typical weather conditions. Therefore, wet cake storage and handling is expected to produce negligible PM₁₀ emissions. However, VOC and HAP emissions are emitted from wet cake.

Steam Generation

Steam is required to power the ethanol production process. SNE will use one (1) boiler with a maximum capacity of 99 MMBtu/hr (EP-012). Natural gas will be the only fuel type combusted by the boiler.

Boiler construction will include ultra Low-NO_x boiler burners. The facility will comply with all applicable requirements of NSPS Subpart Dc, including daily monitoring of fuel use.

Emergency equipment

The emergency equipment consists of one (1) 300-hp diesel-fired engine for the emergency fire water-pump. The engine is limited to the expected number of operating hours during non-emergency periods (maintenance and testing). If there is an emergency requiring the fire water-pump, it is expected that the rest of the facility will be shut down. Therefore, a limitation on the engine is required to restrict the fire pump from operating the unit continuously (8,760 hrs/year) and to limit the plant below PSD threshold levels. SNE is requesting a 500 hour/year operating limitation be placed on the emergency fire water-pump. Since the emergency equipment is diesel fired, a diesel storage tank will be installed. Due to the small tank size, low volume throughput, and low vapor pressure of diesel fuel, the VOC emissions associated with the diesel fuel storage are expected to be negligible.

Equipment Leaks

Equipment leaks are leaks from valves and pumps in light service, gas valves, compressor seals, pressure relief valves, sampling connections, open-ended lines, and flanges. SNE will perform Leak Detection and Repair (LDAR) Program in accordance with NSPS, Subpart VV. {40 CFR 60.480 through 60.489}. Emissions are calculated from *Protocol for Leak Emission Estimates*, EPA-453/R-95-017, November 1995. Emissions include fugitive VOC and HAP emissions.

Haul Roads

Haul road emissions consist of truck traffic on the paved roads as part of the receiving of raw materials (denaturant, grain) or shipping of final products (denatured ethanol, DDGS, WDGS). The haul roads must be in compliance with Title 129, Chapter 32 and the modeled emissions levels. The primary pollutants emitted as a result of haul road traffic are PM and PM₁₀.

Cooling Tower

The facility will have one (1) cooling tower, with a circulation rate of 20,000 gal/min. The total dissolved solids (TDS) concentration in the cooling water will be limited to 3,000 ppm for any single sampling event. The cooling tower is used to cool non-contact process water back to a temperature that is useful for the process. The primary pollutants by the cooling tower are PM and PM₁₀.

Storage Tanks

This facility has three (3) production storage tanks. These production tanks will hold raw material (denaturant) and final products (various grades of ethanol and denatured alcohol). Table D shows the storage tanks that will be constructed at the facility. All of the storage tanks are internal floating-roof vertical aboveground tanks.

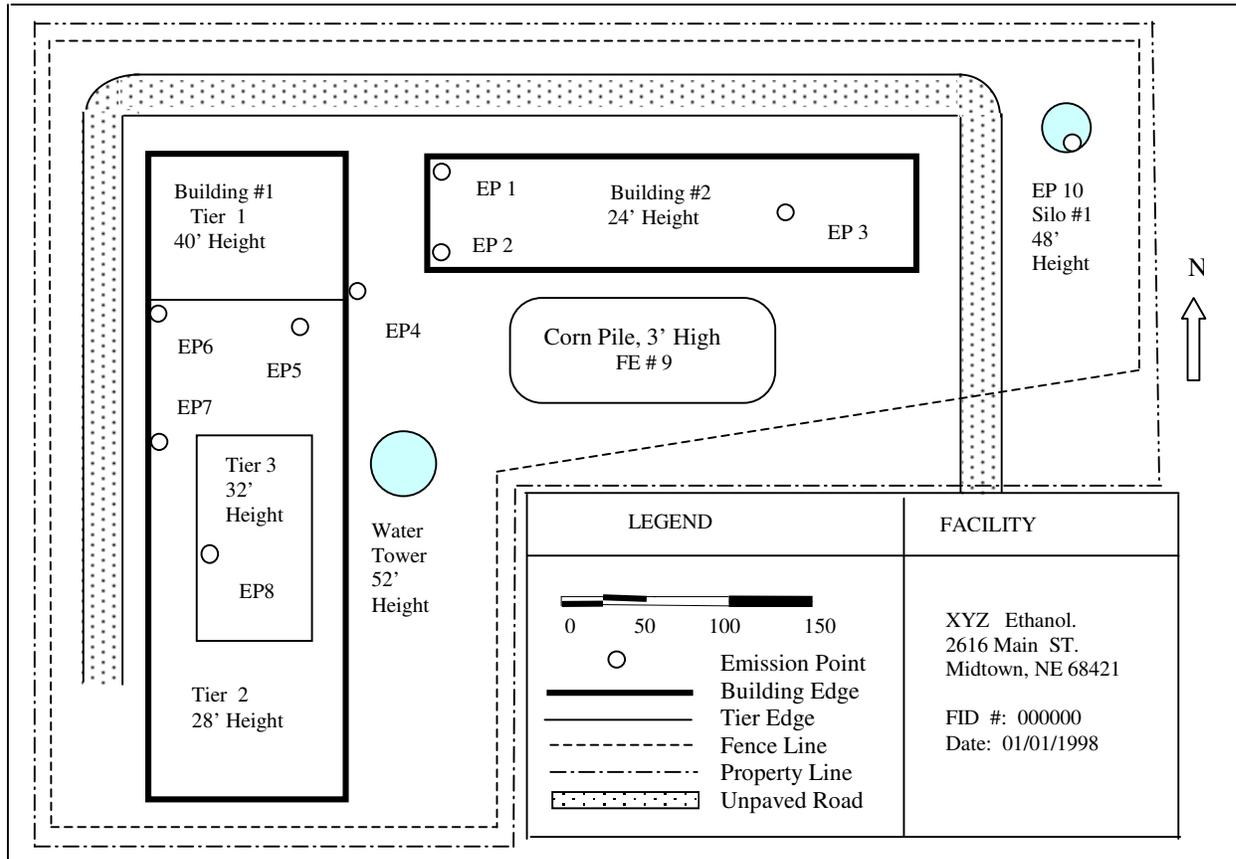
Table D: Storage Tanks

Emission Unit ID#	Tank Capacity	Tank Contents	Annual Throughput (gallons/year)
EU-023	100,000 gallon	200-Proof Ethanol	10,000,000
EU-024	50,000 gallon	Denaturant	500,000
EU-025	100,000 gallon	Denatured Ethanol	10,500,000

53) Sample Facility Layout Diagram



Sample Plant Layout Diagram

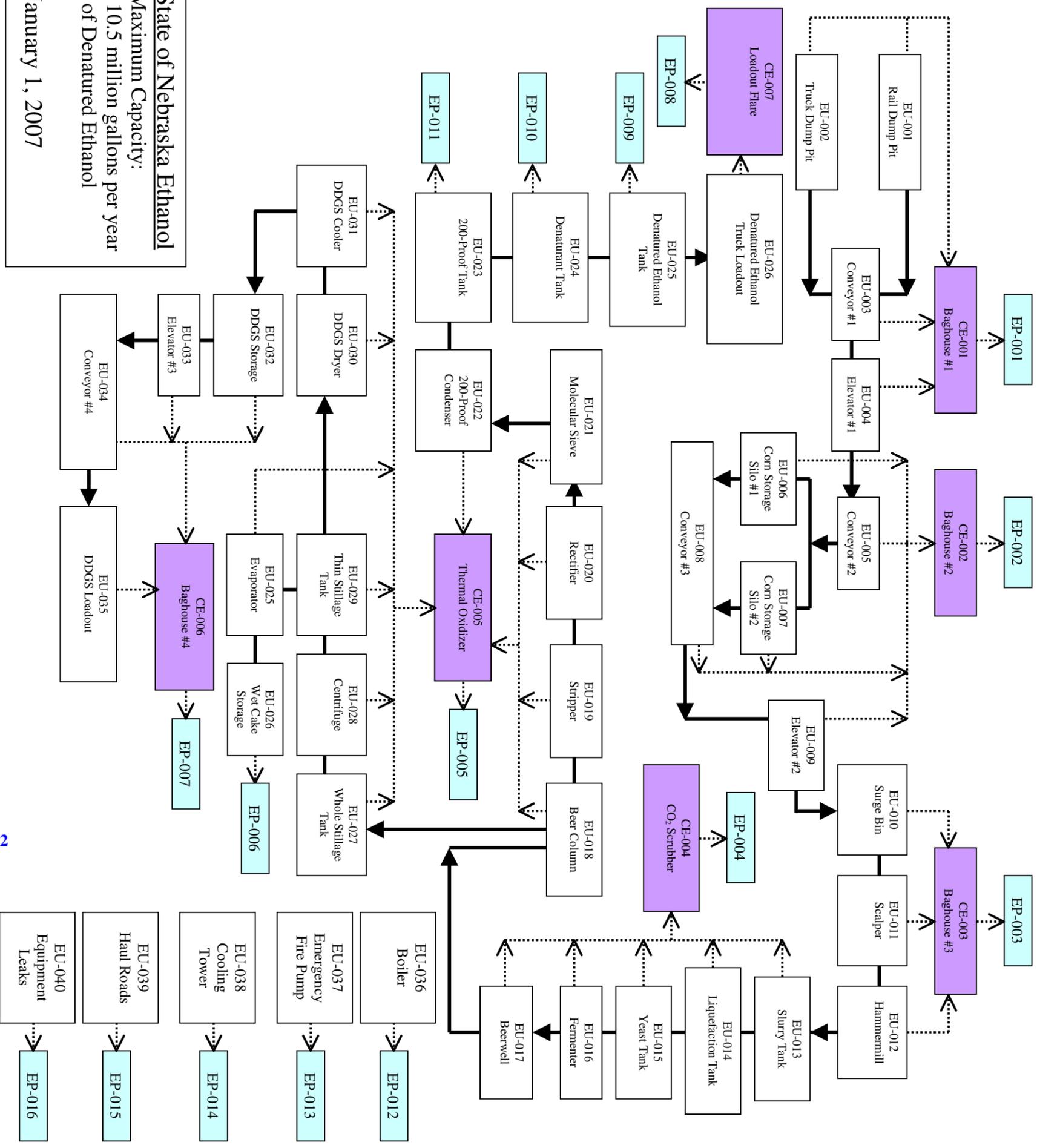


Please Note the following features of the plant layout diagram:

- 1) A scale bar and a North arrow.
- 2) Property lines
- 3) Fence lines or any physical barriers precluding public access.
- 4) Locations of all buildings within the property lines. Locations of tiers on multi-level buildings. Include the building and structure heights, and tier heights. A description of the buildings or structures is optional.
- 5) Locations of ALL emission points. Emission point need not be to scale, however every emission point should be labeled.
- 6) Location of all structures above ground level and within property lines. Structures above ground level, such as gasoline storage tanks, grain storage silos, etc., must be shown. Structures at ground level, such as concrete pads, paved parking lots, etc., are optional.
- 7) Locations of unpaved and paved roads, railroad tracks, and area sources, such as grain piles and wetcake storage, must be shown if their fugitive emissions must be included in the permit application.
- 8) If this is for an existing source, clearly indicate which units exist and which are part of this permitting action.
- 9) All buildings and structures above ground level and all emission points must be marked with identification numbers consistent with all of the sections of the construction permit application.

Note: AutoCAD or equivalent computer aid drawings on paper and on disk are preferred; sketches are acceptable, aerial photographs without the requested information are NOT acceptable.

Nebraska Department of Environmental Quality Sample Process Flow Diagram



State of Nebraska Ethanol
 Maximum Capacity:
 10.5 million gallons per year
 of Denatured Ethanol
 January 1, 2007

Process Flow Diagram: A flow chart that includes all processes, process equipment, stacks, air pollution control equipment, and fuel burning equipment identified in the permit application that the diagram accompanies. This diagram shows how products and materials (including fuel) flow through each process. All units should be identified and properly cross-referenced to match the contents of the application (including existing units). It is important to provide an inclusive date from which the diagram is valid and to clearly indicate which elements currently exist and which are new.

Key Process Flow Diagram Items

- All Emission Units are individually labeled
- All Emission Points are individually labeled
- All Control Equipment is labeled and the units whose emissions are being controlled by the device are clearly shown
- All Emission Units and Control Equipment are named.
- The emissions and process pathways are clearly understood.
- A Legend is included

LEGEND

<p>————— = Process Line</p> <p>..... = Emissions Line</p> <p>▭ = Emission Unit</p> <p>▭ = Control Equipment</p> <p>▭ = Emission Point</p>	<p>▭ = Process Line</p> <p>▭ = Emissions Line</p> <p>▭ = Emission Unit</p> <p>▭ = Control Equipment</p> <p>▭ = Emission Point</p>
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54) Nebraska Department of Environmental Quality Sample Process Flow Diagram



Air Quality Construction Permit Application Form 1.0: Application General Information

FACILITY NAME: <u>State of Nebraska Ethanol</u>	DATE: <u>1/1/2007</u>
NDEQ Facility ID#: _____	

Section 1.3: State BACT and Federal NESHAP/MACT Applicability Determination

IMPORTANT: READ THE INSTRUCTIONS ACCOMPANYING THIS SECTION BEFORE COMPLETING.

Answer the following questions and follow the directions provided:

Step 1) Does/Will the stationary source have the potential to emit one or more hazardous air pollutants (HAP)?

- | | |
|---|---|
| <input checked="" type="checkbox"/> YES | If YES, proceed to Step 2. |
| <input type="checkbox"/> NO | If NO, the source is not subject to any State BACT or Federal NESHAP/MACT standards. You need not continue with the State BACT and Federal NESHAP/MACT Applicability Determination; however include Section 1.3 with your permit application package. |

Step 2) Does/Will the stationary source fall into the following categories (found in 40 CFR Part 63)?

- | | | |
|------------------------------|--|--|
| <input type="checkbox"/> YES | <input checked="" type="checkbox"/> NO | Perchloroethylene Dry Cleaning Facilities (Subpart M) |
| <input type="checkbox"/> YES | <input checked="" type="checkbox"/> NO | Chromium Electroplating and Anodizing (Subpart N) |
| <input type="checkbox"/> YES | <input checked="" type="checkbox"/> NO | Ethylene Oxide Emissions from Sterilization Facilities (Subpart O) |
| <input type="checkbox"/> YES | <input checked="" type="checkbox"/> NO | Halogenated Solvent Cleaning Machines (Subpart T) |
| <input type="checkbox"/> YES | <input checked="" type="checkbox"/> NO | Secondary Lead Smelting Facilities (Subpart X) |
| <input type="checkbox"/> YES | <input checked="" type="checkbox"/> NO | Hazardous Waste Combustors (Subpart EEE) |
| <input type="checkbox"/> YES | <input checked="" type="checkbox"/> NO | Portland Cement Manufacturing (Subpart LLL) |
| <input type="checkbox"/> YES | <input checked="" type="checkbox"/> NO | Secondary Aluminum Production Plants (Subpart RRR) |
| <input type="checkbox"/> YES | <input checked="" type="checkbox"/> NO | Primary Lead Smelting (Subpart TTT) |
| <input type="checkbox"/> YES | <input checked="" type="checkbox"/> NO | Publicly Owned Treatment Works (Subpart VVV) |
| <input type="checkbox"/> YES | <input checked="" type="checkbox"/> NO | Municipal Solid Waste Landfills (Subpart AAAA) |
| <input type="checkbox"/> YES | <input checked="" type="checkbox"/> NO | Mercury Emissions from Mercury Cell Chlor-Alkali Plants (Subpart IIII) |

If **YES** for one or more of the above source categories, the source may be subject to the selected area source federal NESHAP/MACT standards. The requirements for these source categories may apply whether or not your stationary source is considered a major source for HAPs (determined below). Proceed to Step 3.

If **NO** for all, the stationary source is not subject to any area source NESHAP/MACT standards that have been promulgated. Contact the Department via the Air Quality Construction Permit Hotline, (877) 834-0474, if you are unsure if your source falls into one or more of the area source categories. Proceed to Step 3.

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Air Quality Construction Permit Application Form 1.0: Application General Information

FACILITY NAME: <u>State of Nebraska Ethanol</u>	DATE: <u>1/1/2007</u>
NDEQ Facility ID#: _____	

Section 1.3: State BACT and Federal NESHAP/MACT Applicability Determination

Step 3) Does/Will the stationary source have the potential to emit 2.5 tons per year or more of any single HAP and/or 10 tons per year or more of any combination of HAPs?

- YES If YES, proceed to Step 4.
- NO If NO, your source is NOT subject to State BACT Requirements. Your source is only subject to Federal NESHAP/MACT Standards if you selected YES for one or more of the source categories in Step 2. You need not continue with the State BACT and Federal NESHAP/MACT Applicability Determination; however include Section 1.3 with your permit application package.

Step 4) Does/Will the stationary source have the potential to emit 10 tons per year or more of any single HAP and/or 25 tons per year or more of any combination of HAPs?

- YES If YES, your source is a major source of HAP emissions. This stationary source is also subject to Nebraska's State toxic BACT requirements and may be subject to Federal NESHAP/MACT requirements. Proceed to Step 5.
- NO If NO, your source is NOT a major source of HAPs and is only an area source of HAPs if you selected one or more of the source categories in Step 2. This stationary source is subject to Nebraska's State toxic BACT requirements. Proceed to Step 7.

Step 5) Does/Will the stationary source have any equipment that can be classified under one or more of the source categories listed in 40 CFR Part 63 (including those listed in Step 2)?

- YES If YES, list all the source categories applicable to your facility below. Please include the Subpart letter (use additional pages if necessary). Proceed to Step 6.

- NO If NO, your source is a major source for HAP emissions. Your source is NOT subject to any NESHAP/MACT Standards that have been promulgated. Proceed to Step 6.

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Air Quality Construction Permit Application

Form 1.0: Application General Information

FACILITY NAME: <u>State of Nebraska Ethanol</u>	DATE: <u>1/1/2007</u>
NDEQ Facility ID#: _____	

Section 1.3: State BACT and Federal NESHAP/MACT Applicability Determination

Step 6) Would you like federally enforceable permit conditions to be placed in a permit that would limit your HAP emissions to less than the Federal NESHAP/MACT emission thresholds or State toxic BACT emission thresholds? If you are subject to the NESHAP/MACT standards listed in Step 2, you must comply with the regulation and cannot take emission limits to be exempt from the standard.

- YES If YES, on a separate sheet of paper, describe the limitations you would be willing to accept in your permit so that your HAP emissions will not exceed the requested limitation. Each of the HAPs that will be emitted must be discussed. Select which emission limits you would like to make federally enforceable (select ONE):
- 10 tpy of any single HAP and 25 tpy of any combination of HAP
Proceed to Step 9.
 - 2.5 tpy of any single HAP and 10 tpy of any combination of HAP
Proceed to Step 11.
- NO If NO, Proceed to Step 8.

Step 7) Would you like federally enforceable permit conditions to be placed in a permit that would limit your HAP emissions to less than the State toxic BACT emission thresholds?

- YES If YES, Proceed to Step 11.
- NO If NO, Proceed to Step 10.

Step 8) You have indicated that your source is a major source of HAP emissions and that you do not wish to take federally enforceable permit limitations which limit your emissions to below the Federal NESHAP/MACT emission thresholds. If your source is subject to an area source Federal NESHAP/MACT Standards that has been selected in Step 2, a case-by-case MACT determination does not need to be completed. If no Federal NESHAP/MACT standards have not been developed for your source category and no area source NESHAP/MACT standards apply, then a case-by-case MACT determination must be developed for your source.

If this is an existing facility, a case-by-case MACT determination only needs to be completed if the modification taking place is major for HAPs by itself. Please read 40 CFR 63.43 through 63.44 to determine all applicable requirements, including application requirements for a case-by-case determination. You may also want to contact the Department for help in determining the application requirements. You are subject to the State toxics BACT requirements, however the department's policy is that any sources that are subject to a NESHAP/MACT standard or conducts a case-by-case MACT, the requirements of the NESHAP/MACT will be presumptive BACT under the State toxics program.

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Air Quality Construction Permit Application

Form 1.0: Application General Information

FACILITY NAME: <u>State of Nebraska Ethanol</u>	DATE: <u>1/1/2007</u>
NDEQ Facility ID#: _____	

Section 1.3: State BACT and Federal NESHAP/MACT Applicability Determination

Step 9) You have indicated that your source is a major source of HAP emissions and that you wish to take federally enforceable permit limitations which limit your emissions to below the Federal NESHAP/MACT emission thresholds. Therefore, your source is NOT subject to the requirements of the Federal NESHAP/MACT standards identified in Step 5.

Your source is only subject to Federal NESHAP/MACT Standards if you selected YES for one or more of the source categories in Step 2. You are however subject to the State toxics BACT requirement. A BACT analysis must be completed for each HAP with an emissions increase as a result of this project. For assistance on how to conduct a BACT analysis, read the guidance document titled "How Do I Determine BACT for HAPs" located on the Department's website or contact the Department via the Air Quality Construction Permit Hotline at 877-834-0474.

Step 10) You have indicated that your source is NOT a major source of HAP emissions and that you do not wish to take federally enforceable permit limitations which limit your emissions to below the State toxic BACT emission thresholds. Your source is subject to Federal NESHAP/MACT Standards if you selected YES for one or more of the source categories in Step 2. You are also subject to the State toxics BACT requirement.

A BACT analysis must be completed for each HAP with an emissions increase as a result of this project. For assistance on how to conduct a BACT analysis, read the guidance document titled "How Do I Determine BACT for HAPs" located on the Department's website or contact the Department via the Air Quality Construction Permit Hotline at 877-834-0474.

Step 11) You have indicated that you wish to take federally enforceable permit limitations which limit your emissions to below the State toxics BACT emission thresholds. Therefore, your source is NOT subject to the requirements of the Federal NESHAP/MACT standards identified in Step 5 (if your source is major for HAPs). Your source is only subject to Federal NESHAP/MACT Standards if you selected YES for one or more of the source categories in Step 2. You are also NOT subject to the State toxics BACT requirement.



Air Quality Construction Permit Application Form 2.0: Emissions Summary

FACILITY NAME: <u>State of Nebraska Ethanol</u>	DATE: <u>1/1/2007</u>
NDEQ Facility ID#: _____	

Section 2.1: Emission Point Summary

IMPORTANT: Do NOT use pencil to fill out this application. Please type responses or print using black ink.

Complete the following table so that all emission points, control equipment, and emission units are accounted for. Use multiple Section 2.1 forms, if needed, so that all emission points, control equipment, and emission units are included. If you have any questions, feel free to contact the Nebraska Department of Environmental Quality via the Air Quality Construction Permit Hotline at (877) 834-0474, or the Air Quality Permitting Section at (402) 471-2189.

Please check if a separate summary document is used as a replacement for this Section. Identify separate summary document with the title of this Section and attach to this form.

Emission Point ID#	Control Equipment ID#	Emission Unit ID#	Emission Source/Process Description
EP-001	CE-001	EU-001	Rail Dump Pit
EP-001	CE-001	EU-002	Truck Dump Pit
EP-001	CE-001	EU-003	Conveyor #1
EP-001	CE-001	EU-004	Elevator #1
EP-002	CE-002	EU-005	Conveyor #2
EP-002	CE-002	EU-006	Corn Storage Silo #1
EP-002	CE-002	EU-007	Corn Storage Silo #2
EP-002	CE-002	EU-008	Conveyor #3
EP-002	CE-002	EU-009	Elevator #2
EP-003	CE-003	EU-010	Surge Bin
EP-003	CE-003	EU-011	Scalper
EP-003	CE-003	EU-012	Hammermill
EP-004	CE-004	EU-013	Slurry Tank
EP-004	CE-004	EU-014	Liquefaction Tank
EP-004	CE-004	EU-015	Yeast Tank
EP-004	CE-004	EU-016	Fermenter
EP-004	CE-004	EU-017	Beerwell
EP-005	CE-005	EU-018	Beer Column
EP-005	CE-005	EU-019	Stripper
EP-005	CE-005	EU-020	Rectifier
EP-005	CE-005	EU-021	Molecular Sieve
EP-005	CE-005	EU-022	200-Proof Condenser
EP-005	CE-005	EU-025	Evaporator
EP-005	CE-005	EU-027	Whole Stillage Tank
EP-005	CE-005	EU-028	Centrifuge

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Air Quality Construction Permit Application Form 2.0: Emissions Summary

FACILITY NAME: <u>State of Nebraska Ethanol</u>	DATE: <u>1/1/2007</u>
NDEQ Facility ID#: _____	

Section 2.1: Emission Point Summary

IMPORTANT: Do NOT use pencil to fill out this application. Please type responses or print using black ink.

Complete the following table so that all emission points, control equipment, and emission units are accounted for. Use multiple Section 2.1 forms, if needed, so that all emission points, control equipment, and emission units are included. If you have any questions, feel free to contact the Nebraska Department of Environmental Quality via the Air Quality Construction Permit Hotline at (877) 834-0474, or the Air Quality Permitting Section at (402) 471-2189.

Please check if a separate summary document is used as a replacement for this Section. Identify separate summary document with the title of this Section and attach to this form.

Emission Point ID#	Control Equipment ID#	Emission Unit ID#	Emission Source/Process Description
EP-005	CE-005	EU-029	Thin Stillage Tank
EP-005	CE-005	EU-030	DDGS Dryer
EP-005	CE-005	EU-031	DDGS Cooler
EP-006	-	EU-026	WDGS Storage and Loadout
EP-007	CE-006	EU-032	DDGS Storage
EP-007	CE-006	EU-033	Elevator #3
EP-007	CE-006	EU-034	Conveyor #4
EP-007	CE-006	EU-035	DDGS Loadout
EP-008	CE-007	EU-026	Denatured Ethanol Truck Loadout Flare and Fugitives
EP-009	-	EU-025	Denatured Ethanol Tank
EP-010	-	EU-024	Denaturant Tank
EP-011	-	EU-023	200 Proof Tank
EP-012	-	EU-036	Boiler
EP-013	-	EU-037	Emergency Fire Pump
EP-014	-	EU-038	Cooling Tower
EP-015	-	EU-039	Haul Roads
EP-016	-	EU-040	Equipment Leaks
EP-017	-	FS-01	Fugitive Grain Receiving Emissions
EP-018	-	FS-02	Fugitive DDGS Loadout Emissions

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Air Quality Construction Permit Application Form 4.0: External Combustion Units

FACILITY NAME: <u>State of Nebraska Ethanol</u>	DATE: <u>1/1/2007</u>
NDEQ Facility ID#: _____	Emission Point Identification#: <u>N/A (through EP-005)</u>

Section 4.1: External Combustion Unit

IMPORTANT: READ THE INSTRUCTIONS ACCOMPANYING THIS SECTION BEFORE COMPLETING.
Do NOT use pencil to fill out this application. Please type responses or print using black ink.

General Information	
1) Unit ID#: EU-030	2) Installation Date: <input checked="" type="checkbox"/> New
3) Unit Type: <input type="checkbox"/> Boiler <input checked="" type="checkbox"/> Dryer <input type="checkbox"/> Other _____	4) Maximum Rated Capacity: 92.0 MMBtu/hr
5) Gross Power Output: _____ MW <input checked="" type="checkbox"/> N/A	Net Power Output: _____ MW <input checked="" type="checkbox"/> N/A

6) Stack Information <input checked="" type="checkbox"/> N/A				
Height	Top Inside Diameter	Stack Discharge	Exit Velocity of Gas	Exit Temperature of Gas
ft	ft	<input type="checkbox"/> Horizontal <input type="checkbox"/> Vertical	m/s	K

7) Fuel Information				
Type/Grade of Fuel Combusted	Maximum Fuel Capacity (include units)	Heat Content (include units)	Fuel Specifications	Requested Operating Limitation (include units)
Natural Gas	0.090 MMscf/hr	1020 Btu/scf	% Sulfur: N/A	N/A
			% Ash: N/A	
			% Sulfur:	
			% Ash:	
			% Sulfur:	
			% Ash:	

If the steam generating unit combusts more than three types of fuel, attach additional information.

8) Air Pollution Control Equipment				
Is there an air pollution control device(s) associated with this unit? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO				
Control Equipment ID#	Type of Control Equipment	Pollutant(s) Controlled	% Control Efficiency	Installation Date
CE-005	Thermal Oxidizer	VOC	99%	<input checked="" type="checkbox"/> New
		HAP	95%	
		PM	60%	

If multiple pieces of control equipment or more pollutants are being controlled, attach additional information.

9) New Source Performance Standard Applicability				
This steam generating unit is subject to: <input type="checkbox"/> NSPS, Subpart D <input type="checkbox"/> NSPS, Subpart Db <input type="checkbox"/> Other _____				
If unknown, Complete Section 4.2 <input type="checkbox"/> NSPS, Subpart Da <input type="checkbox"/> NSPS Subpart Dc <input checked="" type="checkbox"/> None				

10) Emission Calculations Attached?	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
--	---

11) Additional Information Attached?	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
---	---



Air Quality Construction Permit Application Form 4.0: External Combustion Units

FACILITY NAME: <u>State of Nebraska Ethanol</u>	DATE: <u>1/1/2007</u>
NDEQ Facility ID#: _____	Emission Point Identification#: <u>EP-012</u>

Section 4.1: External Combustion Unit

IMPORTANT: READ THE INSTRUCTIONS ACCOMPANYING THIS SECTION BEFORE COMPLETING.
Do NOT use pencil to fill out this application. Please type responses or print using black ink.

General Information	
1) Unit ID#: EU-036	2) Installation Date: <input checked="" type="checkbox"/> New
3) Unit Type: <input checked="" type="checkbox"/> Boiler <input type="checkbox"/> Dryer <input type="checkbox"/> Other _____	4) Maximum Rated Capacity: 99.0 MMBtu/hr
5) Gross Power Output: _____ MW <input checked="" type="checkbox"/> N/A	Net Power Output: _____ MW <input checked="" type="checkbox"/> N/A

6) Stack Information <input type="checkbox"/> N/A				
Height	Top Inside Diameter	Stack Discharge	Exit Velocity of Gas	Exit Temperature of Gas
15 ft	0.25 ft	<input type="checkbox"/> Horizontal <input checked="" type="checkbox"/> Vertical	25.0 m/s	373.15 K

7) Fuel Information				
Type/Grade of Fuel Combusted	Maximum Fuel Capacity (include units)	Heat Content (include units)	Fuel Specifications	Requested Operating Limitation (include units)
Natural Gas	0.971 MMscf/hr	1020 Btu/scf	% Sulfur: N/A % Ash: N/A	N/A
Diesel Fuel	722.6 gal/hr	137,000 Btu/gal	% Sulfur: 0.05 % Ash: N/A	3,000,000 gal/yr
			% Sulfur: % Ash:	

If the steam generating unit combusts more than three types of fuel, attach additional information.

8) Air Pollution Control Equipment				
Is there an air pollution control device(s) associated with this unit? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO				
Control Equipment ID#	Type of Control Equipment	Pollutant(s) Controlled	% Control Efficiency	Installation Date
				<input type="checkbox"/> New

If multiple pieces of control equipment or more pollutants are being controlled, attach additional information.

9) New Source Performance Standard Applicability				
This steam generating unit is subject to:	<input type="checkbox"/> NSPS, Subpart D	<input type="checkbox"/> NSPS, Subpart Db	<input type="checkbox"/> Other _____	
If unknown, Complete Section 4.2	<input type="checkbox"/> NSPS, Subpart Da	<input checked="" type="checkbox"/> NSPS Subpart Dc	<input type="checkbox"/> None	

10) Emission Calculations Attached?	<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO
-------------------------------------	---	-----------------------------

11) Additional Information Attached?	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
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Air Quality Construction Permit Application Form 4.0: External Combustion Units

FACILITY NAME: <u>State of Nebraska Ethanol</u>	DATE: <u>1/1/2007</u>
NDEQ Facility ID#: _____	

Section 4.2: External Combustion Unit NSPS Applicability Determination

Instructions: Answer the following questions to determine which New Source Performance Standard(s) may apply to your external combustion unit. If this applicability determination indicates that you may be subject to an NSPS, the Department recommends that you read the appropriate subpart to determine if you are in fact subject to the NSPS (40 CFR 60). This section presents the primary applicability criteria. Contact the Department if you have any questions concerning this section or any NSPS.

External Combustion NSPS Applicability Determination for Unit ID#(s) EU-036

Step 1) Is this unit a steam generating unit?

- YES If YES, proceed to Step 2.
 NO If NO, this unit is not subject to a New Source Performance Standard.

Step 2) Is this an Electric Utility Steam Generating Unit with a capacity greater than 250.00 MMBtu/hr?

- YES If YES, proceed to Step 3.
 NO If NO, proceed to Step 5.

Step 3) Was this unit constructed, modified, or reconstructed after September 18, 1978?

- YES If YES, this unit may be subject to NSPS Subpart Da.
 NO If NO, proceed to Step 4.

Step 4) Was this unit constructed, modified, or reconstructed after August 17, 1971 (December 22, 1976 for lignite-fired units)?

- YES If YES, this unit may be subject to NSPS Subpart D.
 NO If NO, this unit is not subject to a New Source Performance Standard.

Step 5) Was this unit constructed, modified, or reconstructed after June 19, 1984?

- YES If YES, proceed to Step 6.
 NO If NO, this unit is not subject to a New Source Performance Standard.

Step 6) Is the maximum rated capacity of the unit greater than 100.0 MMBtu/hr?

- YES If YES, this unit may be subject to NSPS Subpart Db.
 NO If NO, proceed to Step 7.

Step 7) Is the maximum rated capacity of the unit greater than 10.0 MMBtu/hr?

- YES If YES, proceed to Step 8.
 NO If NO, this unit is not subject to a New Source Performance Standard.

Step 8) Was this unit constructed, modified, or reconstructed after June 9, 1989?

- YES If YES, this unit may be subject to NSPS Subpart Dc.
 NO If NO, this unit is not subject to a New Source Performance Standard.

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Air Quality Construction Permit Application Form 5.0: Internal Combustion Units

FACILITY NAME: <u>State of Nebraska Ethanol</u>	DATE: <u>1/1/2007</u>
NDEQ Facility ID#: _____	Emission Point Identification#: <u>EP-013</u>

Section 5.1: Internal Combustion Unit

IMPORTANT: READ THE INSTRUCTIONS ACCOMPANYING THIS SECTION BEFORE COMPLETING. Do NOT use pencil to fill out this application. Please type responses or print using black ink.				
General Information				
1) Unit ID#: EU-037		2) Installation Date: <input checked="" type="checkbox"/> NEW		
3) Unit Type: <input type="checkbox"/> Stationary Gas Turbine <input type="checkbox"/> Natural Gas-Fired Reciprocating Engine <input checked="" type="checkbox"/> Engine <input type="checkbox"/> Other _____				
4) Maximum Rated Capacity: 300 <input type="checkbox"/> MMBtu/hr <input checked="" type="checkbox"/> HP <input type="checkbox"/> KW				
5) Stack Information <input type="checkbox"/> N/A				
Height	Top Inside Diameter	Stack Discharge	Exit Velocity of Gas	Exit Temperature of Gas
8.0 ft	0.25 ft	<input type="checkbox"/> Horizontal <input checked="" type="checkbox"/> Vertical	125 m/s	750.0 K
6) Fuel Information				
Type/Grade of Fuel Combusted	Maximum Fuel Capacity (include units)	Heat Content (include units)	Fuel Specifications	Requested Operating Limitation (include units)
Diesel Fuel	15.3 gal/hr	137,000 Btu/gal	% Sulfur: 0.05 % Ash: N/A	500 hours/year
N/A			% Sulfur: % Ash:	
N/A			% Sulfur: % Ash:	
If the steam generating unit combusts more than three types of fuel, attach additional information.				
7) Air Pollution Control Equipment				
Is there an air pollution control device associated with this unit? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO				
Control Equipment ID#	Type of Control Equipment	Pollutant(s) Controlled	% Control Efficiency	Installation Date
				<input type="checkbox"/> New
If multiple pieces of control equipment or more pollutants are being controlled, attach additional information.				
8) New Source Performance Standard Applicability				
This internal combustion unit is subject to: <input type="checkbox"/> NSPS, Subpart GG <input checked="" type="checkbox"/> NSPS Subpart IIII <input type="checkbox"/> None If unknown, Complete Section 5.2 <input type="checkbox"/> NSPS, Subpart KKKK <input type="checkbox"/> Other _____				
9) Emission Calculations Attached? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO				
10) Additional Information Attached? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO				



Air Quality Construction Permit Application Form 5.0: Internal Combustion Units

FACILITY NAME: <u>State of Nebraska Ethanol</u>	DATE: <u>1/1/2007</u>
NDEQ Facility ID#: _____	

Section 5.2: Internal Combustion Unit NSPS Applicability Determination

Instructions: Answer the following questions to determine which New Source Performance Standard(s) may apply to your internal combustion unit. If this applicability determination indicates that you may be subject to an NSPS, the Department recommends that you read the appropriate subpart to determine if you are in fact subject to the NSPS (40 CFR 60). This section only presents several of the applicability criteria. Contact the Department if you have any questions concerning this section or any NSPS.

Internal Combustion NSPS Applicability Determination for Unit ID#(s) EU-037

Step 1) Is this unit a stationary gas turbine as defined in 40 CFR 60.331?

- YES If YES, proceed to Step 2.
 NO If NO, proceed to Step 4.

Step 2) Is the heat input of this unit at peak load equal to or greater than 10.7 gigajoules/hour?

- YES If YES, proceed to Step 3.
 NO If NO, this unit is not subject to a New Source Performance Standard.

Step 3) Was this unit constructed, modified, or reconstructed after October 3, 1977?

- YES If YES, this unit may be subject to NSPS Subpart GG
 NO If NO, proceed to Step 4.

Step 4) Is this unit a stationary combustion turbine?

- YES If YES, proceed to Step 5.
 NO If NO, proceed to Step 7.

Step 5) Is the power output of the unit greater or equal to 1 megawatt (MW)?

- YES If YES, proceed to Step 6.
 NO If NO, this unit is not subject to a New Source Performance Standard.

Step 6) Was this unit constructed, modified, or reconstructed after February 18, 2005?

- YES If YES, this unit may be subject to NSPS Subpart KKKK.
 NO If NO, this unit is not subject to a New Source Performance Standard.

Step 7) Is this unit a Stationary Compression Ignition Internal Combustion Engine (IC ICE) as defined in 40 CFR 60.4200?
(IC means an ICE that is not a spark ignition using a spark plug or other sparking device)

- YES If YES, proceed to Step 8.
 NO If NO, this unit is not subject to a New Source Performance Standard.

Step 8) Was this unit constructed, modified, or reconstructed after July 11, 2005?

(Non fire pump Stationary IC ICE manufactured prior to April 1, 2006 and fire pump Stationary IC ICE manufactured prior to July 11, 2005 are not considered constructed after July 11, 2005)

- YES If YES, this unit may be subject to NSPS Subpart IIII.
 NO If NO, this unit is not subject to a New Source Performance Standard.

DUPLICATE THIS PAGE AS NEEDED



Air Quality Construction Permit Application Form 7.0: Material Handling

FACILITY NAME: <u>State of Nebraska Ethanol</u>	DATE: <u>1/1/2007</u>
NDEQ Facility ID#: _____	Emission Point Identification#: <u>EP-001</u>

Section 7.1: Material Handling Emission Point Information

IMPORTANT: READ THE INSTRUCTIONS ACCOMPANYING THIS SECTION BEFORE COMPLETING.
Do NOT use pencil to fill out this application. Please type responses or print using black ink.

General Information

1) Type(s) of Material Handled: Corn

2) Unit Information

List the units that contribute to the Emissions from the Emission Point ID# listed above:

Unit ID#	Unit Type ¹	Unit Name	Maximum Capacity (include units)	Installation Date
EU-001	Dump Pit	Rail Dump Pit	15,000 bu/hr	<input checked="" type="checkbox"/> New
EU-002	Dump Pit	Truck Dump Pit	10,000 bu/hr	<input checked="" type="checkbox"/> New
EU-003	Conveyor	Conveyor #1	25,000 bu/hr	<input checked="" type="checkbox"/> New
EU-004	Elevator	Elevator #1	25,000 bu/hr	<input checked="" type="checkbox"/> New
				<input type="checkbox"/> New
				<input type="checkbox"/> New
				<input type="checkbox"/> New
				<input type="checkbox"/> New

If more than eight units' emissions are emitted through this emission point, attach an additional page so that all emission units are accounted for.

¹Unit Types include: Conveyor, Elevator, Hammermill, Silo, Bin, Crusher, etc.

3) Stack Information N/A

Height	Top Inside Diameter	Stack Discharge	Exit Velocity of Gas	Exit Temperature of Gas
30.0 ft	1.0 ft	<input type="checkbox"/> Horizontal <input checked="" type="checkbox"/> Vertical	25.0 m/s	298.15 K

4) Air Pollution Control Equipment

Is there an air pollution control device(s) associated with this unit? YES NO

Control Equipment ID#	Type of Control Equipment	Pollutant(s) Controlled	% Control Efficiency	Installation Date
CE-001	Baghouse	PM	99%	<input checked="" type="checkbox"/> New
		PM10	99%	

If the air pollution control device(s) is a baghouse, complete the following:

Control Equipment ID#	Air Flow Rate (dscf/min)	Grain Loading (grains/dscf)
CE-001	25,000	0.005

5) Emission Calculations Attached? YES NO

6) Additional Information Attached? YES NO

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Air Quality Construction Permit Application Form 7.0: Material Handling

FACILITY NAME: <u>State of Nebraska Ethanol</u>	DATE: <u>1/1/2007</u>
NDEQ Facility ID#: _____	Emission Point Identification#: <u>EP-002</u>

Section 7.1: Material Handling Emission Point Information

IMPORTANT: READ THE INSTRUCTIONS ACCOMPANYING THIS SECTION BEFORE COMPLETING.
Do NOT use pencil to fill out this application. Please type responses or print using black ink.

General Information

1) Type(s) of Material Handled: Corn

2) Unit Information

List the units that contribute to the Emissions from the Emission Point ID# listed above:

Unit ID#	Unit Type ¹	Unit Name	Maximum Capacity (include units)	Installation Date
EU-005	Conveyor	Conveyor #2	25,000 bu/ht	<input checked="" type="checkbox"/> New
EU-006	Silo	Corn Storage Silo #1	50,000 bu	<input checked="" type="checkbox"/> New
EU-007	Silo	Corn Storage Silo #2	50,000 bu	<input checked="" type="checkbox"/> New
EU-008	Conveyor	Conveyor #3	15,000 bu/hr	<input checked="" type="checkbox"/> New
EU-009	Elevator	Elevator #2	15,000 bu/hr	<input checked="" type="checkbox"/> New
				<input type="checkbox"/> New
				<input type="checkbox"/> New
				<input type="checkbox"/> New

If more than eight units' emissions are emitted through this emission point, attach an additional page so that all emission units are accounted for.

¹Unit Types include: Conveyor, Elevator, Hammermill, Silo, Bin, Crusher, etc.

3) Stack Information N/A

Height	Top Inside Diameter	Stack Discharge	Exit Velocity of Gas	Exit Temperature of Gas
30.0 ft	1.0 ft	<input type="checkbox"/> Horizontal <input checked="" type="checkbox"/> Vertical	25.0 m/s	298.15 K

4) Air Pollution Control Equipment

Is there an air pollution control device(s) associated with this unit? YES NO

Control Equipment ID#	Type of Control Equipment	Pollutant(s) Controlled	% Control Efficiency	Installation Date
CE-002	Baghouse	PM	99%	<input checked="" type="checkbox"/> New
		PM10	99%	

If the air pollution control device(s) is a baghouse, complete the following:

Control Equipment ID#	Air Flow Rate (dscf/min)	Grain Loading (grains/dscf)
CE-002	25,000	0.005

5) Emission Calculations Attached? YES NO

6) Additional Information Attached? YES NO

DUPLICATE THIS PAGE AS NEEDED



Air Quality Construction Permit Application Form 7.0: Material Handling

FACILITY NAME: <u>State of Nebraska Ethanol</u>	DATE: <u>1/1/2007</u>
NDEQ Facility ID#: _____	Emission Point Identification#: <u>EP-003</u>

Section 7.1: Material Handling Emission Point Information

IMPORTANT: READ THE INSTRUCTIONS ACCOMPANYING THIS SECTION BEFORE COMPLETING.
Do NOT use pencil to fill out this application. Please type responses or print using black ink.

General Information

1) Type(s) of Material Handled: Corn

2) Unit Information

List the units that contribute to the Emissions from the Emission Point ID# listed above:

Unit ID#	Unit Type ¹	Unit Name	Maximum Capacity (include units)	Installation Date
EU-010	Bin	Surge Bin	25,000 bu	<input checked="" type="checkbox"/> New
EU-011	Scalper	Scalper	1,000 bu/hr	<input checked="" type="checkbox"/> New
EU-012	Hammermill	Hammermill	1,000 bu/hr	<input checked="" type="checkbox"/> New
				<input type="checkbox"/> New
				<input type="checkbox"/> New
				<input type="checkbox"/> New
				<input type="checkbox"/> New
				<input type="checkbox"/> New

If more than eight units' emissions are emitted through this emission point, attach an additional page so that all emission units are accounted for.

¹Unit Types include: Conveyor, Elevator, Hammermill, Silo, Bin, Crusher, etc.

3) Stack Information N/A

Height	Top Inside Diameter	Stack Discharge	Exit Velocity of Gas	Exit Temperature of Gas
30.0 ft	1.0 ft	<input type="checkbox"/> Horizontal <input checked="" type="checkbox"/> Vertical	25.0 m/s	298.15 K

4) Air Pollution Control Equipment

Is there an air pollution control device(s) associated with this unit? YES NO

Control Equipment ID#	Type of Control Equipment	Pollutant(s) Controlled	% Control Efficiency	Installation Date
CE-003	Baghouse	PM	99%	<input checked="" type="checkbox"/> New
		PM10	99%	

If the air pollution control device(s) is a baghouse, complete the following:

Control Equipment ID#	Air Flow Rate (dscf/min)	Grain Loading (grains/dscf)
CE-003	45,000	0.005

5) Emission Calculations Attached? YES NO

6) Additional Information Attached? YES NO

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Air Quality Construction Permit Application Form 7.0: Material Handling

FACILITY NAME: <u>State of Nebraska Ethanol</u>	DATE: <u>1/1/2007</u>
NDEQ Facility ID#: _____	Emission Point Identification#: <u>EP-007</u>

Section 7.1: Material Handling Emission Point Information

IMPORTANT: READ THE INSTRUCTIONS ACCOMPANYING THIS SECTION BEFORE COMPLETING.
Do NOT use pencil to fill out this application. Please type responses or print using black ink.

General Information

1) Type(s) of Material Handled: Dry Distillers Grains with Solubles (DDGS)

2) Unit Information

List the units that contribute to the Emissions from the Emission Point ID# listed above:

Unit ID#	Unit Type ¹	Unit Name	Maximum Capacity (include units)	Installation Date
EU-032	Bin	DDGS Storage	20,000 bu	<input checked="" type="checkbox"/> New
EU-033	Elevator	Elevator #3	10,000 bu/hr	<input checked="" type="checkbox"/> New
EU-034	Conveyor	Conveyor #4	10,000 bu/hr	<input checked="" type="checkbox"/> New
EU-035	Loadout Spout	DDGS Loadout	10,000 bu/hr	<input checked="" type="checkbox"/> New
				<input type="checkbox"/> New
				<input type="checkbox"/> New
				<input type="checkbox"/> New
				<input type="checkbox"/> New

If more than eight units' emissions are emitted through this emission point, attach an additional page so that all emission units are accounted for.

¹Unit Types include: Conveyor, Elevator, Hammermill, Silo, Bin, Crusher, etc.

3) Stack Information N/A

Height	Top Inside Diameter	Stack Discharge	Exit Velocity of Gas	Exit Temperature of Gas
30.0 ft	1.0 ft	<input type="checkbox"/> Horizontal <input checked="" type="checkbox"/> Vertical	25.0 m/s	298.15 K

4) Air Pollution Control Equipment

Is there an air pollution control device(s) associated with this unit? YES NO

Control Equipment ID#	Type of Control Equipment	Pollutant(s) Controlled	% Control Efficiency	Installation Date
CE-006	Baghouse	PM	99%	<input checked="" type="checkbox"/> New
		PM10	99%	

If the air pollution control device(s) is a baghouse, complete the following:

Control Equipment ID#	Air Flow Rate (dscf/min)	Grain Loading (grains/dscf)
CE-006	15,000	0.005

5) Emission Calculations Attached? YES NO

6) Additional Information Attached? YES NO

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Air Quality Construction Permit Application

Form 7.0: Material Handling

FACILITY NAME: <u>State of Nebraska Ethanol</u>	DATE: <u>1/1/2007</u>
NDEQ Facility ID#: _____	Emission Point Identification#: <u>N/A</u>

Section 7.2.2: Grain Handling Facility NSPS Applicability Determination

Instructions: Answer the following questions to determine which New Source Performance Standard(s) may apply to your grain handling facility. If this applicability determination indicates that you may be subject to an NSPS, the Department recommends that you read the appropriate subpart to determine if you are in fact subject to the NSPS (40 CFR 60). This section only presents the primary applicability criteria. Contact the Department if you have any questions concerning this section or any NSPSs.

Grain Handling Facility NSPS Applicability Determination

Step 1) Did construction, modification, or reconstruction commence at this facility after August 3, 1978?

- YES If YES, proceed to Step 2.
- NO If NO, the grain facility is not subject to a New Source Performance Standard.

Step 2) Does this facility have the capability to permanently store more than 2.5 million bushels of grain (corn, wheat, sorghum, rice, rye, oats, barley, and soybean) at one time?

- YES If YES, this facility may be subject to NSPS Subpart DD.
- NO If NO, proceed to Step 3.

Step 3) Does this facility have the capability to permanently store more than one (1) million bushels of grain (corn, wheat, sorghum, rice, rye, oats, barley, and soybean) at one time?

- YES If YES, proceed to Step 4.
- NO If NO, the grain facility is not subject to a New Source Performance Standard.

Step 4) Is the grain handling equipment located at a wheat flour mill, wet corn mill, dry corn mill (products for human consumption), rice mill or soybean oil extraction plant?

- YES If YES, this facility may be subject to NSPS Subpart DD.
- NO If NO, the grain facility is not subject to a New Source Performance Standard.



Air Quality Construction Permit Application
Form 9.0: Storage Tanks

FACILITY NAME: State of Nebraska Ethanol **DATE:** 1/1/2007

NDEQ Facility ID#: _____

Section 9.1: Storage Tank Summary

IMPORTANT: READ THE INSTRUCTIONS ACCOMPANYING THIS SECTION BEFORE COMPLETING
Do NOT use pencil to fill out this application. Please type responses or print using black ink.

Storage Tank Summary

1) Emission Point ID #	2) Tank Unit ID #	3) Tank Contents	4) Maximum Capacity (gallons)	5) Installation Date
EP-011	EU-023	Anhydrous Ethanol	100,000	<input checked="" type="checkbox"/> NEW
EP-010	EU-024	Denaturant	50,000	<input checked="" type="checkbox"/> NEW
EP-011	EU-025	Denatured Ethanol	100,000	<input checked="" type="checkbox"/> NEW
				<input type="checkbox"/> NEW
				<input type="checkbox"/> NEW
				<input type="checkbox"/> NEW
				<input type="checkbox"/> NEW
				<input type="checkbox"/> NEW
				<input type="checkbox"/> NEW
				<input type="checkbox"/> NEW

If there are/will be more than ten existing and/or proposed storage tanks, attach additional information so that each tank is described.



Air Quality Construction Permit Application Form 9.0: Storage Tanks

FACILITY NAME: <u>State of Nebraska Ethanol</u>	DATE: <u>1/1/2007</u>
NDEQ Facility ID#: _____	Emission Point Identification#(s): <u>EP-009</u>

Note: This section must be completed for **each** tank used in the storage of an organic liquid or material containing hazardous air pollutants. A single section may be completed for several tanks **ONLY** if the tanks are identical in size and contents. In addition to completing this section, the most recent TANKS Program must be completed for each storage tank. The "Detailed Format" output should be printed out and attached to this form. You can obtain the TANKS program at <http://www.epa.gov/ttn/chief/software/tanks/>. If you are unable to complete this program, contact the Department for assistance. Please note that if the Department has to complete the TANKS program for you, the length of time it will take for your facility to obtain your construction permit will increase.

Section 9.2: Storage Tank - General Information

IMPORTANT: READ THE INSTRUCTIONS ACCOMPANYING THIS SECTION BEFORE COMPLETING Do NOT use pencil to fill out this application. Please type responses or print using black ink.				
Tank Information				
1) Tank Unit ID#(s): EU-025		2) Installation Date: <input checked="" type="checkbox"/> New		
3) Identify the product(s) stored in this tank: Denatured Ethanol				
4) Tank Description: Internal Floating Roof Tank				
5) TANKS program output attached? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		6) TANKS Program Version: 4.09d <input type="checkbox"/> N/A		
7) Maximum Capacity: 100,000 Gallons		8) Working Volume: 100,000 Gallons		
9) Tank Dimensions: Height 25 Feet Length _____ Feet Diameter 25 Feet				
10) Tank Orientation: <input checked="" type="checkbox"/> Vertical <input type="checkbox"/> Horizontal		Tank Location: <input checked="" type="checkbox"/> Above Ground <input type="checkbox"/> Underground		
11) Type of Primary Seal: <input type="checkbox"/> Mechanical Shoe <input type="checkbox"/> Liquid Mounted <input checked="" type="checkbox"/> Vapor Mounted <input type="checkbox"/> N/A				
12) Air Pollution Control Equipment				
Is there an air pollution control device(s) associated with this unit? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO				
Control Equipment ID#	Type of Control Equipment	Pollutant(s) Controlled	% Control Efficiency	Installation Date
				<input type="checkbox"/> New
If additional pollutants are being controlled, attach additional information.				
13) New Source Performance Standard Applicability				
This storage tank is subject to: <input type="checkbox"/> NSPS, Subpart K <input checked="" type="checkbox"/> NSPS, Subpart Kb <input type="checkbox"/> None If unknown, Complete Section 9.4 <input type="checkbox"/> NSPS, Subpart Ka <input type="checkbox"/> Other _____				
14) Additional Information Attached? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO				



Air Quality Construction Permit Application Form 9.0: Storage Tanks

FACILITY NAME: <u>State of Nebraska Ethanol</u>	DATE: <u>1/1/2007</u>
NDEQ Facility ID#: _____	Emission Point Identification#(s): <u>EP-009</u>

Section 9.3: Storage Tank – Product Information

IMPORTANT: READ THE INSTRUCTIONS ACCOMPANYING THIS SECTION BEFORE COMPLETING
Do NOT use pencil to fill out this application. Please type responses or print using black ink.

Tank Information			
1) Tank Unit ID#(s): <u>EU-025</u>			
2) Is this tank(s) restricted to storing only one product? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO			
If this tank stores more than one product, how many different products are stored in this tank? (Note: The Product Specifications section (below) must be filled out for each product stored)			
3) Product Specifications			
Primary Product Name: <u>Denatured Ethanol</u>		(A) Total VOC Emissions: <u>284.81</u> lb/year	
Hazardous Air Pollutant	(B) Weight % HAP in VOC Emissions	HAP Emissions	
		(C) = (A)x(B) (lb/yr)	(D) = (C)/2000 (ton/yr)
Acetaldehyde	2.00E-04	0.0448	0.00002
Methanol	2.00E-04	0.0448	0.00002
Benzene	2.50E-03	0.1549	0.00008
Carbon disulfide	2.00E-05	0.0012	6.196E-07
Cumene	1.00E-04	0.0062	0.000003
Ethyl Benzene	5.00E-05	0.0031	0.000002
n-Hexane	5.00E-02	3.0980	0.0015
Toluene	5.00E-03	0.3098	0.00015
Total HAP Emissions from Primary Product		168.28	0.0841
3) Product Specifications			
Additional Product Name:		(A) Total VOC Emissions: _____ lb/year	
Hazardous Air Pollutant	(B) Weight % HAP in VOC Emissions	HAP Emissions	
		(C) = (A)x(B) (lb/yr)	(D) = (C)/2000 (ton/yr)
Total HAP Emissions from Additional Product			
Note: If this tank(s) contains more than two different products, please attach additional pages.			

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Air Quality Construction Permit Application Form 9.0: Storage Tanks

FACILITY NAME: <u>State of Nebraska Ethanol</u>	DATE: <u>1/1/2007</u>
NDEQ Facility ID#: _____	Emission Point Identification#(s): <u>EP-010</u>

Note: This section must be completed for **each** tank used in the storage of an organic liquid or material containing hazardous air pollutants. A single section may be completed for several tanks **ONLY** if the tanks are identical in size and contents. In addition to completing this section, the most recent TANKS Program must be completed for each storage tank. The "Detailed Format" output should be printed out and attached to this form. You can obtain the TANKS program at <http://www.epa.gov/ttn/chief/software/tanks/>. If you are unable to complete this program, contact the Department for assistance. Please note that if the Department has to complete the TANKS program for you, the length of time it will take for your facility to obtain your construction permit will increase.

Section 9.2: Storage Tank - General Information

IMPORTANT: READ THE INSTRUCTIONS ACCOMPANYING THIS SECTION BEFORE COMPLETING Do NOT use pencil to fill out this application. Please type responses or print using black ink.				
Tank Information				
1) Tank Unit ID#(s): EU-024		2) Installation Date: <input checked="" type="checkbox"/> New		
3) Identify the product(s) stored in this tank: Denaturant				
4) Tank Description: Internal Floating Roof Tank				
5) TANKS program output attached? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		6) TANKS Program Version: 4.09d <input type="checkbox"/> N/A		
7) Maximum Capacity: 50,000 Gallons		8) Working Volume: 50,000 Gallons		
9) Tank Dimensions: Height 25 Feet Length _____ Feet Diameter 13 Feet				
10) Tank Orientation: <input checked="" type="checkbox"/> Vertical <input type="checkbox"/> Horizontal		Tank Location: <input checked="" type="checkbox"/> Above Ground <input type="checkbox"/> Underground		
11) Type of Primary Seal: <input type="checkbox"/> Mechanical Shoe <input type="checkbox"/> Liquid Mounted <input checked="" type="checkbox"/> Vapor Mounted <input type="checkbox"/> N/A				
12) Air Pollution Control Equipment				
Is there an air pollution control device(s) associated with this unit? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO				
Control Equipment ID#	Type of Control Equipment	Pollutant(s) Controlled	% Control Efficiency	Installation Date
				<input type="checkbox"/> New
If additional pollutants are being controlled, attach additional information.				
13) New Source Performance Standard Applicability				
This storage tank is subject to: <input type="checkbox"/> NSPS, Subpart K <input checked="" type="checkbox"/> NSPS, Subpart Kb <input type="checkbox"/> None If unknown, Complete Section 9.4 <input type="checkbox"/> NSPS, Subpart Ka <input type="checkbox"/> Other _____				
14) Additional Information Attached? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO				

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Air Quality Construction Permit Application Form 9.0: Storage Tanks

FACILITY NAME: <u>State of Nebraska Ethanol</u>	DATE: <u>1/1/2007</u>
NDEQ Facility ID#: _____	Emission Point Identification#(s): <u>EP-011</u>

Note: This section must be completed for **each** tank used in the storage of an organic liquid or material containing hazardous air pollutants. A single section may be completed for several tanks **ONLY** if the tanks are identical in size and contents. In addition to completing this section, the most recent TANKS Program must be completed for each storage tank. The "Detailed Format" output should be printed out and attached to this form. You can obtain the TANKS program at <http://www.epa.gov/ttn/chief/software/tanks/>. If you are unable to complete this program, contact the Department for assistance. Please note that if the Department has to complete the TANKS program for you, the length of time it will take for your facility to obtain your construction permit will increase.

Section 9.2: Storage Tank - General Information

IMPORTANT: READ THE INSTRUCTIONS ACCOMPANYING THIS SECTION BEFORE COMPLETING Do NOT use pencil to fill out this application. Please type responses or print using black ink.				
Tank Information				
1) Tank Unit ID#(s): EU-023		2) Installation Date: <input checked="" type="checkbox"/> New		
3) Identify the product(s) stored in this tank: 200-Proof Anhydrous Ethanol				
4) Tank Description: Internal Floating Roof Tank				
5) TANKS program output attached? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		6) TANKS Program Version: 4.09d <input type="checkbox"/> N/A		
7) Maximum Capacity: 100,000 Gallons		8) Working Volume: 100,000 Gallons		
9) Tank Dimensions: Height 25 Feet Length _____ Feet Diameter 25 Feet				
10) Tank Orientation: <input checked="" type="checkbox"/> Vertical <input type="checkbox"/> Horizontal		Tank Location: <input checked="" type="checkbox"/> Above Ground <input type="checkbox"/> Underground		
11) Type of Primary Seal: <input type="checkbox"/> Mechanical Shoe <input type="checkbox"/> Liquid Mounted <input checked="" type="checkbox"/> Vapor Mounted <input type="checkbox"/> N/A				
12) Air Pollution Control Equipment				
Is there an air pollution control device(s) associated with this unit? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO				
Control Equipment ID#	Type of Control Equipment	Pollutant(s) Controlled	% Control Efficiency	Installation Date
				<input type="checkbox"/> New
If additional pollutants are being controlled, attach additional information.				
13) New Source Performance Standard Applicability				
This storage tank is subject to: <input type="checkbox"/> NSPS, Subpart K <input type="checkbox"/> NSPS, Subpart Kb <input checked="" type="checkbox"/> None If unknown, Complete Section 9.4 <input type="checkbox"/> NSPS, Subpart Ka <input type="checkbox"/> Other _____				
14) Additional Information Attached? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO				

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Printout of TANKS 4.0 Report for EP-09



Air Quality Construction Permit Application Form 10.0: Cooling Tower

FACILITY NAME: <u>State of Nebraska Ethanol</u>	DATE: <u>1/1/2007</u>
NDEQ Facility ID#: _____	Emission Point Identification#(s): <u>EP-014</u>

Section 10.1: Cooling Tower Information

IMPORTANT: READ THE INSTRUCTIONS ACCOMPANYING THIS SECTION BEFORE COMPLETING Do NOT use pencil to fill out this application. Please type responses or print using black ink.					
Cooling Tower Information					
1) Unit ID#: EU-038		2) Installation Date: <input checked="" type="checkbox"/> New			
3) Number of Cooling Tower Cells: 3		4) Drift Loss (DL) Percent: 0.005 % Vendor guarantee attached? <input checked="" type="checkbox"/> Yes			
5) Total Circulation Rate: 1,200,000 gal/hr		Total Circulation Rate: 10,512,000 kgal/year			
6) Total Dissolved Solid (TDS) Concentration					
Per Single Sampling Event: 3,000 ppm		Annual Average Rate: 3,000 ppm			
7) Additive Information					
Will any chemicals be added to the cooling tower water that will emit VOC or HAP into the air? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO If YES, complete the following about the chemicals:					
Additive Name	Amount (to be) Used (gallon/year)	Product Density (lb/gallon)	Weight Percent VOC (%)		
(1)					
(2)					
(3)					
If more than three additives will be added to your cooling tower water, attach additional pages so all additives are listed.					
Additive (1)		Additive (2)		Additive (3)	
Hazardous Air Pollutant	Weight Percent HAP (%)	Hazardous Air Pollutant	Weight Percent HAP (%)	Hazardous Air Pollutant	Weight Percent HAP (%)
If more than six HAPs are contained in your additive(s), attach additional pages so all HAPs are listed.					
8) Emission Calculations Attached? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO					
9) Additional Information Attached? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO					

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C. Chemical

Resistance to Grease, Fats & Oils	Excellent	ASTM D722-45
Resistance to Acids	Excellent	ASTM D543
Resistance to Alkalies	Excellent	ASTM D543

The PVC sheets shall be of uniform thickness and free from holes, air bubbles, foreign matter, undispersed raw material or other manufacturing defects which may adversely affect their performance.

D. Drift Modules

1. The eliminators shall be the blade multipass type with end caps to provide extra structural integrity for beam strength and durability.
2. The drift modules shall be able to span a minimum 6 ft. at design conditions with a minimum of deflection.
3. The eliminators shall be of the nesting type to insure a seamless installation and prevent bypass of the drift droplets.
4. Eliminators used in cross-flow applications must be designed with special drainage to insure the captured drift droplets are not reintrained into the air stream.
5. The eliminators shall be fitted into the interior of the tower to prevent drift in excess of 0.002% of the inlet water-flow rate and guaranteed for all operating conditions.
6. The mass drift quantity shall be determined by the CTI STD-140 HBIK test code or the EPA method 13 A system of analysis. Drift quantity shall not exceed the guarantee of .002%
7. Material used for the eliminators shall be suitable for continuous operation at the maximum discharge air temperature possible.
8. Eliminators shall be PVC or CPVC as required by the temperature of the environment, and shall be fire resistant with a maximum flame spread rate of 15 or less according to ASTM method E-84. A certified test report showing that the cellular eliminator will meet this flame spread rate is required.
9. The drift modules shall measure up to 24 inches wide, 5 3/4" in depth and up to 12 ft. long.



Air Quality Construction Permit Application Form 11.0: Fugitive Emissions Sources

FACILITY NAME: <u>State of Nebraska Ethanol</u>	DATE: <u>1/1/2007</u>
NDEQ Facility ID#: _____	Emission Point Identification #: <u>EP-015</u>

Section 11.1: Haul Roads

IMPORTANT: READ THE INSTRUCTIONS ACCOMPANYING THIS SECTION BEFORE COMPLETING.
Do NOT use pencil to fill out this application. Please type responses or print using black ink.

- 1) Is the NDEQ haul road spreadsheet attached as a substitute for items (2) through (8) below?
 Yes, attach spreadsheet and skip to item (9) below No, proceed to fill out table below

Haul Road / Traffic Parameters

(2) Activity / Road Description	(3) Road Type / Silt Value		(4) Roundtrip Length (ft)		(5) Truck Weight (tons)		(6) Ave. Speed (mph)	(7) Maximum Throughput (units/yr)	(8) Ave. Truck Capacity (units/truck)
			emptv	full	emptv	full			
Example Activity	P	4.00	1,500	2,500	15.0	40.0	30	2,550,000 <input type="checkbox"/>	900 bu
Grain Receiving	P	3.00	545	555	15.0	40.0	30	50,000 <input checked="" type="checkbox"/>	25 tons
Denaturant Delivery	P	3.00	230	870	15.0	40.0	30	5,000,000 <input type="checkbox"/>	7,500 gal
Chemical Delivery	P	3.00	655	445	15.0	49.0	30	5,338 <input type="checkbox"/>	7,500 gal
Denatured Ethanol	P	3.00	930	170	15.0	40.0	30	10,500,000 <input type="checkbox"/>	7,500 gal
DDGS Loadout	P	3.00	880	220	15.0	40.0	30	31,481 <input type="checkbox"/>	25 tons
WDGS Loadout	P	3.00	785	315	15.0	40.0	30	80,952 <input type="checkbox"/>	25 tons
								<input type="checkbox"/>	
								<input type="checkbox"/>	
								<input type="checkbox"/>	
								<input type="checkbox"/>	
								<input type="checkbox"/>	
								<input type="checkbox"/>	

- 9) Silt loading/content values were obtained from (i.e. Testing, AP-42 defaults): Defaults
- 10) To assist in verification of haul road lengths and traffic speeds, please attach a plan view sketch indicating on-site haul road traffic patterns and check box. → Traffic sketch attached? Yes
- 11) Requested permit limits for annual throughput? 50,000 tons/year of grain received via Truck
- 12) Haul road emission calculations are attached or included with your application? Yes



Air Quality Construction Permit Application
Form 11.0: Fugitive Emission Sources

FACILITY NAME: State of Nebraska Ethanol DATE: 1/1/2007
 NDEQ Facility ID#: _____ Emission Point Identification#: EP-016

Section 11.2: Equipment Leaks

IMPORTANT: READ THE INSTRUCTIONS ACCOMPANYING THIS SECTION BEFORE COMPLETING
Do NOT use pencil to fill out this application. Please type responses or print using black ink.

1) Equipment Leak Volatile Organic Compound (VOC) Emission Calculations

(A) Type of Component/Product	(B) Number of Components	(C) Leaking Emission Factor (kg/hr/source)	(D) = (B) x (C) x 9.68 (ton/year)		(E) LDAR Control Efficiency (%)	(F) = (D) x [1-(E)] (tons/yr)	
			Uncontrolled VOC Emissions	VOC Controlled Emissions			
Light Liquid Valves	354	0.00403	13.81	2.21	84%		
Light Liquid Pumps	30	0.0199	5.78	1.79	69%		
Light Liquid Check Valves	27	0.00403	1.05	0.17	84%		
Light Liquid Control Valves	87	0.00403	3.39	0.54	84%		
Pressure Relief Valves	14	0.104	14.09	1.83	87%		
Total VOC Emissions from Equipment Leaks			38.12	6.54	-		

Additional Information Attached? YES NO



Air Quality Construction Permit Application Form 12.0: Control Equipment Emissions

FACILITY NAME: <u>State of Nebraska Ethanol</u>	DATE: <u>1/1/2007</u>
NDEQ Facility ID#: _____	Emission Point Identification#: <u>EP-008</u>

Section 12.1: Combustion Flare

IMPORTANT: READ THE INSTRUCTIONS ACCOMPANYING THIS SECTION BEFORE COMPLETING. Do NOT use pencil to fill out this application. Please type responses or print using black ink.				
General Information				
1) Control Equipment ID#: CE-007		2) Installation Date:		<input checked="" type="checkbox"/> New
3) Maximum Flare Rated Capacity: 10.0 MMBtu/hr		4) Maximum Pilot Rated Capacity: 0.10 MMBtu/hr		
5) Unit Information				
List the emission units whose emissions are controlled by this combustion flare: (Emission Point ID#: <u>008</u>)				
Unit ID#	Emission Source Description	Installation Date		
EU-026	Denatured Ethanol Truck Loadout	<input checked="" type="checkbox"/> NEW		
		<input type="checkbox"/> NEW		
		<input type="checkbox"/> NEW		
		<input type="checkbox"/> NEW		
		<input type="checkbox"/> NEW		
If this combustion flare controls emissions from more than five emission units, please attach additional pages.				
6) Stack Information <input type="checkbox"/> N/A				
Height	Top Inside Diameter	Flare Type	Exit Velocity of Gas	Exit Temperature of
6.0 ft	0.25 ft	<input checked="" type="checkbox"/> Enclosed <input type="checkbox"/> Open	10.0 m/s	373.15 K
7) Flare Fuel Information				
Type/Grade of Fuel Combusted	Maximum Fuel Capacity (include units)	Heat Content (include units)	Fuel Contents	Requested Operating Limitation (include units)
Ethanol Vapor	N/A	N/A	% Sulfur: N/A % Ash: N/A	N/A
8) Pilot Fuel Information				
Type/Grade of Fuel Combusted	Maximum Fuel Capacity (include units)	Heat Content (include units)	Fuel Contents	Requested Operating Limitation (include units)
Natural Gas	0.000098 MMscf/hr	1020 Btu/scf	% Sulfur: N/A % Ash: N/A	N/A
If either the Flare or Pilot will combust more than one type of fuel, attach additional information.				



Air Quality Construction Permit Application

Form 12.0: Control Equipment Emissions

FACILITY NAME: <u>State of Nebraska Ethanol</u>	DATE: <u>1/1/2007</u>
NDEQ Facility ID#: _____	Emission Point Identification#: <u>EP-008</u>

Section 12.1: Combustion Flare (continued)

9) Control Information			
Pollutant(s) Controlled	% Control Efficiency	Pollutant(s) Controlled	% Control Efficiency
VOC	98%		
HAP	65%		
If additional pollutants are being controlled, attach additional information.			
10) Emission Calculations Attached?		<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO
11) Additional Information Attached?		<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO



Air Quality Construction Permit Application Form 12.0: Control Equipment

FACILITY NAME: <u>State of Nebraska Ethanol</u>	DATE: <u>1/1/2007</u>
NDEQ Facility ID#: _____	Emission Point Identification#: <u>EP-005</u>

Section 12.2.1: Thermal Oxidizer (TO) Information

IMPORTANT: READ THE INSTRUCTIONS ACCOMPANYING THIS SECTION BEFORE COMPLETING.
Do NOT use pencil to fill out this application. Please type responses or print using black ink.

General Information

1) Control Equipment ID#: CE-005	2) Installation Date: <input checked="" type="checkbox"/> New
3) Maximum Rated Capacity: 25.0 MMBtu/hr	4) Type of TO: <input checked="" type="checkbox"/> Regenerative <input type="checkbox"/> Recuperative
5) If a regenerative TO, type of regeneration: <input checked="" type="checkbox"/> Online <input type="checkbox"/> Offline <input type="checkbox"/> N/A <input type="checkbox"/> Other _____	

6) Unit Information

List the emission units whose emissions are controlled by this thermal oxidizer:

Unit ID#	Emission Source Description	Installation Date
EU-018	Beer Column	<input checked="" type="checkbox"/> NEW
EU-019	Stripper	<input checked="" type="checkbox"/> NEW
EU-020	Rectifier	<input checked="" type="checkbox"/> NEW
EU-021	Molecular Sieve	<input checked="" type="checkbox"/> NEW
EU-022	200-Proof Condenser	<input checked="" type="checkbox"/> NEW
EU-025	Evaporator	<input checked="" type="checkbox"/> NEW
EU-027	Whole Stillage Tank	<input checked="" type="checkbox"/> NEW
EU-028	Centrifuge	<input checked="" type="checkbox"/> NEW

If this emission point receives emissions from more than eight (8) units, please attach additional pages.

7) Stack Information N/A

Height	Top Inside Diameter	Stack Discharge	Exit Velocity of Gas	Exit Temperature of Gas
50.0 ft	2.0 ft	<input checked="" type="checkbox"/> Vertical <input type="checkbox"/> Horizontal	4.1 m/s	700.0 K

8) Fuel Information

Type/Grade of Fuel Combusted	Maximum Fuel Capacity (include units)	Heat Content (include units)	Fuel Contents	Requested Operating Limitation (include units)
Natural Gas	0.025 MMscf/hr	1020 Btu/scf	% Sulfur: N/A % Ash: N/A	N/A
			% Sulfur: % Ash:	

If the thermal oxidizer combusts more than two types of fuel, attach additional information.

9) New Source Performance Standard Applicability

This thermal oxidizer is subject to: NSPS, Subpart Db Other _____
 If unknown, Complete Section 12.2.2 NSPS, Subpart Dc None



Air Quality Construction Permit Application

Form 12.0: Control Equipment

FACILITY NAME: <u>State of Nebraska Ethanol</u>	DATE: <u>1/1/2007</u>
NDEQ Facility ID#: _____	Emission Point Identification#: <u>EP-005</u>

Section 12.2.1: Thermal Oxidizer (TO) Information

IMPORTANT: READ THE INSTRUCTIONS ACCOMPANYING THIS SECTION BEFORE COMPLETING.
 Do NOT use pencil to fill out this application. Please type responses or print using black ink.

General Information

1) Control Equipment ID#: CE-005	2) Installation Date: <input checked="" type="checkbox"/> New
3) Maximum Rated Capacity: 10.0 MMBtu/hr	4) Type of TO: <input checked="" type="checkbox"/> Regenerative <input type="checkbox"/> Recuperative
5) If a regenerative TO, type of regeneration: <input checked="" type="checkbox"/> Online <input type="checkbox"/> Offline <input type="checkbox"/> N/A <input type="checkbox"/> Other _____	

6) Unit Information

List the emission units whose emissions are controlled by this thermal oxidizer:

Unit ID#	Emission Source Description	Installation Date
EU-029	Thin Stillage Tank	<input checked="" type="checkbox"/> NEW
EU-030	DDGS Dryer	<input checked="" type="checkbox"/> NEW
EU-031	DDGS Cooler	<input checked="" type="checkbox"/> NEW
		<input type="checkbox"/> NEW
		<input type="checkbox"/> NEW
		<input type="checkbox"/> NEW
		<input type="checkbox"/> NEW

If this emission point receives emissions from more than eight (8) units, please attach additional pages.

7) Stack Information N/A

Height	Top Inside Diameter	Stack Discharge	Exit Velocity of Gas	Exit Temperature of Gas
50.0 ft	2.0 ft	<input checked="" type="checkbox"/> Vertical <input type="checkbox"/> Horizontal	4.1 m/s	700.0 K

8) Fuel Information

Type/Grade of Fuel Combusted	Maximum Fuel Capacity (include units)	Heat Content (include units)	Fuel Contents	Requested Operating Limitation (include units)
Natural Gas	0.025 MMscf/hr	1020 Btu/scf	% Sulfur: N/A % Ash: N/A	N/A
			% Sulfur: % Ash:	

If the thermal oxidizer combusts more than two types of fuel, attach additional information.

9) New Source Performance Standard Applicability

This thermal oxidizer is subject to: NSPS, Subpart Db Other _____
 If unknown, Complete Section 12.2.2 NSPS, Subpart Dc None



Air Quality Construction Permit Application Form 12.0: Control Equipment

FACILITY NAME: <u>State of Nebraska Ethanol</u>	DATE: <u>1/1/2007</u>
NDEQ Facility ID#: _____	Emission Point Identification#: <u>EP-005</u>

Section 12.2.1: Thermal Oxidizer (TO) Information (continued)

10) Control and Emissions Information								
Pollutants Controlled	% Control Efficiency	Potential Emissions from Emission Point (This table does not replace the emission calculations for this unit)						
		Combustion Emissions			Process Emissions		Total Emissions	
		Lb/hr	Ton/yr	Included with Process Emissions	Lb/hr	Ton/yr	Lb/hr	Ton/yr
PM	60%	-	-	<input checked="" type="checkbox"/> YES	1.08	4.73	1.08	4.73
PM ₁₀	60%	-	-	<input checked="" type="checkbox"/> YES	1.08	4.73	1.08	4.73
NO _x	0%	-	-	<input checked="" type="checkbox"/> YES	5.51	24.13	5.51	24.13
SO _x	0%	0.07	0.30	<input type="checkbox"/> YES	-	-	0.07	0.30
CO	99%	-	-	<input checked="" type="checkbox"/> YES	5.71	25.01	5.71	25.01
VOC	99%	-	-	<input checked="" type="checkbox"/> YES	3.83	16.78	5.71	16.78
Individual HAPs								
Acetaldehyde	-	-	-	<input type="checkbox"/> YES	0.16	0.70	0.16	0.70
Formaldehyde	-	-	-	<input checked="" type="checkbox"/> YES	0.16	0.70	0.16	0.70
Hexane	-	0.206	0.904	<input type="checkbox"/> YES	-	-	0.206	0.904
Methanol	-	-	-	<input type="checkbox"/> YES	0.06	0.26	0.06	0.26
				<input type="checkbox"/> YES				
Total HAP		0.206	0.904	<input type="checkbox"/> YES	0.38	1.66	0.586	2.564
If additional pollutants are being controlled, attach additional information.								
11) Emission Calculations Attached?					<input checked="" type="checkbox"/> YES			
12) Additional Information Attached?					<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			



Air Quality Construction Permit Application

Form 12.0: Control Equipment

FACILITY NAME: <u>State of Nebraska Ethanol</u>	DATE: <u>1/1/2007</u>
NDEQ Facility ID#: _____	Emission Point Identification#: <u>EP-004</u>

Section 12.3: Control Equipment Information (no combustion)

IMPORTANT: READ THE INSTRUCTIONS ACCOMPANYING THIS SECTION BEFORE COMPLETING.
 Do NOT use pencil to fill out this application. Please type responses or print using black ink.

General Information

1) Control Equipment ID#: CE-004	2) Installation Date: <input checked="" type="checkbox"/> New
3) Type of Control Equipment: CO2 Scrubber	

4) Unit Information

List the emission units whose emissions are controlled by this control device:

Unit ID#	Emission Source Description	Installation Date
EU-013	Slurry Tank	<input checked="" type="checkbox"/> NEW
EU-014	Liquefaction Tank	<input checked="" type="checkbox"/> NEW
EU-015	Yeast Tank	<input checked="" type="checkbox"/> NEW
EU-016	Fermenter	<input checked="" type="checkbox"/> NEW
EU-017	Beerwell	<input checked="" type="checkbox"/> NEW
		<input type="checkbox"/> NEW
		<input type="checkbox"/> NEW
		<input type="checkbox"/> NEW

If this emission point receives emissions from more than ten (10) units, please attach additional pages.

5) Stack Information N/A

Height	Top Inside Diameter	Stack Discharge	Exit Velocity of Gas	Exit Temperature of Gas
50.0 ft	3.0 ft	<input checked="" type="checkbox"/> Vertical <input type="checkbox"/> Horizontal	30.0 m/s	450.0 K

6) Control Information

Pollutant(s) Controlled	% Control Efficiency	Pollutant(s) Controlled	% Control Efficiency
VOC	98%		
HAP	65%		

If additional pollutants are being controlled, attach additional information.

7) Emission Calculations Attached? YES

8) Additional Information Attached? YES NO



Air Quality Construction Permit Application Form 13.0: Ethanol Production Facility

FACILITY NAME: <u>State of Nebraska Ethanol</u>	DATE: <u>1/1/2007</u>
NDEQ Facility ID#: _____	

Section 13.1: Ethanol Production Facility Information

IMPORTANT: READ THE INSTRUCTIONS ACCOMPANYING THIS SECTION BEFORE COMPLETING.
Do NOT use pencil to fill out this application. Please type responses or print using black ink.

General Information

1) Indicate the quantity of the following products that have been/will be produced:

Product	Current Amount	Maximum Proposed Amount
Denatured Ethanol	0.0 gallons/year	10,500,000 gallons/year
Anhydrous Ethanol	0.0 gallons/year	10,000,000 gallons/year
Wet Distilled Grain Solubles (WDGS) - 65% H ₂ O	0.0 tons/year	80,952 tons/year
Modified WDGS (MWDGS) - 30% H ₂ O	0.0 tons/year	0.0 tons/year
Dry Distilled Grain Solubles (DDGS) - 10% H ₂ O	0.0 tons/year	31,481 tons/year
Other: _____		
Other: _____		

2) Milling Type: Wet Milling (SIC 2046)
 Dry Milling (SIC 2869)
 Other: _____

3) Fermentation Type: Batch Fermentation
 Continuous Fermentation
 Other: _____

4) Type(s) of material used for ethanol production: Corn Milo Cellulose Other _____
Maximum grain/material throughput required for maximum ethanol production: 103,704 tons/year

Grain Receiving Information

5) Indicate the number of the following units that have been/will be constructed:

Unit Type	Current Number	Anticipated Total Number
Truck Dump Pit	0	1
Rail Dump Pit	0	1

6) For each Dump Pit complete the following:

Unit Name	Select the most appropriate description(s):
Truck Dump Pit	<input checked="" type="checkbox"/> Enclosed <input type="checkbox"/> Partially Enclosed <input checked="" type="checkbox"/> Choke-flow <input type="checkbox"/> Other _____
Rail Dump Pit	<input checked="" type="checkbox"/> Enclosed <input type="checkbox"/> Partially Enclosed <input checked="" type="checkbox"/> Choke-flow <input type="checkbox"/> Other _____
	<input type="checkbox"/> Enclosed <input type="checkbox"/> Partially Enclosed <input type="checkbox"/> Choke-flow <input type="checkbox"/> Other _____
	<input type="checkbox"/> Enclosed <input type="checkbox"/> Partially Enclosed <input type="checkbox"/> Choke-flow <input type="checkbox"/> Other _____
	<input type="checkbox"/> Enclosed <input type="checkbox"/> Partially Enclosed <input type="checkbox"/> Choke-flow <input type="checkbox"/> Other _____

If there are/will be more than five dump pits located at the facility, attach additional information so that each unit is described.

Section 13.1 continued on Next Page



Air Quality Construction Permit Application Form 13.0: Ethanol Production Facility

FACILITY NAME: State of Nebraska Ethanol **DATE:** 1/1/2007

NDEQ Facility ID#: _____

Section 13.1: Ethanol Production Facility Information (continued)

7) Permanent Grain Storage Information						
Existing				Proposed		
Unit ID#	Install Date	Type	Capacity (bu)	Unit ID#	Type	Capacity (bu)
				EU-006	Silo	50,000
				EU-007	Silo	50,000

If there are/will be more than seven existing and/or proposed storage units, attach additional information so that each unit is described.
If an open storage pile(s) will be used for storage, complete Section 11.3 for each storage pile.

Grain and By-Product Drying Operations N/A

8) Indicate the number of grain dryers that have been/will be constructed:

Unit Type	Current Number	Anticipated Total Number
Grain Dryer	0	0
DDGS Dryers	0	1

If you would like to establish operational limitations on either of the dryer types, please attach additional information that clearly identifies the requested limitation and what unit(s) the limitation applies.

9) For each Dryer complete the following:

Unit Name	Maximum Drying Capacity (tons/hour)	Select the most appropriate description(s):
DDGS Dryer <input checked="" type="checkbox"/> New	100	<input checked="" type="checkbox"/> Column Dryer <input type="checkbox"/> Self Cleaning Screens (<50 mesh) <input type="checkbox"/> Rack Dryer <input type="checkbox"/> Other _____
<input type="checkbox"/> New		<input type="checkbox"/> Column Dryer <input type="checkbox"/> Self Cleaning Screens (<50 mesh) <input type="checkbox"/> Rack Dryer <input type="checkbox"/> Other _____
<input type="checkbox"/> New		<input type="checkbox"/> Column Dryer <input type="checkbox"/> Self Cleaning Screens (<50 mesh) <input type="checkbox"/> Rack Dryer <input type="checkbox"/> Other _____

If there are/will be more than three grain and/or DDGS dryers, attach additional information so that each dryer is described.
For each dryer at the facility, also complete Section 4.1 for external combustion units.

10) New Source Performance Standard Applicability

The grain handling operation located at this Ethanol Manufacturing facility is subject to:
If unknown, Complete Section 7.2.2

NSPS, Subpart DD Other _____
 None



Air Quality Construction Permit Application Form 13.0: Ethanol Production Facility

FACILITY NAME: <u>State of Nebraska Ethanol</u>	DATE: <u>1/1/2007</u>
NDEQ Facility ID#: _____	

Section 13.1: Ethanol Production Facility Information (continued)

Solid By-Product Shipping Information			
11) Indicate the percentage of WDGS that is/will be shipped via the following means:			
Shipped By:	Current Percentage	Anticipated Total Percentage	
Truck (unspecified type)	0 %	100 %	
Rail	0 %	0 %	
Other: _____	%	%	
12) Indicate the percentage of DDGS that is/will be shipped via the following means:			
Shipped By:	Current Percentage	Anticipated Total Percentage	
Truck (unspecified type)	0 %	100 %	
Rail	0 %	0 %	
Other: _____	%	%	
Ethanol Liquid Loadout Information			
13) Indicate the amounts of the following products that have been/will be loaded out:			
Product	Current Amount	Anticipated Total Amount	
Anhydrous Ethanol	0 gallons/year	10,000,000 gallons/year	
Denaturant	0 gallons/year	500,000 gallons/year	
Denatured Ethanol	0 gallons/year	10,500,000 gallons/year	
E85	0 gallons/year	0 gallons/year	
Other: _____	gallons/year	gallons/year	
Other: _____	gallons/year	gallons/year	
14) Requested operational limitation(s) for ethanol liquid loadout (please be specific and include units):			
State of Nebraska Ethanol would like to limit that amount of grain that can be received via truck to 500,000 tons per year			
15) The following Denaturant will be used: <input checked="" type="checkbox"/> Natural Gasoline <input type="checkbox"/> Unleaded Gasoline <input type="checkbox"/> Other _____			
16) Denatured Ethanol will be loaded out into: <input checked="" type="checkbox"/> Trucks <input type="checkbox"/> Railcars <input type="checkbox"/> Both <input type="checkbox"/> Other _____			
17) Type of Ethanol loading into Trucks: <input type="checkbox"/> None <input checked="" type="checkbox"/> Submerged Loading <input type="checkbox"/> Bottom-Fill Loading <input type="checkbox"/> Other _____			
18) Type of Ethanol loading into Railcars: <input checked="" type="checkbox"/> None <input type="checkbox"/> Submerged Loading <input type="checkbox"/> Bottom-Fill Loading <input type="checkbox"/> Other _____			

Section 13.1 continued on Next Page



Air Quality Construction Permit Application Form 13.0: Ethanol Production Facility

FACILITY NAME: <u>State of Nebraska Ethanol</u>	DATE: <u>1/1/2007</u>
NDEQ Facility ID#: _____	

Section 13.1: Ethanol Production Facility Information (continued)

Vapor Recovery System Information		
19) Will a vapor recovery system with flare be installed on the liquid loadout operations? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		
20) The system will recover vapors from: <input checked="" type="checkbox"/> Truck loadout <input type="checkbox"/> Rail loadout <input type="checkbox"/> Both <input type="checkbox"/> Other _____		
21) Capture and Control Efficiencies of Vapor Recovery System		
	Truck Loadout	Rail Loadout
(A) Capture Efficiency	98%	N/A
(B) VOC Control Efficiency	98%	N/A
(A x B) Overall Control Efficiency	96%	N/A
For each combustion flare at the facility, also complete Section 12.1 for combustion flares.		
22) Emission Calculations for Liquid Loadout Attached?		<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
23) Additional Information Attached?		<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO



Air Quality Construction Permit Application Form 13.0: Ethanol Production Facility

FACILITY NAME: <u>State of Nebraska Ethanol</u>	DATE: <u>1/1/2007</u>
NDEQ Facility ID#: _____	Emission Point Identification#: <u>EP-006</u>

Section 13.2: WDGS Storage and Loadout

IMPORTANT: READ THE INSTRUCTIONS ACCOMPANYING THIS SECTION BEFORE COMPLETING. Do NOT use pencil to fill out this application. Please type responses or print using black ink.				
WDGS Product Information				
Maximum Amount of WDGS Produced:	<u>9.24</u>	Tons/hour	<u>80,952</u>	Tons/year
WDGS Average Moisture Content: 65 %				
Is the WDGS Storage enclosed? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		Is the WDGS Loadout enclosed? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		
Air Pollution Control Equipment				
Is there an air pollution control device(s) associated with this unit? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO				
Control Equipment ID#	Type of Control Equipment	Pollutant(s) Controlled	% Control Efficiency	Installation Date
				<input type="checkbox"/> New
Additional Information Attached? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO				

Emission Calculation for WDGS Storage and Loadout using DENCO Emission Factors

Pollutant	(A) WDGS Produced (ton/year)	(B) DENCO Emission Factor (lb/ton WDGS)	(C)=(A)x(B)/2000 Potential Uncontrolled Emission Rate ton/yr)	(D) Control Efficiency (%)	(E)=(C)x[1-(D)] Potential Controlled Emission Rate (ton/yr)
VOC (ethanol)	80,952	0.0083	0.336	0%	0.336
Hazardous Air Pollutants					
Acetaldehyde		1.11 E-04	0.0045	0%	0.0045
Acrolein		1.67 E-05	0.0007	0%	0.0007
Formaldehyde		2.22 E-04	0.009	0%	0.009
Methanol		4.44 E-05	0.0018	0%	0.0018

Construction Permit Application Calculations: Facility Process Information

State of Nebraska Ethanol

Process Data

Maximum Capacity (Anhydrous Ethanol Produced):	10,000,000	gallons per year		
Grain to Ethanol Conversion Factor	2.7	gallons of Ethanol per bushel of corn		
Grain Density:	56	lb/bushel for Corn		
Total Grain Receiving Throughput:	103,704	ton/yr =	11.8	ton/hr
	103,704	ton/yr =	3,703,704	bu/yr
DDGS produced by a Bushel of Grain	17	lb DDGS/bushel of Corn		
Dryer is capable of drying % of WDGS:	100%			
DDGS Generated (10% Moisture)	31,481	ton/yr		
DDGS Generated (Dry Basis)	28,333	ton/yr		
100% WDGS Generated (65% Moisture)	80,952	ton/yr		

Maximum Production/Throughputs

Product #1: Denatured Ethanol (95% Ethanol, 5% Denaturant)	10,500,000	gallons/year		
Product #2: WDGS	80,952	tons/year		
Product #3: DDGS	31,481	tons/year		
Raw Material #1: Grain	103,704	tons/year		
Raw Material #2: Denaturant	500,000	gallons/year		
Anhydrous Ethanol Produced	10,000,000	gallons/year		

Requested Limitations

Grain Received by Truck:	50,000	tons/year		
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Additional Information

Maximum Grain Unloading by Truck and Rail	700	ton/hr		
Maximum Hammermill Capacity (per unit, one unit)	28	ton/hr		
DDGS Truck Loadout Spout	280	ton/hr		

Construction Permit Application Calculations: Grain Receiving, Handling, Storage, and Hammermilling and DDGS Storage and Loadout

State of Nebraska Ehanol

Emission Point ID Numbers: EP-001, EP-002, EP-003, EP-007, EP-017, and EP-018

PM/PM₁₀ Emissions from Grain Receiving, Handling, Storage, and Hammermilling and DDGS Storage and Loadout

Emission Point ID#	Control Equipment ID#	Emission Point Description	(A)	(B)	Controlled PM/PM ₁₀ Emissions		
			Flow Rate	Emission Factor (Grain Loading)	Permit Limitations	Permitted Emissions	
			dscf/min	grains/dscf	(C) = (A)x(B)x60/7000 (lb/hour)	(D) = (C)x8760/2000 (ton/year)	
EP-001	CE-001	Baghouse # 1	25,000	0.005	1.07	4.69	
EP-002	CE-002	Baghouse # 2	25,000	0.005	1.07	4.69	
EP-003	CE-003	Baghouse # 3	45,000	0.005	1.93	8.45	
EP-007	CE-006	Baghouse # 4	15,000	0.005	0.64	2.82	

Conversion Factors: 7,000 grains per pound; 60 minutes per hour; 8,760 hours per year; 2,000 pounds per ton

PM/PM₁₀ Fugitive Emissions from Grain Receiving and DDGS Loadout

Emission Point ID#	Emission Point Description	(A)	(B)	(C)	Emission Factors ^[2]		PM Emissions		PM ₁₀ Emissions	
		Hourly Throughput (tons/hour)	Annual Throughput (tons/year)	Percent Fugitives ^[1]	(D) PM (lbs/ton)	(E) PM ₁₀ (lbs/ton)	(F)=(A)x(C)x(D) (lbs/hr)	(G)=(B)x(C)x(D)/2000 (tons/yr)	(H)=(A)x(C)x(E) (lbs/hr)	(I)=(B)x(C)x(E)/2000 (tons/yr)
EP-017	Grain Receiving Fugitives	700	108,704	5%	0.035	0.0078	1.23	0.09	0.27	0.02
EP-018	DDGS Loadout Fugitives	280	31,481	5%	0.0033	0.0008	0.05	0.00	0.01	0.00

[1] 5% fugitives are assumed since unloading operations will occur in an enclosure and utilize choke-flow systems

[2] Emission Factors are from AP-42 Section 9.1 (S/2003)

Total Emissions from Grain Receiving, Handling, Storage, and Hammermilling and DDGS Storage and Loadout

Particulate Matter (PM) 20.74 tons/year
 Particulate Matter (PM₁₀) 20.67 tons/year

Construction Permit Application Calculations: CO₂ Fermentation Scrubber

State of Nebraska Ethanol

Emission Point ID Number: EP-004

Emission Units Routed to the Fermentation Scrubber

Emission Unit ID	Emission Source
EU-013	Slurry Tank
EU-014	Liquefaction Tank
EU-015	Yeast Tank
EU-016	Fermenter
EU-017	Beer Well

Anhydrous Ethanol Produced (AEP): 10,000,000 gallons/year
 10 MMgal/year
 0.0011 MMgal/hr

Pollutant	(A) Controlled Emission Factor ¹ (lb/MMgal AEP)	Potential Controlled Emission Rate		Permit Limitations	
		(B) = (A) x MMgal/hr (lb/hr)	(C) = (A) x MMgal/yr / 2,000 (ton/yr)	lb/hour	ton/year
Particulate Matter (PM) ²	0.1 lb/hr	0.1000	0.4380	0.12	0.5256
Particulate Matter (PM) ₁₀ ²	0.1 lb/hr	0.1000	0.4380	0.12	0.5256
Volatile Organic Compounds (VOC)	494.26	0.5642	2.4713	5.7	25.0
Individual Hazardous Air Pollutants (HAP)					
Acetaldehyde (Unspeciated)	53.02	0.0605	0.2651	N/A	N/A
Methanol	0.13	0.0001	0.0007	N/A	N/A
Total HAPs	-	0.0607	0.2658	N/A	N/A

¹Emission Factors from stack test results at a similar facility

²Particulate Matter emissions assumptions based on conservative estimates and with Department guidance

Construction Permit Application Calculations: Thermal Oxidizer Emissions during WDGS Production

State of Nebraska Ethanol
Emission Point ID Number: EP-005

Emission Units Routed to the Thermal Oxidizer

Emission Unit ID	Emission Source
EU-018	Beer Column
EU-019	Stripper
EU-020	Rectifier
EU-021	Molecular Sieve
EU-022	200-Proof Condenser
EU-025	Evaporator
EU-027	Whole Stillage Tank
EU-028	Centrifuge
EU-029	Thin Stillage Tank
EU-030	DDGS Dryer
EU-031	DDGS Cooler

Natural Gas Combustion Emissions

Natural Gas Combustion Emissions take into account the 25.0 MMBtu/hr Regenerative Thermal Oxidizer

Total Heat Input Capacity 25.0 MMBtu/hr
Potential Natural Gas Throughput 0.0245 MMscf/hr = 214.6 MMscf/yr

Pollutant	(A) Emission Factor ¹ (lb/MMscf)	(B) = (A) x MMscf/hr Potential Emission Rate (lbs/hr)	(C) = (B)x8760 Potential Emission Rate (lbs/year)	(D) = (C)/2000 Potential Emission Rate (tons/year)
Sulfur Dioxide (SO ₂)	0.6	0.0147	128.7720	0.0644
Individual Hazardous Air Pollutants (HAP)				
Benzene	0.0021	0.0001	4.51E-01	2.25E-04
Dichlorobenzene	0.0012	0.0000	2.58E-01	1.29E-04
Formaldehyde	0.075	0.0018	1.61E+01	8.05E-03
Hexane	1.8	0.0441	3.86E+02	1.93E-01
Lead Compounds	0.0005	0.0000	1.07E-01	5.37E-05
Naphthalene	0.00061	0.0000	1.31E-01	6.55E-05
Polycyclic Organic Matter (POM)	0.0000882	0.0000	1.89E-02	9.46E-06
Toluene	0.0034	0.0001	7.30E-01	3.65E-04
Arsenic Compounds (ASC)	0.0002	0.0000	4.29E-02	2.15E-05
Beryllium Compounds (BEC)	0.000012	0.0000	2.58E-03	1.29E-06
Cadmium Compounds (CDC)	0.0011	0.0000	2.36E-01	1.18E-04
Chromium Compounds (CRC)	0.0014	0.0000	3.00E-01	1.50E-04
Cobalt Compounds (COC)	0.000084	0.0000	1.80E-02	9.01E-06
Manganese Compounds (MNC)	0.00038	0.0000	8.16E-02	4.08E-05
Mercury Compounds (HGC)	0.00026	0.0000	5.58E-02	2.79E-05
Nickel Compounds (NIC)	0.0021	0.0001	4.51E-01	2.25E-04
Selenium Compounds (SEC)	0.000024	0.0000	5.15E-03	2.58E-06
Total HAPs	1.89	0.0463	405.30	0.20

¹Emission Factors from AP-42 Tables 1.4-1, 1.4-2, 1.4-3, and 1.4-4 (7/98)

PM, PM₁₀, NO_x, CO, and VOC emissions from natural gas combustion accounted for in process emissions

Conversion Factor: 1 MMscf = 1020 MMBtu

Construction Permit Application Calculations: Thermal Oxidizer Emissions during WDGS Production (cont.)

State of Nebraska Ethanol
Emission Point ID Number: EP-005

Thermal Oxidizer Process Emissions

Pollutant	Potential Controlled Emission Rate		(C) Control Efficiency (%)	Potential Uncontrolled Emission Rate	
	(A) (lb/hr)	(B) (ton/vr)		(D) = (A)/[1-(C)] (lb/hr)	(E) = (B)/[1-(C)] (ton/vr)
Particulate Matter (PM)	1.08	4.73	60.00%	2.70	11.83
Particulate Matter (PM ₁₀)	1.08	4.73	60.00%	2.70	11.83
Nitrogen Oxides (NO _x)	5.51	24.13	0.00%	5.51	24.13
Sulfur Dioxide (SO ₂)	0.06	0.26	0.00%	0.06	0.26
Carbon Monoxide (CO)	5.71	25.01	99.00%	571.00	2500.98
Volatile Organic Compounds (VOC)	3.83	16.78	99.00%	383.00	1677.54
Individual Hazardous Air Pollutants (HAP)					
Acetaldehyde	0.16	0.70	95.00%	3.20	14.02
Formaldehyde	0.16	0.70	95.00%	3.20	14.02
Methanol	0.06	0.26	95.00%	1.20	5.26
Total HAPs	0.38	1.66	95.00%	7.60	33.29

¹Emission Factors obtained from stack test results at a similar facility

Total Emissions Emitted from Thermal Oxidizer

Pollutant	Potential Emission Rate (tons/year)		Permit Limitations	
	Uncontrolled	Controlled	lb/hour	ton/year
Particulate Matter (PM)	11.83	4.73	1.08	4.73
Particulate Matter (PM ₁₀)	11.83	4.73	1.08	4.73
Nitrogen Oxides (NO _x)	24.13	24.13	5.51	24.13
Sulfur Dioxide (SO ₂)	0.33	0.33	0.08	0.35
Carbon Monoxide (CO)	2500.98	25.01	5.71	25.01
Volatile Organic Compounds (VOC)	1677.54	16.78	3.83	16.78
Individual Hazardous Air Pollutants (HAP)				
Acetaldehyde	1.40E+01	7.01E-01	NA	NA
Benzene	2.25E-04	2.25E-04	NA	NA
Dichlorobenzene	1.29E-04	1.29E-04	NA	NA
Formaldehyde	1.40E+01	7.09E-01	NA	NA
Hexane	1.93E-01	1.93E-01	NA	NA
Lead Compounds	5.37E-05	5.37E-05	NA	NA
Methanol	5.26E+00	2.63E-01	NA	NA
Naphthalene	6.55E-05	6.55E-05	NA	NA
Polycyclic Organic Matter (POM)	9.46E-06	9.46E-06	NA	NA
Toluene	3.65E-04	3.65E-04	NA	NA
Arsenic Compounds (ASC)	2.15E-05	2.15E-05	NA	NA
Beryllium Compounds (BEC)	1.29E-06	1.29E-06	NA	NA
Cadmium Compounds (CDC)	1.18E-04	1.18E-04	NA	NA
Chromium Compounds (CRC)	1.50E-04	1.50E-04	NA	NA
Cobalt Compounds (COC)	9.01E-06	9.01E-06	NA	NA
Manganese Compounds (MNC)	4.08E-05	4.08E-05	NA	NA
Mercury Compounds (HGC)	2.79E-05	2.79E-05	NA	NA
Nickel Compounds (NIC)	2.25E-04	2.25E-04	NA	NA
Selenium Compounds (SEC)	2.58E-06	2.58E-06	NA	NA
Total HAPs	3.35E+01	1.87E+00	NA	NA

Construction Permit Application Calculations: Thermal Oxidizer Emissions during DDGS Production

State of Nebraska Ethanol
Emission Point ID Number: EP-005

Emission Units Routed to the Thermal Oxidizer

Emission Unit ID	Emission Source
EU-018	Beer Column
EU-019	Stripper
EU-020	Rectifier
EU-021	Molecular Sieve
EU-022	200-Proof Condenser
EU-025	Evaporator
EU-027	Whole Stillage Tank
EU-028	Centrifuge
EU-029	Thin Stillage Tank
EU-030	DDGS Dryer
EU-031	DDGS Cooler

Natural Gas Combustion Emissions

Natural Gas Combustion Emissions take into account the 25.0 MMBtu/hr Regenerative Thermal Oxidizer and 92.0 MMBtu/hr DDGS Dryer

Total Heat Input Capacity 117.0 MMBtu/hr
Potential Natural Gas Throughput 0.1147 MMscf/hr = 1004.8 MMscf/yr

Pollutant	(A) Emission Factor ¹ (lb/MMscf)	(B) = (A) x MMscf/hr Potential Emission Rate (lbs/hr)	(C) = (B)x8760 Potential Emission Rate (lbs/year)	(D) = (C)/2000 Potential Emission Rate (tons/year)
Sulfur Dioxide (SO ₂)	0.6	0.0688	602.8632	0.3014
Individual Hazardous Air Pollutants (HAP)				
Benzene	0.0021	0.0002	2.11E+00	1.06E-03
Dichlorobenzene	0.0012	0.0001	1.21E+00	6.03E-04
Formaldehyde	0.075	0.0086	7.54E+01	3.77E-02
Hexane	1.8	0.2065	1.81E+03	9.04E-01
Lead Compounds	0.0005	0.0001	5.02E-01	2.51E-04
Naphthalene	0.00061	0.0001	6.13E-01	3.06E-04
Polycyclic Organic Matter (POM)	0.0000882	0.0000	8.86E-02	4.43E-05
Toluene	0.0034	0.0004	3.42E+00	1.71E-03
Arsenic Compounds (ASC)	0.0002	0.0000	2.01E-01	1.00E-04
Beryllium Compounds (BEC)	0.000012	0.0000	1.21E-02	6.03E-06
Cadmium Compounds (CDC)	0.0011	0.0001	1.11E+00	5.53E-04
Chromium Compounds (CRC)	0.0014	0.0002	1.41E+00	7.03E-04
Cobalt Compounds (COC)	0.000084	0.0000	8.44E-02	4.22E-05
Manganese Compounds (MNC)	0.00038	0.0000	3.82E-01	1.91E-04
Mercury Compounds (HGC)	0.00026	0.0000	2.61E-01	1.31E-04
Nickel Compounds (NIC)	0.0021	0.0002	2.11E+00	1.06E-03
Selenium Compounds (SEC)	0.000024	0.0000	2.41E-02	1.21E-05
Total HAPs	1.89	0.2166	1897.47	0.95

¹Emission Factors from AP-42 Tables 1.4-1, 1.4-2, 1.4-3, and 1.4-4 (7/98)

PM, PM₁₀, NO_x, CO, and VOC emissions from natural gas combustion accounted for in process emissions

Conversion Factor: 1 MMscf = 1020 MMBtu

Construction Permit Application Calculations: Thermal Oxidizer Emissions during DDGS Production (cont.)

State of Nebraska Ethanol
Emission Point ID Number: EP-005

Thermal Oxidizer Process Emissions

Pollutant	Potential Controlled Emission Rate		(C) Control Efficiency (%)	Potential Uncontrolled Emission Rate	
	(A) (lb/hr)	(B) (ton/vr)		(D) = (A)/[1-(C)] (lb/hr)	(E) = (B)/[1-(C)] (ton/vr)
Particulate Matter (PM)	1.08	4.73	60.00%	2.70	11.83
Particulate Matter (PM ₁₀)	1.08	4.73	60.00%	2.70	11.83
Nitrogen Oxides (NO _x)	5.51	24.13	0.00%	5.51	24.13
Sulfur Dioxide (SO ₂)	0.06	0.26	0.00%	0.06	0.26
Carbon Monoxide (CO)	5.71	25.01	99.00%	571.00	2500.98
Volatile Organic Compounds (VOC)	3.83	16.78	99.00%	383.00	1677.54
Individual Hazardous Air Pollutants (HAP)					
Acetaldehyde	0.16	0.70	95.00%	3.20	14.02
Formaldehyde	0.16	0.70	95.00%	3.20	14.02
Methanol	0.06	0.26	95.00%	1.20	5.26
Total HAPs	0.38	1.66	95.00%	7.60	33.29

Total Emissions Emittted from Thermal Oxidizer

Pollutant	Potential Emission Rate (tons/year)		Permit Limitations	
	Uncontrolled	Controlled	lb/hour	ton/year
Particulate Matter (PM)	11.83	4.73	1.08	4.73
Particulate Matter (PM ₁₀)	11.83	4.73	1.08	4.73
Nitrogen Oxides (NO _x)	24.13	24.13	5.51	24.13
Sulfur Dioxide (SO ₂)	0.56	0.56	0.15	0.66
Carbon Monoxide (CO)	2500.98	25.01	5.71	25.01
Volatile Organic Compounds (VOC)	1677.54	16.78	3.83	16.78
Individual Hazardous Air Pollutants (HAP)				
Acetaldehyde	1.40E+01	7.01E-01	NA	NA
Benzene	1.06E-03	1.06E-03	NA	NA
Dichlorobenzene	6.03E-04	6.03E-04	NA	NA
Formaldehyde	1.41E+01	7.38E-01	NA	NA
Hexane	9.04E-01	9.04E-01	NA	NA
Lead Compounds	2.51E-04	2.51E-04	NA	NA
Methanol	5.26E+00	2.63E-01	NA	NA
Naphthalene	3.06E-04	3.06E-04	NA	NA
Polycyclic Organic Matter (POM)	4.43E-05	4.43E-05	NA	NA
Toluene	1.71E-03	1.71E-03	NA	NA
Arsenic Compounds (ASC)	1.00E-04	1.00E-04	NA	NA
Beryllium Compounds (BEC)	6.03E-06	6.03E-06	NA	NA
Cadmium Compounds (CDC)	5.53E-04	5.53E-04	NA	NA
Chromium Compounds (CRC)	7.03E-04	7.03E-04	NA	NA
Cobalt Compounds (COC)	4.22E-05	4.22E-05	NA	NA
Manganese Compounds (MNC)	1.91E-04	1.91E-04	NA	NA
Mercury Compounds (HGC)	1.31E-04	1.31E-04	NA	NA
Nickel Compounds (NIC)	1.06E-03	1.06E-03	NA	NA
Selenium Compounds (SEC)	1.21E-05	1.21E-05	NA	NA
Total HAPs	3.42E+01	2.61E+00	NA	NA

Construction Permit Application Calculations: Ethanol Liquid Loadout

**State of Nebraska Ethanol
Emission Point ID#: EP-008**

Anhydrous Ethanol Loading Rate:	10.00	MMgal/yr
Denaturant Loading Rate:	0.50	MMgal/yr
Denatured Ethanol Loading Rate:	10.50	MMgal/yr

Vapor Recovery Control Efficiency provided in Application

	Truck loadout
Capture efficiency:	98.0%
Control efficiency:	98.0%
Overall control efficiency:	0.0%

Material Physical Data

	Gasoline (RVP-13)	Ethanol	Denaturant (Natural Gasoline)
Molecular weight (M, lbs/lbs-mole)	62	49.9	62
Temperature (T, deg R) ¹	509.71	509.71	509.71
Vapor pressure (P, psia)	5.96	0.636	5.96
Liquid molecular weight (ML)	92	46	92
Density (D, lb/gal)	5.6	6.6	5.6
Liquid Mole Fraction (X) ²	N/A	0.98	0.02

¹Temperatures from TANKS 4.09d, average ambient temperature for Grand Island, NE

²Liquid Mole Fraction (X) was calculated as follows, where V = loading rate:

$$X = \frac{\left(\frac{D \cdot V}{ML} \right)}{\left(\frac{D_{ethanol} \cdot V_{ethanol}}{ML_{ethanol}} \right) + \left(\frac{D_{denaturant} \cdot V_{denaturant}}{ML_{denaturant}} \right)}$$

Hazardous Air Pollutant Weight Fractions

Individual HAPs	Weight Fraction of VOC Emissions		
	Gasoline	Ethanol	Denaturant
Acetaldehyde	N/A	2.00E-04	N/A
Benzene	2.50E-03	N/A	2.50E-03
Carbon disulfide	2.00E-05	N/A	2.00E-05
Cumene	1.00E-04	N/A	1.00E-04
Ethyl benzene	5.00E-05	N/A	5.00E-05
n-Hexane	5.00E-02	N/A	5.00E-02
Methanol	N/A	2.00E-04	N/A
Toluene	5.00E-03	N/A	5.00E-03
Xylene	5.00E-04	N/A	5.00E-04
Total HAPs	5.82E-02	4.00E-04	5.82E-02

Saturation Factors

S _{normal dedicated, submerged loading}	0.6	Saturation factor
S _{clean cargo, submerged loading}	0.5	Saturation factor

Truck loadout is assumed to be non-dedicated trucks, which previous load was unleaded gasoline. The gasoline vapors are assumed to be displaced by the ethanol, for worst-case assumption.

VOC Emissions

Denatured Ethanol Emission Factor Calculations

	Truck Loadout Uncontrolled Emission Factor (lbs VOC/Mgal)
EF _{gasoline}	0.903
EF _{ethanol}	0.380
EF _{denaturant}	0.094
EF _{VOC}	1.377

VOC emission factor equation from AP-42, Section 5.2.2 - Loading Losses (1/1995)

EF = 12.46 * S * P * M / T * (1 - eff / 100) * X = lbs/Mgal per component

EF_{gasoline} emission factors assumes S = S_{normal} - S_{clean cargo} and do not use the Liquid Mole Fraction (X) in the equations.

Construction Permit Application Calculations: Ethanol Liquid Loadout

State of Nebraska Ethanol
Emission Point ID#: EP-008

Total VOC Emission Calculations from Denatured Ethanol Loadout

Loadout Type/Material	(A) Denatured Ethanol Loaded Out (Mgal/year)	(B) Uncontrolled Emission Factor (lbs VOC/Mgal)	(C)=(A)x(B)/2000 Total VOC Emissions (tons/year)	(D) Capture Efficiency (%)	(E)=(C)*(D) Captured VOC Emissions (tons/year)	(F)=(C)-(E) Uncaptured VOC Emissions (tons/year)	(G) Control Efficiency (%)	(H)=(E)x[1-(G)] Captured and Controlled VOC Emissions (tons/year)	(I)=(F)+(H) Total VOC Emissions
100% Loadout by Truck			7.23		7.08	0.14		0.1417	0.29
Truck Loadout									
Gasoline		0.903	4.74	98.00%	4.65	0.09	98.0%	0.0929	0.19
Ethanol	10,500	0.380	2.00	98.00%	1.96	0.04	98.0%	0.0391	0.08
Denaturant		0.094	0.49	98.00%	0.48	0.01	98.0%	0.0097	0.02

Controlled Hazardous Air Pollutant Emissions assuming 100% Truck Loadout

Hazardous Air Pollutant	Truck Loadout			Maximum Controlled
	Gasoline	Ethanol	Denaturant	
Acetaldehyde	N/A	1.58E-05	N/A	1.58E-05
Benzene	4.69E-04	N/A	4.89E-05	5.18E-04
Carbon disulfide	3.75E-06	N/A	3.91E-07	4.15E-06
Cumene	1.88E-05	N/A	1.95E-06	2.07E-05
Ethyl benzene	9.39E-06	N/A	9.77E-07	1.04E-05
n-Hexane	9.39E-03	N/A	9.77E-04	1.04E-02
Methanol	N/A	1.58E-05	N/A	1.58E-05
Toluene	9.39E-04	N/A	9.77E-05	1.04E-03
Xylene	9.39E-05	N/A	9.77E-06	1.04E-04
Total HAPs		0.01		0.01

Total Emissions from Denatured Ethanol Loadout

Pollutant	Ethanol Loadout Emissions (tons/year)
Volatile Organic Compounds (VOC)	0.29
Individual HAPs	
Acetaldehyde	1.58E-05
Benzene	5.18E-04
Carbon disulfide	4.15E-06
Cumene	2.07E-05
Ethyl benzene	1.04E-05
n-Hexane	1.04E-02
Methanol	1.58E-05
Toluene	1.04E-03
Xylene	1.04E-04
Total HAPs	1.21E-02

Construction Permit Application Calculations: Liquid Loadout Flare

State of Nebraska Ethanol
Emission Point ID#: EP-008

Flaring Emissions

Flare Heat Input Capacity	10.0	MMBtu/hr
Operating Time	8,760	hr/yr
Denatured Ethanol Loaded Out	10,500,000	gallons/year
	1.2	1,000 gallons/hour

Pollutant	(A) Emission Factor ⁽¹⁾ (lb/1,000 gallons loaded out)	(B) = (A)x MMBtu/hr Potential Emission Rate (lbs/hr)	(C) = (B)xOT Potential Emission Rate (lbs/year)	(D) = (C)/2000 Potential Emission Rate (tons/year)
Particulate Matter (PM)		Negligible, Smokeless Design		
Particulate Matter (PM ₁₀)		Negligible, Smokeless Design		
Sulfur Oxides (SO _x)		Negligible, Due to Fuel Type		
Nitrogen Oxides (NO _x)	0.1	0.12	1050.00	0.53
Carbon Monoxide (CO)	0.2	0.24	2100.00	1.05
Volatile Organic Compounds (VOC)		VOCs accounted for in Liquid Loadout		

⁽¹⁾Emission Factors based on emissions testing at similar ethanol facility

Pilot Emissions

Total Heat Input Capacity of Pilot	0.100	MMBtu/hr
Heating Value	1020	Btu/scf
Operating Time	8,760	hr/yr
Total Natural Gas Usage	0.0001	MMscf/hr

Pollutant	(A) Emission Factor ¹ (lb/MMscf)	(B) = (A)x MMscf/hr Potential Emission Rate (lbs/hr)	(C) = (B)xOT Potential Emission Rate (lbs/year)	(D) = (C)/2000 Potential Emission Rate (tons/year)
Particulate Matter (PM)	7.6	0.0007	6.5271	0.0033
Particulate Matter (PM ₁₀)	7.6	0.0007	6.5271	0.0033
Sulfur Dioxide (SO ₂)	0.6	0.0001	0.5153	0.0003
Nitrogen Oxides (NO _x)	100	0.0098	85.8824	0.0429
Carbon Monoxide (CO)	84	0.0082	72.1412	0.0361
Volatile Organic Compounds (VOC)	5.5	0.0005	4.7235	0.0024
Individual Hazardous Air Pollutants (HAP)				
Benzene	0.0021	2.06E-07	1.80E-03	9.02E-07
Dichlorobenzene	0.0012	1.18E-07	1.03E-03	5.15E-07
Formaldehyde	0.075	7.35E-06	6.44E-02	3.22E-05
Hexane	1.8	1.76E-04	1.55E+00	7.73E-04
Lead Compounds	0.0005	4.90E-08	4.29E-04	2.15E-07
Naphthalene	0.00061	5.98E-08	5.24E-04	2.62E-07
Polycyclic Organic Matter (POM)	0.0000882	8.65E-09	7.57E-05	3.79E-08
Toluene	0.0034	3.33E-07	2.92E-03	1.46E-06
Arsenic Compounds (ASC)	0.0002	1.96E-08	1.72E-04	8.59E-08
Beryllium Compounds (BEC)	0.000012	1.18E-09	1.03E-05	5.15E-09
Cadmium Compounds (CDC)	0.0011	1.08E-07	9.45E-04	4.72E-07
Chromium Compounds (CRC)	0.0014	1.37E-07	1.20E-03	6.01E-07
Cobalt Compounds (COC)	0.000084	8.24E-09	7.21E-05	3.61E-08
Manganese Compounds (MNC)	0.00038	3.73E-08	3.26E-04	1.63E-07
Mercury Compounds (HGC)	0.00026	2.55E-08	2.23E-04	1.12E-07
Nickel Compounds (NIC)	0.0021	2.06E-07	1.80E-03	9.02E-07
Selenium Compounds (SEC)	0.000024	2.35E-09	2.06E-05	1.03E-08
Total HAPs	-	1.85E-04	1.62E+00	8.11E-04

¹Emission Factors from AP-42 Tables 1.4-1, 1.4-2, 1.4-3, and 1.4-4 (7/98).

Total Loadout Flare Emissions

Pollutant	Total Potential Emission Rate (tons/year)
Particulate Matter (PM)	0.0033
Particulate Matter (PM ₁₀)	0.0033
Sulfur Dioxide (SO ₂)	0.0003
Nitrogen Oxides (NO _x)	0.5679
Carbon Monoxide (CO)	1.0861
Volatile Organic Compounds (VOC)	0.0024
Individual Hazardous Air Pollutants (HAP)	
Benzene	9.02E-07
Dichlorobenzene	5.15E-07
Formaldehyde	3.22E-05
Hexane	7.73E-04
Lead Compounds	2.15E-07
Naphthalene	2.62E-07
Polycyclic Organic Matter (POM)	3.79E-08
Toluene	1.46E-06
Arsenic Compounds (ASC)	8.59E-08
Beryllium Compounds (BEC)	5.15E-09
Cadmium Compounds (CDC)	4.72E-07
Chromium Compounds (CRC)	6.01E-07
Cobalt Compounds (COC)	3.61E-08
Manganese Compounds (MNC)	1.63E-07
Mercury Compounds (HGC)	1.12E-07
Nickel Compounds (NIC)	9.02E-07
Selenium Compounds (SEC)	1.03E-08
Total HAPs	8.11E-04

Construction Permit Application Calculations: Boiler

State of Nebraska Ethanol
Emission Point ID#: EP-012

Unit Description: One (1) 99.0 MMBtu/hr rated natural gas fired Boiler

Total Heat Input Capacity	99.0	MMBtu/hr
Potential Natural Gas Throughput	0.0971	MMscf/hr
	850.6	MMscf/yr

Pollutant	(A) Emission Factor ¹ (lb/MMscf)	(B) = (A)x MMscf/hr Potential Emission Rate (lbs/hr)	(C) = (B)x8760 Potential Emission Rate (lbs/year)	(D) = (C)/2000 Potential Emission Rate (tons/year)
Particulate Matter (PM)	7.6	0.7380	6464.53	3.23
Particulate Matter (PM ₁₀)	7.6	0.7380	6464.53	3.23
Sulfur Dioxide (SO ₂)	0.6	0.0583	510.36	0.26
Nitrogen Oxides (NO _x) ²	0.04	3.9600	34689.60	17.34
Carbon Monoxide (CO) ²	0.04	3.9600	34689.60	17.34
Volatile Organic Compounds (VOC)	5.5	0.5341	4678.28	2.34
Individual Hazardous Air Pollutants (HAP)				
Benzene	0.0021	2.04E-04	1.79E+00	8.93E-04
Dichlorobenzene	0.0012	1.17E-04	1.02E+00	5.10E-04
Formaldehyde	0.075	7.28E-03	6.38E+01	3.19E-02
Hexane	1.8	1.75E-01	1.53E+03	7.66E-01
Lead Compounds	0.0005	4.86E-05	4.25E-01	2.13E-04
Naphthalene	0.00061	5.92E-05	5.19E-01	2.59E-04
Polycyclic Organic Matter (POM)	0.0000882	8.56E-06	7.50E-02	3.75E-05
Toluene	0.0034	3.30E-04	2.89E+00	1.45E-03
Arsenic Compounds (ASC)	0.0002	1.94E-05	1.70E-01	8.51E-05
Beryllium Compounds (BEC)	0.000012	1.17E-06	1.02E-02	5.10E-06
Cadmium Compounds (CDC)	0.0011	1.07E-04	9.36E-01	4.68E-04
Chromium Compounds (CRC)	0.0014	1.36E-04	1.19E+00	5.95E-04
Cobalt Compounds (COC)	0.000084	8.16E-06	7.15E-02	3.57E-05
Manganese Compounds (MNC)	0.00038	3.69E-05	3.23E-01	1.62E-04
Mercury Compounds (HGC)	0.00026	2.52E-05	2.21E-01	1.11E-04
Nickel Compounds (NIC)	0.0021	2.04E-04	1.79E+00	8.93E-04
Selenium Compounds (SEC)	0.000024	2.33E-06	2.04E-02	1.02E-05
Total HAPs	-	0.1834	1.61E+03	0.8032

¹Emission Factors from AP-42 Tables 1.4-1, 1.4-2, 1.4-3, and 1.4-4 (7/98) unless otherwise specified

²Emission Factor from Vendor Information and in units of lb/MMBtu

Conversion Factor: 1 MMscf = 1020 MMBtu

Construction Permit Application Calculations: Emergency Fire Pump

State of Nebraska Ethanol

Emission Point ID Number EP-013

Unit Description: One (1) 300 hp diesel fired Emergency Fire Pump

Potential to Emit from Combusting Diesel Fuel by Internal Combustion for Units Less than 600hp or 447KW or 4.2 MMBtu/hr

Horsepower Rating	300	HP		
Total Heat Input Capacity	2.10	MMBtu/hr		
Heat Content	137,000	BTU/gallon		
Potential Fuel Usage	15.33	gallons/hr =	134,277.37	gallons/year
Diesel Fuel Sulfur Limit	0.5	wt % sulfur		
Limited Operating Time (OT)	500.00	hours/year		
Limited Diesel Fuel Throughput	15.33	gallons/hr =	7,664	gallons/year

Pollutant	(A) Emission Factor ¹ (lb/MMBtu)	(B) = (A) x MMBtu/hr Emission Rate (lbs/hr)		(C) = (B) x OT Emission Rate (lbs/year)		(D) = (C)/2000 Emission Rate (tons/year)	
		Potential	Limited	Potential	Limited	Potential	Limited
Particulate Matter (PM)	0.31	0.65	0.65	5702.76	325.50	2.85	0.16
Particulate Matter (PM ₁₀)	0.31	0.65	0.65	5702.76	325.50	2.85	0.16
Sulfur Dioxide (SO ₂)	0.29	0.61	0.61	5334.84	304.50	2.67	0.15
Nitrogen Oxides (NO _x)	4.41	9.26	9.26	81126.36	4630.50	40.56	2.32
Carbon Monoxide (CO)	0.95	2.00	2.00	17476.20	997.50	8.74	0.50
Volatile Organic Compounds (VOC)	0.36	0.76	0.76	6622.56	378.00	3.31	0.19
Individual Hazardous Air Pollutants (HAP)							
Acetaldehyde	7.67E-04	1.61E-03	1.61E-03	1.41E+01	0.81	7.05E-03	4.03E-04
Acrolein	9.25E-04	1.94E-03	1.94E-03	1.70E+01	0.97	8.51E-03	4.86E-04
Benzene	9.33E-04	1.96E-03	1.96E-03	1.72E+01	0.98	8.58E-03	4.90E-04
Formaldehyde	1.80E-03	3.78E-03	3.78E-03	3.31E+01	1.89	1.66E-02	9.45E-04
Naphthalene	8.48E-05	1.78E-04	1.78E-04	1.56E+00	0.09	7.80E-04	4.45E-05
Toluene	4.09E-04	8.59E-04	8.59E-04	7.52E+00	0.43	3.76E-03	2.15E-04
Xylene	2.85E-04	5.99E-04	5.99E-04	5.24E+00	0.30	2.62E-03	1.50E-04
Total HAPs	5.20E-03	1.09E-02	0.01	9.57E+01	5.46	4.79E-02	2.73E-03

¹Emission Factors are from AP-42 Tables 3.3-1, 3.3-2, 3.3-4 (10/96)

Conversion Factor: Heat Capacity of Diesel Fuel is 137,000 Btu/gal (AP-42 Appendix A)

Note: Operating Time for Potential is 8760 hours

Construction Permit Application Calculations: Cooling Tower

State of Nebraska Ethanol
Emission Point ID#: EP-014

Circulation rate:	1,200,000 10,512,000	gal/hr Mgal/yr (based on 8,760 hrs/yr)
Drift loss percent:	0.005	%
Water density:	8.34	lbs/gal
TDS concentration:	3,000 3,000	ppm single sample event ppm average annual rate

Emission Factor Calculation for PM and PM₁₀

Emission factor equation from AP-42, Section 13.4-2 (01/1995)

$$\text{PM/PM}_{10} \text{ emission factor} = \left(\frac{\text{ppm TDS}}{1,000,000 \text{ lbs water}} \right) \left(\frac{8.34 \text{ lbs water}}{\text{gal}} \right) \left(\frac{1,000 \text{ gal}}{1 \text{ Mgal}} \right) \left(\frac{0.005 \text{ drift loss}}{100} \right)$$

0.001251 lbs/Mgal single sample event (highest hourly rate)
 0.001251 lbs/Mgal average annual rate

Hourly Emissions = (lbs/Mgal single sample event)(hourly throughput gal/hr)(1 Mgal/1,000 gal)

Annual Emissions = (lbs/Mgal average annual rate)(annual throughput Mgal/yr)/(2,000 lbs/ton)

Cooling Tower Emission Summary		
Pollutant	Hourly PTE (lbs/hr)	Annual PTE (tons/year)
PM	1.50	6.58
PM ₁₀	1.50	6.58

Construction Permit Emission Calculations: Haul Road Emissions

State of Nebraska Ethanol
Emission Point ID#: EP-0015

Paved roads {AP-42 Chapter 13.2.1 (11/06)}

Equation (2):
(modified)
$$E = k \times \left(\frac{sL}{2}\right)^{0.65} \times \left(\frac{W}{3}\right)^{1.5} \times \left(1 - \frac{P}{4 \times 365}\right) \times \left(\frac{S}{30}\right)^d$$

	k	d
PM	0.082	0.3
PM ₁₀	0.016	0.5

Unpaved roads {AP-42 Chapter 13.2.2 (11/06)}

Equation (1a):
(modified)
$$E = k \times \left(\frac{sC}{12}\right)^a \times \left(\frac{W}{3}\right)^b \times \left(\frac{365-P}{365}\right) \times \left(\frac{S}{30}\right)^d \times (1-CE)$$

	k	a	b	d
PM	4.9	0.7	0.45	0.3
PM ₁₀	1.5	0.9	0.45	0.5

Haul Road / Traffic Parameters

Activity / Road Description	Road Type / Silt Value	Roundtrip Distance (feet)		Truck Weight (tons)			Ave. Speed (mph)	Maximum Throughput (units/yr) [2]	Ave. Truck Capacity (units/truck)		Annual VMT	
		empty	full	empty	full	Ave. [1]			tons	gallons		
Grain Receiving	p	3.00	545	555	15	40	27.6	30	50,000	25	tons	417
Denaturant Delivery	p	3.00	230	870	15	40	34.8	30	500,000	7,500	gallons	14
Denatured Ethanol Loadout	p	3.00	930	170	15	40	18.9	30	10,500,000	7,500	gallons	292
DDGS Loadout	p	3.00	880	220	15	40	20.0	30	31,481	25	tons	262
WDGS Loadout	p	3.00	785	315	15	40	22.2	30	80,952	25	tons	675

[1] Weighted average = {(distance*weight empty)+(distance*weight full)}/(Roundtrip distance)

Total VMT: 1,659

[2] Includes permit-limited throughput

Fact Sheet Attachment

	Emission Factors (lb/VMT)		Potential Emissions (tons/yr)	
	PM	PM ₁₀	PM	PM ₁₀
Grain Receiving	2.80	0.55	0.58	0.11
Denaturant Delivery	3.95	0.77	0.03	0.01
Denatured Ethanol Loadout	1.58	0.31	0.21	0.04
DDGS Loadout	1.72	0.34	0.23	0.04
WDGS Loadout	2.01	0.39	0.68	0.13
Total Annual Emissions [3]:			1.04	0.20

[3] Total annual emissions do not include emission associated with WDGS loadout since DDGS production is worst-case for entire facility

Description of Constants/Variables

E: haul road emissions (lb/VMT)

k, a, b, c, d: dimensionless constants from AP-42 Tables 13.2.1-1 & 13.2.2-2

sL: silt loading (g/m²) of paved road surface

sC: silt content (%) of unpaved road surface

W: average vehicle weight (tons)

P: days/yr with at least 0.01" of precipitation

$P = 90$

S: mean vehicle speed on road (mph)

default = 30, minimum = 15

CE: unpaved road, dust control efficiency

$CE = 0\%$ default = 0%

VMT: vehicle miles traveled

Construction Permit Emission Calculations: Equipment Leaks

State of Nebraska Ethanol
Emission Point ID#: EP-016

Potential to Emit from leaking product via Equipment Leaks

Type of Component	(A) Number of Components	(B) Leaking Emission Factor (kg/hr/source)	VOC Uncontrolled Emissions		(E) LDAR (cont.eff. %)	VOC Controlled Emissions	
			(C) = (A)x(B)x2.21 (lb/hr)	(D) = (C)x8760/2000 (ton/year)		(F) = (C)x[1-(E)] (lb/hr)	(G) = (D)x[1-(E)] (ton/year)
Gas Valves	20	0.00597	0.26	1.16	87%	0.03	0.15
Light liquid valves	19	0.00403	0.17	0.74	84%	0.03	0.12
Control valves	60	0.00403	0.53	2.34	0%	0.53	2.34
Light liquid pumps	35	0.0199	1.54	6.74	69%	0.48	2.09
Pressure relief valves	41	0.104	9.42	41.27	87%	1.23	5.37
Connectors	120	0.00183	0.49	2.13	55%	0.22	0.96
Flanges	70	0.00183	0.28	1.24	0%	0.28	1.24
Sampling Connections	20	0.015	0.66	2.90	84%	0.11	0.46
Transmitters	45	0.015	1.49	6.53	0%	1.49	6.53
Manholes	10	0.015	0.33	1.45	0%	0.33	1.45

VOC Emissions are calculated from *Protocol for Leak Emission Estimates*, EPA-453/R-95-017, November 1995.

Total VOC Emissions 2.43 lb/hr
 10.65 ton/year

Hazardous Air Pollutant	Mass Fraction of HAP	HAP Emissions	
		lb/hr	ton/year
Acetaldehyde	0.0002	0.0005	0.0021
Acrolein	0.0002	0.0005	0.0021
Formaldehyde	0.0001	0.0002	0.0011
Methanol	0.0002	0.0005	0.0021
Total HAPs	-	0.0017	0.0075

Construction Permit Application Calculations: Determining Worst-Case Scenario

State of Nebraska Ethanol

The following calculations support the determination that 100% DDGS production presents the worst-case scenario for all emissions other than VOC from the State of Nebraska Ethanol Plant

DDGS Production Scenario

Process or Unit	Pollutants					
	Particulate Matter (PM)	Particulate Matter (PM ₁₀)	Sulfur Oxides (SO _x)	Nitrogen Oxides (NO _x)	Carbon Monoxide (CO)	Volatile Organic Compounds (VOC)
RTO during DDGS Production	4.73	4.73	0.66	24.13	25.01	16.78
DDGS Loadout Baghouse	2.82	2.82	-	-	-	-
Truck Traffic (DDGS Loadout)	0.23	0.04	-	-	-	-
DDGS Production Totals	7.77	7.59	0.66	24.13	25.01	16.78

WDGS Production Scenario

Process or Unit	Pollutants					
	Particulate Matter (PM)	Particulate Matter (PM ₁₀)	Sulfur Oxides (SO _x)	Nitrogen Oxides (NO _x)	Carbon Monoxide (CO)	Volatile Organic Compounds (VOC)
RTO during WDGS Production	4.73	4.73	0.35	24.13	25.01	16.78
WDGS Storage and Loadout	-	-	-	-	-	0.34
Truck Traffic (WDGS Loadout)	0.68	0.13	-	-	-	-
WDGS Production Totals	5.41	4.86	0.35	24.13	25.01	17.11

Construction Permit Application Calculations: Facility Wide Emissions

State of Nebraska Ethanol

Facility Wide Emissions as Limited by the Permit

Emission Point ID#	Process or Unit	Pollutants											
		Particulate Matter (PM)	Particulate Matter (PM ₁₀)	Sulfur Oxides (SO _x)	Nitrogen Oxides (NO _x)	Carbon Monoxide (CO)	Volatile Organic Compounds (VOC)						
		Ib/hr	ton/yr	Ib/hr	ton/yr	Ib/hr	ton/yr	Ib/hr	ton/yr	Ib/hr	ton/yr	Ib/hr	ton/yr
EP-001	Grain Receiving: Baghouse #1	1.07	4.69	1.07	4.69	-	-	-	-	-	-	-	-
EP-002	Grain Storage: Baghouse #2	1.07	4.69	1.07	4.69	-	-	-	-	-	-	-	-
EP-003	Grain Hammermilling: Baghouse #3	1.93	8.45	1.93	8.45	-	-	-	-	-	-	-	-
EP-004	Fermentation Scrubber	0.12	0.53	0.12	0.53	-	-	-	-	-	-	-	-
EP-005	Thermal Oxidizer (DDGS)	1.08	4.73	1.08	4.73	0.15	0.66	5.51	24.13	5.71	25.01	3.83	16.78
EP-006	WDGS Storage and Loadout	-	-	-	-	-	-	-	-	-	-	-	-
EP-007	DDGS Storage and Loadout	0.64	2.82	0.64	2.82	-	-	-	-	-	-	-	-
EP-008	Liquid Loadout and Flare	0.0008	0.0033	0.0008	0.0033	0.0001	0.0003	0.1297	0.57	0.2480	1.09	0.0659	0.29
EP-009	Denatured Ethanol Storage Tank	-	-	-	-	-	-	-	-	-	-	-	-
EP-010	Denatured Ethanol Storage Tank	-	-	-	-	-	-	-	-	-	-	-	-
EP-011	200-Proof Ethanol Storage Tank	-	-	-	-	-	-	-	-	-	-	-	-
EP-012	Boiler	0.74	3.23	0.74	3.23	0.06	0.26	3.96	17.34	3.96	17.34	0.53	2.34
EP-013	Emergency Fire Water Pump	0.65	0.16	0.65	0.16	0.61	0.15	9.26	2.32	2.00	0.50	0.76	0.19
EP-014	Cooling Tower	1.30	6.38	1.30	6.38	-	-	-	-	-	-	-	-
EP-015	Haul Roads	0.48	1.04	0.09	0.20	-	-	-	-	-	-	-	-
EP-016	Equipment Leaks	-	-	-	-	-	-	-	-	-	-	2.43	10.65
EP-017	Fugitive Grain Receiving	1.23	0.09	0.27	0.02	-	-	-	-	-	-	-	-
EP-018	Fugitive DDGS Loadout	0.05	0.0026	0.01	0.0006	-	-	-	-	-	-	-	-
Facility-Wide Emissions as Permitted		10.55	37.01	9.18	36.10	0.82	1.06	18.86	44.36	11.91	43.94	13.77	57.21

**Construction Permit Application Calculations: Facility Wide HAP Emissions
Replacement for Form 2.0, Section 2.4**

State of Nebraska Ethanol

Facility Wide Hazardous Air Pollutant Emissions as Limited by the Permit

Hazardous Air Pollutant	Process or Unit									Total Single Hazardous Air Pollutants as limited by the Permit
	Fermentation Scrubber	Thermal Oxidizer	WDGS Loadout	Liquid Loadout	Loadout Flare	Tanks	Boiler	Emergency Fire Pump	Equipment Leaks	
Acetaldehyde	2.65E-01	7.01E-01	4.49E-03	1.58E-05	-	4.52E-05	-	4.03E-04	2.13E-03	0.97
Acrolein	-	-	6.76E-04	-	-	-	-	4.86E-04	2.13E-03	3.29E-03
Benzene	-	1.06E-03	-	5.18E-04	9.02E-07	3.61E-03	8.93E-04	4.90E-04	-	6.57E-03
Carbon disulfide	-	-	-	4.15E-06	-	2.89E-05	5.10E-04	-	-	5.43E-04
Cumene	-	-	-	2.07E-05	-	1.44E-04	3.19E-02	-	-	3.21E-02
Dichlorobenzene	-	6.03E-04	-	-	5.15E-07	-	-	-	-	6.03E-04
Ethyl benzene	-	-	-	1.04E-05	-	7.22E-05	7.66E-01	-	-	7.66E-01
Formaldehyde	-	7.38E-01	8.99E-03	-	3.22E-05	-	-	9.45E-04	1.06E-03	0.75
Hexane	-	9.04E-01	-	1.04E-02	7.73E-04	7.22E-02	2.13E-04	-	-	0.99
Lead Compounds	-	2.51E-04	-	-	2.15E-07	-	-	-	-	2.51E-04
Methanol	6.50E-04	2.63E-01	1.80E-03	1.58E-05	-	4.52E-05	2.59E-04	-	2.13E-03	0.27
Naphthalene	-	3.06E-04	-	-	2.62E-07	-	-	4.45E-05	-	3.51E-04
Polycyclic Organic Matter (POM)	-	4.43E-05	-	-	3.79E-08	-	-	-	-	4.43E-05
Toluene	-	1.71E-03	-	1.04E-03	1.46E-06	7.22E-03	3.75E-05	2.15E-04	-	1.02E-02
Xylene	-	-	-	1.04E-04	-	7.22E-04	1.45E-03	1.50E-04	-	2.42E-03
Arsenic Compounds (ASc)	-	1.00E-04	-	-	8.59E-08	-	8.51E-05	-	-	1.86E-04
Beryllium Compounds (BEC)	-	6.03E-06	-	-	5.15E-09	-	5.10E-06	-	-	1.11E-05
Cadmium Compounds (CDC)	-	5.53E-04	-	-	4.72E-07	-	4.68E-04	-	-	1.02E-03
Chromium Compounds (CRC)	-	7.03E-04	-	-	6.01E-07	-	5.95E-04	-	-	1.30E-03
Cobalt Compounds (COC)	-	4.22E-05	-	-	3.61E-08	-	3.57E-05	-	-	7.80E-05
Manganese Compounds (MNC)	-	1.91E-04	-	-	1.63E-07	-	1.62E-04	-	-	3.53E-04
Mercury Compounds (HGC)	-	1.31E-04	-	-	1.12E-07	-	1.11E-04	-	-	2.41E-04
Nickel Compounds (NIC)	-	1.06E-03	-	-	9.02E-07	-	8.93E-04	-	-	1.95E-03
Selenium Compounds (SEC)	-	1.21E-05	-	-	1.03E-08	-	1.02E-05	-	-	2.23E-05
Total HAPS	2.66E-01	2.61E+00	1.60E-02	1.21E-02	8.11E-04	8.41E-02	8.03E-01	2.73E-03	7.45E-03	
Total Hazardous Air Pollutants as Limited by the Permit										3.81

Fact Sheet Attachment: Title 129, Chapter 20 Applicability

**State of Nebraska Ethanol
Title 129, Chapter 20 Applicability**

Title 129, Chapter 20, Section 001

For process weight rates up to 60,000 lbs/hr: $E = 4.10 p^{0.67}$
 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 PM and p = process weight rate in tons/hr.

Process	P	E	Unit PM emission rate
Grain Handling Baghouse (Baghouse #1)	1,400,000 lbs/hr	73.06 lbs/hr	1.07 lbs/hr
	700.00 tons/hr		
Grain Storage Baghouse (Baghouse #2)	1,400,000 lbs/hr	73.06 lbs/hr	1.07 lbs/hr
	700.00 tons/hr		
Hammermill Baghouse (Baghouse #3)	56,000 lbs/hr	38.23 lbs/hr	1.93 lbs/hr
	28.00 tons/hr		
DDGS Storage and Loadout Baghouse (Baghouse #4)	560,000 lbs/hr	62.22 lbs/hr	0.64 lb/hr
	280.00 tons/hr		
Cooling Tower	10,008,000 lbs/hr	100.37 lbs/hr	1.50 lb/hr
	5,004 tons/hr		

Title 129, Chapter 20, Section 002

Total Heat Input (MMBtu/hr)	Maximum Allowable Emissions of PM (lbs/MMBtu)
10 or less	0.6
Between 10 and 10,000	$1.026/I^{0.233}$ Where I = total heat input in MMBtu/hr.
10,000 or more	0.12

Process equipment	MMBtu/hr	Allowable PM (lbs/MMBtu)	Unit PM emission rate (lbs/MMBtu)
Boilers #1 and #2	95.00	0.36	0.0074
Boiler #3	160.00	0.31	0.0075
Emergency Generator	22.37	0.50	0.0697
Emergency Fire Pump Engine	2.10	0.60	0.3100