FINAL REPORT

DTE ENERGY

DETROIT, MICHIGAN

ST. CLAIR POWER PLANT (SCPP) UNIT 3: RESPONSE CORRELATION AUDIT (RCA)

RWDI #2204122

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SUBMITTED TO

Mark Grigereit
Principal Engineer
mark.grigereit@dteenergy.com

DTE Energy
7940 Livernois
Detroit, Michigan 48210

M: 313.412.0305

FACILITY ADDRESS:

St. Clair Power Plant
4901 Pointe Drive
St. Clair, Michigan 48054

SUBMITTED BY

Brad Bergeron, A.Sc.T., d.E.T.
Senior Project Manager | Principal
Brad.Bergeron@rwdi.com | ext. 2428

Mason Sakshaug, QSTI
Senior Scientist
Mason.Sakshaug@rwdi.com | ext. 3703

RWDI USA LLC
Consulting Engineers & Scientists
2239 Star Court
Rochester Hills, Michigan 48309

T: 248.841.8442
F: 519.823.1316

EXECUTIVE SUMMARY

RWDI USA LLC (RWDI) has been retained by DTE Energy (DTE) to complete the emission sampling program at the St. Clair Power Plant (SCPP) located in St. Clair, Michigan. RWDI performed a Response Correlation Audit (RCA) on the Particulate Matter Continuous Emission Monitoring System (PM CEMS). The RCA was performed on the Unit 3 exhaust stack. The testing is required by 40 CFR Part 63, Subpart UUUUU. Testing was performed in accordance with the Procedure 2 of 40 CFR Part 60, Appendix F, and was conducted from April 25th-April 28th, 2022.

Response Correlation Audit – St. Clair Power Plant - Unit 3

Test Number	PM CEMS (mg/wac)[2]	PM CEMS (correction)	RM CEMS (mg/acm)	Correction (-25% Emission Limit)[1]	Correction (+25% Emission Limit)
Test 1	20.8	4.2	2.9	0.2	8.2
Test 2	17.0	3.5	4.5	0.0	7.5
Test 3	18.0	3.7	3.1	0.0	7.7
Test 4	18.9	3.8	4.4	0.0	7.8
Test 5	15.8	3.3	3.1	0.0	7.3
Test 6	12.9	2.7	2.0	0.0	6.7
Test 7	10.3	2.2	1.8	0.0	6.2
Test 8	9.3	2.0	1.3	0.0	6.0
Test 9	11.8	2.5	1.7	0.0	6.5
Test 10	27.2	5.4	7.0	1.4	9.4
Test 11	22.9	4.6	8.2	0.6	8.6
Test 12	24.6	4.9	5.8	0.9	8.9
Test 13	24.1	4.8	5.7	0.8	8.8
PM CEMS < Greatest PM CEMS Response on correlation regression line				< 37.9 mg/wac	PASS
9 of 12 PM CEMS and PM within 25% of numerical emission limit on correlation regression line					PASS

Notes: 1 – negative values replaced with zero
2 – milligrams per actual cubic meter (Raw Output)

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1 INTRODUCTION

RWDI USA LLC (RWDI) has been retained by DTE Energy (DTE) to complete the emission sampling program at the St. Clair Power Plant (SCPP) located in St. Clair, Michigan. RWDI performed a Response Correlation Audit (RCA) on the Particulate Matter Continuous Emission Monitoring System (PM CEMS). The RCA was performed on the Unit 3 exhaust stack. The testing is required by 40 CFR Part 63, Subpart UUUUU. Testing was performed in accordance with the Procedure 2 of 40 CFR Part 60, Appendix F, and was conducted from April 25th-28th, 2022.

Testing was performed pursuant to Title 40, Code of Federal Regulations, Part 60, Appendix A (40 CFR 60 App. A), Methods 1-5. Criterion for acceptable RCA results are located in Procedure 2 Sec 10.4(5)(i-ii) or alternatively, Sec 10.6(1) and (2).

The fieldwork was performed in accordance with EPA Reference Methods and DTE's intent to test. Copy of Intent to Test Plan is provided in **Appendix A**.

1.1 Location and Dates of Testing

The test program was completed from April 25th-28th, 2022, at the SCPP Unit 3.

1.2 Description of Source

The SCPP located at 4901 Pointe Drive, St. Clair, Michigan, employs the use of four (4) coal-fired boilers (Units 2,3,6, and 7). Units 2 and 3 each have Babcock and Wilcox coal-fired boilers capable of producing 1,070,000 pounds per hour of steam and have Allis Chalmers turbine generators each with a nominally rated capability of 170 megawatts (MW). Units 6 and 7 have Combustion Engineering boilers capable of producing 2,100,000 and 3,580,000 pounds of steam per hour, respectively. The turbine generators on each unit were manufactured by Westinghouse and have a nominally rated capability of 325 and 450 MW, respectively.

The air pollution control equipment on Units 2-3 consists of Wheelbrator Frye electrostatic precipitators on each unit that have designed collection efficiencies of 99.6%. Air pollution control equipment on Unit 6 consists of Research Corporation electrostatic precipitators that have design collection efficiencies of 99.6%. The air pollution control equipment on Unit 7 consists of an American Standard electrostatic precipitator that has design collection efficiency of 99.6%.

The boilers are equipped with Dry Sorbent Injection (DSI) and Activated Carbon Injection (ACI) air quality control systems. The DSI system is used to control acid gas, PM, PM10, PM2.5, and NOx emissions from each unit. Trona is received at the plant where inline mills further refine the Trona. The ACI system is used to control the Mercury emissions from each unit.

Unit	Analyzer	Manufacturer/ Model	Analyzer Range	Serial Number
Unit 3	PM	Sick/Maihak SP100	200 mg/acm	15318414

2.3 Moisture Determination (USEPA Method 4)

Determination of the moisture content of the exhaust gas was performed using USEPA Method 4, "Determination of Moisture Content in Stack Gases". The moisture was collected in the USEPA Method 5 glass impingers and the percentage of water was then derived from the calculations outlined in USEPA Method 4.

2.4 Particulate Matter (USEPA Method 5 MATS Modified)

Filterable Particulate Matter testing was performed using USEPA Method 5 MATS Modified "Determination of Particulate Emissions from Stationary Sources" to measure the filterable (front half) particulate emissions.

The quartz filters used in the sampling were initially desiccated for 24 hours and weighed to a constant weight as described in Method 5 – MATS Modified to obtain the initial tar weight.

After completion of the final leak test for each test, the filter was recovered and the probe, nozzle, and the front half of the filter holder assembly were brushed and rinsed with acetone. The acetone rinses were collected in a pre-cleaned sample container. The container was labeled with the test number, location, test date, and level of liquid was marked. Immediately after recovery, the samples were placed in a storage container for safe handling.

At the laboratory, the acetone rinses were transferred to clean pre-weighed beakers and evaporated to dryness. The beakers and filters were desiccated for 24 hours and weighed to a constant weight (within 0.5 mg).

Collection of filed blanks consist of a blank filter and acetone solution blank. The acetone blank was collected from the rinse bottle used during sample recovery. The blank filter and acetone were collected and analyzed following the sample procedures used to recover the filed samples.

3 OPERATING PARAMETERS

The test program included the collection of PM CEMs emission data and load during each PM emission test. CEMS data can be found in **Appendix B**.

4.5 Laboratory Data

Laboratory analytical results can be found in **Appendix H**.

4.6 Coal Analysis

Analytical results from the coal samples can be found in **Appendix I**.

TABLE

Table 1
SCPP Unit 3 Table of Results

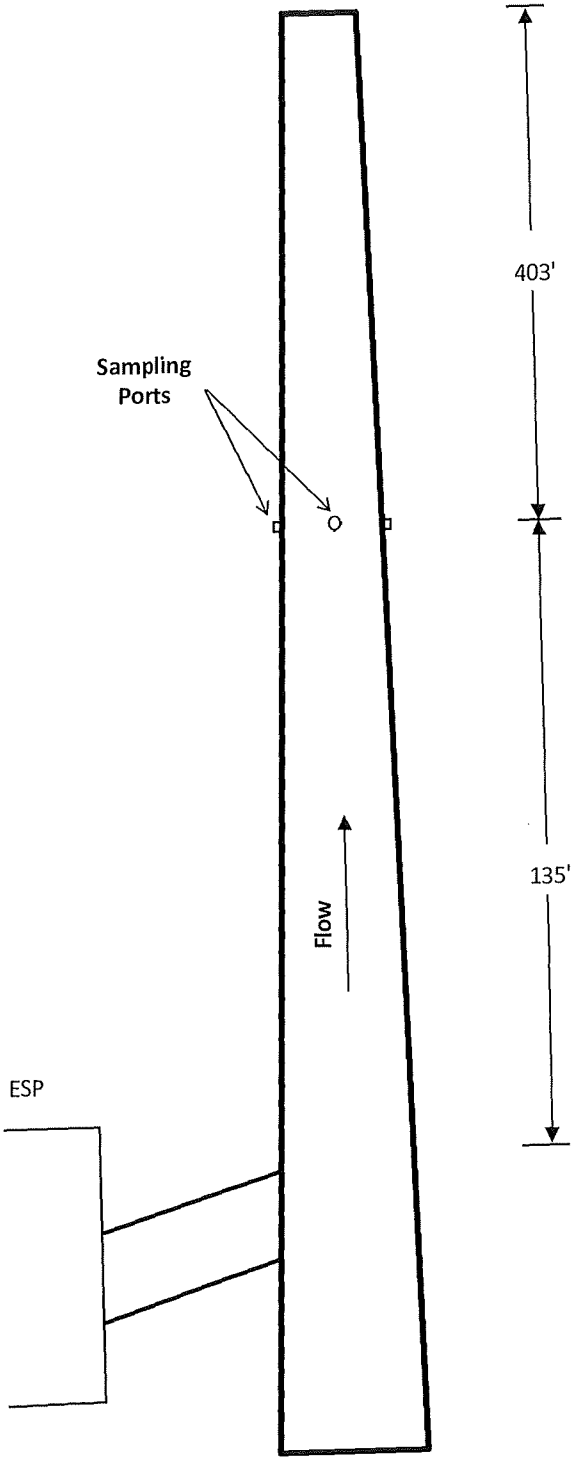
Test Number	Test Date (2022)	Test Time	PM CEMS (mg/wac)[2]	RM PM (mg/acm)	PM CEMS (correction)	Correction (-25% Emission Limit)[1]	Correction (+25% Emission Limit)	PM Load Range	Unit Load (MW)
Test 1	25-April	7:21-8:29	20.8	2.9	4.2	0.2	8.2	Mid	125.2
Test 2	25-April	8:46-9:51	17.0	4.5	3.5	0.0	7.5	Mid	124.6
Test 3	25-April	10:08-11:14	18.0	3.1	3.7	0.0	7.7	Mid	125.5
Test 4	25-April	11:28-12:33	18.9	4.4	3.8	0.0	7.8	Mid	124.5
Test 5	25-April	12:47-13:52	15.8	3.1	3.2	0.0	7.3	Mid	124.9
Test 6	27-April	7:26-8:33	12.9	2.0	2.7	0.0	6.7	Low	125.0
Test 7	27-April	8:48-9:55	10.3	1.8	2.2	0.0	6.2	Low	125.3
Test 8	27-April	10:08-11:12	9.3	1.3	2.0	0.0	6.0	Low	125.1
Test 9	27-April	11:25-12:30	11.8	1.7	2.5	0.0	6.5	Low	124.7
Test 10	28-April	6:54-8:00	27.2	7.0	5.4	1.4	9.4	High	120.2
Test 11	28-April	8:12-9:17	22.9	8.2	4.6	0.6	8.6	High	122.0
Test 12	28-April	9:36-10:40	24.6	5.8	4.9	0.9	8.9	High	128.7
Test 13	28-April	10:51-11:55	24.1	5.7	4.8	0.8	8.8	High	129.8

1 negative numbers were replaced with zero

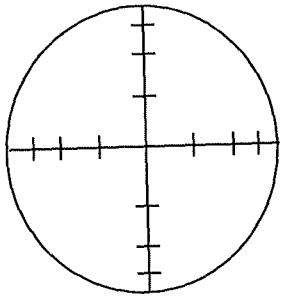
2 milligrams per actual cubic meter (Raw Output)

FIGURES

Figure 1 – Sampling Location
St. Clair Power Plant– Unit 3



Stack Diameter 13'4"



Sample Points

Points	Distance From Inner Wall
1	7.0
2	23.4
3	47.4

Figure 2 –Method 5 (MATS Modified)

St. Clair Power Plant

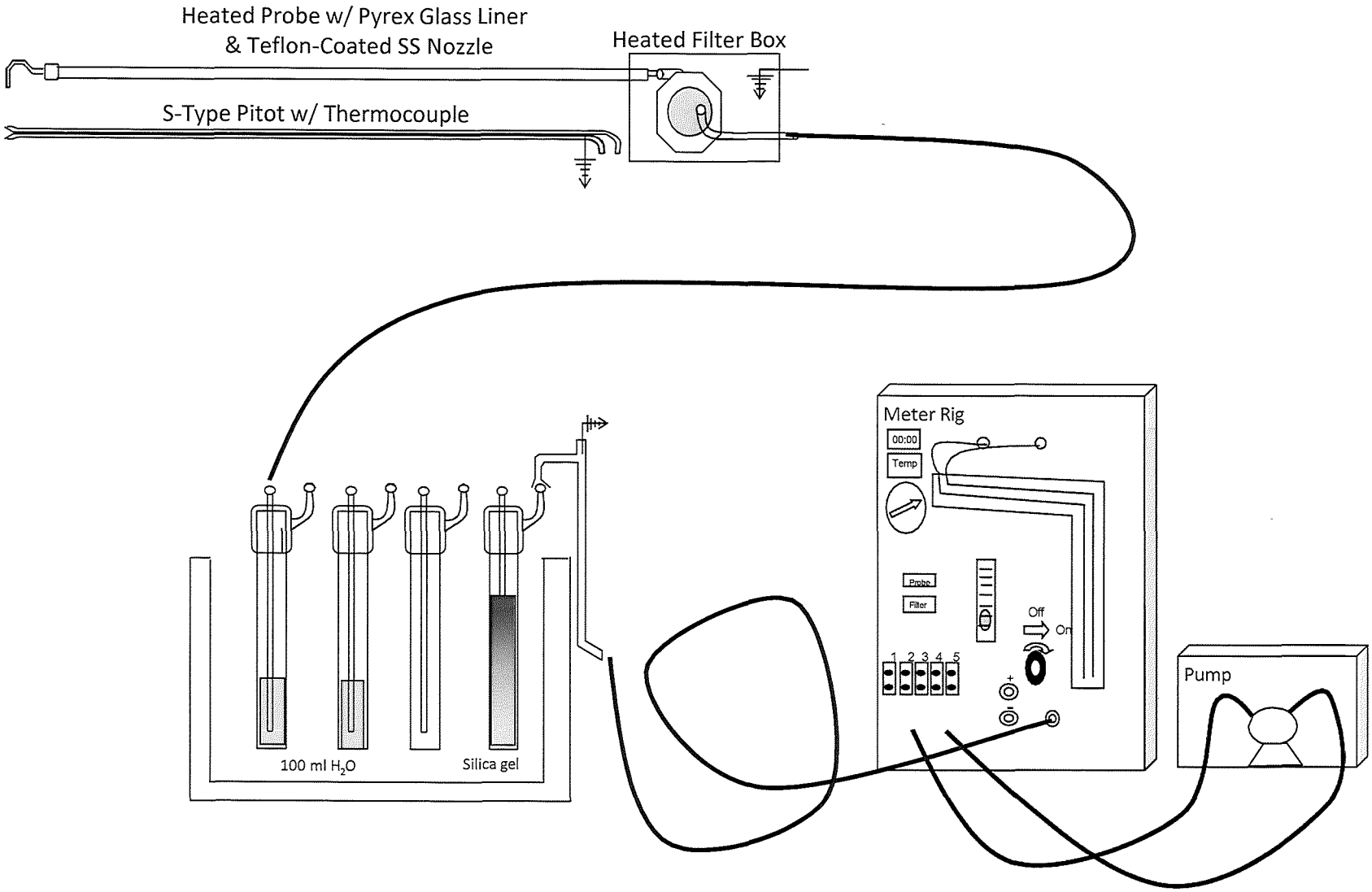


Figure 3
St. Clair Power Plant
EU-Boiler3-SC
PM CEMS RCA
Summary Graph
April 25th-28th, 2022

	CEM	RM			
1	1.9	1	0.67	-3.19	4.53
2	2.0	1.53	0.65	-3.18	4.54
3	2.0	0.9	0.68	-3.18	4.54
4	2.0	0.7	0.68	-3.18	4.54
5	2.0	0.31	0.68	-3.18	4.54
6	20.6	5.55	4.18	0.82	8.04
7	23.5	5.45	4.66	0.02	8.54
8	22.1	5.92	4.42	0.56	8.26
9	22.0	4.05	4.40	0.54	8.26
10	20.0	5.92	4.03	0.17	7.89
11	32.2	6.43	6.30	2.44	10.16
12	35.7	9.05	6.95	3.09	10.81
13	37.8	5.62	7.34	3.48	11.20
14	37.9	7.99	7.36	3.50	11.22
15	35.4	7.56	6.90	3.04	10.76
-Y Intercept	0.0	0.312	0.31	-3.55	4.17

Run	CEM	RM			
1	20.6	2.90	4.2	0.82	8.04
2	17.0	4.50	3.5	-0.39	7.33
3	16.0	3.10	3.7	-0.20	7.52
4	13.9	4.40	3.0	-0.03	7.69
5	15.6	3.10	3.3	-0.61	7.11
6	12.9	2.00	2.7	-1.15	6.57
7	10.3	1.80	2.2	-1.65	6.09
8	9.3	1.30	2.0	-1.62	5.90
9	11.6	1.70	2.5	-1.35	6.37
10	27.2	7.00	5.4	1.51	9.23
11	22.9	6.20	4.6	0.71	8.43
12	24.6	5.80	4.9	1.03	8.75
13	24.1	5.70	4.8	0.93	8.65