

STATE OF MISSOURI



PERMIT BOOK FILE COPY

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: 092008-009 Project Number: 2008-04-096

Parent Company: The Dow Chemical Company

Parent Company Address: 2030 Dow Center, Midland, MI 48674

Installation Name: The Dow Chemical Company - Riverside Plant

Installation Address: 500 Dow Industrial Drive, Pevely, MO 63070

Location Information: Jefferson County, S18, T41N, R6E

Application for Authority to Construct was made for:
Modification to Styrofoam production process to allow for a new blowing agent.
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.

SEP 25 2008

EFFECTIVE DATE


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 departments' Air Pollution Control Program of the anticipated date of start up of this (these) air contaminant source(s). The information must be made available not more than 60 days but at least 30 days in advance of this date. 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 this (these) air contaminant source(s).

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 source(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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Permit No.	
Project No.	2008-04-096

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."

The DOW Chemical Company - Riverside Plant
Jefferson County, S17, T41, R6

1. Control Devices - Baghouse
 - A. The Dow Chemical Company - Riverside Plant shall control emissions from EP-04 and EP-05 using baghouses as specified in the permit application. 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 DNR employees may easily observe them.
 - B. 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).
 - C. The Dow Chemical Company - Riverside Plant shall monitor and record the operating pressure drop across the baghouses at least once every 24 hours. The operating pressure drop shall be maintained within the design conditions specified by the manufacturer's performance warranty.
 - D. The Dow Chemical Company - Riverside Plant shall maintain an operating and maintenance log for the baghouses which shall include the following:
 - i. Incidents of malfunction, with impact on emissions, duration of event, probable cause, and corrective actions; and
 - ii. Maintenance activities, with inspection schedule, repair actions, and replacements, etc.
 - E. Operation in accordance with Permit Condition EU-0110-001 and EU0120-001 of the Dow Chemical Company's Operating Permit can be used in lieu of Special Condition 1.A, 1.C and 1.D.

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

Project Number: 2008-04-096
Installation ID Number: 099-0014
Permit Number:

The Dow Chemical Company - Riverside Plant
500 Dow Industrial Drive
Pevely, MO 63070

Complete: April 25, 2008

Parent Company:
The Dow Chemical Company
2030 Dow Center
Midland, MI 48674

Jefferson County, S17, T41, R6

REVIEW SUMMARY

- The Dow Chemical Company - Riverside Plant has applied for authority to modify their Styrofoam production process to allow for a new blowing agent.
- Hazardous Air Pollutant (HAP) emissions are expected from the proposed equipment. HAPs of concern from this process are styrene (CAS# 100-42-5), ethyl benzene (CAS# 100-41-4) and acrylonitrile (CAS# 107-13-1).
- None of the New Source Performance Standards (NSPS) apply to the proposed equipment.
- The Maximum Achievable Control Technology (MACT) standard, 40 CFR Part 63, Subpart JJJ, *National Emission Standards for Hazardous Air Pollutant Emissions: Group IV Polymers and Resins* applies to the proposed equipment.
- The Maximum Achievable Control Technology (MACT) standard, 40 CFR Part 63, Subpart H, *National Emission Standards for Hazardous Air Pollutant Emissions for Equipment Leaks* applies to the proposed equipment.
- Baghouses are being used to control particulate matter less than 10 microns (PM₁₀) emissions from EP#4 and EP#5. A central vacuum system (EP#10) is also being used to control PM₁₀ generated during production.
- This review was conducted in accordance with Section (5) of Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required*. Potential emissions of all pollutants are below de minimis levels.
- This installation is located in Jefferson County, a nonattainment area for ozone (O₃) and an attainment area for all other criteria air pollutants.

- This installation is on the List of Named Installations [10 CSR 10-6.020(3)(B), Table 2], 20 *Chemical Process Plant*.
- Ambient air quality modeling was performed to determine the ambient impact of styrene.
- Emissions testing is not required for the source.
- An amendment to your Part 70 Operating Permit is required for this installation within 1 year of equipment startup.
- Approval of this permit is recommended with special conditions.

INSTALLATION DESCRIPTION

The Dow Chemical Company at the Riverside Plant in Pevely manufactures polystyrene and extruded polystyrene foam products.

A Part 70 Operating Permit (Operating Permit No. OP2006-069) was granted on September 22, 2006.

The following permits have been issued to The Dow Chemical Company - Riverside Plant from the Air Pollution Control Program.

Table 1: Previously Issued Construction Permits

Permit Number	Description
0879-008	Expansion to the SAN process, ABS process and polystyrene feedstock plants as well as addition of dock facilities.
0382-002A	Installation of a 200 hp natural gas-fired steam generator.
0688-007	Construction of a zinc stearate additive system, which will be made up of a bag emptying station with air filters, transfer system, a 100 gallon melt tank, and a 100 gallon feed tank.
0688-008	Construction of a 30,000 gallon methyl chloride storage tank to replace a 6,000 gallon storage tank.
1291-005	Replacement of an existing 300 horsepower extruder motor and gearbox with a 500 horsepower motor and 600 horsepower gearbox, on its existing 24 inch wide extruded polystyrene foam line.
0992-022	The production of extruded polystyrene and polystyrene.
122005-003	Temporary permit to conduct experimental trials for testing alternative blowing agents at the extruded polystyrene foam manufacturing facility.
122005-003A	Extension of temporary permit.

PROJECT DESCRIPTION

Due to the EPA mandate to eliminate the usage of HCFC 142b by the end of 2009, the Dow Chemical Company, Riverside Plant (Dow) is seeking authority to change to a new blowing agent. The Riverside Plant currently consists of a two step process to produce Styrofoam: a polymer resin production process and a Styrofoam production process. Because the introduction of the new blowing agent generates the need to use a different polystyrene copolymer resin, Dow will receive the new copolymer via rail or truck shipment. The existing polystyrene plant will continue to produce the existing resin for Styrofoam production at other plants and will not be modified at this time.

The new blowing agent that will be used in the Styrofoam production process is not a HAP nor does it contain any VOCs. However, several changes and additions to the existing process are needed as a result of using the new blowing agent. These changes include the following: Modification to an existing silo for storing polymer pellets, modification to two existing blowing agent storage tanks, modification to two reclaim systems, and addition of two day hoppers which feed polymer pellets to the line (EP#61 & 62).

Due to the number of changes to the Styrofoam production process since it was last permitted, the potential emissions of the line were re-evaluated. The Styrofoam process is explained herein.

The polystyrene copolymer is loaded from storage (EP#19 or 63) into four (2 existing and 2 new) polystyrene copolymer feed hoppers (EP#6, 7, 61 & 62) and mixed with additives (EP#1 & 3) en route to the die and forming process. The copolymer is extruded and the blowing agent is introduced to form Styrofoam. After the foam is created, it is then cooled, trimmed, and cut for wrapping and storage. The trimmings and ground scrap are routed through the baghouses (EP#4 & 5) to the fluff bin and are recycled, thereby driving out the blowing agent by passing the stream through a second recycle-only extruding process (EP#2 & 14).

The recycle extruding process reheats the Styrofoam trim and pumps it through a strand die to form polystyrene copolymer strands for cooling, drying, and pelletizing. The strands are cut to size under water in a water ring pelletizer so no particulate emissions result from the cutting process. VOC and HAP emissions from the recycle extruder process are captured by a hood and vented through the reclaim feed vents (EP#2 & 14). A recycle product blower pneumatically conveys the polystyrene copolymer product to the recycle silos for reprocessing into styrofoam.

Table 2: Emission Points associated with the Styrofoam production process

Emission Point	Description
01	M/L Additive Feeders
02	M/L Reclaim Feed Vent
03	48" Additive Feeders
04	M/L Baghouse
05	48" Baghouse
06	M/L /Polystyrene Feed Hopper
07	48" Polystyrene Feed Hopper
10	Central Vacuum System
13	M/L Recycle Feed Hopper
14	48" Reclaim Feed Vent
16	48" Recycle Feed Hopper
19	Polystyrene Storage Silo
20	Recycle Storage Silo
61	48" Line Polymer Day Hopper
62	M/L Polymer Day Hopper

Dow has requested that the production throughputs, the maximum design rates, and the process flow diagrams submitted in this application to be treated as confidential. The company believes that the information identified as "Confidential" has competitive value since access to data would put the company at a competitive disadvantage.

EMISSIONS/CONTROLS EVALUATION

The HAP emission factors associated with EP#2 and #14 were obtained from test data collected during trial runs at the Dow Riverside Plant. The particulate emission factors are based on information obtained from similar sources at other Dow facilities. EP#4 and #5 handle scrap extruded polystyrene foam as part of the recycle system. Baghouses are used to control PM₁₀ emissions from these emission points and are estimated to have 99% control. A central vacuum system (EP#10) is also used to control PM₁₀ emissions and has an estimated control efficiency of 99%.

The following table provides an emissions summary for this project. Existing potential emissions for VOC and HAPs were taken from Operating Permit Number OP2006-069. According to recent Emission Inventory Questionnaires (EIQs), the facility is less than major for all other pollutants. Existing actual emissions were taken from the installation's 2007 EIQ. Potential emissions of the application represent the potential of the Styrofoam production line, assuming continuous operation (8760 hours per year). Since the project is viewed as a modification, the potential emissions of the application included all emissions affected by the modification including both new and existing equipment. However, a potential minus actuals test was not needed to determine the project's emissions increase since potential emissions from the production line are already at de minimus levels for all pollutants and the potential minus actuals tests does not change the type of review needed for this permit. The reason that this permit is

required is because the styrene emissions are over the Screen Modeling Action Level.

Table 3: Emissions Summary (tons per year)

Pollutant	Regulatory De Minimis Levels*	Existing Potential Emissions	Existing Actual Emissions (2007 EIQ)	Potential Emissions of the Application	New Installation Conditioned Potential
PM ₁₀	15.0	<Major	0.15	1.99	N/A
SO _x	40.0	<Major	0.01	N/A	N/A
NO _x	40.0	<Major	1.22	N/A	N/A
VOC	40.0	<95	1.29	3.21	N/A
CO	100.0	<Major	1.03	N/A	N/A
HAPs	10.0/25.0	<24.5 total	N/D	3.21	N/A
Styrene	1.0 / 10.0	N/D	N/D	2.04	N/A
Ethylbenzene	10.0 / 10.0	N/D	N/D	1.10	N/A
Acrylonitrile	10.0 / 10.0	N/D	N/D	0.07	N/A

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

*The first number listed for each individual HAP represents the Screen Modeling Action Level (SMAL) and the second number represents the regulatory de minimis level. The emission levels for Styrene are above its SMAL and therefore Screen modeling was performed.

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 all pollutants are below de minimis levels.

APPLICABLE REQUIREMENTS

The DOW Chemical Company - Riverside Plant 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 your installation, please consult your operating permit.

GENERAL REQUIREMENTS

- *Submission of Emission Data, Emission Fees and Process Information*, 10 CSR 10-6.110
The emission fee is the amount established by the Missouri Air Conservation Commission annually under Missouri Air Law 643.079(1). Submission of an Emissions Inventory Questionnaire (EIQ) is required June 1 for the previous year's emissions.

- *Operating Permits, 10 CSR 10-6.065*
- *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 10-5.160*

SPECIFIC REQUIREMENTS

- *Restriction of Emission of Particulate Matter From Industrial Processes, 10 CSR 10-6.400*
- *Maximum Achievable Control Technology (MACT) Regulations, 10 CSR 10-6.075, National Emission Standards for Hazardous Air Pollutant Emissions: Group IV Polymers and Resins, 40 CFR Part 63, Subpart JJJ*
- *Maximum Achievable Control Technology (MACT) Regulations, 10 CSR 10-6.075, National Emission Standards for Hazardous Air Pollutant Emissions for Equipment Leaks, 40 CFR Part 63, Subpart H*

AMBIENT AIR QUALITY IMPACT ANALYSIS

The styrene potential emission rate was calculated to exceed the Screening Modeling Action Level of 1.0 ton per year. A Screen 3 modeling analysis was performed to determine if the Risk Assessment Levels for styrene would be exceeded at or beyond the property line of the Dow Chemical Company – Riverside facility. Styrene has the potential to be emitted from EP#2 and 14 at 0.23 pound per hour from each emission point. The stack parameters and the nearest property boundary from each stack as provided by the applicant are listed in Table 4.

Table 4: Stack Parameters

Stack No.	Height (ft)	Diameter (ft)	Temperature (F)	Velocity (ft/sec)	Nearest Property Boundary (ft)
EP#2	29.5	1.5	75	16.6	500
EP#14	37.5	1.33	75	18.7	250

The following table lists the air quality impact for styrene.

Table 5: Ambient Air Quality Impact Analysis

Pollutant	Stack No.	Modeled Impact ($\mu\text{g}/\text{m}^3$)	Risk Assessment Level ($\mu\text{g}/\text{m}^3$)	Time Period
Styrene	EP#2	6.48	45.0	24-hour
	EP#14	4.85		
	Total	11.33		
	EP#2	1.30	9.5	Annual
	EP#14	0.97		
	Total	2.27		

As indicated in the above table, styrene emissions from the equipment added under this permit are expected to be in compliance with the Risk Assessment Levels for both the 24 hour and annual average time periods.

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.

Susan Heckenkamp
Environmental Engineer

Date

PERMIT DOCUMENTS

The following documents are incorporated by reference into this permit:

- The Application for Authority to Construct form, dated April 23, 2008, received April 25, 2008, designating The Dow Chemical Company as the owner and operator of the installation.
- U.S. EPA document AP-42, *Compilation of Air Pollutant Emission Factors*, Fifth Edition.
- Saint Louis Regional Office Site Survey, dated May 21, 2008.

Ms. Carla Roberts
Site Environmental Delivery Technician
The DOW Chemical Company - Riverside Plant
500 DOW Industrial Drive
Pevely, MO 63070

RE: New Source Review Permit - Project Number: 2008-04-096

Dear Ms. Roberts:

Enclosed with this letter is your permit to construct. Please study it carefully. Also, note the special conditions, if any, 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 amended 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 do not hesitate to contact Susan Heckenkamp, at the departments' 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

Kendall B. Hale
New Source Review Unit Chief

KBH:shl

Enclosures

c: Saint Louis Regional Office
PAMS File: 2008-04-096

Permit Number: