Comments of Legal & Safety Employer Research, Inc. (LASER) & Concerned Citizens of Logan County (CCLC) Regarding a Proposed Air Discharge Permit to Install Illini Bio-Energy, LLC, Hartsburg, IL

Presented to

Illinois Environmental Protection Agency
Permit Section, Division of Air Pollution Control

&

U.S. Environmental Protection Agency, Region V,
Air & Radiation Division, Permits & Grants Section

December 15, 2006

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This document available on the web at:
http://www.sagady.com/workproduct/LASERCommentIlliniBioEnergy.pdf

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1 Introduction

Legal & Safety Employer Research, Inc. and Concerned Citizens of Logan County have produced these comments as part of an independent review the groups commissioned of the air permit application and draft permit for the proposed Illini Bio-Energy LLC facility. We submit these comments for filing with the Illinois Environmental Protection Agency, Division of Air Pollution Control and the U.S. Environmental Protection Agency, Region 5, Air & Radiation Division.

2 Underestimation of Expected Emissions for Certain Criteria Pollutants Renders Applicant's Submittal Unapprovable as a Minor Source Permit

The comments in subsequent sections identify a number of serious problems showing Applicant's and IEPA's underestimation of expected emissions from specific emission units at the proposed facility. If expected emissions of any criteria pollutant exceed 100 tons per year from the entire source, Applicant's permit as proposed may not be approved since the facility would not have undergone the required Prevention of Significant Deterioration review, including a determination of Best Available Control Technology for criteria pollutants and an air quality impact analysis. The latter analysis must necessarily include a review of compliance with PSD ambient increments and a demonstration that attainment and maintenance of the National Ambient Air Quality Standards will not be jeopardized. The Applicant has not submitted a Best Available Control Technology determination nor an air quality impact assessment; none of the required PSD-related determinations have been made by IEPA for the subject facility.

The margin between the Applicant's admitted emissions and the 100 ton threshold for the subject facility is very small. These margins are shown in the table below (100% DDGS – no wet cake basis/no biomethanator flare) based on Table 1 of the draft permit and on an 8760 hour year potential to emit basis:

Pollutant	**Applicant/IEPA-Admitted Annual Potential to Emit on 100% DDGS basis (tons) (from Table 1)**	**Margin Between Applicant/IEPA Admitted PTE and 100 Ton Threshold (tons)**
Particulate Matter	97.56	2.44
Nitrogen Oxides	97.14	2.86
Volatile Organic Compounds	97.91	2.09
Sulfur Dioxide	83.42	16.58
Carbon Monoxide	97.37	2.63

In subsequent subsections of this comment, we identify a number of emission unit/process areas where expected emissions are underestimated. When the margins from the amount of these underestimates can be quantified and summed, it is clear that the subject facility will have criteria pollutant emissions exceeding the 100 ton major stationary source threshold. Other units have emission projections but the terms of the draft permit do not provide sufficient monitoring measures to assure compliance with the emission limitations on an continual basis. Under these circumstances, the permit should not be issued because of failure to conform to major stationary source permitting requirements.

Notwithstanding the major stationary threshold issue, the individual process unit emission characterizations constitute error in cases where we identify underestimation of expected emissions.

Finally, problems with potential underestimation of acetaldehyde emissions from the fermentation scrubber has the potential to push the total acetaldehyde emissions over the 10 ton major HAP threshold, thus making the facility subject to case by case MACT requirements.

3 Comments Addressing Plant Wide Permit Conditions, Overall Monitoring/Testing Conditions and/or Two or More Process Units

3.1 Compliance with 40 C.F.R. Part 60, Subpart A for NSPS-Affected Units

Conditions 2.1.2(b), 2.8.3(b) and 2.10.3(b) contain language mandating the NSPS-affected units comply with "related provisions" of 40 C.F.R. Part 60, Subpart A, the preamble section to all U.S. EPA New Source Performance Standards.

The term "related provisions" is vague, indeterminate and subject to varying interpretation by either the Applicant or Illinois EPA. Instead, permit language for all NSPS-affected emission units should simply require compliance with all provisions of 40 C.F.R. Part 60, Subpart A.

Although the permit is presently written to address various subsections of 40 C.F.R. §60.18 compliance for the flares, a more generally stated Subpart A compliance requirement should be added to the loading rack and biomethanator flare sections as well.

3.2 Modification of EPA Method 5 for Lower Temperature Flue Gas PM Testing

The draft Illini Bio-Energy permit provides:

> "For emission units for which the average stack gas temperature is less than 250ºF,

> such as grain handling operations, but not including boilers, testing may be conducted at actual stack gas temperature without heating of the probe or filter holders." Condition 3.1-1(b) - Note (a) on U.S. EPA Method 5 stack test method.

While it is not unreasonable to allow a non-heated probe as long as the Method 5 determination is carried out carefully with respect to particulate recovery from the sampling train through post test probe washing, the IEPA provision alone is not sufficient to curb the unacceptable exercise of emission test source discretion provided in other portions of the EPA Method 5 procedures if unheated probe testing is used. In particular, the following provisions of EPA Method 5 allow Applicant sole discretion to choose a problematic post-test analytical procedure when an unheated probe is use:

> "8.1.3 Desiccate the filters at 20 ± 5.6 deg C (68 ± 10 deg F) and ambient pressure for at least 24 hours. Weigh each filter (or filter and shipping container) at intervals of at least 6 hours to a constant weight (*i.e.*, #0.5 mg change from previous weighing). Record results to the nearest 0.1 mg. During each weighing, the period for which the filter is exposed to the laboratory atmosphere shall be less than 2 minutes. **Alternatively *(unless otherwise specified by the Administrator)*, the filters may be oven dried at 105 deg C (220 deg F) for 2 to 3 hours, desiccated for 2 hours, and weighed.** Procedures other than those described, which account for relative humidity effects, may be used, subject to the approval of the Administrator." (EPA Method 5 - Section 8.1.3)

Analytical procedures in EPA Method 5 also provide for handling of sample train filters:

> "Alternatively, the sample may be oven dried at 104 deg C (220 deg F) for 2 to 3 hours, cooled in the desiccator, and weighed to a constant weight, unless otherwise specified by the Administrator. The sample may be oven dried at 104 deg C (220 deg F) for 2 to 3 hours. Once the sample has cooled, weigh the sample, and use this weight as a final weight." (EPA Method 5 - Section 11.2.1)

Method 5 also provides the following as to the probe washings in "Container 2:"

> "NOTE: The contents of Container No. 2 as well as the acetone blank container may be evaporated at temperatures higher than ambient. If evaporation is done at an elevated temperature, the temperature must be below the boiling point of the solvent; also, to prevent "bumping," the evaporation process must be closely supervised, and the contents of the beaker must be swirled occasionally to maintain an even temperature. Use extreme care, as acetone is highly flammable and has a low flash point." (EPA Method 5 - Note after Section 11.2.4)

During a Method 5 determination in which the probe and the filter holder are not heated according to procedures and standards set forth in Method 5 for PM determination in a lower temperature flue gas, what would otherwise be condensible particulate matter that would normally be collected in the back half of a normal Method 5 sampling train with a heated probe may be deposited on the filter and in the probe.

The preceding citations to EPA Method 5 in this subsection are provisions of the method allowing testing party discretion for unsupervised decisions in favor of oven treatment for Method 5 filters and thermal treatment of probe washings. When EPA Method 5 tests incorporate unheated probes and filters, such discretionary thermal methods of sample catch processing may cause unaccounted losses of the condensible particle catch deposited in the front half of the Method 5 sampling train. As a result, any permit allowance granted for Applicant (and the two other ethanol plant operators cited) must disallow all source testing discretion that would allow such thermal treatment methods of filters and probe washings to avoid PM sample losses and subsequent test underestimations on flue gas PM concentration stack test determinations.

3.3 Illinois EPA Cannot Exclude Condensible Particulate Matter from Calculating Total PM Emissions from a Source for Purposes of Major vs. Minor Source Determination

In answering comments submitted in the Marquis Energy ethanol plant NSR proceeding, Illinois EPA stated:

> "The issued permit requires that all emission testing for PM also include measurements of condensible PM. This step was taken to assure that all PM emissions testing fully quantifies PM emissions, even though the emissions of condensible PM from grain handling and milling operations are expected to very small and should not impact compliance determinations, as confirmed by the measurements at the VeraSun plant. Condensible PM emissions from these operations also will not affect the determination that the proposed plant is not a major source. This is because condensible PM is a component of particulate matter10 (PM-10) but not total suspended particulate (TSP), as generally addressed by the permit. The permitted PM-10 emissions of the proposed plant are less than 85 tons/year, compared to the major source threshold of 100 tons/year."[1]

Commenters appreciate one portion of this response committing (in both the Marquis Energy final permit and in the Illini Bio-Energy draft permit at Conditions 3.1-1(a)(i) and

[1] Responsiveness Summary for Public Questions and Comments on the Construction Permit Application from Marquis Energy, LLC for an Ethanol Plant in Hennepin, Illinois, Point #37, Page 12

3.1-1(b)-Note b) regulated parties to carrying out test determinations for condensible particulate matter emissions testing in addition to filterable particulate matter testing.

However, Illinois EPA's determination that......

> "Condensible PM emissions from these operations also will not affect the determination that the proposed plant is not a major source. This is because condensible PM is a component of particulate matter10 (PM-10) but not total suspended particulate (TSP), as generally addressed by the permit."[2]

....must be challenged as violating applicable federal regulations under the Federal Clean Air Act, the federally approved Illinois State Implementation Plant and current EPA guidance in the administrations of New Source Review programs.

We first note no provision of either the draft Illini Bio-Energy or the finally issued Marquis Energy permit contain the abbreviation "TSP" or the phrase "Total Suspended Particulate." There are numerous references to "PM" or "Particulate Matter" which involves the total mass rate of particle emissions regardless of aerodynamic diameter and which also incorporates condensible particulate in the particulate matter total emissions.

In reviewing the Illini Bio-Energy permit application, any reliance of Illinois EPA on a presumption that condensible PM is not part of total particulate matter (PM) emissions for purposes of review as to whether the subject facility exceeds or doesn't exceed the 100 ton particulate matter threshold major stationary source threshold must be rejected for violating applicable federal Prevention of Significant Deterioration regulations at 40 C.F.R. §52.21, *et seq.* These regulations are binding on the Illinois EPA administration of the delegated authority from U.S. EPA to administer the PSD program in the State of Illinois under the federally-approved Illinois State Implementation Plan at 40 C.F.R. §52.720 through §744.

Federal regulations at 40 C.F.R.§52.21(b)(1)(i)(a) establish the 100 ton threshold for major stationary source applicability for "regulated NSR pollutant(s)" that apply to the "chemical process plants," a category including Applicant's proposed facility.

Regulations at 40 C.F.R. §52.21(b)(50) define "regulated NSR pollutant" in the following manner:

> "(50) *Regulated NSR pollutant*, for purposes of this section, means the following:

[2] ibid

> (i) Any pollutant for which a national ambient air quality standard has been promulgated and any constituents or precursors for such pollutants identified by the Administrator (*e.g.*, volatile organic compounds are precursors for ozone);
>
> (ii) Any pollutant that is subject to any standard promulgated under section 111 of the Act;
>
> (iii) Any Class I or II substance subject to a standard promulgated under or established by title VI of the Act; or
>
> (iv) Any pollutant that otherwise is subject to regulation under the Act; except that any or all hazardous air pollutants either listed in section 112 of the Act or added to the list pursuant to section 112(b)(2) of the Act, which have not been delisted pursuant to section 112(b)(3) of the Act, are not regulated NSR pollutants unless the listed hazardous air pollutant is also regulated as a constituent or precursor of a general pollutant listed under section 108 of the Act." (40 C.F.R. §52.21(b)(50))

It is undeniable that condensible particulate matter is a component of PM-10 which is regulated by a National Ambient Air Quality Standard. It is further undeniable that the PSD regulation considers "particulate matter" (PM) emissions to be regulated without regard to aerodynamic diameter and, as such, is constituted by the total mass rate of emissions from a source being evaluated as to whether it is a major source under 40 C.F.R.§52.21(b)(1)(i)(a). Illinois EPA may not disregard condensible particulate matter as contributing to total potential to emit for "particulate matter" emissions when evaluating whether a source is, or is not, to be considered as a major stationary source.

3.4 PM/PM10 Potential to Emit Calculations for Multiple Process Units Employing Fabric Filter Controls Using 0.005 Grains per Standard Cubic Foot Vendor Guarantees Don't Properly Consider the PM/PM10 Potential to Emit from Process-Related Condensible Particulate Matter

Applicant's grain handling emissions uniformly feature a 0.005 grain per standard cubic foot emission factor for these fabric filter controlled units. The 0.005 factor is a common fabric filter vendor guarantee for filterable-only particulate matter (EPA Method 5 "front half" PM catch or EPA Method 201 PM10). For fabric filter units not incorporating further gas treatment, it would be industry practice not to make any guarantees for control of condensible particulate matter since such condensibles will not be controlled by fabric filter-only control units.

If the PM/PM10 potential to emit is calculated solely on the basis of a filterable-particulate-only, vendor-guaranteed emission performance emission potential, then the potential to emit for the unit will not reflect additional emissions potential over and above the maximum 0.005 filterable-only grain outlet process gas loading.

Recent tests at the Vera Sun - Fort Dodge, IA facility show (See Attachment #5) that condensible particulate emissions constitute the majority of emissions from grain handling and receiving and at hammermill discharge points. Applicant's own submittal shows stack test results with condensible particulate emissions over and above the filterable amount from DDGS feed coolers.

At the same Verasun plant (a 110 MMGalEth/year facility) of the feed cooling drum thermal oxidizer bypass, the largest proportion of emitted particulate matter came from Method 202 condensible particulate matter. Dry catch only was 0.016 lbs/hr and the Method 202 catch was 0.128 lb per hour or a potential emission of 0.56 ton/year from a source which discharges only a portion of its flow to the atmosphere. See Attachment #6.

While some of these recent tests show exemplary performance for fabric filter control of filterable particulate matter, the actual potential to emit for the subject process units will nevertheless still be based on vendor guarantees of 0.005 grains per standard cubic foot for filterable-only PM as the control units age and the fabric filter wear. On a potential to emit basis, the condensible PM portion must still be considered to be in addition to the filterable-only potential to emit.

As a result, the grain handling and feed cooler PM/PM10 potential to emit in the emission characterization of the application will all be understated by small, but still significant amounts of condensible particulate matter. While the present draft permit does make progress in the emission assessment area by requiring the Applicant to incorporate condensible PM emission testing in all particulate emission testing, this still leaves the problem of determining the total actual filterable plus condensible PM/PM10 potential to emit during pre-construction review of the subject facility. At this writing, Illinois EPA has failed to properly make the required potential to emit determination that properly incorporates condensible particulate matter for the fabric filter controlled units as all of these PTE determinations are fully occupied by a filterable only determination. While the condensible PM amounts over and above the filterable grain outlet loading of 0.005 grains per dry standard cubic feet are not enormous, they contribute to aggregate underestimated/unaccounted-for PM emissions large enough in the aggregate to push the facility as presently depicted over the 100 ton per year threshold.

3.5 Chemical Speciation Listing for EPA Method 18 Determinations Should be Extended

EPA Method 18 determinations should included all of the following specific speciated volatile organic compound emissions:

> acetaldehyde, acetic acid, ethanol, formaldehyde, formic acid, 2-furaldehyde, methanol, butyric acid, glycerol, pyruvic acid, lactic acid, propionic acid, butanol, acrylamide, acrolein, isoamyl alcohol, ethyl acetate, succinic acid, butanediol, isoamyl acetate, acetone

Several of these compounds are well known yeast fermentation byproducts with higher boiling points (100 -300 Deg C) that will be present in "syrup" that is evaporated product from thin stillage and which is introduced to DGS dryers where such material is either directly volatilized or subject to thermal decomposition and incomplete combustion.

Acrolein, in particular, is a carcinogen which is a thermal breakdown product of glycerol, a principle fermentation byproduct present in syrup.

3.6 The Draft Permit Fails to Provide Physical Throughput and/or Production Rate Limitations in Order to Limit the Potential to Emit of the Loading Rack (for VOC, CO and NOX PTE) and for Road Traffic Fugitives (for PM/PM10 PTE)

Calculation of the VOC/CO/NOX potential to emit for the subject facility at the truck loading rack and for PM/PM-10 potential to emit for the road fugitive PM/PM10 emissions unit are related issues when tanker trucks (for VOC/CO/NOX PTE) and grain trucks (for PM/PM10 PTE) are used in association with these two emission units.

Higher emissions of VOC from the loading rack and PM/PM10 from road fugitives are expected when tanker trucks are used for ethanol product shipment and gasoline denaturant deliveries (PM/PM10 only) rather than rail cars. Higher emissions of PM/PM10 from road fugitives occur when grain deliveries and DDGS/WDGS shipments are by grain trucks rather than by rail cars.

Because the loading rack VOC/NOX/CO potential to emit and the road fugitives PM/PM10 potential to emit depend on the relative proportion of utilization between tanker trucks and rail car tankers for VOC/NOX/CO PTE and between grain trucks and rail hopper cars for PM/PM10 PTE, the permit must be amended to contain federally enforceable physical limitations on the potential to emit that address and limit tanker and grain truck utilization for shipments and deliveries at the site.

While the draft permit does contain plant-wide conditions at Condition 1.1(a), (b) and (c) addressing grain throughput, ethanol production and spent distiller's grain production, these conditions are not sufficient to limit the potential to emit of truck-related emission units given the difference between truck and rail car approaches to dispatch of shipments and deliveries and the inherently different emission characteristics of each method.

The only content in the draft permit addressing tanker truck utilization is at Condition 2.9.6(c):

> "Emissions of nitrogen oxides (NOx), carbon monoxide (CO) and volatile organic material (VOM) from ethanol loadout and flaring shall not exceed the following limits:
>
> Emission Limits

Pollutant	(Tons/Month)	(Tons/Year)
NOx	0.06	0.69
CO	0.30	3.57
VOM	0.10	1.17

> These limits are based on the information in the application including emissions from the flare combustion, maximum ethanol loadout to truck (15 million gallons per year), and the loadout flare destruction efficiency (98%)." (Condition 2.9.6(c))

The last quoted paragraph cannot be explicitly construed as a prohibition on loadout shipments of more than 15 million gallons via tanker truck. At the very least, the draft permit must contain a provision which explicitly and affirmatively states such a prohibition if the potential to emit for the facility is to be limited in a federally enforceable fashion to any such emission characterization portrayals contained in the application and in the draft permit.[3]

A careful examination of the draft permit indicates there are no provisions which limit grain truck utilization for shipment of DDGS and/or wet DGS. Similarly, the draft permit should be amended to include specific, federally enforceable limits prohibiting DDGS and Wet DGS shipment that would exceed that level of shipment contained in the

[3] The reader should note that Commenters take issue with both VOC and PM/PM10 emission characterizations provided by the application. See emission unit-specific sections for such further discussion.

fugitive road dust emission characterization, which shows shipments at 100,000 tons each for DDGS and Wet DGS. Given that total spent distiller's grains in DDGS equivalents for annual production significantly exceeds the numbers of DDGS/Wet DGS shipments shown in the road dust emission characterization, a federally enforceable limit on shipments is necessary to limit the potential to emit to that level shown in the emission characterization.

Federally enforceable limits on tanker and grain truck utilization as discussed above are necessary and essential to ensuring that the overall facility remains below major stationary source thresholds for particulate matter and volatile organic compounds.

4 Discussion of Permit Regulatory Sections and Emission Calculations by Specific Plant Process Area

4.1 Emergency Diesel Engine

4.1.1 Permit Provisions

If emergency diesel engine performance depends on the use of emission control devices, such as trap oxidizers and other equipment, then additional provisions should be incorporated in Section 2.1 of the permit to ensure that such emission controls are tested, monitored and maintained to assure compliance with the stated emission factors.

Emission limitations and physical limits on the hours of operation in Conditions 2.2.5(b) and 2.2.6 should be put on a rolling 12 month average basis.

4.2 Grain Receiving, Handling, Milling, and Processing

4.2.1 Application, Process and Emission Calculation

4.2.1.1 Failure to Provide Effective Unloading Grate Area and Physically Apportioned Airflow Information Renders the Application Incomplete and It Is Thus Impossible to Ensure Compliance with Fugitive Emission Requirements

The Applicant failed to submit technical information on the design of the unloading baghouse process fugitive emissions collection system and the unloading grate area design, including the effective grate area for the major dump-pit area (marked "tbd" – to be determined). This incomplete facility characterization is unacceptable because it is impossible to know if the design of these systems will ensure that fugitive emissions will be properly collected. Any increase in the size of the flow to the baghouse to correct fugitive emission problems or failure of the fugitive emission collection system to properly function threatens to push the overall plant emissions over the major stationary source threshold for the potential to emit calculation on PM emissions.[4]

The application indicates the unloading fabric filter system with gas flow rates of 48,000 SCFM, but this system serves more sources that just the unloading pit. The General Plant Process Flow Diagram for Plant Emissions indicates that this collection system serves the following grain handling processes:

Corn unloading
Elevator leg to storage bins
Storage bin fill conveyor
Storage bin emptying conveyor
Elevator leg to corn day bin
Corn day bin

The application contains no information on the apportionment of fugitive emission gas collection system flows to each of these processes and no information on baffles or other system controls. Without the effective grate area and information on gas collection system flow apportionment in the design, there is no way to ensure that the design of the system and the grate area facial velocities will provide the claimed 95% control efficiency shown in the grain receiving and handling emission calculations.

The applicant should be considered incomplete until these details of system design are provided.

4.2.1.2 Applicant Failed to Consider and Incorporate Condensible Particulate Emissions from Hammermill and Grain Handling Fabric Filter Discharge Points

In a Method 5 and 202 test conducted at the Verasun Fort Dodge Iowa facility, a 110 MMGalEth/year facility, it was found that condensible particulate emissions constitute the greater proportion of total particulate emissions from both the hammermill and grain handling fabric filter discharge points. See Attachment #5. Method 202 condensible

[4] The major source threshold is 100 tons of PM. The source estimated potential to emit presented by Applicant is projecting 98.92 tons/year of PM; Table 1 of the permit shows 98.6 tons PM per year

PM emissions from the hammermill fabric filter were 0.069 lb/hr and were 0.132 lb/hr from the grain handling fabric filter. The combined condensible PM emissions from these two sources generate a potential to emit of 0.88 tons of PM/year at the Verasun facility.

The Application must be revised to consider condensible PM emissions from these two emission units at the subject facility.

4.2.2 Permit Provisions

4.2.2.1 Applicant's Proposed Facility is Not Entitled to Exemption From, or Contingent Compliance Schemes with Requirements on Grain Handling Operations Under 35 IAC 212.462; All Grain Receiving Fugitive Emission Controls Must be Made Mandatory Without Requiring the Contingency of an Adverse IEPA Inspection

Condition 2.3.5(b) of the draft permit states:

> "b. Individual grain handling operations shall comply with applicable requirements of 35 IAC 212.462 (see below), if a certified investigation performed by the Illinois EPA determines that such operation is causing or tending to cause air pollution. [Section 9 of the Environmental Protection Act]"

Condition 2.3.5(b) thus makes requirements under Condition 2.3.5(b)(i) through (iii) conditionally applicable on the existence of an IEPA investigation report of air pollution violation involving the grain handling dust or emissions. The provision making Condition 2.3.5(b)(i) through (iii) only applicable based on a contingency about an adverse inspection result should be stricken from the permit and the provisions of Condition 2.3.5(b)(i) through (iii) should be made mandatory for the following reasons:

First, Applicant is not entitled to the contingent approach to compliance with Condition 2.3.5(b)(i) through (iii) requirements. Section 9 of the Environmental Protection Act provides:

> "Any grain elevator located outside of a major population area, as defined in Section 211.3610 of Title 35 of the Illinois Administrative Code, shall be exempt from the requirements of Section 212.462 of Title 35 of the Illinois Administrative Code provided that the elevator: (1) does not violate the prohibitions of subsection (a) of this Section or have a certified investigation, as defined in Section 211.970 of Title 35 of the Illinois Administrative Code, on file with the Agency and (2) is

> not required to obtain a Clean Air Act Permit Program permit pursuant to Section 39.5. Notwithstanding the above exemption, new stationary source performance standards for grain elevators, established pursuant to Section 9.1 of this Act and Section 111 of the federal Clean Air Act, shall continue to apply to grain elevators."[5]

Since the entire subject facility, including the grain handling unit portion, is required to obtain a Clean Air Act Permit Program permit pursuant to Section 39.5 because this facility is actually a major stationary source of emissions, the facility is not entitled to the exemption provided in Section 9(f). Moreover, the primary activity and purpose of this facility is not to act as a grain elevator in the traditional sense that motivated the legislative intent of the statutory language. This is primarily an ethanol production plant and not a stand-alone grain elevator facility.

In granting the Illinois State Implementation Plan revision to approve the Section 9 of the Illinois Environmental Protection Act, U.S. EPA never intended these exemption to apply outside of stand-alone rural grain elevators. The subject facility is not a rural, standalone grain elevator. One of the premises for granting the federal Illinois SIP rule treatment of standalone grain elevator exemption was that modeling was performed to ensure there would not be any jeopardizing of the National Ambient Air Quality Standards for PM 10. A significant feature of the modeling effort was rural background conditions that didn't account for the presence of large air pollution sources like an ethanol plant in the neighborhood of rural, standalone grain elevators. A recent conference with EPA Region 5 confirmed that there was no intent to exempt ethanol plants with federal approval of Section 9 of the Illinois Act as part of the Illinois State implementation Plan.[6]

The facility is also not entitled to be exempted since it is a new facility under 35 IAC 212.462(e) that has a throughput over 300,000 bushels per year, and further, it doesn't qualify for an exemption under 35 IAC 212.462 through reference to 35 IAC 212.461(c) or (d). This provision is part of the presently approved Illinois State Implementation Plan and must be enforced in new source review permits carried out by the IEPA.

Second, to assure compliance with both emission limitations in the grain handling emission unit (particularly the fugitive emission limit from grain unloading) as well as compliance with PM emission limitation less than the major stationary source limit and the 95% capture efficiency control basis of the fugitive emission calculation, it is essential to ensure the design and operation of the facility to achieve the face velocity specified in

[5] 415 ILCS 5/9(f), in part

[6] December 12, 2006 telephone conference with John Summerhays, EPA Region 5

what is now contingent permit language at Section 2.3.5(b)(ii)(A). This and the related sections must be made mandatory applicable requirements under the permit rather than be contingently applicable on the basis of an adverse inspection by IEPA.

4.2.2.2 The Proposed Permit Does Not Provide Sufficient Monitoring to Assure Compliance for Grain Receiving and Handling Fugitive Emission Limitations

Once it is recognized that Condition 2.3.5(b)(i) through (iii) cannot be put on a contingent applicability basis and must be made mandatory, compliance assurance aspects of the operations in this process location must be addressed. Compliance testing procedures and parameter monitoring requirements should be put in place to ensure continued assured compliance with fugitive controls inherent in all of the provisions under Condition 2.3.5(b)(i) through (iii). These would include measuring collection system flow rates at critical locations based on a compliance test of facial velocities and establishment of set points for compliance evaluation based on flow rates, means to ensure that apportioned ACFM gas collection rates were being achieved, a periodic opacity monitoring requirement to address the no visible emission requirement and monitoring elements for each aspect of Condition 2.3.5(b)(i) through (iii). In addition, ongoing parameter monitoring and measures to assure compliance are absolutely essential to ensuring compliance with the fugitive emission limitations of Condition 2.3.6(a)(ii), (iii) & 2.3.6(b)(ii) since these are completely dependent on maintaining a 95% control level on uncontrolled fugitive emissions.

Operation of the grain unloading and hammermill fabric filter control units must provide sufficient monitoring measures to assure compliance during times when a Method 5 compliance test is not being conducted. Mere monitoring of pressure drop may be sufficient to ensure that gross fabric filter failures are detected, but fabric filter pressure drop is not a sufficiently sensitive technique to detect small leaks and other smaller fabric filter failures that will interfere with compliance with a 0.005 grains per standard cubic foot emission limitation at Condition 2.3.6(a)(i).

Use of “manufacture recommendations” in operational requirements and monitoring provisions at Conditions 2.3.5(c) and 2.3.5(d)(i) is vague and indeterminate; such provisions cannot be enforced in practice. Instead, specific enforceable requirements for emissions and parameter monitoring should be added to the permit. For example, the fabric filter pressure drop parameters and an envelope of variance from such parameters should be determined and fixed during a compliance stack test. The permit should establish a procedure by which such limitations on parameter set points and maintenances of minimal tolerances as an envelope of operation is established pursuant to a compliance stack test and communications with IEPA. The permit should require minimum standard for accuracy and testing concerning pressure drop sensing equipment.

Continuous bag leak detection systems must be put in place to ensure continued compliance withe the 0.005 grains per standard cubic foot emission limitation on the grain receiving and handling and the hammermill fabric filtration units. Merely requiring and annual fabric filter inspection is not sufficiently frequent monitoring to provide an assurance that compliance with emission limitations is being achieved.

4.2.2.3 The Permit Language Should be Amended to Preclude Straight Grain Truck Unloading Operations and Outdoor Grain Management

The permit should be amended to specifically prohibit deliveries of grain to the facility via ordinary straight grain trucks without gondola-bottom gate style unloading capability. All fugitive emission calculations for the facility assumed that all deliveries would be made by rail road cars and trucks with bottom-style loading capability. Emission factors for grain unloading from straight trucks and dump vehicles are considerably higher and were never considered in the facility emission characterization during air permitting. Any subsequent deliveries of grain by straight trucks and subsequent truck dumping would push the facility over the 100 ton/year major stationary source threshold for particulate so it is especially important to ensure that such grain deliveries do not take place through prohibitions contained in the permit.

If the facility intends to accept shipments by straight truck (for example, shipments generated by area farmers), then the emission calculation must be redone and a limit placed on the number of such vehicles per year that will allowed for grain unloading at the facility. At the very least, the Applicant must disclose the expected split between deliveries between straight and hopper bottom trucks. If the subject facility is ever intending to receive undried grain directly from area farmers, the particular emissions estimation method used for grain receiving would be a significant underestimate of actual emissions.

The permit does contain the following provision:

> "Grain from "straight trucks" (as distinguished from hopper bottom trucks) shall only be received if the grain receiving operation for such trucks is equipped with quick closing doors and an aspirated dump pit, as specified by 35 IAC 212.462(b)." Condition 2.3.5(b)

An identical provision was added to the Marquis Energy ethanol plant permit with the following comment:

> "The issued permit includes a requirement that the grain receiving area be equipped with quick closing doors and an aspirated dump pit if grain is received from straight trucks. This appropriately addresses the additional PM emissions that might accompany receiving of grain from straight trucks."[7]

The Illinois EPA reply to comments in the Marquis Energy proceeding and their subsequent identical permit language applied in the final Marquis Energy permit and the draft Illini Bio-Energy permit is non-responsive to the comments made and non-dispositive of the issues raised by Commenters.

EPA AP-42 emission factors from grain receiving are shown in the table below:

AP-42 Grain Receiving Uncontrolled Emission Factors (lbs of emissions per ton received)		
Emission Source	**PM Emission Factor**	**PM-10 Emission Factor**
Straight Truck (SCC 3-02-005-05)	0.18	0.059
Hopper Truck (SCC 3-02-005-51)	0.035	0.0078

As can be seen from the table, the uncontrolled PM emission factor for straight truck grain receiving is over 5 times higher, and the PM-10 uncontrolled factor is over 7.5 times higher, than corresponding uncontrolled emission factors for hopper truck unloading. These differences in uncontrolled emission rates must be considered by Illinois EPA in reviewing the emission characterization of a facility contemplating delivery of grain by straight trucks.

The Applicant's controlled emission rate for hopper truck unloading assumes 95% emission control efficiency for both PM and PM-10 on the basis of both choke flow conditions and an aspirated receiving chamber. Illinois EPA states that "quick closing doors" and an "aspirated dump pit" will "appropriately address" PM/PM10 emissions from the delivery of grain through straight trucks. However, Illinois EPA cannot "appropriately address" straight truck grain unloading emissions by assuming the stated straight truck control measures would produce the same controlled rate of emissions as would be achieved by hopper truck grain receiving without assuming unrealistic control

[7] Point 56, Page 19, Responsiveness Summary for Public Questions and Comments on the Construction Permit Application from Marquis Energy, LLC for an Ethanol Plant in Hennepin, Illinois

efficiencies beyond 95% or radically lower uncontrolled emission rates from straight truck loading. That Illinois EPA failed to quantify straight truck controlled emission rates indicates the agency's failed approach on this issue.

The objective is the control of fugitive emissions during loading. Under Illinois EPA's approach both hopper truck and straight truck unloading would utilize evacuated chambers for receiving grain and also, probably, choke flow conditions. As a result, all of the extra measures of control associated with managing the dramatically larger emissions of straight truck loading would have to be achieved by the "quick closing doors" indicated in the permit provision. However, doors to the grain pit from straight truck loading cannot control any fugitive emissions from straight truck loading while such loading is actually occurring since such doors must remain open to receive the grain. Simply assuming that "quick closing doors" will provide all needed control to achieve the same/similar level of control inherent in 95% control efficiency for hopper loading for inherently higher uncontrolled emissions from straight truck loading cannot pass muster as a valid technique of emission characterization in this circumstance.

Straight truck grain receiving operations must have emissions quantified separately from hopper truck receiving operations given the differences in uncontrolled emission rates. Any approach which does not achieve this receiving operation-specific emission characterization cannot ensure that grain receiving PM/PM10 emissions will not be significantly higher than shown in the application thus jeopardizing assurances that the subject facility is a minor source of PM emissions.

Once the agency recognizes that hopper truck and straight truck controlled fugitive emission rates will have inherent differentials on a per ton loaded basis, then the relative split between hopper trucks and straight trucks becomes a significant matter for limiting the potential to emit for PM and PM-10 emissions.

The permit should be amended to prohibit all outdoor storage or management piles of grain for any reason, such as storage of off-specification grain or blowdown of milled grain from upsets of the fermentation process.

More specifically, the facility must address fugitive particulate emissions from storage, loading operations and track-out from outdoor pads for conducting such operations associated with wet DGS approaches. It cannot be assumed that the surface of wet DGS piles outdoors will stay dry under all conditions and trackout of grains onto paved roads is certainly a potential source of fugitive PM emissions. Trackout may also occur if wet DGS loading takes place in an interior loading operation for wet DGS.

4.3 Fermentation Process Area

4.3.1 Applicant's Disclosures About Inlet and Outlet Fermentation Scrubber Gas Conditions Indicates that the Facility Cannot Comply with its Mass Rate and Percentage Control Emission Limitations

Applicant's submittal provided certain fermentation scrubber inlet and outlet information for process gas in the fermentation area. Applicant's information is not internally consistent and emission calculations indicate the subject facility will not be able to comply with its emission limitations under all likely operating scenarios.

Attachment #7 shows Applicant's submittal of scrubber area gas parameters and a claim of compliance with 900 lbs of VOC per MMgpy ethanol. At 110 MMgallons/year and 8760 hours per year, or the equivalent of 11.3 lbs per hour. Condition 2.4.6(b) sets an emission limitation of 11.12 lbs/hr and 48.69 tons per year. Condition 2.4.6(a) requires that the scrubber demonstrate 98% control efficiency. All of the mass rate emission limitations are essentially based on Applicant's promise of maintaining 900 lbs of VOC per MMgal ethanol.

Given Applicant's admissions about the upper and lower operating conditions of fermentation scrubber gas characteristics and operation as well as nominal average flow values for this process and control unit, Applicant will not be able to maintain compliance with emission limitations of the permit.

Attachment #8 provides supporting calculations for the table below. Mass rate emissions were calculated based on Applicant's fermentation gas inlet and outlet characteristics, gas flows and percentage control claims. The results of this effort are shown in the table below:

		Scaled Hourly VOC Mass Emission in Pounds/Hour for Outlet (Bolded numbers exceed the 11.12 lb per hour emission limit).		
Stated Inlet / Discharge VOC PPMV (as propane) under all stated conditions	**Implicit Scrubber VOC Control Efficiency**	**@ 6000 acfm (minimum)**	**@ average 11000 acfm (APC220)**	**@ 13000 acfm (maximum)**
6000 inlet / 35 outlet	99.4%	1.44 *2.2= 3.17	2.63 *2.2 = 5.79	3.11 *2.2 = 6.84
14000 inlet / 35 outlet	99.8%	1.44 *2.2= 3.17	2.63 *2.2 = 5.79	3.11 *2.2 = 6.84
6000 inlet / 300 outlet	95.0%	12.3 *2.2= **27.1**	22.6 *2.2 = **49.72**	26.7 *2.2 = **58.74**
14000 inlet / 300 outlet	97.9%	12.3 *2.2= **27.1**	22.6 *2.2 = **49.72**	26.7 *2.2 = **58.74**
6000 inlet / 120 outlet	98.0%	4.92 *2.2= 10.8	9.02*2.2 = **19.85**	10.6 *2.2 = **23.46**
14000 inlet / 280 outlet	98.0%	11.5 *2.2= **25.3**	21.1*2.2 = **46.3**	24.9 * 2.2 = **54.74**

The table indicates that the Applicant will not be able to demonstrate compliance with the 11.12 lb/hr emission limitation under a condition of 98% control efficiency given the Applicant's admissions about the range of VOC gas inlet and outlet conditions. The calculation also raises serious questions about whether Applicant will ultimately be able to comply with annual VOC emission limitations as well.

The Applicant has attempted to lull IEPA Permit Section into complacency with performance assurances written in the form of, for example, 900 lbs of VOC per million gallons of ethanol produced. There is no basis for believing such claims of performance have ever been actually demonstrated, simply based on single stack tests for three one hour periods with parameter monitoring allegedly to demonstrate long term compliance.

Applicant's admissions contain a number of factors appearing to mitigate against long term assurances of maintaining compliance with emission limitations. For example, Applicant admits the following about this process area:

> Applicant admits that scrubber water comes "directly from well" at temperatures of 47 degF to 85degF. While the permit may require the Applicant to maintain the a maximum scrubber water outlet temperature demonstrated during the compliance stack test, there is no basis for believing that will be achieved in practice without the ability to regulate scrubber water temperature. In the present case, Applicant's submittal indicates that the scrubber water comes directly from the well with no apparent indication of physical equipment or ability to independently regulate the scrubber water temperature, notwithstanding the permit conditions.

> Applicant has made no admission that it will use a programmable logic control system for automatic controls on scrubber operation to address temperature, gas concentration and flow process swings.
>
> Applicant admits that potential scrubber water must be curtailed on the basis of water balance, which is a consideration apart from maintaining the most optimum scrubber VOC control efficiency.
>
> The Applicant admits that the generation of process gas in the fermentation area is widely variable. However, Applicant hasn't submitted enough information about the time-related nature and characteristics of these process swings to ensure sufficient process knowledge to design compliance accountability measures that ensure stack testing will detect the worst case emissions.

All of these factors and admission should give IEPA pause about the actual emission characterization in this process area, particularly after review of Applicant's expected mass rate emissions based on Applicant's own admissions about process gases and their control.

In particular, IEPA should question any assertion that emissions can be characterized on the basis of performance indicators written in forms like "900 lb VOC/MMgpy." Since the fermentation process is one step removed from the final distillation process and efficiencies inherent in its evaluation, and since there is no practical compliance emission test demonstration covering the time for production of one million gallons of ethanol, this type of performance indicator must be discounted as an evaluator for overall emissions characterization.

4.3.2 Compliance Testing and Monitoring Provisions are Unacceptable

Condition 2.4.5(a)(i) provides:

> "The key operating parameters of the scrubber for the affected units shall be maintained at levels consistent with levels at which emission testing demonstrated compliance with applicable requirements:"

This language is vague and confusing since "affected units" is previously defined in Condition 2.4.3(a) to be more process units than ones that are actually controlled by the fermentation scrubber. For example, the fermentation scrubber control and limitations on the potential to emit have nothing at all to do with emissions and controls for the mixer, yeast tanks and slurry tanks which are also defined by the permit language as "affected units.”

If the intent is that “differential pressure across the scrubber” is also a “key operating parameter,” the language is confusing because “differential pressure across the scrubber” is not listed under Condition 2.4.5(a)(i). Finally, the language above is not sufficiently explicit and specific to make enforceable a process whereby the facility does a compliance test under different process operating variables and an envelope of acceptable scrubber operating parameters is determined and then made enforceable on the subject facility in order to assure compliance on a continual basis. Based on parameter monitoring, there must ultimately be a clear method that provides enforceable criteria as to when a facility must be considered out of compliance.

In particular, the language at Condition 2.4.5(a)(ii) of an operating range of the differential pressure as “defined by the Permittee” being keyed to required compliance actions is particularly offensive in that it imparts to the owner/operator sole discretion to determine the final form of an applicable requirement without reference to the determination through a compliance test or another agreed upon procedure. Such provisions are not practically enforceable in a federally enforceable synthetic minor permit. At the same time, there is nothing in Condition 2.4.5(a)(i) which defines how the key parameters of scrubber operation will be determined and applied.

Differential pressure across a packed tower fermentation scrubber is not as important as maintaining the scrubber flow rate and managing the scrubber liquid temperatures. This is a packed tower and not a high energy venturi scrubber. Scrubber flow rate and scrubber water temperatures are much more germane to proper operation and maintenance of control that differential pressure across a packed spray tower.

There is no provision in the permit that requires compliance tests conducted on the fermentation scrubber to be conducted at a process throughput rate which is at least 95+% of the maximum fermentation input rate (not ethanol output production rate).

4.3.3 Monitoring, Recordkeeping and Reporting Requirements are Inadequate

Actual uncontrolled process generation of VOCs from the fermentation process depends on the fermentation cycle in each tank, tank breathing losses, displacement vapors upon tank filling and other factors. Actual VOC emissions depend on surrogate parameters of both the uncontrolled process generation of VOCs and the parameters of scrubber operation. As a result, the recordkeeping operations required under Condition 2.4.9(a) are insufficient to reflect process and scrubber control parameters from which emissions can be determined and compliance with emission limitations assured.

It isn't clear whether Condition 2.4.9(a) are actual process operating information kept in real time on what is occurring on a continuing basis, or whether it merely reflects design operational targets.

The recordkeeping requirements of Condition 2.4.9 do not reflect all of the extensive parameter monitoring requirements of Condition 2.4.8. At a minimum, all parameter monitoring of Condition 2.4.8 must be incorporated into required recordkeeping provisions.

If the fermentation units are operated as batch operations, then recordkeeping must reflect aspects of the fermentation cycle on each of the seven fermentation tanks. That would include the time of tank filling, tank temperatures, tank blowdown to the beer well, hourly average grain fermentation rate, rate of input charge to the beer well on an hourly basis and potentially other factors. The rate of emissions would be functions of both these factors and the control device parameters. At this writing, nothing in the draft permit indicates exactly how the fermentation scrubber emissions would be calculated from the data required for monitoring and recordkeeping at times when a compliance test was not being conducted. Until there is a firm method for making usual and ordinary emission determinations from this emission unit from control device and process parameters presently listed in the draft and potentially supplemented, the permit should not issue. If emissions will instead be related solely to a function of control device parameters for the scrubber and process throughput in the fermentation area, then this decision should be committed to the record and sufficient monitoring, recordkeeping and reporting provisions should be added to support both emission determination and means to assure compliance with applicable emission limitations.

In retrospect, because of process and control device variability and because of the small margin of compliance with VOC major stationary source applicability, permit provisions for the fermentation exhaust scrubber should incorporate a continuous VOC emissions monitor which is clearly available technology and appropriate for this particular emission unit.

Condition 2.4.10(a)(i) is not specific enough to properly enforce as there is no clear meaning to what a 2.0% exceedance of conditions at 2.4.8 mean; for example, a 2% exceedance on a degree Centigrade temperature would mean something different from a 2% exceedance on a degrees Kelvin scale for the same monitored parameter. Does a 2% exceedance mean 2% above a floor or a maximum on parameter operation? The existing language is too vague and indeterminate to enforce and will lead to subjective determinations. Instead, the language should be rewritten to address parameter envelopes of expected operations proposed for establishment on control device and process parameters during a compliance stack test and a subsequent approval by IEPA.

The provision of Condition 2.4.10(a) allowing the source to operate for up to three hours in malfunction condition without making a report to IEPA is objectionable. Uncontrolled emission rates can range from 1200 to over 2000 lbs/hour with complete loss of the CO2 scrubber. Such emissions can push the facility over the annual major stationary source threshold as present potential to emit is portrayed by IEPA and the Applicant.

Instead, the Applicant should be required to cease fermentation feed preparation input while the CO2 scrubber is in a malfunction condition. Such a malfunction could be caused by something as simple as loss of scrubber water from line freezing or loss of water pumping capability.

4.3.4 The Permit Should Be Amended to Incorporate a Continuous VOC Emissions Monitor on the CO2 Scrubber Exhaust

Because of process and control device variability and because of the small margin of compliance with VOC major stationary source applicability threshold, permit provisions for the fermentation exhaust scrubber should incorporate a continuous VOC emissions monitor which is clearly available technology and appropriate for this particular emission unit. In addition to the continuous VOC monitor, the Applicant should be required also to install a continuous scrubber flue gas flow monitor for fully integrated flue gas pollutant concentration and flow characterization.

In response to a similar comment concerning the need for a continuous VOC monitor made in the Patriot Renewable Fuels permit proceeding, IEPA stated:

> "The circumstances of the fermentation process do not justify continuous emissions monitoring for VOM. First, the process is not believed to be as variable or complex as the comment implies. Second, the permit requires that the fermentation process and associated scrubber be developed and operated so as to ideally operate at no more than 80 percent of the applicable limits for VOM emissions. Third, operational monitoring is adequate to both verify proper operation of the scrubber and identify improper operation of the scrubber. Finally, monitoring for VOM emissions is not readily implemented, as monitoring for VOM poses the same issues for accurate quantification of VOM emissions that are posed by emissions testing, which USEPA has addressed in its industry specific guidance for VOM emissions testing at ethanol plants."[8]

[8] Responsiveness Summary for Public Questions and Comments on the Construction Permit Application from Patriot Renewable Fuel, LLC for an Ethanol Plant in Annawan, Illinois,

IEPA's first rebuttal finding is it self rebutted by Applicant's own submission from its submittal under "Fermentation Scrubber Discussion" in the permit application:

> "The fermentation process is not steady state, but much like a sine wave with peaks and valleys in pressure and gas flows. As a result, the scrubber will see variable gas flow rates, variable concentrations of VOCs, variable water (liquor) flow rates, and variable gas and water temperatures."

Contrary to IEPA's denial of process and scrubber variability characteristics, these are the types of circumstances that fully justify a continuous VOC and flow monitor for the subject facility's CO2 scrubber.

IEPA's second continuous VOC monitor rebuttal claim that the unit "ideally operate[s] at no more than 80 percent of the applicable limits for VOM emissions" is fully contradicted by Commenters in a prior subsection in this scrubber process unit section where we demonstrate, based on Applicant's own admissions, that the facility will not be able to meet its mass rate emission limitations under a 98% percentage reduction control requirement. In addition, we also pointed out all of the countervailing process-related factors that mitigate against maintaining this scrubber emission control unit in the most optimum state for VOC control.

IEPA third continuous VOC monitor rebuttal claim that "operational monitoring is adequate to both verify proper operation of the scrubber and identify improper operation of the scrubber" isn't effectively demonstrated since the Application has not quantitatively demonstrated the tire series of fermentation process gas generation and VOC concentration variability in a manner robust enough to properly design a compliance test protocol that would assure compliance. Given the process variability it isn't possible to know for sure that any three one hour stack test sampling periods were the most appropriate for determining the highest potential of the process for VOC emissions. As such, any parameter monitoring based on compliance tests done without full knowledge that the process was operating during a time of maximum emissions generation will also fail to assure compliance.

IEPA's final continuous VOC monitor rebuttal claim that "....monitoring for VOM poses the same issues for accurate quantification of VOM emissions that are posed by emissions testing.." is a red herring as EPA's generic scaling factor or more complex procedures can be applied to VOC continuous monitoring results done under performance specifications 8 or 8A, just as they are applied to EPA Method 25/25A stack tests.

October, 2006, point #64, p. 23

4.3.5 PM Emissions from the Scrubber Exhaust

Condition 2.4.6(b)(ii) is written on the basis that the PM emissions from the scrubber exhaust shall not exceed 0.13 lb/hr and 0.58 tons/year. However, the permit is written with no monitoring or testing conditions to verify compliance with these limits. Applicant has provided no details on physical control measures to limit PM emissions from this process unit, such as limitations on the dissolved solids concentration of water to be used in the scrubber, the average aerodynamic aerosol diameter of the spray equipment at the top of the pack tower scrubber or what type of demisting pad or other technology will be used at the exhaust, if any. In the absence of such information there is no basis to make the determination that emissions of PM matter will meet the subject limits.

4.4 Distillation Section

4.4.1 The Application is Incomplete Because No Information is Provided on Potential Emissions from Molecular Sieve Regeneration Vacuum Operations

Molecular sieve technology traditionally features two parallel process trains, with one in use for ethanol dehydration and the other in a regeneration cycle at any given time. The regeneration cycle features vacuum processing of the molecular sieve matrix to regenerate it by removing water/weak ethanol solution by vacuum. The vacuum apparatus and any condenser and steam eductors used are likely to have some type of venting. Note that the condenser associated with molecular sieve regeneration will be different from the 200 proof condenser, which is used to process the outflowing ethanol vapor output of the molecular sieves.

Although the permit shows that the oxidizers are a control unit for the molecular sieve units, the actual application process diagram fails to confirm this requirement as no control is shown for the molecular sieve. The process description in the application is incomplete in the absence of details showing the disposition of process offgases from the molecular sieve regeneration cycle.

4.4.2 Other Permit Language Matters

Condition 2.5.5 should clarify that continued operation of the oxidizer shall be maintained above a specific heat input level during the process of shutdown of the facility that has been previously demonstrated in a compliance stack test to show compliance with percentage reduction and mass rate emission limitations.

4.4.3 Distillation Process Monitoring

Condition 2.5.9(a) does not appear to require effective monitoring on a continuing basis of the distillation process unit. The provisions of this section appear only to be to maintain files identifying target operating parameters rather than being requirements to actually monitor and record such parameters on a near real time basis. As a result, such requirements cannot assure compliance with distillation process area requirements.

It isn't clear that monitoring the process parameters indicated can be used as predictive parameters on emissions from the thermal oxidizer. If the objective of process-related monitoring is to be able to determine emissions, then the gas flow from the two distillation condensers will be among the appropriate parameters of interest. If the calculation of emissions at the oxidizer exhaust associated with distillation VOC destruction is the objective then it would also be necessary to determine the mass rate of VOCs in such flows during a compliance stack test to go along with continuous volumetric monitoring. If the objective of the conditions is to try to relate VOC emissions from the oxidizer to the distillation process rate it isn't clear at all on how the four independent variables of information collected in Condition 2.5.9(a) will achieve such a purposes.

If recordkeeping is required for distillation process parameters, the presence of monitoring devices to gain such information is clearly implied. However, there are no conditions that require such monitoring devices to be calibrated, to periodically checked for accuracy and to conform to accurate measurement standards.

4.4.4 Gas Collection System Bypass

The application is not complete because there is no information on the potential for distillation area gas collection system bypass and releases, such as would occur through pressure operated relief valves and ruptured disks. If the facility intends to characterize fugitive emissions from pressure operated relief valves as zero through reliance on ruptured disks, then the permit must make the use of ruptured disks an applicable, federally enforceable requirement under the permit. If the facility intends to construct its facility with pressure operated relief valves, rupture disks, flow diversion valves or any other kind of bypass release device in the distillation system gas collection train, these devices should be listed and any emissions from them be subject to recordkeeping and reporting requirements. If these devices are incorporated in the design, reference to any such emissions should be incorporated into the provisions of Condition 2.5.9(c).

In addition, pressure operated relief valves should be subject to Leak Detection and Repair emission controls.

4.5 Thermal Oxidizer

4.5.1 Applicant Emission Factors and Calculation of PM-10, VOC and CO Are Completely Unsupported by Realistic, Process-Specific Information

The fundamental design objective of using steam tube dryers for spent distiller's grains is to lower the overall drying temperature profile and thus the potential for drying operations to cause thermal degradation to distiller's grains. Such an approach is needed to support and maintain desirable DDGS product quality characteristics. From a process standpoint, such operation means that lower dryer process gas temperatures increases uncontrolled volatile organic compound emissions from soluble organic compounds contained in "syrup" and distiller grains aqueous material without lessor potential for combustion of such VOCs within the dryer process unit. It will also tend to lower carbon monoxide and condensible particulate.

Applicant/ICM-Fagan's characterization of controlled PM-10, VOC and CO emission factors from the thermal oxidizer-controlled steam tube DDGS drying process vary significantly between the Illini Bio-Energy facility and the Marquis Energy facility. The only process difference between the two is that the RTO burners in the Illini Bio-Energy facility are two 18 MMBTU/hr units and the Marquis Energy RTO's are two 10 MMBTU/hr units. The other difference is that the Marquis plant will employs 6 steam tube dryers and the Illini Bio-Energy plant will employ 5 steam tube dryers. Yet, the table below shows the claimed significant differences in controlled emission factors between the two plants.

Controlled Emission Factor for Pollutant	Illini Bio-Energy Application (lb emission/ton DDGS Production)	Marquis Energy Application (lb emission/ton DDGS Production)
CO	0.080	0.260
VOC (not clear is scaled or not)	0.080	0.10
PM-10 (claimed to include condensibles)	0.075	0.033

In support of the claimed factors, Applicant claims the "ICM Emission Guide." However, the ICM Emission Guide is not part of the record and Applicant's reliance on it should be disallowed until it is disclosed as part of the record.

Applicant submitted emission tests from ethanol plants at Verasun Aurora, SD, the Glacial Lakes Energy, Watertown, SD, Badger State, WI and the MGP, Lakota IA plant. None of the information provides the dryer process rate at the time of the test or provides any other basis for comparing the relative magnitude of emissions. None of the particular emission information in the stack test material provided can be conclusively identified as indicating the condensible PM is included. The Verasun and Glacial Lakes information most assuredly do not include condensible PM emissions in the reported totals. Based on the Marquis Energy responsiveness summary, the Glacial Lakes Energy facility uses direct fired dryers. According to SC air regulators, the Verasun plant also uses direct fired dryers. To the best of Commenters knowledge, the remaining two plants also employ direct fired dryers. Based on IEPA's comments in the Marquis Energy case, none of the stack test information submitted in the Illini Bio-Energy case can be relied upon as justifying the controlled emission factors cited by the Applicant.

Applicant's submittal should be deemed incomplete and non-approvable unless and until Applicant submits sufficient information justifying all claimed controlled emission factors. In the absence of such information there is absolutely no way to tell whether such factors should be relied upon and such a circumstance denies public commenters due process rights in the present public comment and hearing proceeding. It is not a sufficient remedy to wait until the plant is constructed and tested to make changes to achieve compliance with emission numbers. This facility is supposed to be subjected to preconstruction review to determine emissions as IEPA determinations on such matters must not be "faith based" proceedings. IEPA should put Applicant under the obligation to submit controlled unit and uncontrolled unit steam tube dryer emission tests and the full engineering calculation basis of any emission estimates if actual test results are not available on RTO-controlled steam tube dryer units.

Even if Applicant were to rely on the Verasun test for carbon monoxide, the controlled emission factor would be on the order of 0.4 lbs CO per ton DDGS, which is higher than the factors cited in the Illini Bio-Energy application.

4.5.2 Applicant's Claimed Thermal Oxidizer Carbon Monoxide Emission Factor for the Controlled-Basis Scenario Is Not Supported by Applicant's Submittal of the Glacial Lake Energy Carbon Monoxide Emissions Performance

Applicant's submittal cites the Glacial Lakes Energy facility, but this facility is indicating a carbon monoxide emission factor of 1.21 lbs CO / ton DDGS which is, again, far higher than the factor used in calculating carbon monoxide potential to emit.

Applicant has failed to provide any more specific details as to the steam tube dryer operations, such as demonstrated uncontrolled emission stack tests at other facilities or process information on the operation of such dryers.

Applicant’s consultant has cited a factor of as high as 0.465 lbs CO per ton DDGS on another current permit application and that was assuming a 95% control basis for carbon monoxide.

In the absence of a complete application and substantial justification for the claimed carbon monoxide emission factor for the thermal oxidizer, the Application must be rejected as being incomplete. Alternative, the Application must be considered non-approvable on the basis of information the Applicant submitted indicating that the carbon monoxide emission factor is at least 1.21 lbs CO/ ton DDGS with predicted CO emissions above the major stationary source threshold.

4.5.3 Number of Steam Tube Dryers

The description contain in Condition 2.6.1 indicates the subject facility will have three steam tube dryers in two different dryer process chains. However, the APC220 form and the General Plant Process Flow Diagram and other information available for the facility indicates a total of only 5 dryers.

4.5.4 Physical Limitation on the Potential to Emit for the Thermal Oxidizer NOX and CO Emissions Will Not Ensure Compliance with the Stated NOX and CO Emission Limitation

With the use of steam tube drying it is presumed that all of the nitrogen oxide emissions from the RTO-Dryer process train will come from the RTO unit itself. The combined NOX emission limitation for both RTO exhausts taken together is shown as 15.77 tons/year in both Table I and in Condition 2.6.6(b)(i).

As written, however, there is no physical natural gas combustion limit that will assure compliance with this limitation. Condition 2.6.5(a)(iii) indicates a natural gas combustion limitation of 176 million cubic feet per year. Commenters assume this limit is applicable on a per oxidizer basis; it would be helpful to clarify that matter in the permit condition language. At 1000 BTU per standard cubic foot, that comes to 1.76E+5 BTU per RTO unit-year. At an emission factor of 0.1 lbs NOX per MMBTU, that is 17,600 lbs of NOX or 8.8 tons of NOX per year per RTO unit, or 17.6 tons per year for both units. This would exceed the listed emission limitation of 15.77 tons of NOX per year and push the entire facility closer to the 100 ton limit.

If an AP-42 CO factor of 0.082 lbs CO/MMBTU was similarly applied to the allowable BTU rate, the CO emission would be 14.4 tons/year exceeding the listed CO emission limitation of 14.28 in both Table I and in Condition 2.6.6(b)(i).

4.5.5 Hourly Limitation of the Potential to Emit for the RTO Burners

Condition 2.6.8-2(a) requires only that natural gas usage be recorded on a month basis. Such a monthly monitoring condition on a physical parameter relating to compliance with hourly emission limitations does not assure compliance with such hourly emission limitations. Monitoring and recordkeeping on natural gas combustion in the RTO units must be sufficiently detailed to record the hourly natural gas combustion rate during every operating hour of the year in order to assure compliance and to have emission limitation be practically enforceable for CO and NOX if there are no continuous monitors for these pollutants.

4.5.6 Biomethanator Gas Use in the RTO Unit Must Be Considered in Review of Physical Gas Combustion Limitations on Potential to Emit

Biomethanator gas is apparently used in the RTO for combustion, but the draft permit fails to consider the BTU input from this gas in potential to emit limitation for this process unit.

4.5.7 Dryer Cyclone Design to Maintain PM Control Effectiveness Operational Envelope Has Not Been Reviewed by IEPA and Test Evaluation Accountability is Not Required

Condition 2.6.5(b) requires the cyclones for the feed dryers to be designed to maintain "effective control of emissions across the full range of operation of the dryers..." However, this issue has never been evaluated by Illinois EPA as there is nothing in the application file on the physical or engineering characteristics of the dryer cyclones. At the very least, Illinois EPA should review the planned design of the cyclones intended for use, including review of the control efficacy features vs. flow rate characteristics of the units.

This matter also gives rise to plant maintenance and emission testing issues as well. Dryer exhaust particulate may exhibit "sticky" characteristics that may have the effect of sticking to the interior of duct work and altering the flow characteristics in ductwork immediately upstream and downstream of cyclones, and perhaps within cyclones as well.

Applicant should be placed under a preventive maintenance program requirement to eliminate any cyclone control efficiency deterioration from such cyclone operational problems.

In addition, the Applicant should be placed under the obligation to test uncontrolled and controlled PM emission rates under less than full dryer capacity operation to verify the performance of cyclone PM controls under those conditions in addition to testing at maximum process rates.

4.5.8 Low NOX RTO Burner Technology

Although the permit requires low NOX RTO burners, Applicant's emission calculation assumes a NOX emission factor of 0.1 lb NOX per million BTU and Applicant's proposed carbon monoxide emission limitation for this unit is very close to the AP-42 carbon monoxide emission factor. These NOX and CO emission factors and the emission limitations in the permit that have relied upon such emission factors are not features of actual low NOX burner technology performance. Condition 2.6.5(a)(iv) will not be practically enforceable in the absence of a requirement for Applicant to submit information and vendor performance/guarantee information for review by IEPA or to otherwise ensure that an IEPA inspection takes place during the construction of the RTO unit.

4.5.9 RTO Temperature Operational Requirements

Conditions 2.6.5(c)(i) & (ii) should be rewritten to create overwhelming primary reliance on temperature and stack oxygen conditions demonstrated during an actual test as showing compliance conditions once such a test has been completed, instead of allowing the operator to rely on manufacturer's recommendations. Reliance on such recommendations do not account for site/unit specific process conditions that may affect the ability of the unit to actually achieve compliance. Reliance on the manufacturer's recommendation at the option of the operator is a vague, indeterminate requirement that interferes or prevents practical enforceability. The manufacturer's recommendation will have never been shown to actually assure compliance of the unit with emission limitations.

4.5.10 Continuous Oxygen, Combustion Temperature and Flue Gas Flow Monitoring Should all be Required by the Permit

The permit should be amended to require continuous flue gas oxygen concentration and flue gas flow monitoring as well as thermal oxidizer combustion temperature monitoring. Flue gas flow and oxygen monitoring are required for determination of proper combustion conditions, residence time and the ability to use continuous emission monitoring information for compliance with short term time unit of mass rate emission limitations. Each monitoring requirement for such a continuous parameter monitor should include numerical tolerances on the accuracy of such measuring devices, requirements for testing to verify accuracy and the specification of required standards according to known and recognized methods (such as from ASTM) for quality assurance/quality control testing. None of these provisions should simply rely on a vague indication of ‘manufacturer’s recommendations.’ Reliance on “manufacturer’s recommendations” is too vague to be enforceable in practice.

Continuous monitoring of oxygen at the exit of the thermal oxidizer units is necessary in order to ensure that products of incomplete combustion will not be present under circumstances where the oxidizer might be subjected to excessive inlet VOC concentrations. Combustion monitoring traditionally embraces both temperature and oxygen monitoring to ensure good combustion conditions and such practices should be imposed by federally enforceable permit condition on the Applicant (along with accuracy requirements for continuous oxygen monitoring according to EPA performance specifications).

Condition 2.6.8-1(b) temperature monitoring accuracy requirements of plus or minus 15 deg F is too lenient when an upset condition at the unit is defined by operations at a temperature 50 deg F below that demonstrated during the last compliance test. In addition, the temperature monitoring requirement does not contain a federally enforceable and clear, recognized test method and frequency by which the temperature monitor accuracy will be verified and confirmed.

For other parameter monitoring, such as the damper provisions shown in condition 2.6.8, every parameter monitored should invoke a recordkeeping requirement to ensure that such material is available for enforcement purposes. In addition, for all parametric monitoring devices, each such monitoring indication that will be relied upon for ensuring compliance must feature a method by which the variance in a monitored parameter can be associated with a threshold for non-compliant operation of the source or emission unit.

4.5.11 The Proposed Permit Fails to Properly Limit the Potential to Emit for VOC and PM Emissions

By virtue of the emission factors stated in Applicant's emission characterization, the Applicant essentially admits that the potential to emit at the RTO exhaust for PM and VOC is determined by the dryer process rate as well as the control efficiency of the thermal oxidizer.

However, the draft permit as proposed contains no physical limitation to restrict the PM, CO and VOC emissions from limitations on either the dried grain production rate or the rate of charging wet grains to the dryer process units. Such a physical limitation on the potential to emit for the dryer RTO process train should be added to the permit. In addition, any such physical limitation must address the alternating ability to produce dried product at different moisture rates since limitations for fully dried DDGS are not equivalent to a limitation on partially dried spent grains. Both hourly and annual limitations on the dryer process rate should be added to the permit in order to assure compliance with both hourly and annual emission limitations.

4.5.12 The Permit Should be Rewritten with Provisions to Ensure that Any Parameter Monitoring Done for Compliance Determination Have an Associated Procedure and Criteria Used to Relate Compliance Operation During a Stack Test to Parametric Conditions During Such a Stack Test and Threshold Parametric Criteria to Ensure that Compliance is Maintained on a Continuous Basis at Times Other Than During a Stack Test

For Conditions that are established at a compliance stack test and are intended as future compliance guideposts, there should be a clear system of IEPA subsequent approval. Compliance stack tests should be used to establish a range of operating parameters under which the facility can be deemed to be in compliance with emission limitations through subsequent continuous parameter monitoring. The permit provisions to establish such ranges of operating parameters to assure compliance must be written to ensure that a source may not "cherry pick" conditions to comply with only a single emission limitation at any one time. The process of establishing an operating condition envelope for compliance operation must reflect simultaneous compliance with all emission limitations demonstrated with simultaneous and corresponding ranges of physical conditions during the test. For example, a range of combustion temperatures and flue gas oxygen concentrations during test conditions must be shown to demonstrate simultaneous compliance with all pollutant emission limitations during maximum production rate/process rate operations.

The Conditions should require all testing operations to be done at maximum process rates. In addition, further test conditions during a series of compliance stack tests should also show compliance with VOC and CO control requirements, stack gas concentration and percentage reduction requirements at the lowest thermal oxidizer heat input rate that the facility is ever expected to employ in regular operations.

For any limit depending on a rate of emission per heat input basis, this facility will pose special and complex problems for compliance monitoring that relies on F factors. The introduction of the dryer and feed cooler gases in addition to natural gas combustion means that natural gas F factors cannot be used. There must be a clear and IEPA approved procedure for determining F factors for compliance monitoring at this facility. The facility should be required to install flow monitors on all combustion stacks to use in association with any continuous monitor to detect stack gas concentrations.

4.5.13 Continuous Emission Monitoring for the Thermal Oxidizer

Both thermal oxidizer exhaust stacks should be subject to continuous nitrogen oxide and carbon monoxide emission monitoring done under QA/QC protocols similar to those found in 40 CFR Part 60, Subpart A.

Continuous emission monitoring for NOX and CO will ensure compliance with requirements that this facility maintain its emissions below the major stationary source threshold. Given the extremely small margins below predicted major stationary source thresholds admitted by the Applicant, such continuous monitoring is the only means by which the source can ensure that it does not cross such thresholds.

4.6 Package Boiler

4.6.1 Carbon Monoxide and Nitrogen Oxides Continuous Emission Monitoring at the Package Boiler Stacks Must be Required and Not Be Made Subject to a Contingent Relaxation Waiver

The permit should be amended to drop provisions allowing the facility to waive or cease its continuous nitrogen oxide and carbon monoxide emissions monitoring. The emission factor projections for nitrogen oxides and carbon monoxide are below AP-42 projections for combustion of natural gas. When a control device and its continued efficacy is needed to assure compliance with emission limitations, continuous emission monitoring should be required to assure compliance during times when compliance stack tests are not being conducted.

The operating ranges for combustion temperature and oxygen in the thermal oxidizer must reflect evaluation of continuous monitoring for both nitrogen oxides and carbon monoxide, since simultaneous compliance with both requirements will increase one pollutant while decreasing another.

Continuous monitoring recordkeeping and reporting provisions in Condition 2.1.9 should include "out of control" periods on monitoring as defined by federal continuous monitoring QA/QC regulations in 40 CFR Part 60, Subpart A.

4.6.2 There is No Federally Enforceable Operational Limit on the Amount of Natural Gas Combusted by the Package Boilers

No provision of Section 2.1 of the draft permit limits the potential to emit other than the design heat input capacity provision of Condition 2.1.5 containing a 230 million Btu/hr design provision. However, nothing in the permit prevents the Permittee from firing the package boilers beyond their design capability. Such firing might occur if degradation of the steam tubes of the boiler occurs in order to maintain the same level of steam output because of a decrease level of thermal efficiency of the boilers.

The draft permit should be revised to include federally enforceable operational limits stating that each boiler shall not be fired at a rate exceeding 230 million BTU/hour in order to have a physical limitation on throughput/production rate that limits the physical potential to emit of the unit. Merely saying that the emission calculations reflect a 230 million BTU/hour rate without actually limiting that rate with a prohibition against firing beyond that rate does not provide a federally enforceable physical heat input limitation on the potential to emit.

Condition 2.1.6(a) contains the following passage:

> "These limits are based on information in the application including the maximum firing rate (230 million Btu/hr, each), the emission factors based on the manufacturer's guaranteed data for NOx (0.04 lb/mmBtu) and CO (0.04 lb/mmBtu) and standard emission factor for other pollutants and continuous operation." (Condition 2.1.6(a))

These permit statements alleging what is contained in the application are, in fact, completely erroneous. The APC240 for the Two Package Boilers process unit indicates both average and maximum firing rates to be 520,000,000 BTU per hour, or 260 MMBTU/hour per boiler. The emission characterization section of the application indicates "2-260 MMBTU/hr Package Boilers" and calculates emissions with a rate of

520 MMBTU/hr heat input rate. In fact, the emission characterization section of the application uses 0.035 lbs of NOX and CO per MMBTU emission factors instead of a factor of 0.04 cited by the permit language above.

4.6.3 Package Boiler VOC, PM and SO2 Hourly and Annual Emission Limitations Reflect Boiler Operation at 260 Million BTU Per Hour

Contrary to the erroneously stated language in Condition 2.1.6(a) saying that the maximum firing rate is 230 million BTU per hour, the hourly and annual emission limitations for VOC, PM and SO2 reflect use of the emission factors in the application with a heat input rate of 260 million BTU per hour.

IEPA should not accommodate in permitting and regulation a situation where a source states it will operate the package boilers at 230 MMBTU/hr when it really intends to operate the boilers at 260 MMBTU/hr. Steam production is a likely bottleneck for the overall process. If the source actually intends to operate at a higher rate that the stated intentions of the application, then all of the other emission units should be re-evaluated for emissions based on potential debottlenecking.

4.6.4 Conflicting NOX and CO Annual Emission Limitations in Permit

"Combined" package boiler annual emission rates for CO and NOX contained in Condition 2.1.6(a) conflict with the CO and NOX annual emission limitations contained in Table I of the permit. The permit writer may have swapped the CO and NOX numbers on Table I. Which of these are enforceable or are both enforceable?

4.6.5 Continuing Compliance with PM, SO2, VOC and HAP Hourly Mass Rate Emission Limitations at the Package Boiler

There appears to be no compliance determination method that ensures continuing compliance with hourly mass emission limitations applicable to this emission unit for criteria pollutants and HAPs from the package boiler units. As a result, the hourly emission limitations for VOCs are not enforceable as a practical matter at times other than when a stack test is conducted and the hourly emission limitations for PM, SO2 and HAPs are never practically enforceable under the permit. If there is no recordkeeping of actual hourly heat input (as opposed to daily average hourly heat input), then there is no effective tracking by the parameter of heat input rate for these pollutants. There is a recordkeeping requirement for daily average of hourly heat input rate, but there is no federally enforceable requirement in the permit to actually conduct natural gas firing volumetric rate monitoring with a gas meter subject to quality assurance and accuracy requirements.

Condition 31.-1(a)(i) doesn't require any stack test for PM, SO2 or HAPs so those hourly and annual emission limitations are never enforceable as a practical matter since site-equipment-specific emission factors are never developed and compliance determination devolves to a purely paper exercise that may not reflect the reality of emissions from the package boiler process equipment.

If there is no monitoring requirement and no recordkeeping requirement that verifies the heat input rate on an hourly basis, there is no basis in Condition 2.1.9(f) to determine what the hourly emissions were for purposes of compliance with hourly emission limitations for every hour of the year. Moreover, the failure of the permit to actually limit the hourly heat input rate and enforce this requirement through actual monitoring of the heat input for every operating hour of the year means there can be no clear assurance that either hourly or annual emission limitations compliance will be achieved for pollutants for which there is no continuous emissions monitor.

The recordkeeping of Condition 2.1.9(b)(ii) cannot ensure compliance with maximum hourly emission rates because it only addresses recordkeeping on the amount of natural gas combusted per day. Daily average calculations cannot ensure compliance with maximum hourly emission limitations.

4.7 DDGS Cooler

4.7.1 Disposition of DDGS Flue Gas Must Be Clarified on the Record and Subjected to Subsequent Amended/Revised Public Notice and Comment

Applicant's submittal contains conflicting information about the disposition of process flue gas from the DDGS cooler fabric filter. The stack parameter table indicated a flow of 50,000 acfm. The APC220 indicates a gas discharge volume of 13,000 acfm. The process unit specific schematic diagram included in the application [apparently taken from Anderson Clymer plant] shows that DDGS cooler fabric filter flows go to two different combustion units plus atmospheric discharge. The PTE sheet and the process description contain no mention of use of DDGS fabric filter process gas discharge for combustion air in any boiler or combustion device. The main Illini Bio-Energy General Plant Process Flow Diagram shows 100% of DDGS cooler fabric filter gases being discharged to the atmosphere.

All of these physical process elements for the DDGS cooler process gas disposition cannot all be simultaneously correct. The conflicting nature and ambiguity of the process-unit-specific information presented prevent meaningful comment on the emission characterization and permit provisions since it is impossible to know for sure what configuration this process equipment will take under the circumstances.

The process gas distribution and emission characterization for the DDGS cooler process unit and any discharge must be clarified and put on the record. Because Illinois EPA's public record concerning this matter is inchoate at the time of the public notice, the clarifying information concerning the subject process area, equipment, emission characterization and process equipment must be subject to a new future public notice and subsequent public comment period. Under the circumstances it is impossible for Illinois EPA to evaluate the present material on the records and to know whether the application will comply with all relevant requirements. It is error to issue the final permit under the circumstances and it is further error to issue the permit without the public having the opportunity to evaluate the missing material and clarifying information elements as such a circumstance denies the public due process of law.

If the subject Illini Bio-Energy facility is supposed to be the same or similar to the Marquis Energy facility for purposes of the DDGS cooler, then the difference in VOC emissions must be reconciled (14.63 t/y for Marquis and 8.92 t/y for Illini Bio-Energy (IBE)). Without a definitive determination of whether IBE is employing DDGS process gas for combustion air, Commenters cannot get to the basis of the allowed VOC amounts and whether they are legitimate, whether they incorporate scaling, whether the permit should be amended to address flow monitoring of process gases from the DDGS cooler, etc. We note that IEPA did not include provision on DDGS process gas flow monitoring and determination that were included in the Patriot permit as issued.

4.8 Cooling Tower Process Unit

4.8.1 Monitoring of the Cooling Tower

The permit should require monthly monitoring of the total dissolved solids (TDS) content of the recirculating cooling water to ensure that the TDS aqueous concentration does not exceed 2500 ppm. The Applicant must be put under a condition requiring cooling tower blowdown and appropriate water addition whenever TDS reaches 2500 ppm.

The permit should be amended to require quarterly measurements of the ethyl alcohol content of cooling water measured at a point directly process-downstream of the 190 and

200 proof condensers at least quarterly to ensure that no breach of the condenser heat exchangers has occurred through corrosion or degradation during the life of the plant.

The permit should be amended to physically limit the potential to emit by requiring that the cooling water recirculation rate shall not exceed the value on an hourly and on an annual basis that was used in the emission calculation. Such a physical limit on the potential to emit for the cooling tower is important because cooling water may very well be one of the process bottlenecks for the subject facility.

4.9 Flares

4.9.1 Enforceable Physical Limitation on Biomethanator Flare Potential to Emit

The permit should be amended to limit the number of hours of operation of the bio-methanator flare to no more than 4380 hours per year to support the emission characterization.

4.9.2 VOC Emissions Estimate is Too Low

The Applicant took the AP-42 VOC emission factor for a flare of 0.14 lbs of TOC per MMBTU and assumed that the methane and ethane content of the flare gas proportion of 63% could be deducted from the factor. As a result, the Applicant rolled the emission factor back to 37% of its total based on an assumption that only regulated VOCs would be accounted for in the flare combustion. Applicant thus used 0.052 lb PM per MMBTU as their emission factor for the flares..

This is a flawed and unsupportable approach producing an underestimate of expected VOC emissions from the biomethanator flare. The Applicant took full credit for what EPA indicated in AP-42 was 8 volume percent emissions of ethane/ethylene, but ethylene is a regulated VOC. Further, ethane is not a likely product of incomplete combustion of ethanol vapors because of the presence of oxygen and its position in the ethanol molecule.

Applicant should be required to recalculate biomethanator flare emissions using the AP-42 emission factor with no methane/ethane deductibles..

4.9.3 Particulate Emissions

The Applicant showed zero biomethanator flare particulate emissions and IEPA’s emission’s table shows 0.44 tons/year of PM/PM-10.

Applicant did not account for condensible particulate matter emissions from "smokeless" flares. At the very least, the flares should be considered as emitting condensable particulate matter at a rate equivalent to AP-42 natural gas combustion rates for condensible PM emissions.

4.10 Fugitive Road Dust Emissions

4.10.1 Applicant Has Underestimated Particulate Emissions from Site Roadways by Using an Unrealistic Silt Loading Factor Not Supported by AP-42 Factors and Not Typical of Agricultural Commodity-Related Facility Roads as Demonstrated by the Experience of Other Nearby States

4.10.1.1 Applicant's 0.4 g/M^2 Silt Loading Factor is Not Supported by the Text of the Relevant AP-42 Standard

Applicant has proposed and IEPA has tentatively accepted use of a silt loading factor of 0.4 g/M^2 in arriving at emissions estimates of 33.74 tons of PM per year. Applicant's claim of an average factor of 0.4 g/M^2 for silt loading on a non-public road and that this is based on the relevant AP-42 factors is not correct. Applicant's road network is not a public road network. Applicant will operate industrial paved roads on the site.

Even if Applicant's road network was a public road, the minimum factor cited as the "ubiquitous baseline" for public roads with less than 500 average daily traffic (ADT) volume is 0.6 g/M^2. Even this factor is subject to multipliers associated with winter road treatments for anti-skidding.

Calculation of Applicant's fugitive road dust emissions using 0.6 g/M^2 with all other factors being the same would yield expected particulate emissions of 43.9 tons per year. This amount of emissions would put the entire facility over the major stationary source emission threshold for particulate matter.

4.10.1.2 Applicant's 0.4 g/M^2 Silt Loading Factor is Not Supported by Actual Industry Experience, Accepted Permitting Practices and the Common Practices of Other Nearby State Jurisdictions

A review of actual industry data of silt loading factors and permitting practices of other nearby states involving silt loading factors is reviewed in the table below:

Case	**Description of Cited Information**	**Silt Loading Factor Cited (g/M^2)**	**See Attach-ment**
MN-1	Measured silt factor at a cereal production facility – Malt-O-Meal cited at air modeling training	0.5	1
MN-2	Measured silt factor in summer at ethanol plant – Chippewa Valley- Benson	0.6	1
MN-3	Measured silt factor in summer at ethanol plant – ADM Marshall, Year 2001 (no cleaning)	0.76 to 2.93	1
MN-4	Measured silt factor in summer at ethanol plant – ADM Marshall, Year 2003 (with cleaning)	0.7 to 0.72	1
MN-5	MPCA Policy - do extensive on-site testing/cleaning, or use AP-42 industrial road values	7.4+ for industrial roads	1
NE-6	Nebraska PSD permit for Archer Daniels Midland Company - Columbus, NE	3.0 - uncontrolled 1.26 - controlled permit limit	2
NE-7	Nebraska PSD permit for Cargill, with actual silt loading values tested by Cargill-MCP	0.92	3
IN-8	Indiana minor source permitting practice for Anderson Clymer and ASA Linden, LLC, with factor taken from AP-42 public road “ubiquitous baseline”	0.6	4

Actual test values at shown in the table indicate that a 0.4 g/M^2 silt loading factor used for emission characterization of the subject facility is too low to reflect loadings actually achieved in practice by the selection of ethanol or agricultural commodity facilities.

In particular, where there has been a prevention of significant deterioration review of fugitive emissions from roads and associated silt loading assumptions, the Applicant and IEPA cannot maintain that the failure in the present case to require any kind of verification or numerical certainty for road fugitive emission controls can achieve lower silt loading than provided for such PSD facilities.

Given that a 0.6 g/M^2 silt loading produces a particulate emission projection that causes the entire facility to exceed the major stationary source threshold, all of the other loadings in the table higher than 0.6 which would appropriately apply to Applicant would make such an exceedance even larger.

4.10.1.3 Nothing in the Draft Permit Requires a Determinant Amount of Fugitive Road Dust Control That Can Be Assured of Achieving the Claimed Low Particulate Emissions

The draft permit contains no measures which will ensure that the 0.4 g/M^2 silt loading and the associated limitation on emissions will actually be achieved. There are no firm requirements for periodic sweeping and cleaning that would allow such a level of silt loading performance to be achieved. Mere reliance on a future plan and completely Applicant-discretionary measures which are not enforceable in practice cannot ensure compliance with the claimed emission limitation.

At a minimum, any permit based on such a low level of silt loading should contain a permit provision actually requiring this silt loading level to be achieved in practice, together with quarterly testing requirements, recordkeeping and reporting. No such measures are presently in the draft permit.

4.10.2 The Applicant Understated the Required Number of Trips for Tanker Truck Shipments of Denatured Ethanol in the Fugitive Road PM/PM10 Emission Characterization

The Applicant's fugitive road PM/PM10 emission characterization contained an entry for delivery of denaturant for at trips of a 7500 gallon tank truck for 5.5 million gallons of denaturant that would be expected for a 5% denatured concentration in the finished product at 110 million gallons of product per year.

A second entry showed 1267 truck tanker trips for 9.5 million gallons of denatured ethanol product. However, the potential to emit calculation for the loading rack and Condition 2.9.6(c) of the draft permit show 15 million gallons of shipments of denatured ethanol product via tanker truck. Denatured ethanol shipments at that level would require a total of 2000 truck tanker trips and not 1267 tanker trips. As a result, the worst case potential to emit calculation for fugitive road PM/PM10 is understated for operations with truck tanker equipment.

While it is possible that loaded trucks bringing denaturant to the facility would leave loaded with denatured ethanol product, there is no assurance provided in Applicant's submittal that this will happen. As a result, a worst case potential to emit calculation for fugitive road emissions must consider the potential 2000 truck trips for tankers for denatured ethanol product shipments.

4.10.3 Applicant's Site Map Depiction of Truck Weighing Stations, Applicant's Fugitive Road Emissions Calculated Relationship Between Number of Truck Trips and Vehicle Miles Traveled and Grain Truck Dispatch for Loaded In/Loaded Out Utilization Are All Unclear in the Application

Poor presentation quality and reproduction of Applicant's site plan prevents Commenters from determining the location of weigh scales in review of the site plan. As a result, Commenters cannot know for sure whether trip in/trip out mileage information in the fugitive road emission calculations representative of what is envisioned for the project based on the site plan.

Although the Applicant indicates 0.4 miles in and 0.4 miles out as road basis for the fugitive emission calculation, the fugitive road emission characterization indicates 1.5 miles for each trip, except for wet DGS. The Application does not explain the basis for the 1.5 mile per trip factor used and the failure of the site plan to verifiably locate the truck weigh scales interferes with Commenters review of Applicant's submittal.

Finally, it isn't clear from the application whether some of the grain truck deliveries will be on a loaded with grain in and loaded with DDGS out basis.

4.11 Product Loading Rack Emission Unit

4.11.1 Transportation Equipment That is Attached to the Loading Rack Becomes Part of the Loading Rack Process and Emissions Unit

The subject facility intends to operate by connecting truck and rail tanker transportation equipment to the loading rack. As such, such transportation equipment is part of the loading rack emission unit and the subject stationary source of air pollution when it is connected to the loading rack and when such tankers are involved in loading operations.

When connected as part of the loading rack emission unit, the design and performance characteristics of the tanker transportation equipment is part of the physical design of the emission unit and must be considered as part of the potential to emit for the emission unit as a whole.

IEPA's draft permit fails to limit the potential to emit for both point source and fugitive emissions of the loading rack emission unit by failing completely to specify any federally enforceable conditions to control the design and performance of such transportation equipment that the Applicant is permitted to utilize for product shipments. This failure has important consequences for both emissions characterization and physical limitations on the potential to emit as outlined in subsequent parts of this subsection.

4.11.2 The Applicant Has Failed to Use the Appropriate Saturation Factors in the Truck and Railcar Loading Volatile Organic Compound Emission Calculations Thus Significantly Underestimating Loading Rack Process Area VOC Emissions

4.11.2.1 Applicant Has Not Provided for Submerged Loading Requirements at the Loading Rack in the Application and the Draft Permit Excuses Applicant From Any Submerge Loading Requirements

A diligent review of Applicant's entire submittal shows no design details, process narrative, drawings or other information showing either the design of the truck tanker and railcar loading racks or explicit design of the loading device and collection system, other than the specification that gases collected by the system will be routed to a flare. The Applicant has not committed to either submerge fill or submerge bottom loading at the prospective operation.

Condition 2.9.4(b) of the draft permit explicitly releases Applicant from any potential obligation to use submerged loading pursuant to 35 IAC 215.122(a); that IEPA rule provides:

> "No person shall cause or allow the discharge of more than 3.6 kg/hr (8 lbs/hr) of organic material into the atmosphere during the loading of any organic material from the aggregate loading pipes of any loading facility having through-put of greater than 151 cubic meters per day (40,000 gal/day) into any railroad tank car, tank truck or trailer unless such loading facility is equipped with submerged loading pipes, submerged fill, or **a** ***device that is equally effective in controlling emissions*** **and is approved by the Agency** according to the provisions of 35 Ill. Adm. Code 201." (35 IAC 215.122(a)) (emphasis added)

In the present situation the Applicant has provided no details, specifications, designs or performance measures for the truck tanker and railcar product loading rack and offgas collection system other than merely saying that collected process gases will be directed to a flare. There is absolutely no Applicant commitment portrayed anywhere to submerged loading as the intended equipment for installation.

Applicant's permit application submittal thus contains no specification of the design of the loading rack for submerged loading and no provision of the draft permit requires a submerged loading design and work practice for the loading rack process equipment. The applicant is thus free to engage in any type of loading practices it chooses since the mere mention of the word "submerged" next to the emission factor in Applicants emission calculation is not sufficient to make submerged loading a federally enforceable requirement, particularly when the direct language of Condition 2.8.4(b) directly contradicts any interpretation that the permit requires submerge loading.

Under these circumstances, there is nothing in the application and draft permit which limits the potential to emit of the loading rack by specifying a clear design basis for submerged loading. Applicant is entirely free to engage in splash loading of both tanker trucks and railcar tankers without violating any federally enforceable physical limitation on the design basis for limiting the potential to emit.

The draft permit must be amended to require submerged loading in order to physically limit the potential to emit for the loading rack through a design and operational requirement in order to ensure that allowed emissions from this emissions unit does not exceed what has been depicted in Applicant's emission characterization.

4.11.2.2 Illinois EPA's Decision in Making a 35 IAC 215.122(a) "Equally Effective" Determination for Applicant's Loading Rack Vapor Control System, While Excusing Applicant from Submerged Loading Requirements and When No Record Exists in Application Materials to Support Any Such Finding, is Erroneous

IEPA has failed to make any findings of fact on its "equally effective" determination under 35 IAC 215.122(a) other than the blunt assertion contained in its draft permit condition. Under these circumstances, with Applicant's failure to provide any details in the application, IEPA has made an erroneous final determination that Applicant's capture and venting system from product loading racks is "equally effective" as submerged loading pipes under the provisions of 35 IAC 215.122(a).

Since draft permit Condition 2.9.4(b) excuses the Applicant from any requirement for either "submerged loading pipes" and nothing in the permit requires submerged bottom loading [and nothing in the Applicant's submittal shows that bottom loading will be provided], the reasonable conclusion is that nothing ensures that One Earth Energy will be using submerged loading. Splash loading will significantly increase loading losses to be controlled and nothing at all in the Application or the draft permit shows why the capture system is somehow "equally effective" within the meaning of 35 IAC 215.122(a).

4.11.2.3 Applicant Has Made No Reliable Certifications Concerning the Truck and Railcar Tanker Transportation Equipment to be Loaded by the Facility and the Draft Permit Contains No Requirements Binding on the Applicant as to the Service Status and Emission Control Efficacy of Transportation Equipment That Will be Loaded at the Facility

The Applicant has used an emission calculation saturation factor for “Submerged loading: dedicated normal service,” but nothing in the application ensures that either the truck or railcar transportation equipment will actually be in “dedicated normal service.” Applicant’s August 10, 2006 “potential to emit” calculation states in the “notes:”

> Trucks assumed carrying gasoline (worst case) prior to taking on load of denatured etoh.”

A potential to emit calculation must reflect the highest amounts of emissions that can occur consistent with equipment design constraints and federally enforceable physical limitations on the potential to emit.

As to the matter of Applicant’s claim of “worst case” emissions characterization, we must first address the status of the transportation equipment. The emission factor section of AP-42 –sec. 5.2 is instructive:

> “The recent loading history of a cargo carrier is just as important a factor in loading losses as the method of loading. If the carrier has carried a nonvolatile liquid such as fuel oil, or has just been cleaned, it will contain vapor-free air. If it has just carried gasoline and has not been vented, the air in the carrier tank will contain volatile organic vapors, which will be expelled during the loading operation along with newly generated vapors.
>
> Cargo carriers are sometimes designated to transport only one product, and in such cases are practicing "dedicated service". Dedicated gasoline cargo tanks return to a loading terminal containing air fully or partially saturated with vapor from the previous load. Cargo tanks may also be "switch loaded" with various products, so that a nonvolatile product being loaded may expel the vapors remaining from a previous load of a volatile product such as gasoline. These circumstances vary with the type of cargo tank and with the ownership of the carrier, the petroleum liquids being transported, geographic location, and season of the year.
>
> One control measure for vapors displaced during liquid loading is called "vapor balance service", in which the cargo tank retrieves the vapors displaced during product unloading at bulk plants or service stations and transports the vapors back

> to the loading terminal. Figure 5.2-5 shows a tank truck in vapor balance service filling a service station underground tank and taking on displaced gasoline vapors for return to the terminal. **A cargo tank returning to a bulk terminal in vapor balance service normally is saturated with organic vapors, and the presence of these vapors at the start of submerged loading of the tanker truck *results in greater loading losses than encountered during nonvapor balance, or "normal", service.*** ”[9] (emphasis added)

Apart from Applicant's statement that tanker trucks in prior gasoline service are expected for use, Applicant has provided no information and made no commitments and/or certifications as to the status of the transportation equipment being loaded. Applicant's claim that its emission characterization supports a "worst case" basis is without merit since tankers which have serviced other tanks in on a vapor balance basis may be loaded at the site and such tankers will have greater vapor saturation than tankers in dedicated normal service which has been assumed in the emission calculation provided by Applicant through use of the 0.6 saturation factor.

In practice with Applicant's proposed facility, truck tankers loaded with gasoline at refinery and bulk terminal locations can take their loads to gasoline service stations loaded in vapor balance service and, after they have delivered those loads they can then be used to accept a load of denatured ethanol for transport back to a refinery or another gasoline product blending location. However, trucks in "dedicated normal"gasoline service are neither the norm, nor the worst case emissions situation based on AP-42 Section 5.2 saturation factors. The norm is now "dedicated vapor balance service" for vehicles delivering gasoline to marketing points through stage 1 controls.

Transportation equipment in "dedicated vapor balance service" will receive most of the tank displacement vapors from gasoline market stations tanks and other product customer tanks that are filled, whereas in "dedicated normal service" the larger proportion of the gasoline station underground tank displacement vapors will be vented to the atmosphere or another "non-truck-tanker, non-vapor balance" emission control system. "Vapor balance service" truck tankers (and not "normal service" tankers) are thus both the worse case and should thus be the most probable case scenario for potential to emit calculations.

"Vapor balance service" will also occur for rail tanker transportation equipment. Nothing in the draft permit limits the potential to emit for rail car loading rack emissions by constraining, in any way all, the type of service for such rail cars. If the Applicant

[9] EPA AP-42 Section 5.2 Emission Factors for "Transportation and Marketing of Petroleum Liquids"

intends to use dedicated denatured ethanol service rail tank cars, then they should amend their application to assert this standard and the draft permit should be amended to specify whether all or a portion of rail tank cars will be in "normal service" with the potential to emit calculation adjusted accordingly along. In the absence of clear, federally enforceable assurances that the assumptions of the potential to emit calculation will, in fact, be incorporated in actual design and operations, then it should be assumed that all rail tankers will be in "vapor balance service" rather than "normal service" for purposes of selecting the higher AP-42 VOC saturation factors implicit with "vapor balance service."

4.11.2.4 Because of Applicant's Selection of an Inappropriate Loading Loss Saturation Factor of 0.60 for Truck and Railcar, Loading Rack Potential to Emit is Understated

Applicant assumed a saturation factor of 0.60 for emission calculations on both truck and railcar tanker loading; EPA indicates the 0.60 factor as being appropriate for "Submerged loading: dedicated normal service."

The preceding subsections indicate that the permit application and the draft permit cannot be relied upon to assure that transportation equipment loaded at the subject facility will necessarily be under "submerged loading: dedicated normal service." Accordingly, the potential to emit calculation should show the worst case design and operational performance as assuming "splash loading; dedicated vapor balance service" for truck tankers and "splash loading,""dedicated normal service" or "clean cargo tank" for railcar tankers.

Under these kinds of loading and service, expected VOC emissions after flare control will be between 160% to 240% of the 0.67 tons/year indicated in the application for point source flare stack potential to emit from truck loading and 0.51 tons/year from rail car loading. Aggregation of such VOC emissions increases from correct assessment of the uncontrolled tank VOC saturation factor changes will cause expected total source emissions to exceed 100 tons of volatile organic compounds.[10]

[10] Note that this prediction of expected flare stack point source PTE consequences of failure to properly handle the saturation factor issue will be somewhat diminished if a 10-30% VOC process fugitive loss of the combined collection system is presumed, as per the discussion in subsequent sections.

4.11.3 Applicant's Potential to Emit Characterization of Emissions for the Loading Rack Emission Unit is Defective Because of Failure to Account for Less than 100% Overall Capture Efficiency of Tank Displacement Vapors and Subsequent Fugitive Volatile Organic Compound Emissions in the Potential to Emit Calculations

4.11.3.1 No Provisions in the Draft Permit Provide Federally Enforceable Requirements Ensuring That All Truck and Railcar Tankers to be Unloaded at the Facility Shall Meet Appropriate Vapor System Collection Efficiency and Vapor "Tightness" Performance Standards and That the Facility Ensure Compliance with Such Requirements Through Monitoring, Recordkeeping and Reporting

Nothing in the draft permit requires that the Applicant not load a truck or railcar unless that transportation equipment has passed an annual leak test for vapor tightness and that any conveyance portions of vapor control systems on the tanker itself are properly installed and operating before the facility loads that tanker. On board tanker vapor collection systems include piping, hatch opening seals, block valves, vapor control valves, vacuum breakers, etc.

Proper operation and collection efficiency of vapor collection systems depends on both the fixed elements at the ethanol rack process area as well as mobile elements on the transportation equipment. Failure to hold Applicant responsible for not loading non-compliant and leaky truck and railcar tankers will significantly increase fugitive volatile organic compound emissions from product loading operations.

4.11.3.2 Applicant and Illinois EPA Have Failed to Properly Characterize Fugitive Volatile Organic Compound and Hazardous Air Pollutant Emissions From the Denatured Ethanol Loadout Operations by a *de facto* Assumption of 100% Loadout System Capture Efficiency When There is No Basis for Such Assumption; AP-42 Emission Factors Don't Countenance 100% Capture Efficiencies

Neither the Applicant nor Illinois EPA have properly characterized all volatile organic compound and hazardous air pollutant emissions from product loading operations at the denatured alcohol product loading rack emission unit. The Applicant claims that the emission determination conforms to AP-42 - Section 5.2, "Transportation and Marketing of Petroleum Liquids." Notwithstanding this claim, the Applicant nevertheless failed to follow the emission determination procedure set forth in this AP-42 guidance.

Specifically, Applicant's emission characterization fails to consider fugitive VOC emissions from product loadout operations. The relevant AP-42 section states:

> "The overall reduction efficiency should account for the capture efficiency of the collection system as well as both the control efficiency and any downtime of the control device. Measures to reduce loading emissions include selection of alternate loading methods and application of vapor recovery equipment. ....However, only 70-90 percent of the displaced vapors reach the control device, because of leakage from both the tank truck and collection system. ***The collection efficiency should be assumed to be 90 percent for tanker trucks required to pass an annual leak test. Otherwise, 70 percent should be assumed***."[11] (emphasis added)

All of Applicant's emission characterization and Illinois EPA's review and permitting activity on the product loading rack operation have effectively assumed 100% capture efficiency when there is no basis in the draft permit and the application to make such an assumption or to assume that such a 100% capture efficiency will be actually achieved in practice. Nothing in the permit provides federally enforceable conditions requiring that the combined loading rack-tanker emission unit system together ensures 100% capture efficiency.

Applicant admits[12] to a total of 58.9 tons/year of potential uncontrolled volatile organic compound emissions possible from truck tankers as well the rail tanker loading units from denatured ethanol product loading operations.

There are no restrictions in the permit to limit the number and type of such vehicles for loading operations. Since nothing in the permit holds the Applicant responsible for not loading any tanker unless it has passed an annual leakage test, the AP-42 - Section 5.2 emission determination recommends a 70% capture rate. This means that actual fugitive VOC emissions calculated on the basis of potential to emit would be 17.67 tons per year. If a 90% capture efficiency is assumed, the fugitive VOC emissions from loading operations would be 5.9 tons per year. Either of these additional fugitive VOC emissions not considered by Applicant or Illinois EPA would put Applicant's proposed facility over the 100 ton VOC major stationary source threshold. Applicant/IEPA similarly

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[11] EPA AP-42 Emission Factors for Transportation and Marketing of Petroleum Liquids, Section 5.2.2.1.1. Loading Losses, Page 5.2-6

[12] Applicant's emission calculation uses saturation factors in the calculation of loading rack uncontrolled VOC emissions that are challenged as being significant underestimations in prior subsections of this comment.

underestimated HAP emissions by failing to account for fugitive emissions from loading operations. Such fugitive HAP emissions must be considered on whether the facility becomes a major HAP emission source under Section 112 of the Clean Air Act and thus subject to case by case MACT requirements.

4.11.4 Applicant Has Failed to Properly Characterize Particulate Emissions from the Loading Rack Flare

While assuming “smokeless design” in the application for the loading rack flare, such a design should not excuse Applicant from characterizing the particulate emissions from such a flare. Applicant has assumed zero flare particle emissions. Most of the emissions would be expected to be condensible particulate emissions. At a minimum, Applicant should have attempted to quantify flare particulate emissions using emission factors for condensible particles from natural gas combustion. There is no reason to believe that combustion of gasoline vapors and ethanol in a flare would produce less Condensible particulate matter than consumption of natural gas, which is primarily methane, on lb PM per MMBTU heat input basis.

4.12 Fugitive VOC Emissions from Plant Components

Applicant’s emission characterization failed to indicate and consider the number of pressure relief valves, open ended lines and sampling connections which will have emissions. These three types of components must be listed and subject to Leak Detection and Repair (LDAR) requirements. In addition, if ruptured disks are used as a control on pressure relief valves, the maintenance and use of such disks must be secured by permit requirements as a federally enforceable physical condition limiting the potential to emit through facility design and operational requirements.

4.13 Miscellaneous VOC Emission Sources

4.13.1 CIP Mash Screen

In the emission characterization section of the application the emission calculation in “Fugitive VOC Survey” indicates the CIP Mash Screen and Centrate Tank would be controlled by the thermal oxidizer. However, Attachment A of the draft permit shows the CIP Mash Screen without control, so the permit is written to allow uncontrolled emissions from this unit.

The CIP Mash Screen were not incorporated into the application's miscellaneous VOC emission sources of 0.65 ton/year.[13]

4.13.2 The Basis for Allowing Uncontrolled Tank Process Units is Inadequate; If Allowed, Uncontrolled Tanks Must be Monitored for VOC

The application attempts to discount the need for controlling VOC emissions from several process tanks on the basis of brief OVA measurements on a much smaller facility. Nothing in the application indicates that the tank process variables and design are the same or different between the planned facility and the one for which measurements were done. For example, it is impossible to know from the application whether the tanks envisioned for the proposed facility and the tanks whose emissions were measured on the smaller facility both had submerged fills – a detail which would be extremely relevant as to whether the emissions are comparable.

The emission projections for the vents on the stillage tank, the syrup tank, the cook water tank, the liquifaction tank and the whole stillage tank were all calculated on the basis of the CFM discharge rates on tanks from a plant with only 41% of the production capacity of the subject facility. There is no reason to believe the tank vent discharge volumes used to calculate the emission rates will be the same with the proposed larger facility with higher throughput volumes and larger tanks. This facility has projected potential to emit VOC emissions that are no more that about 1.45 tons/year below the major stationary source threshold for VOC emissions. Failure to properly consider the potential of these small emissions to add up and put the overall facility over the plant-wide 100 ton/year potential to emit limit will likely lead to improper permitting and regulation of this facility. At the very least, the permit should require periodic monitoring of such process vents and a requirement that such vents be controlled if found to release VOC emissions that push the facility over the major stationary source limitation.

4.13.3 The Application Does Not Consider Emission Potential of Thin Stillage Evaporation-Condensing Process

Although the process flow diagram in the application and the process description contain information showing that the concentrated aqueous stream from the evaporators is mixed with the wet grains from the centrifuge before drying and that the evaporated water is sent

[13] The entire scope of emissions in this estimation was occupied completely by VOC emissions from vents on the thin stillage tank, the syrup tank, the cook water tank, the liquifaction tank #1 and the whole stillage tank.

to the methanator, this description is not sufficient to ensure that emissions of VOCs are not released as overhead vapor flow from a condensation operation to which evaporator vapors are directed. There is no information on whether eductors are used as a motive force for condenser throughput and whether there is any atmospheric discharge associated with evaporation-condensation-evaporator hotwell process for treating thin stillage.

It is difficult to believe that there is no vent at all associated with the evaporator condenser process train in this area and that non-condensibles gases will be completely eliminated.

4.13.4 The Application has Failed to Properly Characterize the Wet Distiller's Grain Handling, Storage and Loading Emission Unit and to Calculate its Annual Potential to Emit for VOC Emissions

The Application is not complete because there are no firm details on how wet distiller's grains and modified wet distiller's grains will be managed. There is no information in the application on the expected dispatch of spent distiller's grain between drying operations and the wet grain and modified wet grain product management options. Because there is no information on process management in this area, no information on the temperature of the material as it is handled, transferred and stored in buildings or in the open from any screening operation, no information on exposed surface area, indoor vs. outdoor management, etc. the application is not complete and any emission characterization in the application for this emission unit lacks credibility.

If outdoor, uncovered storage of wet distiller's grains is used, such a storage management unit poses a risk for water pollution from stormwater leaching and transport from the pile, including the likelihood of high BOD5 releases. If such stormwater is controlled in a pond, such a wastewater management unit must also be considered a potential emission unit in addition to the outdoor storage pad itself.

4.13.5 Cook Water Tank

The cook water tank is listed at Condition 2.4.2 as being an uncontrolled vent in the emission characterization of the application. The cookwater tank receives once through flow from the CO_2 scrubber and should contain significant amounts of ethanol and other volatile organics from that source.

Applicant's process stream diagram shows the cookwater tank receives water from the CO_2 scrubber, the biomethanators and side stripper bottoms. The Application should be regarded as incomplete until Applicant discloses the organic compound content of the cookwater tank and allows a Henry's law determination of expected VOC emissions.

In answer to comments on the Marquis Energy proceeding, IEPA indicated that the venting from such a tank was about 50 cfm at under 50 ppm. This is a greater emission than the Applicant has listed for the cook water tank under miscellaneous VOC emission sources in the present application, with the cook water tank being the second largest of the miscellaneous VOC sources listed.

At the very least, the Applicant should be required to measure and report emissions from all such miscellaneous VOC sources.

The Applicant admits that the mixer requires control by the thermal oxidizer. All of the VOC emissions potential of the mixer – a controlled emission unit – either comes 100% from the ethanol contaminated cook water, or otherwise Applicant has not properly admitted that milled dry corn also releases volatile organic compounds. Applicant's emission characterization for the cook water tank also suffers from being a derivation from a 40 MMgal/year example plant rather than for the considerably larger subject facility. In addition, it isn't clear that the flow rate indicated in the application represents tank displacement losses instead of breathing losses. Cook water tank temperature will also influence emissions from this unit as well as tank configuration and method of fill. None of this information is provided in the application.

The cook water tank should be required in the permit to be controlled by the thermal oxidizer.

4.13.6 Knockout Drum

There is no indication in the application as to air implications of wastewater collected in the knockout drum and its subsequent treatment and management. The knockout drum is used to reduce PM emissions from the thermal oxidizer associated with liquids and aerosols entrained in waste gas flow. In the Marquis Energy proceeding, ICM indicated that knockout pot liquids were used for boiler feedwater, but venting in such systems certainly has the potential to release volatile organic compounds from expansion vents and vacuum breakers in feedwater systems. Knockout pot water will probably include some higher molecular weight organic compounds which will be volatile organic compounds. The Applicant should be required to reveal the analytical work showing that no VOC emissions will result from reuse of knockout pot water in the manner described in the Marquis Energy proceeding.

4.14 Other Deficiencies

The Applicant can be expected to operate natural gas fired space heating units in the fermentation building and other parts of the facility. Although space heating units may be exempted from permitting requirements if under the heat input limitation of Illinois rules, they must nevertheless be counted towards the total of emissions for comparisons with and to the major stationary source threshold. Applicant must quantitatively disclose the total emissions associated with such space heating units as part of a complete application and disclosure of the source's potential to emit characterization.

Applicant's current emission characterization of emissions from natural gas combustion must be taken as an admission and any additional natural gas combustion related particulate, nitrogen oxide and carbon monoxide emissions from space heating must be an additional component of emissions over and above the present emission characterization.

Attachment #1

517-332-9987

Minnesota Air, Water, and Waste Environmental Conf.

Air Modeling – Training (8am-noon)
Sheraton Bloomington Hotel, Atrium 7

February 14, 2006

Chris Nelson & Dennis Becker
Minnesota Pollution Control Agency

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aq-ppt1-04

4

AP42 Silt Loading (grams/m2) Section 13.2.1 – Paved Roads

- AP42 Range for "Public" Roads (Table 13.2.1-3)
  - Non-winter Conditions
    - 0.6 for ADT<500
    - 0.2 for ADT 500-5000
    - 0.06 for ADT 5000-10000
    - 0.03 for ADT>10000
  - Winter Conditions
    - 2.4 for ADT<500
    - 0.6 for ADT 500-5000
    - 0.12 for ADT 5000-10000
    - 0.03 for ADT>10000

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AP42 Silt Loading (grams/m2) Section 13.2.1 – Paved Roads

- AP42 Range for Industrial Facilities
  - Table 13.2.1-4
  - Mean Silt Loading: 7.4-292 g/m^2
  - Range of Values: 0.09-400 g/m^2
  - MPCA Title V Default: 10.0 g/m^2
- Most Common Errors
  - Assuming "public roads" for "industrial facilities"
  - Assuming 0.015 g/m^2 for "limited access" roads
    - Baseline value for public, limited access roads with > 10,000 ADT (i.e., freeways)

Measured Silt Loading Values

- Measured Values in Minnesota (Summer)
  - OSB Manufacturers (Ainsworth [formerly Potlatch] – Grand Rapids, Bemidji): GR=0.39, B=1.19 g/m^2
    - Similar facilities
    - Both use natural gas and wood
    - Silt loadings differ by factor of 3
  - Cereal Production (N. Gas) (Malt-O-Meal - Northfield): 0.5 g/m^2
  - Soybean Processing (N. Gas, Diesel) (Minnesota Soybean Processors - Brewster): 0.11 g/m^2
  - Coal-Fired Public Utility (Virginia Public Utilities): 0.67 to 9.3 g/m2

Measured Silt Loading Values at Selected Ethanol Facilities

- Measured Values at Ethanol Plants (Summer)
  - Chippewa Valley-Benson (N. Gas): 0.37, 0.6 g/m^2
  - ADM-Marshall (2001): 0.76 to 2.93 g/m^2 (no cleaning)
  - ADM-Marshall (2003): 0.70 to 0.72 g/m^2 (w/ cleaning)
    - Two coal-fired boilers; truck & rail delivery of grain, coal, etc.
    - Silt loading approach and exposure profiling method
    - Daily road cleaning (sweeping, vacuuming, and washing)
    - Onsite speed limit of 5 MPH
    - South Coast Air Quality Management District (SCAQMD) Rule 1186 Certified (80% control) – see next slide
- Companies should expect "some" testing

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MPCA Expectations - Silt Loading

- MPCA Expectations
  - Good documentation for proposed silt loading values
  - Companies will do some (extensive) on-site testing/cleaning, or use
    - AP42 Table 13.2.1-4 (Industrial Facilities)
- Permit Requirements
  - Cleaning: sweeping, vacuuming, washing
  - Frequency: daily, weekly, monthly, annual
  - Testing: silt loading and/or exposure profiling
- Other possible solutions
  - Speed limits
  - Salt applications only – no sanding
  - EMISFACT scalars (e.g., SHRDOW7)

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Silt Content – Unpaved Roads

- MPCA Title V Default: 10%
- EPA AP-42 Range for Industrial Sites
  - Mean Silt Content: 4.3 – 24%
  - Range of Values: 0.2 – 29%
- No recent testing in Minnesota
- Usual control: paving or watering or chemical dust suppression

Attachment #2

CONSTRUCTION PERMIT

PERMIT NUMBER: CPM02-0006

PREVENTION OF SIGNIFICANT DETERIORATION (PSD)
PERMIT TO MODIFY AN
AIR CONTAMINANT SOURCE
IS HEREBY ISSUED TO:

Archer Daniels Midland Company (ADM)
3000 East 8th Street
Columbus, Nebraska 68601-9073

FOR THE SPECIFIC MODIFICATION OF:

A Wet Corn Milling and Ethanol Production Facility

TO BE LOCATED AT

3000 East 8th Street
Columbus, Nebraska 68601-9073

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 construction of two new coal-fired boilers and support equipment, one new natural gas-fired boiler, and modification of the existing gluten flash dryer #2 and the fluid bed germ dryer. In addition, this Construction Permit approves the construction of new control equipment for several existing sources, places new and/or revised emission limits on existing equipment, and supersedes all previous construction permits issued for this source. The operations covered by this permit consists of a facility that manufactures ethanol (primary SIC 2046, secondary SIC 2869), starches, high fructose corn syrup, and animal feed products utilizing the wet milling process.

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: Ammonia (NH_3), Best Available Control Technology (BACT), Boiler Operating Day (BOD), Circulating Fluidized Bed Boiler (CFB Boiler), Carbon Monoxide (CO), Chemical Abstract Service Number (CAS #), Code of Federal Regulations (CFR), Compilation of Air Pollutant Emission Factors, Volume I, Stationary Point and Area Sources (AP-42), Construction Permit (CP), Continuous Emissions Monitor System (CEMs), Continuous Opacity Monitoring System (COMS), Factor Information and Retrieval System (FIRE), Hazardous Air Pollutant (HAP), Hydrochloric acid (HCl), Hydrofluoric acid (HF), Hydrogen Sulfide (H_2S), Lead Compounds (Pb), Lowest Achievable Emission Rate (LAER), Maximum Achievable Control Technology (MACT), Mechanical Recompression (MR), Mercury Compounds (Hg), Million British Thermal Units (MMBtu), National Ambient Air Quality Standards (NAAQS), New Source Performance

APPLICABLE REQUIREMENTS AND VARIANCES OR ALTERNATIVES TO REQUIRED STANDARDS:

Consent Decree

On August 21, 2003, a Consent Decree negotiated under United States v. ADM (C.D. IL, NO. 03-CV-2066), was filed with the U.S. District Court – Central District of Illinois. This Consent Decree required several actions from ADM, including the submittal of a revised PSD application for this facility. This submittal was received by the Department on December 15, 2003 and is covered under this permit. In addition, the Consent Decree contained specific requirements on existing emission units, as well as requiring the source to reduce emissions over time by installing various pieces of control equipment, and by optimizing the performance of existing control equipment.

This permit includes the following revisions, which address the specific control requirements contained within the Consent Decree:

- optimization of the scrubber and establishment of a new PM emissions limit (3.03 lb/hr) for Starch Dryer #1;
- submittal of a road silt management plan for the facility (this plan was submitted as part of the application);
- establishment of revised emission limits for Germ Dryers 1-3 (95% VOC control or 20 ppmvd VOC), the Fluidized Bed Germ Dryer (1.5 lb/hr VOC and 4.02 lb/hr CO), Gluten Flash Dryer #1 (22.8 lb/hr VOC and 15.2 lb/hr CO), and Gluten Flash Dryer #2 (22.2 lb/hr VOC and 4.74 lb/hr CO);
- routing of the Stillage/Steepwater evaporator vents (SV-69 and SV-70) and the Gluten RVF Vents (SV 66-68) to the millhouse scrubber (these units were previously uncontrolled) and 95% control of VOC, or a 20 ppmvd VOC emission limit;
- routing of the distillation operation emissions and non-condensable gas stream to the Fermentation/Distillation scrubber system (SV-32, SV-33, and SV-34) with a VOC limit of 13.5 (lb/hr), which represents greater than 95% control; and
- modification of Boiler #1 to replace the existing burner with a low-NO_x burner capable of meeting a NO_x emission limit of 0.06 lb/MMBtu.

As noted above, the CD also requires ADM to install or optimize controls or other mitigation measures to support the NAAQS and increment compliance demonstration, and to use current information to establish more accurate emissions limits for CO and VOC from certain sources. This permit includes the following conditions, which address these goals:

- establishment of revised PM_{10}, CO, and VOC emission limits for the Carbon Furnaces 1 and 2;
- increased stack height requirements for several existing stacks; and
- establishment of a VOC emission limit for the Fiber Dewatering process.

Title 129, Chapter 4 -National Ambient Air Quality Standards (NAAQS)

The potential hourly emissions of PM_{10}, NO_x, CO, and SO_x from the proposed facility modification exceed the threshold for requiring modeling to show compliance with the applicable 24-hour and annual PM_{10} NAAQS, the 1-hour and 8-hour CO NAAQS, the 3-hour and 24-hour SO_2 NAAQS, and the annual NO_2 NAAQS. The air quality analyses adequately demonstrate compliance with applicable NAAQS for NO_x, CO, and SO_x. The modeling predicted violations to the PM_{10} 24-hour and annual NAAQS, however a receptor significance analysis demonstrates that ADM does not cause or contribute significantly to the modeled violations. Additional information is provided in the "PSD Air Quality Impact Analysis"

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RESPONSE TO PUBLIC COMMENTS SUMMARY
On the issuance of a Construction Permit for ethanol production increase and Coal-fired Boiler Project (Facility #39285)

Background Information:

Archer Daniel Midland Company (ADM) submitted a revised Prevention of Significant Deterioration (PSD) Construction Permit application on August 4, 2005. This permit approves the expansion of ethanol production to approximately 120 million gallons per year, and construction of two new coal-fired boilers and support equipment, one new natural gas-fired boiler, and modification of the existing gluten flash dryer #2 and the fluid bed germ dryer.

During the public comment period, The Department received comments from EPA Region VII in Kansas City and from ADM. The following are the Department's responses to the comments received during the public comment period:

COMMENT #1:
EPA recommends that the requirements outlined in the "Truck Traffic Fugitive Control Strategy And Monitoring Plan" (Plan), submitted by ADM with their PSD application, be stated as applicable requirements in the permit.

RESPONSE AND RATIONALE:
Condition XIII.(O)(1)(a) of the draft permit required ADM to develop, maintain, and implement a Plan, however the permit did not specifically address the minimum requirements of the Plan. The requirements outlined in the Plan submitted with the original PSD application include three items:

1) Paving facility roads that will support routine daily process traffic. The draft permit already requires that all roads be paved in Condition XIII.(O)(1).
2) Vacuum sweeping the facility roads three (3) times per week. Instead of a minimum vacuum sweeping frequency mandated in the permit, the Department included in the draft permit the requirement for ADM to conduct daily facility-wide dust surveys to determine when dust control measures should be implemented (Condition XIII.(O)(1)(b)). Visible dust surveys may conclude that vacuum sweeping is required more or less frequently than three times per week. The Department, however, is not opposed to including specific requirements in the permit for ADM to vacuum sweep their roads three times per week. Note that the facility only vacuum swept their roads weekly during the development of site specific emission factors and during the time they were required to test their silt loading to demonstrate compliance with a permit limit of 1.26 grams/square meter.
3) Silt load testing of paved roads between the months of April and October. The Department has determined that silt testing is not necessary to demonstrate that dust emissions from the paved roads are being minimized. This is due to the permit requirement that increases the frequency of vacuum sweeping (three times per week instead of once per week) and because ADM has assumed a more conservative silt loading value of 3.0 grams/square meter when calculating potential emissions from the source. Past testing results show that with weekly vacuum sweeping, ADM has maintained silt loading values well below 3.0 grams/square meter. The requirement to vacuum sweep three times per week makes it even more likely roads will stay clean.

CHANGES:
Permit Conditions XIII.(O)(1)(a) was revised to specify minimum requirements for vacuum sweeping of the ADM paved roads. A corresponding discussion was updated in the Fact Sheet.

APPLICABLE REGULATIONS:
Title 129, Chapter 19 – Prevention of Significant Deterioration; Title 129, Chapter 32 – Duty to Prevent Escape of Dust.

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Appendix A: Emission Calculations
Traffic Fugitive PM Emissions (SV TRUCK_FUG)

Condition XIII.(O)

Road Description	Travel Distance	Potential Rate	Paved PM EF[a]	Paved PM_{10} EF[a]	Potential PM Emissions	Potential PM_{10} Emissions
	(miles)	(trucks/yr)	(lb/VMT)	(lb/VMT)	(tons/yr)	(tons/yr)
Grain Transportation	0.96	155,125	0.31	0.06	22.74	4.43
Starch	1.08	365	0.31	0.06	0.06	0.01
Germ	1.08	5,475	0.31	0.06	0.90	0.18
Gluten	1.08	365	0.31	0.06	0.06	0.01
Feed	0.24	27,375	0.31	0.06	1.00	0.20
Ethanol	1.08	2,190	0.31	0.06	0.36	0.07
By-Product	0.89	12,045	0.31	0.06	1.64	0.32
Chem Deliveries - Route 1	0.89	730	0.31	0.06	0.10	0.02
Chem Deliveries - Route 2	1.08	1,095	0.31	0.06	0.18	0.04
Chem Deliveries - Route 3	0.62	365	0.31	0.06	0.03	0.01
Chem Deliveries - Route 4	0.57	365	0.31	0.06	0.03	0.01
Fructose	1.13	4,745	0.31	0.06	0.82	0.16
CoGen Ash	1.51	5,840	0.31	0.06	1.35	0.26
CoGen Lime	1.51	1,460	0.31	0.06	0.34	0.07
CoGen Coal	1.54	16,425	0.31	0.06	3.86	0.75
				Total:	33.5	6.5

Methodology

Potential to Emit (tons/yr) = Travel Distance (miles) x Number of Trucks/yr x Paved EF (lb/VMT) * (ton/2,000 lb)

[a] Paved road emission factor calculated using the paved road equation in AP-42, Section 13.2.1 (12/03 Version), with an adjustment factor of (1/9.1) applied to reflect ADM testing data at their Columbus, NE and Marshall, MN corn wet mills:

$$Lbs/VMT = \left[k\left(\frac{sL}{2}\right)^{0.65}\left(\frac{W}{3}\right)^{1.5} - C\right]\left(1 - \frac{P}{4N}\right)(1/9.1)$$

Where:

Constants	Value	Units
Average Truck Weight (W)	27.5	tons
Rainy Days (P)	90	days/yr
Days in Period (N)	365	days/yr
Paved Road Silt Loading (sL)	3	g/m2
Paved PM particle size factor (k)	0.082	lb/VMT
Paved PM_{10} particle size factor (k)	0.016	lb/VMT
Brake wear emission factor (C)	0.00047	lb/VMT

Attachment #3

DRAFT

CONSTRUCTION PERMIT

PERMIT NUMBER: <u>CP06-0008</u>

**PREVENTION OF SIGNIFICANT DETERIORATION (PSD)
PERMIT TO MODIFY AN
AIR CONTAMINANT SOURCE
IS HEREBY ISSUED TO:**

Cargill, Incorporated
PO Box 300
Blair, Nebraska 68008-0300

FOR THE SPECIFIC MODIFICATION OF:

A Wet Corn Milling and Ethanol Production Facility

TO BE LOCATED AT:

650 Industrial Road
Blair, Nebraska

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 construction of a new 1,500 MMBtu/hr coal-fired boiler and the expansion of the wet corn milling and ethanol facility to increase production by 140 million gallons per year. Conditions XIII.(A), (D), and (G) of this permit supercede Conditions XVIII.(A)(1), XIX.(C), and XX.(C) of the December 3, 2002 construction permit. No other conditions of the December 3, 2002 are being modified by this construction permit.

This permit may contain abbreviations and symbols of units of measure, which are defined in 40 CFR Part 60.3. Other abbreviations may include, but are not limited to, the following: Best Available Control Technology (BACT), Code of Federal Regulations (CFR), Carbon Monoxide (CO), Construction Permit (CP), Circulating Fluidized Bed (CFB), grains per dry standard cubic foot (gr/dscf), Hazardous Air Pollutant (HAP), Hazardous Air Pollutants (HAPs), Maximum Achievable Control Technology (MACT), Million British thermal units per hour (MMBtu/hr), National Ambient Air Quality Standards (NAAQS), New Source Performance Standards (NSPS), Nitrogen Oxides (NO_x), Particulate Matter (PM), Particulate Matter less than or equal to 10 micrometers (PM_{10}), parts per million-volume dry (ppmvd), Prevention of Significant Deterioration (PSD), Regenerative Thermal Oxidizer (RTO), Sulfur Dioxide (SO_2), Volatile Organic Compounds (VOC).

This permit is issued with the following conditions under the authority of Title 129 - Nebraska Air Quality Regulations as amended March 14, 2006:

DRAFT

(4) 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. Each owner or operator shall submit semiannual reports to the Department beginning six months after the initial startup date.

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

Condition XIII.(P) Requirements for the HAUL ROADS

The existing source has a Truck Traffic Fugitive Control Strategy and Monitoring Plan (Plan) that requires sweeping of roads twice a week and requires that all non-paved roads used to support production-related truck traffic will be paved within 6 months of construction in that area. The most recent approved plan, dated September 27, 2000, also requires annual silt testing. Cargill has used an emission factor of 0.04 lb/VMT for haul road emissions estimates, which is based upon a study conducted by MCP, and which has been approved for use by the Department. During the derivation of the lb/VMT emission factor, MCP also tested silt loading values and the average was 0.92 g/m^2. The Department has determined that as long as the future average silt loading values for all samples taken for each periodic testing event, as established by the Plan, are generally at or below 1.0 g/m^2, continued use of the 0.04 lb/VMT emission factor by Cargill would be appropriate; however, if the average silt loading is above 1.0 g/m^2, the Department may decide that use of the 0.04 lb/VMT emission factor is no longer appropriate. The Plan requires that the source sample silt loading each year for a one-month period, one sample per week on each of the road segments. The Plan also requires an average to be calculated for each road segment in order to ensure compliance with the ambient air quality standards. The average that is to be calculated for purposes of Condition XIII.(P) is the average of all samples for all road segments, because the Department has determined that this method will provide adequate support for use of the 0.04 lb/VMT emission factor for purposes of emissions calculations for emissions inventory purposes.

Condition XIII.(Q) Requirements for NAAQS

This condition establishes minimum stack heights and maximum stack diameters as modeled to demonstrate compliance with the NAAQS, and establishes the public access restriction.

Condition XIII.(R) Requirements for TESTING

This condition outlines the procedures the source must follow for performance testing conducted as required by the permit.

Condition XIII.(S) Requirements for BAGHOUSES

This condition outlines operation and maintenance procedures that the source must follow to ensure proper baghouse operation.

The source has elected to use a leak detection device in lieu of having to conduct routine observations, as required by Condition XIII.(S)(5). The source found that an on-line leak detection system would provide a sensitive and accurate method for locating damaged bags. A leak detection system allows quick detection of the troubled module, which leads to quick repair of a damaged bag. After evaluating the capital cost and value to good operation, the source felt that use of a leak detection system is something that should be added to the scope of the project. The source is considering several technologies, including the Auburn Systems Triboguard (Model 4002) and the PCME-US (Dust Sense 30); however, the vendor

Attachment #4

Appendix A: Emission Calculations
Fugitive Emissions From Paved Roads

Company Name: Premier Ethanol, LLC
Address: Portland, Indiana
FESOP: 075-22858-00032
Reviewer: ERG/MP
Date: May 1, 2006

1. Emission Factors: AP-42

According to AP-42, Chapter 13.2.1 - Paved Roads (12/03), the PM/PM10 emission factors for paved roads can be estimated from the following equation:

$E = (k \times (sL/2)^a \times (w/3)^b - C) \times (1 - p/(4 \times 365))$

where:

E =	emission factor (lb/vehicle mile traveled)	
sL =	road surface silt loading (g/m^2) =	0.6 (g/m^2) (AP-42, Table 13.2.1-3)
w =	mean vehicle weight (tons) =	27.5 tons
k =	empirical constant =	0.082 for PM and 0.016 for PM10
a =	empirical constant =	0.65
b =	empirical constant =	1.5
C =	emission factor for exhaust, brake and tire wear	0.00047 for PM and PM10
p =	number of days per year with 0.01 inches precipitation	120

PM Emission Factor = $(0.082 \times (0.6/2)^{0.65} \times (27.5/3)^{1.5} - 0.00047) \times (1 \quad 120/1460)$ = **0.95** lbs/mile

PM10 Emission Factor = $(0.016 \times (0.6/2)^{0.65} \times (27.5/3)^{1.5} - 0.00047) \times (1 - 120/1460)$ = **0.19** lbs/mile

2. Potential to Emit (PTE) of PM/PM10 Before Control from Paved Roads:

Vehicle Type	*Ave Weight of Vehicles (tons)	*Trip Number (trips/yr)	* Round Trip Distance (mile/trip)	Vehicle Mile Traveled (VMT) (miles/yr)	Traffic Component (%)	Component Vehicle Weight (tons)	PTE of PM (tons/yr)	PTE of PM10 (tons/yr)
DDGS Load Out	27.5	3,504	0.75	2,628	9.9%	2.73	1.25	0.24
Ethanol Load Out	27.5	4,313	0.75	3,235	12.2%	3.36	1.54	0.30
Denaturant Delivery	27.5	190	0.75	143	0.54%	0.15	0.07	0.01
Grain Delivery	27.5	27,331	0.75	20,498	77.3%	21.27	9.78	1.91
Total				**26,504**	**100%**	**27.5**	**12.6**	**2.46**

* This information is provided by the source.

Methodology

Vehicle Mile Traveled (miles/yr) = Trip Number (trips/yr) x Round-Trip Distance (mile/trip)
Traffic Component (%) = VMT / Total VMT
Component Vehicle Weight = Ave. Weight of Vehicles (ton) x Traffic Component (%)
PTE of PM/PM10 before Control (tons/yr) = VMT (miles/yr) x PM/PM10 Emission Factors x 1 ton/2000 lbs

Appendix A: Emission Calculations
Fugitive Emissions From Paved Roads

Company Name: ASA Linden, LLC
Address: 173 West County Road 1100 North, Linden, IN 47955
FESOP: 107-21453-00061
Reviewer: ERG/YC
Date: November 10, 2005

1. Emission Factors: AP-42

According to AP-42, Chapter 13.2.1 - Paved Roads (12/03), the PM/PM10 emission factors for paved roads can be estimated from the following equation:

$$E = (k \times (sL/2)^a \times (w/3)^b - C) \times (1 - p/(4 \times 365))$$

where:

E =	emission factor (lb/vehicle mile traveled)	
sL =	road surface silt loading (g/m^2) =	0.6 (g/m^2) (AP-42, Table 13.2.1-3)
w =	mean vehicle weight (tons) =	29.0 tons
k =	empirical constant =	0.082 for PM and 0.016 for PM10
a =	empirical constant =	0.65
b =	empirical constant =	1.5
C =	emission factor for exhaust, brake and tire wear	0.00047 for PM and PM10
p =	number of days per year with 0.01 inches precipitation	120

PM Emission Factor = $(0.082 \times (7.4/2)^{0.65} \times (29/3)^{1.5} - 0.00047) \times (1 - 120/1460)$ = **1.03** lbs/mile

PM10 Emission Factor = $(0.016 \times (7.4/2)^{0.65} \times (29/3)^{1.5} - 0.00047) \times (1 - 120/1460)$ = **0.20** lbs/mile

2. Potential to Emit (PTE) of PM/PM10 Before Control from Paved Roads:

Vehicle Type	*Ave Weight of Vehicles (tons)	*Trip Number (trips/yr)	* Round Trip Distance (mile/trip)	Vehicle Mile Traveled (VMT) (miles/yr)	Traffic Component (%)	Component Vehicle Weight (tons)	PTE of PM before Control (tons/yr)	PTE of PM10 before Control (tons/yr)
DDGS Load Out	29	14,814	0.95	14,073	47.7%	13.84	7.27	1.42
Ethanol Load Out	29	15,488	0.95	14,714	49.9%	14.47	7.61	1.48
Denaturant Delivery	29	738	0.95	701	2.38%	0.69	0.36	0.07
Total				**29,488**	**100%**	**29.0**	**15.2**	**2.97**

* This information is provided by the source

Methodology

Vehicle Mile Traveled (miles/yr) = Trip Number (trips/yr) x Round-Trip Distance (mile/trip)
Traffic Component (%) = VMT / Total VMT
Component Vehicle Weight = Ave. Weight of Vehicles (ton) x Traffic Component (%)
PTE of PM/PM10 before Control (tons/yr) = VMT (miles/yr) x PM/PM10 Emission Factors x 1 ton/2000 lbs

3. Potential to Emit (PTE) of PM/PM10 after Control from Paved Roads:

The source proposed to use periodic sweeping to control the fugitive dust emissions.
The control efficiency from sweeping is assumed to be 50%.

PTE of PM after Control = 15.2 tons/yr x (1-50%) = **7.62 tons/yr**

PTE of PM10 after Control = 2.97 tons/yr x (1-50%) = **1.48 tons/yr**

Attachment #5

2 SUMMARY AND DISCUSSION

The results of the air emission compliance tests are summarized in the following tables. An overview of the results is presented below:

METHOD	AVERAGE
Hammermill Baghouse	
METHOD 5/202	
Dry Catch Only	
..........(GR/DSCF)	0.00027
..........(LB/HR)	0.053
Dry + Method 202 Wet Catch	
..........(GR/DSCF)	0.00062
..........(LB/HR)	0.122
OPACITY..........(%)	0
Grain Handling Baghouse	
METHOD 5/202	
Dry Catch Only	
..........(GR/DSCF)	0.00035
..........(LB/HR)	0.094
Dry + Method 202 Wet Catch	
..........(GR/DSCF)	0.00084
..........(LB/HR)	0.226
OPACITY..........(%)	0
Fermentation/Distillation (Wet Scrubber)	
VOC Mass Rate as Method 18	
..........(LB/HR)	2.39
EPA METHOD 25A	
..........(ppm,w as carbon)	75.33
..........(LB/HR as carbon)	1.62

Attachment #6

METHOD	AVERAGE
Cooling Drum TO Bypass	
METHOD 5/202	
Dry Catch Only	
....(GR/DSCF)	0.00011
....(LB/HR)	0.016
Dry + Method 202 Wet Catch	
....(GR/DSCF)	0.0010
....(LB/HR)	0.144
OPACITY..(%)	0
VOC Mass Rate as Method 18	
....(LB/HR)	≤ 0.74
EPA METHOD 25A	
.... (ppm,w as carbon)	13.67
.... (LB/HR as carbon)	0.43
DDGS Handling Equipment Baghouse	
METHOD 5/202	
Dry Catch Only	
....(GR/DSCF)	0.00008
....(LB/HR)	0.006
Dry + Method 202 Wet Catch	
....(GR/DSCF)	0.00050
....(LB/HR)	0.032
OPACITY..(%)	0
VOC Mass Rate as Method 18	
....(LB/HR)	≤ 0.14
EPA METHOD 25A	
.... (ppm,w as carbon)	< 3.0
.... (LB/HR as carbon)	< 0.04

No difficulties were encountered in the field or in the laboratory evaluation of the samples. On the basis of these facts and a complete review of the data and results, it is our opinion that the concentrations and emission rates reported herein are accurate and closely reflect the actual values which existed at the time the tests were performed.

Attachment #7

Fermentation Scrubber Discussion:

Illini Bio-Energy, LLC, is proposing to install a counter current scrubber in order to capture gases associated with the project's 7 fermenters and beer well operations. The scrubber will be designed to extract and remove VOCs from the fermentation carbon dioxide exhaust gases. The scrubber is anticipated to be at least 95% efficient at removal of VOC emissions that may be present in the fermenters and beer well operation exhaust gases. This is consistent with the EPA Consent Decrees that require such scrubbers to be 95% efficient. The scrubber, in fact, is expected to achieve much higher overall absorption efficiencies than 95% depending on variables at the time of emission testing.

The fermentation scrubber is optimized for the plant's water balance in order to insure that only non contact water will be discharged. Additional water will put the plant out of balance for water demand. The scrubber is a single pass counter current packed bed with ball rings. The scrubber liquor after passing one time through the scrubber exits directly to the cook process tank (scrubber liquor is not recirculated). The fermentation process is not steady state, but much like a sine wave with peaks and valleys in pressure and gas flows. As a result, the scrubber will see variable gas flow rates, variable concentrations of VOCs, variable water (liquor) flow rates, and variable gas and water temperatures. Hours of operation are expected to be 8760 hours/year. Following are typical variables for the proposed scrubber:

Liquor (water) flow rate:	60 - 120 gpm (90 gpm avg.)
Liquor temperature:	47F – 85F (directly from well)
Gas flow rate:	6000 to 13,000 acfm
Inlet gas temperature:	95F avg. (depending on weather) 518 – 546
Exhaust gas temperature	59 - 87F 14 532 R
Design temp.:	100F
Design operating temp.:	70F – 529
Design pressure:	2 psig vacuum/5 psig pressure
Inlet VOC (propane):	6000 to 14000 ppm
Outlet VOC (propane):	35 to 300 ppm
Additive capability:	Sodium Bisulfite (@ 3 – 10 gph)
Specific gravity (water):	1.0
VOC emission rate:	900 lb VOC/MMgpy

The CO_2 scrubber has been determined to be the most stringent level of VOC control for the fermenter and beer well operations associated with this size of ethanol plant, taking into account environmental, energy and economic impacts. In order to increase the VOC control efficiency, the plant design would have to be modified or other changes made in order to accommodate excess water to the scrubber. The plant has been designed to maintain a water balance that results in no excess process water and thus no process water being discharged to surface water.

BACT is subsequently proposed as follows: Installation of a scrubber capable of achieving a VOM emission rate of 900 lbs VOC/million gallons of ethanol produced. 50a

Attachment #8

as propane					propane			unscaled lb/hr	scaled lb/hr factor2.2	Excess over 11.12 lb/hr
ppmv		acfm	min/hr	liters/ft3	gr/gr-mole	atm				
35	1.00E-06	6000	60	28.3168	44.06	1	=	1.44	3.16	

0.08205	294	454								
R-constant	deg K	gr/lb								
					propane					
ppmv		acfm	min/hr	liters/ft3	gr/gr-mole	atm				
35	1.00E-06	11000	60	28.3168	44.06	1	=	2.63	5.79	

0.08205	294	454								
R-constant	deg K	gr/lb								
					propane					
ppmv		acfm	min/hr	liters/ft3	gr/gr-mole	atm				
35	1.00E-06	13000	60	28.3168	44.06	1	=	3.11	6.84	

0.08205	294	454								
R-constant	deg K	gr/lb								
					propane					
ppmv		acfm	min/hr	liters/ft3	gr/gr-mole	atm				
300	1.00E-06	6000	60	28.3168	44.06	1	=	12.30	27.07	15.87

0.08205	294	454								
R-constant	deg K	gr/lb								
					propane					
ppmv		acfm	min/hr	liters/ft3	gr/gr-mole	atm				
300	1.00E-06	11000	60	28.3168	44.06	1	=	22.56	49.62	38.42

0.08205	294	454								
R-constant	deg K	gr/lb								
					propane					
ppmv		acfm	min/hr	liters/ft3	gr/gr-mole	atm				
300	1.00E-06	13000	60	28.3168	44.06	1	=	26.66	58.65	47.45

0.08205	294	454								
R-constant	deg K	gr/lb								
					propane					
ppmv		acfm	min/hr	liters/ft3	gr/gr-mole	atm				
120	1.00E-06	6000	60	28.3168	44.06	1	=	4.92	10.83	

0.08205	294	454								
R-constant	deg K	gr/lb								
					propane					
ppmv		acfm	min/hr	liters/ft3	gr/gr-mole	atm				
120	1.00E-06	11000	60	28.3168	44.06	1	=	9.02	19.85	8.65

0.08205	294	454								
R-constant	deg K	gr/lb								
					propane					
ppmv		acfm	min/hr	liters/ft3	gr/gr-mole	atm				
120	1.00E-06	13000	60	28.3168	44.06	1	=	10.66	23.46	12.26

0.08205	294	454								
R-constant	deg K	gr/lb								
					propane					
ppmv		acfm	min/hr	liters/ft3	gr/gr-mole	atm				
280	1.00E-06	6000	60	28.3168	44.06	1	=	11.48	25.26	14.06

0.08205	294	454								
R-constant	deg K	gr/lb								
					propane					
ppmv		acfm	min/hr	liters/ft3	gr/gr-mole	atm				
280	1.00E-06	11000	60	28.3168	44.06	1	=	21.05	46.32	35.12

0.08205	294	454								
R-constant	deg K	gr/lb								
					propane					
ppmv		acfm	min/hr	liters/ft3	gr/gr-mole	atm				
280	1.00E-06	13000	60	28.3168	44.06	1	=	24.88	54.74	43.54

0.08205	294	454								
R-constant	deg K	gr/lb								