DIOXIN AND FURAN COMPLIANCE TEST REPORT GROUP I SECONDARY ALUMINUM PRODUCTION UNIT FRITZ ENTERPRISES, INC. RIVER ROUGE, MICHIGAN

Test Dates: July 19 and 20, 2016

Report Date: August 26, 2016

Prepared for:

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Project No. 16-113

CERTIFICATION STATEMENT

This statement certifies that "to the best of their knowledge," based on state and federal regulations, operating permits, plan approvals applicable to each source tested, and reasonable inquiry, the statements and information presented in the attached document are true, accurate, and complete.

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COMPLIANCE TEST REPORT
GROUP I SECONDARY ALUMINUM PRODUCTION UNIT
FRITZ ENTERPRISES, INC.
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William P Cowell — 8/26/16

William P. Cowell, QSTI — Date
Client Project Manager and On-site Supervisor
Montrose Air Quality Services, LLC.

8/26/16

Matthew Dallesasse — Date
District Manager
Montrose Air Quality Services, LLC.

8-25-16

David Splan — Date
Plant Manager and Representative
Fritz Enterprises, Inc.

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1 TEST RESULTS SUMMARY

Installation Permit Number: 15-01A			
Source Name: Aluminum Furnace		**Source ID: Fabric Filter Exhaust Stack**	
Pollutant	**Average Result**	**Limit**	**Compliant / Non-compliant**
Dioxins and Furans	5.9 X 10^{-5} grains of D/F TEQ per ton of feed/charge	2.1 X 10^{-4} grains of D/F TEQ per ton of feed/charge	Compliant

2 INTRODUCTION

Montrose Air Quality Services, LLC. (Montrose) was contracted to perform an emission evaluation of the aluminum furnace fabric filter exhaust stack outlet at Fritz Enterprises, Inc. (Fritz) located in River Rouge, Michigan. Performance testing was conducted to comply with United States Environmental Protection Agency (USEPA), Title 40, Code of Federal Regulations (CFR), Part 63 and their Michigan Department of Environmental Quality (MDEQ) Operating Permit No. 15-01A.

The aluminum furnace fabric filter outlet stack was tested for dioxin/furan (D/F) concentrations in accordance with the test protocol from June 2016. To improve D/F capture, the plant has been modified to inject Powdered Activated Carbon (PAC) (at a nominal 2 lb/hr rate) into the exhaust gas stream via the duct from the scrap preheater. The approved test protocol can be found in Appendix A.

3 CONTACT INFORMATION

Company	**Consultant**	**Testing Firm**
Mr. David Splan Fritz Enterprises, Inc. 1650 West Jefferson Trenton, Michigan 48183 (734) 362-5240 – Telephone dsplan@fritzinc.com	Mr. Joseph Duckett SNC Lavalin America, Inc. 6585 Penn Avenue Pittsburgh, Pennsylvania 15206 412-365-3707 – Telephone joseph.duckett@snclavalin.com	Mr. William P. Cowell, QSTI Montrose Air Quality Services, LLC. 1050 William Pitt Way Pittsburgh, Pennsylvania 15238 (412) 826-3636 – Telephone wcowell@montrose-env.com

4 TEST DATES AND PERSONNEL INFORMATION

Testing was conducted on July 19 and 20, 2016. The following table details the personnel present for this test program:

Organization	Personnel	Responsibility
MDEQ	Mr. Tom Gasloli	On-Site Agency Representative
Fritz Enterprises, Inc.	Mr. David Splan	Test Liaison
SNC Lavalin America, Inc.	Mr. Joseph Duckett	Test Liaison
Montrose	Mr. William P. Cowell, QSTI, Client Project Manager	Team Leader; Operator, RM 23 – sample recovery
	Mr. John E. Wilson, QSTI, Technician II	Manlift-probe pusher, sample recovery

5 ANALYTICAL LABORATORY INFORMATION

USEPA Method 5/23

Vista Analytical Laboratory
Ms. Martha Maier
1104 Windfield Way
El Dorado Hills, CA 95762
(916) 673-1520
mmaier@vista-analytical.com

6 PROCESS DESCRIPTION, PROCESS DATA, AND MISCELLANEOUS SUBPART RRR REQUIREMENTS

6.1 Process Description

Fritz operates a Group I Secondary Aluminum Production Unit (SAPU) in River Rouge, Michigan. Aluminum scrap is introduced to a melting furnace fired with natural gas, where the scrap is melted. Gaseous chlorine is added as a flux into the bottom of the bath and solid sodium chloride and potassium chloride are spread over the top of the bath, also as a flux. The impurities form a layer on the surface of the melt and are skimmed off several times during the melting cycle. The molten aluminum is then poured into molds. The exhaust from the melting furnace is captured by two ducts. The ducts combine into a common duct which directs the exhaust to a cyclone, a negative pressure fabric filter system and then discharges to the atmosphere through a stack. The MDEQ has determined that this plant is subject to the requirements of 40 Code of Federal Regulations (CFR)

Part 63, Subpart RRR – *National Emission Standards for Hazardous Air Pollutants for Secondary Aluminum Production* (Subpart RRR). The facility must comply with dioxin and furan (D/F) standards of Subpart RRR. The facility has previously (September 2014) demonstrated compliance with the PM and HCl limits expressed in their operating permit.

6.2 Process Data

Pertinent process operating and production parameters recorded during the test:

- Aluminum Production Rate
- Feed/Charge Rate (by calculation from production rate)
- Inlet Fabric Filter Temperature
- Fabric Filter Pressure Drops at each Baghouse
- Reactive Chlorine Flux Rate
- Lime Feed Rate
- Fuel Usage
- Baghouse Leak Detector Signal
- PAC Feed Rate

Process data can be found in Appendix B.

7 TEST PROCEDURES

Testing was conducted in accordance with the procedures outlined in the USEPA, Title 40, CFR, Part 60, Appendix A, Testing Methods. All field data sheets can be found in Appendix C.

7.1 Deviations and Testing Anomalies

During Run 2 (Baghouse #1 and #3 running), the PAC feed was interrupted during the test for approximately 15 minutes. It was decided to repeat the test the following day for this baghouse combination. Samples were collected and analyzed for both the Run 2 and the Run 4 tests. Run 2 results are not included in the average of the four test runs due to this anomaly.

7.2 Velocity and Volumetric Flow Rate – USEPA Methods 1 and 2

USEPA Method 1, *Sample and Velocity Traverses for Stationary Sources*, was followed to select sample points across the duct. USEPA Method 2, *Determination of Stack Gas Velocity and Volumetric Flow Rate (Type S Pitot Tube),* was used in conjunction with USEPA Methods 3 and 4 to determine the gas velocity and volumetric flow rate at the stack.

Each set of velocity determinations includes the measurement of gas velocity pressure and gas temperature at each of the USEPA Method 1 traverse points. The velocity pressures were measured with a Type S Pitot tube. Pitot tube calibration followed the geometric calibration protocol specified in Section 4.1 of 40 CFR Appendix A, Method 2. Gas temperature measurements were made using a Type K thermocouple and digital pyrometer. The thermocouple was calibrated in accordance with Section 4.3 of 40 CFR Appendix A, Method 2. A cyclonic flow check was performed prior to testing to verify that cyclonic flow conditions do not exist at the exhaust stack. A copy of the cyclonic flow check is included in Appendix C. Figure 1 details the stack dimensions and sampling points used in the field.

7.3 Gas Composition and Molecular Weight – USEPA Method 3

The oxygen (O_2) concentration, carbon dioxide (CO_2) concentration, and molecular weight of the stack gas was obtained and analyzed in accordance with USEPA Method 3, *Gas Analysis for the Determination of Dry Molecular Weight.* A Fyrite analyzer was used to measure the oxygen and carbon dioxide concentrations.

7.4 Moisture Content – USEPA Method 4

The flue gas moisture content at the stack was determined in accordance with USEPA Method 4, *Determination of Moisture Content in Stack Gases.* The gas moisture was determined by quantitatively condensing the water in chilled impingers. The amount of moisture condensed was determined by the volume of condensate collected and weight differential in the silica gel. A dry gas meter was used to measure the volume of gas sampled. The amount of water condensed and the volume of gas sampled was used to calculate the gas moisture content in accordance with USEPA Method 4. The moisture sampling train was incorporated with the USEPA 23 trains.

7.5 Dioxin / Furan Concentration – USEPA Method 23

The D/F emissions were determined in accordance with USEPA Method 23, *Determination of Polychlorinated Dibenzo-p-dioxins and Polychlorinated Dibenzofurans from Municipal Waste Combustors.*

7.5.1 Sampling Train Setup and Operation

The sampling apparatus contains a glass-lined temperature-controlled probe equipped with a Type S Pitot tube and a sharp-edged stainless-steel buttonhook nozzle. The exit of the probe was connected to a high-efficiency glass fiber filter supported in a glass-filter holder inside an oven heated to 248°F ± 25°F (as measured by an in-gas thermocouple at the filter exit). The exit of the filter holder was connected to a water-jacketed condenser followed by a water-jacketed packed column of adsorbent material (XAD-2) and a knock-out impinger followed by a series of four full-sized impingers. The condenser and XAD-2 trap was continually cooled with a water circulating pump inserted in the ice bath and tubing leading to the two glass pieces. Temperature entering the XAD-2 trap was monitored with an in-gas thermocouple and maintained at a temperature below 68°F. The knockout impinger was empty and the second and third impingers each contained 100 milliliters (ml) of deionized water. The fourth impinger was empty and the fifth impinger contained a pre-weighed amount of silica gel.

The impinger train was connected to a commercially available metering system. Prior to sampling, the dry gas meter was calibrated utilizing the procedures detailed in USEPA Method 5.

The sample train was assembled, allowed to reach operating temperature, and leak checked by plugging the nozzle with a rubber septum and pulling a vacuum of approximately 15" of mercury (Hg). Sampling did not proceed until an acceptable leak check of less than 0.02 cubic feet per minute (cfm) was achieved.

7.5.2 Testing Procedures

Once an acceptable leak check was achieved, the sampling train was placed at the first traverse point and sampling began immediately. The sampling train was operated at an isokinetic rate with an isokinetic variation greater than 90% and less than 110%. Three runs were performed; each run was at least 180 minutes in duration and had a minimum sample volume of 100 dry standard cubic feet (DSCF). At the conclusion of each test run, the sample train was cooled sufficiently, utilizing ambient air or ice, to allow the nozzle to be plugged with the rubber septum. The sampling train was leak-checked at a vacuum equal to or greater than the maximum value reached during sampling.

7.5.3 Sample Recovery

Container 1 – The filter was removed from the filter holder and placed in a labeled glass petri dish and sealed with Teflon® tape.

Adsorbent Module – The module was removed for the sample train, sealed with Teflon® tape, and labeled. The module was stored on ice for transport to the laboratory.

Container 2 – Material in the nozzle, probe, front and back halves of the filter holder, impingers and connecting glassware was quantitatively rinsed with acetone. Acetone rinses were performed a minimum of 3 times. The volume of each rinse was added to Container No. 2, an amber glass sample bottle. The contents of Container 2 were sealed and submitted to the laboratory for Method 23 analysis. Methylene chloride was not used in this test program as allowed by USEPA for SAPU testing.

Container 3 – Material in the nozzle, probe, both halves of the filter holder, impingers and connecting glassware was quantitatively rinsed with toluene three times. The volumes of these rinses were recorded and stored in an amber glass sample bottle designated as Container 3. As permitted, the toluene rinse was combined at the laboratory with the acetone rinse.

Impinger Contents – The impinger contents were measured to within 1 ml, utilizing a graduated cylinder, and discarded. The volume was recorded to calculate moisture content of the effluent gas.

Silica Gel – The silica gel was transferred to the original container and weighed to the nearest ± 0.5 gram (g).

All samples were maintained at 39°F or lower and protected from light. Each fraction was recorded on the sample chain of custody and transported to the laboratory for analysis, along with one complete blank sample train. The polychlorinated dibenzodioxins (PCDD) and polychlorinated dibenzofurans (PCDF) were extracted from the sample, separated by high-resolution gas chromatography, and measured by high-resolution mass spectroscopy. Analytical results are included in Appendix D.

7.6 Calibrations and QA/QC Data

The following field equipment calibrations and quality assurance/quality control (QA/QC) data are contained in Appendix E:

- Nozzle
- Pitot Tube
- Thermocouple
- Dry Gas Meter and Orifice
- Qualified Source Testing Individual (QSTI) Certifications

7.7 Calculations

Emission calculations were completed by using a computer spreadsheet format. The results of each pertinent parameter are detailed on the spreadsheet for each sampling run. A sample calculation for one complete test run is provided in Appendix F.

8 TESTING SUMMARY

A summary of the test results can be found in Table 1. Run 2 results are shown on the table, however, only Runs 1, 3, and 4 are included in the average. Table 2 contains the table nomenclature.

9 CONCLUSION

A compliance test program was completed on the Group 1 Melting Furnace fabric filter exhaust stack at Fritz Enterprises, Inc. in River Rouge, Michigan. Test results represent data that is considered to be representative of the emission rates at the prevailing operating conditions. Based on this testing program, the measured D/F emission rate is in compliance with the EPA Secondary Aluminum MACT and with the MDEQ Permit for this facility.

To the best of Montrose's knowledge, this source test report has been checked for completeness and the results contained herein are accurate, error-free, and representative of the actual emissions measured during testing.