

ALTERNATIVE LOW CARBON FUEL HANDLING PROCEDURES AND TESTING MANUAL

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

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1.0 INTRODUCTION AND PURPOSE

This Alternative Low Carbon Fuel Handling Procedures and Testing Manual provides a summary of operational procedures related to the use of Alternative Low Carbon Fuels (ALCFs) at the St Marys Cement Inc. (Canada) (SMC) St. Marys Cement Plant (the Facility). The Facility is located at 585 Water Street South in St. Marys, Ontario. The following is a summary of what is included in this manual:

- Procedure for ALCF reception, including incoming and outgoing records, and ALCF vendor screening;
- ALCF sampling and testing protocol;
- Steps to take upon identification of deficiencies;
- How ALCFs will be stored at the Facility;
- Fuel preparation and handling procedures; and
- Documentation requirements to remain in compliance with Ontario Regulation (O. Reg.) 79/15.

This manual should be read in conjunction with the current Environmental Compliance Approvals (ECAs).

Should requirements differ between this manual and the ECAs, the ECA requirements should be considered accurate. This manual is administered and maintained by SMC. For a current copy of the manual please contact SMC directly. This manual will be made available to all Facility inspection staff.

1.1 Facility Description

The Facility is a Portland cement manufacturing facility and typically operates 24 hours per day, 7 days per week, and 12 months per year (except during plant shutdowns). The Facility has an approved production limit of 1.1 million tonnes of clinker per year.

ALCFs will be delivered by enclosed trucks, which would enter the proposed fuel storage building. The unloading of these materials will take place in an enclosed process.

The proposed ALCF feed system will be fully integrated with the plant control system to regulate and limit the fuel substitution rates and maintain the required temperature profile and system conditions.

2.0 ALTERNATIVE LOW CARBON FUEL (ALCF) HANDLING PROCEDURES

2.1 ALCF Fuel Reception

ALCFs will be transported to the Facility in enclosed trailers. The typical capacity of each trailer is approximately 20 to 25 tonnes of ALCFs.

In order to minimize potential for fugitive emissions from the unloading of the ALCFs once received at the Facility, material will be unloaded directly from the truck into the ALCF building.

As the fuel is not a subject waste as defined under the Generator Registration Regulation, the material will be accompanied by a straight bill of lading. Each truck will be weighed and directed to the ALCF building for unloading. The unloaded process will be visually inspected by the operator. Processing equipment and fuel feed system will be equipped with video surveillance / monitoring.

Upon completion of unloading, the driver will sweep out any residue remaining in the back of the trailer (especially the tail gate, doors and closure devices) so as to minimize material track out or generation of litter. The driver will close and secure the trailer doors and drive out of the receiving building. The driver will return to the weigh scale where the truck will be re-weighted and a copy of the bill of lading will be given to SMC personnel for record retention.

This process will be monitored by SMC using a 24/7 video surveillance system in the ALCF building.

2.2 Incoming and Outgoing Records

Each truck will be weighed and directed to the ALCF building for unloading. After each trailer is unloaded, the driver will leave a copy of the bill of lading and will be retained as part of the record of delivery. This information will be tracked in electronic logs retained for the ALCF handling.

2.3 ALCF Vendor Screening

SMC intends to enter into formal agreements for ALCF supply. It is anticipated that the ALCF suppliers will be derived from industrial and/or post-consumer sources, with a priority on locally-sourced ALCFs.

The terms of agreement will reflect the requirement of the ALCF supplier to screen for and remove materials that would be unacceptable for SMC, from both the perspective of regulatory compliance and in regard to the suitability of the fuel for the cement making process. Screening would be required to ensure that materials considered hazardous waste (as defined by O. Reg. 347) are excluded from the fuel mix.

Upon securing agreements with ALCF suppliers, SMC will implement an initial fuel testing protocol over a two-month “acceptance period” in which random samples will be taken of the size-reduced fuels and tested once per week. A daily random sample will be taken to make a weekly composite sample (samples will be collected on the days that fuel is delivered to the Facility). The approach will allow for SMC to determine if the material quality specifications are being met and will minimize potential for disruption to stable operations.

During the two-month acceptance period, SMC may decide to undertake random inspections at the point of supply performed by a trained operator who is familiar with the desired composition of the ALCF. The inspector will be in a position so as to safely observe the material as it is being loaded to the transport trailers. If the inspector observes any material in the load which is deemed to be unsuitable for use as ALCF, loading will cease immediately. Unacceptable materials or conditions could include:

- excessively wet material;
- oversized material;
- non-combustible material;
- hazardous materials; and,
- highly odours materials.

Once the acceptance period is complete and if the ALCF supplier has established that they can consistently meet SMC’s ALCF specifications, the frequency of sampling by SMC of the ALCFs will consist of a weekly random sample to produce a monthly composite sample to be tested.

In the ALCF storage building, a 24-hour video surveillance system will be in place to allow trained Facility inspection staff to monitor the receipt and unloading of ALCF at the Facility. The camera will be in a position to observe the material as it is being unloaded. If the inspector observes any material in the load which is deemed to be unsuitable for use as an ALCF, unloading will cease immediately and the material will be returned to the fuel supplier.

SMC shall ensure that an electronic record is prepared each time the fuel is received at the Facility, as outlined in Section 2.8.

2.4 ALCF Sampling and Testing

SMC has established specifications for ALCFs in order to meet both operational and environmental objectives. Operationally, the plant must ensure that the materials meet specifications related to particle size and moisture content so that the materials are suitable for the cement making process. From an environmental standpoint, the metals/metal hydrides scan will be completed in accordance with the current adjunct fuel requirements in the Facility's current ECAs.

The ALCF feed will be sampled as per the protocol below. Once the initial acceptance period is complete, SMC will obtain a metals/metal hydrides scan, including at minimum the compounds listed in Table 2 on a quarterly basis.

Sampling Protocol

During the regular use of ALCFs, fuel sampling and testing will be performed as follows:

- Composite Samples:
 - A grab sample of processed ALCF will be taken by the SMC staff a minimum of one time daily for a period of one week (seven consecutive days or as for many days that the fuel is delivered) for four weeks.
 - One random sample of the grab samples per week for the four-week period will be combined to make the monthly composite sample, which will be used for the monthly or quarterly testing as outlined below to ensure that the products as received meet the required specifications.
- Testing of operating parameters will take place on a monthly basis to ensure that the fuels meet the operational objectives as outlined in Table 1 below.
- Testing of environmental parameters will take place on a quarterly basis to ensure that the fuels meet the environmental objectives as outlined in Table 2 below.
- Testing of carbon (total and biological) will take place in accordance with the Greenhouse Gas Reporting Program as outlined in Table 3 below.

ALCF Specifications and Methodology

Table 1: Alternative Fuel Specifications – Operating Parameters – Tested Monthly

Operational Specification	Parameter	Rationale
Moisture	≤ 25% by weight	• Fuel quality

Operational Specification	Parameter	Rationale
		<ul style="list-style-type: none"> Prevention of run-off Consistent heating value
Chlorine Content	≤ 1.5 % by weight	<ul style="list-style-type: none"> Fuel quality Similar to regulatory guideline in other jurisdictions Testing undertaken in accordance with CSA C22.2 No.03 or MIL-DTL-24643
Calorific Value	≥ 10 MJ/kg	<ul style="list-style-type: none"> Similar to guidance provided by US EPA under CFR 241.3 (d) (1) for non-waste fuels Ease of operation

Table 2: ALCF Specifications – Environmental Parameters - Tested Quarterly

Environmental Specification	Parameter	Rationale
Metals and Metal Hydrides	<p>Testing for the following metals in accordance with current adjunct fuel requirements in the Facility's ECA (Air):</p> <ul style="list-style-type: none"> Antimony Arsenic Barium Beryllium Cadmium Chromium Cobalt Iron Lead Manganese Mercury Nickel Selenium Silver 	<ul style="list-style-type: none"> Quarterly testing of the ALCFs for metals currently listed in the Facility's ECA. Results of POI concentration modelling based on determination of the proportion of the contribution of the ALCF to the mass of the material to the cement plant, should indicate that the POI would not be exceeded. Applies the current approach for fuel testing of Fuel Adjunct Materials in the Facility ECA.

Environmental Specification	Parameter	Rationale
	<ul style="list-style-type: none"> • Tin • Vanadium 	

Table 3: Alternative Fuel Specifications – Carbon Testing (Total and Biological)

Operational Specification	Parameter	Rationale
Carbon	Total and Biological (Biogenic) Carbon	<ul style="list-style-type: none"> • In accordance with the Greenhouse Gas Reporting Program

The methodology used to take these samples will be as follows:

a) Volume and Number of Grab Samples for Composite:

Samples of the processed ALCF will be collected from the fuel feeding conveyor system after the ALCF has been processed and blended or from the trucks if fuel was processed and blended outside the facility.

One representative grab sample per day are to be collected during the weekly sampling period.

The volume of each grab sample should be equal to at least 10 litres (pail or container full).

b) Lot consisting of One Residual Waste Pile

The grab samples will be collected directly from the fuel feed conveyor system using a plastic shovel and a container or pail.

Grab samples will be collected from the fuel feeding conveyor system after ALCF has been processed or blended, or from the trucks if processing and blending was done outside the facility, every day for a week .

c) Preparation of Composite Sample:

One random sample of the grab samples per week for the four-week period will be mixed thoroughly. A composite will be prepared from the mixed grab samples through quartering until a sample volume of 1 to 2 kg is obtained.

Quartering will be performed in the following manner, the residual waste sample is to be reduced is formed into a conical pile, the top of the pile is flattened and dived into four piles along two diameters at right angles to each other, two of the diagonally opposite quarters are removed and discarded, the remaining quarters are mixed and the previous steps are repeated until the desired sample volume is obtained of 1 kg (minimum).

2.5 Identification of Deficiencies

On each day that the Facility is in operation, a visual inspection shall be conducted of the fuel handling facilities, fuel storage facilities and fuel storage areas to determine whether the fuel is stored, handled and maintained in

accordance O. Reg. 79/15. Any deficiencies in the fuel handling facilities, fuel storage or fuel storage areas during a visual inspection or any time shall be remedied forthwith. This inspection may be completed using the 24/7 video surveillance system in the ALCF storage building or other methods.

Immediately after the completion of a visual inspection, an inspection record shall be prepared setting out:

- The name and position of the person who performed the inspection,
- The date of the inspection,
- The amount, type and location of fuel stored at the Facility at the time of the inspection, and
- A description of any deficiencies identified and recommendations regarding steps that should be taken to remedy the deficiencies.

If a deficiency is identified at a time other than during a visual inspection, a record shall be prepared immediately setting out the name and position of the person who identified the deficiency, the date on which it was identified, a description of the deficiency and recommendations regarding steps that should be taken to a remedy by the deficiency.

After a deficiency has been remedied, a record shall be prepared setting out the day on which the deficiency was remedied and a description of the remedial actions taken. SMC will retain:

- A record for two years following the day on which the inspection was conducted or the deficiency was identified, as the case may be; and
- A record for two years following the day on which a deficiency referred to in the record was remedied.
- Records may be retained electronically.

2.6 ALCF Storage

SMC has a proposed dedicated ALCF storage building at the Facility, where reception, unloading, storage, fuel preparation and feeding of the ALCF to the kiln will take place.

In accordance with O. Reg. 79/15 it is expected that each load of ALCF will be used within no more than six months of receipt and SMC shall ensure the following:

- 1) The fuel shall be stored,
 - a. Indoors, or
 - b. Outdoors in enclosed containers that prevents the discharge into the natural environment of both the fuel and any contaminant relating to the fuel.
- 2) The fuel shall be stored, handled and maintained so as to prevent
 - a. Leaks or spills of the fuel and contaminants relating to the fuel, and
 - b. Damage to or deterioration of any container in which the fuel is stored.
- 3) The fuel shall be stored in a safe and secure manner that minimized the impact of dust, odour, noise vectors, vermin and litter on the general public and on the natural environment.

- 4) Access by the general public to fuel handling facilities, fuel storage facilities and fuel storage areas at the Facility shall be controlled by gates, fencing, attendants or other security measures.

2.7 Fuel Preparation and Handling

The ALCF materials may require further size reduction in order to be fed as a fuel and blending to ensure consistency in the fuel feed. This is accomplished through loading the material into a shredder. Materials would then be fed via conveyor to the ALCF feed hopper of the fuel delivery system.

The fuel preparation and handling system will include the following:

- 1) An in-feed conveyor to a shredder to ensure appropriate particle sizes are achieved and to blend materials.
- 2) A drum or belt magnetic separator.
- 3) An enclosed conveyor to transfer materials to the hopper for the ALCF feeding system.
- 4) An ALCF feeding system, electronically controlled and specifically designed to handle light and low bulk density materials.

2.8 Record of Fuel

As required by Section 14 of O. Reg. 79/15 (Record of Fuel), SMC shall ensure that a record is prepared each time the fuel is received at the Site, setting out the following information:

- a) The type and quantity of the fuel received;
- b) The source and origin of the fuel; and
- c) If the vehicle used for transporting the fuel to the site is marked with a number appearing on an environmental compliance approval authorizing the transportation or a registration number appearing on a confirmation of registration under Part II.2 of the Act in respect of the transportation, the number marked on the vehicle; or
- d) If the vehicle is not marked with a number mentioned in paragraph 3, the name of the person transporting the fuel.

In addition, SMC shall ensure that a record is prepared each time ALCF is refused for receipt at the Site, setting out the amount of fuel refused and the reason for the refusal.

The Records of Fuel described above shall be retained for two years following the day on which the fuel described in the record was received at the Site.