



EUBOILER 5 and EUSCREENING Emissions Report

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Prepared for:

Cargill Salt, Inc.

Saint Clair, Michigan

Cargill Salt, Inc.
916 South Riverside Avenue
Saint Clair, Michigan 48079

Project No. 14-4585.00
October 15, 2014

BT Environmental Consulting, Inc.
4949 Fernlee Avenue
Royal Oak, Michigan 48073
(248) 548-8070



MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY DIVISION

**RENEWABLE OPERATING PERMIT
REPORT CERTIFICATION**

Authorized by 1994 P.A. 451, as amended. Failure to provide this information may result in civil and/or criminal penalties.

Reports submitted pursuant to R 336.1213 (Rule 213), subrules (3)(c) and/or (4)(c), of Michigan's Renewable Operating Permit (ROP) program must be certified by a responsible official. Additional information regarding the reports and documentation listed below must be kept on file for at least 5 years, as specified in Rule 213(3)(b)(ii), and be made available to the Department of Environmental Quality, Air Quality Division upon request.

Source Name Cargill Salt County St. Clair
Source Address 916 S. Riverside Ave City St. Clair
AQD Source ID (SRN) A6240 ROP No. MI-ROP-A6240-2009 ROP Section No. NA

Please check the appropriate box(es):

Annual Compliance Certification (Pursuant to Rule 213(4)(c))

Reporting period (provide inclusive dates): From _____ To _____

1. During the entire reporting period, this source was in compliance with ALL terms and conditions contained in the ROP, each term and condition of which is identified and included by this reference. The method(s) used to determine compliance is/are the method(s) specified in the ROP.

2. During the entire reporting period this source was in compliance with all terms and conditions contained in the ROP, each term and condition of which is identified and included by this reference, EXCEPT for the deviations identified on the enclosed deviation report(s). The method used to determine compliance for each term and condition is the method specified in the ROP, unless otherwise indicated and described on the enclosed deviation report(s).

Semi-Annual (or More Frequent) Report Certification (Pursuant to Rule 213(3)(c))

Reporting period (provide inclusive dates): From _____ To _____

1. During the entire reporting period, ALL monitoring and associated recordkeeping requirements in the ROP were met and no deviations from these requirements or any other terms or conditions occurred.

2. During the entire reporting period, all monitoring and associated recordkeeping requirements in the ROP were met and no deviations from these requirements or any other terms or conditions occurred, EXCEPT for the deviations identified on the enclosed deviation report(s).

Other Report Certification

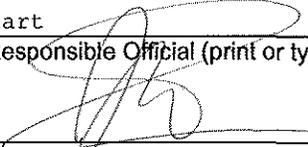
Reporting period (provide inclusive dates): From NA To NA

Additional monitoring reports or other applicable documents required by the ROP are attached as described:

EUBOILER5 exhaust particulate matter emissions test

EUSCREENING exhaust particulate matter emissions test

I certify that, based on information and belief formed after reasonable inquiry, the statements and information in this report and the supporting enclosures are true, accurate and complete

John Stuart Plant Manager 810-989-7530
Name of Responsible Official (print or type) Title Phone Number
 Signature of Responsible Official Date 10/29/2014

* Photocopy this form as needed.



EXECUTIVE SUMMARY

BT Environmental Consulting, Inc. (BTEC) was retained by Cargill Salt, Inc. (Cargill) to conduct a compliance emissions test program on EUBOILER5 and EUSCREENING exhaust stacks at the Cargill facility in St. Clair, Michigan. This emissions testing program consisted of triplicate 60-minute sampling runs for particulate matter (PM) utilizing USEPA Method 5 at both locations. The emissions testing program was conducted on September 4 and 5, 2014.

MDEQ Air Quality Division (AQD) has published a guidance document entitled "Format for Submittal of Source Emission Test Plans and Reports" (December 2013). The following is a summary of the emissions results in the format suggested by the aforementioned document. The results of the emission test program are summarized by Table I.

Table I
Overall Emission Summary
Test Date: September 4th and 5th, 2014

Source	Pollutant	Average Emission Rate	Emission Limit
EUBOILER5	PM	0.140	0.30 lb/1,000 lb of exhaust gas ¹
EUSCREENING	PM	1.69 lb/hr	3.9 lb/hr

1: Corrected to 50% excess air

1. Introduction

BT Environmental Consulting, Inc. (BTEC) was retained by Cargill Salt, Inc. (Cargill) to conduct a compliance emissions test program on EUBOILER5 and EUSCREENING exhaust stacks at the Cargill facility in St. Clair, Michigan. This emissions testing program included evaluation of total filterable particulate matter (PM). Testing consisted of triplicate 60-minute sampling runs for PM utilizing USEPA Method 5 at both locations.

The purpose of this document is to present the test plan for this emissions testing program. The emissions testing program was completed on September 4 and 5, 2014 and was approved by the Michigan Department of Environmental Quality (MDEQ).

1.a Identification, Location, and Dates of Test

Sampling and analysis for the emission test program was conducted on September 4th & 5th, 2014 at the Cargill Salt facility located in Saint Clair, Michigan. The test program included evaluation of PM emissions from EUBOILER5 and EUSCREENING.

1.b Purpose of Testing

MDEQ permit No. MI-ROP-A6240-2009 limits the PM emission rate for EUBOILER5 to 0.3 lb/1,000 lb of gas and EUSCREENING to 3.9 lb/hr. This permit limits emissions from each unit as summarized by Table 1.

Table 1
PM Emission Limitations
Cargill Salt

Emission Unit	Pollutant	Permit Limit
EUBOILER5	PM	0.30 lb/1,000 lb of exhaust gas, Corrected to 50% excess air
EUSCREENING	PM	3.9 lb/hr

1.c Source Description

The EUBOILER5 spreading stoker coal fired boiler with natural gas co-fired burners producing steam for electric generation and process operations and the EUSCREENING is a wet scrubber. The process is continuous and EUBOILER#5 was running on 80,000 lbs steam.



1.d Test Program Contacts

The contact for the source and test report is:

Mrs. Priscila Gavel
EHS Professional
Cargill Salt
916 S. Riverside Ave
St. Clair, MI 48079

Names and affiliations for personnel who were present during the testing program are summarized by Table 2.

Table 2
Test Personnel

Name and Title	Affiliation	Telephone
Mrs. Priscila Gavel EHS Professional	Cargill Salt 916 S. Riverside Ave St. Clair, MI 48079	(586)-924-6162
Mr. Robert Elmouchi Environmental Quality Analyst	MDEQ Air Quality Division	(586)-753-3736
Mr. Mark Dziadosz Environmental Quality Analyst	MDEQ Air Quality Division	(586)-753-3745
Mr. Ken Lievens Project Manager	BTEC 4949 Fernlee Royal Oak, MI 48073	(307) 259-9159
Mr. Kenny Felder Environmental Technician	BTEC 4949 Fernlee Royal Oak, MI 48073	(586) 382-2186

2. Summary of Results

Sections 2.a through 2.d summarize the results of the emissions compliance test program.

2.a Operating Data

EUBOILER5 and EUSCREENING were run at max loading.

2.b Applicable Permit

The applicable permit for this emissions test program is MDEQ permit No. MI-ROP-A6240-2009

2.c Results

The overall results of the emission test program are summarized by Table 3 (see Section 5.a). PM emissions from the EUBOILER5 were less than the corresponding emission limit of 0.3 lb/1,000 lb of exhaust gas, corrected to 50% excess air. PM emissions from EUSCREENING were also below the emission limit of 3.9 lb/hr.

3. Source Description

Sections 3.a through 3.e provide a detailed description of the process.

3.a Process Description

The EUBOILER5 spreading stoker coal fired boiler with natural gas co-fired burners producing steam for electric generation and process operations and the EUSCREENING is a wet scrubber. The process is continuous and EUBOILER#5 was running on 80,000 lbs steam.

3.b Process Flow Diagram

Due to the simplicity of EUSCREENING, a process flow diagram is not needed.

3.c Raw and Finished Materials

EUBOILER5- . The raw materials are natural gas or fuel oil for the boiler.

3.d Process Capacity

EUBOILER 5- Proper operation of the multicyclone mechanical collector is defined as a pressure drop range between 4.5 and 9 inches of water column. Baghouse must be installed and operating properly as defined as a pressure drop range between 3-9. Permittee shall not operate at a steam generation rate greater than 95,000 pounds of steam per hour.

3.e Process Instrumentation

Process data monitored during the emissions test program includes material throughput.

4. Sampling and Analytical Procedures

Sections 4.a through 4.d provide a summary of the sampling and analytical procedures used.

4.a Sampling Train and Field Procedures

The emissions test program utilized the following test methods codified at Title 40, Part 60, Appendix A of the Code of Federal Regulations (40 CFR 60, Appendix A):

- Method 1 - "Sample and Velocity Traverses for Stationary Sources"
- Method 2 - "Determination of Stack Gas Velocity and Volumetric Flowrate"
- Method 3 - "Determination of Molecular Weight of Dry Stack Gas"(Fyrite)
- Method 3A - "Determination of Oxygen and Carbon Dioxide Concentrations in emissions from stationary sources"(Analyzer)
- Method 4 - "Determination of Moisture Content in Stack Gases"
- Method 5 - "Determination of Particulate Matter Emissions from stationary sources"

Stack gas velocity traverses were conducted in accordance with the procedures outlined in Method 1 and Method 2. S-type pitot tubes with thermocouple assemblies, calibrated in accordance with Method 2, Section 4.1.1, was used to measure exhaust gas velocity pressures (using a manometer) and temperatures during testing. The S-type pitot tube dimensions outlined in Sections 2-6 through 2-8 are within specified limits, therefore, a baseline pitot tube coefficient of 0.84 (dimensionless) is assigned. A diagram of the sample points is provided in Figures 1-2.

Cyclonic flow checks were performed at each sampling location. The existence of cyclonic flow is determined by measuring the flow angle at each sample point. The flow angle is the angle between the direction of flow and the axis of the stack. If the average of the absolute values of the flow angles is greater than 20 degrees, cyclonic flow exists.

The Molecular Weight of the gas stream was evaluated according to procedures outlined in Title 40, Part 60, Appendix A, Method 3. The O₂/CO₂ content of the gas stream was measured using a Fyrite combustion analyzer.

The O₂/CO₂ content used to calculate excess air for EUBOILER5 was evaluated according to procedures outlined in 40 CFR 60, Appendix A, Method 3A using a Servomex 4100 O₂/CO₂ analyzer (see Figure 3 for a schematic of the sampling train). The gas stream was drawn through a stainless-steel probe with a heated in-line filter to remove any particulate, a heated Teflon[®] sample line, through a refrigerated sample conditioner with a peristaltic pump to remove the moisture from the sample before it enters the analyzer. Data was recorded on a PC equipped with Labview[®] II data acquisition software. Recorded O₂/CO₂ concentrations were averaged and reported for the duration of each 60-minute test (as drift corrected per Method 7E).

Exhaust gas was extracted as part of the Method 5 sampling train. Exhaust gas moisture content will then be determined gravimetrically.

4.b Particulate Matter (USEPA Method 5)

40 CFR 60, Appendix A, Method 5, "*Determination of Particulate Emissions from Stationary Sources*" was used to measure PM concentrations and calculate PM emission rates (see Figure 4 for a schematic of the sampling train).

BTEC's Nutech[®] Model 2010 modular isokinetic stack sampling system (USEPA Method 5) consisted of (1) a stainless-steel nozzle, (2) a steel lined probe, (3) a heated borosilicate glass filter holder containing a pre-weighed 90-mm diameter filter with Teflon filter support, (4) a set of four Greenburg-Smith (GS) impingers with the first modified and second standard GS impingers each containing 100 ml of deionized water, and with a third dry modified GS impinger and a fourth modified GS impinger containing approximately 300 g of silica gel desiccant, (5) a length of sample line, and (6) a Nutech[®] control case equipped with a pump, dry gas meter, and calibrated orifice.

4.c Recovery and Analytical Procedures

After completion of the final leak test for each test run, the filters were recovered, and the nozzles, probes, and the front halves of the filter holder assemblies were brushed and triple rinsed with acetone. The acetone rinses were collected in a pre-cleaned sample container. BTEC labeled the containers with the test number, test location, and test date, and marked the level of liquid on the outside of each container. BTEC personnel transported all samples to BTEC's laboratory in Royal Oak, Michigan for analysis.

4.d Sampling Ports

A diagram of the stack showing sampling ports in relation to upstream and downstream disturbances is included in Figure 1-2.

4.e Traverse Points

A diagram of the stack indicating traverse point locations and stack dimensions is included in Figure 1-2

5. Test Results and Discussion

Sections 5.a through 5.k provide a summary of the test results.

5.a Results Tabulation

The overall results of the emissions test program are summarized by Table 3.

Table 3
Overall Emission Summary
Test Date: September 4th and 5th, 2014

Source	Pollutant	Average Emission Rate	Emission Limit
EUBOILER5	PM	0.140	0.3 lb/1,000 lb of exhaust gas ¹
EUSCREENING	PM	1.69 lb/hr	3.9 lb/hr

1: Corrected to 50% excess air

5.b Discussion of Results

PM emissions from the EUBOILER5 were less than the corresponding emission limit of 0.3 lb/1,000 lb of exhaust gas, corrected to 50% excess air. PM emissions from EUSCREENING were also below the emission limit of 3.9 lb/hr.

5.c Sampling Procedure Variations

There were no sampling variations used during the emission compliance test program.

5.d Process or Control Device Upsets

No upset conditions occurred during testing.

5.e Control Device Maintenance

There was no control equipment maintenance performed during the emissions test program.

5.f Re-Test

The emissions test program was not a re-test.

5.g Audit Sample Analyses

No audit samples were collected as part of the test program.



5.h Calibration Sheets

Relevant equipment calibration documents are provided in Appendix B.

5.i Sample Calculations

Sample calculations are provided in Appendix C.

5.j Field Data Sheets

Field documents relevant to the emissions test program are presented in Appendix A

Table 4
EUBOILER5 Exhaust Particulate Matter Emission Rates

Company Source Designation Test Date	Cargill, St Clair Boiler 5			Average
	9/4/2014	9/4/2014	9/4/2014	
Meter/Nozzle Information				
	P-1	P-2	P-3	Average
Meter Temperature Tm (F)	79.8	80.4	81.6	80.6
Meter Pressure - Pm (in. Hg)	29.5	29.5	29.5	29.5
Measured Sample Volume (Vm)	33.6	35.4	36.1	35.0
Sample Volume (Vm-Std ft3)	32.8	34.5	35.2	34.2
Sample Volume (Vm-Std m3)	0.93	0.98	1.00	0.97
Condensate Volume (Vw-std)	3.249	3.456	3.673	3.459
Gas Density (Ps(std) lbs/ft3) (wet)	0.0755	0.0755	0.0754	0.0755
Gas Density (Ps(std) lbs/ft3) (dry)	0.0784	0.0784	0.0784	0.0784
Total weight of sampled gas (m g lbs) (wet)	2.72	2.87	2.93	2.84
Total weight of sampled gas (m g lbs) (dry)	2.57	2.71	2.76	2.68
Nozzle Size - An (sq. ft.)	0.000314	0.000314	0.000314	0.000314
Isokinetic Variation - I	100.6	100.8	101.8	101.1
Stack Data				
Average Stack Temperature - Ts (F)	320.8	339.2	343.5	334.5
Molecular Weight Stack Gas- dry (Md)	30.3	30.3	30.3	30.3
Molecular Weight Stack Gas-wet (Ms)	29.2	29.2	29.2	29.2
Stack Gas Specific Gravity (Gs)	1.009	1.009	1.008	1.008
Percent Moisture (Bws)	9.01	9.10	9.46	9.19
Water Vapor Volume (fraction)	0.0901	0.0910	0.0946	0.0919
Pressure - Ps ("Hg)	29.4	29.4	29.4	29.4
Average Stack Velocity - Vs (ft/sec)	47.8	51.4	52.3	50.5
Area of Stack (ft2)	14.3	14.3	14.3	14.3
Oxygen (%)	5.7	5.5	5.3	5.5
Carbon Dioxide (%)	13.1	13.2	13.4	13.2
Carbon Monoxide (%)	0.0	0.0	0.0	0.0
Nitrogen (%)	81.2	81.3	81.3	81.3
% Excess Air	36.2	34.3	32.9	34.5
Exhaust Gas Flowrate				
Flowrate ft ³ (Actual)	41,052	44,159	44,921	43,377
Flowrate ft ³ (Standard Wet)	27,243	28,631	28,968	28,281
Flowrate ft ³ (Standard Dry)	24,789	26,026	26,228	25,681
Flowrate m ³ (standard dry)	702	737	743	727
Total Particulate Weights (mg)				
Nozzle/Probe/Filter	150.7	160.8	292.9	201.5
Total Particulate Concentration				
lb/1000 lb (wet)	0.122	0.124	0.221	0.155
lb/1000 lb (wet) corrected to 50% Excess Air	0.111	0.111	0.197	0.140
lb/1000 lb (dry)	0.129	0.131	0.234	0.165
mg/dscm (dry)	162.2	164.4	294.2	207.0
gr/dscf	0.0709	0.0719	0.1286	0.0904
Total Particulate Emission Rate				
lb/ hr	15.1	16.1	29.0	20.1

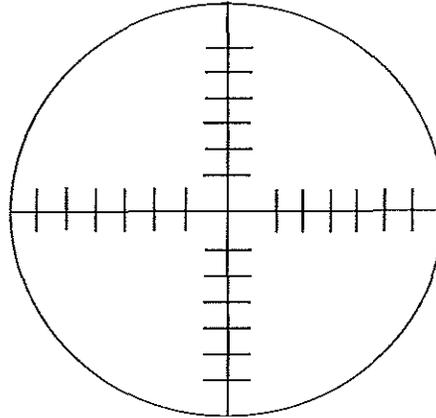
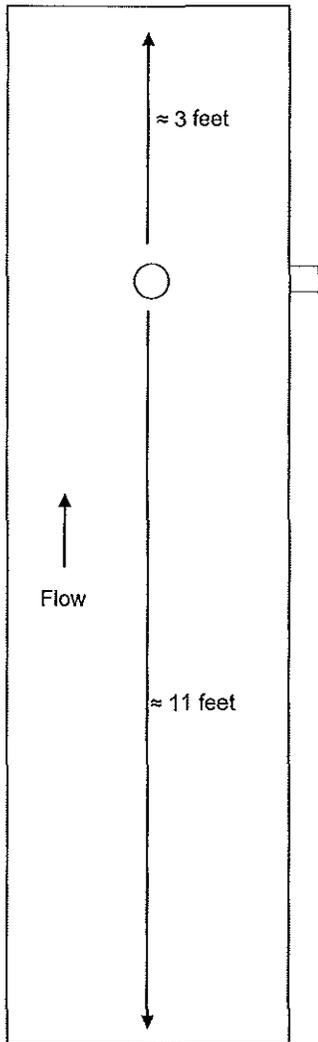
Table 5
EUSCREENING Exhaust Particulate Matter Emission Rates

Company Source Designation Test Date	Cargill St Clair Screening			Average
	9/5/2014	9/5/2014	9/5/2014	
Meter/Nozzle Information	P-1	P-2	P-3	
Meter Temperature Tm (F)	84.5	90.1	93.6	89.4
Meter Pressure - Pm (in. Hg)	29.4	29.4	29.4	29.4
Measured Sample Volume (Vm)	39.0	39.2	39.6	39.3
Sample Volume (Vm-Std ft3)	37.7	37.5	37.6	37.6
Sample Volume (Vm-Std m3)	1.07	1.06	1.07	1.06
Condensate Volume (Vw-std)	1.499	1.518	1.589	1.536
Gas Density (Ps(std) lbs/ft3) (wet)	0.0735	0.0734	0.0734	0.0734
Gas Density (Ps(std) lbs/ft3) (dry)	0.0745	0.0745	0.0745	0.0745
Total weight of sampled gas (m g lbs) (wet)	2.88	2.87	2.88	2.87
Total weight of sampled gas (m g lbs) (dry)	2.81	2.80	2.80	2.80
Nozzle Size - An (sq. ft.)	0.000199	0.000199	0.000199	0.000199
Isokinetic Variation - I	100.7	100.2	100.5	100.5
Stack Data				
Average Stack Temperature - Ts (F)	91.4	92.3	91.9	91.8
Molecular Weight Stack Gas- dry (Md)	28.8	28.8	28.8	28.8
Molecular Weight Stack Gas-wet (Ms)	28.4	28.4	28.4	28.4
Stack Gas Specific Gravity (Gs)	0.981	0.981	0.981	0.981
Percent Moisture (Bws)	3.83	3.89	4.05	3.92
Water Vapor Volume (fraction)	0.0383	0.0389	0.0405	0.0392
Pressure - Ps ("Hg)	29.3	29.3	29.3	29.3
Average Stack Velocity - Vs (ft/sec)	57.9	58.1	58.2	58.1
Area of Stack (ft2)	7.1	7.1	7.1	7.1
Exhaust Gas Flowrate				
Flowrate ft ³ (Actual)	24,553	24,646	24,673	24,624
Flowrate ft ³ (Standard Wet)	23,009	23,060	23,098	23,056
Flowrate ft ³ (Standard Dry)	22,128	22,163	22,162	22,151
Flowrate m ³ (standard dry)	627	628	628	627
Total Particulate Weights (mg)				
Nozzle/Probe/Filter	27.5	21.2	16.1	21.6
Total Particulate Concentration				
lb/1000 lb (wet)	0.021	0.016	0.012	0.017
lb/1000 lb (dry)	0.022	0.017	0.013	0.017
mg/dscm (dry)	25.8	19.9	15.1	20.3
gr/dscf	0.0113	0.0087	0.0066	0.0089
Total Particulate Emission Rate				
lb/ hr	2.15	1.66	1.26	1.69

Figures



diameter = 51.25 inches



Not to Scale

Points	Distance "
1	1.1
2	3.4
3	6.0
4	9.1
5	12.8
6	18.2
7	33.0
8	38.4
9	42.2
10	45.2
11	47.8
12	50.2

Figure No. 1

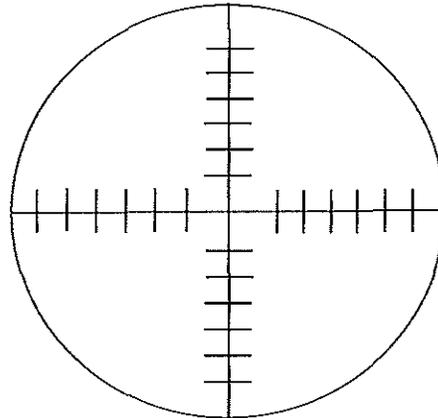
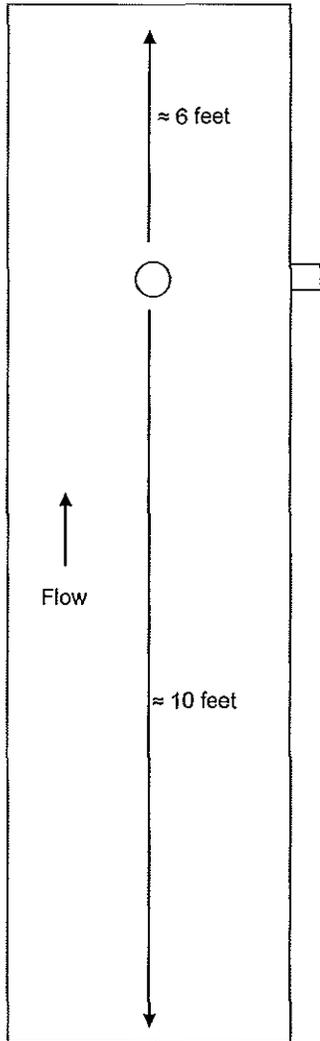
Site:
EUBOILER5
Cargill Salt, Inc.
St. Clair, Michigan

Sampling Date:
September 4, 2014

BT Environmental Consulting, Inc.
4949 Fernlee Avenue
Royal Oak, Michigan 48073



diameter = 36 inches



Not to Scale

Points	Distance "
1	0.8
2	2.4
3	4.2
4	6.4
5	9.0
6	12.8
7	23.2
8	27.0
9	29.6
10	31.8
11	33.6
12	35.2

Figure No. 2

Site:
EUSCREENING
Cargill Salt, Inc.
St. Clair, Michigan

Sampling Date:
September 5, 2014

BT Environmental Consulting, Inc.
4949 Fernlee Avenue
Royal Oak, Michigan 48073

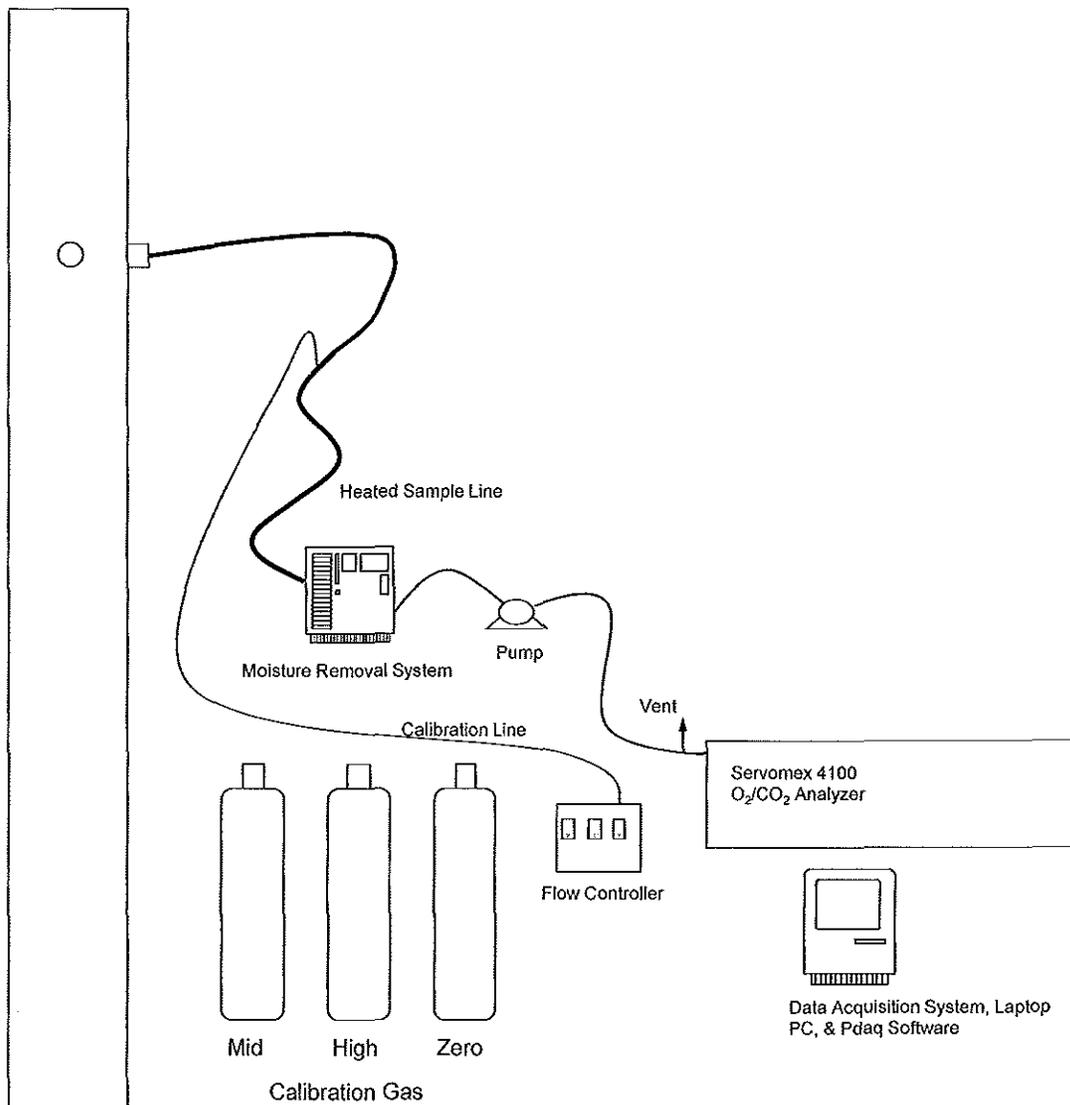


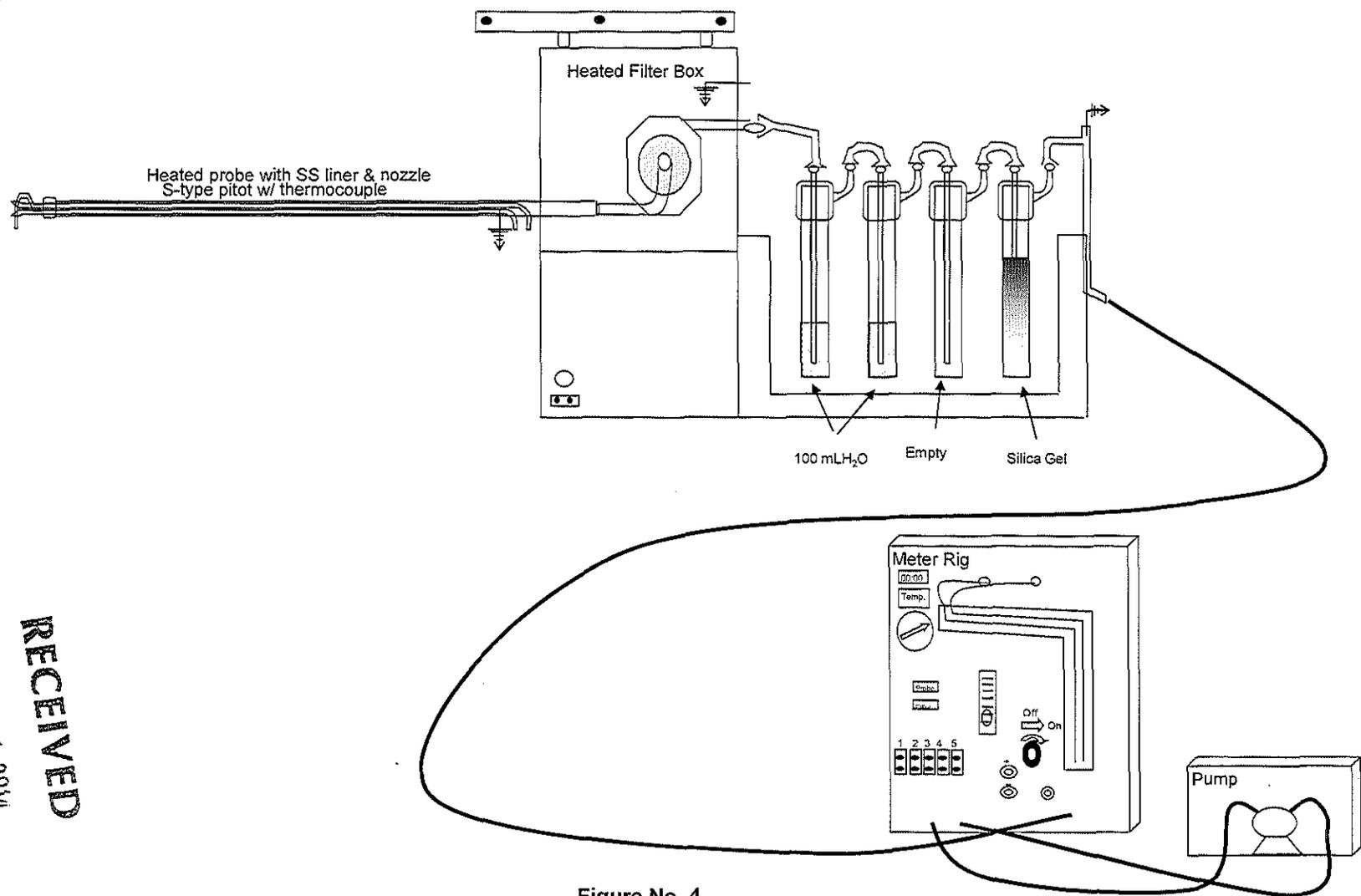
Figure No. 3

Site:
USEPA Method 3A
Cargil Salt, Inc.
St. Clair, Michigan

Sampling Date:
September 4-5, 2014

BT Environmental Consulting Inc.
4949 Fernlee Avenue
Royal Oak, MI 48073

BTEC Inc.



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Figure No. 4

<p>Site: USEPA Method 5 Cargill Salt, Inc. St. Clair, Michigan</p>	<p>Sampling Date: September 4-5, 2014</p>	<p>BT Environmental Consulting, Inc. 4949 Fernlee Avenue Royal Oak, Michigan 48073</p>
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