Appendix G: Source Testing Operating Conditions

ST MARYS CEMENT INC. (CANADA), ST. MARYS PLANT

ST. MARYS, ONTARIO

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1 SOURCE TESTING OPERATING CONDITIONS EXECUTIVE SUMMARY

As per ECA 6394-D78PR2 Schedule G.5.3 the facility is required to record operational data at the time of Source Testing.

The facility's operational data during and around the Source Testing period are as follows.

	March 14 – May 30 2025	**Source Testing April 8 – 11, 2025**
Clinker Production (metric tpd)	1792	1881
Clinker Production (metric tph)	77.4	78.4
Conventional Fuel (petcoke) (metric tph)	5.8	5.0
ALCF Plastic Condition 7.1.b (metric tph)	2.51	4.0
ALCF Wood Condition 7.1.c (metric tph)	0.104	0.29
Industrial Byproduct Materials as Kiln Feed (metric tph)	119.83	126.45

Analysis of the ALCF used on site during the Source Testing indicated material that met the criteria for ALCF.

The following shows a comparison of the results with their applicable limits as listed in Schedule B of the ECA. The results show that the emission concentrations are below those outlined in the ECA for all parameters.

Parameter	**Stack Testing Results**	**ECA Limits**	**Results**
Limits in Schedule B Of the C of A 6394-D78PR2			
Matter	42.6 mg/Rm3	50 mg/Rm3	Pass
Cadmium	0.523 µg/Rm3	7 µg/Rm3	Pass
Lead	20.7 µg/Rm3	60 µg/Rm3	Pass
Mercury	< 2.61 µg/Rm3	20 µg/Rm3	Pass
Dioxins and Furans	< 31.6 pg/Rm3	80 pg/Rm3 ITEQ	Pass
Hydrochloric Acid	9.8 mg/Rm3	27 mg/Rm3	Pass

Concentrations at 250C, 101.3 kPa, dry and 11%O2

2 SCHEDULE G.5.3. RECORDS OF OPERATING CONDITIONS DURING SOURCE TESTING

Schedule G of the ECA 6394-D78P42 Requires the following:

2.1 Fuel Analysis Program

Schedule G.5.3.b. The ECA requires a summary of the results of the fuel analysis program specified in Condition 8.9* of the ECA.

*Note that Condition 8.9 of the ECA 6394-D78PR2 References data during to be recorded during kiln operation. Condition 9.1 of the ECA references the Fuel Analysis Program for Alternative Low Carbon Fuels analysis.

The facility's Alternative Low Carbon Fuel Handling Procedures and Testing Manual (Refer to Appendix G.1) requires the following analysis parameters for acceptance of ALCF. Refer to Appendices G2.1 ALCF Lab Results.

Alternative Fuel Specifications – Operating Parameters

Operational Specification	Parameter	ALCF Composite April 8	ALCF Composite April 9	ALCF Composite April 10	ALCF Composite April 11
Moisture	≤ 25% by weight	8.30	12.37	7.92	8.81
Chlorine Content	≤ 1.5 % by weight	0.22	0.22	0.22	0.22
Calorific Value	≥ 10 MJ/kg	23.385	28.635	29.01	31.317

ALCF Specifications – Environmental Parameters

Environmental Specification	Parameter	ALCF Composite April 8	ALCF Composite April 9	ALCF Composite April 10	ALCF Composite April 11
Testing for the following metals in accordance with current adjunct fuel requirements in the Facility's ECA (Air):	Antimony	<0.1	<0.1	<0.1	<0.1
	Arsenic	<0.1	<0.1	<0.1	<0.1
	Barium	84.5	47.9	19.0	19.8
	Beryllium	<0.1	<0.1	<0.1	<0.1
	Cadmium	<0.1	<0.1	<0.1	<0.1
	Chromium	11.0	5.5	<0.1	<0.1
	Cobalt	<0.1	12.7	7.5	17.9
	Iron	564.6	864.0	606.3	713.3
	Lead	14.2	<0.1	3.4	9.7
	Manganese	13.5	10.4	8.9	8.0
	Mercury	33.2	17.8	3.9	12.3
	Nickel	<0.1	<0.1	<0.1	<0.1
	Selenium	<0.1	<0.1	<0.1	<0.1
	Silver	<0.1	<0.1	<0.1	<0.1
	Tin	<0.1	<0.1	<0.1	<0.1
	Vanadium	<0.1	<0.1	<0.1	<0.1
	Mercury	<0.1	<0.1	<0.1	<0.1

Alternative Fuel Specifications – Carbon Testing (Total and Biological)

Operational Specification	Parameter	ALCF Composite April 11
Carbon	Total and Biological (Biogenic) Carbon	23%

2.2 Clinker Production, Conventional Fuels, Alternative Low Carbon Fuels, Industrial Byproduct Materials

The following table shows the facility's operating conditions the time of Source testing including clinker production in tonnes/hour, conventional fuels fired in the Cement Kiln in tonnes/hour, each category of the ALCF described in Condition 7.1 of the approval in tonnes per hour and tonnes/day.

Condition 7 of the ECA lists the various ALCF approved for use at the facility. Not all approved ALCF materials were in use at the time of the source testing. All weights are listed in metric tons.

	Clinker Production		Conventional Fuel (petcoke) In the kiln		Plastic metric tph Condition 7.1.b		Wood metric tph Condition 7.1.c	
	Metric tph	Summary	Metric tph	Summary	metric tph	Summary	Metric tph	Summary
08-Apr-25 00:00:00	90.8	**Avg tph**	9.2	**Avg tph**	0.0	**Avg tph**	0.0	**Avg tph**
08-Apr-25 01:00:00	74.7	75.3	9.2	6.3	0.0	3.0	0.0	0.7
08-Apr-25 02:00:00	86.0		9.2		0.0		0.0	
08-Apr-25 03:00:00	78.9		7.8		1.6		0.4	
08-Apr-25 04:00:00	67.1		6.3		3.8		1.0	
08-Apr-25 05:00:00	96.6		6.0		4.0		1.0	
08-Apr-25 06:00:00	105.8		5.4		4.0		1.0	
08-Apr-25 07:00:00	56.8		5.7		3.4		0.8	
08-Apr-25 08:00:00	84.6		6.5		2.5		0.6	
08-Apr-25 09:00:00	59.6		5.5		4.0		1.0	
08-Apr-25 10:00:00	68.1		5.5		4.0		1.0	
08-Apr-25 11:00:00	66.7		5.1		4.0		1.0	
08-Apr-25 12:00:00	65.6		4.9		4.0		1.0	
08-Apr-25 13:00:00	68.5		4.9		3.8		1.0	
08-Apr-25 14:00:00	71.5		5.0		4.0		1.0	
08-Apr-25 15:00:00	64.3		7.7		0.3		0.1	
08-Apr-25 16:00:00	72.7		8.3		0.0		0.0	
08-Apr-25 17:00:00	66.6		5.9		3.8		0.9	

08-Apr-25 18:00:00	77.5		5.8		4.0		1.0	
08-Apr-25 19:00:00	88.6		6.1		4.0		1.0	
08-Apr-25 20:00:00	79.7		6.2		4.0		1.0	
08-Apr-25 21:00:00	77.7		6.0		4.0		1.0	
08-Apr-25 22:00:00	65.5		5.4		4.0		1.0	
08-Apr-25 23:00:00	73.6		4.4		4.0		1.0	
09-Apr-25 00:00:00	98.9	**Avg tph**	4.2	**Avg tph**	4.0	**Avg tph**	1.0	**Avg tph**
09-Apr-25 01:00:00	125.8	78.2	4.2	4.7	4.0	4.5	1.0	0.4
09-Apr-25 02:00:00	72.8		4.4		4.0		1.0	
09-Apr-25 03:00:00	87.5		4.4		4.0		1.0	
09-Apr-25 04:00:00	58.5		4.6		4.0		1.0	
09-Apr-25 05:00:00	79.3		4.7		4.0		1.0	
09-Apr-25 06:00:00	67.6		4.8		3.6		0.9	
09-Apr-25 07:00:00	77.5		4.9		3.8		0.9	
09-Apr-25 08:00:00	58.7		4.9		4.0		1.0	
09-Apr-25 09:00:00	59.0		4.9		4.0		1.0	
09-Apr-25 10:00:00	72.0		4.8		4.3		0.0	
09-Apr-25 11:00:00	72.0		4.6		5.0		0.0	
09-Apr-25 12:00:00	56.2		4.8		5.0		0.0	
09-Apr-25 13:00:00	65.7		4.8		5.0		0.0	
09-Apr-25 14:00:00	75.0		4.5		5.0		0.0	
09-Apr-25 15:00:00	69.0		4.4		5.0		0.0	
09-Apr-25 16:00:00	94.1		4.4		5.0		0.0	
09-Apr-25 17:00:00	94.6		4.4		5.0		0.0	
09-Apr-25 18:00:00	84.9		4.5		5.0		0.0	
09-Apr-25 19:00:00	74.7		5.0		5.0		0.0	
09-Apr-25 20:00:00	94.9		5.1		5.0		0.0	

09-Apr-25 21:00:00	81.1		5.2		4.6		0.0	
09-Apr-25 22:00:00	79.4		4.9		5.0		0.0	
09-Apr-25 23:00:00	77.9		4.6		5.0		0.0	
10-Apr-25 00:00:00	83.1	**Avg tph**	5.3	**Avg tph**	3.7	**Avg tph**	0.0	**Avg tph**
10-Apr-25 01:00:00	85.0	78.5	4.6	4.8	5.0	4.7	0.0	0.0
10-Apr-25 02:00:00	76.5		4.6		5.0		0.0	
10-Apr-25 03:00:00	101.8		4.6		5.0		0.0	
10-Apr-25 04:00:00	79.0		4.6		5.0		0.0	
10-Apr-25 05:00:00	81.7		4.6		5.0		0.0	
10-Apr-25 06:00:00	85.8		4.6		5.0		0.0	
10-Apr-25 07:00:00	75.3		4.6		5.0		0.0	
10-Apr-25 08:00:00	86.5		4.6		5.0		0.0	
10-Apr-25 09:00:00	77.9		4.6		5.0		0.0	
10-Apr-25 10:00:00	66.4		4.8		5.0		0.0	
10-Apr-25 11:00:00	66.7		4.9		5.0		0.0	
10-Apr-25 12:00:00	74.9		5.7		3.8		0.0	
10-Apr-25 13:00:00	86.7		7.6		0.5		0.0	
10-Apr-25 14:00:00	79.0		4.7		5.0		0.0	
10-Apr-25 15:00:00	42.0		4.7		5.0		0.0	
10-Apr-25 16:00:00	72.0		4.7		5.0		0.0	
10-Apr-25 17:00:00	80.7		4.6		5.0		0.0	
10-Apr-25 18:00:00	89.2		4.5		5.0		0.0	
10-Apr-25 19:00:00	81.6		4.4		5.0		0.0	
10-Apr-25 20:00:00	77.4		4.4		5.0		0.0	
10-Apr-25 21:00:00	80.1		4.5		5.0		0.0	
10-Apr-25 22:00:00	74.7		4.8		4.4		0.0	
10-Apr-25 23:00:00	80.8		4.4		5.0		0.0	

11-Apr-25 00:00:00	79.2	**Avg tph**	4.4	**Avg tph**	5.0	**Avg tph**	0.0	**Avg tph**
11-Apr-25 01:00:00	84.5	81.6	4.3	4.0	5.0	5.0	0.0	0.0
11-Apr-25 02:00:00	92.9		4.2		5.0		0.0	
11-Apr-25 03:00:00	88.0		4.4		4.9		0.0	
11-Apr-25 04:00:00	72.2		4.4		5.0		0.0	
11-Apr-25 05:00:00	100.3		4.3		5.0		0.0	
11-Apr-25 06:00:00	75.6		4.2		5.0		0.0	
11-Apr-25 07:00:00	84.7		4.2		5.0		0.0	
11-Apr-25 08:00:00	95.3		4.3		5.0		0.0	
11-Apr-25 09:00:00	56.8		4.3		5.0		0.0	
11-Apr-25 10:00:00	56.2		4.2		5.0		0.0	
11-Apr-25 11:00:00	70.5		4.1		5.0		0.0	
11-Apr-25 12:00:00	71.8		3.8		5.0		0.0	
11-Apr-25 13:00:00	76.0		3.7		5.0		0.0	
11-Apr-25 14:00:00	86.0		3.6		5.0		0.0	
11-Apr-25 15:00:00	81.5		3.5		5.0		0.0	
11-Apr-25 16:00:00	86.6		3.6		5.0		0.0	
11-Apr-25 17:00:00	77.7		3.7		5.0		0.0	
11-Apr-25 18:00:00	88.1		3.9		5.0		0.0	
11-Apr-25 19:00:00	84.7		3.9		5.0		0.0	
11-Apr-25 20:00:00	93.5		3.7		5.0		0.0	
11-Apr-25 21:00:00	67.9		3.7		5.0		0.0	
11-Apr-25 22:00:00	81.3		3.7		5.0		0.0	
11-Apr-25 23:00:00	107.1		3.6		5.0		0.0	

No fuel adjunct materials were used at the time of source testing.

The following table shows the facility's operating conditions at the time of Source testing including the industrial byproduct material combined in the raw meal into a kiln feed which enters storage silos. The storage silos empty into the kiln as kiln feed.

Industrial Byproduct Materials are combined in the raw mill creating a kiln feed which enters storage silos. The storage silos empty into the kiln as kiln feed.

Raw Material (metric tpd)	4/8/2025	4/9/2025	4/10/2025	4/11/2025
Total Limestone	1773.53	2616.85	1517.72	3571.49
Crushed Clay	96.18	143.66	81.60	197.26
Total Sandstone	157.78	227.88	101.58	276.01
Total Silica	0.00	8.33	19.67	0.00
Alumina, Low Alkali	0.00	0.00	0.00	97.62
Total Iron	31.89	47.23	25.98	61.03
Total Bottom Ash	82.42	122.56	47.41	97.62
Shale	446.32	658.87	346.40	867.80
Total Alumina Soil	40.60	60.37	23.35	0.00
Total Flyash	0.00	0.00	28.71	158.67
Total Raw Mill Material	2628.71	3885.75	2192.43	5327.50
Total Kiln Feed	2878.32	3068.82	3073.89	3118.97

St Mary's Cement notes there are no other records that may affect the source testing results.

Appendix G.1	Alternative Low Carbon Fuel Handling Procedures and Testing Manual
Appendix G.2	ALCF Lab Results