



Statement of Basis

**Title V Air Quality
Construction Permit**

NuGen Energy, LLC

Marion, South Dakota

Table of Contents

	Page
1.0 Background	1
1.1 Existing Equipment	1
1.2 Proposed Changes.....	3
2.0 New Source Performance Standards	3
2.1 Standards Applicable to Storage Tanks	3
2.2 Standards for Synthetic Organic Chemical Manufacturing.....	4
2.3 Other Applicable New Source Performance Standards.....	4
3.0 New Source Review.....	5
4.0 Prevention of Significant Deterioration.....	5
4.1 Potential to Emit Criteria Pollutants	6
5.0 National Emission Standards for Hazardous Air Pollutants	7
6.0 Maximum Achievable Control Technology (MACT) Standards.....	7
6.1 Potential Hazardous Air Pollutant (HAP) Emissions.....	7
6.2 Applicable MACT Standards	7
7.0 State Requirements.....	7
7.1 State Visible Emission Limits	8
7.2 State Emission Limits	8
7.3 Title V Air Quality Operating Permit Revision	8
8.0 Recommendation	8

1.0 Background

On July 7, 2006, the Department of Environment and Natural Resources (DENR) issued a Title V air quality operating permit to NuGen Energy, LLC (NuGen), for a dry corn mill ethanol production plant located near Marion, South Dakota. This permit was renewed on September 15, 2011. On December 2, 2013, the operating permit was amended to change the permit and facility contact.

On June 2, 2014, DENR issued a construction permit (#28.0502-61-01C) to NuGen for the addition of a 1,500,000 gallon denatured ethanol storage tank and a 200,000 gallon undenatured ethanol storage tank.

On June 17, 2014, DENR issued a construction permit (#28.0502-61-02C) to NuGen for the addition of a new receiving pit and grain storage bin.

1.1 Existing Equipment

Table 1.1 provides a list of the units presently permitted which was taken from the current Title V air quality operating permit as amended on December 2, 2013.

Table 1.1 – Description of Permitted Units, Operations, and Processes

Unit	Description	Maximum Operating Rate	Control Device
#1	Grain receiving, grain transfer, and storage bin loading. Trucks and railcars transport grain to the ethanol plant and dump grain into receiving pits located in a partially enclosed building. Elevator legs transport the grain from the receiving pit to grain storage bins.	1,008 tons of grain per hour	Baghouse
	Elevator legs transport the grain to a day bin by a conveyor and elevator leg.	168 tons of grain per hour	
#2	Grain milling. The grain is transferred from the day bin to one of four hammer mills where the grain is milled into flour.	42 tons of grain per hour (each hammer mill)	Baghouse
	An elevator leg transfers the flour to the fermentation process.	168 tons of flour per hour	
#3	Fermentation system. Ethanol is produced from the fermentation process. The fermentation process occurs in seven fermenters and the liquid beer is stored in a beer well.	91,500 gallons of mash per hour	Wet scrubber
#4	Four DDGS dryers. The distillers	Each dryer has a heat	Two thermal

Unit	Description	Maximum Operating Rate	Control Device
	grain and solubles may be dried in two dryer systems. Each dryer system is comprised of two dryers operated in series. Each dryer has a multi cyclone to collect product and is fired on natural gas. A combination of flue gas recirculation and low NOx burners will be installed on the dryers and thermal oxidizer.	input capacity of 45 million Btus per hour and processes 46.5 tons of DDGS per hour.	oxidizer heat recovery boiler systems. Each thermal oxidizer has a maximum operating rate of 122 million Btus per hour heat input.
	The thin stillage and solids fractions of the wet distillers grain and solubles are separated by six centrifuges.		
	Distillation process. The distillation process distills the liquid beer. The distillation process consists of the beer stripper, rectifier, side stripper, molecular sieve, condensers, and evaporators.	14,400 gallons of ethanol produced per hour.	
	Process vent mixer, cook water tank, centrate tank, and yeast tank.		
	Biomethanator. Methane produced by the biomethanator is either routed to Unit #7 or the DDGS dryers.		
#5	Cooling drum. A cooling drum cools the dried distillers grain.	46.5 tons of dried distillers grain per hour	Baghouse. A portion of the exhaust gases may be passed through the DDGS dryer(s) in Unit #4
#6	Dried distillers grain silo.	500 tons of dried distillers grain per hour	Baghouse
#7	Submerged truck loading rack.	36,000 gallons of denatured ethanol per hour.	A flare. The flare has an operating rate of 12.4 million Btus per hour heat input
	Rail car loading rack.	120,000 gallons of denatured ethanol per hour	
#8	Biomethanator Flare. Methane produced by the biomethanator is either routed to Unit #4 or the biomethanator flare.	6.4 million Btus per hour heat input	Not applicable

Unit	Description	Maximum Operating Rate	Control Device
#9	Fire Pump. The fire pump is fired on distillate oil.	300 horsepower (~ 2.5 million Btus per hour heat input)	Not applicable
#10	Industrial cooling tower.	Not applicable	Not applicable
#11	Tank #1 – An above ground storage tank with an internal floating roof. The tank will store ethanol.	200,000 gallons	Not applicable
#12	Tank #2 – An above ground storage tank with an internal floating roof. The tank will store ethanol.	200,000 gallons	Not applicable
#13	Tank #3 – An above ground storage tank with an internal floating roof. The tank will store gasoline.	200,000 gallons	Not applicable
#14	Tank #4 – An above ground storage tank with an internal floating roof. The tank will store denatured ethanol.	1,500,000 gallons	Not applicable
#15	Tank #5 – An above ground storage tank with an internal floating roof. The tank will store denatured ethanol	1,500,000 gallons	Not applicable

1.2 Proposed Changes

NuGen was issued a construction permit to construct a 200,000 gallon ethanol storage tank. Instead of constructing the 200,000 gallon storage tank, NuGen is proposing to add a 730,000 gallon ethanol storage tank to its facility. The proposed tank will be above ground with internal floating roof. The tank will allow NuGen’s ability to deal with in-climate weather and railcar shortages by increasing finished product storage. This should help prevent shutdowns due to events outside NuGen’s control. The facility has not requested that the 122 million gallon ethanol production limit be increased.

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 tank will be constructed after July 23, 1984, have a capacity greater than 19,913 gallons, and will contain “volatile organic liquids”. Therefore the new tank is applicable to Kb and the construction permit will contain permit conditions for new tanks.

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.

NuGen’s facility is currently applicable to Subpart VV. It is possible for a facility to trigger applicability to VVa, by making certain modifications to the facility. This is based on capital expenditure. In order to trigger the change a percentage of the cost of the facilities replacement cost must be met by the capital expenditures for the project.

The proposed construction does not fit the subpart’s definition of process unit as the storage of final product is not covered by the subpart. Their cost would not be considered part of the capital expenditure for the project. However the pumps, valves and connections used to fill the tank could be covered. The capital expenditure for these items would be very small compared to the cost of replacing the entire plant. Therefore NuGen will not become applicable to VVa due to this project. It should be noted though, that the proposed construction will be subject to VV for any new pumps valves, connections, etc., required to connect the new tank 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 NuGen’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 Marion, South Dakota, which is in attainment or unclassifiable for all the criteria air pollutants regulated under the Clean Air Act. Therefore, NuGen'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 (PM₁₀);
3. Particulate matter with a diameter less than or equal to 2.5 microns (PM_{2.5});
4. Sulfur dioxide (SO₂);
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, NuGen 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. Based on the US Supreme Court decision, scenarios #3, #4, and #5 are not applicable.

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 NuGen 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 amount of these emissions is relatively small, and may be viewed in Table 4.1.

NuGen has a production limit of 122 million gallons of undenatured ethanol written into its operating permit. This volume can be used to estimate VOC emissions from the proposed ethanol tank at the facility.

Table 4.1 – Tank Potential Emissions

Tank Type	Individual Tank Capacity(Gallons)	Net throughput (gallons)	VOC Emissions (Tons)
Ethanol Tank	730,000	61,000,000	0.26
Equipment Leaks	N/A	N/A	0.33 ¹
Total	N/A	N/A	0.59

¹ Includes addition of components associated with the new tank.

Based on the information provided by Tanks 4.0.9d, the proposed construction has the potential to emit less than 1 ton of VOC emissions per year. In the existing permit, DENR did not require a short term limit for the permitted tanks. Therefore DENR does not feel a short term limit is necessary for the new tank. However NuGen will be required to keep records of tank emissions in order to ensure compliance with the facilities current 95 ton VOC limit. As long as compliance is maintained, NuGen will be considered a minor source under the PSD program. Based on the US Supreme Court’s decision and because NuGen 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.

NuGen’s proposed construction does not have the potential to emit HAPs. Ethanol does not emit any HAP emissions. Therefore, NuGen’s proposed construction will not increase the potential HAP 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

NuGen’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 because NuGen has requested federally enforceable limits to avoid PSD, the new tank is not applicable to the exemption and 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 is not applicable to the state's particulate or sulfur dioxide limits.

7.3 Title V Air Quality Operating Permit Revision

NuGen 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 tank. Initial startup will be defined as the first time 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 ethanol storage tank at NuGen's ethanol plant. Questions regarding this permit review should be directed to Earl Berg, Engineer I, Department of Environmental and Natural Resources, Air Quality Program.