Ministry of Public Works

Department of Works and Engineering

Request for Proposals

For

Tynes Bay Waste to Energy Facility - Stack Refurbishment

ADDENDUM 1

Request for Proposals No.: **2022-001-TB**

Issued: **Wednesday October 05, 2022**

Submission Deadline**: Wednesday November 30, 2022 03:00:00 PM AST**

TABLE OF CONTENTS

ADDUNDUM 1

1.1 Ventilation Louvers and Stack Access Doors

The proponents are to include the design, fabrication and replacement of all ventilation louvers in the stack concrete column and above the stack access doors as well as the stack access double doors complete with heavy duty hardware.

1.2 Responses to Questions Received by October 27, 2022

Responses to questions received by October 27, 2022.

1. Analysis of the flue glasses and expected temperature.

See the attached tables – can provide explanations if necessary. Average temperature in the stack flue 473F/245C obviously that's not the temperature in the chimney – don't have any data on that, an estimate would be 100f/37.7C if both streams are running.

2. Would it be possible to obtain a sample of the ash in the flue?

No, the attached tables provide the contents of the gas and particulate matter found in the flue.

3. What was the last coating used on the exterior?

We do not have a record of that coating.

4. Can the aircraft warning light be removed during the refurbishment?

The warning lights must be maintained unless you can obtain written approval from the Authority otherwise.

5. Can the internal flue hopper be removed?

What is the internal flue hopper?

6. Is there a man access in the horizontal section of the flue?

The walkway provides access to both flues. There is a hatch so you can get in there if you're small enough.

7. A representative of the coating specialist will be visiting Bermuda Nov 8th, we are therefore requesting access to the site that day. There are many aspects to this quotation that require extensive consideration, I am therefore respectfully requesting an extension to the closing date to Nov 30.

Agreed, see the revised time table below.

1.3 RFP Timetable

1.3.1 Key Dates

Issue Date of RFP	Wednesday October 05, 2022
Pre-Bid / Site Meeting	Wednesday October 19, 2022 11:00 AM
Deadline for Questions	Wednesday November 23, 2022
Deadline for Issuing Addenda	Friday November 25, 2022
Submission Deadline	Wednesday November 30, 2022 03:00:00 PM
Rectification Period	5 business days
Anticipated Ranking of Proponents	Wednesday December 14, 2022
Contract Negotiation Period	30 calendar days
Anticipated Execution of Agreement	Wednesday February 15, 2023

All times listed are in Atlantic Standard Time (AST). The RFP timetable is tentative only and may be changed by the Government at any time. For greater clarity, business days means all days that the Government is open for business.

Table 1.1

Test Summary
Tynes Bay Waste-to-Energy Facility, Stream #2
Devonshire, Bermuda
May 28-29, 2019

Parameter	Reference Method	Runs	Duration	Comments
Flow	RMs 1-2	Multiple	Varied	
Molecular Weight	RM-3A	Multiple	Varied	
Moisture	RM-4	Multiple	Varied	
Sulfur Dioxide	RM-6C	3	1 hour	
Total Oxides of Nitrogen	RM-7E	3	1 hour	
Carbon Monoxide	RM-10	3	1 hour	
Dioxins, Furans, PAH's [1,2]	RM-23	2	4 hours	
VOCs	RM-25A	3	1 hour	
Hydrogen Chloride	RM-26	3	1 hour	
Trace Metals[3] and PM[4]	RM-5/29	3	2 hours	
Verification of Calibration Gas Dilution System	RM-205	1	N/A	
Particle Sizing	N/A	3	1 hour	

Notes:

RM = United States Environmental Protection Agency Reference Method
[1] Dioxins and Furans are reported as both total and toxic equivalents (TEQ)
[2] 1989 NATO toxic equivalent factors are used for TEQ calculations
[3] Trace Metals include: As, Be, Cd, Cr, Cu, Pb, Ni, Se, Tl, Zn, Hg
[4] Particulate measurements are determined by front half analysis of the RM 29 sample train prior to metals digestion as allowed by RM 29

Table 2.1

Summary of Stack Parameters
Tynes Bay Waste-to-Energy Facility, Stream #2
Devonshire, Bermuda
May 28-29, 2019

Test Type (Location)	Run	Test Date	Start Time	Stop Time	Stack Temp. (°C)	Moisture (%)	Stack Velocity (m/s)	Actual Flow Rate (m3/min)	Dry Normal Flow Rate (DNm3/min)
PM/Metals	**1**	5/28/2019	10:37	12:48	473	8.0	23.7	1,301	632
	2	5/28/2019	12:49	14:58	502	7.8	29.4	1,613	766
	3	5/29/2019	9:05	11:17	467	14.5	25.8	1,419	644
	Average								**681**
Dioxin/PAH	**1**	5/28/2019	10:15	13:09	476	11.4	24.2	1,327	628
	2	5/29/2019	12:48	16:56	476	11.3	24.8	1,362	635
	Average								**631**
HCl	**1**	5/28/2019	15:20	16:20	447	15.4	18.5	1,015	466
	2	5/29/2019	9:07	10:07	455	10.6	21.8	1,194	575
	3	5/29/2019	10:33	11:33	473	10.3	22.9	1,257	596
	Average								**546**
THC	**1**	5/28/2019	11:10	12:10	473	8.0	23.7	1,301	632
	2	5/28/2019	12:40	13:40	502	7.8	29.4	1,613	766
	3	5/29/2019	10:08	11:08	473	10.3	25.8	1,419	644
	Average								**681**
NO_x, CO, SO_2	**1**	5/28/2019	11:10	12:10	473	8.0	23.7	1,301	632
	2	5/28/2019	12:40	13:40	502	7.8	29.4	1,613	766
	3	5/29/2019	10:08	11:08	473	10.3	25.8	1,419	644
	Average								**681**

Table 2.2

Summary of Particulate Matter/Metals Emissions
Tynes Bay Waste-to-Energy Facility, Stream #2
Devonshire, Bermuda
May 28-29, 2019

Stack Parameters		Run 1	Run 2	Run 3	Average
Oxygen (% vol. Dry)		11.4	12.0	10.6	**11.33**
Flow Rate (Nm3/min)		632	766	644	**681**
Metals Emission Rate (mg/Nm3@11% O2)	As	4.61E-03	1.68E-02	1.05E-02	**1.06E-02**
	Be	7.20E-05	6.13E-05	6.01E-05	**6.45E-05**
	Cd	2.08E-02	5.21E-02	1.89E-02	**3.06E-02**
	Cr	5.66E-03	1.13E-02	1.51E-02	**1.07E-02**
	Cu	4.18E-02	1.26E-01	5.41E-02	**7.41E-02**
	Pb	1.33E-01	4.60E-01	1.72E-01	**2.55E-01**
	Ni	6.12E-03	7.79E-03	1.24E-02	**8.76E-03**
	Se	7.20E-04	6.13E-04	6.01E-04	**6.45E-04**
	Tl	6.27E-03	2.32E-02	5.29E-03	**1.16E-02**
	Zn	1.47E+00	3.68E+00	1.71E+00	**2.29E+00**
	Hg	5.08E-03	3.37E-02	2.46E-02	**2.11E-02**
PM Concentration (mg/Nm3@11% O2)		10.86	75.55	32.34	**39.58**
PM Emissions Rate (kg/hr)		0.456	5.914	1.068	**2.479**

Table 2.3

Summary of Dioxin/Furan/PAH's Results
Tynes Bay Waste-to-Energy Facility, Stream #2
Devonshire, Bermuda
May 28-29, 2019

Dioxins/Furans

Date	Run	Concentration	
		TEQ	Total
		ng/Nm3 @ 11% O2	ng/Nm3 @ 11% O2
5/28/2019	1	7.6	405.8
5/29/2019	2	5.3	289.9
Average		**6.42**	**347.84**

PAH's

			µg/Nm3 @ 11% O2
Analyte	**Run 1**	**Run 2**	**Average**
Naphthalene	1.02E+00	7.54E-01	8.87E-01
2-Me-Naphthalene	4.30E-01	1.33E-01	2.82E-01
Acenaphthylene	0.00E+00	8.59E-03	4.30E-03
Acenaphthene	2.51E-01	3.46E-02	1.43E-01
Fluorene	1.69E+00	1.75E-01	9.34E-01
Phenanthrene	5.59E-01	2.34E-01	3.96E-01
Anthracene	7.90E-02	0.00E+00	3.95E-02
Fluoranthene	8.05E-01	3.46E-01	5.75E-01
Pyrene	6.36E-01	2.32E-01	4.34E-01
Benz[a]anthracene	1.95E-01	6.27E-02	1.29E-01
Chrysene/Triphenylene	3.49E-01	1.38E-01	2.43E-01
Benzo[b]fluoranthene	4.21E-01	1.59E-01	2.90E-01
Benzo[k]fluoranthene	1.29E-01	5.49E-02	9.18E-02
Benzo[e]pyrene	9.00E-01	3.15E-01	6.08E-01
Benzo[a]pyrene	3.65E-01	1.02E-02	1.88E-01
Perylene	5.84E-02	6.03E-03	3.22E-02
Indeno[1,2,3-cd]pyrene	1.97E-01	8.17E-02	1.39E-01
Dibenzo[a,h]anthracene	4.45E-02	2.73E-02	3.59E-02
Benzo[g,h,i]perylene	2.31E-01	1.30E-01	1.81E-01

Table 2.4

Compliance Limits
Tynes Bay Waste-to-Energy Facility, Stream #2
Devonshire, Bermuda
May 28-29, 2019

Parameter	Units*	Average Emission	Permit Limit
Particulate	mg/Nm3	39.6	35
Carbon Monoxide	mg/Nm3	41.1	50
Sulfur Dioxide	mg/Nm3	69.4	100
Hydrogen Chloride	mg/Nm3	326	800
Dioxin/Furan	TEQ ng/Nm3	6.42	1.00

*** corrected to 11% O2**

Table 2.5

Summary of Gaseous Emissions
Tynes Bay Waste-to-Energy Facility, Stream #2
Devonshire, Bermuda
May 28-29, 2019

Parameter	Run	Date	Run Times	Oxygen (%)	Normal Flow Rate (Nm3/min)	Concentration (mg/Nm3@11% O2)	Emission Rate (kg/hr)
THC	1	5/28/2019	11:10-12:10	11.5	632	0.75	0.40
(as propane)	2	5/28/2019	12:40-13:40	11.9	766	0.03	0.02
	3	5/29/2019	10:08-11:08	10.5	644	0.67	0.027
					Average	**0.48**	**0.15**
SO2	1	5/28/2019	11:10-12:10	11.5	632	64.48	2.32
	2	5/28/2019	12:40-13:40	11.9	766	33.64	1.40
	3	5/29/2019	10:08-11:08	10.5	644	110.00	4.47
					Average	**69.37**	**2.73**
CO	1	5/28/2019	11:10-12:10	11.5	632	35.92	1.29
	2	5/28/2019	12:40-13:40	11.9	766	70.14	2.92
	3	5/29/2019	10:08-11:08	10.5	644	17.37	0.71
					Average	**41.14**	**1.64**
NOx	1	5/28/2019	11:10-12:10	11.5	632	385.10	13.88
	2	5/28/2019	12:40-13:40	11.9	766	344.60	14.36
	3	5/29/2019	10:08-11:08	10.5	644	330.10	13.42
					Average	**353.27**	**13.89**
HCl	1	5/28/2019	15:20-16:20	10.6	466	397.3	13.33
	2	5/29/2019	09:07-10:07	10.3	575	280.2	11.93
	3	5/29/2019	10:33-11:33	10.6	596	299.1	12.82
					Average	**325.5**	**12.69**

Table 2.6

Summary of Particle Size Testing
Tynes Bay Waste-to-Energy Facility, Stream #2
Devonshire, Bermuda
May 28-29, 2019

Aerodynamic Diameter, µm	Run 1	Run 2	Run 3
13.5 or greater	0.0%	27.1%	1.2%
8.3 - 13.5	0.0%	0.0%	0.0%
5.7 - 8.3	0.0%	14.0%	6.2%
3.8 - 5.7	0.0%	0.0%	0.0%
2.4 - 3.8	0.0%	7.8%	13.2%
1.3 - 2.4	91.2%	0.0%	0.0%
0.75 - 1.3	8.8%	0.0%	38.0%
0.51 - 0.75	0.0%	23.3%	7.8%
0.51 or less	0.0%	27.9%	33.7%
Total	100.0%	100.0%	100.0%

Table 4.1

Equipment Calibration Summary
Tynes Bay Waste-to-Energy Facility, Stream #2
Devonshire, Bermuda
May 28-29,2019

Equipment	Reference	Calibrated With	Limit	Equipment ID	Calibration Date	Calibration Within Limit?
Barometer	Method 2 Section 4.4	NWS Barometer (a)	± 0.1 in. Hg	N/A	5/28/2019	Yes
Meter Box Pre-Test	Method 5 Section 5	Standard Dry Gas Meter	Y: within ±0.02 of avg. DH@: within ±0.2 of avg.	9253	7/17/2018	Yes
				9255	9/11/2018	Yes
				9262	1/28/2019	Yes
Meter Box Post-Test	Method 5 Section 5	Standard Dry Gas Meter	Y: avg. or YQA within 5% of meter box value	9253	7/18/2019	Yes
				9253	5/29/2019	Yes
				9262	5/29/2019	Yes
Pitot Assembly	Method 2	Reference Thermocouple	(b)	9394	8/7/2019	Yes
				9469	8/7/2019	Yes
				9473	8/7/2019	Yes
Nozzles	Method 5	Calipers		GC-27	3/21/2017	Yes
				GC-29	3/21/2017	Yes

NWS = National Weather Service

Notes:
(a) The elevations of GHD and the National Weather Service (at the Niagara Falls Airport) are next to each other, thus eliminating the need for elevation correction. The barometer is calibrated within

one month prior to field use. The date above refers to the post-test calibration date. Refer to the calibration report for pre-test calibration date.

(b) Pitot calibration checks include the measurement of geometric specifications, equipment is inspected for damage or misalignment following each field test.