# Statement of Basis

# Air Quality Construction Permit

# ABE South Dakota, LLC.

# Aberdeen, South Dakota

**South Dakota Department of Environment and Natural Resources**

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# 1.0 Background

On March 6, 2007, the South Dakota Department of Environment and Natural Resources (DENR) issued a renewed Title V air quality permit #28.0505-03 to Heartland Grain Fuels, LP for the ethanol production facility near Aberdeen, South Dakota. At full capacity, the facility may produce approximately 61 million gallons of undenatured ethanol per year. The facility also produces dried distiller grain and solubles (DDGS) as a saleable byproduct. During the term of this permit, the permit was revised as follows:

1. On November 6, 2007, Heartland Grain Fuels, LP submitted an application to add an indirect fired heater to the facility. DENR determined that the addition of a natural gas fired indirect heater was considered to be an insignificant activity.
2. On September 27, 2009, Heartland notified that the facility would change from a limited partnership into a limited liability company. The facility is now known as Advanced BioEnergy, LLC (ABE).
3. On December 20, 2010, ABE was issued a Title V permit to include a modification into the existing Title V air quality operating permit to produce additional DDGS from Unit #3 at the facility, revise the potential emission calculations of the facility based on stack test results, and to revise the major source threshold value in the permit from 95 tons per year (per plant) to 238 tons per year for the entire ABE facility.
4. On October 28, 2011, ABE was issued a Title V permit to incorporate a minor amendment into the existing Title V air quality operating permit that replaced an existing hammer mill cyclone at the ethanol plant.
5. On December 2, 2013, ABE was issued a Title V permit to incorporate a minor amendment into the existing Title V air quality operating permit that added a Pneumatic rail spreader to the DDGS Loadout (Unit #25).
6. On May 8, 2014, ABE notified DENR of a responsible official change from Larry Galero to Richard Peterson, CEO.

ABE currently has a Title V air quality operating permit renewal application pending with the department.

On September 8, 2014, DENR received a construction permit application from ABE to install two 500,000 gallon storage tanks with internal floating roofs for denatured ethanol. The application was considered complete September 8, 2014.

## 1.1 Existing Equipment

Table 1-1 provides a list of units presently permitted; which was taken from the current Title V air quality operating permit issued December 2, 2013.

***Table 1-1 – Description of Permitted Units, Operations, and Processes***

| Unit | Description | Maximum Operating Rate | Control Device |
|---|---|---|---|
| #1 | Elevator legs transport the grain from the adjacent elevator a hammer mill. | 16 tons per hour. | Not Applicable |
| | A hammer mill grinds the grain into | 16 tons per hour. | |

| Unit | Description | Maximum Operating Rate | Control Device |
|---|---|---|---|
| | flour. A 2011 CAMCORP cyclone collects the flour | | |
| | The flour is transported to the fermentation process. | 16 tons per hour. | |
| #2 | A 1991 Cleaver Brooks boiler fired with natural gas and distillate oil. | 750 horsepower (34 million Btus per hour heat input) | Not Applicable |
| #3 | A 1992 Thompson Dehydration rotary drum dryer fired with natural gas. A cyclone collects the product. | 4 tons per hour 25 million Btus per hour heat input | Not Applicable |
| #4 | Fermentation process #1. Ethanol produced in four fermenters and the liquid beer is stored in a beer well. | 12,000 gallons of mash per hour | Wet scrubber |
| | Distillation process #1. The distillation process distills the liquid beer. The distillation process consists of the beer column, rectifier column, condensers, molecular sieve, and evaporator. | 12,000 gallons of mash per hour | |
| | Miscellaneous tanks – vacuum tank, slurry tank, CIP return tank, and two liquefaction tanks. | | |
| #6 | Dried distillers grain cooling drum and cyclone. | 4 tons per hour | Not Applicable |
| #8 | Industrial cooling tower #1. | 600,000 gallons per hour. | Not applicable |
| #9 | Ethanol truck load out | 36,000 gallons per hour. | Not applicable |
| #10 | Ethanol rail car load out | 60,000 gallons per hour. | Not applicable |
| #16 | Tank #T-804 – Above ground storage tank with an internal floating roof. | 76,000 gallons | Not Applicable |
| #21 | Elevator legs transport the grain from the adjacent elevator a hammer mill. | 100 tons per hour for each hammer mill | Baghouse |
| | A surge grain bin | | |
| | Two hammer mills grind the grain into flour. A cyclone collects the flour | | |
| | The flour is transported to the fermentation process. | | |
| #22 | Fermentation process #2. Ethanol produced in four fermenters and the liquid beer is stored in a beer well. | 43,800 gallons of mash per hour | Wet Scrubber |
| #23 | Distillers grain dryer system #2. The system consists of two dryers in series and fired with natural gas. A cyclone collects the product. | 23 tons per hour 45 million Btus per hour heat input for each dryer | Thermal oxidizer / heat recovery boiler |
| | Distillation process #2. The distillation process distills the liquid beer. The | 43,800 gallons of mash per hour | |

| Unit | Description | Maximum Operating Rate | Control Device |
|---|---|---|---|
| | distillation process consists of the beer column, rectifier column, condensers, molecular sieve, and evaporator. | | |
| | Miscellaneous tanks; process tank, two slurry tanks, yeast tank, flash tank, and CIP screen | | |
| | Five centrifuges | | |
| | Thermal oxidizer / heat recovery boiler fired on the off-gases from the processes and natural gas. | 99 million Btus per hour heat input | |
| #24 | Dried distillers grain cooling drum and cyclone. | 23 tons per hour. | Baghouse |
| #25 | Dried distillers grain loadout | 400 tons per hour | Baghouse |
| #26 | Industrial cooling tower #2. | 1,200,000 gallons per hour. | Not Applicable |
| #27 | Ethanol truck load out | 36,000 gallons per hour. | Flare |
| | Flare. The flare is fired with the off gasses from the process and natural gas. | 12.4 million Btus per hour heat input | |
| #28 | Ethanol rail car load out | 60,000 gallons per hour. | Not applicable |
| #30 | Biomethanator Flare. The flare is fired on the off gasses from the biomethanator system and natural gas. | 6.4 million Btus per hour heat input | Not Applicable |
| #31 | Tank #T-61 – Above ground storage tank with an internal floating roof. | 500,000 gallons | Not applicable |
| #32 | Tank #T-62 – Above ground storage tank with an internal floating roof. | 500,000 gallons | Not applicable |
| #33 | Tank #T-63 – Above ground storage tank with an internal floating roof. | 100,000 gallons | Not applicable |
| #34 | Tank #T-64 – Above ground storage tank with an internal floating roof. | 100,000 gallons | Not applicable |
| #35 | Tank #T-65 – Above ground storage tank with an internal floating roof. | 100,000 gallons | Not applicable |

## 1.2 Proposed Changes

ABE has proposed adding two 500,000 gallon denatured ethanol storage tanks to its facility. The proposed storage tanks will be aboveground and have internal floating roofs. The storage tanks will allow ABE increased flexibility for storage with the limited availability of railcars to ship denatured ethanol to customers. They have not requested an increase in ethanol production. The storage tanks will be permitted Unit #36 and Unit #37.

## 2.0 New Source Performance Standards

DENR reviewed the New Source Performance Standards listed in 40 CFR Part 60 to determine if any of the federal New Source Performance Standards are applicable to the proposed changes for this facility. The following may be applicable:

### 2.1 Standards Applicable to Storage Tanks

There are three New Source Performance Standards for storage vessels. The three standards are applicable to the following storage vessels:

1. 40 CFR Part 60, Subpart K: applicable to storage vessels for petroleum liquids capable of storing greater than 40,000 gallons and commenced construction after June 11, 1973 but prior to May 19, 1978;
2. 40 CFR Part 60, Subpart Ka: applicable to storage vessels for petroleum liquids capable of storing greater than 40,000 gallons and commenced construction after May 18, 1978; and
3. 40 CFR Part 60, Subpart Kb: applicable to storage vessels for volatile organic liquids capable of storing 75 cubic meters (approximately 19,813 gallons) or greater and commenced construction after July 23, 1984.

The proposed storage tanks will be constructed after July 23, 1984, have capacities greater than 19,913 gallons, and contain “volatile organic liquids”. Therefore, the new storage tanks are applicable to Subpart Kb and the construction permit will contain pertinent conditions for new storage tank.

### 2.2 Standards for Synthetic Organic Chemical Manufacturing

There are two New Source Performance Standards for synthetic organic chemical manufacturing industries. The two standards are applicable to the following:

1. 40 CFR Part 60, Subpart VV is applicable to affected facilities in the synthetic organic chemical manufacturing industry, of which ethanol is included; and commence construction, reconstruction or modification after January 5, 1981, but before November 8, 2006 and the capacity of the plant is more than 1,000 megagrams per year of ethanol; and
2. 40 CFR Part 60, Subpart VVa is applicable to affected facilities in the synthetic organic chemical manufacturing industry that commence construction, reconstruction, or modification after November 7, 2006 and the capacity of the plant is more than 1,000 megagrams per year of ethanol.

ABE’s facility is currently applicable to Subpart VVa. Therefore, the proposed construction will be subject to VVa for any new pumps valves, connections, etc., required to connect the new storage tanks to the facility.

### 2.3 Other Applicable New Source Performance Standards

DENR reviewed the other New Source Performance Standards and determined there are no other standards applicable to ABE's proposed additions.

## 3.0 New Source Review

In accordance with ARSD 74:36:10:01, the new source review regulations apply to areas of the state which are designated as nonattainment pursuant to the Clean Air Act for any pollutant regulated under the Clean Air Act. This facility is located near Aberdeen, South Dakota, which is in attainment or unclassifiable for all the criteria air pollutants regulated under the Clean Air Act. Therefore, ABE's proposed change is not subject to new source review.

## 4.0 Prevention of Significant Deterioration

Any stationary source which emits or has the potential to emit 250 tons per year or more of any air pollutant is considered a major source and is subject to prevention of significant deterioration (PSD) requirements (ARSD 74:36:09 – 40 CFR. Part 52.21(b)(1)). Any stationary source which emits or has the potential to emit 100 tons per year or more of any air pollutant and is one of the 28 named PSD source categories is subject to PSD requirements (ARSD 74:36:09 – 40 CFR. Part 52.21(b)(1)). The following is a list of regulated pollutants under the PSD program:

1. Total suspended particulate (PM);
2. Particulate matter with a diameter less than or equal to 10 microns ($PM_{10}$);
3. Particulate matter with a diameter less than or equal to 2.5 microns ($PM_{2.5}$);
4. Sulfur dioxide ($SO_2$);
5. Nitrogen oxides ($NO_x$);
6. Carbon monoxide (CO);
7. Ozone – measured as volatile organic compounds (VOC);
8. Lead;
9. Greenhouse gases (carbon dioxide, nitrous oxide, methane, etc.)
10. Fluorides;
11. Sulfuric acid mist;
12. Hydrogen sulfide;
13. Reduced sulfur compounds; and
14. Total reduced sulfur.

If the source is considered one of the 28 named PSD source categories listed in Section 169 of the Federal Clean Air Act, the major source threshold is 100 tons per year of any regulated air pollutant, except for greenhouse gases. The major source threshold for all other sources is 250 tons per year of any regulated air pollutant, except for greenhouse gases.

The Environmental Protection Agency (EPA) recently published and implemented a final rule that no longer lists ethanol plants as a chemical manufacturing plant. Therefore, ABE is not classified as a chemical manufacturing plant or one of the 28 listed source categories for PSD

regulations and the major source threshold is 250 tons per year, except for greenhouse gases.

According to the Clean Air Act, once a pollutant is regulated under any part of the Act, (as was the case with greenhouse gas emissions after the motor vehicle regulations were finalized in March 2010) major new sources or major modifications are subject to the PSD program. Under the Clean Air Act, PSD permits are required for all sources that emit a regulated air pollutant above 100 or 250 tons per year, depending on the source. This threshold, if applied to greenhouse gases, would greatly increase the number of facilities requiring a PSD review. Based on administrative necessity, EPA increased these thresholds through the "Tailoring Rule."

On May 13, 2010, EPA issued the final version of the "Tailoring Rule" for greenhouse gas emissions. The major source threshold for greenhouse gases is listed below:

1. New PSD source because of a criteria air pollutant, the major source threshold for greenhouse gases is 75,000 tons per year of carbon dioxide equivalent or more;
2. For an existing PSD source because of a criteria air pollutant, a major modification for greenhouse gases is an increase of 75,000 tons per year of carbon dioxide equivalent or more;
3. New PSD source if greenhouse gas emissions are 100,000 tons per year of carbon dioxide equivalent or more;
4. For an existing non-PSD source that has the potential to emit 100,000 tons per year of carbon dioxide equivalent emissions or more, a major modification for greenhouse gases is an increase of 75,000 tons per year of carbon dioxide equivalent or more; and
5. In addition to subsection (3) and (4), a specific greenhouse gas, without calculating the carbon dioxide equivalent, also needs to emit greater than 100 or 250 tons per year, whichever is applicable, to be regulated.

On June 24, 2014, the US Supreme Court decided greenhouse gases may not be regulated under the PSD program unless the facility requires a PSD permit for the other regulated air pollutants.

### 4.1 Potential to Emit Criteria Pollutants

DENR uses stack test results to determine air emissions whenever stack test data is available from the source or a similar source. When stack test results are not available, DENR relies on manufacturing data, material balance, EPA's Compilation of Air Pollutant Emission Factors (AP-42, Fifth Edition, Volume 1) document, the applicant's application, or other methods to determine potential air emissions.

The only emitted criteria pollutant from the proposed construction will be volatile organic compounds (VOC). In theory the proposed construction should not change the emissions from the facility as the addition is purely for procedural purposes and ABE has not requested an increase in ethanol production. Even though the emissions should not increase, DENR examined the potential emissions using Tanks 4.0.9d. The amounts of increased emissions are relatively small, and may be viewed in Table 4.1.

According to ABE's application the throughput of undenatured ethanol will remain at 61,000,000 gallons per year. Without increased storage capacity for denatured ethanol, the

facility would be unable to operate at maximum capacity to produce undenatured ethanol.

***Table 4.1: Tank Potential Emissions***

| Unit | Individual Tank Capacity(Gallons) | Net throughput (gallons) | VOC Emissions (Tons) |
|---|---|---|---|
| **#36** | 500,000 | 61,000,000 | 0.16 |
| **#37** | 500,000 | 61,000,000 | 0.16 |
| **Existing Facility**[1] | N/A | N/A | 167 |
| **Total** | N/A | N/A | 167 |

[1] – The potential emissions are based on the December 2010 Statement of Basis.

Based on the information provided by Tanks 4.0.9d, the proposed construction of the denatured ethanol storage tank at the facility has the potential to emit less than 1 ton of VOC's per year. In the existing permit, DENR did not require a short term limit for the permitted storage tanks. Therefore, DENR does not feel a short term limit is necessary for the new storage tank. However, ABE will be required to keep records of tank emissions in order to ensure compliance with the facilities current 238 ton VOC limit. As long as compliance is maintained, ABE will be considered a minor source under the PSD program.

Based on the US Supreme Court's decision and because ABE is not applicable to the PSD program, a review for greenhouse gas emissions are not warranted or required.

# 5.0 National Emission Standards for Hazardous Air Pollutants

DENR reviewed 40 CFR Part 61 to determine the applicability to the proposed changes to this facility to any of the subparts and determined none are applicable.

# 6.0 Maximum Achievable Control Technology (MACT) Standards

## 6.1 Potential Hazardous Air Pollutant (HAP) Emissions

The federal Maximum Achievable Control Technology Standards are applicable to both major and area sources of HAPs. A major source of HAPs is defined as having the potential to emit 10 tons or more per year of a single HAP or 25 tons per year or more of a combination of HAPs. An area source is a source that is not a major source of HAPs.

ABE's proposed construction does not have the potential to emit HAPs. Ethanol does not emit any HAP emissions. Therefore, ABE's proposed construction will not increase the potential HAP's emissions and is still an area source for HAP.

## 6.2 Applicable MACT Standards

DENR reviewed 40 CFR Part 63 to determine the applicability to the proposed changes to this facility to any of the subparts and determined none are applicable.

## 7.0 State Requirements

ABE's existing operations are covered under a Title V air quality operating permit. In accordance with ARSD 74:36:20:01, a construction permit is required for all modifications to an existing source. There are exemptions to this rule under ARSD 74:36:20:04 but the proposed storage tanks are applicable to a federal standard and are not applicable to the exemption. Therefore, the proposed project is required to obtain a construction permit.

### 7.1 State Visible Emission Limits

ARSD 74:36:12:01 establishes a visible emission limit of 20 percent opacity for each unit.

### 7.2 State Emission Limits

The proposed construction of the two storage tanks is not applicable to the state's particulate or sulfur dioxide limits.

### 7.3 Title V Air Quality Operating Permit Revision

ABE will be required to submit an application to revise its Title V air quality operating permit within one year of the initial startup of the new storage tank. Initial startup will be defined as the first time denatured ethanol is stored in the storage tank.

## 8.0 Recommendation

Based on the information submitted in the construction permit application, DENR recommends conditional approval of a construction permit for the proposed addition of the denatured ethanol storage tanks at ABE's ethanol plant**.** Questions regarding this permit review should be directed to Ashley Brakke, Engineer I, Department of Environmental and Natural Resources, Air Quality Program.