

217/782-2113

CONSTRUCTION PERMIT - PSD APPROVAL

PERMITTEE

Kelly-Springfield Tire Company  
Attn: Chuck Grunder  
3769 Route 20 East  
Freeport, Illinois 61032

Application No.: 01040070

I.D. No.: 177813AAA

Applicant's Designation: ETHANOL

Date Received: April 25, 2001

Subject: PSD Permit

Date Issued:

Location: 3769 Route 20 East, Freeport

Permit is hereby granted to the above-designated Permittee to CONSTRUCT emission source(s) and/or air pollution control equipment consisting of the modification of the rubber mixing processes and curing presses in its existing tire manufacturing plant as described in the above referenced application. This Permit is granted based upon and subject to the findings and conditions which follow:

In conjunction with this permit, approval is given with respect to the Prevention of Significant Deterioration of Air Quality Regulations (PSD) for this modification, in that the Illinois Environmental Protection Agency (Illinois EPA) finds that the application fulfills all applicable requirements of 40 CFR 52.21. This approval is issued pursuant to the Clean Air Act, as amended, 42 U.S.C. 7401 et seq., the Federal regulations promulgated thereunder at 40 CFR 52.21 for Prevention of Significant Deterioration of Air Quality (PSD), and a Delegation of Authority agreement between the United States Environmental Protection Agency and the Illinois EPA for the administration of the PSD Program. This approval becomes effective in accordance with the provisions of 40 CFR 124.15 and may be appealed in accordance with the provisions of 40 CFR 124.19. This approval is also based upon and subject to the findings and conditions which follow:

Findings

1. Kelly-Springfield Tire Company ("Kelly-Springfield") has requested a PSD permit for a modification of its tire manufacturing plant in Freeport. The applicant is seeking approval of a change in rubber formulation to include organo-silane coupling agents for the purpose of enhancing the properties of the rubber, including reducing rolling resistance of tires which improves fuel economy. This results in the evolution of ethanol, a volatile organic material (VOM) during the processing and curing of the rubber. The emissions increase from the proposed change in raw materials meets the definition of major modification pursuant to 40 CFR 52.2.

2. The tire manufacturing plant is located in Silvercreek Township in Stephenson County. The area is currently designated attainment for all criteria pollutants.
3. The proposed project has the potential to increase emissions of volatile organic material (VOM) by more than 40 tons per year as listed in Table I. The project is therefore subject to PSD review as a major modification for VOM emissions.
4. After reviewing all the materials submitted by Kelly-Springfield, the Illinois EPA has determined that the plant, as now proposed, will (i) be in compliance with all applicable Board emission standards, (ii) utilize Best Available Control Technology (BACT) on emissions of VOM, and (iii) be in compliance with other limits as set in Conditions of this permit.
5. The air quality analysis submitted by Kelly-Springfield and reviewed by the Illinois EPA shows that the plant, as now proposed, will also not cause violations of the ambient air quality standards for VOM. The air quality analysis also shows compliance with the allowable VOM increment.
6. The Illinois EPA has determined that the plant, as now proposed, would comply with all applicable Illinois Air Pollution Control Board Regulations and the federal Prevention of Significant Deterioration of Air Quality Regulations (PSD), 40 CFR 52.21.
7. A copy of the application and the Illinois EPA's formal review of the application and a draft of this permit were placed in a location in the vicinity of the project, and the public was given notice and opportunity to examine this material and to submit comments and to request a public hearing on this matter.

The Illinois EPA is issuing approval to construct the proposed project subject to the following conditions and consistent with the specifications and data included in the application. Any departure from the conditions of this approval or terms expressed in the application would need to receive prior written authorization of the Illinois EPA.

#### Conditions

##### 1.0 UNIT SPECIFIC CONDITIONS

##### 1.1 Banbury Mixers and Curing Presses

##### 1.1.1 Description

##### Banbury Mixers

The Banbury mixers are the primary pieces of equipment for producing the rubber compounds that are used for the

tires. Operated in batch mode, the mixers blend the raw materials together to form feedstock for the remaining processes. Rubber is mixed several times to achieve the necessary properties and composition. The first step is to produce "non-productive" rubber, during the first stages of mixing. The last stage of mixing in the Banburys is used to produce "productive" rubber, which contains additional ingredients, the curing package, necessary for the vulcanization or curing of the rubber when the tires are produced in the plant.

Curing Presses

Tire curing is the operation during the manufacture of tires where the assembled "green" tire is vulcanized. Curing presses consist of a frame with a control system into which a tire mold, that contains the appropriate tread pattern, sidewall design, tire size and contour, is placed. A tire is loaded into the mold with a rubber bladder inflated into the center of the tire, into which steam is injected to provide the pressure and temperature required to form and vulcanize the tire over a specified time (or cycle). Platen presses hold two molds (dual cavity) simultaneously, typically sized for passenger, front farm and truck sized tire molds. Dome presses hold one mold (single cavity) and are sized to hold the larger rear farm and OTR (Off the Road) sized tires.

This permit addresses the increase in VOM emissions resulting from the use of organo-silane coupling gents, as further discussed in Table I.

1.1.2 List of Emission Units and Air Pollution Control Equipment

Emission Group	Description	Emission Control Equipment
Group 1	7 Banbury Mixers	None
Group 2	Passenger Tire and Farm Tire Curing Presses	None

1.1.3 Applicability Provisions and Applicable Regulations

- a. i. An "affected Banbury mixer" is an emission unit which blends the various rubber compounds as described in Conditions 1.1.1 and 1.1.2.
- ii. An "affected curing press" is a press described in Condition 1.1.1 and 1.1.2.
- b. Each affected Banbury mixer and curing press is subject to 35 IAC 212.321(b)(1), which provides that:

No person shall cause or allow the emission of particulate matter into the atmosphere in any one hour period from any new process emission unit, either alone or in combination with the emission of particulate matter from all other similar process emission units for which construction or modification commenced on or after April 14, 1972, at a source or premises, exceeds the allowable emission rates specified in subsection (c) of 35 IAC 212.321 [35 IAC 212.321(a)].

- c. Each affected Banbury mixer and curing mill is subject to 35 IAC 215.301, which provides that: No person shall cause or allow the discharge of more than 3.6 kg/hr (8 lb/hr) of organic material into the atmosphere from any emission unit unless no odor nuisance exists and non-photochemically reactive materials are used [35 IAC 215.301].

1.1.4 Non-Applicability of Regulations of Concern

- a. This permit is issued based on the affected Banbury mixers and curing presses not being subject to 40 CFR Part 64, Compliance Assurance Monitoring (CAM), because the affected Banbury mixers and curing presses do not use an add-on control devices to achieve compliance with an emission limitation or standard.
- b. This permit is issued based on the affected Banbury mixers and curing presses not being subject to 35 IAC 215.463 because this regulation applies to cementing and bead dipping operations only.

1.1.5 Operating Requirements and Work Practices

Usage of silane coupler in the affected Banbury mixers, determined as the amount of silane coupler material, including carrier material provided by the supplier, shall not exceed the following limits:

Silane Coupler Usage	
<u>(Tons/Month)</u>	<u>(Tons/Year)</u>
180.4	1,443.3

These limits are based on the current month's data and the previous 11 months of data.

1.1.6 Emission Limitations

- a. Emissions of VOM from the combined operation of the affected Banbury mixers and curing presses shall not exceed 0.194 lbs per pound of silane coupler used at the mills. Compliance with this limit shall be determined as a monthly average, in accordance with Condition 1.1.12. This limitation represents Best Available Control Technology (BACT) for these operations.
- b. i. Emissions of VOM attributable to use of organo-silane coupling agents in the affected Banbury mixers and affected curing presses shall not exceed the following limits:

VOM Emissions	
<u>(Tons/Month)</u>	<u>(Tons/Year)</u>
30.0	280.0

- ii. Compliance with annual limits shall be determined on a monthly basis from the sum of the data for the current month plus the preceding 11 months (running 12 month total).

1.1.7 Testing Requirements

- a. Prior to relying on a loss factor for generation of VOM from use of organo-silane coupling agents that is lower than specified in Condition 1.1.12, the Permittee shall have the VOM emissions from the affected Banbury mixers and affected curing presses while using organo-silane coupling agents measured at the Permittee's expense by an approved testing service, to confirm that such lower factor is representative for this source.

Notwithstanding the above, the Illinois EPA may upon request of the Permittee provide more time for testing pursuant to this permit if such time is reasonably needed to address unavoidable delays in performance of testing or if waive this testing if it determines that this factor is supported by test data.

- b. The following methods and procedures shall be used for testing of emissions, as approved by the Illinois EPA. Refer to 40 CFR 60, Appendix A for USEPA test methods.

Location of Sample Points	USEPA Method 1
Gas Flow and Velocity	USEPA Method 2
Flue Gas Weight	USEPA Method 3
Moisture	USEPA Method 4
Volatile Organic Material	USEPA Method 18, 25 or 25A, as appropriate

- c. The Permittee shall submit a written test plan to the Illinois EPA for its approval for the initial testing for VOM and if a significant change in the procedures for this testing is planned from the procedures followed in the previous test. This plan shall be submitted at least 90 days prior to the actual date of testing and include the following information as a minimum:
  - i. A description of the planned test procedures.
  - ii. The person(s) who will be performing sampling and analysis and their experience with similar tests.
  - iii. The specific conditions under which testing will be performed, including a discussion of why these conditions will be representative of maximum emissions.
  - iv. The methodology that will be used to determine the operating rate during the period of testing, e.g., the rate of coupling introduced to the process.
- d. The Permittee shall notify the Illinois EPA prior to conducting these measurements to enable the Illinois EPA to observe testing. Notification for the expected date of testing shall be submitted a minimum of 30 days prior to the expected date. Notification of the actual date and expected time of testing shall be submitted a minimum of 5 working days prior to the actual date of the test. The Illinois EPA may accept shorter advance notice if it does not interfere with the Illinois EPA's ability to observe testing.
- e. Copies of the Final Report(s) for these tests shall be submitted to the Illinois EPA within 30 days after the test results are compiled and finalized.
- f. The Final Report from testing shall include as a minimum:
  - i. A summary of results.

- ii. General Information.
- iii. A detailed description of methodology for determination of the rate of VOM introduced into processes during the period of testing, with supporting information.
- iv. Detailed description of operating conditions of the emission unit(s) being tested, including:
  - A. Process information, e.g. type and amount of rubber processed and organo-silane content; and
  - B. All other relevant control equipment information, i.e., equipment condition and operating parameters during testing.
- v. Data and calculations.
- vi. Conclusions.

1.1.8 Monitoring Requirements

None

1.1.9 Recordkeeping Requirements

- a. The Permittee shall maintain the following operating records for the affected Banbury mixers:
  - i. Changes in the compounding process or the type of silane coupler used that may increase the evolution of VOM, with description, the effect on evolution of VOM-emissions, and supporting data and calculations.
  - ii. Total silane coupler throughput on a monthly and annual basis through the affected Banbury mixers (ton/mo and ton/yr).
- b. The Permittee shall maintain the following emission records for the affected Banbury mixers and curing presses:
  - i. VOM emission factor for the combined operation of the affected Banbury mixers and affected curing presses.
  - ii. Total emissions of VOM for all affected Banbury mixers and curing presses, as

calculated based on the procedures established in Condition 1.1.12.

- iii. VOM emissions from the affected emission units expressed as lb VOM per lb of silane coupler processed, with supporting calculations.

#### 1.1.10 Reporting Requirements

The Permittee shall promptly notify the Illinois EPA, Compliance Section, of deviations of affected Banbury mixers and curing presses with the permit requirements as follows. Reports shall describe the probable cause of such deviations, and any corrective actions or preventive measures taken:

If there is an exceedance of the emission limitations of this permit as determined by the records required by this permit, the Permittee shall submit a report to the Illinois EPA's Compliance Section in Springfield, Illinois within 30 days after the exceedance. The report shall include the emissions released in accordance with the recordkeeping requirements, a copy of the relevant records, and a description of the exceedance or violation and efforts to reduce emissions and future occurrences.

#### 1.1.11 Operational Flexibility/Anticipated Operating Scenarios

N/A

#### 1.1.12 Compliance Procedures

- a. To determine compliance with Conditions 1.1.6, VOM emissions from the affected Banbury mixers and affected curing presses shall be calculated based on an appropriate emission factor for generation of VOM. Unless otherwise approved by the Illinois EPA, this factor shall represent maximum theoretical generation of VOM from the reaction of the most volatilizing organo-silane coupler with the rubber matrix.

For the proposed coupling agents, this yields a factor of

$$E_{\text{BMCE}} = 0.194 \times \text{lbs of silane coupler used}$$

Where the emission factor of 0.194 lb/VOM for each lb of silane coupler developed in conjunction with studies performed by the Rubber Manufacturing Association.



- b. Compliance with the PM emission limits established by 35 IAC 212.121 is assured and achieved by the proper operation and maintenance, as required by this section and the work-practices inherent in operation of the affected Banbury mixers and curing presses.
- c. Notwithstanding the procedures specifying compliance to applicable requirements, any person (including the Permittee) may also use other credible evidence to establish compliance or noncompliance with applicable requirements.

If you have any questions on this permit, please call Bob Smet at 217/782-2113.

Donald E. Sutton, P.E.  
Manager, Permit Section  
Division of Air Pollution Control

DES:RPS:jar

cc: Illinois EPA, FOS, Region 2  
Illinois EPA, Compliance Section  
USEPA

Table I

Changes in VOM Emission from Affected Banbury Mixers and Curing Presses With  
Use of Organo-Silane Coupling Agents (Tons/Year)

<u>Equipment</u>	<u>Past Actual Emissions<sup>1</sup></u>	<u>Emissions Increase<sup>2</sup></u>	<u>Maximum Anticipated Future Emissions<sup>3</sup></u>
Banbury Mixers	7.9	70	77.9
Curing Presses	<u>6.5</u>	<u>210</u>	<u>216.5</u>
Totals:	14.4	280	294.4

- Notes: <sup>1</sup> Actual emissions are the emissions from 2001 based on actual levels of operation and appropriate emission factors for these operations. This does not address other operation at the plant.
- <sup>2</sup> Maximum emissions from use of organo-silane coupling agents, as addressed by this permit. Emissions are assumed to be split 25% and 75% between mixing and curing.
- <sup>3</sup> This assumes all tires from the plant would be produced with rubber containing organo-silane coupling.

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**KELLY-SPRINGFIELD TIRE COMPANY**  
**FREEPORT, ILLINOIS**  
**PROJECT SUMMARY**

I. INTRODUCTION

Kelly-Springfield Tire Company ("Kelly-Springfield") has proposed to modify its existing rubber processing operations at its tire manufacturing plant in Freeport. The project involves the inclusion of organo-silane compound with their current rubber compounds, which results in the liberation of ethanol into the atmosphere. The result will not be an increase in overall production at the plant. The proposed project requires a permit because of the associated emissions of volatile organic material (VOM) generated by the rubber mixers and curing presses.

II. PROJECT DESCRIPTION

Kelly-Springfield manufactures passenger cartires, light duty truck tires, farm tires and a variety of small to medium size industrial tires. The tires produced at Kelly-Springfield are manufactured from eight to eleven different rubber tire components. Each component is made up of one or more rubber compounds produced by blending different quantities of raw and synthetic rubber, pigments, process oils, and carbon black. Tire manufacturing at Kelly-Springfield involves the following sequential processes: raw material handling; rubber mixing (in banburys); calendaring and extruding; tread identification striping; tread end cementing; rubber fabric treatment; bead fabrication; wire belt production (radial tires); ply and fabric toe production; tire assembly; green tire spraying; tire curing & inspection; white sidewall grinding; and protective white sidewall coating. The production areas that emit ethanol resulting from the addition of the organo-silane coupling agents are rubber mixing (Banburys) and tire curing.

Banbury Mixers

The Banbury mixers are the primary pieces of equipment for producing the rubber compounds that are used for the tires. Operated in batch mode, the mixers blend the raw materials together to form feedstock for the remaining processes. Rubber is mixed several times to achieve the necessary properties and composition. The first step is to produce "non-productive" rubber, during the first stages of mixing. The last stage of mixing in the Banburys is used to produce "productive" rubber, which contains additional ingredients, the curing package, necessary for the vulcanization or curing of the rubber when the tires are produced in the plant.

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appropriate tread pattern, sidewall design, tire size and contour, is placed. A tire is loaded into the mold with a rubber bladder inflated into the center of the tire, into which steam is injected to provide the pressure and temperature required to form and vulcanize the tire over a specified time (or cycle). Platen presses hold two molds (dual cavity) simultaneously, typically sized for passenger, front farm and truck sized tire molds. Dome presses hold one mold (single cavity) and are sized to hold the larger rear farm and OTR (Off the Road) sized tires.

III. PROJECT EMISSIONS

The application addresses the introduction of organo-silane agents into the rubber. The purpose of the organo-silane coupling agent is to bond the rubbers, silicas, and carbon black and assist in cross-linking for vulcanization of the tire. Ethanol is evolved during the reaction of silica, rubber, and other compounds while it is being mixed in the Banburys.

Ethanol is also evolved during the curing of organo-silane-containing rubber compound tires. Curing emissions are not limited based on the mixing capacity of Kelly-Springfield, as the potential exists for Kelly-Springfield to import organo-silane-containing rubber compounds mixed at other facilities. Therefore, to evaluate the potential emissions from curing operations, it was assumed that all presses are used continuously to cure tires with the organo-silane-containing rubber compounds.

Potential Project Emissions (Ton/Year)	
Emission Unit	VOM (Tons/Year)
Seven Banbury Mixers	280.0
Passenger Tire and Farm Tire Curing Presses	

IV. APPLICABLE REGULATIONS

A. General

The proposed project will comply with applicable state and federal emission standards, including the Illinois Air Pollution Control Board emission standards and regulations (35 Ill. Adm. Code: Subtitle B) and applicable federal emission standards.

B. Additional Requirements for Major Stationary Source Construction and Modification

The project is in an area classified as attainment for all criteria pollutants. The facility is considered a major source subject to Prevention of Significant Deterioration (PSD) regulations, 40 CFR 52.21 because VOM is regulated under the Clean Air Act.

The increase in VOM emissions resulting from this modification is 280.0 tons per year. The project is therefore subject to the additional requirements imposed by the federal rules for PSD for VOM, namely, that Best Available Control Technology (BACT), be implemented for the affected units.

V. PREVENTION OF SIGNIFICANT DETERIORATION

A major project in an attainment area is subject to the federal PSD rules. The PSD rules were established to ensure that new and modified sources will not adversely impact "clean air" areas and will comply with applicable standards.

A PSD review requires: 1) a case-by-case Best Available Control Technology (BACT) determination, taking into account energy, environmental and economic impacts, as well as technical feasibility; 2) an ambient air quality impact analysis, to determine whether the allowable emissions from the source, in conjunction with the proposed net emissions increase, would cause or contribute to a violation of the applicable PSD increment or National Ambient Air Quality Standard (NAAQS); 3) an assessment of the impact on soils, vegetation and visibility; and 4) public notice and comment, including an opportunity for public hearing. The Illinois EPA has been delegated authority by the USEPA to administer the federal PSD program.

A. Best Available Control Technology

BACT is defined as an emission limitation based on the maximum degree of pollution reduction determined on a case-by-case basis considering technical, economic energy and environmental considerations.

Kelly-Springfield conducted a BACT analysis for VOM in order to determine the most appropriate level of control required at the facility for this pollutant.

Kelly-Springfield has proposed good operating practices to minimize the emissions of VOM. Use of add-on control or material substitution were deemed to be economically infeasible. The Illinois EPA concurred that the project will utilize BACT for VOM.

B. Air Quality Analysis

VOM are a precursor to the formation of ozone in the lower atmosphere (at ground level).

VI. PROPOSED PERMIT

The conditions of the proposed permit contain limitations and requirements for the complete rubber mixing and curing processes, including measures to minimize VOM emissions. The permit also

establishes appropriate compliance procedures, including inspection practices, recordkeeping requirements and reporting requirements.

VII. REQUEST FOR COMMENTS

It is the Illinois EPA's preliminary determination that the proposed permit meets all applicable state and federal air pollution control requirements. The Illinois EPA is therefore proposing to issue a permit for construction of the proposed project.

Comments are requested on this proposed action by the Illinois EPA and the proposed conditions on the draft permit. If substantial public interest is shown in this matter, the Illinois EPA will consider holding a public hearing in accordance with 35 Ill. Adm. Code Part 166.

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