

# Fugitive Dust Control Plan

Great Plains Sand, LLC

Shakopee, MN

**Wenck File #2771-01**

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## **1.0 Introduction**

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Great Plains Sand, LLC (Great Plains) submitted a State Air Permit Application to the Minnesota Pollution Control Agency on February 8, 2012 for the construction and operation of an industrial sand processing facility to be located in Shakopee, Minnesota. The application addressed operations from the mine and the processing facility.

This Plan has been developed to control emissions from drilling and blasting, backhoe operation, bulldozing, outdoor sand piles, outdoor material handling, crushing, truck loading, truck hauling and employee vehicle traffic at the proposed mine and processing facility. Compliance with the control of particulate emissions will be maintained by Great Plains through regular observations of fugitive dust conditions attributable to Great Plain's activities and application of reasonable mitigation measures. At daily intervals, and upon receiving a complaint, Great Plains will investigate fugitive dust conditions. Great Plain's observation of fugitive dust conditions and valid dust complaints are to be addressed by reasonable and appropriate mitigation measures. Great Plains shall record its observations and mitigation measures, as well as any complaints received and mitigation measures taken in response to such complaints.

The designated on-site contact for purposes of compliance with this Plan is listed below:

Mr. Doug Wermerskirchen Operations Manager Great Plains Sands, LLC Phone: (952) 917-9802
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It is assumed that the fugitive particulate emissions control season is approximately March 15<sup>th</sup> through November 21<sup>st</sup> of each calendar year, and also during non-freezing weather conditions during the remainder of the calendar year.

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## **2.0 Fugitive Particulate Emissions Sources**

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Sources of fugitive particulate emissions at the mine and processing facility include drilling and blasting, backhoe and bulldozer operation, rock breaking, outdoor sand storage piles, uncontrolled material handling and transfer, crushing, and vehicle traffic on the unpaved roads. Fugitive dust will be controlled in order to prevent significant exposure of particulate matter to the general public. The sources of fugitive particulate emissions are described in this section.

### **2.1 DRILLING AND BLASTING**

In situations where the sand-bearing geological formation at the mine is tightly cemented, it may be necessary to utilize drilling and blasting to make the sand more amenable to removal. Blasting, using an explosive agent, may be conducted frequently during the mining season. Fugitive emissions will be generated during the drilling and blasting activities.

### **2.2 BACKHOE AND BULLDOZING OPERATIONS**

A backhoe will be utilized at the mine to transfer sand from the pit to the haul trucks or to the sand storage pile. The bulldozer and/or backhoe will be utilized during the overburden removal and berm construction.

### **2.3 ROCK BREAKING**

It may be necessary for Great Plains to utilize a rock breaker in order to break up the large chunks of rock at the mine prior to processing in the facility. The rock breaker will be attached to a front-end loader and moved as necessary around the current phase of the mine. Fugitive emissions will be generated during the operation of the rock breaking activities.

## **2.4 SAND STORAGE PILES**

There are six outdoor sand storage piles at the Great Plains site that are labeled in Figure 1, found in Appendix A. The excavated sand from the mine can be stockpiled in a storage pile located at the mine. After being transferred to the facility, the sand can be fed directly to the grizzly or stockpiled in a surge pile of raw material located outside the building. This stockpile will contain approximately 20,000 cubic yards of raw material which is fed into a pre-screening and crushing unit. This pre-screening and crushing unit generates two small stockpiles (roughly 3,500 cubic yards each) which are fed to the wet plant. After processing, the material will be stockpiled outside using two 150' radial stackers. These stockpiles will contain approximately 100,000 cubic yards of material each, reaching heights of 40-50 feet. The maximum stockpile volumes will only be reached in the fall of the year to provide a supply of washed material to the dryer on a year round basis. By the spring, these stockpiles will be significantly depleted and then replenished again over the course of the subsequent summer and fall. Wind erosion may be a source of fugitive particulate emissions throughout the year. Fugitive particulate emissions from the sand storage piles are also potentially generated from the stacking and reclaiming of sand to and from the pile(s).

## **2.5 UNCONTROLLED MATERIAL HANDLING AND TRANSFER**

Material handling and transfer operations with the potential to generate fugitive particulate emissions include transfer of sand via the front-end loaders and the conveyance of sand from one piece of equipment to the next (conveyors, belts, feeders, etc.). The majority of these material transfer points transfer points will occur at the mine and the processing facility prior to the dryer. Because the natural moisture content of the sand will be approximately 2%, fugitive emissions from the transfer points are anticipated to be minimal based on information outlined in AP-42 Chapter 11.19.2 regarding the processing of wet sand.

## **2.6 JAW CRUSHER EQUIPMENT**

The sand deposit being mined is composed of agglomerated grains of sand. The majority of this material is broken down to individual grains of sand during blasting or by the grizzly feeder. Great Plains may utilize a jaw crusher to further deagglomerate this material. The crusher may generate fugitive particulate emissions; although significant emissions are not anticipated based on the natural moisture content of the material.

## **2.7 ON-SITE VEHICLE TRAFFIC TRAVELING ON UNPAVED ROADS**

All roads at the facility will be unpaved. These roads include the haul road from the mine to the processing plant, the front-end loader routes at the mine and the processing plant and the product loadout and employee traffic road.

Included in Appendix A is a site-layout illustrating the various sources of fugitive emissions as described above.

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## **3.0 Control Measures for Fugitive Particulate Emissions**

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The primary control measures for fugitive particulate emissions from various Great Plains fugitive dust sources are described in this section.

### **3.1 DRILLING AND BLASTING**

Great Plains will conduct drilling and blasting up to frequently during the mining season. Blasting activities will be a relatively small source of fugitive emissions.

#### **3.1.1 Emission Control**

For fugitive dust control, the space between the explosive and the top of the drilled hole will be filled with a stemming material. Stemming material is an inactive material used to backfill a hole for the purpose of containing the explosive energy. The stemming material also acts to minimize fugitive emissions from the blast. The drilling equipment that the facility is planning to purchase comes equipped with a wet suppression system or other equivalent control. Additionally, the natural moisture content of the sand will aid in minimizing fugitive emissions.

### **3.2 BACKHOE AND BULLDOZER OPERATION**

A backhoe will be utilized at the mine to transfer sand from the pit to the haul trucks or to the sand storage pile. The bulldozer and/or backhoe will be utilized during the overburden removal and berm construction. Emissions from these operations are not expected to be significant.

#### **3.2.1 Emission Control**

The natural moisture content of the sand and/or overburden serves as the best control for backhoe and bulldozer operations. If necessary, additional dust control will occur through use of watering techniques.

### **3.3 ROCK BREAKING**

Great Plains may utilize a rock breaker in order to break up the large chunks of rock at the mine prior to processing in the facility. The rock breaker will be attached to a front-end loader and moved as necessary around the current phase of the mine. Fugitive emissions from this operation are not expected to be significant.

#### **3.3.1 Emission Control**

The natural moisture content of the sand serves as the best control for rock breaking operations. If necessary, additional dust control will occur through use of watering techniques.

### **3.4 SAND STORAGE PILES**

Great Plains stores sand in outdoor piles throughout the year. Sand is transferred to and from the storage piles by a front-end loader for all piles prior to the wet plant and a product stacker after the wet plant. The natural moisture content of the four storage piles prior to the wet plant is greater than two percent, while the sand dropping to the two piles post wet plant is completely saturated. Because of the saturated sand, there are negligible emissions from the stacking conveyor drop to the piles. The sand's moisture content in the piles then drain down to five percent prior to being fed into the dryer. Wind erosion is anticipated to be the largest source of fugitive emissions from the sand storage piles.

#### **3.4.1 Emission Control**

Wind erosion is minimized when the exterior of the pile is kept damp. The natural moisture content of the sand will aid in reducing fugitive dust emissions. Additionally, it is estimated that there are over 105 days that are naturally defined "wet" (an average number of days with

perception greater than or equal to 0.25 mm or 0.01 inches based on precipitation data) at the location of the mine and processing facility. During exceptionally dry periods or upon any significant amounts of fugitive dust, the sand piles will be watered to minimize the effect of wind erosion. An exception will be made for freezing conditions that would present a safety hazard to workers or vehicles.

Great Plains Sands will perform on-site visible emission checks at least once daily to verify that visible emissions are at or below 10 percent. Visible emissions do not signal noncompliance with applicable requirements, but visible emissions over 10% will trigger additional watering of the piles.

### **3.5 MATERIAL HANDLING AND TRANSFER**

Material will be transported from the mine, storage piles and wet plant via feeders, belts, conveyors, etc. Material handling and transfer points are not anticipated to result in significant emissions as the natural sand moisture content will be 2 percent or greater.

#### **3.5.1 Emission Control**

The natural moisture content of the sand serves as the best control for material handling operations. If required for opacity limitations, additional dust control will occur through use of water or suitable chemicals.

Additionally, as a preventative control measure, Great Plains will clean up spills of commodities on the facility property to reduce fugitive particulate emissions. It should also be noted that 40 CFR Part 60, Subpart OOO (NSPS OOO) applies to the conveyors and other transfer equipment following the crusher and therefore will be subject to opacity limits as defined by the rule.

### **3.6 JAW CRUSHER**

Before being processed in the facility, the incoming sand from the mine will be passed through a grizzly feeder and then a jaw crusher to process a small portion of the sand that is not deagglomerated during blasting or by the grizzly feeder. The crusher process will be a source of fugitive emissions.

### **3.6.1 Emission Control**

The crusher will process sand at or near the moisture content at which it was mined. Additionally, the crusher will only deagglomerate the sand. No actual “crushing” of the sand grains will occur. Therefore, no new “dry” surfaces will be exposed during the process. Although it is anticipated that the natural moisture content of the material will be sufficient to prevent fugitive dust emissions, a water spray system to control fugitive dust emissions during loading, conveying, and crushing to minimize visible emissions will be utilized, if necessary.

It should also be noted that NSPS OOO applies to jaw crusher and therefore will be subject to opacity limits as defined by the rule.

## **3.7 ON-SITE VEHICLE TRAFFIC TRAVELING ON UNPAVED ROADS**

All roads at the facility will be unpaved and the surfaces of the roads are composed of sand. Truck and heavy equipment traffic over these surfaces is the main sources of fugitive dust from the unpaved roads. There are several vehicle routes that contribute to the fugitive emissions. The facility will utilize a haul truck to transfer sand from the mine to the processing plant. The route of the haul truck will be dependent on the current phase of the mine. There will also be two main front-end loader routes at the facility and two at the mine, along with an employee and product loadout route into and out of the facility.

### **3.7.1 Emission Control**

In order to reduce emissions from unpaved roads, Great Plains Sand has proposed the application of water to control these emissions from the site. This is a standard method for controlling air emissions from these types of sources.

The control efficiency of watering is dependent on the vehicle traffic on the route, the intensity of the application of the water and the frequency of the watering. In order to achieve the appropriate control efficiencies for permitting purposes, it will be necessary for the facility to water the main haul truck route and the front-end loader routes at the mine and the processing facility once per day. The product loadout and employee traffic route will need to be watered once per week. All routes have been proposed at an application intensity of 0.10 gallon per square foot. It is also proposed that any precipitation of greater than 0.10 inches will substitute for one day of watering. This precipitation will be measured using local national weather service data or an on-site rainfall gauge. In addition, Great Plains will perform on-site visible emission checks at least once daily to verify that visible emissions are at or below 10 percent. If visible emissions are observed, the facility will investigate the condition and take appropriate corrective active to reduce the visible emissions. Visible emissions do not signal noncompliance with applicable requirements, but visible emissions over 10% will trigger additional watering of the roads. The observation of fugitive emissions could trigger additional watering – over and above the levels identified above.

To demonstrate compliance with this procedure, Great Plains Sand will be required to maintain records of watering frequency and intensity. Great Plains will keep daily records of water truck use and documentation of meteorological conditions. As noted above, watering will not occur on “wet” days (> 0.10 inches of precipitation) unless visible emissions from the roads are observed to be above 10% by the visible emissions reader or on days that unpaved roads are not being used (e.g., occasional and seasonal mine closures).

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## **4.0 Recordkeeping**

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Great Plains will maintain records to demonstrate compliance with this fugitive dust control plan. Mitigation measures will be taken as needed in order to prevent avoidable amounts of particulate matter from becoming airborne.

If fugitive dust complaints are received, Great Plains will investigate the merit of the complaint, and take appropriate and reasonable measures as soon as practicable. Great Plains will keep a record of complaints received and mitigation measures taken.

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# **Appendix A**

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## **Mine & Processing Facility Site Layout**

Great Plains Sand, LLC Processing Facility - Fugitive Dust Emission Sources

Unpaved Product Loadout and Employee Traffic

40 x 70 Concentrate Storage Pile

40+ Mesh Storage Pile

Wet Screen Storage Pile #1

Wet Screen Storage Pile #2

Grizzly Stockpile

NOTE: Processing Facility Front End Loader Routes, Grizzly Feeder, Jaw Crusher and Various Material Handling and Transfer Points will be located anywhere within area marked in orange.

Mine Stockpile

NOTE: Blasting and Drilling, Backhoe and Bulldozing Operations, Rock Breaking, Mine Front End Loader Routes, and Unpaved Haul Roads will be located anywhere within area marked in red depending on the phase of the mine.

