

FINAL REPORT



DTE ENERGY

DETROIT, MICHIGAN

BELLE RIVER POWER PLANT (BRPP): RESPONSE CORRELATION AUDIT (RCA)

RWDI #2203792

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SUBMITTED TO

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EXECUTIVE SUMMARY

RWDI USA LLC (RWDI) has been retained by DTE Energy (DTE) to complete the emission sampling program at the Belle River Power Plant (BRPP) located in East China, Michigan. RWDI performed a Response Correlation Audit (RCA) on the Particulate Matter Continuous Emission Monitoring System (PM CEMS). The RRA was performed on the Unit 2 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 March 15th-17th, 2022.

Response Correlation Audit - Belle River Power Plant - Unit 2

Test Number	PM CEMS (mg/acm)	RM PM (mg/wac) ²	PM CEMS (correction)	Correction (-25% Emission Limit) ¹	Correction (+25% Emission Limit)
Test 1	0.9	1.2	0.3	0.0	4.9
Test 2	1.1	1.1	0.3	0.0	4.9
Test 3	0.9	0.6	0.3	0.0	4.9
Test 4	0.9	1.3	0.3	0.0	4.9
Test 5	23.8	4.6	2.5	0.0	7.1
Test 6	26.3	3.9	2.9	0.0	7.5
Test 7	28.2	4.1	3.2	0.0	7.8
Test 8	27.8	4.6	3.1	0.0	7.7
Test 9	35.9	4.7	4.6	0.0	9.2
Test 10	39.2	7.2	5.3	0.7	9.9
Test 11	40.7	8.0	5.6	1.0	10.2
Test 12	38.9	7.5	5.2	0.6	9.8
PM CEMS < Greatest PM CEMS Response on correlation regression line				< 48.7 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)



TABLE OF CONTENTS

1	INTRODUCTION	1
1.1	Location and Dates of Testing.....	1
1.2	Description of Source	1
1.3	Personnel Involved in Testing	2
2	SOURCE DESCRIPTION	2
3	SAMPLING AND ANALYTICAL PROCEDURES	3
3.1	Stack Velocity, Temperature, and Volumetric Flow Rate Determination (USEPA Method 1 and 2).....	3
3.2	Oxygen and Carbon Dioxide (USEPA Method 3A).....	3
3.3	Moisture Determination (USEPA Method 4).....	3
3.4	Particulate Matter (USEPA Method 5 MATS Modified).....	3
4	OPERATING PARAMETERS	4
5	TEST RESULTS AND DISCUSSION	4
5.1	Discussion of Results.....	4
5.2	Calibration Sheets	5
5.3	Sample Calculations	5
5.4	Field Data Sheets	5
5.5	Laboratory Data	5
5.6	Coal Analysis	5



LIST OF TABLES

(Table Section)

Table 1: Table 1 BRPP Unit 2 Table of Results

LIST OF FIGURES

(Figure Section)

Figure 1: Sampling Locations Belle River Power Plant – Unit 2

Figure 2: Method 5 (MATS Modified) Belle River Power Plant

Figure 3: BRPP Unit 2 PM CEMS RCA Summary Graph

LIST OF APPENDICES

Appendix A: Copy of Source Testing Plan

Appendix B: DTE CEMS Data

Appendix C: Particulate Matter Results

Appendix C1: Low Load - Particulate Matter Results

Appendix C2: Mid Load - Particulate Matter Results

Appendix C3: High Load - Particulate Matter Results

Appendix D: Calibration Documents

Appendix E: Example Calculations

Appendix F: Field Notes

Appendix F1: Low Load - Field Notes

Appendix F2: Mid Load - Field Notes

Appendix F3: High Load - Field Notes

Appendix G: Analytical Data

Appendix G1: Low & Mid Loads - Analytical Data

Appendix G2: High Load - Analytical Data

Appendix H: Coal Analysis



1 INTRODUCTION

RWDI USA LLC (RWDI) has been retained by DTE Energy (DTE) to complete the emission sampling program at the Belle River Power Plant (BRPP) located in East China, Michigan. RWDI performed a Response Correlation Audit (RCA) on the Particulate Matter Continuous Emission Monitoring System (PM CEMS). The RRA was performed on the Unit 2 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 March 15th-17th, 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 Source Testing Plan is provided in **Appendix A**.

1.1 Location and Dates of Testing

The test program was completed from March 15th-17th, 2022, at the BRPP Unit 2.

1.2 Description of Source

The BRPP located at 4505 King Road, East China, Michigan, employs the use of two (2) Babcock and Wilcox coal-fired boilers (Units 1 and 2) each capable of producing 4,550,000 pounds per hour of steam. Each unit has a Siemens Power Corporation turbine generator with a nominally rated capacity of 635 (Unit 1) and 645 (Unit 2) megawatts (MW).

BRPP utilizes Sick AG Maihak SP100 dust measuring systems. The analyzers utilize a measuring technique based off scattered light principle. The SP100 model is specific for low to medium dust collections. The following unit was audited:

Unit	Analyzer	Manufacturer/ Model	Analyzer Range	Serial Number
Unit 2	PM	Sick/Maihak SP100	200 mg/acm	15318415

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3 SAMPLING AND ANALYTICAL PROCEDURES

3.1 Stack Velocity, Temperature, and Volumetric Flow Rate Determination (USEPA Method 1 and 2)

The exhaust velocities and flow rates were determined following the US EPA Method 2, "Determination of Stack Gas Velocity and Flow Rate (Type S Pitot Tube)". Velocity measurements were taken with a pre-calibrated S-Type pitot tube and incline manometer. Volumetric flow rates were determined following the equal area method as outlined in US EPA Method 1. Temperature measurements were made simultaneously with the velocity measurements and were conducted using a chromel-alumel type "k" thermocouple in conjunction with a digital temperature indicator.

A cyclonic flow check was performed on the stack during the initial flow monitor certification. There was no cyclonic flow present during testing.

3.2 Oxygen and Carbon Dioxide (USEPA Method 3A)

Oxygen (O₂) and carbon dioxide (CO₂) emissions were evaluated using USEPA Method 3A, "Gas Analysis for Carbon Dioxide, Excess Air, and Dry Molecular Weight (Instrumental Analyzer Method)". The analyzers utilize paramagnetic sensors.

The O₂ and CO₂ analyzers were calibrated per procedures outlined in USEPA Method 3A. Zero, span, and mid-range calibration gases were introduced directly into the analyzer to verify the instruments linearity prior to sampling. Zero and mid gases were introduced after each test period to determine instrument drift. A bag sample was pulled from the stack for the duration of each test and analyzed after the test.

3.3 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.

3.4 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" was used to measure the filterable (front half) particulate emissions. Triplicate 60-minute tests were conducted.

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.



Figure 3 provides a graph of the PM CEMS curve with the RCA data. Particulate Matter results are provided in **Appendix C**.

5.2 Calibration Sheets

Calibration sheets can be found in **Appendix D**.

5.3 Sample Calculations

Sample calculations can be found in **Appendix E**.

5.4 Field Data Sheets

Field data sheets can be found in **Appendix F**.

5.5 Laboratory Data

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

5.6 Coal Analysis

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

TABLES



Table 1
BRPP Unit 2 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 (GMW)
Test 1	15-March	7:11-8:25	0.9	1.2	0.3	0.0	4.9	Low	485.9
Test 2	15-March	9:01-10:14	1.1	1.1	0.3	0.0	4.9	Low	485.9
Test 3	15-March	10:55-12:09	0.9	0.6	0.3	0.0	4.9	Low	486.0
Test 4	15-March	12:42-14:08	0.9	1.3	0.3	0.0	4.9	Low	485.9
Test 5	16-March	7:40-8:50	23.8	4.6	2.5	0.0	7.1	Mid	587.2
Test 6	16-March	9:24-10:33	26.3	3.9	2.9	0.0	7.5	Mid	587.0
Test 7	16-March	11:00-12:10	28.2	4.1	3.2	0.0	7.8	Mid	586.7
Test 8	16-March	12:30-13:42	27.8	4.6	3.1	0.0	7.7	Mid	586.9
Test 9	17-March	7:04-8:11	35.9	4.7	4.6	0.0	9.2	High	641.1
Test 10	17-March	8:50-9:57	39.2	7.2	5.3	0.7	9.9	High	640.8
Test 11	17-March	10:20-11:27	40.7	8.0	5.6	1.0	10.2	High	641.2
Test 12	17-March	11:44-12:51	38.9	7.5	5.2	0.6	9.8	High	640.4

¹negative numbers were replaced with zero
²milligrams per actual cubic meter (Raw Output)

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FIGURES

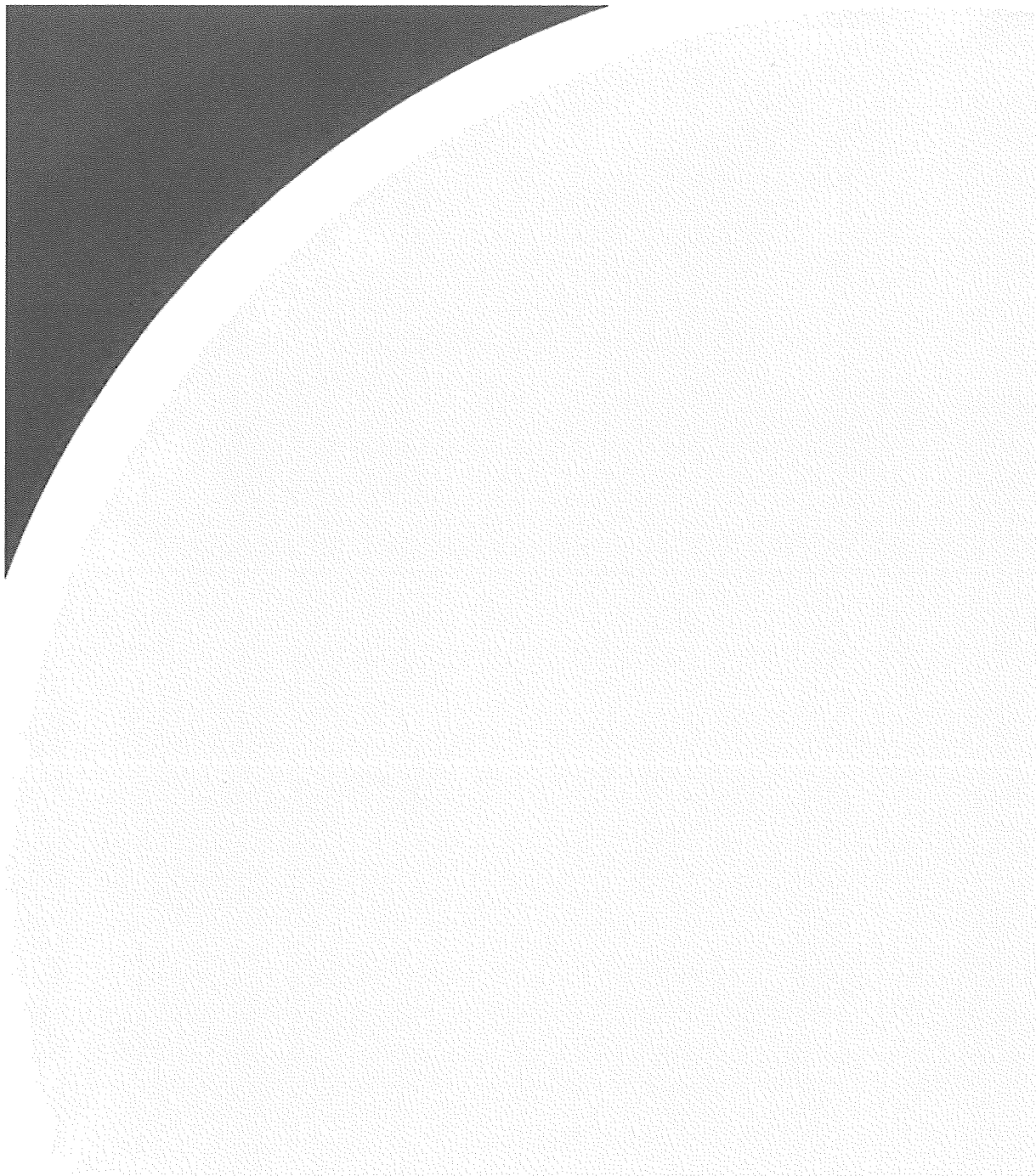


Figure 1 – Sampling Location
Belle River Power Plant – Unit 2

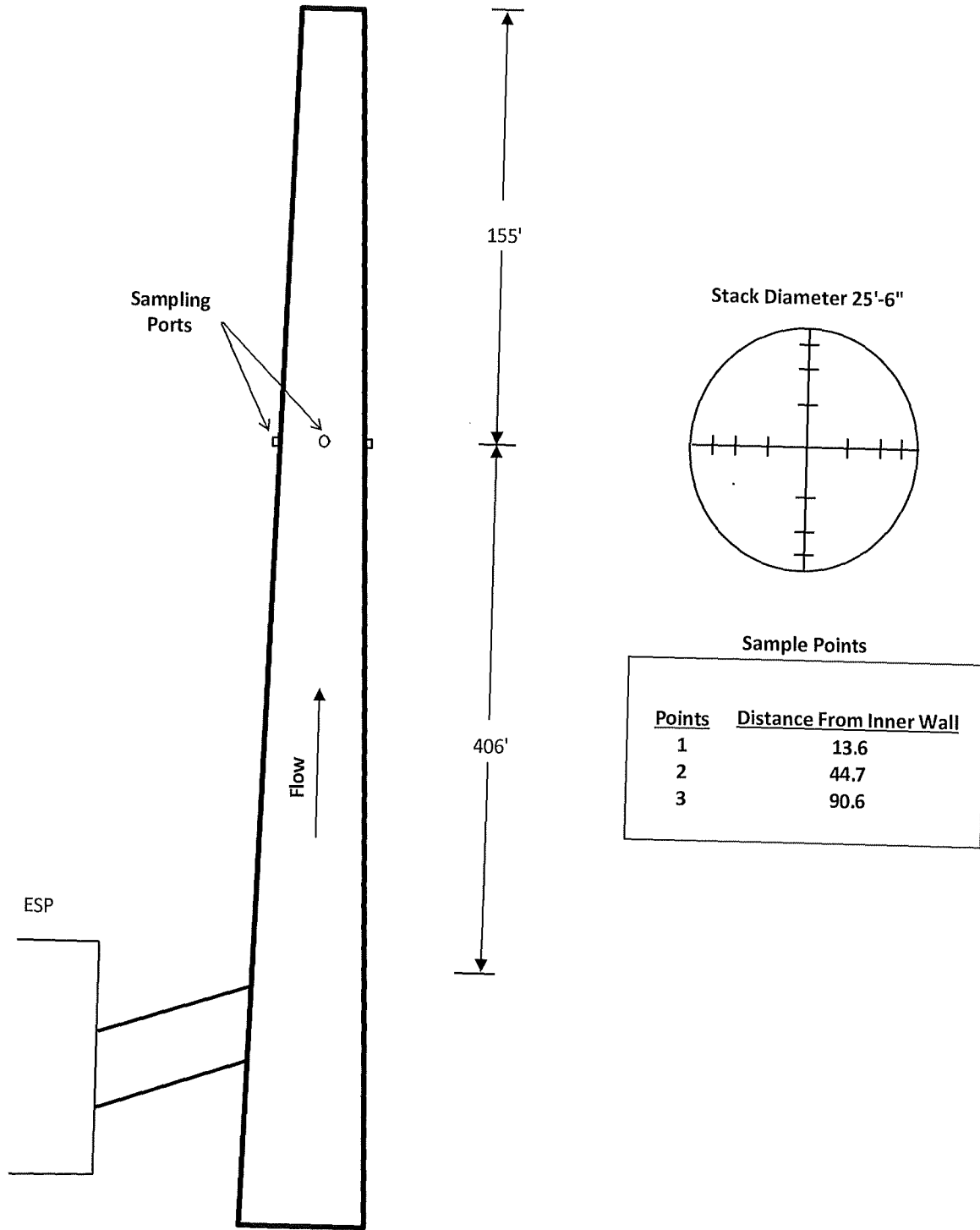
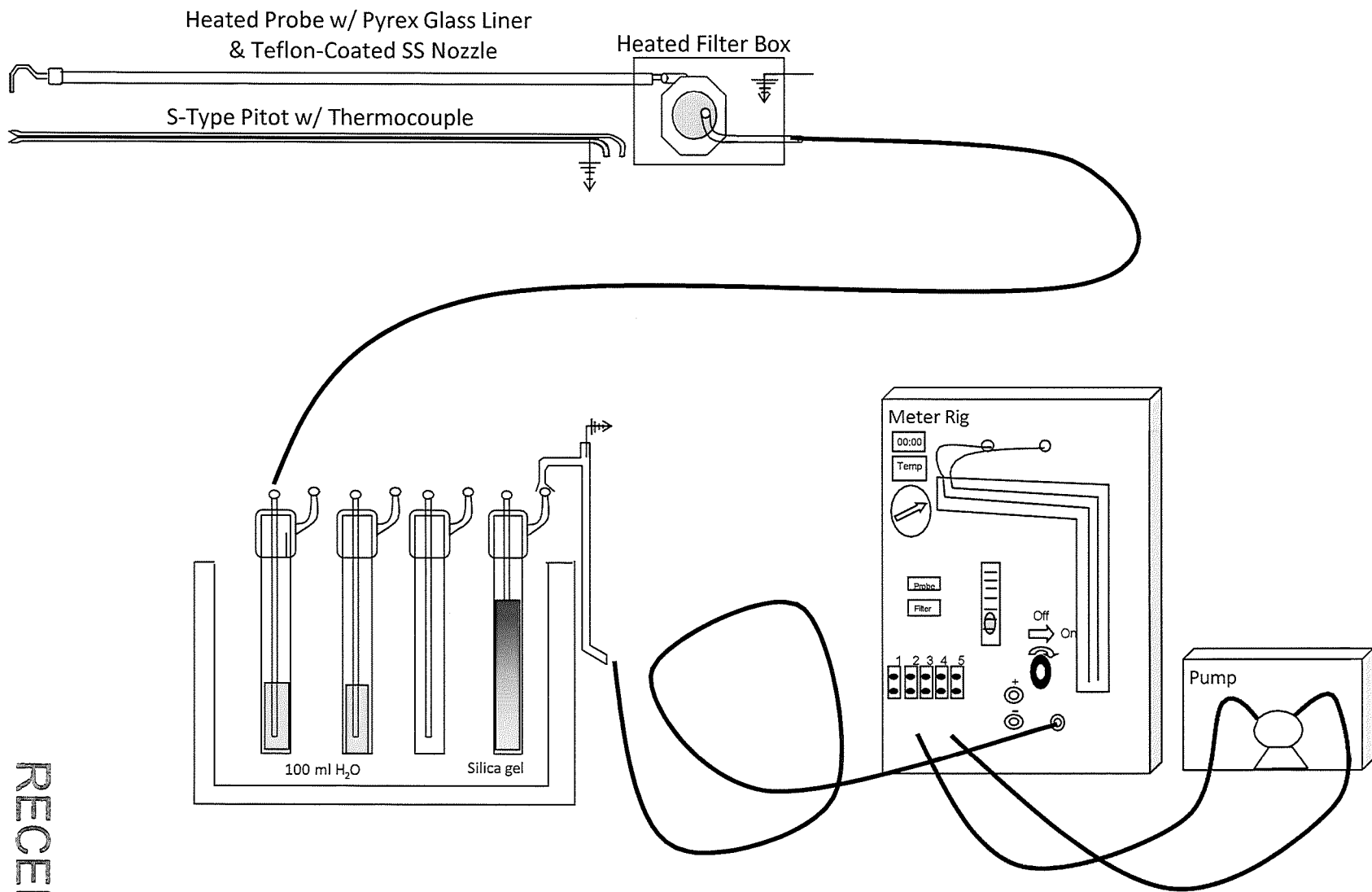


Figure 2 –Method 5 (MATS Modified)
Belle River Power Plant



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Figure 3
BRPP Unit 2
PM CEMS RCA Summary Graph

