

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: 042007 - 012 Project Number: 2007-02-018

Parent Company: Altana AG

Parent Company Address: Abelstr. 45, 46483 Wesel, Germany

Installation Name: The P.D. George Company

Installation Address: 5200 N. Second Street
St. Louis, MO 63166

Location Information: City of St. Louis

Application for Authority to Construct was made for:
Replacement of four existing process tanks with four new ones. The new process tanks will be subject to 40 CFR part 63, Subpart FFFF – *National Emission Standards for Hazardous Air Pollutants for Miscellaneous Organic Chemical Manufacturing*. 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.

APR 16 2007

EFFECTIVE DATE

A handwritten signature in black ink, appearing to read "James Kavanagh".
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 City of St. Louis 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 with 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 Permit Section at (314) 613-7300. If you prefer to write, please address your correspondence to the City of St. Louis, Air Pollution Control Program, 1415 North 13th Street, St. Louis, MO 63106, attention: Permitting Section.

STATE OF MISSOURI



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Permit No.	
Project No.	2007-02-018

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 P.D. George Company
City of St. Louis

1. Emission Limitation

- A. The P.D. George Company shall emit less than 40 tons of Volatile Organic Compounds (VOCs) from the four new process tanks, collectively identified as emission point EP-8, in any consecutive 12-month period.
- B. The P.D. George Company shall determine and record uncontrolled emissions of VOC using measurements and/or calculations for each batch emission episode according to the engineering evaluation methodology in paragraphs (d)(2)(i)(A) through (H) of §63.1257 of Title 40 of the Code of Federal Regulations. The records shall be used to demonstrate compliance with Special Conditions 1(A). The P.D. George Company shall maintain all records required by this permit for not less than five (5) 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 in these tanks for manufacturing of resin products.
- C. The P.D. George Company shall report to the City of St. Louis Air Pollution Control Program's Enforcement Section, 1415 North 13th Street, St. Louis, Missouri 63106, no later than ten (10) days after the end of the month during which the records from Special Condition Number 1(B) indicate that the source exceeds the limitation of Special Conditions Number 1(A).

2. Maximum Achievable Control Technology (MACT) Requirement

The P.D. George Company shall comply with all appropriate monitoring, testing, reporting, and record keeping requirements of 40 CFR 63, Subpart FFFF— *National Emission Standards for Hazardous Air Pollutants: Miscellaneous Organic Chemical Manufacturing*.

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

Project Number: 2007-02-018
Installation ID Number: 510-0096
Permit Number:

The P.D. George Company
5200 N. Second Street
St. Louis, MO 63166

Complete: 2/20/2007
Reviewed: 3/28/2007

Parent Company:
Altana AG
Abelstr. 45
46483 Wesel, Germany

City of St. Louis

REVIEW SUMMARY

- The P.D. George Company has applied for authority to replace four existing process tanks with four new process tanks.
- Hazardous Air Pollutant (HAP) emissions are expected from the proposed equipment. HAPs of concern from this process are Xylene, Triethylamine, Formaldehyde, Ethyl Benzene, Phenol, m-Cresol and p-Cresol
- 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 FFFF—*National Emission Standards for Hazardous Air Pollutants: Miscellaneous Organic Chemical Manufacturing*, applies to the proposed tanks. The tanks are miscellaneous organic chemical manufacturing process units (MCPU) that are located at, or are part of, an existing major source of hazardous air pollutants (HAP) emissions.
- No air pollution control equipment is being used in association with the new equipment.
- This review was conducted in accordance with Section (5) of Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required*. Potential emission of VOC are conditioned to below de minimis levels. HAP emissions are above de minimis levels but this installation is, however, subject to a MACT standard and cannot, therefore, be reviewed in accordance with Section (9) of Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required*. VOC emissions are below de minimis levels.
- This installation is located in City of St. Louis, 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]. The installation is involved with miscellaneous organic chemical manufacturing.
- Ambient air quality modeling was not performed to determine the impact of HAP for this review since the installation is subject to a MACT.
- Emissions testing is not required for the equipment.
- An application to amend the installations Part 70 Operating Permit is required within 1 year to reflect the limitations, conditions, and recordkeeping of this permit.
- Approval of this permit is recommended with special conditions.

INSTALLATION DESCRIPTION

The P. D. George Company is located on 18 acres in the industrial area north of the City of St. Louis, Missouri. It develops and manufactures specialty polymers for electrical and electronic industries. These polymers are used as electrical insulation in various household appliances, heavy-duty electrical equipment, and for automotive applications. Manufacturing includes reactor, blending, and compounding capabilities.

The P. D. George Company currently operates under Part 70 Operating permit number OP2002-035. The Air Pollution Control Program received a renewal application for this permit on December 22, 2006,

The following construction permits have been issued to The P.D. George Company from the Air Pollution Control Program.

Table 1. Previously issued construction permits.

Permit Number	Description
98-01-004SC	Nylon Process Tank
98-07-039SC	Thinning Tank
00-04-018	Chemical Usage in Tanks
00-04-018F	Chemical Usage
01-11-034	Mixers
03-09-017PM	Modify conditions in permit no. 03-09-017
03-09-017PM	Modify conditions in permit 03-09-017
04-04-007	Mixer
04-02-006	Mixer
04-12-024	Mixer
04-12-025	AI Reactor
05-11-011	20,000 gallon tank
06-01-001	800 gallon mixing vessel

PROJECT DESCRIPTION

The P.D. George Company intends to replace four existing process tanks (Process Tank #1, #2, #3 and #4) with four new process tanks to be used in the manufacture of resin products. Each of the four new thinning tanks has a capacity of 6,500 gallons. The new tanks will be used to thin a wide variety of resins from Resin Reactor #1, Resin Reactor #2 and from storage. The new process tanks will be subject to 40 CFR 63 Subpart FFFF – National Emission Standards for Miscellaneous Organic Chemical Manufacture (MON).

Emissions from the tanks are generated due to vapor losses of volatile organic compounds (VOCs) and hazardous air pollutants (HAPs) when resins, thinning materials and cleaning solvents are added to the process tanks; when the tank contents are unloaded; and when heat is applied to the tank contents.

Electrical insulation products, some of which are A4-103, A6-735, E7-2178, A4-575 and A4-2466 are produced at this installation. The process tanks are cleaned using solvents after every run of product. The batch process and cleaning duration are shown in tables 3 and 4.

Table 2 below shows the HAPs that will be emitted from the process tanks.

Table 2. HAPs emitted from the process tanks.

Chemical Name	Chemical Formula	CAS Number
Xylene	C ₈ H ₁₀	95-47-6
Triethylamine	(CH ₃ CH ₂) ₃ N	121-44-8
Formaldehyde	CH ₂ O	50-00-0
Ethyl Benzene	C ₈ H ₁₀	100-41-4
Phenol	C ₆ H ₅ OH	108-95-2
m-Cresol	C ₇ H ₈ O	108-39-4
p-Cresol	C ₇ H ₈ O	106-44-5

EMISSIONS/CONTROLS EVALUATION

VOC and HAP emissions used in this analysis were calculated using guidelines from § 63.1257 of Title 40 of the Code of Federal Regulations.

Emissions from vapor displacement due to transfer of material were calculated using equation 1 below. The individual HAP partial pressures may be calculated using Raoult's law.

$$E = \frac{(V)}{(R)(T)} \times \sum_{i=1}^n (P_i)(MW_i) \dots \dots \dots (\text{Eq.1})$$

where:

- E = mass of HAP emitted
- V = volume of gas displaced from the vessel
- R = ideal gas law constant
- T = temperature of the vessel vapor space; absolute
- P_i = partial pressure of the individual HAP
- MW_i = molecular weight of the individual HAP
- n = number of HAP compounds in the emission stream i = identifier for a HAP compound

Equation 1 was also used to estimate emissions arising from vapor displacement as a result of tank cleaning.

Table 3. Emissions from New Process Tanks by Product

Product	Process Duration (hr)	VOC Emissions		HAP Emissions	
		(lb/batch)	(lb/hr)	(lb/batch)	(lb/hr)
A4-103	9	55.47	6.16	53.03	5.89
A6-735	16	5.57	0.35	5.52	0.35
E7-2178	6	0.66	0.11	0.00	0.00
A4-575	7	60.41	8.63	53.98	7.71
A4-2466	16	33.31	2.08	12.82	0.80

In addition to emissions from vapor displacement during tank cleaning HAPs will also be emitted when the tank contents are heated.

Equations 2, 3 and 4 below were used to estimate the emissions from heating the tank contents during cleaning. Table 4 below shows the emissions (vapor displacement + tank heating) from tank cleaning process.

$$E = \frac{\sum_{i=1}^n ((P_i^*)(x_i)(MW_i))}{P_{atm} - \sum_{j=1}^m ((P_j^*)(x_j))} \times \Delta \eta \dots \dots \dots (\text{Eq. 2})$$

$$\Delta \eta = \frac{V}{R} \left[\left(\frac{Pa_1}{T_1} \right) - \left(\frac{Pa_2}{T_2} \right) \right] \dots \dots \dots (\text{Eq. 3})$$

$$P_{an} = P_{atm} - \sum_{j=1}^m (P_j)_{Tn} \dots \dots \dots (\text{Eq. 4})$$

Where:

E = mass of HAP vapor displaced from the vessel being heated

x_i = mole fraction of each HAP in the liquid phase

x_j = mole fraction of each condensable VOC (including HAP) in the liquid phase

P_i^* = vapor pressure of each HAP in the vessel headspace at any temperature between the initial and final heatup temperatures

P_j^* = vapor pressure of each condensable VOC (including HAP) in the vessel headspace at any temperature between the initial and final heat up temperatures.

$\Delta\eta$ = number of moles of noncondensable gas displaced

V = volume of free space in the vessel

R = ideal gas law constant

T_1 = initial temperature of vessel contents, absolute

T_2 = final temperature of vessel contents, absolute

P_{an} = partial pressure of noncondensable gas in the vessel headspace at initial (n=1) and final (n=2) temperature

P_{atm} = atmospheric pressure

$(P_j)_{Tn}$ = partial pressure of each condensable compound (including HAP) in the vessel headspace at the initial temperature (n=1) and final (n=2) temperature

m = number of condensable compounds (including HAP) in the displaced vapor

j = identifier for a condensable compound

$(P_i)_{Tn}$ = partial pressure of each HAP in the vessel headspace at initial (T_1) and final (T_2) temperature

MWi = molecular weight of the individual HAP

n = number of HAP compounds in the emission stream

i = identifier for a HAP compound

Table 4. Cleaning Emissions from New Process Tanks by Cleaning Solvent

Cleaning Solvent	Cleaning Duration (hr)	VOC Emissions		HAP Emissions	
		(lb/batch)	(lb/hr)	(lb/batch)	(lb/hr)
Xylene	4	7.42	1.86	7.42	1.86
Cresylic Acid	4	0.84	0.21	0.09	0.02

The worst case emission scenario is in the production of A4-575 and subsequent cleaning with xylene. This batch process yields a weighted average VOC and HAP emission rate of 6.17 lb/hr and 5.58 lb/hr respectively or 27.0 tons per year and 24.45 tons per year. The HAP emission rate indicated here is for combined HAPs. Speciation of HAPs emitted from the production of A4-575 indicates that xylene constitutes 99.7% of the emissions, or that it is emitted at a rate of 7.69 lb/hr. When the cleaning operation is factored in then the weighted average xylene emission rate is 5.57 lb/hr. This emission rate translates to 24.4 tons per year of xylene emissions, which is above the 10 ton per year regulatory de minimis level for an individual HAP. The emission rates calculated above are for each process tank. The PTE for the 4 tanks will, therefore be four times as much.

Potential emissions of the application represent the potential of the new equipment, assuming continuous operation (8760 hours per year). The existing actual emissions were obtained from the installations 2005 Emissions Inventory Questionnaire (EIQ) and are for the entire installation. The following table provides an emissions summary for this project.

Table 5. Emissions Summary (tons per year)

Pollutant	Regulatory De Minimis Levels	Existing Potential Emissions	Existing Actual Emissions (2005 EIQ)	Potential Emissions of the Application	New Installation Conditioned Potential
PM ₁₀	15.0	N/D	1.28	0.00	N/A
SO _x	40.0	N/D	0.18	0.00	N/A
NO _x	40.0	N/D	2.21	0.00	N/A
VOC	40.0	N/D	49.80	108.00	<40.00
CO	100.0	N/D	1.63	0.00	N/A
HAPs	10.0/25.0	N/D	N/D**	97.80	N/A
Xylene	10.0	N/D	N/D**	97.60	N/A

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

** HAPs not reported in 2005 EIQ

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 VOC are conditioned to below de minimis levels. Potential emissions of HAP are above de minimis levels but the installation is subject to a MACT.

APPLICABLE REQUIREMENTS

The P.D. George Company 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 April 1 for the previous year's emissions.
- *Operating Permits*, 10 CSR 10-6.065
- *Restriction of Emission of Visible Air Contaminants*, 10 CSR 10-6.220
- *Control of Odors in the Ambient Air*, 10 CSR 10-5.160
- City of St. Louis, Ordinance 65645

SPECIFIC REQUIREMENTS

- *Maximum Achievable Control Technology (MACT) Regulations, 10 CSR 10-6.075, National Emission Standards for Hazardous Air Pollutants: Miscellaneous Organic Chemical Manufacturing, 40 CFR Part 63, Subpart FFFF*
- *Control of Emissions From Manufacture of Paints, Varnishes, Lacquers, Enamels and Other Allied Surface Coating Products, 10 CSR 10-5.390*

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.

Maurice Chemweno
Environmental Engineer

Date

PERMIT DOCUMENTS

The following documents are incorporated by reference into this permit:

- The Application for Authority to Construct form, received February 7, 2007, designating Altana AG as the owner and operator of the installation.
- The Maximum Achievable Control Technology (MACT) standard, 40 CFR Part 63, Subpart FFFF—*National Emission Standards for Hazardous Air Pollutants: Miscellaneous Organic Chemical Manufacturing*

Mr. Todd Thomas
Manager of Regulatory Affairs
The P.D. George Company
5200 N. Second Street
St. Louis, MO 63166

RE: New Source Review Permit - Project Number: 2007-02-018

Dear Mr. Thomas:

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 me at (573) 751-4817, or you may write to me at the Department of Natural Resources' Air Pollution Control Program, P.O. Box 176, Jefferson City, MO 65102. Thank you for your attention to this matter.

Sincerely,

AIR POLLUTION CONTROL PROGRAM

Kendall B. Hale
New Source Review Unit Chief

KBH:mcl

Enclosures

c: City of St. Louis Air Pollution Control Program
PAMS File: 2007-02-018
Permit Number: