

STATE OF MISSOURI

PERMIT BOOK



DEPARTMENT OF NATURAL RESOURCES

MISSOURI AIR CONSERVATION COMMISSION

PERMIT TO CONSTRUCT

Under the authority of RSMo 643 and the Federal Clean Air Act the applicant is authorized to construct the air contaminant source(s) described below, in accordance with the laws, rules and conditions as set forth herein.

Permit Number: 112012-003 Project Number: 2011-12-056

Installation Number: 143-0078.

Parent Company: Agrium Advanced Technologies Inc.

Parent Company Address: 2915 Rocky Mountain Ave., Loveland, CO 80538

Installation Name: Agrium Advanced Technologies Inc.

Installation Address: 566 County Highway 406, Marston, MO 63866

Location Information: New Madrid County, S20, T22N, R14E

Application for Authority to Construct was made for:
Environmentally Smart Nitrogen (ESN) fertilizer production expansion. This review was conducted in accordance with Section (5), Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required*.

Standard Conditions (on reverse) are applicable to this permit.

Standard Conditions (on reverse) and Special Conditions are applicable to this permit.

NOV 15 2012

EFFECTIVE DATE

Handwritten signature of Kyrna L. Moore in black ink.
DIRECTOR OR DESIGNEE
DEPARTMENT OF NATURAL RESOURCES

STANDARD CONDITIONS:

Permission to construct may be revoked if you fail to begin construction or modification within two years from the effective date of this permit. Permittee should notify the Air Pollution Control Program if construction or modification is not started within two years after the effective date of this permit, or if construction or modification is suspended for one year or more.

You will be in violation of 10 CSR 10-6.060 if you fail to adhere to the specifications and conditions listed in your application, this permit, and the project review. In the event that there is a discrepancy between the permit application and this permit, the conditions of this permit shall take precedence. Specifically, all air contaminant control devices shall be operated and maintained as specified in the application, associated plans, and specifications.

You must notify the Department's Air Pollution Control Program of the anticipated date of start-up of these air contaminant sources. The information must be made available within 30 days of actual startup. Also, you must notify the Department of Natural Resources Regional office responsible for the area within which you are located within 15 days after the actual start-up of these air contaminant sources.

A copy of this permit and permit review shall be kept at the installation address and shall be made available to Department of Natural Resources' personnel upon request.

You may appeal this permit or any of the listed special conditions to the Administrative Hearing Commission (AHC), P.O. Box 1557, Jefferson City, MO 65102, as provided in RSMo 643.075.6 and 621.250.3. If you choose to appeal, you must file a petition with the AHC within 30 days after the date this decision was mailed or the date it was delivered, whichever date was earlier. If any such petition is sent by registered mail or certified mail, it will be deemed filed on the date it is mailed. If it is sent by any method other than registered mail or certified mail, it will be deemed filed on the date it is received by the AHC.

If you choose not to appeal, this certificate, the project review and your application and associated correspondence constitutes your permit to construct. The permit allows you to construct and operate your air contaminant sources(s), but in no way relieves you of your obligation to comply with all applicable provisions of the Missouri Air Conservation Law, regulations of the Missouri Department of Natural Resources, and other applicable federal, state and local laws and ordinances.

The Air Pollution Control Program invites your questions regarding this air pollution permit. Please contact the Construction Permit Unit at (573) 751-4817. If you prefer to write, please address your correspondence to the Missouri Department of Natural Resources, Air Pollution Control Program, P.O. Box 176, Jefferson City, MO 65102-0176, attention: Construction Permit Unit.

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SPECIAL CONDITIONS:

The permittee is authorized to construct and operate subject to the following special conditions:

The special conditions listed in this permit were included based on the authority granted the Missouri Air Pollution Control Program by the Missouri Air Conservation Law (specifically 643.075) and by the Missouri Rules listed in Title 10, Division 10 of the Code of State Regulations (specifically 10 CSR 10-6.060). For specific details regarding conditions, see 10 CSR 10-6.060 paragraph (12)(A)10. "Conditions required by permitting authority."

Agrium Advanced Technologies Inc.
New Madrid County, S20, T22N, R14E

1. **Superseding Condition**
The conditions of this permit supersede all special conditions in construction permit 112009-011 issued by the Air Pollution Control Program.
2. **Particulate matter less than 2.5 microns in diameter (PM_{2.5}) Emission Limitation**
 - A. Agrium Advanced Technologies Inc. shall emit less than 10.0 tons of PM_{2.5} in any consecutive 12-month period from the entire installation (see Table 7).
 - B. Attachment A or equivalent forms, such as electronic forms, approved by the Air Pollution Control Program shall be used to demonstrate compliance with Special Condition 2.A.
3. **Control Device Requirement - Enclosure**
The emission units in Table 1 and their drop points shall be completely enclosed.

Table 1: Completely Enclosed Emission Units

Emission Unit	Description
14	Offsize urea conveyor
27	ESN outside conveyor to storage domes
32	ESN diverter valve
35	ESN conveyor to barge shipping

4. **Control Device Requirement - Urea Storage Domes**
Each urea storage dome and activity shed shall be completely enclosed and operated with a vent connected to baghouse CD-01 during respective urea load-in (EU-03) an load-out (EU-05).
5. **Control Device Requirement – ESN Storage Domes**
The two existing ESN storage domes shall be enclosed except for the main door of the activity shed.

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The permittee is authorized to construct and operate subject to the following special conditions:

6. **Control Device Requirement - Barge Shipping**
 Agrium Advanced Technologies Inc. shall operate a telescopic spout that choke flows all ESN processed through ESN barge shipping (EU-36). The spout shall be operated such that the free-fall height of ESN exiting the spout is minimal with respect to river elevation and barge draft.

7. **Control Device Requirement – Truck and Rail Shipping**
 Agrium Advanced Technologies Inc. shall install a flexible sleeve at each ESN rail shipping (EU-34) and ESN truck shipping (EU-34a). The flexible sleeves shall be used whenever ESN is processed through EU-34 or EU-34a. The flexible sleeves shall extend below the top of the shipping trailer and container sides.

8. **Control Device Requirement - Baghouses**
 - A. Agrium Advanced Technologies Inc. shall enclose and control emissions from the emission units in Table 2 using baghouse CD-01.

Table 2: Emission Units Controlled by CD-01

Emission Unit	Description
1	Urea receiving diverter valve
1a	Urea receiving diverter valve
2	Belt conveyor
3	Urea dome load-in
4	Urea dome loader haul road
5	Urea dome load-out
6	Urea hoppers
7	Drag conveyor
8	Bucket elevator
9	Outdoor day bins
10	Belt conveyor
11	Urea screen
12	Sized urea bin
13	Sized urea split conveyor
18a	Line 2 urea weigh belt
19b	Line 2 elevator to preheater

- B. Agrium Advanced Technologies Inc. shall enclose and control emissions from the emission units in Table 3 using baghouse CD-02. The exhaust of CD-02 shall be routed to the exhaust of CD-01.

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SPECIAL CONDITIONS:

The permittee is authorized to construct and operate subject to the following special conditions:

Table 3: Emission Units Controlled by CD-02

Emission Unit	Description
18	Line 1 urea weigh belt
19	Line 1 urea preheater

- C. Agrium Advanced Technologies Inc. shall enclose and control emissions from the line 2 urea preheater (EU-19a) using baghouse CD-04.
 - D. The baghouses shall be operated and maintained in accordance with the manufacturer's specifications. The baghouses shall be equipped with a gauge or meter, which indicates the pressure drop across the control device. These gauges or meters shall be located such that the Department of Natural Resources' employees may easily observe them.
 - E. Replacement filters for the baghouses shall be kept on hand at all times. The bags shall be made of fibers appropriate for operating conditions expected to occur (i.e. temperature limits, acidic and alkali resistance, and abrasion resistance).
 - F. Agrium Advanced Technologies Inc. shall monitor and record the operating pressure drop across each baghouse at least once every 24 hours of operation. The operating pressure drop shall be maintained within the limits established in Special Condition 12.G. If the baghouse was not required to be performance tested, the operating pressure drop range shall be specified by the manufacturer's performance warranty. The operating pressure drop limits shall be kept on site.
 - G. Agrium Advanced Technologies Inc. shall maintain an operating and maintenance log for each baghouse which shall include the following:
 - 1) Incidents of malfunction, with impact on emissions, duration of event, probable cause, and corrective actions; and
 - 2) Maintenance activities, with inspection schedule, repair actions, and replacements, etc.
9. Control Device Requirement - Scrubbers
- A. Agrium Advanced Technologies Inc. shall enclose and control emissions from the emission units listed in Table 4 using scrubber CD-03.

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SPECIAL CONDITIONS:

The permittee is authorized to construct and operate subject to the following special conditions:

Table 4: Emission Units Controlled by CD-03

Emission Unit	Description
20	Line 1 ESN drum
21	Line 1 fluidized bed ESN cooler
22	Combined Line 1 and 2 ESN screen

- B. Agrium Advanced Technologies Inc. shall enclose and control emissions from the emission units listed in Table 5 using scrubber CD-05.

Table 5: Emission Units Controlled by CD-05

Emission Unit	Description
20a	Line 2 ESN drum
21a	Line 2 fluidized bed ESN cooler

- C. The scrubbers shall be operated and maintained in accordance with the manufacturer's specifications. Each scrubber shall be equipped with a meter that indicates the scrubbing liquid flow, air pressure drop, and fluid temperature. These meters shall be located in such a way they may be easily observed by Department of Natural Resources' employees.
- D. Agrium Advanced Technologies Inc. shall monitor and record the scrubbing liquid flow, air pressure drop, and fluid temperature through each scrubber at least once every 24 hours of operation. The flow rate, pressure drop, and temperature shall be maintained within the operating limits specified by Special Condition 12.G. If the scrubber was not required to be performance tested, the above parameters shall be specified by the manufacturer's performance warranty. The operating limits shall be kept on site.
- E. Agrium Advanced Technologies Inc. shall maintain an operating and maintenance log for the scrubbers which shall include the following:
- 1) Incidents of malfunction, with impact on emissions, duration of event, probable cause, and corrective actions; and
 - 2) Maintenance activities, with inspection schedule, repair actions, and replacements, etc.

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SPECIAL CONDITIONS:

The permittee is authorized to construct and operate subject to the following special conditions:

10. Record Keeping and Reporting Requirements
 - A. Agrium Advanced Technologies Inc. shall maintain all records required by this permit for not less than five years and shall make them available immediately to any Missouri Department of Natural Resources' personnel upon request. These records shall include Material Safety Data Sheets (MSDS) for all materials used.
 - B. Agrium Advanced Technologies Inc. shall report to the Air Pollution Control Program's Compliance/Enforcement Section, P.O. Box 176, Jefferson City, MO 65102, no later than ten days after the end of the month during which any record required by this permit shows an exceedance of a limitation imposed by this permit.
11. Haul Roads
 - A. Agrium Advanced Technologies Inc. shall pave all of the haul roads with materials such as asphalt, concrete, or other material(s) that have been preapproved by the Air Pollution Control Program.
 - B. Maintenance and repair of the road surface shall be conducted as necessary to ensure that the physical integrity of the pavement is adequate to achieve control of fugitive emissions from these areas while the installation is receiving or shipping raw materials or product.
12. Performance Testing
 - A. Agrium Advanced Technologies Inc. shall conduct initial performance testing on baghouse CD-01. The following process conditions shall be measured and recorded during the baghouse performance test. The sampling location shall be downstream of the CD-01 / CD-02 exhaust connection.
 - 1) The baghouse filterable PM, PM₁₀, and PM_{2.5} controlled emission factor in pounds (to ten-thousandths decimal) per ton of correct sized urea using EPA Method 201A.
 - 2) The baghouse filterable PM, PM₁₀, and PM_{2.5} emission rate in pounds (to the ten-thousandths decimal) per hour (lb/hr).
 - 3) The baghouse pressure drop in pounds per square inch gauge (psig).
 - 4) Urea throughput from the urea hoppers (EU-06), correct-sized and off-sized urea from the urea screen (EU-11), and correct-sized urea from the urea weigh belts (EU-18 and EU-18a), each in tons per hour (tph).

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The permittee is authorized to construct and operate subject to the following special conditions:

- B. Agrium Advanced Technologies Inc. shall conduct initial performance testing on scrubber CD-03. The following process conditions shall be measured and recorded during the scrubber performance test.
- 1) The scrubber filterable PM, PM₁₀, and PM_{2.5} controlled emission factor in pounds (to ten-thousandths decimal) per ton of correct sized ESN using EPA Method 201A.
 - 2) The scrubber filterable PM, PM₁₀, and PM_{2.5} emission rate in lb/hr to the ten-thousandths decimal.
 - 3) The scrubber diphenylmethane diisocyanate [4,4-] (MDI), CAS 101-68-8 emission rate in lb/hr to the thousandths decimal.
 - 4) Scrubber fluid flow (gallons per hour, gph).
 - 5) Scrubber pressure drop (psig).
 - 6) Scrubber fluid temperature (Fahrenheit, °F).
 - 7) Raw material input to Line 1 ESN drum (EU-20) in tph.
 - 8) Raw material input to Line 2 ESN drum (EU-20a) in tph.
 - 9) Off-sized ESN from the ESN screen (EU-22) in tph. If both Line 1 and Line 2 are operating then divide by two to determine the off-size ESN rate per line.
- C. Agrium Advanced Technologies Inc. shall conduct initial performance testing on the drop point from the ESN screen (EU-22) to the ESN conveyor to storage (EU-27). The following process conditions shall be measured and recorded during the performance test.
- 1) The filterable PM, PM₁₀, and PM_{2.5} uncontrolled and controlled emission factor in pounds (to the ten-thousandths decimal) per ton of ESN.
 - 2) The filterable PM, PM₁₀, and PM_{2.5} controlled emission rate in lb/hr to the ten-thousandths decimal.
- D. Other Air Pollution Control Program preapproved methods may be substituted for any of the above EPA test methods.
- E. These tests shall be performed within 60 days after achieving the maximum hourly production rate of the installation, but not later than 180 days after initial start-up of line 2 for commercial operation, and shall be performed at the maximum hourly design rate (MHDR) of the installation in Table 7, or within 10 percent of the MHDR. If the tests are conducted below 90 percent of the MHDR, then the tested production rate is the new MHDR.

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The permittee is authorized to construct and operate subject to the following special conditions:

- F. A completed Proposed Test Plan Form (enclosed) must be submitted to the Air Pollution Control Program Compliance/Enforcement Section 30 days prior to the proposed test date so that the Air Pollution Control Program may arrange a pretest meeting, if necessary, and assure that the test date is acceptable for an observer to be present. The Proposed Test Plan may serve the purpose of notification and must be approved by the Director prior to conducting the required emission testing.
- G. Two copies of a written report of the performance test results shall be submitted to the Director within 30 days of completion of any required testing.
 - 1) The report must include legible copies of the raw data sheets, analytical instrument laboratory data, and complete sample calculations from the required EPA Method for at least one sample run, and establish corresponding ranges/limits for operating parameters to be used in Special Conditions 8 and 9.
 - 2) The ranges/limits shall be set using the performance test process conditions and results, manufacturer specifications, and installation operational experience. The ranges/limits are subject to Air Pollution Control Program approval.
 - 3) Emission factors developed from testing shall be used for all respective $PM_{2.5}$ limit compliance (Attachment A) and emissions inventory purposes. Composite $PM_{2.5}$ emission factors shall be developed for EP-01 and EP-04 through EP-08 for use in Attachment A. The composite emission factors shall be approved by the Air Pollution Control Program New Source Review Unit before use in Attachment A.
 - 4) The test report is to fully account for all operational and emission parameters addressed both in the permit conditions as well as in any other applicable state or federal rules or regulations.
- H. If the results of the performance tests show that the tested emission rates are greater than those used in the emissions analysis herein (Table 6), then Agrium Advanced Technologies Inc. shall evaluate what effects these higher emission rates would have had on the permit and ambient air quality applicability, and compliance record keeping (Attachment A) of this project. Agrium Advanced Technologies shall submit the results of any such evaluation in a completed Application for Authority to Construct within 30 days of submitting the Performance Test Results report required in Special Condition 12.G.

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SPECIAL CONDITIONS:

The permittee is authorized to construct and operate subject to the following special conditions:

Table 6: Permitted Emission Rates (pounds per hour)

Description	Filterable PM	Filterable PM ₁₀	Filterable PM _{2.5}	MDI
Baghouse (CD-01)	0.75	0.75	0.75	N/A
Wet scrubber (CD-03)	0.8404	0.8404	0.8404	0.0019
ESN conveyor (EU-27)	0.0070	0.0028	0.0028	N/A

N/A = Not Applicable

13. Operational Requirement
 - A. Agrium Advanced Technologies Inc. shall exclusively receive and ship urea and ESN fertilizer, ESN raw materials, and ESN byproducts. Handling of other fertilizers is prohibited.
 - B. Agrium Advanced Technologies Inc. shall receive urea exclusively from Crop Production Services (ID 143-0077) (CPS) barge unloading equipment. Agrium Advanced Technologies Inc. shall not receive urea from CPS storage.
 - C. Agrium Advanced Technologies Inc. shall not ship directly by conveyor any urea or ESN to CPS.

REVIEW OF APPLICATION FOR AUTHORITY TO CONSTRUCT AND OPERATE
SECTION (5) REVIEW

Project Number: 2011-12-056
Installation ID Number: 143-0078
Permit Number:

Agrium Advanced Technologies Inc.
566 County Highway 406
Marston, MO 63866

Complete: December 21, 2011

Parent Company:
Agrium Advanced Technologies Inc.
2915 Rocky Mountain Ave.
Loveland, CO 80538

New Madrid County, S20, T22N, R14E

REVIEW SUMMARY

- Agrium Advanced Technologies Inc. has applied for authority to increase ESN fertilizer production.
- Hazardous Air Pollutant (HAP) emissions are expected from the proposed equipment. HAPs from this process are MDI from urea coating and various HAPs from natural gas combustion.
- None of the New Source Performance Standards (NSPS) under 40 CFR Part 60 apply to the installation. 40 CFR Part 60, Subpart Dc, *Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units* does not apply because the design rate of each individual boiler is less than 10 million British thermal units per hour (MMBtu/hr) heat input.
- None of the National Emission Standards for Hazardous Air Pollutants (NESHAPs) under 40 CFR Part 61 apply to this installation.
- None of the currently promulgated Maximum Achievable Control Technology (MACT) regulations apply to the proposed equipment. 40 CFR Part 63, Subpart BB, *National Emission Standards for Hazardous Air Pollutants From Phosphate Fertilizers Production Plants* does not apply because the installation does not manufacture or handle fresh phosphate fertilizer. 40 CFR Part 63, Subpart JJJJJJ, *National Emission Standards for Hazardous Air Pollutants for Area Sources: Industrial, Commercial, and Institutional Boilers* does not apply because the boilers solely combust natural gas.
- Enclosures, baghouses, scrubbers, flexible sleeves, and a telescoping chute are being used to control the PM, PM₁₀, PM_{2.5}, and MDI emissions from the equipment in this permit.

- This review was conducted in accordance with Section (5) of Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required*. Potential emissions of PM_{2.5} from the entire installation are conditioned below the de minimis level. Potential emissions of other pollutants are below de minimis levels or screening model action levels (SMALs).
- This installation is located in New Madrid County, an attainment area for all criteria pollutants.
- This installation is not on the List of Named Installations found in 10 CSR 10-6.020(3)(B), Table 2. The installation's major source level is 250 tons per year and fugitive emissions are not counted toward major source applicability.
- Ambient air quality modeling for PM₁₀ was performed.
- Emissions testing are required for baghouse CD-01, scrubber CD-03, and ESN handling.
- No operating permit is required for this installation.
- Approval of this permit is recommended with special conditions.

INSTALLATION DESCRIPTION

Agrium Advanced Technologies Inc. (AAT) is a urea fertilizer coating installation located near Marston on the Mississippi River. AAT is an existing synthetic de minimis source of PM₁₀ and a minor source of HAPs under construction permits. AAT has not been subject to operating permit requirements. Only permit 112009-011 has been issued to AAT for the original installation from the Air Pollution Control Program.

PROJECT DESCRIPTION

AAT proposes to install a second urea coating line (line 2) consisting of a screened urea bin, preheater, coating drum, ESN cooling bed and screen, scrubber CD-05, and an ESN barge shipping point. Operation of this equipment will allow more ESN to be produced and will debottleneck existing (line 1) permitted urea handling, liquid ingredient tanks, and ESN conveying and storage. One new urea and one new ESN storage dome will be built to accommodate increased production. Design rates are provided in Table 7.

Barges carrying granular urea will arrive at Slackwater Harbor on the Mississippi River. They will be unloaded by equipment owned by adjacent installation CPS. AAT is a unit of Agrium, Inc. CPS is a wholly-owned subsidiary of Agrium, Inc. However the two installations have been determined separate for permitting purposes. Four factors were considered when making the determination: Standard Industrial Classification (SIC), physical proximity, common control, and support relationship. Support relationship can be a dominating factor by itself. AAT is closest defined with SIC 2875 for fertilizer mixing, not manufactured on site (urea is manufactured into ESN, but the fertilizer itself is not changing). CPS is closest defined with SIC 5191 for farm supplies (although fertilizer mixing does occur). Both facilities share a common property line, truck scale,

and office building. Also, AAT and CPS are under common control. However a support relationship does not exist. Urea destined for AAT will be received by barge using equipment owned by CPS and will pass a diverter valve and a covered belt conveyor before being unloaded to AAT indoor storage piles. AAT cannot receive urea from CPS storage. CPS cannot receive ESN by conveyor from AAT. Emissions attributable to AAT begin at the diverter valve.

There will be two urea storage domes. Each dome can be filled independently, so that the other dome can be emptied at the same time. The dome that is being filled will be sealed and vented to baghouse CD-01. After filling, a front-end loader will take urea from the storage dome and dump it into a hopper. The dome will also be sealed and vented to baghouse CD-01 during urea load-out to the hopper. From the hopper, the urea will travel outside of the storage pile structure to outdoor day bins. The outdoor day bins will store urea in a sufficient quantity so that the front-end loader does not operate continuously. Urea will travel to the ESN manufacturing building, in a continuous process, where it will first be screened to uniform size. Offsize urea will be conveyed, stored, and loaded into shipping containers. Uniform sized urea will travel to a bin, one of two weigh belts, and through one of two fluidized bed preheaters, before entering one of two rotating coating drums. Castor oil, olefin, isocyanate, dye, and proprietary chemicals will be sprayed into the drum to react and form a polymer coating on the urea granules. The coated ESN granules will be cooled on a fluidized bed, screened for uniform size, conveyed to storage, and eventually be shipped via barge, rail, or truck. Offsize ESN from the screen will be conveyed directly into shipping containers.

There will be three ESN storage domes. The two existing ESN domes can be filled, or the new dome can be filled, but the existing and new cannot be filled at the same time. ESN from the existing domes will be transferred to shipping conveyors using a front end loader and a shared hopper. The hopper is located between the two existing domes in a shared building. The building connects each existing dome and has one common entrance/exit large enough for a front-end loader to pass through. ESN from the new dome will primarily be passively fed by gravity to an underground conveyor. A front end loader will only be needed for pile maintenance. The most conservative potential emissions from the ESN domes do not include the new dome, as only one dome can be filled at a time.

Urea handling from the diverter valves to the conveyor that diverges flow to the two weigh belts is controlled by enclosures vented to baghouse CD-01. The existing weigh belt and preheater in line 1 are controlled by baghouse CD-02. The proposed line 2 weigh belt will be controlled by baghouse CD-01. Exhaust from CD-02 flows into exhaust from CD-01. The proposed line 2 preheater will be controlled by baghouse CD-04. The existing ESN drum, ESN cooler, and ESN screen are controlled by wet scrubber CD-03. The proposed line 2 ESN drum and ESN cooler will be controlled by wet scrubber CD-05. ESN conveyors outside of the buildings are totally enclosed. ESN conveyors inside the buildings may be open. ESN storage domes are semi-enclosed but otherwise not controlled. The barge shipping spout is telescoping and choke flows the ESN before free-falling into the barge. ESN truck/rail loading will be equipped with a flexible sleeve that extends below the trailer side or railcar opening. All haul roads are paved.

Table 7: Installation Emission Units

¹ Emission Point (EP)	EP Description	Emission Unit (EU)	EU Description	² Previous Bottlenecked MHDR (tph)	New Bottlenecked MHDR (tph)	
EP-01	Urea receiving and transfer	1	Urea receiving diverter valve	16.33	45.92	
		1a	Urea receiving diverter valve	N/A		
		2	Belt conveyor	16.33		
		3	Urea dome load-in			
		4	Urea dome loader haul road			
		5	Urea dome load-out			
		6	Urea hoppers			
		7	Drag conveyor			
		8	Bucket elevator			
		9	Outdoor day bins			
		10	Belt conveyor			
		11	Urea screen			
		12	Sized urea bin			N/A
		13	Sized urea split conveyor	N/A		
		18	Line 1 urea weigh belt	16.0		45.00
		18a	Line 2 urea weigh belt	N/A		
		19	Line 1 urea preheater	16.0		
		19a	Line 2 urea preheater	N/A		
EP-02	Offsize urea	19b	Elevator to line 2 preheater	N/A	0.92	
		14	Offsize urea conveyor	0.33		
		14a	Offsize urea silo			
		16	Offsize urea bagging loadout			
EP-03	ESN drum, cooler, screen	17	Offsize urea shipping haul road	16.6	23.34	
		20	Line 1 ESN drum			
		21	Line 1 fluidized bed ESN cooler		N/A	
		22	ESN screen			
		20a	Line 2 ESN drum			
EP-04	Offsize ESN	21a	Line 2 fluidized bed ESN cooler	0.33	0.93	
		23	Offsize ESN conveyor			
		25	Offsize ESN loadout			
EP-05	ESN barge shipping	26	Offsize ESN shipping haul road	16.27	46.69	
		27	ESN conveyor to storage			
		28	ESN dome load-in			
		29	ESN dome loader haul road			
		30	ESN dome load-out			
		31	ESN hopper			
		32	ESN conveyor to shipping			
		33	ESN diverter valve			
		35	ESN conveyor to barge shipping			
		36	ESN barge shipping			
EP-06	ESN rail shipping	37	Liquid ingredients receiving road	16.27	46.69	
		27	ESN conveyor to storage			
		28	ESN storage pile load in			
		29	ESN dome loader haul road			
		30	ESN storage pile load out			
		31	ESN hopper			
		32	ESN conveyor to shipping			
		33	ESN diverter valve			
EP-07	ESN truck shipping	34	ESN rail shipping	16.27	46.69	
		37	Liquid ingredients receiving road			
		27	ESN conveyor to storage			
		28	ESN storage pile load in			
		29	ESN dome loader haul road			
		30	ESN storage pile load out			
		31	ESN hopper			
		32	ESN conveyor to shipping			
		33	ESN diverter valve			
34a	ESN truck shipping					
EP-08	Combustion	38	ESN truck shipping haul road	0.0127	0.0157	
		37	Liquid ingredients receiving road			
		39	natural gas combustion			

N/A = Not Applicable ¹ Emission points are grouped for compliance tracking and emissions inventory, but may not emit from the same point.

² Maximum hourly design rate (MHDR) in tons per hour (tph), per permit 112009-011.

EMISSIONS/CONTROLS EVALUATION

The emission rate from baghouse CD-01 was tested under permit 112009-011. However, this rate is no longer valid as the throughput of existing emission units being controlled by the baghouse will more than double and new emission units will be controlled. The controlled emission rate of 0.75 pounds of PM, PM₁₀, and PM_{2.5} per hour from baghouse CD-01 was determined by engineering judgment and will be verified through performance testing.

Baghouse CD-02, which controls the line 1 weigh belt and preheater will potentially see increased loading as a result of this project, but will not be retested due to the relatively small throughput increase at line 1. A portion of the exhaust of CD-02 vents to the exhaust of CD-01, upstream of the performance test sample ports from permit 112009-011. Emissions from proposed baghouse CD-04, which will control only the line 2 preheater, were considered less than baghouse CD-02 and will not be tested for this project. A portion of the exhaust from CD-04 will also vent to the exhaust of CD-01, upstream of the sample ports.

Offsize urea handling emissions were calculated using SCC 3-01-027-09. The SCC specifies uncontrolled filterable PM and PM₁₀ emission factors of 0.02 pounds per ton of ammonium nitrate, each. Urea was considered similar to ammonium nitrate. A PM_{2.5} emission factor was estimated at 25 percent of the PM₁₀ emission factor. Condensable emissions are not expected.

Emissions from the ESN drums, coolers, and screen were calculated using the controlled emission factor developed from performance testing CD-03 under the previous permit. Line 1 drum, cooler, and shared screen are controlled by CD-03. Line 2 drum and cooler are controlled by CD-05. CD-03 will be retested under this permit. As line 1 and line 2 have the same MHDR and CD-03 includes the screen, emissions from CD-05 can be conservatively represented by CD-03.

The uncontrolled emission factors used for various ESN handling steps, 0.003, 0.0012, and 0.0012 pounds of filterable PM, PM₁₀, and PM_{2.5} per ton of ESN respectively were developed from a sieve analysis and engineering judgment. They will be verified through performance testing.

Potential emissions from debottlenecked emission units were calculated using the proposed MHDR. This method is more conservative than performing a potentials minus actuals calculation and does not affect the permit applicability of the project. MHDR for ESN shipping conservatively does not include a reduction from removal of offsize ESN. Barge, rail, and truck ESN shipping were compared to select the process with the highest potential to emit. All three processes have the same MHDR. However, truck shipping must include haul road emissions. Therefore, only truck shipping was included in the project emissions. Barge and rail shipping were conservatively still included in the ambient impact analysis. Enclosed conveyors without negative pressure were reassigned 95 percent PM, PM₁₀, and PM_{2.5} control efficiency, from 99 percent control efficiency in permit 112009-011. Typical default control efficiency for enclosed conveyors vented to a baghouse is 99 percent. Enclosed conveyors vented to a baghouse were assigned 99 percent control. The barge spout was assigned 50 percent

control efficiency.

Potential emissions from front-end loader activity inside the urea and ESN domes, offsize urea shipping, liquid raw material receiving, ESN shipping, and offsize ESN shipping were calculated using AP-42 Section 13.2.1, *Paved Roads*, January 2011. Silt loading of 4.0 grams per square meter was assumed for the dome floors and 1.1 (corn wet milling) was selected for installation roads.

The ESN hopper building was assigned 50 percent capture efficiency for partial enclosure. This reduces emissions from EU-28 through EU-31. This capture efficiency will not be verified through performance testing pending successful ESN handling performance testing.

Potential combustion emissions from the proposed line 2 urea preheater were calculated using AP-42 Section 1.4, *Natural Gas Combustion*, July 1998. The MHDR of the existing primary and reserve boiler has been updated from 6.45 MMBtu/hr heat input each to 5 MMBtu/hr each. Total natural gas MHDR of the installation is 16 MMBtu/hr.

Existing potential emissions are cited from permit 112009-011. Controlled project potential emissions represent the potential of the new and debottlenecked equipment, assuming continuous operation (8,760 hours per year), with control devices but no annual emission limits. The controlled project potential emissions also represent the PM₁₀ emission rates used in the ambient impact analysis. The new installation potential emissions represent the potential emissions of the entire installation, with PM_{2.5} voluntarily limited to less than the de minimis level to avoid refined modeling at the time of permit issuance. The following table provides an emissions summary for this project.

Table 8: Emissions Summary (tpy)

Pollutant	Regulatory <i>De Minimis</i> Levels	Existing Potential Emissions	Existing Actual Emissions (2011 EIQ)	Controlled Project Potential Emissions	New Installation Potential Emissions
PM	25.0	N/D	N/A	13.97	11.58
PM ₁₀	15.0	< 15.0	3.98	12.03	10.21
PM _{2.5}	10.0	N/D	0.05	11.79	< 10.0
SO _x	40.0	N/D	0.01	0.04	0.04
NO _x	40.0	N/D	0.96	6.87	6.87
VOC	40.0	N/D	0.05	0.39	0.39
CO	100.0	N/D	0.80	5.77	5.77
HAPs	10.0/25.0	N/D	3.5E-03	0.15	0.15
MDI	¹ 0.1	< 0.1	N/D	1.70E-02	1.70E-02
CO ₂	N/A	N/D	N/A	8,244.71	8,244.71
CH ₄	N/A	N/D	N/A	0.16	0.16
N ₂ O	N/A	N/D	N/A	0.15	0.15
GHG (Mass)	0/100/250	N/D	N/A	8,245.02	8,245.02
GHG (CO ₂ e)	75,000/100,000	N/D	N/A	8,294.88	8,294.88

N/A = Not Applicable; N/D = Not Determined ¹ SMAL

PERMIT RULE APPLICABILITY

This review was conducted in accordance with Section (5) of Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required*. Potential emissions of PM_{2.5} from the entire installation are conditioned below the de minimis level. Potential emissions of other pollutants are below respective de minimis levels or SMALs.

APPLICABLE REQUIREMENTS

Agrium Advanced Technologies Inc. shall comply with the following applicable requirements. The Missouri Air Conservation Laws and Regulations should be consulted for specific record keeping, monitoring, and reporting requirements. Compliance with these emission standards, based on information submitted in the application, has been verified at the time this application was approved.

GENERAL REQUIREMENTS

- *Submission of Emission Data, Emission Fees and Process Information*, 10 CSR 10-6.110
- *Restriction of Particulate Matter to the Ambient Air Beyond the Premises of Origin*, 10 CSR 10-6.170
- *Restriction of Emission of Visible Air Contaminants*, 10 CSR 10-6.220
- *Restriction of Emission of Odors*, 10 CSR 10-6.165

SPECIFIC REQUIREMENTS

- *Restriction of Emission of Particulate Matter From Industrial Processes*, 10 CSR 10-6.400 does not apply. All emissions meet either 10 CSR 10-6.400(1)(B)6., 7., 12., or 15.
- *Restriction of Particulate Matter Emissions From Fuel Burning Equipment Used for Indirect Heating*, 10 CSR 10-6.405 does not apply. All of the installation's combustion units are fueled exclusively by natural gas.

AMBIENT AIR QUALITY IMPACT ANALYSIS

Air quality modeling was performed to determine the ambient impact of PM₁₀. Modeling was performed at the department's request because historic modeling data indicated that elevated PM₁₀ impacts in the region were likely to approach or exceed increment standards. Compliance with the NAAQS and increment standards has been demonstrated and no further analysis is necessary. For further details on the modeling, please refer to the memo titled "Ambient Air Quality Impact Analysis (AAQIA) for Agrium Advanced Technologies (U.S.), Inc. – August 31, 2012".

STAFF RECOMMENDATION

On the basis of this review conducted in accordance with Section (5), Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required*, I recommend this permit be granted with special conditions.

David Little
New Source Review Unit

Date

PERMIT DOCUMENTS

The following documents are incorporated by reference into this permit:

- The Application for Authority to Construct form, dated December 20, 2011, received December 21, 2011, designating Agrium Advanced Technologies Inc. as the owner and operator of the installation.
- U.S. EPA document AP-42, *Compilation of Air Pollutant Emission Factors*, Fifth Edition.
- Southeast Regional Office Site Survey, dated January 5, 2012.

Attachment A – Installation Wide PM_{2.5} Compliance Worksheet

Agrium Advanced Technologies Inc.
 New Madrid County, S20, T22N, R14E
 Project Number: 2011-12-056
 Installation ID Number: 143-0078
 Permit Number: _____

This sheet covers the period from _____ to _____. Copy this sheet as needed.
 (month, year) (month, year)

A	B	C	D	E	F
Emission Point	Description	Monthly Throughput (tons)	Composite Emission Factor	Emission Factor Units	Monthly PM _{2.5} Emissions (pounds)
EP-01	Urea receiving and transfer		1	Lbs per ton of urea received	
EP-02	Offsize urea		0.0037	Lbs per ton of offsize urea shipped	
EP-03	ESN drums, coolers, screen		2	Lbs per ton shipped ESN	
EP-04	Offsize ESN		3	Lbs per ton of offsize ESN	
EP-05	Barge shipped ESN		4	Lbs per ton of barge shipped ESN	
EP-06	Rail shipped ESN		5	Lbs per ton of rail shipped ESN	
EP-07	Truck shipped ESN		6	Lbs per ton of truck shipped ESN	
EP-08	Natural gas combustion		7.6	Lbs per million SCF natural gas	
G: Total Monthly PM _{2.5} Emissions (tons)					
H: 12-Month PM _{2.5} Emissions J from previous month's Attachment A (tons)					
I: Monthly PM _{2.5} Emissions Total G from previous year's Attachment A (tons)					
J: Current 12-Month PM _{2.5} Emissions (tons)					

- A. Compliance Tracking Emission Point.
 B. Emission Point Description.
 C. Monthly throughput: tons urea, tons ESN, or million SCF natural gas.
 D. Composite PM_{2.5} emission factor. Use the values below until the respective performance test emission factor is approved by the Air Pollution Control Program.
1. For EP-01 use 0.0163.
 2. For EP-03 use 0.0360.
 3. For EP-04 use 0.0024.
 4. For EP-05 use 0.0027.
 5. For EP-06 use 0.0027.
 6. For EP-07 use 0.0029.
- E. Composite emission factor units.
 F. Monthly PM_{2.5} emissions (pounds) calculated by multiplying the monthly throughput by the respective emission factor. $F = C \times D$.
 G. Total monthly PM_{2.5} emissions (tons) calculated by summing the monthly PM_{2.5} emissions (pounds) from each emission point and dividing by 2,000. $G = \text{Summation of } F / 2,000$.
 H. Record the 12-month total PM_{2.5} emissions J from last month's Attachment A.
 I. Record the monthly PM_{2.5} emissions total G from previous year's Attachment A.
 J. Current 12-month PM_{2.5} emissions (tons) calculated by summing this month's PM_{2.5} emissions (tons) with the previous eleven months' PM_{2.5} emissions (tons). A cumulative total of less than 10.0 tons for every twelve month period indicates compliance. $J = G + H - I$.

Mr. Eric Chapman
Operations Manager
Agrium Advanced Technologies Inc.
566 County Highway 406
Marston, MO 63866

RE: New Source Review Permit - Project Number: 2011-12-056

Dear Mr. Chapman:

Enclosed with this letter is your permit to construct. Please study it carefully. Also, note the special conditions on the accompanying pages. The document entitled, "Review of Application for Authority to Construct," is part of the permit and should be kept with this permit in your files. Operation in accordance with these conditions and your new source review permit application is necessary for continued compliance. The reverse side of your permit certificate has important information concerning standard permit conditions and your rights and obligations under the laws and regulations of the State of Missouri.

If you have any questions regarding this permit, please do not hesitate to contact David Little, at the Department of Natural Resource's Air Pollution Control Program, P.O. Box 176, Jefferson City, MO 65102 or at (573) 751-4817. Thank you for your attention to this matter.

Sincerely,

AIR POLLUTION CONTROL PROGRAM

Susan Heckenkamp
New Source Review Unit Chief

SH:dll

Enclosures

c: Southeast Regional Office
PAMS File: 2011-12-056

Permit Number: