DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY DIVISION
ACTIVITY REPORT: Scheduled Inspection

N686728949

FACILITY: Jabil		**SRN / ID:** N6867
LOCATION: 3800 Giddings Road, AUBURN HILLS		**DISTRICT:** Southeast Michigan
CITY: AUBURN HILLS		**COUNTY:** OAKLAND
CONTACT: David Coenen , Health & Safety Quality Systems Engr.		**ACTIVITY DATE:** 03/20/2015
STAFF: Erik Gurshaw	**COMPLIANCE STATUS:** Compliance	**SOURCE CLASS:** SM OPT OUT
SUBJECT: 2015 FCE Inspection		
RESOLVED COMPLAINTS:		

SRN: N6867
COMPANY: Jabil Circuit, Inc.
COMPANY ADDRESS: 3800 Giddings Road; Auburn Hills, MI 48326
PURPOSE OF INSPECTION: Targeted
CONTACT PERSON: Mr. David Coenen, Health and Safety Quality Systems Engineer (Ph: 248-292-6625; Fax: 248-292-6910; E-mail: david_coenen@jabil.com)
COMPANY PHONE NUMBER: 248-391-5300

INTRODUCTION

On March 20, 2015, AQD staff, Erik Gurshaw, conducted a targeted inspection at Jabil Circuit, Inc. located at 3800 Giddings Road in Auburn Hills, Michigan. The purpose of the inspection was to determine compliance with the Federal Clean Air Act; Article II, Part 55, Air Pollution Control of Natural Resources and Environmental Protection Act, 1994 Public Act 451; Michigan Department of Environmental Quality, Air Quality Division (MDEQ-AQD) Rules; and the conditions of Permit To Install (PTI) Number 283-00A for circuit board manufacturing equipment.

Upon arriving at the facility, AQD staff introduced themselves and stated the purpose of the visit to Mr. David Coenen, Health and Safety Quality Systems Engineer. Mr. Coenen indicated that Jabil Circuit, Inc. is open 24 hours a day Monday through Friday (3 eight hour shifts) and for one or two eight hour shifts on Saturday. Approximately 425 people are employed at the facility. Mr. Rick Deleersnyder, Process Quality Engineer (Ph: 248-292-6619; Fax: 248-292-6069; E-mail: rick_deleersnyder@jabil.com), also joined the inspection to provide technical assistance. Both Mr. Coenen and Mr. Deleersnyder assisted AQD staff on the inspection.

COMPANY OVERVIEW

Jabil Circuit, Inc. populates circuit boards with circuits for the automotive, medical, computer, and industrial industries. The facility also assembles final products such as medical sterilization equipment and "Big Belly" trash compactors which are used in the public parks of some municipalities. The facility populates circuit boards through the use of solder paste or solder wave machines and their associated convection curing ovens. 15 solder paste machines, 15 convection ovens, 15 solder wave machines, 2 pallet washers, and 2 stencil washers are permitted at the facility, but only 4 solder paste machines, 8 curing ovens, and 7 solder wave machines are actually present and used by the facility. The facility does have 2 pallet washers and 2 stencil washers, however. The pallet washers are used by the facility to clean trays or "pallets" which are used to convey circuit boards through the solder wave machines during the circuit board production process. These machines use air pressure to spray "Zestron" solution onto the pallets to clean them. The stencil washers use an isopropyl alcohol solution to clean stencils which are used in the solder paste machines. All of the company's process equipment vents to the ambient air. In addition to the circuit board processing equipment, the company also has a "Graymills" parts washer which uses a heavy duty degreasing solvent manufactured by Arrow Chemical Products in Detroit to clean parts. The MSDS sheet for the cleaning solvent used in the parts washer indicates that it contains no hazardous compounds.

PROCESS DESCRIPTION

The solder paste machines are used to apply circuits to the surface of premanufactured circuit boards via the following process: Bare circuit boards are received by the company and conveyed to a solder paste machine where solder is applied to circuit board pads. Most of the solder applied to the pads is lead-free, but some solder containing lead is also used per customer specifications. After solder has been applied to the circuit pads, the circuit board is conveyed to a glue machine where glue is applied to the pads to hold the parts onto 2-sided circuit boards during the curing process. The circuit boards are then conveyed to a quality inspection machine to ensure that solder and glue has been adequately distributed across the board. From the quality inspection machine, the circuit boards are conveyed to several high speed placement machines in series where different parts are surface mounted onto the circuit pads. The boards are then conveyed to a convection curing oven for approximately 10 minutes to melt the solder to ensure that the parts are firmly attached to the circuit pads. The circuit boards are then checked for quality assurance purposes prior to be sent to the customer. The company adds either a water-soluble or no clean flux to the solder at the beginning of the process. Flux helps parts adhere to the circuit pads and prevents oxidization of the solder. Any circuit board using a water-soluble flux in its solder is washed in a heated parts washing machine prior to being checked for quality assurance purposes.

The solder wave machines are used to attach throughole parts (parts which go through the board rather than just on the surface of the board) to premanufactured circuit boards via the following process: Premanufactured boards with througholes are conveyed to an axial or radial autoinsertion machines for the insertion of the throughole part. After the insertion of the part, the circuit boards are manually taken to a solder wave machine where flux is applied to the board in a wave. After the application of flux, the circuit boards are conveyed to heaters to activate the flux before being conveyed to another solder wave machine where the parts soldered to the circuit board. Once again, most of the solder used by the solder wave machines is lead-free although some solder containing lead is also used. The boards are then conveyed to a convection oven where the parts are cured to the board. After the curing process, the boards are checked for quality assurance purposes and shipped to the customer. Any board which had a water-soluble flux applied to it is sent to a heated parts washer for removal of the flux prior to the quality assurance check stage of the process.

COMPLIANCE DETERMINATION

The inspection indicated the following with respect to PTI #283-00A:

FG-CIRCUITMFG

The solder paste machines, curing ovens, solder wave machines, pallet washers, and stencil washers comprise this flexible group. The PTI sets a particulate matter (PM) emission limit of 0.10 lb per 1000 lbs of exhaust gases. Compliance with this limit has not been determined via a stack test, but Operational Memorandum 14 states that this limit corresponds to 20% opacity emanating from a stack. All of the company's equipment vent through a central stack and no opacity was observed to be emanating from the stack before or after the inspection. Therefore, compliance with the PM emission limit can be assumed. The PTI sets a lead emission limit of 10.2 lbs per month from FG-CIRCUITMFG. Stack testing which took place on October 24, 2012, and October 25, 2012, determined that the hourly emission rate for lead from the solder paste machines, solder wave machines, and curing ovens was far below the allowable limits in the PTI. The company uses an emission factor of 0.000365 lb/hour to calculate lead emissions from the solder paste and solder wave machines and an emission factor of 0.00000162 lbs/hour to calculate lead emissions from the curing ovens. These emission limits were determined during the stack test. Monthly lead emissions have been far below the permitted limits since the time of the stack test (monthly lead emissions have been less than 0.20 lbs per month). The PTI also sets a 12-month rolling VOC emission limit of 30.5 tons. From December 2012 through February 2015, the highest 12-month rolling emission of VOCs was 10.62 tons occurring from December 2012 through November 2013. The PTI sets the following monthly material usage limits: 2,149 pounds of solder paste; 28,125 pounds of solder bar (used in the solder wave machines); 150 gallons of flux; 500 gallons of thinner; and 3000 gallons of conformal

coating (conformal coating is a silicon layer applied to some of the circuit boards prior to processing). Monthly records from January 2012 through February 2015 indicate compliance with these material usage limits. The facility is minimizing fugitive emissions of VOCs by keeping all containers covered at all times except when access is necessary. The company is also maintaining the following monthly and 12-month rolling records as required by its PTI: the type of each material used; the chemical composition of each material used, including weight percent of each component; the VOC content of each material used; the usage rate (in grams, pounds or gallons) of each material used; the hours of operation of each component of FG-CIRCUITMFG; the amount if solder paste, flux, and thinner reclaimed; monthly VOC emission calculations; 12-month rolling VOC emission calculations; and monthly lead emission calculations. The company maintains a copy of the stack test results for the lead testing conducted on October 25, 2012, and October 26, 2012, at the facility.

FG-FACILITY

Individual and aggregate 12-month rolling HAP emission limits of 8.9 tons and 22.4 tons, respectively, are established for the entire facility in this flexible group. The only HAPs emitted by the facility are an incremental amount of antimony and butyl carbitol. Leaded solder paste and leaded solder bars contain 1%, by weight, antimony, but it was determined during the permitting process than only 1% of the antimony in the leaded solder paste and bars is actually emitted during the circuit board manufacturing process. Butyl carbitol comprises 2% of the leaded solder paste, but, once again, only 1% of the butyl carbitol in the solder paste is emitted during the manufacturing process. The highest combined 12-month rolling emission of antimony and butyl carbitol from December 2012 through February 2015 was 7.42 pounds occurring from December 2012 through November 2013. Therefore, HAP emissions from the facility are essentially negligible.

CONCLUSION

Based on this inspection, it was determined that Jabil Circuit, Inc. is in compliance with its PTI and all other applicable air rules and regulations. Monthly and 12-month rolling emission records, operational records, and material usage records as required by the PTI from December 2012 through February 2015 are on the CD attached to this report. The MSDS sheet for the degreasing solvent used in the "Graymills" parts washer is also attached to this report.

NAME Erik Dwojaw DATE 3/26/15 SUPERVISOR CTE