

Comments on Draft Permit #12-POY-079

FTS International Proppants, LLC

Acadia, Trempealeau, Wisconsin

March 15, 2013

FTS International Proppants, LLC has applied for an air pollution control construction permit to operate a sand mine and processing plant near Acadia, Wisconsin. The DNR draft permit and preliminary determination do not provide a precise location for the mine and plant. However, Figure 1 was developed from the DNR modeling files for the draft permit. This shows the anticipated location of the sand mine and sand plant buildings and sand dryer and dry plant baghouse stacks east of Acadia on Highway 95.

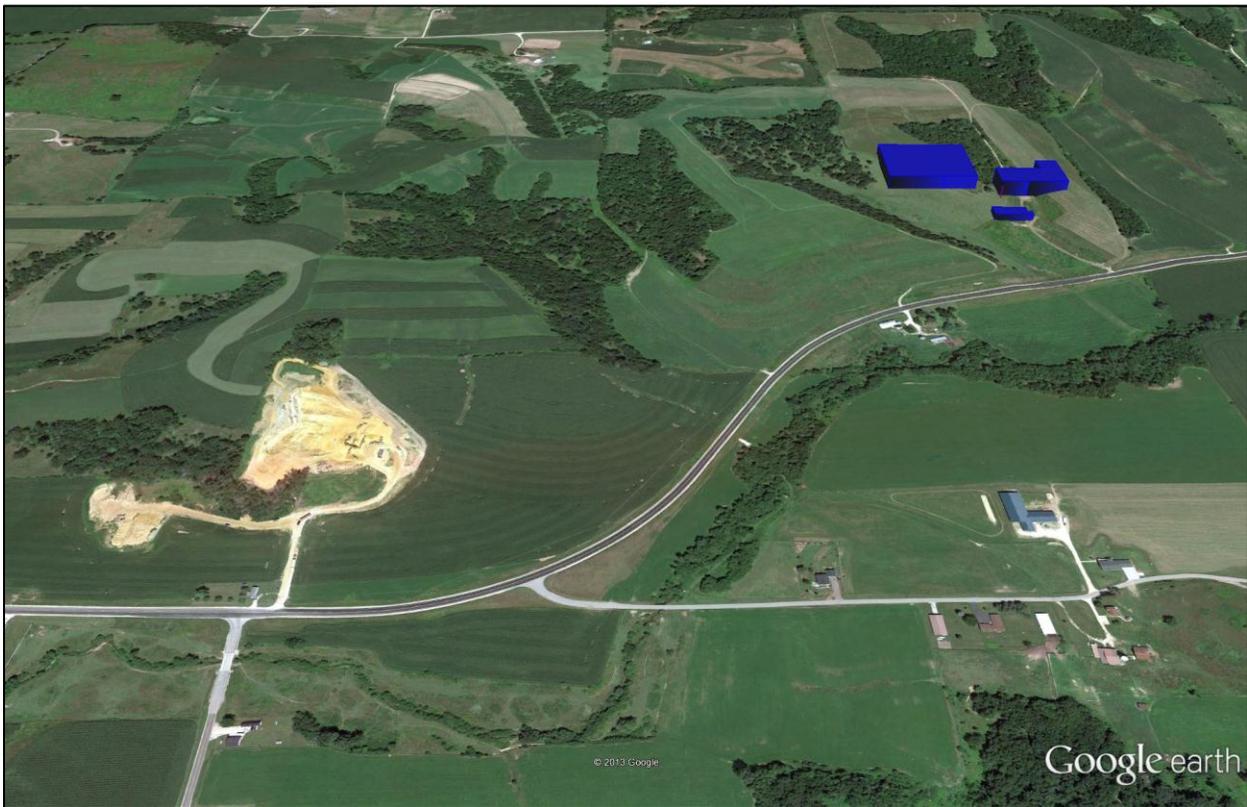


Figure 1 – Proposed Sand Mine and Plant Location

As currently written, Permit #12-POY-079 cannot be issued to FTS International Proppants, LLC for its proposed sand mine and processing plant. Emission limitations and requirements in the draft permit are either not achievable or are too vague to assure protection of air quality standards. There are significant errors in DNR supporting documents including its preliminary

determination and modeling analysis which show the proposed sand plant cannot comply with the requirements for permit issuance: compliance with emission limitations and protection of air quality standards. The final permit cannot be issued until changes are made so the sand plant complies with the criteria for permit approval.

Comments are the draft permit and supporting documents are as follows:

1. P01 – Sand Dryer – PM2.5 emission limitation is not achievable
2. P02 – Dry Plant – PM2.5 emission limitation is not achievable
3. Compliance stack tests should be conducted at full capacity
4. Control measures for fugitive dust sources are vague and unenforceable.
5. The sand plant will violate air quality standards for PM2.5.
6. The sand mine will violate air quality standards for NO2
7. The ambient monitoring requirements is too vague to be effective.
8. No evaluation of compliance with hazardous air pollutant requirements
9. No environmental assessment has been prepared.

1. P01 – Sand Dryer – PM2.5 Emission Limitation is Not Achievable

Based on the NSPS regulations, the allowable emissions from the cyclone and baghouse controlling the rotary sand dryer are 0.025 gr/dscf and 5.57 lbs/hr. At this emission rate, the DNR modeling analysis likely shows the plant will not comply with the NAAQS for PM2.5. To comply with the NAAQS, a lower limit of 1.05 lbs/hr has been proposed. From the DNR preliminary determination it is not clear how this limitation was chosen.

Based on the 26,000 acfm flow rate, the required outlet concentration of the baghouse is:

$$\text{Outlet concentration} = 1.05 \text{ lbs/hr} \times 7,000 \text{ gr/lbs} \div 60 \text{ min/hr} \div 26,000 \text{ acfm} = 0.0047 \text{ gr/acf}$$

This outlet concentration is a very low limitation for a typical baghouse. Earlier this year, the DNR established a BACT emission limitation of 0.004 gr/dscf for a new sand handling baghouse at Aarrowcast, Inc. (Permit #11-POY-262). BACT typically represents the lowest emission limit currently considered achievable by state of the art air pollution control equipment.

The DNR preliminary determination does not explain how the baghouse for the proposed sand dryer is capable of achieving the low PM2.5 emission limitation necessary to comply with the NAAQS. The manufacturer and model number of the baghouse are not provided and there is no evaluation of the design specifications for the baghouse.

The current emissions limit of 1.05 lbs/hr will either need to be increased to provide a reliable safety margin (i.e. 0.01 gr/acf or 2.2 lbs/hr), or the permit application and draft permit should be updated to require the following:

- 1) require use of a highly efficient state of the art baghouse with an air:cloth ratio of 3:1 or less,
- 2) require a vendors performance guarantee,
- 3) require an annual compliance stack test to verify continued compliance with the low emission limit as the baghouse ages and becomes less efficient, and,
- 4) require the installation and operation of bag leak detection system to verify continuous maintenance of the baghouse as the baghouse ages and becomes less efficient.

If the emission limitation is increased to provide a reliable margin of safety, the modeling analysis should be repeated to verify compliance with the NAAQS for PM2.5.

2. P02 – Dry Plant – PM2.5 Emission Limitation is Not Achievable

Based on the NSPS regulations, the allowable emissions from the baghouse controlling the rotary sand dryer are 0.014 gr/dscf and 3.12 lbs/hr. At this emission rate, the DNR modeling analysis likely shows the plant will not comply with the NAAQS for PM2.5. To comply with the NAAQS, a lower limit of 1.0 lbs/hr has been proposed. From the DNR preliminary determination it is not clear how this limitation was chosen.

Based on the 26,000 acfm flow rate, the required outlet concentration of the baghouse is:

$$\text{Outlet concentration} = 1.0 \text{ lbs/hr} \times 7,000 \text{ gr/lbs} \div 60 \text{ min/hr} \div 26,000 \text{ acfm} = 0.0045 \text{ gr/acf}$$

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3) require an annual compliance stack test to verify continued compliance with the low emission limit as the baghouse ages and becomes less efficient, and,

4) require the installation and operation of bag leak detection system to verify continuous maintenance of the baghouse as the baghouse ages and becomes less efficient.

If the emission limitation is increased to provide a reliable margin of safety, the modeling analysis should be repeated to verify compliance with the NAAQS for PM2.5.

3. Compliance stack tests should be conducted at full capacity

The draft permit requires that the P01 – Sand Dryer and P02 – Dry Plant baghouses be tested initially to verify compliance with the emission limitations. The test requirement does not specify the production capacity required for the test. To assure a representative stack test, the draft permit test condition should be updated to require that tests are conducted at 90% or more of full production capacity.

4. Control measures for fugitive dust sources are vague and unenforceable.

The draft permit incorporates a fugitive dust control plan. However, the plan is too vague to be effective.

a. The plan should specifically identify all of the known sources of fugitive dust that are being approved by the DNR including:

- Loading mine haul trucks
- Mine haul truck travel on unpaved roads
- Unloading mine haul trucks into the grizzly feeder
- Primary crushing
- Unloading crusher into the grizzly feeder
- Conveying of crushed stone
- Finished sand truck travel on paved roads
- Blasting

The fugitive dust plan should be updated to require that each source of fugitive dust be checked daily for the presence of visible dust and applied control measures. For each source, the plan should require the following records:

1. daily readings to determine if visible emissions are generated at the source
2. daily readings to determine if visible emissions reach the property boundary
3. daily recording of implemented dust control measures
4. daily recording of dust control measure parameters such as water usage

b. Need for Initial Compliance Test for Blasting

An initial compliance test for visible emissions from the crusher is required but no tests is required for blasting operations. The DNR preliminary determination estimates that PM emissions from blasting will be 18 lbs/hr so that it is potentially a large source of emissions. A compliance test should also be required for the blasting operations to assure compliance with the 20% opacity limitation and use of wet methods required in the fugitive dust plan are effective.

5. The sand plant will violate air quality standards for PM2.5.

The DNR's preliminary determination includes the results of a modeling analysis used to verify compliance with the National Ambient Air Quality Standards or NAAQS. The modeling procedures are described in a February 11, 2013 memorandum from Emily Houlter to Paul Yeung, Air Dispersion Analysis for FTS International Proppants.

The modeling analysis is a critical part of the DNR evaluation of the permit application. Based on the emission limitations allowed by DNR regulations in Chapter NR 415, Wis. Adm. Code, violations of the NAAQS would likely be predicted so that a construction permit could not be issued. New and substantially lower emission limitations have been proposed by the DNR so the modeling analysis will show compliance with the NAAQS.

DNR staff provided the supporting files for the modeling analysis. The files for PM10 were re-run and the results were similar to those presented in the February 11th memorandum. The PM10 modeling results can be used to extrapolate the PM2.5 modeling results, where:

$$PM_{2.5} \text{ Project Impact} = PM_{10} \text{ Project Impact} \times PM_{2.5} \text{ Emissions} / PM_{10} \text{ Emissions}$$

$$32.1 \text{ ug/m}^3 \times (0.132 + 0.126) / (0.258 + 0.258) = 16.05 \text{ ug/m}^3$$

$$PM_{2.5} \text{ Project Impact} + \text{Background} = \text{Total Impact}$$

$$16.05 \text{ ug/m}^3 + 25.6 \text{ ug/m}^3 = 41.65 \text{ ug/m}^3 > 35 \text{ ug/m}^3 \text{ (NAAQS)}$$

To obtain more accurate PM2.5 modeling results, the PM2.5 emission rates were substituted into the PM10 modeling files and the analysis was re-run. The new PM2.5 modeling results were 16.3 ug/m³ which is slightly higher than results based on a simple extrapolation.

In either case, the new PM2.5 modeling results derived here do not agree with the 9.3 ug/m³ plant impact presented in the February 11th memorandum. The new results are higher and predict a violation of the NAAQS for PM2.5. Since compliance with the NAAQS must be shown as a condition of permit approval, the draft permit cannot be approved without substantial changes to the proposed sand mine and plant.

The accuracy of the modeling analysis is also questionable for the following reasons:

- It is based on the extremely low emission limitations established for PM2.5 emissions from the baghouses controlling the P01 – Sand Dryer and P02 – Dry Plant.
- It does not include any of the facility sources of fugitive emissions including crushing, vehicle traffic and blasting.

6. The sand mine will violate air quality standards for NO₂

The DNR preliminary determination provides emission estimates for blasting operations. The maximum emission rate for NO_x is 255 lbs/hr. This is a very high emission rate for any air pollutant. On January 22, 2010, EPA established a new one-hour National Ambient Air Quality Standard (NAAQS) for Nitrogen Dioxide at 100 parts per billion ppb (approximately 189 µg/m³). The DNR modeling analysis used to verify compliance with the air quality standards did not evaluate the air quality impacts due to blasting emissions.

For these comments, a modeling analysis was conducted to estimate the air quality impacts of NO_x emissions from blasting. Emissions from blasting were modeled as an area source using the 255 lbs/hr emission rate distributed over the maximum blasting area of 14,910 ft²/hr.

The maximum predicted 1-hour average concentration of NO₂ was 8,439,543 ug/m³, which is 44,654 times the NAAQS of 189 ug/m³ without consideration of any background concentration. Since compliance with the NAAQS must be shown as a condition of permit approval, the draft permit cannot be approved without substantial changes to the proposed sand mine and plant.

7. The ambient monitoring requirements is too vague to be effective.

Under Condition C.3. of the draft permit, the DNR is requiring the permittee to setup and operate a particulate matter ambient air monitoring system. These permit conditions are too vague to assure compliance with air quality standards and should be updated to provide more clarity.

The draft permit requires FTS to submit a plan for a particulate matter ambient monitoring system within 30 days of final permit issuance. The plan must be approved by the DNR. Monitoring is to be conducted every 6 days unless the DNR asks for a more frequent schedule. Monitoring is to begin within 120 days of operation permit issuance or as specified in the plan. No minimum time period for monitoring is specified in the permit and the company can request a variance from the DNR to stop monitoring if the company shows the general public is not exposed to significant levels of particulate matter from the sand plant.

Monitoring would provide more protection to nearby residents and information for future projects if the final permit included the following specific ambient monitoring requirements:

- Deadline to Begin Monitoring - Ambient monitoring should begin as soon as the sand plant is operating and not after issuance of an operation permit could potential take many years to complete.

b. Length of Monitoring Program - There is no timeframe for monitoring. DNR approval of the plan should require a minimum of 24-months of monitoring. This was the minimum timeframe included under Condition ZZZ.2. of Permit #12-MHR-157 issued to the Silica Sands – Barron Plant on December 18, 2012.

c. Air Pollutant to be Measured – The air pollutant to be measured should be PM_{2.5}, not particulate matter. PM_{2.5} is the health-based air quality standard. Particulate matter is a nuisance. The modeled PM_{2.5} concentrations were estimated to exceed the NAAQS even when stacks had stringent emission limits and fugitive sources were not included in the analysis.

4. Number of Ambient Monitors - A minimum of two monitors should be required: one at the mine and one at the sand processing plant. A monitor at the mine is required because it is located at a separate location than the sand processing plant, and the DNR conducted no analysis to determine if emissions from the mine comply with air quality standards.

5. Monitoring Frequency - A monitoring schedule more frequent than every 6 days is needed to assure that measurements are taken whenever there are dust generating activities. Options include the use of continuous PM_{2.5} monitors or monitor operation every 3 days.

6. Concurrent Production Records - To determine if the PM_{2.5} measurements are representative, it is necessary to know the level of production and dust conditions on the day of monitoring and days when the monitor is not operating. For example, if monitoring occurs on a day of low production and minimal wind, it would not be unexpected to have low dust concentrations. The dust control plan should be updated to require concurrent production and dust conditions on each day monitoring is conducted.

7. Evaluation of Silica Exposure - It is expected that the majority if not all of the particulate matter emissions will be composed of silica. The DNR has recognized that exposure to crystalline silica dust can result in silicosis and cancer.¹ However, it has chosen to not adopt an air quality standard specific to silica as it has done for other hazardous air pollutants under Chapter NR 445, Wis. Adm. Code. To date, it has chosen to rely on existing control requirements and air quality standards for dust including PM₁₀ and PM_{2.5}.

The State of California does have an ambient exposure reference level (REL) of 3 micrograms per cubic meter as expressed on the basis of PM₄ particulate matter.² The updated modeling analysis prepared for these comments predicts an annual average PM_{2.5} concentration of 4.9 µg/m³. This will exceed the California REL. The PM_{2.5} and silica concentrations will also be higher if the modeling analysis is corrected to include: 1) attainable emission estimates for baghouses, and 2) fugitive dust sources. Based on the emission control requirements presented in the draft permit, off-site concentrations above the California REL are likely to occur.

¹ Wisconsin Department of Natural Resources, Report to the Natural Resources Board: Silica Study, August 2011.

² California Office of Environmental Health Hazard Assessment (OEHHA). “Chronic Toxicity Summary, Silica (Crystalline, Respirable).” Published February 2005.

Due to the large amount of uncontrolled fugitive dust sources associated with the sand mining and processing, achieving low dust emissions and airborne concentrations of silica will depend on daily weather, sand conditions, and strict attention of dust control measures.

To assure the public is protected, the final permit should require either: 1) analysis of the particulate matter filters to determine the silica content, or 2) the operation of ambient monitors specifically designed for crystalline silica.

When the DNR evaluated options for protecting the public from silica, no reasonable ambient monitoring methods were available. However, in his recent report, *Ambient Crystalline Silica*, and evaluation of ambient monitoring near two Wisconsin frac sand mining and processing plants, John Richards described a practical monitoring system with an estimated cost of \$8,500. He also made the following recommendation:³

Industrial sources should conduct upwind-downwind studies to measure the increase, if any, in the ambient PM4 crystalline silica concentrations and to measure the variations in background concentrations caused by numerous community and natural sources.

Monitoring airborne concentrations of crystalline silica near the proposed sand plant is necessary to assure protection of the general public and should be incorporated into the draft permit prior to its issuance.

During its evaluation of crystalline silica, the DNR concluded it had no ambient monitoring data and there was no official monitoring method. Now that a reasonably priced and effective monitoring procedure is available, the DNR should begin to require all sand plants to conduct ambient monitoring.

8. No evaluation of compliance with hazardous air pollutant requirements

The DNR preliminary determination concludes that the fuels used by the plant are exempt from the hazardous air pollutant requirements of Chapter NR 445, Wis. Adm. Code. However, no evaluation has been conducted for the emissions of HAP released during blasting operations. In its preliminary determination, the DNR estimated the emission of criteria pollutants from blasting including SO₂, NO_x, VOC, CO and CO₂. As a combustion process, blasting is also expected to generate HAP emissions composed of products of incomplete combustion and constituents of the explosives. In the emission estimation reference used by the DNR for other operations, USEPA provides HAP emission factors for numerous explosives in Chapter 15: Ordinance Detonation. Similar HAP emissions will be released by the explosives to be used at the proposed sand mine.

9. No environmental assessment has been prepared.

³ J. Richards, *Ambient Crystalline Silica*, October 24, 2012.

The DNR has concluded in the preliminary determination that an NR 150 environmental assessment will not be completed for this project. The wide spread increase in construction of sand mines and processing plants for the fracking industry in the region is causing deterioration of the quality of life of area residents. An environmental assessment should be prepared prior to permit issuance. This should identify and evaluate the environmental impacts resulting from the new sand plants.