

Overview of proposed sulphur dioxide regulation for petroleum facilities

The proposed regulation would apply to the five existing petroleum facilities in Ontario, and it would set out sector-specific technical requirements, as detailed below.

In addition to the proposed regulation, the Environmental Protection Act continues to apply, including the prohibition on causing or permitting the discharge of a contaminant into the environment that causes, or is likely to cause, an adverse effect.

The proposed requirements are based on:

- a jurisdictional review;
- input from industry and Sarnia-area First Nations;
- recommendations from an external panel convened by the ministry whose members had specific expertise in petroleum facilities and applicable air pollution control technologies and best management practices; and
- an analysis of sources of sulphur dioxide at each facility, with an emphasis on encouraging Ontario facilities to catch up with facilities in other jurisdictions, such as the United States.

Application

The proposed regulation would apply to the existing five petroleum facilities in Ontario. These facilities include the four petroleum refineries, namely the Imperial Oil refineries in Sarnia and Nanticoke and the Shell and Suncor refineries in Sarnia, as well as the Petro-Canada Lubricants facility in Mississauga.

O.Reg. 530/18: Air Pollution – Discharge of Sulphur Dioxide from Petroleum Facilities

The proposed regulation would maintain the existing requirements for flaring events that were established previously in Ontario Regulation 530/18: Air Pollution – Discharge of Sulphur Dioxide from Petroleum Facilities (O. Reg. 530/18). These requirements include the discharge limit on acid gas combustion equipment of 225 kg of sulphur dioxide in a 24- hour period. Environmental Penalties for discharge limit exceedances as currently outlined in Ontario Regulation 222/07: Environmental Penalties (O. Reg. 222/07) would also continue to apply.

The discharge limit in O. Reg. 530/18 and related penalties that already apply to the Imperial Oil, Shell and Suncor facilities would be extended to the Petro-Canada Lubricants facility as well.

See below for more information on proposed Environmental Penalties

New requirements for the Ontario Petroleum Facilities

The following is an overview of the proposed regulatory requirements for the petroleum facilities:

1. Emission limit requirements for key sources of sulphur dioxide

Key sources of sulphur dioxide identified at the petroleum facilities include the fluidized catalytic cracking units, Houdry catalytic cracking units, fluid coking units, sulphur recovery units, all facility flares including acid gas flares, and all combustion devices such as boilers, heaters, superheaters, furnaces, thermal and catalytic oxidizers that receive and combust sulphur-bearing streams such as vents, reliefs, fuels, co-fuels, supplementary and enrichment fuels, lift gas, purge gas, off-gas, sour gas and acid gas. Not all of these sources may be present at each facility.

Table 1 summarizes the proposed emission limits. The proposed emission limits reflect the following:

- Equipment-specific, process unit-specific sulphur dioxide, hydrogen sulphide and total reduced sulphur emission limits, and possibly a combination of these limits (e.g., a weighted/blended emission limit, for those cases where emissions from two or more processes and/or equipment are sent to one stack), similar to existing US EPA regulations, would be adopted for these key sources.
- For all flares, including acid gas flares, limits would be placed on both the amount of hydrogen sulphide allowed in the fuel gas to the flare and the total mass of sulphur dioxide released from the flare in a 24-hour period. For other combustion devices, the facilities would have a choice of either meeting the appropriate equipment-specific sulphur dioxide discharge limit or a limit on the amount of hydrogen sulphide allowed in any fuel gas burned in these combustion devices to be monitored downstream of all mixing and blending of fuels.

In addition to the proposed emission limits, upon filing of the regulation, solid fuels, such as petroleum coke, would no longer be allowed in any combustion device. These fuels are not currently used, and this requirement would prevent any future use. In addition, the use of liquid fuels such as refinery fuel oil would no longer be allowed in any combustion devices, except for emergency situations or when there is an insufficient supply of critical fuels (for example, supplier constraints). All uses of refinery fuel oil would be recorded and made available to the ministry upon request. Public reporting would also be required whenever these liquid fuels are used, This ban would have the co-benefit of reducing other contaminants such as particulates.

Table 1: Proposed Emission Limits by Source of Contaminant

Sulphur Dioxide Emission Source	Emission Limits
Fluidized Catalytic Cracking Unit, Fluidized Coking Unit, and other Thermal Cracking Units	<ol style="list-style-type: none"> 1. 50 ppmv SO₂ (dry basis, corrected to 0% excess air, 7-day rolling average basis) 2. 25 ppmv SO₂ (dry basis, corrected to 0% excess air, 365-day rolling average basis)
Houdry Catalytic Cracking Unit (See Note 1)	<ol style="list-style-type: none"> 1. 50 ppmv SO₂ (dry basis, corrected to 0% excess air, 7-day rolling average basis) 2. 25 ppmv SO₂ (dry basis, corrected to 0% excess air, 365-day rolling average basis)
Sulphur Recovery Unit with design production capacity greater than 20 tonnes per day (See Note 4)	<p>For Sulphur Recovery Units with an incinerator, the SO₂ emission limit is:</p> <ol style="list-style-type: none"> 1. Determined using equation (1) in Note 2 if the oxygen in the air/oxygen mixture to the Claus burner is continuously measured. 2. 250 ppmv (dry basis) at 0% excess air (12-hour rolling average basis) for Sulphur Recovery Units that use only ambient air in Claus burner or those electing not to monitor O₂ in the air/O₂ mixture to the reaction furnace or for non-Claus Sulphur Recovery Units.
	<p>For Sulphur Recovery Units without an incinerator, the TRS emission limit is:</p> <ol style="list-style-type: none"> 1. Determined using equation (1) if the oxygen in air/oxygen mixture to the Claus burner is continuously measured. 2. 300 ppmv calculated as ppmv (dry basis) SO₂ at 0% excess air (12-hour rolling average basis) for Sulphur Recovery Units that use only ambient air in the Claus burner or for non-Claus Sulphur Recovery Units.
	<p>For Sulphur Recovery Units without an incinerator, the H₂S emission limit is 10 ppmv calculated as ppmv (dry basis) SO₂ at 0% excess air (12-hour rolling average basis).</p>
	<p>Sulphur dioxide mass emission limit of 225 kg SO₂ in 24 hours (in excess of allowable SO₂ or H₂S emission limit), as determined via continuously monitoring SO₂ and flow in the stack and flow or TRS and flow in the fuel gas.</p>
Sulphur Recovery Unit with design production capacity less than or equal to 20 tonnes per day (See Note 1 and Note 4)	<p>For Sulphur Recovery Units with an incinerator, the SO₂ emission limit is:</p> <ol style="list-style-type: none"> 1. Determined using equation (2) in Note 3 if the oxygen in the air/oxygen mixture to the Claus burner is continuously measured. 2. 2,500 ppmv (dry basis) at 0% excess air (12-hour rolling average basis) for Sulphur Recovery Units that use only ambient air in the Claus burner or those electing not to monitor O₂ in air/O₂ mixture to the reaction furnace or for non-Claus Sulphur Recovery Units.

Sulphur Dioxide Emission Source	Emission Limits
	<p>For Sulphur Recovery Units without an incinerator, the TRS emission limit is:</p> <ol style="list-style-type: none"> 1. Determined using equation (2) if the oxygen in the air/oxygen mixture to the Claus burner is continuously measured. 2. 3,000 ppmv calculated as ppmv (dry basis) SO₂ at 0% excess air (12-hour rolling average basis) for Sulphur Recovery Units that use only ambient air in the Claus burner or for non-Claus Sulphur Recovery Units. <p>For Sulphur Recovery Units without an incinerator, the H₂S emission limit is 100 ppmv calculated as ppmv (dry basis) SO₂ at 0% excess air (12-hour rolling average basis).</p> <p>Sulphur dioxide mass emission limit of 225 kg SO₂ in 24 hours (in excess of allowable SO₂ or H₂S emission limit), as determined via continuously monitoring SO₂ and flow in the stack and flow or TRS and flow in the fuel gas.</p>
<p>Combustion Devices (Facilities to elect either SO₂ <u>or</u> H₂S emission limit) (See Note 5)</p>	<p>Concentration Limits for H₂S in fuel gas to Combustion Devices:</p> <ol style="list-style-type: none"> 1. 162 ppmv H₂S (determined hourly on 3-hour rolling average basis) 2. 60 ppmv H₂S (determined daily on 365 successive calendar day rolling average basis) <p>Concentration Limits for SO₂ in any gases discharged to the atmosphere from each Combustion Device:</p> <ol style="list-style-type: none"> 1. 20 ppmv (dry basis, corrected to 0% excess air, determined hourly on 3-hour rolling average basis) 2. 8 ppmv (dry basis, corrected to 0% excess air, determined daily on 365 successive calendar day rolling average basis) <p>Sulphur dioxide mass emission limit of 225 kg SO₂ in 24 hours (in excess of allowable SO₂ or H₂S emission limit), as determined via continuously monitoring SO₂ and flow in the stack and flow or H₂S and flow in the fuel gas.</p>
<p>Flares, including Acid Gas Flares</p>	<p>Concentration Limit for H₂S in fuel gas to Flares:</p> <ol style="list-style-type: none"> 1. 162 ppmv H₂S (determined hourly on 3-hour rolling average) 2. 60 ppmv H₂S (determined daily on 365 successive calendar day rolling average basis) <p>Sulphur dioxide mass emission limit of 225 kg SO₂ in 24 hours, as determined via continuously monitoring TRS and flow in the flare header prior to combustion.</p>

H₂S: Hydrogen Sulphide

ppmv: parts per million by volume

TRS: Total Reduced Sulphur

Acid gas: any gaseous stream that contains at least 0.5 wt% total sulphur

O₂: Oxygen

SO₂: Sulphur Dioxide

Fuel gas: any gas which is generated at a petroleum facility and which is combusted

Notes

1. Houdry Catalytic Cracking Unit (HCCU) and small Sulphur Recovery Units: The ministry is reviewing the emission limits for these two source types and may revise based on additional information.

2. $ELS = K_1 \times (-0.038 \times (\%O_2)^2 + 11.53 \times \%O_2 + 25.6)$ (Equation 1)

ELS = Emission limit for large sulphur recovery unit, ppm_v (as SO₂, dry basis at 0% excess air);

k₁ = Constant factor for emission limit conversion:

k₁ = 1 for converting to the SO₂ limit for a sulphur recovery unit with an incinerator;

k₁ = 1.2 for converting to the reduced sulphur compounds limit for a sulphur recovery unit without an incinerator; and

%O₂ = O₂ concentration of the air/oxygen mixture supplied to the Claus burner, percent by volume (dry basis). If only ambient air is used for the Claus burner or if the owner or operator elects not to monitor O₂ concentration of the air/oxygen mixture used in the Claus burner or for non-Claus sulphur recovery units, use 20.9% for %O₂.

3. $ESS = K_1 \times (-0.38 \times (\%O_2)^2 + 115.3 \times \%O_2 + 256)$ (Equation 2)

ESS = Emission limit for small sulphur recovery unit, ppm_v (as SO₂, dry basis at 0% excess air);

k₁ = Constant factor for emission limit conversion:

k₁ = 1 for converting to the SO₂ limit for a sulphur recovery unit with an incinerator and

k₁ = 1.2 for converting to the reduced sulphur compounds limit for a sulphur recovery unit without an incinerator; and

%O₂ = O₂ concentration of the air/oxygen mixture supplied to the Claus burner, percent by volume (dry basis). If only ambient air is used in the Claus burner or if the owner or operator elects not to monitor O₂ concentration of the air/oxygen mixture used in the Claus burner or for non-Claus sulphur recovery units, use 20.9% for %O₂

4. Sulphur Recovery Unit: For the purposes of this proposed regulation, the term sulphur recovery unit includes all process units which recover sulphur from acid gases produced at amine units and sour water stripper units at a petroleum facility. For example, a Modified Claus Sulphur Recovery Unit may include acid gas feed knock-out drums, the reaction furnace, waste heat boiler, reheaters, catalytic reactors, condensers, coalescer, sulphur pits, sulphur degassing, sulphur loading and, if present, oxidation or reduction control systems and incinerator (thermal oxidizer) or similar combustion device.

5. Combustion Devices: For the purposes of this proposed regulation, the term combustion device includes boilers, heaters, superheaters, furnaces, and thermal and catalytic oxidizers but does not include flares or any incinerator associated with the sulphur recovery unit.

Short-Term Requirements -Additives Three of the impacted facilities have Fluidized Catalytic Cracking Units (FCCUs) for with limits have been proposed in Table 1. It is proposed that those limits be achieved by December 31, 2026.

To ensure emissions are reduced in the short-term, the ministry is also proposing to require that sulphur dioxide-reducing additives be deployed on any FCCUs within two months of this proposed regulation being filed.

With the use of additives it is proposed that Imperial Oil’s Sarnia’s FCCU would be required to achieve a 95% reduction, and Imperial Oil’s Nanticoke facility and Shell’s FCCUs would need to achieve a 35% reduction (note, the reduction required for Shell and Imperial Oil Nanticoke is under review for feasibility and may be revised based on additional information). By July 1, 2022, and by July 1 in each subsequent year, each of these facilities would be required to submit a report to the ministry that demonstrates how the emissions reduction requirement was achieved. This performance requirement would be in place until the emission limits specified in Table 1 for FCCUs come into force.

Root Cause Analysis and Corrective and Preventative Action Reports

In certain circumstances, as described in Table 2, exceedances of the sulphur dioxide emission limit would result in the requirement for a facility to develop a Root Cause Analysis and Corrective and Preventive Action Report and submit this report to the ministry.

Table 2: Proposed Requirements for Root Cause Analysis and Corrective and Preventive Action Reports

Sulphur Dioxide Emission Source	Requirements for Root Cause Analysis and Corrective and Preventive Action Reports
Sulphur Recovery Units	A report would be required if more than 225 kg of SO ₂ was released in 24 hours in excess of the allowable SO ₂ emission limit, as determined through continuous monitoring of SO ₂ concentration and flow in the discharge to the atmosphere.
Combustion Devices	A report would be required if more than 225 kg of SO ₂ was released in 24 hours in excess of the allowable SO ₂ emission limit, as determined through continuous monitoring of either: <ol style="list-style-type: none"> 1. H₂S concentration and flow of all fuels prior to combustion in Combustion Devices 2. SO₂ concentration and flow in the discharge to the atmosphere from all Combustion Devices.
Flares, including Acid Gas Flares	A report would be required if more than 225 kg of SO ₂ was released in 24 hours, as determined through continuous monitoring of TRS and flow of gases prior to combustion in a Flare.

2. Management practices for key sources of sulphur dioxide

Each facility would be required to develop and submit to the ministry by January 1, 2023 a detailed Sulphur Dioxide Emission Minimization Plan for all processing units, flares and other combustion devices that release sulphur dioxide to air. In addition to a description of the facility's systems, procedures, plans, practices and training for managing baseload sulphur dioxide emissions, this plan would be required to identify actions to be taken to minimize sulphur dioxide emissions and peak concentrations in the community caused by transient acid gas combustion events. This plan would list actions taken by facilities to reduce sulphur dioxide emissions on both baseload emissions and all transitional operating conditions in amine units and their feeding systems, sour water stripper units and their feeding systems, sulphur recovery units, tail gas treating units, incinerators, hydrocarbon flares, acid gas flares and flare gas recovery systems.

The Sulphur Dioxide Emission Minimization Plan would be updated prior to the implementation of any changes in the facility, processing units, emission inventories, emission control systems, continuous monitoring systems, operating conditions, *etc.* and submitted to the ministry for review prior to implementation of the proposed changes. If no changes have been made, the plan would still have to be reviewed by the facility once every five years for an assessment of opportunities for additional reductions in sulphur dioxide emissions from the facility and the facility would submit a summary of these five-year assessments to the ministry for review.

3. *Monitoring requirements for sulphur dioxide*

a. Continuous Monitoring Systems

The proposed regulation would include continuous monitoring requirements for each facility so that the concentration of sulphur dioxide, total reduced sulphur, and hydrogen sulphide, the mass of sulphur dioxide and the applicable flow rates from all sources with emission limits as listed in Table 1 can be continuously determined. These continuous monitoring systems would be used for demonstrating compliance with the specified concentration and mass emission limits and for identifying improvement areas for further reductions in sulphur dioxide emissions from the facilities.

Each facility would be required to develop a Continuous Monitoring Systems (CMS) Plan for the design, installation, commissioning, and operation of all required continuous monitoring systems and submit to the ministry for review and approval. Facilities would notify the ministry of any proposed changes to approved Continuous Monitoring Systems Plans for review and approval prior to implementation of these changes. It is proposed that the plan be submitted to the ministry by July 1, 2022 and that these continuous monitoring systems be installed by no later than December 31, 2023 and operated by no later than July 1, 2024.

Facilities would also be required to submit sufficient information to demonstrate the CMS will be effective, including a description of any equipment, processes or procedures the owner or operator plans to install or implement to eliminate or reduce acid gas flaring and combustion. The description shall specify the scheduled year of installation or implementation.

b. Ambient Monitoring

Each facility would be required to operate and maintain at least one ambient air monitor measuring for sulphur dioxide, along with meteorological data, at a location that is approved by the ministry. The facilities located in Sarnia would be required to continue to operate their existing ambient monitors and associated meteorological stations. The facilities located in Nanticoke and Mississauga would be required to establish the required stations by July 1, 2023. A monitoring plan would be submitted to the ministry for approval of the new sulphur dioxide and meteorological monitors. These monitors would need to meet Ontario’s requirements for siting, maintenance, operation, and auditing. Any changes to the monitoring plan would also require approval by the ministry.

Data from these sulphur dioxide monitors would be made publicly available and would be used to assess the trends and track performance in reducing sulphur dioxide air concentrations over time. Facilities would be required to track and report 1-hour exceedances of 120 ppb at all community monitors, which is above the Ambient Air Quality Criterion of 40 ppb (100 µg/m³) but much lower than the Upper Risk Threshold of 250 ppb (690 ug/m³). They will also be required to track and report 5-minute exceedances of 200 ppb at these monitors, which is above the short-term Ambient Air Quality Criterion of 67 ppb (~180 µg/m³). Short-term exposures to 200 ppb can cause asymptomatic reductions in lung function for some asthmatics. Below an hourly value of 120 ppb, there should be few 5- to 10-minute exceedances of 200 ppb. This tracking would be included with the regular reporting of exceedances of the proposed emission limits. Additionally, further abatement actions may be required as appropriate under the Environmental Protection Act.

c. Additional flare monitoring requirements

Additional flare monitoring requirements being proposed are outlined in Table 3.

Table 3: Additional Flare Monitoring Requirements

Operating Parameter	Performance Criteria	Monitoring Method Examples
Pilot flame presence	At least one pilot flame at all times when regulated material is routed to	Thermocouple, ultraviolet (UV) beam sensor or infrared (IR) sensor, or

Operating Parameter	Performance Criteria	Monitoring Method Examples
	the flare, determined on a 15-minute block	Video Imaging Spectral Radiometer (VISR) (see Note 1)
Visible emissions	No visible emissions except for periods less than 5 minutes within any consecutive 2-hour period when operating at less than smokeless capacity	Video monitoring and submission of recorded videos to the ministry upon request
Flare tip velocity (V_{tip})	Less than 60 ft/s OR Less than 400 ft/s and less than maximum allowed flare tip velocity (V_{max})	Ultrasonic time-of-transit flow meters, optical flow sensors (OFS)
Combustion zone operating limits (See Note 2)	Net heating value of flare combustion zone gas (NHV_{cz}) $NHV_{cz} \geq 270$ BTU/SCF, determined on a 15-minute basis	Calculation & monitors (calorimeters, BTU analyzers, GC/MS, ultrasonic time-of-transit)
Dilution operating limits for flares with perimeter assist air	Net heating value dilution parameter (NHV_{dil}) $NHV_{dil} \geq 22$ BTU/ft ² , determined on a 15-minute basis	Calculation & monitors (calorimeters, BTU analyzers, GC/MS, ultrasonic time-of-transit)

Notes

1. **Video Imaging Spectral Radiometer (VISR)** directly and remotely measures relative concentrations of combustion products, CO₂ and unburned hydrocarbons, to calculate flare Combustion Efficiency (**CE**) in real time and eliminates the uncertainty of using surrogate indirect parameters such as Combustion Zone Net Heating Value (NHV_{cz}) and flare tip velocity can be used as an Alternative Test Method for the indirect flare monitoring requirements. Also measures Smoke Index (**SI**) and replaces smoke monitoring, Flame Footprint (**FF**) and replaces pilot flame presence monitoring. VISR measures flare performance metrics such as Heat Release (**HR**) and Flame Stability (**FS**).
2. The ministry is considering whether to provide for other approaches to confirm that adequate and stable combustion is occurring in the combustion zone of the flame.

Reporting requirements

In order to assess environmental outcomes and the facilities' compliance with the new regulation, the facilities would be required to provide to the ministry and the public the following reports in an approved format on a quarterly basis

- all exceedances of the emission limits in Table 1
- all 1-hour monitored values over 120 ppb or 5-minute monitored value over 200 ppb at any of the ambient sulphur dioxide monitoring stations.

In addition, the facilities would be required to report the following information to the ministry and the public in an approved format on an annual basis:

- sulphur dioxide emissions

- summary of root cause analyses and corrective and preventive action reports
- assessed effectiveness of the implemented corrective and preventive actions, and
- progress on implementing the sulphur dioxide reduction measures.

Facilities with continuous monitoring systems in place for any of the sources identified in Table 1 will be required to report to the ministry on a monthly basis the sulphur dioxide emissions data from their continuous monitoring systems for specified sources. This reporting is proposed to be required starting two months from the date the proposed regulation is filed. Facilities in Sarnia would also be required to share this information with local First Nations, and with local cities and municipalities upon request. The information may also be posted on the facilities' websites at a later date. (See questions for feedback set out below).

The facilities would also be required to notify the ministry as soon as practicable whenever sulphur recovery units or combustion devices released more than 225 kg sulphur dioxide in 24 hours in excess of allowable limits. For flares, notification would be required as soon as practicable whenever more than 225 kg sulphur dioxide in 24-hour was released. When these sulphur dioxide mass emission limits are exceeded, a Root Cause and Corrective and Preventive Action Report would be required. This report would detail the root cause of the event, the corrective and preventive actions to be implemented, the implementation schedule for these actions, and the assessment and reporting of the expected and demonstrated effectiveness of the action plan in reducing or eliminating the recurrence of the same causes and consequences before and after implementation of the corrective action(s). This report would need to be submitted within 60 days of the sulphur dioxide mass emission limit being exceeded. As part of this report, facilities may also be required to submit incident-specific emissions information and/or air dispersion modelling of the exceedance period.

In addition, facilities would be required to report to the ministry on a quarterly basis about progress made in implementing any required corrective actions and preventive measures identified in the Root Cause and Corrective and Preventive Actions Report and the effectiveness of these implemented actions in reducing or eliminating the recurrence of the same root causes for the sulphur dioxide emissions.

Finally, all planned and unplanned turn-downs, start-ups, shutdowns and malfunctions of sulphur recovery unit, amine unit, and sour water stripper unit, and any diversions of acid gases away from the sulphur recovery unit to any other destination and all combustion of sour gases and acid gases in flares and other combustion devices would be required to be reported to the ministry in a form approved by the director.

4. Record Keeping to Support Audits and Ministry Oversight

All information on continuous monitoring systems, including technical design specifications, operation and maintenance records (e.g., inspection and testing, calibration and validation records), would be required to be retained onsite for a minimum of 5 years. All raw data and technical information would be shared with the ministry upon request as part of an audit or as part of an incident-based root cause analysis.

Any intended changes to the approved continuous monitoring systems or ambient monitoring stations would be provided to the ministry for review prior to implementation.

5. Reporting to Support Public Transparency

Regular public reporting of key information relating to the implementation of this regulation would be required of each facility. It is proposed that the following information would be made publicly available:

- information about exceedances of the emission limits such as number and duration of exceedances in the calendar year and total emissions from those exceedances
- information about exceedances of the 225 kg sulphur dioxide mass emission limit in any 24-hour period from flares, other combustion devices or the sulphur recovery units
- annual summary of sulphur dioxide emissions from catalytic cracking units, fluid coking units, sulphur recovery units, flares, and combustion devices such as boilers, heaters, furnaces, and thermal and catalytic oxidizers.
- sulphur dioxide ambient monitoring values at community monitors over 120 ppb (1-hour) and 200 ppb (5-minute)

Additionally, we are proposing that each facility would be required to make the following information publicly available:

- status of regulation implementation
- up-to-date Sulphur Dioxide Emission Minimization Plans

Environmental Penalties

As noted above, the ministry is proposing to continue to provide for Environmental Penalties for the contravention of the discharge limit currently contained in O. Reg. 530/18. The ministry is also proposing to amend O. Reg. 222/07 to enable the imposition of Environmental Penalties for contraventions of the requirements in the proposed regulation.

The proposed classification for contraventions of the requirements described above are set out in Table 4. It is proposed that the first date on which an environmental penalty may be ordered for the contravention would be the date on which the relevant requirement begins to apply.

Table 4: Proposed classification of contraventions under O. Reg. 222/07

Contravention	Type of contravention	Seriousness of contravention
Contravention of emission limits set out in Table 1	Type 3	To be determined under s. 12 (3) of O. Reg. 222/07
Contravention of limit on use of solid and liquid fuels in combustion devices and requirement to use sulphur dioxide-reducing additives to achieve the specified reduction from the Fluidized Catalytic Cracking Unit	Type 3	To be determined under s. 15 of O. Reg. 222/07
Contravention of monitoring requirements, including Continuous Monitoring System, ambient monitoring, and additional flare monitoring requirements	Type 2	To be determined under s. 15 of O. Reg. 222/07
Contravention of reporting requirements and requirements to prepare plans or reports, including reporting related to sulphur dioxide-reducing additives, Root Cause Analysis and Corrective and Preventative Action Reports, Sulphur Dioxide Emission Minimization Plan, reporting of exceedances, annual reports and public reporting requirements	Type 1	To be determined under s. 15 of O. Reg. 222/07
Contravention of record keeping and record retention requirements	Type 1	To be determined under s. 15 of O. Reg. 222/07

Exemptions

We are proposing that the new requirements described above constitute the compliance pathway for petroleum facilities in respect of sulphur dioxide discharges, in place of the air standards in Ontario Regulation 419/05: Air Pollution – Local Air Quality (the Local Air Quality Regulation). The facilities that are subject to the new regulation would therefore be exempted from Part II of the Local Air Quality Regulation in respect of sulphur dioxide, except for sections 24, 24.1, 27.1 and 30 (3).

Sections 24, 24.1 and 27.1 of the Local Air Quality Regulation are proposed to continue to apply, which means that the Ministry would still have the authority to require an Emission Summary and Dispersion Modelling Report (s. 24) or an incident-specific Emission Summary and Dispersion Modelling Report (s. 24.1) to be prepared for the facility or require a technology report (s. 27.1) be prepared in respect of the facility and sulphur dioxide.

We are also proposing that subsection 30 (3) of the Local Air Quality Regulation continue to apply to petroleum facilities. This means that the facilities would continue to be required to notify the Ministry if there is reason to believe that discharges may result in the concentration of sulphur dioxide exceeding the Upper Risk Threshold at a point of impingement; however, the notification would not trigger ESDM report requirements.

Other actions to support the proposal

The ministry plans to conduct regular, multi-source modelling to support on-going placement of sulphur dioxide monitors once continuous monitoring data are available and to better understand the impacts of implemented regulatory improvements for the Sarnia, Nanticoke and Mississauga areas. The modelling would also be used to track ongoing performance and to determine if more improvements are needed.

The ministry is considering developing guidance documents on key requirements such as minimum expectations for the root cause analyses, corrective and preventive actions and the assessed effectiveness of those actions, and expectations for the design, installation, commissioning, operation and maintenance of continuous monitoring systems.

Questions for Feedback

1. The requirements in this proposed regulation are based on similar requirements that have been in place at petroleum refineries in the United States for years. It is recognized, however, that Ontario facilities will need time to meet the emission limits, install continuous monitoring systems and comply with other requirements because of the need for capital planning, detailed engineering design work, procurement, *etc.* Ontario facilities may also have to consider turn-around schedules, and some facilities may already have planned for and/or installed equipment to meet these requirements. The ministry is proposing that facilities

comply with the emission limits set out in Table 1 by December 31, 2026 and all other requirements as set out above.

2. In the United States, similar facilities are required to report their emissions by process, while the Canadian National Pollutant Release Inventory generally requires reporting of total facility annual emissions and the annual emissions from tall stacks rather than the reporting of emissions on a per-process basis. Should process-level emissions data (*i.e.*, not performance or operational data) be required to be made publicly available on the facility websites, similar to how public reporting requirements are included in O. Reg. 530/18?