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SOURCE EMISSIONS SURVEY
OF
DTE ENERGY
RIVER ROUGE POWER PLANT
UNIT NO. 2 STACK
UNIT NO. 3 STACK
RIVER ROUGE, MICHIGAN
MICHIGAN PERMIT TO INSTALL #40-08C

NOVEMBER 2013

TESTING COMPANY: METCO ENVIRONMENTAL
3226 COMMANDER DR.
CARROLLTON, TEXAS 75006
972-931-7127
FILE NUMBER 13-368

"I certify that I have personally checked and am familiar with the information submitted herein. The analytical results for laboratory methods performed by METCO Environmental met all the requirements of NELAC Standard, if applicable. Based on my inquiries of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate, and complete"

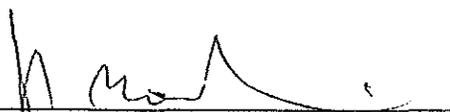

James R. Monfries
Senior Quality Assurance Manager

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INTRODUCTION

METCO Environmental, 3226 Commander Dr., Carrollton, Texas, conducted a source emissions survey of DTE Energy, River Rouge Power Plant, located at 1 Belanger Park Dr., River Rouge, Michigan, on November 11, 12, and 13, 2013. The purpose of these tests was to determine the concentrations of PM-2.5 particulate matter being emitted to the atmosphere via the Unit No. 2 Stack and the Unit No. 3 Stack. Three tests were performed on Unit No. 2 while the unit was operating at an average steam load of 1,618.0 K#/H. Two tests were performed on Unit No. 3 while the unit was operating at an average steam load of 1,684.3 K#/H.

METCO Environmental meets the requirements of an Air Emission Testing Body (AETB) having demonstrated conformance to the ASTM D-7036-04 standard by the Stack Accreditation Council (Certificate Number 2007.003.0113.1217). The sampling was performed by the following METCO personnel: Jeremiah Johnson – Project Supervisor and Brent Newberry. Jeremiah Johnson served as the Qualified Individual on-site. The credentials for the Qualified Individual can be found in Appendix H of the report.

The sampling was performed according to Sampling Protocol 13-368 following the procedures set forth in the Code of Federal Regulations, Title 40, Chapter I, Part 60, Appendix A, Methods 1, 2, 3B, and 4; and Part 51, Appendix M, Methods 201A and 202. Any modifications are described in the Sampling and Analytical Procedures section of the report.

SUMMARY OF RESULTS

Unit No. 2 Stack

Emission Parameter	Run Number 1	Run Number 2	Run Number 3	Average
Total Filterable PM-2.5 Particulate Matter Emissions – lbs/hr	31.67	21.92	21.91	25.17
Total Filterable PM-2.5 Particulate Matter Emissions – lbs/1000 lb ²	0.014	0.009	0.009	0.011
Total PM-2.5 Particulate Matter Emissions – lbs/hr	111.53	141.12	57.10	103.25
Total PM-2.5 Particulate Matter Emissions – lbs/1000 lb ²	0.048	0.061	0.025	0.045

Unit No. 3 Stack

Emission Parameter	Run Number 1	Run Number 2	Average
Total Filterable PM-2.5 Particulate Matter Emissions – lbs/hr	6.02	0.45	3.24
Total Filterable PM-2.5 Particulate Matter Emissions – lbs/1000 lb ²	0.002	< 0.001	< 0.002
Total PM-2.5 Particulate Matter Emissions – lbs/hr	66.63	56.91	61.77
Total PM-2.5 Particulate Matter Emissions – lbs/1000 lb ²	0.020	0.016	0.018

¹ 29.92 "Hg, 68°F (760 mm Hg, 20°C)

² Pounds of particulate matter per thousand pounds of exhaust gas corrected to 50% excess air.

SUMMARY OF RESULTS

Unit No. 2 Stack

PM-2.5 Particulate Matter - EPA Methods 201A/202

Run Number	1	2	3
Date	11/13/13	11/13/13	11/13/13
Time	0855-1113	1132-1346	1405-1621
Stack Flow Rate – ACFM	842,036	813,521	827,468
Stack Flow Rate – DSCFM ¹	583,109	558,672	561,628
Stack Flow Rate – 1,000 lbs/hr	2,733	2,618	2,634
% Water Vapor - % Volume	8.14	8.41	9.55
% Carbon Dioxide - % Volume	10.7	10.8	10.8
% Oxygen - % Volume	9.2	8.8	9.2
% Excess Air @ Sampling Point	76.5	70.4	76.7
Stack Temperature -°F	236	240	239
Stack Pressure - "Hg	29.62	29.63	29.61
Percent Isokinetic	102.8	105.8	104.0

¹ 29.92 "Hg, 68°F (760 mm Hg, 20°C)

SUMMARY OF RESULTS

Unit No. 2 Stack

PM-2.5 Particulate Matter - EPA Methods 201A/202

Run Number	1	2	3
Calculated Cut-Off Diameter - microns	2.5	2.6	2.6
PM-2.5 Particulate Matter Emissions <u>Probe & Filter Catch</u> grains/dscf ¹	0.0063	0.0046	0.0046
grains/cf @ Stack Conditions	0.0044	0.0031	0.0031
lbs/hr	31.67	21.92	21.91
lbs/1000 lb ²	0.012	0.008	0.008
lbs/1000 lb ³	0.014	0.009	0.009
PM-2.5 Particulate Matter Emissions <u>Total Catch</u> grains/dscf ¹	0.0223	0.0295	0.0119
grains/cf @ Stack Conditions	0.0154	0.0202	0.0080
lbs/hr	111.53	141.12	57.10
lbs/1000 lb ²	0.041	0.054	0.021
lbs/1000 lb ³	0.048	0.061	0.025

¹ 29.92 "Hg, 68°F (760 mm Hg, 20°C)

² Pounds of particulate matter per thousand pounds of exhaust gas.

³ Pounds of particulate matter per thousand pounds of exhaust gas corrected to 50% excess air.

SUMMARY OF RESULTS

Unit No. 3 Stack

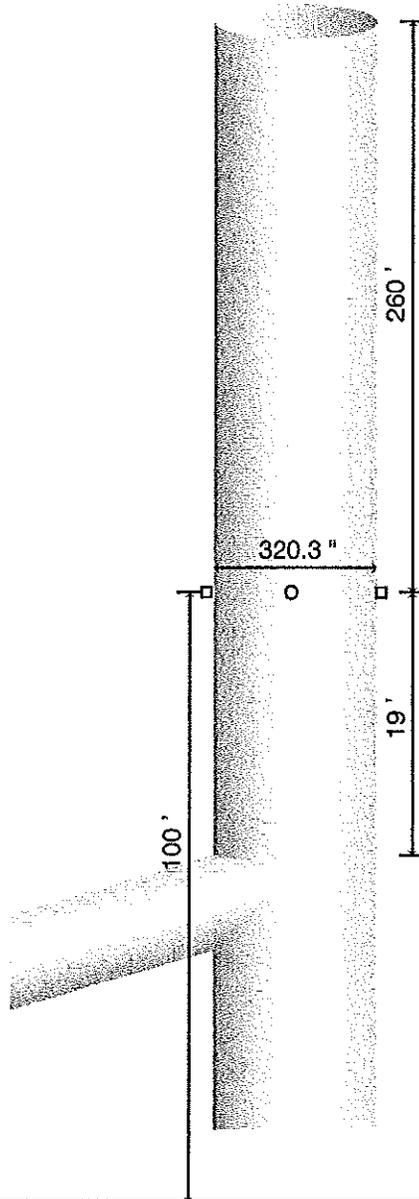
PM-2.5 Particulate Matter - EPA Methods 201A/202

Run Number	1	2
Date	11/12/13	11/12/13
Time	0845-1058	1118-1331
Stack Flow Rate – ACFM	1,168,362	1,184,124
Stack Flow Rate – DSCFM ¹	737,947	739,332
Stack Flow Rate – 1,000 lbs/hr	3,471	3,476
% Water Vapor - % Volume	7.79	8.09
% Carbon Dioxide - % Volume	11.8	11.8
% Oxygen - % Volume	7.6	7.4
% Excess Air @ Sampling Point	55.2	52.8
Stack Temperature -°F	306	312
Stack Pressure - "Hg	29.62	29.61
Percent Isokinetic	90.3	88.4

¹ 29.92 "Hg, 68°F (760 mm Hg, 20°C)

SAMPLING LOCATION

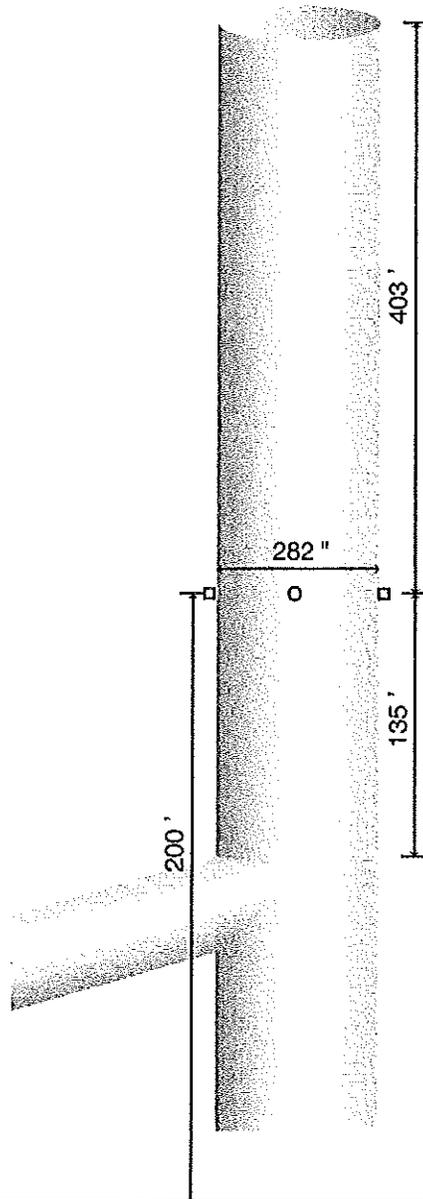
Unit No. 2 Stack



Not to Scale

SAMPLING LOCATION

Unit No. 3 Stack



Not to Scale

SAMPLING AND ANALYTICAL PROCEDURES

The sampling followed the procedures set forth in the Code of Federal Regulations, Title 40, Chapter I, Part 60, Appendix A, Methods 1, 2, 3B, and 4; and Part 51, Appendix M, Methods 201A and 202.

A preliminary velocity traverse was made at each of the two ports on the Unit No. 2 Stack, in order to determine the uniformity and magnitude of the flow prior to testing. All traverse points were checked for cyclonic flow and the average angle of the flow was 15.2 degrees. Alternate procedures would be required if the angle of flow was greater than 20 degrees. Three traverse points were sampled from each of the four ports for a total of twelve traverse points.

A preliminary velocity traverse was made at each of the two ports on the Unit No. 3 Stack, in order to determine the uniformity and magnitude of the flow prior to testing. All traverse points were checked for cyclonic flow and the average angle of the flow was 14.1 degrees. Alternate procedures would be required if the angle of flow was greater than 20 degrees. Three traverse points were sampled from each of the four ports for a total of twelve traverse points.

The sampling train was leak-checked before the test and again after each test. This was done to predetermine the possibility of a diluted sample.

The pitot tube lines were checked for leaks before and after each test under both a vacuum and a pressure. The lines were also checked for clearance and the manometer was zeroed before each test.

An integrated orsat sample was collected and analyzed according to EPA Method 3B during each test.

PM-2.5 Particulate Matter

The PM-2.5 particulate matter samples were taken according to Methods 1, 2, 3B, and 4; and EPA Method 201A - Constant Sampling Rate Procedure, and 202. The stack gas was extracted through an in-stack sizing device that separates and collects particulate matter less than 2.5 microns aerodynamic diameter. For each run on the Unit No. 2 Stack, samples were taken isokinetically at each of the twelve traverse points for a total minimum sampling time of 126.00 minutes. For each run on the Unit No. 3 Stack, samples were taken isokinetically at each of the twelve traverse points for a total minimum sampling time of 119.50 minutes. At the conclusion of each test, the sampling train was purged for sixty minutes with nitrogen at a rate of 14 L/min. Reagent blanks were submitted.

The " front-half " of the sampling train contained the following components:

Stainless Steel Nozzle
In-stack Stainless Steel Sizing Device and Glass Fiber Filter in a Stainless Steel Assembly
Heated Glass Probe @ 248°F ± 25°F
Teflon Sample Line (used on the Unit 2 Stack)

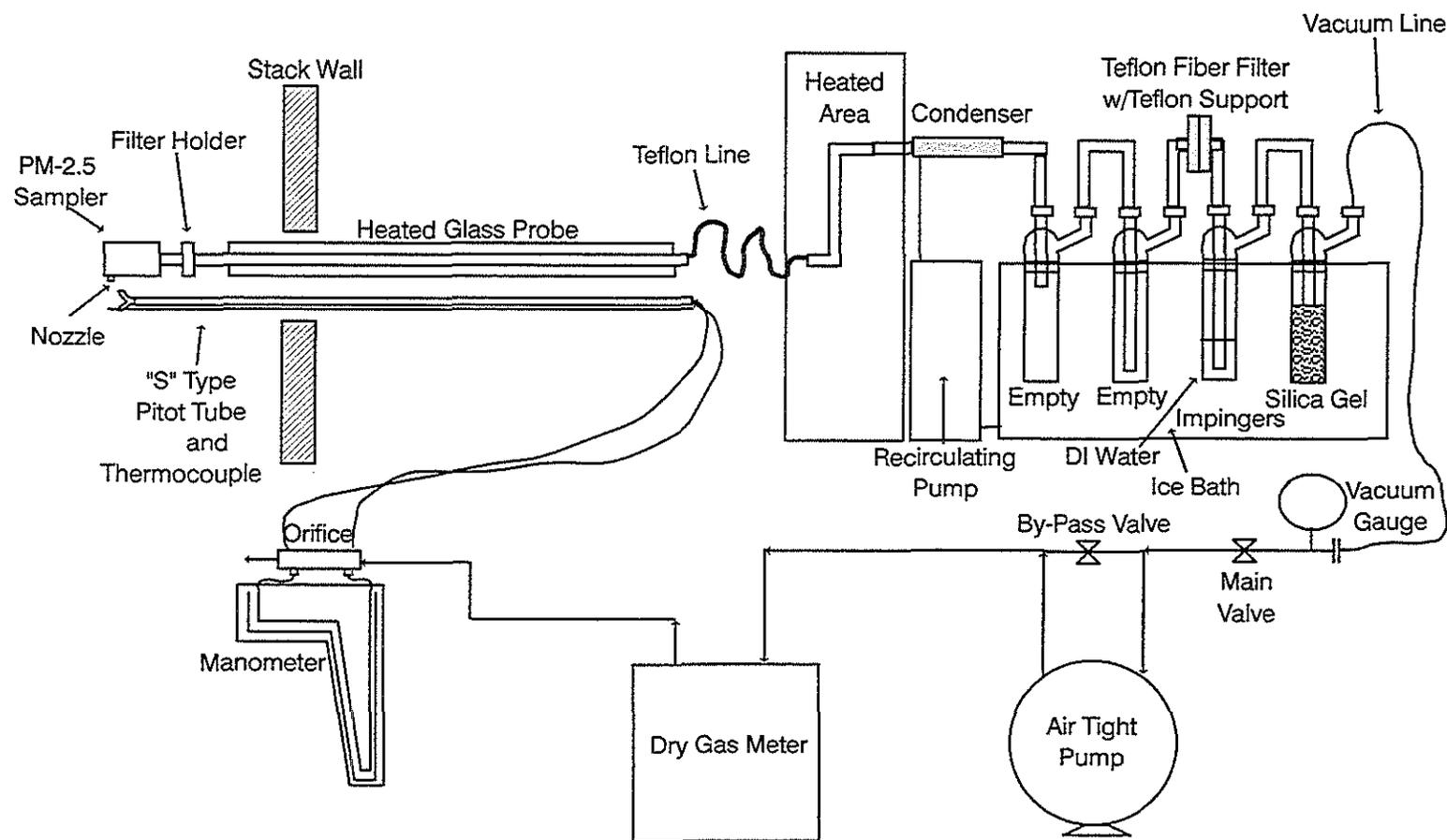
The " back-half " of the sampling train contained the following components:

Condenser Coil
Condensate Trap
Impinger 1 - Modified Design, Empty
Impinger 2 - Modified Design, Empty
Teflon Fiber Filter and Teflon Support @ ≤ 85°F
Impinger 3 - Modified Design, 100 ml Deionized Water
Impinger 4 - Modified Design, Silica Gel

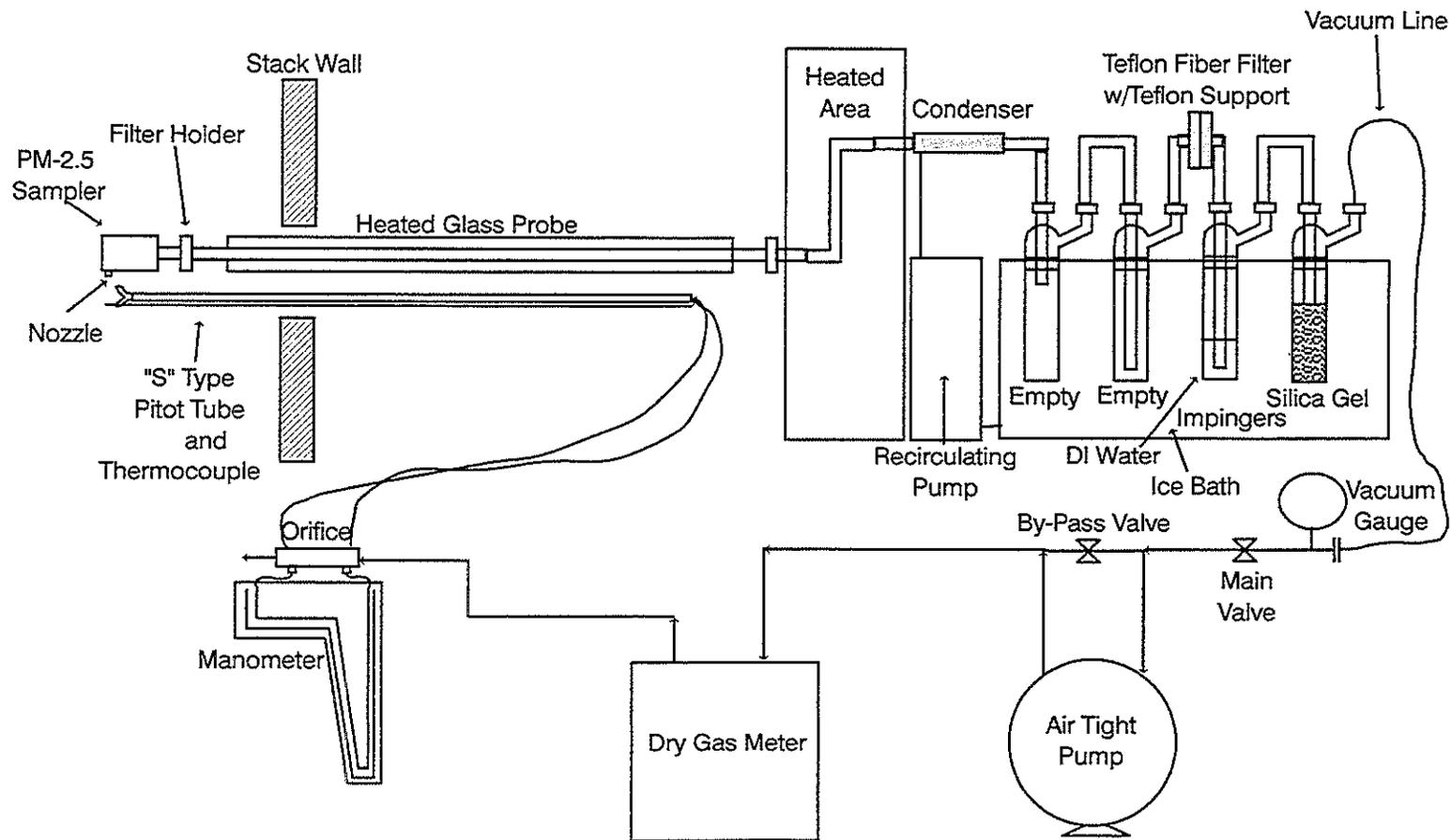
The "front-half" particulate matter samples were analyzed by gravimetric analysis according to EPA Method 201A and the "back-half" particulate matter samples were analyzed by gravimetric analysis according to EPA Method 202 by METCO Environmental. METCO Environmental is accredited to perform this method for

compliance purposes by the National Environmental Laboratory Accreditation Program (T104704406-13-6). The analytical report can be found in Appendix E.

Schematic Diagram of the EPA Combined
Methods PM-10 201A/202 Sampling Train
used on the Unit 2 Stack



Schematic Diagram of the EPA Combined
Methods PM-10 201A/202 Sampling Train
used on the Unit 3 Stack



DESCRIPTION OF TESTS

Personnel from METCO Environmental arrived at the plant at 2:30 p.m. on Monday, November 11, 2013. After meeting with plant personnel and attending a brief safety orientation, the equipment was moved onto the Unit No. 3 Stack and secured. All work was completed at 5:45 p.m.

On Tuesday, November 12, work began at 7:00 a.m. The equipment was prepared for testing. The preliminary data was collected. The first test for PM-2.5 particulate matter began at 8:45 a.m. Testing continued until completion of the second test at 1:31 p.m. The samples were recovered. The equipment was moved off the Unit No. 3 Stack and onto the Unit no. 2 Stack. The equipment was secured for the night and all work was completed at 5:15 p.m.

On Wednesday, November 13, work began at 7:00 a.m. The equipment was prepared for testing. The preliminary data was collected. The first test for PM-2.5 particulate matter began at 8:55 a.m. Testing continued until completion of the third test at 4:21 p.m.

The equipment was moved off of the stack and loaded into the sampling van. The samples were recovered and transported to METCO Environmental's laboratory in Carrollton, Texas, for analysis and evaluation.

Field operations at DTE Energy, River Rouge Power Plant, Unit No. 2 Stack and the Unit No. 3 Stack, located in River Rouge, Michigan, were completed at 7:30 p.m. on Wednesday, November 13, 2013.