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# Project Summary for a Construction Permit Application from Continental Tire North America, Inc. for an Expansion To an Existing Tire Manufacturing Plant in Mount Vernon, Illinois

**Site Identification No.: 081803AAB**
**Application No.: 05110019**

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**Important Dates**

**Application Received: November 7, 2005**
**Comment Period Begins: April 15, 2006**
**Comment Period Closes: May 15, 2006**

## I. Introduction

Continental Tire North America, Inc ("Continental") has submitted a construction permit application for changes to its tire manufacturing plant in Mount Vernon. This project requires an air pollution control construction permit because it involves construction and modification of emission units at the plant.

## II. Background

Tires are composite products made out of various rubber components, as well as fiber, textile and steel cords and reinforcing materials. These components are fabricated separately and then assembled, tire by tire, to build the uncured or green tires. The green tires are then "cooked" in molds in curing presses under appropriate pressure and temperature, vulcanizing the rubber and combining the various components of the tire into a single structure. The cured tires are then trimmed and finished, inspected and stored for shipment.

Various operations in the manufacture of tires are sources of emissions. The mixing of the base rubber is a source of particulate matter and organic emissions. Particulate matter emissions result from the solid materials added to the rubber formulation and are controlled by work practices and filter dust collectors. The organic emissions result from the energy needed to ensure that rubber and other raw materials are thoroughly mixed, which heats the rubber and incidentally results in conditions that are sufficient to generate low concentrations of organic emissions. A similar phenomenon occurs during the curing of the raw tires, with trace losses of organic emissions released each time a mold is opened. Organic emissions also occur from certain of the fabrication operations in which cements and other materials containing organic solvents are used to assemble or combine various components or subcomponents of the tire. Particulate matter emissions also occur from certain tire finishing operations, which are controlled by dust collectors.

## III. Project Description

The project includes construction of three new rubber mixers and ten new curing presses (bringing the number of presses at the plant to 148 presses), increased capacity of certain existing rubber mixers, and certain other new and modified equipment to increase the production capacity of the plant. In conjunction with the proposed increase in production, Continental has also proposed changes to the rubber formulation for certain tire components to include organo-silane coupling agents. The use of this additive in the rubber will act to enhance the properties of the rubber to reduce rolling resistance of tires and improve vehicle fuel economy. This change in the rubber formulation will be accompanied by additional volatile organic material (VOM) emissions during the processing and curing of "silica rubber" at the plant. This is because ethanol, a VOM, is evolved as the coupling agent undergoes reactions during the mixing and subsequent curing of the rubber.

## IV. Project Emissions

The potential changes in emissions from the proposed project, as set forth in the application by Continental, are provided below. For VOM, the change in emissions reflects the difference between past actual emissions and the

emissions that would be allowed by the construction permit. For pollutants other than VOM, the change in emissions reflects the difference in past actual emissions and future projected emissions. This data accounts for both emissions from new and modified emission units and from existing units that will not be physically altered but will experience an increase in operation from the expansion. For example, although the gas-fired boilers at the plant will not be physically altered, they will experience an increase in operation with the expansion of the plant because of the additional process steam needed to support the expansion.

Actual VOM emissions from the plant could be significantly less than the potential emissions stated below, as addressed by the permit. This is because VOM emissions in day-to-day practice could be far less than the maximum emission rates from different operation that were used by Continental in assessing the potential emissions of VOM from the plant after the expansion.

Changes in Emissions (Tons/year)

| Pollutant | Past Actual Emissions | Potential/Future Emissions | Emissions Increase | PSD Significant Emission Rate |
|---|---|---|---|---|
| Volatile Organic Material (VOM) | 137.64 | 715.10 | 577.46 | 40 |
| Particulate Matter (PM) | 31.45 | 39.50 | 8.05 | 15 |
| Nitrogen Oxides ($NO_x$) | 32.27 | 67.50 | 35.23 | 40 |
| Carbon Monoxide (CO) | 27.11 | 56.70 | 29.59 | 100 |
| Sulfur Dioxide ($SO_2$) | 0.20 | 0.41 | 0.21 | 40 |

Because Continental has requested that this project be permitted for a significant increase in VOM emissions, the project must comply with the requirements of the federal rules for Prevention of Significant Deterioration of Air Quality (PSD), 40 CFR 52.21, for emissions of VOM. Because the increases in emissions for other PSD pollutants are not significant, the project is not subject to PSD for other PSD pollutants.

## V. Applicable Emission Standards

All emission sources in Illinois must comply with the Illinois Pollution Control Board's emission standards. The Board's emission standards represent the basic requirements for sources in Illinois. The Board has standards for sources of VOM. This project should readily comply with all applicable Board standards.

Emission units at the plant are also subject to federal New Source Performance Standards (NSPS) and National Emission Standards for Hazardous Air Pollutants (NESHAP). These standards are focused on the fabrication operations for tire components in which cements and other materials containing organic solvents are used. The NSPS addresses these operations that are new or modified relative to the materials that are used and their VOM emissions. The NESHAP became effective to the plant on July 11, 2005, addressing fabricating operations, both new and existing, relative to the solvent-containing materials that are used and hazardous air pollutant (HAP) emissions.

## VI. Best Available Control Technology (BACT)

Because this project is subject to PSD for VOM emissions, Continental must use Best Available Control Technology (BACT) for VOM emissions from proposed new emission units, i.e., three new rubber mixers, ten curing presses and three

tire finishing machines. BACT must also be used for VOM emissions from six existing rubber mixers that will be physically altered to able to handle silica rubber formulations. Lastly, the existing curing presses, which will experience a change in the method of operation accompanied by an increase in VOM emissions, must also use BACT. Other units at the plant, e.g., component fabrication and the tire building machines, which will experience an increase in VOM emissions from the expansion of the plant but whose operations are not otherwise undergoing a physical change or change in the method of operation, are not subject to BACT.

BACT is determined on a case-by-case basis using a "top-down" procedure. The top-down procedure involves ranking available control technologies in descending order of control effectiveness. The top alternative is established as BACT unless this alternative is eliminated due to accompanying cost, energy and environmental impacts.

Continental submitted a BACT demonstration in its application reflecting its judgment as to the emission control technology that should be considered BACT under the PSD rules for affected units. The Illinois EPA has reviewed the material submitted by Continental and made its independent determination of BACT. As explained below, the Illinois EPA concurred with Continental's selection of work practices as BACT, rather than use of add-on emission control devices. However, the Illinois EPA determined that these work practices must be embodied in an appropriate set of emission standards for the affected rubber mixers and curing presses, which are the units of particular concern for VOM emissions.

The BACT demonstration considered the following potentially applicable add-on VOM control technologies for the affected units: condensation, scrubbing, absorption, thermal oxidation, catalytic oxidation, and combined absorption-oxidation. It was concluded that only thermal oxidation is feasible. This is because of the nature of the compounds in the VOM emissions and the low concentration of the emissions in the exhaust stream. For example, the high molecular weight and chemical composition of the emissions would interfere with the effective functioning of absorbers or catalytic oxidizers. The low-concentration of VOM emissions would minimize the effectiveness of condensation or scrubbing. In these circumstances, thermal oxidation is the obvious candidate for add-on control technology, as it poses no concerns for technical feasibility. It is also a highly effective control technology. Accordingly, thermal oxidation is the "top alternative" for control technology for the affected units and must be carefully scrutinized for potential applicability to the affected units.

Continental submitted an economic analysis for the cost impacts of thermal oxidation. In this analysis, Continental evaluated regenerative thermal oxidation (RTO), the type of thermal oxidation that is most inexpensive when controlling large volumes of exhaust and a low concentration of VOM, as are present with the affected units. This analysis also addressed both individual units and various combinations of affected units, to consider the most effective application of RTO control system(s). This analysis shows cost impacts that are on the order of $10,000 per ton for the most effective application of an RTO. This is not surprising as the concentrations of the VOM emissions from the affected units, which are all below 100 ppm, are in the range at which the cost impacts of an RTO can be significant. As this economic analysis did not fully account for all costs, e.g., the cost of ductwork, and the amounts of VOM emissions being controlled were overstated, this is a conservative estimate of the cost impacts of RTO control. In addition, a

review of the control measures used at other new and modified rubber mixers and curing presses shows that work practices are routinely used to minimize the VOM emissions from these operations, not RTO systems. Accordingly, the technology for BACT was determined to be appropriate work practices to minimize emissions for VOM from the affected new and modified units.

Of particular interest for the work practices established as BACT was the possible availability and use of alternative coupling agents, which have lower associated VOM emissions. This is because the coupling agents contribute substantially to emissions from this project. Continental indicates that it has evaluated alternative materials and has not identified lower emitting coupling agents that provide comparable performance in the rubber formulations for the tires. Continental is also concerned that it be able to use coupling agents whose use in tire production is well established, so as to assure the safety and reliability of the tires that it manufactures. In these circumstances, it is not appropriate for the BACT determination to mandate that Continental use alternative coupling agents whose use is not well-established.

In the draft permit, BACT is established in terms of specific limits for the rates and concentrations of VOM emissions from the mixers and curing presses. In addition, a limit is proposed for the rate of VOM emissions directly associated with use of silica coupling agents. It is not expected that these limits reflect and will restrict the operation of the affected units after the expansion. However, these limits memorialize the aspects of VOM emissions from the affected units that underlie the BACT determination. As such these BACT limits indirectly address possible future changes to the affected units, which cannot be specifically identified and addressed at this time. They assure that BACT would be reevaluated if changes were proposed in the future that would result in VOM emissions from the affected units that are beyond the levels that are the basis of the BACT determination that is now being made for the proposed expansion of the plant.

## VII. Air Quality Analysis

An ambient air quality analysis was conducted by Trinity Consultants, the consulting firm working with Continental on the application for this project, to assess the impact of the VOM emissions of the proposed project on air quality. Under the PSD rules, this analysis must determine whether the VOM emissions of the proposed project will cause or contribute to a violation of any applicable air quality standard.

The VOM emissions of the plant are of concern for their potential impact on air quality for ozone, as VOM emissions are a precursor to the formation of ozone in the atmosphere. USEPA has developed a simplified analytical method for assessing ozone impacts for purposes of routine PSD permitting. This methodology predicts the maximum increase in 1-hour ozone concentration from the increase in VOM emissions from a proposed project. The Illinois EPA requires that 1-hour ozone impacts be used to address the 8-hour NAAQS as an interim approach until an equivalent methodology is developed for this purpose. The screening tables are conservative in their assumptions concerning baseline conditions for VOM and $NO_x$ emissions from the sources under evaluation. Trinity Consultants used this approach in calculating a maximum impact from the proposed project on ambient ozone concentration in the surrounding area.

Trinity Consultants performed the USEPA’s simplified analytical method for two scenarios. The first scenario represented present operations considering

current emissions at the tire plant, while the second scenario reflects emissions of VOM and NOx after expansion. (NOx emissions are considered in the analysis because NOx emissions are also a precursor to formation of ozone in the atmosphere.) Under the current operating scenario, the calculated peak contribution to ozone concentrations was 0.014 ppm (parts per million). Under the future scenario for the plant expansion, the calculated concentration is 0.029 ppm. The difference in these impacts, 0.015 ppm, is the potential increase in ozone impact predicted due to the expansion of the plant.

To determine whether the predicted increase in impact will violate the ozone air quality standard, this concentration was added to an appropriate background concentration for ambient ozone that is representative for the area surrounding the plant. The background concentration was obtained from the Illinois EPA's ozone monitoring station in Dale, Illinois, located about 35 miles southeast of the Continental plant. This is the ozone monitoring station closest to the plant. The fourth highest monitored ozone concentration in three years (2002, 2003, and 2004) was used as the background ozone concentration for the area, to be consistent with the form of the one-hour ozone air quality standard. Adding the predicted increase in peak impact from the plant expansion (0.015 ppm) to this maximum background value (0.099 ppm) yields a maximum total ozone concentration of 0.114 ppm. This is less than the historic one-hour ozone air quality standard, 0.120 ppm. It is concluded from this analysis that the proposed expansion of the Continental plant will not cause a violation of the ozone ambient air quality standard.

The application also considered other air-quality related impacts of the proposed project as required by the PSD rules. No industrial or other growth in the area related to the plant expansion were predicted, which would also have impacts on air quality. Significant impacts on soils, vegetation or visibility were also not identified.

## VIII. Draft Permit

The conditions of the draft permit contain limitations and requirements to assure that this project will comply with all applicable Board emissions standards and use BACT as required by the PSD rules.

The permit conditions also establish appropriate compliance procedures, including inspection practices, recordkeeping requirements, monitoring requirements and reporting requirements. The Permittee must carry out these procedures on an on-going basis to demonstrate that the expanded plant is operated within the limitations set by the permit.

## IX. Request for Comments

It is the Illinois EPA's preliminary determination that the project meets all applicable state and federal air pollution control requirements, subject to the conditions proposed in the draft permit. The Illinois EPA is therefore proposing to issue a construction permit for this 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 IAC Part 166.