

STATE OF MISSOURI



DEPARTMENT OF NATURAL RESOURCES

MISSOURI AIR CONSERVATION COMMISSION

PERMIT BOOK

PERMIT TO CONSTRUCT

Under the authority of RSMo 643 and the Federal Clean Air Act the applicant is authorized to construct the air contaminant source(s) described below, in accordance with the laws, rules and conditions as set forth herein.

Permit Number: 05 2015 - 008

Project Number: 2015-03-110
Installation Number: 019-0006

Parent Company: Hubbell Inc.

Parent Company Address: 40 Waterview Dr., Shelton, CT 06484

Installation Name: Hubbell Power Systems - East Street Plant

Installation Address: 1100 E Switzler, Centralia, MO 65240

Location Information: Boone County, S10 T51N R11W

Application for Authority to Construct was made for:
a thermal diffusion galvanizing (TDG) system in its East Street Plant. This review was conducted in accordance with Section (5), Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required*.

Standard Conditions (on reverse) are applicable to this permit.

Standard Conditions (on reverse) and Special Conditions are applicable to this permit.

Stehmp for
Prepared by
Randy Raymond
New Source Review Unit

Wesley V. + for Kyril L. Moore
Director or Designee
Department of Natural Resources

MAY 15 2015

Effective Date

STANDARD CONDITIONS:

Permission to construct may be revoked if you fail to begin construction or modification within two years from the effective date of this permit. Permittee should notify the Air Pollution Control Program if construction or modification is not started within two years after the effective date of this permit, or if construction or modification is suspended for one year or more.

You will be in violation of 10 CSR 10-6.060 if you fail to adhere to the specifications and conditions listed in your application, this permit and the project review. In the event that there is a discrepancy between the permit application and this permit, the conditions of this permit shall take precedence. Specifically, all air contaminant control devices shall be operated and maintained as specified in the application, associated plans and specifications.

You must notify the Department's Air Pollution Control Program of the anticipated date of start up of these air contaminant sources. The information must be made available within 30 days of actual startup. Also, you must notify the Department of Natural Resources' regional office responsible for the area within which you are located within 15 days after the actual start up of these air contaminant sources.

A copy of this permit and permit review shall be kept at the installation address and shall be made available to Department of Natural Resources' personnel upon request.

You may appeal this permit or any of the listed special conditions to the Administrative Hearing Commission (AHC), P.O. Box 1557, Jefferson City, MO 65102, as provided in RSMo 643.075.6 and 621.250.3. If you choose to appeal, you must file a petition with the AHC within 30 days after the date this decision was mailed or the date it was delivered, whichever date was earlier. If any such petition is sent by registered mail or certified mail, it will be deemed filed on the date it is mailed. If it is sent by any method other than registered mail or certified mail, it will be deemed filed on the date it is received by the AHC.

If you choose not to appeal, this certificate, the project review and your application and associated correspondence constitutes your permit to construct. The permit allows you to construct and operate your air contaminant sources(s), but in no way relieves you of your obligation to comply with all applicable provisions of the Missouri Air Conservation Law, regulations of the Missouri Department of Natural Resources and other applicable federal, state and local laws and ordinances.

The Air Pollution Control Program invites your questions regarding this air pollution permit. Please contact the Construction Permit Unit at (573) 751-4817. If you prefer to write, please address your correspondence to the Missouri Department of Natural Resources, Air Pollution Control Program, P.O. Box 176, Jefferson City, MO 65102-0176, attention: Construction Permit Unit.

SPECIAL CONDITIONS:

The permittee is authorized to construct and operate subject to the following special conditions:

The special conditions listed in this permit were included based on the authority granted the Missouri Air Pollution Control Program by the Missouri Air Conservation Law (specifically 643.075) and by the Missouri Rules listed in Title 10, Division 10 of the Code of State Regulations (specifically 10 CSR 10-6.060). For specific details regarding conditions, see 10 CSR 10-6.060 paragraph (12)(A)10. "Conditions required by permitting authority."

Hubbell Power Systems - East Street Plant
Boone County, S10 T51N R11W

1. Control Device Requirement-Baghouse
 - A. Hubbell Power Systems - East Street Plant shall control emissions from the equipment from Wheelabrator Group, a wheel rotating blast abrasive unit, using fabric filter as specified in the permit application.
 - B. The baghouse shall be operated and maintained in accordance with the manufacturer's specifications. The baghouse shall be equipped with a gauge or meter, which indicates the pressure drop across the control device. These gauges or meters shall be located such that Department of Natural Resources' employees may easily observe them.
 - C. Replacement filters for the baghouse shall be kept on hand at all times. The bags shall be made of fibers appropriate for operating conditions expected to occur (i.e. temperature limits, acidic and alkali resistance, and abrasion resistance).
 - D. Hubbell Power Systems - East Street Plant shall monitor and record the operating pressure drop across the baghouse at least once every 24 hours. The operating pressure drop shall be maintained within the design conditions specified by the manufacturer's performance warranty.
 - E. Hubbell Power Systems - East Street Plant shall maintain a copy of the baghouse manufacturer's performance warranty on site.
 - F. Hubbell Power Systems - East Street Plant shall maintain an operating and maintenance log for the baghouses which shall include the following:
 - 1) Incidents of malfunction, with impact on emissions, duration of event, probable cause, and corrective actions; and
 - 2) Maintenance activities, with inspection schedule, repair actions, and replacements, etc.
2. Record Keeping and Reporting Requirements
 - A. Hubbell Power Systems - East Street Plant shall maintain all records required by this permit for not less than five years and shall make them available immediately to any Missouri Department of Natural Resources' personnel upon request. These records shall include SDS for all materials used.

Permit No.

Project No. 2015-03-110

SPECIAL CONDITIONS:

The permittee is authorized to construct and operate subject to the following special conditions:

- B. Hubbell Power Systems - East Street Plant shall report to the Air Pollution Control Program's Compliance/Enforcement Section, P.O. Box 176, Jefferson City, MO 65102, no later than 10 days after the end of the month during which any record required by this permit show an exceedance of a limitation imposed by this permit.

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

Project Number: 2015-03-110
Installation ID Number: 019-0006
Permit Number:

Installation Address:
Hubbell Power Systems - East Street Plant
1100 E Switzler
Centralia, MO 65240

Parent Company:
Hubbell Inc.
40 Waterview Dr.
Shelton, CT 06484

Boone County, S10 T51N R11W

REVIEW SUMMARY

- Hubbell Power Systems - East Street Plant has applied for authority to a thermal diffusion galvanizing (TDG) system in its East Street Plant.
- The application was deemed complete on Date March 30, 2015 (date of receipt).
- HAP emissions are expected from the proposed equipment. HAPs emitted from this process are Nickel Sulfate Hexahydrate, Chromium Nitrate and Chromium Cobalt Nitrate.
- None of the NESHAPs apply to this installation. None of the currently promulgated MACT regulations apply to the proposed equipment.
- A fabric filter is being used to control the particulate emissions from the equipment in this permit.
- This review was conducted in accordance with Section (5) of Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required*. Potential emissions of particulate are below the de minimis levels.
- This installation is located in Boone County, an attainment area for all criteria pollutants.
- This installation is not on the List of Named Installations found in 10 CSR 10-6.020(3)(B), Table 2. The installation's major source level is 250 tons per year and fugitive emissions are not counted toward major source applicability.
- Ambient air quality modeling was not performed since potential emissions of the application are below de minimis levels.
- Emissions testing is not required for the equipment.
- An Intermediate Operating Permit application is currently under review for this installation.

- Approval of this permit is recommended with special conditions.

INSTALLATION DESCRIPTION

As a corporate structure all employees are Hubbell Power Systems (HPS), but there is three distinct business units (BU)– Civil & Construction Products (Allen & East St), Safety Products (Plastics), and the Distribution Center (DC). Wilson St. is only a storage warehouse except for the small amount of space rented to a supplier of fasteners just for storage. No activity generally occurs there, usually the lights are off. Each BU has its own chain of command leading toward HPS corporate. AB Chance operations are a subsidiary (HPS) of Hubbell Incorporated (Delaware). Thus, there are shared service functions for the BU’s such as HR, Safety, Maintenance, Purchase, IT, etc.

Up until 2010, the East St. facility was a separate business unit from other Centralia operations with the primary products being switchgear and re-closers. These product lines were transferred to Alabama and Mexico. Since that time the Allen St. facility has been able to utilize East St. welding equipment that was not transferred. Currently East St. operations are in support of Allen St. operations and considered part of the Civil and Construction Business Unit.

The Civil & Construction Products (Allen St. & East St. Plants, 019-0039 & 019-0006, respectively), are considered one installation, for permitting authority purposes.

The following New Source Review projects from Hubbell Power Systems - East Street Plant have been reviewed by the Air Pollution Control Program.

Table 1: Project History

PAMS ID	Permit Number	Start Date	Complete Date	Description
EX03800006005	0692-002	11-12-91	05-28-92	
EX03800006006	0992-005	06-12-92	08-27-92	
EX03800006007	1192-017	06-16-92	10-27-92	
EX03800006008	0693-023	03-28-93	06-25-93	
EX03800006009	0894-008	04-19-94	07-06-94	
EX03800006010	1096-008	12-12-95	10-15-96	ADD OVEN & PAINT BOOTH
EX03800006011		11-01-96	11-25-96	brass melting pot replacement/ like kind
EX199805463	operating permit	05-14-98	09-27-01	Metal Products Manufacture
EX199912054	032000-010	12-13-99	03-14-00	Solder pot
AP200211147	operating permit	11-14-02	03-13-03	Metal Products
AP200705073	operating permit	05-11-07	06-01-07	Metal Products
AP200710009	no permit required	10-02-07	11-08-07	Welding Stations
AP200710115	operating permit	10-02-07	02-25-08	Add welding stations
AP200809015		08-30-08	09-11-08	Resource Recovery
AP201104029	no permit required	04-13-11	06-10-11	Relocate Lead Pots
AP201205058	operating permit	05-14-12		Metal Products

No outstanding notices of violations. Last Level II Inspection determined that Hubbell Power Systems - East Street Plant was in compliance.

PROJECT DESCRIPTION

Thermal Diffusion Galvanizing (TDG) is proposed as a substitute process for steel parts currently hot dip galvanized and/or that receive zinc Galvanizing via outsourcing outside of Boone County Missouri. Parts outsourced are shipped out of Boone County and then returned for packaging or incorporation into other HPS Centralia assemblies. TDG may reduce the need to use sulfuric acid in proportion to reduction in hot dip Galvanizing at the HPS Centralia Allen Street Plant, as well as resulting wastes associated with that process. The location of the TDG project at East St. facility can be seen in Attachment B.

The principle of operation for TDG is controlled sublimation of zinc powder and subsequent deposition on target steel parts. This sublimation and deposition occurs inside of sealed vessels, during which there are no anticipated quantifiable emissions, as the vessels are designed to be vapor tight for the process to function as designed.

The following equipment is utilized for the TDG system, in order of process steps:

- Step 0: Pre-mix of zinc powder formulation inside rotary mixing cylinder
- Step 1: Rotating blast abrasive unit and attached baghouse with filtered air return to the plant indoor environment.
- Step 2: Custom-fabricated (no manufacturer or model data) electric-hydraulic table for loading of parts and zinc powder into sealed TDG vessels. The TDG system as designed utilizes seven such sealed vessels. Vessels are also custom-fabricated.
- Step 3: Application of TDG inside two (2) electrically powered ovens, which heat TDG vessels and contents to approximately 450 degrees Celsius. There are no anticipated emissions for Step 3.
- Step 4: Cool down process to bring TDG vessels and contents to approximately ambient temperature on steel conveyor rack. There are no anticipated emissions for Step 4.
- Step 5: Custom-fabricated electric-hydraulic table for unloading of parts and any residual zinc powder from TDG vessels.
- Step 6: Preparation of part surfaces for final sealing using Sweco model FMD14LR vibratory tumbler and aqueous solution.
- Step 7: Final seal and drying of coated parts on custom-fabricated conveyor

The TDG system has a designed capacity to process 4.8 million pounds of steel parts annually, with hours of operations identical to that of the East Street Plant: Three shifts (24 hours) per day, Monday through Friday, or 6,240 hours per year.

The TDG process has been proven only on a limited scale for the type of parts proposed for processing to use the system. HPS Centralia does not have sufficient data to determine quantities of specific part numbers to be processed, pending development of quality control procedures, customer acceptance and specification of

the TDG process, and customer orders if process is approved and specified. The TDG system is an intermediate phase of advanced pilot plant/preproduction, subject to the aforementioned factors.

EMISSIONS/CONTROLS EVALUATION

Please refer to Attachment A for an emission summary. Refer to Attachment C for the emission calculation details and documentation of the factors used.

The following table provides an emissions summary for this project. Existing potential emissions were taken from the 2014 annual emissions report. The Hubbell Power Systems - East Street Plant's 2014 annual emissions report provided the existing actual emissions. Potential emissions of the application represent the potential of the new equipment, assuming continuous operation (8760 hours per year).

Table 2: Emissions¹ Summary (tons per year)

Pollutant	Regulatory <i>De Minimis</i> Levels	Existing Potential Emissions	Existing Actual Emissions (2014 EIQ)	Potential Emissions of the Application	New Installation Conditioned Potential
PM	25.0	N/D	N/D	N/D	N/D
PM ₁₀	15.0	0.99	0.98	4.83	5.82
PM _{2.5}	10.0	0.96	0.95	2.49	3.45
SO _x	40.0	0.02	0.01	N/A	0.02
NO _x	40.0	3.50	1.81	0.60	4.10
VOC	40.0	0.19	0.08	N/A	0.19
CO	100.0	0.70	0.29	N/A	0.70
GHG (CO ₂ e)	75,000 / 100,000	N/A	N/A	N/A	N/A
GHG (mass)	0.0 / 100.0 / 250.0	N/A	N/A	N/A	N/A
HAPs	10.0/25.0	N/D	0.01 ²	0.10	0.11 ³

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

PERMIT RULE APPLICABILITY

This review was conducted in accordance with Section (5) of Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required*. Potential emissions of particulates are below de minimis levels.

¹ These are emissions only from East St. facility. They do not include the Allen St. facility.

² Submitted as lead emissions.

³ Represents 2014 actual lead emissions plus project HAP emissions.

APPLICABLE REQUIREMENTS

Hubbell Power Systems - East Street Plant shall comply with the following applicable requirements. The Missouri Air Conservation Laws and Regulations should be consulted for specific record keeping, monitoring, and reporting requirements. Compliance with these emission standards, based on information submitted in the application, has been verified at the time this application was approved. For a complete list of applicable requirements for your installation, please consult your operating permit.

GENERAL REQUIREMENTS

- *Submission of Emission Data, Emission Fees and Process Information*, 10 CSR 10-6.110
- *Operating Permits*, 10 CSR 10-6.065
- *Restriction of Particulate Matter to the Ambient Air Beyond the Premises of Origin*, 10 CSR 10-6.170
- *Restriction of Emission of Visible Air Contaminants*, 10 CSR 10-6.220
- *Restriction of Emission of Odors*, 10 CSR 10-6.165

SPECIFIC REQUIREMENTS

- *Restriction of Emission of Particulate Matter From Industrial Processes*, 10 CSR 10-6.400

STAFF RECOMMENDATION

On the basis of this review conducted in accordance with Section (5), Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required*, this permit is recommended to be granted with special conditions.

PERMIT DOCUMENTS

The following documents are incorporated by reference into this permit:

- The *Application for Authority to Construct* form, dated March 24, 2015, received March 30, 2015, designating Hubbell Inc. as the owner and operator of the installation.

Attachment A

THERMAL DIFFUSION GALVANIZING PROJECT ANALYSIS SUMMARY					
<u>Potential PM emissions</u>					
Activity/Source		PM ₁₀ (lbs/hr)	PM ₁₀ Potential to Emit (tons/year)	PM _{2.5} (lbs/hr)	PM _{2.5} Potential to Emit (tons/year)
1. Loading zinc powder mixer		0.297	1.301	0.089	0.390
2. Zinc powder mixing		0.000	0.000	0.000	0.000
3. Unloading zinc powder mixer		0.297	1.301	0.089	0.390
4. Abrasive blast of parts		0.130	0.569	0.241	1.056
5. Loading of parts and zinc powder formulation		0.297	1.301	0.089	0.390
6. Unloading of parts and residual zinc powder		0.059	0.258	0.040	0.175
7. Passivation		0.010	0.044	0.010	0.044
8. Sealing		0.012	0.053	0.011	0.048
	Total	1.102	4.827	0.569	2.492
<i>Note: PM10/PM2.5 Fractions derived from Appendix A, Updated CEIDARS List, South Coast Air Quality Management District</i>					
<u>Potential HAP emissions:</u>					
Activity/Source		Pounds per hour	Potential to Emit (tons/year)		
7. Passivation		0.011	0.048		
8. Sealing		0.012	0.053		
	Total	0.023	0.101		
<u>Potential NOx emissions:</u>					
Activity/Source		Pounds per hour	Potential to Emit (tons/year)		
7. Passivation		0.125	0.548		
8. Sealing		0.012	0.053		
	Total	0.137	0.600		

Attachment B
Location of TDG Project On-site



Attachment C
(total of pages)
PROCESS STEP EVALUATIONS

Step 0: Zinc Powder Formulation Mixing

Description –

A zinc powder formulation is mixed by manually loading powder into a small electric motor powered rotary mixer similar to a small cement mixer. Although the mixer is similar to those employed in concrete batch mixing, there is no aggregate added. The powder has a higher density, but other similar physical characteristics as Portland cement. Therefore, during the mixing cycle, AP-42 11.6 Portland Cement Manufacturing, Table 11.6-3 was referenced to select the emission factor listed for a finish grinding mill with fabric filter (SCC 3-05-006-17, 3-05-007-17). The mixer to be used will have no controls. Assuming an efficiency of 95% for the fabric filter employed on a finish grinding mill, the emission factor listed adjusted for no controls is 0.0042 lbs/ton X 20 or .084 lbs/ton during the mixing cycle.

Evaluation of Process Step 2 on pages 5 and 6 below provides a detailed narrative on selection of a handling and transfer emission factor for the zinc powder formulation. For the pre-mix step, all of the zinc powder formulation used for part TDG in Process Step 2 is assumed to be first processed during the pre-mix step. It is possible that unloading after the pre-mix step will occur functionally/simultaneously as the same activity as the TDG vessel loading described in the Process Step 2 evaluation, introducing the possibility of “double-counting” emissions. Nonetheless, conservatively, if unloading the mixer does not occur simultaneously as the loading of TDG vessels, PM emissions for the pre-mix step are calculated as follows:

1. Loading of mixer (See Process Step 2 for material quantity) –

(lbs loaded X Emission Factor)/6,240hours = PM emission/hr, or

$$(61,845 \times (60/2000))/6,240 = 0.297 \text{ lbs/hr}$$

Per CEIDARS, PM2.5 fraction = 0.300 of PM10 or 0.089 lbs/hr

2. Mixing of formulation –

(tons mixed X Emission Factors)/6,240 hours = PM emissions/hr, or

$$((61,845/2000) \times .084)/6,240 = .00042 \text{ lbs/hr} \quad \text{PM2.5 fraction} = .00028$$

3. Unloading of mixer –

Assumed identical to emissions from loading of mixer above:

(0.297 lbs/hr PM10, 0.089 lbs/hr PM2.5)

**Attachment C
(continued)**

Process Step 1: Rotating blast abrasive with attached baghouse.

Description –

Equipment is a wheel blast unit similar to those already used at the HPS Centralia Allen Street Plant. Per correspondence from the manufacturer, abrasive consumption for the TDG wheel blast unit can be calculated as a ratio of 0.45 lbs abrasive per hour per horsepower of the blast wheels for the machine. See attached chart with efficiency ratings for the fabric filter used in the baghouse sold as an integrated unit with the blast unit.

Abrasive consumption calculation:

Consumption Rate X Horsepower X Annual Operating Hours = Total Abrasive Consumed, or

0.45 lbs X 34 hp X 6,240 hours = 95,472 lbs of abrasive at 15.30 lbs per operating hour

Per CEIDARS, PM10 fraction for this activity is $0.860 \times 15.3 = 13.158$ lbs/hr PM10 generated

Per CEIDARS, PM2.5 fraction for this activity is $0.790 \times 15.3 = 12.087$ lbs/hr PM2.5 generated

Emission calculation, un-captured:

Abrasive blast unit is connected to control device by metal ducting and flanges. Door to unit for loading and unloading of parts for processing is mechanically sealed while in operation. Given sealed door and negative internal air pressure (vacuum from dust collector), PM10 capture efficiency is assumed as 99.0%.

Un-captured emissions –

PM10 = $(13.158) \times (1-.99) = .132$ lbs/hr

PM2.5 = $(12.087) \times (1-.99) = .121$ lbs/hr

Emission calculation, post-capture, with HEPA rated “afterfilter”:

Amount regulated PM minus un-captured quantity –

$(13.158 - 0.132) = 13.026$ lbs/hr PM10 and $(12.087 - 0.121) = 11.966$ lbs/hr PM2.5

Control efficiency, primary filter = 99%

Post primary = $13.026 \times (1-.99) = 0.130$ lbs/hr PM10 and $11.966 \times (1-.99) = 0.120$ lbs/hr PM2.5

Final emission after HEPA (99.97% efficiency ≥ 3 micron) –

PM10 = $0.130 \times (1 - .9997) = 0.000$ + un-captured emissions = 0.130 lbs/hr

PM2.5 = 0.120 lbs/hr + un-captured emissions = 0.241 lbs/hr

Attachment C
(continued)

Process Step 2: Loading of parts and zinc powder into sealed TDG vessels

Description –

After surface preparation in Process Step 1, parts are manually loaded into TDG vessels and the TDG zinc powder formulation is also added manually. Each TDG vessel is constructed using heavy walled steel pipe of approximately eighteen (18) inches inside diameter and approximately eight (8) feet long. Each end of the vessel is capped with a welded on steel plate, with one end having a bolted secondary cap which is only removed for part loading and unloading. Loading and unloading is accomplished with the vessel access (secondary cap) end elevated at an approximate 15 degree angle.

Approach to calculation methodology:

Given the thickness specification for the galvanizing and surface area of parts to be coated, a total volume of galvanizing to be applied can be calculated. The specific gravity of zinc can then be used to calculate quantity of powder required to create the galvanizing. Per information supplied by the TDG process developer (attached), the sealed vessel process operates at an approximate 80% transfer rate, meaning the amount of zinc powder placed in TDG vessels with steel parts for galvanizing includes an approximate 20% "overage".

Establishment of Emission Factor:

Limited published literature could be found that was directly applicable to the use of metal powder in the manner prescribed by the TDG process. AP-42 was consulted in reference to application of powder coating, at Section 4.2.2.4 Other Metal Coating. However, this Section primarily addresses VOC emission and VOC reduction through the application of powder coating, not solids specifically. This Section does assign a transfer efficiency of 93% for application of powder coating. Also reviewed was written response from the Indiana Department of Environmental Management (IDEM) to Huntington Powder Coating (HPC) of Huntington, Indiana, wherein IDEM accepted HPC's assignment of a 98% transfer efficiency rate for purposes of calculating potential PM emissions for its powder paint booth and 75% for its manual spray booth.

Published guidance for the spraying of metal powders was found from the Texas Commission on Environmental Quality (TCEQ) that cites a "conservative" value of .06 lbs emissions/lb wire consumed and sprayed. Also reviewed and considered analogous to the TDG process was a publication from Australia: "Emission Estimation Technique Manual for Non-Ferrous Metal Manufacture" and U.S. EPA AP-42 guidance in Section 11.24 Metallic Minerals Processing, and Section 12.7 Zinc Smelting.

The referenced Australian document specifically addresses fugitive PM from zinc oxide. The document reviews secondary zinc processing operations, and assigns an uncontrolled factor of 15 kg/Mg for retort and muffle distillation processes. The highest uncontrolled factor listed in this document for secondary zinc smelting is 44.5 kg/Mg.

Attachment C
(continued)

AP-42 Section 11.24, Metallic Minerals Processing identifies a PM10 rating for handling and transfer of low moisture minerals of .06 lb/ton (SCC 3-03-024-04). AP-42 Section 12.7, Zinc Smelting identifies uncontrolled emissions from vertical and electric retort operations (SCC 3-03-030-05) ranging from 7.15 kg/Mg to 14.3 kg/Mg and from 10.0 kg/Mg to 20.0 kg/Mg, respectively.

PM10/PM2.5 fraction data was not found for metal spraying referenced in TCEQ guidance. CEIDARS guidance does provide PM10/PM2.5 fractions for mineral product loading and unloading, and therefore the AP-42 PM10 factor for SCC 30302404 and corresponding CEIDARS PM2.5 fractionation are used in the emission rate calculation below.

Calculation of the total amount of zinc powder (including 20% overage) required to create the galvanizing thickness on the parts proposed to be processed through the TDG system is found in the attached spreadsheet and is an estimated 61,845 pounds.

Estimated fugitive PM emissions from loading of TDG vessels –

$(\text{lbs loaded} \times \text{Emission Factor}) / 6,240 \text{ hours} = \text{PM emission/hr, or}$

$(61,845 \times (60/2000)) / 6,240 = 0.297 \text{ lbs/hr}$

Per CEIDARS, PM2.5 fraction = 0.300 of PM10 or 0.089 lbs/hr

Attachment C
(continued)

Process Step 3: Application of Thermal Diffusion GALVANIZING

Description –

2 electrically powered ovens each heat one sealed TDG vessel and its contents to approximately 450 degrees Celsius during an approximate 180 minute cycle time. TDG vessels remain sealed to during this process.

There are no anticipated PM emissions during this process step.

Process Step 4: Cool Down of TDG Vessel

Description –

After application of the Thermal Diffusion GALVANIZING, TDG vessels are removed from the ovens and place on a rack to cool down to approximately ambient temperature during an approximate one hour cycle time. TDG vessels remain sealed during this process.

There are no anticipated PM emissions during this process step.

Attachment C
(continued)

Process Step 5: Unloading of Parts and Residual Zinc Powder

Description –

After cool down, TDG vessels are placed onto an electric-hydraulic actuated table, with the non-access end lift upward. After removal of the secondary end cap, parts and residual zinc powder will exit the vessel into a collection hopper. The hopper will be of steel construction, designed to capture materials exiting the TDG vessel.

There are no emission controls on the collection hopper as designed. It is assumed all residual zinc powder is subject to emission calculation. Using the emission factor identified in Step 3 for the loading of steel parts and zinc powder, and assuming all 20% overage loaded into the TDG exits the vessel (see attached spreadsheet), the calculated emission for this step is:

$(\text{lbs residual zinc powder unloaded} \times \text{Emission Factor}) / 6,240 \text{ hours} = \text{PM emission/hr, or}$

$(12,369 \times (60/2000)) / 6240 = .059 \text{ lbs/hr}$

Per CEIDARS, PM2.5 fraction = 0.674 of PM10 or 0.040 lbs/hr

Attachment C
(continued)

Process Step 6: Prepare part surfaces for final sealing using tumbler with aqueous solution.

Description –

Parts are placed in a vibratory tumbler (Sweco Model FMD14LR) with ceramic media and aqueous solution to passivate (add a light protective oxide barrier) on part surfaces before final surface sealing and drying. The product used is Macdermid “KeyKote 36”. Please see attached Material Safety Sheet for this product. Current design specification calls for a mixture of 10% product with 90% water. The resulting solution is re-circulated in a closed loop.

This product contains a range of 1% to 3% nickel sulfate hexahydrate, a nickel compound and Hazardous Air Pollutant (HAP) which requires calculation to determine if potential to emit is less than ten (10) tons per year, or if the potential to emit for this HAP combined with all other HAPs at the East Street Plant, is less than a combined 25 tons per year.

Calculation of total HAP per container (55 gallon drum):

s.g. of product X s.g. of water X 55 gal X % HAP in product, or

$1.62 \times 8.345 \times 55 \times 3\% = 22.3$ lbs HAP per drum of product.

Calculation of pure product loss to meet ten (10) HAP threshold:

Ten (10) tons of HAP is equivalent to 20,000 lbs/22.3 lbs per drum, or 897 drums of product.

The TDG system as designed will use no more than one drum of product per month, or the equivalent of 267 lbs of nickel compounds per year:

$22.3 \text{ lbs/drum} \times 1 \text{ drum/month} = 22.3 \times 12 = 267.6$ lbs

Metal HAP emissions for this process (Nickel compounds) have been calculated with the following assumptions: 1) 50% of nickel compounds in solution used are transferred to product; 2) of the 50% of nickel compounds remaining, 50% is lost due to evaporation.

$267.6 \times 0.5 \times 0.5 = 66.9$ lbs/yr Evaporation loss of HAP

$267.6 \times 0.5 \times 0.5 = 66.9$ lbs/ yr potential PM emissions

Per CEIDARS, Fugitive PM emissions for inorganic chemicals are –

PM10 = 0.960 of total PM & PM2.5 = 0.925 of total PM

PM10 loss = $(66.9 \text{ lbs} \times .960)/6240 \text{ hours} = .010$ lbs/hr

PM2.5 loss = $(66.9 \times .925)/6240 = .010$ lbs/hr

Attachment C
(continued)

The "KeyKote 36" product also contains zinc nitrate at a concentration of 30% to 35%. On percentage by weight basis, and if 25% of nitrate were evaporated, the total emission assuming use of one drum per month would be:

35% nitrate X drum weight X 12 = total NO_x , or

.35 X (1.62 X 8.345 X 55) X 12 = 3,123 lbs NO_x

The NO_x emission rate would be (3,123 lbs NO_x X 0.25)/6,240 hours, or 0.125 lbs NO_x/hr

Process Step 7: Final seal and dry of coated parts

Description –

After passivation in Process Step 6, parts enter final seal and dry via conveyor. While on the conveyor, parts are flooded sequentially with two different sealers. Each sealer is re-circulated in a closed loop: Sealer is pumped from a small reservoir tank through a "distribution bar" located above the belt. Solution is not sprayed or atomized. After flowing over part surfaces, the sealer settles under the conveyor and drains back to the reservoir tank.

Sealer 1: "TriTop"

See attached Material Safety Data Sheet. Tritop product is diluted with water for use at a ratio of approximately 60% TriTop to 40% water. This product contains a range of 5% to 10% chromium nitrate and a range of 1% to 5% chromium cobalt nitrate, both trivalent chromium compounds and Hazardous Air Pollutants (HAP) which require calculation to determine if potential to emit is less than ten (10) tons per year, and therefore if a construction permit is required or if the potential to emit for these HAPs combined with all other HAPs at the East Street Plant, is less than a combined 25 tons per years.

Calculation of total HAP per container (55 gallon drum):

Chromium Nitrate

s.g. of product X s.g. of water X 55 gal X % HAP in product, or

1.09 X 8.345 X 55 X 10% = 50.0 lbs HAP per drum of product.

Calculation of pure product loss to meet ten (10) HAP threshold:

Ten (10) tons of HAP is equivalent to 20,000 lbs/50.0 lbs per drum, or 40 drums of product.

The TDG system as designed will use approximately 4 drums of product per year, or the equivalent of 200 lbs of this compound per year.

Attachment C
(continued)

$$50 \text{ lbs/drum} \times 4 \text{ drums/yr} = 200 \text{ lbs/yr}$$

Metal HAP emissions for this process (Chromium compounds) have been calculated with the following assumptions: 1) 50% of chromium compounds in solution used are transferred to product; 2) of the 50% of chromium compounds remaining, 50% is lost due to evaporation.

$$200 \text{ lbs/yr} \times 0.5 \times 0.5 = 50 \text{ lbs/yr HAP emission}$$

$$200 \text{ lbs/yr} \times 0.5 \times 0.5 = 50 \text{ lbs/yr potential PM emission}$$

Per CEIDARS, Fugitive PM emissions for inorganic chemicals are –

$$\text{PM}_{10} = 0.960 \text{ of total PM} \ \& \ \text{PM}_{2.5} = 0.925 \text{ of total PM}$$

$$\text{PM}_{10} \text{ loss} = (50 \text{ lbs} \times .960) / 6240 \text{ hours} = .008 \text{ lbs/hr}$$

$$\text{PM}_{2.5} \text{ loss} = (50 \text{ lbs} \times .925) / 6240 \text{ hours} = .007 \text{ lbs/hr}$$

Chromium Cobalt Nitrate

s.g. of product X s.g. of water X 55 gal X % HAP in product, or

$$1.09 \times 8.345 \times 55 \times 5\% = 25.0 \text{ lbs HAP per drum of product.}$$

Calculation of pure product loss to meet ten (10) ton HAP threshold:

Ten (10) tons of HAP is equivalent to 20,000 lbs/25.0 lbs per drum, or 80 drums of product.

The TDG system as designed will use approximately 4 drums of product per year, or the equivalent of 100 lbs of this compound per year.

$$25 \text{ lbs/drum} \times 4 \text{ drums/yr} = 100 \text{ lbs/yr}$$

Metal HAP emissions for this process (Chromium compounds) have been calculated with the following assumptions: 1) 50% of chromium compounds in solution used are transferred to product; 2) of the 50% of chromium compounds remaining, 50% is lost due to evaporation.

$$100 \text{ lbs/yr} \times 0.5 \times 0.5 = 25 \text{ lbs potential HAP emissions/yr}$$

$$100 \text{ lbs/yr} \times 0.5 \times 0.5 = 25 \text{ lbs potential PM emissions/yr}$$

Per CEIDARS, Fugitive PM emissions for inorganic chemicals are –

$$\text{PM}_{10} = 0.960 \text{ of total PM} \ \& \ \text{PM}_{2.5} = 0.925 \text{ of total PM}$$

Attachment C
(continued)

PM10 loss = (50 lbs X .960)/6240 hours = .004 lbs/hr

PM2.5 loss = (50 lbs X .925)/6240 hours = .004 lbs/hr

The "TriTop" product also contains nitrate compounds at a concentration of 6% to 15%. On percentage by weight basis, and if 25% of nitrate were emitted as NOx, the total emission assuming use of four drum per year would be:

15% nitrate X drum weight X 4 = total NOx emission, or

.15 X (1.09 X 8.345 X 55) X 4 = 300 lbs NOx

Assuming 25% evaporation loss: 300 X 0.25 = 75 lbs/yr NOx Emission

The NOx emission rate would be 75 lbs NOx/6,240 hours, or 0.012 lbs NOx/hr

Sealer 2: ArmorGalv US Sealer/Siflex –

Description –

This product is the second sealer applied to parts. It does not contain any HAPS or other regulated constituents, per information supplied in the Material Safety Data Sheet.

APPENDIX A

Abbreviations and Acronyms

%	percent	m/s	meters per second
°F	degrees Fahrenheit	Mgal	1,000 gallons
acfm	actual cubic feet per minute	MW	megawatt
BACT	Best Available Control Technology	MHDR	maximum hourly design rate
BMPs	Best Management Practices	MMBtu	Million British thermal units
Btu	British thermal unit	MMCF	million cubic feet
CAM	Compliance Assurance Monitoring	MSDS	Material Safety Data Sheet
CAS	Chemical Abstracts Service	NAAQS ...	National Ambient Air Quality Standards
CEMS	Continuous Emission Monitor System	NESHAPs	National Emissions Standards for Hazardous Air Pollutants
CFR	Code of Federal Regulations	NO_x	nitrogen oxides
CO	carbon monoxide	NSPS	New Source Performance Standards
CO₂	carbon dioxide	NSR	New Source Review
CO_{2e}	carbon dioxide equivalent	PM	particulate matter
COMS	Continuous Opacity Monitoring System	PM_{2.5}	particulate matter less than 2.5 microns in aerodynamic diameter
CSR	Code of State Regulations	PM₁₀	particulate matter less than 10 microns in aerodynamic diameter
dscf	dry standard cubic feet	ppm	parts per million
EQ	Emission Inventory Questionnaire	PSD	Prevention of Significant Deterioration
EP	Emission Point	PTE	potential to emit
EPA	Environmental Protection Agency	RACT	Reasonable Available Control Technology
EU	Emission Unit	RAL	Risk Assessment Level
fps	feet per second	SCC	Source Classification Code
ft	feet	scfm	standard cubic feet per minute
GACT	Generally Available Control Technology	SDS	Safety Data Sheet
GHG	Greenhouse Gas	SIC	Standard Industrial Classification
gpm	gallons per minute	SIP	State Implementation Plan
gr	grains	SMAL	Screening Model Action Levels
GWP	Global Warming Potential	SO_x	sulfur oxides
HAP	Hazardous Air Pollutant	SO₂	sulfur dioxide
hr	hour	tph	tons per hour
hp	horsepower	tpy	tons per year
lb	pound	VMT	vehicle miles traveled
lbs/hr	pounds per hour	VOC	Volatile Organic Compound
MACT	Maximum Achievable Control Technology		
µg/m³	micrograms per cubic meter		

Mr. David Lickteig
Environmental Manager
Hubbell Power Systems - East Street Plant
210 North Allen
Centralia, MO 65240

RE: New Source Review Permit - Project Number: 2015-03-110

Dear Mr. Lickteig:

Enclosed with this letter is your permit to construct. Please study it carefully and refer to Appendix A for a list of common abbreviations and acronyms used in the permit. Also, note the special conditions on the accompanying pages. The document entitled, "Review of Application for Authority to Construct," is part of the permit and should be kept with this permit in your files. Operation in accordance with these conditions, your new source review permit application and with your operating permit is necessary for continued compliance. The reverse side of your permit certificate has important information concerning standard permit conditions and your rights and obligations under the laws and regulations of the State of Missouri.

If you were adversely affected by this permit decision, you may be entitled to pursue an appeal before the administrative hearing commission pursuant to Sections 621.250 and 643.075.6 RSMo. To appeal, you must file a petition with the administrative hearing commission within thirty days after the date this decision was mailed or the date it was delivered, whichever date was earlier. If any such petition is sent by registered mail or certified mail, it will be deemed filed on the date it is mailed; if it is sent by any method other than registered mail or certified mail, it will be deemed filed on the date it is received by the administrative hearing commission, whose contact information is: Administrative Hearing Commission, Truman State Office Building, Room 640, 301 W. High Street, P.O. Box 1557, Jefferson City, Missouri 65102, phone: 573-751-2422, fax: 573-751-5018, website: www.oa.mo.gov/ahc.

If you have any questions regarding this permit, please do not hesitate to contact Randy Raymond, at the Department of Natural Resources' Air Pollution Control Program, P.O. Box 176, Jefferson City, MO 65102 or at (573) 751-4817. Thank you for your attention to this matter.

Sincerely,

AIR POLLUTION CONTROL PROGRAM

Susan Heckenkamp
New Source Review Unit Chief

SH:rerl

Enclosures

c: Northeast Regional Office
PAMS File: 2015-03-110

Permit Number: