



Indiana Department of Environmental Management

We Protect Hoosiers and Our Environment.

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(800) 451-6027 • (317) 232-8603 • www.idem.IN.gov

Michael R. Pence
Governor

Carol S. Comer
Commissioner

NOTICE OF 30-DAY PERIOD FOR PUBLIC COMMENT

Preliminary Findings Regarding a
Significant Revision to a
Federally Enforceable State Operating Permit (FESOP)
for DePuy Orthopaedics, Inc., in Kosciusko County
Significant Permit Revision No.: 085-37505-00048

The Indiana Department of Environmental Management (IDEM) has received an application from DePuy Orthopaedics, Inc., located at 700 Orthopaedic Drive, Warsaw IN, 46581, for a significant revision of its FESOP issued on August 18, 2012. If approved by IDEM's Office of Air Quality (OAQ), this proposed revision would allow DePuy Orthopaedics, Inc. to make certain changes at its existing source. DePuy Orthopaedics, Inc. has applied to add new emission units and modify existing emission units.

The applicant intends to construct and operate new equipment that will emit air pollutants; therefore, the permit contains new or different permit conditions. In addition, some conditions from previously issued permits/approvals have been corrected, changed, or removed. These corrections, changes, and removals may include Title I changes (e.g., changes that add or modify synthetic minor emission limits). The potential to emit regulated air pollutants will continue to be limited to less than the Title V and PSD major threshold levels. IDEM has reviewed this application and has developed preliminary findings, consisting of a draft permit and several supporting documents, which would allow the applicant to make this change.

A copy of the permit application and IDEM's preliminary findings are available at:

Warsaw Community Public Library
310 E. Main Street
Warsaw, IN 46580

and

IDEM Northern Regional Office
300 N. Michigan Street, Suite 450
South Bend, IN 46601-1295

A copy of the preliminary findings is available on the Internet at: <http://www.in.gov/ai/appfiles/idem-caats/>.

How can you participate in this process?

The date that this notice is published in a newspaper marks the beginning of a 30-day public comment period. If the 30th day of the comment period falls on a day when IDEM offices are closed for business, all comments must be postmarked or delivered in person on the next business day that IDEM is open.

You may request that IDEM hold a public hearing about this draft permit. If adverse comments concerning the **air pollution impact** of this draft permit are received, with a request for a public hearing, IDEM will decide whether or not to hold a public hearing. IDEM could also decide to hold a public meeting instead of, or in addition to, a public hearing. If a public hearing or meeting is held, IDEM will make a separate announcement of the date, time, and location of that hearing or meeting. At a hearing, you would have an opportunity to submit written comments and make verbal comments. At a meeting,

you would have an opportunity to submit written comments, ask questions, and discuss any air pollution concerns with IDEM staff.

Comments and supporting documentation, or a request for a public hearing should be sent in writing to IDEM at the address below. If you comment via e-mail, please include your full U.S. mailing address so that you can be added to IDEM's mailing list to receive notice of future action related to this permit. If you do not want to comment at this time, but would like to receive notice of future action related to this permit application, please contact IDEM at the address below. Please refer to permit number SPR 085-37505-00048.in all correspondence.

Comments should be sent to:

Kendra Sutherland
IDEM, Office of Air Quality
100 North Senate Avenue
MC 61-53 IGCN 1003
Indianapolis, Indiana 46204-2251
(800) 451-6027, ask for extension 4-5401
Or dial directly: (317) 234-5401
Fax: (317) 232-6749 attn: Kendra Sutherland
E-mail: KSutherl@idem.IN.gov

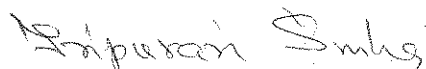
All comments will be considered by IDEM when we make a decision to issue or deny the permit. Comments that are most likely to affect final permit decisions are those based on the rules and laws governing this permitting process (326 IAC 2), air quality issues, and technical issues. IDEM does not have legal authority to regulate zoning, odor, or noise. For such issues, please contact your local officials.

For additional information about air permits and how the public and interested parties can participate, refer to the IDEM Permit Guide on the Internet at: <http://www.in.gov/idem/5881.htm>; and the Citizens' Guide to IDEM on the Internet at: <http://www.in.gov/idem/6900.htm>.

What will happen after IDEM makes a decision?

Following the end of the public comment period, IDEM will issue a Notice of Decision stating whether the permit has been issued or denied. If the permit is issued, it may be different than the draft permit because of comments that were received during the public comment period. If comments are received during the public notice period, the final decision will include a document that summarizes the comments and IDEM's response to those comments. If you have submitted comments or have asked to be added to the mailing list, you will receive a Notice of the Decision. The notice will provide details on how you may appeal IDEM's decision, if you disagree with that decision. The final decision will also be available on the Internet at the address indicated above, at the local library indicated above, at the IDEM Regional Office indicated above, and the IDEM public file room on the 12th floor of the Indiana Government Center North, 100 N. Senate Avenue, Indianapolis, Indiana 46204-2251.

If you have any questions, please contact Kendra Sutherland or my staff at the above address.



Tripurari P. Sinha, Ph.D., Section Chief
Permits Branch
Office of Air Quality



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Carol S. Comer
Commissioner

Craig Evans
DePuy Orthopaedics, Inc.
700 Orthopaedic Drive
Warsaw, IN 46581

Re: 085-37505-00048
Significant Revision to
F085-31933-00048

Dear Mr Evans:

DePuy Orthopaedics, Inc. was issued a Federally Enforceable State Operating Permit (FESOP) Renewal No. F085-31933-00048, on August 15, 2012, for a stationary orthopedic appliance manufacturing source, located at 700 Orthopaedic Drive, Warsaw, IN, 46581. On August 11, 2016, the Office of Air Quality (OAQ) received an application from the source requesting to add and modify emission units and add FESOP limits. The attached Technical Support Document (TSD) provides additional explanation of the changes to the source/permit.

Pursuant to the provisions of 326 IAC 2-8-11.1, these changes to the permit are required to be reviewed in accordance with the Significant Permit Revision (SPR) procedures of 326 IAC 2-8-11.1(f). Pursuant to the provisions of 326 IAC 2-8-11.1, a significant permit revision to this permit is hereby approved as described in the attached Technical Support Document (TSD).

Pursuant to 326 IAC 2-8-11.1, this permit shall be revised by incorporating the significant permit revision into the permit.

All other conditions of the permit shall remain unchanged and in effect. Please find attached the entire FESOP as amended. The permit references the below listed attachments. Since these attachments have been provided in previously issued approvals for this source, IDEM OAQ has not included a copy of these attachments with this amendment:

Attachment A: National Emission Standards for Hazardous Air Pollutants (NESHAPs) for Stationary Reciprocating Internal Combustion Engines [40 CFR 63, Subpart ZZZZ]

Attachment B: New Source Performance Standards (NSPS) for Stationary Compression Ignition Internal Combustion Engines [40 CFR 60, Subpart IIII]

Previously issued approvals for this source containing these attachments are available on the Internet at: <http://www.in.gov/ai/appfiles/idem-caats/>.

Federal rules under Title 40 of United States Code of Federal Regulations may also be found on the U.S. Government Printing Office's Electronic Code of Federal Regulations (eCFR) website, located on the Internet at: http://www.ecfr.gov/cgi-bin/text-idx?tpl=/ecfrbrowse/Title40/40tab_02.tpl.

A copy of the permit is available on the Internet at: <http://www.in.gov/ai/appfiles/idem-caats/>. For additional information about air permits and how the public and interested parties can participate, refer to the IDEM Permit Guide on the Internet at: <http://www.in.gov/idem/5881.htm>; and the Citizens' Guide to IDEM on the Internet at: <http://www.in.gov/idem/6900.htm>.

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 Kendra Sutherland of my staff at 317-234-5401 or 1-800-451-6027, and ask for extension 4-5401.

Sincerely,

Tripurari P. Sinha, Ph.D., Section Chief
Permits Branch
Office of Air Quality

Attachments:
Updated Permit
Appendix A
Technical Support Document

TS/KS

cc: File - Kosciusko County
Kosciusko County Health Department
U.S. EPA, Region V
Compliance and Enforcement Branch
IDEM Northern Regional Office



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Federally Enforceable State Operating Permit Renewal OFFICE OF AIR QUALITY

**DePuy Orthopaedics, Inc.
700 Orthopaedic Dr.
Warsaw, Indiana 46581**

(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.

The Permittee must comply with all conditions of this permit. Noncompliance with any provisions of this permit is grounds for enforcement action; permit termination, revocation and reissuance, or modification; or denial of a permit renewal application. It shall not be a defense for the Permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit. An emergency does constitute an affirmative defense in an enforcement action provided the Permittee complies with the applicable requirements set forth in Section B, Emergency Provisions.

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 2-8 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.

Indiana statutes from IC 13 and rules from 326 IAC, quoted in conditions in this permit, are those applicable at the time the permit was issued. The issuance or possession of this permit shall not alone constitute a defense against an alleged violation of any law, regulation or standard, except for the requirement to obtain a FESOP under 326 IAC 2-8.

Operation Permit No.: F085-31933-00048	
Issued by:	Issuance Date: August 15, 2012
Nathan C. Bell, Section Chief Permits Branch Office of Air Quality	Expiration Date: August 15, 2022

Minor Permit Revision No. 085-36637-00048, issued on April 12, 2016.

Significant Permit Revision No. 085-37505-00048	
Issued by:	Issuance Date:
Tripurari P. Sinha, Ph.D., Section Chief Permits Branch Office of Air Quality	



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Attachment A: National Emission Standards for Hazardous Air Pollutants (NESHAPs) for Stationary Reciprocating Internal Combustion Engines [40 CFR 63, Subpart ZZZZ]

Attachment B- New Source Performance Standards (NSPS) for Stationary Compression Ignition Internal Combustion Engines [40 CFR 60, Subpart III]

SECTION A SOURCE SUMMARY

This permit is based on information requested by the Indiana Department of Environmental Management (IDEM), Office of Air Quality (OAQ). The information describing the source contained in conditions A.1 through A.3 is descriptive information and does not constitute enforceable conditions. However, the Permittee should be aware that a physical change or a change in the method of operation that may render this descriptive information obsolete or inaccurate may trigger requirements for the Permittee to obtain additional permits or seek modification of this permit pursuant to 326 IAC 2, or change other applicable requirements presented in the permit application.

A.1 General Information [326 IAC 2-8-3(b)]

The Permittee owns and operates a stationary orthopaedic appliances manufacturing.

Source Address:	700 Orthopaedic Dr., Warsaw, Indiana 46581
General Source Phone Number:	574-372-7434
SIC Code:	3842 (Orthopedic, Prosthetic, and Surgical Appliances and Supplies)
County Location:	Kosciusko
Source Location Status:	Attainment for all criteria pollutants
Source Status:	Federally Enforceable State Operating Permit Program Minor Source, under PSD Rules Minor Source, Section 112 of the Clean Air Act Not 1 of 28 Source Categories

A.2 Emission Units and Pollution Control Equipment Summary [326 IAC 2-8-3(c)(3)]

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

- (a) Three (3) paint booths, identified as SB1, SB2, and SB3 each equipped with an airless spray gun, for metal parts, with a maximum capacity at each spray gun of 0.125 units per hour, using dry filters for overspray control and exhausting to stacks, E103 E34, and E011, respectively
- (b) Two (2) paint booths, identified as SB4, and SB6, installed in 2002, each equipped with an airless spray gun, for metal parts, with a maximum capacity at each spray gun of 0.125 units per hour, using dry filters for overspray control and exhausting to stacks E90 and E091, respectively.
- (c) One (1) polishing operation, consisting of 40 polishing jacks, installed between 1981 and 1998, each with a maximum throughput of 10 pieces per hour, using wet dust collectors 00266, 00319, 00325, 00326, 00327, 00328, 00127, 00017, 00018, 15104, 15105, 15106, and 15107 for PM and HAPs control, and exhausting through stacks WDC1, WDC2, WDC3, WDC4, WDC5, WDC6, WDC7, WDC8, WDC9, WDC10, WDC11, WDC12, WDC13
- (d) Twenty-one (21) abrasive blasters, constructed prior to 2016, each with one nozzle using twenty-one (21) cyclones as integral control and exhausting indoors.

Emission Unit ID	Year Installed	Internal Diameter of nozzle (inch)	Flow Rate (lb/hr)
BLA1	2015	0.5	615
BLA2	2015	0.5	615
BLA3	2015	0.19	80
BLA4	2015	0.19	80
BLA5	2015	0.19	80
BLA6	2015	0.19	80
BLA7	2015	0.19	80
BLA8	2015	0.19	80
BLA9	2015	0.19	94
BLA10	2015	0.19	80
BLA11	2015	0.19	80
BLA12	2015	0.19	178
BLA13	2015	0.25	81
BLA14	2015	0.19	94
BLA15	2015	0.19	87
BLA16	2015	0.19	80
BLA17	2015	0.19	51
BLA18	2015	0.19	65
BLA19	2015	0.5	343
BLA20	2015	0.31	165
BLA21	2015	0.25	168

A.3 Insignificant Activities [326 IAC 2-7-1(21)][326 IAC 2-8-3(c)(3)(I)]

This stationary source also includes the following insignificant activities:

(a) Twenty (20) Degreasers

- (1) Seventeen (17) ultrasonic, water-based, detergent cleaner/degreasers, identified as emission units 86105/86106 installed in 1992; 00140, 00141, 00142, 00143, 00144, 00145, 83145, 83117, 72051, 60183, 83120, 60182, installed in 2016; and 00136, 00137, 00138, and 00139 all installed in 2008.
 - (2) One (1) Vapor Degreaser, identified as 1106V0315 20632 installed in 2008.
 - (3) Two (2) Oakite ultrasonic water based, detergent degreasers identified as 85105 and 85106 constructed in 1997 and 2000, respectively.
- (c) Liquefied petroleum gas-fired combustion sources with heat input equal to or less than six million (6,000,000) Btu per hour: three liquefied petroleum gas fired fork lift trucks rated at 48, 49 and 90 HP, respectively.
- (d) One-hundred and- six 106 natural gas rooftop heaters, consisting of Roof Top Heaters ID numbers 1, 4, 1a, 2, 2b, 3, 3a 4, 4a, 5, 6a, 7-20, 24, 26, 30, 32, 33, 38, 39, 41-53, 56-71, 71-86, 94, 96-104, 107-117, 121-123, 154-157, 189, and 194, , with individual heat input capacities ranging from 0.08 to 0.225 MMBtu/hr and an aggregate heat input capacity of 29.44 MMBtu/hr.
- (e) Two (2) emergency compression ignition diesel generators, each with a maximum rating of 328 hp, installed in 1994 and 1996.

Under 40 CFR 60, Subpart IIII and 40 CFR 63, Subpart ZZZ, the two (2) emergency generators are affected units.

- (f) One (1) Emergency compression ignition diesel fire pump, identified as DFP1 with a maximum capacity rating of 190 hp, installed in 2014
- Under 40 CFR 60, Subpart IIII and 40 CFR 63, Subpart ZZZZ the emergency fire pump is an affected unit.
- (g) Activities with emissions equal to or less than the following thresholds: 5.0 tons per year PM or PM10, 10 tons per year SO₂, NO_x, or VOC, 0.2 tons per year Pb, 1.0 tons per year of a single HAP, or 2.5 tons per year of any combination of HAPs:
- (1) One (1) Zyglo dipping process consisting of 2 units, identified as emission unit 85106 and 85109, installed in 2000, with a total maximum capacity of 100 units per hour and and venting internally.
 - (2) One (1) Dip Seal process consisting of 2 units, identified as emission unit 72043 and 78080, installed in 1993, with a maximum capacity of 100 units per hour and exhausting to stack E-29b and E-89, respectively.
 - (3) One (1) Peracetic Acid Sterilizing process consisting of 4 units, installed in 1995 and 2016, with a maximum solvent throughput of 0.44 tons per year and exhausting to stack E-60.
 - (4) One (1) isopropyl acid wipe-down process, performed in the Final Clean Value Stream, installed in 1980, with a maximum solvent throughput of 0.02 tons per year and venting internally.
- (h) Two (2) Abrasive Blasters used for maintenance purposes every two weeks, identified as BLTOOL and BLMAINT, approved in 2016 for construction, each with one nozzle and an internal nozzle diameter of 0.3125 and a maximum flow rate of 327.7 pounds per hour, using baghouse as control, and exhausting indoors.
- (i) One (1) welding station, identified as WELD consisting of the following:
- (1) One auto weld machine, identified as WELD1, approved in 2016 for construction, with a maximum electrode consumption of 0.01 pounds per hour, with no control device and exhausting indoors.
 - (2) One (1) manual welder, identified as WELD2, approved in 2016 for construction with a maximum electrode consumption of 0.01 pounds per hour, with no control device and exhausting indoors.
- (j) Two (2) automatic transfer machine systems for cleaning and degreasing joint reconstruction pieces, identified as EU-ATM1 and EU-ATM2, approved in 2016 for construction, with a maximum potential usage of nitric acid of 11, 486 pounds per year for both units, using one nitric acid air scrubber as control and having one back up nitric acid air scrubber in place, and exhausting to SV-ATM.

A.4 FESOP Applicability [326 IAC 2-8-2]

This stationary source, otherwise required to have a Part 70 permit as described in 326 IAC 2-7-2(a), has applied to the Indiana Department of Environmental Management (IDEM), Office of Air Quality (OAQ) to renew a Federally Enforceable State Operating Permit (FESOP).

SECTION B GENERAL CONDITIONS

B.1 Definitions [326 IAC 2-8-1]

Terms in this permit shall have the definition assigned to such terms in the referenced regulation. In the absence of definitions in the referenced regulation, the applicable definitions found in the statutes or regulations (IC 13-11, 326 IAC 1-2 and 326 IAC 2-7) shall prevail.

B.2 Permit Term [326 IAC 2-8-4(2)][326 IAC 2-1.1-9.5][IC 13-15-3-6(a)]

- (a) This permit, F085-31933-00048, is issued for a fixed term of ten (10) years from the issuance date of this permit, as determined in accordance with IC 4-21.5-3-5(f) and IC 13-15-5-3. Subsequent revisions, modifications, or amendments of this permit do not affect the expiration date of this permit.
- (b) If IDEM, OAQ, upon receiving a timely and complete renewal permit application, fails to issue or deny the permit renewal prior to the expiration date of this permit, this existing permit shall not expire and all terms and conditions shall continue in effect, until the renewal permit has been issued or denied.

B.3 Term of Conditions [326 IAC 2-1.1-9.5]

Notwithstanding the permit term of a permit to construct, a permit to operate, or a permit modification, any condition established in a permit issued pursuant to a permitting program approved in the state implementation plan shall remain in effect until:

- (a) the condition is modified in a subsequent permit action pursuant to Title I of the Clean Air Act; or
- (b) the emission unit to which the condition pertains permanently ceases operation.

B.4 Enforceability [326 IAC 2-8-6] [IC 13-17-12]

Unless otherwise stated, all terms and conditions in this permit, including any provisions designed to limit the source's potential to emit, are enforceable by IDEM, the United States Environmental Protection Agency (U.S. EPA) and by citizens in accordance with the Clean Air Act.

B.5 Severability [326 IAC 2-8-4(4)]

The provisions of this permit are severable; a determination that any portion of this permit is invalid shall not affect the validity of the remainder of the permit.

B.6 Property Rights or Exclusive Privilege [326 IAC 2-8-4(5)(D)]

This permit does not convey any property rights of any sort or any exclusive privilege.

B.7 Duty to Provide Information [326 IAC 2-8-4(5)(E)]

- (a) The Permittee shall furnish to IDEM, OAQ, within a reasonable time, any information that IDEM, OAQ may request in writing to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit. Upon request, the Permittee shall also furnish to IDEM, OAQ copies of records required to be kept by this permit.
- (b) For information furnished by the Permittee to IDEM, OAQ, the Permittee may include a claim of confidentiality in accordance with 326 IAC 17.1. When furnishing copies of requested records directly to U. S. EPA, the Permittee may assert a claim of confidentiality in accordance with 40 CFR 2, Subpart B.

B.8 Certification [326 IAC 2-8-3(d)][326 IAC 2-8-4(3)(C)(i)][326 IAC 2-8-5(1)]

- (a) A certification required by this permit meets the requirements of 326 IAC 2-8-5(a)(1) if:

- (1) it contains a certification by an "authorized individual", as defined by 326 IAC 2-1.1-1(1), and
- (2) the certification states that, based on information and belief formed after reasonable inquiry, the statements and information in the document are true, accurate, and complete.
- (b) The Permittee may use the attached Certification Form, or its equivalent with each submittal requiring certification. One (1) certification may cover multiple forms in one (1) submittal.
- (c) An "authorized individual" is defined at 326 IAC 2-1.1-1(1).

B.9 Annual Compliance Certification [326 IAC 2-8-5(a)(1)]

- (a) The Permittee shall annually submit a compliance certification report which addresses the status of the source's compliance with the terms and conditions contained in this permit, including emission limitations, standards, or work practices. All certifications shall cover the time period from January 1 to December 31 of the previous year, and shall be submitted no later than July 1 of each year to:

Indiana Department of Environmental Management
 Compliance and Enforcement Branch, Office of Air Quality
 100 North Senate Avenue
 MC 61-53 IGCN 1003
 Indianapolis, Indiana 46204-2251

- (b) The annual compliance certification report required by this permit shall be considered timely if the date postmarked on the envelope or certified mail receipt, or affixed by the shipper on the private shipping receipt, is on or before the date it is due. If the document is submitted by any other means, it shall be considered timely if received by IDEM, OAQ on or before the date it is due.
- (c) The annual compliance certification report shall include the following:
 - (1) The appropriate identification of each term or condition of this permit that is the basis of the certification;
 - (2) The compliance status;
 - (3) Whether compliance was continuous or intermittent;
 - (4) The methods used for determining the compliance status of the source, currently and over the reporting period consistent with 326 IAC 2-8-4(3); and
 - (5) Such other facts, as specified in Sections D of this permit, as IDEM, OAQ may require to determine the compliance status of the source.

The submittal by the Permittee does require a certification that meets the requirements of 326 IAC 2-8-5(a)(1) by an "authorized individual" as defined by 326 IAC 2-1.1-1(1).

B.10 Compliance Order Issuance [326 IAC 2-8-5(b)]

IDEM, OAQ may issue a compliance order to this Permittee upon discovery that this permit is in nonconformance with an applicable requirement. The order may require immediate compliance or contain a schedule for expeditious compliance with the applicable requirement.

B.11 Preventive Maintenance Plan [326 IAC 1-6-3][326 IAC 2-8-4(9)]

- (a) A Preventive Maintenance Plan (PMP) meets the requirements of 326 IAC 1-6-3 if it includes, at a minimum:
- (1) Identification of the individual(s) responsible for inspecting, maintaining, and repairing emission control devices;
 - (2) A description of the items or conditions that will be inspected and the inspection schedule for said items or conditions; and
 - (3) Identification and quantification of the replacement parts that will be maintained in inventory for quick replacement.

The Permittee shall implement the PMPs.

- (b) If required by specific condition(s) in Section D of this permit where no PMP was previously required, the Permittee shall prepare and maintain Preventive Maintenance Plans (PMPs) no later than ninety (90) days after issuance of this permit or ninety (90) days after initial start-up, whichever is later, including the following information on each facility:
- (1) Identification of the individual(s) responsible for inspecting, maintaining, and repairing emission control devices;
 - (2) A description of the items or conditions that will be inspected and the inspection schedule for said items or conditions; and
 - (3) Identification and quantification of the replacement parts that will be maintained in inventory for quick replacement.

If, due to circumstances beyond the Permittee's control, the PMPs cannot be prepared and maintained within the above time frame, the Permittee may extend the date an additional ninety (90) days provided the Permittee notifies:

Indiana Department of Environmental Management
Compliance and Enforcement Branch, Office of Air Quality
100 North Senate Avenue
MC 61-53 IGCN 1003
Indianapolis, Indiana 46204-2251

The PMP extension notification does not require a certification that meets the requirements of 326 IAC 2-8-5(a)(1) by an "authorized individual" as defined by 326 IAC 2-1.1-1(1).

The Permittee shall implement the PMPs.

- (c) A copy of the PMPs shall be submitted to IDEM, OAQ upon request and within a reasonable time, and shall be subject to review and approval by IDEM, OAQ. IDEM, OAQ may require the Permittee to revise its PMPs whenever lack of proper maintenance causes or is the primary contributor to an exceedance of any limitation on emissions. The PMPs and their submittal do not require a certification that meets the requirements of 326 IAC 2-8-5(a)(1) by an "authorized individual" as defined by 326 IAC 2-1.1-1(1).

- (d) To the extent the Permittee is required by 40 CFR Part 60/63 to have an Operation Maintenance, and Monitoring (OMM) Plan for a unit, such Plan is deemed to satisfy the PMP requirements of 326 IAC 1-6-3 for that unit.

B.12 Emergency Provisions [326 IAC 2-8-12]

- (a) An emergency, as defined in 326 IAC 2-7-1(12), is not an affirmative defense for an action brought for noncompliance with a federal or state health-based emission limitation except as provided in 326 IAC 2-8-12.

- (b) An emergency, as defined in 326 IAC 2-7-1(12), constitutes an affirmative defense to an action brought for noncompliance with a health-based or technology-based emission limitation if the affirmative defense of an emergency is demonstrated through properly signed, contemporaneous operating logs or other relevant evidence that describe the following:

- (1) An emergency occurred and the Permittee can, to the extent possible, identify the causes of the emergency;
- (2) The permitted facility was at the time being properly operated;
- (3) During the period of an emergency, the Permittee took all reasonable steps to minimize levels of emissions that exceeded the emission standards or other requirements in this permit;
- (4) For each emergency lasting one (1) hour or more, the Permittee notified IDEM, OAQ, or Northern Regional Office within four (4) daytime business hours after the beginning of the emergency, or after the emergency was discovered or reasonably should have been discovered;

Telephone Number: 1-800-451-6027 (ask for Office of Air Quality, Compliance and Enforcement Branch), or

Telephone Number: 317-233-0178 (ask for Office of Air Quality, Compliance and Enforcement Branch)

Facsimile Number: 317-233-6865

Northern Regional Office phone: (574) 245-4870; fax: (574) 245-4877.

- (5) For each emergency lasting one (1) hour or more, the Permittee submitted the attached Emergency Occurrence Report Form or its equivalent, either by mail or facsimile to:

Indiana Department of Environmental Management
 Compliance and Enforcement Branch, Office of Air Quality

100 North Senate Avenue

MC 61-53 IGCN 1003

Indianapolis, Indiana 46204-2251

within two (2) working days of the time when emission limitations were exceeded due to the emergency.

The notice fulfills the requirement of 326 IAC 2-8-4(3)(C)(ii) and must contain the following:

- (A) A description of the emergency;
- (B) Any steps taken to mitigate the emissions; and

(C) Corrective actions taken.

The notification which shall be submitted by the Permittee does not require a certification that meets the requirements of 326 IAC 2-8-5(a)(1) by an "authorized individual" as defined by 326 IAC 2-1.1-1(1).

- (6) The Permittee immediately took all reasonable steps to correct the emergency.
- (c) In any enforcement proceeding, the Permittee seeking to establish the occurrence of an emergency has the burden of proof.
- (d) This emergency provision supersedes 326 IAC 1-6 (Malfunctions). This permit condition is in addition to any emergency or upset provision contained in any applicable requirement.
- (e) The Permittee seeking to establish the occurrence of an emergency shall make records available upon request to ensure that failure to implement a PMP did not cause or contribute to an exceedance of any limitations on emissions. However, IDEM, OAQ may require that the Preventive Maintenance Plans required under 326 IAC 2-8-3(c)(6) be revised in response to an emergency.
- (f) Failure to notify IDEM, OAQ by telephone or facsimile of an emergency lasting more than one (1) hour in accordance with (b)(4) and (5) of this condition shall constitute a violation of 326 IAC 2-8 and any other applicable rules.
- (g) Operations may continue during an emergency only if the following conditions are met:
- (1) If the emergency situation causes a deviation from a technology-based limit, the Permittee may continue to operate the affected emitting facilities during the emergency provided the Permittee immediately takes all reasonable steps to correct the emergency and minimize emissions.
 - (2) If an emergency situation causes a deviation from a health-based limit, the Permittee may not continue to operate the affected emissions facilities unless:
 - (A) The Permittee immediately takes all reasonable steps to correct the emergency situation and to minimize emissions; and
 - (B) Continued operation of the facilities is necessary to prevent imminent injury to persons, severe damage to equipment, substantial loss of capital investment, or loss of product or raw material of substantial economic value.

Any operations shall continue no longer than the minimum time required to prevent the situations identified in (g)(2)(B) of this condition.

B.13 Prior Permits Superseded [326 IAC 2-1.1-9.5]

-
- (a) All terms and conditions of permits established prior to F085-31933-00048 and issued pursuant to permitting programs approved into the state implementation plan have been either:
- (1) incorporated as originally stated,
 - (2) revised, or

(3) deleted.

(b) All previous registrations and permits are superseded by this permit.

B.14 Termination of Right to Operate [326 IAC 2-8-9][326 IAC 2-8-3(h)]

The Permittee's right to operate this source terminates with the expiration of this permit unless a timely and complete renewal application is submitted at least nine (9) months prior to the date of expiration of the source's existing permit, consistent with 326 IAC 2-8-3(h) and 326 IAC 2-8-9.

**B.15 Permit Modification, Reopening, Revocation and Reissuance, or Termination
[326 IAC 2-8-4(5)(C)][326 IAC 2-8-7(a)][326 IAC 2-8-8]**

(a) This permit may be modified, reopened, revoked and reissued, or terminated for cause. The filing of a request by the Permittee for a Federally Enforceable State Operating Permit modification, revocation and reissuance, or termination, or of a notification of planned changes or anticipated noncompliance does not stay any condition of this permit. [326 IAC 2-8-4(5)(C)] The notification by the Permittee does require a certification that meets the requirements of 326 IAC 2-8-5(a)(1) by an "authorized individual" as defined by 326 IAC 2-1.1-1(1).

(b) This permit shall be reopened and revised under any of the circumstances listed in IC 13-15-7-2 or if IDEM, OAQ determines any of the following:

(1) That this permit contains a material mistake.

(2) That inaccurate statements were made in establishing the emissions standards or other terms or conditions.

(3) That this permit must be revised or revoked to assure compliance with an applicable requirement. [326 IAC 2-8-8(a)]

(c) Proceedings by IDEM, OAQ to reopen and revise this permit shall follow the same procedures as apply to initial permit issuance and shall affect only those parts of this permit for which cause to reopen exists. Such reopening and revision shall be made as expeditiously as practicable. [326 IAC 2-8-8(b)]

(d) The reopening and revision of this permit, under 326 IAC 2-8-8(a), shall not be initiated before notice of such intent is provided to the Permittee by IDEM, OAQ at least thirty (30) days in advance of the date this permit is to be reopened, except that IDEM, OAQ may provide a shorter time period in the case of an emergency. [326 IAC 2-8-8(c)]

B.16 Permit Renewal [326 IAC 2-8-3(h)]

(a) The application for renewal shall be submitted using the application form or forms prescribed by IDEM, OAQ and shall include the information specified in 326 IAC 2-8-3. Such information shall be included in the application for each emission unit at this source, except those emission units included on the trivial or insignificant activities list contained in 326 IAC 2-7-1(21) and 326 IAC 2-7-1(40). The renewal application does require a certification that meets the requirements of 326 IAC 2-8-5(a)(1) by an "authorized individual" as defined by 326 IAC 2-1.1-1(1).

Request for renewal shall be submitted to:

Indiana Department of Environmental Management
 Permit Administration and Support Section, Office of Air Quality
 100 North Senate Avenue
 MC 61-53 IGCN 1003
 Indianapolis, Indiana 46204-2251

- (b) A timely renewal application is one that is:
- (1) Submitted at least nine (9) months prior to the date of the expiration of this permit; and
 - (2) If the date postmarked on the envelope or certified mail receipt, or affixed by the shipper on the private shipping receipt, is on or before the date it is due. If the document is submitted by any other means, it shall be considered timely if received by IDEM, OAQ on or before the date it is due.
- (c) If the Permittee submits a timely and complete application for renewal of this permit, the source's failure to have a permit is not a violation of 326 IAC 2-8 until IDEM, OAQ takes final action on the renewal application, except that this protection shall cease to apply if, subsequent to the completeness determination, the Permittee fails to submit by the deadline specified, pursuant to 326 IAC 2-8-3(g), in writing by IDEM, OAQ any additional information identified as being needed to process the application.

B.17 Permit Amendment or Revision [326 IAC 2-8-10][326 IAC 2-8-11.1]

- (a) Permit amendments and revisions are governed by the requirements of 326 IAC 2-8-10 or 326 IAC 2-8-11.1 whenever the Permittee seeks to amend or modify this permit.
- (b) Any application requesting an amendment or modification of this permit shall be submitted to:
- Indiana Department of Environmental Management
 Permit Administration and Support Section, Office of Air Quality
 100 North Senate Avenue
 MC 61-53 IGCN 1003
 Indianapolis, Indiana 46204-2251
- Any such application does require a certification that meets the requirements of 326 IAC 2-8-5(a)(1) by an "authorized individual" as defined by 326 IAC 2-1.1-1(1).
- (c) The Permittee may implement administrative amendment changes addressed in the request for an administrative amendment immediately upon submittal of the request. [326 IAC 2-8-10(b)(3)]

B.18 Operational Flexibility [326 IAC 2-8-15][326 IAC 2-8-11.1]

- (a) The Permittee may make any change or changes at the source that are described in 326 IAC 2-8-15(b) and (c) without a prior permit revision, if each of the following conditions is met:
- (1) The changes are not modifications under any provision of Title I of the Clean Air Act;
 - (2) Any approval required by 326 IAC 2-8-11.1 has been obtained;

(3) The changes do not result in emissions which exceed the limitations provided in this permit (whether expressed herein as a rate of emissions or in terms of total emissions);

(4) The Permittee notifies the:

Indiana Department of Environmental Management
 Permit Administration and Support Section, Office of Air Quality
 100 North Senate Avenue
 MC 61-53 IGCN 1003
 Indianapolis, Indiana 46204-2251

and

United States Environmental Protection Agency, Region V
 Air and Radiation Division, Regulation Development Branch - Indiana (AR-18J)
 77 West Jackson Boulevard
 Chicago, Illinois 60604-3590

in advance of the change by written notification at least ten (10) days in advance of the proposed change. The Permittee shall attach every such notice to the Permittee's copy of this permit; and

(5) The Permittee maintains records on-site, on a rolling five (5) year basis, which document all such changes and emission trades that are subject to 326 IAC 2-8-15(b)(1) and (c). The Permittee shall make such records available, upon reasonable request, for public review.

Such records shall consist of all information required to be submitted to IDEM, OAQ in the notices specified in 326 IAC 2-8-15(b)(1) and (c).

- (b) Emission Trades [326 IAC 2-8-15(b)]
 The Permittee may trade emissions increases and decreases at the source, where the applicable SIP provides for such emission trades without requiring a permit revision, subject to the constraints of Section (a) of this condition and those in 326 IAC 2-8-15(b).
- (c) Alternative Operating Scenarios [326 IAC 2-8-15(c)]
 The Permittee may make changes at the source within the range of alternative operating scenarios that are described in the terms and conditions of this permit in accordance with 326 IAC 2-8-4(7). No prior notification of IDEM, OAQ, or U.S. EPA is required.
- (d) Backup fuel switches specifically addressed in, and limited under, Section D of this permit shall not be considered alternative operating scenarios. Therefore, the notification requirements of part (a) of this condition do not apply.

B.19 Source Modification Requirement [326 IAC 2-8-11.1]

A modification, construction, or reconstruction is governed by the requirements of 326 IAC 2.

B.20 Inspection and Entry [326 IAC 2-8-5(a)(2)][IC 13-14-2-2][IC 13-17-3-2][IC 13-30-3-1]

Upon presentation of proper identification cards, credentials, and other documents as may be required by law, and subject to the Permittee's right under all applicable laws and regulations to assert that the information collected by the agency is confidential and entitled to be treated as such, the Permittee shall allow IDEM, OAQ, U.S. EPA, or an authorized representative to perform the following:

- (a) Enter upon the Permittee's premises where a FESOP source is located, or emissions related activity is conducted, or where records must be kept under the conditions of this permit;
- (b) As authorized by the Clean Air Act, IC 13-14-2-2, IC 13-17-3-2, and IC 13-30-3-1, have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;
- (c) As authorized by the Clean Air Act, IC 13-14-2-2, IC 13-17-3-2, and IC 13-30-3-1, inspect, at reasonable times, any facilities, equipment (including monitoring and air pollution control equipment), practices, or operations regulated or required under this permit;
- (d) As authorized by the Clean Air Act, IC 13-14-2-2, IC 13-17-3-2, and IC 13-30-3-1, sample or monitor, at reasonable times, substances or parameters for the purpose of assuring compliance with this permit or applicable requirements; and
- (e) As authorized by the Clean Air Act, IC 13-14-2-2, IC 13-17-3-2, and IC 13-30-3-1, utilize any photographic, recording, testing, monitoring, or other equipment for the purpose of assuring compliance with this permit or applicable requirements.

B.21 Transfer of Ownership or Operational Control [326 IAC 2-8-10]

- (a) The Permittee must comply with the requirements of 326 IAC 2-8-10 whenever the Permittee seeks to change the ownership or operational control of the source and no other change in the permit is necessary.
- (b) Any application requesting a change in the ownership or operational control of the source shall contain a written agreement containing a specific date for transfer of permit responsibility, coverage and liability between the current and new Permittee. The application shall be submitted to:

Indiana Department of Environmental Management
Permit Administration and Support Section, Office of Air Quality
100 North Senate Avenue
MC 61-53 IGCN 1003
Indianapolis, Indiana 46204-2251

Any such application does require a certification that meets the requirements of 326 IAC 2-8-5(a)(1) by an "authorized individual" as defined by 326 IAC 2-1.1-1(1).
- (c) The Permittee may implement administrative amendment changes addressed in the request for an administrative amendment immediately upon submittal of the request. [326 IAC 2-8-10(b)(3)]

B.22 Annual Fee Payment [326 IAC 2-7-19] [326 IAC 2-8-4(6)] [326 IAC 2-8-16][326 IAC 2-1.1-7]

- (a) The Permittee shall pay annual fees to IDEM, OAQ no later than thirty (30) calendar days of receipt of a billing. Pursuant to 326 IAC 2-7-19(b), if the Permittee does not receive a bill from IDEM, OAQ the applicable fee is due April 1 of each year.
- (b) Failure to pay may result in administrative enforcement action or revocation of this permit.
- (c) The Permittee may call the following telephone numbers: 1-800-451-6027 or 317-233-4230 (ask for OAQ, Billing, Licensing, and Training Section), to determine the appropriate permit fee.

B.23 Credible Evidence [326 IAC 2-8-4(3)][326 IAC 2-8-5][62 FR 8314] [326 IAC 1-1-6]

For the purpose of submitting compliance certifications or establishing whether or not the Permittee has violated or is in violation of any condition of this permit, nothing in this permit shall preclude the use, including the exclusive use, of any credible evidence or information relevant to whether the Permittee would have been in compliance with the condition of this permit if the appropriate performance or compliance test or procedure had been performed.

SECTION C**SOURCE OPERATION CONDITIONS**

Entire Source

Emission Limitations and Standards [326 IAC 2-8-4(1)]**C.1 Particulate Emission Limitations For Processes with Process Weight Rates Less Than One Hundred (100) Pounds per Hour [326 IAC 6-3-2]**

Pursuant to 326 IAC 6-3-2(e)(2), particulate emissions from any process not exempt under 326 IAC 6-3-1(b) or (c) which has a maximum process weight rate less than 100 pounds per hour and the methods in 326 IAC 6-3-2(b) through (d) do not apply shall not exceed 0.551 pounds per hour.

C.2 Overall Source Limit [326 IAC 2-8]

The purpose of this permit is to limit this source's potential to emit to less than major source levels for the purpose of Section 502(a) of the Clean Air Act.

(a) Pursuant to 326 IAC 2-8:

- (1) The potential to emit any regulated pollutant, except particulate matter (PM) and greenhouse gases (GHGs), from the entire source shall be limited to less than one hundred (100) tons per twelve (12) consecutive month period.
- (2) The potential to emit any individual hazardous air pollutant (HAP) from the entire source shall be limited to less than ten (10) tons per twelve (12) consecutive month period; and
- (3) The potential to emit any combination of HAPs from the entire source shall be limited to less than twenty-five (25) tons per twelve (12) consecutive month period.
- (4) The potential to emit greenhouse gases (GHGs) from the entire source shall be limited to less than one hundred thousand (100,000) tons of CO₂ equivalent emissions (CO₂e) per twelve (12) consecutive month period.

(b) Pursuant to 326 IAC 2-2 (PSD), potential to emit particulate matter (PM) from the entire source shall be limited to less than one hundred (100) tons per twelve (12) consecutive month period.

(c) This condition shall include all emission points at this source including those that are insignificant as defined in 326 IAC 2-7-1(21). The source shall be allowed to add insignificant activities not already listed in this permit, provided that the source's potential to emit does not exceed the above specified limits.

(d) Section D of this permit contains independently enforceable provisions to satisfy this requirement.

C.3 Opacity [326 IAC 5-1]

Pursuant to 326 IAC 5-1-2 (Opacity Limitations), except as provided in 326 IAC 5-1-1 (Applicability) and 326 IAC 5-1-3 (Temporary Alternative Opacity Limitations), opacity shall meet the following, unless otherwise stated in this permit:

- (a) Opacity shall not exceed an average of forty percent (40%) in any one (1) six (6) minute averaging period as determined in 326 IAC 5-1-4.

- (b) Opacity shall not exceed sixty percent (60%) for more than a cumulative total of fifteen (15) minutes (sixty (60) readings as measured according to 40 CFR 60, Appendix A, Method 9 or fifteen (15) one (1) minute nonoverlapping integrated averages for a continuous opacity monitor) in a six (6) hour period.

C.4 Open Burning [326 IAC 4-1] [IC 13-17-9]

The Permittee shall not open burn any material except as provided in 326 IAC 4-1-3, 326 IAC 4-1-4 or 326 IAC 4-1-6. The previous sentence notwithstanding, the Permittee may open burn in accordance with an open burning approval issued by the Commissioner under 326 IAC 4-1-4.1.

C.5 Incineration [326 IAC 4-2] [326 IAC 9-1-2]

The Permittee shall not operate an incinerator except as provided in 326 IAC 4-2 or in this permit. The Permittee shall not operate a refuse incinerator or refuse burning equipment except as provided in 326 IAC 9-1-2 or in this permit.

C.6 Fugitive Dust Emissions [326 IAC 6-4]

The Permittee shall not allow fugitive dust to escape beyond the property line or boundaries of the property, right-of-way, or easement on which the source is located, in a manner that would violate 326 IAC 6-4 (Fugitive Dust Emissions).

C.7 Asbestos Abatement Projects [326 IAC 14-10] [326 IAC 18] [40 CFR 61, Subpart M]

- (a) Notification requirements apply to each owner or operator. If the combined amount of regulated asbestos containing material (RACM) to be stripped, removed or disturbed is at least 260 linear feet on pipes or 160 square feet on other facility components, or at least thirty-five (35) cubic feet on all facility components, then the notification requirements of 326 IAC 14-10-3 are mandatory. All demolition projects require notification whether or not asbestos is present.
- (b) The Permittee shall ensure that a written notification is sent on a form provided by the Commissioner at least ten (10) working days before asbestos stripping or removal work or before demolition begins, per 326 IAC 14-10-3, and shall update such notice as necessary, including, but not limited to the following:
- (1) When the amount of affected asbestos containing material increases or decreases by at least twenty percent (20%); or
 - (2) If there is a change in the following:
 - (A) Asbestos removal or demolition start date;
 - (B) Removal or demolition contractor; or
 - (C) Waste disposal site.
- (c) The Permittee shall ensure that the notice is postmarked or delivered according to the guidelines set forth in 326 IAC 14-10-3(2).
- (d) The notice to be submitted shall include the information enumerated in 326 IAC 14-10-3(3).

All required notifications shall be submitted to:

Indiana Department of Environmental Management

Compliance and Enforcement Branch, Office of Air Quality
 100 North Senate Avenue
 MC 61-53 IGCN 1003
 Indianapolis, Indiana 46204-2251

The notice shall include a signed certification from the owner or operator that the information provided in this notification is correct and that only Indiana licensed workers and project supervisors will be used to implement the asbestos removal project. The notifications do not require a certification that meets the requirements of 326 IAC 2-8-5(a)(1) by an "authorized individual" as defined by 326 IAC 2-1.1-1(1).

- (e) **Procedures for Asbestos Emission Control**
 The Permittee shall comply with the applicable emission control procedures in 326 IAC 14-10-4 and 40 CFR 61.145(c). Per 326 IAC 14-10-1, emission control requirements are applicable for any removal or disturbance of RACM greater than three (3) linear feet on pipes or three (3) square feet on any other facility components or a total of at least 0.75 cubic feet on all facility components.
- (f) **Demolition and Renovation**
 The Permittee shall thoroughly inspect the affected facility or part of the facility where the demolition or renovation will occur for the presence of asbestos pursuant to 40 CFR 61.145(a).
- (g) **Indiana Licensed Asbestos Inspector**
 The Permittee shall comply with 326 IAC 14-10-1(a) that requires the owner or operator, prior to a renovation/demolition, to use an Indiana Licensed Asbestos Inspector to thoroughly inspect the affected portion of the facility for the presence of asbestos.

Testing Requirements [326 IAC 2-8-4(3)]

C.8 Performance Testing [326 IAC 3-6]

- (a) For performance testing required by this permit, a test protocol, except as provided elsewhere in this permit, shall be submitted to:

 Indiana Department of Environmental Management
 Compliance and Enforcement Branch, Office of Air Quality
 100 North Senate Avenue
 MC 61-53 IGCN 1003
 Indianapolis, Indiana 46204-2251

 no later than thirty-five (35) days prior to the intended test date. The protocol submitted by the Permittee does not require a certification that meets the requirements of 326 IAC 2-8-5(a)(1) by an "authorized individual" as defined by 326 IAC 2-1.1-1(1).
- (b) The Permittee shall notify IDEM, OAQ of the actual test date at least fourteen (14) days prior to the actual test date. The notification submitted by the Permittee does not require a certification that meets the requirements of 326 IAC 2-8-5(a)(1) by an "authorized individual" as defined by 326 IAC 2-1.1-1(1).
- (c) Pursuant to 326 IAC 3-6-4(b), all test reports must be received by IDEM, OAQ not later than forty-five (45) days after the completion of the testing. An extension may be granted by IDEM, OAQ if the Permittee submits to IDEM, OAQ a reasonable written explanation not later than five (5) days prior to the end of the initial forty-five (45) day period.

Compliance Requirements [326 IAC 2-1.1-11]**C.9 Compliance Requirements [326 IAC 2-1.1-11]**

The commissioner may require stack testing, monitoring, or reporting at any time to assure compliance with all applicable requirements by issuing an order under 326 IAC 2-1.1-11. Any monitoring or testing shall be performed in accordance with 326 IAC 3 or other methods approved by the commissioner or the U. S. EPA.

Compliance Monitoring Requirements [326 IAC 2-8-4][326 IAC 2-8-5(a)(1)]**C.10 Compliance Monitoring [326 IAC 2-8-4(3)][326 IAC 2-8-5(a)(1)]**

Unless otherwise specified in this permit, for all monitoring requirements not already legally required, the Permittee shall be allowed up to ninety (90) days from the date of permit issuance or of initial start-up, whichever is later, to begin such monitoring. If due to circumstances beyond the Permittee's control, any monitoring equipment required by this permit cannot be installed and operated no later than ninety (90) days after permit issuance or the date of initial startup, whichever is later, the Permittee may extend the compliance schedule related to the equipment for an additional ninety (90) days provided the Permittee notifies:

Indiana Department of Environmental Management
Compliance and Enforcement Branch, Office of Air Quality
100 North Senate Avenue
MC 61-53 IGCN 1003
Indianapolis, Indiana 46204-2251

in writing, prior to the end of the initial ninety (90) day compliance schedule, with full justification of the reasons for the inability to meet this date.

The notification which shall be submitted by the Permittee does require a certification that meets the requirements of 326 IAC 2-8-5(a)(1) by an "authorized individual" as defined by 326 IAC 2-1.1-1(1).

Unless otherwise specified in the approval for the new emission unit(s), compliance monitoring for new emission units or emission units added through a permit revision shall be implemented when operation begins.

C.11 Instrument Specifications [326 IAC 2-1.1-11] [326 IAC 2-8-4(3)][326 IAC 2-8-5(1)]

- (a) When required by any condition of this permit, an analog instrument used to measure a parameter related to the operation of an air pollution control device shall have a scale such that the expected maximum reading for the normal range shall be no less than twenty percent (20%) of full scale.
- (b) The Permittee may request that the IDEM, OAQ approve the use of an instrument that does not meet the above specifications provided the Permittee can demonstrate that an alternative instrument specification will adequately ensure compliance with permit conditions requiring the measurement of the parameters.

Corrective Actions and Response Steps [326 IAC 2-8-4][326 IAC 2-8-5(a)(1)]**C.12 Risk Management Plan [326 IAC 2-8-4] [40 CFR 68]**

If a regulated substance, as defined in 40 CFR 68, is present at a source in more than a threshold quantity, the Permittee must comply with the applicable requirements of 40 CFR 68.

C.13 Response to Excursions or Exceedances [326 IAC 2-8-4] [326 IAC 2-8-5]

Upon detecting an excursion where a response step is required by the D Section or an exceedance of a limitation in this permit:

- (a) The Permittee shall take reasonable response steps to restore operation of the emissions unit (including any control device and associated capture system) to its normal or usual manner of operation as expeditiously as practicable in accordance with good air pollution control practices for minimizing excess emissions.
- (b) The response shall include minimizing the period of any startup, shutdown or malfunction. The response may include, but is not limited to, the following:
 - (1) initial inspection and evaluation;
 - (2) recording that operations returned or are returning to normal without operator action (such as through response by a computerized distribution control system); or
 - (3) any necessary follow-up actions to return operation to normal or usual manner of operation.
- (c) A determination of whether the Permittee has used acceptable procedures in response to an excursion or exceedance will be based on information available, which may include, but is not limited to, the following:
 - (1) monitoring results;
 - (2) review of operation and maintenance procedures and records; and/or
 - (3) inspection of the control device, associated capture system, and the process.
- (d) Failure to take reasonable response steps shall be considered a deviation from the permit.
- (e) The Permittee shall record the reasonable response steps taken.

C.14 Actions Related to Noncompliance Demonstrated by a Stack Test [326 IAC 2-8-4][326 IAC 2-8-5]

- (a) When the results of a stack test performed in conformance with Section C - Performance Testing, of this permit exceed the level specified in any condition of this permit, the Permittee shall submit a description of its response actions to IDEM, OAQ, no later than seventy-five (75) days after the date of the test.
- (b) A retest to demonstrate compliance shall be performed no later than one hundred eighty (180) days after the date of the test. Should the Permittee demonstrate to IDEM, OAQ that retesting in one hundred eighty (180) days is not practicable, IDEM, OAQ may extend the retesting deadline
- (c) IDEM, OAQ reserves the authority to take any actions allowed under law in response to noncompliant stack tests.

The response action documents submitted pursuant to this condition do require a certification that meets the requirements of 326 IAC 2-8-5(a)(1) by an "authorized individual" as defined by 326 IAC 2-1.1-1(1).

Record Keeping and Reporting Requirements [326 IAC 2-8-4(3)]**C.15 General Record Keeping Requirements [326 IAC 2-8-4(3)] [326 IAC 2-8-5]**

- (a) Records of all required monitoring data, reports and support information required by this permit shall be retained for a period of at least five (5) years from the date of monitoring sample, measurement, report, or application. Support information includes the following:
- (AA) All calibration and maintenance records.
 - (BB) All original strip chart recordings for continuous monitoring instrumentation.
 - (CC) Copies of all reports required by the FESOP.
- Records of required monitoring information include the following:
- (AA) The date, place, as defined in this permit, and time of sampling or measurements.
 - (BB) The dates analyses were performed.
 - (CC) The company or entity that performed the analyses.
 - (DD) The analytical techniques or methods used.
 - (EE) The results of such analyses.
 - (FF) The operating conditions as existing at the time of sampling or measurement.

These records shall be physically present or electronically accessible at the source location for a minimum of three (3) years. The records may be stored elsewhere for the remaining two (2) years as long as they are available upon request. If the Commissioner makes a request for records to the Permittee, the Permittee shall furnish the records to the Commissioner within a reasonable time.

- (b) Unless otherwise specified in this permit, for all record keeping requirements not already legally required, the Permittee shall be allowed up to ninety (90) days from the date of permit issuance or the date of initial start-up, whichever is later, to begin such record keeping.

C.16 General Reporting Requirements [326 IAC 2-8-4(3)(C)] [326 IAC 2-1.1-11]

- (a) The Permittee shall submit the attached Semi-Annual Deviation and Compliance Monitoring Report or its equivalent. Proper notice submittal under Section B –Emergency Provisions satisfies the reporting requirements of this paragraph. Any deviation from permit requirements, the date(s) of each deviation, the cause of the deviation, and the response steps taken must be reported except that a deviation required to be reported pursuant to an applicable requirement that exists independent of this permit, shall be reported according to the schedule stated in the applicable requirement and does not need to be included in this report. This report shall be submitted not later than thirty (30) days after the end of the reporting period. The Semi-Annual Deviation and Compliance Monitoring Report shall include a certification that meets the requirements of 326 IAC 2-8-5(a)(1) by an "authorized individual" as defined by 326 IAC 2-1.1-1(1). A deviation is an exceedance of a permit limitation or a failure to comply with a requirement of the permit.
- (b) The address for report submittal is:
- Indiana Department of Environmental Management
Compliance and Enforcement Branch, Office of Air Quality
100 North Senate Avenue
MC 61-53 IGCN 1003
Indianapolis, Indiana 46204-2251
- (c) Unless otherwise specified in this permit, any notice, report, or other submission required by this permit shall be considered timely if the date postmarked on the envelope or

certified mail receipt, or affixed by the shipper on the private shipping receipt, is on or before the date it is due. If the document is submitted by any other means, it shall be considered timely if received by IDEM, OAQ on or before the date it is due.

- (d) Reporting periods are based on calendar years, unless otherwise specified in this permit. For the purpose of this permit "calendar year" means the twelve (12) month period from January 1 to December 31 inclusive.

Stratospheric Ozone Protection

C.17 Compliance with 40 CFR 82 and 326 IAC 22-1

Pursuant to 40 CFR 82 (Protection of Stratospheric Ozone), Subpart F, except as provided for motor vehicle air conditioners in Subpart B, the Permittee shall comply with applicable standards for recycling and emissions reduction.

SECTION D.1 EMISSIONS UNIT OPERATION CONDITIONS**Emissions Unit Description:**

- (a) Three (3) paint booths, identified as SB1, SB2, and SB3 each equipped with an airless spray gun, for metal parts, with a maximum capacity at each spray gun of 0.125 units per hour, using dry filters for overspray control and exhausting to stacks, E103, E34, and E011, respectively
- (b) Two (2) paint booths, identified as SB4, and SB6, installed in 2002, each equipped with an airless spray gun, for metal parts, with a maximum capacity at each spray gun of 0.125 units per hour, using dry filters for overspray control and exhausting to stacks E90 and E091, respectively.

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

D.1.1 Volatile Organic Compounds (VOC) [326 IAC 8-2-9]

Paint booths SB4, and SB6 shall each use less than fifteen (15) pounds per day of VOC, including coatings, dilution solvents and cleaning solvents. Compliance with this limit renders the requirements of 326 IAC 8-2-9 (Miscellaneous Metal Coating Operations) not applicable.

D.1.2 Hazardous Air Pollutants (HAPs) Limitations

In order to comply with the requirements of 326 IAC 2-8-4 (FESOP) and render the requirements of 326 IAC 2-7 (Part 70 Permits) not applicable, the Permittee shall comply with the following:

- (a) The input of each individual hazardous air pollutant (HAP) delivered to the coating applicators in all the Paint Booths SB1, SB2, SB3, SB4, and SB6 combined shall not exceed 9.9 tons per twelve (12) consecutive month period, with compliance determined at the end of each month.
- (b) The input of total HAPs delivered to the coating applicators in all the Paint Booths SB1, SB2, SB3, SB4, and SB6 combined shall not exceed 23.0 tons per twelve (12) consecutive month period, with compliance determined at the end of each month.

Compliance with these limits and Condition D.2.1, combined with the potential to emit HAPs from all other emission units at this source, shall limit the source-wide total potential to emit any single HAP to less than ten (10) tons per 12 consecutive month period and total HAPs to less than twenty-five (25) tons per 12 consecutive month period and shall render 326 IAC 2-7 (Part 70 Permits) not applicable.

D.1.3 Particulate Matter (PM) [326 IAC 6-3-2(d)]

Pursuant to 326 IAC 6-3-2(d), particulate from the paint booths SB1, SB2, SB3, SB4, and SB6 shall be controlled by a dry particulate filter, and the Permittee shall operate the control device in accordance with manufacturer's specifications.

D.1.4 Preventive Maintenance Plan [326 IAC 2-8-4(9)]

A Preventive Maintenance Plan is required for these facilities and their control devices. Section B - Preventive Maintenance Plan contains the Permittee's obligation with regard to the preventive maintenance plan required by this condition.

Compliance Determination Requirements [326 IAC 2-8-5(a)(1)]**D.1.5 Volatile Organic Compounds (VOC) [326 IAC 8-1-2][326 IAC 8-1-4]**

Compliance with the VOC usage limitations contained in Condition D.1.1 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.1.6 Hazardous Air Pollutants

Compliance with the HAPs usage limitations contained in Condition D.1.2 shall be determined pursuant to 326 IAC 8-1-4(a)(3) and 326 IAC 8-1-2(a) using formulation data supplied by the coating manufacturer.

Record Keeping and Reporting Requirements [326 IAC 2-8-4(3)]**D.1.7 Record Keeping Requirements**

(a) To document the compliance status with Conditions D.1.1 and D.1.2, the Permittee shall maintain records in accordance with (1) through (5) below. Records maintained for (1) through (5) shall be taken as indicated below and shall be complete and sufficient to establish compliance with the VOC usage limit in Condition D.1.1 and the HAPs limitations in Condition D.1.2. Records necessary to demonstrate compliance shall be available within 30 days of the end of each compliance period.

(1) The amount of VOC and HAPs in each coating material and solvent used.

(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.

(2) The cleanup solvent usage for each day for Paint Booths SB4, and SB6;

(3) The total VOC usage for each day for Paint Booths SB4, and SB6;

(4) The individual HAP usage and total HAP usage for each month for Paint Booths SB1, SB2, SB3, SB4, and SB6;

(5) The individual HAP usage and total HAP usage for each twelve (12) consecutive month period for Paint Booths SB1, SB2, SB3, SB4, and SB6; and

(b) Section C - General Record Keeping Requirements, of this permit contains the Permittee's obligations with regard to the records required by this condition.

D.1.8 Reporting Requirements

Semi-annual summaries of the information to document the compliance status with Conditions D.1.1 and D.1.2 shall be submitted using the reporting forms located at the end of this permit, or their equivalent, no later than thirty (30) days after the end of the six (6) month period being reported. Section C - General Reporting contains the Permittee's obligation with regard to the reporting required by this condition. The report submitted by the Permittee does require a certification that meets the requirements of 326 IAC 2-8-5(a)(1) by the "authorized individual" as defined by 326 IAC 2-1.1-1(1).

SECTION D.2 EMISSIONS UNIT OPERATION CONDITIONS**Emissions Unit Description:**

- (c) One (1) polishing operation, consisting of 40 polishing jacks, installed between 1981 and 1998, each with a maximum throughput of 10 pieces per hour, using wet dust collectors 00266, 00319, 00325, 00326, 00327, 00328, 00127, 00017, 00018, 15104, 15105, 15106, and 15107 for PM and HAPs control, and exhausting through stacks WDC1, WDC2, WDC3, WDC4, WDC5, WDC6, WDC7, WDC8, WDC9, WDC10, WDC11, WDC12, WDC13

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

Emission Limitations and Standards [326 IAC 2-8-4(1)]**D.2.1 FESOP and Hazardous Air Pollutants (HAPs) Limitations [326 IAC 2-8]**

In order to comply with the requirements of 326 IAC 2-8-4 (FESOP) and render the requirements of 326 IAC 2-7 (Part 70 Permits) not applicable, the Permittee shall comply with the following:

- (a) The combined Hazardous Air Pollutant (HAP) emissions from the polishing operation consisting of 40 polishing jacks shall not exceed 0.229 pounds per hour.
- (b) The input of each individual hazardous air pollutant (HAP) emissions from the polishing operation consisting of 40 polishing jacks shall not exceed 0.229 pounds per hour.

Compliance with these limits and Condition D.1.2, combined with the potential to emit HAPs from all other emission units at this source, shall limit the source-wide total potential to emit any single HAP to less than ten (10) tons per 12 consecutive month period and total HAPs to less than twenty-five (25) tons per 12 consecutive month period and shall render 326 IAC 2-7 (Part 70 Permits) not applicable.

D.2.2 Preventive Maintenance Plan [326 IAC 2-8-4(9)]

A Preventive Maintenance Plan is required for these facilities and its control devices. Section B - Preventive Maintenance Plan contains the Permittee's obligation with regard to the preventive maintenance plan required by this condition.

Compliance Determination Requirements**D.2.3 Hazardous Air Pollutants (HAPs) Control**

- (a) In order to comply with Conditions D.2.1, HAPs from the polishing operations shall be controlled by wet dust collectors and the Permittee shall operate the control device in accordance with manufacturer's specifications.
- (b) In the event that bag failure is observed in a multi-compartment wet dust collector, if operations will continue for ten (10) days or more after the failure is observed before the failed units will be repaired or replaced, the Permittee shall promptly notify the IDEM, OAQ of the expected date the failed units will be repaired or replaced. The notification shall also include the status of the applicable compliance monitoring parameters with respect to normal, and the results of any response actions taken up to the time of notification.

D.2.4 Dust Collector Failure Detection

- (a) For a single compartment wet dust collector controlling emissions from a process operated continuously, a failed unit and the associated process shall be shut down immediately until the failed unit has been repaired or replaced. Operations may continue only if the event qualifies as an emergency and the Permittee satisfies the requirements of the emergency provisions of this permit (Section B - Emergency Provisions).
- (b) For a single compartment wet dust collector controlling emissions from a batch process, the feed to the process shall be shut down immediately until the failed unit has been repaired or replaced. The emissions unit shall be shut down no later than the completion of the processing of the material in the line. Operations may continue only if the event qualifies as an emergency and the Permittee satisfies the requirements of the emergency provisions of this permit (Section B - Emergency Provisions).

Bag failure can be indicated by a significant drop in the baghouse's pressure reading with abnormal visible emissions, by an opacity violation, or by other means such as gas temperature, flow rate, air infiltration, leaks, dust traces or triboflows.

Compliance Monitoring Requirements [326 IAC 2-8-4][326 IAC 2-8-5(a)(1)]

D.2.5 Visible Emissions Notations

- (a) Visible emission notations of the polishing operation's stacks (WDC1, WDC2, WDC3, WDC4, WDC5, WDC6, WDC7, WDC8, WDC9, WDC10, WDC11, WDC12, WDC13) exhaust shall be performed once per day during normal daylight operations. A trained employee shall record whether emissions are normal or abnormal.
- (b) For processes operated continuously, "normal" means those conditions prevailing, or expected to prevail, eighty percent (80%) of the time the process is in operation, not counting startup or shut down time.
- (c) In the case of batch or discontinuous operations, readings shall be taken during that part of the operation that would normally be expected to cause the greatest emissions.
- (d) A trained employee is an employee who has worked at the plant at least one (1) month and has been trained in the appearance and characteristics of normal visible emissions for that specific process.
- (e) If abnormal emissions are observed, the Permittee shall take reasonable response steps. Section C - Response to Excursions or Exceedances contains the Permittee's obligation with regard to the reasonable response steps required by this condition. Failure to take response steps shall be considered a deviation from this permit.

Record Keeping and Reporting Requirement [326 IAC 2-8-4(3)]

D.2.6 Record Keeping Requirements

- (a) To document the compliance status with Condition D.2.5, the Permittee shall maintain daily records of visible emission notations of the polishing unit's stacks WDC1, WDC2, WDC3, WDC4, WDC5, WDC6, WDC7, WDC8, WDC9, WDC10, WDC11, WDC12, WDC13. The Permittee shall include in its daily record when a visible emission notation is not taken and the reason for the lack of visible emission notation (e.g. the boiler did not operate that day).
- (b) Section C - General Record Keeping Requirements of this permit contains the

Permittee's obligations with regard to the records required by this condition.

SECTION D.3 EMISSIONS UNIT OPERATION CONDITIONS

Emissions Unit Description:

- (d) Twenty- one (21) abrasive blasters, constructed prior to 2016, each with one nozzle using Twenty-one (21) cyclones as integral control and exhausting indoors.

Emission Unit ID	Year Installed	Internal Diameter if nozzle	Flow Rate
BLA1	2015	0.5	615
BLA2	2015	0.5	615
BLA3	2015	0.19	80
BLA4	2015	0.19	80
BLA5	2015	0.19	80
BLA6	2015	0.19	80
BLA7	2015	0.19	80
BLA8	2015	0.19	80
BLA9	2015	0.19	94
BLA10	2015	0.19	80
BLA11	2015	0.19	80
BLA12	2015	0.19	178
BLA13	2015	0.25	81
BLA14	2015	0.19	94
BLA15	2015	0.19	87
BLA16	2015	0.19	80
BLA17	2015	0.19	51
BLA18	2015	0.19	65
BLA19	2015	0.5	343
BLA20	2015	0.31	165
BLA21	2015	0.25	168

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

Emission Limitations and Standards [326 IAC 2-8-4(1)]

D.3.1 Particulate Limitations for Manufacturing Processes [326 IAC 6-3-2]

Pursuant to 326 IAC 6-3-2(e)(2) the particulate from abrasive blasters identified as BLA1- BLA21 shall not exceed a rate of emission of 2.6 lb/hr each at process rate of 0.5 tons per hour.

The pounds per hour limitation were calculated using the following equation:

$$E = 4.10 P^{0.67}$$

where E = rate of emission in pounds per hour;
 and P = process weight rate in tons per hour

D.3.2 Preventive Maintenance Plan [326 IAC 2-8-4(9)]

A Preventive Maintenance Plan is required for these facilities and integral control devices. Section B - Preventive Maintenance Plan contains the Permittee's obligation with regard to the preventive maintenance plan required by this condition.

Compliance Determination Requirements [326 IAC 2 8 5(1)]

D.3.3 Particulate Control

In order to ensure compliance with Condition D.3.1 and for integral purposes, the cyclones of blasters BLA 1 through BLA21 shall be in operation and control PM, PM10, and PM2.5 emissions from the abrasive blasters identified as BLA1 through BLA21 at all times the abrasive blasters are in operation.

Compliance Monitoring Requirements [326 IAC 2-8-4][326 IAC 2-8-5(a)(1)]

D.3.4 Baghouse Inspections

The Permittee shall perform semi-annual inspections of the baghouses controlling particulate from the abrasive blasters to verify that they are being operated and maintained in accordance with the manufacturer's specifications. Inspections required by this condition shall not be performed in consecutive months. All defective bags shall be replaced.

SECTION E.1**NESHAP****Emissions Unit Description:**

- (d) Two (2) emergency compression ignition diesel generators, each with a maximum rating of 328 hp, installed in 1994 and 1996
- (e) One (1) Emergency compression ignition diesel fire pump, identified as DFP1, with a maximum capacity rating of 190 hp, installed in 2014

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

National Emission Standards for Hazardous Air Pollutants (NESHAPs) Requirements [326 IAC 2-8-4(1)]**E.1.1 General Provisions Relating to National Emission Standards for Hazardous Air Pollutants [40 CFR Part 63, Subpart A][326 IAC 20-1]**

- (a) Pursuant to 40 CFR 63, the Permittee shall comply with the provisions of 40 CFR Part 63 Subpart A – General Provisions, except as otherwise specified in 40 CFR Part 63, Subpart ZZZZ.

- (b) Pursuant to 40 CFR 63, the Permittee shall submit all required notifications and reports to:

Indiana Department of Environmental Management
Compliance and Enforcement Branch, Office of Air Quality
100 North Senate Avenue,
MC 61-53 IGCN 1003
Indianapolis, Indiana 46204-2251

E.1.2 National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines [40 CFR Part 63, Subpart ZZZZ][326 IAC 20-82]

The Permittee shall comply with the following provisions of 40 CFR Part 63, Subpart ZZZZ (included as Attachment A of this permit), which are incorporated by reference as 326 IAC 20-82, except as otherwise specified in 40 CFR 63, Subpart ZZZZ:

The two (2) emergency compression ignition diesel generators are each subject to the following applicable portions of the NESHAP for Stationary Reciprocating Internal Combustion Engines:

- (1) 40 CFR 63.6580
- (2) 40 CFR 63.6585
- (3) 40 CFR 63.6590(a)(1)(iii)
- (4) 40 CFR 63.6595(a)(1), (b), and (c)
- (5) 40 CFR 63.6603
- (6) 40 CFR 63.6605
- (7) 40 CFR 63.6625(e)(3), (f), (h), and (i)
- (8) 40 CFR 63.6635
- (9) 40 CFR 63.6640
- (10) 40 CFR 63.6645(a)(5)
- (11) 40 CFR 63.6650
- (12) 40 CFR 63.6655
- (13) 40 CFR 63.6660
- (14) 40 CFR 63.6665

- (15) 40 CFR 63.6670
- (16) 40 CFR 63.6675
- (17) Table 2d (item 4)
- (18) Table 6 (item 9)
- (19) Table 8

The Emergency compression ignition diesel fire pump identified as DFP1, is subject to the following applicable portions of the NESHAP for Stationary Reciprocating Internal Combustion Engines:

- (1) 40 CFR 63.6580
- (2) 40 CFR 63.6585(b)
- (3) 40 CFR 63.6590(a)(2)(ii) and (c)(1)
- (4) 40 CFR 63.6595(a)(7)
- (5) 40 CFR 63.6665
- (6) 40 CFR 63.6670
- (7) 40 CFR 63.6675

SECTION E.2**NSPS****Emissions Unit Description:**

- (f) One (1) Emergency compression ignition diesel fire pump, identified as DFP1, with a maximum capacity rating of 190 hp, installed in 2014

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

New Source Performance Standards (NSPS) Requirements [326 IAC 2-8-4(1)]**E.2.1 General Provisions Relating to New Source Performance Standards [326 IAC 12-1] [40 CFR Part 60, Subpart A]**

- (a) Pursuant to 40 CFR 60.1, the Permittee shall comply with the provisions of 40 CFR Part 60, Subpart A – General Provisions, which are incorporated by reference as 326 IAC 12-1, for the emission unit(s) listed above, except as otherwise specified in 40 CFR Part 60, Subpart IIII.

- (a) Pursuant to 40 CFR 60.4, the Permittee shall submit all required notifications and reports to:

Indiana Department of Environmental Management
Compliance and Enforcement Branch, Office of Air Quality
100 North Senate Avenue
MC 61-53 IGCN 1003
Indianapolis, Indiana 46204-2251

E.2.2 Stationary Compression Ignition Internal Combustion NSPS [326 IAC 12] [40 CFR Part 60, Subpart IIII]

The Permittee shall comply with the following provisions of 40 CFR Part 60, Subpart IIII (included as Attachment B to the operating permit), which are incorporated by reference as 326 IAC 12, for the emission unit, listed above:

- | | |
|------|----------------------------------|
| (1) | 40 CFR 60.4200(a)(2)(ii) and (c) |
| (2) | 40 CFR 60.4205(c) |
| (3) | 40 CFR 60.4206 |
| (4) | 40 CFR 60.4207(b) |
| (5) | 40 CFR 60.4209 |
| (6) | 40 CFR 60.4211(f) |
| (7) | 40 CFR 60.4212 |
| (8) | 40 CFR 60.4214(b) and (c) |
| (9) | 40 CFR 60.4218 |
| (10) | 40 CFR 60.4219 |
| (11) | Table 4 |

**INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
OFFICE OF AIR QUALITY
COMPLIANCE AND ENFORCEMENT BRANCH**

**FEDERALLY ENFORCEABLE STATE OPERATING PERMIT (FESOP)
CERTIFICATION**

Source Name: DePuy Orthopaedics, Inc.
Source Address: 700 Orthopaedic Dr., Warsaw, Indiana 46581
FESOP Permit No.: F085-31933-00048

This certification shall be included when submitting monitoring, testing reports/results or other documents as required by this permit.

Please check what document is being certified:

- Annual Compliance Certification Letter
- Test Result (specify)_____
- Report (specify)_____
- Notification (specify)_____
- Affidavit (specify)_____
- Other (specify)_____

I certify that, based on information and belief formed after reasonable inquiry, the statements and information in the document are true, accurate, and complete.

Signature:

Printed Name:

Title/Position:

Date:

**INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
OFFICE OF AIR QUALITY
COMPLIANCE AND ENFORCEMENT BRANCH
100 North Senate Avenue
MC 61-53 IGCN 1003
Indianapolis, Indiana 46204-2251
Phone: (317) 233-0178
Fax: (317) 233-6865**

**FEDERALLY ENFORCEABLE STATE OPERATING PERMIT (FESOP)
EMERGENCY OCCURRENCE REPORT**

Source Name: DePuy Orthopaedics, Inc.
Source Address: 700 Orthopaedic Dr., Warsaw, Indiana 46581
FESOP Permit No.: F085-31933-00048

This form consists of 2 pages

Page 1 of 2

<input type="checkbox"/> This is an emergency as defined in 326 IAC 2-7-1(12) <ul style="list-style-type: none"> • The Permittee must notify the Office of Air Quality (OAQ), within four (4) business hours (1-800-451-6027 or 317-233-0178, ask for Compliance Section); and • The Permittee must submit notice in writing or by facsimile within two (2) working days (Facsimile Number: 317-233-6865), and follow the other requirements of 326 IAC 2-7-16
--

If any of the following are not applicable, mark N/A

Facility/Equipment/Operation:
Control Equipment:
Permit Condition or Operation Limitation in Permit:
Description of the Emergency:
Describe the cause of the Emergency:

If any of the following are not applicable, mark N/A

Page 2 of 2

Date/Time Emergency started:
Date/Time Emergency was corrected:
Was the facility being properly operated at the time of the emergency? Y N Describe:
Type of Pollutants Emitted: TSP, PM-10, SO ₂ , VOC, NO _x , CO, Pb, other:
Estimated amount of pollutant(s) emitted during emergency:
Describe the steps taken to mitigate the problem:
Describe the corrective actions/response steps taken:
Describe the measures taken to minimize emissions:
If applicable, describe the reasons why continued operation of the facilities are necessary to prevent imminent injury to persons, severe damage to equipment, substantial loss of capital investment, or loss of product or raw materials of substantial economic value:

Form Completed by: _____

Title / Position: _____

Date: _____

Phone: _____

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

FESOP Usage Report
 (Submit Report Semi-Annually)

Source Name: DePuy Orthopaedics, Inc.
 Source Address: 700 Orthopaedic Drive, Warsaw, Indiana 46581-0988
 FESOP Permit No.: F085-31933-00048
 Facility: SB4, SB6
 Parameter: VOC
 Limit: Less than 15 pounds VOC per day per booth

For each semi-annual reporting period, submit six monthly reports (one per month).

Month: _____ Year: _____

Day	Booth	VOC (lbs/day)	Day	Booth	VOC (lbs/day)
1	SB4		17	SB4	
	SB6			SB6	
2	SB4		18	SB4	
	SB6			SB6	
3	SB4		19	SB4	
	SB6			SB6	
4	SB4		20	SB4	
	SB6			SB6	
5	SB4		21	SB4	
	SB6			SB6	
6	SB4		22	SB4	
	SB6			SB6	
7	SB4		23	SB4	
	SB6			SB6	
8	SB4		24	SB4	
	SB6			SB6	
9	SB4		25	SB4	
	SB6			SB6	
10	SB4		26	SB4	
	SB6			SB6	
11	SB4		27	SB4	
	SB6			SB6	
12	SB4		28	SB4	
	SB6			SB6	
13	SB4		29	SB4	
	SB6			SB6	
14	SB4		30	SB4	
	SB6			SB6	
15	SB4		31	SB4	
	SB6			SB6	
16	SB4				
	SB6				

No deviation occurred in this month.

Deviation/s occurred in this month.

Deviation has been reported on_____

Submitted by: _____

Title / Position: _____

Signature:_____

Date:_____

Phone:_____

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

FESOP Semi-Annual Report

Source Name: DePuy Orthopaedics, Inc.
 Source Address: 700 Orthopaedic Drive, Warsaw, Indiana 46581-0988
 FESOP Permit No.: F085-31933-00048
 Facility: Paint Booths SB1, SB2, SB3, SB4, and SB6
 Parameter: HAP Input
 Limit: (a) The input of each individual hazardous air pollutant (HAP) delivered to the coating applicators in all the Paint Booths SB1, SB2, SB3, SB4, and SB6 combined shall not exceed 9.9 tons per twelve (12) consecutive month period.
 (b) The input of total HAPs delivered to the coating applicators in all the Paint Booths SB1, SB2, SB3, SB4, and SB6 combined shall not exceed 23.0 tons per twelve (12) consecutive month period.
 Compliance shall be determined at the end of each month.

For each semi-annual reporting period, submit two quarterly reports.

QUARTER: _____ YEAR: _____

Month	Worst Single HAP (tons)	Worst Single HAP (tons)	Worst Single HAP (tons)
	This Month	Previous 11 Months	12 Month Total

Month	Total HAPs (tons)	Total HAPs (tons)	Total HAPs (tons)
	This Month	Previous 11 Months	12 Month Total

No deviation occurred in this quarter.
 Deviation/s occurred in this quarter.
 Deviation has been reported on: _____

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

**INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
 OFFICE OF AIR QUALITY
 COMPLIANCE AND ENFORCEMENT BRANCH
 FEDERALLY ENFORCEABLE STATE OPERATING PERMIT (FESOP)
 SEMI-ANNUAL DEVIATION AND COMPLIANCE MONITORING REPORT**

Source Name: DePuy Orthopaedics, Inc.
 Source Address: 700 Orthopaedic Dr., Warsaw, Indiana 46581
 FESOP Permit No.: F085-31933-00048

Months: _____ to _____ Year: _____

<p>This report shall be submitted semi-annually based on a calendar year. Proper notice submittal under Section B –Emergency Provisions satisfies the reporting requirements of paragraph (a) of Section C- General Reporting. Any deviation from the requirements of this permit, the date(s) of each deviation, the probable cause of the deviation, and the response steps taken must be reported. A deviation required to be reported pursuant to an applicable requirement that exists independent of the permit, shall be reported according to the schedule stated in the applicable requirement and does not need to be included in this report. Additional pages may be attached if necessary. If no deviations occurred, please specify in the box marked "No deviations occurred this reporting period".</p>	
<input type="checkbox"/> NO DEVIATIONS OCCURRED THIS REPORTING PERIOD.	
<input type="checkbox"/> THE FOLLOWING DEVIATIONS OCCURRED THIS REPORTING PERIOD	
Permit Requirement (specify permit condition #)	
Date of Deviation:	Duration of Deviation:
Number of Deviations:	
Probable Cause of Deviation:	
Response Steps Taken:	
Permit Requirement (specify permit condition #)	
Date of Deviation:	Duration of Deviation:
Number of Deviations:	
Probable Cause of Deviation:	
Response Steps Taken:	

Permit Requirement (specify permit condition #)	
Date of Deviation:	Duration of Deviation:
Number of Deviations:	
Probable Cause of Deviation:	
Response Steps Taken:	
Permit Requirement (specify permit condition #)	
Date of Deviation:	Duration of Deviation:
Number of Deviations:	
Probable Cause of Deviation:	
Response Steps Taken:	
Permit Requirement (specify permit condition #)	
Date of Deviation:	Duration of Deviation:
Number of Deviations:	
Probable Cause of Deviation:	
Response Steps Taken:	

Form Completed by: _____

Title / Position: _____

Date: _____

Phone: _____

**Indiana Department of Environmental Management
Office of Air Quality**

Technical Support Document (TSD) for a Significant Permit Revision

Source Description and Location
--

Source Name:	DePuy Orthopaedics, Inc.
Source Location:	700 Orthopaedic Drive, Warsaw IN, 46581
County:	Kosciusko
SIC Code:	3842 (Orthopedic, Prosthetic, and Surgical Appliances and Supplies)
Operation Permit No.:	F 085-31933-00048
Operation Permit Issuance Date:	August 18, 2012
Significant Permit Revision No.:	085-37505-00048
Permit Reviewer:	Kendra Sutherland

On August 11, 2016, the Office of Air Quality (OAQ) received an application from DePuy Orthopaedics, Inc. related to a modification to an existing stationary orthopedic appliance manufacturing source.

Existing Approvals

The source was issued FESOP (Renewal) No. F085-31933-00048, on August 15, 2012. The source has since received the following approvals:

- (a) Minor Revision No.085-36637-00048, issued on April 12, 2016.

County Attainment Status

The source is located in Kosciusko County.

Pollutant	Designation
SO ₂	Better than national standards.
CO	Unclassifiable or attainment effective November 15, 1990.
O ₃	Unclassifiable or attainment effective July 20, 2012, for the 2008 8-hour ozone standard. ¹
PM _{2.5}	Unclassifiable or attainment effective April 5, 2005, for the annual PM _{2.5} standard.
PM _{2.5}	Unclassifiable or attainment effective December 13, 2009, for the 24-hour PM _{2.5} standard.
PM ₁₀	Unclassifiable effective November 15, 1990.
NO ₂	Cannot be classified or better than national standards.
Pb	Unclassifiable or attainment effective December 31, 2011.

¹Unclassifiable or attainment effective October 18, 2000, for the 1-hour ozone standard which was revoked effective June 15, 2005.

- (a) **Ozone Standards**
Volatile organic compounds (VOC) and Nitrogen Oxides (NO_x) 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 NO_x emissions are considered when evaluating the rule applicability relating to ozone. Kosciusko County has been designated as attainment or unclassifiable for ozone. Therefore, VOC and NO_x emissions were reviewed pursuant to the requirements for Prevention of Significant Deterioration (PSD), 326 IAC 2-2.

- (b) **PM_{2.5}**
 Kosciusko County has been classified as attainment for PM_{2.5}. Therefore, direct PM_{2.5}, SO₂, and NOx emissions were reviewed pursuant to the requirements for Prevention of Significant Deterioration (PSD), 326 IAC 2-2.
- (c) **Other Criteria Pollutants**
 Kosciusko County has been classified as attainment or unclassifiable in Indiana for all other criteria pollutants. Therefore, these emissions were reviewed pursuant to the requirements for Prevention of Significant Deterioration (PSD), 326 IAC 2-2.

Fugitive Emissions

Since this type of operation is not one of the twenty-eight (28) listed source categories under 326 IAC 2-2, 326 IAC 2-3, or 326 IAC 2-7, and there is no applicable New Source Performance Standard that was in effect on August 7, 1980, fugitive emissions are not counted toward the determination of PSD, Emission Offset, and Part 70 Permit applicability.

Status of the Existing Source

The table below summarizes the potential to emit of the entire source, prior to the proposed amendment, after consideration of all enforceable limits established in the effective permits:

This PTE table is from the TSD or Appendix A of F085-36637-00048, issued on April 12, 2016.

Process/ Emission Unit	Potential To Emit of the Entire Source before Proposed Revision (tons/year)								
	PM	PM10*	PM2.5**	SO ₂	NOx	VOC	CO	Total HAPs	Worst Single HAP
Surface Coating Booth	0.36	0.36	0.36	0.00	0.00	14.81	0.00	24	9.90-toluene
Polishing Operation	20.46	20.46	20.46	0.00	0.00	0.00	0.00	0.00	0.00
Heaters	0.24	0.96	0.96	0.08	12.64	0.70	10.62	0.24	0.00
Degreasing Operation	0.00	0.00	0.00	0.00	0.00	0.08	0.00	0.4	0.4-DGBE
Cleaning/Sterilization Operation	0.00	0.00	0.00	0.00	0.00	0.46	0.00	0.00	0.00
Emergency Generators	0.36	0.36	0.36	0.34	5.08	0.41	1.10	0.00	0.00
Abrasive Blasters	4.99	3.49	3.49	0.00	0.00	0.00	0.00	0.00	0.00
Emergency Fire Pump	0.10	0.10	0.10	0.10	1.47	0.12	0.32	0.00	0.00
Total PTE of Entire Source	26.52	25.74	25.74	0.51	19.20	16.58	12.03	24.28	9.9 toluene
Title V Major Source Thresholds	-	<100	<100	<100	<100	<100	<100	<25	<10
PSD Major Source Thresholds	250	250	250	250	250	250	250	-	-
negl. = negligible **PM _{2.5} listed is direct PM _{2.5} .									

- (a) This existing source is not a major stationary source under PSD (326 IAC 2-2), because no PSD regulated pollutant, is emitted at a rate of 250 tons per year or more, and it is not one of the twenty-eight (28) listed source categories as specified in 326 IAC 2-2-1(ff)(1).
- (b) The potential to emit (as defined in 326 IAC 2-7-1(29)) of any single HAP is less than ten (10) tons per year and the potential to emit (as defined in 326 IAC 2-7-1(29)) of a combination of HAPs is less than twenty-five (25) tons per year. However, the Permittee has agreed to limit the source's single HAP emissions and total HAP emissions below Title V levels.

Description of Proposed Revision

The Office of Air Quality (OAQ) has reviewed an application, submitted by DePuy Orthopaedics, Inc. on August 8, 2016, relating to the addition, removal and modification of existing emission units.

The following is a list of the new emission units and pollution control devices:

- (a) Two (2) Abrasive Blasters used for maintenance purposes every two weeks, identified as BLTOOL and BLMAINT, approved in 2016 for construction, each with one nozzle and an internal nozzle diameter of 0.3125 and a maximum flow rate of 327.7 pounds per hour, using baghouse as control, and exhausting indoors.
- (b) One (1) welding station, identified as WELD consisting of the following:
 - (1) One auto weld machine, identified as WELD1, approved in 2016 for construction, with a maximum electrode consumption of 0.01 pounds per hour, with no control device and exhausting indoors.
 - (2) One (1) manual welder, identified as WELD2, approved in 2016 for construction with a maximum electrode consumption of 0.01 pounds per hour, with no control device and exhausting indoors.
- (c) Two (2) automatic transfer machine systems for cleaning and degreasing joint reconstruction pieces, identified as EU-ATM1 and EU-ATM2, approved in 2016 for construction, with a maximum potential usage of nitric acid of 11, 486 pounds per year for both units, using one nitric acid air scrubber as control and having one back up nitric acid air scrubber in place, and exhausting to SV-ATM.
- (d) Updated HAPs emissions from dust metal in the polishing operation.

The following is a list of removed emission units:

- (e) One (1) abrasive blaster, identified as BLA22, constructed in 2015, with a nozzle and using cyclones as integral control and exhausting outdoors.

Enforcement Issues

There are no pending enforcement actions related to this revision

Emission Calculations

See Appendix A of this TSD for detailed emission calculations.

Permit Level Determination – FESOP Revision
--

The following table is used to determine the appropriate permit level under 326 IAC 2-8-11.1 Permit Revisions. This table reflects the PTE before controls of the proposed revision. Control equipment is not considered federally enforceable until it has been required in a federally enforceable permit.

Process/ Emission Unit	PTE of Proposed Amendment (tons/year)									
	PM	PM10	PM2.5	SO ₂	NO _x	VOC	CO	Total HAPs	Worst Single HAP	
Updated Polishing Operation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.56	4.33	Cobalt
Welding	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	Mo
Maintenance Blaster-BL Tool	0.17	0.24	0.24	0.00	0.00	0.00	0.00	0.00	0.00	-
Automatic Transfer Machine	0.00	0.00	0.00	0.00	4.19	0.00	0.00	0.00	0.00	-
Total PTE of Proposed Amendment	0.17	0.24	0.24	0.00	4.19	0.00	0.00	6.60	4.33	Cobalt
negl. = negligible										

Pursuant to 326 IAC 2-8-11.1(f), this FESOP is being revised through a FESOP Significant Permit Revision because the proposed revision is not an Administrative Amendment or Minor Permit revision and the proposed revision involves revising the FESOP limits.

PTE of the Entire Source After Issuance of the FESOP Revision
--

The table below summarizes the potential to emit of the entire source (*reflecting adjustment of existing limits*), with updated emissions shown as **bold** values and previous emissions shown as ~~strikethrough~~ values.

Process/ Emission Unit	Potential To Emit of the Entire Source to accommodate the Proposed Revision (tons/year)								
	PM	PM10*	PM2.5**	SO ₂	NOx	VOC	CO	Total HAPs	Worst Single HAP
Surface Coating Booth	0.36	0.36	0.36	0.00	0.00	14.81	0.00	24 23.0	9.90-toluene
Polishing Operation	20.46	20.46	20.46	0.00	0.00	0.00	0.00	0.00 1.00	0.00 1.00 cobalt
Heaters	0.24	0.96	0.96	0.08	12.64	0.70	10.62	0.24	0.00
ATM	0.00	0.00	0.00	0.00	4.19	0.00	0.00	0.00	0.00
Maintenance Blasters	0.17	0.24	0.24	0.00	0.00	0.00	0.00	0.00	0.00
Welding	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.02
Degreasing Operation	0.00	0.00	0.00	0.00	0.00	0.08	0.00	0.4	0.4-DGBE
Cleaning/Sterilization Operation	0.00	0.00	0.00	0.00	0.00	0.46	0.00	0.00	0.00
Emergency Generators	0.36	0.36	0.36	0.34	5.08	0.41	1.10	0.00	0.00
Abrasive Blasters	4.99 4.91	3.49 3.43	3.49 3.43	0.00	0.00	0.00	0.00	0.00	0.00
Emergency Fire Pump	0.10	0.10	0.10	0.10	1.47	0.12	0.32	0.00	0.00
Total PTE of Entire Source	26.52 26.60	25.74 25.92	25.74 25.92	0.51	19.20 23.39	16.58	12.03	24.28 24.33	9.9 toluene
Title V Major Source Thresholds	-	<100	<100	<100	<100	<100	<100	<25	<10
PSD Major Source Thresholds	250	250	250	250	250	250	250	-	-
negl. = negligible **PM _{2.5} listed is direct PM _{2.5} .									

The table below summarizes the potential to emit of the entire source after issuance of this revision, reflecting all limits, of the emission units. (Note: the table below was generated from the above table, with bold text un-bolded and strikethrough text deleted).

Process/ Emission Unit	Potential To Emit of the Entire Source to accommodate the Proposed Revision (tons/year)								
	PM	PM10*	PM2.5* *	SO ₂	NO _x	VOC	CO	Total HAPs	Worst Single HAP
Surface Coating Booth	0.36	0.36	0.36	0.00	0.00	14.81	0.00	23.0	9.90-toluene
Polishing Operation	20.46	20.46	20.46	0.00	0.00	0.00	0.00	1.00	1.00 cobalt
Heaters	0.24	0.96	0.96	0.08	12.64	0.70	10.62	0.24	0.00
ATM	0.00	0.00	0.00	0.00	4.19	0.00	0.00	0.00	0.00
Maintenance Blasters	2.04	2.86	2.86	0.00	0.00	0.00	0.00	0.00	0.00
Welding	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.02
Degreasing Operation	0.00	0.00	0.00	0.00	0.00	0.08	0.00	0.4	0.4-DGBE
Cleaning/Sterilization Operation	0.00	0.00	0.00	0.00	0.00	0.46	0.00	0.00	0.00
Emergency Generators	0.36	0.36	0.36	0.34	5.08	0.41	1.10	0.00	0.00
Abrasive Blasters	4.91	3.43	3.43	0.00	0.00	0.00	0.00	0.00	0.00
Emergency Fire Pump	0.10	0.10	0.10	0.10	1.47	0.12	0.32	0.00	0.00
Total PTE of Entire Source	26.60	25.92	25.92	0.51	23.39	16.58	12.03	24.33	9.9 toluene
Title V Major Source Thresholds	-	<100	<100	<100	<100	<100	<100	<25	<10
PSD Major Source Thresholds	250	250	250	250	250	250	250	-	-
negl. = negligible **PM _{2.5} listed is direct PM _{2.5} .									

(a) FESOP Status

This revision to an existing Title V minor stationary source will not change the minor status, because the potential to emit criteria pollutants, HAPs and CO_{2e} from the entire source will still be limited to less than the Title V major source threshold levels. Therefore, the source will still be subject to the provisions of 326 IAC 2-8 (FESOP).

(1) HAPs

In order to comply with the requirements of 326 IAC 2-8-4 (FESOP), the source shall comply with the following:

- (1) The input of total HAPs delivered to the coating applicators in all the Paint Booths SB1, SB2, SB3, SB4, and SB6 combined shall not exceed 23.0 tons per twelve (12) consecutive month period, with compliance determined at the end of each month

- (2) The combined Hazardous Air Pollutant (HAP) emissions from the polishing operation consisting of 40 polishing jacks shall not exceed 0.229 pounds per hour.
- (3) The input of each individual hazardous air pollutant (HAP) emissions from the polishing operation consisting of 40 polishing jacks shall not exceed 0.229 pounds per hour.

Compliance with these limits, combined with the potential to emit HAP from all other emission units at this source, shall limit the source-wide total potential to emit of any single HAP to less than ten (10) tons per twelve (12) consecutive month period, total HAPs to less than twenty-five (25) tons per twelve (12) consecutive month period shall render the requirements of 326 IAC 2-7 (Part 70 Permits) and 326 IAC 2-4.1 (Major Sources of Hazardous Air Pollutants (HAP) not applicable.

(b) PSD Minor Source – PM

This modification to an existing PSD minor stationary source will not change the PSD minor status, because the potential to emit PM from the entire source will continue to be less than the PSD major source threshold levels. Therefore, pursuant to 326 IAC 2-2, the PSD requirements do not apply.

(c) PSD Minor Source for all other PSD regulated pollutants other than PM

This modification to an PSD minor stationary source will not change the PSD minor status, because the potential to emit of all other PSD regulated pollutants from the entire source will continue to be less than the PSD major source threshold levels. Therefore, pursuant to 326 IAC 2-2, the PSD requirements do not apply.

Federal Rule Applicability Determination

New Source Performance Standards (NSPS)

- (a) There are no New Source Performance Standards (40 CFR Part 60) and 326 IAC 12 included for this proposed revision.
- (b) The scrubbers are used to control nitric acid vapor produced and no nitric acid is produced at the source. Therefore, the source is not subject to New Source Performance Standards (NSPS) for Nitric Acid, 40 CFR 60, Subpart G.

National Emission Standards for Hazardous Air Pollutants (NESHAP)

- (c) There are no new National Emission Standards for Hazardous Air Pollutants (40 CFR Part 63), 326 IAC 14 and 326 IAC 20 included for this proposed revision.

Compliance Assurance Monitoring (CAM)

- (d) Pursuant to 40 CFR 64.2, Compliance Assurance Monitoring (CAM) is not included in the permit, because the potential to emit of the source is limited to less than the Title V major source thresholds and the source is not required to obtain a Part 70 or Part 71 permit.

State Rule Applicability Determination

- (a) 326 IAC 2-8-4 (FESOP)
See PTE of the Entire Source After Issuance of the FESOP Revision Section above.
- (b) 326 IAC 2-2 (Prevention of Significant Deterioration (PSD))
See PTE of the Entire Source After Issuance of the FESOP Revision Section above.
- (c) 326 IAC 2-4.1 (Major Sources of Hazardous Air Pollutants (HAP))
The unlimited potential to emit of HAPs from the new and modified units is greater than ten (10) tons per year for any single HAP and/or greater than twenty-five (25) tons per year of a combination of HAPs. However, the source shall limit the potential to emit HAPs from the new and modified units to less than ten (10) tons per year for any single HAP and less than twenty-five (25) tons per year of a combination of HAPs. Therefore, the proposed revision is not subject to the requirements of 326 IAC 2-4.1. See PTE of the Entire Source After Issuance of the FESOP Revision Section above.
- (d) 326 IAC 2-6 (Emission Reporting)
Pursuant to 326 IAC 2-6-1, this source is not subject to this rule, because it is not required to have an operating permit under 326 IAC 2-7 (Part 70), it is not located in Lake, Porter, or LaPorte County, and it does not emit lead into the ambient air at levels equal to or greater than 5 tons per year. Therefore, 326 IAC 2-6 does not apply.
- (e) 326 IAC 5-1 (Opacity Limitations)
Pursuant to 326 IAC 5-1-2 (Opacity Limitations), except as provided in 326 IAC 5-1-3 (Temporary Alternative Opacity Limitations)
- (f) 326 IAC 12 (New Source Performance Standards)
See Federal Rule Applicability Section of this TSD.
- (g) 326 IAC 20 (Hazardous Air Pollutants)
See Federal Rule Applicability Section of this TSD.

State Rule Applicability Determination

Welding Operations and Maintenance Blasters

326 IAC 6-3-2 (Particulate Emission Limitations for Manufacturing Processes)

Pursuant to 326 IAC 6-3-1(b)(5), the potential particulate emissions from the welding station and two abrasive blasters are each less than 0.551 pounds per hour. Therefore, these emission units are exempt from the requirements of 326 IAC 6-3.

Automatic Transfer Machines Cleaning Operations

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

Pursuant to 326 IAC 8-1-6(1), the automatic transfer machines are not subject to the provisions of 326 IAC 8-1-6, because baths contain no organic solvent or VOC's.

326 IAC 8-3-2 (Cold Cleaner Degreaser Control Equipment and Operating Requirements)

Pursuant to 326 IAC 8-3-1(a)(1) the automatic transfer machines are not subject to the provisions of 326 IAC 8-3-2 because the solvents used in the tanks do not contain VOC's

326 IAC 8-3-8 (Material Requirements for Cold Cleaner Degreasers)

Pursuant to 326 IAC 8-3-8(a)(1), the automatic transfer machines are not subject to the provisions of 326 IAC 8-3-8 because the solvents used in the tanks do not contain VOC's

Polishing Operation

326 IAC 6-3-2 (Particulate Emission Limitations for Manufacturing Processes)

Pursuant to 326 IAC 6-3-1(b)(5), the potential particulate emissions from each of the 40 polishing stations, are each less than 0.551 pounds per hour. Therefore, these emission units are exempt from the requirements of 326 IAC 6-3.

Compliance Determination, Monitoring and Testing Requirements

- (a) The compliance determination and monitoring requirements applicable to this proposed revision are as follows:

Particulate Control	emission unit	Parameter	Frequency
wet dust collectors	polishing operation	Visible Emissions	Daily

These monitoring conditions are necessary because the wet dust collectors for the polishing operation must operate properly to ensure compliance with (326 IAC 2-8 (FESOP)

Proposed Changes

The following changes listed below are due to the proposed (*revision or amendment*). Deleted language appears as ~~strikethrough~~ text and new language appears as **bold** text:

A.2 Emission Units and Pollution Control Equipment Summary [326 IAC 2-8-3(c)(3)]

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

- (c) One (1) polishing operation, consisting of 40 polishing jacks, installed between 1981 and 1998, each with a maximum throughput of 10 pieces per hour, using wet dust collectors 00266, 00319, 00325, 00326, 00327, 00328, 00127, 00017, 00018, 15104, 15105, 15106, and 15107 for PM **and HAPs** control, and exhausting through stacks WDC1, WDC2, WDC3, WDC4, WDC5, WDC6, WDC7, WDC8, WDC9, WDC10, WDC11, WDC12, WDC13

- (d) Twenty-~~two~~ **one (22 21)** abrasive blasters, constructed prior to 2016, each with one nozzle using Twenty-~~two~~ **one (22 21)** cyclones as integral control and exhausting indoors.

Emission Unit ID	Year Installed	Internal Diameter of nozzle (inch)	Flow Rate (lb/hr)
BLA1	2015	0.5	615
BLA2	2015	0.5	615
BLA3	2015	0.19	80
BLA4	2015	0.19	80
BLA5	2015	0.19	80
BLA6	2015	0.19	80
BLA7	2015	0.19	80
BLA8	2015	0.19	80
BLA9	2015	0.19	94
BLA10	2015	0.19	80
BLA11	2015	0.19	80
BLA12	2015	0.19	178
BLA13	2015	0.25	81
BLA14	2015	0.19	94
BLA15	2015	0.19	87
BLA16	2015	0.19	80
BLA17	2015	0.19	51
BLA18	2015	0.19	65
BLA19	2015	0.5	343
BLA20	2015	0.31	165
BLA21	2015	0.25	168
BLA22	2015	0.19	65

A.3 Insignificant Activities [326 IAC 2-7-1(21)][326 IAC 2-8-3(c)(3)(I)]

This stationary source also includes the following insignificant activities:

- (h) **Two (2) Abrasive Blasters used for maintenance purposes every weeks, identified as BLTOOL and BLMAINT, approved in 2016 for construction, each with one nozzle and an internal nozzle diameter of 0.3125 and a maximum flow rate of 327.7 pounds per hour, using baghouse as control, and exhausting indoors.**
- (i) **One (1) welding station, identified as WELD, approved in 2016 for construction, with a maximum electrode consumption of 0.01 pounds per hour, with no control device and exhausting indoors.**
- (j) **Two (2) automatic transfer machines, identified as EU-ATM, approved in 2016 for construction, with a maximum potential usage of nitric acid of 11, 486 pounds per year for both units, using a nitric acid scrubber identified as CE-ATM as control, and exhausting to SV-ATM**

SECTION D.1 EMISSIONS UNIT OPERATION CONDITIONS

D.1.2 Hazardous Air Pollutants (HAPs) Limitations

In order to comply with the requirements of 326 IAC 2-8-4 (FESOP) and render the requirements of 326 IAC 2-7 (Part 70 Permits) not applicable, the Permittee shall comply with the following:

- (b) The input of total HAPs delivered to the coating applicators in all the Paint Booths SB1, SB2, SB3, SB4, and SB6 combined shall not exceed ~~24.0~~ **23.0** tons per twelve (12) consecutive month period, with compliance determined at the end of each month.

Compliance with these limits **and Condition D.2.1**, combined with the potential to emit HAPs from all other emission units at this source, shall limit the source-wide total potential to emit any single HAP to less than ten (10) tons per 12 consecutive month period and total HAPs to less than twenty-five (25) tons per 12 consecutive month period and shall render 326 IAC 2-7 (Part 70 Permits) not applicable.

SECTION D.2 EMISSIONS UNIT OPERATION CONDITIONS

Emissions Unit Description:

- (c) One (1) polishing operation, consisting of 40 polishing jacks, installed between 1981 and 1998, each with a maximum throughput of 10 pieces per hour, using wet dust collectors 00266, 00319, 00325, 00326, 00327, 00328, 00127, 00017, 00018, 15104, 15105, 15106, and 15107 for PM **and HAPs** control, and exhausting through stacks WDC1, WDC2, WDC3, WDC4, WDC5, WDC6, WDC7, WDC8, WDC9, WDC10, WDC11, WDC12, WDC13

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

Emission Limitations and Standards [326 IAC 2-8-4(1)]

D.2.1 FESOP Hazardous Air Pollutants (HAPs) Limitations [326 IAC 2-8]

In order to comply with the requirements of 326 IAC 2-8-4 (FESOP) and render the requirements of 326 IAC 2-7 (Part 70 Permits) not applicable, the Permittee shall comply with the following:

- (a) The combined Hazardous Air Pollutant (HAP) emissions from the polishing operation consisting of 40 polishing jacks shall not exceed 0.229 pounds per hour.
- (b) The input of each individual hazardous air pollutant (HAP) emissions from the polishing operation consisting of 40 polishing jacks, shall not exceed 0.229 pounds per hour.

Compliance with these limits and Condition D.1.2, combined with the potential to emit HAPs from all other emission units at this source, shall limit the source-wide total potential to emit any single HAP to less than ten (10) tons per 12 consecutive month period and total HAPs to less than twenty-five (25) tons per 12 consecutive month period and shall render 326 IAC 2-7 (Part 70 Permits) not applicable.

~~D.2.1 Particulate Matter (PM)~~

~~Pursuant to 326 IAC 6-3-2(e) (Particulate Emission Limitations for Manufacturing Processes), the total allowable particulate emission rate from the polishing operations shall not exceed 1.30 pounds per hour when operating at a total process weight of 360~~

~~The pound per hour limitation was calculated with the following equation:~~

~~Interpolation of the data for the process weight rate up to 60,000 pounds per hour shall be accomplished by use of the equation:~~

~~$$E = 4.10 P^{0.67}$$
 where E = rate of emission in pounds per hour; and
P = process weight rate in tons per hour~~

D.2.2 Preventive Maintenance Plan [326 IAC 2-8-4(9)]

A Preventive Maintenance Plan is required for these facilities and its control devices. Section B - Preventive Maintenance Plan contains the Permittee's obligation with regard to the preventive maintenance plan required by this condition.

Compliance Determination Requirements

D.2.3 ~~Particulate Control~~

~~In order to comply with Condition D.2.1, the wet dust collectors for particulate control shall be in operation and control emissions from the polishing operations at all times that the polishing operations are in operation.~~

D.2.3 Hazardous Air Pollutants (HAPs) Control

- (a) In order to comply with Conditions D.2.1, HAPs from the polishing operations shall be controlled by wet dust collectors and the Permittee shall operate the control device in accordance with manufacturer's specifications.
- (b) In the event that bag failure is observed in a multi-compartment wet dust collector, if operations will continue for ten (10) days or more after the failure is observed before the failed units will be repaired or replaced, the Permittee shall promptly notify the IDEM, OAQ of the expected date the failed units will be repaired or replaced. The notification shall also include the status of the applicable compliance monitoring parameters with respect to normal, and the results of any response actions taken up to the time of notification.

D.2.5 Dust Collector Failure Detection

- (a) For a single compartment wet dust collector controlling emissions from a process operated continuously, a failed unit and the associated process shall be shut down immediately until the failed unit has been repaired or replaced. Operations may continue only if the event qualifies as an emergency and the Permittee satisfies the requirements of the emergency provisions of this permit (Section B - Emergency Provisions).
- (b) For a single compartment wet dust collector controlling emissions from a batch process, the feed to the process shall be shut down immediately until the failed unit has been repaired or replaced. The emissions unit shall be shut down no later than the completion of the processing of the material in the line. Operations may continue only if the event qualifies as an emergency and the Permittee satisfies the requirements of the emergency provisions of this permit (Section B - Emergency Provisions).

Bag failure can be indicated by a significant drop in the baghouse's pressure reading with abnormal visible emissions, by an opacity violation, or by other means such as gas temperature, flow rate, air infiltration, leaks, dust traces or triboflows.

Compliance Monitoring Requirements [326 IAC 2-8-4][326 IAC 2-8-5(a)(1)]

D.2.6 Visible Emissions Notations

- (a) Visible emission notations of the polishing operation's stacks (WDC1, WDC2, WDC3, WDC4, WDC5, WDC6, WDC7, WDC8, WDC9, WDC10, WDC11, WDC12, WDC13) exhaust shall be performed once per day during normal daylight operations. A trained employee shall record whether emissions are normal or abnormal.

- (b) For processes operated continuously, "normal" means those conditions prevailing, or expected to prevail, eighty percent (80%) of the time the process is in operation, not counting startup or shut down time.
- (c) In the case of batch or discontinuous operations, readings shall be taken during that part of the operation that would normally be expected to cause the greatest emissions.
- (d) A trained employee is an employee who has worked at the plant at least one (1) month and has been trained in the appearance and characteristics of normal visible emissions for that specific process.
- (e) If abnormal emissions are observed, the Permittee shall take reasonable response steps. Section C - Response to Excursions or Exceedances contains the Permittee's obligation with regard to the reasonable response steps required by this condition. Failure to take response steps shall be considered a deviation from this permit.

Record Keeping and Reporting Requirement [326 IAC 2-8-4(3)]

D.2.7 Record Keeping Requirements

- (a) To document the compliance status with Condition D.2.5, the Permittee shall maintain daily records of visible emission notations of the polishing unit's stacks WDC1, WDC2, WDC3, WDC4, WDC5, WDC6, WDC7, WDC8, WDC9, WDC10, WDC11, WDC12, WDC13. The Permittee shall include in its daily record when a visible emission notation is not taken and the reason for the lack of visible emission notation (e.g. the boiler did not operate that day).
- (b) Section C - General Record Keeping Requirements of this permit contains the Permittee's obligations with regard to the records required by this condition.

SECTION D.3 EMISSIONS UNIT OPERATION CONDITIONS

Emissions Unit Description:

- (d) Twenty-~~two~~ **one (22 21)** abrasive blasters, constructed prior to 2016, each with one nozzle using Twenty-~~two~~ **one (22 21)** cyclones as integral control and exhausting indoors.

Emission Unit ID	Year Installed	Internal Diameter if nozzle	Flow Rate
BLA1	2015	0.5	615
BLA2	2015	0.5	615
BLA3	2015	0.19	80
BLA4	2015	0.19	80
BLA5	2015	0.19	80
BLA6	2015	0.19	80
BLA7	2015	0.19	80
BLA8	2015	0.19	80
BLA9	2015	0.19	94
BLA10	2015	0.19	80
BLA11	2015	0.19	80
BLA12	2015	0.19	178
BLA13	2015	0.25	81
BLA14	2015	0.19	94
BLA15	2015	0.19	87
BLA16	2015	0.19	80
BLA17	2015	0.19	51
BLA18	2015	0.19	65
BLA19	2015	0.5	343
BLA20	2015	0.31	165
BLA21	2015	0.25	168
BLA22	2015	0.19	65

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

D.3.1 Particulate Limitations for Manufacturing Processes [326 IAC 6-3-2]

Pursuant to 326 IAC 6-3-2(e)(2) the particulate from abrasive blasters identified as BLA1- ~~BLA22~~ **BLA21** shall not exceed a rate of emission of 2.6 lb/hr each at process rate of 0.5 tons per hour.

D.3.3 Particulate Control

In order to ensure compliance with Condition D.3.1 and for integral purposes, the cyclones of blasters BLA 1 through ~~BLA22~~ **BLA21** shall be in operation and control PM, PM10, and PM2.5 emissions from the abrasive blasters identified as BLA1 through ~~BLA22~~ **BLA21** at all times the abrasive blasters are in operation.

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

FESOP Semi-Annual Report

Source Name: DePuy Orthopaedics, Inc.
Source Address: 700 Orthopaedic Drive, Warsaw, Indiana 46581-0988
FESOP Permit No.: F085-31933-00048
Facility: Paint Booths SB1, SB2, SB3, SB4, and SB6
Parameter: HAP Input
Limit: (a) The input of each individual hazardous air pollutant (HAP) delivered to the coating applicators in all the Paint Booths SB1, SB2, SB3, SB4, and SB6 combined shall not exceed 9.9 tons per twelve (12) consecutive month period.
(b) The input of total HAPs delivered to the coating applicators in all the Paint Booths SB1, SB2, SB3, SB4, and SB6 combined shall not exceed ~~24.0~~ 23.0 tons per twelve (12) consecutive month period.
Compliance shall be determined at the end of each month.

Additional Changes

[Change 1] Pursuant to table 8 to subpart IIII of Part 60, Performance tests only apply to stationary CI ICE with a displacement of ≥ 30 liters per cylinder and engines that are not certified. Testing Requirements under section E.2 Stationary Compression Ignition Internal Combustion NSPS removed from permit for the Emergency compression ignition diesel fire pump, identified as DFP1, with a maximum capacity rating of 190 hp.

SECTION E.2

NSPS

E.2.2 Stationary Compression Ignition Internal Combustion NSPS [326 IAC 12] [40 CFR Part 60, Subpart IIII]

The Permittee shall comply with the following provisions of 40 CFR Part 60, Subpart IIII (included as Attachment B to the operating permit), which are incorporated by reference as 326 IAC 12, for the emission unit, listed above:

- (1) 40 CFR 60.4200(a)(2)(ii) and (c)
- (2) 40 CFR 60.4205(c)
- (3) 40 CFR 60.4206
- (4) 40 CFR 60.4207(b)
- (5) 40 CFR 60.4209
- (6) 40 CFR 60.4211(a), (c) and (f)
- (7) 40 CFR 60.4212
- (8) 40 CFR 60.4214(b) and (c)
- (9) 40 CFR 60.4218
- (10) 40 CFR 60.4219
- (11) **Table 4**

Compliance Determination Requirements [326 IAC 2-8-4(1)]

~~E.2.3 Testing Requirements [326 IAC 2-1.1-11] [326 IAC 2-7-6(1)] [326 IAC 2-7-5(1)]~~

~~In order to document the compliance status with Condition E.2.2, the Permittee shall perform the testing required under 40 CFR 60, Subpart IIII, utilizing methods as approved by the Commissioner, at least once every five (5) years from the date of the most recent valid compliance demonstration.~~

~~Section C – Performance Testing contains the Permittee’s obligation with regard to the performance testing required by this condition.~~

Conclusion and Recommendation

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 August 11, 2016.

The construction and operation of this proposed revision shall be subject to the conditions of the attached proposed FESOP Significant Permit Revision No. 085-37505-00048. The staff recommends to the Commissioner that this FESOP Significant Permit Revision be approved.

IDEM Contact

- (a) Questions regarding this proposed permit can be directed to Kendra Sutherland at the Indiana Department Environmental Management, Office of Air Quality, Permits Branch, 100 North Senate Avenue, MC 61-53 IGCN 1003, Indianapolis, Indiana 46204-2251 or by telephone at (317) 234-5401 or toll free at 1-800-451-6027 extension 4-5401.
- (b) A copy of the findings is available on the Internet at: <http://www.in.gov/ai/appfiles/idem-caats/>
- (c) For additional information about air permits and how the public and interested parties can participate, refer to the IDEM Permit Guide on the Internet at: <http://www.in.gov/idem/5881.htm>; and the Citizens' Guide to IDEM on the Internet at: <http://www.in.gov/idem/6900.htm>.

TSD Appendix A: Emission Calculations
Emission Summary

Company Name: DePuy Orthopaedics, Inc
Source Address: 700 Orthopaedic Drive, Warsaw IN, 46581
Permit Number: 085-37505-00048
Reviewer: Kendra Sutherland

Emission Modifications for SPR 37505										
Emission Unit	PM	PM10	PM2.5	SO2	NOx	VOC	CO	Total HAPs	Single Worst HAP	
Updated Polishing Operation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.56	4.33	Cobalt
Welding	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.03	Co
Maintenance Blaster-BL Tool	0.17	0.24	0.24	0.00	0.00	0.00	0.00	0.00	0.00	-
Automatic Transfer Machine	0.00	0.00	0.00	0.00	4.19	0.00	0.00	0.00	0.00	-
Total Increase	0.17	0.24	0.24	0.00	4.19	0.00	0.00	6.60	4.35	Cobalt

TSD Appendix A: Emission Calculations
Emission Summary

Company Name: DePuy Ory Name: DePuy Orthopaedics, Inc
Source Address: 700 Orthopaedic Drive, Warsaw IN, 46581
Permit Number: 085-37501 Number: 085-37505-00048
Reviewer: Kendra Sutherland

Uncontrolled/Unlimited Potential to Emit before Integral (tons/year)

Pollutant	Emissions Generating Activity											TOTAL
	Surface Coating Booths	Polishing Operations	Insignificant Activities									
			Heaters	ATM	Maintenance Blaster	Welding	Blasters	Degreasing Operations	Cleaning/Sterilizing Operations	Emergency Generators	Emergency Fire Pump	
PM	0.36	20.46	0.24	0.00	0.17	0.00	249.92	0.00	0.00	0.36	0.10	271.44
PM10	0.36	20.46	0.96	0.00	0.24	0.00	174.94	0.00	0.00	0.36	0.10	197.19
PM2.5	0.36	20.46	0.96	0.00	0.24	0.00	174.94	0.00	0.00	0.36	0.10	197.19
SO2	0.00	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.34	0.10	0.51
NOx	0.00	0.00	12.64	4.19	0.00	0.00	0.00	0.00	0.00	5.08	1.47	19.20
VOC	14.81	0.00	0.70	0.00	0.00	0.00	0.00	0.08	0.46	0.41	0.12	16.58
CO	0.00	0.00	10.62	0.00	0.00	0.00	0.00	0.00	0.00	1.10	0.32	12.03
total HAPs	14.48	6.56	0.24	0.00	0.00	0.05	0.00	0.04	0.00	4.4E-03	1.3E-03	14.76
worst case single HAP (toluene)	14.48 (toluene)	4.33 (cobalt)	4.3E-04 (toluene)	0.0E+00	0.0E+00	2.5E-02 (CO)	0.00	0.04 (DGBE)	0.00	4.7E-04 (toluene)	1.4E-04 (toluene)	14.48 (toluene)

Controlled Potential to Emit (tons/year)

Pollutant	Emissions Generating Activity											TOTAL
	Surface Coating Booths	Polishing Operations	Insignificant Activities									
			Heaters	ATM	Maintenance Blaster	Welding	Blasters*	Degreasing Operations	Cleaning/Sterilizing Operations	Emergency Generators	Emergency Fire Pump	
PM	0.36	0.20	0.24	0.00	0.57	0.00	4.905	0.00	0.00	0.36	0.10	6.75
PM10	0.36	0.20	0.96	0.00	0.80	0.00	3.434	0.00	0.00	0.36	0.10	6.23
PM2.5	0.36	0.20	0.96	0.00	0.80	0.00	3.434	0.00	0.00	0.36	0.10	6.23
SO2	0.00	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.34	0.10	0.51
NOx	0.00	0.00	12.64	0.42	0.00	0.00	0.00	0.00	0.00	5.08	1.47	19.62
VOC	14.81	0.00	0.70	0.00	0.00	0.00	0.00	0.08	0.46	0.41	0.12	16.58
CO	0.00	0.00	10.62	0.00	0.00	0.00	0.00	0.00	0.00	1.10	0.32	12.03
total HAPs	14.48	0.07	0.24	0.00	0.00	0.05	0.00	0.04	0.00	4.4E-03	1.3E-03	14.88
worst case single HAP (toluene)	14.48 (toluene)	0.04 (cobalt)	4.3E-04 (toluene)	0.0E+00	0.0E+00	2.5E-02 (CO)	0.00	0.04 (DGBE)	0.00	4.7E-04 (toluene)	1.4E-04 (toluene)	14.48 (toluene)

*With Integral Cyclones

Limited Potential to Emit (tons/year)

Pollutant	Emissions Generating Activity											TOTAL
	Surface Coating Booths	Polishing Operations	Insignificant Activities									
			Heaters	ATM	Maintenance Blaster	Welding	Blasters	Degreasing Operations	Cleaning/Sterilizing Operations	Emergency Generators	Emergency Fire Pump	
PM	0.36	20.46	0.24	0.00	0.17	0.00	4.91	0.00	0.00	0.36	0.10	26.60
PM10	0.36	20.46	0.96	0.00	0.24	0.00	3.43	0.00	0.00	0.36	0.10	25.92
PM2.5	0.36	20.46	0.96	0.00	0.24	0.00	3.43	0.00	0.00	0.36	0.10	25.92
SO2	0.00	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.34	0.10	0.51
NOx	0.00	0.00	12.64	4.19	0.00	0.00	0.00	0.00	0.00	5.08	1.47	23.39
VOC	14.81	0.00	0.70	0.00	0.00	0.00	0.00	0.08	0.46	0.41	0.12	16.58
CO	0.00	0.00	10.62	0.00	0.00	0.00	0.00	0.00	0.00	1.10	0.32	12.03
total HAPs	23.00	1.00	0.24	0.00	0.00	0.05	0.00	0.04	0.00	4.4E-03	1.3E-03	24.33
worst case single HAP (toluene)	9.90 (toluene)	1.00 (cobalt)	4.3E-04 (toluene)	0.0E+00	0.0E+00	2.5E-02 (CO)	0.00	0.04 (DGBE)	0.00	4.7E-04 (toluene)	1.4E-04 (toluene)	9.90 (toluene)

Note: The shaded cells indicate where limits are included.
DGBE = Diethylene Glycol Butyl Ether

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

**Company Name: DePuy Orthopaedics, Inc
Source Address: 700 Orthopaedic Drive, Warsaw IN, 46581
Permit Number: 085-37505-00048
Reviewer: Kendra Sutherland**

Unit	Material	Density (Lb/Gal)	Weight % Volatile (H2O & 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	Particulate Potential (ton/yr)	lb VOC/gal solids	Transfer Efficiency	
SB1	Toluene	7.3	100.00%	0.0%	100.0%	0.0%	0.00%	0.65000	0.125	7.30	7.30	0.59	14.24	2.60	0.00	n/a	75%	
	Paraloid	7.9	56.00%	0.0%	56.0%	0.0%	44.00%	0.15000	0.125	4.42	4.42	0.08	1.99	0.36	0.07	10.05	75%	
SB2	Toluene	7.3	100.00%	0.0%	100.0%	0.0%	0.00%	0.65000	0.125	7.30	7.30	0.59	14.24	2.60	0.00	n/a	75%	
	Paraloid	7.9	56.00%	0.0%	56.0%	0.0%	44.00%	0.15000	0.125	4.42	4.42	0.08	1.99	0.36	0.07	10.05	75%	
SB3	Toluene	7.3	100.00%	0.0%	100.0%	0.0%	0.00%	0.65000	0.125	7.30	7.30	0.59	14.24	2.60	0.00	n/a	75%	
	Paraloid	7.9	56.00%	0.0%	56.0%	0.0%	44.00%	0.15000	0.125	4.42	4.42	0.08	1.99	0.36	0.07	10.05	75%	
SB4	Toluene	7.3	100.00%	0.0%	100.0%	0.0%	0.00%	0.65000	0.125	7.30	7.30	0.59	14.24	2.60	0.00	n/a	75%	
	Paraloid	7.9	56.00%	0.0%	56.0%	0.0%	44.00%	0.15000	0.125	4.42	4.42	0.08	1.99	0.36	0.07	10.05	75%	
SB6	Toluene	7.3	100.00%	0.0%	100.0%	0.0%	0.00%	0.65000	0.125	7.30	7.30	0.59	14.24	2.60	0.00	n/a	75%	
	Paraloid	7.9	56.00%	0.0%	56.0%	0.0%	44.00%	0.15000	0.125	4.42	4.42	0.08	1.99	0.36	0.07	10.05	75%	
Sum for Surface Coating Booths :												3.38	81.13	14.81	0.36			

ETHODOLOGY

* Per the MSDS that was provided by the source

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: Emission Calculations
HAP Emission Calculations
From Surface Coating Operations and Degreasing Operations**

Company Name: DePuy Orthopaedics, Inc.
Source Location: 700 Orthopaedic Drive, Warsaw, IN 46581-0988

Company Name: DePuy Orthopaedics, Inc
Source Address: 700 Orthopaedic Drive, Warsaw IN, 46581
Permit Number: 085-37505-00048
Reviewer: Kendra Sutherland

Unit	Material	Density (Lb/Gal)	Gallons of Material (gal/unit)	Maximum (unit/hour)	Weight % Toluene	Weight % Diethanolamine	Weight % Diethylene Glycol Butyl Ether	Toluene Emissions (ton/yr)	Diethanolamine Emissions (ton/yr)	Diethylene Glycol Butyl Ether Emissions (ton/yr)
SB1	Toluene	7.3	0.65000	0.125	99.50%	0.00%	0.00%	2.58	0.00	0.00
	Paraloid	7.9	0.15000	0.125	48.00%	0.00%	0.00%	0.31	0.00	0.00
SB2	Toluene	7.3	0.65000	0.125	99.50%	0.00%	0.00%	2.58	0.00	0.00
	Paraloid	7.9	0.15000	0.125	48.00%	0.00%	0.00%	0.31	0.00	0.00
SB3	Toluene	7.3	0.65000	0.125	99.50%	0.00%	0.00%	2.58	0.00	0.00
	Paraloid	7.9	0.15000	0.125	48.00%	0.00%	0.00%	0.31	0.00	0.00
SB4	Toluene	7.3	0.65000	0.125	99.50%	0.00%	0.00%	2.58	0.00	0.00
	Paraloid	7.9	0.15000	0.125	48.00%	0.00%	0.00%	0.31	0.00	0.00
SB6	Toluene	7.3	0.65000	0.125	99.50%	0.00%	0.00%	2.58	0.00	0.00
	Paraloid	7.9	0.15000	0.125	48.00%	0.00%	0.00%	0.31	0.00	0.00
Sum for Surface Coating Booths:								14.48	0.00	0.00

Total HAPs for Surface Coating Booths: 14.48

Degreaser	Oakite	8.3	0.062500	2.00	0.00%	0.00%	0.80%	0.00	0.00	0.04
Degreaser	14L	8.4	0.000132	160.00	0.00%	0.12%	0.00%	0.00	9.3E-04	0.00
Sum for Degreasing Operations:								0.00	0.00	0.04

Total State Potential Emissions

Total HAPs for Degreasing Operations: 0.04

Total HAPs for Surface Coating and Degreasing Operations:

14.52

METHODOLOGY

HAPS emission rate (tons/yr) = Density (lb/gal) * Gal of Material (gal/unit) * Maximum (unit/hr) * Weight % HAP * 8760 hrs/yr * 1 ton/2000 lbs

Oakite degreaser calculations have been modified to accurately reflect operation using 92% RO water and 8% Oakite solvent

14L degreaser calculations reflect actual operation using 94% RO water and 6% 14L solvent

**Appendix A: Emissions Calculations
Polishing**

Company Name: DePuy Orthopaedics, Inc
Source Address: 700 Orthopaedic Drive, Warsaw IN, 46581
Permit Number: 085-37505-00048
Reviewer: Kendra Sutherland

Polishing Operations:

The polishing operations are controlled with thirteen (13) wet dust collectors (15104, 15105, 15106, 15107, 00017, 00018, 00325, 00326, 00327, 00328, 00226, 00319, 00127)

Amount of PM collected: 37 pounds per day
 Hours of operation: 8 hours per day
 Estimated control efficiency: 99%

Uncontrolled

Particulate Matter		
Uncontrolled PM PTE (lbs/hr): $37 \text{ lb/8 hr} * 1/99 =$		4.6717 lb/hr
Uncontrolled PM PTE (tons/yr): $(37 \text{ lb/8 hr} * 1/99 * 8760 \text{ hr/yr} * 1 \text{ ton/2000 lbs} =$		20.4621 ton/yr

HAPS		
Uncontrolled Cobalt PTE (lbs/hr): Uncontrolled PM * 64.1% metal content * 50% CoCrMo * 66% cobalt =		0.9882 lb/hr
Uncontrolled Cobalt PTE (tons/yr): Uncontrolled PM * 64.1% metal content * 50% CoCrMo * 66% cobalt =		4.3284 ton/yr
Uncontrolled Chromium PTE (lbs/hr): Uncontrolled PM * 64.1% metal content * 50% CoCrMo * 27% chromium =		0.4043 lb/hr
Uncontrolled Chromium PTE (tons/yr): Uncontrolled PM * 64.1% metal content * 50% CoCrMo * 27% chromium =		1.7707 ton/yr
Uncontrolled Molybdenum PTE (lbs/hr): Uncontrolled PM * 64.1% metal content * 50% CoCrMo * 7% Molybdenum =		0.1048 lb/hr
Uncontrolled Molybdenum PTE (tons/yr): Uncontrolled PM * 64.1% metal content * 50% CoCrMo * 7% Molybdenum =		0.4591 ton/yr
total HAPs		6.5581

Controlled

Particulate Matter		
Controlled PM PTE (lbs/hr): $4.67 \text{ lbs/hr} * (1 - 0.99) =$		0.0467 lb/hr
Controlled PM PTE (tons/yr): $20.46 \text{ ton/yr} * (1 - 0.99) =$		0.2046 ton/yr

HAPS		
Controlled PTE Cobalt: (lbs/hr): Controlled PTE * 64.1% metal content * 50% CoCrMo * 66% Cobalt =		0.0099 lb/hr
Controlled PTE Cobalt: (tons/yr): Controlled PTE * 64.1% metal content * 50% CoCrMo * 66% Cobalt =		0.0433 ton/yr
Controlled PTE Chromium (lbs/hr): Controlled PTE * 64.1% metal content * 50% CoCrMo * 27% Chromium =		0.0040 lb/hr
Controlled PTE Chromium (tons/yr): Controlled PTE * 64.1% metal content * 50% CoCrMo * 27% Chromium =		0.0177 ton/yr
Controlled PTE Molybdenum (lbs/hr): Controlled PTE * 64.1% metal content * 50% CoCrMo * 7% Molybdenum =		0.0010 lb/hr
Controlled PTE Molybdenum (tons/yr): Controlled PTE * 64.1% metal content * 50% CoCrMo * 7% Molybdenum =		0.0046 ton/yr
total HAPs		0.07

METHODOLOGY

Polishing dust metal content based on Chilworth Technology laboratory analysis results of 64.1% metals.
 Metal content in dust based on engineering estimates is 50% Titanium and 50% CoCrMo
 CoCrMo composition is 66% Co, 27% Cr, 7% Mo
 PM=PM2.5=PM10

Cleaning/Sterilizing Operations: Insignificant Activities

Unit	Material	Total Use (ton/yr)	% VOC*	VOC PTE (ton/yr)
IPA Clean	Isopropyl Alcohol	0.02	100%	0.02
Sterilize	Acetic Acid	0.44	100%	0.44
Total:				0.46

*As a worst case estimate, it is assumed that 100% of the VOC used will be emitted.
 Calculations for cleaning/sterilizing operations are taken from CP/MSOP 085-13979-00048, issued 6/28/01.

**Appendix A: Emission Calculations
Inventory of Heaters**

Company Name: DePuy Orthopaedics, Inc
Source Address: 700 Orthopaedic Drive, Warsaw IN, 46581
Permit Number: 085-37505-00048
Reviewer: Kendra Sutherland

Unit Type	Number	Area Served	Manufacturer	Total Filter Square feet	BTU - Input
RTU	1	IT Room - 273; Med. Affairs South-214	Carrier	36	75,000
MAU	1a	Pinnacle Porocoat	CDI		800,000
MAU	1b	Pinnacle Porocoat	York		
RTU	2	New Executive Area	Carrier	54	181,000
MAU	2a	R&D	Trane		
MAU	2b	R&D	Trane		800,000
RTU	3	New Executive Area-Med. Affairs North	Carrier	66	224,000
MAU	3a	West Manufacturing	CDI		800,000
MAU	3b	West Manufacturing	York		
RTU	4	Computer Room Back up	Bryant	54	180,000
MAU	4a	Summit Porocoat Room	CDI		800,000
MAU	4b	Summit Porocoat Room	York		
RTU	5	Fitness Room West	Carrier	66	250,000
MAU	5	R&D Lab - Prototype	Trane		
RTU	6	Cafeteria - Kitchen	Bryant	54	180000
MAU	6a	Manufacturing West	CDI		800,000
MAU	6b	Manufacturing West	York		
RTU	7	Marketing Services - East	Bryant	42	115,000
MAU	7	R&D -802	Trane		
RTU	8	Marketing Services South	Carrier	42	115,000
MAU	8	CU-4 / R&D - 826	Trane		500,000
RTU	9	Marketing Services Center	Carrier	78	180,000
MAU	9	R&D Lab 843	Trane		
RTU	10	Marketing Services Center	Bryant	36	150,000
MAU	10a	Excel Porocoat Room	CDI		
MAU	10b	Excel Porocoat Room	York		
RTU	11	Marketing Services East	Carrier	36	115,000
MAU	11	Kitchen Area Hood	Captive-Aire-System		
RTU	12	Pinnacle-Poly Cell South	Carrier	180	310000
RTU	13	Pinnacle-Poly Cell Center	Carrier	180	310000
RTU	14	Pinnacle-Poly Cell North	Carrier	180	310000
RTU	15	Warehouse Mezzanine East Offices	Carrier	180	224000
RTU	16	Label Room-Poly Room-Boxing Storage	Carrier	180	250000
RTU	17	Warehouse Mezzanine East-Raw Material	Carrier	240	310,000
RTU	18	Warehouse Mezzanine Center	Carrier	240	310,000
RTU	19	Gown Room - Boxing Room	Bryant	48	115,000
RTU	20	Warehouse Mezzanine West Offices	Carrier	216	310,000
RTU	21	Receiving Inspection Area	Bryant	0	
RTU	22	Receiving Inspection Area	Bryant	0	
RTU	24	Customs Cell - South	Carrier	54	180,000
RTU	26	Customs Mezzanine South Area	Carrier	60	180000
RTU	30	Fitness Room East	Carrier	60	224000
RTU	32	Telephone Room - EC-11 - Catwalk	Bryant	36	115,000
RTU	33	Document Management-South side	Carrier	18	115,000
RTU	35o	X-Ray	Carrier		
RTU	37	Health Services	Carrier	42	
RTU	38	Security	Carrier	42	115,000
RTU	39	Health Services	Bryant	36	115000

RTU	41	R&D Engineering Interior Offices	Carrier	192	224000
RTU	42	R&D Lab - Prototype	Carrier	192	224000
RTU	43	R&D Lab - Prototype	Carrier	192	224000
RTU	44	R&D South - Ortho Suite	Carrier	216	250000
RTU	45	Logistics - Quality Area	Carrier	588	310,000
RTU	46	Purchasing	Carrier	180	180000
RTU	47	R&D Office Area South	Bryant	120	180,000
RTU	48	Customer Service	Carrier	84	115000
RTU	49	R&D Office Area West	Carrier	84	115000
RTU	50	Unavailable	Bryant	84	115,000
RTU	50o	IT Room - 39	Liebert	0	
RTU	51	Excel Cell - South	Carrier	324	310,000
RTU	52	Excel Cell - Center	Carrier	324	310,000
RTU	53	Excel Cell - North	Carrier	324	310,000
RTU	54	Manufacturing Engineers - East	Carrier	72	
RTU	56	Manufacturing Engineers - North	Carrier	72	115,000
RTU	57	General Cell	Carrier	324	310,000
RTU	58	Summit - Round & Shiny Cell	Carrier	324	310,000
RTU	59	Specials Manufacturing	Carrier	324	310,000
RTU	60	East Supervisors - North Pinnacle Cell - Restrooms	Carrier	36	115,000
RTU	61	Tool Room - South	Carrier	180	180000
RTU	62	Summit Cell - West	Carrier	108	360,000
RTU	63	Polishing -East	Carrier	3952	310,000
RTU	64	Polishing - West	Carrier	3952	310,000
RTU	65	Executive Area - World Wide - West	Carrier	108	224000
RTU	66	World Wide Conference Room	Carrier	108	74000
RTU	67	Sales Training - South	Carrier	108	180000
RTU	68	Customer Service	Carrier	108	180000
RTU	69	Customer Service - Sales Training North	Carrier	72	115000
RTU	70	Executive Area - World Wide - East	Carrier	108	180000
RTU	71	Tax - Legal Area	Carrier	108	180000
RTU	72	Reznor Air Make up Unit - Clean Room	Reznor	144	
RTU	73	Rapid Metal Prototyping	Carrier	228	231,000
RTU	74	Polymer Processing Lab	Carrier	228	231,000
RTU	75	Poly Room - Passivation	Carrier	408	525000
RTU	76	Restrooms - Welding - Tool Room Office-TR07	Carrier	36	115000
RTU	77	Tool Room - North	Carrier	204	310000
RTU	78	Customs Mezzanine North Area	Bryant	72	250,000
RTU	79	Customs Conference Room	Bryant	36	74,000
RTU	80	Customs Mezzanine Center	Bryant	72	180,000
RTU	81	Customs Mezzanine South East	Bryant	36	74,000
RTU	82	Warehouse South	Carrier	252	310,000
RTU	83	Warehouse West	Carrier	252	310,000
RTU	84	Warehouse East	Carrier	252	310,000
RTU	85	Oil Slinger - Dust Collector	Carrier	144	180,000
RTU	86	Maintenance	Carrier	324	525,000
RTU	94	Express Care	Carrier	180	525000
RTU	96	New Addition	York	192	466000
RTU	97	New Addition	York	192	466000
RTU	98	New Addition	York	192	466000
RTU	99	New Addition	York	192	466000
RTU	100	New Addition	York	192	466000
RTU	101	New Addition	York	192	466000
RTU	102	New Addition	York	192	466000
RTU	103	New Addition	York	192	466000
RTU	104	Media Services	York	192	466000
RTU	107	Cafeteria	York	192	466000
RTU	108	Cafeteria	York	192	466000
RTU	109	Cafeteria Meeting Room	Carrier	192	40000
RTU	110	Document Management-North side	Bryant	192	115000
RTU	111	New PBX Room / TR-03,14	Bryant	36	115,000
RTU	112	R&D Basement - Hydraulic pump room	York	0	466,000

RTU	113	R&D North - Tribology 843	York	192	466,000
RTU	114	R&D NorthWest side	York	192	466,000
RTU	115	R&D North Mezzanine	York	192	466,000
RTU	116	R&D South - Metrology Lab	York	192	300,000
RTU	117	R&D South - Prototype Lab 809	York	192	180,000
RTU	121	R&D Clean Room	AAON	72	316,000
RTU	122	Manufacturing Eng. East side - 339,343	Bryant	0	115,000
RTU	123	Mail Room - Maintenance shop	Carrier	0	250,000
RTU	154	Legal Conference room - 28	Bryant		88,000
RTU	155	The Loft	Bryant		72,000
RTU	156	R&D Furnace room spray booth-808	AAON		180000
RTU	157	R&D Furnace room-808	Carrier		75000
RTU	187	Cafeteria - Cooler			
RTU	188	Cafeteria - Freezer			
RTU	189	R&D SIS Finished goods - 859	Carrier		224,000
RTU	196	Cafeteria Dishwasher Room	Mitsubishi	0	
RTU	194	Logistics Hall-Old 2 story North	Bryant	0	150000

Total BTU =	29,438,000
MMBTU	29.438

**Appendix A: Emissions Calculations
Natural Gas Combustion Only
MM BTU/HR <100**

Company Name: DePuy Orthopaedics, Inc
Source Address: 700 Orthopaedic Drive, Warsaw IN, 46581
Permit Number: 085-37505-00048
Reviewer: Kendra Sutherland

Heat Input Capacity MMBtu/hr	HHV mmBtu mmscf	Potential Throughput MMCF/yr
29.4	1020	252.8

Emission Factor in lb/MMCF	Pollutant						
	PM*	PM10*	direct PM2.5*	SO2	NOx 100 **see below	VOC	CO
Potential Emission in tons/yr	0.24	0.96	0.96	0.08	12.64	0.70	10.62

*PM emission factor is filterable PM only. PM10 emission factor is filterable and condensable PM10 combined.
PM2.5 emission factor is filterable and condensable PM2.5 combined.
**Emission Factors for NOx: Uncontrolled = 100, Low NOx Burner = 50, Low NOx Burners/Flue gas recirculation = 32

Methodology

All emission factors are based on normal firing.
MMBtu = 1,000,000 Btu
MMCF = 1,000,000 Cubic Feet of Gas
Emission Factors are from AP 42, Chapter 1.4, Tables 1.4-1, 1.4-2, 1.4-3, SCC #1-02-006-02, 1-01-006-02, 1-03-006-02, and 1-03-006-03
Potential Throughput (MMCF) = Heat Input Capacity (MMBtu/hr) x 8,760 hrs/yr x 1 MMCF/1,020 MMBtu
Emission (tons/yr) = Throughput (MMCF/yr) x Emission Factor (lb/MMCF)/2,000 lb/ton

See page 2 for HAPs emissions calculations.

**Appendix A: Emissions Calculations
Natural Gas Combustion Only
MM BTU/HR <100
HAPs Emissions**

Company Name: DePuy Orthopaedics, Inc
Source Address: 700 Orthopaedic Drive, Warsaw IN, 46581
Permit Number: 085-37505-00048
Reviewer: Kendra Sutherland

Emission Factor in lb/MMcf	HAPs - Organics				
	Benzene	Dichlorobenzene	Formaldehyde	Hexane	Toluene
Potential Emission in tons/yr	2.7E-04	1.5E-04	9.5E-03	0.23	4.3E-04

Emission Factor in lb/MMcf	HAPs - Metals				
	Lead	Cadmium	Chromium	Manganese	Nickel
Potential Emission in tons/yr	6.3E-05	1.4E-04	1.8E-04	4.8E-05	2.7E-04

Methodology is the same as page 1.

The five highest organic and metal HAPs emission factors are provided above.
Additional HAPs emission factors are available in AP-42, Chapter 1.4.
See Page 3 for Greenhouse Gas calculations.

Appendix A: Emissions Calculations
Automatic Transfer Machines

Company Name:
Source Address:
Permit Number:
Reviewer:

Company Name: DuPuy Orthopaedics, Inc
Source Address: 700 Orthopaedic Drive, Warsaw IN, 46581
Permit Number: 05-37505-00048
Reviewer: Kendra Sutherland

Potential NOx Emissions

Emission Unit ID	Unit Description	Number of Units	Molar Mass HNO3 (lb)	Molar Mass NO2 (lb)	Potential Usage of HNO3 (lb/yr)	Potential Usage of HNO3 (grams)	Moles of HNO3	Moles of NO2*	Potential NOx emitted (lb/yr)	Potential NOx emitted (tons/yr)	Lbs/hr	Control Efficiency	Controlled lbs/hr	Controlled lbs/yr	Controlled TPY
EU-ATM	Automatic Transfer Machine (ATM)	2	63.01	46.01	11486	5.21E+06	2.22E+06	8.26E+04	8.387.10	4.19	0.96	90%	0.10	838.71	0.42
Total of NOx (tons/yr) =										4.19					

*1 mole NOx generated from 1 mole of NO3

Methodology:

Potential usage of HNO3 (lbs) = Pounds HNO3 purchased in 2015
 Potential usage of HNO3 (grams) = Potential usage of HNO3 (lbs) * 454 grams/lb
 Moles of HNO3 = Potential usage of HNO3 (grams) / molar mass HNO3
 Moles of NOx = Moles of HNO3 / 2 moles NOx/mole HNO3
 Potential NOx emitted (lbs/yr) = Moles NO2 * Molar Mass NO2 / 454 (grams/lb)
 Potential NOx emitted (tons/yr) = Potential NOx emitted (lbs/yr) / 2000 lbs
 Controlled NOx emitted (lbs/yr) = potential NOx emitted * (1 - control efficiency)

**Appendix A: Emission Calculations
Abrasive Blasting - Confined
Unit ID: Maintenance Blasters (2)**

Company Name: DePuy Orthopaedics, Inc
Source Address: 700 Orthopaedic Drive, Warsaw IN, 46581
Permit Number: 085-37505-00048
Reviewer: Kendra Sutherland

Table 1 - Emission Factors for Abrasives

Abrasive	Emission Factor (EF)	
	lb PM / lb abrasive	lb PM10 / lb PM
Sand	0.041	0.70
Grit	0.010	0.70
Steel Shot	0.004	0.86
Other	0.010	

Table 2 - Density of Abrasives (lb/ft3)

Abrasive	Density (lb/ft3)
Al oxides	160
Sand	99
Steel	487

Table 3 - Sand Flow Rate (FR1) Through Nozzle (lb/hr)

Flow rate (FR1) of sand through a blasting nozzle as a function of nozzle pressure and internal diameter (ID1)

Nozzle Type (diameter)	Internal diameter, in	Nozzle Pressure (psig)								
		30	40	50	55	60	70	80	90	100
No. 2 (1/8 inch)	0.125	28	35	42	45.5	49	55	63	70	77
No. 3 (3/16 inch)	0.1875	65	80	94	100.5	107	122	135	149	165
No. 4 (1/4 inch)	0.25	109	138	168	181.5	195	221	255	280	309
No. 5 (5/16 inch)	0.3125	205	247	292	323	354	377	420	462	507
No. 6 (3/8 inch)	0.375	285	355	417	447	477	540	600	657	720
No. 7 (7/16 inch)	0.4375	385	472	560	602.5	645	755	820	905	940
No. 8 (1/2 inch)	0.5	503	615	725	780	835	945	1050	1160	1265
No. 10 (5/8 inch)	0.625	820	990	1170	1253	1336	1510	1680	1850	2030
No. 12 (3/4 inch)	0.75	1140	1420	1670	1792.5	1915	2160	2400	2630	2880
No. 16 (1 inch)	1	2030	2460	2900	3120	3340	3780	4200	4640	5060

CALCULATIONS

Adjusting Flow Rates for Different Abrasives and Nozzle Diameters
Flow Rate (FR) = Abrasive flow rate (lb/hr) of abrasive at nozzle pressure and internal nozzle diameter (ID)

D1 = Density of All Oxides from Table 2 = **160** lb/ft3
ID1 = Internal diameter of nozzle for sand blasting from Table 3 = **0.3125** inch
FR1 = Sand flow rate at nozzle pressure and internal diameter (ID1) from Table 3 = **323** lb/hr

Actual blasting media used = **Al Oxide**
D = Density of actual abrasive = **162.31** lb/ft3
ID = internal diameter of actual nozzle = **0.3125** inch
FR = Flow rate of actual abrasive (lb/hr) = **327.7** lb/hr (per nozzle)

Potential to Emit Before Control

FR = Flow rate of actual abrasive (lb/hr) = **327.7** lb/hr (per nozzle)
w = fraction of time of wet blasting = **0** %
N = number of nozzles = **1**
EF = PM emission factor for actual abrasive from Table 1 = **0.010** lb PM / lb abrasive
PM10 emission factor ratio for actual abrasive from Table 1 = **0.70** lb PM10 / lb PM2.5
Number of Blasters = **2**

	PM	PM10	
Potential to Emit (before control)* =	6.553	9.175	lb/hr
=	157.28	220.19	lb/day
=	0.17	0.24	ton/yr

Potential to Emit After Control

	PM	PM10/PM2.5	
Emission Control Device Efficiency =	98.0%	98.0%	
Potential to Emit (after control) =	1.3E-01	1.8E-01	lb/hr
=	3.146	4.404	lb/day
=	0.574	0.804	ton/yr

METHODOLOGY

*Used for maintenance purposes once every other week (2 hours) (26 times a year) =52 hours a year

Blasting medium = Aluminum Oxide

Emission Factors from STAPPA/ALAPCO "Air Quality Permits", Vol. I, Section 3 "Abrasive Blasting" (1991 edition)

Emission Factors for 55 PSI derived by averaging the values for 50 PSI and 60 PSI

Flow rate of actual abrasive (FR) (lb/hr) = FR1 x (ID/ID1)² x (D/D1) ² units

Potential to Emit (before control) = EF x FR x (1 - w/200) x N (where w should be entered in as a whole number (if w is 50%, enter 50))

Potential to Emit (after control) = [Potential to Emit (before control)] * [1 - control efficiency]

Potential to Emit (tons/year) = [Potential to Emit (lbs/hour)] x [624 hours/year] x [ton/2000 lbs]

**Appendix A: Emissions Calculations
Welding and Thermal Cutting**

Company Name: DePuy Orthopaedics, Inc
 Source Address: 700 Orthopaedic Drive, Warsaw IN, 46581
 Permit Number: 085-37505-00048
 Reviewer: Kendra Sutherland

PROCESS	Unit ID	Number of Stations	Weight of Welding Rod/Electrode (lbs)	Max welding rods/electrodes used per hour	Max. electrode consumption per station (lbs/hr)	EMISSION FACTORS* (lb pollutant/lb electrode)				EMISSIONS (lbs/hr)				HAPS (lbs/hr)
						PM = PM10	Co	Cr	Mo	PM = PM10	Co	Cr	Mo	
WELDING														
Auto Weld	WELD 1	1	0.01720	0.1	0.001719606	0.0211	0.67	0.29	0.07	0.000036	0.001	0.000	0.000120372	0.002
Manual Weld	WELD 2	1	0.01720	0.5	0.00859803	0.0211	0.67	0.29	0.07	0.000181	0.006	0.002	0.000601862	0.009
EMISSION TOTALS														
Potential Emissions lbs/hr										0.00018	0.00576	0.00249	0.00060	0.01
Potential Emissions lbs/day										0.00435	0.13826	0.05984	0.01444	0.26
Potential Emissions tons/year										0.00079	0.02523	0.01092	0.00264	0.05

Methodology:

*Emission Factors are default values for carbon steel. Lb pollutant/lb electrode based on electrode composition of 67% Cobalt, 29% Chromium, 7% Molybdenum.
 Welding emissions, lb/hr: (# of stations)(max. lbs of electrode used/hr/station)/emission factor, lb. pollutant/lb. of electrode used)
 Emissions, lbs/day = emissions, lbs/hr x 24 hrs/day
 Emissions, tons/yr = emissions, lb/hr x 8,760 hrs/year x 1 ton/2,000 lbs.

**Appendix A: Emission Calculations
Abrasive Blasting - Confined
Unit ID: BLA1**

Company Name: DePuy Orthopaedics, Inc
Source Address: 700 Orthopaedic Drive, Warsaw IN, 46581
Permit Number: 085-37505-00048
Reviewer: Kendra Sutherland

Table 1 - Emission Factors for Abrasives

Abrasive	Emission Factor (EF)	
	lb PM / lb abrasive	lb PM10 / lb PM
Sand	0.041	0.70
Grit	0.010	0.70
Steel Shot	0.004	0.86
Other	0.010	

Table 2 - Density of Abrasives (lb/ft3)

Abrasive	Density (lb/ft3)
Al oxides	160
Sand	99
Steel	487

Table 3 - Sand Flow Rate (FR1) Through Nozzle (lb/hr)

Flow rate (FR1) of sand through a blasting nozzle as a function of nozzle pressure and internal diameter (ID1)

Nozzle Type (diameter)	Internal diameter, in	Nozzle Pressure (psig)							
		30	40	50	60	70	80	90	100
No. 2 (1/8 inch)	0.125	28	35	42	49	55	63	70	77
No. 3 (3/16 inch)	0.1875	65	80	94	107	122	135	149	165
No. 4 (1/4 inch)	0.25	109	138	168	195	221	255	280	309
No. 5 (5/16 inch)	0.3125	205	247	292	354	377	420	462	507
No. 6 (3/8 inch)	0.375	285	355	417	477	540	600	657	720
No. 7 (7/16 inch)	0.4375	385	472	560	645	755	820	905	940
No. 8 (1/2 inch)	0.5	503	615	725	835	945	1050	1160	1265
No. 10 (5/8 inch)	0.625	820	990	1170	1336	1510	1680	1850	2030
No. 12 (3/4 inch)	0.75	1140	1420	1670	1915	2160	2400	2630	2880
No. 16 (1 inch)	1	2030	2460	2900	3340	3780	4200	4640	5060

CALCULATIONS

Adjusting Flow Rates for Different Abrasives and Nozzle Diameters
Flow Rate (FR) = Abrasive flow rate (lb/hr) of abrasive at nozzle pressure and internal nozzle diameter (ID)

D1 = Density of sand from Table 2 = 99 lb/ft3
 ID1 = Internal diameter of nozzle for sand blasting from Table 3 = 0.5 inch
 FR1 = Sand flow rate at nozzle pressure and internal diameter (ID1) from Table 3 = 615 lb/hr

Actual blasting media used = Glass
 D = Density of actual abrasive = 162.31 lb/ft3
 ID = internal diameter of actual nozzle = 0.5 inch
 FR = Flow rate of actual abrasive (lb/hr) = 1008.3 lb/hr (per nozzle)

Potential to Emit Before Control

FR = Flow rate of actual abrasive (lb/hr) = 1008.3 lb/hr (per nozzle)
 w = fraction of time of wet blasting = 0 %
 N = number of nozzles = 1
 EF = PM emission factor for actual abrasive from Table 1 = 0.010 lb PM / lb abrasive
 PM10 emission factor ratio for actual abrasive from Table 1 = 0.70 lb PM10 / lb PM

	PM	PM10/PM2.5	
Potential to Emit (before control)	10.083	7.058	lb/hr
	241.99	169.39	lb/day
	44.16	30.91	ton/yr

Potential to Emit After Control

	PM	PM10/PM2.5	
Emission Control Device Efficiency	98.0%	98.0%	
Potential to Emit (after control)	2.0E-01	1.4E-01	lb/hr
	4.840	3.388	lb/day
	0.883	0.618	ton/yr

METHODOLOGY

Emission Factors from STAPPA/ALAPCO "Air Quality Permits", Vol. I, Section 3 "Abrasive Blasting" (1991 edition)
 Flow rate of actual abrasive (FR) (lb/hr) = FR1 x (ID/ID1)^2 x (D/D1)
 Potential to Emit (before control) = EF x FR x (1 - w/200) x N (where w should be entered in as a whole number (if w is 50%, enter 50))
 Potential to Emit (after control) = [Potential to Emit (before control)] * [1 - control efficiency]
 Potential to Emit (tons/year) = [Potential to Emit (lbs/hour)] x [8760 hours/year] x [ton/2000 lbs]

**Appendix A: Emission Calculations
Abrasive Blasting - Confined
Unit ID: BLA2**

Company Name: DePuy Orthopaedics, Inc
Source Address: 700 Orthopaedic Drive, Warsaw IN, 46581
Permit Number: 085-37505-00048
Reviewer: Kendra Sutherland

Table 1 - Emission Factors for Abrasives

Abrasive	Emission Factor (EF)	
	lb PM / lb abrasive	lb PM10 / lb PM
Sand	0.041	0.70
Grit	0.010	0.70
Steel Shot	0.004	0.86
Other	0.010	

Table 2 - Density of Abrasives (lb/ft3)

Abrasive	Density (lb/ft3)
Al oxides	160
Sand	99
Steel	487

Table 3 - Sand Flow Rate (FR1) Through Nozzle (lb/hr)

Flow rate (FR1) of sand through a blasting nozzle as a function of nozzle pressure and internal diameter (ID1)

Nozzle Type (diameter)	Internal diameter, in	Nozzle Pressure (psig)							
		30	40	50	60	70	80	90	100
No. 2 (1/8 inch)	0.125	28	35	42	49	55	63	70	77
No. 3 (3/16 inch)	0.1875	65	80	94	107	122	135	149	165
No. 4 (1/4 inch)	0.25	109	138	168	195	221	255	280	309
No. 5 (5/16 inch)	0.3125	205	247	292	354	377	420	462	507
No. 6 (3/8 inch)	0.375	285	355	417	477	540	600	657	720
No. 7 (7/16 inch)	0.4375	385	472	560	645	755	820	905	940
No. 8 (1/2 inch)	0.5	503	615	725	835	945	1050	1160	1265
No. 10 (5/8 inch)	0.625	820	990	1170	1336	1510	1680	1850	2030
No. 12 (3/4 inch)	0.75	1140	1420	1670	1915	2160	2400	2630	2880
No. 16 (1 inch)	1	2030	2460	2900	3340	3780	4200	4640	5060

CALCULATIONS

Adjusting Flow Rates for Different Abrasives and Nozzle Diameters
Flow Rate (FR) = Abrasive flow rate (lb/hr) of abrasive at nozzle pressure and internal nozzle diameter (ID)

D1 = Density of sand from Table 2 = 99 lb/ft3
 ID1 = Internal diameter of nozzle for sand blasting from Table 3 = 0.5 inch
 FR1 = Sand flow rate at nozzle pressure and internal diameter (ID1) from Table 3 = 615 lb/hr

Actual blasting media used = Glass
 D = Density of actual abrasive = 162.31 lb/ft3
 ID = internal diameter of actual nozzle = 0.5 inch
 FR = Flow rate of actual abrasive (lb/hr) = 1008.3 lb/hr (per nozzle)

Potential to Emit Before Control

FR = Flow rate of actual abrasive (lb/hr) = 1008.3 lb/hr (per nozzle)
 w = fraction of time of wet blasting = 0 %
 N = number of nozzles = 1
 EF = PM emission factor for actual abrasive from Table 1 = 0.010 lb PM / lb abrasive
 PM10 emission factor ratio for actual abrasive from Table 1 = 0.70 lb PM10 / lb PM

	PM	PM10/PM2.5	
Potential to Emit (before control)	10.083	7.058	lb/hr
	241.99	169.39	lb/day
	44.16	30.91	ton/yr

Potential to Emit After Control

	PM	PM10/PM2.5	
Emission Control Device Efficiency	98.0%	98.0%	
Potential to Emit (after control)	2.0E-01	1.4E-01	lb/hr
	4.840	3.388	lb/day
	0.883	0.618	ton/yr

METHODOLOGY

Emission Factors from STAPPA/ALAPCO "Air Quality Permits", Vol. I, Section 3 "Abrasive Blasting" (1991 edition)
 Flow rate of actual abrasive (FR) (lb/hr) = FR1 x (ID/ID1)^2 x (D/D1)
 Potential to Emit (before control) = EF x FR x (1 - w/200) x N (where w should be entered in as a whole number (if w is 50%, enter 50))
 Potential to Emit (after control) = [Potential to Emit (before control)] * [1 - control efficiency]
 Potential to Emit (tons/year) = [Potential to Emit (lbs/hour)] x [8760 hours/year] x [ton/2000 lbs]

**Appendix A: Emission Calculations
Abrasive Blasting - Confined
Unit ID: BLA3**

Company Name: DePuy Orthopaedics, Inc
Source Address: 700 Orthopaedic Drive, Warsaw IN, 46581
Permit Number: 085-37505-00048
Reviewer: Kendra Sutherland

Table 1 - Emission Factors for Abrasives

Abrasive	Emission Factor (EF)	
	lb PM / lb abrasive	lb PM10 / lb PM
Sand	0.041	0.70
Grit	0.010	0.70
Steel Shot	0.004	0.86
Other	0.010	

Table 2 - Density of Abrasives (lb/ft3)

Abrasive	Density (lb/ft3)
Al oxides	160
Sand	99
Steel	487

Table 3 - Sand Flow Rate (FR1) Through Nozzle (lb/hr)

Flow rate (FR1) of sand through a blasting nozzle as a function of nozzle pressure and internal diameter (ID1)

Nozzle Type (diameter)	Internal diameter, in	Nozzle Pressure (psig)							
		30	40	50	60	70	80	90	100
No. 2 (1/8 inch)	0.125	28	35	42	49	55	63	70	77
No. 3 (3/16 inch)	0.1875	65	80	94	107	122	135	149	165
No. 4 (1/4 inch)	0.25	109	138	168	195	221	255	280	309
No. 5 (5/16 inch)	0.3125	205	247	292	354	377	420	462	507
No. 6 (3/8 inch)	0.375	285	355	417	477	540	600	657	720
No. 7 (7/16 inch)	0.4375	385	472	560	645	755	820	905	940
No. 8 (1/2 inch)	0.5	503	615	725	835	945	1050	1160	1265
No. 10 (5/8 inch)	0.625	820	990	1170	1336	1510	1680	1850	2030
No. 12 (3/4 inch)	0.75	1140	1420	1670	1915	2160	2400	2630	2880
No. 16 (1 inch)	1	2030	2460	2900	3340	3780	4200	4640	5060

CALCULATIONS

Adjusting Flow Rates for Different Abrasives and Nozzle Diameters	
Flow Rate (FR) = Abrasive flow rate (lb/hr) of abrasive at nozzle pressure and internal nozzle diameter (ID)	
D1 = Density of sand from Table 2 =	99 lb/ft3
ID1 = Internal diameter of nozzle for sand blasting from Table 3 =	0.1875 inch
FR1 = Sand flow rate at nozzle pressure and internal diameter (ID1) from Table 3 =	80 lb/hr
Actual blasting media used =	Glass
D = Density of actual abrasive =	162.31 lb/ft3
ID = internal diameter of actual nozzle =	0.1875 inch
FR = Flow rate of actual abrasive (lb/hr) =	131.2 lb/hr (per nozzle)

Potential to Emit Before Control	
FR = Flow rate of actual abrasive (lb/hr) =	131.2 lb/hr (per nozzle)
w = fraction of time of wet blasting =	0 %
N = number of nozzles =	1
EF = PM emission factor for actual abrasive from Table 1 =	0.010 lb PM / lb abrasive
PM10 emission factor ratio for actual abrasive from Table 1 =	0.70 lb PM10 / lb PM
Potential to Emit (before control) =	PM PM10/PM2.5
=	1.312 0.918 lb/hr
=	31.48 22.03 lb/day
=	5.74 4.02 ton/yr

Potential to Emit After Control	
Emission Control Device Efficiency =	98.0% 98.0%
Potential to Emit (after control) =	PM PM10/PM2.5
=	2.6E-02 1.8E-02 lb/hr
=	0.630 0.441 lb/day
=	0.115 0.080 ton/yr

METHODOLOGY

Emission Factors from STAPPA/ALAPCO "Air Quality Permits", Vol. I, Section 3 "Abrasive Blasting" (1991 edition)

Flow rate of actual abrasive (FR) (lb/hr) = FR1 x (ID/ID1)^2 x (D/D1)

Potential to Emit (before control) = EF x FR x (1 - w/200) x N (where w should be entered in as a whole number (if w is 50%, enter 50))

Potential to Emit (after control) = [Potential to Emit (before control)] * [1 - control efficiency]

Potential to Emit (tons/year) = [Potential to Emit (lbs/hour)] x [8760 hours/year] x [ton/2000 lbs]

**Appendix A: Emission Calculations
Abrasive Blasting - Confined
Unit ID: BLA4**

Company Name: DePuy Orthopaedics, Inc
Source Address: 700 Orthopaedic Drive, Warsaw IN, 46581
Permit Number: 085-37505-00048
Reviewer: Kendra Sutherland

Table 1 - Emission Factors for Abrasives

Abrasive	Emission Factor (EF)	
	lb PM / lb abrasive	lb PM10 / lb PM
Sand	0.041	0.70
Grit	0.010	0.70
Steel Shot	0.004	0.86
Other	0.010	

Table 2 - Density of Abrasives (lb/ft3)

Abrasive	Density (lb/ft3)
Al oxides	160
Sand	99
Steel	487

Table 3 - Sand Flow Rate (FR1) Through Nozzle (lb/hr)

Flow rate (FR1) of sand through a blasting nozzle as a function of nozzle pressure and internal diameter (ID1)

Nozzle Type (diameter)	Internal diameter, in	Nozzle Pressure (psig)							
		30	40	50	60	70	80	90	100
No. 2 (1/8 inch)	0.125	28	35	42	49	55	63	70	77
No. 3 (3/16 inch)	0.1875	65	80	94	107	122	135	149	165
No. 4 (1/4 inch)	0.25	109	138	168	195	221	255	280	309
No. 5 (5/16 inch)	0.3125	205	247	292	354	377	420	462	507
No. 6 (3/8 inch)	0.375	285	355	417	477	540	600	657	720
No. 7 (7/16 inch)	0.4375	385	472	560	645	755	820	905	940
No. 8 (1/2 inch)	0.5	503	615	725	835	945	1050	1160	1265
No. 10 (5/8 inch)	0.625	820	990	1170	1336	1510	1680	1850	2030
No. 12 (3/4 inch)	0.75	1140	1420	1670	1915	2160	2400	2630	2880
No. 16 (1 inch)	1	2030	2460	2900	3340	3780	4200	4640	5060

CALCULATIONS

Adjusting Flow Rates for Different Abrasives and Nozzle Diameters	
Flow Rate (FR) = Abrasive flow rate (lb/hr) of abrasive at nozzle pressure and internal nozzle diameter (ID)	
D1 = Density of sand from Table 2 =	99 lb/ft3
ID1 = Internal diameter of nozzle for sand blasting from Table 3 =	0.1875 inch
FR1 = Sand flow rate at nozzle pressure and internal diameter (ID1) from Table 3 =	80 lb/hr
Actual blasting media used = Zirconia	
D = Density of actual abrasive =	143.58 lb/ft3
ID = internal diameter of actual nozzle =	0.1875 inch
FR = Flow rate of actual abrasive (lb/hr) =	116.0 lb/hr (per nozzle)

Potential to Emit Before Control	
FR = Flow rate of actual abrasive (lb/hr) =	116.0 lb/hr (per nozzle)
w = fraction of time of wet blasting =	0 %
N = number of nozzles =	1
EF = PM emission factor for actual abrasive from Table 1 =	0.010 lb PM / lb abrasive
PM10 emission factor ratio for actual abrasive from Table 1 =	0.70 lb PM10 / lb PM
Potential to Emit (before control) =	PM PM10/PM2.5
=	1.160 0.812 lb/hr
=	27.85 19.49 lb/day
=	5.08 3.56 ton/yr

Potential to Emit After Control	
Emission Control Device Efficiency =	PM PM10/PM2.5
Potential to Emit (after control) =	98.0% 98.0%
=	2.3E-02 1.6E-02 lb/hr
=	0.557 0.390 lb/day
=	0.102 0.071 ton/yr

METHODOLOGY

Emission Factors from STAPPA/ALAPCO "Air Quality Permits", Vol. I, Section 3 "Abrasive Blasting" (1991 edition)
 Flow rate of actual abrasive (FR) (lb/hr) = FR1 x (ID/ID1)^2 x (D/D1)
 Potential to Emit (before control) = EF x FR x (1 - w/200) x N (where w should be entered in as a whole number (if w is 50%, enter 50))
 Potential to Emit (after control) = [Potential to Emit (before control)] * [1 - control efficiency]
 Potential to Emit (tons/year) = [Potential to Emit (lbs/hour)] x [8760 hours/year] x [ton/2000 lbs]

**Appendix A: Emission Calculations
Abrasive Blasting - Confined
Unit ID: BLA5**

Company Name: DePuy Orthopaedics, Inc
Source Address: 700 Orthopaedic Drive, Warsaw IN, 46581
Permit Number: 085-37505-00048
Reviewer: Kendra Sutherland

Table 1 - Emission Factors for Abrasives

Abrasive	Emission Factor (EF)	
	lb PM / lb abrasive	lb PM10 / lb PM
Sand	0.041	0.70
Grit	0.010	0.70
Steel Shot	0.004	0.86
Other	0.010	

Table 2 - Density of Abrasives (lb/ft3)

Abrasive	Density (lb/ft3)
Al oxides	160
Sand	99
Steel	487

Table 3 - Sand Flow Rate (FR1) Through Nozzle (lb/hr)

Flow rate (FR1) of sand through a blasting nozzle as a function of nozzle pressure and internal diameter (ID1)

Nozzle Type (diameter)	Internal diameter, in	Nozzle Pressure (psig)							
		30	40	50	60	70	80	90	100
No. 2 (1/8 inch)	0.125	28	35	42	49	55	63	70	77
No. 3 (3/16 inch)	0.1875	65	80	94	107	122	135	149	165
No. 4 (1/4 inch)	0.25	109	138	168	195	221	255	280	309
No. 5 (5/16 inch)	0.3125	205	247	292	354	377	420	462	507
No. 6 (3/8 inch)	0.375	285	355	417	477	540	600	657	720
No. 7 (7/16 inch)	0.4375	385	472	560	645	755	820	905	940
No. 8 (1/2 inch)	0.5	503	615	725	835	945	1050	1160	1265
No. 10 (5/8 inch)	0.625	820	990	1170	1336	1510	1680	1850	2030
No. 12 (3/4 inch)	0.75	1140	1420	1670	1915	2160	2400	2630	2880
No. 16 (1 inch)	1	2030	2460	2900	3340	3780	4200	4640	5060

CALCULATIONS

Adjusting Flow Rates for Different Abrasives and Nozzle Diameters
 Flow Rate (FR) = Abrasive flow rate (lb/hr) of abrasive at nozzle pressure and internal nozzle diameter (ID)

D1 = Density of sand from Table 2 = 99 lb/ft3
 ID1 = Internal diameter of nozzle for sand blasting from Table 3 = 0.1875 inch
 FR1 = Sand flow rate at nozzle pressure and internal diameter (ID1) from Table 3 = 80 lb/hr

Actual blasting media used = Zirconia
 D = Density of actual abrasive = 143.58 lb/ft3
 ID = internal diameter of actual nozzle = 0.1875 inch
 FR = Flow rate of actual abrasive (lb/hr) = 116.0 lb/hr (per nozzle)

Potential to Emit Before Control

FR = Flow rate of actual abrasive (lb/hr) = 116.0 lb/hr (per nozzle)
 w = fraction of time of wet blasting = 0 %
 N = number of nozzles = 1
 EF = PM emission factor for actual abrasive from Table 1 = 0.010 lb PM / lb abrasive
 PM10 emission factor ratio for actual abrasive from Table 1 = 0.70 lb PM10 / lb PM

	PM	PM10/PM2.5	
Potential to Emit (before control) =	1.160	0.812	lb/hr
=	27.85	19.49	lb/day
=	5.08	3.56	ton/yr

Potential to Emit After Control

	PM	PM10/PM2.5	
Emission Control Device Efficiency =	98.0%	98.0%	
Potential to Emit (after control) =	2.3E-02	1.6E-02	lb/hr
=	0.557	0.390	lb/day
=	0.102	0.071	ton/yr

METHODOLOGY

Emission Factors from STAPPA/ALAPCO "Air Quality Permits", Vol. I, Section 3 "Abrasive Blasting" (1991 edition)
 Flow rate of actual abrasive (FR) (lb/hr) = FR1 x (ID/ID1)² x (D/D1)
 Potential to Emit (before control) = EF x FR x (1 - w/200) x N (where w should be entered in as a whole number (if w is 50%, enter 50))
 Potential to Emit (after control) = [Potential to Emit (before control)] * [1 - control efficiency]
 Potential to Emit (tons/year) = [Potential to Emit (lbs/hour)] x [8760 hours/year] x [ton/2000 lbs]

**Appendix A: Emission Calculations
Abrasive Blasting - Confined
Unit ID: BLA6**

Company Name: DePuy Orthopaedics, Inc
Source Address: 700 Orthopaedic Drive, Warsaw IN, 46581
Permit Number: 085-37505-00048
Reviewer: Kendra Sutherland

Table 1 - Emission Factors for Abrasives

Abrasive	Emission Factor (EF)	
	lb PM / lb abrasive	lb PM10 / lb PM
Sand	0.041	0.70
Grit	0.010	0.70
Steel Shot	0.004	0.86
Other	0.010	

Table 2 - Density of Abrasives (lb/ft3)

Abrasive	Density (lb/ft3)
Al oxides	160
Sand	99
Steel	487

Table 3 - Sand Flow Rate (FR1) Through Nozzle (lb/hr)

Flow rate (FR1) of sand through a blasting nozzle as a function of nozzle pressure and internal diameter (ID1)

Nozzle Type (diameter)	Internal diameter, in	Nozzle Pressure (psig)							
		30	40	50	60	70	80	90	100
No. 2 (1/8 inch)	0.125	28	35	42	49	55	63	70	77
No. 3 (3/16 inch)	0.1875	65	80	94	107	122	135	149	165
No. 4 (1/4 inch)	0.25	109	138	168	195	221	255	280	309
No. 5 (5/16 inch)	0.3125	205	247	292	354	377	420	462	507
No. 6 (3/8 inch)	0.375	285	355	417	477	540	600	657	720
No. 7 (7/16 inch)	0.4375	385	472	560	645	755	820	905	940
No. 8 (1/2 inch)	0.5	503	615	725	835	945	1050	1160	1265
No. 10 (5/8 inch)	0.625	820	990	1170	1336	1510	1680	1850	2030
No. 12 (3/4 inch)	0.75	1140	1420	1670	1915	2160	2400	2630	2880
No. 16 (1 inch)	1	2030	2460	2900	3340	3780	4200	4640	5060

CALCULATIONS

Adjusting Flow Rates for Different Abrasives and Nozzle Diameters
 Flow Rate (FR) = Abrasive flow rate (lb/hr) of abrasive at nozzle pressure and internal nozzle diameter (ID)

D1 = Density of sand from Table 2 = 99 lb/ft3
 ID1 = Internal diameter of nozzle for sand blasting from Table 3 = 0.1875 inch
 FR1 = Sand flow rate at nozzle pressure and internal diameter (ID1) from Table 3 = 80 lb/hr

Actual blasting media used = Grit
 D = Density of actual abrasive = 224.74 lb/ft3
 ID = internal diameter of actual nozzle = 0.1875 inch
 FR = Flow rate of actual abrasive (lb/hr) = 181.6 lb/hr (per nozzle)

Potential to Emit Before Control

FR = Flow rate of actual abrasive (lb/hr) = 181.6 lb/hr (per nozzle)
 w = fraction of time of wet blasting = 0 %
 N = number of nozzles = 1
 EF = PM emission factor for actual abrasive from Table 1 = 0.010 lb PM / lb abrasive
 PM10 emission factor ratio for actual abrasive from Table 1 = 0.70 lb PM10 / lb PM

	PM	PM10/PM2.5	
Potential to Emit (before control) =	1.816	1.271	lb/hr
=	43.59	30.51	lb/day
=	7.95	5.57	ton/yr

Potential to Emit After Control

	PM	PM10/PM2.5	
Emission Control Device Efficiency =	98.0%	98.0%	
Potential to Emit (after control) =	3.6E-02	2.5E-02	lb/hr
=	0.872	0.610	lb/day
=	0.159	0.111	ton/yr

METHODOLOGY

Emission Factors from STAPPA/ALAPCO "Air Quality Permits", Vol. I, Section 3 "Abrasive Blasting" (1991 edition)
 Flow rate of actual abrasive (FR) (lb/hr) = FR1 x (ID/ID1)^2 x (D/D1)
 Potential to Emit (before control) = EF x FR x (1 - w/200) x N (where w should be entered in as a whole number (if w is 50%, enter 50))
 Potential to Emit (after control) = [Potential to Emit (before control)] * [1 - control efficiency]
 Potential to Emit (tons/year) = [Potential to Emit (lbs/hour)] x [8760 hours/year] x [ton/2000 lbs]

**Appendix A: Emission Calculations
Abrasive Blasting - Confined
Unit ID: BLA7**

Company Name: DePuy Orthopaedics, Inc
Source Address: 700 Orthopaedic Drive, Warsaw IN, 46581
Permit Number: 085-37505-00048
Reviewer: Kendra Sutherland

Table 1 - Emission Factors for Abrasives

Abrasive	Emission Factor (EF)	
	lb PM / lb abrasive	lb PM10 / lb PM
Sand	0.041	0.70
Grit	0.010	0.70
Steel Shot	0.004	0.86
Other	0.010	

Table 2 - Density of Abrasives (lb/ft3)

Abrasive	Density (lb/ft3)
Al oxides	160
Sand	99
Steel	487

Table 3 - Sand Flow Rate (FR1) Through Nozzle (lb/hr)

Flow rate (FR1) of sand through a blasting nozzle as a function of nozzle pressure and internal diameter (ID1)

Nozzle Type (diameter)	Internal diameter, in	Nozzle Pressure (psig)							
		30	40	50	60	70	80	90	100
No. 2 (1/8 inch)	0.125	28	35	42	49	55	63	70	77
No. 3 (3/16 inch)	0.1875	65	80	94	107	122	135	149	165
No. 4 (1/4 inch)	0.25	109	138	168	195	221	255	280	309
No. 5 (5/16 inch)	0.3125	205	247	292	354	377	420	462	507
No. 6 (3/8 inch)	0.375	285	355	417	477	540	600	657	720
No. 7 (7/16 inch)	0.4375	385	472	560	645	755	820	905	940
No. 8 (1/2 inch)	0.5	503	615	725	835	945	1050	1160	1265
No. 10 (5/8 inch)	0.625	820	990	1170	1336	1510	1680	1850	2030
No. 12 (3/4 inch)	0.75	1140	1420	1670	1915	2160	2400	2630	2880
No. 16 (1 inch)	1	2030	2460	2900	3340	3780	4200	4640	5060

CALCULATIONS

Adjusting Flow Rates for Different Abrasives and Nozzle Diameters	
Flow Rate (FR) = Abrasive flow rate (lb/hr) of abrasive at nozzle pressure and internal nozzle diameter (ID)	
D1 = Density of sand from Table 2 =	99 lb/ft3
ID1 = Internal diameter of nozzle for sand blasting from Table 3 =	0.1875 inch
FR1 = Sand flow rate at nozzle pressure and internal diameter (ID1) from Table 3 =	80 lb/hr
Actual blasting media used =	Glass
D = Density of actual abrasive =	162.31 lb/ft3
ID = internal diameter of actual nozzle =	0.1875 inch
FR = Flow rate of actual abrasive (lb/hr) =	131.2 lb/hr (per nozzle)

Potential to Emit Before Control	
FR = Flow rate of actual abrasive (lb/hr) =	131.2 lb/hr (per nozzle)
w = fraction of time of wet blasting =	0 %
N = number of nozzles =	1
EF = PM emission factor for actual abrasive from Table 1 =	0.010 lb PM / lb abrasive
PM10 emission factor ratio for actual abrasive from Table 1 =	0.70 lb PM10 / lb PM
Potential to Emit (before control) =	PM PM10/PM2.5
=	1.312 0.918 lb/hr
=	31.48 22.03 lb/day
=	5.74 4.02 ton/yr

Potential to Emit After Control	
Emission Control Device Efficiency =	PM PM10/PM2.5
Potential to Emit (after control) =	98.0% 98.0%
=	2.6E-02 1.8E-02 lb/hr
=	0.630 0.441 lb/day
=	0.115 0.080 ton/yr

METHODOLOGY

Emission Factors from STAPPA/ALAPCO "Air Quality Permits", Vol. I, Section 3 "Abrasive Blasting" (1991 edition)
 Flow rate of actual abrasive (FR) (lb/hr) = FR1 x (ID/ID1)² x (D/D1)
 Potential to Emit (before control) = EF x FR x (1 - w/200) x N (where w should be entered in as a whole number (if w is 50%, enter 50))
 Potential to Emit (after control) = [Potential to Emit (before control)] * [1 - control efficiency]
 Potential to Emit (tons/year) = [Potential to Emit (lbs/hour)] x [8760 hours/year] x [ton/2000 lbs]

**Appendix A: Emission Calculations
Abrasive Blasting - Confined
Unit ID: BLA8**

Company Name: DePuy Orthopaedics, Inc
Source Address: 700 Orthopaedic Drive, Warsaw IN, 46581
Permit Number: 085-37505-00048
Reviewer: Kendra Sutherland

Table 1 - Emission Factors for Abrasives

Abrasive	Emission Factor (EF)	
	lb PM / lb abrasive	lb PM10 / lb PM
Sand	0.041	0.70
Grit	0.010	0.70
Steel Shot	0.004	0.86
Other	0.010	

Table 2 - Density of Abrasives (lb/ft3)

Abrasive	Density (lb/ft3)
Al oxides	160
Sand	99
Steel	487

Table 3 - Sand Flow Rate (FR1) Through Nozzle (lb/hr)

Flow rate (FR1) of sand through a blasting nozzle as a function of nozzle pressure and internal diameter (ID1)

Nozzle Type (diameter)	Internal diameter, in	Nozzle Pressure (psig)							
		30	40	50	60	70	80	90	100
No. 2 (1/8 inch)	0.125	28	35	42	49	55	63	70	77
No. 3 (3/16 inch)	0.1875	65	80	94	107	122	135	149	165
No. 4 (1/4 inch)	0.25	109	138	168	195	221	255	280	309
No. 5 (5/16 inch)	0.3125	205	247	292	354	377	420	462	507
No. 6 (3/8 inch)	0.375	285	355	417	477	540	600	657	720
No. 7 (7/16 inch)	0.4375	385	472	560	645	755	820	905	940
No. 8 (1/2 inch)	0.5	503	615	725	835	945	1050	1160	1265
No. 10 (5/8 inch)	0.625	820	990	1170	1336	1510	1680	1850	2030
No. 12 (3/4 inch)	0.75	1140	1420	1670	1915	2160	2400	2630	2880
No. 16 (1 inch)	1	2030	2460	2900	3340	3780	4200	4640	5060

CALCULATIONS

Adjusting Flow Rates for Different Abrasives and Nozzle Diameters	
Flow Rate (FR) = Abrasive flow rate (lb/hr) of abrasive at nozzle pressure and internal nozzle diameter (ID)	
D1 = Density of sand from Table 2 =	99 lb/ft3
ID1 = Internal diameter of nozzle for sand blasting from Table 3 =	0.1875 inch
FR1 = Sand flow rate at nozzle pressure and internal diameter (ID1) from Table 3 =	80 lb/hr
Actual blasting media used =	Grit
D = Density of actual abrasive =	224.74 lb/ft3
ID = internal diameter of actual nozzle =	0.1875 inch
FR = Flow rate of actual abrasive (lb/hr) =	181.6 lb/hr (per nozzle)

Potential to Emit Before Control	
FR = Flow rate of actual abrasive (lb/hr) =	181.6 lb/hr (per nozzle)
w = fraction of time of wet blasting =	0 %
N = number of nozzles =	1
EF = PM emission factor for actual abrasive from Table 1 =	0.010 lb PM / lb abrasive
PM10 emission factor ratio for actual abrasive from Table 1 =	0.70 lb PM10 / lb PM
Potential to Emit (before control) =	PM 1.816 lb/hr
	PM10/PM2.5 1.271 lb/day
	7.95 ton/yr

Potential to Emit After Control	
Emission Control Device Efficiency =	PM 98.0%
	PM10/PM2.5 98.0%
Potential to Emit (after control) =	3.6E-02 lb/hr
	0.872 lb/day
	0.159 ton/yr

METHODOLOGY

Emission Factors from STAPPA/ALAPCO "Air Quality Permits", Vol. I, Section 3 "Abrasive Blasting" (1991 edition)
 Flow rate of actual abrasive (FR) (lb/hr) = FR1 x (ID/ID1)^2 x (D/D1)
 Potential to Emit (before control) = EF x FR x (1 - w/200) x N (where w should be entered in as a whole number (if w is 50%, enter 50))
 Potential to Emit (after control) = [Potential to Emit (before control)] * [1 - control efficiency]
 Potential to Emit (tons/year) = [Potential to Emit (lbs/hour)] x [8760 hours/year] x [ton/2000 lbs]

**Appendix A: Emission Calculations
Abrasive Blasting - Confined
Unit ID: BLA9**

Company Name: DePuy Orthopaedics, Inc
Source Address: 700 Orthopaedic Drive, Warsaw IN, 46581
Permit Number: 085-37505-00048
Reviewer: Kendra Sutherland

Table 1 - Emission Factors for Abrasives

Abrasive	Emission Factor (EF)	
	lb PM / lb abrasive	lb PM10 / lb PM
Sand	0.041	0.70
Grit	0.010	0.70
Steel Shot	0.004	0.86
Other	0.010	

Table 2 - Density of Abrasives (lb/ft3)

Abrasive	Density (lb/ft3)
Al oxides	160
Sand	99
Steel	487

Table 3 - Sand Flow Rate (FR1) Through Nozzle (lb/hr)

Flow rate (FR1) of sand through a blasting nozzle as a function of nozzle pressure and internal diameter (ID1)

Nozzle Type (diameter)	Internal diameter, in	Nozzle Pressure (psig)							
		30	40	50	60	70	80	90	100
No. 2 (1/8 inch)	0.125	28	35	42	49	55	63	70	77
No. 3 (3/16 inch)	0.1875	65	80	94	107	122	135	149	165
No. 4 (1/4 inch)	0.25	109	138	168	195	221	255	280	309
No. 5 (5/16 inch)	0.3125	205	247	292	354	377	420	462	507
No. 6 (3/8 inch)	0.375	285	355	417	477	540	600	657	720
No. 7 (7/16 inch)	0.4375	385	472	560	645	755	820	905	940
No. 8 (1/2 inch)	0.5	503	615	725	835	945	1050	1160	1265
No. 10 (5/8 inch)	0.625	820	990	1170	1336	1510	1680	1850	2030
No. 12 (3/4 inch)	0.75	1140	1420	1670	1915	2160	2400	2630	2880
No. 16 (1 inch)	1	2030	2460	2900	3340	3780	4200	4640	5060

CALCULATIONS

Adjusting Flow Rates for Different Abrasives and Nozzle Diameters
 Flow Rate (FR) = Abrasive flow rate (lb/hr) of abrasive at nozzle pressure and internal nozzle diameter (ID)

$D1 = \text{Density of sand from Table 2} = 99 \text{ lb/ft3}$
 $ID1 = \text{Internal diameter of nozzle for sand blasting from Table 3} = 0.1875 \text{ inch}$
 $FR1 = \text{Sand flow rate at nozzle pressure and internal diameter (ID1) from Table 3} = 94 \text{ lb/hr}$

Actual blasting media used = Zirconia
 $D = \text{Density of actual abrasive} = 143.58 \text{ lb/ft3}$
 $ID = \text{internal diameter of actual nozzle} = 0.1875 \text{ inch}$
 $FR = \text{Flow rate of actual abrasive (lb/hr)} = 136.3 \text{ lb/hr (per nozzle)}$

Potential to Emit Before Control

$FR = \text{Flow rate of actual abrasive (lb/hr)} = 136.3 \text{ lb/hr (per nozzle)}$
 $w = \text{fraction of time of wet blasting} = 0 \text{ \%}$
 $N = \text{number of nozzles} = 1$
 $EF = \text{PM emission factor for actual abrasive from Table 1} = 0.010 \text{ lb PM / lb abrasive}$
 $PM10 \text{ emission factor ratio for actual abrasive from Table 1} = 0.70 \text{ lb PM10 / lb PM}$

	PM	PM10/PM2.5	
Potential to Emit (before control) =	1.363	0.954	lb/hr
=	32.72	22.90	lb/day
=	5.97	4.18	ton/yr

Potential to Emit After Control

	PM	PM10/PM2.5	
Emission Control Device Efficiency =	98.0%	98.0%	
Potential to Emit (after control) =	2.7E-02	1.9E-02	lb/hr
=	0.654	0.458	lb/day
=	0.119	0.084	ton/yr

METHODOLOGY

Emission Factors from STAPPA/ALAPCO "Air Quality Permits", Vol. I, Section 3 "Abrasive Blasting" (1991 edition)
 Flow rate of actual abrasive (FR) (lb/hr) = $FR1 \times (ID/ID1)^2 \times (D/D1)$
 Potential to Emit (before control) = $EF \times FR \times (1 - w/200) \times N$ (where w should be entered in as a whole number (if w is 50%, enter 50))
 Potential to Emit (after control) = $[\text{Potential to Emit (before control)}] \times [1 - \text{control efficiency}]$
 Potential to Emit (tons/year) = $[\text{Potential to Emit (lbs/hour)}] \times [8760 \text{ hours/year}] \times [\text{ton}/2000 \text{ lbs}]$

**Appendix A: Emission Calculations
Abrasive Blasting - Confined
Unit ID: BLA10**

Company Name: DePuy Orthopaedics, Inc
Source Address: 700 Orthopaedic Drive, Warsaw IN, 46581
Permit Number: 085-37505-00048
Reviewer: Kendra Sutherland

Table 1 - Emission Factors for Abrasives

Abrasive	Emission Factor (EF)	
	lb PM / lb abrasive	lb PM10 / lb PM
Sand	0.041	0.70
Grit	0.010	0.70
Steel Shot	0.004	0.86
Other	0.010	

Table 2 - Density of Abrasives (lb/ft3)

Abrasive	Density (lb/ft3)
Al oxides	160
Sand	99
Steel	487

Table 3 - Sand Flow Rate (FR1) Through Nozzle (lb/hr)

Flow rate (FR1) of sand through a blasting nozzle as a function of nozzle pressure and internal diameter (ID1)

Nozzle Type (diameter)	Internal diameter, in	Nozzle Pressure (psig)							
		30	40	50	60	70	80	90	100
No. 2 (1/8 inch)	0.125	28	35	42	49	55	63	70	77
No. 3 (3/16 inch)	0.1875	65	80	94	107	122	135	149	165
No. 4 (1/4 inch)	0.25	109	138	168	195	221	255	280	309
No. 5 (5/16 inch)	0.3125	205	247	292	354	377	420	462	507
No. 6 (3/8 inch)	0.375	285	355	417	477	540	600	657	720
No. 7 (7/16 inch)	0.4375	385	472	560	645	755	820	905	940
No. 8 (1/2 inch)	0.5	503	615	725	835	945	1050	1160	1265
No. 10 (5/8 inch)	0.625	820	990	1170	1336	1510	1680	1850	2030
No. 12 (3/4 inch)	0.75	1140	1420	1670	1915	2160	2400	2630	2880
No. 16 (1 inch)	1	2030	2460	2900	3340	3780	4200	4640	5060

CALCULATIONS

Adjusting Flow Rates for Different Abrasives and Nozzle Diameters
 Flow Rate (FR) = Abrasive flow rate (lb/hr) of abrasive at nozzle pressure and internal nozzle diameter (ID)

D1 = Density of sand from Table 2 = 99 lb/ft3
 ID1 = Internal diameter of nozzle for sand blasting from Table 3 = 0.1875 inch
 FR1 = Sand flow rate at nozzle pressure and internal diameter (ID1) from Table 3 = 80 lb/hr

Actual blasting media used = Glass
 D = Density of actual abrasive = 162.31 lb/ft3
 ID = internal diameter of actual nozzle = 0.1875 inch
 FR = Flow rate of actual abrasive (lb/hr) = 131.2 lb/hr (per nozzle)

Potential to Emit Before Control

FR = Flow rate of actual abrasive (lb/hr) = 131.2 lb/hr (per nozzle)
 w = fraction of time of wet blasting = 0 %
 N = number of nozzles = 1
 EF = PM emission factor for actual abrasive from Table 1 = 0.010 lb PM / lb abrasive
 PM10 emission factor ratio for actual abrasive from Table 1 = 0.70 lb PM10 / lb PM

	PM	PM10/PM2.5	
Potential to Emit (before control) =	1.312	0.918	lb/hr
=	31.48	22.03	lb/day
=	5.74	4.02	ton/yr

Potential to Emit After Control

	PM	PM10/PM2.5	
Emission Control Device Efficiency =	98.0%	98.0%	
Potential to Emit (after control) =	2.6E-02	1.8E-02	lb/hr
=	0.630	0.441	lb/day
=	0.115	0.080	ton/yr

METHODOLOGY

Emission Factors from STAPPA/ALAPCO "Air Quality Permits", Vol. I, Section 3 "Abrasive Blasting" (1991 edition)
 Flow rate of actual abrasive (FR) (lb/hr) = FR1 x (ID/ID1)^2 x (D/D1)
 Potential to Emit (before control) = EF x FR x (1 - w/200) x N (where w should be entered in as a whole number (if w is 50%, enter 50))
 Potential to Emit (after control) = [Potential to Emit (before control)] * [1 - control efficiency]
 Potential to Emit (tons/year) = [Potential to Emit (lbs/hour)] x [8760 hours/year] x [ton/2000 lbs]

**Appendix A: Emission Calculations
Abrasive Blasting - Confined
Unit ID: BLA11**

Company Name: DePuy Orthopaedics, Inc
Source Address: 700 Orthopaedic Drive, Warsaw IN, 46581
Permit Number: 085-37505-00048
Reviewer: Kendra Sutherland

Table 1 - Emission Factors for Abrasives

Abrasive	Emission Factor (EF)	
	lb PM / lb abrasive	lb PM10 / lb PM
Sand	0.041	0.70
Grit	0.010	0.70
Steel Shot	0.004	0.86
Other	0.010	

Table 2 - Density of Abrasives (lb/ft3)

Abrasive	Density (lb/ft3)
Al oxides	160
Sand	99
Steel	487

Table 3 - Sand Flow Rate (FR1) Through Nozzle (lb/hr)

Flow rate (FR1) of sand through a blasting nozzle as a function of nozzle pressure and internal diameter (ID1)

Nozzle Type (diameter)	Internal diameter, in	Nozzle Pressure (psig)							
		30	40	50	60	70	80	90	100
No. 2 (1/8 inch)	0.125	28	35	42	49	55	63	70	77
No. 3 (3/16 inch)	0.1875	65	80	94	107	122	135	149	165
No. 4 (1/4 inch)	0.25	109	138	168	195	221	255	280	309
No. 5 (5/16 inch)	0.3125	205	247	292	354	377	420	462	507
No. 6 (3/8 inch)	0.375	285	355	417	477	540	600	657	720
No. 7 (7/16 inch)	0.4375	385	472	560	645	755	820	905	940
No. 8 (1/2 inch)	0.5	503	615	725	835	945	1050	1160	1265
No. 10 (5/8 inch)	0.625	820	990	1170	1336	1510	1680	1850	2030
No. 12 (3/4 inch)	0.75	1140	1420	1670	1915	2160	2400	2630	2880
No. 16 (1 inch)	1	2030	2460	2900	3340	3780	4200	4640	5060

CALCULATIONS

Adjusting Flow Rates for Different Abrasives and Nozzle Diameters
Flow Rate (FR) = Abrasive flow rate (lb/hr) of abrasive at nozzle pressure and internal nozzle diameter (ID)

D1 = Density of sand from Table 2 = 99 lb/ft3
 ID1 = Internal diameter of nozzle for sand blasting from Table 3 = 0.1875 inch
 FR1 = Sand flow rate at nozzle pressure and internal diameter (ID1) from Table 3 = 80 lb/hr

Actual blasting media used = Grit
 D = Density of actual abrasive = 224.74 lb/ft3
 ID = internal diameter of actual nozzle = 0.1875 inch
 FR = Flow rate of actual abrasive (lb/hr) = 181.6 lb/hr (per nozzle)

Potential to Emit Before Control

FR = Flow rate of actual abrasive (lb/hr) = 181.6 lb/hr (per nozzle)
 w = fraction of time of wet blasting = 0 %
 N = number of nozzles = 1
 EF = PM emission factor for actual abrasive from Table 1 = 0.010 lb PM / lb abrasive
 PM10 emission factor ratio for actual abrasive from Table 1 = 0.70 lb PM10 / lb PM

	PM	PM10/PM2.5	
Potential to Emit (before control) =	1.816	1.271	lb/hr
=	43.59	30.51	lb/day
=	7.95	5.57	ton/yr

Potential to Emit After Control

	PM	PM10/PM2.5	
Emission Control Device Efficiency =	98.0%	98.0%	
Potential to Emit (after control) =	3.6E-02	2.5E-02	lb/hr
=	0.872	0.610	lb/day
=	0.159	0.111	ton/yr

METHODOLOGY

Emission Factors from STAPPA/ALAPCO "Air Quality Permits", Vol. I, Section 3 "Abrasive Blasting" (1991 edition)
 Flow rate of actual abrasive (FR) (lb/hr) = FR1 x (ID/ID1)^2 x (D/D1)
 Potential to Emit (before control) = EF x FR x (1 - w/200) x N (where w should be entered in as a whole number (if w is 50%, enter 50))
 Potential to Emit (after control) = [Potential to Emit (before control)] * [1 - control efficiency]
 Potential to Emit (tons/year) = [Potential to Emit (lbs/hour)] x [8760 hours/year] x [ton/2000 lbs]

**Appendix A: Emission Calculations
Abrasive Blasting - Confined
Unit ID: BLA12**

Company Name: DePuy Orthopaedics, Inc
Source Address: 700 Orthopaedic Drive, Warsaw IN, 46581
Permit Number: 085-37505-00048
Reviewer: Kendra Sutherland

Table 1 - Emission Factors for Abrasives

Abrasive	Emission Factor (EF)	
	lb PM / lb abrasive	lb PM10 / lb PM
Sand	0.041	0.70
Grit	0.010	0.70
Steel Shot	0.004	0.86
Other	0.010	

Table 2 - Density of Abrasives (lb/ft3)

Abrasive	Density (lb/ft3)
Al oxides	160
Sand	99
Steel	487

Table 3 - Sand Flow Rate (FR1) Through Nozzle (lb/hr)

Flow rate (FR1) of sand through a blasting nozzle as a function of nozzle pressure and internal diameter (ID1)

Nozzle Type (diameter)	Internal diameter, in	Nozzle Pressure (psig)							
		30	40	50	60	70	80	90	100
No. 2 (1/8 inch)	0.125	28	35	42	49	55	63	70	77
No. 3 (3/16 inch)	0.1875	65	80	94	107	122	135	149	165
No. 4 (1/4 inch)	0.25	109	138	168	195	221	255	280	309
No. 5 (5/16 inch)	0.3125	205	247	292	354	377	420	462	507
No. 6 (3/8 inch)	0.375	285	355	417	477	540	600	657	720
No. 7 (7/16 inch)	0.4375	385	472	560	645	755	820	905	940
No. 8 (1/2 inch)	0.5	503	615	725	835	945	1050	1160	1265
No. 10 (5/8 inch)	0.625	820	990	1170	1336	1510	1680	1850	2030
No. 12 (3/4 inch)	0.75	1140	1420	1670	1915	2160	2400	2630	2880
No. 16 (1 inch)	1	2030	2460	2900	3340	3780	4200	4640	5060

CALCULATIONS

Adjusting Flow Rates for Different Abrasives and Nozzle Diameters	
Flow Rate (FR) = Abrasive flow rate (lb/hr) of abrasive at nozzle pressure and internal nozzle diameter (ID)	
D1 = Density of sand from Table 2 =	99 lb/ft3
ID1 = Internal diameter of nozzle for sand blasting from Table 3 =	0.1875 inch
FR1 = Sand flow rate at nozzle pressure and internal diameter (ID1) from Table 3 =	178 lb/hr
Actual blasting media used =	Glass
D = Density of actual abrasive =	162.31 lb/ft3
ID = internal diameter of actual nozzle =	0.1875 inch
FR = Flow rate of actual abrasive (lb/hr) =	291.8 lb/hr (per nozzle)

Potential to Emit Before Control	
FR = Flow rate of actual abrasive (lb/hr) =	291.8 lb/hr (per nozzle)
w = fraction of time of wet blasting =	0 %
N = number of nozzles =	1
EF = PM emission factor for actual abrasive from Table 1 =	0.010 lb PM / lb abrasive
PM10 emission factor ratio for actual abrasive from Table 1 =	0.70 lb PM10 / lb PM
Potential to Emit (before control) =	PM PM10/PM2.5
=	2.918 2.043 lb/hr
=	70.04 49.03 lb/day
=	12.78 8.95 ton/yr

Potential to Emit After Control	
Emission Control Device Efficiency =	PM PM10/PM2.5
Potential to Emit (after control) =	98.0% 98.0%
=	5.8E-02 4.1E-02 lb/hr
=	1.401 0.981 lb/day
=	0.256 0.179 ton/yr

METHODOLOGY

Emission Factors from STAPPA/ALAPCO "Air Quality Permits", Vol. I, Section 3 "Abrasive Blasting" (1991 edition)

Flow rate of actual abrasive (FR) (lb/hr) = FR1 x (ID/ID1)^2 x (D/D1)

Potential to Emit (before control) = EF x FR x (1 - w/200) x N (where w should be entered in as a whole number (if w is 50%, enter 50))

Potential to Emit (after control) = [Potential to Emit (before control)] * [1 - control efficiency]

Potential to Emit (tons/year) = [Potential to Emit (lbs/hour)] x [8760 hours/year] x [ton/2000 lbs]

**Appendix A: Emission Calculations
Abrasive Blasting - Confined
Unit ID: BLA13**

Company Name: DePuy Orthopaedics, Inc
Source Address: 700 Orthopaedic Drive, Warsaw IN, 46581
Permit Number: 085-37505-00048
Reviewer: Kendra Sutherland

Table 1 - Emission Factors for Abrasives

Abrasive	Emission Factor (EF)	
	lb PM / lb abrasive	lb PM10 / lb PM
Sand	0.041	0.70
Grit	0.010	0.70
Steel Shot	0.004	0.86
Other	0.010	

Table 2 - Density of Abrasives (lb/ft3)

Abrasive	Density (lb/ft3)
Al oxides	160
Sand	99
Steel	487

Table 3 - Sand Flow Rate (FR1) Through Nozzle (lb/hr)

Flow rate (FR1) of sand through a blasting nozzle as a function of nozzle pressure and internal diameter (ID1)

Nozzle Type (diameter)	Internal diameter, in	Nozzle Pressure (psig)							
		30	40	50	60	70	80	90	100
No. 2 (1/8 inch)	0.125	28	35	42	49	55	63	70	77
No. 3 (3/16 inch)	0.1875	65	80	94	107	122	135	149	165
No. 4 (1/4 inch)	0.25	109	138	168	195	221	255	280	309
No. 5 (5/16 inch)	0.3125	205	247	292	354	377	420	462	507
No. 6 (3/8 inch)	0.375	285	355	417	477	540	600	657	720
No. 7 (7/16 inch)	0.4375	385	472	560	645	755	820	905	940
No. 8 (1/2 inch)	0.5	503	615	725	835	945	1050	1160	1265
No. 10 (5/8 inch)	0.625	820	990	1170	1336	1510	1680	1850	2030
No. 12 (3/4 inch)	0.75	1140	1420	1670	1915	2160	2400	2630	2880
No. 16 (1 inch)	1	2030	2460	2900	3340	3780	4200	4640	5060

CALCULATIONS

Adjusting Flow Rates for Different Abrasives and Nozzle Diameters	
Flow Rate (FR) = Abrasive flow rate (lb/hr) of abrasive at nozzle pressure and internal nozzle diameter (ID)	
D1 = Density of sand from Table 2 =	99 lb/ft3
ID1 = Internal diameter of nozzle for sand blasting from Table 3 =	0.25 inch
FR1 = Sand flow rate at nozzle pressure and internal diameter (ID1) from Table 3 =	81 lb/hr
Actual blasting media used =	Glass
D = Density of actual abrasive =	162.31 lb/ft3
ID = internal diameter of actual nozzle =	0.25 inch
FR = Flow rate of actual abrasive (lb/hr) =	132.8 lb/hr (per nozzle)

Potential to Emit Before Control	
FR = Flow rate of actual abrasive (lb/hr) =	132.8 lb/hr (per nozzle)
w = fraction of time of wet blasting =	0 %
N = number of nozzles =	1
EF = PM emission factor for actual abrasive from Table 1 =	0.010 lb PM / lb abrasive
PM10 emission factor ratio for actual abrasive from Table 1 =	0.70 lb PM10 / lb PM
Potential to Emit (before control) =	PM 1.328 0.930 lb/hr
=	31.87 22.31 lb/day
=	5.82 4.07 ton/yr

Potential to Emit After Control	
Emission Control Device Efficiency =	PM 98.0% 98.0%
Potential to Emit (after control) =	2.7E-02 1.9E-02 lb/hr
=	0.637 0.446 lb/day
=	0.116 0.081 ton/yr

METHODOLOGY

Emission Factors from STAPPA/ALAPCO "Air Quality Permits", Vol. I, Section 3 "Abrasive Blasting" (1991 edition)
 Flow rate of actual abrasive (FR) (lb/hr) = FR1 x (ID/ID1)² x (D/D1)
 Potential to Emit (before control) = EF x FR x (1 - w/200) x N (where w should be entered in as a whole number (if w is 50%, enter 50))
 Potential to Emit (after control) = [Potential to Emit (before control)] * [1 - control efficiency]
 Potential to Emit (tons/year) = [Potential to Emit (lbs/hour)] x [8760 hours/year] x [ton/2000 lbs]

**Appendix A: Emission Calculations
Abrasive Blasting - Confined
Unit ID: BLA14**

Company Name: DePuy Orthopaedics, Inc
Source Address: 700 Orthopaedic Drive, Warsaw IN, 46581
Permit Number: 085-37505-00048
Reviewer: Kendra Sutherland

Table 1 - Emission Factors for Abrasives

Abrasive	Emission Factor (EF)	
	lb PM / lb abrasive	lb PM10 / lb PM
Sand	0.041	0.70
Grit	0.010	0.70
Steel Shot	0.004	0.86
Other	0.010	

Table 2 - Density of Abrasives (lb/ft3)

Abrasive	Density (lb/ft3)
Al oxides	160
Sand	99
Steel	487

Table 3 - Sand Flow Rate (FR1) Through Nozzle (lb/hr)

Flow rate (FR1) of sand through a blasting nozzle as a function of nozzle pressure and internal diameter (ID1)

Nozzle Type (diameter)	Internal diameter, in	Nozzle Pressure (psig)							
		30	40	50	60	70	80	90	100
No. 2 (1/8 inch)	0.125	28	35	42	49	55	63	70	77
No. 3 (3/16 inch)	0.1875	65	80	94	107	122	135	149	165
No. 4 (1/4 inch)	0.25	109	138	168	195	221	255	280	309
No. 5 (5/16 inch)	0.3125	205	247	292	354	377	420	462	507
No. 6 (3/8 inch)	0.375	285	355	417	477	540	600	657	720
No. 7 (7/16 inch)	0.4375	385	472	560	645	755	820	905	940
No. 8 (1/2 inch)	0.5	503	615	725	835	945	1050	1160	1265
No. 10 (5/8 inch)	0.625	820	990	1170	1336	1510	1680	1850	2030
No. 12 (3/4 inch)	0.75	1140	1420	1670	1915	2160	2400	2630	2880
No. 16 (1 inch)	1	2030	2460	2900	3340	3780	4200	4640	5060

CALCULATIONS

Adjusting Flow Rates for Different Abrasives and Nozzle Diameters
 Flow Rate (FR) = Abrasive flow rate (lb/hr) of abrasive at nozzle pressure and internal nozzle diameter (ID)

$D1 = \text{Density of sand from Table 2} = 99 \text{ lb/ft3}$
 $ID1 = \text{Internal diameter of nozzle for sand blasting from Table 3} = 0.1875 \text{ inch}$
 $FR1 = \text{Sand flow rate at nozzle pressure and internal diameter (ID1) from Table 3} = 94 \text{ lb/hr}$

Actual blasting media used = Zirconia
 $D = \text{Density of actual abrasive} = 143.58 \text{ lb/ft3}$
 $ID = \text{internal diameter of actual nozzle} = 0.1875 \text{ inch}$
 $FR = \text{Flow rate of actual abrasive (lb/hr)} = 136.3 \text{ lb/hr (per nozzle)}$

Potential to Emit Before Control

$FR = \text{Flow rate of actual abrasive (lb/hr)} = 136.3 \text{ lb/hr (per nozzle)}$
 $w = \text{fraction of time of wet blasting} = 0 \text{ \%}$
 $N = \text{number of nozzles} = 1$
 $EF = \text{PM emission factor for actual abrasive from Table 1} = 0.010 \text{ lb PM / lb abrasive}$
 $PM10 \text{ emission factor ratio for actual abrasive from Table 1} = 0.70 \text{ lb PM10 / lb PM}$

	PM	PM10/PM2.5	
Potential to Emit (before control) =	1.363	0.954	lb/hr
=	32.72	22.90	lb/day
=	5.97	4.18	ton/yr

Potential to Emit After Control

	PM	PM10/PM2.5	
Emission Control Device Efficiency =	98.0%	98.0%	
Potential to Emit (after control) =	2.7E-02	1.9E-02	lb/hr
=	0.654	0.458	lb/day
=	0.119	0.084	ton/yr

METHODOLOGY

Emission Factors from STAPPA/ALAPCO "Air Quality Permits", Vol. I, Section 3 "Abrasive Blasting" (1991 edition)
 Flow rate of actual abrasive (FR) (lb/hr) = $FR1 \times (ID/ID1)^2 \times (D/D1)$
 Potential to Emit (before control) = $EF \times FR \times (1 - w/200) \times N$ (where w should be entered in as a whole number (if w is 50%, enter 50))
 Potential to Emit (after control) = $[\text{Potential to Emit (before control)}] \times [1 - \text{control efficiency}]$
 Potential to Emit (tons/year) = $[\text{Potential to Emit (lbs/hour)}] \times [8760 \text{ hours/year}] \times [\text{ton}/2000 \text{ lbs}]$

**Appendix A: Emission Calculations
Abrasive Blasting - Confined
Unit ID: BLA15**

Company Name: DePuy Orthopaedics, Inc
Source Address: 700 Orthopaedic Drive, Warsaw IN, 46581
Permit Number: 085-37505-00048
Reviewer: Kendra Sutherland

Table 1 - Emission Factors for Abrasives

Abrasive	Emission Factor (EF)	
	lb PM / lb abrasive	lb PM10 / lb PM
Sand	0.041	0.70
Grit	0.010	0.70
Steel Shot	0.004	0.86
Other	0.010	

Table 2 - Density of Abrasives (lb/ft3)

Abrasive	Density (lb/ft3)
Al oxides	160
Sand	99
Steel	487

Table 3 - Sand Flow Rate (FR1) Through Nozzle (lb/hr)

Flow rate (FR1) of sand through a blasting nozzle as a function of nozzle pressure and internal diameter (ID1)

Nozzle Type (diameter)	Internal diameter, in	Nozzle Pressure (psig)							
		30	40	50	60	70	80	90	100
No. 2 (1/8 inch)	0.125	28	35	42	49	55	63	70	77
No. 3 (3/16 inch)	0.1875	65	80	94	107	122	135	149	165
No. 4 (1/4 inch)	0.25	109	138	168	195	221	255	280	309
No. 5 (5/16 inch)	0.3125	205	247	292	354	377	420	462	507
No. 6 (3/8 inch)	0.375	285	355	417	477	540	600	657	720
No. 7 (7/16 inch)	0.4375	385	472	560	645	755	820	905	940
No. 8 (1/2 inch)	0.5	503	615	725	835	945	1050	1160	1265
No. 10 (5/8 inch)	0.625	820	990	1170	1336	1510	1680	1850	2030
No. 12 (3/4 inch)	0.75	1140	1420	1670	1915	2160	2400	2630	2880
No. 16 (1 inch)	1	2030	2460	2900	3340	3780	4200	4640	5060

CALCULATIONS

Adjusting Flow Rates for Different Abrasives and Nozzle Diameters
 Flow Rate (FR) = Abrasive flow rate (lb/hr) of abrasive at nozzle pressure and internal nozzle diameter (ID)

$D1 = \text{Density of sand from Table 2} = 99 \text{ lb/ft}^3$
 $ID1 = \text{Internal diameter of nozzle for sand blasting from Table 3} = 0.1875 \text{ inch}$
 $FR1 = \text{Sand flow rate at nozzle pressure and internal diameter (ID1) from Table 3} = 87 \text{ lb/hr}$

Actual blasting media used = Grit
 $D = \text{Density of actual abrasive} = 224.74 \text{ lb/ft}^3$
 $ID = \text{internal diameter of actual nozzle} = 0.1875 \text{ inch}$
 $FR = \text{Flow rate of actual abrasive (lb/hr)} = 197.5 \text{ lb/hr (per nozzle)}$

Potential to Emit Before Control

$FR = \text{Flow rate of actual abrasive (lb/hr)} = 197.5 \text{ lb/hr (per nozzle)}$
 $w = \text{fraction of time of wet blasting} = 0 \%$
 $N = \text{number of nozzles} = 1$
 $EF = \text{PM emission factor for actual abrasive from Table 1} = 0.010 \text{ lb PM / lb abrasive}$
 $PM10 \text{ emission factor ratio for actual abrasive from Table 1} = 0.70 \text{ lb PM10 / lb PM}$

	PM	PM10/PM2.5	
Potential to Emit (before control) =	1.975	1.382	lb/hr
=	47.40	33.18	lb/day
=	8.65	6.06	ton/yr

Potential to Emit After Control

	PM	PM10/PM2.5	
Emission Control Device Efficiency =	98.0%	98.0%	
Potential to Emit (after control) =	3.9E-02	2.8E-02	lb/hr
=	0.948	0.664	lb/day
=	0.173	0.121	ton/yr

METHODOLOGY

Emission Factors from STAPPA/ALAPCO "Air Quality Permits", Vol. I, Section 3 "Abrasive Blasting" (1991 edition)
 Flow rate of actual abrasive (FR) (lb/hr) = $FR1 \times (ID/ID1)^2 \times (D/D1)$
 Potential to Emit (before control) = $EF \times FR \times (1 - w/200) \times N$ (where w should be entered in as a whole number (if w is 50%, enter 50))
 Potential to Emit (after control) = $[\text{Potential to Emit (before control)}] \times [1 - \text{control efficiency}]$
 Potential to Emit (tons/year) = $[\text{Potential to Emit (lbs/hour)}] \times [8760 \text{ hours/year}] \times [\text{ton}/2000 \text{ lbs}]$

**Appendix A: Emission Calculations
Abrasive Blasting - Confined
Unit ID: BLA16**

Company Name: DePuy Orthopaedics, Inc
Source Address: 700 Orthopaedic Drive, Warsaw IN, 46581
Permit Number: 085-37505-00048
Reviewer: Kendra Sutherland

Table 1 - Emission Factors for Abrasives

Abrasive	Emission Factor (EF)	
	lb PM / lb abrasive	lb PM10 / lb PM
Sand	0.041	0.70
Grit	0.010	0.70
Steel Shot	0.004	0.86
Other	0.010	

Table 2 - Density of Abrasives (lb/ft3)

Abrasive	Density (lb/ft3)
Al oxides	160
Sand	99
Steel	487

Table 3 - Sand Flow Rate (FR1) Through Nozzle (lb/hr)

Flow rate (FR1) of sand through a blasting nozzle as a function of nozzle pressure and internal diameter (ID1)

Nozzle Type (diameter)	Internal diameter, in	Nozzle Pressure (psig)							
		30	40	50	60	70	80	90	100
No. 2 (1/8 inch)	0.125	28	35	42	49	55	63	70	77
No. 3 (3/16 inch)	0.1875	65	80	94	107	122	135	149	165
No. 4 (1/4 inch)	0.25	109	138	168	195	221	255	280	309
No. 5 (5/16 inch)	0.3125	205	247	292	354	377	420	462	507
No. 6 (3/8 inch)	0.375	285	355	417	477	540	600	657	720
No. 7 (7/16 inch)	0.4375	385	472	560	645	755	820	905	940
No. 8 (1/2 inch)	0.5	503	615	725	835	945	1050	1160	1265
No. 10 (5/8 inch)	0.625	820	990	1170	1336	1510	1680	1850	2030
No. 12 (3/4 inch)	0.75	1140	1420	1670	1915	2160	2400	2630	2880
No. 16 (1 inch)	1	2030	2460	2900	3340	3780	4200	4640	5060

CALCULATIONS

Adjusting Flow Rates for Different Abrasives and Nozzle Diameters
 Flow Rate (FR) = Abrasive flow rate (lb/hr) of abrasive at nozzle pressure and internal nozzle diameter (ID)

$D1 = \text{Density of sand from Table 2} = 99 \text{ lb/ft3}$
 $ID1 = \text{Internal diameter of nozzle for sand blasting from Table 3} = 0.1875 \text{ inch}$
 $FR1 = \text{Sand flow rate at nozzle pressure and internal diameter (ID1) from Table 3} = 80 \text{ lb/hr}$

Actual blasting media used = Grit
 $D = \text{Density of actual abrasive} = 224.74 \text{ lb/ft3}$
 $ID = \text{internal diameter of actual nozzle} = 0.1875 \text{ inch}$
 $FR = \text{Flow rate of actual abrasive (lb/hr)} = 181.6 \text{ lb/hr (per nozzle)}$

Potential to Emit Before Control

$FR = \text{Flow rate of actual abrasive (lb/hr)} = 181.6 \text{ lb/hr (per nozzle)}$
 $w = \text{fraction of time of wet blasting} = 0 \%$
 $N = \text{number of nozzles} = 1$
 $EF = \text{PM emission factor for actual abrasive from Table 1} = 0.010 \text{ lb PM / lb abrasive}$
 $PM10 \text{ emission factor ratio for actual abrasive from Table 1} = 0.70 \text{ lb PM10 / lb PM}$

	PM	PM10/PM2.5	
Potential to Emit (before control) =	1.816	1.271	lb/hr
=	43.59	30.51	lb/day
=	7.95	5.57	ton/yr

Potential to Emit After Control

	PM	PM10/PM2.5	
Emission Control Device Efficiency =	98.0%	98.0%	
Potential to Emit (after control) =	3.6E-02	2.5E-02	lb/hr
=	0.872	0.610	lb/day
=	0.159	0.111	ton/yr

METHODOLOGY

Emission Factors from STAPPA/ALAPCO "Air Quality Permits", Vol. I, Section 3 "Abrasive Blasting" (1991 edition)
 Flow rate of actual abrasive (FR) (lb/hr) = $FR1 \times (ID/ID1)^2 \times (D/D1)$
 Potential to Emit (before control) = $EF \times FR \times (1 - w/200) \times N$ (where w should be entered in as a whole number (if w is 50%, enter 50))
 Potential to Emit (after control) = $[\text{Potential to Emit (before control)}] \times [1 - \text{control efficiency}]$
 Potential to Emit (tons/year) = $[\text{Potential to Emit (lbs/hour)}] \times [8760 \text{ hours/year}] \times [\text{ton}/2000 \text{ lbs}]$

**Appendix A: Emission Calculations
Abrasive Blasting - Confined
Unit ID: BLA17**

Company Name: DePuy Orthopaedics, Inc
Source Address: 700 Orthopaedic Drive, Warsaw IN, 46581
Permit Number: 085-37505-00048
Reviewer: Kendra Sutherland

Table 1 - Emission Factors for Abrasives

Abrasive	Emission Factor (EF)	
	lb PM / lb abrasive	lb PM10 / lb PM
Sand	0.041	0.70
Grit	0.010	0.70
Steel Shot	0.004	0.86
Other	0.010	

Table 2 - Density of Abrasives (lb/ft3)

Abrasive	Density (lb/ft3)
Al oxides	160
Sand	99
Steel	487

Table 3 - Sand Flow Rate (FR1) Through Nozzle (lb/hr)

Flow rate (FR1) of sand through a blasting nozzle as a function of nozzle pressure and internal diameter (ID1)

Nozzle Type (diameter)	Internal diameter, in	Nozzle Pressure (psig)							
		30	40	50	60	70	80	90	100
No. 2 (1/8 inch)	0.125	28	35	42	49	55	63	70	77
No. 3 (3/16 inch)	0.1875	65	80	94	107	122	135	149	165
No. 4 (1/4 inch)	0.25	109	138	168	195	221	255	280	309
No. 5 (5/16 inch)	0.3125	205	247	292	354	377	420	462	507
No. 6 (3/8 inch)	0.375	285	355	417	477	540	600	657	720
No. 7 (7/16 inch)	0.4375	385	472	560	645	755	820	905	940
No. 8 (1/2 inch)	0.5	503	615	725	835	945	1050	1160	1265
No. 10 (5/8 inch)	0.625	820	990	1170	1336	1510	1680	1850	2030
No. 12 (3/4 inch)	0.75	1140	1420	1670	1915	2160	2400	2630	2880
No. 16 (1 inch)	1	2030	2460	2900	3340	3780	4200	4640	5060

CALCULATIONS

Adjusting Flow Rates for Different Abrasives and Nozzle Diameters
 Flow Rate (FR) = Abrasive flow rate (lb/hr) of abrasive at nozzle pressure and internal nozzle diameter (ID)

$D1 = \text{Density of sand from Table 2} = 99 \text{ lb/ft3}$
 $ID1 = \text{Internal diameter of nozzle for sand blasting from Table 3} = 0.1875 \text{ inch}$
 $FR1 = \text{Sand flow rate at nozzle pressure and internal diameter (ID1) from Table 3} = 51 \text{ lb/hr}$

Actual blasting media used = Grit
 $D = \text{Density of actual abrasive} = 224.74 \text{ lb/ft3}$
 $ID = \text{internal diameter of actual nozzle} = 0.1875 \text{ inch}$
 $FR = \text{Flow rate of actual abrasive (lb/hr)} = 115.8 \text{ lb/hr (per nozzle)}$

Potential to Emit Before Control

$FR = \text{Flow rate of actual abrasive (lb/hr)} = 115.8 \text{ lb/hr (per nozzle)}$
 $w = \text{fraction of time of wet blasting} = 0 \%$
 $N = \text{number of nozzles} = 1$
 $EF = \text{PM emission factor for actual abrasive from Table 1} = 0.010 \text{ lb PM/ lb abrasive}$
 $PM10 \text{ emission factor ratio for actual abrasive from Table 1} = 0.70 \text{ lb PM10 / lb PM}$

	PM	PM10/PM2.5	
Potential to Emit (before control) =	1.158	0.810	lb/hr
=	27.79	19.45	lb/day
=	5.07	3.55	ton/yr

Potential to Emit After Control

	PM	PM10/PM2.5	
Emission Control Device Efficiency =	98.0%	98.0%	
Potential to Emit (after control) =	2.3E-02	1.6E-02	lb/hr
=	0.556	0.389	lb/day
=	0.101	0.071	ton/yr

METHODOLOGY

Emission Factors from STAPPA/ALAPCO "Air Quality Permits", Vol. I, Section 3 "Abrasive Blasting" (1991 edition)
 Flow rate of actual abrasive (FR) (lb/hr) = $FR1 \times (ID/ID1)^2 \times (D/D1)$
 Potential to Emit (before control) = $EF \times FR \times (1 - w/200) \times N$ (where w should be entered in as a whole number (if w is 50%, enter 50))
 Potential to Emit (after control) = $[\text{Potential to Emit (before control)}] \times [1 - \text{control efficiency}]$
 Potential to Emit (tons/year) = $[\text{Potential to Emit (lbs/hour)}] \times [8760 \text{ hours/year}] \times [\text{ton}/2000 \text{ lbs}]$

**Appendix A: Emission Calculations
Abrasive Blasting - Confined
Unit ID: BLA18**

Company Name: DePuy Orthopaedics, Inc
Source Address: 700 Orthopaedic Drive, Warsaw IN, 46581
Permit Number: 085-37505-00048
Reviewer: Kendra Sutherland

Table 1 - Emission Factors for Abrasives

Abrasive	Emission Factor (EF)	
	lb PM / lb abrasive	lb PM10 / lb PM
Sand	0.041	0.70
Grit	0.010	0.70
Steel Shot	0.004	0.86
Other	0.010	

Table 2 - Density of Abrasives (lb/ft3)

Abrasive	Density (lb/ft3)
Al oxides	160
Sand	99
Steel	487

Table 3 - Sand Flow Rate (FR1) Through Nozzle (lb/hr)

Flow rate (FR1) of sand through a blasting nozzle as a function of nozzle pressure and internal diameter (ID1)

Nozzle Type (diameter)	Internal diameter, in	Nozzle Pressure (psig)							
		30	40	50	60	70	80	90	100
No. 2 (1/8 inch)	0.125	28	35	42	49	55	63	70	77
No. 3 (3/16 inch)	0.1875	65	80	94	107	122	135	149	165
No. 4 (1/4 inch)	0.25	109	138	168	195	221	255	280	309
No. 5 (5/16 inch)	0.3125	205	247	292	354	377	420	462	507
No. 6 (3/8 inch)	0.375	285	355	417	477	540	600	657	720
No. 7 (7/16 inch)	0.4375	385	472	560	645	755	820	905	940
No. 8 (1/2 inch)	0.5	503	615	725	835	945	1050	1160	1265
No. 10 (5/8 inch)	0.625	820	990	1170	1336	1510	1680	1850	2030
No. 12 (3/4 inch)	0.75	1140	1420	1670	1915	2160	2400	2630	2880
No. 16 (1 inch)	1	2030	2460	2900	3340	3780	4200	4640	5060

CALCULATIONS

Adjusting Flow Rates for Different Abrasives and Nozzle Diameters
 Flow Rate (FR) = Abrasive flow rate (lb/hr) of abrasive at nozzle pressure and internal nozzle diameter (ID)

$D1 = \text{Density of sand from Table 2} = 99 \text{ lb/ft}^3$
 $ID1 = \text{Internal diameter of nozzle for sand blasting from Table 3} = 0.1875 \text{ inch}$
 $FR1 = \text{Sand flow rate at nozzle pressure and internal diameter (ID1) from Table 3} = 65 \text{ lb/hr}$

Actual blasting media used = Grit
 $D = \text{Density of actual abrasive} = 224.74 \text{ lb/ft}^3$
 $ID = \text{internal diameter of actual nozzle} = 0.1875 \text{ inch}$
 $FR = \text{Flow rate of actual abrasive (lb/hr)} = 147.6 \text{ lb/hr (per nozzle)}$

Potential to Emit Before Control

$FR = \text{Flow rate of actual abrasive (lb/hr)} = 147.6 \text{ lb/hr (per nozzle)}$
 $w = \text{fraction of time of wet blasting} = 0 \%$
 $N = \text{number of nozzles} = 1$
 $EF = \text{PM emission factor for actual abrasive from Table 1} = 0.010 \text{ lb PM / lb abrasive}$
 $PM10 \text{ emission factor ratio for actual abrasive from Table 1} = 0.70 \text{ lb PM10 / lb PM}$

	PM	PM10/PM2.5	
Potential to Emit (before control) =	1.476	1.033	lb/hr
=	35.41	24.79	lb/day
=	6.46	4.52	ton/yr

Potential to Emit After Control

	PM	PM10/PM2.5	
Emission Control Device Efficiency =	98.0%	98.0%	
Potential to Emit (after control) =	3.0E-02	2.1E-02	lb/hr
=	0.708	0.496	lb/day
=	0.129	0.090	ton/yr

METHODOLOGY

Emission Factors from STAPPA/ALAPCO "Air Quality Permits", Vol. I, Section 3 "Abrasive Blasting" (1991 edition)
 Flow rate of actual abrasive (FR) (lb/hr) = $FR1 \times (ID/ID1)^2 \times (D/D1)$
 Potential to Emit (before control) = $EF \times FR \times (1 - w/200) \times N$ (where w should be entered in as a whole number (if w is 50%, enter 50))
 Potential to Emit (after control) = $[\text{Potential to Emit (before control)}] \times [1 - \text{control efficiency}]$
 Potential to Emit (tons/year) = $[\text{Potential to Emit (lbs/hour)}] \times [8760 \text{ hours/year}] \times [\text{ton}/2000 \text{ lbs}]$

**Appendix A: Emission Calculations
Abrasive Blasting - Confined
Unit ID: BLA19**

Company Name: DePuy Orthopaedics, Inc
Source Address: 700 Orthopaedic Drive, Warsaw IN, 46581
Permit Number: 085-37505-00048
Reviewer: Kendra Sutherland

Table 1 - Emission Factors for Abrasives

Abrasive	Emission Factor (EF)	
	lb PM / lb abrasive	lb PM10 / lb PM
Sand	0.041	0.70
Grit	0.010	0.70
Steel Shot	0.004	0.86
Other	0.010	

Table 2 - Density of Abrasives (lb/ft3)

Abrasive	Density (lb/ft3)
Al oxides	160
Sand	99
Steel	487

Table 3 - Sand Flow Rate (FR1) Through Nozzle (lb/hr)

Flow rate (FR1) of sand through a blasting nozzle as a function of nozzle pressure and internal diameter (ID1)

Nozzle Type (diameter)	Internal diameter, in	Nozzle Pressure (psig)							
		30	40	50	60	70	80	90	100
No. 2 (1/8 inch)	0.125	28	35	42	49	55	63	70	77
No. 3 (3/16 inch)	0.1875	65	80	94	107	122	135	149	165
No. 4 (1/4 inch)	0.25	109	138	168	195	221	255	280	309
No. 5 (5/16 inch)	0.3125	205	247	292	354	377	420	462	507
No. 6 (3/8 inch)	0.375	285	355	417	477	540	600	657	720
No. 7 (7/16 inch)	0.4375	385	472	560	645	755	820	905	940
No. 8 (1/2 inch)	0.5	503	615	725	835	945	1050	1160	1265
No. 10 (5/8 inch)	0.625	820	990	1170	1336	1510	1680	1850	2030
No. 12 (3/4 inch)	0.75	1140	1420	1670	1915	2160	2400	2630	2880
No. 16 (1 inch)	1	2030	2460	2900	3340	3780	4200	4640	5060

CALCULATIONS

Adjusting Flow Rates for Different Abrasives and Nozzle Diameters
 Flow Rate (FR) = Abrasive flow rate (lb/hr) of abrasive at nozzle pressure and internal nozzle diameter (ID)

$D1 = \text{Density of sand from Table 2} = 99 \text{ lb/ft3}$
 $ID1 = \text{Internal diameter of nozzle for sand blasting from Table 3} = 0.5 \text{ inch}$
 $FR1 = \text{Sand flow rate at nozzle pressure and internal diameter (ID1) from Table 3} = 343 \text{ lb/hr}$

Actual blasting media used = salt
 $D = \text{Density of actual abrasive} = 135.15 \text{ lb/ft3}$
 $ID = \text{internal diameter of actual nozzle} = 0.5 \text{ inch}$
 $FR = \text{Flow rate of actual abrasive (lb/hr)} = 468.2 \text{ lb/hr (per nozzle)}$

Potential to Emit Before Control

$FR = \text{Flow rate of actual abrasive (lb/hr)} = 468.2 \text{ lb/hr (per nozzle)}$
 $w = \text{fraction of time of wet blasting} = 0 \%$
 $N = \text{number of nozzles} = 1$
 $EF = \text{PM emission factor for actual abrasive from Table 1} = 0.010 \text{ lb PM / lb abrasive}$
 $PM10 \text{ emission factor ratio for actual abrasive from Table 1} = 0.70 \text{ lb PM10 / lb PM}$

	PM	PM10/PM2.5	
Potential to Emit (before control) =	4.682	3.278	lb/hr
=	112.38	78.67	lb/day
=	20.51	14.36	ton/yr

Potential to Emit After Control

	PM	PM10/PM2.5	
Emission Control Device Efficiency =	98.0%	98.0%	
Potential to Emit (after control) =	9.4E-02	6.6E-02	lb/hr
=	2.248	1.573	lb/day
=	0.410	0.287	ton/yr

METHODOLOGY

Emission Factors from STAPPA/ALAPCO "Air Quality Permits", Vol. I, Section 3 "Abrasive Blasting" (1991 edition)
 Flow rate of actual abrasive (FR) (lb/hr) = $FR1 \times (ID/ID1)^2 \times (D/D1)$
 Potential to Emit (before control) = $EF \times FR \times (1 - w/200) \times N$ (where w should be entered in as a whole number (if w is 50%, enter 50))
 Potential to Emit (after control) = $[\text{Potential to Emit (before control)}] \times [1 - \text{control efficiency}]$
 Potential to Emit (tons/year) = $[\text{Potential to Emit (lbs/hour)}] \times [8760 \text{ hours/year}] \times [\text{ton}/2000 \text{ lbs}]$

**Appendix A: Emission Calculations
Abrasive Blasting - Confined
Unit ID: BLA20**

Company Name: DePuy Orthopaedics, Inc
Source Address: 700 Orthopaedic Drive, Warsaw IN, 46581
Permit Number: 085-37505-00048
Reviewer: Kendra Sutherland

Table 1 - Emission Factors for Abrasives

Abrasive	Emission Factor (EF)	
	lb PM / lb abrasive	lb PM10 / lb PM
Sand	0.041	0.70
Grit	0.010	0.70
Steel Shot	0.004	0.86
Other	0.010	

Table 2 - Density of Abrasives (lb/ft3)

Abrasive	Density (lb/ft3)
Al oxides	160
Sand	99
Steel	487

Table 3 - Sand Flow Rate (FR1) Through Nozzle (lb/hr)

Flow rate (FR1) of sand through a blasting nozzle as a function of nozzle pressure and internal diameter (ID1)

Nozzle Type (diameter)	Internal diameter, in	Nozzle Pressure (psig)							
		30	40	50	60	70	80	90	100
No. 2 (1/8 inch)	0.125	28	35	42	49	55	63	70	77
No. 3 (3/16 inch)	0.1875	65	80	94	107	122	135	149	165
No. 4 (1/4 inch)	0.25	109	138	168	195	221	255	280	309
No. 5 (5/16 inch)	0.3125	205	247	292	354	377	420	462	507
No. 6 (3/8 inch)	0.375	285	355	417	477	540	600	657	720
No. 7 (7/16 inch)	0.4375	385	472	560	645	755	820	905	940
No. 8 (1/2 inch)	0.5	503	615	725	835	945	1050	1160	1265
No. 10 (5/8 inch)	0.625	820	990	1170	1336	1510	1680	1850	2030
No. 12 (3/4 inch)	0.75	1140	1420	1670	1915	2160	2400	2630	2880
No. 16 (1 inch)	1	2030	2460	2900	3340	3780	4200	4640	5060

CALCULATIONS

Adjusting Flow Rates for Different Abrasives and Nozzle Diameters
 Flow Rate (FR) = Abrasive flow rate (lb/hr) of abrasive at nozzle pressure and internal nozzle diameter (ID)

D1 = Density of sand from Table 2 = 99 lb/ft3
 ID1 = Internal diameter of nozzle for sand blasting from Table 3 = 0.3125 inch
 FR1 = Sand flow rate at nozzle pressure and internal diameter (ID1) from Table 3 = 165 lb/hr

Actual blasting media used = Grit
 D = Density of actual abrasive = 224.74 lb/ft3
 ID = internal diameter of actual nozzle = 0.3125 inch
 FR = Flow rate of actual abrasive (lb/hr) = 374.6 lb/hr (per nozzle)

Potential to Emit Before Control

FR = Flow rate of actual abrasive (lb/hr) = 374.6 lb/hr (per nozzle)
 w = fraction of time of wet blasting = 0 %
 N = number of nozzles = 1
 EF = PM emission factor for actual abrasive from Table 1 = 0.010 lb PM / lb abrasive
 PM10 emission factor ratio for actual abrasive from Table 1 = 0.70 lb PM10 / lb PM

	PM	PM10/PM2.5	
Potential to Emit (before control) =	3.746	2.622	lb/hr
=	89.90	62.93	lb/day
=	16.41	11.48	ton/yr

Potential to Emit After Control

	PM	PM10/PM2.5	
Emission Control Device Efficiency =	98.0%	98.0%	
Potential to Emit (after control) =	7.5E-02	5.2E-02	lb/hr
=	1.798	1.259	lb/day
=	0.328	0.230	ton/yr

METHODOLOGY

Emission Factors from STAPPA/ALAPCO "Air Quality Permits", Vol. I, Section 3 "Abrasive Blasting" (1991 edition)
 Flow rate of actual abrasive (FR) (lb/hr) = FR1 x (ID/ID1)² x (D/D1)
 Potential to Emit (before control) = EF x FR x (1 - w/200) x N (where w should be entered in as a whole number (if w is 50%, enter 50))
 Potential to Emit (after control) = [Potential to Emit (before control)] * [1 - control efficiency]
 Potential to Emit (tons/year) = [Potential to Emit (lbs/hour)] x [8760 hours/year] x [ton/2000 lbs]

**Appendix A: Emission Calculations
Abrasive Blasting - Confined
Unit ID: BLA22**

Company Name: DePuy Orthopaedics, Inc
Source Address: 700 Orthopaedic Drive, Warsaw IN, 46581
Permit Number: 085-37505-00048
Reviewer: Kendra Sutherland

Table 1 - Emission Factors for Abrasives

Abrasive	Emission Factor (EF)	
	lb PM / lb abrasive	lb PM10 / lb PM
Sand	0.041	0.70
Grit	0.010	0.70
Steel Shot	0.004	0.86
Other	0.010	

Table 2 - Density of Abrasives (lb/ft3)

Abrasive	Density (lb/ft3)
Al oxides	160
Sand	99
Steel	487

Table 3 - Sand Flow Rate (FR1) Through Nozzle (lb/hr)

Flow rate (FR1) of sand through a blasting nozzle as a function of nozzle pressure and internal diameter (ID1)

Nozzle Type (diameter)	Internal diameter, in	Nozzle Pressure (psig)							
		30	40	50	60	70	80	90	100
No. 2 (1/8 inch)	0.125	28	35	42	49	55	63	70	77
No. 3 (3/16 inch)	0.1875	65	80	94	107	122	135	149	165
No. 4 (1/4 inch)	0.25	109	138	168	195	221	255	280	309
No. 5 (5/16 inch)	0.3125	205	247	292	354	377	420	462	507
No. 6 (3/8 inch)	0.375	285	355	417	477	540	600	657	720
No. 7 (7/16 inch)	0.4375	385	472	560	645	755	820	905	940
No. 8 (1/2 inch)	0.5	503	615	725	835	945	1050	1160	1265
No. 10 (5/8 inch)	0.625	820	990	1170	1336	1510	1680	1850	2030
No. 12 (3/4 inch)	0.75	1140	1420	1670	1915	2160	2400	2630	2880
No. 16 (1 inch)	1	2030	2460	2900	3340	3780	4200	4640	5060

CALCULATIONS

Adjusting Flow Rates for Different Abrasives and Nozzle Diameters
Flow Rate (FR) = Abrasive flow rate (lb/hr) of abrasive at nozzle pressure and internal nozzle diameter (ID)

$D1 = \text{Density of sand from Table 2} = 99 \text{ lb/ft}^3$
 $ID1 = \text{Internal diameter of nozzle for sand blasting from Table 3} = 0.25 \text{ inch}$
 $FR1 = \text{Sand flow rate at nozzle pressure and internal diameter (ID1) from Table 3} = 168 \text{ lb/hr}$

Actual blasting media used = Glass
 $D = \text{Density of actual abrasive} = 135.47 \text{ lb/ft}^3$
 $ID = \text{internal diameter of actual nozzle} = 0.25 \text{ inch}$
 $FR = \text{Flow rate of actual abrasive (lb/hr)} = 229.9 \text{ lb/hr (per nozzle)}$

Potential to Emit Before Control

$FR = \text{Flow rate of actual abrasive (lb/hr)} = 229.9 \text{ lb/hr (per nozzle)}$
 $w = \text{fraction of time of wet blasting} = 0 \%$
 $N = \text{number of nozzles} = 1$
 $EF = \text{PM emission factor for actual abrasive from Table 1} = 0.010 \text{ lb PM / lb abrasive}$
 $PM10 \text{ emission factor ratio for actual abrasive from Table 1} = 0.70 \text{ lb PM10 / lb PM}$

	PM	PM10/PM2.5	
Potential to Emit (before control) =	2.299	1.609	lb/hr
=	55.17	38.62	lb/day
=	10.07	7.05	ton/yr

Potential to Emit After Control

	PM	PM10/PM2.5	
Emission Control Device Efficiency =	98.0%	98.0%	
Potential to Emit (after control) =	4.6E-02	3.2E-02	lb/hr
=	1.103	0.772	lb/day
=	0.201	0.141	ton/yr

METHODOLOGY

Emission Factors from STAPPA/ALAPCO "Air Quality Permits", Vol. I, Section 3 "Abrasive Blasting" (1991 edition)
 Flow rate of actual abrasive (FR) (lb/hr) = $FR1 \times (ID/ID1)^2 \times (D/D1)$
 Potential to Emit (before control) = $EF \times FR \times (1 - w/200) \times N$ (where w should be entered in as a whole number (if w is 50%, enter 50))
 Potential to Emit (after control) = $[\text{Potential to Emit (before control)}] \times [1 - \text{control efficiency}]$
 Potential to Emit (tons/year) = $[\text{Potential to Emit (lbs/hour)}] \times [8760 \text{ hours/year}] \times [\text{ton}/2000 \text{ lbs}]$

**Appendix A: Emission Calculations
Degreasers**

Company Name: DePuy Orthopaedics, Inc
Source Address: 700 Orthopaedic Drive, Warsaw IN, 46581
Permit Number: 085-37505-00048
Reviewer: Kendra Sutherland

Degreaser 85105	Oakite	8.3	0.80%	0.0%	0.8%	0.0%	0.00%	0.06250	1.000	0.07	0.07	0.00	0.10	0.02	0.00	n/a	100%
Degreaser 85106	Oakite	8.3	0.80%	0.0%	0.8%	0.0%	0.00%	0.06250	1.000	0.07	0.07	0.00	0.10	0.02	0.00	n/a	100%
Degreaser 00140	14L	8.4	0.50%	0.0%	0.5%	0.0%	0.00%	0.00013	10.000	0.04	0.04	0.00	0.00	0.00	0.00	n/a	100%
Degreaser 00141	14L	8.4	0.50%	0.0%	0.5%	0.0%	0.00%	0.00013	10.000	0.04	0.04	0.00	0.00	0.00	0.00	n/a	100%
Degreaser 00142	14L	8.4	0.50%	0.0%	0.5%	0.0%	0.00%	0.00013	10.000	0.04	0.04	0.00	0.00	0.00	0.00	n/a	100%
Degreaser 00143	14L	8.4	0.50%	0.0%	0.5%	0.0%	0.00%	0.00013	10.000	0.04	0.04	0.00	0.00	0.00	0.00	n/a	100%
Degreaser 00144	14L	8.4	0.50%	0.0%	0.5%	0.0%	0.00%	0.00013	10.000	0.04	0.04	0.00	0.00	0.00	0.00	n/a	100%
Degreaser 00145	14L	8.4	0.50%	0.0%	0.5%	0.0%	0.00%	0.00013	10.000	0.04	0.04	0.00	0.00	0.00	0.00	n/a	100%
Degreaser 83145	14L	8.4	0.50%	0.0%	0.5%	0.0%	0.00%	0.00013	10.000	0.04	0.04	0.00	0.00	0.00	0.00	n/a	100%
Degreaser 83117	14L	8.4	0.50%	0.0%	0.5%	0.0%	0.00%	0.00013	10.000	0.04	0.04	0.00	0.00	0.00	0.00	n/a	100%
Degreaser 72051	14L	8.4	0.50%	0.0%	0.5%	0.0%	0.00%	0.00013	10.000	0.04	0.04	0.00	0.00	0.00	0.00	n/a	100%
Degreaser 60183	14L	8.4	0.50%	0.0%	0.5%	0.0%	0.00%	0.00013	10.000	0.04	0.04	0.00	0.00	0.00	0.00	n/a	100%
Degreaser 83120	14L	8.4	0.50%	0.0%	0.5%	0.0%	0.00%	0.00013	10.000	0.04	0.04	0.00	0.00	0.00	0.00	n/a	100%
Degreaser 60182	14L	8.4	0.50%	0.0%	0.5%	0.0%	0.00%	0.00013	10.000	0.04	0.04	0.00	0.00	0.00	0.00	n/a	100%
Degreaser 00136	14L	8.4	0.50%	0.0%	0.5%	0.0%	0.00%	0.00013	10.000	0.04	0.04	0.00	0.00	0.00	0.00	n/a	100%
Degreaser 00137	14L	8.4	0.50%	0.0%	0.5%	0.0%	0.00%	0.00013	10.000	0.04	0.04	0.00	0.00	0.00	0.00	n/a	100%
Degreaser 00138	14L	8.4	0.50%	0.0%	0.5%	0.0%	0.00%	0.00013	10.000	0.04	0.04	0.00	0.00	0.00	0.00	n/a	100%
Degreaser 00139	14L	8.4	0.50%	0.0%	0.5%	0.0%	0.00%	0.00013	10.000	0.04	0.04	0.00	0.00	0.00	0.00	n/a	100%
Degreaser 20632	Novec	10.6	0.00%	0.0%	0.0%	0.0%	0.00%	0.00013	10.000	7.42	7.42	0.01	0.24	0.04	0.00	n/a	100%
Degreaser 86105/86016	Nitric Acid	11.6	0.00%	0.0%	0.0%	0.0%	0.00%	0.06250	1.000	0.00	0.00	0.00	0.00	0.00	0.00	n/a	100%

Sum for Degreasing Operations: 0.02 0.46 0.08 0.00

ETHODOLOGY

* Per the MSDS that was provided by the source

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

Oakite degreaser calculations have been modified to accurately reflect operation using 92% RO water and 8% Oakite solvent

14L degreaser calculations have been modified to accurately reflect operation using 94% RO water and 6% 14L solvent

**Appendix A: Emission Calculations
 Reciprocating Internal Combustion Engines - Diesel Fuel
 Output Rating (<=600 HP)
 Maximum Input Rate (<=4.2 MMBtu/hr)**

Company Name: DePuy Orthopaedics, Inc
Source Address: 700 Orthopaedic Drive, Warsaw IN, 46581
Permit Number: 085-37505-00048
Reviewer: Kendra Sutherland

Two (2) Emergency Generators **328 hp each**

B. Emissions calculated based on output rating (hp)

Output Horsepower Rating (hp)	656.0
Maximum Hours Operated per Year	500
Potential Throughput (hp-hr/yr)	328,000

	Pollutant						
	PM*	PM10*	direct PM2.5*	SO2	NOx	VOC	CO
Emission Factor in lb/hp-hr	0.0022	0.0022	0.0022	0.0021	0.0310	0.0025	0.0067
Potential Emission in tons/yr	0.36	0.36	0.36	0.34	5.08	0.41	1.10

*PM and PM2.5 emission factors are assumed to be equivalent to PM10 emission factors. No information was given regarding which method was used to determine the factor or the fraction of PM10 which is condensable.

Hazardous Air Pollutants (HAPs)

	Pollutant							
	Benzene	Toluene	Xylene	1,3-Butadiene	Formaldehyde	Acetaldehyde	Acrolein	Total PAH HAPs***
Emission Factor in lb/hp-hr****	6.53E-06	2.86E-06	2.00E-06	2.74E-07	8.26E-06	5.37E-06	6.48E-07	1.18E-06
Potential Emission in tons/yr	1.07E-03	4.70E-04	3.27E-04	4.49E-05	1.35E-03	8.81E-04	1.06E-04	1.93E-04

***PAH = Polyaromatic Hydrocarbon (PAHs are considered HAPs, since they are considered Polycyclic Organic Matter)

****Emission factors in lb/hp-hr were calculated using emission factors in lb/MMBtu and a brake specific fuel consumption of 7,000 Btu / hp-hr (AP-42 Table 3.3-1).

Potential Emission of Total HAPs (tons/yr)	4.45E-03
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Green House Gas Emissions (GHG)

	Pollutant		
	CO2	CH4	N2O
Emission Factor in lb/hp-hr	1.15E+00	4.63E-05	9.26E-06
Potential Emission in tons/yr	1.89E+02	7.59E-03	1.52E-03

Summed Potential Emissions in tons/yr	1.89E+02
CO2e Total in tons/yr	1.89E+02

Methodology

Emission Factors are from AP42 (Supplement B 10/96), Tables 3.3-1 and 3.3-2

CH4 and N2O Emission Factor from 40 CFR 98 Subpart C Table C-2.

Greenhouse Warming Potentials (GWP) from Table A-1 of 40 CFR Part 98 Subpart A.

Potential Throughput (hp-hr/yr) = [Output Horsepower Rating (hp)] * [Maximum Hours Operated per Year]

Potential Emission (tons/yr) = [Potential Throughput (hp-hr/yr)] * [Emission Factor (lb/hp-hr)] / [2,000 lb/ton]

CO2e (tons/yr) = CO2 Potential Emission ton/yr x CO2 GWP (1) + CH4 Potential Emission ton/yr x CH4 GWP (21) + N2O Potential Emission ton/yr x N2O GWP (310).

**Appendix A: Emission Calculations
 Reciprocating Internal Combustion Engines - Diesel Fuel
 Output Rating (<=600 HP)
 Maximum Input Rate (<=4.2 MMBtu/hr)**

Company Name: DePuy Orthopaedics, Inc
Source Address: 700 Orthopaedic Drive, Warsaw IN, 46581
Permit Number: 085-37505-00048
Reviewer: Kendra Sutherland

One (1) emergency fire pump 190 hp

B. Emissions calculated based on output rating (hp)

Output Horsepower Rating (hp)	190.0
Maximum Hours Operated per Year	500
Potential Throughput (hp-hr/yr)	95,000

	Pollutant						
	PM*	PM10*	direct PM2.5*	SO2	NOx	VOC	CO
Emission Factor in lb/hp-hr	0.0022	0.0022	0.0022	0.0021	0.0310	0.0025	0.0067
Potential Emission in tons/yr	0.10	0.10	0.10	0.10	1.47	0.12	0.32

*PM and PM2.5 emission factors are assumed to be equivalent to PM10 emission factors. No information was given regarding which method was used to determine the factor or the fraction of PM10 which is condensable.

Hazardous Air Pollutants (HAPs)

	Pollutant							
	Benzene	Toluene	Xylene	1,3-Butadiene	Formaldehyde	Acetaldehyde	Acrolein	Total PAH HAPs***
Emission Factor in lb/hp-hr****	6.53E-06	2.86E-06	2.00E-06	2.74E-07	8.26E-06	5.37E-06	6.48E-07	1.18E-06
Potential Emission in tons/yr	3.10E-04	1.36E-04	9.48E-05	1.30E-05	3.92E-04	2.55E-04	3.08E-05	5.59E-05

***PAH = Polyaromatic Hydrocarbon (PAHs are considered HAPs, since they are considered Polycyclic Organic Matter)

****Emission factors in lb/hp-hr were calculated using emission factors in lb/MMBtu and a brake specific fuel consumption of 7,000 Btu / hp-hr (AP-42 Table 3.3-1).

Potential Emission of Total HAPs (tons/yr)	1.29E-03
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DePuy Warsaw Insignificant* Air Emission Activities

Company Name: DePuy Orthopaedics, Inc
 Source Address: 700 Orthopaedic Drive, Warsaw IN, 46581
 Permit Number: 085-37505-00048
 Reviewer: Kendra Sutherland

Unit Type	ID	Emission Type	Estimated Emission Quantity (lbs/day)	Venting	Reservoir Size (gal)*	Concentration	% Volatiles in undiluted solvent
Peracetic Acid Sterilizing	E121	Peracetic Acid	0.00	Externally	0.0625		
Dip Seal	72043	VOC	0.00	Externally	5	100	0% volatiles
Dip Seal	78080	VOC	0.00	Externally	5		0% volatiles
Isopropyl Alcohol wipe down	Process	VOC	0.01	Internally	NA		
Zyglo	85106	VOC (penetrant)	0.00	Internally	30		0% volatiles
Zyglo	85109	VOC (cleaner)	0.24	Internally	30	0.08	<1% volatiles
LP Gas-fired lift truck		Combustion	NA	Internally	40 horsepower		
LP Gas-fired lift truck		Combustion	NA	Internally	48 horsepower		
LP Gas-fired lift truck		Combustion	NA	Internally	90 horsepower		

*Insignificance as determined by 326 IAC 2-7-1(21) is as follows:

CO <= 25 lb/day
 Lead <= 0.6 ton/yr or 3.29 lb/day
 NOx <= 5 lb/hr or 25 lb/day
 PM <= 5 lb/hr or 25 lb/day
 SO2 <= 5 lb/hr or 25 lb/day
 VOC <= 3 lb/hr or 15 lb/day

ZyglOs

Emissions (worst case) = vol of cleaner * 0.08 (percent soap) * % volatiles of soap



Indiana Department of Environmental Management

We Protect Hoosiers and Our Environment.

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(800) 451-6027 • (317) 232-8603 • www.idem.IN.gov

Michael R. Pence
Governor

Carol S. Comer
Commissioner

October 18, 2016

Mr. Craig Evans
DePuy Orthopaedics, Inc.
700 Orthopaedic Drive
Warsaw, IN 46581

Re: Public Notice
DePuy Orthopaedics, Inc.
Permit Level: Federally Enforceable State
Operating Permit (FESOP)
Significant Permit Revision
Permit Number: 085-37505-00048

Dear Mr. Evans:

Enclosed is a copy of your draft Federally Enforceable State Operating Permit (FESOP) Significant Permit Revision, Technical Support Document, emission calculations, and the Public Notice which will be printed in your local newspaper.

The Office of Air Quality (OAQ) has prepared two versions of the Public Notice Document. The abbreviated version will be published in the newspaper, and the more detailed version will be made available on the IDEM's website and provided to interested parties. Both versions are included for your reference. The OAQ has requested that the Times Union in Warsaw, Indiana publish the abbreviated version of the public notice no later than October 21, 2016. You will not be responsible for collecting any comments, nor are you responsible for having the notice published in the newspaper.

OAQ has submitted the draft permit package to the Warsaw Community Public Library, 310 East Main Street in Warsaw, Indiana. As a reminder, you are obligated by 326 IAC 2-1.1-6(c) to place a copy of the complete permit application at this library no later than ten (10) days after submittal of the application or additional information to our department. We highly recommend that even if you have already placed these materials at the library, that you confirm with the library that these materials are available for review and request that the library keep the materials available for review during the entire permitting process.

Please review the enclosed documents carefully. This is your opportunity to comment on the draft permit and notify the OAQ of any corrections that are needed before the final decision. Questions or comments about the enclosed documents should be directed to Kendra Sutherland, Indiana Department of Environmental Management, Office of Air Quality, 100 N. Senate Avenue, Indianapolis, Indiana, 46204 or call (800) 451-6027, and ask for extension 4-5401 or dial (317) 234-5401.

Sincerely,

Vivian Haun

Vivian Haun
Permits Branch
Office of Air Quality

Enclosures
PN Applicant Cover letter 2/17/2016



Indiana Department of Environmental Management

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ATTENTION: PUBLIC NOTICES, LEGAL ADVERTISING

October 17, 2016

Times Union
PO Box 1448
Warsaw, IN 46581-1448

Enclosed, please find one Indiana Department of Environmental Management Notice of Public Comment for DePuy Orthopaedics, Inc., Kosciusko County, Indiana.

Since our agency must comply with requirements which call for a Notice of Public Comment, we request that you print this notice one time, no later than October 21, 2016.

Please send a notarized form, clippings showing the date of publication, and the billing to the Indiana Department of Environmental Management, Accounting, Room N1345, 100 North Senate Avenue, Indianapolis, Indiana, 46204.

To ensure proper payment, please reference account # 100174737.

We are required by the Auditor's Office to request that you place the Federal ID Number on all claims. If you have any conflicts, questions, or problems with the publishing of this notice or if you do not receive complete public notice information for this notice, please call Vivian Haun at 800-451-6027 and ask for extension 3-6878 or dial 317-233-6878.

Sincerely,

Vivian Haun

Vivian Haun
Permit Branch
Office of Air Quality

Permit Level: Federally Enforceable State Operating Permit (FESOP)
Significant Permit Revision

Permit Number: 085-37505-00048

Enclosure
PN Newspaper.dot 8/27/2015



Indiana Department of Environmental Management

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Carol S. Comer
Commissioner

October 18, 2016

To: Warsaw Community Public Library

From: Matthew Stuckey, Branch Chief
Permits Branch
Office of Air Quality

Subject: **Important Information to Display Regarding a Public Notice for an Air Permit**

Applicant Name: DePuy Orthopaedics, Inc.
Permit Number: 085-37505-00048

Enclosed is a copy of important information to make available to the public. This proposed project is regarding a source that may have the potential to significantly impact air quality. Librarians are encouraged to educate the public to make them aware of the availability of this information. The following information is enclosed for public reference at your library:

- Notice of a 30-day Period for Public Comment
- Request to publish the Notice of 30-day Period for Public Comment
- Draft Permit and Technical Support Document

You will not be responsible for collecting any comments from the citizens. Please refer all questions and request for the copies of any pertinent information to the person named below.

Members of your community could be very concerned in how these projects might affect them and their families. **Please make this information readily available until you receive a copy of the final package.**

If you have any questions concerning this public review process, please contact Joanne Smiddie-Brush, OAQ Permits Administration Section at 1-800-451-6027, extension 3-0185. Questions pertaining to the permit itself should be directed to the contact listed on the notice.

Enclosures
PN Library.dot 2/16/2016



Indiana Department of Environmental Management

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Michael R. Pence
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Carol S. Comer
Commissioner

Notice of Public Comment

October 18, 2016
DePuy Orthopaedics, Inc.
085-37505-00048

Dear Concerned Citizen(s):

You have been identified as someone who could potentially be affected by this proposed air permit. The Indiana Department of Environmental Management, in our ongoing efforts to better communicate with concerned citizens, invites your comment on the draft permit.


Enclosed is a Notice of Public Comment, which has been placed in the Legal Advertising section of your local newspaper. The application and supporting documentation for this proposed permit have been placed at the library indicated in the Notice. These documents more fully describe the project, the applicable air pollution control requirements and how the applicant will comply with these requirements.

If you would like to comment on this draft permit, please contact the person named in the enclosed Public Notice. Thank you for your interest in the Indiana's Air Permitting Program.

Please Note: *If you feel you have received this Notice in error, or would like to be removed from the Air Permits mailing list, please contact Patricia Pear with the Air Permits Administration Section at 1-800-451-6027, ext. 3-6875 or via e-mail at PPEAR@IDEM.IN.GOV. If you have recently moved and this Notice has been forwarded to you, please notify us of your new address and if you wish to remain on the mailing list. Mail that is returned to IDEM by the Post Office with a forwarding address in a different county will be removed from our list unless otherwise requested.*

Enclosure
PN AAA Cover.dot 2/17/2016

Mail Code 61-53

IDEM Staff	VHAUN 10/18/2016 DePuy Orthopaedics, Inc. 085-37505-00048 DRAFT		Type of Mail: CERTIFICATE OF MAILING ONLY	AFFIX STAMP HERE IF USED AS CERTIFICATE OF MAILING
Name and address of Sender		Indiana Department of Environmental Management Office of Air Quality – Permits Branch 100 N. Senate Indianapolis, IN 46204		

Line	Article Number	Name, Address, Street and Post Office Address	Postage	Handing Charges	Act. Value (If Registered)	Insured Value	Due Send if COD	R.R. Fee	S.D. Fee	S.H. Fee	Rest. Del. Fee	Remarks
1		Craig Evans DePuy Orthopaedics, Inc. 700 Orthopaedic Dr Warsaw IN 46581-0988 (Source CAATS)										
2		Ray Gonzalez Plant Manager DePuy Orthopaedics, Inc. 700 Orthopaedic Dr Warsaw IN 46581-0988 (RO CAATS)										
3		Warsaw City Council and Mayors Office 102 S Buffalo Street Warsaw IN 46580 (Local Official)										
4		Warsaw Community Public Library 310 E Main St Warsaw IN 46580-2882 (Library)										
5		Kosciusko County Board of Commissioners 100 W. Center St, Room 220 Warsaw IN 46580 (Local Official)										
6		Kosciusko County Health Department 100 W. Center Street, 3rd Floor Warsaw IN 46580-2877 (Health Department)										
7		Mr. Jason Morrison SevenGen 604 West Wayne Street Fort Wayne IN 46802 (Consultant)										
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Total number of pieces Listed by Sender	Total number of Pieces Received at Post Office	Postmaster, Per (Name of Receiving employee)	The full declaration of value is required on all domestic and international registered mail. The maximum indemnity payable for the reconstruction of nonnegotiable documents under Express Mail document reconstructing insurance is \$50,000 per piece subject to a limit of \$50, 000 per occurrence. The maximum indemnity payable on Express mil merchandise insurance is \$500. The maximum indemnity payable is \$25,000 for registered mail, sent with optional postal insurance. See Domestic Mail Manual R900, S913, and S921 for limitations of coverage on inured and COD mail. See International Mail Manual for limitations o coverage on international mail. Special handling charges apply only to Standard Mail (A) and Standard Mail (B) parcels.
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