

Summary Report:

Imperial Oil Downstream and Chemical Sarnia Manufacturing Site Acid Gas Minimization Plan Under the Requirements of Ontario Regulation 530/18

Submitted to: Imperial Oil, Downstream and Chemical
Sarnia Manufacturing Site
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Revision History

Version	Date	Summary Changes/Purpose of Revision
1	September 23, 2020	None

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EXECUTIVE SUMMARY

This Acid Gas Combustion Minimization Plan was prepared to satisfy the requirements of Section 9(1) of Ontario Regulation 530/18 “Air Pollution – Discharge of Sulphur Dioxide from Petroleum Facilities” (O. Reg. 530/18). The North American Industry Classification System (NAICS) Codes that apply to this Facility include 324110 (Petroleum Refineries) and 3251 (Basic Chemical Manufacturing). Therefore, Imperial Oil Limited (Imperial) is required to comply with O. Reg. 530/18.

The regulatory requirements state that subject Facilities are required to, on or before July 1, 2020, submit a plan to the Director titled “Acid Gas Combustion Minimization Plan”. In response to the several challenges faced during the COVID-19 outbreak the Ministry of Environment, Conservation and Parks (MECP) indicated that the date for submitted the Acid Gas Combustion Minimization Plan would be extended to October 1, 2020.

The plan required under Section 9(1) must be dated, signed and sealed by a licensed engineering practitioner and must set out the practitioner’s name and license number. The plan shall identify the:

- acid gas combustion equipment and upstream processes which may vent into the equipment;
- measures taken to minimize the combustion of acid gas;
- measures intended to be implemented in the future to minimize acid gas combustion;
- operating condition(s) during which the above measure(s) would minimize flaring or otherwise combustion of acid gas;
- methodology to be followed when performing the analysis of the primary cause of the discharge from the acid gas combustion equipment;
- methodology to be followed for the purpose of identifying the measures that are available to prevent or reduce the risk of recurrence of acid gas combustion;
- identification of the measures that are available to prevent or reduce the risk of a similar discharge happening, and
- information with respect to each time sulphur dioxide was discharged from acid gas combustion equipment at the facility as a result of a sulphur recovery unit failing to operate in a normal manner.

This Acid Gas Combustion Minimization Plan will be updated, on or before July 1st, of each year with information from the previous calendar year and a summary of this plan will be posted on the Facility’s website for a period of five years.

ORTECH Consulting Inc. (ORTECH) was retained by Imperial to prepare this Acid Gas Combustion Minimization Plan under the requirements of O. Reg. 530/18 for their Sarnia Operations.

The Imperial Sarnia Operations include refining, petrochemical and lubricating oil manufacturing facilities on more than 566 hectares of land. The Sarnia refinery converts approximately 19,875 cubic meters (125,000 barrels) of crude oil a day on an annual average basis into a wide range of petroleum products including motor gasoline, diesel fuel, home heating oil, aviation fuel and lubricating oils. Production units for lubricating oils and packaging facilities have been permanently shut down. The Chemical manufacturing operation produces a variety of chemicals, which are basic building blocks and chemical intermediates for many products. These materials may be used to make detergents, alcohol, plasticizers, and many others. Specialty solvents are produced for domestic and industrial use in coatings, adhesives, dry cleaning, ink, rubber and household products.

The polyethylene plant produces resins used in the production of toys, pails, crates, tanks and many household products. Support operations include waste and water treatment facilities, storage, blending and distribution areas, mechanical shops, storehouses, docks and a utility plant with a COGEN which produces steam and provides boiler feed water, service water and instrument air are all located on-site. Imperial's Sarnia Technology Applications & Research (STAR) is also located at the site and provides technical application support, as well as product quality and assurance support.

Acid gas combustion equipment covered under this Plan includes:

- the Sulphur Plant Tail Gas Incinerator, identified as S1-F-3300, which discharges to atmosphere via the CO Boiler stack, and
- the flare system including the CCIS Flare, the FCIS Flare and the Conversion Flare.

Imperial has implemented several measures at the Facility to minimize the frequency, duration and magnitude of flaring or otherwise combusting acid gas as listed in Table 1.

Table 1: Implemented Measures to Minimize Acid Gas Combustion

Measure Taken	Associated Operating Condition	Date of Implementation
Install amine storage and associated amine diversion facilities and procedures.	Amine diversion immediately reduces acid gas production from upstream process units in the event of a Sulphur plant trip. Actions taken minimize the amount of acid gas combusted within either the incinerator or flare.	Already in place
Install rich amine flash drums.	Part of base unit design.	Already in place
Ensure sour water separation	Sour water separation (SWS) occurs in 4 areas of the system (in order); process unit separation drum, SWS feed drum, Sour Water tankage, SWS overhead drum. At Sarnia all of these rely on gravity/residence time separation only.	Already in place
Install sour water storage tanks.	The site strategy is to have 2 dedicated sour water tanks available in the event of SWS or SRU outage. There are additional tanks available in other services if needed.	Already in place
Using oxygen enrichment.	Oxygen enrichment up to 28 vol% is actively used to manage SRU hydraulic constraints for margin capture.	Already in place
Increasing operator training.	Operator training is adequate.	Already in place
Update procedures	Update procedures and site practices related to diversion of SWS acid gas	July 2020

Imperial intends to implement several measures at the Facility to minimize the frequency, duration and magnitude of flaring or otherwise combusting acid gas as listed in Table 2.

Table 2: Measures to be Implemented to Minimize Acid Gas Combustion

Measure to be Taken	Associated Operating Condition	Date of Expected Implementation
Improving instrumentation and control	Evaluate Sour Water Separator (SWS) control scheme and/or facilities upgrades to allow SWS restart without diversion to F3300	July 1, 2023 if evaluation determines solution feasible
Review equipment strategies	Equipment strategy review encompasses all phases of operation.	December 2021