PERMIT GVA0117

Pursuant to:
Greater Vancouver Regional District Air Quality Management Bylaw No. 1082, 2008
and the BC Environmental Management Act, S.B.C 2003, c.53

Issued to:
Parkland Refining (B.C.) Ltd.
(the "Permittee")

To Authorize:
the discharge of air contaminants to the air from
a Petroleum Refinery and Tank Farm

Located at:
5201 Penzance Drive, Burnaby, BC V5C 1L7
and 355 N Willingdon Avenue, Burnaby, BC V5C 1X4

Effective Period:
The terms and conditions set out in the Permit apply to the existing or planned works as of
March 15, 2018 and this permit will expire on January 31, 2021.

All previous versions of this Permit are invalid.

Issued: November 30, 1992
Amended: March 15, 2018
**METRO VANCOUVER REGIONAL DISTRICT AIR QUALITY MANAGEMENT PERMIT**

**SECTION 1 – AUTHORIZED EMISSION SOURCES**

Authorization to discharge air contaminants from the authorized Emission Sources and Works listed below is subject to the specified terms and conditions.

Approximate locations of the emission sources are shown on the Site Plan in section 4.

**EMISSION SOURCE 01R:** Crude unit furnaces discharging through a Stack(s).

MAXIMUM EMISSION FLOW RATE: 770 m³/min
MAXIMUM ANNUAL OPERATING HOURS: 8760 h/y
MAXIMUM PRIMARY BURNER INPUT FIRING RATE: 102 GJ/h

MAXIMUM EMISSION QUALITY:
1. 75 mg/m³ Nitrogen Oxides one-hour average concentration
2. 35 mg/m³ Sulphur Oxides one-hour average concentration
3. 10% Opacity. Based on a six-minute average. During bypass of the SRU, the maximum opacity restriction is 20%.

WORKS AND PROCEDURES:
One stack. Atmospheric column furnace F5104 and vacuum column furnace F5105 shall be fired with refinery fuel gas and/or natural gas using low NOx burners at a maximum firing rate of 102 GJ/h, together with good combustion practices and operating procedures.

**EMISSION SOURCE 06R:** Rheniformer reactors furnaces discharging through a Stack(s).

MAXIMUM EMISSION FLOW RATE: 800 m³/min
MAXIMUM ANNUAL OPERATING HOURS: 8760 h/y
MAXIMUM PRIMARY BURNER INPUT FIRING RATE: 178.8 GJ/h

MAXIMUM EMISSION QUALITY:
1. 65 mg/m³ Nitrogen Oxides one-hour average concentration
2. 35 mg/m³ Sulphur Oxides one-hour average concentration
3. 10% Opacity. Based on a six-minute average. During bypass of the SRU, the maximum opacity restriction is 20%.

WORKS AND PROCEDURES:
One stack. Rheniformer reactor furnaces F5750, F5751 & F5752, heating hydrotreated naphtha, shall be fired with refinery fuel gas and/or natural gas using low NOx burners at a maximum firing rate of 178.8 GJ/h, together with good combustion practices and operating procedures.

---

Issued: November 30, 1992
Amended: March 15, 2018

R.H. (Ray) Robb, P. Eng.
District Director

Permit GVA0117

Page 2 of 46
EMISSION SOURCE 07R: Steam Boiler discharging through a Stack(s).

MAXIMUM EMISSION FLOW RATE: 560 m³/min
MAXIMUM ANNUAL OPERATING HOURS: 8760 h/y
MAXIMUM PRIMARY BURNER INPUT FIRING RATE: 67.3 GJ/h

MAXIMUM EMISSION QUALITY:
1. 230 mg/m³ Nitrogen Oxides one-hour average concentration
2. 35 mg/m³ Sulphur Oxides one-hour average concentration
3. 10% Opacity. Based on a six-minute average. During bypass of the SRU, the maximum opacity restriction is 20%.

WORKS AND PROCEDURES:
One stack. Steam boiler F5204 shall be fired with refinery fuel gas and/or natural gas at a maximum firing rate of 67.3 GJ/h. Fuel oil firing is allowed only during a temporary interruption in gas supply or during contingency testing of the boiler. The fuel oil sulphur content shall not be greater than 0.0015% by weight, whenever this product is available from on-site fuel oil production. All fuel firing must occur using good combustion practices and operating procedures.

EMISSION SOURCE 11R: Steam plant boilers discharging through a Stack(s).

MAXIMUM EMISSION FLOW RATE: 650 m³/min
MAXIMUM ANNUAL OPERATING HOURS: 8760 h/y
MAXIMUM PRIMARY BURNER INPUT FIRING RATE: 105.2 GJ/h

MAXIMUM EMISSION QUALITY:
1. 65 mg/m³ Nitrogen Oxides one-hour average concentration, except during fuel oil firing the emission quality limit is 150 mg/m³
2. 35 mg/m³ Sulphur Oxides one-hour average concentration
3. 10% Opacity. Based on a six-minute average. During bypass of the SRU, the maximum opacity restriction is 20%.

WORKS AND PROCEDURES:
One stack. Steam boiler F6204 shall be fired with refinery fuel gas and/or natural gas at a maximum firing rate of 105.2 GJ/h. Fuel oil firing is allowed only during a temporary interruption in gas supply or during contingency testing of the boiler. The fuel oil sulphur content shall not be greater than 0.0015% by weight, whenever this product is available from on-site fuel oil production. All fuel firing must occur using good combustion practices and operating procedures.
EMISSION SOURCE 13R: Elevated refinery flare discharging through a Stack(s).

MAXIMUM EMISSION FLOW RATE: 3,300 m$^3$/min: The flow is variable up to a maximum flow of 3,300 m$^3$/min, based on gas venting from various unit operations
MAXIMUM ANNUAL OPERATING HOURS: 8760 h/y

MAXIMUM EMISSION QUALITY:
1. 20% Opacity. Based on a six-minute average.

WORKS AND PROCEDURES:
Flare, equipped with three pilot flames with secure pilot gas supply, reliable pilot gas ignition system, flow metering system, and manual control of flare steam injection using good combustion practices and operating procedures.

EMISSION SOURCE 19R: Fluid catalytic cracker (FCC) regenerator and waste heat boiler (WHB) discharging through a Stack(s).

MAXIMUM EMISSION FLOW RATE: 2450 m$^3$/min
MAXIMUM ANNUAL OPERATING HOURS: 8760 h/y

MAXIMUM EMISSION QUANTITY:
1. 860 kg/d Nitrogen Oxides; the restriction does not apply under the following conditions:
   a. During a SO$_2$ Curtailment Event, as defined in the works and procedures for this emission source, plus an additional 48 hours following the end of the SO$_2$ Curtailment Event;
   b. During torch oil or auxiliary burner operations when unit throughput is less than 10,000 barrels per day.
2. 3000 kg/d Sulphur Oxides averaged over a calendar month. Additionally, the concentration shall not exceed an hourly average of 1,600 mg/m$^3$ SO$_2$, measured on emissions from the FCC regenerator only.
3. 26 kg/h Particulate Matter

MAXIMUM EMISSION QUALITY:
1. 110 mg/m$^3$ Carbon Monoxide
2. 5 mg/m$^3$ Hydrogen Sulphide
3. 20% Opacity. Based on a one-hour average. Additionally, during start-up, up to a maximum of 24 hours per calendar year, the maximum opacity restriction is 25%.

WORKS AND PROCEDURES:
One stack, two-stage internal FCC regenerator cyclones, Emtrol third stage separator cyclones and the use of sulphur-scavenging catalyst, together with good operating practices.

Issued: November 30, 1992
Amended: March 15, 2018

Permit GVA0117
WHB shall be fired with refinery fuel gas and/or natural gas at a maximum firing rate of 134.6 GJ/h (typical duty firing rate of 26.9 GJ/h). Fuel oil firing is allowed only during a temporary interruption in gas supply or during contingency testing of the boiler. The fuel oil sulphur content shall not be greater than 0.0015% by weight, whenever this product is available from on-site fuel oil production. All fuel firing must occur using good combustion practices and operating procedures.

A SO₂ Curtailment Event (SCE) is defined as a time period when a sulphur dioxide concentration level at any of Metro Vancouver ambient air monitoring network stations T4, T6, T23, T24 or other air monitoring stations approved by the District Director exceeds a 10-minute rolling average concentration of 0.19 ppm sulphur dioxide or a one-hour average concentration of 0.07 ppm sulphur dioxide. The SCE is not in effect when the ambient air monitoring data is determined to be invalid by Metro Vancouver.

For the purpose and duration that the sulphur-scavenging catalyst is used in the FCC to manage SOₓ emissions, a set-point on the sulphur-scavenging catalyst controller shall be set at a level no higher than 240 ppm SOₓ. At the first available opportunity following the permittee becoming aware of an SCE, the permittee shall take all necessary steps, which may include lowering the FCC sulphur-scavenging catalyst controller set-point level, to achieve an ambient sulphur dioxide level at the affected ambient air monitoring station (T4, T6, T23, T24 or other air monitoring stations approved by the District Director) to below a 10-minute rolling average concentration of 0.19 ppm sulphur dioxide and below a one-hour average concentration of 0.07 ppm sulphur dioxide. Actions required by the permittee during an SCE are conditional on the availability of ambient air monitoring data provided by Metro Vancouver and refinery operational staff access to the data. At the first available opportunity, the permittee shall notify Metro Vancouver of time periods greater than 4 hours when computer system outages occur that will affect operator access to Metro Vancouver’s ambient air monitoring data.

The permittee must report to Metro Vancouver at (604) 436-6777 at the earliest available opportunity of any temporary cessation of the use of sulphur-scavenging catalyst with a set-point no higher than 240 ppm on the FCC stack.

Emissions of SOₓ, NOₓ and the opacity of the emissions shall be continuously sampled at an appropriate location downstream of the FCC regenerator.

The CEMS shall be installed, certified and operated in accordance with a Quality Assurance / Quality Control (QA/QC) plan acceptable to the District Director.

**EMISSION SOURCE 20R: Diesel hydrotreater (DHT) charge furnace discharging through a Stack(s).**

MAXIMUM EMISSION FLOW RATE: 140 m³/min  
MAXIMUM ANNUAL OPERATING HOURS: 8760 h/y  
MAXIMUM PRIMARY BURNER INPUT FIRING RATE: 24.5 GJ/h
MAXIMUM EMISSION QUALITY:
1. 65 mg/m³ Nitrogen Oxides one-hour average concentration
2. 35 mg/m³ Sulphur Oxides one-hour average concentration
3. 10% Opacity. Based on a six-minute average. During bypass of the SRU, the maximum opacity restriction is 20%.

WORKS AND PROCEDURES:
One stack. DHT charge furnace F5601 shall be fired with refinery fuel gas and/or natural gas using low NOₓ burners at a maximum firing rate of 24.5 GJ/h (typical duty firing rate of 6.1 GJ/h), together with good combustion practices and operating procedures.

EMISSION SOURCE 21R: Diesel hydrotreater (DHT) fractionator furnace discharging through a Stack(s).

MAXIMUM EMISSION FLOW RATE: 165 m³/min
MAXIMUM ANNUAL OPERATING HOURS: 8760 h/y
MAXIMUM PRIMARY BURNER INPUT FIRING RATE: 27.4 GJ/h

MAXIMUM EMISSION QUALITY:
1. 65 mg/m³ Nitrogen Oxides one-hour average concentration
2. 35 mg/m³ Sulphur Oxides one-hour average concentration
3. 10% Opacity. Based on a six-minute average. During bypass of the SRU, the maximum opacity restriction is 20%.

WORKS AND PROCEDURES:
One stack. DHT fractionator furnace F5602 shall be fired with refinery fuel gas and/or natural gas using low NOₓ burners at a maximum firing rate of 27.4 GJ/h, together with good combustion practices and operating procedures.

EMISSION SOURCE 22R: Sulphur recovery unit (SRU) incinerator discharging through a Stack(s).

MAXIMUM EMISSION FLOW RATE: 96 m³/min
MAXIMUM ANNUAL OPERATING HOURS: 8760 h/y

MAXIMUM EMISSION QUANTITY:
1. 630 kg/d Sulphur Oxides averaged over a calendar month

MAXIMUM EMISSION QUALITY:
1. 5 mg/m³ Hydrogen Sulphide
2. 300 mg/m³ Nitrogen Oxides

Issued: November 30, 1992
Amended: March 15, 2018

R.H. (Ray) Robb, P. Eng.
District Director

Permit GVA0117
3. 5000 mg/m³ Sulphur Oxides except during:
   a. Start-up for the first 8 hours following introduction of acid gas to the main reactor furnace after scheduled maintenance turnarounds,
   b. Start-up for the first 8 hours following introduction of acid gas to the main reactor furnace after an outage caused by circumstances external to the refinery up to a maximum of 24 hours per calendar year,
   c. On-line heat soak activities up to a maximum of 72 hours per calendar quarter, and
   d. Shut-down on-line heat soak activities up to a maximum of 48 hours per calendar quarter the emission quality limit is 10,000 mg/m³
4. 100 mg/m³ Particulate Matter
5. 20% Opacity. Based on a six-minute average. Additionally, averaging calculations may exclude up to 3 min/h of readings greater than 20%.

WORKS AND PROCEDURES:
One stack. Superclaus SRU, incinerator and related appurtenances together with good operating practices. The minimum calendar quarter average percent sulphur recovery efficiency in the acid gas desulphurization process shall be 98.6%.

Bypass of the SRU (including fuel gas desulphurization, reaction section, incinerator and related appurtenances) is authorized only during emergency conditions and unit malfunctions, provided that Metro Vancouver is notified at the first available opportunity and steps are taken to minimize the release of air contaminants to the atmosphere. If the District Director is satisfied on reasonable grounds that the release of air contaminants may cause pollution of the environment, the District Director may require that further emission reduction measures be taken at the facility.

Metro Vancouver must be notified at the first available opportunity of plans to perform non-emergency maintenance operations that involve bypass of the SRU (including fuel gas desulphurization, reaction section, incinerator and related appurtenances).

Emissions of SO₂ shall be continuously sampled at an appropriate location downstream of the SRU incinerator. The CEMS shall be installed, certified and operated in accordance with a Quality Assurance / Quality Control (QA/QC) plan acceptable to the District Director.

EMISSION SOURCE 22T: Tanker truck loading rack discharging through tanker truck vents and vapour recovery unit vent.

MAXIMUM EMISSION FLOW RATE: 40 m³/min
MAXIMUM ANNUAL OPERATING HOURS: 8760 h/y

WORKS AND PROCEDURES:
Submerged or bottom loading of tanker trucks. Displaced vapours from the tanker trucks must be connected to the existing dual carbon bed vapour recovery unit for products having a Reid Vapour
METRO VANCOUVER REGIONAL DISTRICT AIR QUALITY MANAGEMENT PERMIT

Pressure greater than 48 kPa. Applicable requirements in the most recent versions of Metro Vancouver Emission Regulations must be adhered to.

EMISSION SOURCE 23R: Crude splitter furnace discharging through a Stack(s).

MAXIMUM EMISSION FLOW RATE: 1050 m$^3$/min
MAXIMUM ANNUAL OPERATING HOURS: 8760 h/y
MAXIMUM PRIMARY BURNER INPUT FIRING RATE: 183 GJ/h

MAXIMUM EMISSION QUALITY:
1. 65 mg/m$^3$ Nitrogen Oxides one-hour average concentration
2. 35 mg/m$^3$ Sulphur Oxides one-hour average concentration
3. 10% Opacity. Based on a six-minute average. During bypass of the SRU, the maximum opacity restriction is 20%.

WORKS AND PROCEDURES:
One stack. Crude splitter furnace F5301 shall be fired with refinery fuel gas and/or natural gas using low NO$_x$ burners at a maximum duty firing rate of 183.0 GJ/h (typical duty firing rate of 109.8 GJ/h), together with good combustion practices and operating procedures.

EMISSION SOURCE 24R: Naphtha hydrotreater (NHT) feed furnace discharging through a Stack(s).

MAXIMUM EMISSION FLOW RATE: 180 m$^3$/min
MAXIMUM ANNUAL OPERATING HOURS: 8760 h/y
MAXIMUM PRIMARY BURNER INPUT FIRING RATE: 26.7 GJ/h

MAXIMUM EMISSION QUALITY:
1. 65 mg/m$^3$ Nitrogen Oxides one-hour average concentration
2. 35 mg/m$^3$ Sulphur Oxides one-hour average concentration
3. 10% Opacity. Based on a six-minute average. During bypass of the SRU, the maximum opacity restriction is 20%.

WORKS AND PROCEDURES:
One stack. NHT feed furnace F5710 shall be fired with refinery fuel gas and/or natural gas using low NO$_x$ burners at a maximum firing rate of 26.7 GJ/h, together with good combustion practices and operating procedures.
EMISSION SOURCE 25R: Desulphurizer reboiler discharging through a Stack(s).

MAXIMUM EMISSION FLOW RATE: 180 m³/min
MAXIMUM ANNUAL OPERATING HOURS: 8760 h/y
MAXIMUM PRIMARY BURNER INPUT FIRING RATE: 24.1 GJ/h

MAXIMUM EMISSION QUALITY:
1. 65 mg/m³ Nitrogen Oxides one-hour average concentration
2. 35 mg/m³ Sulphur Oxides one-hour average concentration
3. 10% Opacity. Based on a six-minute average. During bypass of the SRU, the maximum opacity restriction is 20%.

WORKS AND PROCEDURES:
One stack. Desulphurizer reboiler furnace F5715 shall be fired with refinery fuel gas and/or natural gas using low NOx burners at a maximum firing rate of 24.1 GJ/h, together with good combustion practices and operating procedures.

EMISSION SOURCE 26R: Storage tanks discharging through floating roof tank seals with secondary seals.

MAXIMUM EMISSION FLOW RATE: The maximum rate of discharge is that resulting from vapour venting during tank filling and breathing
MAXIMUM ANNUAL OPERATING HOURS: 8760 h/y

WORKS AND PROCEDURES:
Above ground storage tanks #1000, 1002, 1003, 1009, 1012, 1013, 1014, 1018 and 1020 with floating roofs having primary and secondary seals in good condition. During storage of sour water stripper feed, a protective layer of diesel fuel shall be maintained as a top layer. The maximum vapour pressure of volatile organic liquids stored shall not exceed 76 kPa (at 21.1°C).

The Canadian Council of Ministers of the Environment (CCME) Environmental Guidelines for Controlling Emissions of Volatile Organic Compounds from Aboveground Storage Tanks (PN1180) shall be adhered to for all applicable tanks unless otherwise stated in this permit.

EMISSION SOURCE 27R: Storage tanks discharging through floating roof tank with primary seals.

MAXIMUM EMISSION FLOW RATE: The maximum rate of discharge is that resulting from vapour venting during tank filling and breathing
MAXIMUM ANNUAL OPERATING HOURS: 8760 h/y
METRO VANCOUVER REGIONAL DISTRICT AIR QUALITY MANAGEMENT PERMIT

WORKS AND PROCEDURES:
Above ground storage tank #1008 with a floating roof and primary seal in good condition. During storage of sour water stripper feed, a protective layer of diesel fuel shall be maintained as a top layer. The maximum vapour pressure of volatile organic liquids stored shall not exceed 10 kPa (at 21.1°C). Materials with a maximum vapour pressure of 76 kPa may be stored if secondary seals have been installed on the tank roof.

The Canadian Council of Ministers of the Environment (CCME) Environmental Guidelines for Controlling Emissions of Volatile Organic Compounds from Aboveground Storage Tanks (PN1180) shall be adhered to for all applicable tanks unless otherwise stated in this permit.

EMISSION SOURCE 28R: Storage tank discharging through Tank vents.

MAXIMUM EMISSION FLOW RATE: The maximum rate of discharge is that resulting from vapour venting during tank filling and breathing
MAXIMUM ANNUAL OPERATING HOURS: 8760 h/y

WORKS AND PROCEDURES:
Above ground storage tank #1001 with cone roof and tank vents. The maximum vapour pressure of volatile organic liquids stored shall not exceed 10 kPa (at 21.1°C).

EMISSION SOURCE 29R: Gasoline hydrotreater (GHT) furnace discharging through a Stack(s).

MAXIMUM EMISSION FLOW RATE: 500 m³/min
MAXIMUM ANNUAL OPERATING HOURS: 8760 h/y
MAXIMUM PRIMARY BURNER INPUT FIRING RATE: 42.5 GJ/h

MAXIMUM EMISSION QUALITY:
1. 65 mg/m³ Nitrogen Oxides one-hour average concentration
2. 35 mg/m³ Sulphur Oxides one-hour average concentration
3. 10% Opacity. Based on a six-minute average. During bypass of the SRU, the maximum opacity restriction is 20%.

WORKS AND PROCEDURES:
One stack. GHT furnace F7901 shall be fired with refinery fuel gas and/or natural gas using low NOₓ burners at a maximum firing rate of 42.5 GJ/h, together with good combustion practices and operating procedures.

Issued: November 30, 1992
Amended: March 15, 2018

Permit GVA0117
EMISSION SOURCE 30R: Steam plant boiler discharging through a Stack(s).

MAXIMUM EMISSION FLOW RATE: 650 m³/min
MAXIMUM ANNUAL OPERATING HOURS: 8760 h/y
MAXIMUM PRIMARY BURNER INPUT FIRING RATE: 101.8 GJ/h

MAXIMUM EMISSION QUALITY:
1. 65 mg/m³ Nitrogen Oxides one-hour average concentration, except during fuel oil firing the emission quality limit is 150 mg/m³
2. 35 mg/m³ Sulphur Oxides one-hour average concentration
3. 10% Opacity. Based on a six-minute average. During bypass of the SRU, the maximum opacity restriction is 20%.

WORKS AND PROCEDURES:
One stack. Steam boiler F6205 shall be fired with refinery fuel gas and/or natural gas using low NOₓ burners at a maximum firing rate of 101.8 GJ/h, together with good combustion practices and operating procedures. Fuel oil firing is allowed only during a temporary interruption in gas supply or during contingency testing of the boiler. The fuel oil sulphur content shall not be greater than 0.0015% by weight, whenever this product is available from on-site fuel oil production.

EMISSION SOURCE 31R: Steam Methane Reformer discharging through a Stack(s).

MAXIMUM EMISSION FLOW RATE: 312 m³/min
MAXIMUM ANNUAL OPERATING HOURS: 8760 h/y

MAXIMUM EMISSION QUALITY:
1. 100 mg/m³ Nitrogen Oxides one-hour average concentration
2. 5 mg/m³ Sulphur Oxides one-hour average concentration
3. 10% Opacity. Based on a six-minute average.

WORKS AND PROCEDURES:
One stack. Steam Methane Reformer shall be fired with natural gas using low NOₓ burners at a maximum firing rate of 34.7 GJ/h, together with good combustion practices and operating procedures. The Steam Methane Reformer shall not be commissioned until after furnace F6204 (Emission Source 11R) has been retrofitted with low NOₓ burners and furnace F6203 (Emission Source 11R) has been decommissioned.

Issued: November 30, 1992
Amended: March 15, 2018

R.H. (Ray) Robb, P. Eng.
District Director

Permit GVA0117

MAXIMUM EMISSION FLOW RATE: The authorized maximum rate of discharge is that resulting from vapour venting during tank filling, withdrawing and breathing
MAXIMUM ANNUAL OPERATING HOURS: 8760 h/y

WORKS AND PROCEDURES:
Existing tanks with external floating roofs with primary and secondary roof seals in good repair, together with good operating practices. The vapour pressure of materials stored in these tanks shall not exceed 76 kPa.

The Canadian Council of Ministers of the Environment (CCME) Environmental Guidelines for Controlling Emissions of Volatile Organic Compounds from Aboveground Storage Tanks (PN1180) shall be adhered to for all applicable tanks unless otherwise stated in this permit.

EMISSION SOURCE 32RT: Equipment Leaks.

MAXIMUM EMISSION FLOW RATE: The maximum rate of discharge is that resulting from fugitive VOC emissions from equipment leaks
MAXIMUM ANNUAL OPERATING HOURS: 8760 h/y

WORKS AND PROCEDURES:
Valves (including pressure relief valves), pump and compressor seals, threaded joints and flanges. All equipment shall be maintained in accordance with the Leak Detection and Repair (LDAR) program specified in Section 3.B. of this permit.

EMISSION SOURCE 34T: Storage tanks (Number: 14, 27, 152, 153, 176, and 177) discharging through internal floating roof secondary seals.

MAXIMUM EMISSION FLOW RATE: The authorized maximum rate of discharge is that resulting from vapour venting during tank filling, withdrawing and breathing
MAXIMUM ANNUAL OPERATING HOURS: 8760 h/y

WORKS AND PROCEDURES:
Existing tanks with internal floating roofs with primary and secondary roof seals in good repair, together with good operating practices. The vapour pressure of materials stored in these tanks shall not exceed 76 kPa.
The Canadian Council of Ministers of the Environment (CCME) Environmental Guidelines for Controlling Emissions of Volatile Organic Compounds from Aboveground Storage Tanks (PN1180) shall be adhered to for all applicable tanks unless otherwise stated in this permit.

EMISSION SOURCE 35T: Storage tank (Number: 23) discharging through internal floating roof primary seals.

MAXIMUM EMISSION FLOW RATE: The authorized maximum rate of discharge is that resulting from vapour venting during tank filling, withdrawing and breathing
MAXIMUM ANNUAL OPERATING HOURS: 8760 h/y

WORKS AND PROCEDURES:
Existing tanks with internal floating roofs with primary roof seals in good repair, together with good operating practices. The vapour pressure of materials stored in these tanks shall not exceed 10 kPa at any time. Materials with a maximum vapour pressure of 76 kPa may be stored if secondary seals have been installed on the tank roof.

The Canadian Council of Ministers of the Environment (CCME) Environmental Guidelines for Controlling Emissions of Volatile Organic Compounds from Aboveground Storage Tanks (PN1180) shall be adhered to for all applicable tanks unless otherwise stated in this permit.

EMISSION SOURCE 39T: Nine new storage tanks discharging through floating roof secondary seals.

MAXIMUM EMISSION FLOW RATE: The authorized maximum rate of discharge is that resulting from vapour venting during tank filling, withdrawing and breathing
MAXIMUM ANNUAL OPERATING HOURS: 8760 h/y

WORKS AND PROCEDURES:
Future tanks constructed with external floating roofs with primary and secondary roof seals maintained in good repair, together with good operating practices. The vapour pressure of materials stored in these tanks shall not exceed 76 kPa.

The Canadian Council of Ministers of the Environment (CCME) Environmental Guidelines for Controlling Emissions of Volatile Organic Compounds from Aboveground Storage Tanks (PN1180) shall be adhered to for all applicable tanks unless otherwise stated in this permit.

EMISSION SOURCE 40T: All storage tanks with fixed roofs discharging through fixed roof vents.

MAXIMUM EMISSION FLOW RATE: The authorized maximum rate of discharge is that resulting from vapour venting during tank filling, withdrawing and breathing

Issued: November 30, 1992
Amended: March 15, 2018

R.H. (Ray) Robb, P. Eng.
District Director

Permit GVA0117
MAXIMUM ANNUAL OPERATING HOURS: 8760 h/y

WORKS AND PROCEDURES:
All existing and future fixed roof storage tanks, without an internal floating roof, are restricted to the storage of materials with a vapour pressure that shall not exceed 10 kPa. Written notification must be submitted to District Director prior to construction of new fixed roof storage tanks without an internal floating roof.

The Canadian Council of Ministers of the Environment (CCME) Environmental Guidelines for Controlling Emissions of Volatile Organic Compounds from Aboveground Storage Tanks (PN1180) shall be adhered to for all applicable tanks unless otherwise stated in this permit.

Odour filters for sulphurous compounds on Tanks 18, 31, 33, 67, 69, 117.

EMISSION SOURCE 41T: Marine vessel loading and vapour collection discharging through vapour recovery unit stack.

MAXIMUM EMISSION FLOW RATE: 40 m³/min
MAXIMUM ANNUAL OPERATING HOURS: 8760 h/y

WORKS AND PROCEDURES:
Displaced vapours from marine vessels equipped with vapour recovery line fittings must be connected to a dual carbon bed vapour recovery unit for products having a Reid Vapour Pressure greater than 48 kPa. Requirements pertaining to the operation of a vapour recovery system in applicable Metro Vancouver Emission Regulations must be adhered to.

EMISSION SOURCE 42T: Marine vessel loading discharging through marine vessels cargo holds.

MAXIMUM EMISSION FLOW RATE: The authorized maximum rate of discharge is that resulting from displaced vapour venting during product loading
MAXIMUM ANNUAL OPERATING HOURS: 8760 h/y

WORKS AND PROCEDURES:
Loading of products using good operating practices. Emissions from marine vessel holds are authorized only for vessels which are not equipped with connections for a vapour return line to a vapour recovery system and/or for products having a Reid Vapour Pressure less than 48 kPa.

Issued: November 30, 1992
Amended: March 15, 2018

R.H. (Ray) Robb, P. Eng.
District Director

Permit GVA0117
EMISSION SOURCE 43T: Asphalt storage tanks and tank truck loading operations discharging through storage tanks and tanker truck vents.

MAXIMUM EMISSION FLOW RATE: The authorized maximum rate of discharge is that resulting from displaced vapour venting during product loading
MAXIMUM ANNUAL OPERATING HOURS: 8760 h/y

WORKS AND PROCEDURES:
Loading of asphalt products using good operating practices.

The Canadian Council of Ministers of the Environment (CCME) Environmental Guidelines for Controlling Emissions of Volatile Organic Compounds from Aboveground Storage Tanks (PN1180) shall be adhered to for all applicable tanks unless otherwise stated in this permit.
SECTION 2 – GENERAL REQUIREMENTS AND CONDITIONS

A. AUTHORIZED WORKS, PROCEDURES AND SOURCES
Works and procedures, which this permit authorizes in order to control the discharge of air contaminants, shall be employed during all operating periods of the related sources. The Permittee shall regularly inspect and maintain all such works, procedures and sources.

The District Director must be provided with reasonable notice of any changes to or replacement of authorized works, procedures or sources. Any changes to or replacement of authorized works, procedures or sources must be approved by the District Director in advance of operation. For certainty, this does not include routine maintenance or repair.

The discharge criteria described in Section 1 of this permit are applicable on the issued or last amended date of this permit unless specified otherwise. If a date different to the issued or last amended date is specified, the existing works, procedures and sources must be maintained in good operating condition and operated in a manner to minimize emissions.

B. NOTIFICATION OF MONITORING NON-COMPLIANCE
The District Director must be notified immediately of any emission monitoring results, whether from a continuous emissions monitor or periodic testing, which exceed the quantity or quality authorized in Section 1 of this permit. Notification shall be made to Metro Vancouver’s 24-hour number: 604-436-6777, or to regulationenforcement@metrovancouver.org.

C. POLLUTION NOT PERMITTED
Notwithstanding any conditions in this permit, no person shall discharge or allow or cause the discharge of any air contaminant so as to cause pollution as defined in the Greater Vancouver Regional District Air Quality Management Bylaw No. 1082, 2008 and the Environmental Management Act.

D. BYPASSES
The discharge of air contaminants that have bypassed authorized control works is prohibited unless advance approval has been obtained and confirmed in writing from the District Director.

E. EMERGENCY PROCEDURES
In the event of an emergency or condition beyond the control of the Permittee that prevents effective operation of the authorized works or procedures or leads to unauthorized discharge, the Permittee shall:

1. Comply with all applicable statutory requirements;
2. Immediately notify the District Director of the emergency or condition and of contingency actions invoked or planned to mitigate adverse impacts and restore compliance; Notification shall be made to Metro Vancouver’s 24-hour number: 604-436-6777; and
3. Take appropriate remedial action for the prevention or mitigation of pollution.

Issued: November 30, 1992
Amended: March 15, 2018

R.H. (Ray) Robb, P. Eng.
District Director

Permit GVA0117
METRO VANCOUVER REGIONAL DISTRICT AIR QUALITY MANAGEMENT PERMIT

The District Director may specify contingency actions to be implemented to protect human health and the environment while authorized works are being restored and/or corrective actions are being taken to prevent unauthorized discharges.

If an emergency situation results in a “spill” as defined in the Environmental Management Act Spill Reporting Regulation, the spill shall also be reported immediately to the Provincial Emergency Program by telephoning 1-800-663-3456.

F. AMENDMENTS
The terms and conditions of this permit may be amended, as authorized by applicable legislation. New works, procedures or sources or alterations to existing works, procedures or sources must receive authorization in advance of operation.

G. STANDARD CONDITIONS AND DEFINITIONS

Unless otherwise specified, the following applies to this permit:

1. Gaseous volumes are corrected to standard conditions of 20 degrees Celsius (°C) and 101.325 kilo Pascals (kPa) with zero percent moisture.
2. Contaminant concentrations from the combustion of specific fuel types are corrected to the following Oxygen content, unless specified otherwise:
   • 3% O₂ for natural gas and fuel oil; or
   • 8% O₂ for wood fuel
3. Where compliance testing is required, each contaminant concentration limit in this permit will be assessed for compliance based on a valid test using test methods approved by the District Director.
4. Visual opacity measurements are made at the point of maximum density, nearest the discharge point and exclude the effect of condensed, uncombined water droplets. Compliance determinations are based on a six-minute average in accordance with the United States Environmental Protection Agency (US EPA) Method 9: Visual Determination of the Opacity of Emissions from Stationary Sources. Continuous Emission Monitor System (CEMS) opacity compliance determinations are based on a one-hour average (taken from the top of each hour).
5. If authorized in Section 1 of this permit, standby fuel use is restricted to a maximum of 350 hours per year and to those periods during which the primary authorized fuel is not available or during contingency testing of boilers. Fuel oil sulphur content shall not exceed 15 milligrams per kilogram (mg/kg) and emissions during fuel oil firing shall not exceed 10% opacity.
6. Definitions in the Environmental Management Act and Air Quality Management Bylaw apply to terminology used in this permit.
7. Threshold Limit Values (TLV) refer to the Time Weighted Average (TWA) exposure limits for substances specified in the American Conference of Governmental Industrial Hygienists Threshold Limit Values handbook, current on the latest date that this permit issuance or amendment came into effect.
8. Sulphur Oxides (SO₂) are expressed as Sulphur Dioxide.
9. Nitrogen Oxides (NOₓ) are expressed as Nitrogen Dioxide.

Issued: November 30, 1992
Amended: March 15, 2018

R.H. (Ray) Robb, P. Eng.
District Director

Permit GVA0117
10. The Canadian Council of Ministers of the Environment (CCME) "Environmental Guidelines for Controlling Emissions of Volatile Organic Compounds from Aboveground Storage Tanks (PN1180)" shall be adhered to for all applicable tanks unless otherwise stated in this permit.

11. Authorized 'Maximum Annual Operating Hours' of 8760 hours per year for an emission source is equivalent to authorization for continuous operation of the emission source for an entire calendar year, including leap years.

H. RECORDS RETENTION
All records and supporting documentation relating to this permit must be kept for at least three years after the date of preparation or receipt thereof, and be made available for inspection within 48 hours of a request by an Officer.

I. HEATING, VENTILATION, AIR CONDITIONING AND INTERNAL COMBUSTION ENGINES
Air contaminants discharged from any natural gas-fired heating, ventilation or air conditioning system for buildings and any internal combustion engine located at the discharge site shall be maintained and operated in a manner prescribed by the manufacturer to ensure good combustion of the fuel with minimum discharge of air contaminants.

Issued: November 30, 1992
Amended: March 15, 2018

R.H. (Ray) Robb, P. Eng.
District Director

Permit GVA0117
SECTION 3 – REPORTING REQUIREMENTS

A. MONITORING REQUIREMENTS AND REPORTING

Unless otherwise approved in writing by the District Director prior to any sampling or analysis, all measurements shall be performed by an independent agency in accordance with Metro Vancouver Air Emissions Sampling Program Manual of Methods and Standard Operating Procedures and the BC Ministry of Environment Field Sampling Manual, as they may be amended from time to time. Any variance from these procedures must receive prior written approval from the District Director.

A minimum of 5 working days advance notice must be given prior to taking measurements required by this Monitoring and Sampling Program. Notification must be given to the Metro Vancouver Environmental Regulation & Enforcement Division (phone 604-436-6777, Fax 604-436-6707, email regulationenforcement@metrovancouver.org).

Unless otherwise specified, sampling shall be performed under operating conditions representative of the previous 90 calendar days of operation. All field data and calculations must be submitted with monitoring results and they shall be reported in the metric units which are used in this permit. These submissions shall include process data relevant to the operation of the source of the emissions and the performance of the emission control works.

The Permittee shall conduct the following monitoring and sampling and submit electronic reports of the results to the District Director by the dates specified below using a password enabled web based application provided by Metro Vancouver.

<table>
<thead>
<tr>
<th>EMISSION SOURCE</th>
<th>INITIAL DUE DATE</th>
<th>SUBSEQUENT DUE DATES</th>
<th>REQUIREMENT</th>
<th>PARAMETER(S)</th>
<th>TEST METHOD</th>
<th>REPORT TYPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>19R</td>
<td>July 31, 2018</td>
<td>Quarterly, on or before April 30, July 31, October</td>
<td>Submit a written report in a format acceptable to the District Director,</td>
<td>Particulate Matter, Metals</td>
<td>EPA Test Method 29</td>
<td>Stack</td>
</tr>
</tbody>
</table>

Issued: November 30, 1992  
Amended: March 15, 2018  
R.H. (Ray) Robb, P. Eng.  
District Director  
Permit GVA0117
<table>
<thead>
<tr>
<th>EMISSION SOURCE</th>
<th>INITIAL DUE DATE</th>
<th>SUBSEQUENT DUE DATES</th>
<th>REQUIREMENT</th>
<th>PARAMETER(S)</th>
<th>TEST METHOD</th>
<th>REPORT TYPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>31 and January 31 of each year.</td>
<td></td>
<td></td>
<td>detailing the particulate matter and metal concentrations (mg/m³) and emission rates (kg/h and kg/d) in the stack downstream of the FCC regenerator and the waste heat boiler (WHB). This report shall include the following data for the period that the stack sampling is conducted: 1. Type and processing rate of refinery feedstock. 2. Firing rate of WHB. 3. FCC feed rate. 4. Average CEM opacity reading for the period that the particulate matter stack sampling is conducted. The report shall also include a table of maximum predicted ambient concentrations at sensitive receptors of the measured metals by pro-rating previous dispersion modelling (i.e., 2018 or 2020) results of particulate matter concentration due to emissions from Emission Source 19R and comparing</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Issued: November 30, 1992
Amended: March 15, 2018

R.H. (Ray) Robb, P. Eng.
District Director

Permit GVA0117
<table>
<thead>
<tr>
<th>EMISION SOURCE</th>
<th>INITIAL DUE DATE</th>
<th>SUBSEQUENT DUE DATES</th>
<th>REQUIREMENT</th>
<th>PARAMETER(S)</th>
<th>TEST METHOD</th>
<th>REPORT TYPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>19R</td>
<td>April 30, 2018</td>
<td>Quarterly, on or before April 30, July 31, October 31 and January 31 of each year.</td>
<td>Submit a written summary of each of the measured parameters, as monitored by the CEMS for the preceding calendar quarter. For each parameter, this summary shall include: 1. Total hours of valid data collected; 2. Minimum and maximum hourly concentrations in mg/m³; 3. Number of hourly average concentrations exceeding applicable permit restrictions; 4. Calculated daily emission rates in kg/d and total tonnes per calendar quarter (based on stack flow data from an approved discharge flow meter or the most recent stack test flow data where a discharge flow meter is not available); 5. Number of days exceeding applicable kg/d permit restriction. This report shall be accompanied by an electronic data file containing all of the hourly average concentrations supporting the summary.</td>
<td>Nitrogen Oxides, Opacity, Sulphur Oxides</td>
<td>In accordance with approved QA/QC plan</td>
<td>CEM</td>
</tr>
</tbody>
</table>

Issued: November 30, 1992  
Amended: March 15, 2018  
R.H. (Ray) Robb, P. Eng.  
District Director  
Permit GVA0117
<table>
<thead>
<tr>
<th>EMISSION SOURCE</th>
<th>INITIAL DUE DATE</th>
<th>SUBSEQUENT DUE DATES</th>
<th>REQUIREMENT</th>
<th>PARAMETER(S)</th>
<th>TEST METHOD</th>
<th>REPORT TYPE</th>
</tr>
</thead>
</table>
This report shall also include the following process operating data for the period that the stack sampling is conducted:
1. Type and processing rate of refinery feedstock  
Note 1: Sampling of Emission Source 11 shall be conducted on Furnace F6204. | Nitrogen Oxides | EPA Test Method 7E | Stack |
| 11R             | July 31, 2018        | On or before July 31 for each subsequent year. | Submit a written report detailing the measured rate and concentration of SOx in the emissions. An alternate furnace, firing fuel that is representative of normal fuel composition combusted at the refinery, may be tested when furnace F6204 is not available. | Sulphur Oxides | EPA Test Method 6C | Stack |
| 19R             | September 30, 2018   | On or before September 30 for each subsequent year. | Submit a written report detailing the particulate matter size distribution (PM10/PM2.5) in the stack downstream of the FCC regenerator and the waste heat | Particulate Matter | EPA Test Method 201A | Stack |

Issued: November 30, 1992  
Amended: March 15, 2018  
R.H. (Ray) Robb, P. Eng.  
District Director  

Permit GVA0117
boiler (WHB). The sampling and analysis program shall be conducted in such a manner that the Total Particulate Matter concentration for comparable operating conditions can be reported.

This report shall include the following data for the period that the stack sampling is conducted:
1. Type and processing rate of refinery feedstock.
2. Firing rate of WHB.
3. FCC feed rate.
4. Minute and hourly average CEM opacity reading for the period that the stack sampling is conducted.
5. Confirmation that regularly scheduled soot blowing was conducted and the soot blowing schedule.

<table>
<thead>
<tr>
<th>EMISSION SOURCE</th>
<th>INITIAL DUE DATE</th>
<th>SUBSEQUENT DUE DATES</th>
<th>REQUIREMENT</th>
<th>PARAMETER(S)</th>
<th>TEST METHOD</th>
<th>REPORT TYPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>22R</td>
<td>April 30, 2018</td>
<td>Quarterly, on or before April 30, July 31, October 31 and January 31 of each year.</td>
<td>Submit a written summary of each of the measured parameters, as monitored by the CEMS for the preceding calendar quarter. For each parameter, this summary shall include: 1. Total hours of valid data collected;</td>
<td>Sulphur Oxides</td>
<td>In accordance with approved QA/QC plan</td>
<td>CEM</td>
</tr>
</tbody>
</table>

Issued: November 30, 1992
Amended: March 15, 2018

R.H. (Ray) Robb, P. Eng.
District Director

Permit GVA0117
<table>
<thead>
<tr>
<th>EMISION SOURCE</th>
<th>INITIAL DUE DATE</th>
<th>SUBSEQUENT DUE DATES</th>
<th>REQUIREMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facility</td>
<td>June 30, 2020</td>
<td>On or before June 30 for each subsequent year.</td>
<td>2. Minimum and maximum hourly concentrations in mg/m³; 3. Number of hourly average concentrations exceeding applicable permit restrictions; 4. Calculated daily emission rates in kg/d and total tonnes per calendar quarter (based on stack flow data from an approved discharge flow meter or the most recent stack test flow data where a discharge flow meter is not available); 5. Number of days exceeding applicable kg/d permit restriction. This report shall be accompanied by an electronic data file containing all of the hourly average concentrations supporting the summary.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PARAMETER(S)</th>
<th>TEST METHOD</th>
<th>REPORT TYPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Particulate Matter, Sulphur Dioxide, Nitrogen Dioxide</td>
<td>Approved Ambient Monitoring Plan</td>
<td>Monitoring - Other</td>
</tr>
</tbody>
</table>

Issued: November 30, 1992
Amended: March 15, 2018

R.H. (Ray) Robb, P. Eng.
District Director

Permit GVA0117
<table>
<thead>
<tr>
<th>EMISSION SOURCE</th>
<th>INITIAL DUE DATE</th>
<th>SUBSEQUENT DUE DATES</th>
<th>REQUIREMENT</th>
<th>PARAMETER(S)</th>
<th>TEST METHOD</th>
<th>REPORT TYPE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>includes monitoring of nitrogen dioxide, analysis of NO₂ measurements shall be included in this report. The report should compare measurements to Metro Vancouver ambient objectives for all averaging periods in both tables and figures. The report should also include graphical data analysis in the form of wind roses, pollutant roses, multi-year trend analyses. The frequency of exceedance of Metro Vancouver objectives should be discussed. Results of investigations into observed exceedances of Metro Vancouver's ambient objectives should be summarized, including comparison to concurrent, fully validated measurements at Metro Vancouver ambient monitoring network stations, obtained directly from Metro Vancouver. Exceedances that on the balance of probability the Facility contributed to, should be further analysed for common factors (e.g. relative emission rates from various sources at the Facility).</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EMISSION SOURCE</td>
<td>INITIAL DUE DATE</td>
<td>SUBSEQUENT DUE DATES</td>
<td>REQUIREMENT</td>
<td>PARAMETER(S)</td>
<td>TEST METHOD</td>
<td>REPORT TYPE</td>
</tr>
<tr>
<td>-----------------</td>
<td>-----------------</td>
<td>----------------------</td>
<td>-------------</td>
<td>--------------</td>
<td>-------------</td>
<td>-------------</td>
</tr>
<tr>
<td>Facility</td>
<td>July 31, 2018</td>
<td>Quarterly, on or before April 30, July 31, October 31 and January 31 of each year.</td>
<td>Ambient Monitoring Data Report</td>
<td>Nitrogen Dioxide, Particulate Matter, Sulphur Oxides</td>
<td>Approved Ambient Monitoring Plan</td>
<td>Monitoring - Other</td>
</tr>
<tr>
<td>Facility</td>
<td>December 31, 2018</td>
<td>N/A</td>
<td>The permittee shall report to Metro Vancouver, at the first available opportunity, an exceedance of Metro Vancouver objectives measured at any of the approved ambient air quality</td>
<td>Particulate Matter, Sulphur Oxides</td>
<td>Approved Ambient Monitoring Plan</td>
<td>Monitoring - Other</td>
</tr>
</tbody>
</table>

Issued: November 30, 1992  
Amended: March 15, 2018  
R.H. (Ray) Robb, P. Eng.  
District Director  
Permit GVA0117
monitoring station(s) operated by Parkland Refining (B.C.) Ltd. The permittee shall submit a written report within 7 working days of any exceedance describing activities at the refinery, attributing source and cause of the exceedance, if possible, and any changes to operations that may be appropriate to avoid future exceedances.

* Nitrogen dioxide shall be included if the approved monitoring plan includes monitoring of nitrogen dioxide.

<table>
<thead>
<tr>
<th>EMISSION SOURCE</th>
<th>INITIAL DUE DATE</th>
<th>SUBSEQUENT DUE DATES</th>
<th>REQUIREMENT</th>
<th>PARAMETER(S)</th>
<th>TEST METHOD</th>
<th>REPORT TYPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>22T, 41T</td>
<td>March 31, 2018</td>
<td>On or before March 31 for each subsequent year.</td>
<td>Annual report detailing the effectiveness of the Vapour Recovery Unit (VRU) consistent with the most current CGSB Standard for Vapour Control Systems in Gasoline Distribution Networks (CAN/CGSB-3.1000-2013). The results should include the outlet concentration, including mg/L of fuel transferred and vapour recovery efficiency. A detailed log of the type and amount of fuel transferred during the testing period should also be included.</td>
<td>Total Volatile Organic Compounds</td>
<td>EPA Test Method 25A</td>
<td>Monitoring - Other</td>
</tr>
</tbody>
</table>

Issued: November 30, 1992
Amended: March 15, 2018

R.H. (Ray) Robb, P. Eng.
District Director

Permit GVA0117
<table>
<thead>
<tr>
<th>EMISSION SOURCE</th>
<th>INITIAL DUE DATE</th>
<th>SUBSEQUENT DUE DATES</th>
<th>REQUIREMENT</th>
<th>PARAMETER(S)</th>
<th>TEST METHOD</th>
<th>REPORT TYPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>19R</td>
<td>April 30, 2018</td>
<td>N/A</td>
<td>Submit a written report in a format acceptable to the District Director, detailing the particulate matter (mg/m³) and emission rates (kg/h and kg/d) in the stack downstream of the FCC regenerator and the waste heat boiler (WHB). This report shall include the following data for the period that the stack sampling is conducted: 1. Type and processing rate of refinery feedstock. 2. Firing rate of WHB. 3. FCC feed rate. 4. Average CEM opacity reading for the period that the particulate matter stack sampling is conducted.</td>
<td>Particulate Matter</td>
<td>EPA Test Method 5</td>
<td>Stack</td>
</tr>
</tbody>
</table>

Issued: November 30, 1992
Amended: March 15, 2018

R.H. (Ray) Robb, P. Eng.
District Director

Permit GVA0117
B. INFORMATION REPORTING REQUIREMENTS

The Permittee shall submit electronic reports containing the required information to the District Director by the dates specified below using a password enabled web based application provided by Metro Vancouver.

<table>
<thead>
<tr>
<th>EMISSION SOURCE</th>
<th>INITIAL DUE DATE</th>
<th>SUBSEQUENT DUE DATES</th>
<th>REQUIREMENT</th>
<th>REPORT TYPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>13R</td>
<td>April 30, 2018</td>
<td>Quarterly, on or before April 30, July 31, October 31 and January 31 of each year.</td>
<td>Flare</td>
<td>Information - Other</td>
</tr>
</tbody>
</table>

Submit a written report for the preceding calendar quarter detailing the average rate of discharge (m³/min) resulting from flare pilot operation and from flare base load operation. A detailed record shall be submitted of start-stop dates and times of any planned flaring activities, flaring events which result in visible smoke which is apparent for more than a 3-minute period and flaring events which result in hourly average flare flow (total of flow meters) of 50 m³/min or greater. The originating process unit(s), reason for flaring and description of materials flared shall be included.

In addition, each such venting and/or flaring event shall be reported to Metro Vancouver in advance if it is a planned event, or at the first available opportunity following the start of the event if it is the result of an unscheduled or emergency event.

Issued: November 30, 1992
Amended: March 15, 2018

R.H. (Ray) Robb, P. Eng.
District Director

Permit GVA0117
| 26R, 27R, 31T, 34T, 35T, 39T | March 31, 2018 | On or before March 31 for each subsequent year. | Tank Seals

The Canadian Council of Ministers of the Environment (CCME)’s Environmental Guidelines for Controlling Emissions of Volatile Organic Compounds from Aboveground Storage Tanks (PN1180) shall be adhered to for all applicable tanks unless otherwise stated in this permit. A written report of all inspections and gap measurements taken, in the previous calendar year, in accordance with the above guideline must be submitted annually.

With respect to Appendix D.4.2 of the CCME guideline, the following alternative inspection plan is prescribed:
Following a second gas reading which is still below 20% LFL but substantially above the baseline, monitoring should continue and an inspection should be conducted at the first reasonable opportunity. A specified schedule for inspections must be submitted to the District Director for approval within 10 days.

With respect to Part 4, Section 4.3.5 in the CCME guideline: If the permittee cannot complete repairs or replacement of equipment within the specified times, alternative repair or replacement plans and a work schedule must be submitted to the District Director within 30 days of the inspection date.

Notes: Gap measurements are not required for out of service tanks or tanks which contain materials with a vapour pressure less than 10 kPa. A floating roof tank with a dome is treated equivalent to an ‘Internal floating roof’ as described in the CCME guideline.

Issued: November 30, 1992
Amended: March 15, 2018

R.H. (Ray) Robb, P. Eng.
District Director

Permit GVA0117
<table>
<thead>
<tr>
<th>19R, 22R</th>
<th>April 30, 2018</th>
<th>Quarterly, on or before April 30, July 31, October 31 and January 31 of each year.</th>
<th>CEMs Performance Evaluation</th>
<th>Information - Other</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Submit a written report of the preceding calendar quarter detailing the results of the CEMs performance evaluations in accordance with the most currently approved QA/QC protocols. The report shall include, where applicable:</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1. Periods, magnitudes and causes of exceedances of permit limit restrictions;</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2. Systems and analyzer availability;</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3. Summary of daily drift of the analyzer using a control chart format;</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>4. Cylinder gas test results;</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>5. Results of any relative accuracy and bias test conducted through the quarter;</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>6. Summary of all corrective actions taken when the CEMS or analyzer(s) was found to be out of control;</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>7. System evaluation findings, observations and recommendations;</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>22R</th>
<th>April 30, 2018</th>
<th>Quarterly, on or before April 30, July 31, October 31 and January 31 of each year.</th>
<th>SRU Performance</th>
<th>Information - Other</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Submit a written report for the preceding calendar quarter detailing, by sampling or calculation procedures approved by the District Director, the following data:</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1. The average percent sulphur recovery efficiency;</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2. Log of SRU incinerator bypass times, dates, duration, reason for the shutdown, actions taken to resolve any problems, together with the estimated tonnes of SO₂ discharged for each shutdown;</td>
<td></td>
</tr>
</tbody>
</table>
| | | | 3. Total tonnes of sulphur emitted in the tail gas. SRU efficiency shall be calculated as follows: [% SRU efficiency = (sulphur recovered + sulphur

Issued: November 30, 1992
Amended: March 15, 2018

R.H. (Ray) Robb, P. Eng.
District Director

Permit GVA0117
### METRO VANCOUVER REGIONAL DISTRICT AIR QUALITY MANAGEMENT PERMIT

<table>
<thead>
<tr>
<th>Accumulated Sulphur</th>
<th>Calculations</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \text{sulphur accumulated} = \text{sulphur in pit at end of quarter} - \text{sulphur in pit at beginning of quarter} )</td>
<td></td>
</tr>
<tr>
<td>Note. All measurements are in tonnes.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>34T, 35T, 39T, 40T</th>
<th>March 31, 2018</th>
<th>Every 6 months from the initial due date, on or before the last day of each 6-month period.</th>
<th>Tank Seal Upgrade</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Written progress reports on the status of the program for upgrading the seals on existing tank seals, removal of old tanks and construction of new tanks described in Section 1 of this permit. Each report shall summarize all actions taken and planned for the tanks.</td>
<td>Information - Other</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>13R</th>
<th>March 31, 2018</th>
<th>On or before March 31 for each subsequent year.</th>
<th>Flare Flow Verification</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Submit a written report describing the flow verification program at the refinery with a summary of the results of measurements and actions taken. The annual flow verification program shall be conducted by an independent consultant in accordance with vendor specified procedures. Alternatively, the flow verification program can be conducted by the permittee based upon the acceptance of flow verification and reporting procedures, by the District Director.</td>
<td>Information - Other</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>19R, 22R</th>
<th>October 31, 2018</th>
<th>On or before October 31 for each subsequent year.</th>
<th>CEMs Audit</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Submit a written report prepared by a fully independent qualified auditor, for the preceding 12-month period from July 1 to June 30 which shall include:</td>
<td>Information - Other</td>
</tr>
</tbody>
</table>

---

**Issued:** November 30, 1992  
**Amended:** March 15, 2018  
R.H. (Ray) Robb, P. Eng.  
District Director

Permit GVA0117

---

Page 32 of 46
1. Review of the CEMS operation and other associated records and reports to determine if the procedures in the approved QA/QC manual are being followed;
2. Note any changes in the system or procedures since the last yearly evaluation and ensure that these have been included in the QA/QC manual;
3. Include any recommendations for improvements in the CEMS QA/QC protocols.

### LDAR

Submit a written report describing the LDAR program with a summary of the results of measurements and actions taken, in the previous calendar year, in accordance with the CCME guideline described below. Raw data supporting the above submission shall be made available upon request from Metro Vancouver Staff and must be maintained for a minimum of three years. The Canadian Council of Ministers of the Environment (CCME) “Environmental Code of Practice for the Measurement and Control of Fugitive VOC Emissions from Equipment Leaks (October 1993, CCME-EPC-73E)”, shall be adhered to for all applicable equipment. Exceptions to the CCME requirements are as follows:

1. Annual flange leak testing is required on a statistically representative number of flanges throughout the facility.
2. Repair of leaks shall be completed within 90 days, unless a plant shutdown is required. All leaks that require more than 15 days to repair must be reported in writing to the District Director within 21 days of leak detection.
3. A leak in this permit is defined as the detection of a VOC concentration of 1,000 ppmv or more at the emissions source using the measurement protocol of Appendix F of the CCME “Environmental Code of Practice for the

---

**Issued:** November 30, 1992  
**Amended:** March 15, 2018  

R.H. (Ray) Robb, P. Eng.  
District Director  

Permit GVA0117

Page 33 of 46

### Marine Vessel Loading

- Submit a written report summarizing the quantity and types of products loaded to marine vessels with and without the use of the vapour recovery system described in Emission Source 41T. The report shall also provide a listing of the marine vessels using the loading dock which are not equipped to connect a vapour recovery line. A summary of progress regarding the operator’s plans to equip their vessels with vapour recovery line fittings, must also be included.

### Crude Evaluation

- Submit a written report for the preceding calendar quarter containing the following data:
  1. Crude processed (m³, tonnes, average bbl/operating day);
  2. Crude sulphur content (% maximum, % average, tonnes);
  3. Product sulphur content (tonnes);
  4. Sulphur recovered (tonnes);
  5. Calculated discharge of sulphur (tonnes).

### Fuel Combustion

- Submit a written report for the preceding calendar quarter, containing the following:

---

**Issued:** November 30, 1992  
**Amended:** March 15, 2018

Permit GVA0117
1. Weekly sampling and analysis results for hydrogen sulphide concentration (mg/m³) in the fuel gas fired at furnace F6204;
2. Calculated SO₂ discharged (tonnes) resulting from all fuel combustion sources. Calculations shall be based on weekly hydrogen sulphide gas test results modified to reflect total sulphur and based on a ratio established between hydrogen sulphide and total sulphur in the fuel gas;
3. Natural gas consumption (m³);
4. Refinery fuel gas consumption (m³);
5. Details of fuel oil firing, including start/stop dates, quantity burned (tonnes) and percent sulphur content.

<table>
<thead>
<tr>
<th>Facility</th>
<th>April 30, 2018</th>
<th>Quarterly, on or before April 30, July 31, October 31 and January 31 of each year.</th>
</tr>
</thead>
</table>

### Planned Shutdown Schedule

Submit a written report listing the planned shutdown schedule for major process units for the next 3-month period. Any changes in the submitted schedules must be reported in writing at the first available opportunity.

### SO₂ Curtailment Event Reporting

Any SO₂ Curtailment Event, as defined for Emission Source 19R in Works and Procedures, shall be reported to Metro Vancouver at the first available opportunity. In addition, a written report shall be submitted to the District Director at 3 month intervals for the preceding calendar quarter. The report shall include:

1. Periods of time when the ambient SO₂ levels exceeded 0.19 ppm 10-min rolling average, 0.07 ppm 1-hour average;
2. FCC sulphur-scavenging catalyst controller set points;

Issued: November 30, 1992
Amended: March 15, 2018

Permit GVA0117
<table>
<thead>
<tr>
<th>Facility</th>
<th>Month, Year</th>
<th>Due Date</th>
<th>Section</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facility</td>
<td>March 31, 2018</td>
<td>On or before March 31 for each subsequent year.</td>
<td>External Utility Reliability</td>
<td>Submit a written report detailing steps taken or proposed, both internally and with external utility providers, to increase the reliability of utilities.</td>
</tr>
<tr>
<td>Facility</td>
<td>March 31, 2018</td>
<td>On or before March 31 for each subsequent year.</td>
<td>Fugitive VOC Losses</td>
<td>Submit a written report detailing hydrocarbon losses, based on the previous calendar year, from storage tanks, tank truck loading, marine vessel loading, waste water treatment facilities, sludge treatment beds and fugitive emissions losses from equipment leaks. Calculations shall be based on Emission Factors using the most recent version of the US EPA Storage Tank Emissions Calculations in the 'Tanks' Software or equivalent. All data inputs to the equations shall be reported including storage tank capacity, material stored and the annual throughput for each tank and loading operations.</td>
</tr>
<tr>
<td>Facility</td>
<td>May 31, 2018</td>
<td>N/A</td>
<td>Dispersion Model</td>
<td>Submit a written report on the results of dispersion modelling conducted in accordance with dispersion modelling methodology approved by Metro Vancouver in 2018. The report shall include dispersion modelling results for: a. One-hour and annual sulphur dioxide,</td>
</tr>
</tbody>
</table>
b. 24-hour and annual fine particulate matter (PM$_{2.5}$),
c. 24-hour and annual inhalable particulate matter (PM$_{10}$), and
d. One-hour and annual nitrogen dioxide.

The following scenarios shall be modelled:

a. Permitted emission limits and
b. Operational upset resulting in all sour gas being re-routed from the SRU to the refinery flare
c. SRU start-up and heat-soak (SO$_2$ Limit of 10,000 mg/m$^3$), and
d. Fuel-oil firing of Emission Source 11R and Emission Source 30R (NO$_x$ limit of 150 mg/m$^3$).

**Ambient Air Quality Monitoring Plan**

Submit for written approval by the District Director an ambient air quality monitoring plan that includes:

a. at least one ambient monitoring station location on the North Shore for continuous monitoring of sulphur dioxide, PM$_{10}$ and PM$_{2.5}$, as well as representative wind speed and direction,
b. continuous monitoring of representative wind speed and direction at one location within the plant boundary and at as
many locations outside the plant boundary as needed to support representative CALMET modelling,

c. continuous on-line access to real-time data by Metro Vancouver and ability to download historical data

If the dispersion modelling report due May 31, 2018 indicates the potential for exceedances of the nitrogen dioxide CAAQS then the ambient monitoring station(s) shall also include continuous monitoring of nitrogen dioxide.

Proposed instrumentation should be specified in the monitoring plan. Factors to consider for instrument selection include: the use of instruments certified by the US EPA as Federal Equivalent Methods (FEM) or comparable monitoring equipment; the National Air Pollution Surveillance program's (Environment and Climate Change Canada) guidance on air monitoring (i.e. performance specifications); comparability to instruments used in the Metro Vancouver air quality monitoring network; and the US EPA guidance documents for ambient air measurement systems.

The plans should have a section on the proposed quality assurance program that includes: schedule of routine operations and maintenance, verification and calibration, validation, format of the proposed quarterly Calibration and Quality Control report, and a sample of the proposed website layout. A detailed discussion of why the site(s) selected are suitable for monitoring should also be included.

The first ambient monitoring station shall be installed and operational by December 31, 2018.
Facility | July 31, 2018 | N/A | Technology Scoping Plan
--- | --- | --- | ---
The permittee shall submit a Technology Scoping plan to the District Director, for review and written approval, for assessing control technologies that will substantially reduce SO₂ and Particulate Matter (Total, PM₁₀ and PM₂.₅) emissions from permitted sources. If the dispersion modelling report due May 31, 2018 indicates the potential for exceedances of the nitrogen dioxide CAAQS then control technologies that will substantially reduce emissions of nitrogen oxides shall also be included in this plan.

The plan should include but not be limited to the methodologies that will be used to:

- Identify potential control technologies,
- Quantify emission reductions,
- Identify environmental and community impacts,
- Quantify capital and operating costs,
- Assess the feasibility of implementation,
- Rank the potential control technologies.

A qualified professional with demonstrable experience in refinery emission control technologies shall prepare the plan. If it is proposed that internal staff prepare the report, then the plan shall propose an independent third-party peer reviewer and provide their credentials and experience.

Issued: November 30, 1992
Amended: March 15, 2018

Permit GVA0117

Page 39 of 46
### Technology Scoping Report

The permittee shall submit a written Technology Scoping report to the District Director as per the approved Technology Scoping plan. The report shall recommend the subset of technologies that will be the subject of the Refined Technology Assessment for review and written approval by the District Director.

A qualified professional with demonstrable experience in refinery emission control technologies shall prepare the report. If internal staff prepare the report, then the report shall be peer reviewed by an independent third party approved by the District Director.

### Dispersion Modelling Plan

The permittee shall submit a written dispersion modelling plan for modelling to be conducted in support of the Refined Technology Assessment using the latest version of the Metro Vancouver model plan template. The plan shall include up-to-date meteorological and emission information. The plan shall explain deviations from the methodology approved by Metro Vancouver on January 26, 2018.

### Refined Technology Assessment Plan

The permittee shall submit a Refined Technology Assessment plan to the District Director, for review and written approval. The plan should include but not be limited to:
The permittee shall submit a written Refined Technology Assessment report to the District Director as per the approved Refined Technology Assessment plan. The report should include but not be limited to:

- Proposed preferred emission control technology option,
- Refined capital and operating costs,
- Updated dispersion modelling results,
- Proposed emission limits based on implementing the preferred technology, and
- Implementation schedule.

Facility | January 31, 2020 | N/A
---|---|---

Information - Other

**Refined Technology Assessment Report**

The permittee shall submit a written Refined Technology Assessment report to the District Director as per the approved Refined Technology Assessment plan. The report should include but not be limited to:

- Proposed preferred emission control technology option,
- Refined capital and operating costs,
- Updated dispersion modelling results,
- Proposed emission limits based on implementing the preferred technology, and
- Implementation schedule.

**Odour and Air Quality Complaint Management Plan**

The Odour and Air Quality Complaint Management Plan (the Plan) for the Parkland refinery and tank farm operations, shall be reviewed and updated annually for approval by the District Director. The Plan shall identify:

Issued: November 30, 1992
Amended: March 15, 2018

R.H. (Ray) Robb, P. Eng.
District Director

Permit GVA0117
- potential odour sources;
- mitigation measures including:
  - odour control works,
  - operating procedures, and
  - staff training;
- episodic odour complaint protocols; and
- triggers for community monitoring.

The Plan shall include an annual performance evaluation and additional measures, taken or proposed, of continual improvement for odour management at the facility.

<table>
<thead>
<tr>
<th>19R</th>
<th>December 01, 2018</th>
<th>N/A</th>
<th>Interim Solutions Report</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Written Interim Solutions Report detailing a technical evaluation of the measures that are currently used or may be proposed to reduce emissions of SO₂, PM and NOₓ, using the refinery’s existing infrastructure, from 2019 to 2025 for written approval by the District Director. This includes the performance of current catalysts used that have any SOₓ emission reduction capabilities. The evaluation should include a schedule of implementation of the emission reduction measures and identify those measures, including standard operating practices, that may be used to ensure the optimization of emission reduction performance.</td>
</tr>
</tbody>
</table>

Issued: November 30, 1992
Amended: March 15, 2018

R.H. (Ray) Robb, P. Eng.
District Director

Permit GVA0117

Page 42 of 46
<table>
<thead>
<tr>
<th>Metcno</th>
<th>March 01, 2018</th>
<th>N/A</th>
<th>Metals Analysis Test Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facility</td>
<td>March 31, 2018</td>
<td>On or before March 31 for each subsequent year.</td>
<td>Odour and Air Quality Complaint Management Plan Performance Review</td>
</tr>
<tr>
<td>19R, 22R</td>
<td>March 15, 2018</td>
<td>N/A</td>
<td>Emission Quality Limit Exceedance</td>
</tr>
</tbody>
</table>

**Metals Analysis Test Plan**

A written sampling test plan for the analysis of metals, including proposed methodologies, shall be submitted for written approval by Metro Vancouver prior to commencing particulate and metal sampling.

**Odour and Air Quality Complaint Management Plan Performance Review**

Written report detailing annual performance review of Odour and Air Quality Complaint Management Plan. This shall include a summary of all air quality complaints received by the facility from public or agencies during the previous calendar year which includes odour, dust, visible emissions and particulate fallout.

The annual report should also include an analysis of the complaints attributed to the facility, which includes the complaint type, location and source. Analysis should include complaint trends or patterns together with actions taken or proposed to address a source of complaints. Any changes to authorized works and procedures resulting from the air quality complaint analysis should also be identified.

**Emission Quality Limit Exceedance**

Any exceedance of a one-hour average Emission Quality Limit stipulated in Section 1 shall be reported to Metro Vancouver at the first available opportunity. In addition, a written report shall be submitted to the District Director within 5 working days (defined as Monday to Friday, statutory holidays excluded) of the exceedance. This report shall include the following:

---

**Issued:** November 30, 1992  
**Amended:** March 15, 2018  

R.H. (Ray) Robb, P. Eng.  
District Director
1. Incident details and remedial action taken or proposed;
2. For Metro Vancouver ambient air monitoring network stations T4, T6, T23, T24, and other air monitoring stations approved by the District Director, report the number of hourly periods, spanning 4 hours after the CEMS exceedance, where there was:
   a. An exceedance of a Metro Vancouver ambient air quality objective for SO$_2$, TRS, NO$_2$, PM$_{2.5}$ or PM$_{10}$ (as applicable); and/or
   b. An exceedance of a 0.19 ppm SO$_2$ 10-min rolling average.
3. If there is an exceedance identified in 2 above, a summary of ambient air monitoring data shall include the following data for a period of 3 hours before and 4 hours after the exceedance from the stations listed above:
   a. 10-min rolling average concentrations for SO$_2$;
   b. 1-hour average concentrations for SO$_2$, TRS, NO$_2$, PM$_{2.5}$ or PM$_{10}$; and
   c. 1-hour average wind speed and direction.

C. AMENDED OR ADDITIONAL REQUIREMENTS

Based on the results of the monitoring program, including the stack sampling results or any other information, the District Director may:

1. Amend the monitoring and reporting requirement of any of the information required by this Permit including plans, programs and studies.
2. Require additional investigations, tests, surveys or studies.

Issued: November 30, 1992
Amended: March 15, 2018

R.H. (Ray) Robb, P. Eng.
District Director

Permit GVA0117
SECTION 4 – SITE PLAN

LEGAL DESCRIPTION OF DISCHARGE SITE: Block G, District Lot 187, Group 1 and Block 34, District Lot 187 and Block A, District Lot 188, Plan 16649, New Westminster District

The following site plan is not to scale and the locations of the discharge points are approximate.

Tank Farm (Area 1)

Issued: November 30, 1992
Amended: March 15, 2018

R.H. (Ray) Robb, P. Eng.
District Director

Permit GVA0117
LEGAL DESCRIPTION OF DISCHARGE SITE: Block F, Plan 13496, District Lot 188/189, Group 1, New Westminster Group 1 Land District, Except Plan RP 13504 (PCL 3) & RP13238 (PCL 1) & B/L A37751 & 49497, Refinery Area 2 6239-0691 5804-0588 9999-5286 0250-5620

The following site plan is not to scale and the locations of the discharge points are approximate.