PREVENTION OF SIGNIFICANT DETERIORATION (PSD)
REVISED CONSTRUCTION PERMIT

PERMIT NUMBER: CP07-0011

ORIGINAL PERMIT TO MODIFY AN
AIR CONTAMINANT SOURCE
ISSUED ON JUNE 15, 2004 TO:

Chief Ethanol Fuels, Inc.
PO Box 488
Hastings, Nebraska 68902-0488

FOR THE SPECIFIC MODIFICATION OF:

Ethanol Manufacturing Plant

TO BE LOCATED AT:

4225 East South Street
Hastings, Nebraska 68901-8338

Pursuant to Chapter 14 of the Nebraska Air Quality Regulations, the public has been notified by prominent advertisement of this proposed modification of an air contaminant source and the thirty (30) day period allowed for comments has elapsed. This Construction Permit approves the proposed emission limit revisions and increases proposed in the application (application no. 07-0011) submitted by the source on February 16, 2007. This Construction Permit supersedes the permit issued on June 15, 2004 and the modification to that permit issued September 12, 2006.

This permit may contain abbreviations and symbols of units of measure, which are defined in 40 CFR Part 60.3. Other abbreviations may include, but are not limited to, the following: Code of Federal Regulations (CFR), Carbon Monoxide (CO), Construction Permit (CP), Continuous Emissions Monitor (CEM), Hazardous Air Pollutant (HAP), Hazardous Air Pollutants (HAPs), Million British thermal units per hour (MMBtu/hr), New Source Performance Standards (NSPS), Nitrogen Oxides (NO_x), Particulate Matter (PM), Particulate Matter less than or equal to 10 micrometers (PM_{10}), Prevention of Significant Deterioration (PSD), Sulfur Dioxide (SO_2), and Volatile Organic Compounds (VOC).

This permit is issued with the following conditions under the authority of Title 129 - Nebraska Air Quality Regulations as amended February 6, 2008:

General Conditions

I. This permit is not transferable to another source or location. {Title 129, Chapter 17}

II. Holding of this permit does not relieve the owner or operator of the source from the responsibility to comply with all applicable portions of the Nebraska Air Quality Regulations and any other

requirements under local, State, or Federal law. Any permit noncompliance shall constitute a violation of the Nebraska Environmental Protection Act and the Federal Clean Air Act, and is grounds for enforcement action or permit revocation. {Title 129, Chapter 41 & Chapter 17, Section 011}

III. Application for review of plans or advice furnished by the Director will not relieve the owner or operator of legal compliance with any provision of these regulations, or prevent the Director from enforcing or implementing any provision of these regulations. {Title 129, Chapter 37}

IV. Any owner or operator who failed to submit any relevant facts or who submitted incorrect information in a permit application shall, upon becoming aware of such failure or incorrect submittal, promptly submit such supplementary facts or corrected information. If the owner or operator wishes to make changes at the source that will result in change(s) to values, specifications, and/or locations of emission points that were indicated in the permit application (or other supplemental information provided by the owner or operator and reviewed by the Department in issuance of this permit), the owner or operator must receive approval from the Department before the change(s) can be made. In addition, any modification which may result in an adverse change to the air quality impacts predicted by atmospheric dispersion modeling (such as changes in stack parameters or increases in emission rates, potential emissions, or actual emissions) shall have prior approval from the Department. The owner or operator shall provide all necessary information to verify that there are no substantive changes affecting the basis upon which this permit was issued. Information may include, but not be limited to, additional engineering, modeling and ambient air quality studies. {Title 129, Chapter 17, Section 006, 007, & 008}

V. The owner/operator of the source shall provide the following notifications to the Department:

(A) The date construction, reconstruction or modification commenced as defined in Chapter 1, Section 031. Notification shall be postmarked no later than 30 days after such date and include a summary description of whether the requirement was met through: {Chapter 17, Section 012}

(1) Initiating physical on-site construction activities of a permanent nature that meet the definition of "begin actual construction", or

(2) Entering into binding agreements or contractual obligations. If this option is used, the notice shall also include a brief summary of each binding agreement or contractual obligation entered into, the date of the agreement or contract, and why it cannot be cancelled or modified without substantial loss to the owner or operator.

(B) The date of initial startup of operations postmarked within 15 days after such date. {Chapter 7, Section 002.03}

VI. Approval to construct, reconstruct and/or modify the source will become invalid if a continuous program of construction is not commenced within 18 months after the date of issuance of the construction permit, if construction is discontinued for a period of 18 months or more, or if construction is not completed within a reasonable period of time. {Chapter 17, Section 012}

VII. The owner or operator shall allow the Department, EPA or an authorized representative, upon presentation of credentials to: {Neb. Rev. Statute §81-1504}

(A) Enter upon the owner or operator's premises at reasonable times where a source subject to this permit is located, emissions-related activity is conducted or records are kept, for the purpose of ensuring compliance with the permit or applicable requirements;

(B) Have access to and copy, at reasonable times, any records, for the purpose of ensuring compliance with the permit or applicable requirements;

(C) Inspect at reasonable times any facilities, pollution control equipment, including monitoring and air pollution control equipment, practices, or operations, for the purpose of ensuring compliance with the permit or applicable requirements;

(D) Sample or monitor at reasonable times substances or parameters for the purpose of ensuring compliance with the permit or applicable requirements.

VIII. When requested by the Department, the owner or operator shall submit completed emission inventory forms for the preceding year to the Department by March 31 of each year. {Title 129, Chapter 6}

IX. Open fires are prohibited except as allowed by Title 129, Chapter 30.

X. Particulate Matter – General Requirements: {Title 129, Chapter 32}

(A) The owner or operator shall not cause or permit the handling, transporting or storage of any material in a manner, which allows particulate matter to become airborne in such quantities and concentrations that it remains visible in the ambient air beyond the property line.

(B) The owner or operator shall not cause or permit the construction, use, repair or demolition of a building, its appurtenances, a road, a driveway, or an open area without applying all reasonable measures to prevent particulate matter from becoming airborne and remaining visible beyond the property line. Such measures include, but not limited to, paving or frequent cleaning of roads, driveways and parking lots; application of dust-free surfaces; application of water; and planting and maintenance of vegetative ground cover.

XI. If and when the Director declares an air pollution episode as defined in Title 129, Chapter 38, Sections 003.01B, 003.01C, or 003.01D, the owner or operator shall immediately take all required actions listed in Title 129, Appendix I until the Director declares the air pollution episode terminated.

XII. This permit may be revised (reopened and reissued) or revoked for cause in accordance with Title 129 and Title 115, Rules of Practice and Procedure. Conditions under which this permit will be revised or revoked for cause, include but are not limited to: {Title 129, Chapter 15, Section 006}

(A) A determination by the Director, or the Administrator of EPA that:

(1) the permit must be revised to ensure compliance with the applicable requirements;

(2) the permit contains a material mistake or that inaccurate statements were made in the emissions standards or other terms or conditions of the permit.

(B) The existence at the source of unresolved noncompliance with applicable requirements or a term or condition of the permit, and refusal of the owner or operator to agree to an enforceable schedule of compliance to resolve the noncompliance;

(C) The submittal by the owner or operator of false, incomplete, or misleading information to the Department or EPA;

(D) A determination by the Director that the source or activity endangers human health or the environment and that the danger cannot be removed by a revision of the permit; or

(E) The failure of the owner or operator to pay a penalty owed pursuant to court order, stipulation and agreement, or order issued by the Administrator of the EPA.

Specific Conditions

XIII. Specific terms and conditions of this permit:

(A) The source shall emit less than 10 tons of any single HAP and less than 25 tons of all HAPs combined in any period of twelve (12) consecutive calendar months. Compliance with this condition shall be demonstrated through compliance with Condition XIII.(L)(1).

(B) Opacity of visible emissions shall not equal or exceed 20%, as evaluated by an EPA-approved method, in accordance with Title 129, Chapter 20, Sections 004 and 006.

(C) The coal-fired boiler (emission unit 14-1) shall comply with the following conditions:

(1) SO_2 emissions shall not exceed 1.2 pounds per MMBtu heat input. {BACT limit from Construction Permit issued April 10, 1984}

(2) NO_x emissions shall not exceed 0.5 pounds per MMBtu heat input. {BACT limit from Construction Permit issued April 10, 1984}

(3) PM emissions (filterable only) shall not exceed 0.04 pounds per MMBtu heat input. {BACT limit from Construction Permit issued December 5, 1985}

(4) The ash handling system and coal storage bunker shall be equipped with fabric filter systems, which shall be maintained and operated as follows: {Construction Permit issued December 5, 1985}

(a) The fabric dust collectors shall be operated at all times the associated equipment is in operation.

(b) The fabric dust collectors shall be properly installed, operated, and maintained. Manufacturer's instructions, if available, shall be kept on site and readily available to Department representatives.

(c) The fabric dust collectors shall be equipped with an operational pressure differential indicator. The pressure differential indicator readings shall be recorded at least once each day that the associated dry dust collector is operating. The pressure indicator shall be properly installed, operated, calibrated, and maintained. The manufacturer's operation and maintenance manual, or its equivalent, detailing proper operation, inspection, and maintenance of the equipment shall be kept on site and readily available to Department representatives.

(d) Routine observations (at least once each day of dust collector operation) shall be conducted to determine whether there are visible emissions from the stack exhaust, leaks, noise, atypical pressure differential readings, or other indicators, which may necessitate corrective action. Corrective action shall be taken immediately if necessary.

(e) Collected waste material from the fabric filters shall be handled, transported, and stored in a manner that ensures compliance with Condition X.

(f) Baghouses filter bags are to be inspected and/or replaced according to the operation and maintenance manual or more frequently as indicated by pressure differential indicator readings or other indication of bag failure.

(5) The owner or operator shall collect a grab sample of coal each day a coal shipment is delivered to the plant and analyze a composite sample two times per month. The composite sample shall be analyzed for sulfur content and heating value (Btu/lb).

(6) CO emissions shall not exceed 146.06 tons per any period of twelve (12) consecutive calendar months. {Chapter 19}

(7) Emissions of NO_x shall not exceed 161.1 tons per any period of twelve (12) consecutive calendar months. {Chapter 19}

(8) Emissions from SO_2 shall not exceed 287.7 tons per any period of twelve (12) consecutive calendar months. {Chapter 19}

(D) The natural gas-fired boiler (emission unit 15-1) shall comply with the following conditions:

(1) Emission unit 15-1 shall combust only natural gas. {Chapter 19}

(2) The maximum heat input shall not exceed 249 MMBtu per hour when fired with natural gas. Natural gas flow rate shall not exceed an average of 249,300 standard cubic feet per hour. The flow rate shall be recorded on an hourly basis and the record shall be kept onsite. The average flow rate shall be calculated as

the arithmetic mean of 24 consecutive hourly measurements. Each exceedance of the flow rate restriction shall be reported to the Department within 10 calendar days of the exceedance. (Construction Permit issued February 1, 1993)

(3) NO_x emissions shall not exceed 117.3 tons per any period of twelve (12) consecutive calendar months. {Chapter 19}

(4) NO_x emissions shall be controlled by low NO_x multistage combustion burners. {BACT limit from Construction Permit issued February 1, 1993}

(5) NO_x emissions shall not exceed 0.16 pounds per MMBtu for natural gas combustion. {BACT limit from Construction Permit issued February 1, 1993}

(6) For emission unit 15-1, the source shall comply with the applicable requirements of 40 CFR 60 Subpart Db - Standards of Performance for Industrial-Commercial-Institutional Steam Generating Units and Subpart A – General Provisions {Chapter 18, Sections 001.01 and 001.22}

(E) Grain, meal, and DDGS handling facilities combined shall emit less than 4.33 lb/hr of PM/PM_{10} and shall comply with the following conditions: {Chapter 19}

(1) PM/PM_{10} emissions from the following grain, meal, and DDGS handling facilities shall be controlled using fabric filter dust collectors:

(a) Grain receiving/Hammermills C and D (F-11107 and F-11204);

(b) Grain surge bin (F-11201);

(c) Hammermills A and B (F-11202);

(d) Transfer of meal from meal collection to meal feed bin (F-1301 and F-11301); and

(e) DDGS conveying and storage (F-6201 and F-16201).

(2) The operation of each dust collector shall be in accordance with the following requirements: {Title 129, Chapter 34}

(a) The fabric dust collectors shall be operated at all times the associated equipment is in operation.

(b) The fabric dust collectors shall be properly installed, operated, and maintained. Manufacturer's instructions, if available, shall be kept on site and readily available to Department representatives.

(c) The fabric dust collector shall be equipped with an operational pressure differential indicator. The pressure differential indicator readings shall be recorded at least once each day that the associated dry dust collector is operating. The pressure indicator shall be properly installed, operated, calibrated, and maintained. The manufacturer's operation and maintenance manual, or its equivalent, detailing proper operation,

inspection, and maintenance of the equipment shall be kept on site and readily available to Department representatives.

(d) Routine observations (at least once each day of dust collector operation) shall be conducted to determine whether there are visible emissions from the stack, leaks or noise, atypical pressure differential readings, or other indicators, which may necessitate corrective action. Corrective action shall be taken immediately if necessary.

(e) Collected waste material from the fabric dust collectors shall be handled, transported, and stored in a manner that ensures compliance with Condition X.

(f) Baghouses filter bags are to be inspected and/or replaced according to the operation and maintenance manual or more frequently as indicated by pressure differential indicator readings or other indication of bag failure.

(F) VOC emissions from fermentation, distillation, and dryer operations shall be controlled by scrubbers and shall be limited to 8.30 lb/hr combined. Operation of the scrubbers shall be in accordance with the following requirements: {Chapter 19}

(1) The scrubbers shall be operated at all times when the associated emission units are in operation.

(2) The scrubbers shall be properly installed, operated, and maintained. Manufacturer's specifications, if available, shall be kept on site and readily available to Department representatives.

(3) The scrubber shall be inspected daily by qualified plant personnel to determine whether there are atypical operating parameters, visible leaks, noise, or other indications which may necessitate corrective action. Corrective action shall be taken immediately if necessary.

(4) The actual operating parameters (including water circulation rate or flow rate) for the scrubbers shall be determined and documented on a daily basis.

(G) The requirements from Title 129, Nebraska Air Quality Regulations, Chapter 18, Sections 001.01 and 001.14 – Equipment Leaks of VOC in the Synthetic Organic Chemical Manufacturing Industry – Subparts A and VV, apply to all affected equipment used in the ethanol production processes, including but not limited to the following. (40 CFR 60.480)

(1) Compliance with NSPS, Subpart VV shall be demonstrated for all equipment within 180 days of initial startup. (40 CFR 60.482-1)

(2) Test methods and procedures shall be consistent with the requirements found in 40 CFR 60.485. The methods include:

(a) Method 21 shall be used to determine the presence of leaking sources. (40 CFR 60.485(b)(1))

(b) Method 21 shall be used to determine the background level. (40 CFR 60.485(c)(2))

(c) Procedures that conform to the general methods in ASTM E-260, E-168, E-169 (incorporated by reference – see § 60.17) shall be used to determine the percent VOC content in the process fluid that is contained in or contacts a piece of equipment. (40 CFR 60.485(d)(1))

(d) Standard reference texts or ASTM D-2879 (incorporated by reference – see § 60.17) shall be used to determine the vapor pressure of the components in the liquid in the light liquid service. (40 CFR 60.485(e)(1))

(3) Equipment under this subpart is defined as each pump, compressor, pressure relief device, sampling connection system, open-ended valve or line, valve, and flange or other connector in VOC service and any devices or systems required by this subpart. (40 CFR 60.481)

(4) Emissions will be controlled by the Leak Detection and Repair Program as defined in 40 CFR 60.482-1 through 60.482-10.

(H) The requirements from Title 129, Nebraska Air Quality Regulations, Chapter 18, Section 001.14 – Standards of Performance for Volatile Organic Liquid Storage Vessels (including Petroleum Liquid Storage Vessels) for which Construction, Reconstruction, or Modification Commenced After July 23, 1984 – Subpart Kb, apply to storage tank T-26101 (40 CFR 60.110b)

(1) The storage tank T-26101 shall be equipped with a fixed roof in combination with an internal floating roof meeting the specifications in 40 CFR 60.112b(a)(1).

(2) After installing the control equipment required in 40 CFR 60.112b(a)(1) on storage tank T-26101, the owner or operator shall comply with the inspection and operating requirements in 40 CFR 60.113b(a).

(I) The following conditions apply to truck traffic:

(1) All on-site haul roads with production-related truck traffic shall be paved. {Chapters 19 and 32}

(2) The permittee shall use Best Management Practices (BMPs) to control emissions from haul roads and to comply with Condition X. BMPs include, but are not limited to: paved roads; covering haul road trucks; regular sweeping of paved roads; a posted plant speed limit of 5 miles per hour; and paving or treating parking areas, driveways, and shoulders. The effectiveness of the BMPs shall be demonstrated by compliance with Condition X. {Chapters 19 and 32}

(3) For each day of operation, the permittee shall conduct a survey of the plant property and haul roads to determine if visible fugitive emissions are being generated and leaving plant property. Documentation of all BMPs implemented and daily surveys shall be maintained in a log. {Chapters 19 and 32}

(4) Haul road PM emissions from the ethanol, WDGS, DDGS, syrup, denaturant, and coal trucks shall be less than 21.22 tons per any period of 12 consecutive calendar months. At no time during the first eleven (11) calendar months after the permit issuance date shall the PM emission limit be exceeded. The following equation shall be used to demonstrate compliance: {Title 129, Chapter 4}

2.26 lb/VMT x [(# of trucks$_{ethanol}$ x haul road length (miles)) + (# of trucks$_{WDGS\ and\ Denaturant}$ x haul road length (miles)) + (# of trucks$_{DDGS\ \&\ syrup}$ x haul road length (miles)) + (# of trucks$_{coal}$ x haul road length (miles))] ÷ 2000 < 21.22 tpy

(J) The Cooling Tower C shall comply with the following requirements:

(1) The Cooling Tower C shall be properly operated and maintained. Manufacturer's specifications, if available, shall be kept on site and readily available to Department representatives.

(2) The drift loss shall be limited to 0.0016 percent, which shall be calculated as the weighted average of the drift losses for all cooling tower cells. Verification of drift loss shall be by manufacturer's guarantee. Manufacturer's drift loss guarantee shall be kept on site and readily available to Department representatives, upon request.

(3) The total dissolved solids concentration (TDS) in the cooling water in Cooling Tower C shall not exceed 7,000 ppm for any single sampling event. A TDS sample shall be collected and tested at a minimum of once per calendar month.

(K) The ethanol loadout to truck and rail car tanks shall comply with the following requirements:

(1) A vapor collection and control system shall be in operation at all times the loading facility is in operation.

(2) The vapor collection and control system shall have a minimum overall control efficiency of 90%.

(3) The vapor collection and control system shall be properly designed, installed, operated, and maintained. Manufacturer's specifications shall be kept on site and readily available to the Department representatives.

(4) If a flare is used, the flare shall be operated with a flame present at all times the loading facility is in operation. A thermocouple or equivalent device capable of continuously monitoring the flame shall be installed, and thermocouple readings shall be recorded once per hour. The thermocouple shall be equipped with an alarm to indicate the absence of a flame, and calibrated in accordance with the manufacturer's instructions.

(L) Records shall be maintained on-site for a minimum period of five (5) years. These records shall be clear and readily accessible to Department representatives and shall include the following:

(1) To demonstrate compliance with Condition XIII.(A), the Permittee shall maintain copies of emission calculations verifying compliance with the HAP emission limitations. The data shall be compiled on a monthly basis by the 15th day of each month for the preceding twelve months.

(2) To demonstrate compliance with the SO_x, NO_x, and CO emission limitations in Conditions XIII.(C) and (D), the permittee shall maintain the following records:

(a) The amount of coal and natural gas burned in each boiler per month;

(b) The sulfur content of the coal burned in the boilers; and

(c) The calculated total emissions of SO_x, NO_x, and CO emitted from the coal boiler each month and calculated total emissions of NO_x emitted from the natural gas boiler each month.

(3) The permittee shall maintain appropriate records to support the emission calculations. The permittee shall submit an updated emission estimation plan for review by the Department and incorporation in the operating permit as necessary (e.g., after a change is made in the operation of the facility or a stack test result indicates that a revision is necessary). The plan shall detail how emissions of NOx, SO2, CO, VOC, and HAP will be quantified in order to demonstrate compliance with Conditions XIII.(A), (C)(6), (7), and (8), and (D)(3), including the methodology used and the type of data that will be used.

(4) To demonstrate compliance with Condition XIII.(C)(5), the permittee shall maintain copies of the results of coal analyses and the dates on which the coal samples were analyzed. The Permittee shall submit to the Department reports of the coal analyses performed each quarter.

(5) To demonstrate compliance with Condition XIII.(D), the permittee shall maintain the following records:

(a) The average hourly natural gas flow rates;

(b) The daily average natural gas flow rates each 24-hour period;

(6) Inspection and maintenance records for each dust collector, to show compliance with Conditions XIII.(C)(4) and (E)(2) shall include the following:

(a) Records documenting when routine observations were performed with a description including pressure differential readings and any atypical observations.

(b) Records documenting when routine maintenance and corrective actions were performed with a description of the maintenance and/or corrective action performed.

(c) Filter replacement records including filter type, and date of filter installation.

(d) Records documenting equipment failures, malfunctions, or other variations, including time of occurrence, remedial action taken, and when corrections were made.

(7) To demonstrate compliance with Condition XIII.(F), the permittee shall maintain the following records:

(a) Records documenting when routine maintenance and corrective actions were performed with a description of the maintenance and/or corrective action performed.

(b) Records documenting equipment failures, malfunctions, or other variations, including time of occurrence, remedial action taken, and when corrections were made.

(8) To demonstrate compliance with Condition XIII.(H), the owner or operator shall report and keep records as described in 40 CFR 60.115b – Reporting and Recordkeeping Requirements. Records of the dimension of the storage vessel and analysis of its storage capacity shall be maintained onsite for the life of the source as required in 40 CFR 60.116b. All other reports and records shall be maintained for at least 2 years.

(9) To demonstrate compliance with Conditions X and XIII.(I), the permittee shall maintain the following:

(a) Records documenting use of BMPs on haul roads, to demonstrate compliance with Conditions X. and XIII.(I)(2).

(b) Records of haul road visible emissions checks taken daily during operation and a description of BMPs implemented to demonstrate compliance with Condition XIII.(I)(3).

(c) Emission calculations for each calendar month and for each period of twelve (12) consecutive calendar months to demonstrate compliance with Condition XIII.(I)(4).

(10) To demonstrate compliance with Condition XIII.(J)(3), the permittee shall maintain records of the total dissolved solids concentration in the Cooling Tower C water. These records shall be compiled monthly by the 15th day of each month for the previous month.

(11) To demonstrate compliance with Conditions XIII.(G) and (K), the permittee shall maintain the following records for the ethanol loadout facility and its vapor collection and control system:

(a) Records including the date in which leak detection testing occurred, which valves, pumps, seals, open-ended lines, flanges, connectors, etc. were tested, and name of the individual who conducted the testing.

(b) The owner or operator shall submit a leak detection and repair report every six (6) calendar months to the Department. The initial semi-annual report shall be submitted beginning six (6) months after the initial startup date [60.487 (a)]. Subsequent reports for each six (6) calendar month reporting period shall be submitted within 45 days following June 30 and December 31 of each year. Each report must be certified by a responsible official and include the following items:

(i) Date and time testing occurred;

(ii) Name of individual who conducted the testing; and

(iii) Additional information required to be reported to the Department in accordance with 40 CFR 60.480.

(c) Records documenting when routine maintenance and preventive actions were performed with a description of the maintenance and/or preventive action performed.

(d) Records documenting any failures, malfunctions, or other variations, including time of occurrence, remedial action taken, and when corrective actions were made.

(e) Following the installation of the flare, the permittee shall maintain records of all temperature measurements required by Condition XIII.(K)(4).

(f) The owner or operator shall report and keep records as described in 40 CFR 60.487 – Reporting requirements and in 40 CFR 60.486 – Recordkeeping requirements.

(12) Records of data, calculations, and total emissions should be kept, as necessary, to ensure compliance with each specific condition so that compliance is easily and continuously verified. Except for coal analysis data, the records, calculations, and total emissions shall be computed at least monthly for the previous month and the previous twelve consecutive calendar month period, and shall be updated by the 15th calendar day of each calendar month. The coal analysis data and sulfur dioxide emissions calculations shall be completed monthly for the previous month and the previous twelve consecutive calendar month period, and shall be updated by the 25th day of each calendar month.

(M) The performance tests required in this permit must be completed and submitted to the Department as follows: (Title 129, Chapter 34, Section 001)

(1) The permittee shall use the testing methods specified in 40 CFR 60, Appendix A or an alternative method approved by the Department.

(2) An emissions testing protocol, or equivalent information, shall be submitted to the Department prior to any performance test.

(3) The permittee shall provide the Department a 30-day notice of any performance test to allow the Department the opportunity to have an observer present (Title 129, Chapter 34, Section 003).

(4) The written results, including methods used, data, and results of such tests, shall be sent to the Department within 45 days of completion of each performance test (Title 129, Chapter 34, Section 002.07).

(N) For the baghouses, scrubbers, and flare specified by Conditions XIII.(C)(4), XIII.(E)(1), XIII.(F), and XIII.(K), the permittee shall monitor and develop ranges for the operating parameters (including, but not limited to, pressure differentials, scrubber flow rates, and operating temperatures). The ranges of operating parameters indicative of normal operation shall be established from data obtained during the performance testing and/or from other basis, such as historical operating parameter trends, manufacturer's specifications, and engineering judgment. The permittee shall submit the proposed ranges of operating parameters for review by the Department and incorporation in the operating permit within 120 days after the issuance date of this permit. (Title 129, Chapter 34, Section 006)

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

2/19/08 **{Original Signed}**

Date

Shelley Kaderly, Air Administrator
Air Quality Division

FACT SHEET

Chief Ethanol Fuels, Inc.
4225 East South Street
Hastings, Nebraska 68902

February 19, 2008

DESCRIPTION OF THE FACILITY OR ACTIVITY:

Chief Ethanol Fuels, Inc. (Chief) operates an ethanol manufacturing plant in Hastings, Nebraska. The plant is located in Adams County, which is in attainment for all criteria pollutants. The principal products of this plant are denatured ethanol, wet distiller's grains with solubles (WDGS) and dried distiller's grains with solubles (DDGS). Since the primary product is ethanol, the plant operates under the Standard Industrial Classification (SIC) Code 2869 (Industrial Organic Chemicals) and North American Industry Classification System (NAICS) Code 325193.

Chief manufactures ethanol from corn and milo. The corn and milo are ground using hammermills and fermented by adding water, enzymes, and yeast. The resulting product of fermentation (known as "beer") is transferred to distillation units, where the ethanol is separated from the stillage. The ethanol is dried using molecular sieves and denatured using natural gasoline. The stillage is transferred to centrifuges and then either transferred to storage and loadout as WDGS or dried in steam-heated dryers to produce DDGS. The WDGS and DDGS are sold as animal feed.

Background and History:

The plant was constructed in 1984 and modified in 1991 through 1993, 1996, 1998, 2004, and 2006. The original plant had a maximum ethanol production capacity of 10 million gallons per year. The construction projects undertaken at the source between 1991 and 1993 increased the production capacity to 28.5 million gallons of ethanol per year. The construction during this time period consisted of a new grain unloading facility and handling system, replacement of existing hammer mills, modifications to the fermentation system, addition of a stillage decanter, installation of a new DDGS dryer, installation of a 249 million British Thermal Unit (MMBtu) per hour boiler, and a new distillation system. Construction permits for these modifications to the existing plant were issued on April 6, 1992 (for Phase I), July 2, 1992 (for Phase II), and February 1, 1993 (for Phase III). The February 1, 1993 construction permit was modified in a September 20, 1994 permit.

In 1996, Chief submitted a construction permit application for the construction of a concrete pad for WDGS storage and loadout; installation of associated enclosed screw augers; and construction of a new centrifuge for stillage processing. These modifications to the plant increased the ethanol production capacity from 28.5 million gallons per year to 42 million gallons per year. In a December 23, 1997 letter to Chief, NDEQ stated that these modifications to the plant did not require a construction permit under Title 129, Chapter 17.

In 1998, Chief submitted another construction permit application for the installation of two-700,000 gallon fermentation tanks, one 1,000,000 gallon denatured ethanol storage tank, two hammermills and a baghouse for the grain processing line. In addition to these new units, the application included the replacement of fermentation scrubber II, modification of the emission collection system for the fermentation tanks, returning distillation unit 1 and the associated scrubber to service, and increasing the cooling water circulation capacity. These modifications to the plant increased the production capacity

from 42 million gallons per year to 65 million gallons per year. In a February 19, 1998 letter to Chief, NDEQ stated that these modifications to the plant did not require a construction permit under Title 129, Chapter 17.

After further review, the Department determined in 2000 that: (1) the 1996 and 1998 construction projects should be considered one modification under the Prevention of Significant Deterioration (PSD) regulations because the 1998 construction activities were undertaken within two years of the 1996 construction activities; (2) both the 1996 and 1998 projects increased the ethanol production capacity of the plant; and (3) a construction permit is required for these construction activities, because the increase in potential emissions is greater than the PSD significance thresholds. The net increase in emissions is defined as the future potential emissions from the source (after the 1998 modification) minus the actual emissions prior to 1996 and 1998 modifications. For the 1996/1998 construction activities, Chief elected to limit the operation of their facility such that the net emission increase for the modification was less than the PSD thresholds. Although the net increase in emissions as limited are less than the thresholds stated in Title 129, Chapter 17, section 001.01, a construction permit is required for the modifications in order to make the limitations federally enforceable. The 2004 construction permit satisfied the permitting requirements for the 1996/1998 modifications.

In August 2003, during the preparation of the 2004 construction permit, Chief decided to replace the existing vapor recovery control device used to control volatile organic compound (VOC) and hazardous air pollutant (HAP) emissions from the ethanol loadout facility with a new collection system and flare. Chief provided engineering specifications for the new control system on August 28, 2003 and requested this change to the control system be included in the 2004 construction permit.

On April 8, 2004, Chief requested permission to undertake repair work on the coal-fired boiler. The repair work consisted of the replacement of warped internal tubing. The boiler re-tubing modification was addressed in the June 15, 2004 construction permit. The 2004 construction permit superseded the construction permits issued December 5, 1985, February 1, 1993, and September 20, 1994.

Chief submitted a construction permit application on July 14, 2005 requesting to revise the construction permit issued on June 15, 2004. In this construction permit application, Chief requested to correct the maximum cooling water circulation rate for Cooling Tower C from 2,400,000 gallons per hour (gal/hr) to 1,320,000 gal/hr, to increase the total dissolved solids concentration in the cooling water in Cooling Tower C, to correct the identification number for vent scrubber from C-1402 to C-21402, to implement Best Management Practices (BMPs) for the haul roads based on the Department's March 21, 2005 'Haul Road Particulate Modeling Construction Permitting' Memo, and to construct a new fermentation tank (5C). An amendment to the June 15, 2004 permit was issued on September 12, 2006.

Content of this Revised Permit:

Chief submitted an application (application no. 07-0011), received February 16, 2007, to revise conditions of the 2004 permit and requested that a revised permit be issued that would supersede the 2004 construction permit and 2006 construction permit amendment. The main purpose of this permit revision is to increase and combine several emission limits that were unnecessarily restrictive in the 2004 construction permit (i.e., the emission limits could have been set higher without triggering the PSD thresholds). Stack testing conducted by Chief in October 2006 showed they would be in violation of several of their current permit limits. After discussion with the Department, the source has proposed lb/hr VOC and PM/PM_{10} emission limits. The result of the revisions to the emission limits is that the facility will no longer be in violation of permitted limits after issuance of this revised permit, while the limits will still be protective of the applicable PSD thresholds for the 1996 and 1998 modifications. The second

purpose of this permit is to delete the nitrogen oxide (NO_x) and sulfur dioxide (SO_2) limits that were placed on both boilers combined because only the natural gas boiler experienced increased utilization with the 1996/98 modifications. The coal fired boiler had run near maximum capacity before the natural gas boiler was constructed and before the 1996/98 modifications.

This permit supersedes the permits issued June 15, 2004 and September 12, 2006 and, as such, will be the only active construction permit for the source at this time.

TYPE AND QUANTITY OF AIR CONTAMINANT EMISSIONS ANTICIPATED:

The principal emissions from this source include carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen oxides (NO_x), volatile organic compounds (VOC), particulate matter (PM), particulate matter less than or equal to 10 micrometers (PM_{10}), and hazardous air pollutants (HAP). The CO, SO_2 and NO_x emissions result primarily from the combustion of fossil fuels in the plant's two process boilers: a 110 MMBtu per hour coal-fired boiler and a 250 MMBtu per hour natural gas-fired boiler. Appendix A includes the detailed emission calculations.

The following paragraphs briefly describe the proposed revisions and how the emissions were calculated for each emission unit. Revisions to the 2004 and 2006 permit conditions are covered in detail in the permit condition discussions at the end of this document.

Boilers

The coal boiler was originally permitted on April 10, 1984 and the natural gas boiler was originally permitted on February 1, 1993. The boilers were included in the emission calculations for the 1996/98 modifications as if the boilers had been debottlenecked or increased in utilization. Although the natural gas boiler experienced increased utilization with the 1996/98 modifications, the coal fired boiler had run near maximum capacity before the natural gas boiler and 1996/98 modifications so it did not experience increased utilization; therefore, emissions from the coal boiler do not need to addressed for the 1996/98 modifications.

When the coal-fired boiler's warped internal tubing was replaced in 2004, the past actual emissions that should have been used to determine if the modification triggered PSD were those from 2002-03. A limit of 161.1 tons per year (tpy) for NO_x, 287.7 tpy for SO_2, and 146.1 tpy for CO, would have been required for the coal-fired boiler to avoid PSD review for the coal-fired boiler re-tubing project, whereas the 2004 permit established a lb/MMBtu limit that was overly restrictive for CO and did not limit annual emissions of SO_x for the coal-fired boiler. A PM_{10} limit would not have been required since the increase from past actual to future potential emissions would not have exceeded 15 tpy; therefore, the PM_{10} limit established in the 2004 permit is being removed. This permit deletes the combined NO_x and SO_2 limits for the natural gas and coal fired boilers because they were not necessary, given that the coal boiler did not increase utilization for the 1996/1998 modifications and the natural gas boiler was not modified as part the 2004 coal-fired boiler re-tubing project. This permit also establishes a tpy NO_x limit for the natural gas-fired boiler to ensure that increased utilization as a result of the 1996/98 modifications does not result in NO_x emissions greater than the PSD significance threshold of 40 tpy. Calculations are shown in Appendix A.

Grain Handling & DDGS Storage and Conveyance

Grain handling operations affected by the 1996/98 modifications include grain unloading, conveying, receiving, hammermills, and meal conveying. DDGS storage and conveyance were also affected. The

emission rates used to calculate the emissions from these processes are based on stack test data, if available (see fact sheet attachment for the emissions estimation methodology). The past actual emission rate for PM_{10} is estimated to be approximately equal to the measured PM emission rate measured at the outlet of the baghouse. The past actual emissions of PM/PM_{10} were calculated by multiplying the total number of operating hours in 1994 and 1995 by the lb/hr PM/PM_{10} emission rate. In the 2004 permit the future potential emission rate for PM/PM_{10} was estimated to be approximately equal to the measured PM emission rate measured at the outlet of the baghouse plus a safety factor of 30%. The future potential emissions were calculated assuming 8,760 hours of operation per year.

Cooling Tower No. C

The PM/PM_{10} emissions from cooling tower C are calculated as follows:

$$PM/PM_{10} \text{ emissions} = (8.34 \text{ lb/gallon}) \times (TDS/1{,}000{,}000) \times C \times (D/100)$$

Where:

TDS	=	Total dissolved solids (ppm)
C	=	Cooling water circulation rate (gallons/hour)
D	=	Drift loss factor (%)

In the 2004 permit the actual PM/PM_{10} emissions are the average of the estimated emissions for 1994 and 1995, and were calculated using a TDS concentration of 1,000 ppm and a drift loss factor of 0.002%. The future potential emissions were calculated in the 2006 modification using the maximum throughput of 1,320,000 gallons of circulating water per hour, a TDS concentration of 7,000 ppm, and a drift loss factor of 0.002%. This permit corrects the drift loss factor to 0.0016%. The drift loss factor was obtained from the manufacturer of the cooling tower. The TDS value of 1,342 ppm used to estimate past actual emissions was based on daily conductivity readings taken by plant personnel prior to the 1996/98 modification of this cooling tower.

Haul Road Emissions

Haul road emissions at this facility consist of truck traffic on paved roads as part of the receiving of raw materials (denaturant, grain), hauling of coal, and shipping of final products (denatured ethanol, WDGS, DDGS). Condition XIII.(J) of the 2004 construction permit was revised in the 2006 construction permit revision because Chief wanted to eliminate the haul road conditions in the 2004 permit that were based on short-term dispersion modeling. Chief implemented BMPs for the haul roads in accordance with the Department's March 21, 2005 'Haul Road Particulate Modeling Construction Permitting' memo. Chief proposed the following BMPs in their application: paved roads; covering haul road trucks; regular sweeping of paved roads; a posted plant speed limit of 5 miles per hour; and paving or treating parking areas, driveways, and shoulders. BMPs can be adjusted by Chief as necessary to control their fugitive dust. By implementing BMPs, Chief now uses a silt loading factor of 3 grams/square meter (g/m^2) allowed by the Department's March 21, 2005 Memo without being required to do quarterly testing. Chief had a silt loading test conducted on June 23, 2005, which resulted in an average silt loading factor of 1.52 g/m^2.

The potential emission calculations in the June 2004 construction permit fact sheet were based on a silt loading value of 1.15 g/m^2. Emission factors were calculated using Equation 1 in AP-42, Chapter 13.2.1 – Paved Roads (12/03). The potential PM and PM_{10} emissions were calculated by multiplying the emission factor by the estimated vehicle miles traveled and the potential number of trucks. The calculations in the 2006 fact sheet updated and corrected the source's potential emission calculations. A speed correction

factor was incorporated into the emission calculation equation. The speed correction factor for PM is (the mean vehicle speed ÷ 30)$^{0.3}$, and for PM_{10} (the mean vehicle speed ÷ 30)$^{0.5}$. This factor comes from the second emission calculation equation (1b) in AP-42, Chapter 13.2.2 – Unpaved Roads. The Department allows the use of this correction factor for speeds no less than 15 mph. Chief provided the following reasons as to why the speed correction factor is appropriate to use:

1) Trucks stop at the front gate to weigh in/out or to wait their turn for entry into the plant.
2) Corners within the plant haul roads are sharp 90 degree turns requiring the lower speeds.
3) Trucks stop at the individual loadout areas based upon the product carried or shipped. These include areas for coal, ethanol, DDGS, and WDGS.
4) The plant has a speed bump located near the west exit gate of the plant.
5) The plant has a 5 mph posted speed limit for plant safety and to minimize haul road emissions. This limit is enforced by notifying drivers and employers when the speed limit is exceeded.

To estimate the potential number of grain hauling trucks, the actual number of grain trucks used in 2005 were multiplied by the ratio of the potential amount of ethanol Chief could produce to the actual amount of ethanol produced in 2005 (i.e., 20,716 trucks x 65 MMgal/62.543 MMgal). Chief is limiting the PM emissions from all other trucks (ethanol, WDGS, DDGS, syrup, coal, and denaturant) to less than 21.22 tpy. This limit, in conjunction with the cooling tower TDS limit of this permit revision, the limit for the grain, meal, and DDGS handling facilities, and the PM limits in place in the June 15, 2004 construction permit, will ensure that PM emissions do not exceed the PSD threshold of 25 tpy.

The spreadsheet for the 2006 modification corrected past actual emissions for paved roads. Haul road lengths were corrected, the speed correction factor was added, and a silt loading factor of 5.77 g/m^2 was used instead of the 1.15 g/m^2 value that was used in the 2004 fact sheet calculations. The following average silt loading test values were submitted (in g/m^2) for the respective testing dates: 5.62 on March 30, 2004; 6.22 on September 25, 2004, and 8.22 on November 12, 2004. Chief submitted their Dust Control Plan to the Department on December 13, 2004, and these tests were conducted before BMPs were implemented at the facility. Therefore, those silt loading values were used to calculate the haul road past actual emissions, when there also would have been no BMPs in place, and they should have been representative of Chief's past actual emissions. The increase in PM and PM_{10} emissions is the difference between the future potential and the past actual emissions. See Appendix A of the fact sheet for detailed calculations.

WDGS Storage and Loadout Area

The future potential VOC emission rate for the WDGS storage and loadout facilities was calculated by using the NDEQ accepted DENCO emission factors noted in the Ethanol Air Quality Construction Permit Application Forms. Since the WDGS storage and loadout facilities were new processes constructed in 1996, there were no past actual emissions of VOC associated with this operation. This method of emission estimation assumes the worst-case scenario that 100% WDGS and 0% DDGS is produced at the facility.

Fermentation Process

The actual VOC emissions from fermentation tanks No. 1 through 4 were estimated using an emission rate of 3.19 pounds of VOC per hour and the total number of operating hours for 1994 and 1995. Since fermentation tanks No.1 through 4 were all vented to scrubber C-1401 (previously designated C-1508), the emission rate is based on the design specifications for this scrubber. The VOC emissions from fermentation tanks No.5 and No.6 are controlled using scrubber C-11402. The actual VOC emissions

from these tanks are calculated using stack test data from the scrubber exhaust and the total number of operating hours for 1994 and 1995.

During the 1998 modification, the source installed two new fermentation tanks (identified as tanks 6 and 7) and replaced scrubber C-11402 with a new scrubber identified as C-21402. After the modification, the emissions from tanks 1a, 1b, 2a, and 2b, continued to be exhausted to scrubber C-1401, while the emissions from tanks 3a, 3b, 4a, 4b, 5a, 5b, 6 and 7 were exhausted to the new scrubber. Based on the design specifications for the scrubbers and knowledge of the emissions generated by the fermentation process, Chief proposed a combined emission limit of 9.75 tons of VOC per year for scrubbers C-1401 and C-21402. These scrubbers will now be included in the new revised lb/hr VOC combined emission limit along with the distillation scrubbers and the DDGS dryer.

The plant design firm Vogelbusch provided estimates of the pre-project potential HAP emissions from the two fermentation scrubbers. Design estimates were used because no stack testing data was available for the conditions and equipment before the 1996 and 1998 projects were completed. The estimates are based upon potential plant production of 28.5 MMgal/yr.

The pre-project scrubbers consisted of C-1401 and C-11402. C-1401 is the original scrubber installed in 1984. The permitted project changed this scrubber from controlling fermentation tanks 1 through 4 to tanks 1a, 1b, 2a, and 2b. Scrubber C-11402 controlled fermentation tanks 5 and 6, but was replaced in 1998 by a new scrubber C-21402 to control tanks 5a, 5b, 6 & 7. No stack testing for HAPs were available for these pre-project conditions.

The post-project potential HAP emissions were estimated from October 2006 stack testing. This value would best represent the HAP emission rate for current plant operations.

Distillation Unit. No. II

Scrubber C-11533 controls emissions from Unit II Distillation. The past actual VOC emissions from the Unit II Distillation (previously referred to as the Rectifying Column) were calculated using an emission rate of 0.0990 pounds of VOC per hour (determined from stack test data) and the total number of operating hours in 1994 and 1995.

In the 2004 permit the future potential VOC emissions from the rectifying column were calculated using an emission rate of 0.73 pounds of VOC per hour. The 0.73 pound per hour limit was specifically requested by Chief for scrubber C-11533. As this was a source requested limit and not based on regulation, this scrubber will also be included in the new lb/hr VOC combined emission limit.

Pre-project potential HAP emissions were calculated using stack testing performed in January 1994. Post project potential HAP emissions were calculated using October 2006 stack test data.

DDGS Dryer

The facility has one dryer scrubber, C-11801, to control emissions from dryers A, B, and C. The past actual VOC emissions from the dryer were calculated using an emission rate of 0.46 pounds of VOC per hour (determined from stack test data) and the actual operating hours for 1994 and 1995. In the 2004 permit the future potential VOC emissions were limited to an emission rate after the scrubber of 2.5 pounds of VOC per hour. The 2.5 pound per hour limit was specifically requested by Chief for scrubber C-11801. As this was also a source requested limit and not based on regulation, this scrubber will also be included in the new lb/hr VOC combined emission limit.

Stack testing completed in October 2006 was used to calculate pre-project and post-project potential HAP emissions.

2006 Stack test data was used for pre-project calculations because the dryer emission rate in lb/hr is not dependent upon the ethanol production rate at the facility. The dryer emission rate is based on the dryer feed rates and scrubber operation. Stack testing for the dryer scrubber represents a worst-case scenario by testing the dryers at near capacity feed rates. No modification of the dryers or scrubber occurred during the 1996 and 1998 project that would have increased the emission rate. Therefore, the potential emissions were calculated on the best available stack testing data and for the maximum hours of operation.

Distillation Unit No.I

Scrubber S-1501 controls emissions from Unit I Distillation. Since this unit was being returned to service, there were no VOC emissions in 1994 and 1995. In the 2004 permit the future potential emissions from this unit were limited to 0.43 pounds of VOC per hour. A stack test performed in 2006 shows the VOC emission rate after the control device is 0.09 pounds per hour. As this was also a source requested limit and not based on regulation, this scrubber will also be included in the new lb/hr VOC combined emission limit.

No pre-project potential HAP emissions were calculated because Unit I distillation was returned to service as part of the 1996/98 permitted project. Post project potential HAP emissions were calculated using October 2006 stack test data.

Ethanol Loadout

The denatured ethanol produced at this plant is shipped offsite using either truck or rail car tanks. The rail cars used by Chief are dedicated tanks used only for shipping denatured ethanol, which are either owned by Chief or rented. The trucks used for shipping are not dedicated to the transport of denatured ethanol. As a result, the previous cargoes may have been gasoline. The past actual and future potential emissions from the loading of denatured ethanol into truck and rail car tanks are calculated using the equation (1) in AP-42, Section 5.2 (Transportation and Loading of Petroleum Liquids, 1/95).

The past actual emissions from the loading of dedicated rail car tanks are calculated by multiplying the loading loss per 1000 gallons by the average number of gallons shipped by rail in 1994 and 1995. The HAP emissions from the storage tanks are based on the HAP content (weight fraction) of the individual HAPs commonly found in ethanol and denaturant.

The total uncontrolled, emissions prior to the 1996/1998 modification is the sum of the loading emissions for tank and rail car tank loading. In 1994 and 1995 Chief used a vapor recovery unit to control emissions from the loading of truck and rail cars, the past actual emissions of VOC from product loading was calculated by multiplying the uncontrolled emission estimate by (1- Control Efficiency (90%)). The past actual emissions of an individual HAP are calculated using the weight fraction of the HAP in gasoline, ethanol, and/or denaturant.

The future potential emissions are calculated by assuming the worst case scenario in which all denatured ethanol is loaded into rail tanks. The future potential emissions of VOC and HAPs are calculated using the same methodology used to estimate the past actual emissions from truck tanks.

In 2004, Chief installed a collection system and flare to replace the vapor recovery system. The flare burns propane as a supplementary fuel. The future potential flare control system 2004 permit calculations were removed and replaced by the vapor recovery unit calculations because the flare installation was not part of the 1996/98 modifications. The annual emission limit was deleted because the future potential emissions of the flare using manufacturer's efficiency data (above 90%) would not exceed the allowable project increase of 40 tpy. The future potential emissions were 10.79 tpy based on 65 MMgal (See Appendix A). The future potential emissions from the flare were calculated using engineering specifications provided by the source and emission factors from AP-42, Chapter 1.4.

Storage Tanks

The past actual and future potential VOC emissions from the storage tanks were calculated using the EPA Tanks 4.0d program. This program uses the maximum storage capacity and annual throughputs for each storage tank and data on the physical properties of the material stored to calculate working and breathing VOC losses from the storage tanks. Storage tanks T-1501A, T-1501B, and T-11501C are used to store anhydrous ethanol; tanks T-6101, T-6102, and T-26101 are used to store denatured-ethanol; and tank T-6103 is used to store natural gasoline. The past actual VOC emissions for the storage tanks are the average of the total VOC losses for 1994 and 1995. The future potential VOC emissions were calculated using a maximum ethanol production rate of 65 MMgallons per year. The future potential VOC emissions also include the working and breathing VOC losses from the new storage tank T-26101.

Table 1 below shows the permitted emissions as a result of the permit modifications for the 1996/98 modifications, the 2004 coal-fired boiler re-tube project, and the flare installation. Tables 2 and 3 show the increases in emissions for various projects relative to the PSD significance thresholds:

Table 1. Permitted Facility-Wide Emissions

Regulated Pollutant	PTE with Permit Limits	2004 Permit PTE	Increase in Emissions
Particulate Matter (PM)	99.4	72.5	26.9
Particulate Matter smaller than 10 microns (PM_{10})	61.0	35.6	25.4
Sulfur Dioxide (SO_2)	288.4	276.4	12.0
Oxides of Nitrogen (NO_x)	279.2	217.8	61.4
Carbon Monoxide (CO)	238.7	140.2	98.2
Volatile Organic Compounds (VOC)	67.7	48.6	19.1
Hazardous Air Pollutants (HAPs):			
Single HAP	< 10	< 10	--
Total HAPs	< 25	< 25	--

Note: Emissions listed are in units of tpy; the '2004 Permit PTE' values are from the 2004 calculations spreadsheet.

Table 2. Summary for the 1996/98 Modification after this Permitting Revision

Regulated Pollutant	PTE with Permit Limits	2-Year Average Actual Emissions	Net Potential Increase	PSD Significant Increase Threshold
Particulate Matter (PM)	80.09	55.61	24.48	25
Particulate Matter smaller than 10 microns (PM_{10})	37.0	31.3	5.6	15
Sulfur Dioxide (SO_2)	0.66	0.3	0.3	40
Oxides of Nitrogen (NO_x)	117.3	77.9	39.4	40
Carbon Monoxide (CO)	91.98	11.5	80.5	100
Volatile Organic Compounds (VOC)	66.3	26.8	39.4	40

Note: Emissions listed are in units of tpy

Table 3. Summary for 2004 Boiler Re-Tubing Project after this Permitting Revision

Regulated Pollutant	PTE with Permit Limits	2-Year Average Actual Emissions	Net Potential Increase	PSD Significant Increase Threshold
Particulate Matter (PM)	19.3	5.4	13.8	25
Particulate Matter smaller than 10 microns (PM_{10})	24.0	10.9	13.2	15
Sulfur Dioxide (SO_2)	287.7	248.3	39.4	40
Oxides of Nitrogen (NO_x)	161.1	121.7	39.4	40
Carbon Monoxide (CO)	146.06	46.7	99.4	100
Volatile Organic Compounds (VOC)	1.4	1.1	0.3	40
Lead	0.012	0.009	0.002	0.6

Note: Emissions listed are in units of tpy

APPLICABLE REQUIREMENTS AND VARIANCES OR ALTERNATIVES TO REQUIRED STANDARDS:

Chapter 4 – Ambient Air Quality Standards: This modification does not trigger modeling because the emissions increases are less than the thresholds for which modeling may be required. In addition, the source conducted modeling (received August 3, 2007) that demonstrated that increases in emissions as a result of this modification would not result in modeled violations or significantly contribute to modeled violations.

Chapter 17 – Construction Permit Requirements: The source requires a permit revision to increase limits that were established in the 2004 construction permit. Emissions from the source are such that the source is in the $3,000 fee category per Chapter 17, Section 003.01.

Chapter 18 – New Source Performance Standards (NSPS), and 40 CFR Part 60: The natural gas-fired boiler is subject to the requirements of 40 CFR 60, Subpart Db (Standards of Performance for Industrial-Commercial-Institutional Steam Generating Units) because this boiler was constructed after June 19, 1984 and has a heat input capacity that is greater than 100 MMBtu per hour. The coal-fired boiler is not subject to 40 CFR 60, Subpart Dc because it was constructed prior to June 9, 1989. Although constructed after August 17, 1971, the coal-fired boiler is not subject to the provisions of 40 CFR 60, Subpart D (Standards of Performance for Fossil-Fuel-Fired Steam Generators for Which Construction is

Commenced After August 17, 1971) because the heat input of the boiler is less than 250 MMBtu per hour.

40 CFR 60, Subpart Kb

Storage Tank T-26101

The 1,000,000-gallon storage tank (identified as tank T-26101) is subject to the provisions of the New Source Performance Standard (NSPS) 40 CFR 60, Subpart Kb – Standards of Performance for Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced After July 23, 1984. This NSPS applies to this storage tank because it was constructed after July 23, 1984, has a storage capacity greater than 40 cubic meters (10,567 gallons) and is used to store denatured ethanol. Under this regulation, storage tanks with design capacities greater than 151 cubic meters (39,890 gallons) containing a volatile organic liquid with a maximum true vapor pressure of greater than 5.2 kPa and less than 76.6 kPa are required to comply with the provisions of 40 CFR 60.112b. Based on the vapor pressure for ethanol and the maximum average monthly temperature for Hastings, Nebraska, the maximum true vapor pressure for ethanol exceeds 5.2 kPa and, therefore, this storage tank is subject to the provisions of 40 CFR 60.112b. In order to comply with this regulation, Chief equipped the new storage tank with an external fixed roof, an internal floating roof and a mechanical shoe seal as specified in 40 CFR 60.112b(a)(1). In compliance with the record keeping requirements in 40 CFR 60.7(a)(1) (Notification and record keeping), Chief submitted a written notification of construction on December 8, 1999. As required by 40 CFR 60.7(a)(3) and 40 CFR 60.115b(A)(1), Chief submitted the notification of the actual start up date and the initial compliance report on May 31, 2002. The applicable standards, compliance monitoring, testing, reporting and recordkeeping requirements for this subpart are described in Condition XIII.(I).

Storage Tank T-11501C

Although constructed in 1993, storage tank T-11501C is not subject to the control requirements of 40 CFR 60, Subpart Kb because tanks with maximum capacities less than 75 cubic meters (19,817 gallons) and greater than 40 cubic meters (10,567 gallons) are only required to keep records of the size of the tank. The maximum storage capacity of tank T-11501C is 19,000 gallons.

Other Tanks

Storage Tanks T-1501A, T-1501B, T-6101, T-6102, T-6103, T-6104, T-6105, and T-6106 are not subject to 40 CFR 60, Subpart Kb because they were constructed prior to the July 23, 1984 applicability date.

40 CFR 60, Subpart Ka

Although constructed between May 18, 1978 and July 23, 1984, the gasoline storage tank (T-6103) is not subject to the requirement of 40 CFR 60, Subpart Ka (Standards of Performance for Storage Vessels for Petroleum Liquids for Which Construction, Reconstruction, or Modification Commenced After May 18, 1978, and Prior to July 23, 1984), because this NSPS applies to storage tanks with capacities greater than 40,000 gallons. The storage capacity of tank T-6103 is 30,492 gallons.

This NSPS is not applicable to storage tanks T-1501A, T-1501B, T-1904, T-1906, T-6101, T-6102, T-6104, T-6105, and T-6106 because these storage tanks are not used to store petroleum liquids.

40 CFR 60, Subparts NNN and RRR

The distillation column and reactor are not subject to the requirements of the New Source Performance Standards (NSPS) 40 CFR 60, Subpart RRR (Standards of Performance for Volatile Organic Compound Emissions From Synthetic Organic Chemical Manufacturing Industry (SOCMI) Reactor Processes) or 40 CFR 60, Subpart NNN (Standards of Performance for Volatile Organic Compound Emissions From Synthetic Organic Chemical Manufacturing Industry (SOCMI) Distillation Operations. EPA's Region 5 previously reviewed the applicability of these standards to plants manufacturing ethanol from corn and concluded that NSPS subparts NNN and RRR do not apply to biological processes. The background documentation prepared during the development of NSPS Subparts NNN and RRR indicate that the manufacture of ethanol by fermentation (biological synthesis) was excluded from the scope of both NSPS. For example, U.S. EPA document 450/3-83-005b, *Operations in Synthetic Organic Chemical Manufacturing Industry – Background information for Proposed Standards* (published 1983) states "The scope of the distillation NSPS does not include polymers, coal tar distillation products, chemicals extracted from natural sources, or chemicals totally produced by biological synthesis." Similarly, U.S. EPA document 450/3/90-016a, *Reactor Processes in Synthetic Organic Chemical Manufacturing Industry – Background Information for Proposed Standards* (published in June 1990) states "… a total of 173 chemicals produced …are included in the scope of reactor processes. The list … does not include polymers or chemicals produced exclusively by biological synthesis."

40 CFR 60, Subpart VV

This plant is subject to requirements of the NSPS 40 CFR 60, Subpart VV (Standards of Performance for Equipment Leaks of VOC in the Synthetic Organic Chemicals Manufacturing Industry) because (1) the plant manufactures ethanol (a chemical listed as a regulated chemical under this subpart in 40 CFR 60.489); (2) the plant was constructed after January 5, 1981; and (3) the plant has equipment meeting the definition of "affected facilities" that have a design capacity greater than 1,000 Mg per year. This subpart is applicable to the following equipment: valves, pumps, compressors, pressure relief devices, sampling systems, and open-ended lines in VOC service that handle gas, vapor, or light liquids with VOC contents equal to or greater than 10 percent by weight. The NSPS requires: (1) a leak detection and repair program for valves in gas/vapor and light liquid service and pumps in light liquid service; (2) equipment for compressors, sampling systems and open-ended lines; and (3) no detectable emissions (i.e., less than 500 ppm as determined by Reference Method 21) during normal operations for pressure relief devices in gas/vapor service.

This subpart also requires monitoring, leak detection, and repairs. A leak is defined as an instrument reading of VOC concentration of greater than or equal to 10,000 ppm.

Chapter 19 – Prevention of Significant Deterioration (PSD): Chief is a synthetic organic compound manufacturing industry (SOCMI) plant, and the PSD threshold is 250 tons per year per pollutant, excluding fugitive dust emissions per Title 129, effective February 6, 2008. Prior to February 6, 2008, Chief was considered one of the listed sources identified in Title 129, Chapter 2, Section 008.01, and was considered an existing major source for PSD because their potential emissions of SO_2, NO_x, and CO were greater than 100 tpy at the time of the 1996/98 modifications. Limits established in the 2004 and 2006 construction permits and the revised limits established in this permit ensure that increases in emissions for criteria pollutants from the 1996/98 modifications and the 2004 boiler re-tubing project do not exceed the PSD significance thresholds. Therefore, PSD is not required for the 1996/98 modifications project or the boiler re-tubing project.

Chapter 27 – Hazardous Air Pollutants: Stack testing was conducted at Chief in October 2006. The potential HAP emissions increase due to the 1996/98 modifications are 0.84 tons per year for any single HAP and 2.62 tons per year of combined HAP. The results of these stack tests show that the HAP emissions do not exceed the 2.5/10 tons per year thresholds; therefore, Chief is not required to submit a BACT analysis for 1996/1998 modification.

Chapter 28 – Hazardous Air Pollutant Emission Standards (MACT): The source is not subject to any requirements within this chapter because it is not a major source of HAPs. The permit restricts HAP emissions to less than the major source thresholds of 10 tpy for any single HAP and 25 tpy for total HAPs.

Proposed Revisions to the 2004 Permit

The following discussions address proposed changes to the conditions in the June 15, 2004 construction permit (as amended September 12, 2006):

The only change in the original Condition XIII.(A) of the 2004 construction permit is a change in the compliance demonstration reference from Condition XIII.(M)(7) to (L)(7).

Condition XIII.(B) of the 2004 construction permit remains unchanged.

Condition XIII.(C) of the 2004 construction permit has been deleted, as only the natural gas boiler increased utilization for the 1996/98 modifications; therefore, there was no need for the NO_x and SO_2 limits for the boilers combined.

Condition XIII.(D) of the 2004 construction permit has been re-numbered to Condition XIII.(C). The CO limit has been revised to a tpy limit to allow more flexibility than the previous limit, yet ensure that the re-tubing project does not trigger PSD review for those pollutants. The PM_{10} limit has been removed because the past actual to future potential emissions increase is less than the PSD threshold of 15 tpy. The CO and PM_{10} limits established in the 2004 construction permit were unnecessarily restrictive and did not allow the source the amount of emissions that should have been allowed before PSD would have been triggered. Condition XIII.(C)(9) will also be added to incorporate an SO_2 limit for the coal-fired boiler, to prevent the boiler re-tubing project in 2004 from triggering PSD review for SO_2.

Condition XIII.(E) of the 2004 construction has been re-numbered to Condition XIII.(D). All conditions related to fuel oil will be deleted. Chief requested to remove fuel oil as an allowable fuel to combust in the boiler, as they currently are not capable of combusting fuel oil, and they would also have to install a continuous monitoring system when burning fuel oil. Condition XIII.(E)(3) is being replaced with a tons per year NO_x limit to prevent increased utilization of the natural gas boiler from triggering PSD review for NO_x emissions. Condition XIII.(E)(7) has been revised (and is now Condition XIII.(D)(6)) to remove the NSPS Subpart Db requirements that only applied because of the permitted use of fuel oil. Condition XIII.(E)(8) is being deleted, as a CO limit was not necessary to keep the 1996/98 modifications from triggering PSD. The increase in CO emissions was only 80.5 tpy, which is under the 100 tpy PSD threshold. Condition XIII.(E)(9) is being deleted because there was no regulatory authority to require a lb/hr PM_{10} limit. This was a new condition in the 2004 construction permit, which cited Title 129, Chapter 17 as the regulatory authority. Chapter 17 states when a permit is required along with permitting requirements, it does not require any specific emission limits.

Condition XIII.(F) of the 2004 construction permit has been re-numbered to Condition XIII.(E). This condition is being changed to a combined lb/hr PM/PM_{10} emission limit for grain, meal, and DDGS handling facilities.

Condition XIII.(G) of the 2004 construction permit (and (G)(1), as amended by the 2006 construction permit) has been re-numbered to Condition XIII.(F). This condition is being changed to a combined lb/hr VOC emission limit for fermentation, distillation, and dryer scrubbers.

Condition XIII.(H) of the 2004 construction permit has been re-numbered to XIII.(G).

Condition XIII.(I) of the 2004 construction permit has been re-numbered to XIII.(H).

Condition XIII.(J) of the 2004 construction permit has been re-numbered to XIII.(I), and the new haul road conditions that were revised in the 2006 construction permit are being incorporated.

Condition XIII.(K) of the 2004 construction permit has been renumbered to XIII.(J), and the TDS limit established in the 2006 construction permit is being incorporated.

Condition XIII.(L) of the 2004 construction permit has been re-numbered to XIII.(K). The VOC emissions limit is being deleted based on potential emissions as a result of the 2004 vapor recovery/flare project.

Condition XIII.(M) of the 2004 construction permit has been re-numbered to XIII.(L). This condition is also being revised to include appropriate references to the re-lettered permit conditions.

Condition XIII.(N) of the 2004 construction permit has been re-numbered to XIII.(M).

Condition XIII.(O) of the 2004 construction permit has been re-numbered to XIII.(N). This condition is also being revised to include appropriate references to the re-lettered permit conditions.

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

(A) This limits the emissions of a single hazardous air pollutant (HAP) to less than 10 tons per year and the emissions of combined HAPs to less than 25 tons per year. This limit combined with the record keeping requirements in Condition XIII.(L), ensures that the source is a minor source for HAP emissions. If the source exceeds these limitations after the effective dates, the requirements of 40 CFR 63, Subparts FFFF and EEEE may be applicable to this source.

(B) This condition requires the source to comply with the opacity limits in Title 129, Chapter 20, Section 004. Pursuant to Section 006 of Chapter 20, sources for which an opacity standard applies as specified elsewhere in Title 129 do not have to comply with the opacity requirements of Chapter 20. Because there are no opacity standards specified in NSPS Subpart Db for natural gas the opacity standard of Chapter 20 applies when the existing natural gas-fired boiler is burning natural gas.

(C) This condition outlines the requirements for the coal-fired boiler (14-1). Some of these conditions are from previously issued permits. Conditions (1) and (2) are from the April 10, 1984 construction permit and Conditions (3) and (4) are from the December 5, 1985 construction permit. The sulfur dioxide emission limit of 1.2 pounds per MMBtu heat input is less than the 2.5 pounds per MMBtu limit established in Title129, Chapter 24, Section 001 for fossil fuel burning

equipment; therefore, compliance with Condition (1) will ensure compliance with Title129, Chapter 24, Section 001. Condition (4) requires the source to use fabric filters to control emissions of PM and PM_{10} from the ash handling system and coal storage bunker. This condition also includes some operational requirements to ensure correct operation of the fabric filters. Condition (5) requires the permittee to collect a grab sample of coal each day a shipment is delivered to the plant and to analyze a composite sample two times per month. The sample will be analyzed for sulfur content and heating value (Btu/lb). The results of the analyses are used to calculate sulfur dioxide emissions. Condition (6) establishes a tpy CO limit to ensure that PSD review for CO is not triggered for the 2004 boiler re-tubing project. Condition (7) establishes a tpy NO_x limit to ensure that PSD review for NO_x is not triggered for the 2004 boiler re-tubing project. Condition (8) establishes a tpy SO_2 limit to ensure that PSD review for SO_2 is not triggered for the 2004 boiler re-tubing project. See Appendix A for detailed emission calculations.

(D) This condition outlines the requirements for the natural gas-fired boiler (15-1). Conditions (1), (2), and (4) through (6) are from a construction permit issued on February 1, 1993; however, Condition (1) has been revised to reference only natural gas, since fuel oil is not combusted in the natural gas-fired boiler. Condition (3) is a tons per year NO_x limit to prevent the 1996/98 modifications from triggering PSD review. Compliance with Condition (1) will ensure compliance with the 2.5 pounds per MMBtu limit established in Title129, Chapter 24, Section 001. Condition (6) establishes the applicability of 40 CFR 60, Subpart Db to the natural gas-fired boiler.

(E) This condition outlines the combined lb/hr PM and PM_{10} emission limits for the grain handling operations and DDGS handling facilities. This limit is being set to avoid triggering PSD and ensures compliance with the NAAQS. The source submitted modeling that demonstrated compliance with the NAAQS at the emission rates identified during testing, which are consistent with the lb/hr limit established in this condition. Condition (1) identifies the equipment for which control with dust collectors is required and Condition (2) establishes the operational and maintenance requirements for the baghouses. At the request of the source, the requirement to maintain spare bags onsite has been removed from the baghouse requirements; however, the source understands that in the event of a bag failure, the processes being controlled by the baghouse cannot be operated until the bag has been replaced.

(F) This condition outlines the requirements for the VOC emissions from the fermentation and distillation processes and the DDGS dryer. This emission limit is set to prevent Chief from triggering PSD review, while allowing them maximum operational flexibility. This limit was increased from the 2004 limit to give the source what they should have been allowed in the 2004 permit. Condition (1) includes requirements to ensure the scrubbers are operating correctly.

(G) This condition describes the standards, compliance monitoring, testing, reporting and recordkeeping procedures required for compliance with 40 CFR 60, Subparts A and VV - Standards of Performance for Equipment Leaks of VOC in the Synthetic Organic Chemicals Manufacturing Industry (Title 129, Nebraska Air Quality Regulations, Chapter 18, Sections 001.01 and 001.14.

(H) This condition describes the standards, compliance monitoring, testing procedures, reporting and recordkeeping requirements for ethanol storage tank (T-26101). These provisions are required because this storage tank is subject to 40 CFR 60, Subparts A and Kb – Standards of Performance for Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for

Which Construction, Reconstruction, or Modification Commenced After July 23, 1984 and Title 129, Nebraska Air Quality Regulations, Chapter 18, Section 001.14.

(I) This condition outlines the requirements for the haul roads. Conditions (2) and (3) are designed to show that Best Management Practices are being implemented and tracked as necessary. Condition (4) limits the source to prevent triggering PSD review in conjunction with the other PM limits in the permit.

(J) This condition outlines the requirements for the Cooling Tower C. Condition (1) requires the Cooling Tower C be properly operated and maintained and copies of manufacturer's specifications (if available) be kept on site. Condition (2) requires Chief to maintain copies of records verifying the drift loss factor used to calculate the emissions of particulates. Condition XIII.(3) requires the source to measure the total dissolved solids (TDS) in the cooling water once per month. The TDS combined with the maximum circulation rate of 1.32 million gallons per hour can be used to calculate the PM/PM_{10} emissions from this cooling tower.

(K) This condition outlines the requirements for the ethanol loadout facility. Condition XIII.(K). The source will comply with this limitation using a vapor collection system and flare. The overall minimum control efficiency of the VOC control device must be equal to or greater than 90%. Chief is required to measure the temperature in the combustion zone with a thermocouple or other device and must maintain a flame at all times the ethanol loadout facility is in operation.

(L) This condition outlines the record keeping requirements necessary to demonstrate compliance with the conditions in this permit.

Condition (1) outlines the requirement to maintain a copy of HAP emissions calculations and the deadline to perform the necessary calculations.

Condition (2) outlines the records required for the boilers. These records include the amount of coal and natural gas burned in the boilers; the sulfur content of the coal burned, and the gas flow rate. These records will enable the source to demonstrate compliance not only with the nitrogen oxides and sulfur dioxide emission limits, but also with the pound per MMBtu emission limits.

The permittee has submitted an emission estimation plan that was reviewed by the Department and incorporated into the operating permit. The plan detailed how annual emissions of NOx, SO2, CO, and HAP will be quantified in order to demonstrate compliance with Conditions XIII.(A), (C)(6), (7), and (8), and (D)(3), including the methodology used and the type of data that will be used. Condition (3) requires the source to maintain records to support emission calculations and to submit an updated emissions estimation plan to reflect revised limits established by this permit.

Condition (4) outlines the requirements to maintain copies of coal analyses required by Condition XIII.(D)(5) and submit quarterly reports. The coal analyses and quarterly reporting are previous requirements from the December 5, 1984 construction permit.

Condition (5) outlines the natural gas flow rate records required for the natural gas boiler.

Condition (6) outlines the records required to demonstrate compliance with the operation of the dust collectors. These records include documentation of inspections, maintenance activities, malfunctions, and pressure differential readings.

Condition (7) outlines the records required to demonstrate compliance with the emission limitations for volatile organic compounds from the fermentation and distillation processes.

Condition (8) requires the permittee to submit reports and keep records for Tank T-26101.

Condition (9) requires the source to document the use of Best Management Practices, visible emission surveys, and calendar month emission calculations.

Condition (10) requires Chief to maintain records of total dissolved solids concentration in the Cooling Tower C water.

Condition (11) requires Chief to maintain records demonstrating compliance with the Leak Detection and Repair Program, maintenance activities, and equipment failures, malfunctions and other variations. Chief will also be required to maintain records of the temperature measurements required by Condition XIII.(K)(4).

Condition (12) requires the source to maintain records of data, calculations and total emissions.

(M) This condition establishes the requirements for performance tests.

(N) This condition requires the source to monitor and develop ranges for the operating parameters. The operating parameter ranges must be based on performance tests or other data, such as manufacturer's specifications.

STATUTORY OR REGULATORY PROVISIONS ON WHICH PERMIT REQUIREMENTS ARE BASED:

Applicable regulations: Title 129 - Nebraska Air Quality Regulations as amended February 6, 2008.

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

The public notice, as required under NAQR Chapter 14, shall be published on January 10, 2008, in the Hastings Tribune newspaper. Persons or groups shall have 30 days from that issuance of public notice (February 8, 2008) to provide the NDEQ with any written comments concerning the proposed permit action and/or to request a public hearing, in accordance with NAQR Chapter 14. If a public hearing is granted by the Director, there will be a notice of that meeting published at least 30 days prior to the hearing. Persons having comments or requesting a public hearing may contact:

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

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

Nick Steinke
Air Quality Division-Permitting Section
Nebraska Department of Environmental Quality
PO Box 98922
Lincoln, Nebraska 68509-8922

Telephone inquiries may be made at: (402) 471-2189

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

RE: RESPONSE SUMMARY

Chief Ethanol Fuels, Inc.
4225 East South Street
Hastings, NE 68902
(NDEQ Facility #58049)

To Whom It May Concern:

The Department has considered all comments received and has made a final decision to issue the Construction Permit for the above referenced facility. This Permit approves construction of a 130 kW emergency generator in accordance with regulations contained in Title 129 - Air Quality Regulations.

The decision regarding issuance of this Construction Permit may be appealed under Neb. Rev. Stat. 81-1509. This appeal shall be done in accordance with the Administrative Procedure Act, Neb. Rev. Stat. Section 84-901 to 84-920 and Title 115 - Rules of Practice and Procedure.

In preparing this summary, the Department reviewed all comments made during the public comment period from January 10, 2008 to February 8, 2008 and listed all comments in the attached Responsiveness Summary. The Responsiveness Summary consists of four sections:

Comment #: The comment is summarized.

Response and Rationale: Department's response to the comment raised and the rationale.

Changes: Any changes to the Permit and/or Fact Sheet are addressed.

Applicable Regulations/Statutes: This is a listing of regulations/statutes pertinent to the comment.
The Department appreciates the time and the conscientious efforts of all that have commented. If you have any questions, please contact Brad Reid or me at (402) 471-2189.

Sincerely,

_____ _____

Shelley Kaderly, Air Administrator Date
Air Quality Division

Enclosure

RESPONSE TO PUBLIC COMMENTS SUMMARY
On the Issuance of a Revised Construction Permit
for an Ethanol Facility (Facility ID# 58049)

Background Information:

Chief Ethanol Fuels, Inc. (Chief) submitted a construction permit application, received February 16, 2007, for permission to revise emission limits at their ethanol plant located in Hastings, Adams County, Nebraska. The primary fuel to be combusted in the emergency generator is natural gas with propane being a secondary fuel. The emergency generator will be replacing an existing generator that is at the Chief facility.

A representative of Chief submitted comments and a "red-line" markup of the permit documents on February 7, 2008 concerning Chief's construction permit that was on public notice. The following are NDEQ's responses to the "red-line" markup comments received during the public comment period:

COMMENT #1 (Summarized): The equation in Condition XIII.(I)(4) for calculating haul road emissions needs to be revised. Haul road PM emissions are limited to 21.22 tpy; however, the equation required that calculated emissions from haul roads be limited to less than 20.83 tpy. Therefore, revision of the equation is necessary to make it consistent with the permit limit.

RESPONSE AND RATIONALE: The Department agrees.

CHANGES: Condition XIII.(I)(4) was changed as requested and the fact sheet on page 5 was updated with the correct limit from the permit.

APPLICABLE REGULATIONS: None

COMMENT #2 (Summarized): Historical information in Condition XIII.(L)(3) that relates to recordkeeping for emission calculations should be moved to fact sheet. The source has already submitted an emissions calculation plan to the Department. The condition states that the permittee has already submitted a plan; however, it would be more appropriate to discuss what has happened historically in the fact sheet, not in the permit. As such, the source proposed revising the condition by removing historical narrative and by adding detail as to the nature and scope of an updated plan.

RESPONSE AND RATIONALE: The Department agrees.

CHANGES: Removed historical discussion from Condition XIII.(L)(3) of the emission calculation plan and replaced it with details of what the plan requirements are. The fact sheet now discusses that the permittee has already submitted a plan for compliance with this condition.

APPLICABLE REGULATIONS: None

COMMENT #3 (Summarized): Condition XIII.(L)(10) are the recordkeeping requirements for showing compliance with Condition XIII.(J)(3) related to the TDS concentration in cooling tower C water. The permittee would like this condition clarified that the recordkeeping is also for cooling tower C explicitly.

RESPONSE AND RATIONALE: The Department will revise Condition XIII.(L)(10) by adding clarification that records are for cooling tower C.

RESPONSE TO PUBLIC COMMENTS SUMMARY
On the Issuance of a Revised Construction Permit
for an Ethanol Facility (Facility ID# 58049)

CHANGES: "Cooling tower water" was replaced with "cooling tower C water" in Condition XIII.(L)(10).

APPLICABLE REGULATIONS: None

COMMENT #4: Condition XIII.(M) relates to performance testing. Per guidance from the Compliance Section at NDEQ, Chief requests that the wording is changed from "tests…must be successfully completed and approved by the Department" to "tests…must be completed and submitted to the Department". Chief also requests that Condition XIII.(M)(2) be revised to add "or equivalent information" when referencing the testing protocol and remove citation to regulation as the requirement in not found in Chapter 34, Section 003.

RESPONSE AND RATIONALE: The Department agrees that the word "successfully" can be removed from the condition as all performance tests conducted as a result of this permit (whether "successful" or "unsuccessful") should be submitted to the Department. The Department also agrees that the requirement for "approval" of the tests should be removed as the Department does not provide approvals for test results, rather it determines whether the testing demonstrates compliance with the underlying limit or not. Finally, the Department agrees to add "or equivalent information" to Condition XIII.(M)(2) so it is clear that what the Department is concerned about is the information contained in an emissions testing protocol, and not its title or that it is prepared exclusively by a testing company. For example, a testing protocol prepared and submitted for a past round of testing may be referenced or repeated for future tests. The invalid rule citation at the end of Condition XIII.(M)(2) will be removed.

CHANGES: Condition XIII.(M) was revised to read "The performance tests required in the permit must be completed and submitted to the Department as follows: (Title 129, Chapter 34, Section 001)". Condition XIII.(M)(2) was revised to read "An emissions testing protocol, or equivalent information, shall be submitted to the Department prior to any performance test."

APPLICABLE REGULATIONS: Title 129, Chapter 34 – Emission Sources; testing; monitoring

ADDITIONAL REVISIONS TO THE PERMIT FACT SHEET:

Revised the paragraph on page 8 before Table 1, Permitted Facility-Wide Emissions, to clarify the basis for the facility-wide emission totals and to remove a reference to a table (Table 4) that is not in the fact sheet. Also corrected the PM_{10} PTE and the increase in emissions due to a transposed number – PM_{10} emissions in the fact sheet were 60.1, but should've been 61.0. Emissions as a result of this project were not changed.

Chapter 19 PSD Discussion on page 11 was revised in accordance with the recent rule change for the PSD applicability threshold as it relates to ethanol plants. As such, the discussion was revised to reference the new threshold of 250 tpy and remove the old threshold of 100 tpy.

The description of the recordkeeping requirements beginning on page 15 were re-numbered to make it consistent with the numbering of the recordkeeping requirements in the construction permit.

Questions regarding this summary may be directed to:

RESPONSE TO PUBLIC COMMENTS SUMMARY
On the Issuance of a Revised Construction Permit
for an Ethanol Facility (Facility ID# 58049)

Air Quality Division-Permitting Section
Nebraska Department of Environmental Quality
PO Box 98922
Lincoln, NE 68509-8922

Appendix A - Summary of Source-wide Emissions for the 96/98 modifications
(without lb/hr limits for PM, PM10, and VOCs)

	Future Potential Emissions (tons/year)		
Facility/Process	PM	PM_{10}	VOC
Natural Gas Boiler	8.32	8.32	6.02
Grain Handling	16.22	16.22	0
Grain Handling Fugitives	8.44	2.10	0
DDGS Handling	11.17	11.06	0
Dryer	0	0	2.01
WDGS Handling	0	0	2.34
Grain Hauling	17.7	3.01	0
Ethanol Hauling	2.16	0.37	0
DDGS and Other Hauling	19.06	3.24	0
Distillation Unit II	0	0	0.61
Distillation Unit I	0	0	0.39
Cooling Tower	5.40	0.98	0
Storage Tanks	0	0	5.17
Ethanol Loadout	0	0	10.79
Fermenters	0	0	16.38
Fugitive Equipment Leaks	0	0	5.60
Totals	88.51	45.29	49.32

	Past Actual Emissions (tons/year)		
Facility/Process	PM	PM_{10}	VOC
Natural Gas Boiler	4.13	4.13	2.99
Grain Handling	10.36	10.36	0
Grain Handling Fugitives	4.24	1.05	0
DDGS Handling	10.83	10.72	0
Dryer	0	0	1.95
WDGS Handling	0	0	0.00
Grain Hauling	19.5	3.4	0
Ethanol Hauling	0.99	0.17	0
DDGS and Other Hauling	4.61	0.78	0
Distillation Unit II	0	0	0.42
Distillation Unit I	0	0	0.00
Cooling Tower	0.97	0.73	0
Storage Tanks	0	0	3.25
Ethanol Loadout	0	0	4.17
Fermenters	0	0	14.1
Fugitive Equipment Leaks	0	0	0.0
Totals	55.61	31.35	26.85

Future Potential - Past Actuals

	PM	PM_{10}	VOC
	tpy	tpy	tpy
Future Potential Emissions	88.5	45.3	49.3
Past Actual Emissions	55.6	31.3	26.8
Increase in Emissions	**32.9**	**13.9**	**22.5**
PSD Threshold	25.0	15.0	40.0

Appendix A - Summary of Source-wide Emissions for the 96/98 modifications with Permitted Limits

	Limited Future Potential Emissions (tons/year)		
Facility/Process	PM	PM_{10}	VOC
Natural Gas Boiler	8.32	8.32	6.02
Grain Handling/DDGS Handling[a]	18.97	18.97	0
Grain Handling Fugitives	8.44	2.10	0
Dryer/Distillation Units/Fermenters[b]	0	0	36.35
WDGS Handling	0	0	2.34
Grain Hauling	17.7	3.01	0
Ethanol Hauling[c]	2.16	0.37	0
DDGS and Other Hauling[c]	19.06	3.24	0
Cooling Tower	5.40	0.98	0.00
Storage Tanks	0	0	5.17
Ethanol Loadout	0	0	10.79
Fugitive Equipment Leaks	0	0	5.60
Totals	80.09	36.98	66.27

[a] These baghouse emission units are combined together under a PM/PM_{10} permit limit of 4.33 lb/hr, which equates to 18.97 tons per year.

[b] These emission units are combined together under a VOC permit limit of 8.30 lb/hr, which equates to 36.35 tons per year.

cThe tpy limit for PM for the haul roads is equivalent to the sum of the ethanol and DDGS and other hauling.

	Past Actual Emissions (tons/year)		
Facility/Process	PM	PM_{10}	VOC
Natural Gas Boiler	4.13	4.13	2.99
Grain Handling	10.36	10.36	0
Grain Handling Fugitives	4.24	1.05	0
DDGS Handling	10.83	10.72	0
Dryer	0	0	1.95
WDGS Handling	0	0	0.00
Grain Hauling	19.5	3.4	0
Ethanol Hauling	0.99	0.17	0
DDGS and Other Hauling	4.61	0.78	0
Distillation Unit II	0	0	0.42
Distillation Unit I	0	0	0.00
Cooling Tower	0.97	0.73	0
Storage Tanks	0	0	3.25
Ethanol Loadout	0	0	4.17
Fermenters	0	0	14.1
Fugitive Equipment Leaks	0	0	0.0
Totals	55.61	31.35	26.85

Future Potential - Past Actuals

	PM	PM_{10}	VOC
	tpy	tpy	tpy
Future Potential Emissions	80.1	37.0	66.3
Past Actual Emissions	55.6	31.3	26.8
Permitted Increase in Emissions	**24.5**	**5.6**	**39.4**
PSD Threshold	25	15	40

Appendix A - Summary of Source-wide HAP Emissions

	Post 1996/98 Modification Limited Future Potential Emissions (tons/year)	
Facility/Process	Single HAP[a]	Total HAPs
Natural Gas Boiler	0	2.068
Grain Handling	0	0
Grain Handling Fugitives	0	0
DDGS Handling	0	0
Dryer	1.752	1.984
WDGS Handling	0.0312	0.1109
Grain Hauling	0	0
Ethanol Hauling	0	0
DDGS and Other Hauling	0	0
Distillation Unit II	0.394	0.403
Distillation Unit I	0.263	0.276
Cooling Tower	0	0
Storage Tanks	0.0008	0.4719
Ethanol Loadout	0.0014	1.59
Fermenters	4.47	4.77
Fugitive Equipment Leaks	0.001	0.125
Totals	6.91	11.80

[a] The greatest single HAP is acetaldehyde.

	Pre-1996/98 Potential Emissions (tons/year)	
Facility/Process	Single HAP	Total HAPs
Natural Gas Boiler	0	1.754
Grain Handling	0	0
Grain Handling Fugitives	0	0
DDGS Handling	0	0
Dryer	1.752	1.984
WDGS Handling	0	0
Grain Hauling	0	0
Ethanol Hauling	0	0
DDGS and Other Hauling	0	0
Distillation Unit II	0.043	0.043
Distillation Unit I	0.00	0.00
Cooling Tower	0	0
Storage Tanks	0.0005	0.427
Ethanol Loadout	0.0006	0.695
Fermenters	4.275	4.275
Fugitive Equipment Leaks	0.000	0.000
Totals	6.071	9.178

[a] The greatest single HAP is acetaldehyde.

Future Potential - Past Potential	Single HAP	Total HAPs
	tpy	tpy
Future Potential Emissions	6.91	11.80
Past Potential Emissions	6.07	9.18
Increase in Emissions	**0.84**	**2.62**
State BACT Threshold	2.5	10.0

Appendix A - Emissions from coal-fired boiler

NOTE: Coal boiler emissions not included in the summary tables, as emissions from the coal boiler aren't applicable to the VOC and PM/PM_{10} limits for the 96/98 project.

Past Actual Emissions:				Heating Value*		Sulfur Content*		Throughput*				Actual Emissions		
Pollutant	Emission Factor	Units	Source	2002 (Btu/lb)	2003 (Btu/lb)	2002 (%)	2003 (%)	2002 (MMBtu)	2002 (tpy)	2003 (MMBtu)	2003 (tpy)	2002 (tpy)	2003 (tpy)	Average (tpy)
PM	0.014	lb/MMBtu	Stack Test (10/97)	8,972	8,713			742,884	41,418	812,565	46,648	5.2	5.7	5.4
PM_{10}[1]	0.028	lb/MMBtu	Stack Test (10/97)+Condensables Adjustment	8,972	8,713			742,884	41,418	812,565	46,648	10.4	11.4	10.9
NO_x	0.313	lb/MMBtu	Stack Test (12/00)	8,972	8,713			742,884	41,418	812,565	46,648	116.3	127.2	121.7
SO_2	35	lb/ton	AP-42 (9/98) Table 1.1-3	8,972	8,713	0.328	0.317	742,884	41,418	812,565	46,648	237.7	258.8	248.3
CO	0.12	lb/MMBtu	Stack Test (10/97)	8,972	8,713			742,884	41,418	812,565	46,648	44.6	48.8	46.7
VOC	0.05	lb/ton	AP-42 (9/98) Table 1.1-19	8,972	8,713			742,884	41,418	812,565	46,648	1.0	1.2	1.1
Lead	4.20E-04	lb/ton	AP-42 (9/98) Table 1.1-18	8,972	8,713			742,884	41,418	812,565	46,648	0.009	0.010	0.009

[1]The 1997 stack test did not account for condensables; in order to compare past actuals to the future potentials, which include condensables, condensables have been assumed to equal the filterable emissions from the 1997 stack test. Since condensable emissions are typically greater than or equal to filterable emissions for this type of source, this assumption is conservative for purposes of estimating actual emissions.

*Heating value and sulfur content from coal analyses; throughput from production records.

Future Potential Emissions:				Throughput		Emissions
Pollutant	Emission Factor	Units	Source	(MMBtu)	(tpy)	(tpy)
PM	0.04	lb/MMBtu	Emission Limit in Permit	963,600	55,354	19.3
PM_{10}	0.0499	lb/MMBtu	Stack Test (10/06)	963,600	55,354	24.0
NO_x	0.5	lb/MMBtu	Emission Limit in Permit	963,600	55,354	240.9
SO_2	1.2	lb/MMBtu	Emission Limit in Permit	963,600	55,354	578.2
CO	6	lb/ton	AP-42 (9/98) Table 1.1-3	963,600	55,354	166.1
VOC	0.05	lb/ton	AP-42 (9/98) Table 1.1-19	963,600	55,354	1.4
Lead	4.20E-04	lb/ton	AP-42 (9/98) Table 1.1-18	963,600	55,354	0.012

Net Emission Increase:

Pollutant	PSD Significance Levels (tpy)	Past Actual (tpy)	Future Potential (tpy)	Unlimited Future Potential Minus Past Actual (tpy)	PSD Significance for Unlimited Potential Emissions	Limited Future Potential (tpy)	Unlimited Future Potential Minus Past Actual (tpy)	PSD Significance for Unlimited Potential Emissions
PM	25	5.4	19.3	13.8	No			
PM_{10}	15	10.9	24.0	13.2	No			
NO_x	40	121.7	240.9	119.2	Yes	161.1	39.4	No
SO_2	40	248.3	578.2	329.9	Yes	287.7	39.4	No
CO	100	46.7	166.1	119.4	Yes	146.06	99.4	No
VOC	40	1.1	1.4	0.3	No			
Lead	0.6	0.009	0.012	0.0	No			

Notes:

The NO_x, SO_2, and CO limitations will make PSD review not applicable to the 2004 modification of the coal-fired boiler.

Appendix A - Emissions from Natural Gas Boiler

Note: Only the Natural Gas Boiler is being included because the coal boiler was not debottlenecked or increased in utilization due to the 96/98 project.

							Emission Factors					Actual Emissions				
		MMcf	Btu/cf	MMBtu	Hours	EF Source	NO_x lb/MMBtu stack test 25[a]	SO_x lb/MMcf AP-42	PM/PM_{10} lb/MMcf AP-42	CO lb/MMBtu stack test 25[a]	VOC lb/MMcf AP-42	NO_x TPY	SO_x TPY	PM/PM_{10} TPY	CO TPY	VOC TPY
1994	NG Boiler	767	1,000	766,964	8400		0.131	0.6	7.6	0.0211	5.50	50.24	0.23	2.91	8.09	2.11
1995	NG Boiler	1,406	1,000	1,405,574	8580		0.150	0.6	7.6	0.0211	5.50	105.56	0.42	5.34	14.83	3.87
	Average											77.9	0.3	4.1	11.5	3.0
Potential[c]	NG Boiler	2,190	1,000	2,190,000			0.16	0.6	7.6	lb/MMcf AP-42 84	5.50	175.2	0.66	8.32	91.98	6.02
	Future Potential - Past Actual											97.3	0.3	4.2	80.5	3.0

Limited Emissions =	117.3

[a] Stack Test 25 was performed January 11, 1994 for different boiler rates. Emission factor is interpolated based on average annual operating rat

[b] The future potential emissions of NOx and CO are calculated using the permit limits of 0.16 lb/MMBtu and 0.04 lb/MMBtu respectively.

[c] Natural Gas Boiler FGR placed in service September 2002. NOx emission factor is permitted limit.
PEM system was originally installed in 1997.

Appendix A - Emissions from Natural Gas Boiler

Pre-Project PTE HAP Emissions from Natural Gas Boiler

	MMcf	Btu/cf	MMBtu	Emiss. Factor AP-42 (7/98) lb/MMcf*	Actual Emissions (tpy)
NG Boiler	1,857	1,000	1,857,120		
			formaldehyde	7.50E-02	0.070
			toluene	3.40E-03	0.003
			naphthalene	6.10E-04	0.001
			arsenic	2.00E-04	0.000
			chromium	1.40E-03	0.001
			cobalt	8.40E-05	0.000
			lead	5.00E-04	0.000
			manganese	3.80E-04	0.000
			nickel	2.10E-03	0.002
			beryllium	1.20E-05	0.000
			cadmium	1.10E-03	0.001
			selenium	2.40E-05	0.000
			benzene	2.10E-03	0.002
			dichlorobenzene	1.20E-03	0.001
			hexane	1.80E+00	1.671
			mercury	2.60E-04	0.000
			2-methylnaphthalene	2.40E-05	0.000
			3-methylchloranthrene	1.80E-06	0.000
			7,12-dimethylbenz(a)anthracene	1.60E-05	0.000
			acenaphthene	1.80E-06	0.000
			acenaphthylene	1.80E-06	0.000
			anthracene	2.40E-06	0.000
			benz(a)anthracene	1.80E-06	0.000
			benzo(a)pyrene	1.20E-06	0.000
			benzo(b)pyrene	1.80E-06	0.000
			benzo(g,h,i)perylene	1.20E-06	0.000
			benzo(k)fluoranthene	1.80E-06	0.000
			chrysene	1.80E-06	0.000
			dibenzo(a,h)anthracene	1.20E-06	0.000
			fluoranthene	3.00E-06	0.000
			fluorene	2.80E-06	0.000
			indeno(1,2,3-cd)pyrene	1.80E-06	0.000
			phenanathrene	1.70E-05	0.000
			pyrene	5.00E-06	0.000
Total HAPs NG Boiler					1.754
Greatest HAP				Hexane	1.671

Appendix A - Emissions from Natural Gas Boiler

Post-Project PTE HAP Emissions from Natural Gas Boiler

	MMcf	Btu/cf	MMBtu	Emiss. Factor AP-42 (7/98) lb/MMcf*	Actual Emissions (tpy)
NG Boiler	2,190	1,000	2,190,000		
			formaldehyde	7.50E-02	0.082
			toluene	3.40E-03	0.004
			naphthalene	6.10E-04	0.001
			arsenic	2.00E-04	0.000
			chromium	1.40E-03	0.002
			cobalt	8.40E-05	0.000
			lead	5.00E-04	0.001
			manganese	3.80E-04	0.000
			nickel	2.10E-03	0.002
			beryllium	1.20E-05	0.000
			cadmium	1.10E-03	0.001
			selenium	2.40E-05	0.000
			benzene	2.10E-03	0.002
			dichlorobenzene	1.20E-03	0.001
			hexane	1.80E+00	1.971
			mercury	2.60E-04	0.000
			2-methylnaphthalene	2.40E-05	0.000
			3-methylchloranthrene	1.80E-06	0.000
			7,12-dimethylbenz(a)anthracene	1.60E-05	0.000
			acenaphthene	1.80E-06	0.000
			acenaphthylene	1.80E-06	0.000
			anthracene	2.40E-06	0.000
			benz(a)anthracene	1.80E-06	0.000
			benzo(a)pyrene	1.20E-06	0.000
			benzo(b)pyrene	1.80E-06	0.000
			benzo(g,h,i)perylene	1.20E-06	0.000
			benzo(k)fluoranthene	1.80E-06	0.000
			chrysene	1.80E-06	0.000
			dibenzo(a,h)anthracene	1.20E-06	0.000
			fluoranthene	3.00E-06	0.000
			fluorene	2.80E-06	0.000
			indeno(1,2,3-cd)pyrene	1.80E-06	0.000
			phenanathrene	1.70E-05	0.000
			pyrene	5.00E-06	0.000
Total HAPs NG Boiler					2.068
Greatest HAP				Hexane	1.971

* - Emission factors for the natural gas boiler are from AP-42, Chapter 1.4, Tables 1.4-3 and 1.4-4 (7/98).
** - Emission factors for the coal boiler are from AP-42, Chapter 1.1, Tables 1.1-13 and 1.1-14 (9/98).
*** Pre-project PTE based on maximum month steam usage on March 1995 of approximately 170 kpph or 85% of boiler rated capacity of 200 kpph.

Appendix A - Emissions from Grain Handling

1998 Grain Handling

1994		Throughput	Units	PM	Units	PM10	Units	EF Source	PM TPY	PM10 TPY
F-11107	Grain Unloading Pit	1,600	hr	**1.5595**	lb/hr	**1.5595**	lb/hr	06 Stack Test	**1.2476**	**1.2476**
F-11201	Loading Conveyor and Surge Bin	8,400	hr	**0.0051**	lb/hr	**0.0051**	lb/hr	06 Stack Test	**0.0213**	**0.0213**
F-11202	Hammermills A&B	8,400	hr	**0.1269**	lb/hr	**0.1269**	lb/hr	06 Stack Test	**0.5328**	**0.5328**
F-11301	Transfer Feed to Meal Bin	8,400	hr	**0.0193**	lb/hr	**0.0193**	lb/hr	06 Stack Test	**0.0811**	**0.0811**
F-1301	Backup - Transfer Feed to Meal Bin	8,400	hr	**1.9926**	lb/hr	**1.9926**	lb/hr	06 Stack Test	**8.369**	**8.369**
Total				3.7034		3.7034			**10.252**	**10.252**
1995										
F-11107	Grain Unloading Pit	1,632	hr	**1.5595**	lb/hr	**1.5595**	lb/hr	06 Stack Test	**1.2726**	**1.2726**
F-11201	Loading Conveyor and Surge Bin	8,580	hr	**0.0051**	lb/hr	**0.0051**	lb/hr	06 Stack Test	**0.0218**	**0.0218**
F-11202	Hammermills A&B	8,580	hr	**0.1269**	lb/hr	**0.1269**	lb/hr	06 Stack Test	**0.5442**	**0.5442**
F-11301	Transfer Feed to Meal Bin	8,580	hr	**0.0193**	lb/hr	**0.0193**	lb/hr	06 Stack Test	**0.0829**	**0.0829**
F-1301	Backup - Transfer Feed to Meal Bin	8,580	hr	**1.9926**	lb/hr	**1.9926**	lb/hr	06 Stack Test	**8.548**	**8.548**
Total				3.7034		3.7034			**10.470**	**10.470**
Average									**10.361**	**10.361**
Future Potential**										
F-11107/F-11204	Grain Unloading Pit and Hammermills C and D	8,760	hr	**1.5595**	lb/hr	**1.5595**	lb/hr	06 Stack Test	**6.831**	**6.8307**
F-11201	Loading Conveyor and Surge Bin	8,760	hr	**0.0051**	lb/hr	**0.0051**	lb/hr	06 Stack Test	**0.0223**	**0.0223**
F-11202	Hammermills A&B	8,760	hr	**0.1269**	lb/hr	**0.1269**	lb/hr	06 Stack Test	**0.5556**	**0.5556**
F-11301	Transfer Feed to Meal Bin	8,760	hr	**0.0193**	lb/hr	**0.0193**	lb/hr	06 Stack Test	**0.0846**	**0.0846**
F-1301	Backup - Transfer Feed to Meal Bin	8,760	hr	**1.9926**	lb/hr	**1.9926**	lb/hr	06 Stack Test	**8.728**	**8.728**
Total				**3.7034**		**3.7034**			**16.221**	**16.221**
Future Potential - Past Actual									**5.860**	**5.860**

Notes:

PM_{10} emissions are assumed to be equivalent to PM emissions.

Future potential assumed to equal 2006 stack tested value.

The 2006 stack test included testing for condensibles. The 2006 test results on a lb/hr basis were used to calculate past actuals in conjunction with 1994/1995 hours of operation.

Hammermills C and D were installed with a new baghouse, F-11204, in 1998. This baghouse stack was connected to the existing grain receiving baghouse stack, F-11107. Therefore, these baghouses are shown as a combined emission point for purposes of the future potential emissions estimates.

Appendix A - Grain Handling Fugitive Emissions

1994	Throughput	Units	PM	Units	PM_{10}	Units	EF Source	Control	PM TPY	PM_{10} TPY
Grain Unloading Pit Fugitives	291,375	tons	0.0350	lb/ton	0.0078	lb/ton	AP-42 9.9.1	90%	0.510	0.114
Storage Bin Vent	291,375	tons	0.0250	lb/ton	0.0063	lb/ton	AP-42 9.9.1	0%	3.642	0.918
Total									4.152	1.031
1995										
Grain Unloading Pit Fugitives	303,603	tons	0.0350	lb/ton	0.0078	lb/ton	AP-42 9.9.1	90%	0.531	0.118
Storage Bin Vent	303,603	tons	0.0250	lb/ton	0.0063	lb/ton	AP-42 9.9.1	0%	3.795	0.956
Total									4.326	1.075
1994-1995 Average									4.239	1.053
Future Potential										
Grain Unloading Pit Fugitives	592,075	tons	0.0350	lb/ton	0.0078	lb/ton	AP-42 9.9.1	90%	1.036	0.231
Storage Bin Vent	592,075	tons	0.0250	lb/ton	0.0063	lb/ton	AP-42 9.9.1	0%	7.401	1.865
Total									8.437	2.096
Future Potential - Past Actual									4.198	1.043

Notes:
Emission factors are from AP-42 Section 9.9.1 for Grain Elevators and Processes.
Control of 90% is based on NDEQ Construction Application Form 3.2.1 for enclosed dump pit, overhead doors closed during unloading 0% of the time.

Appendix A - Emissions from Distillers DDGS

1994		Throughput	Units	PM	Units	PM_{10}	Units	EF Source	Control	PM (tpy)	PM_{10} (tpy)
F-6201	DDGS Storage and Conveyance 1	8,400	hr	0.6000	lb/hr	0.60	lb/hr	06 Stack Test		2.520	2.520
F-16201	DDGS Storage and Conveyance 2	8,400	hr	1.9167	lb/hr	1.92	lb/hr	07 Stack Test		8.050	8.050
DDGS Transfer	DDGS Transfer and Loadout to Truck	30,326	tons	0.0033	lb/ton	0.0008	lb/ton	AP-42 9.9.1-2	0%	0.050	0.012
	DDGS Transfer and Loadout to Rail	55,341	tons	0.0033	lb/ton	0.0008	lb/ton	AP-42 9.9.1-2	0%	0.091	0.022
Total										10.712	10.604
1995											
F-6201	DDGS Storage and Conveyance 1	8,580	hr	0.6000	lb/hr	0.60	lb/hr	06 Stack Test		2.574	2.574
F-16201	DDGS Storage and Conveyance 2	8,580	hr	1.9167	lb/hr	1.92	lb/hr	07 Stack Test		8.223	8.223
DDGS Transfer	DDGS Transfer and Loadout to Truck	32,177	tons	0.0033	lb/ton	0.0008	lb/ton	AP-42 9.9.1-2	0%	0.053	0.013
	DDGS Transfer and Loadout to Rail	58,719	tons	0.0033	lb/ton	0.0008	lb/ton	AP-42 9.9.1-2	0%	0.097	0.023
Total										10.947	10.833
Average										10.829	10.72
Future Potential Emissions											
F-6201	DDGS Storage and Conveyance 1	8,760	hr	0.6000	lb/hr	0.60	lb/hr	06 Stack Test		2.628	2.628
F-16201	DDGS Storage and Conveyance 2	8,760	hr	1.9167	lb/hr	1.92	lb/hr	07 Stack Test		8.395	8.395
Total				2.5167		2.52					
DDGS Transfer	DDGS Transfer and Loadout to Truck	0	tons	0.0033	lb/ton	0.0008	lb/ton	AP-42 9.9.1-2	90%	0.000	0.000
	DDGS Transfer and Loadout to Rail	88,000	tons	0.0033	lb/ton	0.0008	lb/ton	AP-42 9.9.1-2	0%	0.145	0.035
Total										11.168	11.058

Future Potential - Past Actual	0.34	0.34

Notes:

F-6201 was replaced in 1997. F-16201 was installed in 1993.

DDGS Transfer and Loadout emission factors are from AP-42 Section 9.9.1 for Grain Elevators and Processes.

The 2006-07 stack tests included testing for condensibles. The 2006-07 test results on a lb/hr basis were used to calculate past actuals in conjunction with 1994/1995 hours of operation.

Worst-case PM/PM10 scenario assumes more emissions are generated if 100% WDGS & 0% DDGS is produced due to haul road emissions as noted in the road emission tab.

An estimated 40% DDGS is loaded out to rail above to indicate what is estimated for scenario of maximum DDGS production and would be above worst-case scenario.

This is based on 9,250 tons of total feed/Mmgal of denatured ethanol - 7% Syrup with 40% DDGS/60%WDGS

Enclosed building for DDGS truck loadout placed in service July 2005. Control of 90% is based on NDEQ Ethanol Construction Application Form 6.0 for

enclosed loading with overhead doors closed during unloading 0% of the time.

* PM10 emissions are assumed to be equivalent to PM emissions.

Appendix A - WDGS VOC & HAP Emissions

	Anhydrous Ethanol Produced (gal)	Denatured Ethanol Produced (gal)	WDGS (35% moisture) (tons)	WDGS VOC Emission Factor (lb/ton)	WDGS VOC Emissions (tpy)
1994	25,896,999	27,266,000	0	0.00830423	0.00
1995	28,167,501	29,650,000	0	0.00830423	0.00
1995/1996 Average	27,032,250	28,458,000	0	0.00830423	0.00
65MGDen Using worst case 100%WDGS			562,650	0.00830423	2.34

	Anhydrous	61,750,000	gal
New Potential	Denatured	65,000,000	gal

WDGS HAPs	DENCO Emission Factor lb/ton	1994 Emissions (tpy)	1995 Emissions (tpy)	94/95 Avg Emissions (tpy)	Future Potential Emissions (tpy)	
Acetaldehyde	1.11E-04	0.0000	0.0000	0.0000	3.12E-02	
Acrolein	1.67E-05	0.0000	0.0000	0.0000	4.70E-03	
Formaldehyde	2.22E-04	0.0000	0.0000	0.0000	6.25E-02	
Methanol	4.44E-05	0.0000	0.0000	0.0000	1.25E-02	
	Total HAP	0.0000	0.0000	0.0000	0.1109	
	Single HAP				6.25E-02	Formaldehyde
	Acetaldehyde				3.12E-02	

Notes:
HAP calculations use DENCO emission factors from NDEQ Ethanol Air Quality Construction Permit Application Forms.
No WDGS storage or loadout area existed in 1994 and 1995 so no emissions existed for past actuals.
Worst-case scenario assumes all WDGS as feed based on 9,250 tons of total feed/Mmgal of denatured ethanol - 7% Syrup

Appendix A - Past Actual & Future Potential Emissions from Grain Hauling Activities

Grain Hauling

		Grain (tons)	# of Trucks [a]	Total Miles Traveled [b]	PM_{10} Emission Factor (lb/VMT)	PM Emission Factor (lb/VMT)	PM (uncontrolled)		PM_{10} (uncontrolled)	
(paved roads)	1994	291,375	10,595	6,039.4	0.59	3.45	10.42	tpy	1.77	tpy
(paved roads)	1995	303,603	11,040	6,292.9	0.59	3.45	10.86	tpy	1.84	tpy
(unpaved roads)	1994	291,375	10,595	1,695.3	1.85	10.21	8.66	tpy	1.57	tpy
(unpaved roads)	1995	303,603	11,040	1,766.4	1.85	10.21	9.02	tpy	1.64	tpy
						2 Year Average =	19.48	tpy	3.41	tpy
Future Potential [c]			21,530	15,716.8	0.38	2.26	35,477	lb/yr	6,022	lb/yr
					paved	paved	17.74	tpy	3.01	tpy
						Future potential - past actual =	-1.74	tpy	-0.40	tpy

[a] Each grain truck can haul an estimated 27.5 tons of grain.

[b] Total route traveled equaled 0.57 paved & 0.17 unpaved miles in 1994-95 and assumes 100% of trucks travel 0.73 miles (all paved) for future potential.

[c] The unpaved portion of this road was paved in the summer of 2001. Potential number of trucks were calculated by the actual number of trucks in 2005 (20,716) by the ratio of the potential amount of ethanol produced to the actual amount of ethanol produced in 2005 (65 MM/62.543 MM gallons).

Ethanol Hauling

	Ethanol (gal)	# of Trucks [a]	Total Miles Traveled [b]	PM_{10} Emission Factor (lb/VMT)	PM Emission Factor (lb/VMT)	PM (uncontrolled)		PM_{10} (uncontrolled)	
1994 [c]	6,571,100	821	566.8	0.59	3.45	0.98	tpy	0.17	tpy
1995 [c]	6,780,400	848	584.8	0.59	3.45	1.01	tpy	0.17	tpy
					2 Year Average =	0.99		0.17	
Future Potential [d]		2,275	1,911.0	0.38	2.26	2.16	tpy	0.37	tpy
				paved	paved				
					Future potential - past actual =	1.16	tpy	0.20	tpy

[a] Average of 8,000 gallons per truck.

[b] Total route traveled equaled 0.69 miles in 1994-95. Assumes 100% of trucks travel 0.84 miles (all paved) for future potential.

[c] An estimated 23% of total ethanol produced in 1994 and 1995 was shipped by truck, 77% was shipped by rail.

[d] Potential # of trucks assumes 28% of ethanol produced is shipped by truck and each truck holds 8,000 gallons.

WDGS Hauling, DDGS Hauling, Syrup Hauling, Coal Hauling, Denaturant Hauling

	Amount Hauled (tpy)	# of Trucks [a]	Total Miles Traveled [b]	PM_{10} Emission Factor (lb/VMT)	PM Emission Factor (lb/VMT)	PM (uncontrolled)		PM_{10} (uncontrolled)	
1994									
WDGS/Syrup Hauling	50,405	1,833	1,264.7	0.59	3.45	2.18	tpy	0.37	tpy
DDGS Hauling [c]	30,326	1,103	760.9	0.59	3.45	1.31	tpy	0.22	tpy
Coal Hauling	47,670	3,288	986.3	0.59	3.45	1.70	tpy	0.29	tpy
Denaturant Hauling		179	123.2	0.59	3.45	0.21	tpy	0.04	tpy
Total						5.41		0.92	
1995									
WDGS/Syrup Hauling	40,531	1,474	1017.0	0.59	3.45	1.75	tpy	0.30	tpy
DDGS Hauling [c]	32,177	1,170	807.4	0.59	3.45	1.39	tpy	0.24	tpy
Coal Hauling	12,110	835	250.6	0.59	3.45	0.43	tpy	0.07	tpy
Denaturant Hauling		184	127.1	0.59	3.45	0.22	tpy	0.04	tpy
Total						3.80	tpy	0.65	tpy
					2 year average =	4.61	tpy	0.78	tpy
Future Potential [d]									
WDGS Hauling	562,650	20,460	14117.4	0.38	2.26	15.93	tpy	2.70	tpy
DDGS & Syrup Hauling	42,350	1,540	1293.6	0.38	2.26	1.46	tpy	0.25	tpy
Coal Hauling		4,000	1200.0	0.38	2.26	1.35	tpy	0.23	tpy
Denaturant Hauling[e]		406	280.3	0.38	2.26	0.32	tpy	0.05	tpy
Total						19.06	tpy	3.24	tpy
					Future potential - past actual =	14.46		2.45	tpy

[a] 1994-95 trucks were calculated using the following average trucks data: WDGS & DDGS - 27.5ton/trk; Coal - 14.5ton/trk, Denaturant 8,000 gal/trk

[b] Total route traveled equaled 0.69 mile (all paved) for WDGS, DDGS, Syrup & Denaturant in 1994-95; assumes 100% of trucks travel 0.84 mile for DDGS and syrup, 0.69 mile for WDGS, and 0.3 mile for coal.

[c] An estimated 35.4% of DDGS produced in 1994-95 was shipped by truck. 64.6% was shipped by rail.

[d] Potential number of trucks were calculated by assuming feed product shipped is 100% WDGS and 0% DDGS as a worst case scenario, an estimated 42,350 tons of syrup must be shipped each year, and coal hauled is based upon coal boiler capacity and heat value of coal.

[e] All denaturant assumed to be delivered by truck. (Worst-case scenario)

Appendix A-1: Revised Emission Calculations
Emission Factors for Paved and Unpaved Roads

Past Actual

Unpaved

$$E_{ext} = \frac{lbs}{VMT} = \left[\frac{k\left(\frac{s}{12}\right)^{a}\left(\frac{W}{3}\right)^{b}}{\left(\frac{M_{dry}}{0.2}\right)^{c}}\right]\left(\frac{365-p}{365}\right)\left(\frac{S}{30}\right)^{d}$$

E_{ext}=emission factor	1.85	lb PM_{10}/VMT	10.21	lb PM/VMT
k=base emission factor	2.6	lb PM_{10}/VMT	10	lb PM/VMT
s=surface material silt content	5.7	%	5.7	%
W=mean vehicle weight	27.5	tons	27.5	tons
M_{dry}=dry surface material moisture content	0.2	%	0.2	%
p=days per year with precip.	90	days	90	days
a=size-specific constant	0.8		0.8	
b=size-specific constant	0.4		0.5	
c=size-specific constant	0.3		0.4	
S=mean vehicle speed	15	mph	15	mph
d=size specific constant	0.5		0.3	

-Equation and constants k,a,b,c from AP-42, Table 13.2.2-2 (9/98).

-Constants Mdry and p from AP-42 (9/98) 13.2.2.

-Average weight, W, from 2005 truck data.

-Speed correction factor from AP-42 Chapter 13.2.2 (12/03).

Paved

$$E = \frac{lbs}{VMT} = \left[k\left(\frac{sL}{2}\right)^{0.65}\left(\frac{W}{3}\right)^{1.5} - C\right]\left(1-\frac{P}{4N}\right)\left(\frac{S}{30}\right)^{d}$$

E=emission factor	0.59	lb PM_{10}/VMT	3.45	lb PM/VMT
k=base emission factor	0.016	lb PM_{10}/VMT	0.082	lb PM/VMT
sL=surface silt loading	5.77	g/m^2	5.77	g/m^2
W=average weight of vehicles	27.5	tons	27.5	tons
C = emission factor correction	0.00047	lb/VMT	0.00047	lb/VMT
P=number of wet days	90		90	days
N=days in avg. period	365		365	days
S=mean vehicle speed	15	mph	15	mph
d=size specific constant	0.5		0.3	

-Equation and base emission factor, k, from AP-42 Chapter 13.2.1 (12/03).

-Surface silt loading, sL, is based on the NDEQ's default value of 3 g/m^2 for one calendar quarter, and for the other three quarters (in g/m^2): 5.62 on 3/30/04; 6.22 on 9/25/04, and 8.22 on 11/12/04.

-Average weight of vehicle based on 2005 truck data.

-Number of wet days, P, from AP-42, Figure 13.2.1-2.

-Speed correction factor from AP-42 Chapter 13.2.2 (12/03).

Appendix A-1: Revised Emission Calculations
Emission Factors for Paved and Unpaved Roads

Future Potential

Paved

$$E = \frac{lb\,s}{V\,M\,T} = \left[k\left(\frac{sL}{2}\right)^{0.65}\left(\frac{W}{3}\right)^{1.5} - C \right]\left(1 - \frac{P}{4N}\right)\left(\frac{S}{30}\right)^{d}$$

E=emission factor	0.38	lb PM_{10}/VMT	2.26	lb PM/VMT
k=base emission factor	0.016	lb PM_{10}/VMT	0.082	lb PM/VMT
sL=surface silt loading	3	g/m^2	3	g/m^2
W=average weight of vehicles	27.5	tons	27.5	tons
C = emission factor correction	0.00047	lb/VMT	0.00047	lb/VMT
P=number of wet days	90		90	days
N=days in avg. period	365		365	days
S=mean vehicle speed	15	mph	15	mph
d=size specific constant	0.5		0.3	

-Equation and base emission factor, k, from AP-42 Chapter 13.2.1 (12/03).

-Surface silt loading, sL, is a value for which the NDEQ does not required silt testing when BMPs are used.

-Average weight of vehicle based on 2005 truck data.

-Number of wet days, P, from AP-42, Figure 13.2.1-2.

-Speed correction factor from AP-42 Chapter 13.2.2 (12/03).

Appendix A - VOC Emissions from Fermentation Scrubbers

1998 Fermenters 1 through 7 with Fermentation Tanks 1a, 1b, 2a and 2b
Controlled by Scrubber C-1401 (previously designated C-1508 and used to control emissions from fermenters 1 through 4) and Fermentation Tanks 3 through 7 controlled by Scrubber C-21402.
(Tanks 5 and 6 previously controlled by Scrubber C-11402). Tanks 6 and 7 are new units

1994		Hours	VOC	Units	EF Source	VOC (tpy)
C-1401	Fermentation Vent Scrubber I (C-1508)	8,760	3.190	lb/hr	Specs	14.0
C-11402	Fermentation Vent Scrubber II (C-11402)	8,760	0.023	lb/hr	stack test 1/15/94	0.10
1995						
C-1401	Fermentation Vent Scrubber I (C-1508)	8,760	3.190	lb/hr	Specs	14.0
C-11402	Fermentation Vent Scrubber II (C-11402)	8,760	0.023	lb/hr	stack test 1/15/94	0.10
Average Emissions for fermenters						14.1
Future Potential Emissions for C-1401		8760	0.93	lb/hr	stack test 10/4/06	4.07
Future Potential Emissions for C-21402		8760	2.81	lb/hr	stack test 10/3/06	12.31
Total Future Potential			3.74			16.38
Future Potential - Past Actual						2.3

Note:
There is no stack test data which represents the operation of scrubber C-1401 in 1994 and 1995. The emission factor of 3.19 lb/hr has been used in past AEIs and is based on design control efficiency.
Scrubber C-11402 past actuals based on 1994 stack testing of 0.0232 lb/hr with a 0.15 lb/hr permit limit.
The 1998 project changed the feed to scrubber C-1401, resulting in a lower emission rate.
Scrubber C-21402 replaced C-11402 in 1998.
Future Potential emissions equal 10/06 stack test results.

Appendix A - HAP Emissions from Fermentation Scrubbers

1998 Fermenters 1 through 7 with Fermentation Tanks 1a, 1b, 2a and 2b
Controlled by Scrubber C-1401 (previously designated C-1508 and used to control emissions from fermenters 1 through 4) and Fermentation Tanks 3 through 7 controlled by Scrubber C-21402.
(Tanks 5 and 6 previously controlled by Scrubber C-11402). Tanks 6 and 7 are new units

Pre-Project Potential Emissions		Hours	Single HAP	Units	Total HAPs	Units	EF Source	Single HAP (tpy)	Total HAPs (tpy)
C-1401	Fermentation Vent Scrubber I (C-1508)	8,760	0.273	lb/hr	0.273	lb/hr	VB Estimate	1.196	1.196
C-11402	Fermentation Vent Scrubber II (C-11402)	8,760	0.703	lb/hr	0.703	lb/hr	VB Estimate	3.079	3.079
Total								4.275	4.275
Future Potential Emissions for C-1401		8760	0.250	lb/hr	0.280		stack test 10/4/06	1.095	1.226
Future Potential Emissions for C-21402		8760	0.770	lb/hr	0.810		stack test 10/3/06	3.373	3.548
Total								4.468	4.774
Future Potential - Past Potential								0.193	0.499

Notes:
Pre-Project Potential Emissions are based on Vogelbusch estimates with 28.5 MMgal/year denatured ethanol production.
Future Potential emissions equal 10/06 stack test results.
See Permit Fact Sheet for description of emission calculation methodology.
The greatest single HAP is acetaldehyde.

Appendix A - Emissions from Distillation Unit #1

Distillation Unit #1, Scrubber S-1501

1994	Throughput	Units	VOC	Units	EF Source	VOC TPY
N/A						
1995						
N/A						
Average						0.00
Future Potential Emissions	8760	hr	0.09	lb/hr	Stack Test 10/6/06	0.39

Notes:
There were no past actual emissions because Unit I was returned to service and had not operated during those years.
Future Potential emissions equal 10/06 stack test results.

Distillation Unit #1, Scrubber S-1501

Pre-Project Potential Emissions	Throughput	Units	Single HAP	Units	Total HAP	Units	EF Source	Single HAP (tpy)	Total HAP (tpy)
N/A									
Total									0.00
Future Potential Emissions	8760	hr	0.06	lb/hr	0.063		Stack Test 10/6/06	0.2628	0.28

Notes:
There were no past actual emissions because Unit I was returned to service and had not operated during those years.
Future potential emissions equal 10/06 stack test results.
The greatest single HAP is acetaldehyde.

Appendix A - VOC Emissions from Distillation Unit II

Distillation Unit II -Rectifying Column, Scrubber C-11533

1994		Throughput	Units	VOC	Units	EF Source	VOC TPY
C-11533	Rectifying Column Vent Scrubber	8,400	hr	0.0990	lb/hr	stack test 17	0.416
1995							
C-11533	Rectifying Column Vent Scrubber	8,580	hr	0.0990	lb/hr	stack test 17	0.425
Average							0.420
Future Potential Emissions		8,760	hr	0.1400	lb/hr	Stack Test 10/6/06	0.613

Notes:
Stack Test 17 was performed on January 20, 1994.
Future Potential emissions equal 10/06 stack test results.

HAP Emissions from Distillation Unit II

Distillation Unit II -Rectifying Column, Scrubber C-11533

Pre-Project Potential Emissions		Throughput	Units	Single HAP	Units	Total HAPs	Units	EF Source	Single HAP TPY	Total HAPs TPY
C-11533	Distillation Unit II Vent Scrubber	8,760	hr	0.0098	lb/hr	0.0099	lb/hr	Stack Test 1/20/94	0.043	0.043
Total									0.043	0.043
Future Potential Emissions		8,760	hr	0.090	lb/hr	0.0920	lb/hr	Stack Test 10/6/06	0.394	0.403

Notes:
Pre-Project Potential Emissions are based on stack testing performed on January 20, 1994
Future Potential emissions equal 10/06 stack test results.
See Permit Fact Sheet for description of emission calculation methodology.
The greatest single HAP is acetaldehyde.

Appendix A - Emissions from DDGS Dryer

DDGS Dryer Vent Scrubber, C-11801

1994		Throughput	Units	VOC	Units	EF Source	VOC TPY
C-11801	DDGS Dryer Vent Scrubber	8,400	hr	0.4600	lb/hr	Stack Test 10/7/06	1.932
1995							
C-11801	DDGS Dryer Vent Scrubber	8,580	hr	0.4600	lb/hr	Stack Test 10/7/06	1.973
Average							1.953
Future Potential Emissions		8760	hr	0.4600	lb/hr	Stack Test 10/7/06	2.015

DDGS Dryer Vent Scrubber, C-11801

Pre-Project Potential Emissions		Throughput	Units	Single HAP	Units	Total HAP	Units	EF Source	Single HAP TPY	Total HAPs TPY
C-11801	DDGS Dryer Vent Scrubber	8,760	hr	0.4000	lb/hr	0.4530	lb/hr	Stack Test 10/7/06	1.752	1.984
Total									1.752	1.984
Future Potential Emissions		8760	hr	0.4000	lb/hr	0.4530	lb/hr	Stack Test 10/7/06	1.752	1.984

Notes:
The greatest single HAP is acetaldehyde.

Appendix A - Past Actual Emission Calculations for Cooling Tower C

USEPA 1995 AP-42, Chapter 13.4 Wet Cooling Towers

	g/L			
Average	1.34	Total dissolved solids	1,342	ppm

For Cooling Tower C,

Flow:	16500	gpm	990,000	gph
Drift:	0.002	% of total circulating flow		
Cells:	3			

Estimated PM Emissions from Beavon	0.97 ton PM/yr

Total Estimated PM10 Emissions	0.73 ton PM_{10}/yr	Emission Rate	
		0.166	lb/hr total
		0.055	lb/hr per cell

CALCULATION OF PM10 FRACTION FOR COOLING TOWERS

EPRI Droplet Diameter (um)	Droplet Volume (um3)	Droplet, Mass (ug)	Particle Mass (Solids) (ug)	Solid Particle Volume (um3)	Solid Particle Diameter (um)	EPRI % Mass Smaller	Wt% PM-10 in PM Emissions
10	524	5.24E-04	7.03E-07	0.32	0.85	0	
20	4189	4.19E-03	5.62E-06	2.56	1.70	0.196	
30	14137	1.41E-02	1.90E-05	8.62	2.54	0.226	
40	33510	3.35E-02	4.50E-05	20.44	3.39	0.514	
50	65450	6.54E-02	8.78E-05	39.92	4.24	1.806	
60	113097	1.13E-01	1.52E-04	68.99	5.09	5.702	
70	179594	1.80E-01	2.41E-04	109.55	5.94	21.348	
90	381704	3.82E-01	5.12E-04	232.84	7.63	49.812	
110	696910	6.97E-01	9.35E-04	425.12	9.33	70.509	
130	1150347	1.15E+00	1.54E-03	701.71	11.03	82.023	75.1
150	1767146	1.77E+00	2.37E-03	1077.96	12.72	88.012	
180	3053628	3.05E+00	4.10E-03	1862.71	15.27	91.032	
210	4849048	4.85E+00	6.51E-03	2957.92	17.81	92.468	
240	7238229	7.24E+00	9.71E-03	4415.32	20.35	94.091	
270	10305995	1.03E+01	1.38E-02	6286.66	22.90	94.689	
300	14137167	1.41E+01	1.90E-02	8623.67	25.44	96.288	
350	22449298	2.24E+01	3.01E-02	13694.07	29.68	97.011	
400	33510322	3.35E+01	4.50E-02	20441.30	33.92	98.34	
450	47712938	4.77E+01	6.40E-02	29104.89	38.16	99.071	
500	65449847	6.54E+01	8.78E-02	39924.41	42.40	99.071	
600	113097336	1.13E+02	1.52E-01	68989.37	50.89	100	
	Cooling Tower Design TDS =			**1,342**	ppmw		
	Cooling Tower PM10 fraction of total PM =			**75.1**	wt. %		
Note: See "Calculating Realistic PM_{10} Emissions from Cooling Towers" for basis.							

Notes:

-Lab report TDS data for 1994 and 1995 averaged 1327 and 1357, respectively for a 2 yr average of 1342 ppm.

-Emission factor is from AP-42, Chapter 13.4 (Wet Cooling Towers)

PM/PM10 emission factor (lbs/gal) = (8.34 lb/gal x TDS x (1/1,000,000) x DL/100)

-Past Actual Drift Loss = 0.002% based on three original cells.

-The drift loss factors obtained from Marley, the manufacturer of the cooling tower were <0.001% for the 2 cells installed in 1998 and <0.002% for the 3 original cells in 1993.

-A TDS value of 7000 ppm is used to calculate the PM/PM10 future potential emissions.

Appendix A - Future Potential Emission Calculations for Cooling Tower C

USEPA 1995 AP-42, Chapter 13.4 Wet Cooling Towers

	g/L			
Average	7.00	Total dissolved solids	7,000	ppm

For Cooling Tower C,

Flow:	22000	gpm	1,320,000	gph
Drift:	0.0016	% of total circulating flow		
Cells:	5			

Estimated PM Emissions from Beavon	5.40 ton PM/yr

Total Estimated PM10 Emissions	0.98 ton PM_{10}/yr	Emission Rate	
		0.224	lb/hr total
		0.045	lb/hr per cell

CALCULATION OF PM10 FRACTION FOR COOLING TOWERS

EPRI Droplet Diameter (um)	Droplet Volume (um3)	Droplet, Mass (ug)	Particle Mass (Solids) (ug)	Solid Particle Volume (um3)	Solid Particle Diameter (um)	EPRI % Mass Smaller	Wt% PM-10 in PM Emissions
10	524	5.24E-04	3.67E-06	1.67	1.47	0	
20	4189	4.19E-03	2.93E-05	13.33	2.94	0.196	
30	14137	1.41E-02	9.90E-05	44.98	4.41	0.226	
40	33510	3.35E-02	2.35E-04	106.62	5.88	0.514	
50	65450	6.54E-02	4.58E-04	208.25	7.35	1.806	
60	113097	1.13E-01	7.92E-04	359.86	8.82	5.702	
70	179594	1.80E-01	1.26E-03	571.44	10.30	21.348	18.2
90	381704	3.82E-01	2.67E-03	1214.51	13.24	49.812	
110	696910	6.97E-01	4.88E-03	2217.44	16.18	70.509	
130	1150347	1.15E+00	8.05E-03	3660.19	19.12	82.023	
150	1767146	1.77E+00	1.24E-02	5622.74	22.06	88.012	
180	3053628	3.05E+00	2.14E-02	9716.09	26.47	91.032	
210	4849048	4.85E+00	3.39E-02	15428.79	30.89	92.468	
240	7238229	7.24E+00	5.07E-02	23030.73	35.30	94.091	
270	10305995	1.03E+01	7.21E-02	32791.80	39.71	94.689	
300	14137167	1.41E+01	9.90E-02	44981.89	44.12	96.288	
350	22449298	2.24E+01	1.57E-01	71429.58	51.48	97.011	
400	33510322	3.35E+01	2.35E-01	106623.75	58.83	98.34	
450	47712938	4.77E+01	3.34E-01	151813.89	66.19	99.071	
500	65449847	6.54E+01	4.58E-01	208249.51	73.54	99.071	
600	113097336	1.13E+02	7.92E-01	359855.16	88.25	100	
		Cooling Tower Design TDS =		**7,000**	ppmw		
	Cooling Tower PM10 fraction of total PM =			**18.2**	wt. %		
Note: See "Calculating Realistic PM_{10} Emissions from Cooling Towers" for basis.							

Appendix A - Past Actual Emissions from Ethanol Loadout
1994

Anhydrous ethanol loading rate:	27.1415	MMgal/yr
Denaturant loading rate:	1.4285	MMgal/yr
Denatured ethanol loading rate:	28.5700	MMgal/yr

	Truck	Railcar
$S_{normal\ dedicated}$	0.6	1.45
$S_{clean\ cargo}$	0.5	1.45

Capture efficiency:	98.0%	Assumed based on manufacturer.
Control efficiency:	90.0%	Assumed for vapor recovery system
Overall control efficiency:	88.2%	

Physical Data	Materials		
	Gasoline	Ethanol	Denaturant
Molecular weight (M)	62	46	62
Temperature (T, deg R)[a]	540	540	540
Vapor pressure (P, psia)[b]	9.95	1.218	9.95

[a] $T_{gasoline}$ ant $T_{ethanol}$ is loaded out at elevated temperature.

[b] Assume worst-case based on RVP 13 gasoline. Vapor pressures taken from Tanks 4.0.9d.

Emission Factors [a]	Uncontrolled (Truck)	Uncontrolled (Rail)	Controlled (Truck)	Controlled (Rail)	
$E_{gasoline}$	8.54	20.64	1.01	2.44	lb/Mgal
$E_{ethanol}$	0.78	1.87	0.09	0.22	lb/Mgal
$E_{denaturant}$	8.54	20.64	1.01	2.44	lb/Mgal

[a] Emission factors based on AP-42 5.2 (1/95)

VOC Emissions (tpy)	Uncontrolled (Truck)	Uncontrolled (Rail)	Controlled VOC (Truck)	Controlled HAP (Truck)	Controlled VOC (Rail)	Controlled HAP (Rail)
$E_{gasoline}$	1.40	11.35	0.17	0.07	1.34	0.54
$E_{ethanol}$	2.42	19.59	0.29	0.0011	2.31	0.0092
$E_{denaturant}$						
Total	3.82	30.94	0.45	0.07	3.65	0.55

1994

Total Dentured Ethanol Production	28,570,000	Gallons Ethanol shipped by truck	6,571,100
Number of Ethanol trucks	821	Gallons Ethanol shipped by rail	21,998,900
Percent of Ethanol shipped by truck	23.00%		
Percent of Ethanol shipped by rail	77.00%		

Estimated Load out Emissions Based on Percentages		
Load out by Truck	**0.45**	
Load out by Rail	**3.65**	
TOTAL	**4.10**	tpy
	8,204	pounds

Appendix A - Past Actual Emissions from Ethanol Loadout
1994
Loadout

HAPs	Fraction Gasoline	Fraction Ethanol	Gasoline (tpy)	Ethanol (tpy)	Total
Acetaldehyde		0.0002	-	0.0005	0.0005
Benzene	0.025		0.0376	-	0.0376
Cumene	0.01		0.0151	-	0.0151
Ethyl Benzene	0.02		0.0301	-	0.0301
Methanol		0.0002	-	0.0005	0.0005
MTBE	0.075		0.1129	-	0.1129
Toluene	0.15		0.2258	-	0.2258
Xylene	0.12		0.1806	-	0.1806
		Total	0.6020	0.0010	0.6030
		Single HAP-	Toluene		0.2258
		Acetaldehyde			0.0005

Appendix A - Past Actual Emissions from Ethanol Loadout
1995

Anhydrous ethanol loading rate:	28.0060	MMgal/yr
Denaturant loading rate:	1.4740	MMgal/yr
Denatured ethanol loading rate:	29.4800	MMgal/yr

	Truck	Railcar
$S_{normal\ dedicated}$	0.6	1.45
$S_{clean\ cargo}$	0.5	1.45

Capture efficiency:	98.0%	Assumed based on manufacturer.
Control efficiency:	90.0%	Assumed for vapor recovery system
Overall control efficiency:	88.2%	

Physical Data	Materials		
	Gasoline	Ethanol	Denaturant
Molecular weight (M)	62	46	62
Temperature (T, deg R)[a]	540	540	540
Vapor pressure (P, psia)[b]	9.95	1.218	9.95

[a] $T_{gasoline}$ ant $T_{ethanol}$ is loaded out at elevated temperature.

[b] Assume worst-case based on RVP 13 gasoline. Vapor pressures taken from Tanks 4.0.9d.

Emission Factors [a]	Uncontrolled (Truck)	Uncontrolled (Rail)	Controlled (Truck)	Controlled (Rail)	
$E_{gasoline}$	8.54	20.64	1.01	2.44	lb/Mgal
$E_{ethanol}$	0.78	1.87	0.09	0.22	lb/Mgal
$E_{denaturant}$	8.54	20.64	1.01	2.44	lb/Mgal

[a] Emission factors based on AP-42 5.2 (1/95)

VOC Emissions (tpy)	Uncontrolled (Truck)	Uncontrolled (Rail)	Controlled VOC (Truck)	Controlled HAP (Truck)	Controlled VOC (Rail)	Controlled HAP (Rail)
$E_{gasoline}$	1.45	11.71	0.17	0.07	1.38	0.55
$E_{ethanol}$	2.50	20.21	0.29	0.0012	2.39	0.0095
$E_{denaturant}$						
Total	3.95	31.92	0.47	0.07	3.77	0.56

1995

Total Dentured Ethanol Production	29,480,000	Gallons Ethanol shipped by truck	6,780,400
Number of Ethanol trucks	848	Gallons Ethanol shipped by rail	22,699,600
Percent of Ethanol shipped by truck	23.00%		
Percent of Ethanol shipped by rail	77.00%		

Estimated Load out Emissions Based on Percentages		
Load out by Truck	**0.47**	
Load out by Rail	**3.77**	
TOTAL	**4.23**	tpy
	8,466	pounds

Appendix A - Past Actual Emissions from Ethanol Loadout
1995
Loadout

HAPs	Fraction Gasoline	Fraction Ethanol	Gasoline (tpy)	Ethanol (tpy)	Total
Acetaldehyde		0.0002	-	0.0005	0.0005
Benzene	0.025		0.0388	-	0.0388
Cumene	0.01		0.0155	-	0.0155
Ethyl Benzene	0.02		0.0311	-	0.0311
Methanol		0.0002	-	0.0005	0.0005
MTBE	0.075		0.1165	-	0.1165
Toluene	0.15		0.2329	-	0.2329
Xylene	0.12		0.1864	-	0.1864
		Total	0.6212	0.0011	0.6223
		Single HAP-	Toluene		0.2329
		Acetaldehyde			0.0005

Appendix A - Potential Emissions from Ethanol Loadout Based on 28.5 MMgal/yr

Anhydrous ethanol loading rate:	27.075	MMgal/yr
Denaturant loading rate:	1.425	MMgal/yr
Denatured ethanol loading rate:	28.5	MMgal/yr

	Truck	Railcar
$S_{normal\ dedicated}$	0.6	1.45
$S_{clean\ cargo}$	0.5	1.45

Capture efficiency:	98.0%	Assumed based on manufacturer.
Control efficiency:	90.0%	Assumed for vapor recovery system
Overall control efficiency:	88.2%	

Physical Data	Materials		
	Gasoline	Ethanol	Denaturant
Molecular weight (M)	62	46	62
Temperature (T, deg R)[a]	540	540	540
Vapor pressure (P, psia)[b]	9.95	1.218	9.9

[a] $T_{gasoline}$ ant $T_{ethanol}$ is loaded out at elevated temperature.

[b] Assume worst-case based on RVP 13 gasoline. Vapor pressures taken from Tanks 4.0.9d.

Emission Factors [a]	Uncontrolled (Truck)	Uncontrolled (Rail)	Controlled (Truck)	Controlled (Rail)	
$E_{gasoline}$	8.54	20.64	1.01	2.44	lb/Mgal
$E_{ethanol}$	0.78	1.87	0.09	0.22	lb/Mgal
$E_{denaturant}$	8.50	20.54	1.00	2.42	lb/Mgal

[a] Emission factors based on AP-42 5.2 (1/95)

VOC Emissions (tpy)	Uncontrolled (Truck)	Uncontrolled (Rail)	Controlled VOC (Truck)	Controlled HAP (Truck)	Controlled VOC (Rail)	Controlled HAP (Rail)
$E_{gasoline}$	0.00	14.71	0.00	0.00	1.74	0.69
$E_{ethanol}$	0.00	25.38	0.00	0.0000	2.99	0.0120
$E_{denaturant}$						
Total	0.00	40.08	0.00	0.00	4.73	0.71

PTE

Total Dentured Ethanol Production	28,500,000	Gallons Ethanol shipped by truck	0	(Worst-case)
Number of Ethanol trucks	0	Gallons Ethanol shipped by rail	28,500,000	
Percent of Ethanol shipped by truck	0.00%			
Percent of Ethanol shipped by rail	100.00%			

Estimated Load out Emissions Based on Percentages		
Load out by Truck	**0.00**	
Load out by Rail	**4.73**	
TOTAL	**4.73**	tpy
	9,460	pounds

Appendix A - Potential Emissions from Ethanol Loadout Based on 28.5 MMgal/yr

Loadout

HAPs	Fraction Gasoline	Fraction Ethanol	Gasoline (tpy)	Ethanol (tpy)	Total
Acetaldehyde		0.0002	-	0.0006	0.0006
Benzene	0.025		0.0434	-	0.0434
Cumene	0.01		0.0174	-	0.0174
Ethyl Benzene	0.02		0.0347	-	0.0347
Methanol		0.0002	-	0.0006	0.0006
MTBE	0.075		0.1301	-	0.1301
Toluene	0.15		0.2603	-	0.2603
Xylene	0.12		0.2082	-	0.2082
		Total	0.6941	0.0012	0.6953
		Single HAP-	Toluene		0.2603
		Acetaldehyde			0.0006

Appendix A - Potential Emissions from Ethanol Loadout Based on 65 MMgal/yr

Anhydrous ethanol loading rate:	61.75	MMgal/yr
Denaturant loading rate:	3.25	MMgal/yr
Denatured ethanol loading rate:	65	MMgal/yr

	Truck	Railcar
$S_{normal\ dedicated}$	0.6	1.45
$S_{clean\ cargo}$	0.5	1.45

Capture efficiency:	98.0%	Assumed based on manufacturer.
Control efficiency:	90.0%	Assumed for vapor recovery system
Overall control efficiency:	88.2%	

Physical Data	Materials Gasoline	Ethanol	Denaturant
Molecular weight (M)	62	46	62
Temperature (T, deg R)[a]	540	540	540
Vapor pressure (P, psia)[b]	9.95	1.218	9.9

[a] $T_{gasoline}$ ant $T_{ethanol}$ is loaded out at elevated temperature.

[b] Assume worst-case based on RVP 13 gasoline. Vapor pressures taken from Tanks 4.0.9d.

Emission Factors [a]	Uncontrolled (Truck)	Uncontrolled (Rail)	Controlled (Truck)	Controlled (Rail)	
$E_{gasoline}$	8.54	20.64	1.01	2.44	lb/Mgal
$E_{ethanol}$	0.78	1.87	0.09	0.22	lb/Mgal
$E_{denaturant}$	8.50	20.54	1.00	2.42	lb/Mgal

[a] Emission factors based on AP-42 5.2 (1/95)

VOC Emissions (tpy)	Uncontrolled (Truck)	Uncontrolled (Rail)	Controlled VOC (Truck)	Controlled HAP (Truck)	Controlled VOC (Rail)	Controlled HAP (Rail)
$E_{gasoline}$	0.00	33.54	0.00	0.00	3.96	1.58
$E_{ethanol}$	0.00	57.88	0.00	0.0000	6.83	0.0273
$E_{denaturant}$						
Total	0.00	91.42	0.00	0.00	10.79	1.61

PTE

Total Dentured Ethanol Production	65,000,000	Gallons Ethanol shipped by truck	0	(Worst-case)
Number of Ethanol trucks	0	Gallons Ethanol shipped by rail	65,000,000	
Percent of Ethanol shipped by truck	0.00%			
Percent of Ethanol shipped by rail	100.00%			

Estimated Load out Emissions Based on Percentages		
Load out by Truck	**0.00**	
Load out by Rail	**10.79**	
TOTAL	**10.79**	tpy
	21,574	pounds

Appendix A - Potential Emissions from Ethanol Loadout Based on 65 MMgal/yr

Loadout

HAPs	Fraction Gasoline	Fraction Ethanol	Gasoline (tpy)	Ethanol (tpy)	Total
Acetaldehyde		0.0002	-	0.0014	0.0014
Benzene	0.025		0.0989	-	0.0989
Cumene	0.01		0.0396	-	0.0396
Ethyl Benzene	0.02		0.0792	-	0.0792
Methanol		0.0002	-	0.0014	0.0014
MTBE	0.075		0.2968	-	0.2968
Toluene	0.15		0.5937	-	0.5937
Xylene	0.12		0.4749	-	0.4749
		Total	1.5831	0.0027	1.5858
		Single HAP-	Toluene		0.5937
		Acetaldehyde			0.0014

Appendix A - Emissions from Storage Tanks

1998 Storage Tank Emissions

1994		Throughput	Units	Working Loss (lb/yr)	Standing Loss (lb/yr)	Control Efficiency	VOC TPY
T-1501A	Anhydrous Ethanol	8,632,333	gal	1,047.27	104.58	0%	0.58
T-1501B	Anhydrous Ethanol	8,632,333	gal	1,047.27	104.58	0%	0.58
T-11501C	Anhydrous Ethanol	8,632,333	gal	1,047.27	104.58	0%	0.58
T-6101	Denatured Ethanol	13,633,000	gal	7,043.97	1,454.91	90%	0.42
T-6102	Denatured Ethanol	13,633,000	gal	7,043.97	1,454.91	90%	0.42
T-6103	Gasoline	1,363,000	gal	9,280.88	2,838.88	90%	0.61
Total							3.18
1995							
T-1501A	Anhydrous Ethanol	9,389,167	gal	1,115.86	104.58	0%	0.61
T-1501B	Anhydrous Ethanol	9,389,167	gal	1,115.86	104.58	0%	0.61
T-11501C	Anhydrous Ethanol	9,389,167	gal	1,115.86	104.58	0%	0.61
T-6101	Denatured Ethanol	14,825,000	gal	7,194.47	1,454.91	90%	0.43
T-6102	Denatured Ethanol	14,825,000	gal	7,194.47	1,454.91	90%	0.43
T-6103	Gasoline	1,482,500	gal	9,456.05	2,838.88	90%	0.61
Total							3.31
						Average:	3.25
Potential at 65 MMgal/year Ethanol Production							
T-1501A	Anhydrous Ethanol	20,583,333	gal	2,130.33	104.58	0%	1.12
T-1501B	Anhydrous Ethanol	20,583,333	gal	2,130.33	104.58	0%	1.12
T-11501C	Anhydrous Ethanol	20,583,333	gal	2,130.33	104.58	0%	1.12
T-6101	Denatured Ethanol	10,833,333	gal	6,691.76	1,454.91	90%	0.41
T-6102	Denatured Ethanol	10,833,333	gal	6,691.76	1,454.91	90%	0.41
T-26101	Denatured Ethanol	43,333,333	gal	130.97	392.37	0%	0.26
T-6103	Gasoline	3,250,000	gal	12,046.98	2,838.88	90%	0.74
Total							5.17
						Future Potential - Past Actual (tpy):	1.93

Notes:
Emission estimates calculated using EPA's Tanks 4.0d Program.
In 1994 & 1995 Tanks T-6101, T-6102, and T-6103 were equipped with a vapor recovery unit, which had an estimated control efficiency of 90%.
Tank T-26101 has an internal floating roof.
Vapor Recovery Unit was replaced by a flare system in October 2004 with estimated control efficiency of 95% based on manufacturer's guarantee.
Future Potential emissions are based on vapor recovery unit.

Appendix A - Tanks Pre-Project Potential HAP Emissions Based on 28.5 MMGal/yr Denatured Ethanol

			Pre-Project PTE based on 28.5 Mmgal/yr Denatured								
Capacity (gal)		Contents	Throughput	Working	Breathing	Ethanol Uncontrolled Total	Gasoline Uncontrolled Total	Control	Ethanol Controlled Total	Gasoline Controlled Total	Controlled Total
19000	T-11501C	Anhydrous Ethanol	9,025,000	1,083	105	1,187		0%	1,187		1,187
19000	T-1501A	Anhydrous Ethanol	9,025,000	1,083	105	1,187		0%	1,187		1,187
19000	T-1501B	Anhydrous Ethanol	9,025,000	1,083	105	1,187		0%	1,187		1,187
250000	T-6101	Denatured Ethanol	14,250,000			5,852	4,975	90%	585	498	1,083
250000	T-6102	Denatured Ethanol	14,250,000			5,852	4,975	90%	585	498	1,083
30000	T-6103	Natural Gasoline	1,425,000	9,372	1,963		11,335	90%		1,134	1,134
		Total Anhydrous Production	27,075,000					Total (tpy)	2.37	1.06	3.43
		Total Denatured Production	28,500,000								

HAPs	Fraction Gasoline	Fraction Ethanol	Emissions (tpy)	
Acetaldehyde		0.0002	0.0005	
Benzene	0.025		0.0266	
Cumene	0.01		0.0106	
Ethyl Benzene	0.02		0.0213	
Methanol		0.0002	0.0005	
MTBE	0.075		0.0798	
Toluene	0.15		0.1596	
Xylene	0.12		0.1277	
		Total	0.4267	
		Single HAP	0.1596	Toluene
		Acetaldehyde	0.0005	

Notes: Emission estimates calculated using EPA's Tanks Program.
In 1994 & 1995 Tanks T-6101, T-6102, and T-6103 were equipped with a vapor recovery unit, which had an estimated control efficiency of 90%.

Tanks Post-Project Potential Emissions Based on 65 MMGal/yr Denatured Ethanol

				Post-Project PTE based on 65 Mmgal/yr Denatured							
Capacity (gal)	ID	Contents	Throughput	Ethanol Working	Ethanol Breathing	Uncontrolled Ethanol Total	Uncontrolled Gasoline Total	Control	Ethanol Controlled Total	Gasoline Controlled Total	Controlled Total
19000	T-11501C	Anhydrous Ethanol	20,583,333	2,130	105	2,235		0%	2,235		2,235
19000	T-1501A	Anhydrous Ethanol	20,583,333	2,130	105	2,235		0%	2,235		2,235
19000	T-1501B	Anhydrous Ethanol	20,583,333	2,130	105	2,235		0%	2,235		2,235
1000000	T-26101	Denatured Ethanol	43,333,333			341	201	0%	341	201	543
250000	T-6101	Denatured Ethanol	10,833,333			5,557	4,725	90%	556	473	1,028
250000	T-6102	Denatured Ethanol	10,833,333			5,557	4,725	90%	556	473	1,028
30000	T-6103	Gasoline	3,250,000				12,047	90%		1,205	1,205
		Total Anhydrous Production	61,749,999					Total (tpy)	4.08	1.18	5.25
		Total Denatured Production	65,000,000								

HAPs	Fraction Gasoline	Fraction Ethanol	Emissions (tpy)	
Acetaldehyde		0.0002	0.0008	
Benzene	0.025		0.0294	
Cumene	0.01		0.0118	
Ethyl Benzene	0.02		0.0235	
Methanol		0.0002	0.0008	
MTBE	0.075		0.0882	
Toluene	0.15		0.1763	
Xylene	0.12		0.1411	
		Total	0.4719	
		Single HAP	0.1763	Toluene
		Acetaldehyde	0.0008	

Notes: Emission estimates calculated using EPA's Tanks Program.
Tank T-26101 has an internal floating roof.
Tanks T-6101, T-6102, and T-6103 were equipped with a vapor recovery unit until October 2004, which had an estimated control efficiency of 90%.

Appendix A - Fugitive VOC Equipment Leaks (FS04)

Controlled emissions (lbs/hr) = (# of components)(emission factor lb/comp.-hr)(1- Control Effectiveness)
VOC emissions (lbs/yr) = (Controlled emissions in lbs/hr) * 8,760 (hr/yr) * VOC Weight %
VOC emissions (tpy) = (VOC emissions in lbs/yr) * 1 (ton/2,000 lb)

Distillation Operations-Unit 1 Components returned to service

Equipment Component Source	Product	Component Count[1]	Emission Factor [2] (lb/comp.-hr)	Hours	Subpart VV Control Effectiveness[3]	Controlled Emissions (lb/hr)	VOC Weight (%)[4]	VOC Emissions (lb/yr)	Annual Emissions (tpy)
Valves	Gas/Vapor	69.0	0.01319	8,760	67%	0.300	53%	1,382	0.69
Valves	Light Liquid	207.0	0.00891	8,760	61%	0.719	53%	3,307	1.653
Pumps	Light Liquid	10.0	0.04398	8,760	69%	0.136	53%	627	0.31
Compressor Seals	Gas/Vapor	0.0	0.50388	8,760	0%	0.000	53%	0	0.00
Pressure-Relief Valves	Gas/Vapor	8.0	0.22984	8,760	67%	0.607	53%	2,791	1.40
Sampling Connections	All	6.0	0.03315	8,760	87%	0.026	53%	119	0.06
Open-ended Lines	All	266.0	0.00376	8,760	87%	0.130	53%	597	0.30
Connectors	---	731.0	0.00404	8,760	87%	0.384	53%	1,768	0.88
Total								10,590	**5.29**

HAP Emission Calculation*

HAP	Fraction	Emissions (tpy)
Acetaldehyde	2.00E-04	0.0011
Methanol	2.00E-04	0.0011
Total		**2.12E-03**

Tank Farm-1 MMG tank construction components

Equipment Component Source	Product	Estimated Component Count[1]	Emission Factor [2] (lb/comp.-hr)	Hours	Subpart VV Control Effectiveness[3]	Controlled Emissions (lb/hr)	VOC Weight (%)[4]	VOC Emissions (lb/yr)	Annual Emissions (tpy)
Valves	Gas/Vapor	0.0	0.01319	8,760	67%	0.000	100%	0	0.00
Valves	Light Liquid	11.0	0.00891	8,760	61%	0.038	100%	335	0.167
Pumps	Light Liquid	1.0	0.04398	8,760	69%	0.014	100%	119	0.06
Compressor Seals	Gas/Vapor	0.0	0.50388	8,760	0%	0.000	100%	0	0.00
Pressure-Relief Valves	Gas/Vapor	0.0	0.22984	8,760	67%	0.000	100%	0	0.00
Sampling Connections	All	0.0	0.03315	8,760	87%	0.000	100%	0	0.00
Open-ended Lines	All	0.0	0.00376	8,760	87%	0.000	100%	0	0.00
Connectors	---	35.0	0.00404	8,760	87%	0.018	100%	161	0.08
Total								615	**0.31**

HAP Emission Calculation*

HAP	Fraction	Emissions (tpy)
Acetaldehyde	0.0002	0.0001
Methanol	0.0002	0.0001
Benzene	0.0250	0.0077
Cumene	0.0100	0.0031
Ethylbenzene	0.0200	0.0062
MTBE	0.0750	0.0231
Toluene	0.1500	0.0461
Xylenes	0.1200	0.0369
Total		**1.23E-01**

[1] Component counts is the estimated total number from expansion project.

[2] Emission factors taken from Protocol for Equipment Leak Emission Estimates, EPA-453/R-95-017, Table 2-1.

[3] Control Effectiveness taken from Protocol for Equipment Leak Emission Estimates, EPA-453/R-95-017, Table 5-2.

[4] VOC is worst-case for each process stream. 1/3 of components are est. to be in each of the following categories of VOC Weight: 1) 8-10%, 2) 50-60%, 3) 90-100%

VOC Total = 5.60

Total 1.25E-01

HAP Emission Calculation*

HAP	Fraction	Emissions (tpy)
Acetaldehyde	0.0002	0.0011
Benzene	0.0250	0.0077
Cumene	0.0100	0.0031
Ethylbenzene	0.0200	0.0062
Methanol	0.0002	0.0011
MTBE	0.0750	0.0231
Toluene	0.1500	0.0461
Xylenes	0.1200	0.0369
Total		**1.25E-01**

Notes:
* HAP estimates are conservative, based on total VOC from equipment leaks, and worst-case HAP speciation from either ethanol or denaturant.
No fermentation components were included because the average VOC % by weight was consistently below the Subpart VV VOC service definition.