

STATE OF MISSOURI



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: **072012-010**

Project Number: 2012-03-060
Installation Number: 031-0064

Parent Company: Kyowa Hakko Bio
Parent Company Address: P.O. Box 1550, Cape Girardeau, MO 63702
Installation Name: BioKyowa, Inc. – Main Production Facility
Installation Address: 5469 Nash Rd., Cape Girardeau, MO 63702
Location Information: Cape Girardeau County, S28, T18N, R13E

Application for Authority to Construct was made for:
An increase in amino acid production at Plant 1 and modifications to the amino production process at Plant 2. This review was conducted in accordance with Section (5) of 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.

JUL 23 2012

EFFECTIVE DATE

Nancy K. H. for Kyra L. Moore

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. The 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.

The permittee will be in violation of 10 CSR 10-6.060 if the permittee fails 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.

The permittee shall notify the department's Air Pollution Control Program of the anticipated date of startup of these air contaminant sources. The information shall be made available within 30 days of actual startup. Also, the permittee shall notify the Department of Natural Resources' Regional office responsible for the area within which the permittee is located within 15 days after the actual startup 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.

The permittee 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 the permittee chooses to appeal, the permittee shall 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 the permittee chooses not to appeal, this certificate, the project review and the application and associated correspondence constitutes the permit to construct. The permit allows the permittee to construct and operate the air contaminant sources, but in no way relieves the permittee of the 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 questions regarding this air pollution permit. Please contact the Construction Permit Unit at (573) 751-4817. If you prefer to write, please address the 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(12)(A)10: "Conditions required by permitting authority."

BioKyowa, Inc. – Main Production Facility
Cape Girardeau County, S28, T18N, R13E

1. Baghouse Requirements
 - A. The permittee shall control emissions from the following emission units using baghouses, as specified in the permit application:
 - 1) Plant 1
 - a) EP-25 Filter Aid Vent
 - b) EP-26 Dryer Vent
 - c) EP-27 Hopper and Bagging Vent
 - d) EP-29 Dry Crystal Conveyor Vent
 - e) EP-39 Decolorizing System Vent
 - f) EP-40 Sodium Metabisulfite Addition
 - g) EP-42 Bulk Ammonium Sulfate Unloading
 - h) EP-51 Evaporation Process Scrubber Vent
 - 2) Plant 2
 - a) EP-36 Sodium Metabisulfite Vent
 - B. The baghouses shall be operated and maintained in accordance with the manufacturer's specifications. Each baghouse 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.
 - C. 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).
 - D. The permittee shall monitor and record the operating pressure drop across each baghouses at least once every 24 hours while the equipment is in operation. The operating pressure drop shall be maintained within the design conditions specified by the manufacturer's performance warranty. The manufacturer's performance warranty containing the design

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SPECIAL CONDITIONS:

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

conditions shall be retained on-site. If the pressure drop reading should fall outside of the normal operating range, then the associated equipment shall be shut down as quickly as reasonably practical. Corrective actions shall be taken to address the cause of the non-normal pressure drop and the baghouse(s) shall be returned to normal operation before re-starting the equipment.

- E. The permittee shall maintain an operating and maintenance log for the baghouses 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.
- 2. Scrubber Requirements:
 - A. The permittee shall control emissions from the following emission units using scrubbers, as specified in the permit application:
 - 1) Plant 1
 - a) EP-40 Sodium Metabisulfite Addition
 - b) EP-51 Evaporation Process Scrubber Vent
 - B. The scrubbers shall be operated and maintained in accordance with the manufacturer's specifications. Each scrubber shall be equipped with a gauge or meter, which indicates the pressure drop across the control device. Each scrubber shall be equipped with a flow meter that indicates the water flow rate through the scrubber. These gauges or meters shall be located such that the Department of Natural Resources' employees may easily observe them.
 - C. The permittee shall monitor and record the operating pressure drop across each scrubber at least once every 24 hours while the equipment is in operation. The operating pressure drop shall be maintained within the design conditions specified by the manufacturer's performance warranty. The manufacturer's performance warranty containing the design conditions shall be retained on-site.
 - D. The permittee shall monitor and record the water flow rate through each scrubber at least once every 24 hours while the equipment is in operation. The water flow rate shall be maintained within the design conditions specified by the manufacturer's performance warranty. The

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SPECIAL CONDITIONS:

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

manufacturer's performance warranty containing the design conditions shall be retained on-site.

- E. The permittee 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.
 - 3) A written record of regular inspection schedule, the date and results of all inspections including any actions or maintenance activities that result from that inspection.
- 3. Emergency Engine Requirements
The permittee shall install a nonresettable meter on the emergency engine (EP-52).
- 4. Recordkeeping Requirement
The permittee 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.

- 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 modeling was not performed since potential emissions of the application are below de minimis levels.
- Emission testing is not required for the equipment.
- The permittee is required to modify their Part 70 operating permit renewal application, Project #2011-01-015, to include the increased production and new equipment contained within this permit within one year of startup of the equipment.
- Approval of this permit is recommended with special conditions.

INSTALLATION DESCRIPTION

BioKyowa, Inc. – Main Production Facility is an existing manufacturer of feed additives for domestic animals. The manufacturing process consists of two amino acid production plants (Plant 1 and Plant 2); a natural gas/fuel oil fired Utility Plant to produce process steam for operation; an Evaporation Plant; and a Wastewater Treatment Plant. The method of production involves fermentation to produce the feed additives and subsequent processing and handling of the product.

The emissions from the existing installation consist of particulates from the grinding and sizing of the finished product, combustion emissions from the Utility Plant, and Volatile Organic Compounds (VOCs) and Hazardous Air Pollutants (HAPs) from Plant 1 and Plant 2 fermentation and extraction processes. The installation is considered a minor source for construction permitting. The installation is considered a major source for operating permitting. The permittee has submitted a Part 70 operating permit renewal application, Project #2011-01-015; within one year of the startup of the equipment the permittee shall modify their Part 70 operating permit renewal application to include this construction permit.

The following permits have been issued to the permittee from the Air Pollution Control Program:

Table 1: Permit History

Permit Number	Description
0983-006...009	Construction of a new l-lysine production installation
0284-020	Addition of a new boiler
0190-002	New boiler and drying system
0693-020	Approval to combust fuel oil #2 in the existing natural gas-fired boilers
1099-021	Expansion to increase l-lysine production and to add FNA line
1099-021A	Wording correction
1099-021B	Wording change
122002-002	Modification of an existing FNA feed additive process line to allow for the production of argentine, glutamine, and other amino acids in the BFK process line
OP2006-040	Part 70 Operating Permit expires 07/12/2011
082008-017	Installation of four 11.56 MMBtu/hr natural gas-fired boilers and the addition of an aftercooler to Plant 2, resulting in increased throughput
OP2006-040A	Part 70 Operating Permit Significant Modification to include construction permit 082008-017 expired 07/12/2011
N/A	Part 70 Operating Permit renewal application 2011-01-015 received 1/10/2011
112011-002	Installation of two conical dryers and associated handling equipment at Plant 2

PROJECT DESCRIPTION

The permittee is proposing to debottleneck the amino acid production at Plant 1 by adding a forced circulation evaporator, a rotary drum filter (PFS-350C), a 40,000 gallon Condensate Tank for Evaporator (T-360A), a 40,000 gallon Condensate Tank for Evaporator (T-360B), a 2,500 gallon Feed Balance Tank for Evaporator (T-393), a 40,000 gallon Slurry Tank for Evaporator (T-399), a 100 gallon Defoamer Tank for Evaporator (T-422), a 300 gallon CIP Tank Holding Sulfamic Acid (T-423), an 85 gallon diesel storage tank, and a 60 kw emergency diesel generator (EP-52).

The debottlenecking of Plant 1 will increase evaporation rates through the Plant 1 extraction process affecting every emission unit/point associated with Plant 1:

- EP-25 Filter Aid Vent – existing emission point
- EP-26 Dryer Vent – existing emission point
- EP-27 Hopper and Bagging Vent – existing emission point
- EP-29 Dry Crystal Conveyor Vent – existing emission point
- EP-33 Fermentation Tank Vent A – existing emission point
- EP-34 Fermentation Tank Vent B – existing emission point
- EP-35 Fermentation Tank Vent C – existing emission point
- EP-40 Sodium Metabisulfite Addition – existing emission point
- EP-51 Evaporation Process Scrubber Vent – new emission point
- EP-52 Emergency Diesel Generator – new emission point

The new forced circulation evaporator will vent to EP-51 Evaporation Process Scrubber Vent, which will contain a new scrubber (SC-372) that is comparable to the existing scrubber (SC-371) for EP-40 Sodium Metabisulfite Addition.

The new rotary drum filter is identical to existing drum filters PFS-350B and PFS-350A, and will be tied into the existing piping that is vented through EP-40 Sodium Metabisulfite Addition.

The production debottleneck will increase the carbon usage of the Plant 1 decolorization process to 260,000 kg per year (287 tons per year).

The production debottleneck will increase the bulk ammonium sulfate usage of Plant 1 to 650,000 kg per year (717 tons per year).

The permittee is also proposing modifications to the amino acid production process at Plant 2 consisting of the addition of a 16,000 gallon carbon slurry tank (T-2360B) for the decolorization process, the relocation of two existing 900 gallon water tanks, the relocation of an existing ammonia recovery system to an existing plate and frame evaporator, modifications to existing resin columns, and replacement/modification of miscellaneous motors and fans. The modifications at Plant 2 increase the evaporative capacity of Plant 2 to increase production of the amino acid with the longest evaporative time; however, the increased evaporative capacity is not a debottleneck as Plant 2's maximum production rate is based upon a different amino acid with a short evaporative time.

The new carbon slurry tank (T-2360B) will be identical to the existing 16,000 gallon carbon slurry tank (T-2360A). The carbon slurry will be made in T-2360A and then the liquid volume will be transferred to T-2360B. The new tank is only for increased carbon slurry storing capacity and will not increase carbon slurry usage. Special Condition 3.A of Construction Permit 082008-017 limiting the installation to 1,500 pounds of carbon black in EP-36 Sodium Metabisulfite Vent still applies.

The relocation of the two existing 900 gallon water tanks to Plant 2 is to aid in the hot water recirculation of the decolorization process. Increased hot water recirculation in the decolorization process will increase the usage of EP-36 Sodium Metabisulfite Vent to 600 kg per year (0.66138 tons per year), but should not affect any other Plant 2 emission points/units.

The permittee has requested confidentiality as allowed per 10 CSR 10-6.210 with regards to the maximum hourly design rates of the permitted equipment due to the proprietary nature of the information. This information can only be obtained with written permission from Kyowa Hakko Bio.

EMISSIONS/CONTROLS EVALUATION

Uncontrolled emissions of PM, PM₁₀, and PM_{2.5} for the project exceed the de minimis levels; however, the facility has proposed using baghouses and scrubbers to control emissions below the de minimis levels making them applicable for this Section (5) permit. In the event of a modification, a potential minus actuals calculation can be used to determine the project's potential emission increase; however, a potential minus actuals test was not conducted for this project as controlled potential emissions are below the de minimis levels and additional calculation of potential minus actuals would not change the type of review needed for this permit.

The pollutants of concern for the purpose of this review are PM, PM₁₀, and PM_{2.5}. SO_x and VOC emissions were also evaluated; however, uncontrolled potential emissions are below the de minimis levels.

Table 2: Control Devices and Emission Factors

Emission Unit	Description	MHDR/ Maximum Annual Usage	Control Efficiency ¹	Pollutant	Emission Factor Source ²
EP-25	Plant 1 Filter Aid Vent	Confidential	99	PM/PM ₁₀ /PM _{2.5}	FIRE for Process SCC 30200754
EP-26	Plant 1 Dryer Vent		99	PM/PM ₁₀ /PM _{2.5}	FIRE for Process SCC 30200754
EP-27	Plant 1 Hopper and Bagging Vent		99	PM/PM ₁₀ /PM _{2.5}	FIRE for Process SCC 30200804
EP-29	Plant 1 Dry Crystal Conveyor Vent		99	PM/PM ₁₀ /PM _{2.5}	FIRE for Process SCC 30200804
EP-33	Plant 1 Fermentation Tank Vent A		0	VOC	Scale-up of stacktested emission factor
EP-34	Plant 1 Fermentation Tank Vent B				
EP-35	Plant 1 Fermentation Tank Vent C		97	PM/PM ₁₀ /PM _{2.5}	AP-42 Table 8.12-3
EP-36	Plant 2 Sodium Metabisulfite Vent		97	PM/PM ₁₀ /PM _{2.5}	AP-42 Table 6.1-4
EP-39	Plant 1 Decolorizing System Vent		99	PM/PM ₁₀ /PM _{2.5}	FIRE for Process SCC 30200540
EP-40	Plant 1 Sodium Metabisulfite Addition		50	SO _x	AP-42 Table 8.13-1 ³
EP-42	Plant 1 Bulk Ammonium Sulfate Unloading		98	PM/PM ₁₀ /PM _{2.5}	FIRE for Process SCC 30104007
EP-51	Plant 1 Evaporation Process Scrubber Vent		99	PM/PM ₁₀ /PM _{2.5}	AP-42 Table 8.12-3
EP-51	Plant 1 Evaporation Process Scrubber Vent		50	SO _x	AP-42 Table 8.13-1
EP-52	Emergency Generator		60 kW	0	PM/PM ₁₀ /PM _{2.5} , SO _x , and VOC

¹Control efficiencies are as stated within this permit application.

²Emission factors were taken from U.S. EPA's Factor Information Retrieval (FIRE) Data System, 6.25, and U.S. EPA document AP-42, *Compilation of Air Pollutant Emission Factors*, Fifth Edition, Tables 6.1-4 (May 1983), 8.12-3 (July 1993), and 8.13-1 (July 1993).

The control efficiencies stated within the application were applied within the project calculations as they are reasonable for the type of control device being employed.

Project potential emissions assume continuous operation (8,760 hours per year) of the new and modified equipment associated with Plant 1 and Plant 2 as described above, except EP-52 Emergency Generator which was evaluated at 500 hours of annual operation due to its emergency designation. The following table provides an emissions summary for this project:

Table 3: Emissions Summary (tons per year)

Pollutant	Regulatory <i>De Minimis</i> Levels	Existing Potential Emissions¹	Existing Actual Emissions (2011 EIQ)	Uncontrolled Potential Emissions of the Application	Conditioned Potential Emissions of the Application
PM	25.0	N/D	N/D	64.62	0.88
PM ₁₀	15.0	51.91	2.57	61.96	0.85
PM _{2.5}	10.0	N/D	1.71	61.96	0.85
SO _x	40.0	<250	1.15	14.55	6.95
NO _x	40.0	171.33	8.39	10.92	0.62
VOC	40.0	89.25	9.31	6.47	5.63
CO	100.0	79.48	18.89	2.35	0.13
GHG	100,000	N/D	N/D	403.58	23.04
HAPs	10.0/25.0	20.37	0.60	0.01	<0.01

N/D = Not Determined

¹Existing Potential Emissions were taken from Construction Permit 112011-002.

PERMIT RULE APPLICABILITY

This review was conducted in accordance with Section (5) of Missouri State Rule 10 CSR 10-6.060 *Construction Permits Required*. The increase in controlled potential emissions is below de minimis levels for all pollutants.

APPLICABLE REQUIREMENTS

The permittee 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. For a complete list of applicable requirements for the installation, please consult the installation's operating permit.

GENERAL REQUIREMENTS:

- 10 CSR 10-6.110 *Submission of Emission Data, Emission Fees and Process Information*
- 10 CSR 10-6.065 *Operating Permits*
- 10 CSR 10-6.165 *Restriction of Emission of Odors*
- 10 CSR 10-6.170 *Restriction of Particulate Matter to the Ambient Air Beyond the Premises of Origin*
- 10 CSR 10-6.220 *Restriction of Emission of Visible Air Contaminants*

SPECIFIC REQUIREMENTS:

- 10 CSR 10-6.260 *Restriction of Emission of Sulfur Compounds*
- 10 CSR 10-6.070 *New Source Performance Regulations*
 - 40 CFR Part 60, Subpart IIII – *Standards of Performance for Stationary Compression Ignition Internal Combustion Engines*
- 10 CSR 10-6.075 *Maximum Achievable Control Technology Regulations*
 - 40 CFR Part 63, Subpart ZZZZ – *National Emission Standard for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines*

STAFF RECOMMENDATION

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

Alana L. Rugen, EIT
Environmental Engineer II

Date

PERMIT DOCUMENTS

The following documents are incorporated by reference into this permit:

- The Application for Authority to Construct form, received March 21, 2012, designating Kyowa Hakko Bio as the owner and operator of the installation.
- U.S. EPA document AP-42, *Compilation of Air Pollutant Emission Factors*, Fifth Edition.
- U.S. EPA's Factor Information Retrieval (FIRE) Data System 6.25

Mr. Toshihiko Hirao
President
Kyowa Hakko Bio
P.O. Box 1550
Cape Girardeau, MO 63702

RE: New Source Review Permit - Project Number: 2012-03-060
Installation ID: 031-0064

Dear Mr. Hirao,

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, your new source review permit application and with your operating permit 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 contact Alana Rugen at the department's Air Pollution Control Program, P.O. Box 176, Jefferson City, MO 65102 or by telephone at (573) 751-4817. Thank you for your time and attention to this matter.

Sincerely,

AIR POLLUTION CONTROL PROGRAM

Susan Heckenkamp
New Source Review Unit Chief

SH:arl

Enclosures

c: Southeast Regional Office
PAMS File: 2012-03-060

Permit Number: