

P0024

MANILA

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

P002454309

FACILITY: A123 Systems	SRN / ID: P0024
LOCATION: 38100 Ecorse, ROMULUS	DISTRICT: Detroit
CITY: ROMULUS	COUNTY: WAYNE
CONTACT: Joseph Frendo , Plant Manager	ACTIVITY DATE: 07/15/2020
STAFF: C. Nazaret Sandoval	COMPLIANCE STATUS: Compliance
SUBJECT: FY2020 Scheduled Inspection	SOURCE CLASS: SM OPT OUT
RESOLVED COMPLAINTS:	

SOURCE: SRN P0024 – A123 Systems, LLC

FACILITY LOCATION: 38100 Ecorse Road, Romulus, MI 48174

PURPOSE OF INSPECTION: Scheduled Inspection

INSPECTION DATE: 7/15/2020

INSPECTOR: Nazaret Sandoval (EGLE-AQD)

FACILITY CONTACTS:

Joseph Frendo – Plant Manager (jfrendo@a123systems.com)

Michael Beach – Production Supervisor (mbeach@123systems.com)

1 - FACILITY AND PROCESS DESCRIPTION

The facility located at 38100 Ecorse Road, Romulus MI occupies an area of 287,000 square feet with approximately 15,000 sq. ft. office space and 272,000 sq. ft. manufacturing space. This facility manufactures anode and cathode electrodes in rolls which are sent to another location for cell assembly and the final production of rechargeable lithium-ion batteries.

The site plant layout shows the location of the process equipment and the other areas in the building. The anode and the cathode manufacturing operations consist of separate coating lines, solvent recovery operations and control equipment. The anode manufacturing process uses graphite as the primary coating component, whereas the cathode manufacturing uses a lithium ion phosphate powder.

The following is a description of the manufacturing process:

- The electrode making process starts with mixing materials into what is called “slurry”. From each chemical storage and receiving area, the raw materials are mixed separately in the anode mixing room and the cathode mixing room with binders and with n-methylpyrrolidone (NMP) that acts as a carrier. There is one dust collector per coating line to control particulate matter from powder mixing and weighing.
- Thereafter, the anode slurry and the cathode slurry are applied as a thin coating to rolls of metallic foil sheets in the coating room.
- The coated foil sheets pass through curing ovens to yield the final anode and cathode products.
- The NMP, which is driven off in the curing ovens, is captured, condensed, distilled, and reused in the process.
- Separate scrubbers for the anode and cathode lines control the VOC exhaust emissions generated from the NMP recovery system.
- The rolls of electrodes are then sent to calender machines (hard pressure rollers) for electrode pressing to achieve uniform thickness of electrode material coating on the foils.
- From the pressure rollers, the rolls are unloaded and transferred to other facilities for cutting in individual sheets of specific geometries for cell assembly operations.

The rest of the building is dedicated to office space, the boiler room, the chiller room and permit exempt equipment identified later in this report.

The facility has a natural gas-fired emergency generator located outside of the building.

2 - PERMIT BACKGROUND AND APPLICABLE REQUIREMENTS

State Regulations:

The original project proposal submitted with a permit application to the DEQ on December 7, 2009 considered the installation of powder blocks and/or coating blocks operations at six different locations in Romulus, MI to support the powder production and coating processes of the rechargeable lithium-ion battery manufacturing process. All six facilities and emission units were grouped into one Permit (PTI 291-09) issued by the DEQ on September 22, 2010. If all six facilities were built, the source would have been subject to Title V, requiring an ROP, based on the potential CO emissions being over 100 tons per year (tpy). All other pollutants would have potential emissions below applicable thresholds for Title V and PSD. However, the scope of the project was cut down and only the facility at 38100 Ecorse Road, Romulus, MI was built. According to a letter dated January 12, 2012 from A123 to the DEQ-AQD Detroit field office, the facility located at Ecorse Road was under construction during the months of January and February of 2011, and some of the equipment were tested during those months.

In addition, the powder block operations, described in the original 2009 permit application, which included the production of lithium-iron phosphate powder material for cathode manufacture was not installed at Ecorse road. The lithium-ion phosphate powders are manufactured storage in another facility and they are brought to the plant and stored in several tanks located at the cathode powder storage area.

On August 27, 2015 I conducted an unscheduled site review of the facility operations at Romulus. During the inspection I confirmed that a very limited portion of the original permit PTI 291-09 was applicable to the existing operations at the site and there were some discrepancies between the permitted equipment and the equipment that was installed. In addition, the company had gone through multiple changes in ownership since the time PTI 291-09 permit was issued. As a result of these observations, I asked A123 representatives to submit a permit modification to adequately represent the actual operations at Romulus. A123 submitted a permit application to AQD in 2016. AQD permit section evaluated the permit application and PTI 291-09A was issued on 12/20/2016.

The main emissions associated with the anode and cathode electrode manufacturing process include VOC from the NMP usage in coating lines, solvent recovery, and parts cleaners. In addition, natural gas combustion emissions are associated with the boilers and emergency engine.

According to the evaluation in the permit files this facility is classified as a synthetic minor source for VOCs and the PTI is an opt-out permit. A123 has a facility-wide emission limit for HAPs which restricts the emissions to below the major source threshold. This is an area source of HAPs.

In summary, AQD regulates the following emission units with their respective descriptions as they are identified in permit to install (PTI) No. 291-09A:

Emission Unit ID	Emission Unit Description (Process Equipment & Control Devices)	Flexible Group ID
EU5BOILER1	59.9 MMBTU/hr natural gas-fired boiler	NA
EU5ANODELINE1	Anode Coating Line 1. Two pass Anode Coater, Curing Oven and refrigerated condenser.	FG5ANODE
EU5ANODELINE2	Anode Coating Line 2. One pass Anode Coater, Curing Oven and refrigerated condenser.	FG5ANODE
EU5ANODEDISTIL	Anode Line solvent recovery by Distillation	FG5ANODE
EU5CATHODELINE1	Cathode Coating Line 1. Two pass Cathode Coater, Curing Oven and refrigerated condenser.	FG5CATHODE
EU5CATHODELINE2	Cathode Coating Line 2. Two pass Cathode Coater, Curing Oven and refrigerated condenser.	FG5CATHODE
EU5CATHODEDISTIL	Cathode Line solvent recovery by Distillation.	FG5CATHODE

Federal Regulations:

The federal regulations that could potentially apply to the operations in Romulus were evaluated when A123 submitted the most recent permit application to AQD, in 2016 (For details refer to evaluation in AQD files). The

evaluation determined that the facility is subject to:

- NSPS Subpart Dc - The 59.9 MMBtu/hr natural gas-fired boiler is subject to the federal NSPS for Small Industrial-Commercial -Institutional Steam Generating Units as specified in 40 CFR 60 Subpart Dc. This standard requires the facility to track and maintain records of the fuel usage per calendar month for a period of two years.
- NSPS Subpart JJJJ - The emergency engine is subject to the Standard of Performance for Stationary Spark Ignition Internal Combustion Engines (SI ICE), Section 60.4230(a)(4)(iv) - Owners and operators of SI ICE that commenced construction on or after June 12, 2006, where the stationary SI ICE are manufactured on or after January 1, 2009, and the emergency engine has a maximum engine power greater than 19 KW (25 HP). The engine must comply with the emission standards listed in Table 1 of the subpart. Compliance with the emission standard could be demonstrated by purchasing a USEPA certified engine. In addition, the operating time for the emergency engine must be limited to 100 hours per year for maintenance and readiness testing, but 50 hours may be used for non-emergency situations.
- NESHAP Subpart ZZZZ – The 100 KW natural gas emergency engine is subject to the NESHAP for Stationary RICE; however, spark ignition RICE located at an area source, which commenced construction after June 12, 2006 meets these requirements by meeting the requirements cited for NSPS Subpart JJJJ.

3 - EXEMPT EQUIPMENT

There are various emission units that are exempt from the requirements of Rule 201(1) to obtain a permit to install. A summary table listing the exempt equipment is attached to this report. The list contains the equipment identification and description, the applicable exemption, as well as the justification for the exemption. The list was prepared by AQD based on the evaluation provided by A123 and their consultants during the permit application of 2016. Additional information pertaining to Rule 278a - Scope of permit exemption - was submitted by A123 consultants in previous years and it is saved in AQD files.

The exempt equipment list was updated during the inspection of 7/15/2020 to reflect the shutdown of the Research & Product Development (R&D) laboratory where small batches of lithium iron phosphate powders were produced using a spray dry system that used a three-step filtration method and an electric oven. The final product was shipped out for use in experimental cells. The R&D activities were discontinued around August 2019 and all the equipment from the lab was dismantled and moved out to A123 Systems in Novi.

The rest of the exempt equipment listed on the summary table remain at the facility.

4 - INSPECTION NARRATIVE

On July 15, 2020 I arrived at A123 in Romulus at approximately 10:00 AM and met with Mr. Joseph Frendo and Mr. Michael Beach. After the introductions, I stated the purpose of the inspection, which was to determine compliance with the Federal Clean Air Act; Article II, Part 55, Air Pollution Control, of the Natural Resources and Environmental Protection Act, 1994 PA 451, the applicable Michigan Department of Environment, Great Lakes and Environment (EGLE) air regulations, and the requirements/conditions cited in permit PTI 291-09A.

Since its installation, the manufacturing process has always run significantly below its maximum capacity. Historical records show that year 2016 has been one of the few times when the facility operated continuously for a full year. The information collected during the inspection of 5/23/2018 indicated that the facility has been operating based on product demand and has not run in a continuous mode. It stopped production at the end of May 2017 and remained closed through October 1, 2017. Then, they restarted manufacturing at about 25% capacity in October 2017 and continued to operate through December 2017. The facility remained closed until approximately mid-June 2018 and continue operating at about 25% capacity through September/October 2018. Production ramped up during 2019 but only with coating line 1 in operation until the shutdown in August 2019. At the time of the visit the facility was not operating. There were plans to start with a pilot plant but that never happened, so in 2020 the plant has not been manufacturing new cells. Except for the R&D lab equipment (which were moved out), all process and auxiliary equipment are disconnected but remain in the building. One of the largest rooms in the building is currently used for the storage of equipment brought from the A123 Livonia facility after the shutdown of that facility on 10/31/2019.

The building was closed for two months due to COVID-19 and it was reopened in June. It remains open Monday to Friday from 6:00 am to 2:30 pm but there are not immediate plans on starting production. Any changes will be notified to AQD.

We proceeded to the plant walkthrough and Mr. Frendo and Mr. Beach showed me the main manufacturing areas inside the building (i.e. anode and cathode coating lines) as well as the solvent recovery system located outside (i.e. refrigerated condensers and scrubber). All equipment and processes (i.e. mixing room, electrode coating &

processing, and the NMP recovery) are unchanged. We walked to the location of the former lab and the area was completely empty. We also checked the utility room, the auxiliary equipment, the emergency generator, and the baghouses.

In previous email communications with Mr. Frendo I have identified the sections of the PTI that included the equipment currently installed at A123 Romulus location. I identified the emission units that are described on the permit and identified the emission limits restrictions as well as the recordkeeping requirements. I asked for the process operating records, maintenance inspection logs, solvent usage and emission data, and utility data. Some of the records requested were provided via email on 7/14/2020 and additional records were received by AQD in the following weeks after the inspect date.

The inspection concluded with a closing meeting where I indicated that I would review the records and will prepare an inspection report which will summarize the compliance evaluation for the facility.

I left the facility at approximately 1:30 PM.

The permit compliance analysis and the outcomes of the inspection are presented on the next sections of this report.

5 - COMPLIANCE HISTORY (Complaints, Violations Notice, Consent Orders)

Our records show that this facility has no history of Complaints, Violations Notices, or outstanding Consent Orders.

6 - COMPLIANCE EVALUATION

The facility operations were checked for compliance with the applicable state and federal air quality regulations and the permit conditions of PTI 291-09A.

The permit conditions are summarized below for each emission unit:

EU5BOILER1: 59.9 MMBTU/hr natural gas-fired boiler

Pollution Control Equipment - Low NOx burners

SC I. - EMISSION LIMITS -In Compliance

Pollutant	Limit	Time Period /		Refer to:	Compliance Y/N
		Operating Scenario	Equipment		
1. NO _x	2.9 lb/hr	*Test Protocol	EU5BOILER1	SC VI. 4	Y
*As Specified in the Test Protocol					

SC II. 1 - MATERIAL LIMITS - In Compliance

The fuel records show that the facility only burns natural gas in EU5BOILER1. - Refer to the attached records of natural gas usage received via email on 7/16/2020. Please note that in 2019 the reported records for natural gas usage were collected from DTE receipts, which included the monthly natural gas usage for the whole facility and not the gas usage for EU5BOILER1. In the emission calculations for the 2019 MAERS report they conservatively applied the facility's usage for the boiler.

SC III, SC IV, and SC VI –In Compliance

The boiler and the associated emission control equipment are maintained and operated according to the manufacturer instructions.

The associated low-NOx burners are installed, maintained, and operated in a satisfactory manner.

The burners in EU5BOILER1 do not exceed a total capacity of 59.9 MMBTU/hr.

A123 contracts boiler's specialists for the maintenance of its boiler in a regular basis. Verification of compliance with the above cited conditions was based on the evaluation of the most recent maintenance records and annual inspections of the boiler. Refer to records provided by A123 on 9/15/2020.

SC VI - MONITORING/RECORDKEEPING -In Compliance

1 and 2. The facility keeps monthly fuel use records in accordance with 40 CFR 60.48c(g)(2), which allows facilities to record and maintain the total amount of each fuel combusted during each calendar month. The boiler only uses natural gas. Natural gas usage records are maintained in a satisfactory manner and they were available to AQD upon request. Records for year 2019 were provided via email on 7/16/2020.

3. The facility maintains manufacturer's written instructions for operating and maintaining the boiler and emission control equipment. Records of all maintenance performed on the boiler and control equipment are kept on files. For this inspection, AQD received records of the most recent boiler maintenance activities. Records dated 01/12/2019, 03/27/2019 and 06/18/2019 were provided by A123 on 9/15/2020 and are part of this report. One of the major repairs cited in one of the maintenance reports was the replacement of the boiler transfer pump.

4. The facility maintains the manufacturer's documentation certifying the heat capacity of each burner installed in EU5BOILER1. The short term NOX limit cited on the permit was based on the maximum heating capacity of the boiler (59.9 MMBTU/hr.) and the usage of natural gas with a heating value of 1,020 MMBTU/ MMCF and an accepted NOx emission factor of 50 lbs. of NOx per MMCF natural gas usage. There are not requirements for testing.

SC VIII. - STACK/VENT RESTRICTIONS - In Compliance

The exhaust gases from the stacks listed in the table below discharge unobstructed vertically upwards to the ambient air:

Stack & Vent ID	Maximum Exhaust Diameter/Dimensions (inches)	Minimum Height Above Ground (feet)	Compliance Y/N
1. SV5AE10	50.8	65.6	Y - No Changes

FG5ANODE and FG5CATHODE: Anode and Cathode coating lines and solvent recovery system
Emission Units: EU5ANODELINE1, EU5ANODELINE2, EU5ANODEDISTIL and EU5CATHODELINE1, EU5CATHODELINE2, EU5CATHODEDISTIL

Pollution Control Equipment: Refrigerated condensers, scrubber

SC I. - EMISSION LIMITS - In Compliance

Pollutant	Limit	Time Period/	Equipment	Compliance Y/N
		Operating Scenario		
1. VOC	39.3 lb./day (for each anode/cathode line)	calendar day	FG5ANODE and FG5CATHODE	Y

The VOC emission limit of 39.3 lb/day for FG5ANODE and 39.3 lb/day for FG5CATHODE is based on a total maximum NMP usage of 12,000 tons per year. That usage was estimated for a continuous operation (24 hours, 365 days in a year) of the emission units included in FG5ANODE and FG5CATHODE and accounted for the NMP used during coating, mixing, and cleaning operations. The release of VOC from the NMP recovery system is associated with a satisfactory operation of the pollution control equipment as defined under SC IV.1 and SC IV.2 (see next section).

In 2019, the records showed that the NMP usage rate was substantially below the potential value established during permit evaluation. The actual NMP reported usage for year 2019 was 78.1 tons for FG5ANODE and 196.9 tons for FG5CATHODE; for a total of 275 tons/year. The total includes the NMP used for binders, slurry made, premix and cleaning operations.

The estimated VOC emissions after controls were reported as 198 lb per year for FG5ANODE, and 327.4 lb per year for FG5CATHODE. The plant only operated the coating line No. 1 from January to August 2019. One of the reports shows a total of 4,032 hours of operation per year; assuming 24 hours per day, that is equivalent to 168 days of operation in calendar year 2019. Therefore, the estimated average daily VOC emissions per calendar day are 1.2 lb of VOC /day from the anode and 1.95 lb of VOC /day from the cathode.

SC IV. 1 & SC IV. 2 - DESIGN/EQUIPMENT PARAMETERS - In Compliance

The facility operates the anode and cathode coating lines and the solvent recovery system in a satisfactory manner. Satisfactory operation of the condenser includes maintaining the exhaust gas temperature below 21 degrees Celsius (°C). According to the records, the facility has a target set point of 17°C. In 2019 there has not been an increase above 21 degrees C and records show that the temperature is generally maintained in the range of 12- 15 degrees ° C. Corrective actions to lower the exhaust gas temperature have not been needed. See a sample of daily records for the week of 6/17/2019 to 6/21/2019.

Satisfactory operation of the packed bed wet scrubber includes maintaining the makeup water flow rate above 3 liters per minute. According to the records, the target set point is at 5 liters per minute and the scrubber shuts down if the make-up water flow rate falls below 3 liters per minute. In 2019 there has not been a decrease in the freshwater flow rate below the requirements for optimal operation. Therefore, corrective action to raise the makeup water flow rate above 3 liters per minute has not been needed. Based on the records inspected, the minimum recorded rate has been around 3.2 liter per minute (in cathode side). The spreadsheet with sample records are attached for both the anode and the cathode.

SC VI. - MONITORING/RECORDKEEPING - In Compliance

Records are maintained on file for a period of five years.

1 - In 2019, all required monthly calculations in acceptable format have been maintained by the facility and were provided upon request.

2 – When the plant was operating, the exhaust gas temperature of the condenser was continuously monitored every five seconds. Temperature records could be printed out from the facility computer data system for any period. Examples of the recorded temperature at five seconds interval for an operating day had been provided in the past and were available upon request. However, since the system has been shut down for almost a year, the staff was not able to provide continuous monitoring records. Daily records were available and a sample was provided for this inspection.

3 - When the plant was operating the makeup water flow rate of the packed bed wet scrubber was continuously monitored every five seconds. Records could be recorded/printed out for any lapse of time. Monthly records were available upon request by the last day of the calendar month, for the previous calendar month. A spreadsheet with an example of the recorded freshwater flow rate per day was provided and has been attached to the report.

SC VIII. - STACK/VENT RESTRICTIONS - In Compliance

The exhaust gases from the stacks listed in the table below discharge unobstructed vertically upwards to the ambient air:

Stack & Vent ID	Maximum Exhaust Diameter/Dimensions (inches)	Minimum Height Above Ground (feet)	Underlying Applicable Requirements
1. SV5AE12	56	47	R 336.1225, 40 CFR 52.21(c) & (d)

7 - FEDERAL REGULATIONS**NSPS Subpart JJJJ – In Compliance**

A123 demonstrated compliance with the emission standards listed in Table 1 of the subpart by purchasing a USEPA certified engine (refer to permit files). The emission standards are guaranteed by following the engine manufacturer recommended maintenance practices. The facility has a contract with a company that provides routine maintenance to the generator. In a letter dated 5/10/2019 the service company specified the scope of work, which included two visits per calendar year for general inspections, maintenance, repairs, and monthly readiness testing. A123 provided a sample record dated 5/24/2019 that shows the routine maintenance conducted when the reading on the non-resettable hourly meters in the emergency generator was 652.9 hours. The checklist showed engine oil and filter change, and the replacement of the spark plugs.

In addition, the operating time for the emergency engine has been limited to less 100 hours per year for maintenance

and readiness testing, and less than 50 hours may be used for non-emergency situations. A sample record showed the results of a load-bank testing conducted on 9/27/2019; at the end of the test the hourly meter reading was 667.5 hours. Therefore, based on a meter reading of 596.2 hours recorded in December 2017 (from previous inspection); the estimated total operating time in two years is about 71 hours or an annual average of 36 hours. All records for the generator were provided by A123 via email on 9/15/2020.

There are not indications or records of power outage requiring the usage of the emergency generator.

8 - MAERS

The report for emission year 2019 was timely submitted to AQD on 3/11/2020. AQD reviewed the report and completed the audit on 5/11/2020. For details refer to compliance activity report No. CA P002453564 in MACES database. The facility passed the audit with no further comments or review from AQD.

9 - FINAL COMPLIANCE DETERMINATION

A123 appears to be in substantial compliance with the applicable state and federal air quality regulations, as well as with the requirements and special conditions of PTI 291-09A.

NAME

HandoralDATE 9/21/2020

SUPERVISOR

JK