Ministry of the Environment

Ottawa District Office

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Ontario

June 7, 2011

Plasco Trail Road Inc.
1000 Innovation Drive,
Suite 400
Kanata, Ontario
K2K 3E7

Attention: Mr. John O'Sullivan, VP-Operations

Dear Mr. O'Sullivan:

Re: Addendum to the June 3, 2011 letter on Plasco Trail Road – Final Source Testing Reports

On June 3, 2011, I wrote to you providing a summary of compliance with Ministry of the Environment requirements as they relate to air emissions from the Plasco Trail Road facility during source testing activities.

I would like to clarify the following two points in the June 3, 2011, letter:

- Six of the nine in-stack concentration limits (as prescribed by Schedules 'A' and 'B') were assessed for compliance including: Particulate Matter, Cadmium, Lead, Mercury, Dioxin/Furans and total Organic Matter (THC). Plasco met in-stack limits for these six parameters as prescribed by the Certificate of Approval with the exception of THC discharged from engine # 1; (*The limits were not based on 24 hour averaging times as previously stated)*
- The Certificate of Approval requires that Plasco continuous emission monitors operate for 168 hours continuously without corrective maintenance to the CEMS. 168 hours of continuous CEMS operation was not achieved; *(the CEMs are required to operate for 168 hours continuously)*

These clarifications should be read in conjunction with the attached letter of June 3, 2011, along with the attached May 16, 2011, memorandum from the ministry's Standards and Development Branch. I trust this further clarifies the ministry's summary of compliance with Ministry of the Environment requirements as they relate to air emissions from the Plasco Trail Road facility during source testing activities.

Should you have any comments, questions or wish to discuss any of the above, please contact me directly at (613) 521-3450, extension 224.

Sincerely,

Jason Ryan
District Manager (A)

Attachment (2)

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Ontario

June 3, 2011

Plasco Trail Road Inc.
1000 Innovation Drive,
Suite 400
Kanata, Ontario
K2K 3E7

Attention: Mr. John O'Sullivan, VP-Operations

Dear Mr. O'Sullivan:

Re: Plasco Trail Road – Final Source Testing Reports

Under Regulation 254/06 and Certificate of Approval Air 7043-8A7KNZ (as amended), Plasco was required to complete source testing under a number of operational conditions to demonstrate emissions from the Trail Road facility comply with provincial emission standards.

The Ministry approved a pre-test plan submitted by Ortech on November 29, 2010, which permitted Plasco to proceed with the testing programs required under the Regulation and Certificates of Approval.

From December 2, 2010 through December 17, 2010, Plasco undertook source testing activities at its Trail Road facility. On March 3, 2011, Plasco submitted final source testing results to the Ministry for review as required under Certificate of Approval.

Ministry technical staff has completed the review of source testing information submitted by Plasco and the results are documented in the attached Memorandum dated May 16, 2011, addressed to Steve Burns, District Manager. The Memorandum was prepared with due consideration for Plasco's comments on the draft version discussed via teleconference with ministry staff on May 10, 2011. The Memorandum also serves to respond to Plasco's letter of May 19, 2011 to Steve Burns in which Plasco requested the Ministry consider additional comments on the status of compliance with Plasco-specific Regulations and Certificates of Approval.

The following is provided as a summary of compliance with Ministry of the Environment requirements as they relate to air emissions from the Plasco Trail Road facility during source testing activities; additional details are provided in the attached Memorandum.

- Source Testing was completed for Scenarios 1 and 2 as described by Condition 6(4) of Certificate of Approval 7043-8A7KNZ. The operating conditions during the source testing program met the minimum requirements outlined in the certificate of approval.

- The source testing conducted met the sampling equipment calibration and sampling strategy indicated in the reference test methods. The testing program met the source testing requirements outlined in the certificate of approval.

- The emissions are the reflection of the level and mode of operation of the facility during the source testing program. The production levels during source testing were noted to be significantly lower than the maximum operating capacity referenced in the Certificates of Approval. During the May 10, 2011 teleconference, Plasco confirmed that the Trail Road facility was operating at the maximum achievable throughput during the referenced source testing program.

The Certificate of Approval (Air) requires Plasco assess compliance with provincial emission limits for a wide variety of parameters through a number of methods, including source testing (Schedules 'A' through 'D') and continuous emission monitoring (Schedule 'A', 'B' & 'E').

- During source testing, Plasco recorded validated data for parameters listed in Schedule 'C' (polycyclic organic matter) and Schedule 'D' (volatile organic matter) which demonstrates compliance with prescribed limits for Plasco's Trail Road facility.

- During source testing activities, the facility met the in-stack limits set by the Certificate of Approval for the contaminants that sufficient information was provided for compliance assessment:
    - Six of the nine in-stack concentration limits (based on 24-hour averaging period as prescribed by Schedules 'A' and 'B') were assessed for compliance including: Particulate Matter, Cadmium, Lead, Mercury, Dioxin/Furans and total Organic Matter (THC). Plasco met in-stack limits for these six parameters as prescribed by the Certificate of Approval with the exception of THC discharged from engine # 1;
    - Engine # 1 exhaust complies with the THC in-stack limit only when redirected and discharged through the flare;
    - The compliance status of NO_x, SO_2 and HCl could not be determined due to insufficient emission data to validate these emissions which require a 24-hour averaging period.

- Based on a review of information gathered by Plasco during the demonstration project, Plasco's continuous emission monitoring (CEM) system is considered not certified to provide reliable emission concentrations for Ministry compliance purposes as the CEMs have not successfully met the performance specifications listed in Schedule 'E' of the Certificate of Approval Air.
    - The certificate of approval requires Plasco operate for 168 hours continuously without corrective maintenance to stabilize its operation to site specific conditions; 168 hours of continuous operation was not achieved;
    - The accuracy and analytical ranges of the equipment relative to the requirements of the certificate of approval are such that the data cannot be relied upon to establish compliance with prescribed emission limits.

The above statements are not to be considered broad statements on the overall status of compliance with Ministry requirements throughout the duration of the Plasco Trail Road demonstration period between January 2008 and January 2011. The statements above related to emission levels are applicable only to the operating conditions and emission data gathered specifically for the purposes of source testing during the operating period from December 2, 2010 through December 17, 2010 and reflect operational conditions at Plasco Trail Road during the source testing period.

Should you have any comments, questions or wish to discuss any of the above, please contact me directly at (613) 521-3450, extension 224.

Sincerely,

Jason Ryan
District Manager (A)

Attachment (1)

Ministry of the Environment
Standards Development Branch
40 St. Clair Avenue West
Toronto ON M4V 1M2

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Ontario

Via email: steve.burns@ontario.ca

TSS File No: ER:SA:108775:10

2011/05/16

MEMORANDUM

TO: Steve Burns, District Manager
Ottawa District Office
Eastern Region

FROM: Guillermo Azocar, Source Assessment Specialist
Technology Standards Section
Standards Development Branch

SUBJECT: Comments on three reports containing the results from the December 2010 Emission Measurement Program conducted at Plasco Trail Road Inc. (Ottawa facility). Amended Certificate of Approval (Air) No. 7043-8A7KNZ, as amended through Notice 1.

Please find enclosed our evaluation of the 2010 source testing program report, dated March 03, 2011, prepared by Ortech Environmental (Ortech), Ortech Project # 21233, on behalf of Plasco Trail Road Inc. (Plasco), and referring to source testing conducted at Plasco's Energy-From-Waste Demonstration facility, located in Ottawa, Ontario. The testing was required by the Certificate of Approval (Air) No. 7043-8A7KNZ (as amended through Notice #1, issued on November 26, 2010), Condition 6(4).

***Background*:**

The December 2010 source testing program was undertaken by Plasco to provide the level of the emission of selected air contaminants, when using Plasma Gasification Technology to process and convert non-hazardous municipal solid waste, in order to produce synthetic gas (Syngas). The Syngas is used to feed the reciprocating engines, which have a power rating of 704 kW.

Sources Tested:

- Syngas fired Reciprocating Engine #1 exhaust duct (before discharging to the Flare Stack)
- Flare Stack

***Operating scenarios tested*:**

The operating scenarios are defined in the Amended Certificate of Approval (Air) No. 7043-8A7KNZ, Notice No.1, Condition 6(4).

1. **Scenario 1**: Feed to converter is 100% Municipal Solid Waste (MSW); three (3) modes:

    - At the flare stack when the flare is combusting on Syngas and assist gas (propane) only,
    - At the flare stack when the flare is combusting on Syngas, assist gas (propane), and the exhaust of Engine #1, when Engine #1 is at the maximum load achievable at the time of testing but not less than 350 kW, and
    - At the vertical exhaust ductwork after the SCO/SCR of Engine #1 and before discharging to the Flare, when Engine #1 is at the maximum load achievable at the time of testing but not less than 350 kW.

2. **Scenario 2**: when the feed to the Converter is majority Municipal Waste with about 3 - 5% by weight of the feed *High Carbon Waste* consisting primarily of recycled plastic rejects; three (3) modes:

    - At the flare stack when the flare is combusting on Syngas and assist gas (propane) only,
    - At the flare stack when the flare is combusting on syngas, assist gas (propane), and the exhaust of Engine #1, when Engine #1 is at the maximum load achievable at the time of testing but not less than 350 kW, and
    - At the vertical exhaust ductwork after the SCO /SCR of Engine 1 and before discharging to the Flare, when Engine #1 is at the maximum load achievable at the time of testing but not less than 350 kW.

***Target contaminants for this source testing program*:**

1. Total suspended particulate matter (TSP),
2. Selected metals (32, but only Cd, Hg, Pb required by CofA),
3. Dioxins/furans (17 isomers),
4. Polycyclic aromatic hydrocarbons (43,only 40 are listed in the CofA's Schedule C),
5. Volatile organic compounds (43, only 29, are listed in the CofA's Schedule D),
6. Aldehydes and Ketones (6, only 4 are listed in the CofA's Schedule D),
7. Acid gases (HCl, SO_2, NOx),
8. Ammonia (NH_3),
9. Total hydrocarbons (THC), and
10. Combustion gases (oxygen, CO, CO_2).

Condition during the Source Testing Program:

Under Scenario 1, Plasco is approved to process and convert non-hazardous Municipal Waste up to a maximum of 75 tonnes per day (3.1 t/h equivalent); with source testing taking place at the maximum load achievable at the time of the source testing.

The municipal solid waste (MSW) achievable processing rate during the source testing program, while Engine #1 was online was reported on average at 2.10 tonnes per hour (3.1 t/h is the maximum rate allowable). When Engine #1 was offline, the municipal solid waste (MSW) processing rate was reported on average at 1.82 t/h.

Under Scenario 2, Plasco is approved to process and convert non-hazardous Municipal Waste up to a maximum of 75 tonnes per day and High Carbon Waste (plastic rejects) up to a maximum of 10 tonnes per day.

The municipal solid waste (MSW) achievable processing rate during the source testing program, while Engine #1 was online was reported on average between 1.56 and 2.11 tonnes per hour (3.1 t/h is the maximum rate allowable), with plastic reject usage varying between 0.75 to 1.2 t/d (approximately 4% by weight of the total MSW processed). When Engine #1 was offline, the municipal solid waste (MSW) processing rate was reported on average at 1.82 t/h, with the plastic reject at approximately 4% by weight of the total MSW processed.

Engine #1 has a power rating of 704 kW. The Certificate of Approval required source testing will proceed only when the engine power rating is at least 350 kW. The maximum load achievable for Engine #1 was reported at 400 kW.

The operating conditions during the source testing program met the minimum requirements outlined in the Certificate of Approval, Condition 6(4).

The following tables provide a summary of the process conditions during the source testing program, and a general breakdown of the Syngas constituents.

***Summary on Source Testing Activities*:**

The final source testing report from Plasco consists of 3 individual reports.

- The first report refers to source testing conducted at the reciprocating engine #1 exhaust, during two scenarios: 100% municipal solid waste (MSW) and MSW with 3%-5% plastic rejects.
- The second report refers to emission testing at the Flare Stack combusting the reciprocating engine #1 exhaust, Syngas and assist gas (under the same two scenarios mentioned above).
- The third report refers to emission testing at the Flare Stack combusting Syngas and assist gas (under the same two scenarios mentioned above).

The source testing program was aimed at determining the emission level of 142 contaminants, as generally described at the beginning of this memorandum.

The source testing program was conducted for eleven (11) days, from December 02, 2010 to December 17, 2010. The testing and continuous monitoring effectual time was between 6 to 12 hours, on average. The source testing program was witnessed in parts by staff from the MOE's Standards Development Branch.

The source testing was conducted meeting the sampling equipment calibration and sampling strategy indicated in the reference test methods.

The following table provides a summary of the sampling conditions during the source testing program:

Syngas Fired Engine #1 (inlet Stream to the Flare)

Measurement Parameter		Units	Scenario 1 Test #1	Scenario 1 Test #2	Scenario 1 Test #3	Scenario 1 Average	Scenario 2 Test #1	Scenario 2 Test #2	Scenario 2 Test #3	Scenario 2 Average	Max Allowable
Date			2010-12-02	2010-12-03	2010-12-04	---	2010-12-05	2010-12-08	2010-12-10	---	---
Time Period			(04:04-19:01)	(05:15-18:52)	(10:00-20:23)	---	(10:34-19:45)	(06:04-20:18)	(04:09-22:40)	---	---
MSW Used		kg/d	31500	29301	22947	**27916**	18940	20923	29287	**23050**	**75000**
Plastic Rejects		kg/d	0	0	0	**0**	750	880	1200	**943**	**10000**
MSW Usage Rate		t/h	2.10	2.10	2.10	**2.10**	2.10	2.11	1.56	**1.92**	**3.13**
MSW Moisture		%	43	---	---	---	---	34	32	---	---
Syngas Flow		Nm^3/h	2522.6	2626.9	2914.6	2688.0	3085.6	2737.1	2328.3	2717.0	---
Syngas Flow to Engine #1		Nm^3/h	1526.5	1522.2	1471	1506.4	1414.4	1565.6	1291.8	1423.9	---
Syngas Flux		MJ/h	8054.0	8358.4	9615.9	8676.1	10381.2	8255.9	8490.4	9042.5	---
Syngas	HHV	MJ/Nm^3	3.1	3.1	3.2	3.1	3.3	3.0	3.6	3.3	---
	CO	% (vol)	15.6	14.6	15.4	15.2	16.7	15.2	18.8	16.9	---
	CO_2	% (vol)	9.1	9.7	10.0	9.6	9.8	9.7	8.1	9.2	---
	H_2	% (vol)	10.5	10.6	10.8	10.6	10.9	9.5	12.2	10.9	---
	CH_4	% (vol)	2.1	2.1	2.2	2.1	2.3	2.0	2.5	2.3	---
	O_2	% (vol)	0.3	0.2	0.3	0.3	0.5	0.5	0.5	0.5	---
	C	% (vol)	22.5	22.1	23.2	22.6	24.2	22.9	24.4	23.8	---
Propane Flow Rate (at Flare)		SCFM	31.4	29.5	25.7	28.9	20.7	23.1	16.4	20.1	---
Engine #1 Power Throughput		kW	400	400	400	**400**	400	400	400	**400**	**704**

Flare Combusting Assisst Gas and Engine #1 Exhaust Gas

Measurement Parameter		Units	Scenario 1 Test #1	Scenario 1 Test #2	Scenario 1 Test #3	Scenario 1 Average	Scenario 2 Test #1	Scenario 2 Test #2	Scenario 2 Test #3	Scenario 2 Average	Max Allowable
Date			2010-12-02	2010-12-03	2010-12-04	---	2010-12-05	2010-12-08	2010-12-10	---	---
Time Period			(04:04-19:01)	(05:15-18:52)	(10:00-20:23)	---	(10:34-19:45)	(06:04-20:18)	(04:09-22:40)	---	---
MSW Used		kg/d	31500	29301	22947	**27916**	18940	20923	29287	**23050**	**75000**
Plastic Rejects		kg/d	0	0	0	**0**	750	880	1200	**943**	**10000**
MSW Usage Rate		t/h	2.10	2.10	2.10	**2.10**	2.10	2.11	1.56	**1.92**	**3.13**
MSW Moisture		%	43	---	---	---	---	34	32	---	---
Syngas Flow		Nm^3/h	2522.6	2626.9	2914.6	2688.0	3085.6	2737.1	2328.3	2717.0	---
Syngas Flow to Engine #1		Nm^3/h	1526.5	1522.2	1471	1506.4	1414.4	1565.6	1291.8	1423.9	---
Syngas Flux		MJ/h	8054.0	8358.4	9615.9	8676.1	10381.2	8255.9	8490.4	9042.5	---
Syngas	HHV	MJ/Nm^3	3.1	3.1	3.2	3.1	3.3	3.0	3.6	3.3	---
	CO	% (vol)	15.6	14.6	15.4	15.2	16.7	15.2	18.8	16.9	---
	CO_2	% (vol)	9.1	9.7	10.0	9.6	9.8	9.7	8.1	9.2	---
	H_2	% (vol)	10.5	10.6	10.8	10.6	10.9	9.5	12.2	10.9	---
	CH_4	% (vol)	2.1	2.1	2.2	2.1	2.3	2.0	2.5	2.3	---
	O_2	% (vol)	0.3	0.2	0.3	0.3	0.5	0.5	0.5	0.5	---
	C	% (vol)	22.5	22.1	23.2	22.6	24.2	22.9	24.4	23.8	---
Propane Flow Rate (at Flare)		SCFM	31.4	29.5	25.7	28.9	20.7	23.1	16.4	20.1	---
Engine #1 Power Throughput		kW	400	400	400	**400**	400	400	400	**400**	**704**

Flare Combusting Assist Gas and No Engine #1 Exhaust Gas

Measurement Parameter		Units	Scenario 1 Test #1	Scenario 1 Test #2	Scenario 1 Test #3	Scenario 1 Average	Scenario 2 Test #1	Scenario 2 Tests #2 and #3	Scenario 2 Average	Max Allowable
Date			2010-12-11	2010-12-12	2010-12-15	---	2010-12-16	2010-12-17	---	---
Time Period			(12:21-21:38)	(13:03-21:19)	(07:56-18:46)	---	(05:56-18:52)	(04:11-21:11)	---	---
MSW Used		kg/d	14616	12419	18015	**15017**	23449	30310	**26880**	**75000**
Plastic Rejects		kg/d	0	0	0	**0**	940	1210	**1075**	**10000**
MSW Usage Rate		t/h	1.55	1.53	1.57	**1.55**	1.84	1.79	**1.82**	**3.13**
MSW Moisture		%	35	---	---	---	37	---	---	---
Syngas Flow		Nm^3/h	2400.1	1913.2	2043	2118.8	2198.9	2271.5	2235.2	---
Syngas Flow to Engine #1		Nm^3/h	0	0	0	0	0	0	0	---
Syngas Flux		MJ/h	6509.9	4626.4	4559.7	5232.0	6038.2	6839.5	6438.9	---
Syngas	HHV	MJ/Nm^3	2.7	2.4	2.2	2.4	2.7	3.0	2.9	---
	CO	% (vol)	15.7	15.5	13.6	14.9	18.0	19.5	18.8	---
	CO_2	% (vol)	10.4	10.1	9.1	9.9	7.5	7.3	7.4	---
	H_2	% (vol)	10.8	9.6	7.7	9.4	10.0	11.2	10.6	---
	CH_4	% (vol)	1.4	1.4	1.3	1.4	1.7	1.8	1.8	---
	O_2	% (vol)	0.3	0.3	0.7	0.4	0.7	0.4	0.6	---
	C	% (vol)	24.7	24.3	21.4	23.5	23.8	25.0	24.4	---
Propane Flow Rate (at Flare)		SCFM	11.4	19.1	17.8	16.1	15.2	9.5	12.4	---
Engine #1 Power Throughput		kW	0	0	0	**0**	0	0	**0**	**0**

The following six tables provide a summary of the validated emissions during this source testing program, at the operating level achieved by the facility.

Plasco Demonstration Program - December 2010							
		Scenario 1			Scenario 2		
Measurement Parameter	**Units**	**Engine Exhaust**	**Flare Engine**	**Flare No Engine**	**Engine Exhaust**	**Flare Engine**	**Flare No Engine**
SOURCE PHYSICAL CONFIGURATION							
Stack Height (from grade) - CofA	m	----	12.1	12.1	----	12.1	12.1
Stack Height (from grade) - Field Meas.	m	----	----	----	----	----	----
Stack diameter (CofA)	m	0.25	2.74	2.74	0.25	2.74	2.74
Stack diameter - Field Measurement	m	0.34	2.63	2.63	0.34	2.63	2.63
TSP-METALS							
EFFLUENT CHARACTERISTICS							
TSP/Metals							
Average Stack Temperature	°C	350	780	687	341	776	661
Average Velocity	m/s	21.7	3.34	2.96	20.9	3.12	3.27
Oxygen Concentration	%	4.5	7.1	10.4	4.5	7.6	11.5
CO2 Concentration	%	13.6	10.8	8.0	13.4	10.3	7.1
Effluent Molecular Weight (dry)	kg/kg mol	30.5	30.1	29.8	30.4	30.1	29.7
Effluent Molecular Weight (wet)	kg/kg mol	29.4	29.1	29.1	29.3	29.1	29.1
Effluent Moisture Content	%	9.0	8.5	6.0	9.1	8.3	5.3
Actual Effluent Flow Rate	m3/s	1.97	18.2	16.1	1.90	17.0	17.8
Standard Flow Rate (wet)	STDm3/s	0.943	5.07	4.89	0.913	4.74	5.56
Standard Flow Rate (dry)	STDm3/s	0.857	4.64	4.59	0.829	4.34	5.27
SAMPLE PARAMETERS							
TSP/Metals							
Sample Period	minutes	252	240	240	252	240	240
Dry Reference Sample Volume	STDm3	4.95	3.82	3.74	4.95	3.73	4.31
Number of Sampling Ports	----	2	2	2	2	2	2
Sampling Ports Location (ideal/non-ideal)	----	Ideal	Ideal	Ideal	Ideal	Ideal	Ideal
Number of Traverses	----	2	2	2	2	2	2
Number of Sampling Points	----	12	40	40	12	40	40
Number of Readings/Sampling Point	----	7	2	2	7	2	2
Sampling time per Reading	minutes	3	3	3	3	3	3
Average Isokineticity	%	100.7	100.7	100.9	99.6	101.2	101.3
Readings Isokinetic	%	99	96	99	100	96	98
SVOCs							
EFFLUENT CHARACTERISTICS							
Average Stack Temperature	°C	350	769	685	344	774	656
Average Velocity	m/s	21.5	3.40	3.35	20.7	3.39	3.34
Oxygen Concentration	%	4.5	7.1	10.4	4.5	7.6	11.5
CO2 Concentration	%	13.6	10.8	8.0	13.4	10.3	7.1
Effluent Molecular Weight (dry)	kg/kg mol	30.5	30.1	29.8	30.4	30.1	29.7
Effluent Molecular Weight (wet)	kg/kg mol	29.4	29.1	29.1	29.3	29.1	29.1
Effluent Moisture Content	%	8.9	8.1	5.6	9.0	8.1	4.9
Actual Effluent Flow Rate	m3/s	1.95	18.5	18.2	1.87	18.4	18.2
Standard Flow Rate (wet)	STDm3/s	0.930	5.22	5.55	0.897	5.16	5.73
Standard Flow Rate (dry)	STDm3/s	0.847	4.79	5.23	0.816	4.74	5.44
SAMPLE PARAMETERS							
Sample Period	minutes	252	240	240	252	240	240
Dry Reference Sample Volume	STDm3	4.51	3.87	4.27	4.30	4.00	4.43
Number of Sampling Ports	----	2	2	2	2	2	2
Sampling Ports Location (ideal/non-ideal)	----	Ideal	Ideal	Ideal	Ideal	Ideal	Ideal
Number of Traverses	----	2	2	2	2	2	2
Number of Sampling Points	----	12	40	40	12	40	40
Number of Readings/Sampling Point	----	7	2	2	7	2	2
Sampling time per Reading	minutes	3	3	3	3	3	3
Average Isokineticity	%	97.9	99.0	99.6	97.7	99.5	99.6
Readings Isokinetic	%	99	97	99	100	99	100
VOCs							
EFFLUENT CHARACTERISTICS							
Average Stack Temperature	°C	343	769	685	344	774	656
Average Velocity	m/s	20.8	3.40	3.35	20.7	3.39	3.34
Oxygen Concentration	%	4.5	7.1	10.4	4.5	7.6	11.5
CO2 Concentration	%	13.4	10.8	8.0	13.4	10.3	7.1
Effluent Molecular Weight (dry)	kg/kg mol	30.5	30.1	29.8	30.4	30.1	29.7
Effluent Molecular Weight (wet)	kg/kg mol	29.4	29.1	29.1	29.3	29.1	29.1
Effluent Moisture Content	%	9.1	8.1	5.6	9.0	8.1	4.9
Actual Effluent Flow Rate	m3/s	1.96	18.5	18.2	1.9	18.4	18.2
Standard Flow Rate (wet)	STDm3/s	0.937	5.22	5.55	0.897	5.16	5.73
Standard Flow Rate (dry)	STDm3/s	0.853	4.79	5.23	0.816	4.74	5.44
SAMPLE PARAMETERS							
Sample Period	minutes	60	60		60	60	60
Dry Reference Sample Volume	STDm3	0.0519	0.0519	0.0652	0.0573	0.0662	0.0618
Number of Traps Used	----	3	3		3	3	3
Number of Sampling Ports	----	1	1		1	1	1
Sampling Ports Location (ideal/non-ideal)	----	Ideal	Ideal	Ideal	Ideal	Ideal	Ideal
Number of Traverses	----	1	1		1	1	1
Number of Sampling Points	----	1	1		1	1	1
Number of Readings/Sampling Point	----	4	4		4	4	4
Sampling time per Reading	minutes	5	5		5	5	5

Note: The diameter of both the flare and the engine duct do not match the dimensions listed in the Certificate of Approval. The height of the Flare stack was not confirmed during the source testing program.

Plasco Demonstration Program - December 2010

Measurement Parameter		Units	Scenario 1 Engine Exhaust	Scenario 1 Flare Engine	Scenario 1 Flare No Engine	Scenario 2 Engine Exhaust	Scenario 2 Flare Engine	Scenario 2 Flare No Engine
TSP	Concentration	mg/Rm³	1.04	0.730	0.840	0.907	0.973	0.530
	Emission Rate	mg/s	1.48	4.71	4.06	1.21	5.70	2.65
METALS								
Aluminum	Concentration	ug/Rm³	5.42	5.37	7.96	6.64	5.32	1.80
	Emission Rate	ug/s	7.70	34.3	37.0	9.03	32.0	9.10
Aluminum Oxide	Concentration	ug/Rm³	----	----	----	----	----	----
	Emission Rate	ug/s	----	----	----	----	----	----
Antimony*	Concentration	ug/Rm³	0.025	0.038	5.10	0.024	0.042	4.10
	Emission Rate	ug/s	0.035	0.243	0.250	0.034	0.240	0.240
Arsenic	Concentration	ug/Rm³	0.037	0.174	0.560	0.029	0.332	0.260
	Emission Rate	ug/s	0.052	1.11	2.60	0.041	1.28	1.30
Barium	Concentration	ug/Rm³	0.114	0.947	0.230	0.064	0.138	0.130
	Emission Rate	ug/s	0.163	6.07	1.10	0.088	0.787	0.670
Berillium *	Concentration	ug/Rm³	0.025	0.038	0.051	0.024	0.042	0.049
	Emission Rate	ug/s	0.035	0.243	0.250	0.034	0.240	0.240
Bismuth*	Concentration	ug/Rm³	0.061	0.094	0.130	0.061	0.108	0.120
	Emission Rate	ug/s	0.088	0.603	0.610	0.084	0.607	0.610
Boron	Concentration	ug/Rm³	20.3	11.5	13.6	18.7	12.5	8.18
	Emission Rate	ug/s	29.6	74.3	65.0	25.7	72.3	41.0
Cadmium	Concentration	ug/Rm³	0.021	0.042	0.067	0.012	0.070	0.024
	Emission Rate	ug/s	0.030	0.270	0.320	0.016	0.417	0.120
Calcium	Concentration	ug/Rm³	12.7	19.4	83.1	46.7	22.3	66
	Emission Rate	ug/s	18.5	123	390	61.7	130	330
Calcium Oxide	Concentration	ug/Rm³	----	----	----	----	----	----
	Emission Rate	ug/s	----	----	----	----	----	----
Chromium - Total	Concentration	ug/Rm³	0.787	1.01	1.56	1.30	3.80	0.480
	Emission Rate	ug/s	1.10	6.47	7.50	1.77	21.1	2.40
Cobalt*	Concentration	ug/Rm³	0.025	0.038	0.051	0.024	0.037	0.049
	Emission Rate	ug/s	0.035	0.243	0.250	0.034	0.213	0.240
Copper	Concentration	ug/Rm³	0.763	0.870	1.53	0.697	1.07	0.730
	Emission Rate	ug/s	1.10	5.63	7.40	0.970	6.90	3.70
Iron	Concentration	ug/Rm³	4.40	6.76	5.80	3.84	48.8	3.65
	Emission Rate	ug/s	6.23	44.0	28.0	5.30	312	18.0
Lead	Concentration	ug/Rm³	0.037	0.200	0.260	0.028	0.218	0.033
	Emission Rate	ug/s	0.053	1.27	1.20	0.039	1.31	0.170
Lithium**	Concentration	ug/Rm³	0.061	0.213	0.220	0.087	0.370	0.061
	Emission Rate	ug/s	0.088	1.40	1.10	0.118	2.08	0.310
Magnesium	Concentration	ug/Rm³	5.73	7.95	9.50	3.74	6.97	3.61
	Emission Rate	ug/s	8.28	51.0	45.0	5.10	40.7	18.0
Magnesium Oxide	Concentration	ug/Rm³	----	----	----	----	----	----
	Emission Rate	ug/s	----	----	----	----	----	----
Manganese	Concentration	ug/Rm³	1.88	0.947	1.15	1.16	0.76	29.0
	Emission Rate	ug/s	2.69	6.13	5.50	1.65	4.86	140
Mercury - Total	Concentration	ug/Rm³	0.069	0.163	0.200	0.153	0.106	0.160
	Emission Rate	ug/s	0.099	1.08	0.950	0.210	0.617	0.810
Molybdenum	Concentration	ug/Rm³	1.11	1.98	2.59	1.13	2.10	2.20
	Emission Rate	ug/s	1.57	12.7	13.0	1.57	12.3	11.0
Nickel	Concentration	ug/Rm³	0.500	0.530	0.870	0.810	1.52	0.490
	Emission Rate	ug/s	0.707	3.40	4.20	1.11	8.67	2.50
Phosphorus	Concentration	ug/Rm³	3.69	4.94	10.6	4.18	5.77	6.19
	Emission Rate	ug/s	5.23	31.7	51.0	5.67	33.3	31.0
Phosphorus Pentachloride	Concentration	ug/Rm³	----	----	----	----	----	----
	Emission Rate	ug/s	----	----	----	----	----	----
Potassium*	Concentration	ug/Rm³	12.2	18.9	25.3	12.2	21.1	35.4
	Emission Rate	ug/s	17.8	120	120	16.7	120	180
Potassium Oxide*	Concentration	ug/Rm³	----	----	----	----	----	----
	Emission Rate	ug/s	----	----	----	----	----	----
Selenium	Concentration	ug/Rm³	0.717	1.46	4.74	0.700	1.65	3.94
	Emission Rate	ug/s	1.01	9.23	22.0	0.943	9.43	20.0
Silicon	Concentration	ug/Rm³	915	243	269	768	343	448
	Emission Rate	ug/s	1300	1563	1310	1027	1923	2260
Silica	Concentration	ug/Rm³	----	----	----	----	----	----
	Emission Rate	ug/s	----	----	----	----	----	----
Silver*	Concentration	ug/Rm³	0.025	0.038	0.051	0.024	0.042	0.049
	Emission Rate	ug/s	0.035	0.243	0.250	0.034	0.240	0.240
Sodium	Concentration	ug/Rm³	40.7	53.6	105	69.9	99.1	50.1
	Emission Rate	ug/s	58.0	347	510	94.7	570	250
Sodium Hydroxide	Concentration	ug/Rm³	----	----	----	----	----	----
	Emission Rate	ug/s	----	----	----	----	----	----
Strontium	Concentration	ug/Rm³	0.137	0.173	0.320	0.163	0.213	0.180
	Emission Rate	ug/s	0.207	1.12	1.50	0.223	1.20	0.930
Tin	Concentration	ug/Rm³	1.64	2.75	4.01	1.27	3.37	3.32
	Emission Rate	ug/s	2.30	17.7	19.0	1.77	19.3	17.0
Thallium *	Concentration	ug/Rm³	0.025	0.038	0.051	0.024	0.042	0.049
	Emission Rate	ug/s	0.035	0.243	0.250	0.034	0.240	0.240
Titanium	Concentration	ug/Rm³	1.92	2.81	1.87	1.54	2.12	2.21
	Emission Rate	ug/s	2.73	18.0	9.00	2.10	12.3	11.0
Vanadium*	Concentration	ug/Rm³	0.120	0.187	0.250	0.123	0.210	0.240
	Emission Rate	ug/s	0.177	1.20	1.20	0.167	1.20	1.20
Zinc	Concentration	ug/Rm³	3.36	2.69	4.05	2.27	8.87	1.95
	Emission Rate	ug/s	4.81	17.0	19.0	3.17	57.0	9.70

* Using the method detection limit to calculate the emissions from both scenarios.
** Using the method detection limit to calculate the emissions from Scenario 1 only.

Plasco Demonstration Program - December 2010									
			Scenario 1			Scenario 2			
Measurement Parameter		**Units**	**Engine Exhaust**	**Flare Engine**	**Flare No Engine**	**Engine Exhaust**	**Flare Engine**	**Flare No Engine**
ACID GASES								
HYDROGEN CHLORIDE	Concentration	ug/Rm^3	490	283	120	220	197	120
	Emission Rate	ug/s	687	1847	640	300	1207	630
HYDROGEN FLUORIDE	Concentration	ug/Rm^3	----	----	----	----	----	----
	Emission Rate	ug/s	----	----	----	----	----	----
NITROGEN OXIDES (NOx)	Concentration	mg/Rm^3	117	107	117	138	135	172
	Emission Rate	mg/s	163	703	610	187	827	876
SULPHUR DIOXIDE (SO2)	Concentration	mg/Rm^3	13.6	37.8	24.5	5.39	34.3	22.1
	Emission Rate	mg/s	19.2	247	123	7.30	207	113
AMMONIA*	Concentration	ug/Rm^3	143	167	290	143	173	470
	Emission Rate	ug/s	207	1083	149	193	1063	242
COMBUSTION GASES								
CARBON DIOXIDE	Concentration	g/Rm^3	147	139	135	145	138	133
	Emission Rate	g/s	209	913	703	198	840	681
CARBON MONOXIDE	Concentration	mg/s	9.91	3.98	4.25	7.01	4.85	3.9
	Emission Rate	mg/Rm^3	13.7	26.0	22.3	9.57	28.7	20.2
EXCESS OXYGEN	Concentration	g/Rm^3	----	----	----	----	----	----
	Emission Rate	g/s	49.6	440	668	48.3	453	802
ORGANIC MATTER (THC)	Concentration (wet)	ppmv	248	0.0	0.0	209	0.0	0.0
	Emission Rate	----	----	----		----		

* Using the method detection limit to calculate the emissions for both scenarios.
Note: Metals' train stack gas parameters used to calculate the acid gases and combustion gases emissions

Plasco Demonstration Program - December 2010									
			Scenario 1			Scenario 2			
Measurement Parameter		**Units**	**Engine Exhaust**	**Flare Engine**	**Flare No Engine**	**Engine Exhaust**	**Flare Engine**	**Flare No Engine**
Dioxins and Furans								
2,3,7,8-TCDD*	Concentration	pgTEQ/Rm^3	0.617	0.793	0.660	0.320	0.777	0.757
	Emission Rate	pgTEQ/s	0.880	5.27	3.600	0.427	4.93	3.93
1,2,3,7,8-PCDD*	Concentration	pgTEQ/Rm^3	0.110	0.150	0.210	0.065	0.167	0.223
	Emission Rate	pgTEQ/s	0.150	1.00	1.10	0.087	1.06	1.16
1,2,3,4,7,8-HxCDD*	Concentration	pgTEQ/Rm^3	0.027	0.038	0.055	0.026	0.047	0.040
	Emission Rate	pgTEQ/s	0.037	0.253	0.310	0.035	0.303	0.203
1,2,3,6,7,8-HxCDD*	Concentration	pgTEQ/Rm^3	0.028	0.039	0.055	0.027	0.049	0.036
	Emission Rate	pgTEQ/s	0.039	0.257	0.310	0.037	0.310	0.187
1,2,3,7,8,9-HxCDD*	Concentration	pgTEQ/Rm^3	0.027	0.038	0.055	0.027	0.047	0.038
	Emission Rate	pgTEQ/s	0.038	0.253	0.310	0.036	0.303	0.193
1,2,3,4,6,7,8-HpCDD**	Concentration	pgTEQ/Rm^3	0.006	0.008	0.014	0.016	11.2	0.011
	Emission Rate	pgTEQ/s	0.009	0.055	0.077	0.022	0.072	0.058
1,2,3,4,6,7,8,9-OCDD**	Concentration	pgTEQ/Rm^3	0.003	0.003	0.004	0.003	0.002	0.003
	Emission Rate	pgTEQ/s	0.004	0.021	0.022	0.003	0.011	0.014
TOTAL DIOXINS	Concentration	pgTEQ/Rm^3	**0.818**	**1.07**	**1.05**	**0.485**	**7.00**	**1.11**
	Emission Rate	pgTEQ/s	**1.16**	**7.11**	**5.73**	**0.648**	**12.3**	**5.75**
2,3,7,8-TCDF*	Concentration	pgTEQ/Rm^3	0.033	0.055	0.077	0.037	0.064	0.041
	Emission Rate	pgTEQ/s	0.046	0.383	0.420	0.049	0.403	0.213
2,3,4,7,8-PCDF**	Concentration	pgTEQ/Rm^3	0.136	0.153	0.320	0.296	0.217	0.270
	Emission Rate	pgTEQ/s	0.193	1.02	1.80	0.393	1.38	1.39
1,2,3,7,8-PCDF*	Concentration	pgTEQ/Rm^3	0.014	0.016	0.025	0.011	0.022	0.019
	Emission Rate	pgTEQ/s	0.020	0.105	0.140	0.014	0.141	0.102
1,2,3,4,7,8-HxCDF*	Concentration	pgTEQ/Rm^3	0.042	0.037	0.051	0.048	0.075	0.034
	Emission Rate	pgTEQ/s	0.060	0.243	0.280	0.064	0.470	0.180
1,2,3,6,7,8-HxCDF*	Concentration	pgTEQ/Rm^3	0.026	0.037	0.051	0.036	0.051	0.035
	Emission Rate	pgTEQ/s	0.036	0.243	0.280	0.048	0.327	0.183
2,3,4,6,7,8-HxCDF	Concentration	pgTEQ/Rm^3	0.033	0.038	0.061	0.049	0.044	0.036
	Emission Rate	pgTEQ/s	0.047	0.250	0.340	0.066	0.277	0.187
1,2,3,7,8,9-HxCDF*	Concentration	pgTEQ/Rm^3	0.033	0.047	0.033	0.023	0.042	0.028
	Emission Rate	pgTEQ/s	0.047	0.313	0.180	0.030	0.263	0.143
1,2,3,4,6,7,8-HpCDF**	Concentration	pgTEQ/Rm^3	0.007	0.007	0.017	0.010	0.013	0.009
	Emission Rate	pgTEQ/s	0.010	0.046	0.095	0.014	0.082	0.045
1,2,3,4,7,8,9-HpCDF*	Concentration	pgTEQ/Rm^3	0.007	0.010	0.009	0.004	0.009	0.004
	Emission Rate	pgTEQ/s	0.010	0.066	0.046	0.006	0.060	0.019
1,2,3,4,6,7,8,9-OCDF*	Concentration	pgTEQ/Rm^3	0.001	0.002	0.002	0.001	0.002	0.001
	Emission Rate	pgTEQ/s	0.002	0.012	0.013	0.001	0.013	0.006
TOTAL FURANS	Concentration	pgTEQ/Rm^3	**0.333**	**0.401**	**0.646**	**0.514**	**0.539**	**0.477**
	Emission Rate	pgTEQ/s	**0.470**	**2.66**	**3.59**	**0.687**	**3.41**	**2.47**
DIOXINS & FURANS	Concentration	pgTEQ/Rm^3	**1.15**	**1.47**	**1.70**	**1.00**	**1.63**	**1.58**
	Emission Rate	pgTEQ/s	**1.63**	**9.77**	**9.32**	**1.36**	**10.4**	**8.22**

* Using the method detection limit to calculate the emissions both scenarios.
** Using the method detection limit to calculate the emissions both Scenario 1.

Plasco Demonstration Program - December 2010									
			Scenario 1			Scenario 2			
Measurement Parameter		**Units**	**Engine Exhaust**	**Flare Engine**	**Flare No Engine**	**Engine Exhaust**	**Flare Engine**	**Flare No Engine**
PAHs								
ACENAPHTHENE*	Concentration	ug/Rm^3	0.005	0.022	0.009	0.006	0.009	0.009
	Emission Rate	ug/s	0.008	0.149	0.049	0.008	0.054	0.049
ACENAPHTHYLENE	Concentration	ug/Rm^3	0.007	0.531	0.032	0.013	0.159	0.016
	Emission Rate	ug/s	0.010	3.61	0.180	0.018	1.01	0.082
ANTHRACENE**	Concentration	ug/Rm^3	0.005	0.007	0.009	0.006	0.007	0.009
	Emission Rate	ug/s	0.008	0.049	0.049	0.008	0.042	0.049
BENZO(a)ANTHRACENE*	Concentration	ug/Rm^3	0.005	0.007	0.009	0.006	0.008	0.009
	Emission Rate	ug/s	0.008	0.049	0.049	0.008	0.048	0.049
BENZO(b)ANTHRACENE*	Concentration	ug/Rm^3	0.005	0.007	0.009	0.006	0.013	0.009
	Emission Rate	ug/s	0.008	0.049	0.049	0.008	0.083	0.049
BENZO(b)FLUORANTHENE*	Concentration	ug/Rm^3	0.005	0.008	0.009	0.006	0.013	0.009
	Emission Rate	ug/s	0.008	0.053	0.049	0.008	0.083	0.049
BENZO(k)FLUORANTHENE*	Concentration	ug/Rm^3	0.005	0.008	0.009	0.006	0.013	0.009
	Emission Rate	ug/s	0.008	0.053	0.049	0.008	0.083	0.049
BENZO(a)FLUORENE*	Concentration	ug/Rm^3	0.005	0.007	0.009	0.006	0.008	0.009
	Emission Rate	ug/s	0.008	0.049	0.049	0.008	0.049	0.049
BENZO(b)FLUORENE*	Concentration	ug/Rm^3	0.005	0.007	0.009	0.006	0.008	0.009
	Emission Rate	ug/s	0.008	0.049	0.049	0.008	0.049	0.049
BENZO(ghi)PERYLENE	Concentration	ug/Rm^3	0.008	0.008	0.025	0.013	0.043	0.013
	Emission Rate	ug/s	0.011	0.052	0.140	0.017	0.270	0.071
BENZO(a)PYRENE*	Concentration	ug/Rm^3	0.005	0.007	0.009	0.006	0.009	0.009
	Emission Rate	ug/s	0.008	0.049	0.049	0.008	0.058	0.049
BENZO(e)PYRENE	Concentration	ug/Rm^3	0.016	0.007	0.009	0.017	0.018	0.009
	Emission Rate	ug/s	0.023	0.049	0.049	0.023	0.116	0.049
BIPHENYL	Concentration	ug/Rm^3	0.955	0.223	0.056	0.267	0.201	0.040
	Emission Rate	ug/s	1.35	1.51	0.310	0.350	1.26	0.210
2-CHLORONAPHTHALENE*	Concentration	ug/Rm^3	0.005	0.007	0.009	0.006	0.008	0.009
	Emission Rate	ug/s	0.008	0.049	0.049	0.008	0.049	0.049
CHRYSENE/TRIPHENYLENE*	Concentration	ug/Rm^3	0.005	0.008	0.009	0.006	0.010	0.009
	Emission Rate	ug/s	0.008	0.051	0.049	0.008	0.066	0.049
CORONENE	Concentration	ug/Rm^3	0.019	0.009	0.013	0.009	0.033	0.012
	Emission Rate	ug/s	0.026	0.060	0.069	0.012	0.206	0.061
DIBENZO(ac/ah)ANTHRACENE*	Concentration	ug/Rm^3	0.005	0.007	0.009	0.006	0.008	0.009
	Emission Rate	ug/s	0.008	0.049	0.049	0.008	0.049	0.049
DIBENZO(ae)PYRENE*	Concentration	ug/Rm^3	0.005	0.007	0.009	0.006	0.008	0.009
	Emission Rate	ug/s	0.008	0.049	0.049	0.008	0.049	0.049
9,10-DIMETHYLANTHRACENE*	Concentration	ug/Rm^3	0.005	0.007	0.009	0.006	0.008	0.009
	Emission Rate	ug/s	0.008	0.049	0.049	0.008	0.049	0.049
7,12-DIMETHYLBENZO(a)ANTHRACENE*	Concentration	ug/Rm^3	0.005	0.007	0.009	0.006	0.008	0.009
	Emission Rate	ug/s	0.008	0.049	0.049	0.008	0.049	0.049
FLUORANTHENE	Concentration	ug/Rm^3	0.009	0.135	0.018	0.017	0.061	0.014
	Emission Rate	ug/s	0.013	0.913	0.100	0.022	0.390	0.074
FLUORENE	Concentration	ug/Rm^3	0.009	0.059	0.009	0.007	0.015	0.007
	Emission Rate	ug/s	0.013	0.397	0.049	0.009	0.098	0.036
INDENO(1,2,3-cd)PYRENE*	Concentration	ug/Rm^3	0.005	0.007	0.009	0.006	0.011	0.009
	Emission Rate	ug/s	0.008	0.049	0.049	0.008	0.069	0.049
2-METHYLANTHRACENE*	Concentration	ug/Rm^3	0.005	0.007	0.009	0.006	0.008	0.009
	Emission Rate	ug/s	0.008	0.049	0.049	0.008	0.049	0.049
3-METHYLCHOLANTHRENE*	Concentration	ug/Rm^3	0.005	0.007	0.009	0.006	0.008	0.009
	Emission Rate	ug/s	0.008	0.049	0.049	0.008	0.049	0.049
1-METHYLNAPHTHALENE	Concentration	ug/Rm^3	0.011	0.075	0.019	0.012	0.026	0.014
	Emission Rate	ug/s	0.016	0.503	0.104	0.016	0.163	0.074
2-METHYLNAPHTHALENE	Concentration	ug/Rm^3	0.023	0.076	0.027	0.022	0.030	0.022
	Emission Rate	ug/s	0.032	0.510	0.150	0.029	0.193	0.110
1-METHYLPHENANTHRENE*	Concentration	ug/Rm^3	0.005	0.010	0.009	0.006	0.008	0.009
	Emission Rate	ug/s	0.008	0.070	0.049	0.008	0.049	0.049
9-METHYLPHENANTHRENE**	Concentration	ug/Rm^3	0.005	0.017	0.009	0.006	0.008	0.009
	Emission Rate	ug/s	0.008	0.110	0.049	0.008	0.049	0.049
NAPHTHALENE	Concentration	ug/Rm^3	0.269	2.03	0.936	0.370	0.991	0.412
	Emission Rate	ug/s	0.377	13.7	5.26	0.493	6.29	2.14
PERYLENE*	Concentration	ug/Rm^3	0.005	0.007	0.009	0.006	0.008	0.007
	Emission Rate	ug/s	0.007	0.049	0.049	0.008	0.049	0.034
PHENANTHRENE	Concentration	ug/Rm^3	0.015	0.234	0.042	0.023	0.089	0.026
	Emission Rate	ug/s	0.022	1.58	0.230	0.030	0.570	0.140
PICENE*	Concentration	ug/Rm^3	0.005	0.007	0.009	0.006	0.008	0.009
	Emission Rate	ug/s	0.008	0.049	0.049	0.008	0.049	0.049
PYRENE	Concentration	ug/Rm^3	0.008	0.048	0.025	0.028	0.044	0.021
	Emission Rate	ug/s	0.012	0.320	0.140	0.037	0.278	0.110
QUINOLINE*	Concentration	ug/Rm^3	0.005	0.007	0.009	0.006	0.008	0.009
	Emission Rate	ug/s	0.008	0.049	0.049	0.008	0.049	0.049
m-TERPHENYL	Concentration	ug/Rm^3	0.011	0.009	0.009	0.007	0.008	0.009
	Emission Rate	ug/s	0.016	0.061	0.049	0.009	0.049	0.049
o-TERPHENYL**	Concentration	ug/Rm^3	0.007	0.013	0.009	0.006	0.008	0.009
	Emission Rate	ug/s	0.010	0.086	0.049	0.008	0.049	0.049
p-TERPHENYL	Concentration	ug/Rm^3	0.008	0.007	0.009	0.006	0.008	0.009
	Emission Rate	ug/s	0.011	0.049	0.049	0.008	0.049	0.049
TETRALIN	Concentration	ug/Rm^3	0.033	0.027	0.053	0.033	0.022	0.041
	Emission Rate	ug/s	0.047	0.180	0.290	0.045	0.140	0.210

* Using the method detection limit to calculate the emissions both scenarios.
** Using the method detection limit to calculate the emissions Scenario 2.
*** Using the method detection limit to calculate the emissions Scenario 1.

Plasco Demonstration Program - December 2010									
			Scenario 1			Scenario 2			
Measurement Parameter		**Units**	**Engine Exhaust**	**Flare Engine**	**Flare No Engine**	**Engine Exhaust**	**Flare Engine**	**Flare No Engine**
VOCs									
ACETONE	Concentration	ug/Rm^3	6.00	67.0	153	208	87.6	137
	Emission Rate	ug/s	8.37	440	787	287	523	700
BENZENE	Concentration	ug/Rm^3	30.0	13.6	18.8	39.7	13.1	17.5
	Emission Rate	ug/s	42.3	89.3	96.3	54.0	78.0	89.3
BROMODICHLOROMETHANE*	Concentration	ug/Rm^3	0.72	13.2	18.5	6.61	13.1	17.3
	Emission Rate	ug/s	1.03	88.3	96.3	8.87	78.0	88.7
BROMOFORM (TRIBROMOMETHANE)*	Concentration	ug/Rm^3	0.72	13.2	18.5	6.61	13.1	17.3
	Emission Rate	ug/s	1.03	88.3	96.3	8.87	78.0	88.7
BROMOMETHANE	Concentration	ug/Rm^3	6.44	32.8	47.1	26.9	29.9	35.8
	Emission Rate	ug/s	9.20	217	247	36.3	182	183.3
1,3-BUTADIENE***	Concentration	ug/Rm^3	1.09	13.2	18.5	6.61	13.1	17.3
	Emission Rate	ug/s	1.53	88.3	96.3	8.87	78.0	88.7
2-BUTANONE (MEK)**	Concentration	ug/Rm^3	86.0	13.2	18.7	30.6	13.1	17.3
	Emission Rate	ug/s	120	88.3	96.3	41.3	78.0	88.7
CARBON TETRACHLORIDE*	Concentration	ug/Rm^3	0.72	13.2	18.5	6.61	13.1	17.3
	Emission Rate	ug/s	1.03	88.3	96.3	8.87	78.0	88.7
CLOROBENZENE	Concentration	ug/Rm^3	0.74	13.2	18.5	6.64	13.1	17.3
	Emission Rate	ug/s	1.05	88.3	96.3	8.90	78.0	88.7
CHLOROETHANE*	Concentration	ug/Rm^3	1.48	26.3	37.0	13.2	26.1	34.6
	Emission Rate	ug/s	2.10	170	193	17.7	159	177
CLOROFORM (TRICHLOROMETHANE)*	Concentration	ug/Rm^3	0.72	13.2	18.5	6.61	13.1	17.3
	Emission Rate	ug/s	1.03	88.3	96.3	8.87	78.0	88.7
CHLOROMETHANE	Concentration	ug/Rm^3	5.47	27.0	37.0	32.8	26.1	34.9
	Emission Rate	ug/s	7.60	177	193.3	44.7	159	177
CUMENE (ISOPROPYLBENZENE)*	Concentration	ug/Rm^3	0.72	13.2	18.5	6.61	13.1	17.3
	Emission Rate	ug/s	1.03	88.3	96.3	8.87	78.0	88.7
DIBROMOCHLOROMETHANE*	Concentration	ug/Rm^3	0.72	13.2	18.5	6.61	13.1	17.3
	Emission Rate	ug/s	1.03	88.3	96.3	8.87	78.0	88.7
DIBROMOMETHANE*	Concentration	ug/Rm^3	0.72	13.2	18.5	6.61	13.1	17.3
	Emission Rate	ug/s	1.03	88.3	96.3	8.87	78.0	88.7
DICHLORODIFLUOROMETHANE*	Concentration	ug/Rm^3	1.45	26.3	37.0	13.2	26.1	34.6
	Emission Rate	ug/s	2.03	170	193	17.7	159	177
1,1-DICHLOROETHANE*	Concentration	ug/Rm^3	0.72	13.2	18.5	6.61	13.1	17.3
	Emission Rate	ug/s	1.03	88.3	96.3	8.87	78.0	88.7
1,2-DICHLOROETHANE**	Concentration	ug/Rm^3	0.84	13.2	18.5	6.66	13.1	17.3
	Emission Rate	ug/s	1.20	88.3	96.3	8.87	78.0	88.7
1,1-DICHLOROETHENE*	Concentration	ug/Rm^3	0.72	13.2	18.5	6.61	13.1	17.3
	Emission Rate	ug/s	1.03	88.3	96.3	8.87	78.0	88.7
TRANS-1,2-DICHLOROETHENE*	Concentration	ug/Rm^3	0.72	13.2	18.5	6.61	13.1	17.3
	Emission Rate	ug/s	1.03	88.3	96.3	8.87	78.0	88.7
1,2-DICHLOROPROPANE*	Concentration	ug/Rm^3	0.72	13.2	18.5	6.61	13.1	17.3
	Emission Rate	ug/s	1.03	88.3	96.3	8.87	78.0	88.7
ETHYLBENZENE	Concentration	ug/Rm^3	1.94	13.2	18.5	6.61	13.1	17.4
	Emission Rate	ug/s	2.75	88.3	96.3	8.87	78.3	88.7
ETHYLENEDIBROMIDE*	Concentration	ug/Rm^3	0.72	13.2	18.5	6.61	13.1	17.3
	Emission Rate	ug/s	1.03	88.3	96.3	8.87	78.0	88.7
2-HEXANONE***	Concentration	ug/Rm^3	4.06	13.2	18.5	6.61	13.1	17.3
	Emission Rate	ug/s	5.70	88.3	96.3	8.87	78.0	88.7
IODOMETHANE	Concentration	ug/Rm^3	1.01	13.7	18.5	6.91	13.1	17.3
	Emission Rate	ug/s	1.44	89.7	96.3	8.87	78.0	88.7
METHYLENE CHLORIDE	Concentration	ug/Rm^3	10.3	24.8	98.7	54.0	73.1	55.8
	Emission Rate	ug/s	14.4	160	516	72.7	433	283
STYRENE	Concentration	ug/Rm^3	1.47	13.2	18.5	6.64	13.1	17.3
	Emission Rate	ug/s	2.07	88.3	96.3	8.87	78.0	88.7
1,1,1,2-TETRACHLOROETHANE*	Concentration	ug/Rm^3	0.72	13.2	18.5	6.61	13.1	17.3
	Emission Rate	ug/s	1.03	88.3	96.3	8.87	78.0	88.7
1,1,2,2-TETRACHLOROETHANE*	Concentration	ug/Rm^3	0.72	13.2	18.5	6.61	13.1	17.3
	Emission Rate	ug/s	1.03	88.3	96.3	8.87	78.0	88.7
TETRACHLOROETHENE*	Concentration	ug/Rm^3	0.72	13.2	18.5	6.61	13.1	17.3
	Emission Rate	ug/s	1.03	88.3	96.3	8.87	78.0	88.7
TOLUENE	Concentration	ug/Rm^3	29.4	661	1935	21.1	1862	2437
	Emission Rate	ug/s	42.2	4307	10093	28.7	11313	12387
1,1,1-TRICHLOROETHANE*	Concentration	ug/Rm^3	0.72	13.2	18.5	6.61	13.1	17.3
	Emission Rate	ug/s	1.03	88.3	96.3	8.87	78.0	88.7
1,1,2-TRICHLOROETHANE*	Concentration	ug/Rm^3	0.72	13.2	18.5	6.61	13.1	17.3
	Emission Rate	ug/s	1.03	88.3	96.3	8.87	78.0	88.7
TRICHLOROETHENE*	Concentration	ug/Rm^3	0.72	13.2	18.5	6.61	13.1	17.3
	Emission Rate	ug/s	1.03	88.3	96.3	8.87	78.0	88.7
TRICHLOROTRIFLUOROETHANE*	Concentration	ug/Rm^3	1.45	26.3	32.6	13.2	26.1	34.6
	Emission Rate	ug/s	2.03	170	171	17.7	159	177
1,2,4-TRIMETHYLBENZENE*	Concentration	ug/Rm^3	0.72	13.2	18.5	6.61	13.1	17.3
	Emission Rate	ug/s	1.03	88.3	96.3	8.87	78.0	88.7
1,35-TRIMETHYLBENZENE*	Concentration	ug/Rm^3	0.72	13.2	18.5	6.61	13.1	17.3
	Emission Rate	ug/s	1.03	88.3	96.3	8.87	78.0	88.7
VINYL ACETATE**	Concentration	ug/Rm^3	0.72	13.2	18.5	7.40	13.1	17.3
	Emission Rate	ug/s	1.03	88.3	96.3	9.93	78.0	88.7
VINYL CHLORIDE (CHLOROETHENE)*	Concentration	ug/Rm^3	1.45	26.3	37.0	13.2	26.1	34.6
	Emission Rate	ug/s	2.03	170	193	17.7	159	177
XYLENE	Concentration	ug/Rm^3	3.66	52.6	73.9	26.5	52.2	69.3
	Emission Rate	ug/s	5.17	355	242	35.5	318	352

* Using the method detection limit to calculate the emissions from both scenarios.
** Using the method detection limit to calculate the emissions from Scenario 1.
*** Using the method detection limit to calculate the emissions from Scenario 2.

Plasco Demonstration Program - December 2010								
			Scenario 1			Scenario 2		
Measurement Parameter		**Units**	**Engine Exhaust**	**Flare Engine**	**Flare No Engine**	**Engine Exhaust**	**Flare Engine**	**Flare No Engine**
ALDEHYDES								
Acetaldehyde	Concentration	ug/Rm^3	50.8	126	171	57.6	70.1	178
	Emission Rate	ug/s	72.0	823	890	79.8	427	910
Acrolein*	Concentration	ug/Rm^3	1.89	2.28	3.12	1.81	2.19	3.43
	Emission Rate	ug/s	2.67	15.0	16.0	2.45	14.0	18.0
Formaldehyde	Concentration	ug/Rm^3	209	82.2	62.0	111	165	111
	Emission Rate	ug/s	293	533	320	154	1037	570
EFFLUENT CHARACTERISTICS								
Average Stack Temperature		°C	343	775	685	344	774	656
Average Velocity		m/s	20.8	3.26	3.35	20.7	3.39	3.34
Oxygen Concentration		%	4.5	7.6	10.4	4.5	7.6	11.5
CO2 Concentration		%	13.4	10.3	8.0	13.4	10.3	7.1
Effluent Molecular Weight (dry)		kg/kg mol	30.5	30.1	29.8	30.4	30.1	29.7
Effluent Molecular Weight (wet)		kg/kg mol	29.4	29.1	29.1	29.3	29.1	29.1
Effluent Moisture Content		%	9.1	8.2	5.6	9.0	8.1	4.9
Actual Effluent Flow Rate		m3/s	1.96	18.3	18.2	1.87	18.4	18.2
Standard Flow Rate (wet)		STDm3/s	0.937	5.15	5.55	0.897	5.16	5.73
Standard Flow Rate (dry)		STDm3/s	0.853	4.72	5.23	0.816	4.74	5.44
SAMPLE PARAMETERS								
Sample Period		minutes	60	60	60	60	60	60
Dry Reference Sample Volume		STDm^3	0.0320	0.0318	0.0304	0.0335	0.0326	0.0306
Number of Sampling Ports		----	1	1	1	1	1	1
Sampling Ports Location (ideal/non-ideal)		----	1	1	1	1	1	1
Number of Traverses		----	1	1	1	1	1	1
Number of Sampling Points		----	1	1	1	1	1	1
Number of Readings/Sampling Point		----	12	12	12	12	12	12
Sampling time per Reading		minutes	5	5	5	5	5	5

* Using the method detection limit to calculate the emissions for both Scenarios.

The testing program met the source testing requirements outlined in the amended Certificate of Approval (Air) No. 7043-8A7KNZ.

Compliance with In-Stack Concentrations

The Certificate of Approval's Condition 2 outlines the in-stack concentration limits that are required to be met by the facility while in operation.

The following table provides a summary of the compliance status of the facility, as it relates to in-stack concentrations:

PLASCO DEMONSTRATION PROGRAM - DECEMBER 2010

Operating Mode	Scenario	PM	CADMIUM	LEAD	MERCURY	DIOXINS	THC	NOx	SO2	HCl
		(mg/Rm^3)	(ug/Rm^3)	(ug/Rm^3)	(ug/Rm^3)	($pgTEQ/Rm^3$)	(ppmv - CH_4)	(ppmv)	(ppmv)	(ppmv)
ENGINE #1 EXHAUST (BEFORE RELEASE TO THE FLARE)	Scenario 1	1.04	<0.02	0.04	0.07	1.15	160*	N/A	N/A	N/A
	Scenario 2	0.91	<0.01	0.03	0.15	1.00	127*	N/A	N/A	N/A
FLARE EMISSIONS - TREATING ENGINE #1 EXHAUST	Scenario 1	0.73	0.04	0.20	0.17	1.47	0.0	N/A	N/A	N/A
	Scenario 2	0.97	<0.07	0.22	0.10	1.63	0.0	N/A	N/A	N/A
FLARE EMISSIONS - BY PASS MODE (NO ENGINE EXHAUST)	Scenario 1	0.84	0.07	0.26	0.20	1.69	0.0	N/A	N/A	N/A
	Scenario 2	0.53	<0.02	0.03	0.16	1.58	0.0	N/A	N/A	N/A
CofA (Air) No. 7043-8A7KNZ LIMITS	Operational	12	---	---	---	---	75**	---	14	13
	Maximum	17	14	142	20	80	100**	110	21	18

N/A - 24-hour averages not available to determine compliance with limits.

* Normalized to 11% oxygen and based on the average of all "10-minute rolling averages".
** Normalized to 11% oxygen and based on any single "10-minute average" exceedance.

As can be observed from the table, the facility meets the in-stack limits set by the Certificate of Approval, for the contaminants that enough information was provided for their assessment.

Three of the nine in-stack concentration limits (based on 24-hour averages) could not be assessed for compliance due to insufficient sampling time.

Highlights on Engine #1 Exhaust THC generation, and Treatment:

Engine #1 Exhaust complies with the total organic matter (THC) in-stack limit only when it discharges through the Flare. THC and carbon monoxide (CO) are indicators of good combustion conditions (CO), and effective destruction of organic compounds within the exhaust gas stream (THC).

THC is reported on methane basis; but may encompass a wide range of trace organic compounds when some portion of the Syngas remains unburned or just partially burned. Some of those trace organic compounds may be hazardous air contaminants.

Based on the organic matter slip (unburned organic matter) provided by Plasco, when running Engine #1 (at the operating parameters prevalent during Scenario 1), the organic matter slip was calculated at 2.5% (assuming a 250 ppmv dry corrected total organic carbon – TOC - engine exhaust concentration).

GE Infra, Energy indicated to Plasco that the organic compounds slip is a technical/physical limitation of the reciprocating engines that it manufactures; that the engines are already optimized, and that any further reduction on the organic matter emissions can be done only through exhaust gas "after-treatment."

Engine #1 is equipped with a MIRATECH® selective catalytic reduction and oxidation (SCO/SCR) equipment, complete with urea dosing for treatment of its exhaust. The system targets the reduction of oxides of nitrogen (NOx), carbon monoxide (CO), and hydrocarbons (HC) from the engine exhaust gas emissions.

Based on specific conservative raw engine data provided by Plasco (on its Trail Road site), MIRATECH rated the system's removal efficiency, as follows: Nitrogen Oxides (NOx) 82%, Carbon Monoxide (CO) 95%, and non-methane hydrocarbons (NMHC) 60%.

The relevance on pointing out the THC limit at Engine #1 exhaust is that, if the Engine exhausts directly to the atmosphere, Plasco will need to reduce the level of unburned Syngas exhausted (calculated at approximately 2.5% of the total Syngas feed to the engine), by further improving the engine's combustion efficiency, or increasing the removal/reduction efficiency of the SCO/SCR system (estimated by its manufacturer at 60% for NMHC).

On the field observation side, during the source testing program, the organic matter speciation emissions showed that a significant number of the compounds monitored were below detection, and the rest exhibited very low concentrations, even though that THC was above the set operational and maximum "in-stack" limits.

This field observation should not be taken as a conclusive indication of unnecessary stringent THC limits; but potentially the lower organic emissions being the result of the facility operating with no significant process stressors that may be present or develop by operating the facility continuously at its maximum capacity; rather than not continuously, at approximately two thirds of its MSW processing capacity, at less than 50% of its high organic content matter processing capacity, and the engine operating at a power throughput of less than 60% of its rated capacity.

Continuous Emission Monitoring System:

Plasco's Continuous emission monitoring (CEM) system is considered not certified to provide reliable emission concentrations to the MOE, as the continuous emission monitors (CEMs) have not met successfully the performance specifications listed in the CofA's Scheduled E, that are required to be met, as indicated in the CofA's Condition 6(1).

A relative accuracy of Plasco's CEM system was undertaken by SDB. The relative accuracy of the CEM system consisted in comparing minute averages collected simultaneously by the source testing consultant's analyzer and Plasco's CEMs.

The following table provides a summary of the relative accuracy results.

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Operating Mode	Scenario	Parameter	Units	NOx	NO	SO2	HCl	THC	CO	CO2*	O2*	Moisture*
ENGINE #1 EXHAUST (BEFORE RELEASE TO THE FLARE)	Scenario 1	Relative Accuracy	%	29	33	16	376	4	48	8	2	----
		Maximum	ppmv	405	332	10.0	1.6	383	8.2	16.2	5.9	----
		Minimum	ppmv	12.5	9.8	4.7	0.7	214	5.1	13.3	2.8	----
		# of 1-minute Rdgs.	----	149	124	149	**	149	149	128	149	----
	Scenario 2	Relative Accuracy	%	25	28	71	668	5	45	7	12	1
		Maximum	ppmv	956	824	8.7	1.5	264	9.3	16.4	6.9	11.4
		Minimum	ppmv	13.5	10.4	0.0	0.04	57.6	2.4	6.5	2.9	2.9
		# of 1-minute Rdgs.	----	174	174	174	**	174	174	174	174	**
FLARE EMISSIONS - TREATING ENGINE #1 EXHAUST	Scenario 1	Relative Accuracy	%	34	39	45	223	----	98	12	13	15
		Maximum	ppmv	178	134	24.3	0.5	3.6	3.4	13.5	8.1	9.8
		Minimum	ppmv	13.1	38.4	5.2	0.0	0.0	0.9	5.7	4.9	7.6
		# of 1-minute Rdgs.	----	179	54	179	**	179	179	179	179	**
	Scenario 2	Relative Accuracy	%	26	----	62	----	----	109	13	15	27
		Maximum	ppmv	237	----	518	0.36	0.0	49.2	13.0	9.4	10.0
		Minimum	ppmv	45.0	----	0.0	0.00	0.0	0.0	8.8	4.6	7.4
		# of 1-minute Rdgs.	----	204	----	204	**	204	204	204	204	**
FLARE EMISSIONS - BY PASS MODE (NO ENGINE EXHAUST)	Scenario 1	Relative Accuracy	%	27	----	25	1758	----	42	16	14	17
		Maximum	ppmv	114	----	104	2.0	0.0	15.0	9.6	12.8	7.2
		Minimum	ppmv	20.4	----	0.0	0.0	0.0	0.0	6.2	8.4	5.4
		# of 1-minute Rdgs.	----	726	----	726	**	726	726	726	726	**
	Scenario 2	Relative Accuracy	%	25	----	7	272	----	92	18	16	55
		Maximum	ppmv	126	----	40.0	0.7	0.0	30.0	9.1	14.3	6.9
		Minimum	ppmv	44.4	----	0.0	0.0	0.0	0.0	4.8	9.2	4.8
		# of 1-minute Rdgs.	----	717	----	717	**	717	717	717	717	**
RELATIVE ACCURACY LIMIT	CofA Sch. E	----	%	≤ 10	≤ 10	≤ 10	≤ 20	≤ 10	≤ 10	----	≤ 10	----

* Maximum and Minimum concentrations reported in %
** Based on three 4.2-hour isokinetic testing

CEM	Range		
CO	0-2000	ppmv (dry)	
NO	0-150	ppmv (dry)	
O_2	0-25	% vol (dry)	
CO_2	0-20	% vol (dry)	
SO_2	0-50	ppmv (dry)	
THC	0-200	ppmv (wet)	CH_4
HCl		ppmv (dry)	

As can be seen, some analyzers may pass the relative accuracy and at times they will not. There may be many factors for this to happen. The first one is that the Certificate of Approval CEMs requirement of a 168 hour continuous operation without corrective maintenance (to stabilize its operation to site specific conditions) could not be undertaken, as Plasco did not run continuously for 168 hours.

The other aspect will be the accuracy of the analyzer range based on the monitored concentration. For example, the CO analyzer has an operation range of 0-2000 ppmv, with the actual exhaust concentration of less than 20 ppmv on average. This actual concentration falls below the analyzers capability to provide reliable readings (20 ppmv represent 0.01% of the analyzer's scale).

Summarizing,

The source testing program was conducted meeting the source testing requirements and the minimum operating conditions to undertake source testing stated in the Certificate of Approval's Condition 6(4).

The emissions are the reflection of the level and mode of operation of the facility during the source testing program; which was significantly lower that the maximum operating capacity

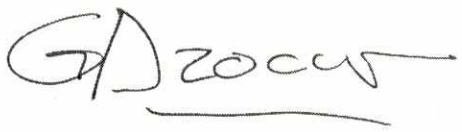
stated in the Certificate of Approval (i.e., typically, the MOE approach to validate worst emissions scenario is based on operating the facility at maximum operating capacity).

The continuous emission monitoring system (CEMs) assessment indicates that the existing CEMs configuration may not be suited at providing reliable real time level of emissions from the facility.

The facility met the in-stack concentration limits, for six of the nine contaminants listed in the Certificate of Approval, and for THC at the engine exhaust only when it discharges through the Flare.

The compliance status of three contaminants (NOx, SO_2 and HCl) could not be determined due to insufficient emission data to validate their emissions based on 24-hour averages.

If you have questions regarding the above evaluation, please call me at (416) 327-6403.



Guillermo Azocar

cc:

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File AQ-02 (Plasco Trail Road Inc.)

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