INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
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Mitchell E. Daniels, Jr.
Governor

Thomas W. Easterly
Commissioner

100 North Senate Avenue
Indianapolis, Indiana 46204
(317) 232-8603
(800) 451-6027
www.IN.gov/idem

TO: Interested Parties / Applicant

DATE: March 31, 2005

RE: R.R. Donnelley & Sons Company / SSM 085-20370-00009

FROM: Paul Dubenetzky
Chief, Permits Branch
Office of Air Quality

Notice of Decision: Approval - Effective Immediately

Please be advised that on behalf of the Commissioner of the Department of Environmental Management, I have issued a decision regarding the enclosed matter. Pursuant to IC 13-15-5-3, this permit is effective immediately, unless a petition for stay of effectiveness is filed and granted according to IC 13-15-6-3, and may be revoked or modified in accordance with the provisions of IC 13-15-7-1.

If you wish to challenge this decision, IC 4-21.5-3 and IC 13-15-6-1 require that you file a petition for administrative review. This petition may include a request for stay of effectiveness and must be submitted to the Office of Environmental Adjudication, 100 North Senate Avenue, Government Center North, Room 1049, Indianapolis, IN 46204, **within eighteen (18) calendar days of the mailing of this notice**. The filing of a petition for administrative review is complete on the earliest of the following dates that apply to the filing:

(1) the date the document is delivered to the Office of Environmental Adjudication (OEA);
(2) the date of the postmark on the envelope containing the document, if the document is mailed to OEA by U.S. mail; or
(3) The date on which the document is deposited with a private carrier, as shown by receipt issued by the carrier, if the document is sent to the OEA by private carrier.

The petition must include facts demonstrating that you are either the applicant, a person aggrieved or adversely affected by the decision or otherwise entitled to review by law. Please identify the permit, decision, or other order for which you seek review by permit number, name of the applicant, location, date of this notice and all of the following:

(1) the name and address of the person making the request;
(2) the interest of the person making the request;
(3) identification of any persons represented by the person making the request;
(4) the reasons, with particularity, for the request;
(5) the issues, with particularity, proposed for considerations at any hearing; and
(6) identification of the terms and conditions which, in the judgment of the person making the request, would be appropriate in the case in question to satisfy the requirements of the law governing documents of the type issued by the Commissioner.

If you have technical questions regarding the enclosed documents, please contact the Office of Air Quality, Permits Branch at (317) 233-0178. Callers from within Indiana may call toll-free at 1-800-451-6027, ext. 3-0178.

Enclosures
FNPER.dot 1/10/05

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Mr. Joe Kingan
R.R. Donnelley & Sons Company
P.O. Box 837
Warsaw, IN 46581

March 31, 2005

Re: 085-20370
First Significant Source Modification to
Part 70 Permit No.: 085-6040-00009

Dear Mr. Kingan:

R.R Donnelley & Sons Company was issued Part 70 operating permit T085-6040-00009 on August 5, 2002, relating to the operation of publication rotogravure printing. An application to modify the source was received by the Office of Air Quality (OAQ) on November 12, 2004. Pursuant to the provisions of 326 IAC 2-7-10.5, a significant source modification to this permit is hereby approved as described in the attached Technical Support Document.

The modification is as follows:

(a) Install two (2) heatset web offset lithographic printing presses and a regenerative thermal oxidizer for VOC control.

(b) Limit the VOC emissions from the lithographic printing presses to less than 39.6 tons per year.

The following construction conditions are applicable to the proposed project:

General Construction Conditions

1. The data and information supplied with the application shall be considered part of this source modification approval. Prior to any proposed change in construction which may affect the potential to emit (PTE) of the proposed project, the change must be approved by the Office of Air Quality (OAQ).

2. This approval to construct does not relieve the permittee of the responsibility to comply with the provisions of the Indiana Environmental Management Law (IC 13-11 through 13-20; 13-22 through 13-25; and 13-30), the Air Pollution Control Law (IC 13-17) and the rules promulgated thereunder, as well as other applicable local, state, and federal requirements.

3. Effective Date of the Permit
Pursuant to IC 13-15-5-3, this approval becomes effective upon its issuance.

4. Pursuant to 326 IAC 2-1.1-9 and 326 IAC 2-7-10.5(i), the Commissioner may revoke this approval if construction is not commenced within eighteen (18) months after receipt of this approval or if construction is suspended for a continuous period of one (1) year or more.

5. All requirements and conditions of this construction approval shall remain in effect unless modified in a manner consistent with procedures established pursuant to 326 IAC 2.

6. Pursuant to 326 IAC 2-7-10.5(l) the emission units constructed under this approval shall not be placed into operation prior to revision of the source's Part 70 Operating Permit to incorporate the required operation conditions.

This significant source modification authorizes construction of two (2) heatset web offset lithographic presses. Operating conditions shall be incorporated into the Part 70 operating permit as a significant permit modification in accordance with 326 IAC 2-7-10.5(l)(2) and 326 IAC 2-7-12. Operation is not approved until the significant permit modification has been issued.

This decision is subject to the Indiana Administrative Orders and Procedures Act - IC 4-21.5-3-5. If you have any questions on this matter, please contact Rajesh Thotakura, c/o OAQ, 100 North Senate Avenue, P.O. Box 6015, Indianapolis, Indiana, 46206-6015, or at 973-575-2555, extension 3216, or dial 1-800-451-6027, and ask for extension 3-6878.

Sincerely,

Origianl signed by Nisha Sizemore for
Paul Dubenetzky, Chief
Permits Branch
Office of Air Quality

Attachments
RT / EVP

c: File - Kosciusko County
U.S. EPA, Region V
Kosciusko County Health Department
IDEM Northern Regional Office
Air Compliance Section Inspector – Doyle Houser
Compliance Data Section - Karen Ampil
Administrative and Development
Technical Support and Modeling - Michele Boner

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PART 70 OPERATING PERMIT
OFFICE OF AIR QUALITY

R.R. Donnelley & Sons Company
Warsaw Manufacturing Division
2801 West Old Road 30
Warsaw, Indiana 46581-0837

(herein known as the Permittee) is hereby authorized to operate subject to the conditions contained herein, the source described in Section A (Source Summary) of this permit.

This permit is issued in accordance with 326 IAC 2 and 40 CFR Part 70 Appendix A and contains the conditions and provisions specified in 326 IAC 2-7 as required by 42 U.S.C. 7401, et. seq. (Clean Air Act as amended by the 1990 Clean Air Act Amendments), 40 CFR Part 70.6, IC 13-15 and IC 13-17.

Second Significant Source Modification.: 085-20370-00009 - Pages changed or added: 5, 8a 46c, 46d, 46e, and 62b	
Issued by: Original signed by Nisha Sizemore Paul Dubenetzky, Branch Chief Office of Air Quality	Issuance Date: March 31, 2005 Expiration Date: March 31, 2010

D.5 FACILITY OPERATION CONDITIONS - Eight (8) Portable Ink Jet Printers 46a

Emission Limitations and Standards [326 IAC 2-7-5(1)]
D.5.1 Volatile Organic Compounds (VOCs) Limits [326 IAC 2-2] [326 IAC 8-1-6] [326 IAC 2-4.1-1]
D.5.2 Volatile Organic Compounds (VOCs) and Hazardous Air Pollutants (HAPs)
D.5.3 Preventive Maintenance Plan [326 IAC 2-7-5(13)]

Record Keeping and Reporting Requirements [326 IAC 2-7-5(3)] [326 IAC 2-7-19]
D.5.4 Record Keeping Requirements
D.5.5 Reporting Requirements

D.6 FACILITY OPERATION CONDITIONS - Two (2) Heatset Web Offset Lithographic Printing Presses with Regenerative Thermal Oxidizer 46c

Emission Limitations and Standards [326 IAC 2-7-5(1)]
D.6.1 Volatile Organic Compounds (VOCs) Limits [326 IAC 8-1-6]
D.6.2 PSD Minor Limit [326 IAC 2-2]
D.6.3 Preventive Maintenance Plan [326 IAC 2-7-5(13)]

Compliance Determination Requirements
D.6.4 Volatile Organic Compounds (VOC) [326 IAC 8-1-2]
D.6.5 Volatile Organic Compounds (VOC) [326 IAC 8-1-4] [326 IAC 8-1-2(a)]
D.6.6 Testing Requirements [326 IAC 2-7-6(1),(6)] [326 IAC 2-1.1-11]
D.6.7 VOC Emissions
D.6.8 Thermal Oxidizer Temperature
D.6.9 Parametric Monitoring

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(o) One (1) Goss heatset web offset lithographic printing press with six (6) units and one (1) web identified as Press WM-401 with a maximum line speed of 1800 feet per minute and a maximum printing width of 38 inches, with associated in-line equipment and VOC emissions controlled by a regenerative thermal oxidizer, identified as RTO-1; and

(p) One (1) Goss heatset web offset lithographic printing press with eight (8)units and two (2) webs identified as Press WM-402 with a maximum speed of 3000 feet per minute and a maximum printing width of 72 inches, with associated in-line equipment and VOC emissions controlled by a regenerative thermal oxidizer, identified as RTO-1.

SECTION D.6 FACILITY OPERATION CONDITIONS

Facility Description [326 IAC 2-7-5(15)]:

(a) One (1) Goss heatset web offset lithographic printing press with six (6) units and one (1) web identified as Press WM-401 with a maximum line speed of 1800 feet per minute and a maximum printing width of 38 inches, with associated in-line equipment and VOC emissions controlled by a regenerative thermal oxidizer, identified as RTO-1; and

(b) One (1) Goss heatset web offset lithographic printing press with eight (8)units and two (2) webs identified as Press WM-402 with a maximum speed of 3000 feet per minute and a maximum printing width of 72 inches, with associated in-line equipment and VOC emissions controlled by a regenerative thermal oxidizer, identified as RTO-1.

(The information describing the process contained in this facility description box is descriptive information and does not constitute enforceable conditions.)

Emission Limitations and Standards [326 IAC 2-7-5(1)]

D.6.1 Volatile Organic Compounds (VOCs) Limits [326 IAC 8-1-6]

Pursuant to 326 IAC 8-1-6 (General Reduction Requirements), the Best Available Control Technology (BACT) for the two (2) heatset web offset lithographic presses, identified as WM-401 and WM-402, shall be as follows:

(a) The exhaust shall be vented to the Regenerative Thermal Oxidizer (RTO-1) with a minimum of 97% destruction efficiency for VOC;

(b) The VOC content of the Fountain solution shall be no greater than 3% VOC as applied;

(c) The blanket and roller washes shall have a vapor pressure no greater than 10 mm Hg at 20 ^{o}C or the VOC content shall be limited to 2.5 lb/gal as applied; and

(d) The capture and retention efficiencies used for reporting compliance shall be as follows and are based on USEPA's "Alternative Control Techniques Document: Offset Lithographic Printing" (EPA 453/R-94-054, June 94):

(1) 100 percent capture, by weight, of the VOC in press ready inks;
(2) 70 percent capture, by weight, of the VOC in press ready fountain solutions;
(3) 40 percent capture , by weight, of the VOC in press ready automatic cleaning solvents;
(4) 20 percent retention, by weight, of VOC in inks in the paper substrate; and
(5) 50 percent retention, by weight, of manual cleaning solvents in the cleaning wipers. Cleaning wipers shall always be placed in closed containers after use.

Compliance with the above limits and conditions will satisfy the Best Available Control technology (BACT) requirements of 326 IAC 8-1-6.

D.6.2 PSD Minor Limit [326 IAC 2-2]

The amount of VOC delivered to the substrate and the amount of VOC used for cleanup shall be limited such that the VOC emitted, after controls, is less than 39.6 tons from presses WM-401 and WM-402 combined per twelve (12) consecutive month period, with compliance determined at the end of each month. Compliance with this limit will render the requirements of 326 IAC 2-2 (PSD) not applicable.

D.6.3 Preventive Maintenance Plan [326 IAC 2-7-5(13)]

A Preventive Maintenance Plan, in accordance with Section B - Preventive Maintenance Plan, of this permit, is required for these facilities and its control device.

Compliance Determination Requirements

D.6.4 Volatile Organic Compounds (VOC) [326 IAC 8-1-2]

Pursuant to 326 IAC 8-1-2(a), the Permittee shall operate the thermal oxidizer, at all times when at least one of the two (2) lithographic presses (WM-401 and WM-402) is in operation, to achieve compliance with condition D.6.1 and D.6.2.

D.6.5 Volatile Organic Compounds (VOC) [326 IAC 8-1-4] [326 IAC 8-1-2(a)]

Compliance with the VOC content and usage limitations contained in Conditions D.6.1 and D.6.2 shall be determined pursuant to 326 IAC 8-1-4(a)(3) and 326 IAC 8-1-2(a) by preparing or obtaining from the manufacturer the copies of the “as supplied” and “as applied” VOC data sheets, Material Safety Data Sheets, or other VOC content information. IDEM, OAQ reserves the authority to determine compliance using Method 24 in conjunction with the analytical procedures specified in 326 IAC 8-1-4.

D.6.6 Testing Requirements [326 IAC 2-7-6(1),(6)] [326 IAC 2-1.1-11]

Within sixty (60) days after achieving maximum capacity but no later than one hundred and eighty (180) days after initial startup, the Permittee shall conduct a performance test to verify VOC destruction efficiency as per condition D.6.1 for the thermal oxidizer utilizing methods as approved by the Commissioner. This test shall be repeated at least once every five years from the date of the most recent valid compliance demonstration. Testing shall be conducted in accordance with Section C - Performance Testing.

D.6.7 VOC Emissions

Compliance with Condition D.6.2 shall be demonstrated within 30 days of the end of each month. This shall be based on total volatile organic compound emitted for the previous month, and adding it to previous 11 months total VOC emitted do as to arrive at VOC emissions for the most recent 12 consecutive month period. The VOC emissions for a month can be arrived at using the following equation for usage:

VOC emitted = [(VOC input from inks) x (1 - 0.2^a) x (1 - 0.97^b) + (VOC input from fountain solution) x (1 - 0.7^c x 0.97^b) + (VOC input from automatic cleaning solvents) x (1 - 0.4^d x 0.97^b)] + (VOC from manual cleaning solvents) x (1-0.5^e)

a. 20 percent retention, by weight, of VOC in inks in the paper substrate;
b. 97 % destruction efficiency of VOC;
c. 70 percent capture, by weight, of the VOC in press ready fountain solutions;
d. 40 percent capture , by weight, of the VOC in press ready automatic cleaning solvents;
e. 50 percent retention, by weight, of manual cleaning solvents in the cleaning wipers;

The Permittee shall use the destruction efficiency demonstrated from the most recent IDEM approved stack test and the capture and retention efficiencies listed in condition D.6.1(d).

D.6.8 Thermal Oxidizer Temperature

(a) A continuous monitoring system shall be calibrated, maintained, and operated on the thermal oxidizer for measuring operating temperature. For the purpose of this condition, continuous shall mean no less often than once per minute. The output of this system shall be recorded continuously except when there is a fluctuation in the temperature of the thermal oxidizer such that the temperature falls below 1400 ^{0}F. At anytime the temperature falls below 1400 ^{0}F, the Permittee shall record the output of the system as a 3-hr average for that period. From the date of issuance of this permit until the approved stack test results are available, the Permittee shall operate the thermal oxidizer at or above the 3-hr average temperature of 1400 ^{0}F.

(b) The Permittee shall determine the 3-hr average temperature from the most recent valid stack test that demonstrates compliance with limits in condition D.6.1, as approved by IDEM.

(c) On and after the date the approved stack test results are available, the Permittee shall operate the thermal oxidizer at or above the 3-hr average temperature as observed during the compliant stack test.

D.6.9 Parametric Monitoring

(a) The Permittee shall determine the appropriate duct pressure or fan amperage from the most recent valid stack test that demonstrates compliance with limits in condition D.6.1, as approved by IDEM.

(b) The duct pressure or fan amperage shall be observed at least once per day when the thermal oxidizer is in operation. On and after the date the approved stack test results are available, the duct pressure or fan amperage shall be maintained within the normal range as established in most recent compliant stack test.

Record Keeping and Reporting Requirement [326 IAC 2-7-5 (3)][326 IAC 2-7-19]

D.6.10 Record Keeping Requirements

(a) To document compliance with Conditions D.6.1 and D.6.2, the Permittee shall maintain records in accordance with (1) through (8) below. Records maintained for (1) through (8) shall be taken monthly and shall be complete and sufficient to establish compliance with the VOC usage limits and/or the VOC emission limits established in Conditions D.6.1and D.6.2.

(1) The VOC content of each ink, coating material, cleanup solvent and fountain solution used.

(2) The amount of ink and coating material used on monthly basis.

(A) Records shall include purchase orders, invoices, and material safety data sheets (MSDS) necessary to verify the type and amount used.

(3) The cleanup solvent usage for each month.

(4) The fountain solution usage for each month.

(5) Weight percent of VOC in fountain solution (wt %).

(6) The aggregate monthly VOC emissions and the annual VOC emissions.

(7) The continuous temperature records (on a 3-hr average basis whenever the temperature is not continuously above the minimum required temperature) for the thermal oxidizer and the 3-hr average temperature used to demonstrate compliance during the most recent compliant stack test.

(8) Daily records of the duct pressure or fan amperage.

(b) To document compliance with Condition D.6.3, the Permittee shall maintain of records of any additional inspections prescribed by the Preventive Maintenance Plan.

(c) All records shall be maintained in accordance with Section C - General Record Keeping Requirements, of this permit.

D.6.11 Reporting Requirements

A quarterly summary of the information to document compliance with Conditions D.6.1 shall be submitted to the address listed in Section C - General Reporting Requirements, of this permit, using the report forms located at the end of this permit, or their equivalent, within thirty (30) days after the end of the quarter being reported. The report submitted by the Permittee does require the certification by the 'responsible official' as defined by 326 IAC 2-7-1(34).

INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
OFFICE OF AIR QUALITY
COMPLIANCE DATA SECTION

Part 70 Source Modification Quarterly Report

Source Name: R.R. Donnelley & Sons Company - Warsaw Manufacturing Division
Source Address: 2801 West Old Road 30, Warsaw, Indiana 46581
Mailing Address: Old Route 30 West, P.O. Box 837, Warsaw, Indiana 46581-0837
Part 70 Permit No.: T 085-6040-00009
Source Modification No.:085-20370-00009
Facility: Two (2) heatset web offset lithographic presses identified as WM-401 & WM-402
Parameter: VOC usage, VOC emissions
Limit: The amount of VOC delivered to the substrate and the amount of VOC used for cleanup shall be limited such that the VOC emitted, after controls, is less than 39.6 tons from presses WM-401 and WM-402 combined per twelve (12) consecutive month period. The following equation shall be used to determine the VOC emissions:

VOC emitted = [(VOC input from inks) x (1 - 0.2^1) x (1 - 0.97^2) + (VOC input from fountain solution) x (1 - 0.7^3 x 0.97^2) + (VOC input from automatic cleaning solvents) x (1 - 0.4^4 x 0.97^2)] + (VOC from manual cleaning solvents) x (1-0.5^5)

1. 20 percent retention, by weight, of VOC in inks in the paper substrate;
2. 97 % destruction efficiency of VOC;
3. 70 percent capture, by weight, of the VOC in press ready fountain solutions;
4. 40 percent capture , by weight, of the VOC in press ready automatic cleaning solvents;
5. 50 percent retention, by weight, of manual cleaning solvents in the cleaning wipers;

YEAR: _____

Month	Column 1		Column 2		Column 1 + Column 2	
	VOC usage This Month	VOC Emissions This Month	VOC usage Previous 11 Months	VOC Emissions Previous 11	VOC usage 12 Month Total	VOC Emissions 12 Month
Month 1						
Month 2						
Month 3						

No deviation occurred in this quarter.

Deviation/s occurred in this quarter.

Deviation has been reported on: _____

Submitted by: _____
Title / Position: _____
Signature: _____
Date: _____
Phone: _____

Attach a signed certification to complete this report.

Indiana Department of Environmental Management
Office of Air Quality

Technical Support Document (TSD) for a Significant Source Modification and Significant Permit Modification to a Part 70 Operating Permit

Source Background and Description

Source Name:	**R.R Donnelley & Sons Company-Warsaw Manufacturing Division**
Source Location:	**2801 West Old Road 30 Warsaw IN 46581**
County:	**Kosciusko**
SIC Code:	**2754**
Operation Permit No.:	**T085-6040-00009**
Operation Permit Issuance Date:	**August 5, 2002**
Significant Source Modification No.:	**SSM 085-20370-00009**
Significant Permit Modification No.:	**SPM 085-20472-00009**
Permit Reviewer:	**RT/EVP**

The Office of Air Quality (OAQ) has reviewed a modification application from R.R Donnelley & Sons Company relating to the installation of two (2) heatset web offset lithographic printing presses and a regenerative thermal oxidizer for volatile organic compound (VOC) emissions control.

History

R.R Donnelley & Sons Company was issued Part 70 operating permit T085-6040-00009 on August 5, 2002, relating to the operation of publication rotogravure printing. On November 12, 2004, R.R Donnelley & Sons Company submitted an application to OAQ to install two (2) heatset web offset lithographic printing presses and a regenerative thermal oxidizer for VOC control.

Explanation of Modification Requested

On November 12, 2004, R.R Donnelley & Sons Company submitted a request to:

(a) Install two (2) heatset web offset lithographic printing presses and a regenerative thermal oxidizer for VOC control.

(b) Limit the VOC emissions from the lithographic printing presses to less than 39.6 tons per year.

The potential emissions from the two (2) proposed heatset web offset lithographic printing presses are calculated utilizing the emission factors obtained from EPA ACT and CTG for offset lithography. The potential VOC emissions from the two (2) proposed heatset web offset lithographic printing presses, before controls, are 2296.05 tons per year.

Currently, the existing source is a major PSD stationary source because the source criteria pollutant emissions, after all applicable limits and standards, are greater than the respective major source levels of 250 tons per year. To render PSD not applicable for this modification, the source is taking a VOC emission limit of 39.6 tons per year, after controls, from two (2) proposed heatset web offset lithographic printing presses and compliance with this limit will render PSD not applicable.

Existing Approvals

The source was issued a Part 70 Operating Permit (T085-6040-00009) on August 5, 2002. The source has since then received the following:

(a) First Administrative Amendment No.: 085-16533-00009, issued on October 4, 2002;

(b) Second Administrative Amendment No.: 085-17386-00009, issued on June 30, 2002;

(c) Third Administrative Amendment No.: 085-18023-00009, issued on September 8, 2003;

(d) First Significant Source Modification No.: 085-17834-00009, issued on December 3, 2003;

(e) First Significant Permit Modification No.: 085-18151-00009, issued on December 5, 2003;

(f) First Minor Source Modification No.: 085-18172-00009, issued on March 22, 2004;

(g) Second Significant Permit Modification No.: 085-18435-00009, issued on February 16, 2004;

(h) Fourth Administrative Amendment No.: 085-18825-00009, issued on April 14, 2004; and

(i) Fifth Administrative Amendment No.: 085-18925-00009, issued on September 18, 2004.

Enforcement Issue

There are no enforcement actions with the equipment proposed in the modification.

Stack Summary

Stack ID	Operation	Height (feet)	Diameter (feet)	Flow Rate (acfm)	Temperature (^{0}F)
RTO-1	Two (2) heatset web offset lithographic printing presses	45	4	49800	420

Recommendation

The staff recommends to the Commissioner that the Significant Source Modification and Significant Permit Modification be approved. This recommendation is based on the following facts and conditions:

Unless otherwise stated, information used in this review was derived from the application and additional information submitted by the applicant.

An application for the purposes of this review was received on November 12, 2004. Additional information was received on December 23, 2004, January 28, 2005, February 2, 2005 and February 8, 2005.

Emission Calculations

See Appendix A of this document for detailed emissions calculations (three (3) pages).

Potential to Emit Before Controls for the Modification

Pursuant to 326 IAC 2-1.1-1(16), Potential to Emit is defined as "the maximum capacity of a stationary source to emit any air pollutant under its physical and operational design. Any physical or operational limitation on the capacity of a source to emit an air pollutant, including air pollution control equipment and restrictions on hours of operation or type or amount of material combusted, stored, or processed shall be treated as part of its design if the limitation is enforceable by the U.S. EPA."

This table reflects the PTE before controls due to the modification. Control equipment is not considered federally enforceable until it has been required in a federally enforceable permit.

Pollutant	Potential To Emit (tons/year)
PM	-
PM-10	-
SO_2	-
VOC	2296.05
CO	-
NO_x	-

Note: For the purpose of determining Title V applicability for particulates, PM-10, not PM, is the regulated pollutant in consideration.

HAPs	Potential To Emit (tons/year)
Worst Case Single HAP	10.34
Combined HAPs	14.78

Justification for Modification

The Part 70 operating permit is being modified through both Part 70 Significant Source Modification and Significant Permit Modification. The source is installing two (2) heatset web offset lithographic printing presses and a regenerative thermal oxidizer for VOC control. Since the increase in the potential emissions due to this modification are greater than 25 tons per year of VOC, this modification is reviewed as significant source modification, pursuant to 2-7-10.5 (f) (7). The source is installing a regenerative thermal oxidizer (RTO) with a destruction efficiency of 97 % and taking a VOC usage limit to limit VOC emissions from this modification to less than 39.6 tons per year and render 326 IAC 2-2 (PSD) not applicable. Therefore, pursuant to 326 IAC 2-7-12(d), this modification request is reviewed as significant permit modification.

County Attainment Status

The source is located in Kosciusko County.

Pollutant	Status
PM-10	Attainment
SO_2	Attainment
NO_2	Attainment
1-hour Ozone	Attainment
8-hour Ozone	Attainment
CO	Attainment
Lead	Attainment

(a) Volatile organic compounds (VOC) and Nitrogen Oxides (NOx) are regulated under the Clean Air Act (CAA) for the purposes of attaining and maintaining the National Ambient Air Quality Standards (NAAQS) for ozone. Therefore, VOC and NOx emissions are considered when evaluating the rule applicability relating to the ozone standards. Kosciusko County has been designated as attainment for the 8-hour ozone standard. Therefore, VOC emissions and NOx were reviewed pursuant to the requirements for Prevention of Significant Deterioration (PSD), 326 IAC 2-2. See the State Rule Applicability for the source section.

(b) Kosciusko County has been classified as attainment or unclassifiable in Indiana for other criteria pollutants. Therefore, these emissions were reviewed pursuant to the requirements for Prevention of Significant Deterioration (PSD), 326 IAC 2-2. See the State Rule Applicability for the source section.

(c) Fugitive Emissions
Since this type of operation is not one of the twenty-eight (28) listed source categories under 326 IAC 2-2 and since there are no applicable New Source Performance Standards that were in effect on August 7, 1980, the fugitive emissions are not counted toward determination of PSD and Emission Offset applicability.

Actual Emissions

The following table shows the actual emissions from the source. This information reflects calendar year 2002 emissions, based upon the Indiana Air Emission Summary Data for criteria pollutants.

Pollutant	Emissions (ton/yr)
PM	0
PM10	2
SO_2	0
VOC	315
CO	22
NO_x	27

Existing Source Status

Existing Source PSD Definition (emissions after controls, based on 8,760 hours of operation per year at rated capacity and/or as otherwise limited):

	PM (tons/yr)	PM10 (tons/yr)	SO2 (tons/yr)	NO_X (tons/yr)	VOC (tons/yr)	CO (tons/yr)	Worst Case Single HAP (tons/yr)	Comb. HAPs (tons/yr)
Source	2.38	2.38	0.16	27.29	315.03	21.85	18.6	23.25
PSD Major Levels	250	250	250	250	250	250	-	-
Part 70 Major Levels	-	100	100	100	100	100	10	10/25

(a) This existing source is a major PSD stationary source because the source criteria pollutant emissions, after all applicable limits and standards, are greater than the respective major source levels of 250 tons per year, and it is not one of the 28 listed source categories.

(b) These emissions are based upon the application and technical support document for Significant Source Modification 085-18172-00009, issued on March 22, 2004.

Potential to Emit After Controls for the Modification

The table below summarizes the total potential to emit, reflecting all limits, of the significant emission units for the modification.

	Potential to Emit (tons/year)							
Process/facility	PM	PM-10	SO_2	NO_X	VOC	CO	Haps	
							Single	Total
two (2) heatset web offset lithographic printing presses	0.00	0.00	0.00	0.00	39.6	0.00	3.35	6.6
Total Emissions due to modification	0.00	0.00	0.00	0.00	39.6	0.00	3.35	6.6
PSD Significant Levels	25	15	40	40	40	100	N/A	N/A

The source is taking a VOC usage limit, in conjunction with controlling VOC emissions with a RTO, to limit the VOC emissions from the two (2) heatset web offset lithographic printing presses to less than 39.6 tons per year. Therefore, the requirements of PSD do not apply to this modification. This source after the proposed modification remains as a major PSD stationary source because the VOC emissions are greater than 250 tons per year.

Federal Rule Applicability

(a) There are no New Source Performance Standards (NSPS)(326 IAC 12 and 40 CFR Part 60) included in this modification.

(b) The requirements of 40 CFR 60, Subpart QQ, Standards of Performance for the Graphics Arts Industry: Publication Rotogravure Printing were not included in this modification. This standard applies to each publication rotogravure printing press that commenced construction, modification or reconstruction after October 28, 1980. The printing presses installed in this modification are heatset web offset lithographic presses and not rotogravure presses.

(c) The requirements of 40 CFR 63.820, Subpart KK - National Emission Standard for the Printing and Publishing Industry were not included in this modification. This standard applies to major source of hazardous air pollutants (HAPs), at which publication rotogravure, product and packaging rotogravure or wide-web flexographic printing presses are operated. The two (2) heatset web offset lithographic printing presses at this source are not publication, product and packaging rotogravure printing presses, or wide-web flexographic printing presses, therefore, the requirements of this rule were not included.

(d) 40 CFR 64, Compliance Assurance Monitoring

The requirements of 40 CFR Part 64, Compliance Assurance Monitoring, apply to a pollutant-specific emissions unit (PSEU), as defined in 40 CFR 64.1, at a major source that is required to obtain a Part 70 or 71 permit if the PSEU meets the following criteria:

(1) the unit is subject to an emission limitation or standard for an applicable regulated air pollutant,

(2) the unit uses a control device as defined in 40 CFR 64.1 to comply with that emission limitation or standard, and

(3) the unit has a potential to emit (PTE) before controls equal to or greater than 100 percent of the amount (tons per year) of the pollutant required for a source to classified as a Part 70 major source.

This source was issued initial Part 70 permit no. T085-6040-00009 on August 5, 2002. The two (2) heatset web offset lithographic printing presses as PSEUs have uncontrolled PTE at greater than 100 percent of the applicable major Part 70 threshold, each uses a control device (RTO) as defined in 40 CFR 64.1 to comply with the VOC emission limitation. The PSEUs meets the criteria for Compliance Assurance Monitoring applicability. Hence 40 CFR Part 64, Compliance Assurance Monitoring, are applicable to the two (2) heatset web offset lithographic printing presses.

The pollutant-specific emission units are “large units” as described in 40 CFR 64.5. Therefore, the owner or operator has to submit a CAM plan pursuant to 40 CFR 64 as part of the significant permit revision application. The Permittee has submitted a CAM plan on November 12, 2004. The monitoring requirements (see page 8 of TSD) for two (2) heatset web offset lithographic printing presses will satisfy the requirements of 40 CFR 64, Compliance Assurance Monitoring.

State Rule Applicability - Entire Source and Individual Facilities

326 IAC 2-2 (PSD Minor Limit)

The source has always been a major source for PSD applicability. The modification to install the two (2) heatset web offset lithographic printing presses, identified as WM-401 & WM-402, is major because the potential to emit VOC is greater than 40 tons per year. However, the source is installing a regenerative thermal oxidizer (RTO) with a destruction efficiency of 97 % and taking a VOC usage limit. This VOC usage limit in conjunction with RTO will limit the potential to emit of VOC to less than 39.6 tons per 12 consecutive month period from the two (2) heatset web offset lithographic printing presses and compliance with this limit renders PSD not applicable. To allow variances in the process, the source has opted to take VOC limit of 39.6 tons per twelve consecutive month period instead of less than 40 tons per twelve consecutive month period.

The installation of two (2) heatset web offset lithographic printing presses will not increase the utilization at other units because these printing presses are a part of stand alone line.

326 IAC 8-1-6 (New Facilities, General Reduction Requirements)

Facilities constructed after January 1, 1980, with potential VOC emissions greater than 25 tons per year are subject to 326 IAC 8-1-6. The two (2) heatset web offset lithographic presses have potential VOC emissions greater than 25 tons per year. Therefore, they are subject to the requirements of 326 IAC 8-1-6.

After conducting the top-down BACT analysis (refer App. B of TSD), the BACT for the two (2) heatset web offset lithographic presses has been determined as follows:

(a) The exhaust shall be vented to the Regenerative Thermal Oxidizer (RTO-1) with a minimum of 97% destruction efficiency for VOC;

(b) The VOC content of the Fountain solution shall be no greater than 3% VOC as applied;

(c) The Blanket and Roller washes shall have a vapor pressure no greater than 10 mm Hg at 20 ^{o}C or the VOC content shall be limited to 2.5 lb/gal as applied; and

(d) The capture efficiencies used for reporting compliance shall be as follows and are based on USEPA's "Alternative Control Techniques Document: Offset Lithographic Printing" (EPA 453/R-94-054, June 1994)

(1) 100 percent capture, by weight, of the VOC in press ready inks;
(2) 70 percent capture, by weight, of the VOC in press ready fountain solutions; and
(3) 40 percent capture, by weight, of the VOC in press ready automatic cleaning solvents.

326 IAC 8-5-5 (Graphic Arts Operations)

The two (2) heatswet web offset lithographic printing presses (WM-401 & WM-402) are not subject to 326 IAC 8-5-5 because these presses are not packaging rotogravure, publication rotogravure or flexographic.

Testing Requirements

326 IAC 2-7-6(1), (6), 326 IAC 2-1.1-11 (Testing Requirements)

(a) Within sixty (60) days after achieving the maximum capacity but no later than one hundred and eighty (180) days after initial startup, the Permittee shall conduct a performance test to verify VOC destruction efficiency for the thermal oxidizer using methods as approved by the Commissioner. This test shall be repeated at least once every five years from the date of the most recent valid compliance demonstration. Testing shall be conducted in accordance with Section C - Performance Testing.

Compliance Determination Requirements

326 IAC 8-1-2 (Volatile Organic Compounds (VOC))

Pursuant to 326 IAC 8-1-2(a), the Permittee shall operate the thermal oxidizer to achieve compliance with 326 IAC 8-1-6.

326 IAC 8-1-4, 326 IAC 8-1-2(a) (Volatile Organic Compounds (VOC))

Compliance with the VOC content and usage limitations pursuant to 326 IAC 8-1-6 and to render 326 IAC 2-2 not applicable shall be determined pursuant to 326 IAC 8-1-4(a)(3) and 326 IAC 8-1-2(a) by preparing or obtaining from the manufacturer the copies of the "as supplied" and "as applied" VOC data sheets. IDEM, OAQ reserves the authority to determine compliance using Method 24 in conjunction with the analytical procedures specified in 326 IAC 8-1-4

VOC Emissions

Compliance with PSD Minor Limit (326 IAC 2-2) shall be demonstrated within 30 days of the end of each month. This shall be based on the total volatile organic compound emitted for the previous month, and adding it to previous 11 months total VOC emitted so as to arrive at VOC emissions for the most recent 12 consecutive month period. The VOC emissions for a month can be arrived at using the following equation for VOC usage:

VOC emitted = [(VOC input from inks) x (100 - % overall control efficiency) + VOC input from fountain solution) x (100 - % overall control efficiency)+ VOC input from automatic cleaning solvents) x (100 - % overall control efficiency)] + [Uncontrolled VOC from manual cleaning solvent]

Pursuant to the requirements of 326 IAC 8-1-6, the BACT includes the following compliance determination requirements:

Thermal Oxidizer Temperature

(a) A continuous monitoring system shall be calibrated, maintained, and operated on the thermal oxidizer for measuring operating temperature. For the purpose of this condition, continuous shall mean no less often than once per minute. The output of this system shall be recorded as 3-hr average. From the date of issuance of this permit until the approved stack test results are available, the Permittee shall operate the thermal oxidizer at or above the 3-hr average temperature of 1400 ^{0}F.

(b) The Permittee shall determine the 3-hr average temperature from the most recent valid stack test that demonstrates compliance with limits in condition D.6.1 (326 IAC 8-1-6), as approved by IDEM.

(c) On and after the date the approved stack test results are available, the Permittee shall operate the thermal oxidizer at or above the 3-hr average temperature as observed during the compliant stack test.

Parametric Monitoring

(a) The Permittee shall determine the appropriate duct pressure or fan amperage from the most recent valid stack test that demonstrates compliance with limits pursuant to BACT (326 IAC 8-1-6), as approved by IDEM.

(b) The duct pressure or fan amperage shall be observed at least once per day when the thermal oxidizer is in operation. On and after the date the approved stack test results are available, the duct pressure or fan amperage shall be maintained within the normal range as established in most recent compliant stack test.

Compliance Requirements

Permits issued under 326 IAC 2-7 are required to ensure that sources can demonstrate compliance with applicable state and federal rules on a more or less continuous basis. All state and federal rules contain compliance provisions, however, these provisions do not always fulfill the requirement for a more or less continuous demonstration. When this occurs IDEM, OAQ, in conjunction with the source, must develop specific conditions to satisfy 326 IAC 2-7-5. As a result, compliance requirements are divided into two sections: Compliance Determination Requirements and Compliance Monitoring Requirements.

Compliance Determination Requirements in Section D of the permit are those conditions that are found more or less directly within state and federal rules and the violation of which serves as grounds for enforcement action. If these conditions are not sufficient to demonstrate continuous compliance, they will be supplemented with Compliance Monitoring Requirements, also Section D of the permit. Unlike Compliance Determination Requirements, failure to meet Compliance Monitoring conditions would serve as a trigger for corrective actions and not grounds for enforcement action. However, a violation in relation to a compliance monitoring condition will arise through a source's failure to take the appropriate corrective actions within a specific time period.

There is no compliance monitoring requirements applicable to this modification.

Changes Proposed

The changes listed below have been made to the Part 70 Operating Permit (T065-7398-00003), issued June 15, 1999:

1. Section A.2 (Emission Units and Pollution Control Equipment Summary) is revised to reflect the proposed installation of two (2) heatset web offset lithographic presses for this modification, as follows:

A.2 Emission Units and Pollution Control Equipment Summary [326 IAC 2-7-4(c)(3)] [326 IAC 2-7-5(15)]

This stationary source consists of the following emission units and pollution control devices:

(o) One (1) Goss heatset web offset lithographic printing press with six (6) units and one (1) web identified as Press WM-401 with a maximum line speed of 1800 feet per minute and a maximum printing width of 38 inches, with associated in-line equipment and VOC emissions controlled by a regenerative thermal oxidizer identified as RTO-1; and

(p) One (1) Goss heatset web offset lithographic printing press with eight (8)units and two (2) webs identified as Press WM-402 with a maximum speed of 3000 feet per minute and a maximum printing width of 72 inches, with associated in-line equipment and VOC emissions controlled by a regenerative thermal oxidizer identified as RTO-1.

2. Section D.6 conditions (facility description and operating conditions) are added to reflect the proposed installation of two (2) heatset web offset lithographic presses for this modification, as follows:

SECTION D.6 FACILITY OPERATION CONDITIONS

Facility Description [326 IAC 2-7-5(15)]:

(a) One (1) Goss heatset web offset lithographic printing press with six (6) units and one (1) web identified as Press WM-401 with a maximum line speed of 1800 feet per minute and a maximum printing width of 38 inches, with associated in-line equipment and VOC emissions controlled by a regenerative thermal oxidizer identified as RTO-1; and

(b) One (1) Goss heatset web offset lithographic printing press with eight (8)units and two (2) webs identified as Press WM-402 with a maximum speed of 3000 feet per minute and a maximum printing width of 72 inches, with associated in-line equipment and VOC emissions controlled by a regenerative thermal oxidizer identified as RTO-1.

(The information describing the process contained in this facility description box is descriptive information and does not constitute enforceable conditions.)

Emission Limitations and Standards [326 IAC 2-7-5(1)]

D.6.1 Volatile Organic Compounds (VOCs) Limits [326 IAC 8-1-6]

Pursuant to 326 IAC 8-1-6 (General Reduction requirements), the Best Available Control technology (BACT) for the two (2) heatset web offset lithographic presses, identified as WM-401 and WM-402, shall be as follows:

(a) The exhaust shall be vented to the Regenerative Thermal Oxidizer (RTO-1) with a minimum of 97% destruction efficiency for VOC;

(b) The VOC content of the Fountain solution shall be no greater than 3% VOC as applied;

(c) The Blanket and Roller washes shall have a vapor pressure no greater than 10 mm Hg at 20 ^{o}C or the VOC content shall be limited to 2.5 lb/gal as applied; and

(d) The capture efficiencies used for reporting compliance shall be as follows and are based on USEPA's "Alternative Control Techniques Document: Offset Lithographic Printing" (EPA 453/R-94-054, June 1994)

(1) 100 percent capture, by weight, of the VOC in press ready inks;
(2) 70 percent capture, by weight, of the VOC in press ready fountain solutions; and
(3) 40 percent capture, by weight, of the VOC in press ready automatic cleaning solvents.

Compliance with the above limits and conditions will satisfy the Best Available Control technology (BACT) requirements of 326 IAC 8-1-6.

D.6.2 PSD Minor Limit [326 IAC 2-2]

The amount of VOC delivered to the substrate and the amount of VOC used for cleanup shall be limited such that the VOC emitted, after controls, is less than 39.6 tons from presses WM-401 and WM-402 combined per twelve (12) consecutive month period, with compliance determined at the end of each month. Compliance with this limit will render the requirements of 326 IAC 2-2 (PSD) not applicable.

D.6.3 Preventive Maintenance Plan [326 IAC 2-7-5(13)]

A Preventive Maintenance Plan, in accordance with Section B - Preventive Maintenance Plan, of this permit, is required for these facilities and its control device.

Compliance Determination Requirements

D.6.4 Volatile Organic Compounds (VOC) [326 IAC 8-1-2]

Pursuant to 326 IAC 8-1-2(a), the Permittee shall operate the thermal oxidizer, at all the times when WM-401 and WM-402 are in operation, to achieve compliance with condition D.6.1 and D.6.2.

D.6.5 Volatile Organic Compounds (VOC) [326 IAC 8-1-4] [326 IAC 8-1-2(a)]

Compliance with the VOC content and usage limitations contained in Conditions D.6.1 and D.6.2 shall be determined pursuant to 326 IAC 8-1-4(a)(3) and 326 IAC 8-1-2(a) by preparing or obtaining from the manufacturer the copies of the "as supplied" and "as applied" VOC data sheets. IDEM, OAQ reserves the authority to determine compliance using Method 24 in conjunction with the analytical procedures specified in 326 IAC 8-1-4

D.6.6 Testing Requirements [326 IAC 2-7-6(1),(6)] [326 IAC 2-1.1-11]

Within sixty (60) days after achieving maximum capacity but no later than one hundred and eighty (180) days after initial startup, the Permittee shall conduct a performance test to verify VOC destruction efficiency as per condition D.6.1 for the thermal oxidizer utilizing methods as approved by the Commissioner. This test shall be repeated at least once every five years from the date of the most recent valid compliance demonstration. Testing shall be conducted in accordance with Section C - Performance Testing.

D.6.7 VOC Emissions

Compliance with condition D.6.2 shall be demonstrated within 30 days of the end of each month. This shall be based on the total volatile organic compound emitted for the previous month, and adding it to previous 11 months total VOC emitted so as to arrive at VOC emissions for the most recent 12 consecutive month period. The VOC emissions for a month can be arrived at using the following equation for VOC usage:

VOC emitted = [(VOC input from inks) x (100 - % overall control efficiency) + VOC input from fountain solution) x (100 - % overall control efficiency)+ VOC input from automatic cleaning solvents) x (100 - % overall control efficiency)] + [uncontrolled VOC from Manual cleaning solvent]

The Permittee shall use the destruction efficiency demonstrated from the most recent IDEM approved stack test and the capture efficiency listed in Condition D.6.1 (d)

D.6.8 Thermal Oxidizer Temperature

(a) A continuous monitoring system shall be calibrated, maintained, and operated on the thermal oxidizer for measuring operating temperature. For the purpose of this condition, continuous shall mean no less often than once per minute. The output of this system shall be recorded as 3-hr average. From the date of issuance of this permit until the approved stack test results are available, the Permittee shall operate the thermal oxidizer at or above the 3-hr average temperature of 1400 ^{0}F.

(b) The Permittee shall determine the 3-hr average temperature from the most recent valid stack test that demonstrates compliance with limits in condition D.6.1, as approved by IDEM.

(c) On and after the date the approved stack test results are available, the Permittee shall operate the thermal oxidizer at or above the 3-hr average temperature as observed during the compliant stack test.

D.6.9 Parametric Monitoring

(a) The Permittee shall determine the appropriate duct pressure or fan amperage from the most recent valid stack test that demonstrates compliance with limits in condition D.6.1, as approved by IDEM.

(b) The duct pressure or fan amperage shall be observed at least once per day when the thermal oxidizer is in operation. On and after the date the approved stack test results are available, the duct pressure or fan amperage shall be maintained within the normal range as established in most recent compliant stack test.

Record Keeping and Reporting Requirement [326 IAC 2-7-5 (3)][326 IAC 2-7-19]

D.6.10 Record Keeping Requirements

(a) To document compliance with Conditions D.6.1 and D.6.2, the Permittee shall maintain records in accordance with (1) through (9) below. Records maintained for (1) through (9) shall be taken monthly and shall be complete and sufficient to establish compliance with the VOC usage limits and/or the VOC emission limits established in Conditions D.6.1 and D.6.2.

(1) The VOC content of each coating material and solvent used.

(2) The amount of coating material and solvent used on monthly basis.

(A) Records shall include purchase orders, invoices, and material safety data sheets (MSDS) necessary to verify the type and amount used.

(B) Solvent usage records shall differentiate between those added to coatings and those used as cleanup solvents.

(3) The cleanup solvent usage for each month;

(4) The total VOC usage for each month;

(5) The weight of VOCs emitted for each compliance period.

(6) Weight percent of VOC in fountain solution (wt %);

(7) The aggregate monthly VOC emissions and the annual VOC emissions.

(8) The continuous temperature records (on an 3-hr average basis) for the thermal oxidizer and the 3-hr average temperature used to demonstrate compliance during the most recent compliant stack test.

(9) Daily records of the duct pressure or fan amperage.

(b) To document compliance with Condition D.6.3, the Permittee shall maintain of records of any additional inspections prescribed by the Preventive Maintenance Plan.

(c) All records shall be maintained in accordance with Section C - General Record Keeping Requirements, of this permit.

D.6.11 Reporting Requirements

A quarterly summary of the information to document compliance with Conditions D.6.2 shall be submitted to the address listed in Section C - General Reporting Requirements, of this permit, using the report forms located at the end of this permit, or their equivalent, within thirty (30) days after the end of the quarter being reported. The report submitted by the Permittee does require the certification by the 'responsible official' as defined by 326 IAC 2-7-1(34).

3. The Table of Contents shall be modified to reflect the conditions that have been added.

4. The quarterly reporting form is added.

INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
OFFICE OF AIR QUALITY
COMPLIANCE DATA SECTION

Part 70 Source Modification Quarterly Report

Source Name: R.R. Donnelley & Sons Company - Warsaw Manufacturing Division
Source Address: 2801 West Old Route 30, Warsaw, Indiana 46581
Mailing Address: Old Route 30 West, P.O. Box 837, Warsaw, Indiana 46581-0837
Part 70 Permit No.: T 085-6040-00009
Source Modification No.:085-20370-00009
Facility: Two (2) heatset web offset lithographic presses identified as WM-401 & WM-402
Parameter: VOC usage, VOC emissions
Limit: The amount of VOC delivered to the substrate and the amount of VOC used for cleanup shall be limited such that the VOC emitted, after controls, is less than 39.6 tons from presses WM-401 and WM-402 combined per twelve (12) consecutive month period. The following equation shall be used to determine the VOC emissions:

VOC emitted = [(VOC input from inks) x (100 - % overall control efficiency) + VOC input from fountain solution) x (100 - % overall control efficiency) + VOC input from automatic cleaning solvents) x (100 - % overall control efficiency)] + [Uncontrolled VOC from manual cleaning solvent]

YEAR:

Month	Column 1		Column 2		Column 1 + Column 2	
	VOC usage This Month	VOC Emissions This Month	VOC Usage Previous 11 Months	VOC Emissions Previous 11 Months	VOC usage 12 Month Total	VOC Emissions 12 Month Total
Month 1						
Month 2						
Month 3						

No deviation occurred in this quarter.

Deviation/s occurred in this quarter.

Deviation has been reported on:

Submitted by:
Title / Position:
Signature:
Date:
Phone:

Attach a signed certification to complete this report.

Conclusion

The operation relating to publication rotogravure printing shall be subject to the conditions of the attached proposed Significant Source Modification No. 085-20370-00009 and Significant Permit Modification No. 085-20472-00009.

Indiana Department of Environmental Management
Office of Air Quality

Addendum to the
Technical Support Document (TSD) for a Part 70 Significant Source Modification and Part 70 Significant Permit Modification

Source Background and Description

Source Name:	R.R. Donnelley & Sons Company-Warsaw Manufacturing Division
Source Location:	2801 West Old Road 30 Warsaw IN 46581
County:	Kosciusko
SIC Code:	2754
Operation Permit No.:	T085-6040-00009
Operation Permit Issuance Date:	August 5, 2002
Significant Source Modification No.:	SSM 085-20370-00009
Significant Permit Modification No.:	SPM 085-20472-00009
Permit Reviewer:	RT / EVP

On February 17, 2005, the Office of Air Quality (OAQ) had a notice published in Times Union in Warsaw, Indiana, stating that R.R. Donnelley & Sons Company had applied for Part 70 significant source modification and Part 70 significant permit modification relating to the installation of two (2) heatset web offset lithographic printing presses and a regenerative thermal oxidizer for volatile organic compound (VOC) emissions control. The notice also stated that OAQ proposed to issue a permit for this operation and provided information on how the public could review the permit and other documentation. Finally, the notice informed interested parties that there was a period of thirty (30) days to provide comments on whether this permit should be issued as proposed.

On March 4, 2005, OAQ received comments from R.R. Donnelley & Sons Company through their Environmental Health and Safety Director.

The summary of the comments and related responses for the comments received from R.R. Donnelley & Sons Company representative are presented. Any changes made to the permit as a result of the following comments are shown in bold and deleted permit language is shown with a line through it. Permit changes affecting the permit's Table of Contents are also revised without replication herein.

Comments Received from R.R. Donnelley & Sons Company:

Part 70 Operating Permit

Comment 1:

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The description of the new emission units in the Table of Contents is incorrect and minor typographical errors have been noted. The entry for D.6 should be revised as follows:

D.6 FACILITY OPERATION CONDITIONS - ~~Two (2) Portable Ink Jet Printers~~ **Two (2) Heatset Web Offset Lithographic Printing Presses with Regenerative Thermal Oxidizer Control….**46c

Response 1:

IDEM, OAQ agrees. Table of contents section D.6 has been changed as shown below.

D.6 FACILITY OPERATION CONDITIONS - ~~Two (2) Portable Ink Jet Printers~~ **Two (2) Heatset Web Offset Lithographic Printing Presses with Regenerative Thermal Oxidizer Control….**46c

Comment 2:

In order to clarify the capture, control and retention factors used in determining the emissions form the new sources, the following revisions are requested:

D.6.1 Volatile Organic Compound (VOC) Limits [326 IAC 8-1-6]

Pursuant to 326 IAC 8-1-6 (General Reduction Requirements), the Best Available Control Technology (BACT) for the two (2) heatset web offset lithographic presses, identified as WM-401 and WM-402, shall be as follows:

(a) The exhaust shall be vented to the Regenerative Thermal Oxidizer (RTO-1) with a minimum of 97% destruction efficiency for VOC;

(b) The VOC content of the press-ready fountain solution shall be no greater than 3% VOC as applied;

(c) The blanket and roller washes shall have a vapor pressure no greater than 10 mm Hg at 20°C or the VOC content shall be limited to 2.5 lb/gal as applied; and

(d) The capture **and retention** efficiencies used for reporting compliance shall be as follows and are based on USEPA's "Alternative Control Techniques Document: Offset Lithographic Printing" (EPA 453/R-94-054, June 94):

(1) 100 percent capture, by weight, of the VOC in press ready inks;
(2) 70 percent capture, by weight, of the VOC in press ready fountain solutions;
(3) 40 percent capture, by weight, of the VOC in press ready automatic cleaning solvents;
(4) 20 percent retention, by weight, of VOC in inks in the paper substrate; and
(5) 50 percent retention, by weight, of the manual cleaning solvents in the cleaning wipers.

Compliance with the above limits and conditions will satisfy the Best Available Control Technology (BACT) requirements of 326 IAC 8-1-6.

Response 2:

IDEM, OAQ agrees with the Permittee. According to USEPA's "Alternative Control Techniques Document: Offset Lithographic Printing" (EPA 453/R-94-054, June 94), for manual cleaning solvents, fifty (50) percent of VOC remains in the wipers after use, for inks, twenty (20) percent of VOC in the paper substrate. However, the cleaning wipers must be placed in the closed containers to avoid evaporative losses. Therefore, Condition D.6.1 has been revised as shown below.

D.6.1 Volatile Organic Compound (VOC) Limits [326 IAC 8-1-6]

Pursuant to 326 IAC 8-1-6 (General Reduction Requirements), the Best Available Control Technology (BACT) for the two (2) heatset web offset lithographic presses, identified as WM-401 and WM-402, shall be as follows:

(a) The exhaust shall be vented to the Regenerative Thermal Oxidizer (RTO-1) with a minimum of 97% destruction efficiency for VOC;

(b) The VOC content of the press-ready fountain solution shall be no greater than 3% VOC as applied;

(c) The blanket and roller washes shall have a vapor pressure no greater than 10 mm Hg at 20°C or the VOC content shall be limited to 2.5 lb/gal as applied; and

(d) The capture **and retention** efficiencies used for reporting compliance shall be as follows and are based on USEPA's "Alternative Control Techniques Document: Offset Lithographic Printing" (EPA 453/R-94-054, June 94):

(1) 100 percent capture, by weight, of the VOC in press ready inks;
(2) 70 percent capture, by weight, of the VOC in press ready fountain solutions; ~~and~~
(3) 40 percent capture, by weight, of the VOC in press ready automatic cleaning solvents;
(4) 20 percent retention, by weight, of VOC in inks in the paper substrate; and
(5) 50 percent retention, by weight, of the manual cleaning solvents in the cleaning wipers. Cleaning wipers shall always be placed in closed containers after use.

Compliance with the above limits and conditions will satisfy the Best Available Control Technology (BACT) requirements of 326 IAC 8-1-6.

Comment 3:

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To clarify when the oxidizer operation is required, the following revision to Condition D.6.4 is suggested:

D.6.4 Volatile Organic Compounds (VOC) [326 IAC 8-1-2]

Pursuant to 326 IAC 8-1-2(a), the Permittee shall operate the thermal oxidizer, at all times when **either** WM-401 ~~and~~ **or** WM-402 ~~are~~ **is** in operation, to achieve compliance with condition D.6.1 and D.6.2.

Response 3:

Since both the lithographic presses WM-401 and WM-402 are not mutually exclusive, OAQ believes that both the presses can be operated simultaneously. Therefore, Condition D.6.4 has been changed as shown below.

D.6.4 Volatile Organic Compounds (VOC) [326 IAC 8-1-2]

Pursuant to 326 IAC 8-1-2(a), the Permittee shall operate the thermal oxidizer, at all times when **at least one of the two (2) lithographic presses** (WM-401 and WM-402) ~~are~~ **is** in operation, to achieve compliance with condition D.6.1 and D.6.2.

Comment 4:

Since Material Safety Data Sheets are a reliable source of VOC information, the following revision to Condition D.6.5 is suggested:

D.6.5 Volatile Organic Compounds (VOC) [326 IAC 8-1-4] [326 IAC 8-1-2(a)]

Compliance with the VOC content and usage limitations contained in Conditions D.6.1 and D.6.2 shall be determined pursuant to 326 IAC 8-1-4(a)(3) and 326 IAC 8-1-2(a) by preparing or obtaining from the manufacturer the copies of the "as supplied" ~~and "as applied"~~ VOC data sheets, **Material Safety Data Sheets (MSDS), or other VOC content information**. IDEM, OAQ reserves the authority to determine compliance using Method 24 in conjunction with the analytical procedures specified in 326 IAC 8-1-4.

Response 4:

IDEM, OAQ partially agrees with the Permittee. Condition D.6.5 does not require that R. R. Donnelley & Sons Company obtain "as applied" VOC data sheets from the manufacturers. The Permittee should prepare or obtain from the manufacturer the copies of the "as supplied" and "as applied" VOC data sheets. In some cases, the Permittee has to prepare the "as applied" VOC data sheets from the manufacturer's "as supplied" data sheets. Therefore, wording "as applied" will not be removed from the Condition D.6.5. Condition D.6.5 has been changed as shown below.

D.6.5 Volatile Organic Compounds (VOC) [326 IAC 8-1-4] [326 IAC 8-1-2(a)]

Compliance with the VOC content and usage limitations contained in Conditions D.6.1 and D.6.2 shall be determined pursuant to 326 IAC 8-1-4(a)(3) and 326 IAC 8-1-2(a) by preparing or obtaining from the manufacturer the copies of the "as supplied" and "as applied" VOC data sheets, **Material Safety Data Sheets (MSDS), or other VOC content information**. IDEM, OAQ reserves the authority to determine compliance using Method 24 in conjunction with the analytical procedures specified in 326 IAC 8-1-4.

Comment 5:

Based on the requested changes to D.6.1 above and for consistency in VOC emissions calculations, the following revision to Condition D.6.7 is suggested:

D.6.7 VOC Emissions

Compliance with Condition D.6.2 shall be demonstrated within 30 days of the end of each month. This shall be based on total volatile organic compound emitted for the previous month, and adding it to previous 11 months total VOC emitted so as to arrive at VOC emissions for the most recent 12 consecutive month period. The VOC emissions for a month can be arrived at using the following equation:

VOC emitted = [VOC input from inks x (1 – 0.2 {20% ink VOC retention}) x (1 - destruction efficiency {97%}) + VOC input from fountain solution x (1 – 0.7 {70% capture} x destruction efficiency {97%}) + VOC input from automatic cleaning solvents x (1 – 0.4 {40% capture} x destruction efficiency {97%})] + VOC input from manual cleaning solvents x (1 – 0.5 {50% manual solvent VOC retention)

The Permittee shall use the destruction efficiency as demonstrated from the most recent IDEM approved stack test and the capture and retention efficiencies listed in condition D.6.1 (d).

Response 5:

IDEM, OAQ agrees with the Permittee. Based on the changes made to Condition D.6.1 i.e. including fifty (50) percent manual solvent VOC retention and twenty (20) percent ink VOC retention, the equation in Condition D.6.7 has been changed as shown below.

D.6.7 VOC Emissions

Compliance with Condition D.6.2 shall be demonstrated within 30 days of the end of each month. This shall be based on total volatile organic compound emitted for the previous month, and adding it to previous 11 months total VOC emitted do as to arrive at VOC emissions for the most recent 12 consecutive month period. The VOC emissions for a month can be arrived at using the following equation for usage:

VOC emitted = [(VOC input from inks) x (1~~00~~ – ~~% overall control efficiency~~ **0.2[a]) x (1 - 0.97[b])** + (VOC input from fountain solution) x (1~~00~~ – ~~% overall control efficiency~~ **0.7[c] x 0.97[b])** + **(**VOC input from automatic cleaning solvents) x (1~~00~~ – ~~% overall control efficiency~~ **0.4[d] x 0.97[b])]**~~+ Uncontrolled~~ **(**VOC from manual cleaning solvents**) x (1-0.5[e])**

a. 20 percent retention, by weight, of VOC in inks in the paper substrate;
b. 97 % destruction efficiency of VOC
c. 70 percent capture, by weight, of the VOC in press ready fountain solutions
d. 40 percent capture, by weight, of the VOC in press ready automatic cleaning solvents;
e. 50 percent retention, by weight, of the manual cleaning solvents in the cleaning wipers.

The Permittee shall use the destruction efficiency demonstrated from the most recent IDEM approved stack test and the capture **and retention** efficienci~~y~~**es** listed in condition D.6.1 (d).

Comment 6:

Although a continuous temperature monitoring system will be employed, specifying a one minute sampling time contradicts the most recent EPA guidance on continuous monitoring (See "Technical Support Document (TSD) for Title V Permitting of Printing Facilities", Office Of Air Quality Planning And Standards, U.S. Environmental Protection Agency, January 2005). In addition, the data will be collected and output based on real-time readings, not on a 3-hour basis, as suggested. The following revision to Condition D.6.8 is requested:

D.6.8 Thermal Oxidizer Temperature

(a) A continuous monitoring system shall be calibrated, maintained, and operated on the thermal oxidizer for measuring operating temperature. ~~For the purpose of this condition, continuous shall mean no less often than once per minute. The output of this system shall be recorded as 3-hr average.~~ From the date of issuance of this permit until the approved stack test results are available, the Permittee shall operate the thermal oxidizer at or above the 3-hr average temperature of 1400 °F.

(b) The Permittee shall determine the 3-hr average temperature from the most recent valid stack test that demonstrates compliance with limits in condition D.6.1, as approved by IDEM.

(c) On and after the date the approved stack test results are available, the Permittee shall operate the thermal oxidizer at or above the 3-hr average temperature as observed during the compliant stack test.

Response 6:

IDEM, OAQ partially agrees with the Permittee. Though the EPA guidance on continuous monitoring for thermal oxidizers for printing facilities define continuous temperature recording sampling time as at least one measurement taken and recorded every fifteen (15) minutes, IDEM, OAQ believes that fifteen (15) minutes is a significant time difference between two temperature readings and there could be severe temperature fluctuations during this fifteen (15) minute period. To ensure proper operation of thermal oxidizer, IDEM, OAQ believes that temperature reading shall be recorded no less often than once per minute. Therefore, there will be no change in the definition of continuous temperature recording time based on this comment. However, the Permittee is not required to record 3-hr averages whenever the temperature of the thermal oxidizer is 1400 ^{o} F or above. If there is a fluctuation in the temperature of thermal oxidizer and the temperature falls below 1400 ^{o} F then the output of the monitoring shall be recorded as 3-hr average for that period. Therefore Condition D.6.8 is modified as follows:

D.6.8 Thermal Oxidizer Temperature

(a) A continuous monitoring system shall be calibrated, maintained, and operated on the thermal oxidizer for measuring operating temperature. For the purpose of this condition, continuous shall mean no less often than once per minute. The output of this system shall be recorded ~~as 3-hr average~~ **continuously except when there is a fluctuation in the temperature of the thermal oxidizer such that the temperature falls below 1400 ^{o}F. At anytime that the temperature falls below 1400 ^{o}F, the Permittee shall record the output of this system as a 3-hr average for that period**. From the date of issuance of this permit until the approved stack test results are available, the Permittee shall operate the thermal oxidizer at or above the 3-hr average temperature of 1400 °F.

(b) The Permittee shall determine the 3-hr average temperature from the most recent valid stack test that demonstrates compliance with limits in condition D.6.1, as approved by IDEM.

(c) On and after the date the approved stack test results are available, the Permittee shall operate the thermal oxidizer at or above the 3-hr average temperature as observed during the compliant stack test.

Comment 7:

With two presses controlled by a single oxidizer, duct pressure and fan amperage will vary depending upon which of the presses is in operation and will, therefore, provide no information or relevance in monitoring operations. The lithographic presses operate with the dryers negative relative to the surrounding pressroom to ensure effective VOC capture. All exhaust from the dryers is directed to the oxidizer for control, ensuring effective VOC destruction. We request that Condition D.6.9 be deleted.

Response 7:

Compliance monitoring conditions are in the permit in order to ensure continuous compliance with the requirements of capture efficiencies. The OAQ believes that observing duct pressure or fan amperage once per day when thermal oxidizer is in operation is a very effective means of ensuring proper capture of VOCs and ongoing compliance for thermal oxidizer. Therefore, no changes will be made to the Condition D.6.9 due to this comment.

Comment 8:

Minor revisions to the recordkeeping requirements are suggested for clarity, to avoid the apparent duplication of Conditions D.6.10 (a)(5) and (7), eliminate unnecessary requirements and remove the parametric monitoring requirements of D.6.9 as follows:

D.6.10 Record Keeping Requirements

(a) To document compliance with Conditions D.6.1 and D.6.2, the Permittee shall maintain records in accordance with (1) through ~~(9)~~ **(7)** below. Records maintained for (1) through ~~(9)~~ **(7)** shall be taken monthly and shall be complete and sufficient to establish compliance with the VOC usage limits and/or the VOC emission limits established in Conditions D.6.1and D.6.2.

(1) The VOC content of **ink,** coating material, **cleanup** solvent and **fountain solution** used.

(2) The amount of **ink and** coating material ~~and solvent~~ used on monthly basis.

(A) Records shall include purchase orders, invoices, and material safety data sheets (MSDS) necessary to verify the type and amount used.

~~(B) Solvent usage records shall differentiate between those added to coatings and those used as cleanup solvents.~~

(3) The cleanup solvent usage for each month;

(4) ~~The total VOC usage for each month~~ **The fountain solution usage for each month;**

~~(5) The weight of VOCs emitted for each compliance period.~~

~~(6)~~**(5)** Weight percent of VOC in fountain solution (wt %);

~~(7)~~ **(6)** The aggregate monthly VOC emissions and the annual VOC emissions.

~~(8)~~ **(7)** The continuous temperature records (~~on an 3-hr average basis~~) for the thermal oxidizer and the 3-hr average temperature used to demonstrate compliance during the most recent compliant stack test.

~~(9) Daily records of the duct pressure or fan amperage.~~

Response 8:

Since the solvents are used only for cleaning and not used in the coatings, Condition D.6.10 (a) (2) (B) has been removed from the condition. As condition D.6.10 (a) (5) and (7) are similar, condition (5) has been removed from the condition. Based on response to comment 6, the temperature shall be recorded continuously rather than 3-hr average. Therefore, Condition D.6.10 (a) (8) (renumbered as D.6.10 (a) (7)) has been changed as shown below. However, based on the response to comment 7, the duct pressure or fan amperage monitoring are still required to ensure proper capture of VOCs and ongoing compliance of thermal oxidizer. Therefore, there will be no change to Condition D.6.10 (a) (9) (renumbered as D.6.10 (a) (8)) due to this comment. Condition D.6.10 in the permit has been changed as shown below.

D.6.10 Record Keeping Requirements

(a) To document compliance with Conditions D.6.1 and D.6.2, the Permittee shall maintain records in accordance with (1) through ~~(9)~~ **(8)** below. Records maintained for (1) through ~~(9)~~ **(8)** shall be taken monthly and shall be complete and sufficient to establish compliance with the VOC usage limits and/or the VOC emission limits established in Conditions D.6.1and D.6.2.

(1) The VOC content of **ink,** coating material, **cleanup** solvent and **fountain solution** used.

(2) The amount of **ink and** coating material ~~and solvent~~ used on monthly basis.

(A) Records shall include purchase orders, invoices, and material safety data sheets (MSDS) necessary to verify the type and amount used.

~~(B) Solvent usage records shall differentiate between those added to coatings and those used as cleanup solvents.~~

(3) The cleanup solvent usage for each month.

(4) ~~The total VOC usage for each month~~ **The fountain solution usage for each month.**

~~(5) The weight of VOCs emitted for each compliance period.~~

~~(6)~~**(5)** Weight percent of VOC in fountain solution (wt %).

~~(7)~~ **(6)** The aggregate monthly VOC emissions and the annual VOC emissions.

~~(8)~~ **(7)** The continuous temperature records (on an 3-hr average basis **whenever the temperature is not continuously above the minimum required temperature**) for the thermal oxidizer and the 3-hr average temperature used to demonstrate compliance during the most recent compliant stack test.

~~(9)~~**(8)** Daily records of the duct pressure or fan amperage.

Comment 9:

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Consistent with the comments on Condition D.6.7 above, the formula in the Quarterly Report form has been modified as follows:

Response 9:

IDEM, OAQ agrees. The formula in the Quarterly Report form has been changed in the permit as shown below.

INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
OFFICE OF AIR QUALITY
COMPLIANCE DATA SECTION

Part 70 Source Modification Quarterly Report

Source Name: R.R. Donnelley & Sons Company - Warsaw Manufacturing Division
Source Address: 2801 West Old ~~Route~~ **Road** 30, Warsaw, Indiana 46581
Mailing Address: Old Route 30 West, P.O. Box 837, Warsaw, Indiana 46581-0837
Part 70 Permit No.: T 085-6040-00009
Permit Modification No.:085-20472-00009
Facility: Two (2) heatset web offset lithographic presses identified as WM-401 & WM-402
Parameter: VOC usage, VOC emissions
Limit: The amount of VOC delivered to the substrate and the amount of VOC used for cleanup shall be limited such that the VOC emitted, after controls, is less than 39.6 tons from presses WM-401 and WM-402 combined per twelve (12) consecutive month period. The following equation shall be used to determine the VOC emissions:

VOC emitted = ~~[(VOC input from inks) x (100 - % overall control efficiency) + VOC input from fountain solution) x (100 - % overall control efficiency)+ VOC input from automatic cleaning solvents) x (100 - % overall control efficiency)] + [Uncontrolled VOC from manual cleaning solvents]~~
[(VOC input from inks) x (1-0.2[a]) x (1 - 0.97[b]) + (VOC input from fountain solution) x (1- 0.7[c] x 0.97[b]) + (VOC input from automatic cleaning solvents) x (1–0.4[d] x 0.97[b])]+ (VOC from manual cleaning solvents) x (1-0.5[e])

a. 20 percent retention, by weight, of VOC in inks in the paper substrate;
b. 97 % destruction efficiency of VOC
c. 70 percent capture, by weight, of the VOC in press ready fountain solutions
d. 40 percent capture, by weight, of the VOC in press ready automatic cleaning solvents;
e. 50 percent retention, by weight, of the manual cleaning solvents in the cleaning wipers.

YEAR:

Month	Column 1		Column 2		Column 1 + Column 2	
	VOC usage This Month	VOC Emissions This Month	VOC usage Previous 11 Months VOC	VOC Emissions Previous 11 Months	VOC usage 12 Month Total	VOC Emissions 12 Month Total
Month 1						
Month 2						
Month 3						

☐ No deviation occurred in this quarter.

☐ Deviation/s occurred in this quarter.
Deviation has been reported on:

Submitted by:
Title / Position:
Signature:
Date:
Phone:

Attach a signed certification to complete this report.

<u>IDEM also decided to make the following changes to the proposed permit.</u>

Revision 1

The BACT determination (Appendix B) document has been updated to reflect the changes made to Condition D.6.1. Appendix B has been changed as shown below.

Capture **and Retention** Efficienc~~y~~**ies**

The capture **and retention** efficiencies for the ink oil, fountain solution, and cleaning solvent VOCs are based on the published factors contained in EPA's draft Guideline Series document "Control of Volatile Organic Compound Emissions from Offset Lithographic Printing" and "Alternative Control Techniques Document: Offset Lithographic Printing" (EPA 453/R-94-054, June 1994). Press emissions will be determined from the combination of VOC usage in each of the process materials, the appropriate retention and/or capture efficiencies, and the destruction efficiency of the oxidizer.

Based on USEPA's "Alternative Control Techniques Document: Offset Lithographic Printing" (EPA 453/R-94-054, June 1994), the capture **and retention** efficiencies shall be assumed as follows:

(1) 100 percent capture, by weight, of the VOC in press ready inks;
(2) 70 percent capture, by weight, of the VOC in press ready fountain solutions;~~ and~~
(3) 40 percent capture, by weight, of the VOC in press ready automatic cleaning solvents;
(4) 20 percent retention, by weight, of VOC in inks in the paper substrate; and
(5) 50 percent retention, by weight, of the manual cleaning solvents in the cleaning wipers. Cleaning wipers shall always be placed in closed containers after use.

The press dryers are always operated at negative pressure relative to the surrounding pressroom, with all dryer exhaust directed to the RTO-1, to ensure 100 % capture of the VOCs resulting from press ready inks. To capture emissions from fountain solution and automatic cleaning solvent, a completely separate capture system would need to be constructed. Building a separate capture system to capture typical emissions of 22.78 tons per year is not economically feasible. IDEM is not aware of any requirements (including BACT or LAER determinations) for heatset lithographic printing where a total enclosure has been required and IDEM does not believe such an approach is warranted in this case.

In addition, because the fountain solution and automatic cleaning solvent are applied on the press several feet away from the dryer, obtaining a higher capture efficiency is not practical, since a total enclosure, with a significant increase in exhaust airflow and, therefore, a significant increase in the size of the pollution control system would be required to handle the increased flow. This would also result in significantly lower concentrations at the inlet of the control device, which would negatively impact the destruction efficiency.

The destruction efficiency of 97 % in conjunction with the materials proposed for use on the two (2) heatset web presses are consistent with the materials that have served as the basis for BACT or LAER at the other printing operations. The most recent LAER determination (IL-0070, March 14, 2001) was based on the use of 97 % efficient pollution control device and limitations on the VOC content and/or vapor pressure of the press ready fountain solution and cleaning solvents. The limitations on these materials, namely fountain solution used for the heatset operations, shall be limited to no greater than 3 % VOC applied, and cleaning solvent with a vapor pressure limited to 10 mmHg or less at 20 ^{o}C or VOC content limited to 2.5 lb/gal.

IDEM proposes that BACT for the two (2) heatset lithographic printing presses, identified as WM-401 and WM-402, be as follows:

(a) The exhaust shall be vented to the Regenerative Thermal Oxidizer (RTO-1) with a minimum of 97 % destruction efficiency for VOC;

(b) The VOC content of the Fountain solution shall be no greater than 3 % VOC as applied;

(c) The cleanup solvents shall have a vapor pressure no greater than 10 mmHg at 20 ^{o}C or the VOC content shall be limited to 2.5 lb/gal as applied; and

(d) The capture **and retention** efficiencies shall be required, based on USEPA's "Alternative Control Techniques Document: Offset Lithographic Printing" (EPA 453/R-94-054, June 1994)

(1) 100 percent capture, by weight, of the VOC in press ready inks;
(2) 70 percent capture, by weight, of the VOC in press ready fountain solutions;
(3) 40 percent capture, by weight, of the VOC in press ready automatic cleaning solvents;
(4) 20 percent retention, by weight, of VOC in inks in the paper substrate; and
(5) 50 percent retention, by weight, of the manual cleaning solvents in the cleaning wipers. Cleaning wipers shall always be placed in closed containers after use.

Compliance with the above limits and conditions will satisfy the requirements of 326 IAC 8-1-6.

Appendix B

Best Available Control Technology (BACT) Determination

Source Background and Description

Source Name:	**R.R Donnelley & Sons Company**
Source Location:	**2801 West Old Road 30 Warsaw IN 46581**
County:	**Kosciusko**
SIC Code:	**2754**
Operation Permit No.:	**T085-6040-00009**
Operation Permit Issuance Date:	**August 5, 2002**
Significant Source Modification No.:	**SSM 085-20370-00009**
Significant Permit Modification No.:	**SPM 085-20472-00009**
Permit Reviewer:	**RT/EVP**

The Indiana Department of Environmental Management (IDEM) has performed the following BACT review for a major modification to an existing publication rotogravure printing source owned and operated by R.R Donnelly & Sons Company, located in Warsaw Indiana. The source currently has the following equipment, as shown below, at the facility.

(a) four (4) natural gas boilers,
(b) fourteen (14) publication rotogravure printing presses,
(c) One (1) gravure cylinder wash machine,
(d) Two (2) chromium plating lines,
(e) Six (6) cylinder making finishing sinks located in the east plant
(f) One (1) wastewater treatment system located in the east plant
(g) Thirty-seven (37) storage tanks,
(h) One (1) cylinder making finishing sink station located in the west plant,
(i) one (1) pneumatic dust and paper trim collection system located in the east side of plant,
(j) one (1) paper trim collection system located in the west side of the plant,
(k) eight (8) portable ink jet printers,
(l) three (3) rotogravure proof presses,
(m) two (2) gravure parts press parts washer,

This modification will permit the construction of two (2) heatset web offset lithographic printing presses, identified as WM-401 & WM-402, and a thermal oxidizer, identified as RTO-1.

The source is located in Kosciusko County which is designated as attainment or unclassifiable for all criteria pollutants. Based upon emission calculations completed by IDEM and the source, the modification shall result in a net increase of potential volatile organic compound (VOC) emissions of greater than twenty-five (25) tons per year. Therefore, pursuant to 326 IAC 8-1-6 the source shall reduce VOC emissions from the new facilities, which are not regulated by other provisions of 326 IAC 8, using best available control technology (BACT). The purpose of this BACT Analysis is to evaluate the level of control that constitutes BACT for the affected facilities.

The operations conducted at the source are production of magazines and catalogs. The processes include printing operations using the rotogravure printing presses, some chrome plating operations to chrome plate the cylinders used for printing, a cylinder finishing operation, storage tanks to store inks and solvents, part washers to clean the parts, pneumatic dust and paper trim collectors to trim the publication before binding, portable ink jet printers to print the address labels and natural gas boilers. Each of the processes are regulated either by rules pertaining to the emissions of particulate matter (326 IAC 6), sulfur dioxide (326 IAC 7) or are elsewhere regulated by other 326 IAC 8 rules. Therefore, these operations are not considered as a part of this analysis.

The specific facilities requiring evaluation in this analysis include:

(a) One (1) heatset web offset lithographic printing press with six (6) units, Identified as WM-401;
(b) One (1) heatset web offset lithographic printing press with eight (8) units, Identified as WM-402.

IDEM conducts BACT analyses in accordance with the *"Top-Down" Best Available Control Technology Guidance Document* outlined in the 1990 draft USEPA *New Source Review Workshop Manual*, which outlines the steps for conducting a top-down BACT analysis. The steps are discussed as follows:

1. Identify all potentially available control options

The first step in evaluating potential applicable control technologies involved a review of control technology determinations made for permitted heatset web lithographic printing sources. The USEPA's RACT /BACT /LAER clearinghouse (RBLC) database was searched for the purpose of identifying comparable sources that have implemented BACT for the affected facilities. This search was performed in the following steps:

(a) A search was first conducted by the same SIC Code as for the source (2754). Thirteen (13) publication rotogravure printing sources were identified in the RBLC database for the past ten (10) years. Three (3) sources out of the thirteen (13) identified sources performed a BACT analysis for the purpose of analyzing heatset web lithographic printing press operations. Since this type of printing operation is representative of the subject facilities at R.R Donnelly & Sons, these three (3) sources were included in the list of comparable sources. The three (3) identified sources were two (2) Quad Graphics, Inc. plants in Oklahoma and one (1) Quad/Graphics, Inc. plant in Martinsburg, WV. The BACT or LAER determination has been based on use of add-on control devices at all the three (3) sources. All the three (3) sources have used 97.5 % control efficiency through the use of an Oxidizer for VOC control as BACT.

(b) Finally, a RBLC search was conducted specifically searching for printing-publication (No.: 41.022) and printing/publication (No.:41.023) process type. Twenty two (22) printing-publication process types and fourteen (14) printing/publication process type sources were identified. Thirteen (13) sources out of the thirty six (36) identified sources performed a BACT analysis for the purpose of analyzing heatset web lithographic printing press operations. Since this type of printing operation is representative of the subject facilities at the R.R Donnelly & Sons, these thirteen (13) sources were included in the list of comparable sources. The BACT or LAER determinations at the thirteen (13) sources are summarized in Table 1. IDEM also reviewed the RBLC Clearing house for other determinations for coating or related operations using pollution control devices on or after January 1, 2000. These determinations are summarized in Table 2.

With one exception, the BACT or LAER determination has been based on the use of an add-on control device, frequently combined with requirements of low VOC fountain solution (generally < 5 % VOC in the applied fountain solution) and low (30 % VOC or less) or low vapor pressure (VOC composite vapor pressure of 10 mm Hg or less at 20 ^{o}C) cleaning solvents. Review of Table 1 and 2 reveals that add-on control devices with destruction efficiencies from 90 % to 98 % have been established as BACT or LAER for variety of VOC sources, including heatset lithographic printing operations.

Table 1- BACT and LAER determinations for Heatset Web Lithographic Printing

ID	Date	BACT /LAER	Determination	Facility	
GA-00081	4/28/98	BACT	95% Oxidizer, VOC limits on coatings and solvents	World Color	Limits on VOC content of coatings and solvents not specified. Use of covered containers for rags and towels.
IL-055	3/1/98	LAER	96% Oxidizer, VOC limits on fountain solution and cleaning solution	Brown Printing Company	Chilled reservoir or low VOC fountain solution. Low vapor pressure or low VOC cleaning solution. Limits not specified.
IL-0069	9/6/00	BACT	97% Oxidizer , low vapor pressure or low VOC cleaning solvent , Alcohol free fountain solution	Quebecor World	Cleaning solution with 5.0 mm Hg VOC composite partial pressure (CPP) at 68 deg. F, or 30% volatile organic matter by wt. and VOC CPP <10 mm of Hg. Fountain solution has no alcohol and VOC = 0.5% by volume as applied.
Il-0070	3/14/01	LAER	existing oxidizer system must meet 97% destruction; if new afterburner installed, 99% or 98% and 1500 f	Quebacor World	Cleaning solution with 5.0 mm Hg VOC composite partial pressure (CPP) at 68 deg. F, or 30% volatile organic matter by wt. and VOC CPP <10 mm of Hg. Fountain solution has no alcohol and VOC = 0.5% by volume as applied.
OK-0054	8/21/01	BACT	97.5% Oxidizer	Quadgraphics	Only a portion of fugitive VOC emissions from the fountain solution & automatic blanket wash will be captured and controlled thru the thermal oxidizer. Fugitive emissions are limited by VOC content, vapor pressure Limits and work practice procedures. Limits not specified.
OK-0097	2/3/04	BACT	97.5 % Oxidizer	Quadgraphics	Only a portion of fugitive VOC emissions from the fountain solution & automatic blanket wash will be captured and controlled thru the thermal oxidizer. Fugitive emissions are limited by VOC content, vapor pressure Limits and work practice procedures. Limits not specified.
TN-0091	4/14/97	BACT	97% Thermal Oxidizer	World Color	VOC emissions limited to 3.51% of the mass of VOC per mass of all ink, fountain solution, coating, and blanket wash used (including water and exempt compounds)
WI-0084	3/8/99	BACT	97.5% Thermal Oxidizer	Quadgraphics	No composition limits specified
WI-0140	7/13/99	BACT	97.5% Thermal Oxidizer	Quadgraphics	No limits on VOC content
WI-0153	4/26/00	BACT	97.5% Thermal Oxidizer	Quadgraphics	No composition limits specified
WI-0176	8/14/00	BACT	97.5% Thermal Oxidizer	Quadgraphics	No composition limits specified
WI-0188	6/24/97	LAER	Use of good operating procedures with solvents used in the cleaning operation.	Golden Books Publishing Company	Use of good operating procedures with solvents used in clean up operations. No composition limits specified.
WV-0013	8/30/01	BACT	97.5% Thermal Oxidizer	Quadgraphics	No composition limits specified

Table 2- BACT and LAER determinations for other coating sources using VOC control devices

ID	Date	BACT /LAER	Determination	Facility
AL-0191	3/23/04	BACT	95% Thermal Oxidizer	Hyndai
IN-0113	2/3/03	BACT	RTO (Efficiency not specified)	Masterbrand Cabinets, Inc
AR-0059	1/7/03	BACT	90% RTO/CTO	Georgia Pacific Oriented Strandboard
AL-0192	10/18/02	BACT	95% RTO	Honda Manufacturing
WI-0193	9/25/02	BACT	95% Catalytic or Regenerative Oxidizer	Pecheney Plastic Packaging
WI-0189	6/11/02	BACT	95% Catalytic Oxidation System	Curwood, Inc.
CA-0986	5/7/02	LAER	95% Regenerative Thermal Oxidizer	Latex Technology
SC-0074	4/8/02	BACT	95% TCO	Kronotex, USA
MI-0351	4/2/02	BACT	RTO (Efficiency not specified)	General Motors
CA-0985	8/20/01	LAER	95% Thermal Oxidizer	Watkins Manufacturing
WI-0169	6/22/01	BACT	96.7% Thermal Oxidizer	3M
WI-0143	6/1/01	BACT	95% Catalytic Oxidizer system	Bemis Films
MI-0352	11/3/00	BACT	98% Oxidizer for flexo coater, VOC limits on fountain solution and cleaning solvent	Pollard (US) Ltd.
FL-0213	9/26/00	BACT	95% Regenerative Thermal Oxidizer	Nallite International, Inc
VA-0246	8/18/00	BACT	97.5% Incinerator	Nynax America Corp.
IN-0103	6/28/00	BACT	95% RTO	AM general
TN-0088	6/6/00	BACT	Recuperative Thermal Oxidizer (Efficiency not specified)	Saturn Corporation
MI-0280	3/27/00	BACT	Recuperative Thermal Oxidizer (Efficiency not specified)	Depor Industries, Inc
LA-0161	3/24/00	BACT	95% Oxidizer	General Motors

2. BACT Determination

Destruction Efficiency

Although much of the focus on controlling VOC emissions from heatset web offset lithographic printing emphasizes the destruction efficiency of add-on pollution control devices, best available control technology (BACT) for this process involves several key components in addition to add-on controls. These measures need to be considered in the aggregate for the control of VOC emissions from the process, rather than just the add-on control device efficiency. IDEM evaluation of BACT included:

(a) Use of low volatility cleaning solvents to limit solvent evaporation during use;
(b) Work practices for VOC/HAP containing materials to minimize evaporative loses of materials that are not in use;
(c) Operation of press dryers at a negative pressure relative to the surrounding pressroom to effectively capture of the VOCs volatilized in the drying operations;
(d) Use of low-VOC, low-volatility fountain solutions to limit evaporative losses and to ensure effective capture of the VOC emissions for control; and
(e) Operation of a pollution control device that efficiently oxidizes the captured VOCs under all process conditions and also minimizes fuel consumption to limit the generation of greenhouse gases and nitrogen oxides.

In combination with these other control strategies, IDEM believes a control device with a 97% minimum destruction efficiency constitutes BACT, especially considering the fact that IDEM is proposing the use of a regenerative thermal oxidizer, although having a slightly lower destruction efficiency, has a much higher thermal efficiency than recuperative controls, thereby minimizing greenhouse gas and nitrogen oxide emissions.

The destruction efficiency in case of Pollard (US) Ltd. is 98 %, which is greater than the proposed 97 %. The BACT determination for Pollard is for the operation consisting of gravure and flexographic operations controlled by a catalytic oxidizer, and lithographic printing utilizing UV cured inks. IDEM believes that the control of flexographic and gravure VOC emissions is not comparable to control of VOC emissions from conventional lithographic printing operations and, therefore, IDEM does not believe that the technological feasibility of the proposed control approach should be compared to the Pollard requirements. Permits WI-0084, WI-0140, WI-0153, and WI-0176, mentioned in table 1, have control efficiencies of 97.5 %. However, there are no required capture efficiencies specified for any of the BACT determinations for the permits WI-0084, WI-0140, WI-0153, and WI-0176. WI-0176 contains no emissions limitation (only control efficiency) and WI-0140 states explicitly that it contains no VOC content limitations. Neither WI-0084 nor WI-0153 contains any VOC content limits. (See Tables 1 and 2 of BACT review) In many cases BACT determinations were solely for the control device and do not include any additional limitations on composition of materials, unlike IDEM's proposal, where such limitations have been addressed. Therefore, IDEM proposes a regenerative thermal oxidizer (RTO-1) with minimum VOC destruction efficiency of 97 % in conjunction with additional limitations on composition of materials as BACT.

VOC Limitations

Although limits on fountain solutions or cleaning solvents have been included in some BACT determinations, many determinations do not impose any such limitations.

Numerous state and local environmental regulations have also been evaluated to determine what emissions limitations have been promulgated in regulations for the lithographic printing process. Regulations reviewed include the following lithography-specific rules, given in table 3 below:

Table 3 - Numerous state and local environmental regulations

Agency	Regulation	VOC Limits
San Diego County Air Pollution Control District	Rule 67.16	Ink limited to 300g/l VOC. Cleaning solvent limited to a VOC content of less than 200 grams per liter of material or a VOC vapor pressure of 45 mm of Hg at 20°C or less. Fountain solution limited to 15% VOC by volume
South Coast Air Quality Management District	Rule 1171	Solvents for roller wash-step 2, blanket wash, and on-press components limited to VOC content of 800 grams per liter.
South Coast Air Quality Management District	Rule 1130	Fountain solution limited to VOC content of 80 grams per liter.
San Joaquin Valley Unified Air Pollution Control District	Rule 4607	Limits the cleaning solvent to a VOC content of less than 900 grams per liter of material or a VOC vapor pressure of 25 mm of Hg at 20°C or less. Fountain solution limited to 8% VOC by volume.
Delaware	CAP.24.47	Limits the cleaning solvent to a VOC content of less than 30% by weight or a VOC vapor pressure of 10 mm of Hg at 20°C or less. Fountain solution limited to 3% alcohol substitute VOC by volume.
Illinois	35 IAC 218.407 and 35 IAC 219.407	Limits the cleaning solvent to a VOC content of less than 30% by weight or a VOC vapor pressure of 10 mm of Hg at 20°C or less. Fountain solution limited to 5% alcohol substitute VOC by volume.
Massachusetts	310 CMR 7.26	Limits the cleaning solvent to a VOC content of less than 30% by weight or a VOC vapor pressure of 10 mm of Hg at 20°C or less. No VOC limit for fountain solution, but alcohol prohibited.
Missouri	10 CSR 10-2.340	No limits on cleaning solution. Requires storage of solvents and used towels in closed containers. Fountain solution limited to 10% alcohol substitute VOC by volume.
Missouri	10 CSR 10-5.442	Limits the cleaning solvent to a VOC content of less than 30% by weight or a VOC vapor pressure of 10 mm of Hg at 20°C or less. Fountain solution limited to 5% alcohol substitute VOC by volume.

New Hampshire	Env-A 1204.37	No limits on cleaning solution. Requires storage of solvents and used towels in closed containers. Fountain solution limited to 5% alcohol substitute VOC by volume.
New York	6 §234.3	No limits on cleaning solution. Fountain solution limited to 15% VOC by volume.
Tennessee	1200-3-18-.43	Limits the cleaning solvent to a VOC content of less than 30% by weight or a VOC vapor pressure of 10 mm of Hg at 20°C or less. Fountain solution limited to 4.6% alcohol substitute VOC by volume.
Texas	30 TAC 115.442	Limits the cleaning solvent to a VOC content of less than 50% by weight (70% if using shop towel management processes) or a VOC vapor pressure of 10 mm of Hg at 20°C or less. Fountain solution limited to 3% alcohol substitute VOC by volume.
Virginia	9 VAC 5-40-7820	Limits the cleaning solvent to a VOC content of less than 30% by weight or a VOC vapor pressure of 10 mm of Hg at 20°C or less. Fountain solution limited to 5% alcohol substitute VOC by volume.
Wisconsin	NR 422.142	Limits the cleaning solvent to a VOC content of less than 30% by weight or a VOC vapor pressure of 10 mm of Hg at 20°C or less. Up to 55 gallons per year of noncompliant solvents may be used. Fountain solution limited to 10% alcohol substitute VOC by volume.

The materials limitations proposed for BACT are as follows:

(a) The VOC content of the Fountain solution shall be no greater than 3 % VOC as applied;

(b) The cleanup solvents shall have a vapor pressure no greater than 10 mmHg at 20 ^{o}C or the VOC content shall be limited to 2.5 lb/gal as applied.

The 3% VOC limit in fountain solution is as stringent as the lithographic printing regulations for these jurisdictions, and are comparable to those included in other BACT determinations. For the cleanup solvents, the limit of 10 mm of Hg at 20°C or less (or) VOC content of 2.5 lb/gal (299 grams/liter) is also as stringent as the lithographic printing regulations for these jurisdictions, and are comparable to those included in other BACT determinations. The source has expressed that it is going to use 10 mm of Hg at 20°C or less limit for cleaning solvents.

Capture and Retention Efficiencies

The capture and retention efficiencies for the ink oil, fountain solution, and cleaning solvent VOCs are based on the published factors contained in EPA's draft Guideline Series document "Control of Volatile Organic Compound Emissions from Offset Lithographic Printing" and "Alternative Control Techniques Document: Offset Lithographic Printing" (EPA 453/R-94-054, June 1994). Press emissions will be determined from the combination of VOC usage in each of the process materials, the appropriate retention and/or capture efficiencies, and the destruction efficiency of the oxidizer.

Based on USEPA's "Alternative Control Techniques Document: Offset Lithographic Printing" (EPA 453/R-94-054, June 1994), the capture efficiencies shall be assumed as follows:

(1) 100 percent capture, by weight, of the VOC in press ready inks;
(2) 70 percent capture, by weight, of the VOC in press ready fountain solutions; and
(3) 40 percent capture, by weight, of the VOC in press ready automatic cleaning solvents.
(4) 20 percent retention, by weight, of VOC in inks in the paper substrate; and
(5) 50 percent retention, by weight, of the manual cleaning solvents in the cleaning wipers. Cleaning wipers shall always be placed in closed containers after use.

The press dryers are always operated at negative pressure relative to the surrounding pressroom, with all dryer exhaust directed to the RTO-1, to ensure 100 % capture of the VOCs resulting from press ready inks. To capture emissions from fountain solution and automatic cleaning solvent, a completely separate capture system would need to be constructed. Building a separate capture system to capture typical emissions of 22.78 tons per year is not economically feasible. IDEM is not aware of any requirements (including BACT or LAER determinations) for heatset lithographic printing where a total enclosure has been required and IDEM does not believe such an approach is warranted in this case.

In addition, because the fountain solution and automatic cleaning solvent are applied on the press several feet away from the dryer, obtaining a higher capture efficiency is not practical, since a total enclosure, with a significant increase in exhaust airflow and, therefore, a significant increase in the size of the pollution control system would be required to handle the increased flow. This would also result in significantly lower concentrations at the inlet of the control device, which would negatively impact the destruction efficiency.

The destruction efficiency of 97 % in conjunction with the materials proposed for use on the two (2) heatset web presses are consistent with the materials that have served as the basis for BACT or LAER at the other printing operations. The most recent LAER determination (IL-0070, March 14, 2001) was based on the use of 97 % efficient pollution control device and limitations on the VOC content and/or vapor pressure of the press ready fountain solution and cleaning solvents. The limitations on these materials, namely fountain solution used for the heatset operations, shall be limited to no greater than 3 % VOC applied, and cleaning solvent with a vapor pressure limited to 10 mmHg or less at 20 ^{o}C or VOC content limited to 2.5 lb/gal.

IDEM proposes that BACT for the two (2) heatset lithographic printing presses, identified as WM-401 and WM-402, be as follows:

(a) The exhaust shall be vented to the Regenerative Thermal Oxidizer (RTO-1) with a minimum of 97 % destruction efficiency for VOC;

(b) The VOC content of the Fountain solution shall be no greater than 3 % VOC as applied;

(c) The cleanup solvents shall have a vapor pressure no greater than 10 mmHg at 20 ^{o}C or the VOC content shall be limited to 2.5 lb/gal as applied; and

(d) The capture and retention efficiencies shall be required, based on USEPA's "Alternative Control Techniques Document: Offset Lithographic Printing" (EPA 453/R-94-054, June 1994)

(1) 100 percent capture, by weight, of the VOC in press ready inks;
(2) 70 percent capture, by weight, of the VOC in press ready fountain solutions;
(3) 40 percent capture, by weight, of the VOC in press ready automatic cleaning solvents;
(4) 20 percent retention, by weight, of VOC in inks in the paper substrate; and
(5) 50 percent retention, by weight, of the manual cleaning solvents in the cleaning wipers. Cleaning wipers shall always be placed in closed containers after use.

Compliance with the above limits and conditions will satisfy the requirements of 326 IAC 8-1-6.

Appendix A: Emissions Calculations
VOC and Particulate
From Surface Coating Operations

Company Name: R.R. Donnelley & Sons Company
Address City IN Zip: P.O. Box 837
SSM #: T085-20370-00009
Reviewer: RT/EVP
Date: 1/5/2005

Before Controls

Material	Density (Lb/Gal)	Weight % Volatile (H20 & Organics)	Weight % Water	Weight % Organics	Volume % Water	Volume % Non-Volatiles (solids)	Gal of Mat. (gal/unit)	Maximum (unit/hour)	Pounds VOC per gallon of coating less water **	Pounds VOC per gallon of coating **	Potential VOC pounds per hour **	Potential VOC pounds per day **	Potential VOC tons per year	Wt % (Ethylene Glycol)	Wt % (Naphthalene)	Ethylene Glycol ** (tons /year)	Napthalene ** (tons /year)
Ink	8.25	0.38	0.00	0.38	0.00	0.00	0.12	246.24	3.14	3.14	2.20	52.91	402.36	0.00%	0.00%	0.00	0.00
Fountain Solution	8.55	0.20	0.00	0.20	0.00	0.00	0.11	3.90	1.71	1.71	0.75	18.05	3.29	33.30%	0.00%	1.10	0.00
Automatic Blanket wash	6.90	1.00	0.00	1.00	0.00	0.00	0.15	4.95	6.90	6.90	5.17	124.19	22.66	0.00%	5.30%	0.00	1.20
Manual Wash	7.00	1.00	0.00	1.00	0.00	0.00	0.15	3.76	7.00	7.00	4.00	96.02	8.76	0.00%	5.30%	0.00	0.46
State Potential Emissions		**Add worst case coating to all solvents**									**12.13**	**291.17**	**437.08**			**1.10**	**1.67**

After Controls

Material	Density (Lb/Gal)	Weight % Volatile (H20 & Organics)	Weight % Water	Weight % Organics	Volume % Water	Volume % Non-Volatiles (solids)	Gal of Mat. (gal/unit)	Maximum (unit/hour)	Pounds VOC per gallon of coating less water **	Pounds VOC per gallon of coating **	Potential VOC pounds per hour **	Potential VOC pounds per day **	Potential VOC tons per year	Wt % (Ethylene Glycol)	Wt % (Naphthalene)	Ethylene Glycol ** (tons /year)	Napthalene ** (tons /year)
Ink	8.25	0.38	0.00	0.38	0.00	0.00	0.12	246.24	3.14	3.14	2.20	52.91	9.66	0.00%	0.00%	0.00	0.00
Fountain Solution	8.55	0.20	0.00	0.20	0.00	0.00	0.11	3.90	1.71	1.71	0.75	18.05	1.06	33.30%	0.00%	0.35	0.00
Automatic Blanket wash	6.90	1.00	0.00	1.00	0.00	0.00	0.15	4.95	6.90	6.90	5.17	124.19	13.87	0.00%	5.30%	0.00	0.74
Manual Wash	7.00	1.00	0.00	1.00	0.00	0.00	0.15	3.76	7.00	7.00	4.00	96.02	8.76	0.00%	5.30%	0.00	0.46
State Potential Emissions		**Add worst case coating to all solvents**									**12.13**	**291.17**	**33.35**			**0.35**	**1.20**

**** Note : The calculations include the following efficiencies**
a) Control Efficiency of 97 % for thermal oxidizer
b) 20 % (by weight) ink VOC retention in the substrate for heatset printing;
c) According to USEPA's "Alternative Control Techniques Document :Offset Lithographic Printing" (EPA 453/R-94-054) June 94:
1) 50 % manual cleaning solvent VOC retention in the cleaning cloths;
2) 100 % Capture efficiency by weight for VOC in press ready inks;
3) 70 % Capture efficiency by weight of VOC in fountain solution;
4) 40 % Capture efficiency by weight of the VOC in press ready automatic cleaning solvent.

METHODOLOGY

Pounds of VOC per Gallon Coating less Water = (Density (lb/gal) * Weight % Organics) / (1-Volume % water)
Pounds of VOC per Gallon Coating = (Density (lb/gal) * Weight % Organics)
Potential VOC Pounds per Hour = Pounds of VOC per Gallon coating (lb/gal) * Gal of Material (gal/unit) * Maximum (units/hr)
Potential VOC Pounds per Day = Pounds of VOC per Gallon coating (lb/gal) * Gal of Material (gal/unit) * Maximum (units/hr) * (24 hr/day)
Potential VOC Tons per Year = Pounds of VOC per Gallon coating (lb/gal) * Gal of Material (gal/unit) * Maximum (units/hr) * (8760 hr/yr) * (1 ton/2000 lbs)
Particulate Potential Tons per Year = (units/hour) * (gal/unit) * (lbs/gal) * (1- Weight % Volatiles) * (1-Transfer efficiency) *(8760 hrs/yr) *(1 ton/2000 lbs)
Pounds VOC per Gallon of Solids = (Density (lbs/gal) * Weight % organics) / (Volume % solids)
Total = Worst Coating + Sum of all solvents used

Appendix A: Emissions Calculations
VOC and Particulate
From Surface Coating Operations

Company Name: R.R. Donnelley & Sons Company
Address City IN Zip: P.O. Box 837
SSM #: T085-20370-00009
Reviewer: RT/EVP
Date: 1/5/2005

Before Controls

Material	Density (Lb/Gal)	Weight % Volatile (H20 & Organics)	Weight % Water	Weight % Organics	Volume % Water	Volume % Non-Volatiles (solids)	Gal of Mat. (gal/unit)	Maximum (unit/hour)	Pounds VOC per gallon of coating less water **	Pounds VOC per gallon of coating **	Potential VOC pounds per hour **	Potential VOC pounds per day **	Potential VOC tons per year	Wt % (Ethylene Glycol)	Wt % (Napthalene)	Ethylene Glycol ** (tons /year)	Napthalene ** (tons /year)
Ink	8.25	0.38	0.00	0.38	0.00	0.00	0.12	1088.64	3.14	3.14	9.75	233.93	1778.86	0.00%	0.00%	0.00	0.00
Fountain Solution	8.55	0.20	0.00	0.20	0.00	0.00	0.11	32.85	1.71	1.71	6.34	152.07	27.75	33.30%	0.00%	9.24	0.00
Automatic Blanket wash	6.90	1.00	0.00	1.00	0.00	0.00	0.15	6.60	6.90	6.90	6.90	165.58	30.22	0.00%	5.30%	0.00	1.60
Manual Wash	7.00	1.00	0.00	1.00	0.00	0.00	0.15	9.50	7.00	7.00	10.11	242.59	22.14	0.00%	5.30%	0.00	1.17
State Potential Emissions			**Add worst case coating to all solvents**								**33.09**	**794.18**	**1858.97**			**9.24**	**2.77**

After Controls

Material	Density (Lb/Gal)	Weight % Volatile (H20 & Organics)	Weight % Water	Weight % Organics	Volume % Water	Volume % Non-Volatiles (solids)	Gal of Mat. (gal/unit)	Maximum (unit/hour)	Pounds VOC per gallon of coating less water **	Pounds VOC per gallon of coating **	Potential VOC pounds per hour **	Potential VOC pounds per day **	Potential VOC tons per year	Wt % (Ethylene Glycol)	Wt % (Napthalene)	Ethylene Glycol ** (tons /year)	Napthalene ** (tons /year)
Ink	8.25	0.38	0.00	0.38	0.00	0.00	0.12	1088.64	3.14	3.14	9.75	233.93	42.69	0.00%	0.00%	0.00	0.00
Fountain Solution	8.55	0.20	0.00	0.20	0.00	0.00	0.11	32.85	1.71	1.71	6.34	152.07	8.91	33.30%	0.00%	2.97	0.00
Automatic Blanket wash	6.90	1.00	0.00	1.00	0.00	0.00	0.15	6.60	6.90	6.90	6.90	165.58	18.49	0.00%	5.30%	0.00	0.98
Manual Wash	7.00	1.00	0.00	1.00	0.00	0.00	0.15	9.50	7.00	7.00	10.11	242.59	22.14	0.00%	5.30%	0.00	1.17
State Potential Emissions			**Add worst case coating to all solvents**								**33.09**	**794.18**	**92.23**			**2.97**	**2.15**

**** Note : The calculations include the following efficiencies**
a) Control Efficiency of 97 % for thermal oxidizer
b) 20 % (by weight) ink VOC retention in the substrate for heatset printing;
c) According to USEPA's "Alternative Control Techniques Document :Offset Lithographic Printing" (EPA 453/R-94-054) June 94:
1) 50 % manual cleaning solvent VOC retention in the cleaning cloths;
2) 100 % Capture efficiency by weight for VOC in press ready inks;
3) 70 % Capture efficiency by weight for VOC in fountain solution;
4) 40 % Capture efficiency by weight of the VOC in press ready automatic cleaning solvent.

METHODOLOGY

Pounds of VOC per Gallon Coating less Water = (Density (lb/gal) * Weight % Organics) / (1-Volume % water)
Pounds of VOC per Gallon Coating = (Density (lb/gal) * Weight % Organics)
Potential VOC Pounds per Hour = Pounds of VOC per Gallon coating (lb/gal) * Gal of Material (gal/unit) * Maximum (units/hr)
Potential VOC Pounds per Day = Pounds of VOC per Gallon coating (lb/gal) * Gal of Material (gal/unit) * Maximum (units/hr) * (24 hr/day)
Potential VOC Tons per Year = Pounds of VOC per Gallon coating (lb/gal) * Gal of Material (gal/unit) * Maximum (units/hr) * (8760 hr/yr) * (1 ton/2000 lbs)
Particulate Potential Tons per Year = (units/hour) * (gal/unit) * (lbs/gal) * (1- Weight % Volatiles) * (1-Transfer efficiency) *(8760 hrs/yr) *(1 ton/2000 lbs)
Pounds VOC per Gallon of Solids = (Density (lbs/gal) * Weight % organics) / (Volume % solids)
Total = Worst Coating + Sum of all solvents used

Appendix A: Emissions Calculations
VOC and Particulate
From Surface Coating Operations

Company Name: R.R. Donnelley & Sons Company
Address City IN Zip: P.O. Box 837
SSM #: T085-20370-00009
Reviewer: RT/EVP
Date: 1/5/2005

Unlimited Potential to Emit

Process / Emission Unit	PM	PM-10	SO2	NOx	VOC	CO	Single	HAPS
	(tons / yr)	(tons / yr)	(tons / yr)	(tons / yr)	(tons / yr)	(tons / yr)	HAP (Ethylene Glycol)	(tons / yr)
WM-401	0.00	0.00	0.00	0.00	437.08	0.00	1.10	2.76
WM-402	0.00	0.00	0.00	0.00	1858.97	0.00	9.24	12.02
Total	**0.00**	**0.00**	**0.00**	**0.00**	**2296.06**	**0.00**	**10.34**	**14.78**

Limited Potential to Emit

Process / Emission Unit	**PM**	**PM-10**	**SO2**	**NOx**	**VOC**	**CO**	**Single**	**HAPS**
	(tons / yr)	**(tons / yr)**	**(tons / yr)**	**(tons / yr)**	**(tons / yr)**	**(tons / yr)**	**HAP (Ethylene Glycol)**	**(tons / yr)**
WM-401	0.00	0.00	0.00	0.00	33.35	0.00	0.35	1.55
WM-402	0.00	0.00	0.00	0.00	92.23	0.00	2.97	5.12
Total	**0.00**	**0.00**	**0.00**	**0.00**	**125.58**	**0.00**	**3.32**	**6.67**